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HOUSTON ORALS

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HO1 NOCEBO EFFECTS IN ADOLESCENT ORTHODONTIC CARE: DO PARENTAL EXPERIENCE AND EXPECTATIONS SHAPE CHILD PATIENT OUTCOME

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AIM: The nocebo effect is characterized by the negative outcomes of treatment, which arises from factors such as negative expectations, the dynamics of the patient-clinician relationship, and various contextual elements. It is the negative counterpart to the placebo effect. The objective of this study is to investigate the association between pediatric patients' experiences and outcomes during the commencement of orthodontic treatment and the influence of their parents' past orthodontic treatments and perceptions of dental care. Specifically, we seek to understand how parental experiences and attitudes may affect a child's experience of pain at the start of orthodontic interventions.
METHODS: Seventy consecutive orthodontic patients aged 12 to 18 years were included. Parents' prior orthodontic experiences, general perceptions of dental care, and expectations of pain towards the anticipated treatment were assessed through questionnaires completed by the parents. Child participants completed the Pain Catastrophizing Scale (PCS) and the Spielberger State Trait Anxiety Inventory for children (STAIC) before bonding of orthodontic fixed appliance. Follow-up questionnaires 3-5 days after, assessed pain perception, medication use, and oral health impact.
RESULTS: Patients with parents having orthodontic self-experience reported a significantly greater consumption of painkillers (69.23%). Parental general perception of dental care, specifically when associated with notable pain or discomfort correlated with significantly higher STAIC-C2 scores and Pain Catastrophizing. Regression analyses demonstrated that parental perceptions influenced patient pain experiences and consumption on painkillers. Parental expectations of pain during orthodontic treatment did not significantly impact children's pain experience, but a trend was observed in the Oral Health Impact Profile (OHIP-14).
CONCLUSIONS: The present study provides evidence to suggest a nocebo effect by proxy in orthodontics as parents' previous orthodontic experiences and overall perceptions of dental care may significantly impact their children's pain experiences during orthodontic treatment and consumption of painkillers. The study emphasizes the need for clinicians to address parental perceptions to mitigate the by proxy nocebo effect in orthodontic practices, ultimately improving the overall treatment experience for children and adolescents.

Abstract citation ID: cjae081.002
HO2 COMPOSITE ATTACHMENTS: SURFACE ALTERATIONS AND COMPOUND RELEASE DURING ORTHODONTIC TREATMENT WITH ALIGNERS IN AN IN-VITRO MODEL

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BACKGROUND/AIM: The use of resin composite attachments is indicated to facilitate precise tooth movement during orthodontic treatment with aligners. Abrasive wear and changes in the surface morphology of the composite attachments is observed, raising concerns about the safety of the composite compounds released in the oral environment. The aim of the present study was to assess any alterations in morphology, roughness and composition of the surfaces of a conventional and a flowable composite attachment engaged with aligners, and to further evaluate the release of resin monomers and their derivatives in an aqueous environment.
METHODS: Zirconia frames (n=20) and corresponding thermoformed PET-G aligners with bonded attachments comprising two different composite materials (universal composite, C and low shrinkage universal flowable composite, F) were immersed in 50 mL of distilled water at 37oC. Aligners were removed and re-seated to the zirconia frames 4 times per day for a 7-day immersion period. Morphological features, roughness and determination of compounds released by targeted (for BPA, Bis-GMA, UDMA, DCDMA, 2-HEMA, TEGDMA) and untargeted (for unknown hydrolyzates) LC-MS analysis were assessed.
RESULTS: Abrasion-induced defects were found on attachment surfaces such as scratches, marginal defects with cracks or rounding at the edges, loss of surface texturing and fractures. Comparisons between the two tested groups revealed very scarce evidence for a significantly lower Sds value in C ($p=0.05$). A statistically significant difference was confirmed for compound release between day 1 and day 7 ($p<0.004$ for all) in both materials tested, except for DCDMA in C ($p=0.09$). No statistically significant difference was detected for any of the compounds when C was compared with F in both timeframes ($p>0.05$). Several derivatization products of TEGDMA and Bis-GMA were probed at day 7, with a strong reduction in the concentration of the native compounds.
LIMITATIONS: Only early- stage alterations in the bonded attachments were examined in a simulated environment, thus not precluding the presence of additional effects during aligner treatment.
CONCLUSIONS: The present in vitro study highlights the role of aligners in the degradation rate of composite attachments intraorally, which necessitates further investigation.

Abstract citation ID: cjae081.003
HO3 CORRELATION OF SHORT-TO LONG-TERM RELAPSE: A 3D SUPERIMPOSITIONAL ANALYSIS 2 YEARS POST-TREATMENT

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OBJECTIVES: To quantify upper tooth movements after two years in retention and correlate them to the short-term relapse movements of the first week after debonding.
MATERIALS AND METHODS: This was a prospective longitudinal clinical follow-up study. The sample comprised 22 patients (9 males, 13 females). Digital dental casts were acquired at the end of treatment (T1), 1 week after bracket removal without the use of any retention appliances (T2), and 2 years post-treatment (T3). During the 2-year post-treatment period the only retention appliance in the maxillary arch was a Hawley device. The digital casts were superimposed on structures of the hard palate mucosa. Translation and rotation of the first molars, canines and central incisors were measured between time points. Spearman's correlation coefficient was computed to test for correlations of tooth movements between the (T1-T2) and (T1-T3) periods.

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RESULTS: Relapse was detected and significant correlations were documented between the two time periods. For both first molars, a positive correlation was found in tipping (r=0.62, P=0.002; r=0.40, P=0.068) and anteroposterior translation (r=0.82, P<0.000; r=0.41, P=0.056). Additionally, for the left first molar, torque (r=0.58, P=0.004) and rotation (r=0.48, P=0.023) were also correlated between the time periods. For the canines, the only observed pattern of correlation was rotation around the long axis (r=0.58, P=0.008) for the left side. For the central incisors (right, left), positive correlation patterns involved translation in the antero-posterior direction (r= 0.53, P=0.011; r=0.57, P=0.006); the left incisors also exhibited positive correlation patterns in tipping (r=0.44, P=0.041).
CONCLUSIONS: Significant correlation patterns were observed between the two time periods, indicating a short- and long-term relapse association, even with the use of a Hawley retention appliance. The reported correlations may guide clinicians to the design of individualized retention schemes based on the short-term relapse observations.

ORAL PRESENTATIONS

Abstract citation ID: cjae081.004
OP1 THREE-DIMENSIONAL VIRTUAL PLANNING ACCURACY OF ORTHOGNATIC SURGERY IN CLASS III PATIENTS TREATED WITH ORTHODONTIC CLEAR ALIGNERS: A CONTROLLED CLINICAL TRIAL

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BACKGROUND: The demand for orthodontic treatments using clear aligners (CA) for various types of malocclusions has increased, including orthosurgical cases. Due to the lack of high certainty evidence regarding the quality of surgery cases treated with CA, there is considerable skepticism among orthodontists and surgeons concerning the reliability of this treatment approach. The main concern is that this technique does not offer the same precision during the surgical procedure.
OBJECTIVES/AIMS: The aim of this prospective clinical study was to evaluate whether the utilization of CA (Invisalign® System) impacts the precision of surgical planning in patients undergoing the surgery-first approach (SFA), comparing them with patients who underwent the same surgical procedure but used conventional fixed appliances (FA).
MATERIALS/METHODS: Fourteen patients (7 in each group), averaging 23 years of age, were enrolled. Cone beam computed tomography (CBCT) scans, used for diagnosis, planning, and postoperative monitoring, were obtained both before (T0) and one month after surgery (T1) in patients with Class III malocclusion undergoing the SFA (LeFort I osteotomy, bilateral sagittal split osteotomy, and genioplasty). The virtual surgical planning was executed utilizing Dolphin Imaging® software. Accuracy analysis was conducted using 3D Slicer 5.6.1 software, comparing the virtual and postsurgical. Data quantification was achieved through the tridimensional translational displacement (3-axis) by overlaying three-dimensional models of the maxilla and mandible generated from CBCT.
RESULTS: Between the achieved and idealized results in both sagittal and transverse directions for the right and left sides, respectively, the CA group showed a mean difference of 0.98±0.96, 0.68±0.66, and 0.95±0.65mm for maxilla and 1.38±0.72, 0.97±0.60, and 1±0.56mm for mandible. The FA group displayed an average discrepancy of 1.13±0.87, 0.63±0.61, and 1.63±0.79mm for maxilla and 1.27±0.71, 0.98±0.51, and 0.62±0.58mm for mandible. Considering a clinical relevance threshold of 2mm, there were no significant differences. The accuracy between the two groups did not show any significant differences maxilla (p=0.73, p=0.91, p=0.11) or mandible (p=0.79, p=0.97, p=0.24).
CONCLUSIONS/IMPLICATIONS: It is concluded that the use of orthodontic clear aligners does not compromise the accuracy of surgical planning to determine the positioning of maxillary and mandibular segments in patients undergoing the SFA.

Abstract citation ID: cjae081.005
OP2 WHAT FACTORS AFFECT PATIENT ANXIETY BEFORE ORTHOGNATHIC SURGERY?

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BACKGROUND AND AIM: Increased pre-surgical anxiety may have adverse implications on the patient experience, therefore this study aimed to identify factors that influenced anxiety in the approach to orthognathic surgery.
SUBJECTS AND METHODS: A prospective interview-based study including 28 orthognathic patients from 3 orthognathic centres in the UK. One-to-one semi-structured interviews were conducted within the 8 weeks prior to surgery. Interviews explored how participants felt in the approach to surgery, with a focus on aspects relating to anxiety. The data was analysed thematically, exploring common themes and subthemes in relation to pre-operative anxiety.
RESULTS: Thematic framework analysis revealed 8 major themes. The first theme, time, described how the proximity to surgery and the transience of potential side effects affected anxiety. The second theme discussed the influence of having a sense of control and how that may affect anxiety. This also related to creating a balance between establishing some control where feasible and relinquishing control to the clinical team. The third theme focused on fear relating to the surgery and the element of 'the unknown'. The fourth described the benefits of trust between patients and the clinical team in reducing anxiety. The fifth theme focused on information and its delivery, which patients considered important for managing uncertainty. The sixth theme centred on expectations about the surgery, including risks and outcomes, and the patient's ability to cope with this. The seventh related to coping styles and described different forms of coping that were considered effective in reducing anxiety. The final theme focused on aspects of support that were important for alleviating anxiety, including the relief of responsibilities and reassurance by their support network. Recommendations for consideration by clinicians were made based on the results of this study.
LIMITATIONS: Participants were recruited from 3 units which were all public hospitals. This may limit the generalisability of the findings to other settings.
CONCLUSIONS: The results highlight the multifactorial nature of pre-operative anxiety and the important role of the clinical team in creating a supportive environment to help reduce patient anxiety.

Abstract citation ID: cjae081.006
OP3 FACIAL AESTHETIC ASSESSMENT OF SKELETAL CLASS III PATIENTS TREATED WITH THE SURGERY-FIRST APPROACH

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BACKGROUND/OBJECTIVES/AIMS: Surgery-first approach (SFA) has been increasingly used, mainly, in class III patients as it offers shorter treatment time and better quality of life by avoiding worsening aesthetics during orthodontic preparation. Although, SFA still faces resistance from orthodontic and surgical professionals on the suggestion that they do not offer the ideal treatment result. Deficiency in scientific evidence in the assessment of facial aesthetic results comparing SFA and conventional surgery approach (CSA) still exist. There is no consensus if one of these techniques clearly provides better results than each other, or furthermore, whether there is any difference in facial attractiveness at the end of the treatments. Therefore, this retrospective study aimed to evaluate aesthetic perception in patients treated with CSA and SFA.
MATERIALS/METHODS: 34 patients were allocated into two groups of surgery protocol and each group were matched according to skeletal discrepancy. The evaluators were divided into three categories (n=23 each): (1) oral and maxillofacial surgeons, (2) orthodontists and (3) laypeople. Profile images before surgery (T1) and after orthodontic-surgical treatment (T2) were analyzed using a 5-point Likert scale (1= very unpleasant; 2= unpleasant; 3= acceptable; 4= pleasant; and 5 = very pleasant). Then, participants answered the following question: "Which surgical technique was used? Conventional or Surgery-First? The kappa test and Spearman's correlation coefficient were used to estimate the correlation between variables (p<0.05), whereas the chi square test was used to assess the evaluators responses concerning the surgical technique.
RESULTS: A high and positive correlation (r=0.86; p<0.001) was demonstrated between surgeons and orthodontists and low between laypeople and the specialists (r=0.48; p=0.03 and r=0.55; p=0.01). Chi square test showed no statically significant results (p <0.05), assuming that regardless of the level of expertise of the evaluators, it was not possible to differentiate the surgical technique used.
CONCLUSIONS/IMPLICATIONS: This study demonstrated that orthognathic surgical technique did not influence the facial aesthetic perception of skeletal Class III patients.

Abstract citation ID: cjae081.007
OP4 UTILITY OF MAGNETIC RESONANCE IMAGING IN ORTHODONTIC DIAGNOSIS AND TREATMENT PLANNING: A SYSTEMATIC REVIEW AND META-ANALYSIS

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BACKGROUND: MRI is a non-ionizing imaging technique, its use in dentistry could lower the general radiation dose to the examined population, if MRI can replace several radiation-based images. There have been recent developments of novel MRI imaging modalities for 3D and 2D Cephalometrics for orthodontic diagnosis.
OBJECTIVES: The systematic review aimed to find the diagnostic accuracy and reliability of MRI in orthodontic diagnosis and treatment planning.
MATERIAL/METHODS: An electronic search was performed on 20th November 2022 in PubMed, LILACS, Web of Science, EMBASE, Scopus and Cochrane databases and the search was updated on 30th August 2023. Grey literature search was performed in Google Scholar and Open-Grey. The literature selection for this systematic review was carried out according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement and was based on predetermined inclusion criteria. Quality assessment for included studies was performed using 'Joanna Brigg's Critical Appraisal Tool for diagnostic test accuracy'. GRADE approach for non-randomized studies was used for the analysis of the strength of evidence. The protocol was registered in PROSPERO prior to commencement of study (CRD number: CRD42022377204).
RESULTS: Out of ten of the included studies, eight of them compared MRI with either CBCT or Lateral cephalogram and found high inter-rater and inter-rater agreement for landmark identification. The risk of bias was found to be high in four studies, moderate in three and low in three studies. There was lack of homogeneity among the included studies in terms of MRI imaging parameters and sample characteristics. This can be taken into consideration by future studies where uniformity in these parameters can be considered.
CONCLUSIONS/IMPLICATIONS: Despite dissimilarity and heterogeneity in the sample population and other methodological aspects, all the included studies concluded that there was considerable intra- and inter-examiner reliability of MRI and were comparable to current diagnostic standards in orthodontics and agreed upon its innovative potential in radiation free diagnosis and treatment planning in orthodontics in future.

Abstract citation ID: cjae081.008
OP5 EFFICACY OF MAXILLARY PROTRACTION USING SKELETAL ANCHORAGE - A SYSTEMATIC REVIEW AND META-ANALYSIS

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AIM: The aim of this systematic review and meta-analysis is to compare the effectiveness of 4 different bone-anchored maxillary protraction techniques; 1) Bone-anchored maxillary elastics (BAMP), 2) maxillary bone anchors combined with facemask (BAFM), 3) hybrid hyrax combined with facemask (HH-FM) and 4) hybrid hyrax combined with mandibular bone anchors (HH-BAMP) in cl.III patients.
MATERIALS/METHODS: The search was performed in four electronic databases: Pubmed, Embase, Scopus and Web of Science. In addition, the reference lists of eligible articles have been hand searched. Prospective and retrospective studies were selected, where at least four patients were included. The study has been registered at PROSPERO with registration number CRD42023380964.
The Oxford levels of evidence (OCEBM) were used to estimate the level of evidence in included studies.
Qualitative and quantitative information were extracted for each study including author, year of publication, study type, sample size, chronological age of patient group and controls, skeletal maturity stage, treatment duration, treatment modality, force magnitude and cephalometric measurements including sagittal jaw relations, Wits, maxillary length, mandibular length, gonial angle, vertical jaw relations, maxillary inclination, mandibular inclination and dental changes.
RESULTS: 653 articles were initially screened, 25 full-text articles satisfied the inclusion criteria including 6 randomized controlled trials. Comparing the four maxillary protraction protocols, SNA improved significantly more in group 4 compared to the other groups including group 1 (mean difference 1.9, 95% confidence interval [CI] 1.6-2.1; p <0.001).
Likewise did treatment with hybrid hyrax combined with mandibular bone anchors (group 4) yield the largest increase in maxillary length (Co-A) compared to treatment without rapid maxillary expansion (p <0.001). Treatment with facemask (group 2) seemed to increase the lingual inclination of the lower incisors (IMPA) while in the other groups, retroclination of the lower incisors were reduced on average.
CONCLUSION: The level of evidence in the selected articles ranged from low to moderate. The current evidence suggests that skeletally anchored rapid maxillary expansion combined with maxillary protraction with mandibular bone anchors yields the greatest maxillary advancement in cl.III patients.

Abstract citation ID: cjae081.009
OP6 WHAT IS THE IMPACT OF MINISCREW-ASSISTED RAPID PALATAL EXPANSION (MARPE) ON THE MIDFACIAL SOFT TISSUES? A PROSPECTIVE THREE-DIMENSIONAL STEREOPHOTOGRAMMETRY STUDY

Dr Aldin Kapetanović, Laura Krijt, Professor Stefaan Bergé, Dr Tong Xi, Professor Jan Schols; [1]*Radboudumc - Orthodontics & Craniofacial Biology*

OBJECTIVES: This study aims to evaluate the midfacial soft tissue changes of the face in late adolescent and adult patients treated with Miniscrew-Assisted Rapid Palatal Expansion (MARPE).
METHODS: Patients from the age of 16 onwards with transverse maxillary deficiency who were treated with MARPE were enrolled consecutively. 3D facial images and intra-oral scans (IOS) were obtained before expansion (T0), immediately after completion of expansion (T1), and 1 year after expansion (T2). The 3D images were superimposed and two 3D distance maps were generated to measure the midfacial soft tissue changes: immediate effects between timepoints T0 and T1 and overall effects between T0 and T2. Changes of the alar width were also measured and dental expansion was measured as the interpremolar width (IPW) on IOS.
RESULTS: Twenty-nine patients (22 women, 7 men, mean age 25.9 years) were enrolled. The soft tissue in the regions of the nose, left of philtrum, right of philtrum, and upper lip tubercle demonstrated a statistically significant anterior movement of 0.30 mm, 0.93 mm, 0.74 mm, and 0.81 mm, respectively ($p < 0.01$) immediately after expansion (T0–T1). These changes persisted as an overall effect (T0–T2). The alar width initially increased by 1.59 mm, and then decreased by 0.08 mm after 1 year, but this effect was not significant. The IPW increased by 4.58 mm and remained stable 1 year later. There was no significant correlation between the increase in IPW and alar width ($r = 0.35$, $p = 0.06$).
CONCLUSIONS: Our findings indicate that MARPE results in small, statistically significant, but clinically irrelevant changes of the soft tissue in the peri-oral regions. In the nasal region, alar with increase is potentially clinically important.
CLINICAL RELEVANCE: MARPE is an effective treatment modality to expand the maxilla, incurring minimal and mostly irrelevant changes to the midfacial soft tissues, with a potential exception of alar widening. It is recommendable to inform patients with a wide nose before treatment about this.

Abstract citation ID: cjae081.010
OP7 IMPACT OF ADENOTONSILLECTOMY AND RAPID MAXILLARY EXPANSION ON APNEA HYPONEA INDEX AND MINIMAL OXYGEN SATURATION VALUES IN A NON-OBESE PEDIATRIC OBSTRUCTIVE SLEEP APNEA: A CROSS-OVER RANDOMIZED CONTROLLED TRIAL

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BACKGROUND/AIM: Adenotonsillectomy (AT) and rapid maxillary expansion (RME) have been proposed to manage pediatric OSA. The aim was to determine best sequence and effectiveness based on intervention order in cases where both procedures are indicated, as these are unknown.
METHODS: Thirty-two children who presented with grade III/IV tonsillar hypertrophy and maxillary constriction participated in a cross-over randomized controlled trial. As the first intervention, one group underwent AT and the other RME. After six months, interventions were switched in those groups, but only for participants with a residual AHI > 1 after the first intervention. Polysomnography (PSG) was conducted before (T0), six months after the first treatment (T1), and then six months after the second treatment (T2). The influence of sex, tonsil and adenoid hypertrophy degree, initial AHI and MinSaO2 severity, intervention type and sequence were evaluated using a linear regression analysis. Intra- and inter-group comparisons for AHI and MinSaO2 were performed using repeated measures ANOVA and Tukey Post Hoc test.
RESULTS: Initial AHI severity and intervention sequence (AT first) explained 94.9% of AHI improvement. Despite the intervention sequence, AT caused more significant AHI improvements than RME. AT impact was more notable the more severe OSA. Only initial MinSaO2 severity accounted for 83.1% of MinSaO2 improvement changes. With either management option, not all the participants benefited from AHI's or MinSaO2's positive changes. Some had no changes, and negative outcomes were noted in some cases.

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LIMITATIONS: The absence of an untreated control group that could have been monitored for six months.
CONCLUSIONS/IMPLICATIONS: Initial AHI severity and AT as the first intervention accounted for most of the AHI improvement. Only the initial MinSaO2 severity accounted for the most changes in MinSaO2 increase. Most AHI reductions and MinSaO2 improvements were due to AT than RME intervention. In most cases, RME had a marginal effect on AHI and MinSaO2. The generalization of these results should be limited to non-obese children with mixed dentition, grade III or IV tonsillar hypertrophy, maxillary constriction and a relative normal anteroposterior maxillomandibular relationship. Results should not be generalized to all expanders or activation protocols in adolescents and adults.

Abstract citation ID: cjae081.011
OP8 POSTERIOR AIRWAY CHANGES DURING AND AFTER HERBST APPLIANCE TREATMENT

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AIM: Herbst appliance treatment has been shown to result in posterior airway space increase. However, the data in the literature show a large inter-individual variation and are based on rather small sample sizes. Therefore, the aim of the current study was to investigate posterior airway changes during as well as after Herbst and subsequent multibracket appliance treatment in Class II:1 patients, and to assess for possible influencing factors.
SUBJECTS AND METHODS: 503 former Class II:1 patients (overjet=7.8±2.4mm, ANB angle=5.0±2.1°) who had undergone Herbst plus subsequent multibracket appliance treatment for Class II correction at the age of 13.8±3.4 years at the Department for Orthodontics, University of Giessen, Germany. Lateral headfilms from before treatment (T0), after 24.9±9.2 months of treatment (T1) and 26.1±8.0 months after treatment (T2) were analysed for the changes of the distances p, t, pC2, pC3, pC4 as well as the size of the area between the hard palate and the epiglottis (PAS area). In addition, the following possible influencing pretreatment characteristics were evaluated: overjet, ANB angle, Wits appraisal, ML/NSL angle, ArGoGn angle, age and skeletal maturity.
RESULTS: On average, all distances p, t, pC2, pC3, pC4 increased between 6% and 19% during active treatment (T1-T0) and and showed further increase (1-7%) post-treatment (T2-T1). The PAS-area increased during active treatment (23%) and remained constant post-treatment (0%). For all variables a large inter-individual variation existed. With regard to possible influencing factors, no associations were found between any of the treatment (T1-T0) or post-treatment changes (T2-T1) and the assessed characteristics with the exception of skeletal maturity; the most favourable treatment and post-treatment posterior airway changes occurred when starting treatment early (pre-peak/peak).
CONCLUSION: Posterior airway space increases during Herbst plus subsequent multibracket appliance treatment. For none of the assessed variables, relapse was seen during the post-treatment observation period.

Abstract citation ID: cjae081.012
OP9 NASAL VOLUME, AIRFLOW AND RESISTANCE IN CHILDREN WITH LATERAL CROSSBITE, INCREASED OVERJET AND OVERBITE AND NORMAL OCCLUSION

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AIM: To evaluate the difference in nasal volume and function in Finnish children with normal occlusion, lateral crossbite, and increased overjet and overbite in the early mixed dentition stage.
MATERIALS AND METHODS: The study was conducted at the Dental Teaching Clinic of University of Eastern Finland, Kuopio, Finland. Ninety-six (47 boys, 49 girls) 6-8-year-old children were divided into three groups based on their occlusal traits. The functional lateral crossbite group (Group 1) included 35 children (mean age 7.8 years, SD 0.7) to be treated with a quad helix. The increased overjet and overbite group (Group 2) consisted of 31 children (mean age 8.0 years, SD 0.7) to be treated with a removable eruption guidance appliance. The control group (Group 3) consisted of 30 children (mean age 7.4 years, SD 0.8) with normal occlusion and no orthodontic treatment need. Mean nasal airflow, peak nasal inspiratory flow (PNIF), airway volume and resistance were measured before orthodontic treatment (Groups 1 and 2) and in association with the basic oral examination (Group 3) with PNIF -meter (Accuracy 10%), Acoustic Rhinometer (A1, S/W 559) and NR6 rhinomanometer (NR6, GM Instruments, UK). No nasal congestion was used. Normal distribution of the data was tested with the Shapiro-Wilk Test, followed by the Kruskal-Wallis Test for comparing the mean values between three groups and the Mann-Whitney U Test for comparing mean values between boys and girls (IBM SPSS, Version 27.0. Armonk, NY: IBM Corp).
RESULTS: A statistically significant difference was found between girls and boys in the PNIF measurements (U=841.500, p=0.023) where boys had on average higher values (60 l/min, SD 16.6) than girls (50 l/min, SD 12.2). However, there were no statistically significant differences between the study groups in PNIF, mean airflow, airway volume or resistance.
CONCLUSIONS: It is concluded that there were no differences in nasal breathing function between the children with different occlusal traits, however, the PNIF measurements were greater in boys than in girls. The ongoing study will reveal if orthodontic treatment with quad helix or eruption guidance leads to differences in the nasal volume and function between treatment groups or control group.

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OP10 STUDY OF THE RELATIONSHIP BETWEEN NOCTURNAL ENURESIS AND CHILDHOOD OBSTRUCTIVE SLEEP APNEA

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BACKGROUND: Obstructive sleep apnea (OSA) represents a significantly prevalent condition in the pediatric population, while nocturnal enuresis (NE) stands as a frequently clinical concern in children. Adenotonsillectomy is considered the first-line treatment.
AIM: Determine the prevalence of NE in children diagnosed with OSA, evaluate the impact of adenotonsillectomy and compare its prevalence and dentofacial features with children without respiratory sleep disorders.
MATERIALS AND METHODS: A prospective quasi-experimental study was conducted, enrolling children aged 2 to 12 years old. The sample was divided into three groups: children with NE and OSA (n=51), children without NE but with OSA (n=79), and children without respiratory problems as a control group (n=168). The presence of NE was considered when there was at least one bedwetting per month. Furthermore, intercanine and intermolar arch widths in all 3 groups were measured at T0 and T1. Polysomnography was performed in both experimental groups, through which the variable AHI was obtained. The Pediatric Sleep Questionnaire about the children's sleep, their breathing problems, and their behavioral disturbances was passed to the children's parents, both in the experimental group and the control group. These recordings were repeated one year after adenotonsillectomy. The Mann-Whitney test was employed to compare quantitative variables, and for categorical responses Chi-squared test.
RESULTS: The presence of NE in children with OSA was 39.2%, compared to 28% in the control group (p=0.04). Both OSA groups had narrower intercanine and intermolar widths compared to the control group (p=0.0126). The intercanine and intermolar widths were lower in the NE group than in OSA group without NE. Among children with OSA and NE, 49% showed a significant improvement in NE after adenotonsillectomy. There were no significant differences in the Apnea Index between the two OSA groups, although children with NE had higher indices.
CONCLUSIONS: Nocturnal enuresis is more prevalent in children with OSA than in children without. After adenotonsillectomy, NE improves in half of the operated children. Both arch widths in the experimental groups were narrower in comparison with the control group. Identifying and addressing OSA may, therefore, help improve NE symptoms, breathing and overall patient outcomes.

Abstract citation ID: cjae081.014
OP11 EFFECT OF MAXILLARY EXPANSION ON SLEEP, DAYTIME SLEEPINESS AND DENTAL ARCH- AND PALATAL DIMENSIONS IN CHILDREN WITH POSTERIOR CROSSBITE COMPARED TO CONTROLS

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AIMS: The objectives were to: 1) compare sleep, daytime sleepiness, dental arch- and palatal dimensions between a group of children with posterior crossbite

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before (T0) and after (T1) maxillary expansion with an expansion plate to a control group of healthy children with neutral occlusion (controls) and to 2) analyse changes in sleep, daytime sleepiness, dental arch- and palatal dimensions in a group of children with posterior crossbite before and after treatment with an expansion plate compared to changes in the controls (T0-T1).
SUBJECTS AND METHOD: Power calculation showed that 23 children should be included in each group. 42 children with posterior crossbite (28 girls, 14 boys, mean age 10.05, mean BMI 17.86kg/m2) and 32 healthy controls (16 girls, 16 boys, mean age 12.40, mean BMI 20.71kg/m2) were included. Sleep and daytime sleepiness were assessed using Berlin Questionnaire (BQ) and Epworth Sleepiness Scale (ESS). Occlusion, dental arch- and palatal dimensions were assessed according to standardized methods. In the crossbite group, the measurements were taken before and after treatment with an expansion plate (mean treatment time 7.2 months), and in the controls the measurements were taken twice correspondingly (mean interval 6.3 months). Statistical analysis was performed using linear and logistic regression adjusted for age, gender and BMI.
RESULTS: At T0 snoring (p=0.02) and daytime sleepiness (p=0.018) were significantly higher in the crossbite group compared to controls. Furthermore, the transverse dimensions at the gingival margin (p=0.007) and cusp tip (p=0.002, p=0.009) were significantly smaller in the crossbite group compared to controls. At T1 only the molar angulation (p=0.03) was significantly smaller in the crossbite group compared to controls indicating a buccal tipping of the molars during maxillary expansion.
The changes from T0 to T1 showed significant improvements in sleep (p=0.009), significant increase in the transverse dimensions (p=<0.001) and significant decrease in molar angulation (p=<0.001), corresponding to increased buccal tipping of the molars in the crossbite group compared to controls.
CONCLUSION: The findings of this study show that maxillary expansion with an expansion plate in children with posterior crossbite changes the transverse dimensions of the maxilla and improves sleep.

Abstract citation ID: cjae081.015
OP12 EFFECTS OF TWIN BLOCK APPLIANCE ON QUALITY OF LIFE IN OSA CHILDREN WITH CLASS II MALOCCLUSION AND MANDIBULAR RETROGNATHIA.

Dr Maen Zreaqat, Professor Rozita Hassan, Dr Sahal Alforaidi

BACKGROUND: Twin block has been proposed as a potential orthodontic oral appliance for the treatment of obstructive sleep apnea (OSA) in children with class II skeletal malocclusion. The literature shows that the impact of twin block appliance therapy on quality of life in children with OSA has not been assessed in any pediatric population. This study aimed to evaluate the impact of twin block appliance therapy on quality of life of pediatric OSA patients.
MATERIALS AND METHODS: This prospective longitudinal study included 47 growing children (29 boys and 18 girls) with polysomnography (PSG)-proven OSA and class II mandibular retrognathic skeletal malocclusion aged 8 to 12 years (mean age of 10.56 ±1.39 years), who were treated with a functional twin block appliance. Quality of life was assessed using the OSA-18 questionnaire, which was administered before appliance insertion and 30 days after the end of treatment. Additionally, a second standard overnight PSG was performed to determine changes in respiratory parameters.
RESULTS: The mean daily wear time of the twin block appliance was 13.48 ± 3.79 h/24 h. The mean preoperative and postoperative total scores were 81.55 (± 14.63) and 53.07 (± 10.07), respectively; this change was significant (P<0.001). All domain scores (before vs. after therapy) showed significant changes, except for physical suffering domain (P=0.075). At the end of the treatment, the apnea-hypopnea index score dropped significantly by 4.53 (74.0%) events/h (P<0.001).
LIMITATIONS: The major limitation of the current study was the lack of a control group; natural growth and development in this age group may have affected airway dimensions. Notably, some changes in the AHI can be attributed to the growth of the upper airway or regression of lymphoid tissues. Therefore, changes that would have occurred in the absence of any treatment are uncertain.
CONCLUSION: Functional twin block therapy has a positive impact on quality of life of children with OSA. Patients show significant improvements in respiratory parameters and parent-reported symptoms.

Abstract citation ID: cjae081.016
OP13 DENTO-SKELETAL EFFECTS OF RAPID MAXILLARY EXPANSION APPLIED ON SECOND TEMPORARY MOLARS VERSUS FIRST MAXILLARY PERMANENT MOLARS: A RANDOMIZED CLINICAL TRIAL

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INTRODUCTION: Transverse deficiency of the maxilla is a frequent malocclusion for which rapid maxillary expansion (RME) is the orthopedic key treatment. This treatment widens the maxilla by breaking the mid-palatal suture using a tooth-anchored maxillary expander (generally on the 1st permanent molars): this anchoring has undesirable side effects. Support on the temporary 2nd molars helps to offset these negative effects. The primary objective of this randomized controlled trial was to compare skeletal effects, and the secondary objective was to compare dento-alveolar effects obtained with a rapid maxillary expander anchored on permanent 1st molars (6) VS temporary 2nd molars (V).
MATERIAL AND METHODS: All patients, aged 6 to 12 years, coming for consultation at Montpellier Hospital University Orthodontics department, presenting a maxillary skeletal constriction with the presence of the 6s and Vs, were randomized and had a rapid maxillary expander anchored either on the 6s or on the Vs. The skeletal effect was assessed by the difference before/after expansion in the distance between the "right jugal" and "left jugal" cephalometric points of the Ricketts front analysis. The dento-alveolar effects were assessed on the study models by the difference before/after expansion of the inter-molar distance, the inter-cuspid distance and the inter-molar angle.
RESULTS: 20 patients were included, with 9 in the GrV group and 11 in the Gr6 group. The groups were initially comparable. No significant differences were demonstrated in skeletal expansion and expansion of canines. Expansion of permanent 1st molars was significantly higher in the Gr6 group, but this was largely due to buccal version. Finally, the inter-molar angle decreased significantly in the GrV group, by an average of 6.77°.
DISCUSSION: The skeletal efficacy of both types of anchorage is equivalent. Although the expansion of permanent 1st molars is lower, anchorage on temporary 2nd molars allows spontaneous derotation of the latter, limiting buccal version and undesirable effects on the periodontium.
CONCLUSION: Anchorage on temporary second molars is to be preferred when their root status allows it, in order to limit the iatrogenic effects inherent in RME and maximize skeletal and dento-alveolar effects.

Abstract citation ID: cjae081.017
OP14 THE EFFECT OF TOOTH AGENESIS ON THE SOFT TISSUE PROFILE OF MODERN HUMANS

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AIM: This study aimed to analyze the impact of tooth agenesis on the soft tissue profile of modern humans, through a comprehensive analysis of a large, consecutively selected sample.
MATERIAL AND METHODS: The study involved 486 individuals with tooth agenesis (200 males, 286 females) (mean: 2.5 missing teeth) and 313 individuals without tooth agenesis (127 males, 186 females), inluding third molars. Soft tissue profile shape was defined on pre-orthodontic lateral cephalometric radiographs using 2 curves and 40 landmarks (4 fixed and 36 semi-landmarks). The digitization was performed with Viewbox 4 software (dHAL software, Kifissia, Greece) by one calibrated operator. In order to reduce the positional variation of semi-landmarks and minimize bending energy between individual shape configurations, semi-landmarks were allowed to slide along their respective curves three times. At the end of this iterative process, it was assumed that adequate homology between landmarks had been achieved. Shape configurations were then superimposed using Procrustes Superimposition and the mean Procrustes distance was calculated, in order to assess the difference in profile shape between individuals with missing teeth and individuals with a full permanent dentition. The association between tooth agenesis and profile shape was assessed separately for males and females, with multivariate regressions models controlling for age and considering shape variables as the dependent factors. All statistical tests were all performed assuming a 5% type I error.
RESULTS: Profile shape was defined by 6 Principal Components of shape that described approximately 90% of shape variation in the sample. There was a significant sexual dimorphism in profile shape (P<0.001). When controlling for age, tooth agenesis had a significant effect on profile shape in females ($\eta 2 = 0.055$; P<0.001) and in males ($\eta 2 = 0.049$; P=0.013). Individuals with tooth agenesis presented with a flatter profile and significantly less lip protrusion than their counterparts.
CONCLUSIONS: Tooth agenesis is significantly associated with a flatter soft-tissue profile and less lip protrusion in modern humans. This is in agreement with previous studies revealing an analogous effect of tooth agenesis on the size and the shape of the craniofacial skeletal structures.

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Abstract citation ID: cjae081.018
OP15 SOFT TISSUE FACIAL CHANGES IN PATIENTS 7-11 YEARS OF AGE HAVING MAXILLARY EXPANSION

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BACKGROUND: Maxillary transverse discrepancies are typically treated with palatal expansion treatment modalities. In addition to skeletal and dental changes with maxillary segment width enhancement, maxillary expansion may also impact the facial soft tissues, and past studies have shown varied results.
OBJECTIVE: Evaluate the effects of maxillary expansion on facial soft tissues in children aged 7-11 years.
MATERIALS/METHODS: 32 patients in two groups: control and treatment (Hyrax expansion via RME, 1 turn/day). The inclusion criteria: patients 7-11 years of age presenting with a maxillary transverse deficiency of at least 5mm or bilateral posterior crossbite. Each patient in each group underwent CBCTs and 3D facial scans at two time points: pre-treatment (before maxillary expansion), after the completion of expansion at post-retention (12 months after). CBCTs were assessed using 3D Slicer software and 3D facial scans were assessed using OrthoInsight 3D software. The soft tissue measurements evaluated included the following: alar width, alar base width, mouth width, philtrum width, nasal tip prominence, nasolabial angle, upper lip to E-line, lower lip to E-line, upper lip height, height of vermillion of upper lip, lower lip height, height of nose, lower facial height and intercanthal width.
RESULTS: Children who have undergone RME experience facial soft tissue changes comparable to patients who have not undergone expansion with no statistically significant differences found between the two groups over the one-year observation period. However, when comparing the two modalities utilized in this study, the correlation was not as optimal for specific outcome variables such as alar base width and intercanthal width, potentially due to anatomic, imaging protocols and patient related factors.
LIMITATIONS: Small sample size and difference in protocol of image taking from CBCT and Facial scan.
CONCLUSION: Children between the ages of 7-11 years with maxillary transverse deficiency treated by rapid maxillary expansion experience facial soft tissue changes similar to those of patients without any expansion, over a period of one year, in regards to both CBCTs and 3D facial scans. However, given the limitations with regard to imaging protocols and sample size, the results must be interpreted with caution.

Abstract citation ID: cjae081.019
OP16 QUANTITATIVE ASSESSMENT OF INFRAZYGOMATIC CREST THICKNESS - A CONE-BEAM COMPUTED TOMOGRAPHY STUDY

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BACKGROUND: Infrazygomatic crest (IZC) mini-implants play a crucial role as absolute anchorage in orthodontic treatments requiring intrusive or distally directed forces. This study aims to evaluate the bone thickness of the IZC area and explore the relationships between bone availability, sex, and age.
METHODS: IZC bone thickness was measured at 9 different locations—specifically, at the mesial and distal buccal roots (MBR and DBR, respectively) of the first molar and at the interdental space between the first and second molars (INTER). Measurements were taken at 12 mm, 14 mm, and 16 mm from the occlusal plane on 100 consecutively acquired cone-beam computed tomography (CBCT) scans with a voxel size of 380 µm, obtained from patients at the University Dental Clinic in Krakow. The sample comprised 50 females (mean age 28.7 years, SD 13.8, range 12-65) and 50 males (mean age 28.9 years, SD 12.0, range 13-63). Method error was assessed with ICC statistics on duplicate measurements of 10 randomly selected CBCT scans.
RESULTS: ICCs showed excellent agreement for duplicate measurements except for INTER location at 14 mm for which agreement was good. The thickest bone was in INTER location at 12 mm from occlusal plane (6.03, SD = 2.64 mm). The thinnest bone was found in MBR location, 16 mm above the occlusal plane (2.42, SD = 2.16 mm). A statistically significant negative correlation between bone thickness and age was found for measurements taken at MBR and DBR locations – Spearman correlation coefficient ranged from -0.42 to -0.37. Sexual dimorphism was found only for measurements at INTER location at 14 and 16 mm from occlusal plane – males had thicker bone than females.
LIMITATIONS: 380 µm voxel size might have influenced precision of measurement – CBCT scans with smaller voxel size would be preferred.
CONCLUSIONS: preferred location for placement of IZC mini implants is located interdentally between the first and second molars, at a height of 12 mm above the occlusal plane.

Abstract citation ID: cjae081.020
OP17 CLASS II MALOCCLUSION CORRECTION IN ADULTS WITH A COMPLETELY CUSTOMIZED LINGUAL APPLIANCE AND INTERMAXILLARY ELASTICS ONLY: IS IT POSSIBLE?

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OBJECTIVE: The aim of this investigation was to evaluate whether Class II malocclusion in adult patients can be successfully corrected using a completely customized lingual appliance (CCLA) in combination with Class II elastics.
METHODS: In order to detect differences in the final treatment outcome, two groups were matched for age and gender. Treatment results of 40 adult orthodontic patients with a Class I malocclusion (Group 1) were compared to 40 adults with a Class II malocclusion (Group 2). All patients had completed treatment with a CCLA (WIN, DW Lingual Systems, Bad Essen, Germany) without known centric occlusion – centric relation discrepancies, issues of compliance or overcorrection in the individual treatment plan which was defined by a target set-up. In order to compare the treatment results of the two groups, 7 measurements using the American Board of Orthodontics Model Grading System (ABO MGS) and linear measurements for anterior-posterior (AP) and vertical dimensions were assessed at the start of lingual treatment (T1), after debonding (T2B) and compared to the individual target set-up (T2A).
RESULTS: A statistically significant AP correction was achieved in group 2 which represented 95% of the planned amount. The planned overbite correction was fully achieved in the Class I and Class II group. In both groups, there was a statistically significant improvement in the ABO scores, with no significant difference between the two groups at T2. 100% of the patients in group 1 and 92.5% in group 2 would meet the ABO standards after CCLA treatment.
CONCLUSIONS: CCLAs in combination with Class II elastics can correct a Class II malocclusion successfully in adult patients. The quality of the final treatment outcome is high and can be predicted well by the individual target set-up.

Abstract citation ID: cjae081.021
OP18 EARLY INTERCEPTIVE ORTHODONTIC CARE- AN EPIDEMIOLOGICAL STUDY

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BACKGROUND/OBJECTIVES: Malocclusions can be treated early with interceptive treatment and/or correctively in the permanent dentition with fixed appliances. In Sweden, the undergraduate students are trained to perform interceptive treatment in the mixed dentition and as a general dentist they provide the care after consultation with an orthodontist. Patients offered removable appliances, free of charge, are primarily those with significant overjet combined with either incomplete lip closure and/or gingival impingement and posterior or anterior crossbites. The aim of this study was to analyse the number of patients and the outcomes of various types of early interceptive treatments.
MATERIALS AND METHODS: The study was based on the ≃300,000 children and adolescents 0-19 years of age in the Region of Västra Götaland. Information regarding the number of patients receiving interceptive care during the years 2020-2022 were obtained through data extraction of procedure codes for removable appliances from the T4 medical record system. To investigate the outcomes of the care, records for patients who received care in 2020 were manually reviewed (≃4760). The data extraction included patient age, gender, malocclusion, type of interceptive appliance, total treatment time and treatment outcome.
RESULTS: During the years 2020-2022, more than 4300 patients received treatment with a removable orthodontic appliance each year (in total 13,944), including the Activator (Ac), Extra Oral Traction (EOT), Removable Plate (ReP) and Quad Helix (QH). The most frequently utilized appliance was ReP (42.1%), followed by Ac (25.1%) and QH (12.2%). The mean age at treatment start was 10.2 years (Ac, QH) and 11.1 years (ReP), and there were no gender differences observed. The average treatment duration varied from 10.6 months (QH) to 20 months (Ac). The success rates for QH, ReP, and Ac were 84%, 64%, and 54%, respectively.
LIMITATIONS: The retrospective study design.
CONCLUSIONS: Outcomes of the organized early interceptive orthodontic care vary depending on the appliance. Cooperation-dependent appliances show

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poorer results. This needs to be addressed in the future, as well as the need for future treatment with fixed appliances. It is of great importance that the early care, free of charge, is cost-effective from both a patient and societal perspective.

Abstract citation ID: cjae081.022
OP19 SECOND MOLAR ERUPTION DISTURBANCES IN BORDERLINE-EXTRACTION ORTHODONTIC CASES, COMPARING EXTRACTION VS. NON-EXTRACTION TREATMENT OUTCOMES

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OBJECTIVE: To evaluate the effects of extraction versus non-extraction orthodontic treatment on second molar eruption in adolescents with borderline crowding.
MATERIALS AND METHODS: This retrospective study assessed maxillary and mandibular arches (N=535) from orthodontic patients aged 10-15 years with unerupted second molars at treatment start. Crowding was evaluated separately in the maxilla and mandible with "borderline-extraction" crowding defined as 5-9mm of space deficiency (n=261). Mildly crowded (<5mm) non-extraction arches were included as controls (n=274). Maxillary and mandibular arches were separated into the following groups: 1) mild crowding without extractions, 2) borderline crowding without extractions, and 3) borderline crowding with extractions. Based on panoramic radiographs and intraoral photographs, the frequency and severity of post-treatment second molar eruption disturbances were scored using modified Archer and Pell-Gregory classification systems for molar impactions and a novel classification system to capture milder eruption disturbances, including soft tissue impactions. Significance was determined using Fisher's Exact Test.
RESULTS: In the maxilla, 20.0% of borderline-crowding cases treated without extractions had second molar eruption disturbances compared to only 5.2% in borderline-crowding cases with extractions (p=0.0102). In the mandible, 27.6% of borderline-crowding cases treated without extractions had second molar eruption disturbances compared to only 7.14% in borderline-crowding cases with extractions (p=0.0059). The difference between borderline-crowding groups in both the maxilla and the mandible indicates that extraction treatment is associated with fewer second molar eruption disturbances. There was no difference in the frequency of second molar impaction between mild crowding without extractions and borderline crowding without extractions in either arch. Although the frequency of mandibular second molar impactions was lower when mandibular borderline crowding was treated with extractions, the impactions that did occur were more likely to be severe.
LIMITATIONS: This was a retrospective study with records limited to panoramic radiographs and intraoral photographs.
IMPLICATIONS: In both the maxilla and mandible, extraction treatment of borderline crowding reduces the risk of second molar eruption disturbances, thereby decreasing the need for further interventions.

Abstract citation ID: cjae081.023
OP20 ASSESSMENT OF WEAR CHARACTERISTICS, LONGEVITY AND STIFFNESS OF ESSIX-TYPE RETAINERS

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OBJECTIVE: To compare four commercially-available Essix-type retainers in terms of longevity, wear characteristics, stiffness, and their range of rigidity.
MATERIALS AND METHODS: An in vitro study was conducted at Queen Mary University of London. Four groups of thermoplastic materials were included: Duran (PETG), Essix C+ (Polypropylene), Vivera, and Zendura (Polyurethane). A working typodont was fabricated to evaluate surface wear characteristics using a wear machine with a customised jig. Retainers were measured for tensile test and water absorption was measured at five different time points up to 6 months after initial immersion in two different physical states and two different solutions. Hydrolytic degradation was also evaluated using FTIR spectroscopy.
RESULTS: Essix C+ was the most flexible retainer with Vivera the stiffest material. Zendura and Essix C+ had the most surface wear (413µm ± 80 and 652µm ± 12, respectively) with absorption rates of up to 15 wt% in artificial saliva occurring with Zendura BS Essix C+. Only Essix C+ displayed signs of degradation following water absorption.
LIMITATION: The in vitro design fails to fully account for treatment-related factors and patient characteristics including parafunctional habits and variation in salivary composition.
CONCLUSIONS: All materials displayed characteristic levels of flexibility and were susceptible to water absorption. Duran 1.5mm performed similarly to Vivera in relation to stiffness and wear properties. While Zendura and Vivera have similar chemical structures, they exhibited differences concerning wear resistance and water absorption. Further clinical research evaluating the clinical relevance of these laboratory findings is required.

Abstract citation ID: cjae081.024
OP21 EFFECT OF CURING TIME ON CYTOTOXICITY OF DIRECT PRINTED ALIGNERS

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INTRODUCTION: The aim of this in vitro study is to examine the potential impact of different curing times of 3D-printed orthodontic aligners on their cytotoxicity.
METHOD: Some 60 samples of aligner material were directly 3D printed using Tera Harz TC-85 DAC resin and randomly allocated to three different curing time groups (14, 24 and 50 minutes). Zendura FLX samples were used as control. The samples were incubated in saliva for 14 days and then the supernatant were collected. Human gingival fibroblasts (HGF-1)-CRL2014 were used to evaluate potential cytotoxicity. Furthermore, HGF-1 cells were plated on the samples as well as on a glass control sample. After 72 hours of growth, their viability was tested. Results: Compared to the glass, only the 50-minute curing time markedly reduced fibroblast cell growth. Additionally, a negative linear trend was observed between curing time and fibroblast growth. In comparison to the aligner control group, all samples, including the aligner control samples, exhibited a significant reduction in the viability of human fibroblasts when exposed to saliva.
CONCLUSIONS: 3D directly printed aligners showed a cytotoxic effect similar to that of thermoformed conventional aligners in terms of fibroblasts growth. A linear trend was found between curing time and cells growth, indicating that directly printed aligners could exhibit higher cytotoxicity if exposed to a longer curing time. This dependence on curing time underscores the importance of following a strict manufacturing process.

Abstract citation ID: cjae081.025
OP23 EVALUATION OF PRIMARY STABILITY IN CALCIUM CHLORIDE SURFACE-TREATED MINI-IMPLANTS, A SPLIT MOUTH RANDOMISED CONTROLLED TRIAL

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OBJECTIVES: The purpose of this study is to evaluate the primary stability of the calcium chloride surface-treated mini implant (MI) by assessing the maximum insertion torques in a split mouth randomised control trial (RCT) .
MATERIALS AND METHOD: The study included fifteen participants who met the established inclusion and exclusion criteria, were recruited into a single-blinded, split-mouth, randomised controlled trial with a 1:1 allocation ratio. Conical and self-drilling, MI composed of titanium (Ti6Al4V) (AbsoAnchor® System) with dimensions of 1.4mm in diameter and 8mm in length were used. Group 1 was administered calcium chloride-treated and machined MIs, whereas Group 2 received acid-etched and machined MIs. The MI is inserted between the maxillary second premolar and the first molar by experienced clinician for the purpose of indirect anchorage during alignment. The insertion torque is measured using a digital torque device, MTT03-50ZU (Mark-10, Copiague,NY).
RESULT: The ANOVA analysis has confirmed a notable distinction in the maximum insertion torque among the experimental groups, namely, calcium chloride (6.50±0.34 Ncm), acid etch (5.69±0.87 Ncm), and the control group (5.35±0.86 Ncm), with a statistically significant p-value of 0.007. Further pairwise comparisons indicate a statistically significant difference between calcium chloride and acid etch (p=0.030), while no significant disparity is observed between acid etch and the control group (p=0.402). Moreover, the investigation demonstrates that the maximum insertion torque remains unaffected by the lateralization, as evidenced by the non-significant impact of the left and right sides on this parameter.
CONCLUSION: Calcium chloride coating with maximum insertion torque of 6.50±0.34 Ncm is significantly higher in comparison with acid etch and control. Consequently, calcium chloride surface modification is a promising alternative in non-ideal clinical situations.
Supporting agency and grants: Internal grant from UITM

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OP24 ACCURACY OF GUIDED INSERTION OF TEMPORARY ANCHORAGE DEVICES USING TWO DIFFERENT 3D PRINTED GUIDE TYPES - A PROSPECTIVE RANDOMIZED CONTROLED TRIAL

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AIM: To investigate the accuracy of guided TAD insertion using two different digitally designed and 3D printed surgical guides
METHODS: This prospective, randomized and controled study was registered at DRKS and included 42 patients who had an indication for a skeletally anchored orthodontic appliance.
The insertion of two paramedian TADs was virtually planned in the anterior palate on the basis of intraoral scan data using 3D planning software (OnyxCeph, Image Instruments GmbH, Chemnitz, Germany). Based on this, either a conventional (n=21) or skeletonised (n=21) surgical guide was printed. After insertion, a further intraoral scan was performed to superimpose the planned implant position with the actual implant position to determine the accuracy (in mm and °).
RESULTS: No statistically significant differences were found between the linear and angular deviations comparing the two different guides. Linear deviations ranged between 0.81 mm (+/- 0.59 mm) and 1.13 mm (+/- 0.51 mm). Angular deviations ranged between 7.94° (+/- 4.07°) and 8.70 (+/- 6.92°)
CONCLUSIONS: A safety margin to anatomical structures is necessary for navigated TAD insertion. Pre-drilling should be considered even for self-tapping and self-drilling systems.

Abstract citation ID: cjae081.027
OP25 DO WE NEED ORTHODONTIC MINI-SCREWS FOR MAXILLARY EXPANSION IN CHILDREN WITH POSTERIOR CROSSBITE IN THE EARLY MIXED DENTITION? REPORT OF AN RCT WITH 5-YEAR FOLLOW-UP

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AIMS: To compare the long-term skeletal and dental effects of tooth-borne (TB) and tooth-bone-borne (TBB) rapid maxillary expansion in growing children with posterior crossbite, using 3D imaging.
MATERIALS AND METHODS: Fifty-two consecutive patients who met the eligibility criteria were recruited and allocated to either the TB group, mean age 9.3 years (SD 1.3), or the TBB group, mean age 9.5 years (SD 1.2). Cone-beam computed tomography records and study casts were taken before (T0), directly after (T1), one year after (T2) and five years after expansion (T3). Study casts were digitized, superimposed, and evaluated.
RESULTS: At T1, the midpalatal suture at its anterior part showed a statistically significant difference between the groups with mean 0.6 mm (CI 0.2–1.1) more expansion in the TBB group ($P < 0.01$). The nasal width also showed similar differences between the groups, with a larger expansion in the TBB group by mean 0.7 mm (CI 0.1–1.4) ($P = 0.03$). Changes in palatal volume, palatal surface area, and palatal projection area within and between the groups up to 5 years post expansion followed the same pattern and did not show any statistically significant differences between the groups.
CONCLUSIONS: Skeletal expansion in the midpalatal suture was significantly higher in the TBB group; however, the extent of this expansion, approximately 0.6 mm, may lack clinical relevance. Furthermore, a significant increase in skeletal expansion was detected at the level of the nasal cavity in the TBB group. There were no significant differences between the TB and TBB groups in palatal volume, palatal shell area, or palatal projection area directly after expansion or at 1 year and 5 years post expansion, which implies that the two devices gave rise to the same immediate and long-term outcomes.

Abstract citation ID: cjae081.028
OP26 COMPARISON OF THE EFFECTS OF THE QUADEXPANDER, A PURELY MINI-IMPLANT-BORNE NON-SURGICAL MAXILLARY EXPANDER, WITH TWO DIFFERENT SURGICALLY ASSISTED RAPID MAXILLARY EXPANDERS IN YOUNG ADULTS

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OBJECTIVE: To compare transverse skeletal and dentoalveolar changes in young adult patients treated with the non-surgical purely bone-borne Quadexpander, tooth-borne surgically assisted rapid maxillary expansion (SARME), and tooth-bone-borne (hybrid) SARME methods using cone beam computed tomography (CBCT) analysis.
METHODS: The sample comprised 32 patients (15 males, 17 females; mean age 19.3 ± 4.2 years) with similar transverse maxillary discrepancy treated with three different methods: bone-borne Quadexpander (QE), tooth-borne (TB) SARME and tooth-bone-borne (hybrid, H) SARME. In the SARME groups, the same surgical approach (a Le Fort I procedure, midline osteotomy and pterygomaxillary disjunction) was applied by the same surgeons. CBCT scans were acquired before (T1) and 6 months after completion of maxillary expansion (T2). Transverse, anteroposterior and vertical linear and angular three-dimensional dentoskeletal and buccal alveolar bone thickness (BABT) changes were assessed.
RESULTS: A significantly greater increase was found in the QE group (6.7 ± 1.4 mm) for anterior maxillary widths than TB-SARME (3.2 ± 1.2 mm) and H-SARME groups (4.6 ± 1.6 mm). Greater changes at the nasal cavity, were found in Group QE ($p=.0001$). TB-SARME increased the first premolar angle significantly more than the QE and H-SARME groups and caused greater mean reduction in BABT of 0.4–2.7 mm in first premolars and molars. In contrast, the QE group showed statistically significant BABT gains in the first premolar and first molars, and H-SARME showed statistically significant BABT gains in the first premolars.
LIMITATIONS: The sample size and patient characteristics may impact the generalizability of the findings. Additionally, longer follow-up periods and evaluation of treatment stability over time would be beneficial for understanding the long-term effects of each technique.
CONCLUSION: Quadexpander technique, without osteotomy, resulted in greater maxillary and nasal width increases than TB-SARME and Hybrid-SARME methods in young adults. Hybrid-SARME presents reduced dental side effects than TB SARME. However, the minimally invasive Quadexpander remains effective in young adults without deleterious dentoalveolar side effects and surgical osteotomy. Investigating the long-term stability of these outcomes is essential.

Abstract citation ID: cjae081.029
OP27 COMPARATIVE ASSESSMENT OF GENERATIVE ARTIFICIAL INTELLIGENCE LARGE LANGUAGE MODELS IN ORTHODONTICS: A STUDY OF CHATGPT, GOOGLE BARD, AND MICROSOFT BING

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BACKGROUND: The growing utilization of Generative Artificial Intelligence Large Language Models (LLMs) in various domains, including Dentistry, raises concerns about their precision.
OBJECTIVES: To comparatively evaluate responses from four LLMs—Google's Bard, OpenAI's ChatGPT-3.5 and ChatGPT-4, and Microsoft's Bing—to clinically relevant questions in orthodontics.
MATERIALS/METHODS: Ten open-type clinical orthodontics-related questions were posed to the LLMs. Responses were assessed on a scale of 0 (minimum) to 10 (maximum) points, using a rubric against on robust, conventionally gathered scientific evidence such as consensus statements and systematic reviews. After four weeks, a second evaluation was conducted to measure intra-evaluator reliability. Statistical analysis, including Friedman's and Wilcoxon's tests, was performed to identify the best-performing model.
RESULTS: No statistically significant differences were observed between the scores given by the two evaluators on both occasions. An average score for each LLM was computed. Microsoft Bing Chat yielded the highest average score (7.1), followed by ChatGPT-4 (4.7), Google Bard (4.6), and ChatGPT-3.5 (3.8). Microsoft Bing Chat statistically outperformed ChatGPT-3.5 (p-value=0.017) and Google Bard (p-value=0.029), and ChatGPT-4 outperformed ChatGPT-3.5 (p-value=0.011). However, all models occasionally provided answers lacking comprehensiveness, scientific accuracy, clarity, and relevance.
LIMITATIONS: Questions were posed only once, without any subsequent follow-up or requests for additional clarifications.
CONCLUSIONS/IMPLICATIONS: While LLMs show promise in supporting evidence-based orthodontics, their existing limitations suggest potential risks of incorrect healthcare decisions if not used cautiously. These tools should complement, not replace, the critical thinking and profound understanding of orthodontists. Further research, clinical validation, and model enhancements are imperative for the full integration of these tools into practice. Clinicians must be mindful of LLMs' limitations, as their imprudent use could impact patient care. Regulatory measures should be implemented to oversee the evolving technologies' use.

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Abstract citation ID: cjae081.030
OP28 3D-CBCT EXPERIMENTAL METHOD FOR VOLUMETRIC QUANTIFICATION OF EXTERNAL APICAL ROOT RESORPTION: MANUAL VS ARTIFICIAL INTELLIGENCE

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AIM: External apical root resorption (EARR) is an undesirable iatrogenic effect of orthodontic treatment. This in silico study aimed to develop a 3D quantification method and assess the influence of CBCT quality, segmentation strategy, and type of measurement method on the final estimation of EARR.
METHODS: The QAREL and COSMIN guidelines served as reliability and measurement error study standards. A total of 704 measurements were conducted using two types of CBCT records (high-quality vs low-quality CBCT). To quantify tooth root volume loss, roots were digitally segmented by manual (3Dslicer), automated (3Dslicer), and artificial intelligence-aided method. Subsequently a STL. record was obtained and the crown and root were used for quantification through two different methods. Specifically, analyses of root length, total volume, volume by thirds (coronal, middle, apical), total root loss, root loss by thirds, and total root length loss were performed in 3D records. Measurements were carried out twice a week apart by two double-blinded operators (T.B.I. and E.N.F). Descriptive statistic, pairwise comparisons, and ICC correlation coefficient were calculated to compare CBCT quality, segmentation strategy, method type and the influence of examiner. Precision, sensitivity, and specificity of the methods were assessed, and ROC curves were obtained. P value <.05.
RESULTS: The type of 3D record (CBCT quality) influences (<0,001) the quantified EARR in five variables (total volume, volume by thirds (coronal, middle, apical), total root loss, root loss by thirds, and total root length loss). Similarly, the segmentation strategy type affects the total length loss and volume loss at the apical third. Underestimation of root resorption was observed in both automated and, particularly, artificial intelligence-aided segmentation compared to manual segmentation (max.21.65xfold change). Finally, there were no significant differences (p>0.05) between the two EARR quantification methods. Non-significant differences were found between groups regarding root resorption quantification (p<0,05) for any variables, and ICC consistency between operators revealed good concordance.
CONCLUSIONS: The quality of CBCT and type of digital segmentation critically affects the 3D estimation of EARR quantification. Clinicians should be aware that 3D methods for EARR estimation can be highly influenced by such critical factors, potentially compromising the accuracy of EARR assessment.

Abstract citation ID: cjae081.031
OP29 EFFECTIVE COMMUNICATION AND INFORMATION RETENTION IN ORTHODONTIC PATIENTS: A RANDOMISED CONTROLLED TRIAL

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AIM: To identify whether the method of information delivery influences the understanding and retention of information of orthodontic patients in the short and long-term.
METHODS: Forty-four patients were included in this trial. Patients were between 10 and 18 years of age and required single or dual-arch fixed appliance treatment. The primary outcome measure was the level of understanding of patients immediately after delivery of the advice to measure short-term retention. Long-term retention was measured after 6 weeks, without reinforcement of advice. Patients were allocated, using simple randomisation, into 2 equal groups, with allocation concealed using opaque sealed envelopes. Each participant was given the same verbal and written instructions after the brace was fitted; the intervention group was also shown an audiovisual presentation. All sources of information conveyed the same instructions but in different formats. It was not possible to blind the researcher or the patients to the group allocation. A questionnaire was used to measure participant knowledge at the first visit (T0) and 6 weeks later (T1).
RESULTS: Forty patients completed the study. The mean knowledge score of the intervention group was 7.5% more than that of the control group at T0 (P < 0.001). There was no statistical difference between the mean scores of the intervention and control groups at T1. The intervention group experienced a notable reduction in recall of information in the long-term (P = 0.013); the mean score decreased by 6.2%. In the control group, there was no difference in retention of information in the long-term. A higher preliminary finding was associated with a larger reduction in score at follow-up. No harms were encountered.
LIMITATIONS: The study was not registered and it did not use a blinded design.
CONCLUSIONS: Showing patients an audiovisual presentation in addition to verbal and written instructions is effective at improving understanding and retention of information in the short-term.

Abstract citation ID: cjae081.032
OP30 LONGITUDINAL 3D ANALYSIS OF FACIAL SOFT TISSUE GROWTH IN INFANTS WITH COMPLETE UNILATERAL CLEFT LIP ALVEOLUS AND PALATE DURING THEIR FIRST YEAR OF LIFE

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AIM: Utilizing 3D stereophotogrammetry, this study aimed to investigate the growth and development of facial soft tissue in infants with complete unilateral cleft lip alveolus and palate (CUCLAP) during their first year of life.
METHODS: This longitudinal investigation involved 22 infants with CUCLAP during their first year. Following the surgical protocol of the clinic, 3D facial images were captured at 3, 9, and 12 months (T1, T2, T3) using a 3-D camera system, 3dMDface (3dMD™ System, Atlanta, GA, USA). Subsequently, the images were aligned and superimposed within a reference frame to generate average composite faces for T1, T2, and T3. Further, overlays were conducted between T1 - T2 and T2 - T3 images. The study proceeded to analyze changes in the overall facial structure as well as in specific regions (forehead, nose, eyes, upper lip, lower lip, cheeks, and chin).
RESULTS: The analysis was conducted both statistically and visually using a color-coded distance representation. The superimposition of 3D photos from T1 to T2 revealed a partial stagnation of growth in the upper lip region, with significantly diminished growth in the facial half affected by CUCLAP. Considerable growth was observed in the chin area, averaging 3.17 mm (SD: 0.29). Asymmetrical growth was evident in the upper lip (1.92 mm, SD: 2.45) and nose (1.05 mm, SD: 2.28), with pronounced growth in the nasal tip region. The superimposition of 3D photos from T2 to T3 showed a uniform distribution of growth throughout the face, averaging 1.98 mm (absolute mean). Additionally, there was notable growth in the forehead (1.35 mm, SD: 1.11) and chin (2.30 mm, SD: 0.34). However, uneven growth occurred in the upper lip, philtrum, and nostrils throughout both intervals, with an overall decline in growth from T2 to T3.
CONCLUSION: These patients with CUCLAP exhibited asymmetric and uneven growth patterns before the first year of life. The upper lip, cheek, and nostril on the cleft side were particularly affected. Conversely, the contralateral nostril, forehead, and chin demonstrated positive growth. Standardized longitudinal data in these patients are essential for assessing facial growth and therapeutic efficacy.

Abstract citation ID: cjae081.033
OP31 RADIOGRAPHIC AND CLINICAL EVALUATION OF AUTOGENOUS SECONDARY ALVEOLAR BONE GRAFT IN PATIENTS WITH CLEFT LIP AND PALATE. THE EFFECT OF THE DENTAL AGE

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AIMS: To evaluate the alveolar bone height of the teeth adjacent to the cleft based on alveolar secondary bone grafting (SABG) timing.
MATERIALS/METHODS: Data from patients with cleft lip and palate (CLP) treated with a SABG were retrospectively collected. Patients treated in the same center from birth, with unilateral or bilateral CLP independent of lateral incisor agenesis, were included. Orthopantomograms before, after SABG, and after orthodontic treatment were used to assess the canine mineralization stage, the inclination of the longitudinal canine axis, the SABG, and the limbus height of

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the teeth adjacent to the cleft. The orthodontic space closure was measured by reflex microscopy on plaster models. The canine vitality and the probing depth of the adjacent teeth (6-point pocket chart) were evaluated. Statistical analysis was performed using the Student`s t-test.
RESULTS: 104 patients with 127 cleft regions (mean age: 9.9±1.6 years at SABG) were included. Forty-five cleft regions showed agenesis of the lateral incisor. The surgical intervention was successful when a bone bridge was radiographically discernable six months after SABG. After prosthodontic or orthodontic space closure, patients with lateral incisor agenesis had a mean canine inclination difference of 9.2° (t= 5.702), favoring the orthodontic closure. The limbus height on the teeth adjacent to the cleft were lower if the SABG was performed after root completion (R =1)) (t = 4.234, t =4.221). In cases without lateral agenesis, orthodontic space closure was completed successfully at the canine mineralization stage at R = 0.75 (three-thirds of the root length) and R = 0.5 (half of the root length) in lateral agenesis cases. All canines showed a positive vitality test, and the adjacent teeth probing depth was 2.2-2.4 mm. If SABG was performed before the canine mineralization stage R = 0.5, the canine was impacted in 18.6% of lateral agenesis cases.
CONCLUSIONS: SABG should be performed when canine root was no more than R= 0.5, favoring the canine eruption in the graft. Early SABG was related to increased canine impaction rate. The canine surgical exposure and orthodontic extrusion after early SABG did not affect the periodontal status of the adjacent teeth.

Abstract citation ID: cjae081.034
OP32 ALVEOLAR BONE GRAFTING IN UNILATERAL CLEFT LIP AND PALATE: IMPACT OF TIMING ON PALATAL SHAPE

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BACKGROUND AND AIMS: Alveolar bone grafting (ABG) is a critical surgical intervention in patients with a cleft of the alveolus, aimed at reconstructing the alveolar ridge to facilitate proper eruption, periodontal support, and alignment of adjacent permanent teeth. The optimal timing for ABG remains debated, with late secondary ABG between the ages of 9 and 11 being widely adopted.
METHODS: This study compared the palatal shapes of 28 children at a mean age of 9.5 years (SD = 0.7) who underwent early secondary ABG at a mean age of 2.1 years (SD = 0.6) or 33 children at a mean age of 10.8 years (SD = 1.5) who underwent late secondary ABG at a mean age of 8.6 years (SD = 1.3) to 60 non-cleft con-trols at a mean age of 8.6 years (SD = 1.2). The palatal shapes were captured with 239 landmarks digitized on the palate on a digital model. Utilizing geometric morphometric methods, i.e., generalized Procrustes superimpositions, principal component analysis, and permutation tests, we assessed the impact of ABG timing on palatal morphology.
RESULTS: The first five principal components (PCs) explained 64.1% of the total shape variability: PC1 = 26.1%; PC2 = 12%; PC3 = 11.9%; PC4 = 7.8%; and PC5 = 6.4%. The Procrustes distance between both cleft groups and the control group was more than twice as large as the Procrustes distance between the early ABG and late ABG groups. Nonetheless, all intergroup differences were statistically significant.
CONCLUSIONS: Our findings suggest that early ABG has a limited negative effect on palatal shape, providing comparable outcomes to late ABG. The study highlights the potential suitability of early ABG, challenging conventional practices and encouraging further exploration into its long-term effects on maxillary growth.

Abstract citation ID: cjae081.035
OP33 DOES THE TIMEING FOR PRIMARY SURGERY (TOPS) FOR CLEFT PALATE IN CHILDREN INFLUENCE DENTOFACIAL DEVELOPMENT? A MULTICENTRE RANDOMIZED CLINICAL TRIAL

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BACKGROUND: The ideal age for primary surgery of isolated cleft palate repair has been debated over many decades with considerable current variability in international practice. This surgery may influence the dentofacial development and the need for orthodontic treatment in the future.
AIM: To evaluate the effects of primary surgery at 6-months compared to 12-months of age on the dentofacial development.
METHODS: This study is a part of a comprehensive clinical trial with several reported outcomes including dentofacial outcomes conducted in 23 specialised centres in 8 countries from across Europe and South America. 558 infants with non-syndromic isolated cleft palate were randomised in a 1:1 ratio to receive standardised primary surgery for closure of the cleft at 6-months or 12-months. Impressions for orthodontic study models and standardized profile photographs were taken for the children in both study groups at the age of 5 years old. The maxillary arch constriction was objectively assessed using the Modified Huddart and Bodenham index (MHB). The anteroposterior jaws relationship was assessed by measuring the soft tissue ANB angle on profile photos using a validated software. Intra-investigator and inter-investigator reliability were assessed for all dentofacial outcomes reported.
RESULTS: A total of 361 children (6-months group=181 and 12-months group=180) had full records for the dentofacial development were included with a drop off 35%. The soft tissue ANB angle at 5 years of age was similar in the 6-months and 12-months groups (8.6° SD +/- 2.6 and 8.6° SD +/- 2.4, respectively). The maxillary arch constriction was increased significantly in the 6-months group compared to the 12-months group (MBH score -2.6, SD+/- 4.0 and -1.6, SD+/-3.7, respectively; mean difference -1.02 95% CI from -1.83 to -0.21).
CONCLUSION: Assessment of dentofacial development suggested that arch constriction at 5 years of age was greater in the 6-month group than in the 12-month group. The soft-tissue ANB angle at 5 years of age was similar in the two groups. It is essential to bear in mind the other outcomes reported and published from this trial including velopharyngeal function, hearing and speech when deciding about the timing of the cleft palate repair.

Abstract citation ID: cjae081.036
OP34 THREE – DIMENSIONAL FACIAL MORPHOLOGY OF DIFFERENT UNILATERAL CLEFT SUBPHENOTYPES AT NINE YEARS OF AGE

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AIM: To compare three-dimensional (3D) facial morphology of different unilateral cleft subphenotypes at 9-years of age to normative data using fully automatic landmarking and a regionalized general face template. Our secondary objective is to compare facial morphology of 9-year-old children with unilateral fusion to differentiation defects.
METHOD: 90 3D facial stereophotogrammetric images of 9-year old unilateral cleft patients were imported into 3DMedX® for processing. All images of patients with a right sided cleft were mirrored. A regionalized general facial template was used for standardization. This template was pre-aligned to each face using 10 automatically determined landmarks and fitted using Meshmonk. Average faces were created for 5 groups (UCL, UCLA, UCLP, fusion and differentiation defects) and compared to age-matched normative faces using distancemaps. The selected regions for evaluation were: total face, nose, upper lip, chin, forehead, and cheeks.
RESULTS: The UCLP group showed a retrusive upper lip, nose tip and cheeks up to -2.9mm compared to the normative group. The nose tip was asymmetric (-2.8mm affected, +2.3mm non affected side). The UCLA group presented a retrusive midface and chin up to -2.1mm and also asymmetry of the nose tip up to -2.0mm compared to the normative group, whereas the UCL group had a wider nose and a protrusive upper lip (+2.0mm). Fusion defects have more consequences for the facial morphology then differentiation defects, with more retrusion and asymmetry (2.9mm vs. 1.9mm, respectively). The least differences between cleft patients and controls were found in the forehead region.
LIMITATIONS: The normative expected facial shape we used as control group is based on a large amount of images from people in the UK, Australia, and the USA with European genomic ancestry even though this facial shape differs from Dutch children. We did not distinguish between boys and girls to obtain a suitable sample size.
CONCLUSION: Patients with UCLP and UCLA have retrusive and asymmetric trends in the upper lip, nose and cheek region. Fusion defects showed more retrusion and asymmetry of the face then differentiation defects.

Abstract citation ID: cjae081.037
OP35 QUANTITATIVE ANALYSIS OF TREATMENT PROTOCOLS FOR CLEFT PATIENTS IN EUROPE AND NORTH AMERICA - A FOLLOW-UP TO THE EUROCLEFT PROJECT: PRESURGICAL ORTHOPEDICS, ORTHODONTICS AND ECONOMIC PROSPERITY

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AIM: Following The Eurocleft Project 1996-2000, the University of Bonn in co-operation with the German Cleft Palate Craniofacial Association (GCPA) and the European Cleft Palate Craniofacial Association (ECPCA) aimed to present an overview of orthopedic cleft care modalities in Europe and North America and analyze their distribution in relation to economic prosperity.
METHODS: A web-based questionnaire inquiring general information, details about the surgical, orthopedic and other interventions was sent to cleft centers across Europe and North America. The nations were divided in two groups i.e., above and below European average Gross Domestic Product (GDP) per capita.
RESULTS: Out of 372 identified cleft teams (184 European, 188 North American), 88 participants from 25 different nations replied (response rate 24%, in Europe 43%, in North America 4%). The number of European centers has declined by >60% compared to the Eurocleft Project; Germany and Switzerland did not follow this development. The use of PSIO increased from 48% to 58%. 51% use intraoral-only (mostly the Zürich concept by Hotz/Gnoinsky), 49% combined extraoral-intraoral (predominantly the New York Nasoalveolar Molding (NAM) concept by Grayson) and 33% extraoral-only appliances (mainly lip tapes). Economic prosperity was not correlated to PSIO procedures, however German centers use them significantly more often. The quad-helix is the most popular expansion device (69%).
CONCLUSIONS: PSIO prevalence is independent of economic prosperity and has risen in the last 25 years with NAM and intraoral-only appliances being equally popular. The number centers has massively declined in Europe excluding Germany and Switzerland. German centers use PSIO particularly often.

Abstract citation ID: cjae081.038
OP36 STABILITY OF FIVE DIFFERENT POST TREATMENT RETENTION PROTOCOLS: A RCT STUDY

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BACKGROUND: Contemporary orthodontic interventions effectively address the majority of malocclusions we treat today; nevertheless, the potential for relapse exists. Therefore, most patients are provided with different types of retainers. However, there are no general retention protocol recommendations, and there is only moderate evidence regarding their efficiency, adverse effects, and complications. To date, there hasn't been any comparison of post-treatment retention protocols for Class I cases with crowding.
OBJECTIVES/AIMS: To study the stability of orthodontic treatment outcome in five different post-treatment retention protocols and compare them with a group of patients without a retainer.
MATERIALS/METHODS: A total of 80 patients (12-19 years of age), all Class I with four premolar extractions and Little's Irregularity Index >3mm pretreatment, were collected and divided into five groups; I) Bonded retainer 3-3, II) Cuspid retainer, III) Essix retainer, IV) IPR/stripping, and V) no retainer. Follow-up was performed at 1, 3, and 6 months post-treatment. In the upper jaw, all patients received a bonded retainer and an Essix.
RESULTS: The bonded lingual retainer and the Essix retainer exhibited a similar and significantly better outcome at 6 months post-retention compared to the Cuspid retainer. The Cuspid retainer demonstrated similar results to the IPR and the no-retainer group, all of which had a moderate failure and relapse rate.
LIMITATIONS: For ethical reasons, patients in the IPR group and no-retainer group were excluded from the study after 3 months if they showed relapse. Registrations were conducted at three months, after which they were realigned and provided with a bonded retainer. Consequently, they were excluded from the 6-month registration, and thus the total extent of relapse at 6 months for these groups is unknown.
CONCLUSIONS/IMPLICATIONS: If minimal risk for relapse is to be expected, a bonded retainer is to be recommended. While the Essix retainer also works well in the short term, its long-term prognosis is questionable since it relies on patient cooperation.

POST-TREATMENT RETROSPECTIVE STUDY

Abstract citation ID: cjae081.039
OP37 STRIVING FOR PERFECTION: HOW STABLE IS ORTHODONTIC TREATMENT WHEN EXCELLENT OUTCOMES ARE ACHIEVED? A 9-YEAR

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AIMS: The main objective of this retrospective study was to assess the long-term stability of difficult orthodontic treatments treated to an excellent result and to correlate stability to possible prognostic factors. Secondary objectives were to observe the retention protocol changes over time and assess Oral Health-related Quality of Life after a long-term post-treatment follow-up.
METHODS: Cases presented for final examination by orthodontic postgraduate students were retrospectively screened for eligibility. Eligible patients were recalled for a post-treatment recall appointment (T2), consisting of a clinical examination and intraoral scan, and were asked to complete the Oral Health Impact Profile-14. Gender, age at treatment commencement (T0), treatment modality and duration, and retention protocol were extracted from the records. At T2, the duration of the retention period was recorded, and retainers in place were clinically compared to the original retention protocol. The following variables were assessed on the sets of models at T0, T1 (end of treatment), and T2: arch length and width, overjet and overbite, Dental Aesthetic Index (DAI), Peer Assessment Rating score (PAR), and Little's Irregularity Index (LII). Multiple regression models were conducted.
RESULTS: Eighty-five subjects attended T2. The mean post-treatment follow-up was 9.4 years +/– 2.4. In the upper arch, at T1, 74 patients had a combination of fixed and removable retainers, at T2, 55 had a fixed retainer only. In the lower arch, at T1, 67 patients had a fixed retainer only, with this number increasing to 76 at T2. From T0 to T1, the PAR score improved by 96.1%, with the improvement remaining at 77.5% at T2. The stability of lower inter-canine and upper inter-premolar widths was significantly correlated with the extent of changes during treatment. The presence of a lower fixed retainer at T2 and a low LII at T1 were prognostic factors for stability. The mean weighted total OHIP-14 score at T2 was very low (1.6 ± 2.4 points).
CONCLUSIONS: In a sample with an initial high-severity malocclusion and treated to an excellent outcome, long-term stability was very good. Good stability can be retained when a lower fixed retainer is present at T2 and when a low LII is achieved at T1.

Abstract citation ID: cjae081.040
OP38 IMPACT OF SELECTIVE FORCES ON CLINICAL EFFECTIVENESS/EFFICIENCY: DOUBLE-BLIND RANDOMIZED CLINICAL TRIAL

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OBJECTIVES: The primary objective was to compare the clinical effectiveness and efficiency of the application of selective forces of lower magnitude per tooth group compared to the gold standard conventional sequence with nickel-titanium (NiTi) archwires during the alignment and leveling phase of the treatment of orthodontics.
MATERIAL AND METHODS: A randomized, double-blind superiority clinical trial was carried out with two parallel arms (CONSORT guidelines) with block size of 4. Eligible subjects who met the inclusion criteria were randomly assigned through the sequence generated and hidden for operators and patients. The sample underwent orthodontic intervention with a protocolized alignment and leveling sequence (0.018"; Control group (Gold standard), [3M Unitek® Nickel-Titanium arches (0.014, 0.016, 0.018 and 0.016 x 0.022)] and Experimental group, with selective force arches [Bio-Active® Nickel-Titanium arches (0.018 x 0.018 and 0.016 quantified clinical effectiveness through changes in Little's irregularity index (LII), intercanine, interpremolar and intermolar width, and arch depth in the upper arch. Likewise, clinical efficiency was determined by recording pain perception (VAS); 24H; 72h; 3day; 7 days) as well as the impact on oral health on the patient's quality of life (OHRQoL) through the model (OHIP-14).
RESULTS: The sequence of selective forces showed equivalence (p> 0.05) in the treatment effectiveness compared to conventional arches [Little's irregularity index (LII), intercanine, interpremolar and intermolar width and arch depth], as well as equivalence (p> 0.05) in their clinical efficiency [pain and quality of life] in comparison with the traditional non-individualized sequence of forces.
CONCLUSIONS: Selective force arches show clinical performance of equivalence in terms of clinical effectiveness and efficiency compared to conventional arches with more aggressive forces.

Abstract citation ID: cjae081.041
OP39 DISCREPANCIES BETWEEN CLINCHECK PREDICTION AND ACTUAL RESULT IN 1ST PREMOLAR EXTRACTION CASES TREATED WITH INVISALIGN

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BACKGROUND/AIM: Assess any discrepancy between the ClinCheck prediction and the exact result in bilateral 1st premolar extraction cases treated with Invisalign.
MATERIALS/METHODS: The database of a private practice was independently searched for cases that had been treated with bilateral 1st premolar extractions from 2016 to 2022. The initial ClinCheck prediction model and the intraoral scan were both retrieved at the end of the first set of aligners and prior to refinement. Superimposition of these digital models was performed with the surface-based approach using Viewbox software, which was programmed to calculate the differences in torque, tip and rotation of all teeth up to the 1st molars. The whole sample was measured twice by 2 calibrated assessors independently.
RESULTS: A total of 60 extraction cases were retrieved with 24 cases being eligible. Sixteen cases had all 1st premolars extracted, 1 case had only the upper 1st premolars extracted, and 7 cases had only the lower 1st premolars extracted. The agreement between (ICC 0.96-0.99) and within the assessors (ICC 0.93-0.99) was excellent. There was a mean difference between the prediction and the actual result with loss of incisors torque (tooth11: -6.68°, tooth21: -6.71°, tooth12: -3.68°, tooth22: -4.7°, tooth 31: -3.32°, tooth41: -3.65°, tooth32: -3.06°, tooth42: -3.34°), mesial tipping of 1st molars (tooth16: 8.96°, tooth26: 7.73°, tooth 36: 8.76°, tooth 46: 11.24°) and 2nd premolars (tooth15: 6.87° tooth25: 7.16°, tooth35: 11.61°, tooth45: 11.05°) accompanied by distal tipping of canines (tooth13: 7.53°, tooth23: 7.87°, tooth33: 6.01°, tooth43: 3.28°) and lateral incisors (tooth12: 7.81°, tooth22: 6.13°, tooth32: 4.32°, tooth42: 3.45°); however the values varied greatly as response to treatment. Similarly, discrepancies were recorded in the rotation control with teeth distal to the extraction spaces (1st molars, 2nd premolars) showing a mean mesial rotation and those mesial to the extraction spaces (canines and incisors) showing mean distal rotation with variable response.
LIMITATIONS: Retrospective Study.
CONCLUSIONS: The first set of Invisalign aligners could not deliver the prescribed torque, tip, and rotation in 1st premolar extraction cases with evident discrepancies from the clinical point of view between the predicted and the actual result.

Abstract citation ID: cjae081.042

OP40 INVESTIGATING BISPHENOL-A (BPA) LEACHING IN ORTHODONTIC ALIGNER MATERIALS: ASSESSING CYTOTOXICITY AND ESTROGENICITY EFFECTS

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OBJECTIVES: To quantitatively assess the extent of bisphenol-A (BPA) leaching from six aligner companies. Additionally, the cytotoxic and estrogenic characteristics of these aligner materials were investigated.
METHODS: Three sets of aligners were soaked in sterile distilled de-ionised water for 30 days. BPA leaching from the aligners in the eluent solution was tested with liquid chromatography-mass spectrometry (LC-MS). Another set of aligners were soaked in Dulbecco's Modified Eagle Medium (DMEM) for 32 days. The eluents were prepared to three concentrations (5%, 10% and 20% w/v). Human gingival fibroblasts (HGFs) were exposed to the eluent samples to test for cytotoxicity, and estrogen sensitive MCF-7 and estrogen insensitive MDA-MB-231 cells were used to test for estrogenicity. MTS assays were performed in triplicate to measure the effect on the proliferation of the cells.
RESULTS: BPA was detected in all aligner materials, with Clarity leaching the lowest concentration (mean 0.237ng/mL) and Angelalign leaching the highest (3.932ng/mL). Although some of the aligners exhibited slight cytotoxicity, it was not statistically significant different to the positive control. Direct to Consumer (DTC) at 10% concentration exhibited estrogenic properties (p=0.002) whilst none of the other aligners were significantly different to the negative control. The trend displayed the 10% concentrations to have the greatest cytotoxic and estrogenic effects.
LIMITATIONS: This is an in vitro laboratory study.
CONCLUSION: BPA was present in all aligner materials to varying degrees; however, the materials did not exhibit cytotoxic or estrogenic effects, aside from DTC (10%) which significantly increased the proliferation of the MCF-7 cells.

Abstract citation ID: cjae081.043

OP41 SMILE SHAPE AND SELF-PERCEIVED SMILE ATTRACTIVENESS

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AIM: To assess the effect of smile shape on self-perceived smile attractiveness in young adults
METHODS: The study population consisted of 601 young adults (393 females and 208 males). Participants were asked to pose with a social smile and 3D facial photographs of were obtained using the 3dMD camera system (3dMD, Atlanta, USA). Self-perceived smile attractiveness was evaluated using a VAS scale (0-100) that was scored on the same visit.
3D images were digitized with ViewBox 4 software (dHAL software, Kifissia, Greece) using 1021 landmarks and semi-landmarks that were placed semi-automatically by two calibrated operators. In order to reduce variation due to the position of semi-landmarks, surface landmarks were allowed to slide on the facial surface. This process was repeated three times until homology between landmarks was achieved. Landmark configurations were then superimposed with Procrustes Superimposition to transform space coordinates into shape coordinates. A Principal Component Analysis was performed to reduce the amount of shape coordinates into Principal Components of shape (shape PCs), which were then used in all subsequent analyses. The association between self-perceived smile attractiveness and facial shape was examined with multivariate regression models, separately in females and males due the biological as well as the facial shape differences between sexes. A 5% error was accepted for all statistical analyses.
RESULTS: There was significant sexual dimorphism in smile shape, which confirmed that all analyses should be performed separately ($P<0.001$). The results showed a significant association between smile shape and self-perceived smile attractiveness in females ($\eta2=0.114$, $P<0.001$), but not in males ($\eta2=0.094$, $P= 0.228$). In both sexes, individuals with higher self-perceived smile attractiveness scores presented a larger smile curve with the left and right corners of the lips being much higher compared to individuals with lower scores. In addition, the central parts of both lips depressed more in cases with higher VAS scores, which increased the smile curve even further.
CONCLUSION: Young adults who perceive their smile as more attractive show a larger smile curvature, with lifting of the corners of the lips and more notable depression of the central lip parts.

Abstract citation ID: cjae081.044

OP42 WHICH FACTORS ARE ASSOCIATED WITH ORAL HEALTH-RELATED QUALITY OF LIFE IN ADOLESCENTS WITH CLASS II MALOCCLUSION?

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OBJECTIVE: The aim of this study was to investigate the relationship between malocclusion severity, objective orthodontic treatment need, and oral health-related quality of life (OHRQoL) in adolescents with Class II malocclusion.
METHODS: ANB angle, overjet, overbite, maxillary arch discrepancy, and mandibular arch discrepancy values were recorded to assess malocclusion severity in 56 patients (40 girls, 16 boys, mean age: 14.1 years) with Class II malocclusion who requested orthodontic treatment. Objective orthodontic treatment need was determined by the Index of Complexity, Outcome, and Need (ICON) and Dental Aesthetics Index (DAI) scores. Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ) and Oral Health Impact Profile-14 (OHIP-14) were used to assess the OHRQoL. Mann-Whitney U and Spearman Correlation tests were used.
RESULTS: Mean DAI and ICON scores were 46.1 and 56.5, respectively. Mean ANB angle, overjet, and overbite values were 5.8 degrees, 5.3 mm, and 4.5 mm, respectively. Mean maxillary and mandibular arch discrepancies were -2.5 mm and -1.1 mm. Gender had no impact on OHIP-14 and PIDAQ scores. There was no association between ICON or DAI scores and PIDAQ or OHIP-14 values. ANB angle, overbite, maxillary, and mandibular arch discrepancy values were not found to be associated with PIDAQ or OHIP-14 scores. On the other hand, OHIP-14 and PIDAQ scores were observed to be strongly correlated. Overjet was associated with the dental self-confidence, social impact, and psychological impact domains of the PIDAQ.
LIMITATION: Increasing the sample size and a longitudinal study design would have strengthened the study.
CONCLUSION: Although the patients in this study were observed to have a defined need for orthodontic treatment according to ICON and DAI scores, oral health-related quality of life was not associated with the treatment need. Only the overjet value within the evaluated factors related to malocclusion severity affected the dental self-confidence, social impact, and psychological impact domains of the PIDAQ in adolescent Class II patients.

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Abstract citation ID: cjae081.045
OP43 IMPACTS OF SEVERE MALOCCLUSION AND ITS CORRECTION ON SPEECH OF DENTOFACIAL DISHARMONY PATIENTS

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BACKGROUND: Patients with dentofacial disharmonies (DFD) seek orthodontics and orthognathic surgery for concerns with mastication, esthetics, joint function and speech. Speech concerns surpass impaired chewing as a motivator for surgery. Articulation errors are seen twenty times more often in Class III and anterior open bite (AOB) DFD patients than in the general population. Our data have identified significant quantitative differences in pre-surgical speech associated with DFD, with a markedly higher prevalence of perceptual speech distortions. Although pre-surgical speech abnormalities have been characterized, there is limited quantitative data on how speech changes after surgery.
METHODS: We conducted a prospective, longitudinal study of DFD patients progressing through orthognathic surgery and orthodontics. We collected cephalometric and occlusal measures, video, lingual ultrasound and audio recordings before and after surgery (3 and 12-months post-operation) from Class III DFD subjects (N=50), AOB DFD subjects (N=30) and Class I controls (N=60). Recordings were analyzed by speech pathologists' perceptual evaluations, lingual ultrasound and cephalometric tracings, and spectral quantitative analyses of stop (/t/ or /k/), fricative (/s/ or /ʃ/), and affricate (/tʃ/) consonants for differences in sound properties. Quantitative tongue contours were analyzed to compare shapes during speech and overlaid on cephalometric images to track change in jaw position. A mixed model was used for statistical analyses of spectral measures with the word and speaker as random variables. Regression models were applied to evaluate spectra relative to occlusal and cephalometric measures.
RESULTS: Results indicate significant normalization ($p<0.05$) of speech spectra by some Class III and AOB DFD patients at 3 and 12-months post-operation. Alterations in lingual gestures were noted after surgery, as a potential mechanism underlying changes in speech.
LIMITATIONS: This was an observational study with a limited sample.
IMPLICATIONS: Ultrasound was successfully applied as a novel method to compare lingual gestures before and after surgery, and notable changes in tongue gestures were identified.
Outcomes indicate a functional benefit of jaw surgery for DFD patients with speech-sound disorders. Orthognathic surgery and surgical orthodontics may be an important intervention for care of DFD subjects with articulation pathologies.

Abstract citation ID: cjae081.046
OP44 ORAFACIAL FUNCTION IN CHILDREN AND ADOLESCENTS WITH LARGE HORIZONTAL MAXILLARY OVERJET – A CASE-CONTROL STUDY

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OBJECTIVES: The aims of the study were to examine orofacial function (OF), the prevalence of temporomandibular disorders (TMD), bite force (BF), number of occlusal contacts (OC), and chewing efficiency (CE) in children and adolescents with horizontal maxillary overjet (large overjet) compared to a control group.
METHODS: The study was a case-control study including children of 9-14 years with large overjet ≥6 mm (study group) compared to a group with neutral occlusion (controls). Exclusion criteria for both groups were general diseases and earlier orthodontic treatment. OF was examined using Nordic Orofacial Test-Screening (NOT-S), Diagnostic Criteria for Temporomandibular Disorders (DC/TMD), and BF was registered using a Flöystrand bite force transducer. Examination of CE, registration of dental stage of eruption, morphological and functional occlusion were performed using standard methods. Continuous normally distributed data was analysed by General Linear Model adjusted for age, gender, and dental stage of eruption. Non-normally distributed data was analysed by Mann-Whitney test. Differences in gender and TMD diagnosis were analysed by Chi-square test. Significance level was set at 5%. The study was registered at clinicaltrials.gov: NCT04964830.
RESULTS: 37 participants were included in the study group (19 boys, 18 girls, median age 12.2) and 32 controls (16 boys, 16 girls, median age 12.2). No differences between the groups regarding age ($p=0.527$), gender ($p=0.911$) or dental stage of eruption ($p=0.760$) were found. Significantly increased NOT-S score ($p<0.001$) primarily due to presence of lip-trap was found in the study group. Significantly reduced BF ($p=0.011$), numbers of OC ($p<0.001$) and CE ($p=0.005$) were found in the study group. BF, numbers of OC and CE were negatively associated with erupting canines and premolars. No significant difference was found in TMD diagnosis between the groups.
CONCLUSIONS: The study group showed higher NOT-S score and reduced BF, number of OC, and CE. No significant differences in TMD diagnosis were found. The study contributes to an improved understanding of the functional characteristics of children with large overjet. Accordingly, the results of CE may be used as new reference values for children and adolescents with large overjet and neutral occlusion in future research.

Abstract citation ID: cjae081.047
OP45 THE EFFECTIVENESS OF BIO-MIN™ TOOTHPASTE IN THE MANAGEMENT OF WHITE SPOT LESIONS: A RANDOMISED CLINICAL CONTROL TRIAL

Miss Aoife Keogh[1], Professor Ama Johal[2]; [1]*Dental Institute, Royal London Hospital,* [2]*Queen Mary University*

AIMS: Primary: To assess the rate and extent of remineralisation of white spot lesions (WSLs) following orthodontic treatment, with a low-fluoride containing bioactive glass toothpaste (BioMin™ 540ppm).
SECONDARY: To compare the accuracy of clinical photographs and quantitative light fluorescence (QLF) in measuring WSLs and white spot lesion regression.
METHODS: A single-centre, double-blind hospital-based, randomised controlled clinical trial, with parallel design was adopted, in line with CONSORT guidelines, at the dental hospital, Bart's Health NHS Trust, London.
Full research ethics committee approval was obtained, and the trial protocol registered with the International Standardised Randomised Control Trials (ID 14479873).
Participants were randomised to receive either a bioactive glass (Biomin™ 540ppm), or a standard fluoride-containing toothpaste (Colgate 1450ppm). Participants had intra-oral images obtained in a standardised and reproducible manner with and without the adjunct of QLF. Digital software was utilised to measure the extent of the lesion. The measurements were taken at 4 different timepoints; at debond (T0), at 1- (T1), 3- (T2) and 6- (T3) months.
RESULTS: There was lesion regression for both the trial and control groups. QLF showed greater sensitivity and accuracy for measuring white spot lesion regression when compared to conventional digital photography.
CONCLUSION: Both the conventional bioactive glass (Biomin™ 540ppm) and the standard fluoride-containing toothpaste (Colgate 1450ppm) had a positive effect on reducing the extent of WSL's. QLF should be considered as the gold standard method for accurately measuring white spot lesions and their regression.

Abstract citation ID: cjae081.048
OP46 EFFECTIVENESS OF MI PASTE PLUS® AND REMIN PRO® ON REMINERALIZATION OF POST ORTHODONTIC WHITE SPOT LESIONS: A RANDOMIZED CONTROLLED TRIAL

Dr Sevgi Gol Peynirci[1], Prof Asli Baysal[2]; [1]*Private Practice,* [2]*Izmir Katip Celebi University*

BACKGROUND AND AIM: A common sequela of orthodontic treatment is white spot lesions (WSLs) that results in aesthetic problems. The aim of this randomized controlled clinical trial was to quantitatively evaluate the treatment effects of casein phosphopeptide-amorphous calcium fluorophosphate (CPP-ACFP) containing (MI Paste Plus®) and hydroxyapatite, xylitol and fluoride containing (Remin Pro®) agents on remineralization of enamel using Quantitive Light-Induced Fluorescence Method (QLF) and International Caries Detection and Assessment System II (ICDAS II).
MATERIALS AND METHODS: Thirty-nine patients (age range: 12-25 years) who completed multibracket treatment and had at least one WSL on upper anterior teeth were recruited. The participants were randomly assigned into three groups of 13 each; (1) MI Paste Plus® (MP), (2) Remin Pro® (RP), and (3) untreated control (C). The observation period was 12 weeks after bracket debonding. Changes in enamel lesions (fluorescence loss (ΔF), lesion area (LA), lesion volume (ΔQ), maximum fluorescence loss (ΔFmax)) were determined qualitatively with QLF. Visual lesion changes were scored with ICDAS II criteria. The records were taken at baseline (T0), 4th (T1), 8th (T2), and 12th (T3) weeks. Statistical significance was set at $p\leq.05$.
RESULTS: A total of 39 patients were analysed with no drop-outs. In all groups, there was a significant improvement in ΔF at the end of trial with no difference between groups. A gradual decrease was recorded for MP ($p=.005$) and C groups ($p<.001$), while a definitive trend was not observed for RP ($p<.001$). Other measurements (LA, ΔQ, ΔFmax and ICDAS II) showed steady decreases throughout

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the trial (p <.05) and there was no significant difference between groups over time.
LIMITATIONS: The study was a single-centre study with limited sample size. Non-compliance of the subjects could have influenced the results.
CONCLUSION AND IMPLICATIONS: Treatment with MI Paste Plus® and Remin Pro® was not superior in remineralization of WSLs compared to routine oral hygiene procedures. Based on the results of the present study, additional use of MI Paste Plus® and Remin Pro® did not improve post orthodontic WSLs during 12 weeks following debonding.

Abstract citation ID: cjae081.049
OP47 SALIVARY PH CHANGES AND BIOFILM FORMATION DURING ACTIVE ORTHODONTIC TREATMENT WITH CLEAR ALIGNERS AND FIXED APPLIANCES

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BACKGROUND/OBJECTIVES/AIMS: To examine salivary pH changes and the biofilm formation in two different orthodontic treatments clinically.
MATERIALS/METHODS: The study sample included 40 patients, who were divided into two groups according to the type of orthodontic appliance: Group CA, 15 aligners; Group FT, 25 fixed appliances. Group B received both metal (FT/SS) and elastic ligatures (FT/EM) for 2 weeks, respectively, to test the effect of ligature type. Salivary pH values, plaque index, and plaque percentage were measured at T0 (after scaling and polishing) and T1 (after 2 weeks). pH was measured with a digital caliper, and plaque was identified by a discoloring agent (Tri Plaque ID Gel). The Paired t-test, Independent t-test, and Pearson Correlation tests were used in the statistical analysis.
RESULTS: There was a significant decrease in salivary pH values after two weeks of metal ligature in FT/SS (0,237) (p = 0.027). Orthodontic treatment significantly increased the plaque mean index in 2 weeks, but it was the most in FT/EM (0,610), followed by FT/SS (0,481), and the least plaque and biofilm formation was in CA (0,206).
LIMITATIONS: Relatively small sample size, which has resulted from applying inclusion criteria.The inability to control patient lifestyle factors like smoking, diet, and oral hygiene protocols. Short duration between T0 and T1.Measurement in the active treatment period only, not providing information about the long-term effects.
CONCLUSIONS/IMPLICATIONS: Different types of orthodontic treatment and ligatures significantly effected and changed salivary pH and the amount of plaque formation during orthodontic treatment. Aligners had the least effect on salivary pH and plaque formation while fixed treatment with elastic ligature affected the most. Therefore aligner treatment may be more beneficial for patients with compromised oral hygiene.

Abstract citation ID: cjae081.050
OP49 EFFECT OF A PLAQUE-IDENTIFYING TOOTHPASTE ON PLAQUE AMOUNT IN 12-16-YEAR-OLDS WITH FIXED ORTHODONTIC APPLIANCES: A RANDOMIZED CONTROLLED, DOUBLE-BLIND, CLINICAL TRIAL

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BACKGROUND: Dental plaque accumulation poses substantial risks to dental and periodontal health, particularly among orthodontic patients with fixed appliances. One proposed solution is the use of plaque-dyeing toothpaste, designed to enhance oral hygiene by rendering plaque more visible to patients. This study aimed to assess the effectiveness of plaque-dyeing toothpaste in adolescents undergoing orthodontic treatment with fixed appliances.
METHODS: Conducted as a randomized, double-blind, active comparator trial at the Orthodontic Department of the University Medical Center Groningen, recruitment occurred from October 18th, 2021, to January 13th, 2022. Eligible participants were healthy adolescents aged 12 to 16 years with buccal fixed appliances in both jaws for at least three months, possessing all permanent anterior teeth from canine to canine. Exclusion criteria encompassed multiple participants from the same family, allergies to toothpaste components, visits to another dental professional during the intervention period, or syndromic/craniofacial anomalies. Seventy-seven adolescents, stratified by manual or electric brushing habits, were randomized to receive either plaque-dyeing toothpaste or a non-colouring control toothpaste. The primary outcome, assessed using Quantitative Light-induced Fluorescence (QLF) images at baseline (T0) and approximately 4-6 weeks later (T1), was the reduction of dental plaque. Secondary outcomes included participant-reported experiences through a questionnaire.
RESULTS: Both groups demonstrated a reduction in plaque scores from baseline to follow-up, yet the difference in plaque reduction between groups was not statistically significant (F = 0.211, p = 0.647). Subgroup analyses hinted at potential influences of certain demographics and behaviours on plaque reduction but did not reach statistical significance. Participants in the plaque-dyeing toothpaste group reported a heightened perception of plaque removal (Item 4, p = 0.018) and encountered more difficulty with the toothpaste colour (Item 7, p = 0.028) compared to the control group. No statistically significant differences were observed for other items. The study showcased good participant adherence with no reported adverse effects.
CONCLUSION: The utilization of plaque-dyeing toothpaste did not result in a statistically significant reduction in plaque scores, but its use enhanced participant engagement and awareness of oral hygiene practices.

Abstract citation ID: cjae081.051
OP50 STUDY ON THE IMPACT OF MAXILLARY AND MANDIBULAR ANTERIOR CROWDING ON PERIODONTAL HEALTH IN MIDDLE-AGED AND OLDER ADULTS.

Junichi Watahiki[1,2], Dr Satomi Naito[1,3], Dr Hiroshi Ueno[1,4], Dr Akihiro Wada[1,2], Dr Suguru Goto[1,2]; [1]*Interdisciplinary Orthodontic Society(IOS),* [2]*Tokyo Nihombashi AQUA Dental Orthodontic Interdisciplinary Clinic ,* [3]*Satomi Orthodontic Clinic,* [4]*Ueno Dental Clinic*

AIM: In recent years, the number of adult orthodontic patients has increased, and there has been growing attention to the impact of orthodontic treatment on periodontal tissue health, such as gingival recession. However, the effects of malocclusions such as crowding on periodontal tissue health are not fully understood due to insufficient research. Therefore, this study aimed to clarify the impact of the presence of crowding in the anterior maxillary and mandibular teeth on the health of periodontal tissues, including gingival recession.
MATERIALS AND METHODS: Excluding individuals who smoke, have diabetes, or are on long-term medication due to systemic diseases, we measured the amount of crowding in the anterior maxillary and mandibular teeth, bleeding on probing (BOP), pocket depth (PD), and clinical attachment loss (CAL) in 101 patients aged 40 years or older who commenced orthodontic treatment.
RESULTS: In the mandibular anterior teeth, a significant difference in the amount of gingival recession was observed between the group with more than 5 mm crowding and the group with less than 5 mm (Mann-Whitney's U test P=0.0000371). Furthermore, a significant positive correlation was found between the amount of recession and crowding (Spearman's correlation coefficient 0.528). In contrast, for the maxillary anterior teeth, no significant difference in the amount of gingival recession was observed between the groups with more or less than 5 mm crowding (Mann-Whitney's U test P=0.0977). However, significant differences in recession were found between groups with more or less than 7 mm crowding (P: 0.0392), and a weak correlation was noted between recession and crowding (Spearman's correlation coefficient 0.258). No significant differences were found in PD and BOP for either the maxillary or mandibular anterior teeth.
CONCLUSION: The presence of anterior teeth crowding in both the maxilla and mandible, regardless of the presence of inflammation in periodontal tissues, may influence the amount of gingival recession. However, it was suggested that the level of crowding that poses a risk differs between the maxillary and mandibular anterior teeth, with mandibular crowding potentially presenting a higher risk compared to maxillary crowding.

Abstract citation ID: cjae081.052
OP51 INCIDENCE OF GINGIVAL RECESSIONS IN ORTHODONTIC PATIENTS, TREATED WITH FIXED APPLIANCES AND LINGUAL FIXED RETAINER

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AIM: To evaluate possible risk factors in the development of gingival recessions in the six lower anterior teeth, in orthodontic patients after at least five years from the end of treatment with fixed appliances and in the retention period with a fixed lingual retainer.
MATERIAL AND METHODS: This study has been designed as a retrospective longitudinal case-control study of 5-year follow-up data. 186 patients were

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studied, 96 treated patients and 88 from the control group from the Complutense University of Madrid. Demographic, cephalometric, occlusal and periodontal variables were analyzed at three different times: start of treatment, end of treatment and after five years in retention. the student's t test was performed for quantitative variables and Chi2 for categorical variables and the Cochrane Q test for intragroup variables. Multiple linear regression model were also performed.
RESULTS: In the control group the age was higher in the group that presented recession and the skeletal class II values with an increase of recessions. In the treated group, the male group presented a higher number of recessions, the skeletal class II values, the fine biotype and the increased probing depth presented a higher number of recessions. The most affected teeth were the canines and in addition, recessions were significantly increased in all cases of T2 with respect to T1 and T3 with respect to T2 considerably.
LIMITATIONS: The study has two limitations: the fact that it is a retrospective study per se and the cross-sectional follow-up of the control group.
CONCLUSIONS: Orthodontic treatment and the retention phase may be risk factors for the development of gingival recessions. The age, gender, skeletal pattern, gingival biotype and probing depth may be determining factors in the occurrence of gingival recession in the retention period.

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OP52 A CROSS SECTIONAL EVALUATION OF THE ASSOCIATION BETWEEN ORTHODONTIC TREATMENT, RETENTION MODALITY AND THE PREVALENCE OF GINGIVAL RECESSION.

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BACKGROUND: The prevalence of gingival recession in orthodontically treated patients and the effect of retainer type on its occurrence remain poorly-understood.
AIM: We aimed to investigate the association between previous orthodontic treatment and retainer type on the prevalence of gingival recession in the long term.
METHODS: We included subjects both with and without a history of previous orthodontics (at least 5 years post-treatment). The periodontal status and the presence of gingival recession were recorded. A Generalized Estimating Equation (GEE) logistic regression model was used to examine the effect of the mode of retention and tooth type on recession adjusted for age, gender, and gingival phenotype.
RESULTS: A total of 251 patients (mean age of 32±9.43 years) were included. Ninety-nine (39.4%) had a history of orthodontics with observation period of 15.7 years. Those undergoing orthodontics followed by fixed retention had the highest prevalence of recession. A history of orthodontics followed either by removable (Odds ratio: 2.76; 95% CI: 1.59; 4.81; P<0.001) or fixed retention (Odds ratio: 2.13; 95% CI: 1.20; 3.79; P= 0.010) was statistically associated with the occurrence of recession. Both age and the presence of a thin gingival phenotype were significant predictors for recession (P <0.001). The adjusted probabilities of recession per tooth indicated that the lower central incisors had the highest probability for recession, with either a fixed or removable retainer.
LIMITATIONS: This is a cross sectional study and therefore may have been susceptible to selection bias, although participants were enrolled consecutively. Some confounder factors may have not been adequately controlled, including home oral hygiene practices. Moreover, a wide age range spanning teenager to adulthood was included. Nevertheless, a large sample allowing for both evaluation of the effects of fixed and removable retention, and indeed permitting particularly prolonged evaluation, was possible.
CONCLUSIONS: Based on this observational study the provision of orthodontic treatment followed by removable or fixed retention had a bearing on the occurrence of recession. The etiology of gingival recession is multifactorial with a thin periodontal phenotype, age and smoking history being risk factors, while mandibular central incisors are the most susceptible site.

Abstract citation ID: cjae081.054
OP53 IS COMBINING ORTHODONTIC AND PERIODONTAL TREATMENT FOR PATIENTS WITH SEVERE (STAGE IV) PERIODONTITIS ASSOCIATED WITH ANY ADDED BENEFITS?

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BACKGROUND: Stage IV periodontitis is characterized, apart from high severity / complexity (attachment loss, radiographic bone loss, and deep probing depths), from loss of multiple teeth and / or alterations of the masticatory function. Periodontitis stage IV patients are often characterized by pathologic tooth migration, including posterior bite collapse pathologically migrated teeth, posterior bite collapse, secondary occlusal trauma, drifting, and flaring. These act as complexity factors not only for the management of periodontitis, but also for the prognosis of the whole dentition, and the majority of these patients present secondary malocclusions that require interdisciplinary treatment with orthodontics.
AIM: Aim of this systematic review with meta-analyses was to investigate if combining periodontal anti-inflammatory treatment for stage IV periodontitis with orthodontic correction of the underlying malocclusion is beneficial to the patient.
METHODS: Nine databases were searched up to November 2023 for randomized/non-randomized clinical studies on the combined periodontal-orthodontic treatment for stage IV periodontitis patients with pathological tooth migration. After duplicate study selection, data extraction, and risk-of-bias assessment, random-effect meta-analyses of mean differences (MDs) / Standardized Mean Differences (SMDs) / Odds Ratios (ORs) and their 95% confidence intervals (CIs) were performed.
RESULTS: Forty studies were included, covering a total of 1608 patients, 38.9% male, and with average age of 44.8 years. Compared to periodontal treatment alone, the combined periodontal-orthodontic treatment was associated with improved clinical attachment level (MD:-0.35; 95%-CI:-0.55 to -0.14; P<0.001), pocket probing depth (MD:-0.67; 95-CI:-1.07 to -0.27; P=0.001), gingival inflammation (SMD:-2.17; 95-CI:-2.71 to -1.63; P<0.001), radiographic bone level (MD:-0.06; 95-CI:-0.11 to -0.01; P=0.01), tooth mobility (OR:0.20; 95-CI:0.08 to 0.52; P<0.001), treatment failure (OR:0.14; 95-CI:0.05 to 0.42; P<0.001), and patient-reported outcomes of mastication / fixation / esthetics / comfort (MDs:0.41-0.71; P<0.001).
LIMITATIONS: The orthodontic management of these patients is complex and requires coordination between the periodontal and orthodontic specialist, while careful considerations pertaining to appliance choice and mechanotherapy, as well as post-treatment maintenance protocols are needed.
CONCLUSIONS: Orthodontic treatment is beneficial in the treatment of adult patients with severe (stage IV) periodontitis in terms of periodontal outcomes, patient satisfaction, and long-term stability.

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OP54 RISK OF ALVEOLAR BONE LOSS DURING ORTHODONTIC TREATMENT OF LOWER ANTERIOR TEETH – A PROSPECTIVE CBCT STUDY ON PREDISPOSING FACTORS

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BACKGROUND: Larger degrees of tooth movements in thin alveolar bone may exceed limits of bony envelope, cause fenestrations and dehiscences, which consequently increase risk for gingival recession and overall long-term prognosis.
The aim was to study changes of alveolar bone level (ABL) of lower anterior teeth (AT) during orthodontic treatment (OT) and predisposing factors for the ABL loss.
METHODS: The study included 141 patients, ≤18 years, with Class I malocclusion, maxillary and/or mandibular AT crowding that required extraction of four premolars. ABL measurements on lower AT were performed on CBCT images before (T0) and after (T1) OT. Changes in ABL height and the presence of ABL at three different levels (marginal ABL at 2 mm from CEJ, at halfroot and apical level) were analysed. Factors, such as facial height, pre-treatment buco-lingual ABL width, inter-canine distance, Little's irregularity index, gender and age were also analysed.
RESULTS: Mean loss of ABL (T0-T1) was found on lingual (4.1 mm, SD 3.70) and buccal (1.1 mm; SD 2.13) surfaces (p<0.05) of all lower AT, significantly

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more on incisors (p<0.05). Already pre-treatment 1/3 of lingual and buccal surfaces of central incisors had missing marginal alveolar bone at 2 mm from CEJ. Change (T0-T1) in the presence of lingual marginal ABL in central and lateral incisors was >50%, however change (T0-T1) in presence of buccal marginal ABL was significantly less (>15%) (p<0.05). Change in the presence of marginal ABL on buccal and lingual surfaces of lower canines was only up to 15%. At halfroot level ABL coverage was lost in >70% of lingual surfaces of lower central incisors and >50% of lingual surfaces of lateral incisors. Bucco-lingual ABL width at apical level and 20 mm inferior CEJ, also facial height were predisposing factors for ABL loss on lingual and/or buccal surfaces, with more tendency to ABL loss in increased facial height and narrow ABL cases.
CONCLUSIONS: OT with lower premolar extractions has increased risk for lingual ABL loss of lower incisors. Facial height and bucco-lingual width of alveolar process at apical level and at the level 20 mm inferior CEJ were predisposing factors for ABL loss.

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OP55 LONG-TERM IMPACT OF ORTHODONTIC TREATMENT ON GINGIVAL RECESSION IN ADULTS WITH COMPROMISED ANTERIOR TEETH: A RETROSPECTIVE STUDY

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AIM: Occurrence of gingival recessions, a clear sign of loss of periodontal support, is a risk of orthodontic and periodontal treatment. This study compared risk for long term development and increase of recessions after orthodontic and/or periodontal treatment of periodontally compromised patients, by measuring gingival recessions. Risk factors comprised orthodontic treatment, original periodontal condition assessed on intra-oral photographs, individual teeth, length of observation period, patient age and gender.
MATERIALS AND METHOD: This retrospective study involved 109 periodontally compromised adult patients who underwent extensive perio-treatment, 52 also received orthodontic treatment and permanent fixed retention, in 57 the malocclusion was maintained. In all patients the presence and size of gingival recessions of anterior upper and lower anterior teeth was examined on intraoral photographs at the start (T0; 41-66 yrs.), at the end of orthodontic and/or periodontal treatment (T1) and after 8(4-26) yrs.(T2). Associations between the multiple variables were evaluated with multiple regression analyses, Spearman's rank and Pearson's correlation coefficients and Eta coefficients.
RESULTS: During the whole period (T0-T2) Recession size at maxillary central incisors and cuspids and for all lower teeth increased significantly more in the group with orthodontic treatment At T2 only the mean recession size of lower teeth in the orthodontic group was significantly (0.4mm) larger than in the non- orthodontic group. The frequency of recessions at T2 was significantly larger in the ortho group for Ci en I2s (60% versus 40%). The increase of recession size frequency of the orthodontically treated lower teeth occurred largely post-treatment, the same was the case for frequency increase for Ci and I2s. The increase of gingival recession size during treatment in the lower jaw was negatively correlated (R:-0.40) with recession size at T0 in both groups. Only for the orthodontic group the patient age at T0 was correlated (R: 0.30) to recession size increase during treatment (T0-T1)
CONCLUSION: Additional Orthodontic treatment after perio-therapy affected the occurrence and amount of gingival recession in adult periodontal patients. However, the long-term (clinically almost negligible) recession size difference between the orthodontic and non-orthodontic groups outweighs the functional and esthetic advantages of orthodontic treatment results.

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OP56 ORTHODONTIC TOOTH MOVEMENT THROUGH REGENERATIVE SITES: A 25-YEAR SYSTEMATIC REVIEW

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BACKGROUND: Alveolar bone defects can be present from congenital or acquired causes. Clinically, orthodontic tooth movement (OTM) through areas of bony defects may be impaired and has been shown to increase the risk of gingival recessions, periodontal pockets, root resorption, and loss of pulp vitality, unless re-establishment of the alveolar bone width and height has been accomplished either by spontaneous healing or with the aid of bone grafts, before OTM. Despite its popularity, limited work has been done on the impact of different bone regeneration materials on OTM.
AIM: To investigate the efficacy of OTM through bone regenerated with osteoconductive grafts, as well as the risk of root resorption (RR), in relation to the type of graft material and the timing of force initiation.
METHODS: Following PRISMA-ScR guidelines, three major electronic databases were searched (PubMed, EMBASE, and Cochrane). Only studies that reported on the primary outcome (OTM rate) were included. Investigations with less than 3 participants/group or a lack of control group were excluded.
RESULTS: The final sample consisted of 16 randomized and controlled clinical trials. Among them, 9 reported on RR (the secondary outcome). The articles showed substantial heterogeneity and low to moderate quality. Most studied OTM through alloplasts (7) and xenografts (8), 3 addressed allografts, 3 autografts, and 6 analyzed 2 grafts. Timing of force initiation varied from 0 to 13 weeks post-grafting. CONCLUSIONS: The type of graft material may affect the OTM rate and therefore should be chosen by the surgeon in cooperation with the orthodontist. The risk for RR does not seem to be increased by the presence of the graft. Ideally, OTM should be initiated after a period of bone healing and regeneration, which depends on the material rate of degradation and the metabolism of each species.
There is no need to wait for full bony healing since mechanical forces stimulate bone remodeling and regeneration as well as graft degradation. However, due to the limited and poor-quality evidence, future studies are mandatory for deciding on the ideal graft and timing for optimal OTM in each clinical setup.

Abstract citation ID: cjae081.058
OP57 DO WE NEED TO SANDBLAST OR JUST PUMICE THE ENAMEL SURFACE BEFORE BONDING OUR LOWER RETAINERS? A SINGLE-OPERATOR 2-ARM 18-MONTH 88-PATIENT RANDOMIZED CONTROLLED TRIAL.

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AIM: To compare over an 18-month period the bonding failure rate of lower canine to canine Zachrisson-type retainer after either sandblasting or pumicing the enamel surface prior to bonding.
MATERIAL AND METHODS: Ethical approval was obtained. Patients about to enter their retention phase after having undergone orthodontic treatment, were recruited from October 2019 to January 2021 at the local University hospital. Patients were block-randomized either in the 50µ aluminum oxide particles sandblasting group (experimental) or in the pumicing group (control). Eligibility criteria included minimal age of 11, presence of all mandibular incisors and canines, no active carious lesion, no restoration nor periodontal disease. All wires were bonded by the same operator. Primary outcome was any first-time bonding failure of the retainer, which was recorded by two assessors at 3, 6, 9, 12, 15, 18 months after bonding. Wire factures and unexpected adverse movements were recorded as secondary outcomes. Randomization sequence was generated via the CleanWeb® platform by blocks of variable size. Assessors and statistician were blinded to group assignments. Groups were compared with a Pearson's $\chi 2$ test. A Kaplan-Meier survival analysis was performed, and groups compared with a Log-Rank test.
RESULTS: Eighty-eight patients (mean age: 16.5, S.D. ±4.5) were recruited and forty-four patients randomized in each group. Eighty-two patients (experimental: 38, control: 44) were finally analyzed. At 18 months, the number of first-time bonding failure was respectively 3 out of 38 (7.9%) and 11 out of 44 (25.0%) among the sandblasting and pumicing groups (Pearson's χ^2 test, p=0.04). Relative risk with 95% CI was 0.32 [0.10-0.96]. The 18-month survival 93% rate in the sandblasting group was significantly different from the 75% rate in the pumicing group (Log-Rank test, p=0.02). No single wire fractured during this 18-month follow-up. No serious harm was observed except some dental unexpected adverse movements in 7.1% patients.
LIMITATIONS: 2 recent RCT's which do not share the same methodology, do not reach to the same conclusion.
CONCLUSIONS: Enamel sandblasting leads to a statistically and clinically significant 3-fold reduction in bonding failure rate of lower bonded retainers, compared to simple pumicing.
TRIAL REGISTRATION: ClinicalTrials.gov ID NCT03954145.
FUNDING: none.

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OP58 EFFECTIVENESS OF TECHNOLOGY ENHANCED LEARNING IN ORTHODONTIC TEACHING

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AIMS: Technological advancements in teaching have made significant improvements over the past decade and have been incorporated in institutions to aid the learner's experience. This review aims to assess whether Technology Enhanced Learning (TEL) pedagogy is more effective at improving students' attitude and knowledge retention in orthodontic training than traditional methods.
METHODOLOGY: The searches comprised of Systematic Reviews (SRs) related to the comparison of TEL and traditional teaching methods from the following databases: PubMed, SCOPUS, Medline and Embase. One researcher performed the screening, data extraction and analysis and assessed the risk of bias and quality using A MeasSurement Tool to Assess systematic Reviews 2 (AMSTAR-2). Kirkpatrick's 4-level evaluation model was used to evaluate the educational values.
RESULTS: A sum of 34 SRs were identified after removal of duplications and irrelevant SRs; 4 fit the inclusion criteria. On Level 1, students showed positivity to TEL methods, although acknowledging that the harder the platforms to use, the less favourable. Nonetheless, the students still showed high levels of acceptability. Level 2 showed there is no significant overall advantage of increased knowledge when it comes to TEL methods. One SR showed that certain aspects of study within orthodontics deliver a statistical improvement with TEL. Level 3 was the least reported on. Results showed that if left without time restrictions, TEL methods may be advantageous. Level 4 shows that both methods are equally as effective, but TEL has the potential to overtake traditional methods in the future as a form of active, student-centred approach.
CONCLUSION: TEL has a high level of acceptability and potential to improve learning in orthodontics. Current reviews have potential to be improved, but the biggest aspect that needs to be addressed is the primary study, which shows a lower level of evidence and heterogeneity in their results. As it stands, the replacement of traditional methods with TEL cannot be fully supported in an evidence-based manner. The potential of TEL methods has been recognised and is already starting to show some evidence of the ability to be more effective in some aspects of learning to cater for a more technology savvy generation.

Abstract citation ID: cjae081.060
OP59 CLINICAL IMPLICATION OF SPHENO-OCCIPITAL SYNCHONDROSIS FUSION

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OBJECTIVE: The purpose of this study was to characterize the spheno-occipital synchondrosis fusion (SOSF) from pre-adolescents to young adults.
MATERIALS/METHODS: A total of 630 Korean subjects (308 men, 322 women; age range, 6–18 y) were divided into 26 groups according to sex and age. After 3-dimensional computed tomography (CT) images were reoriented using the Frankfort horizontal (FH) plane, mid-sagittal plane, and frontal plane via ON3D software (3DONS), the cervical vertebrae maturation index (CVMI) and SOSF stages were identified using 6-stage and 5-stage scoring systems, respectively. The distributions of stage in each group were statistically investigated.
RESULTS: Women showed early appearance and a short range of onset (CVMI stage 2, SOSF stage 2), middle (CVMI stage 4, SOSF stage 3 and stage 4), and completion (CVMI stage 6, SOSF stage 5), indicating rapid skeletal maturation compared with men. In both males and females, there were strong positive correlations between age and CVMI stage (rs = 0.902, rs = 0.890), between age and SOSF stage (rs = 0.887, rs = 0.885), and between CVMI and SOSF stages (rs = 0.955, rs = 0.964) (all P < 0.001). The mean ages at SOSF stage 3 and stage 4 (12.7~13.9 y in males and 11.0~12.5 y in females) could be used as indicators of the pubertal growth peak. Regression equations for SOSF stage (y), age (a), and CVMI stage (b) were as follows: y = 1.355–(0.133×a)+(0.29007×b)+(0.041×a×b) for males (r2 = 0.9496); y = 1.305–(0.158×a)+(0.455×b)+(0.036×a×b) for females (r 2 = 0.9606). Ordinal logistic regression analyses with the proportional odds model showed that females had more advanced SOSF stages than males (odds ratio: 1.972; 95% CI: 1.063–3.658, P < 0.05).
CONCLUSION/IMPLICATION: In terms of clinical implication, our findings may provide basic references for the stages of skeletal maturation in normal adolescents as well as syndromic craniosynostosis patients.

Abstract citation ID: cjae081.061
OP60 PALATAL RUGAE CHANGE SHAPE FOLLOWING ORTHODONTIC TREATMENT

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BACKGROUND/OBJECTIVES/AIMS: Palatal rugae are anatomical landmarks located on the mucosa of the hard palate, with various applications in forensics, insertion of mini-screws, and superimposition. So far, there is ambiguous evidence regarding the extent of changes in palatal rugae during orthodontic treatment. The objective of the present study was to investigate changes in the shape and complexity of palatal rugae following orthodontic treatment with and without extractions.
MATERIALS/METHODS: Pre- and post-treatment plaster models of maxillae from 28 cases involving first premolar extractions (17 females and 11 males) and 33 non-extraction cases (19 females and 14 males) were scanned and analyzed. The patients ranged in age from 10 to 29 years. We applied mesh cropping, ball pivoting, distance mapping, contour cropping of rugae, best-fit superimposition, and fractal dimension (FD) analysis. The average distance between corresponding points of the outlines of pre- and post-treatment palatal rugae (indicating shape change) and the disparity in their pre- and post-treatment FDs (reflecting the complexity of their shapes) were then computed.
RESULTS: The average distance between pre- and post-treatment outlines was 0.415±0.117 mm and 0.302±0.13 mm for the extraction and non-extraction groups, respectively, revealing a statistically significant difference between them ($p<0.001$). Furthermore, the average pre-treatment FDs were 1.499±0.031 for the extraction group and 1.485±0.037 for the non-extraction group, while their average post-treatment FDs were 1.498±0.04 and 1.484±0.043, respectively. Nevertheless, the differences between pre- and post-treatment fractal dimensions were not found to be significant either within each group, or across the groups.
CONCLUSIONS: Palatal rugae change shape during orthodontic treatment, but their shape complexity, as measured by the fractal dimension, remains unaltered. Extraction treatment exerts a more pronounced effect compared to treatment without extractions. Although the changes are small, caution is necessary when using rugae for superimposition and forensic dentistry purposes.

Abstract citation ID: cjae081.062
OP61 APPLICATION OF ORTHODONTIC FORCE ON AUTOTRANSPLANTED TEETH

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BACKGROUND: Tooth autotransplantation (TAT) serves as a biological option for replacing missing teeth and often requires orthodontic treatment. The scarce literature suggests that orthodontic force helps preventing ankylosis of autotransplanted teeth, but applying orthodontic forces too early and for too long may lead to undesirable outcomes, such as root resorption or pulp necrosis.
AIM: This prospective study aims to assess the impact of orthodontic force application on autotransplanted teeth, exploring the effect of the time lapse between surgery and orthodontic force initiation on root development of autotransplanted teeth.
METHODS: Root development post-surgery was assessed by measuring the root-to-crown ratio on a total of 291 periapical radiographs prospectively collected from 52 patients who underwent autotransplantation of 59 premolars to central incisors. Radiographs were prospectively collected at a biyearly basis until the end of orthodontic treatment.
RESULTS: Teeth subjected to orthodontic forces shortly after transplantation (6 weeks after surgery) tended to exhibit shorter roots compared to those with delayed force initiation. Later application of orthodontic forces also resulted in a cessation of root growth, albeit occurring after an initial growth period post-surgery.
LIMITATIONS: The study used 2D radiographs. While 3D imaging provides a more comprehensive view, its increased radiation exposure raises ethical concerns, particularly in longitudinal studies involving multiple radiographic assessments in children. Additionally, the study's relatively small sample size, although substantial in the context of autotransplantation, limits broad generalizations. Also, responses to orthodontic force initiation varied among transplanted teeth. This diversity in outcomes may be attributed to factors like donor tooth characteristics and patient-specific variables.
CONCLUSION: Early initiation of orthodontic treatment post-autotransplantation led to a cessation of root development, resulting in shorter roots over time. This study underscores the critical importance of carefully timing orthodontic interventions in autotransplantation. Further research should focus on refining our understanding of the specific impact of timing of orthodontic force application after tooth transplantation.

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OP62 IMMUNE RESPONSE TO MULTIBRACKET APPLIANCE TREATMENT. IS IT A MATTER OF METAL ION RELEASE CONCENTRATION OR SENSITIZATION? A PILOT STUDY.

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BACKGROUND/AIM: Modulating endogenous and exogenous factors regulate the corrosion behaviour of orthodontic alloys and, hence, the ion release. Experimental and clinical data summarized concentrations below potentially toxic levels that trigger allergic alterations or even minor systemic symptoms. Therefore, this prospective cohort aimed to explore the long- and short-term immune system response in patients treated with multibracket appliances (MBA).
MATERIAL/METHODS: Thirty adults aged 18 - 35 with no dental restorations were divided equally into three groups (G). Patient groups at the end (G1) and at the beginning (G2) of MBA treatment and a non-treated control group (G3) were evaluated at four time points (T1 – T4) in a 21-day observational period. Anamnesis and intraoral examination were conducted. Unstimulated saliva and blood samples were collected. Multielement analyses to determine the ion release in the saliva (25 metals), blood toxic metal analyses (28 metals), and metal lymphocyte transformation tests (14 metals) were carried out.
RESULTS: Saliva analysis showed an increased nickel ion release in all three groups with significant fluctuations ($p \leq 0.001$) in G1 and G2 at T2. A significant increase in gold, antimony, and aluminium was observed in G1 and G2 at T2 compared to the control (G3) ($p \leq 0.001$). Blood values demonstrated only a few deviations from the reference laboratory range. Patients with type IV hypersensitivity were observed in all groups: one in G1, five in G2, and four in G3. Two more patients (G1) developed borderline sensitization. All nickel-sensitized patients, but one, showed saliva values above the reference but not in the blood. The same applies to one borderline gold-sensitization. The patient most sensitized to nickel had low ion saliva loads. No deviations from the allowed upper dose were recorded in palladium- and mercury-sensitized patients.
CONCLUSIONS/IMPLICATIONS: MBA may affect immune system reaction (Type IV sensitization), which appears independent of the ion concentration levels. Prolonged ion release triggered the immune responses. Modulating factors that may stimulate the metal ion release, metal safety factors, and the long-term systemic or immune responses should be further evaluated. Orthodontic materials selection for an optimal customized approach should be considered, especially in patients with underlying health conditions.

HOUSTON POSTERS

Abstract citation ID: cjae081.064
HP1 STATIC MECHANICAL PROPERTIES OF A NOVEL RESIN FOR ALIGNERS DIRECT PRINTING AT DIFFERENT PRINTING RESOLUTIONS AT ROOM TEMPERATURE AND COMPARED TO ANOTHER RESIN

Prof Marco Migliorati[1], Dr Sara Drago[1], Davide Pastorino[1], Anna Fortunato[1], Prof Alberto Lagazzo[1]; [1]*Genova University*

AIM: The conventional clear aligners production technique is based on vacuum thermoforming with thermoplastic material molding on physical models of the dental casts. Recently, biocompatible photopolymer materials have been introduced and direct 3D printing of aligners has been made possible. The aim of the present study is to provide a characterization of the mechanical properties of a novel resins for direct 3D printing of aligners at two different resolution settings, and to compare its mechanical properties to another material dedicated to direct 3D printing.
MATERIALS: Three different materials were examined: Tera Harz TC-85 resin samples printed at a 100 µm resolution, Tera Harz TC-85 resin samples printed at a 50 µm resolution and Senartek Clear-A printed at a 50 µm resolution. In order to carry out the tests, dog-bone and parallelepiped samples were prepared. The Zwick/Roell Z0.5 machine (full scale range 500N) was used to apply a tensile test on the samples until rupture and a bending test at room temperature (21°C). An additional Tera Harz TC-85 resin group of samples printed at a 100 µm resolution was tested at 37°C. A blinded statistical analysis was performed. Data were tested for normality. Differences among groups were evaluated using the Kruskal-Wallis rank sum test, and multiple post-hoc comparisons were carried out with the Bonferroni method. Results are expressed as median and interquartile ranges, and differences with a p-value <0.05 were selected as significant.
RESULTS: A significant difference was found among groups at room temperature in Elastic modulus ($p = 0.001$), Ultimate tensile strength, Fracture elongation and Fracture tensile strength. Particularly, Clear-A showed a significant difference with respect to TC-85 printed at the same resolution.
CONCLUSIONS: No significant differences were found in the mechanical properties of TC-85 printed at different resolutions. In all tests Clear A samples showed a higher elastic modulus and a shorter plastic plateau. The preliminary tests at 37°C (performed on TC-85 only) suggest that the elastic modulus of this material may change according to the temperature.

Abstract citation ID: cjae081.065
HP2 OCCLUSAL CHARACTERISTICS IN MODERN HUMANS WITH TOOTH AGENESIS

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AIM: Although tooth agenesis has been linked to a smaller craniofacial size, reduced facial convexity and a shorter skeletal face, the occlusal characteristics of individuals with tooth agenesis remain largely unexplored. The aim of this study was to investigate potential associations between tooth agenesis and occlusal traits in a large sample of modern humans.
MATERIAL AND METHODS: The study sample comprised 402 individuals with permanent tooth agenesis (238 females, 164 males) and 404 matched individuals without tooth agenesis, not considering third molars. These were selected consecutively without considering any malocclusion traits. Dentoskeletal morphology was defined through twelve skeletal and dental anatomical landmarks on pre-treatment cephalometric radiographs. The effect of missing teeth on occlusal, dentoalveolar, and dentoskeletal traits was evaluated with three multivariate regression models, adjusted for the effects of sex and age factors.
RESULTS: Tooth agenesis was significantly associated with a reduced overjet, an increased interincisal angle, and shorter upper and lower dental arch lengths ($P \leq 0.001$), but not with overbite ($p=0.256$). The following measurements were also significantly reduced in individuals with missing teeth: U1 to palatal plane angle, U1 to palatal plane distance, U6 to palatal plane distance, L6 to mandibular plane distance, L1 to mandibular plane angle, and L1 to mandibular plane distance ($P<0.05$). The sagittal positions of U1 to the craniofacial complex and to the face were progressively retruded as the number of missing teeth increased ($P<0.05$).
CONCLUSIONS: Tooth agenesis has a substantial influence on dental and occlusal characteristics, as well as on the sagittal position and inclination of anterior teeth. The detected associations emphasize the necessity for personalized, multidisciplinary approaches in individuals with multiple agenesis to achieve optimal anterior teeth positioning, as well as sufficient lip support, and successfully meet treatment goals.

Abstract citation ID: cjae081.066
HP3 MASSETER MUSCLE THICKNESS BEFORE AND AFTER THE CORRECTION OF UNILATERAL FUNCTIONAL POSTERIOR CROSSBITE IN GROWING INDIVIDUALS: A PROSPECTIVE CONTROLLED STUDY

Mrs Fara Beltrami[1], Professor Stavros Kiliaridis[1,2], Professor Gregory Antonarakis[1]; [1]*Division of orthodontics, University clinics of dental medecine,* [2]*Department of orthodontics and dentofacial orthopedics*

AIM: To evaluate whether oral functional asymmetry in children with unilateral functional posterior crossbite creates an asymmetry in the masseter muscle thickness, and whether this asymmetry is normalised after crossbite correction and elimination of the mandibular functional shift.
MATERIALS AND METHODS: Two groups of growing individuals were studied prospectively: (1) treatment group: children with unilateral posterior crossbite associated with a mandibular functional shift, undergoing crossbite correction with maxillary expansion; and (2) control group: children without transversal malocclusions followed up over the same period of time without any orthodontic treatment. The thickness of the masseter muscles was measured bilaterally using ultrasonography recordings at three time points: pre-treatment (T0); nine months after (T1); and two and a half years after posterior crossbite correction (T2). Differences between the groups and the presence of asymmetry before and after treatment were evaluated using paired and unpaired t-tests.

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RESULTS: Bilateral asymmetry in masseter muscle thickness was found in the "crossbite" group at T0. It was found that the thickness of the masseter muscles on the crossbite side was significantly thinner than on the contralateral normal side (p=0.013). No statistically significant difference was found in the thickness of the masseter muscles between the left and the right sides in the control group. At T1, no statistically significant differences were found either for the thickness of the masseter muscle between the former crossbite side and the normal side in the "crossbite" group, or between the left and the right sides in the control group. These results remained stable at T2.
CONCLUSIONS: The masseter muscles in untreated individuals with unilateral posterior crossbite associated with mandibular shift are thinner in the crossbite side than in the contralateral non-crossbite side. This muscular asymmetry in the "crossbite" subjects however is eliminated some time after successful treatment of this malocclusion, possibly due to the bilateral symmetrisation of the activity of the elevator masticatory muscles after crossbite correction.

Abstract citation ID: cjae081.067
HP4 THE ACCURACY OF INVISALIGN IN BILATERAL 1ST PREMOLAR EXTARCTION CASES. A THREE-DIMENSIONAL RETROSPECTIVE, COHORT STUDY.

Dr Maria Zyli[1], Dr Vasiliki Sophocleous[2], Assistant Professor Christodoulos Laspos[1], Professor Nikolaos Pandis[3], Dr Alexandra K. Papadopoulou[4]; [1]*European University of Cyprus, School of Dentistry,* [2]*International University of Catalunya,* [3]*Department of Orthodontics. University of Bern,* [4]*Division of Orthodontics, University of Geneva*

BACKGROUND/OBJECTIVES/AIMS: Assess any discrepancy between the ClinCheck prediction and the exact result in bilateral 1st premolar extraction cases treated with Invisalign.
MATERIALS/METHODS: The database of a private practice was independently searched for cases that had been treated with bilateral 1st premolar extractions from 2016 to 2022. The initial ClinCheck prediction model and the intraoral scan of the achieved result were retrieved at the end of the first set of aligners and prior to any refinement. Superimposition of the digital models was performed with the surface-based approach using the Viewbox software, programmed to calculate the differences in torque, tip and rotation of all teeth up to the 1st molars. The entire sample was measured twice by 2 calibrated assessors independently.
RESULTS: A total of 60 extraction cases were retrieved with 24 cases being eligible for inclusion. Sixteen cases had all 1st premolars extracted, 1 case had only upper 1st premolars extracted, and 7 cases had only lower 1st premolars extracted. The agreement between (ICC 0.96-0.99) and within the assessors (ICC 0.93-0.99) was excellent. There was a mean difference between the prediction and the actual result with loss of incisors torque (tooth11: -6.68°, tooth21: -6.71°, tooth12: -3.68°, tooth22: -4.7°, tooth 31: -3.32°, tooth41: -3.65°, tooth32: -3.06°, tooth42: -3.34°), mesial tipping of 1st molars (tooth16: 8.96°, tooth26: 7.73°, tooth 36: 8.76°, tooth 46: 11.24°) and 2nd premolars (tooth15: 6.87° tooth25: 7.16°, tooth35: 11.61°, tooth45: 11.05°) accompanied by distal tipping of canines (tooth13: 7.53°, tooth23: 7.87°, tooth33: 6.01°, tooth43: 3.28°) and lateral incisors (tooth12: 7.81°, tooth22: 6.13°, tooth32: 4.32°, tooth42: 3.45°); however the values varied greatly in response to treatment. Discrepancies were recorded in the rotation control with teeth distal to the extraction spaces (1st molars, 2nd premolars) showing variable mesial rotation and those mesial to the extraction spaces (canines and incisors) showing variable distal rotation.
LIMITATIONS: Retrospective design.
CONCLUSIONS/IMPLICATIONS: The first set of Invisalign aligners could not deliver the prescribed torque, tip, and rotation in 1st premolar extraction cases with clinically important discrepancies between the predicted and the actual result.

CLINICAL POSTERS

Abstract citation ID: cjae081.068
CP1 DOUBLE THE TOOTH; DOUBLE THE TROUBLE ?

DR RANJ ABDULLA[1], DR JOHN LINDEN[1], DR GILLIAN RICHARDSON[1], DR ALISON CAIRNS[1]; [1]*GLASGOW DENTAL HOSPITAL & SCHOOL*

BACKGROUND: Although the exact aetiology is unclear, the tooth resulting from the union of two separate tooth germs (fusion), or the attempted division of a single tooth germ (gemination) is often referred to as a 'double tooth'. With a reported incidence of 0.1% in the permanent dentition and occurring more commonly in the anterior region, treatment for aesthetic, orthodontic or functional reasons may be required.
AIMS: To illustrate challenges in managing a double tooth in the paediatric dental patient.
OBJECTIVES: To highlight the importance of multidisciplinary treatment planning for patients with a double tooth and the range of treatment options which exist
METHODS: The case series explores four cases of paediatric patients with a double tooth in the permanent dentition and highlights a range of presentations of a double tooth and the clinical challenges which they can present. They demonstrate the use of special investigations, including plain film radiographs and cone beam computed tomography (CBCT), to facilitate treatment planning and will discuss the endodontic, restorative, and surgical considerations of such dental anomalies, including the importance of collaboration between paediatric dental and orthodontic teams.
CONCLUSION: Effective management of a double tooth in the paediatric dental patient is often complex. Treatment options rely on a holistic approach with specific consideration regarding patient motivation, and long-term orthodontic and restorative goals to maximise aesthetics and patient satisfaction as the child progresses into adulthood.

Abstract citation ID: cjae081.069
CP2 A PROTOCOL FOR COMPUTER-AIDED DESIGN AND COMPUTER-AIDED MANUFACTURING OF FIXED BONDED STAINLESS STEEL RETAINERS

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BACKGROUND & AIMS: Maintaining a stable result following the completion of orthodontic treatment continues to be one of the biggest challenges within orthodontics. Consequently, the use of retention appliances is essential for maintaining long-term functional and aesthetic outcomes. Fixed retention are commonly used as an effective and reliable form of retention. However, for the clinician fixed retainers can be time consuming to place and technique sensitive. In addition, there are potential risks of unexpected post-treatment tooth movements and debonding. Recent advances in computer-aided design and computer-aided manufacturing (CAD/CAM) presents the opportunity to streamline and simplify the retention phase of orthodontic treatment by digitally scanning and fabricating retainers . It has been shown that CAD/CAM fixed retainers result in a lower incidence of debonding and less relapse in intercanine width than compared with traditional flexible multistranded stainless steel retainers. We present a novel method for the fabrication of stainless steel bonded fixed retainers using CAD/CAM.
We aim to present a protocol used for the fabrication of stainless-steel bonded retainers using computer-aided design and computer-aided manufacturing (CAD/CAM).
METHODS: The fabrication of the stainless steel (SS) retainer involves scanning of the patient at their last visit prior to debonding. The brackets are debonded digitally using a combination of manual adjustment of the scan and edit modules available on the Onyx Ceph software. The scanned models are then blocked out. Utilising a three-point approach the retainer is designed to specification and a block out is incorporated into the design to allow for the composite bonding process. The model is now ready for printing. The stainless-steel retainer is then put through an electropolishing process to smooth and round the edges in preparation for fit.
CONCLUSION: We have presented an efficient, streamlined digital workflow for custom CAD/CAM fixed stainless steel retainers to be bonded on the day of debond. Further research is required into the long -term stability and clinical effectiveness of CAD/CAM printed stainless steel retainers

Abstract citation ID: cjae081.070
CP3 HOW COVID-19 PANDEMIA AFFECTED ORTHODONTIC TREATMENT: CASE REPORT

Miss Hatice Kok[1], Mr Hasan Catalkaya[1], Mr Furkan Anil Aksoy[1]; [1]*Selcuk University*

AIM: The aim of this case report is to present the orthodontic treatment of a case of moderate crowding whose treatment had to be interrupted during the pandemic.
MATERIAL/METHODS: The male patient with a chronological age of 15 years and 5 months referred to the Department of Orthodontics. The clinical examination revealed that the patient convex profile, Angle Class

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I malocclusion,3mm overjet, 2.5mm overbite, 5mm maxillary crowding and 3mm mandibular crowding. Cephalometric analysis revealed skeletal Class I malocclusion and vertical growth pattern (SNA:80.5°, SNB:76.7°, ANB:3.8°, Sn-GoGn:40.7°, Mx1-SN:104.8°, IMPA:93.3°, interincisal angle:121.2°). Fixed MBT devices with 0.022-inch slots were attached to the maxillary and mandibular teeth. After the leveling and alignment of the upper and lower arch, the Covid-19 pandemic broke out and the patient missed his appointments for 15 months. When the patient applied to our department, cephalometric analysis revealed that the upper and lower anterior teeth were procline (SNA:80.5°, SNB:77.6°, ANB:2.9°, Sn-GoGn:39.9°, Mx1-SN:107.6°, IMPA:101.9°, interincisal angle:110.7°). Four segment distalization with the help of temporary anchorage device (TAD) was considered. A 0.017 × 0.025-inch stainless steel archwire was inserted and a power arm was placed mesial to the canine. Four 2x12mm mini screws (two infrazigomatic and two buccal shelf) were applied. Closecoil was applied from the miniscrews to the power arms with a force of 50 grams per root.

RESULTS: Total treatment duration was 2 years ands 1 month. A lingual retainer and hawley appliance were applied to the patient for permanent retention. Posttreatment cephalometric analysis results revealed Class I skeletal relationship with SNA:82°, SNB:78.2°, ANB:3.8°, Sn-GoGn:39°, Mx1-SN:102.3°, IMPA: 98.5°, interincisal angle:120.3°. Ideal overjet and overbite were obtained, Class I dental relationship was achieved.

CONCLUSIONS: In orthodontic treatments; the importance of treatment sessions and appointment continuity is very important in preventing undesirable side effects and not prolonging the treatment period. In this unfortunate epidemic that the world experienced, the treatment period was extended due to the concerns experienced by the patients but fortunately it was resolved before major problems occurred.

Abstract citation ID: cjae081.071

CP4 ORTHOPEDIC TREATMENT OF A HYPERDIVERGENT SKELETAL CLASS III MALOCCLUSION USING ALT-RAMEC PROTOCOL AND FACE MASK THERAPY: A CASE REPORT

Mr Furkan Anil Aksoy[1], Mrs Zehra Ileri[1]; [1]*Selcuk University*

AIM: To present the orthopedic treatment of a patient with skeletal Class III and midface deficiency using an alternating rapid maxillary expansion appliance (Alt-RAMEC) and a face mask (RHG).

MATERIALS: Clinical examination of a male patient with a chronological age of 11 years and 3 months revealed maxillary and midface growth retardation, flat profile, mandibular laterognathia, 1.9mm negative overjet, 2mm overbite. De Nevreze maneuver was positive. Cephalometric analysis revealed that he had skeletal Class III malocclusion and vertical growth pattern (SNA:75.5°, SNB:77.1°, ANB:-1.6°, FMA: 31.3°, Sn-GoGn:39.6°, Mx1-SN:102.7°, IMPA:91.4°, interincisal angle:126.3°). After cementation of the bonded appliance with Hyrax screw, the screw was turned ¼ turn twice a day for 1 week until the occlusal radiograph revealed that the midpalatal suture was opened. In order to obtain sufficient transversal width in the maxilla, the screw was activated ¼ turn once a day for 1 week. Afterwards, the use of RHG and the 7 week Alt-RAMEC protocol were started. The RHG was applied at an angle of 25-30° to the occlusal plane and 800g of extraoral force was applied. After a total of 5 months of use of the RHG appliance, molar bands were cemented to the upper first molars, Goshgarian type transpalatal arch was placed and fixed MBT devices with 0.022-inch slots were attached to the maxillary and mandibular teeth.

RESULTS: At the end of the treatment, clinical examination revealed Angle Class I relationship, ideal overjet and overbite, and improvement in profile. Cephalometric analysis showed a skeletal Class I relationship, a clockwise rotation of the mandible and an increase in the Mx1-SN angle (SNA:77.9°, SNB:76.9°, ANB:1°, Sn-GoGn:42.6°, Mx1-SN:109.1°, IMPA:89.5°, interincisal angle:118.7°). Total treatment duration was two years.

CONCLUSIONS: With the Alt-RAMEC protocol, mobilization of the sutures was achieved and the RHG appliance worked more effectively. The combination of Alt-RAMEC protocol and RHG has provided successful results in the orthopedic treatment of skeletal class III malocclusion and is an effective treatment option in the treatment of mild-moderate Class III malocclusion due to maxillary retrusion.

Abstract citation ID: cjae081.072

CP5 A LITTLE BIT EXTRA: CASE SERIES

Dr Malaaika Al-koky[1], Miss Sheena Kotecha, Mr Shane Higgins; [1]*Birmingham Dental Hospital*

BACKGROUND: Supernumeraries affect 2% of the population, with a predilection for the anterior maxilla. The aetiology may be environmental or genetic. Genetic referral should be considered if there are concurrent medical factors, multiple supernumerary teeth or extra-oral features. Supernumeraries may result in crowding, delayed eruption, impaction of adjacent teeth, root resorption or cysts. Careful multidisciplinary planning, supplemented with 3D imaging, is essential to ensure effective treatment.

CASE SERIES: A series of patients with multiple supernumeraries is presented. Four patients aged 7-20 years presented with 7-12 supernumerary teeth in various sites of the maxilla and mandible. Prospective follow up since initial presentation, with conventional and CBCT imaging has been undertaken. The medical history, extra-oral and intra-oral features are documented. Patient 1, female, presents with a mild malocclusion, no impeded eruption of teeth but 12 supernumeraries. Patient 2, male, presents with impeded eruption of UR1, UL1, LR2 and LL2, syndactyly of the toes, upturned earlobes, mild bilateral ptosis, congenital cataracts and aphakic glaucoma. Patient 3, male, presents with un-erupted UR1, supernumeraries that have developed over time, maternal history of stomach cancer with a positive family history of supernumeraries. Patient 4, female, with hereditary genetic fibromatosis and macrodontia, developed supernumeraries during treatment.

MANAGEMENT: All patients have had orthodontic treatment, following CBCT imaging and liaison from Oral Surgery. The decision to retain or remove a supernumerary tooth was based on surgical risks and the effects of orthodontic treatment. All patients have been referred to the Women's and Children's Hospital Clinical Genetics department. Genetic testing identifies gene alteration, variant of unknown significance, genes associated with increased risk of developing cancer and research. This is detected through whole genome sequencing and bloods for genome sequencing microarray.

DISCUSSION: Supernumeraries pose many challenges to orthodontic treatment. This case series encourages a multidisciplinary approach involving surgical colleagues to assist with orthodontic treatment planning. Patients with multiple supernumeraries should be counselled with regards to the benefits of referral to a geneticist for further investigation, potentially assisting with early detection of certain conditions that have lifelong implications.

Abstract citation ID: cjae081.073

CP6 THE DIGITAL SIDE OF ORTHODONTICS: UTILISING QR CODES IN CONSENT

Dr Malaaika Al-koky[1], Dr Reem Al-Koky, Mr Shane Higgins, Miss Sheena Kotecha; [1]*Birmingham Dental Hospital*

BACKGROUND: Obtaining valid consent is a GDC standard. The inclusion of all material risks underpins informed consent. Patient information leaflets (PILs) support the consent process. They are usually provided in paper format. These can be costly, non-environmentally friendly, require storage and can be misplaced. QR codes for PILs can be incorporated into consent forms to overcome the issues with printed leaflets.

AIMS AND OBJECTIVES: To audit the consent process at the Dental Hospital and identify areas of improvement.

METHODS: A 2-cycle audit was undertaken on the pre-existing Orthodontic consent forms. The recording of the treatment plan and options were evaluated. The documented risks, benefits and whether further information provided such as PILs was documented.

RESULTS: Cycle 1: 82% of consent forms had a treatment plan and the benefits of treatment. One third of forms omitted some of the common risks of treatment. The alternative treatment options were not always recorded.

Cycle 2: 100% of consent forms including the treatment plan. 96% listed the benefits. The recording of risks had improved. Breakages, loss of vitality and treatment duration were often omitted. PILs may have been provided but this was not documented.

DISCUSSION: A new standardized consent form has been designed. All of the material risks of orthodontic treatment are included. The consent form includes a patient agreement. QR codes were generated and linked to the British Orthodontic Society PILS are incorporated on the consent form.

CONCLUSIONS: The new consent form ensures all patients obtain the relevant risks and improves the quality of the consent process. Patients can readily access the PILs related to their treatment. The avoidance of printed leaflets supports sustainability. The incorporation of the digital side (QR codes) with the consent form no doubt improves the overall consent process.

Abstract citation ID: cjae081.074

CP7 EFFICIENT CORRECTION OF ADULT ANTERIOR SUPRACLUSION WITH MINI-IMPLANTS: A CASE REPORT

Dr Tarik Barr[1], Dr Zehaira Boukhari[2], Pr Chakib Tahraoui[2], Pr Souad Meddah[1]; [1]*HMUS Staoueli,* [2]*HCA*

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INTRODUCTION: Anterior supraclusion, or excessive overbite, is a common orthodontic malocclusion characterized by an excessive vertical overlap of the upper and lower incisors. It can be caused by a variety of factors, including skeletal discrepancies, dental crowding, and parafunctional habits. Traditional treatment options for anterior supraclusion include orthodontics, orthognathic surgery, or a combination of the two.
MATERIALS AND METHODS: This case report describes the treatment of anterior supraclusion in two adult patients using mini-implants. The mini-implants were used to provide anchorage for orthodontic appliances, which were used to correct the malocclusion. The mini-implants were placed between the central and lateral incisors. The patients were followed for a period of three months.
AIM: To assess the efficacy and effectiveness of mini-screws in the correction of incisor overbite.
RESULTS: At the end of the three-month follow-up period, both patients had achieved significant improvement in their anterior supraclusion. The mean overbite reduction was 4.25 mm in the first patient and 3.5 mm in the second patient. There were no complications associated with the use of mini-implants.
DISCUSSION: The results of this case report suggest that mini-implants are a promising new approach to the treatment of anterior supraclusion. They are a minimally invasive option that can provide effective correction of the malocclusion, with a short treatment time and a low risk of complications.
CONCLUSIONS: Mini-implants are a valuable tool for the effective treatment of anterior supraclusion, particularly in adults. They offer a number of advantages over traditional orthodontic techniques, including: Increased anchorage: Mini-implants can provide significantly more anchorage than conventional orthodontic appliances, making it easier to achieve the desired movements.
SHORTER TREATMENT TIME: Mini-implants can help to shorten the treatment time by allowing for more rapid movement of the teeth.
REDUCED RISK OF COMPLICATIONS: Mini-implants are associated with a lower risk of complications than orthognathic surgery.
KEYWORDS: mini-implants, supraclusion, incisors, ingression

Abstract citation ID: cjae081.075
CP8 EFFECTIVENESS OF ALIGNERS IN OVERBITE TREATMENT: A LITERATURE REVIEW.

Dr Tarik Barr[1], Pr Chakib Tahraoui[2], Pr Souad Meddah[1], Dr Zehaira Boukhari[2]; [1]*HMUS Staoueli,* [2]*HCA*

INTRODUCTION: Overbite is a common malocclusion characterized by an excessive vertical overlap of the upper and lower teeth. It can be caused by a variety of factors, including genetics, thumb sucking, and tongue thrust. Overbite can lead to a number of problems, including dental crowding, speech difficulties, and facial asymmetry.
Traditionally, overbite has been treated with braces. However, aligners are a newer and increasingly popular option. Aligners are clear, removable appliances that are worn for 22 hours a day. They are designed to move the teeth gradually and gently.
A number of studies have investigated the effectiveness of aligners in the treatment of overbite. Aligners are also associated with a number of benefits over braces, including being more comfortable, less visible, and requiring fewer office visits.
MATERIALS AND METHODS: This literature review was conducted to assess the effectiveness of aligners in the treatment of overbite. A search of the PubMed, Scopus, Google Scholar, and Cochrane Library databases was conducted using the following keywords: aligners, overbite, orthodontics, literature review. The search yielded 10 relevant articles, which were reviewed in detail.
RESULTS: The review found that aligners can be effective in treating overbite, but the results were somewhat heterogeneous. Some studies found that aligners were as effective as braces in correcting overbite, while others found that aligners were less effective, especially in severe cases.
The review also found that the success of aligners in treating overbite was influenced by a number of factors, including the severity of the overbite, the age of the patient, and the presence of other dental or skeletal anomalies.
DISCUSSION: The review suggests that aligners can be a viable option for the treatment of overbite in mild to moderate cases. However, more research is needed to determine the effectiveness of aligners in more severe cases.
CONCLUSION: The use of aligners in the treatment of overbite requires careful planning and execution. A thorough diagnosis is essential to determine whether aligners are the appropriate treatment option. The orthodontist should also have a good understanding of the biomechanics of aligners and their limitations.

Abstract citation ID: cjae081.076
CP9 PAEDIATRIC OBSTRUCTIVE SLEEP APNEA SYNDROME AND CRANIO-CERVICO-FACIAL MORPHOLOGY : ABOUT AN ORTHODONTIC CLINICAL STUDY

Dr Keltoum Benmorkat[1], Pr ABDELKADER Boukemouche[1]; [1]*Faculté De Médecine D'alger*

Obstructive Sleep Apnoea Syndrome (OSAS) is a type of sleep-disordered breathing characterized by partial and/or complete upper airway obstruction that affects normal ventilation .
Multiple components are involved in OSAS in children.Pharyngeal and palatine tonsil hypertrophy is the main predisposing factor. Various abnormalities are predisposing factors for obstructive sleep apnoea, such as decreased mandibular and maxillary lengths, skeletal retrusion, increased lower facial height and, consequently, increased total anterior facial height, a larger craniocervical angle, small posterior airway space and an inferiorly positioned hyoid bone.
The diagnosis is based on the clinical history, a physical examination and tests confirming the presence and severity of upper airway obstruction. Attention must be paid to identify the craniofacial characteristics. When necessary, children should be referred to orthodontists and/or sleep medicine specialists for adequate treatment .

Abstract citation ID: cjae081.077
CP10 THE CONE BEAM COMPUTED TOMOGRAPHY DIAGNOSTIC APPLICATIONS : IN THE PERIODONTAL BONE ASSESSMENT AND ORTHODONTIC

Dr Keltoum Benmorkat[1], Dr Kahina Zerouki[1]; [1]*Faculté De Médecine D'alger*

The cone beam Computed tomography accurately and comprehensively defines the proper diagnosis, treatment, and craniofacial anatomy for a good prognosis. CBCT, used in many branches of dentistry, has found itself a broad place in orthodontics in recent years. Orthodontics shifts from lines, lengths, and angles to spaces, surfaces, and volumes. Numerous developments are expected in this field in the future. However, as CBCT generates a high level of radiation despite being a highly beneficial tool, it should only be applied when conventional radiography is insufficient to provide the required information.
Evidence is strong that CBCT imaging potentially could replace 2D in- traoral imaging for most dentoalveolar tasks, especially in endodontic and periodontal applications.
This possibility is especially worthy of consider- ation because mere diagnostic equivalency of CBCT and 2D systems may favor the former because imaging is faster and accompanied by fewer prob- lems of geometric distortion. When considering such a shift in imaging strat- egy, dose and costs must come into consideration, balanced with the perspective that most CBCT studies are easier to perform in a dental office when compared with a full-mouth series of radiographs, or perhaps even a panoramic radiograph with bitewings and selected periapical images.
For now, CBCT imaging, like its medical counterpart, can be seen as a highly useful and, with some tasks, indispensable part of the dental imaging armamentarium.

Abstract citation ID: cjae081.078
CP11 ULTRASONOGRAPHY CONTRIBUTION IN FUNCTIONAL THERAPY

Prof Fouzi BOUKHAZANI[1]; [1]*National Center for Medical Assessment of Aircrew Members*

The masticatory muscles' function and insertion affect the face's morphological features. In orthodontic functional therapy and myotherapy, these muscles are stretched before transmitting the forces to jawbones.
This research aims to evaluate ultrasonography before and after functional therapy to check the masseter response.
To achieve this objective, 11 growing patients have been treated by functional therapy and/or appliances. The masseter thickness has been evaluated before and after the active treatment.
The functional therapy was started at 10.48±1.31 years old. The mean thickness of the masseter before treatment was 7.68± 1.40 mm at rest position. After functional therapy of 3 months, the thickness increased and it was 8.10±0.97 mm at rest position.
In recent decades, electromyography (EMG) was considered the gold standard but recently, Türker reported some methodological problems. Patini et al. state that ultrasonography could be reliable and noninvasive in the evaluation of the muscle's thickness as found in the actual study.
Thus, ultrasonography is a useful tool to check the muscles' response to our therapies. As found earlier, this technique is reliable and noninvasive for children.

Abstract citation ID: cjae081.079
CP12 THE USE OF MINI SCREWS IN BIMAXILLARY PROTRUSION MANAGEMENT

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Bimaxillary protrusion is a condition characterized by protrusion of maxillary and mandibular bones with increased procumbency of the lips. Orthognathic surgery is usually required to correct significant skeletal problems. The aim of this case presentation is to report orthodontic alternative to surgical treatment.
This case report describes the treatment of a 21-year-old man with a skeletal Class I pattern, bimaxillary protrusion and lips incompetence. The compensatory orthodontic treatment included distal movement of the maxillary and mandibular dento-alveolar parts using miniscrews. The total active treatment time was about 13 months. The tooth alignment and profile were significantly ameliorated with an improved lip function.
The litterature reports cases of bimaxillary protrusion with different features related to patients ethnicity. In this case, lips incompetence was the main complaint in addition to the esthetic impact of the protrusion. The surgical approach used to be the solution for adult patients in these cases but in our situation, miniscrews have been used as an anchorage for retraction due to patient's refusal for surgery.
In conclusion, miniscrews helped to achieve esthetic and functional outcomes of treatment thus they can be considered as an alternative for orthognathic surgery in refusals situations.

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CP13 ORTHODONTIC-SURGICAL CORRECTION OF CLASS III SKELETAL MALOCCLUSION THROUGH MAXILLARY ADVANCEMENT, IMPACTION, MANDIBULAR COMPENSATORY ROTATION, AND MENTOPLASTY. CLINICAL CASE.

Miss Nadia Veronica Gonzalez Carrillo[1], Mister Pedro Lara Mendieta[1]; [1]*UNAM*

Deformities dentomaxillofacial are conditions that lead to a disharmony between the maxilla and the mandible, seriously affecting facial appearance, masticatory function, and causing a negative impact on the patient's self-esteem. This clinical case presents a 25-year-old male patient diagnosed with Angle Class III malocclusion, concave profile, dolichofacial facial biotype, vertical and sagittal deficiency in the maxilla, and excessive mandibular growth.
Orthodontic treatment included the use of fixed appliances with a Roth prescription of 0.022" × 0.025". The surgical plan focused on maxillary advancement with a high Lefort I osteotomy, bilateral maxillary impaction, and compensatory mandibular rotation. Two years after surgery, complete aesthetic and functional rehabilitation has been achieved. This has also led to an improvement in the patient's psychological state. The case illustrates the value of treatment in Class III patients and the collaboration between orthodontists and maxillofacial surgeons.

Abstract citation ID: cjae081.081
CP14 ORTHODONTIC MICROSCREW AS A TEMPORARY RESTORATION FOR MAXILLARY CANINE: CLINICAL CASE REPORT

Miss Nadia Veronica Gonzalez Carrillo[1], Miss Fabiola Hernández Girón[1], Mister Henry Paul Sango Muñoz[1]; [1]*UNAM*

The extraction of permanent canines represents an unconventional treatment alternative. However, it can be considered when the position of the retained canine is unfavorable or when anatomical constraints prevent its proper alignment with the arch. Treatment options are limited to implants, or fixed prosthesis. A 13-year-old female patient with an impacted maxillary canine and a dilacerated right upper premolar with a palatal root was presented. A vertical titanium mini-implant was inserted as a temporary restorative option into the edentulous area's alveolar process, followed by the fabrication of a provisional crown. This replacement approach may enhance the vertical development of the alveolar process, maintains bone density, preserves alveolar process morphology, and provided an aesthetic and comfortable alternative for the patient. Vertically TAD's placed may be used as temporary replacement of extracted permanent canines, thus preserving the distance between the pontic, the alveolar mucosa and promoting continuous alveolar vertical development.

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CP15 MODERNISING PATIENT EDUCATION WITHIN THE UNIVERSITY ORTHODONTIC DEPARTMENT: A SUSTAINABLILITY QUALITY IMPROVEMENT PROJECT

Miss Reanna Craig[1], Mr Christopher Johnston[2], Mr Andrew McBride[2], Professor John Marley[2]; [1]*Royal School Of Dentistry,* [2]*Queens University, Belfast*

BACKGROUND: Fixed appliances are the primary treatment method within orthodontics. Patients that undergo treatment within the department receive five pages of prose which details oral hygiene instruction, analgesic dosages, risks of fixed appliance therapy and management of orthodontic emergencies. These pages are folded in half and placed in a non-biodegradable plastic sleeve. This has been the status quo for over twenty years and is extremely wasteful of time, resources and has a detrimental environmental impact.
AIM: This quality improvement project aims to improve patient satisfaction with information packs, reduce material costs and improve departmental efficiency by streamlining information dissemination, making further information available via scannable QR code and ending the use of plastic folders by February 2024.
MATERIALS/METHODS: Data collection began with Microsoft forms patient satisfaction questionnaire to assess suitability of current information sheets. An improved patient information sheet was produced and a scannable QR code produced that directs patients to the online British Orthodontic Society patient information leaflet. This was pilot tested within the department and rolled out to patients. This rollout involved Quality improvement methodology and Plan Study Act Do (PDSA) cycles were used. Data collection continued and the results analysed. A second PDSA based on patient feedback was completed to address poor image clarity. A third PDSA cycle outsourced printing to reduce costs.
RESULTS: - Patient satisfaction questionnaires concluded 95% felt they still were adequately informed, while 5% felt they were better informed about how to manage their fixed appliance.
- Dental nurses' satisfaction questionnaire confirmed this change has reduced time spent in production of previous patient information pack.
- The use of plastic folders has ceased.
- Reduced inventory price by 90%.

CONCLUSIONS/IMPLICATION: This Project has demonstrably improved patient satisfaction with their treatment information.
By reducing reliance on printed material and plastic, there has been a financial and environmental benefit.
Departmental efficiency has been improved by the streamlining of information packs. Stakeholder engagement has been achieved and staff satisfaction has improved.
A further rollout to include Removal Appliance information is planned following the success of this project

Abstract citation ID: cjae081.083
CP16 IMPROVING COMPLIANCE AT RETAINER REVIEW APPOINTMENTS WITHIN THE UNIVERSITY ORTHODONTIC DEPARTMENT: A TWO CYCLE AUDIT

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BACKGROUND: Retainers are essential post-orthodontic treatment to prevent relapse. Orthodontists assume responsibility for patient retention for twelve months once treatment is complete. Patients attend retainer review appointments at three months and twelve months after treatment has been completed. Patients are expected to attend with their retainers to assess for relapse and monitor the condition of their retainers. Whenever patients attend without retainers this causes the need for re-appointment. This wastes valuable resources and prevents patients progressing to discharge.
AIM: To improve compliance at retainer reviews and reduce the number of attendances without retainers.
MATERIALS/METHODS: Data was collected for all retainer reviews over a three month period. Only vacuum formed retainers were included in this audit. A record was kept of if the patient brought their retainer. This data was collated on Microsoft Excel. The intervention was to place a sticker on each appliance box with the message "PLEASE BRING TO YOUR NEXT APPOINTMENT" written in red writing. This has become standard practice within the department.
RESULTS: - Reduced number of patients attending retainer review appointments without retainers.
- All retainer reviews were carried out within this period. Of these eight retainers were forgotten (30%).
- We have been able through this intervention to see a decrease to 12% attending without their retainer.

CONCLUSIONS/IMPLICATION: This audit has demonstrated improved patient compliance with retainer review appointments and reduced the burden for re-appointment. By reducing the requirement for re-appointment, this allows more efficient patient discharge.

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Departmental efficiency has been improved and this simple intervention has allowed us to achieve our aim.

Abstract citation ID: cjae081.084
CP17 TREATMENT OF A PATIENT WITH SKELETAL CLASS II MALOCCLUSION WITH FIXED FUNCTIONAL APPLIANCE: A CASE REPORT

Mrs Hatice Koroglu[1], Mrs Zehra Ilerı[1], Bayan Melike Dogru[1]; [1]*Selcuk University, Faculty of Dentistry, Department of Orthodontics*

AIM: To present the treatment of a patient with a severe skeletal Class II malocclusion with a fixed functional appliance without orthognathic surgery.
MATERIALS: A female patient with a chronological age of 17 years applied to our clinic with the complaint of protruded upper anterior teeth and retruded mandible. Clinical examination revealed a convex profile, Angle Class II malocclusion, flared upper incisors with anterior diastema, a narrowed nasolabial angle and prominent soft tissue chin, 12.6 mm overjet, 4 mm overbite. Initial cephalometric analysis were as follows: SNA: 84.4°, SNB: 79.7°, ANB: 4.7°, SNGoGn: 23.4°, Mx1-SN: 127°, Mx1-NA (Deg): 42.6°, IMPA: 99.2°, Md1-NB (Deg): 22.3°, interincisal angle: 110.4°. In the treatment of the case, leveling was done up to 19x25 SS archwire. Then, a fixed functional appliance with anterior buccal root torque to the mandibular arch wire was applied. Forsus™ Fatigue Resistant Device EZ Module was preferred as the appliance.
RESULTS: Posttreatment cephalometric analysis showed that SNA: 83.1°, SNB: 79.8°, ANB: 3.3°, SNGoGn: 23.8°, Mx1-SN: 104.3°, Mx1-NA (Deg): 21.2°, IMPA: 101.9°, Md1-NB (Deg): 25.6°, interincisal angle: 130°. The patient wore the Forsus appliance for five months and the total treatment period was two years and three months. As a result of the treatment, skeletal and dental Class I relationships were obtained, and overjet and overbite were brought to their normal values. An improvement was observed in the soft tissue profile of the patient.
CONCLUSIONS: Although long-term follow-up results are important, with a careful treatment plan, fixed functional appliances may be an appropriate treatment option for Class II anomalies in young adults. In Class II individuals, where the lower incisors are mostly proclined, wearing an anterior buccal root torque arch wire combined with a fixed functional appliance in mandible reduces incisor proclination.

Abstract citation ID: cjae081.085
CP18 TREATMENT OF A PATIENT WITH SKELETAL CLASS III MALOCCLUSION WITH ORTHOGNATIC SURGERY: A CASE REPORT

Miss Hatice Kok[1], Mrs Hatice Koroglu[1], Mr Hasan Catalkaya[1], Bayan Melike Dogru[1]; [1]*Selcuk University, Faculty of Dentistry, Department of Orthodontics*

AIM: The aim of this case report is to present the fixed orthodontic treatment of a patient with skeletal Class III malocclusion with orthognathic surgery.
MATERIAL/METHODS: A female patient with a chronological age of 18 years and 6 months applied to our clinic with the complaint, her retruded upper teeth and prognathic profile. Clinical examination revealed a concave profile, Angle Class III malocclusion, 0 mm overjet, 0 mm overbite. It was found as a result of the cephalometric analysis: SNA: 79.4°, SNB: 81.9°, ANB: -2.5°, SNGoGn: 35°, Mx1-SN: 107°, Mx1-NA (Deg): 27.6°, IMPA: 83.7°, Md1-NB (Deg): 20.6° ve interincisal angle: 134.4°. After the lower and upper arches were leveled, surgical planning was made. According to the patient's surgical planning; The maxilla was moved 4 mm forward with a Le-Fort I osteotomy.
RESULTS: At the end of thirty six months of treatment, Class I molar-canine relationship and ideal overjet-overbite were achieved. Found in cephalometric analysis after orthognathic surgery: SNA: 83.5°, SNB: 82°, ANB: 1.5°, SNGoGn: 33.9°, Mx1-SN: 106.2°, Mx1-NA (Deg): 24.8°, IMPA: 91.3°, Md1-NB (Deg): 27.3° and interincisal angle: 126.5°.
CONCLUSIONS: At the end of the treatment, Angle Class I molar and ideal Class I canine relationship were obtained. Overjet and overbite have been brought to their ideal values. A positive change was observed in the soft tissue profile of the patient.

Abstract citation ID: cjae081.086
CP19 ORTHODONTIC CAMOUFLAGE OR ORTHOGNATIC SURGERY: A CASE REPORT

Miss Hatice KOK[1], Bayan Hicran Merve Ersen[1]; [1]*Selcuk University*

AIM: To present a case report of the compensation treatment of a patient with skeletal Class III malocclusion who did not want to be treated with orthognathic surgery.
MATERIAL AND METHODS: The male patient with a chronological age of 15 years and 8 months referred to the Department of Orthodontics. The clinical examination showed that the patient had midface and maxillary deficiency with concave profile, Angle Class III malocclusion, -0,5 mm overjet, 2 mm overbite with anterior crossbite. Cephalometric analysis showed skeletal Class III malocclusion and horizontal growth pattern (SNA:83.2°, SNB:87.4°, ANB: -4.2° , Sn-GoGn:24.8° , Mx1-SN:111.4° , IMPA:85.6° , interincisal angle :138.2°). According to hand-wrist radiography, the patient growth period is DP3u. Orthognathic surgery was recommended to the patient for an orthodontic treatment plan, but the patient did not accept it. Then, the case was examinated again and decided to compansate with fixed orthodontic treatment was applied. The patient was imformed about the treatment plan and its possible risks.
RESULTS: Fixed orthodontic treatment with Class III elastics was performed with the Classic 0.22 slot MBT braket system. Anterior crossbite corrected. Ideal canine and molar relationship was achieved. The total treatment duration was 16 months. A lingual retainer was applied to the patient for permanent retention. Posttreatment cephalometric analysis results SNA:85.7°, SNB:88.8°, ANB: -3.1° , Sn-GoGn:25.1° , Mx1-SN:117.1° , IMPA:82°, interincisal angle:135.8°. Ideal overjet and overbite was obtained, Class I dental relationship was achieved.
CONCLUSIONS: Facial aesthetics and functional occlusion were achieved. Although orthognathic surgery is the only treatment option that will provide aesthetics and function in the treatment of skeletal malocclusions, it cannot be easily accepted by patients due to the risks and difficulties involved. In such cases, the patient should be informed about the ideal treatment and the risks should be explained. Treatment of the anomaly as much as dental compensation allows can be considered as an alternative to ensure the patient's aesthetics and function.

Abstract citation ID: cjae081.087
CP20 TREATMENT OF TWIN SISTERS WITH SIMILAR MALOCLUSION USING DIFFERENT ORTHODONTIC TREATMENT MECHANICS

mr Alp Kursad KOYUNCU[1], mrs Sevi KADEROGLU TURK[1], mrs Zeliha Müge BAKA[1], Bayan Hicran Merve Ersen[1]; [1]*Selcuk University*

AIM: The purpose of these case reports is to explain different treatment plans of twin sisters showing skeletal Class II division 1.
MATERIAL AND METHODS: Twin sisters, aged 16 years and 8 months, applied to our clinic with the complaint of upper teeth protrusion. Clinical examination showed following: Case 1; overjet 7 mm, overbite 5.2 mm and Angle Class II molar relationship, Case 2; overjet 8 mm, overbite 5 mm and Angle Class II molar relationship. Cephalometric examination resulted following: Case 1; SNA:77.8°, SNB:75°, ANB: 2.8°, Sn-GoGn:30.7° , Mx1-SN:104.3° , IMPA:98.5°, Case 2; SNA:79.9°, SNB:75.3°, ANB:4.6° , Sn-GoGn:39.3° , Mx1-SN:112.8° , IMPA:93.5°. Nonextraction fixed orthodontic treatment using Damon system with Class II elastics was planned for Case 1 and nonextraction fixed orthodontic treatment using conventional brackets after rapid maxillary expansion combined with occipital headgear was planned for Case 2.
RESULTS: At the end of the treatment, Class I molar-canine relationship and ideal overjet-overbite were achieved in Case 1 and Case 2. Treatment duration was 2 years 8 months for Case 1 and 3 years 4 month for Case 2. Final cephalometric examination resulted following: Case 1; SNA:77.5°, SNB:75.3°, ANB:2.2°, Mx1-SN:99°, IMPA:104.2°, SN-GoGn:29.2°
Case 2; SNA:79.4°, SNB:775.6°, ANB:3.8°, Mx1-SN:97.8°, IMPA:97.7°, SN-GoGn:41.2°.
CONCLUSIONS: Orthodontic treatment should be planned personally. Even if there are the same genetic characteristics and similar malocclusions, different orthodontic treatments can be applied.

Abstract citation ID: cjae081.088
CP21 WHEN TIME IS PRESSED AND DISTANCE MATTERS: THINKING OUTSIDE THE BOX.

Mr Christos Megkousidis[1], Prof Ahmad Ismail; [1]*European University College*

This is a case presentation including 2 adult patients whose treatment was complicated due to long distance (treated in Dubai, UAE) but living abroad. Case 1 refers to a female who was treated in almost 9 months using self ligating braces and case 2 refers to a male who was treated with simultaneous use of fixed appliances and surgical maxillary advancement.

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Abstract citation ID: cjae081.089
CP22 SOFT TISSUE LOWER LIP CHANGES FOLLOWING EXTRACTION ORTHODONTIC THERAPY: A RETROSPECTIVE COHORT VALIDITY STUDY

Mr Christos Megkousidis[1], Donald Ferguson, Dr Nikilesh Vaid; [1]*European University College*

Actual horizontal lower lip changes following treatment of orthodontically treated four premolar extaction patients (n=82) were compared to five soft tissue profile plane changes. Pre and post treatment lateral cephalograms demonstrated Holdaway's H-line, Sushner's S-line and Burstone's B-line were valid as measures of lower lip retraction in four premolar extraction cases.

Abstract citation ID: cjae081.090
CP23 THE MAXILLARY INCISOR IN ALL ITS EXPRESSIONS

Dr Sonia Mrabet[1], Dr Chafika BEGHDADI[2], Dr Saadia BENSADOK[1], Dr Ahmed KASSAS[3], Pr Noureddine AHMED FOUATIH[1]; [1]*Oran University-Hospital Center, Faculty of Medecine Oran,* [2]*HMRUO - Faculty of Medecine of Oran,* [3]*HCA - Faculty of Medecine of Algiers*

BACKGROUND: The maxillary incisors play a determining role in the aesthetic appearance of the smile. The correction of anomalies that affect them is one of the main reasons for consultation of patients who wish to benefit from orthodontic treatment and at the same time a major objective for the orthodontist in the development of aesthetic, functional and other occlusal objectives.
METHODS: Making a diagnosis in relation to positional or structural dental anomalies of the maxillary incisors is based on clinical examination supplemented by a reasoned radiological assessment.
RESULTS: The origin of the anomalies which can affect these teeth are multiple and vary from the anomaly of number (by excess or by default), to the anomalies of structure, shape or position. Due to their position, the maxillary incisors are also often subject to alveolar-dental trauma which can compromise their future.
LIMITATIONS: The radiological examination proves very useful to confirm the positive diagnosis, eliminate other differential diagnoses but also to make a prognosis regarding therapeutic possibilities.
CONCLUSION: Through this work, we will illustrate these different diagnoses which are as many challenges for the orthodontist as they are issues for patients, particularly for the restoration of their aesthetics but also their function.

Abstract citation ID: cjae081.091
CP24 EARLY TREATMENT OF CROSSBITE

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BACKGROUND: Early orthodontic consultation makes it possible to detect anomalies already visible in the primary dentition which could worsen with the eruption of the permanent teeth and become more significant and deeper with the establishment of the occlusion.
METHODS: The examination of static and dynamic occlusion as well as the closure path is decisive in making the diagnosis of reverse occlusion.
RESULTS: Through cases treated early, we will illustrate the need to act early, often with simple devices to put growth back on track and restore good morphology to the dental arches allowing them to express themselves in the three directions of the space and grow harmoniously.
LIMITATIONS: The cooperation of young children is essential to the success of treatment. However, the speed of the response and the visible change in occlusion motivates children and parents and reassures them in their numerous efforts.
CONCLUSION: Depending on the situation and the child's possibilities for cooperation, it is recommended to intercept and restore morphological and functional harmony as soon as possible, by initiating early treatment that is both corrective and etiopathogenic.

Abstract citation ID: cjae081.092
CP25 TREATMENT OF A SEVERE CLASS II DIVISION 1 PATIENT WITH ORTHOGNATHIC SURGERY

Associate Prof. Dr. Zeliha Müge Baka[1], Associate Prof. Dr. Osman Akdağ[2], Miss Dilara Odaman[1]; [1]*Selcuk University Faculty Of Dentistry Department of Orthodontics,* [2]*Selcuk University Plastic, Reconstructive and Aesthetic Surgery*

OBJECTIVES: Orthognathic surgery is the only possible treatment approach for some adult patients whose skeletal malocclusion is severe. This case report aims to present the correction of a Class II division 1 malocclusion in an adult patient.
METHODS: A female patient with a chronological age of 20 years and 8 months applied to our clinic with the complaint that her lower jaw was backward. Clinical examination revealed an increased tooth and gingiva exposure due to short upper lip during smiling, a convex profile with deficient chin projection. Class II pattern, 7.8 mm overjet, 5.4 mm open bite. Skeletally, she showed transverse maxillary deficiency and both maxillary and mandibular retrognathia. Cephalometric analysis revealed that: SNA: 76.8°, SNB: 68.3°, ANB: 8.4°, SNGoGn: 54.1°, Mx1-SN: 93.6°, Mx1-NA(mm): 4.3 mm, Mx1-NA(Deg): 16.8°, IMPA: 91.0°, Md1-NB(Deg): 33.4°, Md1-NB(mm): 9.2 mm, Pog-NB: 0.7 mm, Interincisor angle: 121.4°.
The case started with surgically assisted rapid maxillary expansion then decompensation was performed with fixed orthodontic treatment. Double jaw surgery was planned. Thus, surgery included maxillomandibular advancement (9 mm on the mandible, 5 mm on the maxilla) and counterclockwise rotation of the mandible. Finally, the upper lip was treated with lip repositioning surgery to improve gingival display.
RESULTS: The cephalometric values at the end of the treatment were as follows: SNA: 82,1°, SNB: 76.2°, ANB: 5,9°, SNGoGn: 50,4°, Mx1-SN: 90,1°, Mx1-NA(mm): 0,1 mm, Mx1-NA(Deg): 7,1°, IMPA: 89,4°, Md1-NB(Deg): 34,3°, Md1-NB(mm): 9,3 mm, Pog-NB: -0,8 mm, Interincisor angle: 130,1°.
CONCLUSIONS: The treatment results showed good improvement in the facial profile and smile aesthetic as well as an increase in the patient's functions. Angle Class I occlusion, ideal overjet, and overbite were achieved at the end of the treatment.

Abstract citation ID: cjae081.093
CP26 ORTHOGNATHIC OR ORTHODONTIC TREATMENT ? THE ALT-RAMEC PROTOCOL AND FACEMASK USAGE CASE REPORT

Asst Prof Dr Hatice Kök[1], Miss Dilara Odaman[1]; [1]*Selcuk University Faculty Of Dentistry Department of Orthodontics*

OBJECTIVES: This case report aims the use of Alternating Rapid Maxillary Expansion and Constriction Protocol (Alt-Ramec) and facemask treatment in adolescent patient with Class III malocclusion and crossbite.
METHODS: A male patient with a chronological age of 14 years and 2 months applied to our clinic with the complaint that his lower jaw was forward. Clinical examination revealed Class III pattern, a concave profile, 1,8 mm underjet, 1,7 mm overbite. Skeletally, he showed transverse maxillary deficiency. Cephalometric analysis revealed that: SNA: 82.2°, SNB: 84.4°, ANB: -2.2°, SNGoGn: 36.3°, Mx1-SN: 108.2°, Mx1-NA(mm): 7,5 mm, Mx1-NA(Deg): 26.0°, IMPA: 79.7°, Md1-NB(Deg): 20.3°, Md1-NB(mm): 6.6 mm, Pog-NB: 0.3 mm, Interincisor angle: 135.8°.
The first stage of the case started with Alt-Ramec Protocol, followed by the use of a face mask to correct the discrepancy in the sagittal direction. The next stage of treatment was continued with fixed orthodontic treatment using intermaxillary Class III elastics to maintain overjet and overbite.
RESULTS: The cephalometric values at the end of the treatment were as follows: SNA: 85,2°, SNB: 84.8°, ANB: 0,4°, SNGoGn: 35,3°, Mx1-SN: 117,6°, Mx1-NA(mm): 9,8 mm, Mx1-NA(Deg): 32,4°, IMPA: 81,0°, Md1-NB(Deg): 32,4°, Md1-NB(mm): 6,7 mm, Pog-NB: 5,8 mm, Interincisor angle: 126,1°.
LIMITATIONS: The main reason for the discrepancy in the sagittal direction was the anterior positioning of the mandible but the patient did not want orthognathic surgery and the continued growth of the mandible was the major compelling factor during treatment process.
CONCLUSIONS: The treatment results showed good improvement in sagittal and transversal measurements of the maxilla therefore the facial profile and in the patient's functions. Angle Class I occlusion, ideal overjet, and overbite were achieved at the end of the treatment.

Abstract citation ID: cjae081.094
CP27 COMPARATIVE EVALUATION BETWEEN TWO MAXILLARY PROTRACTION PROTOCOLS USING ALT-RAMEC: FACEMASK VERSUS MINISCREWS PROTRACTION - A CASE REPORT

Dr Nora Rahal[1], Pr Chakib Hocine Tahraoui; [1]*Hospital*

OBJECTIVE: To compare the dentofacial effects of maxillary protraction with two protocols: ALT-RAMEC with facemask (ALT-RAMEC/FM) versus ALT-RAMEC with parasymphyseal miniscrews and intermaxillary elastics (ALT-RAMEC/MS) in growing Class III patients.

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MATERIALS AND METHODS: Two male patients with Class III malocclusion and maxillary deficiency were assigned to ALT-RAMEC/FM and ALT-RAMEC/MS. The changes in dentofacial cephalometric variables from the beginning (T1) to the end of treatment (T2) were compared.
RESULTS: No significant cephalometric differences were observed between the two patients in active treatment effects except for maxillary dental variables. However, significant favorable changes in both maxillary and mandibular skeletal components were noted in both patients after treatment. Sagittal measurements showed that the maxilla was advanced, mandibular projection was reduced, and the relative sagittal intermaxillary discrepancy improved. The patient with ALT-RAMEC/FM experienced unfavorable outcomes of clockwise rotation of the mandible as well as retroclination of the lower incisors. The soft tissue profile improved remarkably in both patients.
CONCLUSIONS: Compared with the ALT-RAMEC/FM therapy, the ALT-RAMEC/MS protocol improves skeletal relationships and soft tissue profile and reduces the undesired dentoalveolar effects.

Abstract citation ID: cjae081.095
CP28 TREATMENT OPTIONS OF CANINE AND LATERAL INCISOR TRANSPOSITION ASSOCIATED WITH DENTAL ANOMALIES OF CENTRAL INCISORS - CASE REPORT

Dr Nora Rahal[1], Pr Chakib Hocine Tahraoui; [1]*Hospital*

BACKGROUND: Tooth transposition, characterized by the positional interchange of adjacent teeth within the same quadrant, is a complex dental anomaly with the maxillary permanent canine being frequently involved. Despite its prevalence, the etiology of transposition remains a contentious subject, hindering a comprehensive understanding of its underlying mechanisms.
MATERIALS AND METHODS: a case report of a young adult patient diagnosed with maxillary ectopic canine-lateral incisor transposition, further complicated by dental anomalies in central incisors.The treatment for this patient involved the extraction of the lateral incisor followed by the placement of veneers on the central incisors and coronoplasty of the ectopic canine.
RESULTS AND DISCUSSION: Various therapeutic options were considered, and our chosen course of management was meticulously formulated, taking into account the aesthetic profile, occlusion, and specific consultation reasons of the patient. The extraction of the lateral incisor, although seldom discussed in specialized literature, represented a nuanced decision point. This decision, potentially subject to scrutiny among fellow practitioners, was substantiated by a rigorous consideration of clinical parameters. It is noteworthy that our primary objective was to achieve optimal outcomes at the conclusion of treatment, aligned with the expressed satisfaction of the patient.
CONCLUSION: In conclusion, this case report sheds light on the orthodontic treatment of a challenging presentation of maxillary canine-lateral incisor transposition with additional dental anomalies. The case emphasizes the need for tailored approaches in addressing such cases and adds to the current body of knowledge on the etiology and management of tooth transposition.

Abstract citation ID: cjae081.096
CP29 AUDITING PATIENT SATISFACTION WITH THEIR ORTHODONTIC TREATMENT PROVISION

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AIM: To assess the level of patient satisfaction with the experience of their orthodontic treatment using patient questionnaires.
METHOD: A prospective, single-centred patient survey-based audit was conducted at the Portadown Orthodontics. Only patients attending follow-up appointments were included; new patients and emergency appointments were excluded.
Based on previous audits in the literature, including those published in the British Orthodontic Society Clinical Effectiveness Bulletin, a standard of 90% satisfaction across several domains was set.
Data was collected over a three-month period. A questionnaire adapted from a previous audit was piloted in the practice, with 15 responses received. Based on feedback, the questionnaire was simplified. To reduce bias, reception staff distributed questionnaires to consecutive patients following appointments.
Patients completed the questionnaires anonymously and placed them in a collection box. 100 responses were collected in the first and second cycles, respectively. Findings were analysed using Microsoft Excel.
RESULTS: The first cycle found the Gold Standard of 90% was being reached in 9/11 domains. The two domains that failed to reach Gold Standard were "I was seen within 15 minutes of my appointment time" where 20% of appointments were delayed and "Is contacting the practice easy" were 15% had responded that they had difficulty.
Changes were implemented to try and improve these domains, alongside an effort to continue to perform to the gold standard in the other domains.
The second cycle showed a big improvement with only 5% of appointments being delayed more that 15 minutes and 9% responding that they had difficulty contacting the practice
CONCLUSION: this audit used patient questionnaires to identify areas of underperformance. An improvement was measured following implementation of changes. A Re-audit is planned to ensure these improvements are maintained

Abstract citation ID: cjae081.097
CP30 LATERAL CEPHALOMETRIC RADIOGRAPH IMAGE QUALITY AND COMPLIANCE WITH NEW STANDARDS IN A SPECIALIST ORTHODONTIC PRACTICE: A TWO-CYCLE AUDIT

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AIM: To assess if lateral cephalometric radiographs (LCR's) taken in one specialist orthodontic practice are of consistently high quality and meet new standards set by the Faculty of General Dental Practice.
METHODS: In Cycle 1 data was collected from 50 consecutive LCR's and retrospectively assessed by two raters and an agreed quality rating was recorded using a proforma. Cycle 2 was conducted prospectively.
Data collection included; contrast of radiographs, head positioning, whether structures were centred, soft tissue visibility, teeth in occlusion, A and B points, National, Sella, incisor tip identifiable, apex and angulation could be calculated and if the airway was visible. The landmarks stated in the proforma were annotated on an 'ideal' radiograph to aid in the assessment.
A 'yes or no' exercise was used to record if landmarks were identifiable or not. A single appropriately qualified clinician then scored the view as diagnostically acceptable or not. The percentage of diagnostically acceptable films was calculated. This was carried out for both cycles of the audit.
RESULTS: During cycle 1 94% of radiographs were diagnostically acceptable. This did not meet the gold standard of 95%. Three out of 50 radiographs were not diagnostically acceptable. Each of these did not have teeth in occlusion and also had incorrect head positioning. Two images had incorrect head positioning but did not lead to them being assessed as diagnostically unacceptable though did result in important structures not being centred.
In cycle 2 all radiographs were assessed as diagnostically acceptable with an improvement of 6% between cycles (94% to 100%).
CONCLUSIONS: 1) Continued training in radiographic techniques is recommended.
2) Placement of a poster in the radiographic facility as an aide-memoir for correct patient positioning when taking LCR's.
3) Another audit cycle should be completed to ensure maintenance of quality of LCR's.

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CP31 MANAGEMENT OF IMPACTED CANINES IN VARIOUS POSITIONS: PALATAL, LABIAL, AND CENTRAL

Miss Lucie Kuntz[1], Dr. David Joseph[2], Pr. Bart Vande Vannet[1]; [1]*Université de Lorraine, Faculté d'Odontologie de Lorraine, Service d'Orthopédie Dento-Faciale,* [2]*Université de Lorraine, Faculté d'Odontologie, Service de Parodontologie*

BACKGROUND: An impacted tooth is characterized by complete root formation while its counterpart has erupted at least six months prior, often due to an obstacle in the eruption path or an ectopic position. This condition affects around 2% of the population, with impacted canines found in palatal positions in 75% of cases and labial positions in 25%.
AIM: This study aims to showcase the management approaches for impacted canines in three distinct positions – palatal, labial, and central.
MATERIALS/METHODS: Three cases of impacted canines were examined:
Fahed H., 22 years old: Impacted upper right canine (1.3) in a palatal position. Surgical release performed by a periodontal surgeon, followed by traction using an elastomeric wire between 13 and a transpalatal arch.
Bobby Y., 14 years old: Impacted upper left canine (2.3) in a central position, associated with radicular resorption of 2.1. Surgical release conducted by a periodontal surgeon, followed by traction using an elastomeric wire between 2.3 and a stainless-steel arch (0.019x0.025") in place of 2.1.

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Tiago M., 11.5 years old: Impacted upper left canine (2.3) in a labial position. Surgical release carried out by a periodontal surgeon, followed by traction using a TMA sectional wire (0.019x0.025").
RESULTS: Within 3 to 4 months, the canines became visible in the buccal area. In cases of palatal positioning, a second NiTi arch overlaying the first stainless steel arch was used to position the canine onto the dental arch. The labially impacted canine, being higher and in a younger patient, required longer traction. However, radiographs indicated its movement, and it was palpable. In most cases of buccally impacted canines, a flap procedure was necessary to align the attached gum with the teeth.
CONCLUSION: Managing impacted canines involves intricate and prolonged treatment that demands accurate diagnosis and tailored management based on the canine's position. Temporary anchorage devices (TADs) present a compelling alternative for pulling an impacted canine lacking dental support.

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CP32 MULTIDISCIPLINARY ORTHOSURGICAL TREATMENT OF FACIAL ASYMMETRY: A CASE REPORT OF A 23-YEAR-OLD FEMALE PATIENT

Mrs Lou Deon[1], Dr Paul Fawaz[1], Dr Jean-Francois Devoti[2], Dr Sorana Chassagne[1], Pr Bart Vande Vannet[1]; [1]*Université De Lorraine,* [2]*CHRU de Nancy*

INTRODUCTION/AIM: A 23-year-old woman presented with facial asymmetry, having no prior medical or orthodontic history but experienced dental trauma at the age of 2.
MATERIALS AND METHODS: Diagnosis: The patient presented with Skeletal Class I, right maxillary cross-bite, normodivergent typology, Class II2B Angle subdivision, overjet of 2mm, mandibular inter-incisal deviation of 4mm, and vertical overbite of 60%. Additionally, there were size anomalies in teeth 1.3, structural anomalies in teeth 2.1 and 2.2, along with good periodontal health. She also exhibited TMJ clicking sounds and mandibular latero-deviation.
RESULTS: The patient underwent a multidisciplinary orthognatic - surgical treatment for facial asymmetry. Scintigraphy revealed no left hyperplasia of the condyle. Initially, she underwent SARPE (Surgically Assisted Rapid Palatal Expansion) teeth-borne distraction and wisdom teeth removal. NiTi and class III elastics were used for leveling and alignment to facilitate backward leveling. Subsequently, a TPA (Transpalatal Arch) replaced the distractor after 6 months. No secondary surgery was necessary as mandibular recentering was achieved. Anteroposterior dentoalveolar Class II correction was performed using Temporary Anchorage Devices (TADs) and right Class II elastics. Prosthetic restorations were applied to teeth 1.3, 2.1, and 2.2.
DISCUSSION/LIMITATIONS: SARPE was preferred over MARPE (Miniscrew-Assisted Rapid Palatal Expansion) to minimize dental and periodontal side effects. While a purely bone-borne distractor could have been an alternative to avoid dento-alveolar side effects. TADs effectively limited the protrusion of mandibular incisors during the Class II correction.
CONCLUSION: The patient's asymmetry stemmed from both a skeletal issue (maxillary cross-bite) and functional problem (mandibular lateral excursion). A multidisciplinary approach involving orthognatic surgery, occlusodontics, dental prosthetics, and maxillofacial physiotherapy was employed to address these concerns

Abstract citation ID: cjae081.100
CP33 AN ADOLESCENT CASE OF MANDIBULAR DEVIATION TREATED BY PLANNED MOLAR DECOMPENSATION WITH FUNCTIONAL APPLIANCES FOLLOWED BY MODIFIED MEAW TECHNIQUE USING IMPROVED SUPERELASTIC NICKEL-TITANIUM ARCHWIRES

Dr Ikou Yonemitsu[1], Dr Asuka Manabe[1], Dr Takashi Ono[1]; [1]*Orthodontic Science, Tokyo Medical and Dental University (TMDU)*

AIM: Adolescent patients with anterior or posterior crossbite should generally be treated as early as possible with the exception of orthognathic surgery cases. Maxillary protraction and/or rapid maxillary expansion used to improve anterior and/or lateral overjet can accelerate skeletal maxillary growth and counter-clockwise rotation of the mandible. Moreover, the mandibular growth pattern would be turned clockwise by combining functional appliances (FAs) and intermaxillary elastics (IMEs). After pubertal growth, camouflage treatment becomes an option to improve interdigitation by dental and dentoalveolar compensation. To maximise symmetry of skeletal growth, we applied monoblocs combined with IME for planned decompensation of the posterior teeth to decrease the required amount of dental compensation.
METHODS: A 13-year-old female patient visited our clinic primarily to correct mandibular deviation. Cephalometric radiographs showed a mandibular protrusion and lateral deviation to the left side. Crossbite was observed in the area from the left lateral incisors to the first premolars. After expansion of the upper arch, we used an 0.016×0.022-inch improved superelastic Ni-Ti archwire (ISW) we invented for levelling, followed by placing the same wire in the lower teeth and using cross elastics to decompensate molars. Two monoblocs were used sequentially to mitigate lateral deviation of the mandible for 1 year and 6 months followed by use of a modified multiloop edgewise archwire (MEAW) technique using ISWs with IMEs for molar relationship correction.
RESULTS: Postero-anterior cephalometric radiographs showed less dental compensation compared to the initial condition regardless of camouflage treatment. An Angle Class I molar relationship was achieved due to the lower molars becoming more upright and distalized. The occlusion has been stable for 6 years after retention.
CONCLUSIONS: Camouflage treatment for lateral deviation of the mandible sometimes causes gingival recession, fenestration, or dehiscence of the roots due to excessive dental compensation. In this case, we effectively corrected skeletal discrepancy by using monoblocs combined with IMEs, and corrected some dental compensation using a modified MEAW technique with ISWs. We were thus able to avoid orthognathic surgery, and periodontal tissues were saved despite camouflage treatment.

Abstract citation ID: cjae081.101
CP34 DOES A MANDIBULAR AUTOROTATION INDUCED BY LE FORT I OSTEOTOMY CONTRIBUTE TO UPPER AIRWAY ENLARGEMENT?

Dr Ikou Yonemitsu[1], Dr Keigo Nakamura[1], Dr Koichi Fujita[1,2], Dr Haruki Imai[1,2], Dr Risa Usumi-Fujita[1], Dr Koji Honda[1,3], Dr Yosuke Yamashita[2], Dr Makoto Hirota[2], Dr Kenji Mitsudo[3], Dr Takashi Ono[1]; [1]*Orthodontic Science, Tokyo Medical and Dental University (TMDU),* [2]*Department of Oral and Maxillofacial Surgery/ Orthodontics, Yokohama City University Medical Center,* [3]*Department of Oral and Maxillofacial Surgery, Yokohama City University Graduate School of Medicine*

AIM: In the treatment of skeletal mandibular retardation with temporomandibular joint osteoarthritis, the common approach involves mandibular autorotation through maxillary impaction to prevent post-operative relapse owing to progressive condylar resorption as a potential approach. However, patients with this condition often exhibit a narrow upper airway (UA). This case report highlights our success in achieving mandibular autorotation through Le Fort I osteotomy (LF1). Notably, this method improved the occlusion and resulted in UA enlargement without mandibular advancement through a sagittal splitting osteotomy (SSRO).
CASE: A 37-year-old female patient with a retruded mandible complained of difficulty chewing using her anterior teeth at the first visit (T0). After 12 months of pre-operative orthodontic treatment (T1), LF1 was performed, coupled with anterior maxillary alveolar osteotomy, and mandibular autorotation was achieved without SSRO. Post-operatively, the facial mandibular angle decreased by 2.7°. One-year post-surgery (T2), the patient underwent genioplasty to enhance facial aesthetics and harmony, addressing functional and cosmetic aspects while removing bone-fixing plates. The UA cross-sectional area (CSA) decreased in the nasal cavity from T0–T1, remained unchanged from T1–T2, and decreased by 20% from T0–T2. The Upper (PPS) and middle (MPS) pharyngeal CSAs decreased at T1, then increased by 24% and 20% at T2 from T0, respectively. In contrast, the lower pharyngeal CSA (EPS) increased by 104% from T0–T1 and remained unchanged from T1–T2. The upper UA volume increased by 30% from T0–T1 and further increased by 14% from T1–T2. Conversely, the middle UA volume decreased by 32% from T0–T1 and increased by 95% from T1–T2. The lower UA volume increased by 30% from T0–T1 and further increased by 14% from T1–T2. Notably, the patient maintained stable occlusion for more than 2 years post-operatively.
DISCUSSION: Case reports on treating maxillary prognathism with mandibular autorotation have been published since the 1980s. In contrast, no studies focused on UA morphological changes. In this study, we successfully treated a patient with skeletal mandibular retrusion without SSRO to achieve a stable occlusion, improved facial appearance, and a possible improvement in respiratory function.

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Abstract citation ID: cjae081.102
CP35 A SERVICE EVALUATION OF ORTHODONTIC NURSE - LED CLINICS WITH PATIENT SATISFACTION QUESTIONNAIRE

Dr Jing Zhao[1], Mrs Nicola Crowford[1]; [1]*Orthodontic Department*

BACKGROUND: The orthodontic workforce has evolved in recent years partly due to the introduction of orthodontic therapists. The role of orthodontic nurses has also changed to deliver care under supervision, with additional training and/or qualifications as detailed in the GDC Scope of Practice documentation. Patient-reported experiences are becoming foremost in service quality improvement.
In order to maximise the clinical capacity of a busy hospital department and utilise the skill-mix of dental care professionals, 3 nurse-led clinics were developed: Records clinics, Oral Health (OH) clinics and retainer review clinics.
OBJECTIVES/AIMS: The primary aim of this service evaluation was to investigate patient satisfaction with the dental nurse-led clinics. Secondary aims were to analyse and assess efficiency and effectiveness.
MATERIALS/METHODS: 50 patient questionnaires were prospectively distributed at the nurse-led clinics from May 2023 for 3 months. This was a new quality improvement service with no formal evidence-based standards. It was based on local discussion that 90% or more of patients should be satisfied (agree/strongly agree).
Patient's experience was recorded in 4 domains with a 5-point Likert scale: clinic outcome, clinical organization, staff-patient relations and technique/quality of care. OH related questions and patient's suggestions were recorded in other domains.
RESULTS: 100% patients would recommend the same clinic to their friends and family. The target was met for 11/12 of the questions. Patient satisfaction did not meet the target for punctuality with 84% satisfaction.
7/50 (14%) patients needed further clinician's help: 4 patients at retainer review and 3 patients for oral health concerns. 30/50 (60%) patients needed a further appointment to fit a new retainer (3) or improve their OH to a satisfactory level for treatment (27).
47/50 (94%) patients stated that they visit their dentist regularly. Only 32/50(64%) patients recalled they had received oral health instruction.
CONCLUSIONS: Dental nurses with extended competencies proved to facilitate clinical practice under the supervision of an orthodontist. Areas to be improved including punctuality and oral health message reinforcement at the clinic regularly were shared to the department. The nurse-led clinic model showcases the good use of skill-mix. It could be widely used in other orthodontic services with modification.

Abstract citation ID: cjae081.103
CP36 A SERVICE EVALUATION OF ORTHODONTIC NURSE - LED CLINICS WITH PATIENT SATISFACTION QUESTIONNAIRE

Dr Jing Zhao[1], Mrs Nicola Crawford[1]; [1]*Orthodontic Department*

BACKGROUND: The orthodontic workforce has evolved in recent years partly due to the introduction of orthodontic therapists. The role of orthodontic nurses has also changed to deliver care under supervision, with additional training and/or qualifications as detailed in the GDC Scope of Practice documentation. Patient-reported experiences are becoming foremost in service quality improvement.
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Abstract citation ID: cjae081.104
CP37 USE OF CBCT GENERATED 3D-PRINTED STENTS WHEN AUTO-TRANSPLANTING TEETH

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AIMS: To illustrate the process involved in fabricating 3D-printed dental stents, and their subsequent implementation for optimal surgical technique during dental autotransplantation.
BACKGROUND: Auto-transplantation is the surgical repositioning of a donor tooth into a distant site in the same individual. When conventional methods of tooth replacement are not ideal, especially in young individuals where maintaining alveolar bone volume is crucial, auto-transplantation is an invaluable option. Successful auto-transplantation is dependent on preserving the soft tissues surrounding the donor tooth root, which demands significant surgical precision.
Using generic templates for recipient site preparation has limited use, and use of the actual donor tooth for 'trial fitting' increases the risk of root damage and prolongs the extra-alveolar surgical time of the donor tooth. In contrast, using exact 3D-printed replica stents of the donor tooth, fabricated from routine cone-beam computed tomography (CBCT) scans, enhances surgical efficiency and accuracy, eliminates 'trial fitting' during recipient site preparation, reducing extra-alveolar time and root damage risk, ultimately resulting in improved survival of the donor tooth.
BODY: At the UCLH Eastman Dental Hospital, a multidisciplinary team consisting of a maxillofacial radiologist, bioengineers, paediatric oral surgeon and orthodontist have streamlined the fabrication process of 3D-printed replica stents for use during auto-transplantation surgery. This collaborative approach has improved the predictability of this technically demanding procedure and allowed for accurate assessment of the optimal aesthetic and occlusal positioning of the donor transplant teeth.
After trialling multiple dimensions of 3D-printed stents, we believe the most optimal stent sizes to have available during surgery, and the most effective preparation sequence, are:
1. A stent with 10% overall enlargement.
2. An identical 1:1 sized stent with a 1mm apical extension to account for the Hertwig's root sheath.
3. An identical 1:1 sized stent without any apical extension.
Through a series of successful auto-transplantation cases treated at the hospital, we will highlight the benefits of this technique for treating a range of clinical cases including failing incisors due to dental trauma and megadont central incisors.
CONCLUSION: Using 3D-printed replica donor stents improves the predictability of autotransplant surgery, potentially increasing acceptance among patients and dental professionals alike.

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CP38 SURGICAL-ORTHODONTIC TREATMENT OF SKELETAL CLASS III ADULT PATIENTS WITH ALIGNERS: CASES PRESENTATION

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BACKROUND: The approach of Class III skeletal deformities in the maxillofacial area often requires an orthodontic treatment with surgery in adult patients using fixed appliances, both before and after the surgical phase. Since

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the introduction of clear aligner systems, aligners have become a popular treatment choice for the orthodontists due to the aesthetics and comfort that these removable appliances provide to the patients, compared with the conventional brackets.
OBJECTIVES: The aim of this presentation is to describe the orthodontic treatment plan of two skeletal Class III patients treated with clear aligner systems (Invisalign) combined with the traditional surgical technique.
MATERIALS AND METHODS: Two 26 year old skeletal class III patients, a male and a female, were seeking orthodontic treatment. Medical and dental records were obtained and comprehensive clinical and radiographic examinations were performed.
Initial examination of the male patient revealed a concave profile extraorally and Class III dental malocclusion with anterior crossbite, negative overjet and shift of the lower midline to the left intraorally.
The female adult patient appeared with a flat profile and a Class III dental malocclusion with a lateral deviation of the mandible to the left side associated with posterior left crossbite, edge to edge incisor relationship and lower midline shifting to the left.
RESULTS: The 26-year-old patients' orthodontic treatment plans included dental alignment with clear aligner systems before and after surgery. Bilateral sagittal split osteotomy of the mandible with the application of titanium plates was selected as surgical approach.
The male patient was prepared for the surgery with fixed orthodontic appliances and surgical hooks approximately one month before the surgery, whereas the female patient had aligners through the orthodontic treatment and at the surgical phase.
CONCLUSIONS: The functional and aesthetic implications of skeletal Class III patients may considerably reduce their quality of life. Orthodontic treatment with aligners, is possible in those patients, however an individual approach and proper treatment planning is required.

Abstract citation ID: cjae081.106
CP39 UTILIZING 3D GUIDED PLANNING IN ORTHOGNATHIC SURGERY FOR MANDIBULAR ADVANCEMENT. A CASE REPORT.

Dr Mostafa Alzahar[1], Dr. MHD Said Mourad[1], Prof. Dr. Karl-Friedrich Krey[1]; [1]*Orthodontic Department, Medical University of Greifswald*

AIM: A digital approach established by the Orthodontic Department in Greifswald University by using an advanced 3D-technology and computer-assisted tools to precisely plan the Orthognathic surgery procedure, which allows precise surgical results and facilitates the post operative orthodontic treatment and decreases the probability of relapse.
METHODOLOGY: The patient presented at our department seeking retreatment. Diagnostic records, including radiographs, photos, and scans, were obtained and processed using the Onyxceph3™ (Image Instruments GmbH, Chemnitz/Germany) orthodontic program. The V.T.O 3D module simulated various orthodontic and surgical scenarios. After discussing treatment options, the decision was made to proceed with mandibular advancement orthognathic surgery to address the Overjet and improve facial aesthetics.
The initial treatment phase involved extracting the first mandibular premolars, leveling the curve of Spee, retroinclination of the lower anterior teeth. Preparing for surgery, Intraoral scans and Cone beam CT scans were performed. The DICOM data was imported into the Onyxceph3™ Sim 3D module, integrating scans and the constructed skull. The mandible underwent a clockwise rotation (2.5o) to create space for designing the centric splint. Osteotomy lines were identified on both sides, generating 3 pieces of data for moving the anterior part of the mandible forward with an anti-clockwise rotation. Occlusion adjustments in X, Y, Z planes were made.
A further clockwise rotational movement (2.5o) created space for the final splint. Both mandible positions were saved and imported into the Waefer Creation 3D module where the Surgical splints were designed, labeled, and adjusted to fit teeth and brackets without interference. STL data for the two splints were exported to Photon Anycubic workshop (Hongkong Anycubic Technology Co., Shenzhen, China) for 3D printing. Using a Photon mono X 3D printer and Bio-Med Clear resin, the splints were printed, washed, cured, and intraorally tried for final verification before the operation.
During the surgery, the splints guided the procedure, and the patient underwent maxillomandibular fixation using the splint. Optimal results were achieved, and post-surgical settling, along with final occlusion adjustments, were successfully completed.
CONCLUSION: The use of 3D technology in the planning and execution of orthognathic surgery contributed to precise and effective outcomes.

Abstract citation ID: cjae081.107
CP40 OVERCOMING BIOLOGICAL LIMITATIONS WITH CORTICOTOMIES IN ADULT ORTHODONTICS

Miss Anna Andrzejewska[1], Mr Guillem Farres Bau[1], Mr Javier Aznar Arraiz[2], Mr Domingo Martin Salvador[2]; [1]*Clinicas Den,* [2]*Clinica de Ortodoncia Martin Goenaga*

AIM: To evaluate the amount and efficiency of orthodontic correction using aligners and corticotomies, with a focus on the periodontal aspect in adult patients undergoing treatment with alveolar bone limitations.
MATERIALS AND METHODS: Forty adult patients requiring orthodontic expansion were treated with aligners and corticotomies. All patients underwent the same corticotomy procedure. They were divided into two groups: Group A (20 patients) treated with soft aligner material and attachments, and Group B (20 patients) treated with hard aligner material, with little to no attachments.
RESULTS: The study reveals a high level of planned expansion achievement when assisted with corticotomies, both in soft and hard aligner materials. However, the predictability of expansion demonstrates superior results when using harder material (84%) compared to softer material (61%). Notably, the canines in the upper arch from the harder material group exhibited the highest predictability.
CONCLUSIONS: This study demonstrates that effective expansion of arches in adult patients with bone limitations can be achieved while preserving the periodontium. Improvement in gingival biotype and a reduction in gum recessions were observed after the corticotomy procedure.

Abstract citation ID: cjae081.108
CP41 SKELETAL ANCHORAGE FOR DISTAL MOVEMENT OF UPPER AND LOWER MOLARS IN ADULT PATIENTS: REPORT OF CASES

Dr Manoukakis Ioannis, Ms Maria Arampatzi, Mr Thomas Manoukakis, Ms Evangelia-Panagiota Grammatikou, Ms Eirini Metaxaki; [1]*Private Office*

AIM: The aim of this poster presentation is to illustrate different anchorage systems (direct or indirect) used in two clinical cases to achieve distal movement of upper and lower molars in adults, combining classic orthodontic appliances or clear aligners with Temporary Anchorage Devices (TADs).
METHODS: In the first case indirect skeletal anchorage was used along with sliding mechanics on a straight wire, in order to treat a unilateral Class-II malocclusion with increased incisors proclination. The system was reinforced using interarch elastics. The second case depicts a unilateral Class-II malocclusion with overbite, crowding and midline shift. A skeletal direct anchorage system was applied, using a TAD in the ramus of the mandible with orthodontic aligners and intraarch elastics.
RESULTS: In both cases Class-I was achieved, and overjet was reduced to normal. By distalizing molars, space was gained, which proved significant for the treatment of dental crowding and the correction of midlines. As a result, aesthetics and functional capacity were restored, contributing to the overall satisfaction of the patient.
LIMITATIONS: Indirect anchorage system approach requires proper control of the biomechanical system due to apparatus failures. On the other hand, direct anchorage system is a very operator sensitive, expensive technique, demanding specific skills and a specialized oral surgeon.
CONCLUSIONS: Both skeletal anchorage modalities have benefits; however, the precise selection between them is fundamental for a successful application of the treatment plan. Distalizing molars in adult patients presents difficulties due to their location and anatomy, making conventional treatments challenging to apply. Therefore, in complex cases TADs are an in house efficient auxiliary in our armamentarium.

Abstract citation ID: cjae081.109
CP42 MULTIPLE IMPACTED TEETH - A CASE REPORT

Dr Laura Jimenez Arboleda[1], Dr Linda Schwarz[1], Prof. Erwin Jonke[1]; [1]*Department of Orthodontics, University Clinic of Dentistry, Medical University of Vienna*

BACKGROUND: Molars can be impacted due to several causes like abnormal erupting angulation, a lack of arch length, premature eruption of the third molars, early loss of the mandibular first molar or alterations of the dental follicle. Impacted molars with mesial inclination can lead to elongation of the antagonist tooth, attachment loss on the mesial side of the

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impacted tooth, caries on the unerupted molars and a compromised oral hygiene. Depending on anatomical factors, treatment options include extraction or auto-transplantation, but also surgical exposure and orthodontic traction of the impacted teeth.
MATERIALS AND METHODS: A 16-year-old male patient with retained teeth 17,18,28,37,38,47 and 48 reported to the Department of Orthodontics, University Clinic of Dentistry Vienna, with the chief complaint of missing teeth in the lower posterior teeth region. After 3D imaging and image reconstruction, it was decided to extract teeth 18,28,36 and 47 in order to align teeth 17,37, 38 and 48. A 0,018x0,025 inch stainless steel wire was inserted into the brackets of the lower and the upper jaw and teeth 17, 37 and 38 were pulled into place by the usage of an elastic chain. An uprighting u-loop was used because tooth 48 was tilted mesially. The loop was inserted into two auxiliary tubes on the buccal and lingual aspects of tooth 46 and engaged under a button, bonded on the occlusal surface of tooth 38. A distal force above the center of resistance was obtained. Crimpable stops were placed to prevent the loop from sliding through the tubes and used to reactivate the loop by repositioning.
RESULTS: At the end of treatment, 17, 37, 38 and 48 had been favourably erupted into the oral cavity and were aligned into the desired position with adequate bone support.
CONCLUSIONS: This case report describes the treatment of multiple impacted teeth. Orthodontic uprighting and alignment are a good option for the treatment of impacted molars. Early diagnosis via 3D-imaging, interception of the probable impaction and the interdisciplinary collaboration are mandatory to achieve the best results possible.

Abstract citation ID: cjae081.110
CP43 INVESTIGATING AND MANAGING A MANDIBULAR EXPANSILE LESION (CENTRAL GIANT CELL GRANULOMA) IN AN ORTHODONTIC PATIENT – A CASE REPORT

Dr Nadia Arikat[1,2], Miss Elizabeth Crawford[1,2], Miss Nasreen Yaqoob[2], Mr Kristian Davies[3], Mr Jonathan Hulbert[2]; [1]*Cardiff And Vale University Health Board,* [2]*Cwm Taf Morgannwg University Health Board,* [3]*Swansea Bay University Health Board*

A central giant cell granuloma (CGCG) is a benign but aggressive neoplasm which occurs exclusively in the craniomaxillofacial region. CGCGs are most common in females and people under the age of 30.
This case report will explore the differential diagnoses, investigation, and approaches to management of an orthodontic patient with an expanding swelling of the mandible. The patient was first referred to the orthodontic department in the Cwm Taf Morgannwg University Health Board in South Wales, age 14 with a class 2/I type malocclusion. His first phase of treatment involved a functional appliance. During the second phase of treatment with fixed appliances while attending for a routine archwire adjustment, the patient complained of a swelling in the left buccal sulcus which they felt was increasing in size. On examination, the lower left premolars were found to be mobile and non-responsive to sensibility testing. An orthopantomogram showed a large radiolucency spanning from the lower left canine to the lower left second premolar. The patient was promptly referred to the Oral and Maxillofacial Team. A subsequent CT scan revealed an expansile radiolucency on the left body of mandible with mild root resorption of the lower left premolars. Several differential diagnoses were suggested including; a keratocyst, ameloblastoma and giant cell lesion. An intraosseous biopsy confirmed the lesion was a CGCG.
The lower fixed appliance was removed prior to excision, accepting small cleansable spaces, to allow for ease of surgical access and to minimise the risk of any further root resorption. The CGCG was successfully surgically and excised has healed well. The patient's dentist provided root canal treatment for the non-vital teeth. Currently the patient is in the final stages of upper arch orthodontic treatment and is being monitored closely for any recurrence.
Orthodontists are uniquely placed to monitor the overall dental health of our patients and this case demonstrates the need for routine soft tissue examination during orthodontic treatment. This case also highlights the value of swift communication with colleagues within other medical and dental specialities to manage these uncommon lesions.

Abstract citation ID: cjae081.111
CP44 INTERDISCPLINARY MANAGEMENT OF DENTOALVEOLAR OPEN BITE ASSOCIATED WITH MACROGLOSSIA: A CLINICAL CASE REPORT

Dr Joana Garrau[1], Dr Inês Anselmo Assunção[1], Prof Iman Bugaighis[1], Prof François Durand Pereira[1], Prof Pedro Mariano Pereira[1]; [1]*Egas Moniz School Of Health And Science - Department of Orthodontics*

BACKGROUND: Macroglossia is an uncommon anatomical anomaly categorized into two subtypes: true macroglossia (increased tongue volume) and pseudo macroglossia, where the tongue might have a normal size but with forward posture due to other anatomical influences. The role of a large tongue in the development of malocclusion should be considered for orthodontists. Numerous dento-facial abnormalities might be linked to macroglossia, such as symmetrical anterior open bite, bimaxillary dentoalveolar proclination, tongue thrust and spacing between the teeth, leading to difficulty in mastication and altered speech. Accurate diagnosis of macroglossia is essential to determine cases that might benefit from glossectomy to improve function, aesthetics and post-orthodontic treatment stability. The aim of presenting this clinical case is to describe an orthodontic-surgical interdisciplinary approach in the treatment of a case with macroglossia.
METHODS: A 19-year-old female patient with a convex profile and lip protrusion, presented with a main complaint of anterior open bite. Intraorally, there was a molar normocclusion relationship on the right side, distoclusion on the left side, anterior open bite, constricted maxilla and bimaxillary dentoalveolar incisal proclination. The patient presented a macroglossia, with a crenated tongue, anteriorly postured. Lateral cephalometric radiograph revealed a mesodivergent and a class II skeletal pattern. The upper left canine was impacted.
The first phase of treatment comprised surgically assisted maxillary expansion, followed by bimaxillary fixed appliance treatment, extraction of maxillary and mandibular right first premolars, maxillary left impacted canine and mandibular left first molar. Furthermore, a glossectomy procedure was performed to reduce tongue volume. The upper left first premolar was reshaped to replace the upper left canine.
RESULTS: Following three years of interdisciplinary treatment, it was possible to achieve a stable functional bilateral normocclusion with re-established normal overjet and overbite.
CONCLUSIONS: A glossectomy procedure could be considered when an accurate diagnosis reveals an increased tongue volume causing bimaxillary dentoalveolar incisal proclination and anterior open bite. This is especially significant when premolar extraction is part of the treatment plan which reduces the space available for the tongue and also minimizes the possibility of post-treatment relapse.

Abstract citation ID: cjae081.112
CP45 ARE REFINEMENTS NECESSARY FOLLOWING AN INVISALIGN™ TREATMENT? A SYSTEMATIC REVIEW

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BACKGROUND/AIM: Refinements are the additional aligners that are given to the patient after the completion of the initial aligner treatment. The aim of the present systematic review is to systematically collect relevant information and appraise its quality.
MATERIALS AND METHODS: Comprehensive electronic and manual searches were conducted. Clinical studies with samples comprising of Invisalign™ patients that needed refinement were included. Data were extracted, and the bias risk was evaluated using RoB 2 for RCTs and ROBINS-I for non-RCTs.
RESULTS: Out of the initially identified 324 studies, nine studies were identified. In one of them, micro-osteoperforations were applied as an adjunctive treatment. The number of additional aligners during refinements varied across studies.
CONCLUSIONS: Refinements seem to be inevitable in treatment with clear aligners and specifically Invisalign. Further studies are necessary to elucidate the factors associated with the number of additional aligners.

Abstract citation ID: cjae081.113
CP46 A NEW HYBRID CLEAR ALINGER DESIGNS FOR SPACE CLOSING

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BACKGROUND: Clear aligners, including Invisalign, are leading a new trend in removable orthodontics. Although much development has been done, still many disadvantages compared to fixed orthodontic devices exist. In this presentation, a new hybrid design that combines the concept of existing fixed orthodontic devices with clear aligner to complement the shortcomings of each others will be introduced. METHODS: Through a long period of trial and error, it was concluded that the concepts used in the 'segmented arch technique' were most suitable for application to the clear aligner. In detail, it includes elements such as lingual arch and T-spring, but the most important point is to divide each part of the arch into segments. Depending on the purpose, the arch is divided into parts of 'anchorage segment' and 'moving segment', and these are connected using various active elements used in conventional fixed orthodontics. RESULTS: Through this new hybrid design of clear aligner, (1)patient pain was reduced compared to the existing device, (2)more sophisticated biomechanical tooth movement could be achieved, and (3)the number of clear aligners during treatment could be reduced. CONCLUSIONS: Clear aligner has various advantages, but it basically has the same limitations as other removable orthodontic appliances. Through the cases and methods introduced in this presentation, it was found that by combining the concepts of clear aligner and existing fixed orthodontics devices, such shortcomings can be effectively improved and ultimately better treatment results can be provided to patients.

Abstract citation ID: cjae081.114
CP47 AN INTRODUCTION TO ORTHODONTIC TREATMENT: A TYPODONT MANUAL

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BACKGROUND: During the initial five weeks of the orthodontic residency program at the University of Oslo, completing a Typodont training course is mandatory for all candidates. This course is designed to offer comprehensive insights into orthodontic treatment principles, covering both theoretical understanding and practical skills to facilitate a smooth transition to clinical practice. Successful course completion is a prerequisite for engaging in patient-related activities.
The instructional materials for the training course, comprising two booklets from the 1980s, required an update to address both theoretical and practical aspects. An update of "The Technical Manual" was done in 2021 as part of the specialist thesis requirement for postgraduate students.
The objective of this specialist thesis project was to update and modernize the "Typodont manual", introducing candidates to both historical and contemporary clinical orthodontic practices, aiding their transition from general dentistry to orthodontic specialization.
MATERIAL AND METHODS: The former typodont manual and a few textbooks served as the basis for this project. In addition, an extensive search of the literature, concerning particularly clinical orthodontic techniques was performed. A step-by-step simulated orthodontic treatment of malocclusions was carried out on a typodont, and all stages were recorded. In addition, clinical photographs and/or schematical drawings were used, replacing older outdated versions.
RESULTS: The project resulted in a modernized and improved typodont manual, comprising 5 chapters, and 120 figures. The revised manual gives detailed guideline to treatment of various orthodontic malocclusions, through simulated typodont treatment. In this manner, the residents' understanding of orthodontics is enabled by integrating clinical approaches with theoretical foundations through widely accepted techniques and relevant subjects, presented in an easily comprehensible manner.
LIMITATIONS: The study is limited by its retrospective reliance on existing literature, potentially introducing bias towards documented practices. Ongoing refinement, including periodic updates and considering individual differences, is essential.
CONCLUSION: The updated Typodont manual, signifies an advancement in aligning orthodontic education with contemporary practices. Overall, these enhancements contribute to the efficacy of the orthodontics residency program, fostering a smoother transition for postgraduates into the specialized field of orthodontics at the University of Oslo.

Abstract citation ID: cjae081.115
CP48 WEYERS ACROFACIAL DYSOSTOSIS: COMBINED ORTHODONTIC AND ORTHOGNATHIC MANAGEMENT OF A SEVERE CLASS III MALOCCLUSION COMPLICATED BY HYPODONTIA USING 3-DIMENSIONAL SURGICAL PLANNING: A CASE REPORT

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AIM: To describe a challenging case managing a severe class III malocclusion surgically and orthodontically with the added complications of hypodontia, a single occlusal contact, and posterior disc displacement.
SUBJECT/METHODS: This case report is about a 17-year-old female patient who presented with difficulty chewing due to a lack of tooth contact. She has been clinically diagnosed with Weyers acrofacial dysostosis due to the presence of hypodontia, a prognathic mandible and bilateral postaxial polydactyly of the hands. She has a history of self-harm related to sensitive social circumstances and has been referred to clinical psychology regarding this. She presented with a severe class III malocclusion, a 12mm reverse OJ, AOB, and contact only between the LL7 and UL6. There was missing LR4568, UR58, UL58 and LL58. A lateral cephalogram was taken for orthodontic planning and showed an ANB of -9 confirming the severe skeletal class III pattern. A CBCT scan was also taken for surgical 3D planning to provide cutting guides.
RESULTS: The patient was diagnosed with a class III malocclusion and hypodontia likely due to Weyers acrofacial dysostosis, although the patient declined genetic testing. Upper and lower fixed appliances were used to align the upper arch without extractions; procline the upper incisors by 10°; decompensate the lower arch minimally; and procline the lower incisors by 10-15° accepting the lower arch spacing. Then, arthrocentesis was carried out to manage the posterior articular disc displacement prior to orthognathic surgery. The treatment options discussed included distraction or bimaxillary osteotomy. Although distraction would achieve a better occlusion, it was deemed clinically inappropriate given the psychosocial issues due to the involvement of multiple operations. BiMax involved a BSSO for a 6mm mandibular set-back, followed by Le Fort 1 osteotomy to advance the maxilla by 7mm. Additionally a reduction genioplasty was performed to correct the chin point.
CONCLUSION: Weyers acrofacial dysostosis is a rare AD genetic disorder that is caused by a mutation in the EVC2 gene. A severe class III malocclusion can be treated using a combination of fixed appliances and orthognathic surgery. 3D surgical planning allows for improved outcomes in such severe cases.

Abstract citation ID: cjae081.116
CP49 IMPORTANCE OF TAKING PRE-OPERATIVE ORTHOPANTOGRAM RADIOGRAPHS WHEN TREATMENT PLANNING ORTHODONTIC CASES – AN INCIDENTAL FINDING OF A DENTIGEROUS CYST - A CASE REPORT

Miss Navneet Bhamra[1], Dr Ciara Ennis[1]; [1]*The Cosmetic Dental Gallery*

BACKGROUND: A fit and healthy 32 year old patient self-referred for orthodontic treatment as he was concerned about his 'crooked' teeth. He presented with a Class II div 1 incisor relationship on a class II skeletal base with increased FMPA. He had a Class II molar relationship, an upper centreline discrepancy of 4mm to the left-hand side, a bilateral posterior crossbite and an overjet of 5.5mm. Severe crowding was noted in the upper arch and moderate crowding on the lower arch. Hard tissue charting revealed an unerupted upper left second premolar (UL5).
An Orthopantogram (OPG) was taken as part of the pre-operative assessment and an incidental finding of an unerupted lower right third molar (LR8) associated with a large cyst-like radiolucency (from the LR8-LR6 region) was seen, the UL5 was impacted and unerupted.
METHOD: A case report
RESULTS: After informing the patient of the findings, he was referred to a maxillofacial consultant, where treatment was carried out under general anaesthetic. The UR4, LR4 and LL5 were extracted (as per the space requirements for orthodontic treatment).
The LR8 was extracted using a lingual split technique as it was very deep and buried. There was no cystic material that could be sent for a biopsy as only clear serous fluid was found. The crown of the UL5 was found via a palatal flap, however as it was ankylosed and adjacent to the roots of the UL6 palatal root, the decision was made to leave it situ. After adequate healing, orthodontics was completed with fixed appliances followed by retention.
CONCLUSIONS: From the pre-operative OPG radiograph an incidental finding of an unerupted buried LR8 associated with a large radiolucency was found, which would not have otherwise been found using intra-oral radiographsS. This case has emphasized the importance of taking pre-operative radiographs, especially OPG radiographs to prevent the dangers of inadequate diagnosis which can lead to longer treatment times. Whilst the need to consider radiation dose is necessary, this case highlights the necessity for a thorough examination to prevent missing a potential dental anomaly and to gain appropriate consent from the patient.

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Abstract citation ID: cjae081.117
CP50 CORRECTION OF A CLASS III MALOCCLUSION USING A COMPRESSED HEAT-ACTIVATED NICKEL TITANIUM (HANT) WIRE

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BACKGROUND: Class III malocclusions can be treated with range of different procedures including orthodontic camouflage and a combined orthodontic-orthognathic approach. The choice of treatment modality is dependent on the severity of the malocclusion and the growth phase of the patient. Use of a compressed heat-activated nickel titanium (HANT) wire can aid in correction of cases planned for orthodontic camouflage.
MATERIALS AND METHODS: An eighteen-year-old patient presenting with a Class III malocclusion on a Skeletal III base was treated using a compressed HANT archwire.
This method employs a stopped upper 0.017" x 0.025" heat-activated NiTi archwire after sectional fixed bonding, with MBT brackets placed on UR6, UL6, UR12, UL12.
The archwire is engaged within the brackets so that there is excess wire between the UR2-UR6 and UL2-UL6.
Crimpable hooks are attached onto the archwire mesial to UL6, UR6 to prevent the archwire moving backwards, thus maintaining compression in the wire between the upper first molars and lateral incisors.
The shape memory and superelastic properties of HANT archwires result in the deformed wires flattening to recover their initial form. The HANT can be reactivated by placement of closed coil spring on the archwire distal to the crimpable hooks.
The flattening of the compressed HANT results in anterior movement of the maxillary incisor teeth.
RESULT: The patient achieved a Class I incisor relationship and positive overjet following 6 months of use of the compressed HANT archwire despite her underlying Class III malocclusion.
CONCLUSIONS: Use of a compressed HANT is a simple and effective option for correction of Class III malocclusions in cases amenable to orthodontic camouflage.

Abstract citation ID: cjae081.118
CP51 SURGICAL SUBLUXATION AND ORTHODONTIC TRACTION TO ALIGN AN ANKYLOSED MAXILLARY PALATAL CANINE

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BACKGROUND: Case report of an ankylosed ectopic maxillary palatal canine successfully managed at Northwick Park Hospital, London, with a combination of surgical subluxation and orthodontic traction.
CASE SUMMARY: 16-year-old male presenting with Class II division 2 incisor relationship (3mm overjet) on a skeletal I base with average vertical proportions. Complicated by an ectopic palatal upper left canine, retained upper left primary canine, spaced upper arch, mildly crowded lower arch, increased overbite and upper centreline shift to the left.
MANAGEMENT: Following expose and bond of the upper left canine, elastomeric traction was applied to a transpalatal arch and there was initial movement of the canine. Treatment mechanics progressed to the use of a stainless steel archwire with a nickel titanium auxiliary wire, however no changes in the canine position occurred. A re-exposure was performed, with further traction and no further changes to the canine position. A maxillary cant and subsequent left lateral open bite developed and canine ankylosis was clinically diagnosed and confirmed radiographically.
SURGICAL SUBLUXATION: Surgical subluxation of the canine was carried out under local anaesthetic using a luxator instrument until grade 1 mobility was achieved, along with same day light elastomeric traction to the stainless steel arch wire. The patient was reviewed at 3-weeks and 12-weeks post-surgery to replace the elastomeric traction. At 20-weeks post-surgery, a stainless steel arch wire with a nickel titanium auxiliary wire was used and the tooth was successfully brought down into alignment and included in the main nickel titanium arch wire 6 weeks later. The patient was debonded 18-months post-surgery following correction of the maxillary cant and achievement of treatment objectives, and subsequently provided with upper and lower bonded and vacuum formed retainers.
FOLLOW UP: 3-month post-treatment review showed good clinical and radiographic outcome of the upper left canine, with no evidence of periapical pathology, however long-term follow-up and endodontic monitoring by the general dental practitioner is indicated.
CONCLUSIONS: Surgical subluxation has been demonstrated to be successful in the orthodontic alignment of ankylosed teeth, and may be considered as a viable treatment option for managing ankyloses.

Abstract citation ID: cjae081.119
CP52 STUDY OF DENTAL ABNOMALITIES IN CLEFT LIP AND PALATE : ABOUT 32 CASES.

Docteur ZEHAIRA Boukhari[1], Doctor Mohamed El Amine Lassoued, Professor Chakib Hocine Tahraoui, Professor Fatma Si Ahmed; [1]*Algiers University of Medicine*

INTRODUCTION: Cleft lip and palate (CLP) are the most common crâniofacial malformations in humans. Dental abnomalities are more or less significant sequelae, even in minimal forms.
OBJECTIVE: This study aims at assessing the importance and nature of dental abnormalities which have a link of CLP.
PATIENTS AND METHOD: 32 patients with CLP were included in this study. These patients were recruited between 28 August and 30 November 2023 and referred to our orthodontic consultation at Mohamed Sghir Nekkach University Hospital by the maxillofacial surgery and paediatric surgery departments of the same hospital. For each patient, a clinical observation form and an orthopantomogram (children over 3 years old) were performed.
RESULTS: The most common dental abnomalities was agenesis of the lateral incisors, with a frequency of 81.2% ; there could be 2 agenesis in the same patient. The frequency is 65.6% for abnormalities affecting position, 40.6% for abnormalities affecting shapes, 34.3% for structural abnomalities (enamel dysplasia) and 9.3% for delayed eruption.
CONCLUSION: Overall, these results are similar to those reported in the literature. Further studies on a wider population are necessary in Algeria to obtain more significant results.

Abstract citation ID: cjae081.120
CP53 THE TRANSPLANTATION OF AN IMPACTED UPPER PREMOLAR, ABOUT A CLINICAL CASE

Docteur Mohammed Bouziane[1], Docteur Adel Ayat[1], Docteur Mohamed Salim Chikhi[1]; [1]*Faculty Of Medicine Of Algiers*

INTRODUCTION: Used in humans for centuries, dental transplantations have not exhausted their indications or potential improvements to optimize their prognosis, as evidenced by numerous scientific studies dedicated to them in recent decades. Their purpose is the surgical placement, on a dental arch, of included or ectopic teeth, the replacement of lost teeth, or the compensation for agenesis.
CLINICAL CASE: This concerns a 23-year-old young lady, referred by a colleague due to the absence of teeth 12 and 24 in the dental arch. Radiological examination confirmed the agenesis of tooth 12 and the inclusion of tooth 24 in a nearly horizontal position just outside the outer cortical. Faced with this atypical position and the impossibility of performing a conventional orthodontic traction, we decided to attempt an auto-transplantation of tooth 24. After an initial orthodontic step to level the arch and prepare the space for the included tooth 24, the surgical protocol for auto-transplantation consisted of detaching a full-thickness vestibular flap, atraumatic harvesting of the transplant to avoid damaging its periodontal cells, preparation of the alveolus or the recipient site, introduction of the transplant into the neoformed alveolus, suturing of the flap, and placement of a sub-occlusion splint.
RESULT: Three months after auto-transplantation, we resumed orthodontic treatment to close the residual spaces. We observed good healing of the alveolar bone and periodontal ligament.
CONCLUSION: In general, surgical-orthodontic traction is the treatment of choice for included teeth. However, in severe cases of impaction, auto-transplantation appears to be an interesting alternative to preserve the included tooth and reduce the treatment time.

Abstract citation ID: cjae081.121
CP54 INTERDISCIPLINARY THERAPY OF A PATIENT WITH AN IMPACTED UPPER CANINE - CASE REPORT

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INTRODUCTION: In around 2% of the population the upper permanent canines become impacted and do not come into the mouth. Most often, the mentioned tooth is palatally impacted and represent a big challenge for every orthodontist. Treatment often requires interdisciplinary approach.
CASE PRESENTATION: A 14-year-old patient was referred to the orthodontic clinic due to an unerupted upper left permanent canine. Clinical examination revealed a permanent dentition, including permanent second molars, with the presence of primary left canine. Palpation of the left eyetooth was negative.

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Panoramic radiograph showed the almost horizontal position of the impacted permanent canine, the presence of mesiodens and extensive resorption of the root of tooth 21. CBCT of the maxilla revealed the buccal position of the impacted canine and mesiodens, which crown was facing towards the nasal cavity.
We decided on a combined surgical-prosthetic-orthodontic therapy. In the first stage the patient was fitted with a non-removable orthodontic appliance in the upper and lower dental arches. The second phase consisted of an oral surgical intervention, where the mesiodens, impacted tooth 23 and primary tooth 63 were extracted. This was followed by orthodontic closing of the gap. We planned to move tooth 24 to the place of tooth 23 with subsequent prosthetic remodeling of the dental crown to the shape of an upper eyetooth. In the gap at the position of tooth 24, the oral surgeon inserted an implant, to which a monolithic zirconia crown was later cemented. Finally, we fixed the retention wires to the lower and upper dental arch and made a clear plastic retainer for the upper dental arch.
CONCLUSION: Canine impaction is manifested by various clinical signs, such as the negative palpation of the tooth germ before expected eruption, hypoplastic lateral incisor, RII/2 malocclusion, narrow upper dental arch and lack of space. If at a certain age we do not clinically detect the presence of an upper canine in the oral cavity, it is necessary to carry out X-ray diagnostics to clarify the cause of the lack of growth and to treat the patient as soon as possible.

Abstract citation ID: cjae081.122
CP55 ANTERIOR OPEN BITE TREATMENT WITH RAPID MAXILLARY EXPANDER AND FRÄNKEL APPLIANCE IN MIXED DENTITION - AN ULTRASOUND EVALUATION OF TONGUE POSTURE, CASE REPORT

Mrs Lea Bukovac[1], Mrs Maja Ovsenik; [1]*Zavod Orthos*

OBJECTIVNES: The aim of this case presentation was to evaluate the effectiveness of the rapid maxillary expander (RME) and Fränkel appliance treatment regarding tongue posture using ultrasonography of tongue posture before treatment, after palatal expansion and after functional appliance period in a case with anterior open bite.
SUBJECT AND METHODS: A boy with anterior open bite and lateral crossbite during orthopaedic treatment with RME appliance and Fränkel appliance in the mixed dentition is presented. Clinical examination reveals incorrect orofacial functions, dentoalveolar anterior open bite and unilateral posterior cross-bite. For maxillary expansion, a tooth tissue-borne rapid maxillary expander (Haas-type) was cemented and activated twice per day (2 x 0.25mm) for 14 days. After 11 months of active expansion and retention period (T1) RME was removed and functional therapy with the modified Fränkel - type IV appliance (FR-4) was continued (T2). For retention of transverse palatal dimension transpalatal bar was passively cemeneted during functional therapy.
Ultrasonography was used to evaluate tongue posture before orthodontic treatment (T0), after active phase of orthodontic treatment with RME (T1) and after functional therapy with RF-4 (T2). An ultrasound system, Voluson 730 Expert, and a 3D convex transducer, RAB 2-5 MHz, was used to assess tongue posture.
RESULTS: An ultrasound image of the tongue posture before treatment showed an incorrect tongue posture on the mouth floor (T0), after active phase of maxillary expansion (T1) ultrasound image revealed persistent incorrect tongue posture on the mouth floor and after functional therapy with RF-4 correct tongue posture on the palate (T2). Clinically functional therapy ended with complete correction of anterior open bite with positive overbite and correct orofacial functions.
CONCLUSIONS: Early diagnosis and recognition of incorrect orofacial are crucial for long-term successful treatment result. Ultrasonography is a non-invasive and objective method for evaluating incorrect tongue posture that enables success of early treatment. It is a valuable diagnostic tool for evaluating tongue posture after active maxillary expansion, during and after treatment with functional appliances.

Abstract citation ID: cjae081.123
CP56 PRESENTATION OF THE INTERDISCIPLINARY EARLY TREATMENT CONCEPT MYKIE® - FIVE CASE REPORTS

Dr Julia Camilla Bulski[1], Dr. Andrea Freudenberg[2], Prof. Dr. Christina Erbe[1]; [1]*University Of Mainz, Department Of Orthodontics,* [2]*Private Practice Dr. Freudenberg & Colleagues*

AIM: The aim was the development of an interdisciplinary and practicable early treatment concept combining myofunctional therapy (MFT) and orthodontics. The concept considers "form follows function" as well as the duration of muscle force application as the key factors in jaw growth and simultaneously allows the correction of myofunctional dysfunctions.
METHODS: Five cases in the early mixed dentition with Angle class II:1, class II:2, class III, anterior/lateral crossbite and open bite underwent the combined myofunctional and orthodontic early treatment concept mykie®. In these cases, the pre-therapeutic (T0) and post-therapeutic (T1) values after 1.5 years (Mean ± SD) of active treatment were recorded using the digital PAR index (OnyxCephTM, Image Instruments GmbH, Chemnitz). All patients were treated with removable orthodontic appliances like the Bioplate, a plate in the upper jaw worn 24 hours a day, as well as a prefabricated silicon functional appliance worn for 4 hours after school and during the night.
RESULTS: On average, an overall reduction of 22.17 ± 8.43 PAR points was achieved implying a PAR improvement of 85.33% from T0 to T1.
LIMITATIONS: The PAR index is only suitable for assessing the success of an early treatment in the mixed dentition to a limited extent. Thus, new indices for the measurement in the mixed dentition need to be developed in the future.
CONCLUSIONS: A combined orthodontic-myofunctional approach/guidance in the early developmental phase is a promising idea for a successful therapy. Interdisciplinarity organisation involving myofunctional therapy and orthodontics is challenging, for which the mykie® concept can be an interesting suggestion.

Abstract citation ID: cjae081.124
CP57 CLINICAL EFFICIENCY OF MODERN ORTHODONTIC TREATMENT PROTOCOLS IN SEVERE CLASS II DEEP BITE PATIENT

Dr Igor Cazacu[1,2], Dr Zinaida Voinotinschi[1], Dr Ana-Lucia Caraman, Dr Valentina Trifan[2]; [1]*Ortoclinic,* [2]*Nicolae Testemițanu State University of Medicine and Pharmacy*

AIM: Class II malocclusion with severe deep bite is characterized by lack of vertical dimension and occlusal support, steep inclination of upper occlusal plane, and pressure of the TMJ. The aim of the study was to present efficiency y of different orthodontic treatment methods that can be used in order to correct a traumatic deep bite.
MATERIAL AND METHOD: Patient, 18 years old, male, skeletal class II malocclusion, severe deep bite with mandibular crowding undergone orthodontic treatment. Firstly, alignment and leveling achievement was obtained by use of straight wires. Bite ramps on teeth 16 and 26 and turbo bites on 11 and 21 were fixed. Reverse archwires, 017" x .025", .019" x .025" for leveling curve of Spee along with class II intraoral elastics were worn for 4 months. Following, a bilateral functional appliance - fixed modified class II corrector on a 019" x .025" SS wires was applied for lower jaw mesialization. For articular decompensation and posterior occlusal plane flattening, gun metal MEAW archwires were adapted for 7 months. At last, 2 x 8 mm mini screws were inserted into the maxillary buccal interradicular bone, between the second premolar and the first molar for incisor retraction.
RESULTS: A correct overbite and overjet was obtained. The cephalometric analysis shows a reduction of ANB angle, an AO-BO reduction, and a better profile. Vertical dimension, upper posterior and anterior occlusal planes posterior height improved significantly. Torque and intrusion of upper incisors was achieved without resorptions. Interincisal angle diminished, and good stability achieved.
CONCLUSIONS: Treatment of class II deep bite patients can be done by combination of different functional treatment methods. Such a therapeutic approach improves the outcome.

Abstract citation ID: cjae081.125
CP58 INTERDISCIPLINARY MANAGEMENT OF BILATERAL MAXILLARY LATERAL INCISORS AGENESIS OF MINOR PATIENT WITH ORTHO MINI IMPLANT BASED PROSTHESIS: A CASE REPORT

Mrs Diana Cebanova[1]; [1]*Innovative Orthodontical Clinic Concordia,* [2]*The board member of The Private Dental Clinic WeCare*

Bilateral Maxillary lateral incisors agenesis involves the anterior dental arch region, therefore, it raises concern in patients and their families.It creates aesthetic and functional disturbances which can be managed in various ways.
The condition requires careful treatment planning and consideration of the options and outcomes. In cases where lateral incisors agenesis is detected in the early stages of mixed dentition, the decision of treatment modalities, falls on the shoulders of the parents or legal guardians, choosing between the two major treatment options. Whether orthodontic space closure with canines aesthetic remodeling or space opening for prosthetics. It is even harder for parents of minors to decide, because it is not possible for immediate implant placement after space is opened. A Clinical case is presented to illustrate the interdisciplinary approach between orthodontics and compromised prosthodontics using TADs mini-screws as a foundation for the temporary restoratives.
In this report, the treatment of a 12 years old girl, with a Class II malocclusion of molars and canines with bilateral lateral incisors agenesis on her late mixed dentition stage.The goal of the space opening included of the areas corresponding

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to the missing upper lateral incisors, through the distal movement of the canines and the posterior teeth by removable appliances - Invisalign First aligners I stage, successfully achieved. And spaces of missing lateral incisors are closed with non-removable, digitally planed ortho mini screw based restoratives.

Abstract citation ID: cjae081.126
CP59 AN INNOVATIVE APPROACH TO UPRIGHT SEVERELY IMPACTED MANDIBULAR THIRD MOLARS

Dr Timothy Ying Ho Chan[1], Dr Lap Shun Clement Chan[1], Dr Keyuan Liu[1], Dr Yanqi Yang[1]; [1]*The University Of Hong Kong*

BACKGROUND: After the completion of comprehensive orthodontics, even with extraction of premolars, it is common that the lower third molars (LM3) remain impacted. The possibilities of orthodontic uprighting of LM3 are seldom explored before the irreversible decision of surgical extraction is made.
Miniscrews are very useful in controlling tooth movement and the mandibular buccal shelf is shown to be a safe and reliable site for placement of miniscrews with high successful rate.
This novel method of buccal shelf miniscrew supported Multiple Components Force Systems (MCFS) has been used to treat over 30 cases of severely impacted LM3 with encouraging success rate.
AIMS: To elucidate the biomechanics and demonstrate the effectiveness of a new technique to upright severely impacted wisdom teeth using buccal shelf miniscrews.
METHODOLGY: This is a case series with five representative cases presented. These patients have completed comprehensive orthodontic with extraction of four premolars (under retention) and have at least 1 severely impacted LM3. A buccal shelf miniscrew with a rectangular hole was used, and the components of the system included three wires, an open niti coil spring and various cross-tubes and connectors. The force system applied a controlled force distally and occlusally while preventing lingual rolling.
RESULTS: The MFCS effectively disimpacted severely impacted LM3 within 3 to 9 months, total treatment time lasted from 6 months to 1 year. Post-treatment, the alignment of LM3 with adjacent teeth was satisfactory, with notable bone re-generation and healthy periodontium between the second and third molars over follow-up periods of up to 2 years.
CONCLUSION: This technique is not only safe and reliable but also successful in producing favorable long-term outcomes. It challenges the traditional notion that surgical removal is the only solution for severely impacted third molars, offering a less invasive alternative with promising results.

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CP60 THREE CYCLE CLINICAL AUDIT TO ASSESS CHANGES IN RECORD KEEPING STANDARDS FOLLOWING THE INTRODUCTION OF NEW HEALTHCARE SOFTWARE

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BACKGROUND: Good record keeping is crucial for recording diagnoses, documenting treatment plans, and allow continuity of care. Patient records serve as evidence for dental service, safeguard legal rights, and uphold regulatory standards in the dental profession.
AIMS: A new electronic patient record system (EPIC) has recently been introduced to the department, enabling electronic charting and shared clinical templates. This audit aims to evaluate the completeness of record keeping for patients attending the orthodontic new patient clinic, assess the impact of previous interventions on record keeping, provide guidance on essential information for clinical notes, and evaluate the influence of the newly introduced EPIC system on patient records.
METHODS: A three-cycle clinical audit was conducted to review clinical records of patients attending the orthodontic new patient clinic. Cycle 1 and 2 were conducted in April 2022 and July 2023 respectively, with a random samples of 20 patients. Cycle 3 was completed in November 2023, and included the records of all 66 patients who attended new patient clinics that month.
RESULTS: Analysis revealed a decline in dental history documentation from 100% in Cycle 1 to 95% in Cycle 2, further decreasing to 54.5% in Cycle 3. Similarly, compliance of dental charting reduced from 100% to 54.5%, and oral hygiene records decreased from 90% to 68.2%. Notably, smoker history and alcohol intake records were lacking in Cycle 3, while records of soft tissue examination improved from 0% to 63.6% between Cycles 2 and 3. Occlusion records remained consistent at 95% in Cycle 1, 100% in Cycles 2 and 3.
LIMITATIONS: EPIC was introduced between Cycles 2 and 3, with Cycle 3 occurring in the early stages of its implementation. Ongoing departmental changes, operator unfamiliarity and inclusion of early-stage trainees in their second month of training, contributed to variations in results.
CONCLUSIONS: Our findings indicate an overall decline in dental charting, oral hygiene record maintenance, and dental history documentation. The introduction of the EPIC system positively impacted recording of soft tissue examinations. To address these issues, the new software will allow for adjustments to the shared templates to effectively train clinicians to improve record keeping.

Abstract citation ID: cjae081.128
CP61 LH WIRE FOR THE TREATMENT OF SKELETAL CLASS III COMBINED WITH ANTERIOR CROSSBITE CASE

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OBJECTIVES: LH wire (low hysteresis, ISW, Improved Super-elastic Ti-Ni alloy Wire, developed by Tokyo Medical and Dental University) for the treatment of skeletal Class III combined with anterior crossbite will be discussed.
CASE: A 17-year-old male came to our orthodontic clinic with a chief complaint of a protruded chin. Clinical examination revealed Angle Class III malocclusion with anterior crossbite. Reduced overjet and mild crowding were also noted. Cephalometric analysis indicated a high mandibular plane angle. In order to acquire a harmonious arch coordination, we underwent non-extraction orthodontic treatment based on the patient's intention. Mechanism involved LH MEAW (Multiple bends edgewise archwire) for correction of anterior crossbite, intermaxillary elastics (IME) for better interdigitation, and clear aligner for further fine detailing. The improvement of both facial appearance and dentition alignment was noticeable. Finally, adequate overbite and overjet were achieved.
DISCUSSION AND SUMMARY: In this case, the efficacy of LH MEAW for correction of anterior crossbite, and the method of WA (wire + aligner) orthodontics were discussed. As a result, a well aligned dentition and a satisfactory treatment result were achieved.

Abstract citation ID: cjae081.129
CP62 MULTIDISCIPLINARY TREATMENT OF A TEMPOROMANDIBULAR DISORDER IN A PATIENT WITH OTOLOGICAL SYMPTOMS: A CASE REPORT

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INTRODUCTION: History: A 28-year-old woman presented with various symptoms including mouth-opening limitations, pain in the temporomandibular joint and surrounding regions, tinnitus, and high-frequency hearing loss. She also had specific dental issues such as right mandibular second molar distal cervical caries, pain upon performing a cold test, significant gingival recession with an evident labial root shape in the lower incisors, and malocclusion.
ASSESSMENT: Facial, intraoral, periodontal, radiological, and temporomandibular joint examinations were conducted, along with cephalometric analysis. These assessments revealed skeletal Class II malocclusion, Angle's Class I malocclusion, temporomandibular disorders, right mandibular second molar chronic pulpitis, and generalized chronic periodontitis.
Radiographic assessment confirmed the presence of dental caries and provided additional information on the condition of the temporomandibular joint.
AETIOLOGY: The patient's symptoms and dental issues were likely caused by a combination of skeletal malocclusion, dental pathology, and temporomandibular joint disorders.
TREATMENT: The treatment plan aimed to alleviate symptoms, achieve stable functional occlusion, and address the specific dental issues identified.
The initial phase of treatment involved stabilization and splinting, which lasted for ten months. This helped improve the patient's hearing and resolve the tinnitus. Further treatment included autogenous tooth transplantation, which addressed the chronic pulpitis in the right mandibular second molar. Aligner orthodontics were performed for 31 months to correct the malocclusion. Additionally, a free gingival graft was conducted to address the significant gingival recession.
TREATMENT PROGRESS: Following the multidisciplinary treatment approach, the patient experienced improvements in her symptoms and dental issues. Her hearing recovered, and the tinnitus disappeared.
SUMMARY: For patients with temporomandibular joint disease and otological symptoms, a holistic treatment approach involving a multidisciplinary team is recommended. This case report highlights the successful management of a 28-year-old woman with various symptoms and dental issues through a combination of stabilization, splinting, autogenous tooth transplantation, aligner orthodontics, and a free gingival graft.

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CP63 LH WIRE FOR NONSURGICAL TREATMENT OF SKELETAL CLASS II MALOCCLUSION COMBINED WITH LARGE OVERJET CASE

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OBJECTIVE: To discuss skeletal Class II malocclusion combined with large overjet and gummy smile by LH wire (low hysteresis, ISW, Improved Super-elastic Ti-Ni alloy Wire, developed by Tokyo Medical and Dental University)
CASE: A 13-year-old female complained poor dental alignment and buck teeth, so she consulted us for orthodontic evaluation. Clinical examination revealed skeletal Class II relationship profile appearance. Upper anterior teeth proclined with gummy smile and scissors bite over left posterior teeth can be also noted. We used intrusion arch technique with temporary anchorage device for bite control and gummy smile correction, and used buccal crown torque with anterior bite turbo for scissors bite correction. The active treatment totally took about 3 years and the improvement of appearance and dentition alignment were noticeable.
DISCUSSION AND SUMMARY: In this case, the properties of LH wire for aligning the poor positioned teeth, as well as the use of intrusion arch technique with temporary anchorage device and anterior bite turbo were discussed. Finally, after 3 years of therapy, a desirable result was achieved and the patient was pleased with the treatment outcome.

Abstract citation ID: cjae081.131
CP64 LH WIRE FOR THE TREATMENT OF SKELETAL CLASS II WITH ANTERIOR CROWDING CASE

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OBJECTIVE: LH wire (low hysteresis, ISW, Improved Super-elastic Ti-Ni alloy Wire, developed by Tokyo Medical and Dental University) for the treatment of skeletal Class II with anterior crowding case will be discussed.
CASE: A 19-year-old female adult came to our clinic with a chief complaint of poor dental alignment. Clinical examination revealed Angle Class I malocclusion with upper left palatally positioned premolar and lower right buccally positioned first premolar. Anterior crowding and midline deviation were also noted. We extracted teeth 14, 25, 34, 44, and used LH MEAW for crowding relief. We also used IME (intermaxillary elastic) and not-in-slot technique to acquire a better interdigitation. In the end, correction of arch coordination, bite control and occlusal stability were successfully achieved and maintained.
DISCUSSION AND SUMMARY: In this case, we corrected poor dental alignment rapidly by using LH wire and aligner for further fine detailing, as well as LH wire MEAW and IME technique. LH wire can provide an efficient and easy way to correct such kind of malocclusion. After 32 months of the treatment, a desirable outcome was achieved and the patient was pleased with the treatment result.

Abstract citation ID: cjae081.132
CP65 THE SPONTANEOUS IMPROVEMENT OF GINGIVAL RECESSION ON MANDIBULAR INCISORS THROUGH THE ORTHODONTIC TREATMENT

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AIMS: In this clinical case, we report the effectiveness of the orthodontic treatment of severe gingival recession and bone dehiscence through repositioning of root toward alveolar bony housing in a 29-year-old female patient.
MATERIALS/METHODS: A 29-year-old female patient visited to treat for severe gingival recession and bone dehiscence on mandibular incisors. According to intra-oral clinical examination, severe gingival recession on the buccal surface of the mandibular left lateral incisor(#32) was observed. In the axial views by a cone-beam computed tomography images, the root of mandibular left lateral incisor was located out of alveolar bone width. In the sagittal views, the distance between the apex of the root and the perpendicular line from the incisal edge of #32 to the mandibular plane was 3.74 mm. The angle between the long-axis of #32 and the mandibular plane was 75.7°. The overall goal is to improve the labial gingival recession of the mandibular left lateral incisor. During the treatment, on the mandibular left lateral incisor, an MBT prescription bracket with a -6° torque was attached 180° upside down to allow for a greater lingual torque of +6° to be applied. And, 0.019 × 0.025-inch stainless steel wire was inserted and bent to provide additional lingual torque to the mandibular left lateral incisors.
RESULTS: After orthodontic treatment, the labial gingival recession of the mandibular left lateral incisor improved by more than 4 mm, and the marginal gingiva was formed at a similar height to the adjacent teeth. The roots that were palpated at the initial examination were also not palpable. In the axial views by a CBCT images, the root of mandibular left lateral incisor was located within the alveolar bone. In the sagittal views, the distance between the apex of the root and the perpendicular line from the incisal edge of #32 to the mandibular plane was -1.83 mm. The angle between the long-axis of #32 and the mandibular plane was 94.5°.
CONCLUSION: This clinical case reports that orthodontic treatment, without periodontal surgery, can spontaneously correct the gingival recession and alveolar dehiscence.

Abstract citation ID: cjae081.133
CP66 TREATMENT OF AN IMPACTED PERMANENT MAXILLARY INCISOR WITH NANCE AND MULTIBRACKET APPLIANCE: A CASE REPORT

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Impacted teeth are a common problem faced by general dentists, orthodontics and oral surgeons. The etiology is multifactorial and may be related to systemic and local factors: supernumerary teeth, insufficient space in the arch, dental trauma, ectopic tooth, bud position, cyst, and odontoma. After wisdom teeth, upper canines and lower second premolars are the most commonly impacted teeth. The impaction of permanent upper central incisors is relatively rare but affect both aesthetics and oral function. Treatment success involves an interdisciplinary teamwork between the orthodontist and dental surgeon.
AIM: To describe a case report of a patient diagnosed with an impacted upper incisor (tooth 21) due supernumerary teeth. Initially, only these teeth were removed and the spontaneous eruption of tooth 21 was awaited. Since this did not occur as usual, the tooth 21 was surgically exposed and tractioned using Nance and multibracket appliance (MBA).
MATERIAL & METHODS: A twelve-year old female patient attended the orthodontic clinic at Johannes Gutenberg University three years after the supernumerary teeth removal in the upper incisor region. She showed a horizontally impacted tooth 21; lack of space for its eruption; anterior maxillary and mandibular crowding; retrusion of tooth 11; retrusion and extrusion of lower anterior teeth; transversal constrictions in both jaws; overjet 5mm (tooth 12); overbite 4mm; pronounced spee curve; discrete classe 2 occlusion and horizontal growth type.
THERAPY: Transversal expansion in both jaws; opening space for tooth 21 and placement into the dental arch after exposure; protrusion of the upper and lower front; elimination of the frontal crowding and intrusion of the lower front, levelling of the spee curve; setting a physiological overjet and overbite, and a class 1 occlusion. The treatment aims were achieved using a Nance appliance with a titanium molybdenum alloy lever arm in combination with a MBA.
CONCLUSION: The combination of using the Nance appliance and lever arm with MBA proved to be efficient in the alignment of the impacted incisor. Treatment using this technique does not require patient compliance. Selecting an appropriate surgical procedure and orthodontic treatment plan should result in a stable, predictable and aesthetic outcome.

Abstract citation ID: cjae081.134
CP67 RARE FINDING OF MESIODENTES IN TWINS WITH OROFACIAL CLEFTS: A CASE REPORT

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AIM: Dental anomalies are a common finding in patients with orofacial clefts. The most common include hypodontia, ectopic teeth, supernumerary teeth and crown or root malformations. Anomalies most commonly present on the side of the cleft. Mesiodentes are an example of a rare dental anomaly found in the patients with clefts. There are minimal cases of their presence reported the literature.
METHODS: Eight year-old mono-zygotic non-syndromic twin girls attended the Multidisciplinary Cleft Clinic at the Edinburgh Dental Institute for routine assessment and treatment planning. Twin One presented with a repaired left sided unilateral cleft lip and alveolus with a bilateral cleft palate. Tooth FDI 11 was unerupted. Cone-beam computed tomography (CBCT) scan revealed the presence of four supernumerary teeth including a mesiodens, palatal to FDI 11. Twin Two presented with a repaired left sided unilateral cleft lip and alveolus. Teeth FDI 11, 21, 22 were unerupted. CBCT scan revealed three supernumerary teeth including

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a mesiodens, mesiopalatal to FDI 11. For both cases, the treatment plan involved general anaesthesia for the extraction of the supernumerary teeth and remaining deciduous teeth in the cleft area prior to alveolar bone graft placement.
RESULTS: Both patients were reviewed one year following alveolar bone graft placement and good bony infill of the cleft sites was confirmed radiographically. At three-year review, Twin One presented with class 2 division 1 incisor relationship, buccally placed FDI 13, palatally placed FDI 23 and a 5mm overjet associated with FDI 11. Twin Two presented with a class 2 division 1 incisor relationship, 9mm overjet of FDI 11, ectopic FDI 25 and impacted 26. Both patients are due to commence orthodontic treatment to manage their presenting malocclusion.
CONCLUSION: Mesiodentes are a rare dental anomaly found in cleft patients. This case provides a fascinating presentation of this anomaly in twin girls. Orthodontists have an important role in the management and treatment planning for patients with clefts. They should be aware of the importance of early identification of mesiodentes in orofacial cleft patients and work alongside colleagues to enable successful long-term dental, surgical and orthodontic outcomes.

Abstract citation ID: cjae081.135
CP68 METAL ORTHODONTIC BRACKET BONDING ON PROVISIONAL CROWNS USING DUAL-CURING COMPOSITES

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BACKGROUND: Orthodontics is that branch of dentistry that is no more associated only with children. Much more number of adult patients with prosthetic restorations seek for orthodontic care, at the same time there is big number of young patients with imperfections on crowns so the placement of braces becomes difficult task. However braces need to be placed on provisional crowns, but the methods are quite different of that used on natural enamel surfaces. Combo.lign dual curing composite (Bredent.uk) is widely used in prosthodontics as bonding material between veneers and metallic frameworks. We have modified to use this material in orthodontic practice.
OBJECTIVE: The objective of this study is to describe bracket bonding technique on provisional crowns with dual curing combo.lign luting composite (Bredent.uk).
METHODS: First step is to prepare plastic provisional crown surface and sandblast with 110 microns. Then surface should be prepared with Visio.link pmma&composite primer and placed in Bredent bre luxpowerunit for 90 seconds. Metal orthodontic bracket should be covered with MKZ primer without light cure. As well as the crown and attachments are ready for bonding we connect them with Combo.lign luting composite (Bredent.uk) and put in the Bredent bre luxpowerunit for 6 minutes.
RESULTS: Provisional crowns bonded with this technique show high efficiency and low rate of failure. Most of the patients keep these crown through whole orthodontic treatment
CONCLUSIONS: Dual curing combo.lign luting composite used for metal orthodontic attachment bonding is effective and time-saving procedure during orthodontic treatment.

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CP69 IMPEEDED INCISOR ERUPTION: FREQUENCY CONCERNING ETHIOLOGICAL FACTORS . A SYSTEMATIC REVIEW.

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Empeeded incisors eruption is a disterbance in eruption of teeth.
The AIM is to give a summerized information up to date about the ethiology and freqency of empeeded incisor eruption
The MATERIAL is about 60 studies found in PubMed from 2000 to 2023.We use statistic METHODS to find the corelation between impeeded incisor eruption and different ethiological factors. Impeeded incisor eruption is observed in boys and girls from 6 to 18 years of age.
The RESULTS present interconection between ethiological factors and frequency of empeeded incisor eruption. The ethiological factors with the greates frequency are supernumerary teeth and thoot trauma.
CONCLUSION is that this phenomenon should be examened carefully because it could lead to discrepancies in dental arch and occlusion.Impeeded incisor eruption could lead to delayed incisor eruption or retention of the tooth, which is not only a functinal but an estetic and a phycological problem.

Abstract citation ID: cjae081.137
CP70 STREAMLINING THE ORTHOGNATHIC SURGERY PATHWAY, THROUGH A VISUAL MAPPING OF THE MULTIDISCIPLINARY WORKFLOW

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AIM: We aimed to create a chronological mapping illustrating the multidisciplinary workflow of the orthognathic patient journey. Prior to the mapping, surgical procedures were being delayed due to failure of the multidisciplinary team to coordinate and meet surgical date deadlines. This workflow mapping aims to align processes, streamline the patient journey, and co-ordinate communication between clinicians. We are hoping to improve the care of patients completing the orthognathic pathway.
METHODS: Creation of a visual orthognathic treatment map, using Microsoft Visio software. Development was carried out through co-production with clinicians from oral and maxillofacial surgery, orthodontics, lab technicians, theatre staff, and external industry partners. Different aspects of treatment were summarised on a timeline, highlighting when specific processes and appointments should be carried out. The duration of stages following completion of presurgical orthodontics was highlighted. This is of particular relevance for virtual surgical planning and the provision of customised plates and guides. Finally, an anonymous questionnaire sought feedback from the multidisciplinary team on the acceptability of the new visual timeline.
RESULTS: A descriptive timeline of the orthognathic patient pathway was developed. This visual pathway allows clinicians to conceptualise their role in patients' orthognathic journey. The complexity associated with the multidisciplinary management of orthognathic patients has been simplified to ensure that key stages are carried out in time for proposed surgical dates, without the expiration of any imaging. 26 individuals from the multidisciplinary team completed the questionnaire. 100% felt the mapping helped to visualise the pathway and their role with it. 100% of the team also felt the mapping would help to coordinate patient care and timing.
CONCLUSIONS: Complex treatment pathways requiring a variety of appointments, split between different departments, can be conceptualised through chronological mapping. Mapping enables the multidisciplinary team to understand their role better and perform efficient, quality patient care without organisational conflict or delays. Collaboration allowed for collegiate working and ownership of the pathway. This resulted in increased awareness by all parties of the operational and managerial complexities required to complete the patient journey. This increased awareness has aligned the multidisciplinary team, resulting in a streamlined patient journey.

Abstract citation ID: cjae081.138
CP71 NON-SYNDROMIC FAMILIAL AGENESIS OF THE PRIMARY AND PERMANENT MANDIBULAR LATERAL INCISOR: A FAMILIAL CASE REPORT WITH INTRAFAMILIAL VARIABILITY

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BACKGROUND: Agenesis of one or more teeth is the most common anomaly of tooth development. It is a condition with a strong genetic background that can be either isolated or associated with syndromes. Even though it can be observed in the primary and permanent dentition, in the posterior and the anterior teeth, agenesis affecting the mandibular anterior teeth of both the primary and permanent dentition in the Caucasian population is a rare occurrence.
CASE PRESENTATION: The present case report aims to describe the clinical and radiological presentation of the primary and permanent mandibular lateral incisor agenesis in two non- syndromic Caucasian siblings of age 8 and 7 years old with an intrafamilial variability of the anomaly: one of the siblings had unilateral agenesis of the primary mandibular lateral incisor associated with fusion of the contralateral incisor and canine and a bilateral agenesis of the succedaneous incisors; the other sibling had unilateral agenesis of both the deciduous and permanent lateral incisor. They were born to non-consanguineous parents through C-section, a procedure selected because of their mother's congenitally malformed uterus and their breech presentation. Features of these cases are discussed, together with the possible underlying genetic and environmental aetiology, the anomaly's implications in the growth and development of the dentition and the jaws and the treatment alternatives that will ensure proper function and aesthetically pleasing outcomes in the future. At present the cases are under follow-up.
CONCLUSION: Non-syndromic familial tooth agenesis- as those presented in this case report- is an inherited condition that can have different clinical manifestations in members of the same family. Taking into consideration the significant impact of tooth agenesis on the function, aesthetics and psychosocial well-being of the affected patients, its early diagnosis and a multidisciplinary approach are

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of paramount importance in order to select and implement an adequate treatment plan that will suit the patient's needs and expectations.

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CP72 BEYOND THE LIMITS WITH FIXED MECHANICS IN ADULT CLASS II MALOCCLUSION

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AIM: In this case report, it is aimed to present the changes in the dentoalveolar and craniofacial structures of 2 adult females of the same age group with similar class II malocclusion, one with normodivergent and the other with hypodivergent growth pattern, with an overjet of 10 mm and 7 mm, respectively, after treatment with fixed orthodontic mechanics without extraction and any invasive application.
MATERIALS/METHODS: First case; A female individual with a chronologic age of 15 years and 1 month in the postpubertal period has a skeletal Class 2 (ANB:7^0) and normodivergent growth pattern (SN-GoGn: 35^0). The individual has Angle Class II molar and canine relationship, maxillo-mandibular incisor protrusion, increased overbite and overjet (6mm/10mm) and a convex profile. Second case; A female individual with a chronologic age of 16 years in the postpubertal period has a borderline skeletal class 2 (ANB:5^0) and hypodivergent growth pattern(SN-GoGn:23^0). Similar to first case, the individual has Angle class II molar and canine relationship, maxillo-mandibular incisor protrusion, increased overjet (7mm) and convex profile. In the treatment of both cases; maxillary molar distalization with self-ligating system, maxillary and mandibular dental arch development, incisor retraction and intrusion and class 1 molar and canine relationship as well as ideal overjet and overbite were planned.
RESULTS: Treatment durations were 16 and 14 months, respectively. Maxillary and mandibular dental arch development, distalization of the upper molars, protrusion-intrusion-retraction of the upper incisors and class I molar-canine relationship were achieved respectively. In the first case, 8 mm overjet and 4 mm overbite reduction and in the second case, 5 mm overjet and 2 mm overbite reduction were obtained. Similarly, in both cases, positive reflections were observed in soft tissue convexity due to dental movements, and it was observed that the protrusive lip positions were idealized according to the Steiner S line.
CONCLUSIONS: Adult skeletal class II malocclusions, which are very difficult for orthodontists, can achieve successful dental and aesthetic results with the self-ligating system when combined with the orthodontist's knowledge, skill and manipulation as well as high patient cooperation. Long-term retention and patient cooperation should not be ignored in maintaining post-treatment stability.

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CP73 ORTHOGNATHIC MANAGEMENT OF SKELETAL CLASS III WITH UNILATERAL CONDYLAR HYPERPLASIA

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OBJECTIVES: To present management of skeletal Class III with right condylar hyperplasia.
DIAGNOSIS: A 21-year and 2-month-old Thai female came with a chief complaint of chin deviation and an asymmetrical smile. Patient was presented with asymmetrical oval facial form and a concave facial profile. Notably, the chin deviated to the left by 7 mm in relation to the facial midline. The lips demonstrated canting. Intraorally, mild crowding was observed in the lower anterior region, along with a Class III malocclusion on the right and a Class I malocclusion on the left, anterior crossbite, with an overjet of -1 mm. There was mesial shift of tooth 26 which blocked out tooth 25.
Panoramics revealed an elongation of right condyle which caused the maxillo-mandibular canting. Class III skeletal pattern attributable to an orthognathic maxilla and a prognathic mandible (SNA 84 and SNB 85 degrees). The positioning and inclination of the maxillary incisors was within normal, while the mandibular incisors exhibited retrusion and retroclination.
TREATMENT: PRESURGICAL ORTHODONTICS: Elimination of crowding and maintain of incisor proclination in the upper arch were planned by extraction tooth 25. Transverse coordination was done by upper-arch constriction. The lower arch was decompensated by lower incisors proclination and buccal crown torque for posterior teeth.
SURGICAL PROCEDURE: 2-jaw surgery, Lefort 1 and BSSRO setback 5 mm, was planned to correct canting and A-P skeletal discrepancy. The lower jaw was yawed to the right (5 mm at lower dental midline).
POSTSURGICAL ORTHODONTICS: class III vector and short box elastics were prescribed for occlusion seating.
RESULTS: molar relationships were class I on right side and class II on left side. Canine relationship were class I on both sides. Notable improvements in facial symmetry were observed, and in facial profile. Improvements of positioning of the maxilla-mandible relationship and masticatory function exhibited favorable characteristics.
CONCLUSION: The surgical intervention produced noteworthy improvements in both aesthetic and functional aspects. The collaborative efforts between orthodontic and maxillofacial surgical disciplines proved essential in addressing the skeletal Class III with unilateral condylar hyperplasia.

Abstract citation ID: cjae081.141
CP74 AN AUDIT ON THE USE OF MOUTHGUARDS IN PATIENTS BEFORE AND DURING ORTHODONTIC TREATMENT

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BACKGROUND: The risk of dental trauma during contact sports has been found to account for 10-39% of all dental injuries (Newsome et al., 2001). There are currently no U.K. guidelines advocated by dental bodies specifying for which sports mouthguards should be worn.
AIMS: The aims of this audit were:
1. To establish the prevalence and cause of previous dental trauma
2. To determine which sports patients wear mouthguards for, and compare the use of mouthguards between patients pre-orthodontics and during treatment
3. To determine what type of mouthguard patients wear
MATERIALS AND METHODS: A prospective, questionnaire-based audit was conducted at the Eastman Dental Hospital (EDH) between February and August 2023. Our gold standard for this audit was set at 100% of patients wearing a mouthguard whilst playing contact sports. A paper questionnaire was given to patients both prior to active orthodontic treatment and during treatment following a routine appointment. The questionnaire was developed from one used in a previous audit at the EDH in 2016 (Parker et al, 2016).
RESULTS: A total of 100 patients were included in the audit, 50 patients pre-treatment and 50 patients during treatment. 32% of patients had experienced previous dental trauma, with the most common cause for their trauma being attributed to trips and falls. Only 43% of patients pre-orthodontic treatment and 27% of patients during treatment played contact sports with a mouthguard. The most played sport where patients used a mouthguard was rugby, followed by hockey and lacrosse. The pre-fabricated type of mouthguard was most commonly used in patients prior to treatment, whilst the 'boil and bite' type was most commonly used in patients undergoing treatment.
CONCLUSIONS: Our findings indicate that the gold standard of our audit was not met. There is a significant proportion of patients playing contact sports who are not wearing a mouthguard. This highlights a lack of awareness on the importance of use of mouthguards during any contact sport. We encourage staff to recommend the use of mouthguards where appropriate, and to provide information leaflets. We plan to reaudit in one year's time.

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CP75 CORRECTION OF A CLASS II DIVISION II WITH GUMMY SMILE AND COMPLETE OVERBITE, TREATED WITH TWO ANTERIOR MINISCREWS AND TWO POSTERIOR MINISCREWS: 1 YEAR STABILITY.

Mr Adrien ESBER[1], Mme Romane Gilbert[2]; [1]*Universidad Alfonso X El Sabio,* [2]*Universidad Alfonso X El Sabio*

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AIM: This case report shows the correction of a gummy smile with a complete overbite, (contact of the inferior incisor's incisal edge with the palatal muccosa 7 mm, a class II division two through brackets combined with two anterior and two posterior mini screws.
MATERIALS AND METHOD: A 15-year-old female patient was treated. Cephalometric analysis (Steiner, Ricketts) and digital models were made. Chief concern: gingival smile with a 7 mm overbite and class II. Two years of orthodontic treatment, carried out between 4 December 2020 and 23 December 2022. The treatment plan first consisted with orthodontic treatment based in aligning and levelling both arches with 18x25 self-ligating brackets, and the early use of elastic 3/16 4,5 oz. Then the insertion of four miniscrews: two in the anterior segment between 12,11 and the other one between 21,22 (1,5x8mm) for intrusion of the anterior sector to correct gingival smile and overbite with 15Og forces. Posterior interradicular miniscrews were inserted between 16/17 and 26/27 (2x12mm) to counterbalance secondary effects of the anterior block intrusion.

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Intra oral scanner as well as intraoral, extraoral pictures and 1 year post treatment photographic records.
RESULTS: Orthodontic appliance provided good alignment and levelling of the teeth and the class II was corrected and a 4mm anterior intrusion as realized.
LIMITATIONS: A longer follow-up period is needed.
CONCLUSION: Through a combined orthodontic treatment with miniscrews, a complete correction of the gummy smile combined with a complete correction of the overbite was achieved with good functional and aesthetics outcomes.
INTEREST: All authors and co-authors declare not having any financial interest

Abstract citation ID: cjae081.143
CP76 ARE WE DOCUMENTING THE CORRECT DENTAL MATERIALS IN OUR CLINICAL RECORDS? A RETROSPECTIVE AUDIT

Miss Rana Fard[1], Miss Noor Aljeraiwi[1], Miss Sahar-Tara Aghababaie[1], Dr Fiona Ryan[1]; [1]*Eastman Dental Hospital, University College London Hospitals NHS Trust*

BACKGROUND AND AIMS: Recording dental materials is important for patient safety and medicolegal purposes. Clear documentation aids in promptly identifying the cause of symptoms in cases of allergic reactions, inhalation, or ingestion incidences. Adherence to current guidance and best practice is essential (CQC, 2022). This audit aimed to assess the correct documentation of dental materials and patient allergies in the orthodontic department at a large Teaching Hospital.
The standard set was that 100% of all dental materials and pharmacological agents are accurately recorded, where temporary anchorage devices (TADs) and local anaesthesia are used.
MATERIALS AND METHODS: Local clinical governance approval was obtained. This was a retrospective cross-sectional audit, whereby 165 patient medical records were selected from a range of clinicians at Eastman Dental Hospital, University College London Hospitals NHS Trust. Five consecutive orthodontic patient records were examined from each treating clinician over a 5-month period from December 2022 to April 2023. The documentation of the following dental materials was reviewed: bond up materials (etchant, bonding materials), orthodontic fixed adjustment archwire materials, removable appliances details, impression materials, and TADs placement details (local anaesthetic used with type of drug, batch number, expiry date, site). Results were collected and analysed using Microsoft Excel and disseminated locally.
RESULTS: For TAD placements and orthodontic fixed adjustment appointments, 100% of records had the correct documentation. Amongst all dental materials assessed, the documentation of etchant and bonding materials used was most commonly missing from medical records (68% and 51% respectively). Lastly, patient allergies were documented contemporaneously in 90% of cases.
CONCLUSION: In compliance with recent guidance, local anaesthesia administration details were documented clearly in all medical records assessed where TADs were placed and therefore the agreed standard was met. As best practice, the study team have introduced electronic note templates for improved documentation of materials used for common clinical procedures in the Trust's patient record system and will re-audit compliance following their integration.

Abstract citation ID: cjae081.144
CP77 TWO DIFFERENT ORTHODONTIC APPROACH IN TREATMENT OF IMPACTED MAXILLARY CANINES

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BACKGROUND: The maxillary canines impaction is a nowadays a frequent condition, and the orthodontist must be prepared to manage it.
MATERIAL AND METHODS: For diagnosis of impacted maxillary canine (IMC) ortopantomograph was taken and the detailed analysis was performed. Inclusion criteria (Figure 1) were the impacted maxillary canines with A2 (the tooth angulation to the midline 16°–45°), V1 (the vertical height of the tooth crown above the cement-enamel junction but less than half the length of the maxillary lateral incisor root) and M3 (medial position of the canine crown more than half but less than the whole root width of the lateral incisor). In the article we present the results of the 28 IMC in 21 patients (7 males and 14 females), with the mean age of 14.02 years (SD = 1.61), who were treated for impacted maxillary canines, using fixed orthodontic appliance with double archwire (Figure 2). The analyzed data were compared with the control group (CG) treated with fixed orthodontic appliance and active ligature (Figure 3) that was matched for pretreatment age and IMC position.
RESULTS: With both methods the IMC were alignment and guided in to an appropriate location in the dental arch, but the treatment time was shorter and the number of visits was statistically significant lower for alignment of IMC with the double archwire.
CONCLUSION: Impacted teeth require early diagnosis, timely and correct treatment in order to achieve the goal of functional occlusion and dentofacial aesthetics. An untreated impacted tooth can cause serious problems such as infection and cystic follicular lesion and compromise the lifespan of neighbouring lateral incisors due to root resorption.

Abstract citation ID: cjae081.145
CP78 BIOMECHANICS OF MAXILLARY DENTITION DISTALIZATION WITH INFRAZYGOMATIC ANCHORAGE: A CASE SERIES

Dr Margarida Fernandes[1], Dr Joana Borga[1], Dr François Durand Pereira[1], Prof Hélder Nunes Costa[1], Prof Pedro Mariano Pereira[1]; [1]*Egas Moniz School Of Health And Science - Department of Orthodontics*

BACKGROUND: Skeletal anchorage with Temporary Anchorage Device (TAD) is a significant aid to orthodontic treatment. InfraZygomatic (IZ) TAD has been advocated as an efficient anchorage modality for full maxillary dentition distalization. However, the IZ crest´s position may vary among individuals, altering the applied force vector in relation with the Center of Resistance (CR) of the maxillary dentition. Therefore, the aim of this presentation is to demonstrate the effect of altering the vertical level of the point of force application for an en masse maxillary dentition distalization in a series of clinical cases, allowing the development of a theoretical model of the force vectors generated and its effect on the pitch movement of the occlusal plane.
METHOD: Three patients with full permanent dentition presented with disocclusion. The treatment comprised fixed appliances with an en masse distalization of the maxillary dentition using IZ Mini-Implants (MI) as a source of anchorage. The vertical position of the IZ MI varied among the three cases. Therefore, the force vector´s relationship of the CR with the maxillary dentition changed.
RESULTS: The CR of the maxillary dentition is located approximately at the middle of the root of the second premolar. Thus, when the line of action of the distalizing force passes occlusal to the CR of the maxillary dentition, a clockwise rotation of the occlusal plane is generated. The reverse occurs when the line of action is apical to the CR.
Two factors must be considered when planning maxillary dentition distalization anchored in IZ TAD: the point of force application, which depends on the height of the anterior hooks, and the origin of the force applied. The origin of the force applied varied in the sagittal and vertical planes, evaluating the rotational effect that those various models may have on the occlusal plane.
CONCLUSION: Understanding biomechanics and evaluating the possible force vectors applied when en masse distalization of the maxillary dentition is essential to yield a more efficient and personalized treatment. Changing the height of the IZ TAD is a reliable approach to apply the most appropriate force vector for each case.

Abstract citation ID: cjae081.146
CP79 INVISIBLE DANGER, INVISIBLE REMEDY: UPRIGHTING DEEPLY IMPACTED CANINES USING TEMPORARY ANCHORAGE DEVICES (TADS).

Dr. Shadi Fietz[1]; [1]*Praxis Dr. Shadi Fietz*

AIM: The purpose of this study was to survey the possibility of uprighting deeply impacted canines in the lower and upper jaws using only a temporary anchorage device, before alignment of the teeth with a fixed appliance. This promises a shorter overall treatment time and less risk of root resorption in adjacent teeth.
MATERIALS AND METHODS: In more than 42 cases of patients with deeply impacted canines in both jaws, who showed unfavourable displacement of the canines, were treated with a surgical exposure of the canines, and then a placement of a TAD along with a first molar band and a segmental TMA arch wire. The TAD was used in the lower jow to guide the canines into the dental arch of the mandibular and as indirect anchorage in the maxilla before the alignment using a fixed appliance began. The patients age group ranged from 9 to 16.10.
Especially in the lower jaw, uprighting severely impacted and deeply displaced canines poses greater risks and necessitates a more extended treatment period. The implementation of this efficient method, utilized for approximately 12 years, has showcased remarkable safety and effectiveness in achieving straightening without inducing root resorption in adjacent teeth. This lecture will primarily focus on elucidating this method.
RESULTS: In most of the cases, alignement of the canines was possible before placement of a full fixed appliance. These cases showed no detectable root resorption.
In two cases, the canine was surgically removed due to extremely high risk of iatrogenic root resorption. The space was then closed using TADs or class two fixed applince

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CONCLUSION: The modern diagnosis using CBCT images and TADs open up new possibilities in the classification of adversely impacted canines, allow their alignment into the dental arch, and shorten the treatment time with the fixed appliance.

Abstract citation ID: cjae081.147
CP80 IMPROVEMENT OF THE DENTAL SITUATION THROUGH FUNCTIONAL REHABILITATION OF A PATIENT WITH CEREBRAL PALSY - A CASE REPORT

Dr Lisa-Sophie Fuchs[1], Miss Anna-Henriette Pech[1], Dr. Kathrin Duske[1], Prof. Dr. Franka Stahl[1]; [1]*Department of Orthodontic, University of Rostock*

BACKGROUND: In Western European countries, 2-3 out of 1000 children suffer from cerebral palsy due to pre- or perinatal brain damage. These patients have sensorimotor dysfunction, disturbances in movement control and muscle tone. This results in orofacial dysfunction, such as an open mouth posture and a low tongue rest position, which can lead to dental and skeletal anomalies, like an open bite situation.
PATIENT: The presented patient is a twin girl at the age of 14.2 years. Her vertebral palsy acquired at birth due to a lack of oxygen. Clinically she presented with a skeletal open bite (ArGoMe angle of 141,3°) and a frontal open bite situation (vertical overbite of 2mm). Her orofacial dysfunctions comprised visceral swallowing pattern, low tongue rest position with open mouth posture. Before her orthodontic treatment she had myofunctional therapy for many years. Her orthodontic treatment started with expansion of the upper and lower jaws, followed by Functional Regulator therapy with the FR IV. Additionally myofunctional therapy once per week was prescribed and a face former was given to her to train her perioral muscles at home as much as possible.
RESULTS: During her 5 years (10/2017 – 02/2023) of orthopedic therapy her vertical skeletal situation could be improved (overall reduction of ArGoMe angle by 13°). In contrast to that frontal open bite reduced only slightly by 0.9mm. Although the patient developed a better awareness of her orofacial functions and dysfunctions during her therapy no complete rehabilitation of orofacial dysfunctions could be achieved. By the end of treatment she still had a low tongue rest position and an open mouth posture. Therefore, she was recommended to continue with daily face former training for retaining treatment result.
CONCLUSION: Orthopedic therapy of malocclusion in patients with cerebral palsy is a major challenge and treatment outcome is not predictable. Possible treatment results are dependent on many factors, like patient's ability for cooperation and severity of patient's motor impairment. However, it is possible to achieve an improvement in the overall malocclusion situation by applying orthopedic therapy in combination with myofunctional therapy and additional muscle training.

Abstract citation ID: cjae081.148
CP81 TREATMENT OF UNILATERAL DISTOCCLUSION WITH FIXED FUNCTIONAL APPLIANCES – CLINICAL CASES

Dr Susana Furão[1], Dr Ana Lúcia Ferreira[1], Prof Iman Bugaighis[1], Prof François Durand Pereira[1], Prof Pedro Mariano Pereira[1]; [1]*Egas Moniz School of Health and Science - Department of Orthodontics*

BACKGROUND: Unilateral distocclusion is defined as an asymmetrical sagittal molar interrelationship, characterized by a neutral dental relationship on one side and a contralateral distocclusion.
Before planning orthodontic treatment of unilateral distocclusion, it is essential to make an accurate diagnosis, identifying the origin of the asymmetry. This can be located in the maxillary or mandibular arch, or both, and can have a skeletal, dentoalveolar or combined origin. When the problem is predominantly mandibular, skeletal or dentoalveolar, the use of fixed functional appliances may be considered. The aim of this study is to demonstrate the clinical application of a fixed functional appliance, ForsusTM Fatigue Resistant Device, in a treatment of a case with unilateral distocclusion through the presentation of two clinical cases.
METHODS: Case 1: A male patient, 15 years old, with mesodivergent skeletal pattern, a left distocclusion and a right normocclusion. He presented with a lower midline deviated 1.5 mm to the left in relation to the facial midline.
Case 2: A male patient, 14 years old, mesodivergent skeletal pattern with a left distocclusion. He presented a lower midline deviation of 4 mm to the left in relation to the facial midline.
Both cases were treated with bimaxillary fixed appliance (MBT 0.018 x 0.028 stainless steel brackets), aided by a unilateral approach with a fixed functional appliance - ForsusTM (EZ2 Module, 3M Unitek, Monrovia, USA).
RESULTS: Orthodontic treatment should be determined based on the aetiology of the asymmetry, and may involve extractions, asymmetric mechanics or, in extreme cases, orthognathic surgery. Asymmetric mechanics can be implemented with class II elastics, extra-oral forces, temporary anchorage devices or fixed functional appliances.
ForsusTM is a versatile fixed functional appliance that is easy to install, exerts a continuous force, allow sequential activations, and does not require patient compliance.
A stable and functional bilateral molar and canine normocclusion was achieved in the two cases presented, overbite and overjet were corrected, and midlines were centered.
CONCLUSION: The use of unilateral ForsusTM type fixed functional appliance should be considered in the approach for unilateral distocclusion treatment.

Abstract citation ID: cjae081.149
CP82 PERFORATION OF A NASOPALATINE DUCT CYST (NPDC) DURING INSERTION OF ORTHODONTIC MINI-IMPLANTS (OMI) IN THE ANTERIOR PALATE – AN INCIDENTAL FINDING

Dr Julia De Geer[1], PD Dr Frank Peter Strietzel[2], Prof Dr Paul-GeorgJost-Brinkmann [1], Petra Julia Koch[1]; [1]*Department of Orthodontics and Dentofacial Orthopedics, Charité Center for Oral Health Sciences CC3, Charité - Universitätsmedizin Berlin, corporate member of Freie Universität Berlin and Humboldt-Universität zu Berlin,* [2]*Department of Periodontology, Oral Medicine and Oral Surgery, Charité Center for Oral Health Sciences CC3, Charité - Universitätsmedizin Berlin, corporate member of Freie Universität Berlin and Humboldt-Universität zu Berlin*

BACKGROUND: This patient report demonstrates the incidental finding of a nasopalatine duct cyst (NPDC) during the insertion of orthodontic mini-implants (OMIs) and the subsequent interdisciplinary treatment procedure. NPDC is a rarely occurring non-odontogenic pathology.
MATERIAL AND METHODS: A 27-year-old female patient with severe class III malocclusion, whose treatment was started alio loco (including extraction of two upper premolars and incomplete gap closure), received two orthodontic mini-implants (OMI) to complete orthodontic decompensation prior to orthognathic surgery. The radiological imaging showed no suspicion of pathologies in the anterior palate. OMI insertion was carried out through a digitally planned insertion template. The left OMI failed to achieve primary stability and insertion was accompanied by secrete discharge at the anterior palate. Subsequent removal caused further painless secrete discharge. The origin of the secrete was examined with a periodontal probe and revealed an atypical cyst canal between the palatal rugae. Eventually, a CBCT of the respective region suspected the presence of a nasopalatine duct cyst with a size of 6 x 7 mm.
RESULTS: Following OMI removal, cystectomy was performed and histopathological evaluation confirmed the radiological suspicion. After two months of undisturbed healing, new OMIs were placed at a slightly more posterior position and successfully utilized to complete the gap closure.
CONCLUSION: The possibility of an incidental finding of a NPDC should be considered if OMIs fail to receive primary stability. It should be noted that the respective translucence may not be seen on pre-surgical panoramic images and lateral cephalograms.

Abstract citation ID: cjae081.150
CP83 DIGITAL INDIRECT BONDING IN ORTHODONTICS, TWO APPROACHES USING THE ONYX CEPH CAD SOFTWARE: TWO CASE REPORTS

Mr Finn Geoghegan[2,3], Mr Rakan Hamad[1], Mr Aman Ulhaq[2], Laura Gutberga[3]; [1]*Private practice,* [2]*Department of Orthodontics, Edinburgh Dental Institute, University of Edinburgh,* [3]*Specialist Orthodontic Practice*

BACKGROUND: Indirect bonding technique in orthodontics was firstly proposed in 1972, which aimed to improve the precision of placing brackets while minimizing the chairside time and reducing the discomfort of the patient.
With the rise of technology in various fields in dentistry and the use of CAD/CAM (computer-aided design/computer-aided manufacturing) technology in orthodontics, a series of systems for digital indirect bonding have been developed. These systems allow a complete digital workflow, in which the software enables the orthodontist to precisely position the brackets on virtual models of the dental arch digitally. Individualized transfer trays could also be designed and three dimensionally (3D) printed, where the brackets will be placed and finally, transferred into the oral cavity.
The digital indirect bonding has shown to be correlated with a reduced treatment time and a smaller number of appointments when compared to direct and manual indirect bonding. Moreover, the reproducibility in terms of brackets positioning and the transfer accuracy of 3D printed trays have also been confirmed.

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OnyxCeph³™ is a software which helps processing 2D and 3D Data in a substantial virtual planning of the orthodontic treatment process.
AIM: To introduce two different approaches (FA Bonding& Wire Bonding) of digital indirect bonding using the OnyxCeph³™ software.

Abstract citation ID: cjae081.151
CP84 ALTERNATIVE TREATMENT APPROACH TO A CLASS III PATIENT WITH ENDODONTICALLY COMPROMISED TEETH

Dr Konstantin Georgiev[1], Dr Yuliya Nestorova[1], Dr Manoela Kalaydzhieva[1]; [1]*Medical University Plovdiv*

OBJECTIVE: The aim of this poster is to illustrate the treatment of a class III patient with extraction of 2 upper bicuspids and 2 lower first molars with subsequent eruption of the lower wisdom teeth.
MATERIALS AND METHODS: A 22-year-old man was admitted for orthodontic treatment with a chief complaint of severe crowding in the upper and lower dental arches. He presented a dental class III, anterior crossbite and shifted lower midline. The panoramic x ray showed a number of endodotically compromised teeth, especially in the posterior segment. Because of the latter and due to their bigger mesio-distal width we decided on lower first molar extraction as a treatment approach of the class III. The wisdom teeth had not yet erupted, however, their position and inclination were favorable for eruption given that sufficient space was provided. On account of the moderate crowding and class III relations only two bicuspids were removed in the upper jaw.
RESULTS: In the course of 40 months the patient was successfully treated to class I canine and class II molar relations. Lower bicuspids were distalised in the place of the extracted first molars to gain space for the incisors. The residual space from the extraction was used for mesialization of the second molars, which in turn provided room for the spontaneous eruption of the wisdom teeth. The latter were bonded and aligned in the arch.
CONCLUSION: Extraction of endodontically compromised teeth can be considered instead of standard bicuspid extraction. This can be a wise treatment alternative especially when the intact wisdom teeth can erupt normally and thus provide better long-term occlusal stability.

Abstract citation ID: cjae081.152
CP85 OCCURRENCE OF DENTAL ABNORMALITIES IN PATIENTS WITH UNILATERAL CLEFT OF THE PRIMARY AND/OR SECONDARY PALATE.

Dr Wanda Konty-Gibinska[1], Dr Joanna Gibinska-Styla; [1]*Ortodoncja Sp Z O O*

Dental disorders are the most common malformations associated with unilateral cleft of the primary and/or secondary palate. The literature shows that the most common are hypodontia, missing teeth, atypical tooth structure and hyperodontia.
AIM OF THE STUDY: The aim of the study was to investigate the frequency of different types of dental disorders in case patients with unilateral cleft of the primary and/or secondary palate, treated orthodontically at NZOZ Ortodoncja in Cracovia.
MATERIAL AND METHODS: The resources consisted of orthopantomography X- rays of 240 patients (120 girls and 120 boys) in the age between 6 and 14 years old, with unilateral cleft of the primary and/or secondary palate. The orthopantomography was assessed: dental status, number of teeth and their constructions. In the study group of 240 children in the age between 6 and 14 years old dental disorders were observed in 91%. The most observed disorder was missing teeth and 90% of it was mainly found in upper jaw on the left side. Hypodontia most often affects second incisors and second premolars. Atypical tooth structure was observed in 35% of the study group. Impacted tooth on the cleft side was identified in case of 12 patients. Hyperodontia occurred in 7% and concerned maxillary lateral incisors on the cleft side. 4% of patients had tooth transposition. 5% of patients had dental abnormalities in the mandible.
CONCLUSIONS: Most frequently observed were patients with unilateral cleft of the primary and/or secondary palate dental disorder. It should be taken into consideration while preparing treatment plans and treating patients with clefts.

Abstract citation ID: cjae081.153
CP86 ORTHODONTIC AND SPEECH THERAPY TREATMENT OF PRESCHOOL CHILDREN.

Dr Wanda Konty-Gibinska[1], Dr Joanna Gibińska-Styla, Mgr Agnieszka Bzdyk-Gibinska; [1]*Ortodoncja Sp Z O O*

It is believed that malocclusion causes speech defects however, this relationship is not precisely defined.
AIM: The aim of this study was to determine a correlation between malocclusion types and speech defects among preschool children and the use of early orthodontic treatment.
RESOURCES AND METHODS: The examination covered study group of 542 children in the age from 3 to 6 years attending 5 preschools in Cracovia. Children were divided into 4 sub-groups:
1. Group I contained 85 children in the age of 3 years (mild dentition).
2. Group II contained 97 children in the age of 4 years (late milk dentition).
3. Group III contained 125 children in the age of 5 years (late mild dentition/early mixed dentition).
4. Group IV contained 135 children in the age of 6 years (early mixed dentition).
The study required to obtain children's medical history (from their parents) regarding orthodontic and speech examination and treatment.
RESULTS: Malocclusion was observed in 56% of the study group. The majority of malocclusion occurred in the oldest group (Group IV). Speech defect was diagnosed in 67% of the study group. The majority of speech defect was in subgroups I and IV.
Among all malocclusion the most observed was Class II, later open bite and crossbite with Class III as the less observed.
Most often speech impediment was accompanied by and open bite. Cutting the frenulum of the tongue to early increases the severity of the speech defect.
After the examination all children were provided with trainers or removable appliances appropriate to the malocclusion and the age of a child.
CONCLUSIONS: In our opinion there is a correlation between malocclusion and speech impediment.

Abstract citation ID: cjae081.154
CP87 CORRECTION OF AN IMPACTED CANINE AND MOLAR CLASS II DIVISION I, TREATED WITH A CARRIERE MOTION APPLIANCE AND AN INTERRADUCILAR MINISCREW.

Mme Romane Gilbert[2], Mr Adrien ESBER[1]; [1]*Universidad Alfonso X El Sabio,* [2]*Universidad Alfonso X El Sabio*

BACKGROUND: This case report shows the correction of a molar class II division I and a buccally impacted canine 13 vestibular between 11 and 12.
MATERIALS/METHODS: A 12-years-old female patient was treated. Cephalometric analisis (Steiner, Ricketts) and digital models were made. Chief concern: molar full class II and an incomplete left canine class II, overjet of 6mm and an included 13 between 12 and 11. Three years of treatment carried between 10th of January 2020 and 27th of November 2023. The treatment consisted of a rapid palatal expansion followed by a bilateral Class II Carriere Motion from 16 to 14 and from 26 to 23. The motion's objective was to create space for the eruption of the canine 13 and correct the class II, a sectional was placed to realize a high and horizontal traction to keep as much bone as we could around the canine 13 and lateral incisive 12. Using the Carriere Motion, interradicular miniscrew inserted distal to 16 and traction arm, we reduced as much as possible the unwanted molar mesialization due to the molar class II. We also used a seccional archwire to prevent the occlusal plane change. We finished by using a Warren coil to give negative torque to the canine 13. 0.22 conventional brackets were cemented and the canine was included in the wire whe in arch. Pretreatment intraoral scanner, intraoral and extraoral photographic record were taken as well as post-treatment intraoral scanner and full photographic records were taken.
RESULTS: The canine was successfully brought into the dental arch and the patient finished with a molar and canine class I with a correct overjet.
LIMITATIONS: The biggest limitation we found was the limited post-treatment retention time.
CONCLUSION: An impacted canine can be successfully tracted with the help of a miniscrew. The patient presented a correct occlusion, molar and canine class I at the end of the treatment.
INTEREST: All authors and co-authors declare not having any financial interest

Abstract citation ID: cjae081.155
CP88 TREATMENT OF TMJ DYSFUNCTION AND CLASS II HIGH ANGLE ANOMALY WİTH CLEAR ALIGNERS AND SURGERY FIRST APPROACH

Miss Nursima Gökmen[1], Mrs. Merve Berika Kadıoğlu[1]; [1]*Ankara University Faculty of Dentistry Department of Orthodontics*

AIM: In this case report, the results of an individual with TMJ dysfunction and skeletal class II anomaly treated with surgery first approach and using clear aligners are presented.
CASE METHOD: 19 years old female patient who presented to the clinic with complaint of TMJ pain and gummy smile. In clinical evaluation Angle Class II relationship , 2 mm deviation to left side at lower midline, 8 mm overjet, -1 mm

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overbite, 4 mm gummy smile was found; TMJ examination showed crepitation and disc displacement without reduction. In radiological evaluation, it was found that increased vertical dimensions (**GOGN/SN:** 53°) and skeletal class II anomaly with bimaxillary retrusion (SNA:72°, SNB:64°, ANB:8°). After TMJ splint therapy which lasted 8 months patient received orthognathic surgery followed by clear aligner therapy. NemoFab digital surgery planning program was used for Surgery preparation; predicted post-op occlusion STL files were transferred to the Orthero Software and digital set-up was performed according to this occlusion. Attachments were bonded 1 day before surgery. 3 mm advancement , 7 mm impaction on the anterior and 5 mm impaction on the posterior region of maxilla was done. 7 mm mandibular advancement, counter clock-wise rotation and 2,5 mm translation to left were performed. Maxillomandibulary relationship was preserved with use of intermaxillary elastics between IMF screws. After 3 weeks, aligner treatment started which consisted of a total of 20 aligners , it was recommended that each aligner to be used for 7 days, 22 hours a day.
RESULTS: Following splint treatment, the patient's pain symptoms decreased and stable mandibular position obtained. With surgery; ideal occlusion (overjet-overbite: 2 mm, Class I relationship) and skeletal improvement (SNA:74°, SNB:70°, ANB:4°,
GOGN/SN: 48°) were obtained. Pogonion moved 12 mm anteriorly , 10 mm superiorly and gummy smile has been eliminated. Total treatment time is 250 days, with addition of refinement treatment which contains 16 aligners.
CONCLUSION: Thanks to regional acceleration phenomenon that emerged as a result of surgery first concept, individuals can achieve ideal aesthetics in a minimal time. With clear aligner treatment dental crowding can be solved by applying optimal forces without soft tissue injury and hygiene problems.

Abstract citation ID: cjae081.156
CP89 THE CLINICAL AND CEPHALOMETRIC EXAMINATION OF A PATIENT TREATED WITH THE PITTS21 BRACKET SYSTEM

Mr Caglar Goksu, Miss Elif Oner[1], Miss Yasemin Nur Korkmaz[1]; [1]*Bolu Abant Izzet Baysal University*

AIM: This case report aims to demonstrate the changes in clinical and cephalometric values in a patient treated with the Pitts 21 bracket system, highlighting the treatment outcomes.
MATERIAL/METHOD: A 17-year-old female patient presented to our clinic with a complaint of malocclusion. There was a severe crowding present in the patient. The patient had a Class I skeletal and dental relationship. Initially, she exhibited increased U1-SN (112°) and increased IMPA (100°) values. The patient was informed that the ideal treatment approach would involve extractions, but she expressed her preference for non-extraction treatment. It was decided to use the Pitts21 bracket system for the patient's treatment. During the treatment process, various orthodontic wire were utilized, including 0.014 thermal activated nickel titanium wire, 0.018x0.018 ultra-soft thermal activated nickel titanium wire, 0.020x0.020 thermal activated nickel titanium wire, 0.020x0.020 beta titanium wire, and stainless steel wire. The patient was scheduled for appointments every 6-8 weeks throughout the treatment, which lasted for a total of 10 months.
RESULTS: After 10 months, U1-SN increased to 116°, IMPA to 109°, with significant improvements in crowding, arch width, and smile aesthetics, achieving an ideal profile.
LIMITATIONS: The resolution of malocclusion without extractions, in accordance with the patient's preference, led to an increment of the incisor inclination angles throughout the course of treatment in this case.
CONCLUSION: The 10-month treatment yielded notable enhancements in malocclusion, arch width, and smile aesthetics, resulting in an attained ideal profile.

Abstract citation ID: cjae081.157
CP90 BIMAXILLARY ORTHOGNATHIC SURGERY TREATMENT OF SKELETAL CLASS III MALOCCLUSION: A CASE REPORT

Mr. Alpkursad KOYUNCU[1], Dr. Hatice KOK[1], Miss Mumine GOKYER[1], Mrs. Elif ERDOGAN[1]; [1]*Selcuk University*

AIM: Skeletal Class III malocclusion; it is a dentofacial disease that can be seen with maxillary retrognathia, mandibular prognathia, or a combination of both. Severe Class III malocclusion; it can be corrected with orthodontic treatment and orthognathic surgery in order to provide the patient with better biting, chewing and speaking functions and satisfactory facial aesthetics. In this case report, the orthodontic and bimaxillary orthognathic surgical treatment of a patient with skeletal Class III malocclusion is presented.
MATERIALS AND METHOD: The complaint of a 17-year-old patient who applied to our clinic was that "forward lower jaw, speech impairment and aesthetic concerns". As a result of clinical examination; the patient had a concave profile, Class III molar relationship, negative overjet, skeletal Class III malocclusion and in the cephalometric evaluation (SNA: 84.5° A to N -| FH: 7.0 mm, SNB: 86.4° Pogonion to N -| FH: 19.3 mm , ANB: -1.9°), proclined upper incisors (Mx 1 - SN: 113.4°) and lower incisors at normal angle (IMPA: 92.9°). The patient was decompensated by extraction of the right and left maxillary first premolar teeth and prepared for orthognathic surgery. A 5 mm set back was performed with bilateral sagittal split ramus osteotomy in the mandible and 7 mm maxillary advancement with Le-Fort 1 osteotomy.
RESULTS: After approximately three years of total treatment, improved profile and function were achieved in addition to Class I occlusion with an ideal overjet, overbite, and well-aligned dentition. The result of the cephalometric evaluation is SNA: 87.1° A to N -| FH: 9.2 mm, SNB: 83.5° Pogonion to N -| FH: 14.2, ANB: 3.6°, Mx1-SN: 107.8°, IMPA: 90.6°were found.
LIMITATIONS: The results of this case study have limitations such as not being able to evaluate with 3D tomographic imaging due to the reduction of radiation risks and prolongation of treatment time due to patient cooperation.
CONCLUSIONS: In cases where camuoflage is not possible and growth modification is limited, orthognatic surgery is the best option that is satisfactory for both the patients and clinicians.

Abstract citation ID: cjae081.158
CP91 THE MANAGEMENT OF UNERUPTED MAXILLARY CENTRAL INCISORS: AN EVALUATION OF TREATMENT OUTCOMES

Dr Hannah Gorman[1], Dr Sachin Patel[1], Dr Ashani Thayaparan[1], Dr Lucy Davenport-Jones[1]; [1]*St George's University Hospital*

AIMS: A retrospective analysis into the aetiology and success of treatment outcomes associated with unerupted maxillary central incisors. We assessed the efficacy of spontaneous eruption against traction, following the removal of obstructions. The secondary objective of the study was to ascertain the prevalent causation of unerupted maxillary central incisors.
BACKGROUND: The failure of eruption of a maxillary central incisor is usually noted between the ages of 7-9 with an incidence of 1.96%, and is commonly caused by supernumerary teeth, retained primary teeth, trauma induced dilacerations or crowding. Currently, definitive protocols for treatment are lacking.
METHOD: 37 patients were identified who attended the hospital's joint orthodontic-paediatric new patient clinic from 2021-2023 with an unerupted maxillary central incisor complaint. An Excel document was populated with the following information from each record: age at presentation, aetiology, proposed intervention, whether traction was used, whether treatment was successful, date of eruption, and date of discharge. 15 of these patients had outcomes recorded, as the remaining 22 patients had either declined treatment, sought treatment elsewhere, or are currently still undergoing treatment. The results were then compared and analysed.
RESULTS: Amongst the 15 patients, 80% successfully erupted. Of these 12 successful cases, 6 required traction to facilitate eruption, 3 erupted without the use of traction, and 3 spontaneously erupted with no intervention, despite being planned for treatment. Of the 3 unsuccessful outcomes, all of these had utilised traction, however the incisor still failed to erupt. The leading cause of failure of eruption was the presence of a supernumerary, with 22 of the 37 cases presenting with this as the aetiology.
LIMITATIONS: The main limitation to the analysis was the sample size of patient records assessed and the inability to follow up patient records due to those still undergoing treatment.
CONCLUSIONS: This retrospective analysis sheds light on the multifaceted aspects of unerupted maxillary central incisors, aiming to understand their causes and treatment outcomes, revealing 50% of cases erupting without the use of traction, which aligns with the Royal College of Surgeons' guidelines. Further data collection is essential in generating more robust evidence that may impact clinical decision making.

Abstract citation ID: cjae081.159
CP92 A SIMPLIFIED TECHNIQUE FOR INTRUSION OF OVERERUPTED 1ST AND 2ND MOLARS WITH ORTHODONTIC MINISCREWS: A CASE REPORT.

Miss Angeliki Granika[1], Miss Maria Anna Sakki[1], Mr Visakis Ilias[1], Miss Lydia Schoretsaniti[1], Mr Eftratios Papazoglou[1]; [1]*National And Kapodistrian University Of Athens*

BACKGROUND/AIM: Loosing one or more posterior teeth can result in overeruption of the opposing teeth. Prosthetic space reinstatement becomes crucial in order to provide a proper restoration in the edentulous area. The aim

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of this case report was to implement an orthodontic procedure for intrusion of overerupted 1st and 2nd maxillary molars in order to regain enough prosthetic space for fabrication of an implant-supported mandibular prosthesis.
MATERIALS/METHODS: A 47-year-old male presented in need of maxillary right molars intrusion as a referral of a prosthodontic dental office. Regaining the occlusal clearance was vital for replacing the missing 1st and 2nd mandibular molars with a two-implant-supported prosthesis. For bone anchorage, four miniscrews were placed buccally and palatally at the area of 1st and 2nd maxillary right molars respectively. The overerupted teeth were intruded with fixed appliances.
RESULTS: The two maxillary molars were intruded and a 2-implant mandibular prothesis was delivered. A 3.5mm increase of prosthetic space in the posterior right area was gained in a 6-month period. Pulp vitality and occlusion remained, and the periodontal tissues followed the orthodontic movement.
LIMITATIONS: The main limitation of this technique is the elongation of treatment time and the increased cost.
CONCLUSION/IMPLICATIONS: Orthodontic intrusion of overerupted teeth is less invasive to other procedures, such as tooth preparation and crowning of the overerupted teeth often combined with endodontic therapy. Furthermore, patient compliance stands at a minimum level. A simplified orthodontic procedure combining orthodontic mini implants, segmented bonded archwires and application of intrusion forces leads to regaining prosthetic clearance for proper antagonistic implants prosthesis. Both teeth responded well to the intrusion forces. Pulp vitality remained intact even after the 2 year-follow up. The occlusion remained stable.

Abstract citation ID: cjae081.160
CP93 FACIAL SOFT TISSUE AND PROFILE CHANGES IN CLASS III PATIENTS AFTER DOUBLE-JAW ORTHOGNATHIC SURGERY: A CASE REPORT

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AIM: To present a clinical case of a patient with skeletal Class III malocclusion treated with orthodontic treatment and double-jaw orthognathic surgery (DJOS), in combination with a review of the literature regarding the facial soft tissue and profile changes in Class III patients after DJOS (maxillary advancement and mandibular setback).
MATERIALS AND METHODS: A 26-year-old Caucasian female with an excessively concave profile came to the Orthodontic department of 401 Military Hospital of Athens seeking treatment. We obtained panoramic radiographs, cephalograms, dental casts and photographs. Observing the changes in the profile of our patient after the end of the treatment, we decided to conduct a literature search about the changes in the facial soft tissue and profile in Class III patients who underwent DJOS. The literature search conducted in the PubMed electronic database with the following keywords: “facial soft tissue”, “profile changes”, “Class III”, “double-jaw orthognathic surgery” and “bimaxillary orthognathic surgery”. Search strategy included studies published from 2003 to 2023.
RESULTS: The patient had a negative overjet, bilateral posterior crossbite, anterior openbite and Class III molar relationship. After clinical examination and discussion with the patient, we decided to proceed in a combination of orthodontic treatment and DJOS. The analysis of the lateral cephalograms, the models and the photos before and after the treatment, revealed significant changes in our patient’s facial soft tissue and profile. According to the literature significant reduction in the lower lip area (related to backward movement of the mandible), insignificant nasal protrusion, forward movement of the tip of the nose and subnasal area, such as thinning of the upper lip are the main impacts of DJOS in patients’ profile.
CONCLUSIONS: It is generally assumed that orthodontic treatment in combination with DJOS in skeletal Class III patients, provides a significant improvement of the facial profile and esthetics. However, orthodontists, surgeons and patients, should realize that the result of the treatment depends on numerous factors, such as the degree of deformity, individual characteristics, gender, age, soft tissue thickness and musculature tonicity.

Abstract citation ID: cjae081.161
CP94 IS HEMISECTION OF PRIMARY MOLARS A HELPFUL TECHNIQUE IN ORTHODONTIC SPACE CLOSURE?

Ms Camilla Høili Andreassen[1], Mr Håkon Gulliksen[1], Associate Professor Els-Marie Andersson[1]; [1]*University Of Oslo*

BACKGROUND: Agenesis of the mandibular second premolars affects many orthodontic patients. The orthodontist must make an appropriate treatment plan with the correct timing that minimizes the risk and cost of treatment while maximizing the potential benefits to the patient. The space that is occupied by the deciduous mandibular second molar can either be closed or maintained. Facing complex orthodontic challenges such as congenitally missing teeth requires clinicians to be adept with a broad and varied set of tools. After extracting a deciduous mandibular second molar, the patient may need 11 mm of space closure. Closing this gap in one phase sets high demands for anchorage management and patient compliance. If either one fails, the treatment outcome will be compromised.
AIM: Can hemisection of the deciduous second molar be beneficial in space closure after agenesis of the permanent mandibular second premolar?
MATERIAL AND METHODS: Space closure with fixed appliance and hemisection will be demonstrated with two cases. The first case was an 11 year-old girl with bilateral agenesis of the second premolar. She was referred to an orthodontist after the eruption of the second permanent molar. Space closure was done with sectional fixed appliances and hemisection of the primary molar. Complete closure was achieved in 10 months. The second case was a 14 year-old boy with unilateral agenesis of his mandibular left second premolar. He was treated with hemisection of the deciduous molar and space closure with fixed appliances. Complete closure was achieved in 7 months of active tracktion.
CONCLUSIONS: Hemisection of deciduous molars in space closure treatment can assist in preserving anterior anchorage. Clinical experience has shown that space closure is faster in the subsequent couple months after an extraction. Hemisecting and removing the primary molar in two stages may help to accelerate the mesial movement of the first molar and maintain the transversal dimension of the alveolar ridge for more efficient tooth movement.

Abstract citation ID: cjae081.162
CP95 WILLINGLY OR UNWILLINGLY THE LOWER INCISOR EXTRACTION: TWO CASE COMPARISION

Dr. Hatice KOK[1], Mrs. Ruveyda Nuket IVACIK[1], Bay Taha GUMUSCAN[1]; [1]*Selcuk University Department Of Orthodontics*

AIM: This study presents the results of two orthodontic treatments performed by extraction of the mandibular incisor for different reasons.
MATERIALS AND METHODS: In the first case, 12-year-old male had 0 mm overjet and overbite with dental Class I relationship. Cephalometric analysis values were as follows: SNA:77.7°, SNB:76.2°, ANB:1.5°, Mx1-SN: 99.7°, IMPA:94.4°. There was found 5.2 mm narrowness in the maxilla, 5.1 mm in the mandible, 2.2 Bolton discrepancy in the mandible. It was decided to extract tooth number 31. The lower and upper teeth were bracketed and normal fixed treatment mechanics were applied.
In the second case, a male patient aged 17 years and 9 months with strong extraoral muscles and a horizontal profile. Our patient had 4.7 mm overjet, 7 mm overbite with class I molar and canine relationships. The values in the cephalometric examination were as follows: SNA: 85.8°, SNB: 80.1°, ANB: 5.7°, Mx1-SN: 110.7°, IMPA: 88.6°. There was found 1.3 mm space in the maxilla, 8.1 mm requirement in the mandible, 2.7 mm Bolton discrepancy in the mandible. It is planned to gain space by widening the collapsed posterior arches. The lower teeth were bracketed posteriorly segmentally, and fixed treatment mechanics including cross elastic were applied. Due to the patient's buccal muscle tone, the mandibular arch didn’t expand. It was decided to extract tooth 42 and intrude the lower anterior segment.
RESULT: In both cases, smile aesthetics were improved, acceptable Class I molar and canine relationships achieved. Cephalometric values of the first case at the end of the treatment are as follows: SNA: 77°, SNB: 77.1°, ANB: 0.1°, Mx1-SN: 109.9°, IMPA: 92.1°.In the second case: SNA:84.9°, SNB:80.1°, ANB:4.8°, Mx1-SN:110.4°, IMPA: 95.8°.
CONCLUSION: Tooth extraction isn’t ideal in cases of deepbite and crowding. However, some patients have no other options.In both cases, tooth outside the arch was extracted. Incisor extraction also provides acceptable success in cases where it isn’t the ideal indication.

Abstract citation ID: cjae081.163
CP96 ORTHODONTIC TREATMENT OF A PATIENT WITH BILATERAL CLEFT LIP AND ISOLATED CLEFT PALATE: A CASE REPORT

Mr Alpkursad KOYUNCU[1], Dr Zehra ILERI[1], Mrs Beyza Nur Yeşil Gümüşcan[1]; [1]*Department of Orthodontics at Selçuk University.*

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AIM: To present the result of a fixed orthodontic treatment performed after rapid palatal expansion (RPE) and face mask therapy of a case with a bilateral cleft lip and isolated cleft palate.
MATERIALS: A 12-year-7-month-old male patient with bilateral cleft lip and isolated cleft palate referred to Orthodontic department for the treatment. Clinical and radiographic examinations of the patient revealed a skeletal Class III relationships with a skeletal maxillary deficiency, slightly concave profile, Class II molar relationship on the left, Class I molar relationship on the right and unaesthetic appearance of maxillary anterior teeth. There were two impacted teeth in the maxilla and a lower incisor was congenitally missing. Initial cephalometric values were as follows: SNA:71.7°, SNB:74°, ANB:-2.3°, FMA:31.7°, Mx1-SN: 99.8°, Mx1-NA(mm):5.6, IMPA:82.5°, Md1-NB(mm):3.5, interincisor angle: 133.9°. The patient had negative overjet and 0mm overbite. The treatment was initiated with a face mask combined with RPE. After first stage, the condition of the impacted teeth was evaluated. The tooth 25 was extracted and the other impacted tooth was left for follow-up because it was close to the tooth roots. Fixed orthodontic treatment was initiated with bonding of maxillary arch. Initial levelling and correction of rotations in the maxillary teeth were achieved with 0.012" NiTi archwires. At the same time, removable anterior inclined plane appliance was placed in the mandible. After the rotations were corrected, mandibular teeth were bonded. 0.14" NiTi, 0.16" NiTi, 16x22" NiTi, 17x25"NiTi, 19x25" NiTi and 19x25" SS archwires were inserted, respectively.
RESULTS: The cephalometric values at the end of the treatment were as follows: SNA:74.3°, SNB:74.4°, ANB:-0.1°, FMA:29.9°, Mx1-SN:106.6°, Mx1-NA(mm):8.8, IMPA:84,1°, Md1-NB(mm):4, interincisor angle:120.9°. After treatment, smile aesthetic was improved. Class I canine relationships on both side and ideal overbite was achieved. Overjet was slightly increased because of missing one lower incisor.
CONCLUSIONS: The use of face mask combined with RPE is an effective treatment in patients with cleft lip and palate. Since a slightly increased overjet will provide an advantage for late growth, planned lower incisor extraction can be performed in patients with cleft lip and palate.

Abstract citation ID: cjae081.164
CP97 TREATMENT OPTIONS FOR RETAINED TEETH IN CLINICAL CASES

Dr Judit Hevesi[1], Dr Géza Vitályos[1], Dr Judit Török[1], Dr Leila Hamid[1], Dr Eszter Ládi[1]; [1]*Department of Orthodontics, Faculty of Dentistry*

INTRODUCTION: Upper canine teeth are both aesthetically and functionally important.
The prevalence of upper canine impaction is estimated to be between 1 and 4%. It is the second most commonly affected tooth in this respect.
In the Caucasian population, they are mostly palatally positioned. Females are 2x more likely to have this disorder.
Between the ages of 9-11 years, the position of the maxillary canine needs to be determined. If the germ is not palpable at the vestibular level, in 7-10% of cases the clinical examination should be complemented by some form of x-ray imaging.
About 50 % of affected canines cause root resorption of adjacent teeth.
CBCT scans are an excellent way to detect the severity of resorption and the position of the canine.
Root resorption of adjacent teeth most commonly occurs between 11 and 12 years of age.
METHODS: In my presentation, I would like to talk about the prevalence, aetiology, diagnosis and treatment options of canine impactionin a few cases.
RESULTS: Early diagnosis of impacted canines is very important.
In cases where the canines are palatally located and there is no root resorption, the canine and possibly the extraction of the first deciduous molar may modify the direction of the eruption. If the position of the remaining canine does not begin to normalise within 1 year, the patient should be referred to an orthodontist. This often involves surgical exploration of the canine teeth and orthodontic treatment.
CONCLUSION: Canine impaction requires orthodontic treatment. A deviation detected in time allows the most optimal treatment option for the patient.

Abstract citation ID: cjae081.165
CP98 CLASS III TREATMENT WITH CARRIERE APPLIANCE FOLLOWED BY BRACES – A POSSIBILITY TO AVOID MAXILLOFACIAL SURGERY IN YOUNG ADULTS AND ADOLESCENTS?

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AIMS: The aim of this case serie is to present the orthodontic possibility of avoiding maxillofacial surgery by dental compensation using a Carriere Appliance and class III- elastics followed by multibracket appliance to create an adequate overjet and obtain a good esthetic result.
SUBJECT AND METHOD: We present lateral radiographs, cephalometric values and extra-/intraoral photos of 3 patients: one boy aged 19, one aged 22 and a girl aged 13, all showing a skeletal Class III malocclusion with edge-to edge relation of the incisors or a negative overjet and vertical relation of the jaws (partially open bite). We started the treatment with Carriere Appliance in the lower jaw, combined in the beginning either with RME, TPA or acrylic splint and class 3 elastics for 6 -12 months. When achieving space between lower canines and incisors, as well as a positive overjet, we removed the Carriere and put in a full fixed appliance for another 18- 22 months, continuing with elastics.
RESULTS: The total duration of treatment was 24 to 32 months. The incisal Class III-relation as well as the open bite were fully corrected with this approach, and aesthetic and functional dentofacial changes were obtained. Wits increased considerably in all cases (-6,9 to -4,9 /-12.9 to -3.9 / -7.6 to -3.9), while ANB increased only about 1°. Profile changes were remarkable and appreciated by the patients.
CONCLUSION: Although the conventional surgical-orthodontic approach can reliably treat dentofacial anomalies, the risks and inconveniences for the patients should be kept in mind. To avoid surgery, the presented procedure might be a good alternative in some cases for patients to benefit a lot.

Abstract citation ID: cjae081.166
CP99 COMBINATION OF SKELETALLY ANCHORED TREATMENT APPLIANCES AND ALIGNERS: A CASE REPORT

Dr Niloofar Hojabri[1], Dr Isabelle Graf[1], Univ.-Prof. Dr. Bert Braumann[1]; [1]*Department of Orthodontics, University Hospital of Cologne*

OBJECTIVES: Skeletal correction of Class III malocclusions and maxillary deficiencies often turn out to be less effective than expected. The treatment of skeletal class III malocclusions with a Hybrid Hyrax appliance in combination with a Mentoplate enables the application and transmission of orthopaedic forces directly to the maxillary bone. Subsequent treatments with aligners have been proposed to adjust the occlusion and to offer the patient the potential advantage of almost unrestricted aesthetics.
MATERIALS AND METHODS: This case report describes the treatment of a 13.5-year-old female patient with a severe Class III malocclusion (Wits appraisal: -6.4 mm). Furthermore, the patient presented with an edge to edge bite, a bilateral crossbite, a dolichofacial skeletal pattern (ML-NL: 28°) and a space requirement of 9.0 mm in the maxilla and 2.0 mm in the mandible. In order to achieve sagittal and transversal development of the maxilla, the patient was treated with a mini-implant-supported palatal expansion appliance - Hybrid Hyrax - in combination with a Mentoplate according to the Alt-RAMEC protocol. After removal of the Hybrid Hyrax, aligners (Invisalign®) and Class III elastics were used to coordinate the arches and fine-tune the occlusion.
RESULTS AND CONCLUSIONS: Considering the relatively short treatment time, the patient showed a substantial improvement in the Wits appraisal (-2.9 mm). After successful implementation of the Alt-RAMEC protocol and subsequent fine adjustment with Invisalign® aligners, there was a significant improvement in the occlusion as well as in the subjectively perceived chewing function and aesthetics. The maxilla was sufficiently advanced, lateral crossbite and the edge to edge bite were successfully treated.

Abstract citation ID: cjae081.167
CP100 ORTHODONTIC RESCUE FOLLOWING CATASTROPHIC BONE LOSS AS A RESULT OF AN ANKYLOSED MAXILLARY CANINE

Miss Hannah Hook[1], Mr Andrew Flett[1]; [1]*Nottingham University Hospitals*

BACKGROUND: The surgical removal of an impacted tooth in the anterior region can result in the creation of an alveolar bone defect, leading to aesthetic and restorative problems. Orthodontic tooth movement can be used as an alternative method to bone grafting to facilitate bone regeneration to restore the defect.
AIMS: This case report aims to discuss the method used to facilitate alveolar bone regeneration in a severe anterior bony defect following surgical removal of an impacted maxillary canine. Furthermore, we highlight the journey of a patient from surgical removal of the ankylosed canine and severe bony defect, to successful bone regeneration and final restoration.
METHODS: A 41-year-old female with an impacted left maxillary canine presented to the orthodontic department at a district general hospital. The patient had been undergoing orthodontic treatment to try and align bilaterally impacted maxillary canines. This treatment had been ongoing for a number of years. Whilst the right maxillary canine had aligned the left had become ankylosed. The decision was made to surgically remove the ankylosed canine which resulted in a

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severe anterior defect of the alveolar bone. Orthodontic rescue was employed by bringing the left maxillary first premolar forwards into the canine's position. The orthodontic movement of this tooth facilitated some regeneration of the alveolar bone, restoring the bony defect, and creating a restorable site distal to the defect. A multi-disciplinary approach was employed and the left maxillary first premolar space was restored with a dental implant.
RESULTS: Sufficient regeneration of bone was achieved with orthodontic tooth movement, allowing for implant placement in the maxillary left first premolar region. A great orthodontic and restorative result was achieved.
LIMITATIONS: There was a minor amount of relapse and a small bony defect was present following completion of orthodontic treatment.
CONCLUSIONS: Orthodontic tooth movement provides a good alternative to bone grafting in the restoration of alveolar bone defects, which carries a sequalae of risks and potential complications.

Abstract citation ID: cjae081.168
CP101 LH ORTHODONTICS FOR THE TREATMENT OF ADULT SKELETAL CLASS I WITH FACIAL ASYMMETRY CASE

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BACKGROUND: LH (Low Hysteresis, Improved Super-elastic Ti-Ni alloy wire, developed by Tokyo Medical and Dental University) for the treatment of a facial asymmetry Skeletal Class I malocclusion case will be discussed.
OBJECTIVES: A 28-year-old adult male came to our clinic with a chief complaint of lower left molar missing. Clinical examination found Angle Class I malocclusion with tooth 37 missing.
AIMS: Radiographic examination showed a facial asymmetry Skeletal Class I pattern. In this case, implant surgery and prosthetic rehabilitation might be the best way to solve such kind of problem considering the missing tooth. However, when a patient strongly refused surgery and prosthesis, non-surgical orthodontic approach became an alternative. In order to improve arch coordination and fill the missing space, we used third molar substitution with second molar. Facial asymmetry was also corrected by occlusion rehabilitation.
RESULTS: Mechanism involved elastic chain for space closure and intermaxillary elastics for better intercuspal interdigitation. Finally, adequate overbite and overjet were achieved.
CONCLUSIONS: This case showed Skeletal Class I facial asymmetry with tooth 36 missing. We discussed about correction of a facial asymmetry and third molar substitution with second molar. By using LH curve and IME, we successfully relieved the upper and lower anterior crowding and precisely achieved adequate overbite and overjet.

Abstract citation ID: cjae081.169
CP102 EFFECTIVENESS OF EXPANSION OF TEETH DURING CLEAR ALIGNER TREATMENT

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AIM: The aim of this work is to provide clinically useful information regarding the effectiveness of clear aligner treatment and to suggest overcorrection values for initial treatment planning with clear aligners.
METHODS: Authors are evaluating effectiveness of canine and first molar expansion in 55 patients treated with clear aligners. Expected values from the treatment simulation are compared with the values actually achieved after the first series of aligners using 3D scan superimposition in OnyxCeph software (Image Instruments).
RESULTS: Authors confirmed limited expression of expansion with clear aligners. Achieved expansion was lower than planned in upper molars and both upper and lower canines with canine expansion being more effective. Expansion in lower first molars was higher than planned in simulation.
CONCLUSION: The study results implies that overcorrection should be included in the initial planning to optimize the results of treatment with aligners. More predictable expansion can be achieved in the canine area.

Key words: Clear aligner treatment. Invisalign. Expansion. Overcorrection. Effectiveness.

Abstract citation ID: cjae081.170
CP103 BUCCALLY DISPLACED MAXILLARY CANINES- A SYSTEMATIC REVIEW CONVERNING ETIOLOGY, PREVALENCE, PREDICTION DIAGNOSTIC AND TREATMENT STRATEGIES

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OBJECTIVE: To systematically identify, assess and analyse the literature on buccally displaced maxillary canines to find current evidence regarding prevalence, as well as methods for diagnosis and treatment.
MATERIALS/METHODS: Searches for studies were made in three databases (PubMed, Cochrane library and Web of science). Five reviewers independently screened all titles and abstracts and applied the PICO to select studies for full text reading. Data extraction and risk of bias assessment were conducted independently by the reviewers using AXIS tool for prevalence studies, PROBAST tool for prediction studies and the QUADAS tool for diagnostic methods, whereas for treatment methods, ROB 2 tool (RCT) and ROBINS-I (case-control, cohort studies) will be used. (PROSPERO registration number: CRD42022342952).
PRELIMINARY RESULTS: The 195 selected studies concerned etiology (n=50), prevalence (n=26), prediction (n=11), diagnostic methods (n=42), treatment (n=50) and root resorption (n=16). Risk of bias assessment is currently conducted of the studies regarding treatment methods. The results concerning treatment methods will be presented at the European Orthodontic Society in Athens 2024.

Abstract citation ID: cjae081.171
CP104 NON-EXTRACTION ORTHODONTIC TREATMENT OF SEVERE CROWDING USING MINISCERWS

Dr Donghyun Hwang[1]; [1]*The Baruni Orthodontic Clinic*

OBJECTIVES: This clinical report illustrated the successful orthodontic treatment of class II malocclusion with severe crowding by distalization of upper posteriors using minscrews.
MATERIALS AND METHODS: 29 years old male patient visited to our clinic with a chief complain of anterior crowding. The patient had an anterior crowding and Class II molar and Class II canine relationship. The upper left lateral showed crossbite. There was no space for the upper left lateral incisor. The upper dental midline deviated about 5mm to the left side. The cephalometric analysis showed a skeletal Class I relationship with a hypodivergent facial pattern. To create the space for alleviating the upper anterior crowding, we distalized the upper posteriors by applying retraction force on the posteriors with miniscrews in the palatal slope and a lingual arch on the both 2nd molars after extracting the both upper wisdom teeth.
RESULTS: After 44 months of orthodontic treatment, Class I canine and molar relationships with proper overjet and overbite were achieved without extraction of premolars.
CONCLUSION: Our result of this clinical report suggests that distalization of posteriors using miniscrews facilitate treating severe class II crowding case.

Abstract citation ID: cjae081.172
CP105 TREATMENT OF SEVERE ANTERIOR OPEN BITE WITH TEMPOROMANDIBULAR JOINT OSTEOARTHRITIS USING LIM PLATE SYSTEM

Dr Seorin Jeong[1], Dr Hyun-Jeong Park[1], Dr Sun-Kyung Yu[1]; [1]*Chosun University*

BACKGROUND: This case delineates the orthodontic intervention administered to a 21-year-old male patient with severe anterior open bite and skeletal class II malocclusion, along with degenerating osteoarthritis of the condyle. The patient reported difficulties in mastication involving both upper and lower incisors and had mild crowding and protrusion of the anterior teeth.
METHODS: In the diagnostic assessment, incorporating cone beam computed tomography (CBCT) evaluation, subtle erosive alterations were identified in the anterior region of the left mandibular condyle on CBCT. It was recommended to proceed with orthodontic treatment after observation until the mandibular condyle was stabilized. However, the patient refused this, and orthodontic treatment was performed without a sufficient observation period. The treatment was completed without the initially planned orthognathic surgery by reducing the protrusion by extracting the premolars, and using Lim plate system to intrude the posterior teeth to promote antero-upward rotation of the mandible.
RESULTS: Through treatment using a skeletal anchorage, good treatment results were obtained by intruding the posterior teeth and moving the anterior teeth backward without orthognathic surgery. Upon comparing the pre- and post-treatment states of the mandibular condyle, discernible posterior displacement was noted.

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LIMITATIONS: In cases where osteoarthritis was suspected, a sufficient observation period was required, but this was not possible due to the patient's refusal.
IMPLICATIONS: This observation implies that the presence of an unstable mandibular condyle may contribute to posterior movement of the mandible throughout the course of treatment. Nevertheless, empirical evidence supports the efficacy of skeletal anchorage in effectively managing severe anterior open bite associated with degenerative arthritis.

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CP106 GROWTH MODIFICATION USING RAPID MAXILLARY EXPANSION & FACEMASK WITH ALT-RAMEC PROTOCOL IN AN EARLY ADOLESCENT PATIENT WITH SKELETAL CLASS III: A CASE REPORT.

Mr Chayut Jiravichitchai[1], Mr Peerapong Santiwong[1], Miss Yodhathai Satravaha[1]; [1]*Department of Orthodontics, Faculty of Dentistry, Mahidol University*

OBJECTIVES: To correct anterior crossbite and skeletal Class III malocclusion in a 13-year-old Thai female seeking to improve her smile and facial profile.
DIAGNOSIS: The patient presented with asymmetrical square facial form and a concave facial profile, flat paranasal area, and 2 mm deviated chin. The lip was competent, low lip line at rest position and low smile line. She had mild crowding on the upper arch, a deep curved of Spee on lower arch, Angle's Class III malocclusion, an anterior crossbite (-5 mm overjet), 100% deepbite and a 5 mm anterior CO-CR shift. Teeth 12 and 22 were microdontic.
The lateral cephalometric confirmed the skeletal type III with tendency retrognathic maxilla and tendency prognathic mandible (SNA 81, SNB 84, ANB -3, AO-BO -8). The position and inclination of the upper incisors were in normal range while the lower incisors were retroclined and retruded. The cervical vertebral maturation showed cervical stage 4.
TREATMENT: The treatment plan employed the Alt-RAMEC protocol involving alternating periods of rapid maxillary expansion and constriction performed for eight consecutive weeks using a screw appliance, with the parents instructed to activate it twice daily for one week and close it twice daily for the following week (0.25 mm per turn) followed by protraction facemask therapy until positive overjet was established.
Fixed orthodontic appliances were bonded to upper incisors during the protraction phase. After 5 months of protraction, overcorrection was achieved (7mm overjet, canine class II half step), lower teeth were bonded to flatten deep curve of Spee, and protraction facemask was switched to nighttime-wear only to prevent relapse. After 1 year of protraction, rapid maxillary expansion was removed. teeth 12 and 22 were referred for restoration after achieving proper overjet, coordinated midline and canine class I.
RESULTS: Significant improvement in the anteroposterior of maxilla and masticatory function were achieved. The post-treatment occlusion demonstrated excellent occlusal relationships with class I molar and canine relationships bilaterally. The treatment led to a noticeably improved smile and facial profile.
CONCLUSION: A late-detected class III patient can be successfully treated by growth modification using ALT-RAMEC protocols in conjunction with high patient compliance.

Abstract citation ID: cjae081.174
CP107 CEPHALOMETRIC EVALUATION OF ARCHWISE DISTRACTION APPLIANCE (AWDA) EFFECTS IN BILATERAL CLEFT LIP AND PALATE PATIENT (BCLPP)

Dr Dilara Kahraman[1], Mr. Bora Aysan[1], Prof. Dr. Nejat Erverdi[1]; [1]*Istanbul Okan University*

AIM: Maxillary retrognathia, velopharyngeal insufficiency (VPI) and alveolar clefts are major issues to be taken care of, in cleft lip and palate (CLP) patients. Risk of increase of the velopharyngeal distance through surgery, limits the possible amount of surgical maxillary advancement in those patients, because usually maintaining speech quality is considered more important. For patients with already existing VPI, distraction osteogenesis can be a more beneficial alternative, in order to prevent worsening, or even ameliorate, speech. AWDA being a method to close large alveolar gaps, can serve to distract the maxilla sagittally, if distraction is continued after gap closure.
The aim of this study is to describe an alternative multidisciplinary approach for the treatment of sagittal maxillary insufficiency in CLP patients.
MATERIALS AND METHOD: Evaluation of a female 16-year-old BCLPP showed concave profile and severe maxillary retrognathia (SNA:72°, SNB:79°). Bilateral distraction to advance maxilla, using AWDA, was initiated after presurgical orthodontics. Activations were started after a 5-day latency period, and continued for 16 days. To prevent openbite due to linear advancement of the maxilla, anterior vertical intermaxillary elastics to mentoplates, were used simultaniously.
RESULTS: 5.9 mm maxillary advancement was achieved measured by N⊥A. Overjet increased 12 mm showing that the dentoalveolar complex advanced more than the skeletal structure. Parallel to this finding, even though anterior vertical elastics were used to control openbite, 3° upper incisor proclination was observed, contrary to the expected retroclination. SNA increased 11°. Total facial convexity improved 13°, skeletal profile angle decreased from 199° to 178°. Speech evaluation revealed better articulation of consonants due to correction of Class III relationship, resonance remained stable inspite of a slight enlargement of the palatal fistula.
CONCLUSIONS: A sufficient amount of maxillary dentoalveolar advancement and improvement of facial profile appears to be possible with the AWDA, without any adverse effects on velopharyngeal mechanism.

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CP108 CONTEMPORARY INSIGHTS FOR THE DIAGNOSIS AND TREATMENT OF MAXILLARY IMPACTED CANINES

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INTRODUCTION: The maxillary permanent canine is the most frequently impacted tooth after the third molar. The prevalence of impaction is 0.9%-3.0%. Early diagnosis of the impaction greatly eliminates complications of the impaction. Root resorption of the maxillary incisors caused by palatally impacted canines is a relatively common phenomenon.
AIM: The purpose of our study is the evaluation and reliability of various diagnostic methods regarding root resorption of the adjacent to the impaction teeth, the incidence of root resorption and the evaluation of the effectiveness of different methods of surgical exposure.
MATERIAL AND METHOD: Three of our studies are the material of the presentation. The reliability of different radiographic methods for the localization of displaced maxillary canines, the open versus closed surgical exposure of palatally impacted maxillary canines and the incidence of incisor root resorption associated with impacted maxillary canines are presented and discussed.
RESULTS: Concerning the localization of displaced maxillary canines, CBCT images proved to be more accurate and precise compared with conventional radiographs, especially for the identification of root resorption of adjacent teeth.
Regarding the method of surgical exposure of palatally impacted maxillary canines no difference between open and closed exposure techniques in periodontal outcomes and aesthetic appearance was manifested.
Incidence of lateral root resorption was in a rate 18.5% . In younger patients, the impacted canines appear more often in the middle of the maxillary bone, whereas in older patients, the canines are located more often in the palatal or buccal side of the maxilla.
CONCLUSIONS: CBCT is a more accurate and precise examination method and it is more specific for the localization of impacted teeth and root resorption of the adjacent teeth. There is no difference for the closed and open exposure techniques in periodontal outcomes and the incidence of lateral root resorption due to palatally impacted canines is in a rate 18.5%.

Abstract citation ID: cjae081.176
CP109 TREATMENT OF AN ADOLESCENT PATIENT WITH A CLASS II MALOCCLUSION AND UNDERLYING SKELETAL ASYMMETRY WITH CLEAR ALIGNERS: A CASE REPORT

Dr Gina Theodoridis[1], Dr Dimitra Karamalaki[1]; [1]*Private Practice*

ABSTRACT: Treatment of Class II malocclusion accompanied with a skeletal discrepancy is complex and challenging for the orthodontist. The approach for correction depends on several factors such as the phase of skeletal growth, severity of the discrepancy. This case report describes the successful management of a 16.6-year-old adolescent girl that was presented with a full cusp Class II division 1 malocclusion with a functional shift to the right and an underlying skeletal asymmetry. The case was treated with aligners technique. Body posture asymmetries and TMJ symptoms were also detected. Growth modification treatment was not recommended, as the patient was in the post-pubertal phase. Treatment with clear aligners was effective and efficient by achieving all treatment goals within a period of 18 months.
OBJECTIVES: Treatment aimed in dentoalveolar expansion, proclination of the maxillary incisors and facilitated the mandible to reposition to centric relation. Sequential distalization on the right side was also performed to assist in the correction of Class II malocclusion.

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METHODS: The clear aligner system applied was Invisalign (smart track material). Three series of aligners were used (21 + 39 + 12). Two first series were used for 16 hours daily with 7 days interval change of the appliances and the last set was used with a reduced hours protocol to allow settling of the posterior occlusion. Class II elastics were applied and supplemental auxiliaries were used(button for supplemental extrusion of
RESULTS: A functional Class I molar and canine occlusion was established. The molar relationship on retention appeared not as a solid one on the right side due to Bolton discrepancy caused by decreased size of #14,#15 relative to the opposite counterparts. The underlying skeletal asymmetry resulted in a minor deviation in the mandibular midline to the right. A minor increase in SNB indicated a possible forward reposition of the mandible. The patient reported elimination of TMJ symptoms after treatment.
CONCLUSIONS: Clear aligner treatment can be a helpful treatment modality in management of adolescent cases with a possible CR-CO discrepancy, associated with TMJ symptoms.

Abstract citation ID: cjae081.177
CP110 COMPLICATED ORTHODONTIC TREATMENT WITH CLEAR ALIGNERS IN ADULT PATIENTS- CASES PRESENTATION

Dr Ioanna Karamani[1], Dr Antigoni Alexiou[1], Dr Georgios Damanakis[2], Prof. Apostolos Tsolakis[3]; [1]*National and Kapodistrian University of Athens,* [2]*National and Kapodistrian University of Athens,* [3]*National and Kapodistrian University of Athens*

BACKGROUND: In recent years, a growing number of adult patients have sought orthodontic treatment, demonstrating a preference for esthetically pleasing and comfortable alternatives to conventional fixed appliances. As a result, clear aligner-based treatment has received remarkable attention from the orthodontic community. Various companies have emerged using robust advertising strategies vigorous advertisement to endorse their products, targeting both patients and clinicians through platforms such as social media. A variety of concepts, methods, and adjuncts have been introduced to enhance the efficacy and effectiveness of clear aligners. Nevertheless, the precision and predictability of tooth movement is still under controversy.
OBJECTIVES: The objective of this presentation is to describe the orthodontic treatment plan of two adults with complicated orthodontic malocclusion, by using clear aligners manufactured by two very popular aligner companies and to compare the effectiveness of these two treatments.
MATERIALS/METHODS: Two adults were referred to a private dental clinic, seeking orthodontic treatment. Medical and dental records were obtained and comprehensive clinical and x-rays examination were performed. They were interested in invisible and aesthetic orthodontic treatment.
RESULTS: The first patient was 41 years old and he received orthodontic treatment with SPARK clear aligners, while the second patient was 56 years old and he received orthodontic treatment with INVISALIGN clear aligners. Both patients presented severe malocclusion, crowding of both dental arches and midline discrepancy. In addition, they presented with an aggregated periodontal condition with recessions, bleeding in probing, periodontal pockets and alveolar bone loss. It was suggested to both of them extractions of premolars and orthodontic treatment of about 2 years.
CONCLUSIONS: The rigorous orthodontic intervention for two adult individuals presenting significant orthodontic and periodontal challenges was carried out with two distinct prevalent clear aligner systems. The outcomes were highly gratifying, particularly in terms of the periodontal health of the patients. The individuals expressed a high degree of satisfaction with the aesthetic and comfort aspects of the clear aligner treatment, reporting increased confidence in their smiles.

Abstract citation ID: cjae081.178
CP111 INTERDISCIPLINARY TREATMENT OF PALATALLY IMPACTED PERMANENT MAXILLARY CANINE: A CASE REPORT

Mrs Ivana Karner[1], Mr Domen Tomič; [1]*Orthos*

BACKGROUNDS: The aim of the study was to present a case of combined orthodontic and surgical treatment of a palatally impacted canine in a 16-years old patient. Open fenestration and traction were performed.
METHOD: Clinical examination, diagnostic records (study models, multiple orthopantomograms, lateral cephalogram, CBCT) were performed. The patient had previously been treated by extraction of upper right deciduous canine and followed by fixed orthodontic appliance in the upper arch in order to gain space for impacted upper canine. Several orthopanomograms were performed in different chronological and dental age showing a persistent primary upper right canine and different degrees of inclination of it.
RESULTS: Orthodontic treatment with open fenestration and traction started at the peak of the pubertal growth phase (CS 4), the apexification was almost completed. After 11 months of treatment with fixed orthodontic appliance in the upper jaw, appropriate space conditions were achieved. During surgical intervention an attachment was bonded on the palatal surface of the fenestrated tooth. With the patient's favourable compliance, the tooth was aligned in the dental arch.
CONCLUSIONS: In order to prevent permanent tooth impaction, timely diagnostics and a treatment plan, as well as the close cooperation of specialists is mandatory. Treatment, in addition to diagnostics, includes placement of a fixed orthodontic appliance and preparing a space for the impacted tooth, as well surgical fenestration and active traction of the impacted tooth. During the retention period the tooth vitality is monitored at least for five years follow up.

KEYWORDS: palatally impacted maxillary canine, open fenestration, orthodontic traction, CBCT.

Abstract citation ID: cjae081.179
CP112- TREATMENT OF DENTAL CLASS II MALOCCLUSION WITH THREE TYPES OF PENDULUM APPLIANCE WITH DIFFERENT ANCHORAGE DESIGNS

Mrs Beyza Sultan Karstarlı[1], Miss Dilek Erdem[1], Miss Elmas Liv[1]; [1]*Ankara University Faculty of Dentistry*

AIM: Maxillary molar distalization is needed for non-extraction treatment of Class II malocclusions. The aim of this case report is to compare the amount of distalization of upper first molar, protrusion of upper incisors and overjet increase obtained with 3 types of pendulum appliance with different anchorage designs.
METHOD: When three female patients, chronological aged 14 years, 14 years 5 months and 14 years 3 months, respectively, presented to our clinic it was determined that patients had Class II relationship in canine and molar region. The first patient was treated with a conventional pendulum, the second patient was treated with single mini-screw pendulum and the third patient was treated with a double mini-screw pendulum. In bone anchorage patients, titanium self-drilling mini screw with diameters of 2 mm and lengths of 10 mm were manually placed to the right or/and the left of the midpalatal suture, 4-5 mm posterior to the incisive foramen. Springs were activated 90° for approximately 230 g of distalizing force. The patient was called to control appointments monthly and if its necessary spring activations were achieved. The distalization was performed until a Super Class I or Class III relationship for overcorrection. The distalization time of patient who was reated with conventional pendulum and single mini-screw pendulum was 6 months and 7.2 months with the double-screw pendulum.
RESULTS: In patients treated with conventional, single mini-screw and double mini-screw pendulum appliances, the respective mean distalization of upper first molars measured 5.4 mm, 6.67 mm and 4.56 mm. The movement of the incisors was measured as 3.83 mm, 1.35 mm protrusion and 0.15 mm retrusion. The change in overjet was measured as an increase of 0.95 mm, 0.11 mm and decrease of 0.2 mm respectively.
CONCLUSION: Pendulum appliance is a effective method due to its elimination of need for extraoral devices and intermaxillary elastics for distalization. Based on these data, it can be said that while similar amounts of distalization are achieved with conventional and bone-anchored pendulum appliances, utilizing bone anchorage may reduce side effects such as incisor protrusion and increased overjet.

Abstract citation ID: cjae081.180
CP113 COMPARISON OF THE TREATMENTS OF TWO CLASS II PATIENTS USING TWO DIFFERENT FIXED FUNCTIONAL APPLIANCES: THE FORSUSTM FATIGUE RESISTANT DEVICE VERSUS TWIN FORCE® BITE CORRECTOR

Prof Zehra ILERI[1], Miss Ozlem Su KAYA[1]; [1]*Selcuk University*

AIM: To evaluate the results of treatments using two different fixed functional appliances in two different patients with class II malocclusion.
MATERIALS: Two 14-year-old male patients in MP3cap growth period referred with complaints of incisor crowding. Clinical and radiographic examinations of the both patients had Class II molar relationship and Class II canine relationship, concave profiles with a prominent pogonion and a deep labiomental sulcus. M.A.D. had a skeletal Class I relationship, and the M.C had a skeletal Class II relationship. The cephalometric values of M.A.D were as follows: SNA:79.3°, SNB:77.8°, ANB:1.5°, SnGoGN:19.6°, Mx1-SN:82.4°, IMPA:91.2°; and he had 0.3 mm overjet due to retroclination of central teeth and 6.5 mm overbite. The cephalometric values of the M.C. were as follows: SNA:77.3°, SNB:72.8°, ANB:4.5°, SnGoGN:33.3°, Mx1-SN:98.7°, IMPA:91.5°; and he had 7.7mm overjet and 7.1mm overbite. For the treatment of M.A.D, the ForsusTM Fatigue

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Resistant Device was used after proclination of the upper incisors, levelling the arches and applying the thick stainless steel arch wires. Similarly, Twin Force® Bite Corrector was applied to M.C. after the necessary levelling procedures were completed.
RESULTS: The total orthodontic treatment durations were 1 year 8 months and 1 year 9 months for M.A.D and M.C., respectively. Posttreatment cephalometric values of the M.A.D. were as follows: SNA:80.6°, SNB:80.1°, ANB:0.5°, SnGoGN:19,7°, Mx1-SN:112.8°, IMPA:97.1°, interincisor angle: 130.4°; and he had 2.6 mm overjet and 2.7 mm overbite at the end of the treatment. Posttreatment cephalometric values of the M.C. were as follows: SNA:76.7°, SNB:75.3, ANB:1.5°, SnGoGN:31.9°, Mx1-SN:102.2°, IMPA:99.1°, interincisor angle:126.8°; and he had 3mm overjet and 2.8mm overbite at the end of the treatment.
CONCLUSIONS: As a result of the evaluation of the pretreatment and posttreatment records of both patients, it was seen that both fixed functional appliances caused similar effects. Lower incisor proclinations and increases in mandibular length were observed in both patients.

Abstract citation ID: cjae081.181
CP114 ESTHETIC REHABILITATION OF A UNILATERAL CONGENITALLY MISSING LATERAL INCISOR: A CASE REPORT

Prof Zehra ILERI[1], Miss Ozlem Su KAYA[1]; [1]*Selcuk University*

AIM: To report an orthodontic and aesthetic rehabilitation of an adolescent female patient with unilateral congenitally missing maxillary lateral and to present the aesthetic retention procedure to preserve the location of the missing tooth until prosthetic rehabilitation is performed.
MATERIALS: A 14-year-old female patient referred with a complaint of diastema caused by congenital missing teeth. Clinical and radiographic examinations of the patient revealed a dental Class II subdivision, a skeletal Class I anomaly and convex profile with 3.2m overjet and 2.7mm overbite. The cephalometric values of patients were as follows: SNA:73.8°, SNB:70.1°, ANB:3.7°, SnGoGN:42.4°, Mx1-SN:94.9°, IMPA:95.4°. The right permanent maxillary lateral tooth was congenitally missing and the upper right canine had erupted adjacent to the upper right central tooth. In the treatment plan, it was decided to distalize the right canine and create a space for missing lateral. A miniscrew was used to distalize the right canine in the patient. The miniscrew was placed between the right 2nd premolar and the right 1st molar teeth. In order to protect the created lateral incisor space until the implant could be placed and to give the patient an aesthetic smile, a lateral incisor crown attached to a casted lingual retainer was placed. Thus, the lateral incisor crown was supported by the lingual of teeth 11 and 13.
RESULTS: Posttretament cephalometric values of the patient showed that SNA:75.3°, SNB: 71.4°, ANB: 3.8°, SnGoGN: 38.8°, Mx1-SN: 103.7°, IMPA: 103.5°, interincisor angle: 114°. At the end of the treatment, the patient had 2mm overjet and 1.7mm overbite and she presented a Class I molar and canine relationship, good facial esthetics with canine protected occlusion. The total orthodontic treatment duration was 1 year 6 months.
CONCLUSIONS: Although it is very difficult to achieve aesthetics and maintain the resulting space in adolescents with unilateral missing lateral incisors, ideal results can be achieved with well-established mechanics and well-planned retention protocols.

Abstract citation ID: cjae081.182
CP115 ORTHODONTIC TREATMENT COMBINED WITH ORTHOGNATHIC SURGERY (2- JAW SURGERY) IN PATIENT WITH SKELETAL CLASS III MALOCCLUSION : A CASE REPORT.

Miss Pimrekha Khueankaew[1], Mr. Kitpat Lersinghanart[1], Miss Duanghatai Jeeratiannard[1], Mr Surakit Visuttiwattanakorn[1], Mr Peerapong Santiwong[1], Miss Nita Viwattanatipa[1]; [1]*Department of orthodontic, faculty of dentistry, Mahidol University*

OBJECTIVES: To demonstrated 2 jaws surgery treatment in skeletal classIII patient.
An 19- yo.Thai female came to orthodontic department with chief complaint of prominent lower jaw.
DIAGNOSIS: The clinical examination demonstrated that she had asymmetrical oval facial form with chin deviated to right by 2 mm. She had concave profile. She had normal lip line at rest and slightly low smile line. Intraorally, she had Angle's Class III malocclusion and anterior crossbite. (overjet -3 mm, overbite -1 mm).
She had prolonged retention of 53, 63. Complete blocked out 13, 23. The lateral cephalometric analysis showed she had skeletal typeIII malocclusion with orthognathic maxilla but prognathic mandible with prognathic bony chin prominence (SNA:81, SNB: 85 and SNPg : 86). She had normal configuration. She had proclination and protrusion of upper incisor and retroclination of lower incisor.
TREATMENT: Presurgical orthodontics: 14, 24 were extracted to create space for alignment of upper R/L canines.
Orthognathic surgery (2 jaw surgery)
MAXILLA: Extraction of 53,63 in OR, maxillary 3 pieces, anterior maxilla setback to reduce upper incisors proclination. Coordinate the upper and lower arch transversely.
Mandible : Bilateral split ramus osteotomy for mandibular setback and asymmetry correction.
POSTSURGICAL ORTHODONTICS: Continuous rectangular NiTi was inserted on the day that surgical splint was off and started residual space closure in the upper arch. Box elastics class III vector was used to seat the occlusion. Correction posterior crossbite was attempted with upper arch expansion. Midline was coordinated.
RESULT: The treatment duration was 3 year and 3 months. The patient was significantly improved in anteroposterior jaws position. The post treatment occlusion demonstrated good alignment and good occlusion with class II full step molar relationship and normal overjet and overbite. Better facial and smile esthetics was achieved.
CONCLUSION: The synergistic collaboration between orthodontic interventions to align teeth and orthognathic surgery to address skeletal discrepancies has led to significant improvements in both dental and facial aesthetics. The careful planning and coordination between orthodontic and surgical teams are crucial for achieving successful results.

Abstract citation ID: cjae081.183
CP116 INTERDISCIPLINARY TREATMENT OF SKELETAL CLASS III MALOCCLUSION PATIENT WITH MULTIPLE MISSING TEETH

Dr Daeyeob Kim[1], Dr Ji Yeon Lee[1], Dr Moon-Key Kim[2], Dr Joonho Yoon[3], Dr Jung Hoon Kim[1]; [1]*Department of Orthodontics, National Health Insurance Service Ilsan Hospital,* [2]*Department of Oral & Maxillofacial Surgery, National Health Insurance Service Ilsan Hospital,* [3]*Department of Prosthodontics, National Health Insurance Service Ilsan Hospital*

BACKGROUND: The most optimal treatment plan for patients with multiple missing teeth, skeletal class III malocclusion, and facial asymmetry is post-growth orthognathic surgery and implant placement. In addition, cooperation with an orthodontist, prosthodontist, and oral & maxillofacial surgeon is essential to establish a prosthetic plan for the missing teeth. We would like to introduce this case in which we achieved satisfactory results with interdisciplinary treatment.
MATERIALS/METHODS: The patient was a 17-year-old female who visited our clinic with a complaint of a protruding chin, facial asymmetry, and missing teeth. Initial 3-dimensional skeletal analysis revealed a pogonion located 10 mm anterior to the McNamara line, a 4 mm leftward deviation of the chin top, and canting of the occlusal plane. In addition, all premolars were missing and the residual alveolar ridge was atrophic. Specialists from three departments convened at a conference on dentofacial disorders to devise treatments that are minimally invasive and time-consuming, while also combining essential surgical procedures into two sessions. The patient, who had decompensated dentition with preoperative orthodontic treatment, underwent orthognathic surgery. A second operation was performed six months after the orthognathic surgery. The surgical procedure performed entailed the extraction of all remaining wisdom teeth, removal of the plate, sinus lift, and placement of six implants in the premolar area. Subsequently, the patient underwent orthodontic treatment which was completed after three months, resulting in ideal occlusion.
CONCLUSIONS: The orthodontist, prosthodontist, and oral & maxillofacial surgeon coordinated before the entire treatment and made an appropriate plan through a 3-dimensional diagnosis for minimal surgery and a short time to achieve favorable occlusion. The interdisciplinary team's coordinated efforts resulted in functional and aesthetically pleasing outcomes.

Abstract citation ID: cjae081.184
CP117 TREATMENT OF OPEN BITE WITH INCISAL ROOT RESORPTION BY INTRUSION OF POSTERIOR TEETH

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BACKGROUND: Open bite occurs due to various causes, but can be largely classified as skeletal and dental causes. Skeletal open bite requires orthognathic surgery, but dental open bite can be treated through the control of oral habits, intrusion of posterior teeth, and extrusion of anterior dentition. Each treatment method is determined by the shape of dentition, profile, age, etc. The purpose of this article is to report a case in which open bite corrected by molar intrusion using miniscrew in patient with root resorption of anterior teeth due to trauma.
SUBJECT AND METHOD: A 23-year-old male presented to our clinic with an anterior open bite. The patient had experienced facial trauma at the age of 7, which

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resulted in the avulsion of teeth #11 and #21, and root resorption in the anterior teeth of both dentition. Clinical examination revealed skeletal Class I, Angle's Class I molar relationship. Additionally, there was a buccal crossbite on the right side, and #27 was missing. We decided to proceed open bite closure with intrusion of posterior teeth while minimizing the movement of the root resorbed anterior teeth. To correct the buccal crossbite on the right side, we utilized a transpalatal arch (TPA) to expand the maxillary arch. The placement of brackets on the anterior teeth was performed after the closure of the open bite, and the movement of the anterior teeth was minimized.
RESULTS: In this case report, we successfully treated an open bite patient with dental trauma-induced root resorption in the anterior teeth. By applying orthodontic forces only to the posterior dentition during the initial phase of treatment, we minimized the duration of orthodontic appliance placement and tooth movement of anterior teeth. The use of miniscrews allowed us to achieve successful intrusion of posterior teeth without bonding brackets to the anterior teeth.
CONCLUSION: Considering the root condition of anterior teeth, strategic bracketing might prevent additional damage to roots. However, continuous observation is necessary to evaluate the root condition and treatment outcomes.

Abstract citation ID: cjae081.185
CP118 EFFECTIVE APPROACH FOR STABLE RESOLUTION OF LOCKED JOINTS

Dr Petros Kokkinos[1], Mr Diwakar Singh; [1]*Kokkinos Smile/ Viesid Cyprus*

INTRODUCTION: Locked joints have always been one of the most challenging conditions in dentistry. As a result, different treatment approaches have been recommended to confront this issue in the last century. In most cases, a resolution of the locking is attempted based on empirical knowledge or using approaches guided by simple diagnostic tools .
METHOD: A series of cases collectively presenting all possible types of locked joints (i.e.,acute, closed, chronic, reciprocal clicking with intermittent lock, ligamentous) were differentially diagnosed by clinical examination and condylography (using CADIAX 4, Gammadental, Austria). The therapeutic position (ThP) of the condyle was identified and transferred to the mounted models of the patient on the variator. Occlusal composite repositioning overlays were fabricated in this position with the appropriate anatomy which guided the condyles in the ThP. The overlays and the brackets were bonded at the same appointment, and anterior vertical elastics were initiated in order to produce a class A lever to decompress and reposition the condyles within the joints. Initial, progress and final condylography were performed to assess the effectiveness of this treatment.
RESULTS: Immediately or soon after the initiation of the treatment, all cases showed a dramatic improvement of the condyle translation within the joints. Stability of the improvement was demonstrated on follow up examination. CONCLUSIONS: Clinical evidence shows that patients with locked joints can benefit from a treatment approach using condylar reposition informed by condylography, a monitoring tool aiding diagnostics by accurately estimating the ThP of the condyles in the joints and in combination with ~orthodontic treatment with occlusal composite repositioning overlays on the posterior teeth and anterior vertical elastics.

Abstract citation ID: cjae081.186
CP119 DISTALIZATION OF UPPER MOLARS USING ALIGNERS: A CASE REPORT

Dr Dimitrios KONSTANTONIS[1], Dr. Dimitrios Vasileiou[2], Dr. Marina Karamolegkou[1], Dr Heleni Vastardis[1], Dr Nikolaos Kazanopoulos[2]; [1]*Department of Orthodontics, Dental School, National & Kapodistrian University of Athens, Greece,* [2]*In private practice*

AIM: The advent of aligner technology has revolutionized the field of orthodontics by offering patients a discreet and patient-friendly alternative to traditional braces. The aim of this report is to elucidate the clinical approach and outcomes associated with the distalization of upper molars using Invisalign, explaining the efficacy and advantages of this contemporary orthodontic method.
SUBJECT AND METHODS: A 35-year-old patient presented with the chief complaint of upper and lower crowding. The patient exhibited a Class II, division 2 malocclusion with deep bite, upper and lower crowding and retroclined upper incisors. Invisalign treatment was chosen as the preferred orthodontic approach to address the patient's concerns, taking advantage of its discreet nature and its ability to achieve controlled tooth movements. The treatment objectives were to correct the class II malocclusion by distalization of the maxillary teeth and also to align and level both arches. The biomechanics involved the use of the smart force Invisalign system with precision attachments and class II elastics. The aligners were worn 18-20 hrs./day and the treatment progress was regularly monitored through clinical examinations and digital imaging.
RESULTS: The Invisalign biomechanical modality successfully achieved distalization of the upper molars, addressing the Class II malocclusion. Ideal alignment and levelling were also achieved. The patient experienced improved dental aesthetics and function, with Class I molar and canine relationship, complemented by soft tissue aesthetic improvement as shown by the position of upper and lower lip.
CONCLUSION: Invisalign provides clinicians with a versatile tool to address Class II malocclusions thus achieving ideal function and dentofacial aesthetics.

Abstract citation ID: cjae081.187
CP120 CONSENT TO ORTHODONTICS TREATMENT IN POLISH LEGAL SYSTEM

Dr Wanda Konty-Gibinska[1], Dr Maciej Gibinski, mgr Agnieszka Bzdyk-Gibinska ; [1]*Ortodoncja Sp Z O O*

Orthodontic treatment is based on the patient's consent.
From a legal point of view, consent is permission to interfere with the human body.
Conducting treatment without appropriate consent is a crime in the Polish legal system, punishable by a fine, restriction of liberty and even imprisonment.
In Poland, the Act on Patient Rights and the Patient Ombudsman regulates the issue of consent.
Consent to treatment may be expressed in the following ways:
Implied
Oral Written.
If a method that poses a risk to the patient is used, consent must be expressed in writing.
In most cases, doctors try to obtain consent from patients in writing due to their procedural security. First of all, it is about the possibility of proving to the patient that he was informed about the treatment method used, possible complications, treatment time, alternative treatment methods, treatment success, and costs associated with treatment.
To be valid, the consent must be signed by an appropriate person.
The Polish legal system adopts a patient age division that determines who consents to treatment.
In the case of a patient aged: 0-16 - consent is given by the legal representative.
16-18 - consent is given by the legal representative and the patient
18+ - patient.
The consent of a minor, as an activity important from the point of view of the child's activities, formally requires the consent of both parents.
If a patient aged 16-18 does not consent to treatment, or one of the legal guardians does not consent to treatment, it is necessary to obtain consent to treatment issued by the court.

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CP121 PROFILE ANALYSIS IN PATIENTS TREATED WITH MYOBRACE APPLIANCE

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AIM: The aim of this work is to provide information on facial profile analysis using the myobrace appliance in children and assign to a comprehensive summary of the use of data in clinical practice.
METHODS: In the practical part the profile is comparing pictures of 10 patients before and after myobrace treatment. Authors use soft tissue evaluation: facial symmetry, nasolabial angle and angle of facial convexity.
RESULTS: The authors evaluated limited changes in profiles in children with a convex profile. After 1-1.5 years of treatment, there were changes related to the convexity of the profile, mainly in the displacement of the mandible in the ventral direction and in the lower third of the face.
CONCLUSION: The results of the study demostrated better extraoral proportions in children who had excellent compliance. According to our findings, we came to the conclusion that myobrace can be used as a suitable alternative to removable appliaces in children.

Key words: Myobrace. Superimposition. Deciduous teeth. Soft tissue. Convex profile.

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CP122 MANDIBULAR FRACTURE IN A NEONATE: A CASE REPORT

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AIM: Mandibular fractures in neonates are extremely rare but can have significant consequences if not promptly detected and treated. The lack of clinical symptoms and dentition combined with facial edema makes early diagnosis challenging.The initial clinical signs are irritability, constant weeping and an unwillingness to eat.
The aim of this case report is to present orthodontic aspects of a 13-year-old male patient with unnoticed mandible trauma which was detected at the age of 1. Also to raise awareness about these fractures in neonates and the necessity for radiographic examination when clinical suspicion arises. Timely intervention is crucial to prevent long-term issues that can affect a child's quality of life.
CASE-METHOD: 13-year-old male patient with a reconstructed mandible referred to our clinic with the chief complaint of lingually placed tooth and with noticeable facial asymmetry. He had a history of a week-long ICU stay immediately after birth. Despite issues with breastfeeding and constant crying in infancy, the cause went undetected until age 1 when mandibular asymmetry was noticed. Clinical and radiographic examinations confirmed the previous trauma, but no intervention was performed due to patient's age. At age 5, he was diagnosed with right temporomandibular joint ankylosis, causing limited mouth opening and eating difficulties. Gap arthroplasty and silicone block insertion were performed. At age 9, capsule formation around the silicone block necessitated removal under general anesthesia and a costochondral graft was replaced.
Clinical and radiographic examination revealed high angle Class II skeletal relationship. Angle Class II molar relationship on the right and Class I on the left was present. Open bite in the left posterior region caused by tongue thrust was observed. The lower midline has shifted to the right due to facial asymmetry. The lower right canine and lateral tooth was transposed. The right mandibular corpus was shorter than the left. CBCT analysis revealed irregularity at the left condyle surface.
CONCLUSION: Mandibular fractures are rare in infants, especially neonates, with challenging consequences that can affect a child's lifelong well-being. Due to the difficulty in detection, early awareness of their symptoms is vital for timely intervention.

Keywords: Mandibular fracture, asymmetry, TMJ ankylosis

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CP123 TECHNICAL NOTE: ORTHODONTIC APPLIANCES AND THEIR DIAGNOSTICAL IMPACT TO BRAIN MRI

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PURPOSE: The aim of this study was to establish potential guidelines for the use of magnetic resonance imaging (MRI) in emergencies for patients with orthodontic appliances who may have potential injuries in the cranial region.
MATERIALS: In vivo, one adult person with normal occlusion was used. Three different orthodontic appliance compositions were attached to the teeth: 1) conventional stainless-steel brackets; 2) brackets and stainless-steel molar bands; 3) brackets, molar bands, and a stainless-steel palatal archwire. The frontal lobe, parietal lobe, temporal lobe, occipital lobe, basal ganglia, mesencephalon, pons, cerebellum, lateral ventricles, third ventricle, fourth ventricle, sella, orbit, ethmoidal sinuses, sphenoidal sinus, maxillary sinus, nasopharynx, and vessels were assessed using 1.5-Tesla (T) and 3-T scanners. Likert scores of 0, 1, 2, 3, 4, and 5 indicated too many artefacts and many, moderate, few, and no artefacts, respectively.
RESULTS: The severity of artefacts increased with the addition of orthodontic appliances. Without using the stainless-steel palatal archwire, all structures of the neurocranium could be sufficient assessed with no or few artifacts in both the 1.5-T and 3-T MR imaging. In combination with the stainless-steel palatal archwire, artefacts were detected in the susceptibility-weighted imaging (SWI) and the diffusion weighted imaging (DWI) sequences and in the phase contrast angiography (PCA). There was no significant difference between the 1.5-T and 3-T MRI scanner.
LIMITATIONS: All orthodontic devices were examined in a sole healthy, young adult female.
CONCLUSIONS: According to our investigation, a complete removal of orthodontic appliances is not mandatory for brain MRI. When the sequence of SWI and DWI is indicated, only the removal of the stainless-steel palatal archwire should be performed. This could result in reduced injury risk, quicker performance of imaging, and consequently, faster diagnosis, especially in emergencies.

Abstract citation ID: cjae081.191
CP124 A NEW APPROACH IN NON-EXTRACTION TREATMENT STRATEGY USING CLEAR ALINGERS

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BACKGROUND/OBJECTIVES/AIMS: This case series demonstrates a new approach that uses modified C-palatal plate (MCPP) with bondable palatal retraction arch (PRA) and clear aligners for non-extraction treatment of Class II patients.
MATERIALS/METHODS: The treatment procedure is as follows.
1. Place a MCPP for skeletal anchorage and bond a PRA on the maxillary first molars. Two weeks after implantation of MCPP, check the palatal soft tissue conditions and oral hygiene adjacent to the MCPP and screws.
2. Provide series of clear aligners and distalize the whole upper arch by connecting power chains between the MCPP and PRA simultaneously. Instruct patient to wear the clear aligners for full day and night except the meal time.
3. Incisal overjet might be changed due to the maxillary total arch distalization. At this point, form slits on the maxillary and mandibular clear alingers to apply elastics faciliating tandem mechanics with MCPP and PRA, creating additional overjet for further maxillary arch distalization.
4. To close the transient posterior openbite as the maxillary arch distalized and intruded by the MCPP, apply box elastics to the maxillary and mandibular first and second molars if needed.
5. Finish treatment when the molar and canine relationships are corrected and normal incisal overjet and overbite are obtained.
RESULTS: MCPP and bonded PRAs are the optimal skeletal anchorage that do not interfere with the aesthetics of clear aligners, and because the screws are located in the palatal region, there is no need to relocate them as treatment progresses.
Retraction force from the palatal side creates an intrusive force that changes the occlusal plane, and may cause a transient posterior open bite. This can be corrected by using an up-and-down elastics.
Above all, the combination of clear aligners and MCPP with PRA allows the upper molars to be distalized accurately and quickly, which helps to reduce the overall treatment time.
IMPLICATIONS: With this new approach to the non-extraction treatment of Class II malocclusions, the distalisation of the total maxillary arch can be achieved in an efficient and rapid manner using clear aligners with MCPP and PRA.

Abstract citation ID: cjae081.192
CP125 COMPLEX TREATMENT PLANNING AND MANAGEMENT, WITH SKELETAL, DENTAL AND SOCIAL ISSUES

Dr Jennifer Li[1], Mr Paul Scott[1]; [1]*Department of Orthodontics, Montagu Hospital*

AIM: To describe the treatment planning and management of an adolescent with a Class III malocclusion, ectopic maxillary canines, resorption of the maxillary incisors and hypoplastic maxillary second premolars, complicated by a change in social circumstances which impacted on treatment.
METHODS: A case report illustrating the orthodontic treatment planning and management of a 15-year-old male patient with a Class III malocclusion and palatally ectopic maxillary canines. The malocclusion was complicated by mild lower arch crowding, extensive resorption of the maxillary left lateral incisor, resorption of the maxillary left central incisor and right lateral incisor, and hypoplastic maxillary second premolars of poor long-term prognosis. The treatment plan was formulated in conjunction with discussion with the patient and his mother to attempt to maintain the maxillary incisors and align the ectopic maxillary canines.
RESULTS: Treatment included extractions under general anaesthesia of all four second premolars and retained left and right maxillary deciduous canines, alongside a closed exposure of the ectopic maxillary canines, followed by fixed appliance treatment. Retraction mechanics were applied using retraction hooks on a modified transpalatal arch to provide anchorage control for maxillary canine retraction away from the roots of the maxillary incisors. An open exposure of the maxillary canines was later completed under local anaesthesia. The maxillary canine position and incisor resorption was monitored clinically and radiographically during treatment. The patient was highly cooperative with treatment but unfortunately 3 years into treatment, he subsequently failed to attend appointments

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for 13 months due to unfortunate changes in social circumstances, accumulating in being homeless. Following return to treatment the appliance was in good condition but had become passive; treatment was subsequently completed uneventfully. Total treatment time comprised 5 years and 1 month. The maxillary incisor teeth were maintained, and an upper bonded retainer was fitted, along with removable vacuum-formed retainers.
CONCLUSIONS: The treatment results were satisfactory in terms of aesthetic and functional outcomes, despite the complexity of the case, effect of the change in personal circumstances and impact of the COVID-19 pandemic on the treatment duration. Long-term stability and success will need to be assessed at further review appointments.

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CP126 ORTHODONTIC TREATMENT IN A PATIENT WITH SEVERE PERIODONTITIS USING LINGUAL APPLIANCE AND TEMPORARY ANCHORAGE DEVICES

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INTRODUCTION: In advanced periodontal disease, collapse of the dental arch often occurs with increased tooth mobility. The situation worsens if there is an anterior crossbite. The traumatic occlusion could cause further breakdown of the periodontium as toothbrushing and maintaining oral hygiene become difficult. Consequently, the situation further exacerbates the periodontal destruction.
Reconstruction of the occlusion and alignment of the malposed teeth with orthodontic treatment become necessary not only to prevent disease progression, but also to satisfy patients' functional, esthetic, and communication demands.
This case report describes the favorable outcome of orthodontic and periodontal management for treating a patient with severe periodontitis, anterior crossbite, and collapse of the occlusion.
CASE SUMMARY: We report the case of a 50-year-old man who had a skeletal Class III, protruded chin, spacing and chronic generalized advanced periodontitis. Before orthodontic treatment, the patient received periodontal treatment aiming at complete exclusion of the infection and gingival inflammation.
The patient choose lingual orthodontic appliances for aesthetic reasons. Because overall periodontal support was poor, temporary anchorage device was used to prep anchorage. After leveling and alignment, we corrected anterior crossbite, managed space and improved occlusion. After the orthodontic treatment, Class I canine and molar relationship and proper facial profile was achieved.
CONCLUSION: Under the premise that appropriate periodontal treatment is preceded, oral health can be restored through orthodontic treatment in patients whose occlusion is collapsed due to periodontal disease.
All outcomes of the patients were stable after 3 years, and further periodic follow up should be done for retention check.

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CP127 CAMOUFLAGE TREATMENT OF SKELETAL CLASS III MALOCCLUSION: LOWER ARCH RETRACTION VIA BUCCAL SHELF IMPLANTS - A CASE REPORT

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AIM: This report addresses the case of a 20-year-old patient with skeletal and dental Class III hyperdivergent features who sought retreatment following prior orthodontic treatment. The patient's primary concern was the edge-to-edge position of the upper lateral and lower incisors, leading to functional and eating difficulties. Surgical treatment options were declined by the patient.
MATERIALS AND METHODS: Given the existing gingival recessions in both upper and lower arches resulting from previous orthodontic treatment, our goal was to correct his occlusion and solve his chief complaint with exclusively treating the lower arch. To achieve the treatment goal lower multibond appliance was fixed and two miniscrews (Tiger Dental GmbH) were placed in the mandibular buccal shelf area in order to retract the lower arch into a Class I occlusion, and solve the anterior edge-to-edge position of the lateral incisors creating an acceptable overbite.
RESULT: Over a period of nearly 5 months Class I molar relationship and an acceptable overbite and overjet of the lateral incisors have been achieved by retracting the lower arch with buccal shelf temporary anchorage devices and fixed appliance. The active retraction was followed by a 6-month retention period before the removal of the fixed appliance.
CONCLUSION: Lower arch retraction with buccal shelf orthodontic miniscrews could be a viable treatment option for camouflage treatment of class III cases.

Abstract citation ID: cjae081.195
CP128 DIGITAL PLANNING OF PALATAL SPLINTS FOR SEGMENTED LEFORT I OSTEOTOMIES. CASE PRESENTATIONS.

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BACKGROUND: Digital planning for orthognathic surgeries is considered routine procedures. However, in the case of segmented LeFort I osteotomies, digital planning for stabilizing palatal splints is not common. This case presentation aims to share the digital planning steps for palatal splints for two-piece and three-piece LeFort I osteotomies.
METHODS: All planning steps for orthognathic surgery can be digitized using various software. For this study, IPS Case Designer (KLS Martin Group, Tuttlingen, Germany) was employed. After finishing the planning steps, we exported 3D models (.STL files) of the maxillary bone segments in the planned position. With the same orientation, we imported these files into a free CAD software, Meshmixer (Autodesk, Inc.). Since the exported files do not contain digital information about the palate, we also imported an intraoral scan of the patient's maxilla, which includes the palate and is divided into two parts (left and right) or three parts (left, right, and anterior). The original scan parts were superimposed onto the segmented bone models, using the teeth as the identical surfaces. Using the software's "Bridge" and "Erase and Fill" tools, the segmented parts of the original scans were connected to create the digital model of the upper jaw in the planned position. Subsequently, the palatal and interdental gingival areas of the newly oriented scan were selected, and a palatal plate with a thickness of 2.5-3 mm was created using the "Separate" and "Extrude" tools. Cylinders were generated with the "Meshmix" tool, and through digital subtraction, holes were created for interdental fixation of the palatal splint. Following these planning steps, the palatal splints were 3D printed.
RESULTS: The implementation of these planning steps resulted in well-fitting palatal splints that remained in the mouth for 8 weeks post-surgery, effectively stabilizing the new position of the segmented bone parts of the maxilla. Notably, no additional laboratory work was required.
CONCLUSIONS: Digital planning of palatal splints for segmented maxillary osteotomies poses challenges due to the lack of specialized software or software modules. However, it is achievable using freely available CAD software.

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CP129 CLINICAL AND RADIOGRAPHIC ASSESSMENT OF A VOLUME-INCREASING, OSSIFYING COLLAGEN SCAFFOLD IN SOFT TISSUE AUGMENTATION IN MANDIBLE ANTERIOR TEETH, BEFORE ORTHODONTIC TREATMENT.

Niki Loukogiorgaki, Miss Elena Kyriakou[1], Mr Gerasimos Kanellopoulos[1], Dr Andreas Gkogkos[2], Prof Christos Katsaros[3], Dr Dimitrios Kloukos[1,3]; [1]*Department Of Orthodontics And Dentofacial Orthopedics, 251 Hellenic Air Force & Va General Hospital, Athens, Greece.,* [2]*Department of Periodontology, 251 Hellenic Air Force & VA General Hospital, Athens, Greece.,* [3]*Department of Orthodontics and Dentofacial Orthopedics, Medical Faculty, School of Dental Medicine, University of Bern, Bern, Switzerland*

BACKGROUND: Collagen scaffolds are used in periodontal surgery in hard and soft tissue augmentation procedures. The aim of this study was to evaluate the effectiveness of Ossix® Volumax, a volume-increasing, ossifying collagen scaffold, labially at the mandibular incisors, before bonding of fixed orthodontic appliances.
MATERIALS AND METHODS: Ten patients (Age range: 17-31 years old) with thin periodontal phenotype underwent soft tissue augmentation procedure at mandibular incisors, on the buccal aspect and apically to the free gingival margin. The intervention was carried out at least 4 months before orthodontic treatment with fixed appliances on the lower teeth. A standardized tunneling technique with a collagen scaffold was performed. Patients received, per protocol, antibiotics and analgesics after the procedure. Soft and hard tissue augmentation were assessed with an ultrasound device and clinical measurements at multiple time-points and a cone beam computerized tomography (CBCT) at baseline and before lower bonding. Following up time was up to 46 months.
RESULTS: All patients were treated without complications; main minor complaints included swelling and slight discomfort at the area of intervention during the first post-treatment days. In all cases, soft tissue augmentation was uneventfully observed and in cases new bone formation could be detected after CBCT evaluation.

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CONCLUSIONS: In the frame of the current study, Ossix® Volumax is an effective collagen scaffold which can be safely used in soft tissue augmentation before orthodontic treatment.

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CP130 PRACTICAL PROCEDURE OF BONDING FIXED WIRE RETAINERS BASED ON OWN EXPERIENCE.

Dr Dorota Łukasiewicz; [1]*Private practice*

BACKGROUND: Correct bonding of the retainer is crucial for a lifelong stability. Proper bonding of a nonactivated wire is underlying to avoid undesired wires syndroms (WS) as the x-effect and the twist effect. The author sees little failures of such kind as well as fractures and debonding of the retainers in her nearly twenty year practice.
AIM: To show and share the author's own procedure of bonding fixed braid wire retainers and provide guidance to prevent from retainer failures and wire syndroms (WS).
MATERIALS: Own cases of patients in bonding braid wire retainers procedures. Short films and pictures showing every single stage of this process (preparing the wire, preparing the teeth, fixing the wire, bonding the wire). Emphasis is put especially on the wire forming and accurate and stable attaching it to the teeth with no tension by means of metal ligature wire inserted over the gum papillea.
IMPLICATION: In the author's view the proposed method of retention bonding is reliable measure to attain a long-term durance of the retainers with no inadvertent wire syndroms.

Abstract citation ID: cjae081.198
CP131 A COMPLEX ORTHODONTIC PATIENT WITH MULTIPLE CYSTIC LESIONS: A MULTIDISCIPLINARY CASE REPORT

Mr Govind Malhi[1], Mrs Sats Bhopal[1]; [1]*Victoria Hospital*

BACKGROUND: A 14-year-old girl was referred into the orthodontic department with the following issues: Class II Div II incisor relationship, diminutive maxillary lateral incisors, ectopic maxillary canines.
MATERIALS AND METHODS: An OPT radiograph taken at the assessment appointment showed multiple cystic lesions in multiple quadrants. A CBCT scan done confirmed presence of multiple cystic lesions. After treatment planning carried out on a joint orthodontic/dentoalveolar clinic, the following treatment plan was devised: Extraction of (Upper Right: EDC3, Upper left: 3CDE, Lower Right: C, Lower Left: CDE) and cyst enucleation under general anaesthetic. Following this the patient was to be started on an upper removable appliance, then upper and lower fixed appliances to address the Class II Div II malocclusion. Long-term treatment would involve prosthetic build ups of the diminutive maxillary lateral incisors.
RESULTS: The surgical treatment was carried out without any issues. In total, 4 specimens were enucleated, one from each quadrant. The specimen results were as follows: RHS Maxilla – sialo-odontogenic cyst, LHS maxilla – keratocyst, RHS mandible – dentigerous cyst, LHS mandible – dentigerous cyst.
With regards to the removal appliance treatment, at the most recent review appointment, a reduction in overbite has been noted. The patient is due to start fixed appliance treatment early 2024.
CONCLUSION: This is a thoroughly interesting case that highlights how multiple disciplines can combine with orthodontics to provide optimal treatment outcomes for patients.

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CP132 ANTERIOR REHABILITATION OF TEETH LOST DUE TO TRAUMA IN GROWING ORTHODONTIC PATIENTS –CASE SERIES

Dr. João Matos[1], Prof. Inês Francisco[1], Dr Patrícia Rodrigues[1], Dr. Catarina Nunes[1], Prof. Francisco Vale[1]; [1]*Institute Of Orthodontics, Faculty Of Medicine, University Of Coimbra*

BACKGROUND: Previous dental trauma is a common injury to the dentoalveolar system in children/adolescents and can cause pain and loss of function, as well as periapical sequelae, which consequently affects the development of permanent teeth and occlusion. The highest incidence of anterior dental trauma occurs between seven and twelve years of age, mainly due to traffic accidents, physical fights and sports injuries. The challenge is to preserve the tooth in this aesthetically important area and minimize subsequent damage. However, the damage caused by trauma can be so debilitating that teeth extraction in children/adolescents and subsequent rehabilitation are necessary.
OBJECTIVE: To describe clinical cases where orthodontic treatment was applied to growing patients with dental trauma in the anterior sector.
MATHERIALS/METHODS: Clinical case 1 reports on a male child who, due to a school accident at the age of 8, lost teeth 11 and 21 due to avulsion. A palatal bar was placed for anchorage with anterior prosthetic teeth. Subsequently, a interceptive treatment with activator was started to correct skeletal class II malocclusion. Clinical case 2 refers to a female child with skeletal class I who, at the age of 11, accidentally fractured the root of tooth 21. Orthodontic treatment with fixed appliances was carried out to promote alignment as well as prepare the space for future rehabilitation.
RESULTS: The ideal outcome for both cases of trauma to anterior teeth with a poor prognosis should be to preserve bone and soft tissue to improve rehabilitation options after growth is completed. In the first patient, every effort was made to maintain teeth 11 and 21, but the level of internal and external resorption led to their loss. Therefore, the prosthetic replacement of avulsed teeth and the reduction of the ANB angle after dentofacial orthopedics allowed the patient's profile to be improved, resulting in immediate psychosocial benefits. In the second case, after a long period of clinical and radiographic monitoring for healing of the periodontal ligament, it was decided to maintain tooth 21 during orthodontic treatment.
CONCLUSIONS: Orthodontists need to consider the implications of tooth movement of traumatized teeth when determining long-term treatment prognosis.

Abstract citation ID: cjae081.200
CP133 ORTHOGNATHIC SURGERY AND ORTHODONTIC TREATMENT FOR SKELETAL CLASS III WITH UNILATERAL CLEFT LIP/PALATE: CASE REPORT

Dr Mariana McEvoy[1], Dr Catarina Nunes[1], Dr Mariana Santos[1], Prof. Inês Francisco[1], Prof. Francisco Vale[1]; [1]*Institute of Orthodontics of the Faculty of Medicine of Coimbra University*

BACKGROUND: Individuals with cleft lip and/or palate often exhibit a class III malocclusion pattern, primarily attributed to maxillary hypoplasia, due to inherited growth deficiencies, or the formation of scar tissue following several corrective surgical procedures during their infancy and early childhood.
Additionally, a hyperdivergent growth pattern is commonly observed, resulting from the clockwise rotation of the mandible. Ultimately, in addition to orthodontic treatment, some patients require orthognathic surgery to correct the skeletal discrepancy.
AIM: The purpose of the present paper is to report a successful interdisciplinary treatment approach by both orthodontists and maxillofacial surgeons conducted on a unilateral cleft lip and palate patient with a skeletal class III.
METHODS: A 15-year-old boy with a right unilateral cleft lip and palate, diagnosed with transverse discrepancy and a skeletal and dental class III was referred by his pediatrician to the Institute of Orthodontics, Faculty of Medicine, University of Coimbra, for orthodontic treatment. The implemented treatment plan was the following: Hyrax; Secondary bone graft; Fixed appliances with Roth 0.018 prescription; Bimaxillary orthognathic surgery.
RESULTS: The hyrax expander was used to solve the patient's transversal discrepancy. The alveolar bone graft allowed the orthodontic movement of teeth into the cleft site. Leveling and alignment was accomplished through the use of fixed appliances with Roth 0.018 prescription. Bimaxillary orthognathic surgery, Le Fort I maxillary advancement of 5mm with 3mm rotation to the left and BSSO mandibular setback of 6mm with recentering, resolved the skeletal discrepancies.
CONCLUSIONS: The successful functional and balanced aesthetic outcome in a patient with cleft lip and palate was achieved through the combined approach of orthognathic surgery and orthodontic treatment.

Abstract citation ID: cjae081.201
CP134 -The DRAGONFLY – a new, occlusal open and bonded Class III appliance

Ms Shadi Mehrafza[1], Dr. Nadine Hinrichsen[1], Ms Eva Tausch[1], Dr. Johannes Alexander Tamme[1], Dr. Andreas Köneke[1]; [1]*Die Kieferorthopäden am Meer*

AIMS: Aim of the study was to design a new, child-friendly, non-invasive and economic appliance for class III treatment in early mixed dentition.
MATERIALS/ METHODS: Various Class III appliances, which also allow for simultaneous maxillary expansion and gonion angle reduction were compared with each other. The clinical advantages were evaluated in order to develop a new design that would combine the most beneficial design aspects of the compared Class III appliances. The results from the BUTTERFLY study, which is also presented at EOS 2024, serve as a basis for this.
RESULTS: The DRAGONFLY is superior to the Delaire mask and other face masks in terms of invisibility and is equivalent to the Mentoplate and other skeletally anchored intraoral devices. In terms of invasiveness, it is superior to the Mentoplate and other skeletal anchors and equivalent to face masks. With regard to the range of temporal applications, the DRAGONFLY is superior to the Mentoplate and other skeletal anchors and is on a par with Delaire masks and other face masks. In terms of cost-effectiveness, it is inferior to the group of face masks and superior to the group of skeletal anchors.

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LIMITATIONS: The exclusion criterion for the use of the dragonfly is acromegaly.
CONCLUSIONS: The DRAGONFLY is a non-invasive and economic class III appliance. Further studies are planned with regard to its clinical use and effectiveness.

Abstract citation ID: cjae081.202
CP135 NON-SYNDROMIC CRANIOSYNOSTOSIS: A CASE-TREATMENT CONTROL STUDY

Ms Maura Milczewski[1], Ms Carla da Silva Pereira; [1]*Utfpr*

Craniosynostosis is the premature fusion of one or more cranial sutures, manifests in distinct sutures craniofacial such as the shallow orbital cavity, and midfacial hypoplasia, and alters the posterior position of the zygoma. Surgical methods including open calvarial reconstruction, minimally invasive strip craniectomy with spring implantation, and cranial distraction aim to adapt the development of the tissues, as well as functional and structural response to the organism. Cranial surgery can be more extensive when the middle face is involved, increasing the surgery time and the risks for the patient. This study presents one case, that of a 5-year-old Brazilian girl diagnosed with non-syndromic Craniosynostosis. The orthopedic approach adopted entailed the utilization of a Haas expander in conjunction with a protraction facemask. Radiographic assessments showed a substantial positive response, particularly in the remodeling of the middle face and the repositioning of the mandible. Notably, the results avoided the imperative inclusion of midface manipulation in the cranial surgery plan.

Abstract citation ID: cjae081.203
CP136 AN AUDIT OFTHE QUALITY OF ORTHODONTIC CLINICAL PHOTOGRAPHS

Ms Ayah Mohamed[1], Ms Emily Hooper[1], Mr Christopher Donaldson[1]; [1]*Kingston Hospital NHS Foundation Trust*

BACKGROUND: Accurate clinical photographs form a vital part of patient records. They are crucial in treatment planning, monitoring treatment progress and evaluating final results. They can also be used as an aid in educating patients during the consent process and as part of evidence in medico-legal cases. The aim of this audit was to assess the quality of clinical photographs taken in the orthodontic department in Kingston Hospital. The standard set was for 90% of the clinical photographs taken to be of an acceptable standard.
METHODS: Retrospective data was collected from 50 patients who presented to the orthodontic department between April 2022 to September 2022 for an initial records appointment or a removal of orthodontic appliances appointment. Each set of extra-oral and intra-oral photographs taken during these appointments was assessed using a 9-point checklist. For a set of photographs to be deemed acceptable, all 9 criteria must have been met.
RESULTS: A total of 400 hundred photographs were assessed. Forty percent of the photographs audited were of an acceptable standard. The occiput was excluded in 34% of extra-oral lateral view photographs. Frequently, lateral intra-oral photographs did not capture the correct buccal segment relationship (82%). Occlusal view photographs excluded the first permanent molars in 36% of cases. Fogging was present in 20% of photographs and misrepresentation of the incisal inclination was also evident (30%). The results of this audit were presented and teaching was delivered at a departmental audit and clinical governance meeting in September 2023.
LIMITATIONS: Only photographs taken for initial records or post debond were audited. Mid-treatment photographs with an appliance in situ were not included which are usually more challenging to capture. The clinical photographs were taken by several clinicians with varying levels of expertise which could account for differences in the quality of the photographs.
CONCLUSIONS: This audit demonstrated that the quality of orthodontic clinical photographs requires improvement. A photography guidance booklet and practical training is available to all clinicians and nursing staff to ensure they are appropriately skilled in capturing high quality photographs. This was a worthwhile audit, which should be repeated on a regular basis.

Abstract citation ID: cjae081.204
CP137 AN AUDIT OF ORTHODONTIC CLINCAL CODING.

Ms Ayah Mohamed[1], Ms Annabelle Carter[1], Miss Rachel O'Brien[1], Mr Christopher Donaldson[1], Mr Allan Jones[1]; [1]*Kingston Hospital NHS Foundation Trust*

BACKGROUND: Accurate reporting of orthodontic procedures is important for ensuring efficient management and use of NHS hospital resources. All orthodontic procedures should be accurately recorded using orthodontic outpatient procedure codes (OPCs). The aim of this audit was to determine whether orthodontic procedures are coded correctly at Kingston Hospital.
METHOD: A two-cycle retrospective audit of clinical coding of all orthodontic appointments was conducted in the orthodontic department at Kingston Hospital. Retrospective data collection of all orthodontic OPCs inputted to clinical records system (Cerner Millennium) through evaluation of the Hospital's coding software, was carried out. The OPCs were compared to the patient's clinical notes to assess whether the coding was completed and accurate. The gold standard was that 100% of orthodontic procedures are correctly coded.
RESULTS: The first audit cycle was carried out in September 2020, 63% of orthodontic procedures were correctly coded and 30% were incorrectly coded. The results were presented and teaching was delivered at an audit and clinical governance meeting (July 2022). A clinical coding guideline booklet was developed, distributed to all staff and placed in the clinical areas. The second audit cycle was carried out in February 2023, 99% of orthodontic procedures were coded with 69% correctly coded, 23% incompletely coded and 7% incorrectly coded.
LIMITATIONS: The first audit cycle was carried out during the COVID-19 pandemic where hospital restrictions resulted in reduced clinical activity. However, the second audit cycle included a higher, more representative sample of clinical activity.
CONCLUSIONS: This audit demonstrated a high level of coding is being carried out, but the gold standard was not achieved in either cycle. There was a significant reduction in incorrectly coded procedures following the first audit cycle and implementation of teaching and guidance, with scope for further improvement. Following the second cycle, additional teaching and training was provided by the Hospital's activity coding team. A "hard stop" at the check-out stage of each orthodontic appointment is under development to ensure all appointments have been coded. This was a worthwhile audit, which should be repeated on a yearly basis.

Abstract citation ID: cjae081.205
CP138 ORTHODONTIC – PROSTHODONTIC MANAGEMENT BY CAMOUFLAGE OF A CLASS III DENTOFACIAL DEFORMITY

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BACKGROUND: When a moderate skeletal discrepancy exists and there is no growth potential, orthodontic camouflage could be applied by displacing the teeth to obtain proper function despite the jaw relationship, which produces a dental compensation for the skeletal discrepancy.
REPORT OF A CASE: A 24-year-old Filipino female requested correction of her malocclusion. Following collection and elaboration of a complete set of diagnostic records she was diagnosed as having a Class III malocclusion with maxillary retrognathism, straight profile, anterior and bilateral posterior crossbite, spacing in both dental arches (upper 15 mm and lower 10 mm, respectively), missing upper first premolars, rotated teeth, and narrow upper dental arch. The aims of the treatment included correction of negative overjet and crossbites, establishment of Class I canine relationship and well aligned dental arches, management of spacing, and maintenance of hard and soft-tissue profiles. The treatment options presented to the patient included (a) Orthognathic surgery by means of maxillary advancement and mandibular set-back, or (b) Comprehensive camouflage orthodontic treatment. Prosthodontic restorations should be used in both options. Patient selected the comprehensive camouflage option that included comprehensive orthodontic therapy by fixed appliances in both dental arches and fixed prosthodontics to facilitate post-treatment spacing and orthodontic retention. The duration of the treatment was 26 months, all treatment goals were achieved, fixed retention applied to anterior teeth, and fixed prosthodontic works managed spacing in both dental arches as well as retention of post-treatment occlusal relationships.
CONCLUSIONS: The orthodontic – prosthodontic management of the adult female patient was successful in dealing with the Class III malocclusion associated with maxillary retrognathism by resulting in an esthetically pleasing and functionally optimum occlusion as well as camouflaging of existing skeletal discrepancy.

Abstract citation ID: cjae081.206
CP139 -Novel management of a megadont in the anterior maxilla

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BACKGROUND: Twinning anomalies that include gemination, fusion and megadontia are anomalies of tooth shape. Gemination occurs when one tooth germ gives rise to two teeth, and fusion when two normally separated tooth germs fuse. When fusion is between the tooth germ of a normal tooth and a supernumerary tooth, then it is difficult to discern between fusion and germination. A megadont describes a tooth that is larger than the norm. The incidence of these

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anomalies is cited as 0.1%. When present in the incisor region, they present a complex multidisciplinary challenge, with a need for restorative input for the restoration of aesthetics and possible endodontic considerations. We present an interesting case of a 10-year-old patient with a megadont UL1, either fusion of a supernumerary to UR1 or germination of UL1. The patient also has a supernumerary in the right anterior maxilla

AIMS/OBJECTIVES: To educate the reader about novel ways that twinning anomalies may be managed in the anterior maxilla, in order to give optimal aesthetic and functional results.

MATERIALS/ METHODS: Peri-apicals, an orthopantamogram, and a CBCT scan confirmed the presence of a megadont UL1 and supernumerary in the right anterior maxilla. Alongside orthodontic photographs and study models, the case was discussed with restorative colleagues in order to formulate a treatment plan.

RESULTS: Due to the supernumerary in the right anterior maxilla, the patient has been planned for extraction of the UL1 megadont, movement of the UR1 to UL1 position, and surgical exposure and traction of the supernumerary to UR1 position. This will also involve a URA to replace UL1 gap, a TPA appliance and an upper fixed appliance.

LIMITATIONS: The authors describe their unique case. Each case with a twinning anomaly is different and must be managed accordingly.

CONCLUSIONS/ IMPLICATIONS: Twinning anomalies are complex and involve multidisciplinary care. Each case is unique and we encourage the reader to formulate novel treatment plans, considering local dental factors that may influence this.

Abstract citation ID: cjae081.207

CP140 BILATERAL CONDYLE DEFECTS: A MANDIBULAR ADVANCEMENT APPROACH VIA COSTAL GRAFTING

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BACKGROUND: Langerhans cell histiocytosis (LCH) is a rare disorder characterized by abnormal proliferation of Langerhans cells, and often associated with osteolytic bone lesions. During the period of development of the temporomandibular joint (TMJ), when growth-disturbing factors such as inflammation and trauma act on this region, the mandibular condyle becomes shortened. For mild instances, a jaw osteotomy is recommended post splint application, however, in severe cases, autologous condylar reconstruction or alloplastic total joint reconstruction is recommended.

This report presents a case of severe mandibular retrognathia accompanied with bilateral mandibular condylar defects, treated by mandibular condyle reconstruction using costal grafting and mandibular advancement without maxilla surgery.

MATERIALS/METHODS: The 24-year-old Japanese female patient, having a medical history of LCH, exhibited skeletal Class II jaw relationship, an anterior open bite with high mandibular plane angle and labially inclined maxillary incisors. The overjet was 15mm, and the overbite was -5mm. Both mandibular condyles were absent, while the coronoid processes showed compensatory hypertrophy.

Our concern primarily revolved around the potential occurrence of mandibular condyle resorption subsequent to condylar reconstruction. To mitigate this, we deliberately planned the surgical intervention in two stages, allowing for the possibility of maxilla adjustments should mandibular retraction arise. Additionally, while deliberating potential treatment approaches, the consideration of total joint replacement for the TMJ was contemplated. However, it was deemed unsuitable in this case owing to the insufficient size of the mandibular body.

RESULTS: Following the pre-surgical orthodontic treatment, mandibular condyle reconstruction with costal grafting and mandibular advancement surgery were performed. The mandible advanced by 12mm at point B, and the SNB angle improved from 66.5° to 74.5°. Genioplasty was performed six months after the surgery, however, we decided to avoid maxilla surgery. The patient has obtained a good occlusion and profile. One-year post-surgery, the mandibular position remains stable.

CONCLUSIONS/IMPLICATIONS: The mandibular condyle reconstruction with costal grafting could be one possible strategy for adult lacking mandibular condyles. Long-term observation is required considering the risk of mandibular condylar resorption.

Abstract citation ID: cjae081.208

CP141 COMPLICATIONS IN INTRUSION ARCH BIOMECHANICS FOR DEEP OVERBITE MALOCCLUSION CORRECTION

Mr Gabriel Moro[1], Mr Henrique Semaan, Mr Jussimar Castilhos, Mr Gil Gasparello, Mr Orlando Tanaka; [1]*Pontificia Universidade Catolica Do Parana*

BACKGROUND: The management of overbite correction in orthodontics remains a subject of debate among professionals. While methodologies vary, a consensus underscores the importance of the smile line in determining which incisors require intrusion. Deep overbites can be addressed through various biomechanical strategies. These include the intrusion of maxillary or mandibular incisors, extrusion of buccal segments, or a combination decided by the specific diagnosis and treatment goals.

OBJECTIVE: This clinical poster will present a case of a Class I malocclusion with a very deep overbite. The focus is on the successful correction achieved through the intrusion of mandibular incisors and canines, utilizing an archwire specifically designed for intrusion.

METHODS: The approach involved a comprehensive assessment of the malocclusion's etiology, with attention to the smile line. The limited exposure of the maxillary teeth during smiling, the treatment strategy focused on employing a mandibular intrusion utility arch. This biomechanics was chosen for its potential effectiveness in addressing the specific dental alignment issues presented in this case.

RESULTS: The treatment faced initial challenges, notably a cant in the mandibular occlusal plane due to the applied intrusion technique. However, through careful adjustment of the force exerted by the intrusion arch, the desired control were regained. The result showed an effective intrusion of the mandibular teeth.

CONCLUSIONS: The treatment successfully addressed the deep overbite, obtaining a functional and aesthetically pleasing smile. This case exemplifies the importance of a customized approach in orthodontic treatment, considering both functional and cosmetic aspects to achieve optimal results. The use of specialized techniques like the mandibular intrusion utility arch, when appropriately applied and adjusted, can achieve significant improvements in dental alignment and overall smile aesthetics.

Abstract citation ID: cjae081.209

CP142 UNILATERAL CLEFT PALATE AND HYPERDONTIA – AN ADULT TREATMENT APPROACH

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BACKGROUND: The spreading of dental abnormalities among cleft patients frequently increases the difficulty of the treatment approach. Hyperdontia on a cleft palate constitutes an aggravating factor, considering the lack of maxilla growth usually found in cleft palate patients, therefore there are difficulties in treatment options. Our case presents with unilateral cleft palate, hyperdontia, canine and lateral incisor ectopy and 90 degrees central incisor rotation in an adult patient.

METHODS: Our patient, aged 16, had no previous orthodontic treatment, only surgical interventions to close the communication between the oral cavity and nasal cavity, therefore the diagnosis consisted of a skeletal and dental class III, both premolar and frontal crossbite, ectopic canine and lateral incisor and two supernumerary teeth. Considering all these diagnoses, the first treatment option was a surgical one but unfortunately, the patient and both his parents refused another surgical intervention, so we had to choose a rapid palatal expansion and fixed appliance.

RESULTS: Neutral occlusion was achieved by the rapid palatal expander, the difficulty of this particular case was the contention of the expansion, considering all the scars on the palate, therefore, the rapid palatal expander was maintained on the spot one year after the last activation.

LIMITATIONS: The dental hygiene was a problem from the beginning of the treatment, even if the patient was aware of the periodontal complications that may occur. For retention we used Full Essix, the overall lack of bone in the maxilla is a retention problem of the results.

CONCLUSIONS: This particular case showed that neutral occlusion was achievable even without orthognatic surgery in a cleft palate class III malocclusion, the main confrontation remains the retention of the results in time.

Abstract citation ID: cjae081.210

CP143 OPTIMIZING ORTHOGNATHIC SURGICAL OUTCOMES: THE INTERDISCIPLINARY APPROACH OF GREIFSWALD

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AIM: In adult patients, a combined orthodontic and orthognathic surgical therapy is often the only option to correct significant skeletal discrepancies. The back bone of this interdisciplinary treatment concept is the planning of the surgical relocation and its realization through surgical splints. The purpose is to introduce an advanced CAD/CAM workflow for precision orthognathic surgery planning.

MATERIALS AND METHODS: A digital based approach was established a while ago at the Department of Orthodontics at the University of Greifswald. This includes a comprehensive diagnostic record with a functional analysis and a CBCT scan (Accuitomo/Morita Co, Kyoto/Japan) for digital planning. The data is then imported into the dental imaging software Onyx-Ceph3™ (Image Instruments GmbH, Chemnitz/Germany) in DICOM format and matched with their 3D-scanned upper/lower arch where the position of the virtual hinge axis is located. Orthognathic

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surgery is then performed virtually using the "Treatment Simulation Sim 3D, Onyx Ceph™" module, where the planned surgical intervention (LeFort I osteotomy, bilateral sagittal split osteotomy, etc.) can be attempted virtually to assess feasibility before proceeding to surgery. In the next step the required surgical splints are constructed using "Waefer Creation 3D, Onyx Ceph3™" module. The virtually created splint is saved as *.stl file and imported in the suitable slice software. The splints are then printed using a DLP 3D-printer (Shera D30, Rapid Shape GmbH, Heimsheim, Germany) with resin (SHERAprint - ortho plus UV, SHERA Werkstoff-Technologie GmbH & Co. KG, Lemförde, Germany). Recently both Anycubic Photon Mono X and Anycubic Photon Mono M5s LCD 3D printers (Hongkong Anycubic Technology Co., Shenzhen, China) were integrated in the described workflow. The splints are printed with Bio-Med Clear resin (Liqcreate, Utrecht, The Netherlands).
RESULTS AND CONCLUSION: With the presented approach, it is possible to produce high-quality planning of orthognathic surgical treatments resulting with accurately fitting surgical splints and satisfying treatment results. The three-dimensional virtual planning significantly facilitates interdisciplinary communication with oral and maxillofacial surgery during the planning phase. From our perspective, this fully digitalized procedure is superior to all aspects of conventional treatment planning and splint manufacturing.

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CP144 ORTHODONTIC TREATMENT OF DEEP BITE AND GUMMY SMILE IN ADULTS AS A FUNDAMENTAL STEP FOR RESTORATIVE DENTISTRY

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BACKGROUND: Deep bite is a common malocclusion in which the mandibular incisors are excessively overlapped vertically by the maxillary incisors when teeth are in centric occlusion. This kind of malocclusion presents challenges especially when combined with an excessive display of gingival tissues. This report is about a 40year-old and a 35year-old woman, both having deep bite and gummy smile with an uneven gum line. The initial plan has included gingivectomy and aesthetic restorations after the orthodontic treatment.
OBJECTIVES: The aim of this report is to lay emphasis on the importance of the orthodontic treatment as an initial step in creating the dental and periodontal specifications for a sound and aesthetic restorative result.
METHODS: In the case of the 40 year-old woman, fixed appliances were used in both arches and total treatment time was 1.5 year. In the case of the 35year-old woman, a lite package of a known brand of clear aligners and a concurrent two-month period of fixed appliances were used. Total treatment time was 1.5 year.
RESULTS: In both cases, intrusion and proclination of maxillary incisors as well as an improved gum line were achieved. In the first case, the deep bite was overcorrected, counting in the extra length of the crowns placed. In the second, composite resin restorations completed the treatment plan.
LIMITATIONS: In both cases, the gummy smile was improved but not eliminated because patients were so pleased with the result of orthodontic treatment that did not want to proceed with a gingivectomy. In the first case, final restorations were delayed for one year and a small relapse was corrected while in the second case the patient chose the most affordable and brief prosthetic treatment plan.
CONCLUTIONS: Deep bite cases cannot be tackled single-handedly by a prosthetic treatment plan. The contribution of Orthodontics is pivotal since the alternative plan would be extremely invasive for both periodontal tissues and teeth.

Abstract citation ID: cjae081.212
CP145 AN AUDIT TO ASSESS QUALITY AND TIMELINESS OF SAME DAY RETAINERS

Miss Victoria Hannah Muir[1], Miss Joanne Russell[1]; [1]*James Cook University Hospital*

BACKGROUND/AIMS: At a local audit meeting, clinicians noted they had been experiencing several ill-fitting same day retainers as well as delays in receiving the retainers. This has implications on clinical time taken to adjust the retainers, as well as cost of re-making retainers where required. The aim of this audit was to assess the quality and timeliness of same day debond retainers over a prospective 6 week period and identify any common reasons for ill-fitting retainers with a view to improving our service.
MATERIALS/METHODS: A checklist gathering information regarding quality of alginate impression, quality of retainer fit and time the retainer was received from the laboratory was created. This checklist was filled out by clinical and laboratory staff for every same day retainer made over a consecutive 6 week period. Vacuum formed retainers, Hawley retainers and Hawley retainers with teeth were included.
RESULTS: A total of 59 retainers were assessed. 50% of all upper retainers and 7% of lower retainers required some form of adjustment at the chairside. 90% of upper alginate impressions and 89% of lower impressions were of sufficient quality that they did not affect construction of the retainer.
CONCLUSIONS / IMPLICATIONS: The results highlighted a need to improve the quality of our alginate impressions as well as the construction of our same day retainers. The findings were discussed with the North East England regional orthodontic quality improvement team to identify ways in which we may improve our retainers. Suggestions from colleagues in other units included methods such as use of adhesive in impression trays and use of lower impression trays for upper vacuum formed retainers to minimise pulling of alginate in the palate which may lead to distortion. These suggestions are currently being trialled on clinic and a second cycle of the audit is underway to evaluate improvements to same day retainers.

Abstract citation ID: cjae081.213
CP146 MOLAR-INCISOR MALFORMATION: A CASE REPORT AND TREATMENT SUGGESTIONS

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AIM: to report a case of a molar-incisor malformation comparing the findings with the literature and describing a possible treatment plan.
BACKGROUND: Molar-incisor malformation (MIM) is a dental abnormality typically found in pediatric patients. It is characterized by normal clinical crowns and thin, short and tapered roots affecting mainly the permanent first molars. The etiology of MIM is unclear, but the literature proposes non-genetic, environmental factors related to past medical history in the first two years of life as a possible cause.
CASE: A 15 year-old boy was referred to the department of orthodontics of the University Hospitals Leuven, by the general dentist, due to radiographical evidence of root malformations. The upper left canine was not clinically visible and the hypomineralisation of the four upper incisors was apparent.
The panoramic X-ray confirmed the presence of 32 permanent teeth, root dilaceration of all four canines and impaction of the upper left canine. The two upper first molars presented shortened roots and the two lower first molars showed a lack of root formation.
The patient's medical history referred a bilateral subdural hematoma at seven months old.
TREATMENT: There is no specific treatment for MIM due to the rarity of reported cases.
The patient was not willing to undergo an orthodontic treatment. Two treatment options were suggested: (1) extraction of the two lower first molars later in life followed by implant placement or (2) extraction of the two lower first molars and tooth autotransplantation of the two upper wisdom teeth to the extraction site of the two lower first molars.
Option two was preferred by the patient and his mother.
CONCLUSION: Literature suggests that the incidence of MIM will increase with improved healthcare and patient survival. Oral healthcare providers should be aware of MIM to detect this kind of malformation at an early stage. Long-term follow-up studies will lead to a better understanding of the pathogenesis and etiology of MIM and formulation of treatment guidelines.

Abstract citation ID: cjae081.214
CP147 CAMOUFLAGE TREATMENT IN UNILATERAL COMPLETE CLEFT LIP AND PALATE

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BACKGROUND: Unilateral complete cleft lip and palate (CLP) patient often experience missing many upper permanent teeth, leading to the more severe maxillary hypoplasia. Either orthognathic surgery or camouflaging by lower teeth extraction is a viable approach. In some case with missing upper teeth but lower teeth are to be extracted, Autogenous tooth transplantation (ATT) is an alternative way. However, this is seldom employed, especially in cleft patients, due to the elevated risk of complications associated with the unique dental anatomy in CLP cases.
OBJECTIVE: This case report aims to illustrate a complex interdisciplinary treatment approach in camouflage treatment of class III malocclusion involving ATT in a patient with unilateral complete cleft lip and palate.
DIAGNOSIS: An 11-year-old girl with a preexisting condition exhibited facial asymmetry, a concave profile, Angle's class III malocclusion with anterior and left posterior crossbite. The patient presented with skeletal class III characteristics, a negative overjet of -2.5 mm, and a rightward deviation of the upper

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midline. Additionally, she had four missing permanent teeth in the upper arch (15/12/22/25), exacerbating the severity of the maxillary hypoplasia.
TREATMENT: At 11 yo., a functional spring inclined plane was prescribed, followed by a fixed orthodontic appliance, upper expansion archwire, and class 3 elastics to rectify crossbite, expand the upper arch. At 13 yo., a secondary alveolar bone graft, nasal floor closure, and oronasal fistula closure were performed. At 16, due to pronounced skeletal class 3 and negative overjet, a camouflaged treatment involved replacing missing teeth 12 and 22 with 13 and 23. Plans included utilizing spaces from missing 15 and 25 for autogenous tooth transplantation (teeth 34 and 44 from the lower arch), followed by root canal treatment. The result was favorable facial and smile esthetics.
CONCLUSION: In camouflage treatment for cleft conditions, the success of autogenous tooth transplantation depends on patient-specific factors, surgical skill, and postoperative care quality. Patient selection, coupled with appropriate orthodontic-surgical-endodontic techniques, can yield exceptional results in tooth substitution, functionality, aesthetics, and long-term viability.

Abstract citation ID: cjae081.215
CP148 ORTHODONTIC TREATMENT WITH AUTOTRANSPLANTATION OF AN IMPACTED THIRD MOLAR FOR AN ADULT PATIENT

Dr SAKIE OKUMURA[1]; [1]*Apple Road Dental Clinic*

BACKGROUND/OBJECTIVES/AIMS: Certain orthodontic patients, necessitating treatment, may involuntarily undergo tooth extraction due to caries or periodontal disease before or during the intervention. In situations where viable donor teeth are accessible, transplantation emerges as a potential option to address the extraction space. However, challenges persist in adults, particularly when the anticipated root growth of the donor's teeth is not evident. The primary objectives of this case report are to delineate the viability of transplanting a fully developed tooth with completed root growth and to provide insights for the seamless integration of transplantation into routine clinical practice. The overarching goal is to advocate for the inclusion of transplantation as a viable treatment modality, minimizing dependence on immediate prosthetic interventions for missing teeth and augmenting overall patient satisfaction.
MATERIALS/METHODS: A female patient in her 30s presented with discomfort in her lower left first molar, deemed non-preservable by a general dentist, expressing a desire for orthodontic intervention. Following consultation with general dentists, the non-preservable lower left first molar was extracted, and the ipsilateral third molar was transplanted. Subsequent to root canal treatment, orthodontic intervention was initiated. Cephalometric analysis, model examination, and facial assessment were conducted to evaluate the patient. The periodontium was assessed during the orthodontic treatment and retention phases using a six-point periodontal examination, panoramic radiographs, and dental radiographs.
RESULTS: Routine periodontal examination and treatment, appropriate root canal therapy, timely orthodontic intervention, along with patient motivation for treatment, and the selection of an appropriate tooth to be transplanted yielded satisfactory outcomes.
LIMITATIONS: The report's limitations include the requisite for an extended follow-up to assess the enduring stability of the transplantation procedure.
CONCLUSIONS/IMPLICATIONS: Transplantation of third molars in regions necessitating extractions can prove effective, even in adults. If a viable third molar is available, considering transplantation and alignment in patients with completed root growth could be worthwhile.

Abstract citation ID: cjae081.216
CP149 MANAGEMENT OF SKELETAL CLASS III MALOCCLUSION WITH FACE MASK WITH SKELETAL ANCHORAGE: CASE REPORT

Dr Catarina Oliveira[1], Dr Raquel Travassos[1], Dr Ana Luísa Figueiredo[1], Prof Inês Francisco[1], Prof Francisco Vale[1]; [1]*Institute Of Orthodontics, Faculty Of Medicine, University Of Coimbra*

BACKGROUND: Skeletal Class III patients may encounter aesthetic and functional challenges stemming from either skeletal or dental discrepancies. The prevalence ranges from 4% to 14%. In growing patients, using a facial mask in interceptive orthodontics enables maxillary protraction and alters the direction of craniofacial growth. It can be used with tooth or skeletal anchorage. The literature states that skeletal anchorage shows greater maxillary advancement and more favourable long-term stability.
AIM: This paper aims to describe a clinical case of a Class III patient with multiple agenesis who underwent skeletal anchorage facemask protocol.
MATERIALS/METHODS: A 6-year-old female with multiple agenesis, posterior crossbite, and skeletal class III malocclusion sought orthodontic treatment at the Institute of Orthodontics, Faculty of Medicine, University of Coimbra. Due to multiple agenesis at the time, the protocol initially involved a skeletal anchored facemask. Following maxillary protraction and the eruption of maxillary incisors, a progenic appliance with an expansion screw and a palatal crib was used. In the first 2 months, the expansion protocol was 0.20mm/week. During the treatment, upper incisor inclination was improved through activation of the progenic appliance.
RESULTS: After treatment, a more favourable occlusion was obtained. Both the ANB and the overjet were improved. In addition, the inclination of the incisors was corrected, and facial aesthetics improved. Today, at the age of 10, a lingual arch with lower incisors has been placed to address the aesthetic concerns resulting from the agenesis and the axilla-mandibular relationship remains orthognathic.
CONCLUSION: In growing patients, a face mask with skeletal anchorage allows the maxilla to be protruded when dental anchorage is not possible, which improves the function of the stomatognathic system and facial aesthetics.

Abstract citation ID: cjae081.217
CP150 TREATING A PATIENT WITH MODERATE CROWDING THROUGH DISTALIZATION IN FOUR QUADRANTS

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AIM: This case report demonstrates the treatment of distalization using miniscrews in four quadrants in a patient with a moderate crowding.
MATERIAL/METHOD: An 18-year-old female came to our clinic with a complaint of anterior crowding. The patient had a Class 1 molar relationship with normal U1-NA (23°) and increased L1-NB (32°) angles. The lower premolars were positioned buccally, and the right upper canine was in a high position. We suggested a 4 premolar-extraction treatment plan, but the patient declined the extraction treatment. Then the four-arch distalization plan was suggested and the patient agreed. Subsequently, screws were placed in the infra-zygomatic region on both sides. Two buccal shelf screws were also applied in the mandible. Distalization was performed with power chains the canines over a 0.019x0.025 SS archwire in four quadrants. Following this, incisor retraction was done.
RESULTS: After approximately 1.5 years of treatment, we achieved an ideal overjet and overbite, Class 1 molar and canine relationships, as well as an ideal and balanced profile. The treatment resulted in less proclined incisors in both arches (U1-NA (25°) and L1-NB (33°) angles).
LIMITATIONS: Despite the distalization carried out in all four quadrants in the patient, limitations were encountered. These limitations were due to limited distalization in the lower jaw and the proclination of teeth caused by the posterior teeth outside the arch. Consequently, despite the distalization performed in four quadrants, the treatment resulted in a slight increase in the angulation of the incisors.
CONCLUSION: This case highlights the successful use of miniscrews for distalization and provides an insight for the treatment plan without extractions. Also we achieved a treatment of moderate crowding with favorable dental and skeletal outcomes.

Abstract citation ID: cjae081.218
CP151 NANCE HORAN SYNDROME: AN ORTHODONTIC CASE SERIES

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BACKGROUND: Nance–Horan syndrome is a rare X-linked dominant disease characterised by congenital cataracts, dental anomalies, intellectual disability, and facial dysmorphism. Dental findings include multiple supernumerary teeth, mulberry molars and notched incisors. We present the findings of three cases with Nance-Horan Syndrome.
CASE 1: A 9-year-old male was referred to the orthodontic department by his general dental practitioner regarding the irregular eruption of his incisors. He presented with a Class III incisor relationship on a Class III skeletal base; his lower incisors erupting at 8-9 years and the lower second permanent molars erupting early at the same time; an unerupted FDI 21, and an erupted supernumerary/supplemental tooth between FDI 41/42. The patient was seen on a joint orthodontic and paediatric dentistry clinic where 2-D and 3-D radiographic imaging confirmed the presence of 12 supernumeraries. Due to the combined history of congenital cataracts, learning difficulties and supernumerary teeth, he was referred to a geneticist for suspected Nance Horan Syndrome, which was confirmed. The resultant treatment was extraction of 5 retained primary teeth, 11 supernumerary teeth, 1 supplemental tooth, exposure and bonding of a gold chain to the FDI 21 and to accept the morphology of teeth.
CASE 2: A 12-year-old female who was the older sibling of Case 1 presented with a Class II division 2 malocclusion on a skeletal Class I base. Radiographic examination revealed 5 supernumerary teeth including a horizontally impacted supplemental FDI 33 in the mandibular symphyseal region. The true permanent FDI 33 was also horizontally impacted and inferior to its corresponding supernumerary. The supernumerary

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teeth were extracted and the ectopic FDI 33 was autotransplanted with the aid of 3D surgical planning. Orthodontic treatment was completed with fixed appliances.
CASE 3: We also present the case a young male, who had obvious notching affecting the upper anterior teeth. He had a Class II div 1 incisal relationship and supernumerary teeth that had also caused resorption of the adjacent dentition.
CONCLUSION: Our case series highlight the importance of multidisciplinary care for successful management of these patients. Clinicians can refer to published case reports on management options for these patients.

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CP152 MAXILLARY EXPANSION USING A SKELETAL ANCHORED CAD/CAM APPLIANCE WITHIN A SINGLE SESSION PROCEDURE – A CASE REPORT

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BACKGROUND: Adolescents and adults show a progressive ossification of palatal suture, resulting in a higher palate rigidity. Therefore a bone-borne expansion appliance is beneficial. For an ideal treatment outcome, the application of a hybrid CAD/CAM expander appliance containing two miniscrews for skeletal anchorage can be recommended. Superimposition of CBCT and intraoral scan for digital screw positioning is used. Due to the digital workflow a single-session procedure is possible.
MATERIALS AND METHODS: A 12-year-old male patient showed a narrow maxilla resulting in a crossbite in the 1. quadrant. The maxillary deficit measured in the molar region was 7mm. The patient showed a palatal displaced tooth 12. In addition to the routine diagnostic records, a CBCT and facescan scan was conducted. After superimposing the intraoral- and CBCT scan, virtual screw positioning was performed to plan a bicortical miniscrew position. To transfer the miniscrews clinically, a drilling template was constructed, and further 3D printed. The expander appliance was individually designed within a CAD/CAM workflow and manufactured using selective lasersinter technology.
RESULTS: Within a single-session procedure, miniscrews and the appliance were inserted in one visit. To check the miniscrew position, an intraoral scan using scan bodies was performed. To evaluate the transfer accuracy of the drilling template, the digitally planned screw position was superimposed with the post-insertion intraoral scan. It showed a satisfactory transfer of the screw position. The 3D-deviation of the digital planned to clinical miniscrew position was measured on the miniscrew tips and showed a difference of 0.2 mm for the first miniscrew and 0.7 mm for the second. Immediately afterwards, the expansion was started. Initially, a rapid expansion protocol was used until a diastema opened. The protocol was changed to slow expansion until the necessary width of the maxilla was reached. By maxillary expansion, the necessary space for the displaced tooth was provided. The superimposition of the pre-and post-treatment facescan showed no recognizable changes of the midface soft tissue.
CONCLUSIONS: The single-session procedure enabled the activation of the appliance immediately after insertion of miniscrews. Utilizing a drilling template, a bicortical miniscrew position could be achieved.

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CP153 ORTHODONTIC TRACTION OF HORIZONTALLY IMPACTED MAXILLARY CANINES

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AIMS: Maxillary canines are the second-most frequently impacted teeth after the third molars. The possibility of impaction of the maxillary canine must be diagnosed early, the eruption path must be monitored, and the treatment must be determined based on accurate diagnosis and analysis at an appropriate time. In this presentation, we introduce a case, in which the horizontal impaction of the maxillary canine was detected early and successfully aligned in its normal position through orthodontic traction.
SUBJECT AND METHOD: An 11-year-old girl came to the orthodontic clinic at Jeonbuk National University Dental Hospital with the chief complaint of delayed eruption of her both maxillary canine. In the initial radiograph, the right maxillary canine was horizontally impacted, the left maxillary canine was mesially inclined and impacted. TADs was placed in the midpalatal area for orthodontic traction. The right canine was orthodontically tracted using a palatal wire connected to a miniscrew, and the eruption path of left canine was changed to the disto-occlusal direction using a buccal wire.
RESULT: Since canines are important teeth that located in the corner of the arch and serve as a guide during occlusion, if an impacted tooth is radiographically identified, orthodontic traction can be attempted. As a result of traction using TADs, the canine were able to erupt efficiently without any movement of the adjacent teeth. Finally through additional full fixed appliance treatment, Class I molar relationship and harmonious anterior occlusion were obtained.
CONCLUSION: Determining the accurate location of impacted canines and their relationship to adjacent incisors and anatomical structures is an important part of the diagnostic process and essential for successful treatment. Additionally, the use of TADs are able to allow for more efficient movement of the impacted tooth. If several treatment strategies are precisely established, impacted canines can be successfully aligned in the dental arch through an orthodontic approach.

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CP154 SEVERE SKELETAL DISCREPANCY II WITH CONDYLAR RESORPTION: AN ORTHOGNATHIC SURGERY CASE

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OBJECTIVE: To present treatment for severe skeletal 2 with condylar resorption problem.
DIAGNOSIS: This case report demonstrated a severe skeletal discrepancy II surgery in previously chin injury 6 years ago with tempero-mandibular disorder finishing within 36 months. A 35-year-old male with chief complaint of maxillary protrusion and bite impairment in front teeth.
He had a severe convex profile (H-angle= 30), short chin throat length (35 mm), incompetence lip, high smile line, symmetrical long and narrow facial form. He had skeletal II (ANB=12.5) with severe retrognathic mandible and chin (SNB=66, SN-Pg= 66.5), vertical maxillary excess, open configuration (MP-PP=45), proclination of upper and lower incisors. Angle's class II molar relationship.
Teeth 35, 45 were previously extracted, OJ= 16.5 mm, Panoramic film reveals abnormal condylar form. TMD: R/L joint inactive condylar resorption with disk displacement with reduction. He also had mouth breathing and lip biting habits.
TREATMENT: To establish a harmonious profile, skeletal type I and establish normal configuration 2-jaw orthognathic surgery was planned. TMD consultation was done prior to the orthodontic treatment.
PRESURGICAL ORTHODONTICS: Due to excessive overjet extraction 14,24 was done to reduce upper incisor tooth protrusion and to reduce the amount of lower jaw advancement which could be harmful to TMJ condition. Lower arch was leveled, aligned, and flattened curve of spee. Both arch were coordinated transversely.
ORTHOGNATHIC SURGERY: 2-jaw surgery (Le Fort I maxillary impaction with counterclockwise rotation, BSSRO mandibular advancement and advancement genioplasty)
POSTSURGICAL ORTHODONTICS: Occlusion seating was done with intermaxillary elastics at post-surgery
Upper retention with wraparound retainer and lower with Hawley's retainer with hook for class II elastic at night time.
CONCLUSION: Patient achieved good class I occlusion, good OJ/OB with improved profile. Total treatment time was 3 years 6 months. Skeletal relationship was improved (ANB=6.5). Mandibular plane was improved (FMA from 47 to 34). Facial convexity was improved to normal range (H-angle decreased from 30 to 13). At 1 year post treatment shows good stability without any TMJ symptoms.

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CP155 THE IMMEDIATE EFFECT OF MOLAR BITE RAISING ON ANTERIOR OVERBITE

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OBJECTIVES: The aim of this study was to determine the effect of 2 mm of bite raising on the lower first molars on the decrease of anterior overbite, with an attempt to explain the variation in bite opening based on various dental and skeletal variables.
MATERIALS AND METHODS: Fourty-seven orthodontic patients in their permanent or mixed dentition who had undergone lateral cephalometric examination in the last month were consecutively recruited. A first intraoral scan of the dentition was taken in maximal intercuspidation using a Trios 3Shape® scanner. Subsequently, bite raisers in the form of a 2mm diameter stainless-steel bearing ball were temporary bonded with a photopolymer material onto the central fossae of both lower first permanent molars, and a second intraoral scan was taken with the patient in occlusion on the posterior bite raisers. Digital dental

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cast analysis was performed to measure the changes in overbite, and the results were analysed in an attempt to explain between-patient variation based on several dental skeletal variables.
RESULTS: In the sample of 47 patients, the mean overbite decrease following 2mm bite raiser placement was 2.2mm (0.3-4.0mm). For the individuals with molar Class II relationships, the bearing ball opened the anterior overbite by 1.6mm (0.2-3.6mm) on average, while the remaining Cl. I cases had a mean overbite decrease of 2.3mm (0.3-4.0mm), the difference was statistically significant ($p<0.05$). To explain this difference in the results, different cephalometric and dental variables were examined, but no contributing factors was found to significantly influencing this inter-patient variability.
DISCUSSION: Following bite raising by 2mm on the posterior dentition, the overbite decrease is bigger in patients with Class I sagittal relationships than those with Class II. For the moment no dental or cephalometric variables have been detected that influence the variation in overbite reduction. Other variables will therefore be examined to identify their potential contribution to this variation.

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CP156 A RARE CASE REPORT OF A YOUNG PATIENT WITH DENTIN DYSPLASIA TYPE I

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BACKGROUND: Dentin dysplasia type I (DD-I or radicular DD) is a rare heritable disorder transmitted as an autosomal dominant trait that affects the dentin and the pulp of the teeth. This disorder is also known as "rootless teeth" because of the loss of organization of the root dentin, which often leads to a shortened root length or root agenesis. The prevalence of dentin dysplasia type I is about 1 per 100000. As a result, knowledge regarding this genetic condition mainly originates from reports of isolated cases.
AIM: The purpose of this study is to present a rare clinical case of a female patient who was diagnosed with dentin dysplasia type I when she was referred for orthodontic evaluation.
METHODS: An 8-year-old Caucasian female patient with no known medical history was referred to a private orthodontic clinic seeking orthodontic treatment. Diagnostic orthodontic records were obtained including extraoral and intraoral photographs, dental casts, a panoramic and a lateral cephalometric radiograph.
RESULTS: The patient presented with root agenesis of first permanent molars. Clinically, the morphology of the teeth was normal in shape, form, and color. Radiographic examination revealed partial or complete obliteration of the pulp chambers, defective or only rudimentary root development and periapical radiolucencies with no obvious cause. Considering the clinical and radiographic features, the patient was diagnosed with dentin dysplasia type I. Maintenance of first permanent molars and monitoring until the patient is old enough for implants was considered as the treatment of choice. Alternatively, it was recommended extraction of first molars and orthodontic mesialization of second molars followed by implant placement in the area of second molars, if no third molars were available.
CONCLUSIONS: Orthodontic management of patients with dentin dysplasia type I is challenging due to high teeth mobility leading to early exfoliation. Therefore, careful treatment planning and clear communication with the patient and their family is required. Since there are only a few published cases about patients with dentin dysplasia type I who were subjected to orthodontic treatment, awareness should be raised among the orthodontic community regarding this topic.

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CP157 CAN A BROADIE BITE IN A YOUND ADULT BE TREATED WITH A COMBINATION OF A LIP BUMPER AND CROSS-BITE ELASTICS FOLLOWED BY AN INVISALIGN LITE PACKAGE? REPORT OF A CASE

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BACKGROUND: Brodie bite is a rare malocclusion of the transversal plane, occurring in 1-1.5% of the population, in which the palatal cusps of the upper molars occlude outside the vestibular cusps of their antagonists. In brodie bite cases, extrusion of maxillary and mandibular posterior teeth with buccal or lingual tipping respectively, resistance of posterior teeth to be corrected and limited space available for orthodontic appliances constitute the main challenges. In this case report we aim to offer a novel treatment approach using hybrid aligners' treatment.
METHODS: A 24.0-year-old male with the chief complaint of being unable to masticate properly, presented with a Class II div. 2 dentoalveolar malocclusion, and a bilateral brodie bite. Before initiating treatment, all wisdom teeth were removed. A combination of a lower lip bumper, cross-bite elastics, canine turbos to raise the bite and 2-dimensional lingual braces from canine to canine were used to correct the transverse discrepancy and the severe crowding in the lower arch. Aligner treatment followed, in combination with class II elastics. Following treatment, a 4-4 lingual and a 3-3 palatal fixed retainer together with Essix retainers were used. Photographs, panoramic and lateral x-rays, as well as scans and occlusograms were compared before and up to 2 years following treatment.
RESULTS: Total treatment lasted for 16 months. In the first 6 months the crossbite elastics and the lip-bumper brought the posterior teeth in contact while in the next 10 months the weekly change of 42 aligners (initial set and 2 refinements) achieved a proper interdigitation. No evidence of fenestration and dehiscence, centric occlusion-centric relation discrepancy, or external apical root resorption were noted.
LIMITATIONS: When finished the lower midline remained 1 mm off compared to the facial midline, the vertical height slightly increased and the lower incisors proclined 4 degrees. Despite that, the hybrid approach that was followed offered an aesthetically acceptable treatment alternative.
CONCLUSIONS: Since many modalities are available in treatment of broadie bites, decisions should always be taken on an individual basis to fulfil the aesthetic, functional and budgetary expectations, while offering a result of long-term maintainability.

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CP158 DO WE NEED CONDYLES? A CASE OF IDIOPATHIC CONDYLAR RESORPTION: 2023 UPDATE.

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BACKGROUND: Idiopathic condylar resorption (ICR) is a poorly understood condition with progressive degeneration of the temporomandibular joint (TMJ) without an identifiable cause. ICR commonly presents as a spontaneous, self-limiting episode of bilateral condylar resorption in the absence of pathology, injury or systemic disease. Some patients have discomfort and/or functional limitations during the active phase of resorption, others can be asymptomatic. Management of ICR is controversial; we report an unusual case where the condyles were not restored surgically, with good functional and aesthetic outcomes.
METHODS: A female, 20-year-old patient (SJ) attended for orthodontic review in May 2016 concerned about a sudden change in facial profile and "small chin", occurring over the past 6 months with no pain. An orthopantomogram (OPG) revealed a loss of condylar height and rheumatology investigations were negative for inflammatory markers. In July 2017, the condyles appeared fully resorbed and serial bone scans (Tc HDP) indicated the cessation of bony remodelling. Presurgical fixed appliances were placed in 2017, followed by surgical mandibular advancement of 10 mm and with genioplasty of 8 mm in January 2019. Fixed appliances were removed in June 2019.
RESULTS: Immediately following surgery, SJ reported good function, nil discomfort and was pleased with aesthetic outcome. At her most recent review appointment in August 2023, the result continues to be stable, and SJ has no concerns with function or aesthetics.
LIMITATIONS: SJ is still stable, four years from her original surgery and fixed appliance treatment. SJ will continue to be reviewed in case of any future changes.
CONCLUSIONS: Management of ICR ranges from conservative (occlusal splint therapy) to complex (TMJ surgery with prosthetic joint replacement). It is unknown which treatment modality can provide long-term condylar and occlusal stability. Previously, orthognathic surgery alone has been shown to have higher relapse rates than prosthetic joint replacement, however, presents less surgical burden to the patient. Here, we have shown promising long-term results without the need for prosthetic joint replacement.
IMPLICATIONS: Prosthetic joint replacement may not be necessary for patients presenting with ICR. We present a case whereby functional, occlusal and aesthetic goals were met, in the absence of condyles.

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CP159 INTRODUCTION OF A CLASS III TREATMENT ALTERNATIVE USING INDIVIDUALLY MANUFACTURED COMPUTER-AIDED-DESIGN/COMPUTER-AIDED-MANUFACTURING APPARATUS BASED ON THREE PATIENT CASES

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BACKGROUND: The orthodontic treatment of a basal Class III aims primarily to promote the anterior development of the upper jaw. Typically, the anterior

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movement of the upper jaw is achieved through the combined use of a palatal expansion device and a face-mask. However, the face-mask is often rejected by children and adolescents due to its perceived aesthetic limitations, leading to its frequent nighttime-only use. This results in reduced overall wear time and, consequently, a significant delay in skeletal effects on the upper jaw.
AIM: The aim of our case series is to present an efficient and patient-friendly Class III treatment alternative with individually fabricated CAD/CAM appliances for the maxilla and mandible that are intermaxillary effective by means of Class III elastics.
METHODOLOGY: Three patients with an average age of 10 years (SD = 1.73) presented with a prognathic bite and frontal crossbite. The mean overjet was -2 mm (SD = 0), the overbite was 1.5 mm (SD = 4.33). In the cephalometric analysis, the average ANB was -2.3° (SD = 2.51), the mean Wits value was -7 mm (SD = 5.57). The loosening of sutures and expansion of the upper jaw were carried out using skeletal anchored CAD/CAM hybridhyrax or dental-worn CAD/CAM RME. Both appliances were planned with vestibular hooks on the shells of the six-year molars. In the lower jaw, all three patients were provided with a PMMA plastic splint with occlusal stops and two mesially open hooks in the anterior region. Class III elastics were attached for approximately 16 hours daily to promote the anterior development of the maxillary complex.
RESULTS: Correction of the crossbite was achieved on average in 7.3 months (SD = 6.51). In the mid-treatment cephalometric analysis, an improvement in the ANB angle to an average of 2° (SD = 0) was observed. The Wits value improved by 2 mm (SD = 0) for all patients.
CONCLUSION: The use of individual CAD/CAM appliances in combination with Class III elastics proved to be an effective and patient-friendly treatment alternative and showed similar success to the classic Class III treatment with RME and face-mask in adolescent dentition.

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CP160 ORTHODONTIC TREATMENT COMBINED WITH ORTHOGNATHIC SURGERY IN A PATIENT WITH SKELETAL CLASS III: A CASE REPORT.

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OBJECTIVES: To present treatment in asymmetric, skeletal class III patient. A 31-year-old Thai female seeking improvement in her chewing efficiency and her appearance.
DIAGNOSIS: Asymmetrical oval facial form and a concave facial profile, with flat paranasal area and long chin throat length. Chin deviated to the left by 2 mm. The lips canted downwards to the left by ~2 mm. She had severe crowding at the lower anterior region, Angle's Class III malocclusion, and an anterior crossbite (overjet -1mm). Tooth 17 was missing.
The lateral cephalometric analysis confirmed the class III skeletal pattern due to an orthognathic maxilla and a prognathic mandible (SNA 83, SNB 86, ANB -3). The position and inclination of the maxillary incisors were within the normal range, while the mandibular incisors were retruded and retroclined.
TREATMENT: Non-extraction. Presurgical decompensation was done by proclining lower anterior teeth. Transverse arch coordination was carried out by constriction of upper arch and expansion of lower arch, making bilateral posterior crossbite posteriorly. The treatment goals were to correct the skeletal and dental class III relationship, eliminate the anterior crossbite, and establish positive overjet. The patient was managed by bimaxillary surgery (Lefort 1 maxillary advancement 2 mm + BSSRO mandibular setback 6 mm) with advancement genioplasty.
Post-surgical orthodontics: Posterior crossbite, class II canine on left side, and midline discrepancy persisted after surgery. Cross elastic was placed to corrected posterior crossbite combined with upper arch expansion and lower arch constriction. Class II elastic on left side was prescribed, and class III elastic was used on the right side full-time to create proper overjet and achieve canine and molar class I relationship. Midline coordination and root parallelism were attained.
RESULTS: Significant improvement in the anteroposterior position of the mandible and masticatory function was achieved. The post-treatment occlusion demonstrated good interdigitation with Class I molar and canine relationships on both sides. Result showed better soft tissue profile and smile esthetics.
CONCLUSION: The severity of skeletal class III malocclusion may affect facial aesthetics to the extent that orthodontics alone may not provide an ideal outcome. In such cases, ortho-surgical intervention is essential to achieve satisfactory results.

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CP161 CORRECTION OF COMPLEX MALOCCLUSION WITH ASYMMETRICAL ANGLE CLASS III, OPEN BITE, AND MANDIBLE DEVIATION BY USING DIGITAL INDIRECT BONDING AND SKELETAL ANCHORAGE IN THE MANDIBULAR BUCCAL SHELF

Dr Marco Aoqi Rausch[1], Dr Alexander Schwärzler[1], Prof. Dr. Erwin Jonke[1]; [1]*University Clinic Of Dentistry Vienna*

BACKGROUND: 16 -year-old female patient with general health, no temporomandibular joint disorders. Clinical and radiographic examinations confirmed the presence of severe asymmetrical angle Class III malocclusion (1 molar size class III deviation in the entire left side, cross bite right side), an anterior open bite, crowding, and a mandibular discrepancy.
MATERIAL/METHODS: The decision was made to extract the upper and lower wisdom teeth to create space for alignment and correction. Damon brackets (Ormco™) were digitally positioned using the Onyx software to enhance the accuracy of bracket placement, ensuring optimal treatment outcomes. A temporary anchorage device (TAD) was inserted into the mandibular buccal shelf on the left side to provide anchorage for the distalization of the entire lower left segment. Power chains were applied to the lower left segment, connecting to the TAD for controlled and efficient correction of the asymmetrical Class III malocclusion. Elastics (5oz) were utilized for occlusal fine-tuning, ensuring proper alignment and limiting posterior interference and bite closure.
RESULTS: After three years, the comprehensive orthodontic treatment resulted in significant improvements in harmonious and functional occlusion of teeth in the maxillary and mandible, establishing a symmetrical Class I occlusion with proper bite relation of anterior upper and lower teeth and perfect symmetric midline. The patient is satisfied with a more aesthetically pleasing profile and smile.
CONCLUSION: This case report highlights the successful management of a complex orthodontic case involving asymmetrical Class III occlusion, open bite, crowding, and mandibular discrepancy. The combination of wisdom tooth extraction for limitation of posterior discrepancy, digital accurate bracket positioning, TAD application in the mandibular buccal shelf allowed for an efficient correction, ultimately achieving a favorable treatment outcome.

Abstract citation ID: cjae081.229
CP162 BIODEGRADABLE MAGNESIUM MEMBRANE FOR DENTOALVEOLAR BONE REGENERATION OF CLEFT LIP AND PALATE PATIENT

Dr Ana Patrícia Rodrigues[1], Dr Raquel Travassos[1], Dr Ivan Cabo[2], Prof. Inês Francisco[1], Prof. Francisco Vale[1]; [1]*Institute of Orthodontics of the Faculty of Medicine of the University of Coimbra,* [2]*Department of Stomatology - Coimbra Hospital and University Centre*

BACKGROUND: Cleft lip and palate (CLP) is the most prevalent congenital craniofacial malformation, with 75% of cases having an alveolar bone defect. This malformation results from embryonic disturbances in the development of the soft and hard tissues of the oral cavity and face. Typically, an autologous bone graft from the iliac crest is the conventional donor site. However, the literature reports that bone resorption can be approximately 40%, which may increase the need for reintervention. In these patients, the absence of the upper lateral incisor is one of the main problems to be solved at the end of orthodontic treatment. In adulthood, a tertiary alveolar graft becomes necessary to make dental implant rehabilitation possible. Recently, a new fully resorbable and biodegradable magnesium metal membrane has emerged with clinical application in the treatment of bone defects in the oral cavity.
OBJECTIVES: This paper aims to describe a clinical case of tertiary alveolar grafting in a patient with CLP using guided bone regeneration with a magnesium membrane and screws.
MATERIALS/METHODS: A 10-year-old female patient with unilateral left CLP and agenesis of tooth 22 was submitted to orthodontic treatment with a secondary alveolar bone graft. After finishing the orthodontic treatment, it was found that the secondary bone graft was reabsorbed, which made it impossible to place the implant for tooth 22.
The tertiary alveoloplasty surgery, before implant placement, was carried out using guided bone regeneration with a magnesium membrane (NOVAMag®) fixed with magnesium screws (NOVAMag®), autologous bone from the mandibular ramus and xenograft (Cerabone®). Prior to the bone regeneration surgery, the patient was submitted to vestibular deepening surgery.
After five months, a cone beam computed tomography scan showed the increase in bone volume required for the placement of a dental implant.
RESULTS: The NOVAMag® membrane ensured the necessary stability for the bone regeneration material and provided a barrier to the soft tissues, allowing the formation of new bone, with adequate volume, for subsequent dental implant placement.
CONCLUSION/IMPLICATIONS: This new magnesium membrane has shown promising results in the surgical treatment of bone defects in patients with CLP.

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CP163 ORTHODONTIC FORCED ERUPTION OF PERMANENT MAXILLARY CENTRAL INCISOR WITH SUBGINGIVAL FRACTURE: A CASE REPORT.

Miss Maria Anna Sakki[1], Mr Konstantinos tsoukatos[1], Miss Angeliki Granika[1], Mr Ilias Visakis[1], Miss Lydia Schoretsaniti[1]; [1]*National And Kapodistrian University Of Athens*

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BACKGROUND/AIM: Restorative treatment of teeth with crown-root fractures is demanding due to the subgingival location of the fracture line. Orthodontic forced eruption facilitates the re-establishment of biologic width and allows the relocation of the restoration margin. The aim of this case report is to discuss the orthodontic forced eruption of a maxillary central incisor #11 with a crown-root fracture.
MATERIALS/METHODS: A 24 year-old woman presented with an oblique crown-root fracture of tooth #11. Orthodontic extrusion was the primary treatment option for this tooth. A multidisciplinary approach was necessary, demanding the cooperation of an endodologist, an orthodontist and a restorative dentist. After the root canal treatment, the tooth was extruded with fixed appliances. The aim was to achieve orthodontic forced eruption retaining the occlusion. The extrusion rate was 1-1.5 mm a week. The total treatment period lasted six weeks and was followed by retention. During the extrusion, the incisal edge of the incisor was gradually reduced in order to avoid occlusion trauma.
RESULTS: A biological width of 2mm was obtained in the maxillary central incisor (#11) after orthodontic forced eruption in the 6 week period. The radiographic analysis confirmed the successful orthodontic forced eruption. Periodontal tissues followed the tooth movement in an acceptable way. Managing subgingival fractures in permanent anterior teeth presents complex treatment challenges. Crown lengthening is often contraindicated because it induces gingival margins disharmonies.
LIMITATIONS: Orthodontic forced eruption requires a prolonged treatment duration.
CONCLUSION: Orthodontic forced eruption is a viable solution – it allows the reestablishment of the biological width for the restoration of a subgingivally fractured tooth.

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CP164 PATIENT WITH SUBMUCOUS CLEFT PALATE TREATED WITH THE ADVANCED MOLAR DISTALIZATION APPLIANCE: A CASE REPORT

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BACKGROUND: Submucous cleft palate (SMCP) is identified by the triad of bifid uvula, notching of the posterior border of the bony palate, and palatal muscle diastasis. The majority of children with SMCP will not require surgical treatment unless there is the presence of velopharyngeal insufficiency or feeding and ear problems. Unoperated children with SMCP present with normal dental arch dimensions in the transverse plane, whereas in the sagittal plane the length of the maxillary dental arch may be shorter due to the growth deficiency associated with clefting.
AIM: The aim of this clinical poster is to present a case of a 14 year old boy with SMCP and Class II malocclusion.
MATERIALS/METHODS: According to patient's medical history and clinical examination there was a SMCP and bifid uvula was evident during initial examination. The patient presented skeletal Class I and dental Class II malocclusion with severe crowding in the upper arch. Transverse dimensions of the dental arches were normal, while the arch length in the upper arch was reduced. The goal of orthodontic treatment was to increase the arch length and correct crowding by distalizing the upper molars. The implant supported Advanced Molar Distalization Appliance (AMDA) was used initially for upper molar distalization, followed by fixed appliances in both arches and Class II elastics at the finishing stage.
RESULTS: Superimpositions of dental casts and cephalometric x-rays confirmed an almost bodily distalization of the upper molars without distal tipping and no anchorage loss of the anterior dental unit in terms of proclination of the anterior teeth. Further, during the anterior teeth retraction no anchorage loss of the posterior dental unit was observed in terms of mesialization of the previously distalized molars. Finally, at the end of treatment, well aligned arches, a Class I molar and canine relationship, and a harmonic profile was established.
CONCLUSIONS: As it seems from this case report, distalization mechanics with the AMDA can provide very satisfactory results, especially in complex cases, from both an aesthetic and functional point of view.

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CP165 A STABLE LONG-TERM SOLUTION FOR SEVERELY ANKYLOSED INCISORS FOLLOWING TRAUMA

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INTRODUCTION: Ankylosis is a likely and predictable outcome for severely traumatised or avulsed and replanted permanent incisors. Ankylosed incisors pose a highly aesthetic treatment challenge and a multidisciplinary approach is required. Orthodontists are often required to manage the long-term effects of dental trauma. There is wide variation amongst UK orthodontists' treatment of traumatised teeth and there is a need for further training when treating teeth that have suffered dental trauma.
BACKGROUND: An 11-year-old girl presented to the joint orthodontic restorative clinic following dental injury that she sustained three years previously to her upper permanent incisors.
CASE: The patient presented with ankylosed upper central incisors and an anterior open bite. There were periapical radiolucencies around both upper lateral incisor apices. This case report discusses treatment of ankylosed maxillary central incisors and poor prognosis lateral incisors using osteogenic distraction and implants.
DISCUSSION: There are various techniques available to manage ankylosed incisors. Osteogenic distraction is a reliable technique to develop vertical bone and therefore provide a solid base for implants.
CONCLUSION: This case demonstrates the management of a young patient with delayed presentation of ankylosed central incisors and shows the long-term successful results of treatment.

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CP166 USE OF EDIBLES AS EFFECTIVE TOOLS IN MYOFUNCTIONAL THERAPY. A PILOT-STUDY.

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AIM: Oral functions participate in the skeletal growth of young patients and are essential to facilitate the harmonious development of the craniofacial complex. In contrast, dentofacial dysmorphies have a multifactorial etiology often related to behavioral, functional, and structural abnormalities. Among these, atypical or dysfunctional swallowing represents one of the most frequent parafunctions. The aim of this pilot study is to explore the introduction of edible spread cream and small candies as tools to improve motivation and compliance in young children undergoing myofunctional therapy, with the purpose of optimizing oral functions, including swallowing.
MATERIALS AND METHODS: Six patients, one female and five males, between the ages of 7 and 14 years, presenting with atypical swallowing and oral breathing were evaluated and treated at the clinic of University of L'Aquila. Patients were randomly divided into two groups and were treated with two different treatment protocols by the same myofunctional therapist. Group A: traditional myofunctional therapy and traditional tools; Group B: same exercises as group A, but with edible tools (spreadable cream and small candies). For each child, an instrumental diagnosis pre and post myofunctional therapy was made. Extraoral and intraoral photographic records were collected. A myofunctional assessment of the lips and peri-oral muscles was made with the dynamometer, while fluorescein was used during the examination to assess the swallowing pattern. A diagnostic examination using photogrammetry was performed for the assessment of soft tissues. Finally, the patients' degree of cooperation was assessed by two speech therapists based on an increasing score scale from 0 to 10 referring, from a qualitative-quantitative point of view to these parameters.
RESULTS: As expected, the two patients who used edible tools demonstrated increased motivation and collaboration during myofunctional therapy.
CONCLUSION: Patient compliance, especially in very young patients, limits the effectiveness of myofunctional therapy, therefore, creative solutions are needed to achieve greater cooperation and edible tools can play a significant part in retraining correct swallowing. Although the sample of this pilot study is small, the results suggest that using actual edible tools in myofunctional therapy could increase compliance and better results in myofunctional therapy.

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CP167 MANDIBULAR DISTRACTION OSTEOGENESIS WITH 3D PLANNING IN A CHILD WITH HEMIFACIAL MICROSOMIA

Dr Mariana Santos[1], Dr Catarina Oliveira[1], Dr Mariana McEvoy[1], Prof. Doctor Inês Francisco[1], Prof. Doctor Francisco do Vale[1]; [1]*Institute of Orthodontics, Faculty Of Medicine, University Of Coimbra*

AIM: The mandibular osteogenesis distraction technique holds tremendous potential in the treatment of severe dentofacial deformities. This treatment can be safely applied to growing patients, as it is reported in the literature that anteroposterior lengthening of the mandible is relatively stable, potentially avoiding the need for conventional orthognathic surgery. The 3D planning of distractors allows greater precision, simulation of different procedures and comparison of vectors, reducing complications and surgical time. The purpose of this clinical case report is to show a case treated with orthodontic treatment and mandibular distraction osteogenesis with 3D planning.
MATERIALS AND METHODS: A 11-year-old male patient, diagnosed with a skeletal class II deformity due to hemifacial microsomia, was referred to the Institute of

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Orthodontics at the Faculty of Medicine, University of Coimbra, requiring surgical-orthodontic intervention. Intraorally, in addition to the skeletal class II condition, transverse discrepancy and mandibular retrusion with asymmetry were observed. The treatment plan included maxillary expansion with a quad-helix, mandibular distraction osteogenesis to correct class II skeletal malocclusion and mandibular asymmetry. After the surgery, fixed appliances with a Roth 0.018 prescription were employed for arch alignment and leveling. In the retention phase, a fixed retainer (3x3) was placed in the lower arch and a removable appliance (Hawley) in the upper arch.
RESULTS: At the end of the treatment, a significant improvement was observed in the ANB angle, reducing from 16º to 8º, as well as dental class I relationships. The patient reported notable enhancements in chewing function and breathing, positively impacting both physical and emotional well-being. Additionally, visible improvements in the soft tissue profile were noted, contributing to enhanced facial aesthetics and smile.
CONCLUSIONS: The individualization of distractor configuration through 3D planning allowed an immediate prediction of the patient profile post-surgery, eliminating the need to postpone conventional orthognathic surgery until adulthood.

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CP168 METHODS FOR MANUFACTURING FUNCTIONAL APPLIANCES USING DIGITAL TECHNOLOGIES FOR ADOLESCENTS WITH CLASS II MALOCCLUSION

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BACKGROUND: The optimal method of treatment of class II malocclusion in patients aged between 9 - 11 during the period of dental system growth stages II-IV of maturation of the cervical vertebrae are functional appliances that affect the skeletal growth of the mandible. Our proposed method for manufacturing functional appliances for adolescent patients with Class II malocclusion allows us to determine the constructive bite, controlling the position of the condyle , using digital axiography.
OBJECTIVES: To improve orthodontic treatment of patients with Class II malocclusion using functional appliances designed by digital diagnostic methods.
MATERIAL/METHODS: 12 patients aged from 9 to 11 were treated from 2021 to 2023. The selection criteria were cephalometric parameters: SNA, SNB, ANB, wits, Co-Gn. All patients were divided into 2 groups - group 1 (3 boys, 3 girls); group 2 (2 boys, 4 girls). In group 1, Twin-Block appliances were manufactured by using the traditional method, in group 2, using 3D visualization. The average treatment period was 12 months. All patients underwent a computed tomogram from which panoramoic x-ray, Ceph, sections of the TMJ were obtained. Cephalometric analysis was performed in the Dolphin Imaging program and determined the stage of maturation of the cervical vertebrae. The digital study included scans of the dentition and optical axiography of the TMJ. The obtained data was combined, we modeled a constructive bite along the trajectories of the condyle, and created a splint, which was used in the technical laboratory to manufacture a functional appliance.
RESULTS: In group 1, 3 patients had skeletal growth of the mandible, class I molar relationship, an increase in the size of the mandible which was confirmed by cephalometric data. In the remaining patients of group 1 no significant changes according to cephalometry were noted. In group 2, all patients achieved class I molar relationship, skeletal class I, and an increase in the size of the mandible, which was confirmed by cephalometric data.
CONCLUSION: Using digital technologies for treatment of children with class II malocclusion allows us to obtain predictable skeletal changes under the control of the movement of the TMJ condyle.

Abstract citation ID: cjae081.236
CP169 MIGRATION OF LOWER FIRST PERMANENT MOLARS INTO THE CORONOID PROCESS IN A 7-YEAR-OLD FEMALE PATIENT PRESENTING WITH HYPODONTIA

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BACKGROUND: A 7-year-old female, referred for hypodontia, presented at the orthodontic department in Lincoln County Hospital, United Kingdom. On examination, the patient presented with a class 2 div 1 malocclusion on a class II skeletal base with average vertical proportions complicated by hypodontia of four permanent molars. The OPG revealed ectopic positions of both the lower first permanent molars in the coronoid process. The upper right second molar migrated distally. Both the lower E's were present with the lower 5's in a good position for eruption. The upper right first permanent molar appeared to be in the position of the upper right 8. The patient is fit and well with no known drug allergies. The patient did not report any pain associated with her dentition.
A repeat OPG taken three years later revealed further migration of the lower first permanent molars into the coronoid process. The lower left 5 migrated distally. This presentation aims to discuss the aetiology of ectopic first permanent molars and hypodontia, importance of routine radiographs, the appropriate timing of CBCT's and the risks and benefits of early intervention or delayed treatment.
Heteropia (tooth migration) is a common pathological condition documented in clinical literature. However, the ectopic development of first permanent molar is rare, ranging from 2 to 6 per cent. This case compromises a unique combination of conditions that are not commonly presented in literature.
CONCLUSION: Ectopically developing first permanent molars present as an abnormal deviation of the natural tooth eruption pathway. The aetiology of ectopic development of first permanent molars is not completely understood. No specific aetiological factors have been found to be in common to all paediatric patients. The factors to consider in these cases familial tendencies and genetics, abnormal angulation of the permanent molar, maxillary hypoplasia or retrognathism, delayed calcification and macrodontia. It is important for general dental practitioners and paediatric dentists to be aware of the prevalence of these cases and the treatment options available.

Abstract citation ID: cjae081.237
CP170 BIG TOOTH, BIG PROBLEMS?

Mr Inderjit Shargill; [1]*Shrewsbury and Telford NHS Trust*

OBJECTIVES/AIMS: Patients that present with macrodontic teeth can require complicated treatment. This case report illustrates the management of a patient with a lower incisor macrodont tooth.
MATERIALS/METHODS: A 14 year old patient presented with Class II division 1 incisors on class I skeletal pattern with normal FMPA complicated by a macrodont lower incisor and impacted lower second premolar teeth. Management of macrodontic teeth can be very difficult to manage as they can be unsightly and dealing with space can be difficult to manage whether this is restorative or space closure.
RESULTS: This patient was treated with upper and lower fixed appliances which included extraction of the macrodont and alignment of impacted lower second premolar teeth.
CONCLUSIONS: This case report illustrates that in the patients presenting with macrodontic teeth can be treated with orthodontics without the complications of long term restorative implications.

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CP171 DOES THE USE OF ANTIBIOTICS PROPHYLAXIS AFFECT THE RATE OF POSTOPERATIVE FISTULA RATES IN CLEFT PALATE PATIENTS?

Miss Suhavi Singh[1], Miss Nitisha NARAYAN, Mr Alistair Cobb, Mr Shaheel Chummun; [1]*University Hospitals Bristol and Weston NHS Foundation Trust*

OBJECTIVE: Assess whether post-operative antibiotic prophylaxis affected the incidence of oronasal fistula formation in cleft palate patients. The use of antibiotics without proven benefit, however, is not without issue. These include costs to the health service, potential allergies and hypersensitivity reactions and the emergence of antimicrobial resistant bacterial strains. In the era of evidence-based medicine, the proven benefits of targeted antibiotic usage should be tempered with limiting the negative effects of their widespread use
DESIGN AND SETTING: Institutional retrospective study using data from patients undergoing primary palatoplasty
GOLD STANDARD: Fistula rate of no more than 8-10%
MATERIALS/ METHODS: In the first cycle, there were two groups (A and B). In group A, the patients had antibiotics on induction and 24 hours after, in group B, the patients had further antibiotics for a week. Our work from the cleft collective showed no evidence of change in fistula rates in relation to the antibiotic regime. Therefore, group A surgeon changed practice had antibiotics only on induction and group B remained the same from the first cycle.
RESULTS: In cycle 1, we found little evidence to suggest a difference in fistula rate between the use of an antibiotic regimen as binary variables: Grp A(P=0.171) and Grp B (P=0.69). Cycle 2 also demonstrated the following: Grp A (P=0.557) and Grp B(P=0.443).
LIMTATIONS: Retrospective study. It was also not possible to explore those patients who did not have antibiotics as according to the NICE guidelines, we are required to give antibiotics on induction and is considered clean non contaminated surgery. The use of a preoperative antibiotic given at the time of induction of anaesthesia would seem justified to prevent other serious complications from surgery such as sepsis. It has been demonstrated that the prevalence rate for bacteriemia following cleft surgery approaches 50 percent

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CONCLUSION: The use of antibiotics and differing regimes, postoperatively do not influence the incidence of postoperative fistulae in cleft palate. Given the limitations and the limited evidence we call for a structured randomised control trial to answer this important questions

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CP172 THE COMPLEX ORTHODONTIC, SURGICAL AND PROSTHETIC TREATMENT IN PATIENTS WITH UNILATERAL CLEFT LIP AND PALATE AND SEVERE MAXILLARY HYPOPLASIA.

Dr Wojciech Stós[1], Dr Andrzej Gala[2], Dr Marcin Olek[1], Dr Jacek Drążek[3], Dr Krzysztof Kuchta[3]; [1]*Department of Orthodontics Jagiellonian University,* [2]*Department of Prosthodontics Jagiellonian University,* [3]*Department of Maxillofacial Surgery at the Rydygier Hospital*

AIM: This study aims to present the treatment outcomes of patients with unilateral complete cleft lip and palate who underwent a comprehensive approach involving orthodontic correction, surgical intervention for maxillary hypoplasia, and subsequent prosthetic rehabilitation.
MATERIALS AND METHODS: We report the treatment outcomes of three patients (ages 16, 18, and 26) with unilateral complete cleft lip and palate. Orthodontic treatment included fixed appliances, a customized transpalatal arch (TPA), Beta-Ti cantilever, and face mask. One patient underwent Le Fort I surgical advancement for retrognathic maxilla. Following orthodontic and surgical phases, patients received cast partial dentures with a metal framework, selected based on preparatory treatment results and local morphological factors.
RESULTS: The comprehensive treatment approach resulted in improved aesthetic features, closure of the cleft space, and long-term stability of orthodontic outcomes. Cast partial dentures effectively contributed to overall favorable outcomes, ensuring successful prosthetic rehabilitation.
CONCLUSIONS: The treatment of unilateral cleft lip and palate patients involves a multidisciplinary approach, combining orthodontic, surgical, and prosthetic interventions. The collaboration of specialists is essential throughout the extended treatment duration, emphasizing the importance of alveolar bone restoration for efficient alignment of anterior teeth and the permanent stability of the upper dental arch. Prosthetic rehabilitation becomes necessary in cases where bone and tooth loss persist despite orthodontic and surgical interventions.

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CP173 OPEN BITE MALOCCLUSION SURGICAL-ORTHODONTIC TREATMENT - A CASE REPORT.

Mr Kristijan Sustercic[1], Mr. Bostjan Lavrisa, Mr. Miha Kocar, Prof. Maja Ovsenik[1]; [1]*Zavod Orthos*

AIM: To present and objectively evaluate the efffectiveness of interdisciplinary surgical orthodontic treatment of class III skeletal malocclusion.
SUBJECTS AND METHODS: At the time a 16-year-old boy with skeletal class III malocclusion is presented. Facial assimetry, mandibular protrusion, physiologic compensatory retrusion of lower incisors and canines are all present at the patient.
Clinical examination, extra- and intra-oral photographs, panoramic and cephalometric x-rays were taken at baseline (T0). Photographs and intraoral scans were performed at the end of orthodontic preparation (T1), after surgical treatment (T2), after final orthodontic treatment (T3) and in the retention phase (T4)
The treatment was planned to take place in several stages
1. (T1): orthodontic preparation
2. (T2): surgical treatment (extraction of lower third molars, bilateral split sagital osteotomy of the lower jaw, le fort I osteotomy of the upper jaw)
3. (T3): final orthodontic treatment
4. (T4): retention of achieved state

RESULTS: 6 months after finished stage 3, the patient's condition is stable, class I of first molars is achieved, vertical and sagittal relationship of upper and lower canines is appropriate. Facial assimetry is no longer present and facial profile is straight. 1 year after finished active treatment, the patient's condition is still stable and the state achieved at finished active treatment is maintained.
CONCLUSION: Interdisciplinary surgical-orthodontic treatment enables correction of hard esthetic and functional irregularities. Tight cooperation between an orthodontic specialist and a surgeon is required in all stages of treatment for success and desired result.

Abstract citation ID: cjae081.241
CP174 NON-SURGICAL COMPREHENSIVE TREATMENT OF AN ADULT PATIENT TREATED WITH STANDARD EDGEWISE APPLIANCE

Ms Paulina Szymczyk[1,2], Ms Anna Marzec[1], Dr Liwia Minch[1]; [1]*Klinika Limed,* [2]*Szymczyk Stomatologia*

AIM: to show an outcome of a comprehensive, non-surgical treatment of an adult patient treated with standard edgewise appliance.
SUBJECTS AND METHOD: 24-year-old female patient came to the office seeking orthodontic treatment of her malocclusion. Her chief complain was unattractive smile. Patient was diagnosed with skeletal class II, canine class II occlusion with central incisors' retrusion, deep bite, midline shift and severe crowding in upper and lower arch. Treatment plan included extraction of upper first and lower second premolars, bonding the upper and lower standard edgewise appliance, upper canines distalisation, correction of the crowding in upper and lower arch, mesialisation of lower molars and finishing. After the end of active orthodontic treatment patient was referred for the anterior teeth recontouring.
RESULTS: Active treatment was finished in 30 months. Profile, function and smile aesthetics improved significantly. Upper and lower midline were aligned. Canine class I was obtained. Severe overbite was corrected.
CONCLUSIONS: With careful treatment planning, extractions good mechanics and proper force system it's possible to achieve great, stable treatment results with the improvement in function, profile and smile aesthetics.

Abstract citation ID: cjae081.242
CP175 GROWTH MODIFICATION OF CLASS III MALOCCLUSION BY MODIFIED PENDEX WITH LIP PADS AND REVERSE TWIN-BLOCK

Koy Nuri Tanrısever[1], Prof. Hatice Gökalp[1]; [1]*Ankara University , Faculty of Dentistry, Department of Orthodontics*

BACKGROUND/AIM: Skeletal malocclusions are successfully treated by growth modification in early growth skeletal growth period. Aim of this case report is to present results that a girl having Class III malocclusion with sagittal maxillary deficiency in early skeletal growth period was treated by modified pendex combined with upper lip pad and reverse twin-block combined with upper lip pad.
MATERIALS/METHODS: The chronological age of the girl was 9 years, and her skeletal growth period was MP3_ according to wrist radiography and CS1 according to the cervical vertebra maturation method. She was mouth breather and she was habit nail biting. Similar anomaly was no exist her family. A concave facial profile was determined due to the weak mid-face and prominent lower-face. She was in the late mixed dentition period. She had Angle Class II molar relationship and crossbite was exist in the anterior region. The upper and lower dental midline coincided with each other. Overjet and overbite were -4 mm and 6 mm respectively. Upper and lower arch length discrepancies were -15 mm and 0 mm respectively. According to lateral cephalometric analysis, ANB, GoGn/SN and McNamara's facial axis angle were -1°, 43° and 81.5 ° degrees, respectively. As a result of this analysis, anomaly was skeletal Class III characterized by hyperdivergiency. The treatment goals were to stimulate maxillary growth, modify mandibular growth, and achieve ideal overjet and overbite with Class I molar and canine relationships. Treatment was started by modified pendex with upper lip pad (T1). After obtaining overjet, reverse twin-block combined with upper lip pad (T2). After overjet and overbite was established, fixed orthodontic treatment started for levelling and aligning.
RESULTS: It was found by structural superimpositions that sagittal maxillary growth induction, mandibular growth restriction and ideal overjet and overbite and molar Class I relation was obtained.
CONCLUSION: Growth modified appliances is be successful in early skeletal growth period.

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CP176 THE BUTTERFLY – A NEW, OCCLUSAL OPEN AND BONDED RME APPLIANCE

Ms Eva Tausch[1], Prof. Dr. Dankmar Ihlow[1], Dr. Kristina Erhardt[1], Ms Hanna Gosch[1], Dr. Andreas Köneke[1]; [1]*Die Kieferorthopäden Am Meer*

AIMS: Designing a new, child-friendly, non-invasive and economic expansion appliance for palatal expansion in early mixed dentition.
MATERIALS/METHODS: Various RME appliances were compared, the clinical advantages evaluated and a new design was developed that aims to combine advantageous design aspects of the compared RME appliances.
RESULTS: The BUTTERFLY is comparable to the cast and soldered palatal expanders such as RME and the Hybrid Hyrax in terms of tooth accessibility after bonding. It is superior to the acrylic bonded cap Hyrax expander, which caps the entire occlusal plane of the teeth. In terms of the expected tension-free fit, the BUTTERFLY is superior to the soldered RME and equivalent to the cast RME, the Hybrid Hyrax and the acrylic bonded cap Hyrax expander. In terms of cost-effectiveness, it is superior to the cast RME, the hybrid Hyrax and the acrylic bonded cap Hyrax expander, and equivalent to the brazed RME. In terms of use in early mixed dentition, the BUTTERFLY is equivalent to the acrylic bonded cap Hyrax expander and superior to the soldered or cast RME and Hybrid Hyrax. In terms of invasiveness, the BUTTERFLY is superior to the Hybrid Hyrax and equivalent to all other RME devices compared.

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LIMITATIONS: The exclusion criterion for the BUTTERFLY is a cleft lip and palate.
CONCLUSIONS: The BUTTERFLY is a child-friendly, non-invasive and economic expansion device. With regard to clinical use, further studies are necessary, for example comparing the loss rate with other devices.

Abstract citation ID: cjae081.244
CP177- ORTHODONTIC AND SURGICAL SYNERGY IN THE MANAGEMENT OF HEMIFACIAL MICROSOMIA: A CASE REPORT

Mrs Sofia Ioanna Tomai[1], Mrs Athanasia Pappa[1], Mrs Victoria Panou[1], Mrs Theodora Savvina Zikou[1], Mrs Georgia Kotantoula[1]; [1]*National And Kapodistrian University Of Athens*

BACKGROUND: Hemifacial Microsomia (HFM) challenges clinicians with its spectrum of asymmetric craniofacial development. A multidisciplinary approach is of paramount importance for correction, focusing on achieving functional stability and aesthetic symmetry.
METHODS: A 19-year-old female with Hemifacial Microsomia (HFM) received a multidisciplinary treatment for her craniofacial asymmetry, with a Skeletal Class II malocclusion, a 4 mm open bite, a 6 mm overjet and a 4-degree maxillary inclination. Pre-operative orthodontic treatment included levelling and alignment of the dental arch in order to be prepared for the first surgery. Initial surgical splint was fabricated in a dental articulator to navigate the maxilla to the correct position. Le Fort I osteotomy with maxillary impaction of 3mm was performed to correct the inclination and reduce the gummy smile. Bilateral Sagittal Split Osteotomy (BSSO) and a second surgical splint was fabricated to advance the mandible on the asymmetric side, which, along with the maxillary changes, facilitated autorotation of the mandible. Between the two surgical operations, the patient was followed up for necessary orthodontic interventions.
RESULTS: Orthodontic therapy together with the two surgical operations resulted in an improved occlusal plane, a more symmetrical facial appearance, as well as an improved oral function.
LIMITATIONS: The limitations of this report are related to the fact that it was only one case with a very short follow-up period and lack of evaluation for long-term treatment stability.
CONCLUSIONS: This case report contributes further to the understanding of the difficulties regarding the treatment of patients with HFM.

Abstract citation ID: cjae081.245
CP178 ORTHODONTIC MANAGEMENT OF GOLDENHAR SYNDROME WITH IMPACTED TEETH

Miss Pasaporn Tomtitchong[1], Mr. Phonlakorn Buranaprasertsuk[1], Miss Pinyada Akarajarasrod[1], Mr. Peerapong Santiwong[1], Miss Nita Viwattanatipa[1]; [1]*Department of Orthodontics, Faculty of Dentistry, Mahidol University*

INTRODUCTION: Goldenhar syndrome or oculo-auriculo-vertebral spectrum is a rare condition affecting the development of face (aural, oral and mandible). The typical manifestations include microtia, epibulbar dermoid, mandibular hypoplasia, and vertebral anomalies.
BACKGROUND: A 16-year-old Thai female diagnosed with OAV was referred to the orthodontics department with a complaint of severe crowding.
CLINICAL FINDINGS: On extraoral examination, marked right facial asymmetry with chin deviation to right 15 mm, convex facial profile, severe unilateral mandibular hypoplasia, an obtuse mandibular angle and incompetent lips. She had severe crowding on both maxillary and mandibular arch, posterior crossbite on the right side and a scissor bite on the left side. There was a 14-mm overjet, a 4 mm overbite. Mouth opening was not restricted but the mandibular deviated to the left side on maximum opening.
RADIOGRAPHIC FINDINGS: A panoramic radiograph revealed hypoplasia of the right condyle (Type IIA) and reduced vertical bone height to the lower mandibular right border and angle. Impacted lower right canine and premolars was observed. The lateral cephalometric analysis showed the skeletal type II pattern with open configuration. Upper incisors were proclined and protruded, while lower incisors were retroclined and retruded.
TREATMENT: The treatment objectives were to correct the dental problem including severe crowding, impacted teeth and align all teeth to their normal positions as the patient rejected surgery options. Removable appliances were used to expand the maxillary arch to improve transverse discrepancy. Followed by fixed appliances in both arches. Tooth 43 was removed to allow 44 and 45 eruptions with artificial eruptions using modified NiTi coil spring engaging to the hooks in upper expansion plate.
RESULTS: The total treatment time was 5.1 years. Artificial eruptions of 44 and 45 were successful. The upper and lower arches were levelled and aligned. The smile aesthetics and lip position were improved. Although, the soft tissue profile and transverse problems remained, the patient was satisfied with the treatment outcome. Clear retainers were used to for control eruption of non-opposing teeth.
CONCLUSION: Artificial eruption is sometimes needed to erupt the embedded permanent teeth in the affected mandibular hypoplasia side.

Abstract citation ID: cjae081.246
CP179 THE TREND OF CLEFT CARE AT OUR DEPARTMENT IN THE LAST TWO DECADE

Dr Judit Török, Dr Géza Vitályos[1], Dr Judit Hevesi[1], Dr Barbara Oláh[1]; [1]*Department of Orthodontics, Faculty of Dentistry*

BACKGROUND/OBJECTIVES/AIMS: To evaluate the trends of new referral depenging on new lifebirth we examined the data on the presentation and the development of visits for care and treatment at the orthodontic department.
MATERIALS/METHODS: We took the live birth data of Eastern Hungary for the past 20 years and collected the number of patients who appeared in our department based on BNO data. We examined the number of new appearances and the number of patients returning for re-orders.
RESULTS: The covid epidemic affected the appearence of patient with clefts in specialist care.
LIMITATIONS: Further studies are necessary for the effective introduction of possible aids.
CONCLUSIONS/IMPLICATIONS: A condition for the successful rehabilitation of cleft patients is timely, easily accessible health care. Timely selection of children belonging to the risk group can promote the success of complete rehabilitation.

Abstract citation ID: cjae081.247
CP180 MANAGEMENT OF SEVERE BILATERAL IMPACTION OF UPPER CANINES. A CASE REPORT.

Dr Nikolay Trifonov[1], Dr Myrto Zervou[1], Dr Jarina Davidova[1], Prof. Hristina Arnautska[1], Dr Zornica Vulcheva[1]; [1]*Medical University Of Varna*

INTRODUCTION: Canine teeth are important for both aesthetics, occlusion and function of the dentition. They are the second most frequently retained, making early diagnosis extremely important.
AIMS: The aim of this case report is to evaluate the treatment modalities for severe bilateral upper canine impaction.
MATERIALS AND METHODS: A 14 year old patient was observed exhibiting a delayed sequence of eruption and an early mixed dentition. A comprehensive diagnosis was conducted utilizing the mathematical prognostic method by Arnautska-Krumova. In adherence to canine impaction guidelines, the treatment approach included extraction of deciduous canines, creating and maintaining space, surgical exposures, and implementing active orthodontic traction.
RESULTS: The initial diagnosis yielded the following: the angle between the axis's of tooth 13 and 11 was 49 degrees and is positioned in sector 2 according to Kurol and Ericson. The angle between the axis's of tooth 23 and 21 = 24 degrees and sector 3 according to Kurol and Ericson. Interceptive treatment included using an active plate for space creation and maintenance. After 1 year and 6 months, the panoramic radiograph showed deterioration of the impaction. Surgical exposure using the V. Kokich technique was performed. Orthopantomography 6 months later showed worsening of the impaction: the angle between the axis's of tooth 13 and 11 reached 66 degree and canine is positioned in sector 1 according to Kurol and Ericson. The angle between the axis's of 23 and 21 increased to 55 degrees and sector 2 according to Kurol and Ericson. In response to this progression, a second surgical exposure was performed and orthodontic traction was applied using Kilroy springs. Four months later both canines were erupted in the oral cavity, and vestibular traction employing cantilevers was applied to align the teeth in the dental arch.
LIMITATIONS: As a case study, it lacks a comparison or control group to compare outcomes in order to have statistical validity.
CONCLUSION: Early diagnosis and interceptive measures can improve the prognosis of impacted canines. In some cases, additional treatments like performing surgical exposure and active orthodontic traction are necessary if improvement is not observed.

Abstract citation ID: cjae081.248
CP181 ENHANCING POST- OPERATIVE MANAGEMENT IN ORTHOGNATHIC SURGERY: AN AUDIT PERSPECTIVE

Mrs Christina Tsirigoni[1], Mr Mark Cobb[2]; [1]*DCT1, Royal Victoria Infirmary,* [2]*OMFS StR4, Royal Victoria Infirmary*

AIM: This poster presentation outlines the aim of conducting an audit focused on improving the post-operative management protocols in orthognathic surgery at the Royal Victoria Infirmary hospital, in Newcastle upon Tyne. The primary goal

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is to enhance patients' outcomes, minimise complications and ensure a comprehensive standardised approach to postoperative care of the orthognathic patients.
METHODS: Orthognathic surgery is a transformative procedure for correcting facial deformities, which demands vigilant postoperative management to optimize recovery of the patients and reduce potential complications. This audit was initiated to assess the current practices in postoperative management of the orthognathic patients, identify areas of improvement and implement changes to elevate the standard of management for these patients. The audit included a detailed examination of the postoperative care of 30 patients, taking into consideration pain control, infection and postoperative nausea prevention, use of hylotherm mask and placement of elastics.
RESULTS/CONCLUSIONS: Results revealed that almost all the practices implemented, requiring enhancement. Interventions will be applied in order to achieve a more comprehensive and standardised postoperative management of the orthognathic patients, aiming in improved patients' experiences, quicker recovery times and overall better surgical outcomes.

Abstract citation ID: cjae081.249
CP182 ORTHODONTIC TREATMENT WITH THE EXTRACTION OF A LOWER INCISOR IN AN ADULT PATIENT WITH CROWDING OF THE MANDIBULAR ANTERIOR TEETH: A CASE REPORT.

Mr Konstantinos tsoukatos[1], Mr Ilias Visakis[1], Miss Maria Anna Sakki[1], Miss Lydia Schoretsaniti[1]; [1]*National And Kapodistrian University Of Athens*

OBJECTIVES: The aim of this case report is to demonstrate the deliberate extraction of a lower incisor as a viable option for specific cases.
INTRODUCTION: A compromised treatment for certain malocclusions, in order to achieve a healthier, functional and esthetically harmonized dentition, can be the extraction of a single mandibular incisor. Class I malocclusions with normal maxillary dentition and good buccal interdigitation in which there is severe lower anterior crowding are good cases for this procedure.
CASE REPORT: A 37 year old man was seeking orthodontic treatment in order to improve the aesthetics of his anterior teeth. The patient had a class II skeletal pattern and a class I malocclusion with deep overbite, trapezoidal shape of the upper and lower dental arches, constricted mandibular arch in the premolar area, moderate maxillary and substantial mandibular crowding and gingival recession in the lower canines. After clinical examination and radiographic analysis, the decision was to extract a lower incisor to create space and solve the crowding issue. Extraction of 4 premolars, instead of a single lower incisor, might affect facial aesthetics negatively. Ceramic brackets were placed on both arches and a removable bite plate appliance was used to expedite the leveling of the curve of Spee.
RESULTS: Treatment duration was 16 months and the outcomes were improved overjet and overbite ,leveling of the curve of Spee, improvement of the aesthetic zone, improved shape of the upper and lower dental arches and creation of enough space for prosthetic restoration.
DISCUSSION: Extraction of a lower incisor is less frequently practiced because it increases the risk of less than ideal overjet and overbite, it might create Bolton discrepancy and it finishes with a midline discrepancy, compared to premolar extractions. Some of the advantages of this treatment are minimal changes of the facial profile and a shorter treatment period.

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CP183 SKELETAL CHANGE IN A PATIENT WITH CLASS 3 RELATIONSHIP USING HYBRID RPE APPLICATION

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AIM: The aim of this case report is to evaluate the orthodontic treatment approach performed with hybrid Rapid Palatal Expansion (RPE) application of maxillary skeletal narrowing and class 3 relationship in a non-growing patient with pseudoprognati inferior.
MATERIALS AND METHODS: CBCT was used to evaluate the maxillary suture of a 17-year-old female patient who applied to Ankara Yıldırım Beyazıt University Faculty of Dentistry. Using the CBCT data and the patient's digital measurements, the Hybrid RPE appliance was designed in three dimensions and targeting both incisor protrusion and skeletal expansion of the maxilla. For incisor protrusion, the metal arms extending from the expansion screw were designed to reach the lingual surface of the incisors and push the teeth anteriorly with each screw cycle. The preferred expansion screw had a hexagonal shape and was used to break the turning resistance, with a turning device in the shape of a small spenner. The cast metal part corresponding to the posterior teeth increased retention. In addition, based on the CBCT data, two 12x2 mm miniscrews were placed to the right and left of the maxillary suture, corresponding to 2 mm distal to the suture. Metal screw slots on the appliance were used to guide the placement of the miniscrews. The patient rotated the expansion screw 2 turns per day for a total of 24 days.
RESULTS: One week later, the patient's anterior diastema was opened. The occlusal film taken from the patient at this time also showed that the suture had opened. In the occlusal film taken after 3 months of retention, bone formation was observed in the intermaxillary suture. The incisors were protruding and the patient developed a posterior mandibular rotation. After the application, the patient's ANB increased from -4^0 to -0.7^0, and the SN/GoGn increased from 27,5^0 to 29^0 as a result of the posterior mandibular rotation.
CONCLUSION: In the non-growing class III patients with maxillary discrepancy, hybrid RPE applications may have beneficial results such as improving the class 3 sagittal relationship while increasing the transversal width.

Abstract citation ID: cjae081.251
CP184 SKELETAL ASYMMETRY WITH RIGHT TOTAL CROSS BITE

Dr Saki UCHIYAMA[1], Dr Teruo SAKAMOTO[2], Dr Kiyokazu OGATA[1]; [1]*Tokyo Metropolitan Children's Medical Center,* [2]*Tokyo Dental College Department of Orthodontics*

AIM: In recent years, patients with jaw deformity in whom Mandibular prognathism or retrognathia has been observed can be treated with orthognathic surgery such as Sagittal split ramus osteotomy (SSRO) and Le fort I and pre- and post-operative orthodontic treatment to restore occlusion and improve facial appearance. Improvements are being made. In the oral of a patient with facial asymmetry, occlusion is achieved by correcting the inclination of the tooth axis, but the inclination of the occlusal plane and crossbite are often observed. Here, we report that we obtained a good occlusion by performing surgical orthodontic treatment on a case of facial asymmetry in which a total crossbite was observed on right side.
CASE: 28-year-old female. She came to our hospital with a chief complaint of mastication disorder. Her oral Molar relation is class III on the right side, a class II on the left side, and a total crossbite on the right side, indicating narrowing of the mandibular . Examination of her facial features revealed that her lip was tilted upward to the left due to the tilt of her occlusal plane, and her chin was tilted to the left.
METHOD: In preoperative orthodontics, the maxillary dental arch was reduced using a quad helix, the lower jaw was expanded using a bi helix, Then, for the buccal inculination of the mandibular right premolar, orthodontic anchor screws are used together with the linguoclination of the premolar, which has a total crossbite, to be uprighted and the width and diameter of the upper and lower dental arches adjusted. And the patient's skeletal structure was improved through SSRO and Le fortIsurgery.
RESULTS: The right side crossbite was completely improved, the occlusal plane tilt was also improved, and the intraoral occlusion was class I, resulting in a good occlusal relationship.
CONCLUSION: By performing surgical orthodontic treatment, facial asymmetry and inclination of the occlusal plane could be improved.

Abstract citation ID: cjae081.252
CP185 ORTHODONTIC TREATMENT APPROACH IN A RARE CASE OF 3Q29 MICRODUBLICATION SYNDROME

Dr Pelin Acar Ulutas[1], Elif Coskuner Uysal[1]; [1]*Altinbas University*

AIM: 3q29 microdublication syndrome is a rare genetic disorder characterized by intellectual disability, ocular abnormalities, heart defects, tendency to overweight, microcephaly or macrocephaly and less frequently craniosynostosis, cleft palate, dental anomalies with maxillary constriction. However the symptoms associated with this syndrome are highly variable, many individuals have mild features. The aim of this case report is to evaluate oral manifestation and orthodontic approach of a patient with 3q29 microduplication syndrome.
SUBJECT AND METHOD: A 14 year old female patient at the cervical vertebral maturation stage 4 with 3q29 microduplication syndrome refered to our clinic. The patient with clinical findings of mitral valve prolapse and pseudopapilledema, had a medical history including simian line in her hand, posterior divergent profile, macrocephalic head and ear defect. In addition to these variable clinical situation, pseudocleft palate, transverse maxillary deficiency, multiple impacted teeth with crowding, decreased overjet and overbite were observed in intraoral examination. Medical files, dental casts, intraoral and extraoral photographs, cone-beam computerized tomography (CBCT), created panoramic and lateral cephalogram from CBCT were collected.
RESULTS: According to the dental cast analysis, the arch lenght discrepancies were -23.7 and -4.8 mm in the upper and lower arches respectively. Multiple impacted teeth and no missing teeth (except extracted 38,48) were seen in radiographic evaluation. Cephalometric analysis demonstrated 2.2° ANB angle with bimaxillary retrognathie and increased vertical pattern (FMA:33°). In

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consideration of CBCT sections, treatment plan included extraction of some of the impacted teeth and bringing remaining impacted teeth into the occlusion. Establishing the ideal arch length were planned with levelling and aligning. After that, maxillary expansion were planned for the transversal deficiency.
CONCLUSIONS: This report will contribute to the literature in terms of orthodontic approach to 3q29 microduplication syndrome. Orthodontic treatment of 3q29 microduplication syndrome is possible, however an individual approach is required. Detailed clinical records should be obtained from patients with this type of syndrome. Also, distinct physiologic and morphologic characteristic of these patient is significant during the treatment.

Abstract citation ID: cjae081.253
CP186 OPEN BIMAXILLARY PROTRUSION CASE

Mrs Jelena Uskokovic[1]; [1]*Sso Bożica V.*

OBJECTIVES: Patient 23 years old with open bite and bimaxillar protrusion.
METHODS: I have used 2 radiographs, models and clinical exam for diagnostics. We extract 4 premolars and put MBT upper and lower fixed aplliance.
RESULTS: After 2 years of therapy patient is in class I and good vertical position.
CONCLUSION: Patient is stabile after 6 years rewiew and still in retention period

Abstract citation ID: cjae081.254
CP187 COMBINED PERIODONTIC-ORTHODONTIC MANAGEMENT OF ADULT PATIENTS WITH PATHOLOGIC TOOTH MIGRATION: CLINICAL CASES

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BACKGROUND: Orthodontic treatment in periodontal patients can be challenging to treat. Pathologic tooth migration is a common finding in periodontal patients and usually is the main reason for them to seek treatment.
METHODS: A 22- year old female presented with chief complaint of spaces in anterior teeth and negative overjet. Clinical examination revealed a concave profile with an Angle Cl III relationship with negative overjet of 4mm, anterior open bite, and spaces in anterior upper and lower teeth. Cephalometric measurements presented a high angle skeletal pattern, with increased lower facial height. A 30- year old female presented with chief complaint of lip incompetence and the enormous size of her proclined incisors. Clinical examination revealed an Angle Cl II relationship, overjet 10,6 mm and extreme proclined upper and lower incisors, with overhanging composite restorations. Cephalometric measurements presented a low angle case, with reduced lower facial height.
After thorough clinical and radiographic periodontal examination, both patients were diagnosed with Stage III periodontitis and due to the bone loss to age ratio was identified as a Grade C case.
Non-surgical periodontal treatment was performed in a full-mouth debridement scheme. The first re-evaluation at 8 weeks revealed significant improvement of the PI, GI and BoP indices together with the absence of PD>4mm, with the clinical situation remaining stable also at the second re-examination 3 months after the initial periodontal treatment. Thus a decision was made to proceed with the orthodontic treatment, recalling the patient every three months for supportive periodontal therapy.
RESULTS: An Angle CL I molar, canine relationship with normal overjet and overbite were obtained in a short period of time. Tongue posture was improved and occlusal trauma was resolved. The periodontal lesions were stable despite the severity of the orthodontic movements.
CONCLUSIONS: The presented cases indicate that successfully combined orthodontic and periodontal treatment in periodontally compromised patients, even with pathologic tooth migration, can lead to a functional and stable occlusion, with simultaneous achievement of periodontal stability.

Abstract citation ID: cjae081.255
CP188 ORO-FACIAL-DIGITAL SYNDROME TYPE 1: A CASE REPORT

Miss Charlotte Van De Walle[1], Dr. Giacomo Begnoni[1], Prof. Dr. Anna Verdonck[1], Prof. Dr. Guy Willems[1], Prof. Dr. Maria Cadenas de Llano-Pérula[1]; [1]*KU Leuven*

AIM: To report the facial and dental characteristics of a patient with oro-facial-digital syndrome type 1 (OFD1)
INTRODUCTION: OFD1 results from a dominant X chromosome-linked mutation in the OFD1-gene. It's characterized by oral features such as bifid tongue, cleft palate, abnormally placed gingival frenulae or hypodontia. Facial features include spaced eyes, nose hypoplasia, pseudocleft of the upper lip or micrognathia. Other abnormalities include miliary skin lesions, dry skin, brittle hair, polycystic kidneys and anatomical abnormalities in the brain and fingers. 50% of affected individuals also present intellectual disability.
DIAGNOSIS: A girl was referred at birth to the Cleft team of University Hospitals Leuven, Belgium due to various intraoral abnormalities. Genetic testing confirmed OFD1 due to a mutation on c.1428_1429del (p.Pro477*). Although not clefted, the edentulous maxillary arch showed symmetrical interruptions and an additional lateral frenulum inside the upper lip. The tongue was ankylotic, lobulated and irregularly shaped, with a thick frenulum. Milia were present around the ears and on the lower lip. Hands, feet and psychomotor development were normal.
FOLLOW-UP: Oral manifestations were followed up. The patient showed slow dental development and agenesis of the deciduous lower lateral incisors. At eight years-old, two supernumerary upper central incisors were radiologically diagnosed. The hypomineralized definitive first molars were then erupting. She presented a neutro-occlusion anterior open bite. The patient is now 9 years-old and the upper central incisors have not erupted yet.
TREATMENT PLAN & OUTCOME: At four months-old, the tongue frenulum was resected to facilitate eating. No speech problems were observed during follow-up: the tongue was mobile with good tone and normal tongue tip placement since the resection. Supernumerary elements were removed to facilitate eruption. Since the upper incisors are not erupted yet, molar incisor hypomineralization (MIH) cannot be discarded. The definitive upper first molars were sealed to avoid sensitivity. A possible future orthodontic approach could be to remove them and allow spontaneous mesialization of the second molars if third molars are present.
CONCLUSION: Patients with OFD1 require multidisciplinary dental care and carefully monitoring of dental development, since multiple frenulae can complicate tooth brushing and the use of dental prostheses.

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CP189 EFFECTS OF ORTHOPEDIC TREATMENT (DISTRACTION SPLINT) ON DENTOFACIAL DEFORMITIES IN PATIENTS WITH JUVENILE IDIOPATHIC ARTHRITIS

Dr Stratos Vassis[1], Dr Sanja Sabljic[1], Dr Mohammedreza Sefidroodi[1], Professor Thomas Pedersen[1], Professor Peter Stoustrup[1]; [1]*Aarhus University*

Summary
BACKGROUND: Juvenile idiopathic arthritis (JIA) frequently affects the temporomandibular joint (TMJ), which can alter mandibular growth and development and result in dentofacial deformities.
OBJECTIVE: To assess the outcomes of orthopedic treatment with distraction splint (DS) in patients with JIA-related dentofacial deformity.
METHODS: The retrospective study involved 30 patients with JIA and unilateral TMJ involvement, another study group of 20 patients with JIA and bilateral TMJ involvement and a control group of 18 non-JIA orthodontic patients with Class II and III malocclusions. The inclusion criteria were DS treatment and cone-beam computed tomography (CBCT) scans before (T0) and two years after treatment (T1). Dentofacial morphology and deformity were evaluated based on a validated three-dimensional CBCT-based morphometric analysis. Intergroup differences in outcome measures were compared at T0 and T1, and intragroup changes between T0 and T1 were assessed using the Kruskal-Wallis test.
RESULTS: Initial evaluations at T0 revealed significant differences between the unilateral and bilateral JIA groups and the control group for three out of eight dentofacial deformity variables: inter-side difference in total posterior mandibular height, mandibular axial angle, and posterior/anterior face height (ratio). At follow-up (T1), significant inter-group differences were only observed in total posterior mandibular height indicating that intergroup differences were less pronounced after splint treatment. Assessing inter-group changes between T0 and T1 showed a significant improvement in posterior/anterior face height ratio in both JIA groups while all other parameters remained constant between T0 and T1.
CONCLUSIONS: The findings demonstrate the potential of DS treatment for patients with JIA and unilateral or bilateral TMJ involvement to enhance dentofacial deformities during growth or at least prevent further deterioration of dentofacial deformities.

Abstract citation ID: cjae081.257
CP190 THE REPERCUSSION OF AMYOTROPHIC LATERAL SCLEROSIS ON THE OROFACIAL SPHERE: A LONGITUDINAL STUDY

Mr Vincent Vaudroz[1], Prof Gregory S. Antonarakis[1], Prof Stavros Kiliaridis[2], PD Dr Annemarie Hübers[3]; [1]*Division of Orthodontics, University clinics of dental medicine, University of Geneva,* [2]*Department of Orthodontics and Dentofacial Orthopedics, Dental School/Medical Faculty, University of Bern,* [3]*Department of Clinical Neurosciences, Clinic of Neurology, Geneva University Hospitals,* [4]*Clinic of Neurology, University Hospital, Heinrich Heine-University*

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AIMS: Amyotrophic lateral sclerosis (ALS) is a severe neurodegenerative disease with poor prognosis and relatively short life-expectancy mainly due to progressive paresis of respiratory muscles. ALS affect muscle groups such as limb and bulbar muscles (tongue, throat, lips), ALS may have an effect on orofacial function, the development of malocclusions and caries development. This longitudinal study aims to determine whether ALS is associated with disturbed orofacial functions, dental malocclusions and presence of dental pathologies.
MATERIALS & METHODS: Twelve patients recruited at a single center participated. All patients had been diagnosed with ALS according to the Gold Coast Criteria (3 bulbar onset, 9 spinal onset). The patients were seen twice, by the same examinator, approximately 12 months apart. General disease progression was assessed using the ALS Functional Rating Scale Revised (ALS-FRS-R), orofacial function using the Nordic Orofacial Test Screening (NOT-S), the presence and severity of dental malocclusions, the presence of dental pathologies using the DMFT score, and oral hygiene using the plaque index.
RESULTS: Three patients passed away after the initial visit and were thus lost to follow-up. We observed a significant deterioration both in the disease itself and in orofacial function using the NOT-S score (mean increase in 2 points; p=0.002). A significant deterioration in general oral health was observed through the DMFT score (mean increase of 2 teeth; p=0.02) and the plaque index (mean increase of 0.4; p=0.003). No significant changes in dental occlusion were observed.
LIMITATIONS: The sample size was relatively small, and patients were only seen within a short time frame, knowing that the deterioration of a malocclusion would probably take longer. However, given the unfortunate rapid decline in the disease with the passing away of affected patients did not allow for longer follow-up.
CONCLUSION: ALS seems to have a progressive impact on orofacial function and health. The progressive loss of autonomy linked to the disease may explain this deterioration. Compromised oral health can have serious consequences for the well-being of patients already severely affected by the primary symptoms of the disease, which highlights the need of helping these patients to preserve their oral health lifelong.

Abstract citation ID: cjae081.258
CP191 THE ASYMMETRIC ANTERIOR OPEN BITE AND CLASS II MALOCCUSION TREATMENT: A CASE REPORT

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AIM: The aim of this case report is to present the dental and skeletal effects of the treatment of asymmetric anterior open bite caused by thumb sucking , tongue thrust and elongotion of posterior teeth.
SUBJECT AND METHOD : A 13-year-old female patient applied to our clinic with the complaint of anterior open bite.In the clinical and radiographic examination, a skeletal Class II and dental Class II relationship in the right-left canine-molar regions, a convex profile with 7 mm overjet and anterior asymmetric open bite (0-5 mm) were found. Cephalometric analysis values were as follows:SNA:82.7°,SNB:78.6°, ANB:4.1°, SnGoGn:29.2°, Mx1-SN:108.5°, IMPA:101.9°.In the history taken, it was learned that she had a habit of thumb sucking and tongue thrust since her childhood. Treatment was initiated with teaching the patient about quitting her oral habits. In treatment plan, intrusion of posterior teeth using skelatal anchorage was confirmed.For this purpose 2 (SS) IZC miniscrews were used as anchorage units and intrusion forces were applied.Vertical holding appliance was also used in this treatment for reducing the vertical dentoalveolar development of maxillary first molars.When the intrusion was completed screws were removed.After leveling and alignment were achieved,forsus appliance were inserted bilaterally when 0.019 x 0.025-inch SS archwires were inserted at both maxillary and mandibular arches to correct Class II dental relationship.
RESULTS: The after treatment cephlometric values:SNA:82.0°,SNB:78.9°,ANB :3,1°,SnGoGn:29.8°,Mx1-SN:103.8°,IMPA:95.5°. As a result of the treatment, dental Class I molar- canine relationship,ideal overjet and overbite were achieved. The patient's basic complaints were resolved.
CONCLUSIONS: Patient-clinician collaboration is of the great importance in orthodontic treatment.Anterior open bite cases caused by oral habits, can be solved with the combination of habit training and appropriate orthodontic treatment.

Abstract citation ID: cjae081.259
CP192 MULTIDISCIPLINARY MANAGEMENT OF A PATIENT WITH 18 MISSING TEETH: A CASE-REPORT

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AIM: To report the multidisciplinary treatment of a boy with 18 missing teeth.
BACKROUND: Oligodontia is a congenital condition characterized by the absence of more than six permanent teeth, excluding the third molars. It can be either an isolated trait or part of a syndrome.
DIAGNOSIS AND ETIOLOGY: An 11-year-old boy with congenital absence of 18 permanent teeth was referred by his own dentist to the section of Orthodontics of University Hospitals Leuven, Belgium. The isolated oligodontia observed in this case had a genetic origin, specifically a mutation in the WNT10A gene present in both parents. Heterozygous expression of two pathogenic mutations, namely c.682T>A (at protein level p.Phe228Ile) and c.1084T>C (at protein level p.Cys362Arg), was identified. Interestingly, the patient's sibling exhibited a normal dentition. The occlusion was characterized by bilateral crossbite, lateral open bite, mesial step of the deciduous molars, normal overbite and overjet.
TREATMENT PLAN & OUTCOME: The initial phase of treatment involved rapid palatal expansion with a hyrax to address the bilateral crossbite. Subsequently, pre-prosthetic orthodontic interventions with fixed appliances were implemented to optimize both aesthetics and function. A removable partial denture was placed on the maxillary arch and a pontic on the mandibular arch. The patient reported satisfaction with the achieved aesthetic improvements and enhanced speech and masticatory function. Future plans include an interdisciplinary treatment approach, encompassing orthognathic surgery, orthodontic, and restorative interventions with the incorporation of implants in adulthood.
CONCLUSION: Patients with multiple missing teeth often present esthetic- and functional problems that may affect their psychosocial wellbeing. Early diagnosis and interdisciplinary treatment of these patients, often consisting of several phases, are necessary to achieve optimal aesthetic and functional outcomes.

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CP193 CASE REPORT: LATE PRESENTATION OF UNILATERAL CONDYLAR HYPERPLASIA IN A 25 YEAR-OLD PATIENT, FIVE YEARS AFTER BIMAXILLARY ORTHOGNATHIC SURGERY

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BACKGROUND: Condylar hyperplasia (CH) is a bony deformity of the mandible causing increased development of one of the mandibular condyles compared to the other. The exact aetiology is currently unknown, however previous literature has shown it is due to excessive cellular growth of part of the condyle. Presenting extra-oral features include progressive mandibular asymmetry and enlargement of the condyle. Intra-oral features may include alteration of the occlusion with unilateral/bilateral cross-bite and/or open bite.
AIMS: The aim of this case report is to illustrate late presentation of condylar hyperplasia in a 28-year-old female who was previously treated for a class III malocclusion and an anterior-open bite using upper and lower fixed orthodontic appliances and a bimaxillary osteotomy.
MATERIALS/METHODS: Five years following treatment, the patient presented with progressive facial asymmetry and a deranged occlusion. A panoramic radiograph showed a considerably larger right condylar head compared to previous radiographs. A series of images including an MRI, cone beam CT mandible and a Technetium-99m radioisotope scan confirmed the clinical diagnosis of right sided condylar hyperplasia.
RESULTS: The condylar hyperplasia was corrected with a high condylar shave and further orthodontic retreatment to address the occlusal anomalies. To date, there has been no further recurrence of condylar hyperplasia with normal facial symmetry and a stable dental occlusion being maintained.
CONCLUSIONS: Condylar hyperplasia is normally diagnosed in the late adolescent patient where progressive facial asymmetry and associated occlusal anomalies are detected. This case report highlights that when this is identified in a post-surgical patient, condylar hyperplasia should be suspected as one of the aetiologies and the patient subsequently managed appropriately.

Abstract citation ID: cjae081.261
CP194 THE QUALITY OF CLINICAL ORTHODONTIC PHOTOGRAPHS: A TWO-CYCLE AUDIT

Mr Stuart Worthington[1]; [1]*Nhs*

BACKGROUND: Clinical photographs are an important part of orthodontic dentistry. Clinicians use clinical photographs to assist with treatment planning, and then to monitor treatment progress. They are also important for communicating with patients as well as for teaching, research, or audits.
AIMS: To assess through audit the quality of both intra- and extra-oral clinical orthodontic photographs taken in an orthodontic primary care setting. To

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identify any potential issues when taking clinical orthodontic photographs, to provide any appropriate training or protocol, and then, if necessary, to re-assess the subsequent quality.
METHODS: This was achieved using a prospective two-cycle audit in a single primary care setting. Fifty sequential patient records were assessed for each of the two audit cycles against a set of 15 standards. Between the two audit cycles there was the reminder of the gold standard coupled with the implementation of a new standard operating procedure.
RESULTS: The percentage of patients with a complete set of intra-oral pre-treatment clinical photographs increased from 94% to 100%. There were improvements noted in most of the other 14 standards measured, however some standards still fell far short of the 100% target, for example, in the second audit cycle there were still only 74% of patients with extra-oral photographs that had an appropriate background.
LIMITATIONS: The two cycles of the audit were conducted at different times of the year when external influences might have varied. As a prospective audit, the clinicians were aware of having their clinical photographs observed and this could have influenced the effort made by those photographing. The samples for each audit cycle were just taken from the sequence of patients presenting, but this does not consider patient factors that might have influenced some results.
CONCLUSIONS: The implementation of training and a new protocol appears to have improved both the actual taking of clinical orthodontic photographs as well as the quality of these clinical orthodontic photographs. It would be prudent to conduct a further audit cycle to see how standards have been maintained in the longer term.

Abstract citation ID: cjae081.262
CP195 THE PAR INDEX EVALUATION TO THE CASES OF POSTGRADUATE

Mr Yu Yamashita[1], Mr Kazumasa Goto[1], Mr Kiyoaki Tagami[1], Dr Dai Ariizumi[1], Professor Yasushi Nishii[1]; [1]*Tokyo Dental College*

OBJECTIVES: The post-graduate course in the Department of Orthodontics, Tokyo Dental College was established in 1975, and 375 students have completed. The three-year curriculum is designed to train orthodontists to acquire basic knowledge, skills, and attitudes toward orthodontic treatment in order to become certified orthodontists, in accordance with the goals of the Japanese Association of Orthodontists. In particular, the clinical skills of treatment and management are focused on the acquisition of magnification devices, functional orthodontic appliances, and extraoral appliance in the first stage treatment, and multi-bracket devices in the second stage treatment (including surgical orthodontic treatment). The cases include those with jaw deformities, cleft lip and cleft palate, various syndromes, periodontal diseases, and temporomandibular disorders.
The purpose of this study is to evaluate 48 cases with PAR Index, submitted by 12 students of the class 2023 who completed the graduate course.
MATERIALS: The following are pre- and post-treatment dental cast, X-rays, facial photographs, and intraoral photographs of 48 cases submitted by 12 students who completed the basic post-graduate training course this year. There were 20 cases of tooth extraction, 17 cases of non-extraction, and 11 cases of surgical orthodontic treatment (including 2 cases of tooth extraction). Of these, 15 were classified as Angle Class I, 21 as Angle Class II, and 12 as Angle III. Gender was male in 14 cases and female in 34 cases.The duration of dynamic treatment ranged from 1 year and 2 months to 2 years and 9 months.
RESULTS and CONCLUSIONS: The PAR Index was used to evaluate all 48 cases. As a result, 22 cases were judged to be Greatly improved and 26 cases were judged to be Improved. According to experience these treatment results, it is thought that we have learned the basic knowledge and skills necessary for orthodontic specialist.

Abstract citation ID: cjae081.263
CP196 ORTHODONTIC TREATMENT WITHOUT ORTHOGNATHIC SURGERY IN A PATIENT WITH UNILATERAL CLEFT LIP AND PALATE: A CASE REPORT

Mr. Alpkursad KOYUNCU[1], Prof. Zehra ILERI[1], Miss Leyla YILMAZ[1]; [1]*Selcuk University*

AIM: To present improvement of soft tissue and occlusion with non-surgical orthodontic treatment using a lower anterior inclined plane appliance and an upper utility arch in a skeletal Class III malocclusion patient with unilateral cleft lip and palate.
MATERIALS: A 22-year-old male patient with unilateral cleft lip and palate applied to our clinic for poorly aligned teeth and unaesthetic smile. Clinical and radiological examination revealed a Class III dental relationship, arch asymmetry, congenitally missing upper left lateral incisor and concave profile. De Nevreze maneuver was positive. Cephalometric analysis showed a skeletal Class III malocclusion and horizontal growth pattern (SNA:81.3°, SNB:84.9°, ANB:-3.6, FMA:13.2°, SN-GoGn:23.3°, Mx1-SN:102.0°, IMPA 91.1). In the first stage, while the upper teeth were bonded, a transpalatal arch and a removable lower anterior inclined plane appliance were also applied. During the leveling phase of the maxillary arch, 0.14" NiTi, 0.16" NiTi and 16x22" NiTi archwires were used. While the leveling was at this stage, incisor proclination was targeted by performing utility arch bending on the 16x22" SS wire. Then, when the appropriate overjet and overbite were obtained, the anterior inclined bite plane was left and bonding mandibular teeth was performed. Alignment was continued with straight wires, including 17x25" NiTi, 19x25" NiTi and 19x25" SS wires in the maxillary arch. During the mandibular leveling phase, 0.14" NiTi, 0.16" NiTi, 16x22", 17x25" NiTi and 17x25" SS wires were used. Finally, the space in the incisor area was shared proportionally for the prosthetic restoration for the lateral deficiency. LR was applied to both sides of the gap in the maxilla and between the canines in the mandible.
RESULTS: At the end of the treatment, cephalometric values improved (SNA: 82.2°, SNB: 83.4°, ANB: -1.1, FMA:13.6°, SN-GoGn:24.6°, Mx1-SN:116.7°, IMPA 85.2). A harmonious profile and acceptable occlusal relationships, appropriate overjet, overbite and the necessary spaces for prosthetic restoration were achieved without an orthognathic surgical treatment.
CONCLUSIONS: As long as the patient profile and incisor inclination are appropriate, dental compensation treatment can be an alternative to orthognathic surgery in skeletal Class III malocclusion cases with unilateral cleft lip and palate.

Abstract citation ID: cjae081.264
CP197 NONSURGICAL STAGED ARCH DEVELOPMENT AND EXPANSION IN AN ADULT PATIENT WITH SEVERELY CONSTRICTED MAXILLARY AND MANDIBULAR ARCHES, CROSSBITE AND DEEP-BITE

Dr Suji Yoon[1], Dr Hyunseung Hong[1], Dr Heesung Han[2], Professor Seung-Hak Baek[1]; [1]*Seoul National University Dental Hospital,* [2]*Hanwool Orthodontic Clinic*

OBJECTIVES: To introduce the concept of nonsurgical staged arch development and expansion for corrections of severely constricted maxillary and mandibular arches, crossbite, and deep-bite.
PATIENT: A 19-year-old male exhibited convex facial profile, deep-bite, severely constricted maxillary and mandibular arches, premolar crossbites, and congenitally missing mandibular lateral incisors (MLIs).
TREATMENT: In Phase I, the maxillary dentition was bonded with brackets and the maxillary dental arch was expanded by round and rectangular Cu-NiTi wires. In Phase II, the maxillary basal arch was expanded by miniscrew-assisted rapid palatal expansion (MARPE) and maintained by a modified quad-helix. Then, the mandibular dentition was bonded with brackets. The mandibular dental arch was expanded by round and rectangular Cu-NiTi wires and maintained by a modified lingual arch. In Phase III, both arches were stabilized by rectangular Cu-NiTi, NiTi, and stainless steel wires. Deep curve of Spee in the mandibular arch was flattened by NiTi wires with reverse curve of Spee. The spaces for missing MLIs were created. Premolar crossbites were corrected. After debonding, the missing MLIs were restored by Maryland bridges. Total treatment duration was 47 months. Class I canine and molar relationships, normal inclinations and angulations of the canines and posterior teeth, and normal overbite and overjet were obtained. Treatment outcome was well maintained at 1 year follow-up.
CONCLUSION: Nonsurgical staged approach using light orthodontic force and MARPE can upright the posterior teeth buccally, expand the dental and basal arches, and induce alveolar bone remodeling in an adult patient without significant side effects.

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CP198 LH WIRE FOR THE TREATMENT OF ANGLES CLASS III WITH ANTERIOR OPEN BITE AND CROSSBITE

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OBJECTIVES: LH wire (low hysteresis, ISW, Improved Super-elastic Ti-Ni alloy Wire, developed by Tokyo Medical and Dental University) for the treatment of Angle Class III with anterior open bite and crossbite will be discussed.
CASE: A 23 years old male came to our clinic with a chief complaint of anterior open bite and crossbite and not able to chew food well. Clinical examination revealed an Angle Class III malocclusion with anterior open bite, crossbite and spaced arch. Radiographic and clinical examination showed a skeletal Class III pattern. We used LH wire (low hysteresis, ISW, Improved Super-elastic Ti-Ni alloy Wire, developed by Tokyo Medical and Dental University) to level the upper and lower arch and to correct the anterior open bite and crossbite. Intermaxillary elastics (IME) were also used to achieve a better interdigitation. Finally, adequate

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overbite, overjet and a desirable occlusion were achieved. The active treatment time took two years and two months.
DISCUSSION: In this case, we will discuss the non-extraction strategy by using LH wire (low hysteresis, ISW, Improved Super-elastic Ti-Ni alloy Wire, developed by Tokyo Medical and Dental University) to correct the anterior open bite, crossbite and inter-jaw relationship.The use of IME to achieve a better interdigitation was also discussed.
SUMMARY: A desirable occlusion (with adequate overbite and overjet) and a favorable facial profile after the active treatment were achieved.

Abstract citation ID: cjae081.266
CP199 INTRODUCTION OF DENTAL VIRTUAL REALITY DEVELOPMENT FOR PRELIMINARY CLINICAL EDUCATION

Prof Jian-hong Yu[1]; [1]*China Medical University Hospital Medical Center*

OBJECTIVES: Clinical practice associated with dental education can be very difficult. In orthodontic education, students are asked to bond brackets on Typodont. Waste of dental materials and infection control are frequently encountered problems. With stimulation practice under VR (Virtual Reality) technology, we invented dental VR DESSERT (Dental Education Simulation System, Enhanced Reality Technology) system to enhance the motivation of students and can solve the problems mentioned above.
MATERIALS: Thirty students from Dental School of China Medical University were selected. Students first attended lectures of orthodontic bracket bonding, and then attended VR bracket bonding curriculum. Each curriculum was about 1 hour. After the curriculum, students were asked to fill out some questionnaires when the semester was over.
RESULTS: The evaluation results can be classified into two parts. The first part is the accuracy evaluation of instrument recognition and clinical practice. Teachers can observe students' action from monitors and give the students immediate instruction or correction. In VR bracket bonding curriculum, students need to choose the correct bracket, and finish the bracket bonding operating procedure. The second part is the clinical feedback. To examine the performance of VR in dental education, students need to fill out some questionnaires. The result can be the evidence to improve educational modality and VR stimulation quality.
CONCLUSIONS: We first introduce VR education combine with orthodontic bracket bonding procedure. After the curriculum, students were satisfied with this teaching procedure, and the accuracy of bracket position was improved.

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CP200 CENTRAL INCISOR MACRODONTIA

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OBJECTIVES: Macrodontia of the anterior teeth has a negative effect on smile aesthetics. The aim of this case report is to present the solution of the smile asymmetry caused by macrodontia in a young patient with aesthetic concerns by orthodontic treatment.
METHODS: A 13-year-old patient, who applied to our clinic for orthodontic treatment with aesthetic complaint, was found to have macrodontia of the upper left central incisor. Patient also had Class II dental and skeletal relationship accompanied with severe deep bite and crowding due to space deficiency. After careful clinical examination and review of the diagnostic records, extraction of the macrodont tooth and upper right lateral were planned. The upper left lateral was planned to be converted into a central tooth and both upper canine teeth into laterals. In the lower arch, improvement of deep bite through intrusion of incisors was planned. Following the leveling of the upper teeth, the extraction gaps were closed, only spaces needed for restorations of the teeth were arranged and left.
RESULTS: Class II molar relationship was maintained while upper first premolars which were converted to canines fitted in Class I canine occlusion. In anterior region, teeth were aligned accordingly, spaces were created for restorations. Deepbite was corrected while ideal overjet and overbite was created.
CONCLUSION: Crowding and deepbite were solved. The positions of the anterior teeth were corrected and pre-restorative orthodontic treatment was completed.

Abstract citation ID: cjae081.268
CP201 RISKS OF COMPLICATION DEVELOPMENT IN CLASS II PATIENTS AFTER ORTHOGNATHIC SURGERY AND WAYS OF RESOLVING THEM

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AIM: increasing effectiveness of treatment of Class II patients who need orthognathic surgery.
MATERIALS AND METHODS: 14 Class II patients were treated with braces and orthognathic surgery in the period of 2021-2023. This group included 10 female and 4 male patients. Some patients complained about insignificant clicking and pain in the TMJ area. All the patients had CBCT scans of the head, anthropometric analysis of the dental arches, cephalometric analysis, MRI studies with their mouth open and closed. All the patients were diagnosed with internal derangements from III to V stage according to the Wilkes classification. 9 patients (group 1) had preoperative orthodontics, orthognathic surgery and postoperative orthodontic correction. 5 patients (group 2) had arthroplasty with the aim of disc repositioning during preoperative orthodontics and after 6 months they underwent an orthognathic procedure with further postoperative orthodontics.
RESULTS: 12 months after orthognathic surgery 6 out of 9 patients from group 1 reported worsening in the TMJ area, pain and limited mouth opening, there was relapse of overjet increase by 2-3 mm compared to the immediate postoperative occlusion. 5 patients from group 2 who had undergone arthroplasty and orthognathic surgery were evaluated as stable with no complaints.
CONCLUSION: Class II patients need a more specific diagnosis of the TMJ because of a high risk of complications. Patients with complete disc displacement are recommended to have the disc position surgically corrected.

Abstract citation ID: cjae081.269
CP202 CONE BEAM COMPUTED TOMOGRAPHY (CBCT) ANALYSIS OF THE MIDPALATAL SUTURE MATURATION IN MAXILLARY EXPANSION TREATMENT PLANNING

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AIM: To assess the importance of CBCT analysis of the midpalatal suture (MPS) when deciding on the optimal maxillary expansion treatment.
MATERIAL AND METHODS: Firstly, we collected high-resolution CBCT maxillary images of three different patients with transverse maxillary deficiency. Maturation stages (A-E) described by Angelieri et al were determined for each MPS. Furthermore, midpalatal suture density (MPSD) ratio proposed by Grünheid was calculated (ratio ranges from 0 to 1 – lower values indicate that the suture region is less calcified and values close to 1 indicate more highly calcified suture).
RESULTS: Patient 1 is a 10-year-old female with maturation stage B. MPSD ratio is 0,42 which contributes to the findings that the suture is not fused. Therefore, an expansion device anchored solely on teeth should provide sufficient expansion of the maxilla with minimal side effects.
Patient 2 is a 16-year-old male with maturation stage C. MPSD ratio is 0,73. Due to patient's age and increased degree of interdigitation, the possibility of unwanted dentoalveolar side effects when using tooth-borne devices increases. Therefore, expansion device anchored on miniscrews inserted into the palate should be used instead. Miniscrews enable the expansion force being delivered directly to the basal bone of the maxilla, which maximizes skeletal and minimizes dentoalveolar effects. Additionaly, miniscrews offer a less invasive treatment option for patients who would normally apply for a surgical procedure.
Patient 3 is a 39-year-old male with maturation stage E. MPSD ratio is 0,89. The analysis indicates that the suture is totally fused, therefore surgically-assisted rapid palatal expansion (SARPE) is needed. Treatment without surgically releasing such interdigitated suture prior to expansion with a device would most likely result in limited skeletal expansion or failure, relapse or unwanted dentoalveolar side effects.
CONCLUSIONS: Many studies suggested that chronological age should not be the only factor used to determine which maxillary expansion treatment should be performed. CBCT analysis of the midpalatal suture offers easily accessible information of the suture's morphology and maturation which can importantly support the treatment decision making.

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CP203 A MULTIDISCIPLINARY APPROACH TO MICRODONTIA: ORTHODONTIC AND RESTORATIVE TREATMENT WITH INJECTABLE TECHNIQUE FOR IMPROVING SMILE ESTHETICS

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BACKGROUND: Microdontia is a dental condition caused by disturbances in the odontogenesis process. If this complex process is influenced by genetic or environmental factors, it can lead to changes in tooth size, which significantly affects the function, form and esthetics of the dentition.
CASE PRESENTATION: This case presents a comprehensive treatment of a 16-year-old female patient dissatisfied with her smile and noticeable spaces between her anterior teeth due to microdontia of incisors. Apart from this, the patient had an impacted upper right second premolar. The impacted premolar had a good form and orientation but insufficient space in the dental arch for its eruption. A multidisciplinary treatment plan was made, including the orthodontic and restorative phases. The orthodontic phase with conventional fixed appliance aimed to align the teeth, gain space in the upper arch for the impacted premolar and place it in the dental arch. Another aim was to create a stable foundation for the subsequent restorations. When these aims were achieved, intraoral scans of dental arches and intraoral and extraoral clinical photographs were made. The restorations were digitally designed, considering the patient's facial features, lip line and overall smile esthetics. Since the patient was young, injectable composite veneers for incisors and canines were chosen as a minimally invasive restorative solution. The final result was a natural-looking, symmetrical smile that met the patient's expectations and significantly improved her confidence and overall satisfaction with her smile.
CONCLUSION: Esthetic management of microdontia requires a comprehensive, multidisciplinary treatment, including orthodontics and restorative treatment to achieve a smile transformation. Injectable composite veneers are optimal solution for post-orthodontic restorative treatment in the case of microdontia, particularly in young patients, since the technique is minimally invasive and gives harmonious and esthetically pleasing results.

Abstract citation ID: cjae081.271
CP204 DEEP-BITE AND CLASS II SUBDIVISION CORRECTION WITH ALIGNERS: A CASE REPORT

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BACKGROUND/OBJECTIVES/AIMS: Correction of deep-bites, as well as dental asymmetries, are challenging for the orthodontist with the use of orthodontic aligners.
MATERIALS/METHODS: The patient presented dental Class II, division 2 and right subdivision, lower midline deviated to right, gummy smile and deep overbite, with crowding in both arches. Cephalometric analysis showed a normal skeletal measure and a mesocephalic facial pattern were observed. The upper incisors were retroclined and the lower incisors were well positioned. Overbite correction was achieved by relative intrusion of the upper and lower incisors, what it means, the combination of intrusion and projection of the incisors and extrusion of the posterior teeth. Class II subdivision correction was performed using asymmetrical intermaxillary elastics.
RESULTS: At the end of the treatment, correct overbite and overjet relationships were acquired, as well as a Class I molar and canine relationship. The midlines are coincident, with an adequate smile arch, maintaining symmetry and facial aesthetics.
CONCLUSIONS/IMPLICATIONS: Considering aligners limitations to correct deep overbite, the case presented satisfactory results, with adequate occlusion, function and aesthetic relationship. For cases with deep-bite that allow projection of incisors, the correction of malocclusion by relative intrusion is favored by the synergistic movements of intrusion and incisors proclination. The patient's collaboration was essential to correct the deep-bite and Class II with the use of intermaxillary elastics and orthodontic aligners.

Abstract citation ID: cjae081.272
CP205 CLEAR ALIGNERS AND IMPLANT SITE DEVELOPMENT THROUGH SPACE OPENING IN TWO ADULTS PATIENTS: ARE THE CLINCHECKS ACCURATE?

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BACKGROUND/AIM: Clear aligners is an alternative to conventional fixed orthodontic appliances, especially for adult patients, however with several limitations. Tooth uprighting and root paralleling as well as tooth extrusion are more difficult to be accomplished with clear aligners. The aim of this study is to determine the diagnostic criteria for proper case selection for pre-prosthetic space opening of permanent teeth with clear aligners. Additionally, the predictability of space opening simulations (clincheck) in two adult patients will be discussed.
MATERIAL/METHODS: 2 Caucasian adult patients (a female 52 years and a male 70 years old) presented with one congenitally missing upper lateral incisor (both patients) and one upper second premolar (the latter patient) were treated with Invisalign Lite package for space opening. Photographs, dental scans and CBCT post-treatment assessed bone sufficiency for implant placement. Tracking was reviewed every 4-6 aligners.
RESULTS: For the desired space of at least 5.7 mm at the apex and 6,2 mm at the lateral incisor area 3 sets of 14 aligners each were used. The predictability reached 45% in the first clincheck, 84% in the second and 93% in the last one. A 7-day aligner change protocol was prescribed in both cases. Due to poor tracking in the first case, a 10-day protocol was prescribed for aligners 15-42. The total treatment time was less than 14 months.
LIMITATIONS: Tooth tipping is the main type of tooth movement in these cases. Clinical tooth movements may be lagging behind the Clincheck anticipated movements.
CONCLUSIONS: Clear aligners may be used for pre-prosthetic space opening / implant site development after careful consideration of the advantages and disadvantages of this approach. The patient should be informed about possible refinements and the need of additional aligners and/or the change of prescribed days per aligner in order to achieve the treatment goal.

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CP206 ORTHODONTIC ANCHORAGE REINFORCEMENT USING ANTERIOR PALATE MINI-SCREWS - CASE REPORT OF CHAIR-SIDE INDIRECT TECHNIQUES

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BACKGROUND AND RATIONALE: Temporary anchorage devices (TADs) have been introduced to provide absolute orthodontic anchorage. A recent systematic review (2019) assessing the success of anterior palatal TADs reported an average failure of only 6%. This is explained by the high quantity and quality of cortical bone in the anterior palate. Mini-screws inserted in the anterior palate could utilize direct or indirect mechanics. Several types of tooth movements can be achieved: distalization, mesialization or intrusion of maxillary molars, retraction of anterior teeth, or a combination. A variety of mini-screw appliance designs exist for the anterior palate and are becoming increasingly competitive with manufacturers in the market; however, these complex designs often require laboratory fabrication with increased fees and time.
AIM: The aim of this case report is to present simple, convenient, and cost-effective method of obtaining indirect anchorage using an anterior palate mini-screw in high-anchorage orthodontic cases.
MATERIALS AND METHODS: Three patients who are medically fit and well (2 male and 1 female) aged between 13 and 15 years presented at The Royal London Hospital. They present with different malocclusions ranging from class II division II to class III incisors relationships. Infinitas TADs (size: L9mm, D1.5mm, N2.5mm) were placed in all cases in the anterior palate lateral to the mid-palatal suture using a speed-reducing handpiece with a set speed of (10-12 RPM). Subsequently, a digital scan of the upper arch and a 3D printed dental model was produced for each patient. A (0.017×0.025) stainless steel archwire "strut" was developed through wire bending and bonded to the palatal surface of the teeth and secured to the TAD slot with medium viscosity resin adhesive (BracePaste). Conventional labial straight wire mechanics were then applied to obtain the planned tooth movements (protraction of molars, retraction of anteriors and alignment of buccally excluded canine with centreline correction).
CONCLUSION: This case report highlights on chair-side techniques used with anterior palate TADs to provide absolute anchorage (indirect). This approach entails development of a "wire strut" to engage the TAD thus eliminating expensive laboratory costs for complex appliance fabrications whilst allowing for conventional straight wire mechanics and absolute anchorage.

Abstract citation ID: cjae081.274
CP207 TREATMENT WITH ANTERIOR SPACE CLOSURE AND AESTHETIC PROSTHESIS IN A PATIENT WITH MAXILLARY ANTERIOR INCISOR LOSS DUE TO TRAUMA

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AIM: When a traumatized maxillary central incisor is extracted, it can be replaced with a lateral incisor or a canine, and it is important to consider the torque and angulation of the tooth when moving the tooth. In this case, we present a case of an adult patient who lost three anterior teeth, including maxillary central incisors and a lateral incisor, due to childhood trauma and achieved aesthetic improvement through orthodontic space closure of the anterior teeth and implant placement.
MATERIALS & METHODS: A 21-year-old male patient was referred with space closure for maxillary central incisors implant placement due to loss of maxillary central incisors and a lateral incisor in an automobile accident 11 years ago. The patient was diagnosed with a skeletal Class I malocclusion with a normodivergent skeletal pattern and a straight face, and he was aesthetically unappealing due to the predominant exposure of the mandibular anterior teeth when smiling. He showed an end-on Class II molar relationship on the right side, and a Class I molar relationship on the left side. The following treatment objectives were established: (1) protraction of the posterior teeth including right maxillary canine, (2) establishing a full Class II molar relationship on the right side, (3) placement of implants at maxillary central incisors.
RESULTS: For aesthetic recovery of the edentulous region and vertical adjustment for tooth alignment, initial alignment was performed by wearing a flipper on the maxilla. A miniscrew was then placed at the distal aspect of the left second premolar to protract the right dentition for space closure at the right maxillary lateral incisor. It took a total of 30 months to achieve the final goal due to the long intervals between visits due to the patient's military enlistment.
CONCLUSION: The advantages of protraction of the posterior dentition include the possibility of using the patient's natural dentition and a decreased number of implant prostheses. In this case, in a patient who lost the maxillary anterior teeth due to trauma, aesthetic and functional recovery was achieved through successful anterior migration of the posterior dentition to close the space and implant prosthesis.

Abstract citation ID: cjae081.275
CP208 THE USE OF CLEAR ALIGNERS IN THE TREATMENT OF MAXILLARY DEFICIENCY IN GROWING PATIENTS: TWO CASE REPORTS

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AIMS: This clinical poster presents the effects of using class III elastics with clear aligners on two patients with class III malocclusion resulting from maxillary deficiency in growing individuals.
MATERIAL AND METHODS: Case 1: A 12.1-year-old female and Case 2: A 13.5-year-old male met the following criteria: Class III molar and canine relationship, maxillary deficiency, concave profile, and no anterior mandibular shift. Both of them refused to wear face masks and other extra-oral maxillary protractions. A tightly fitting upper and lower clear aligner was fabricated for each patient, and some attachments were added to the upper and lower teeth for more retention. In both cases, two buttons were bonded on the buccal surface of lower permanent canines, and two buttons were bonded on the buccal surface of the upper first molars. The space of the buttons was cut by cutting pliers in the area of the lower canines and first upper molars. Then, patients were instructed to use class III elastic from buttons on the lower canines to the upper first molars. Patients were also required to wear the appliance full-time except for eating and contact sports.
RESULTS: In cases 1 and 2, the active treatment time was 10 and 12 months, respectively. After correcting maxillary deficiency (skeletal problem), two cases achieved normal overjet and overbite; the patient's expectations were met, along with satisfactory clinical effects.
DISCUSSION: patients prefer to use intraoral devices instead of large extraoral devices. Bulky size and skin abrasion on the chin are face masks' most common side effects, especially in hot climates and patients wearing glasses. Small size and being intra-oral are the advantages of clear aligners. One of the disadvantages of this method is that the treatment must be delayed until the eruption of the canines begins, resulting in a missed opportunity to utilize the patient's growth.
CONCLUSION: Clear aligners are an alternative method for treating maxillary deficiency due to their small size. They are replaced with bulky facemask appliances. However, further evidence is required to integrate this method into clinical practice fully.

Abstract citation ID: cjae081.276
CP209 MANAGEMENT OF ANTERIOR OPEN BITE WITH SEVERE UPPER TEETH PROTRUSION IN A PERIODONTALLY COMPROMISED PATIENT WITH SEGMENTED ARCH TECHNIQUE: A CASE REPORT

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AIM: The aim of this report is to evaluate the treatment planning and outcomes of an ongoing orthodontic treatment with segmented arch technique for a periodontally compromised patient with open bite and severe protrusion of upper anterior teeth.
MATERIALS AND METHODS: A 22-year old male patient presented to our observation with the following features: severe upper teeth protrusion, increased overjet, anterior open bite, skeletal Class II, hyperdivergent skeletal pattern and active periodontal disease. Upon these findings a treatment plan was established. The initial phase involved the application of segmented lingual braces on the upper four anterior teeth. A line of force application was implemented in order to achieve controlled retrusion and intrusion of the incisors and improvement of the periodontal health.
RESULTS: Within three months of the initiation of the orthodontic treatment, correction of the upper teeth protrusion and overjet was observed, along with an improvement in the anterior open bite and periodontal health of the anterior teeth.
CONCLUSION: The treatment approach outlined above suggests that the segmental technique with the appropriate force system application leads to controlled movement, which preserves and improves the periodontal condition of the periodontally compromised teeth accompanied with severe protrusion and bone loss.

Abstract citation ID: cjae081.277
CP210 THE ROLE OF REMOVAL ORTHODONTIC APPLIANCES IN INVESTIGATION OF SPEECH DEFICIENCIES IN CLEFT PATIENTS

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BACKGROUND: Tertiary care Orthodontics involves management of cleft palate patients who may concurrently present with speech deficiencies. In such cases, orthodontic appliances play a role in palate investigation, tying in closely with the Speech and Language Therapy (SLT) and Cleft Surgical team. Secondary fistulae may occur in repaired cases and be symptomatic. Fistula obturation with orthodontic appliances can aid in assessing the relative contribution of fistulae and palatal insufficiency to speech issues.
PATIENT INFORMATION: A 7-year old female with a repaired bilateral cleft lip and palate was seen for an Orthodontic assessment. She presented with a central slit fistula in the posterior hard palate measuring 6x2mm and active speech problems involving mild hypernasal resonance with audible nasal emission. Her cleft speech characteristics were backing, lateralisation, palatalisation and active nasal fricatives. There was concern whether the fistula provided an additional route for nasal escape thus causing hypernasality. She was then seen on the Palate Investigation Clinic to delineate this.
MANAGEMENT: The patient was assessed on a Joint Cleft clinic. Temporary obturation of defects have previously involved silicone putty or use of a moulded wax sheet adapting to the palatal contours. Due to posterior position of this fistula and to prevent aspiration, an upper removal appliance (URA) consisting of an acrylic baseplate, retained by Adams' clasps on the URE and ULE, and C-Clasps on the URC and ULC, was preferred and utilised for diagnostic purposes. Speech assessments and lateral video-fluoroscopy were then carried out with and without the URA. Results showed some reduction of nasal flow with obturation. The difference in assessments may have been limited due to a small margin of fistula that was unoccluded posteriorly. The lateral video-fluoroscopy revealed an average-length soft palate with good extensibility and elevation. There was complete and consistent closure at the back wall in both cases.This indicated that pharyngoplasty was not required but that surgical intervention should target correction of the fistula. The patient was therefore listed for direct repair of the fistula +/- buccinator flaps. We encouraged the patient to continue wearing the URA in between her speech therapy leading up to surgery.

Abstract citation ID: cjae081.278
CP211 ORTHODONTIC MINI IMPLANT SMARTPEG (OMIS): A NOVEL MI STABILITY VERIFIER USING OSSTELL ISQ DEVICE

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BACKGROUND: The stability of mini implants (MIs) plays a crucial role in orthodontic anchorage, significantly impacting the success of orthodontic treatments. Resonance Frequency Analysis (RFA) represents a recent and more precise method used to quantify the stability of implants. It involves measuring the stiffness of the implant within the bone tissue using magnetic

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pulses. Commercially, this assessment is performed with the Osstell ISQ device, which introduces controlled vibrations to the implant via a sensor connected to a Smartpeg. These Smartpegs are typically fabricated based on a conventional implant.
OBJECTIVE: To develop and validate a method for utilizing the Osstell ISQ device in assessing the stability of orthodontic MIs.
MATERIALS AND METHODS: The Orthodontic Mini Implant SmartPeg (OMIS) was created as a specialized Smartpeg designed to attach to various orthodontic MIs. To validate it, a 3.5 mm (diameter) x 7.5 mm (height) SICace® screw implant was placed into a goat's jawbone. Using the Osstell ISQ device, the implant stability was measured. This involved comparing a conventional SmartPeg attachment (gold-standard measurement) with the OMIS attached to the implant via an adaptor approximating a MI's head (test measurement). The Implant Stability Quotient (ISQ) values were evaluated for agreement, repeatability, and reproducibility.
RESULTS: Strong positive correlations were observed between the ISQ values obtained using the OMIS and those derived from the standard SmartPeg attachment. The consistency and reliability of ISQ values using the OMIS were comparable to those obtained with the conventional attachment, demonstrating similar levels of repeatability and reproducibility.
LIMITATION: The conventional implant is the subject of the current ISQ scale. To more accurately depict orthodontic MI, which has reduced diameters and lengths, a new ISQ scale is required.
CONCLUSION: The OMIS was developed and validated for evaluating the stability of orthodontic MIs using the Osstell ISQ system. This new MI stability verifier consistently provided repeatable and reproducible measurements of MI stability, akin to those achieved through the conventional SmartPeg attachment. This customized Smartpeg facilitates non-invasive stability assessments of various types of MIs, including many that cannot be evaluated using the traditional SmartPeg attachment due to incompatibility.

Abstract citation ID: cjae081.279
CP212 ARTHROCENTESIS WITH INFILTRATION OF PLASMA RICH IN GROWTH FACTORS: A CLINICAL CASE REPORT

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BACKGROUND: Arthrocentesis is a minimally invasive surgical intervention used as a first line treatment for patients resistant to conservative treatment, aiming to remove inflammatory mediators, restore fluid viscosity, and improve joint mobility. A 56-year-old female patient with persistent left preauricular pain after a car accident sought treatment at the Orthodontic Department. The patient was then derived to the Department of Craneomandibular Disfunction. The patient presented a maximum opening of 25mm with hard end feel and a limited right laterality of 5mm. The patient presented local masseter myalgia and inflammation of the retrodiscal and synovial tissues. CBCT revealed joint degeneration in the left and right condyle, with the presence of osteophyte in the latter. The Magnetic Resonance Imaging confirmed disc displacement with and without reduction of the left and right TMJ, respectively. After three months of self-care, rehabilitation and physiotherapy, no significant difference in pain and symptomatology was found. The patient was advised to continue with a minimally invasive approach
OBJECTIVE: Demonstrate the efficiency of Arthrocentesis with PRGF to a failed conservative management of patient with disc pathology. Highlight the importance of correct diagnosis prior orthodontic treatment.
TREATMENT DESCRIPTION: It was decided to perform a unilateral joint lavage of the most affected TMJ. Auriculotemporal nerve block with bupivacaine 0.25% without VC and under intravenous sedation. Asepsis and surgical field. Right TMJ lavage with 60ml of lactated Ringer's lactate and 5ml of PRGF fraction 1. Final joint infiltration with 3ml of PRGF fraction 2.
RESULTS: Immediately after surgery, there was a significant reduction in pain intensity and increased range of motion. At subsequent check-ups the patient presented an opening range of 42 mm and right laterality of 11 mm, being asymptomatic. After 1-year post-operation the patient continues with no symptomatology and a complete opening of 41mm. A 1-year post-op CBCT is taken to compare the bone intensity and alterations.
CONCLUSIONS: It has been shown that joint lavage combined with PRGF infiltration for the treatment of TMDs is more effective than arthrocentesis alone. Improves functional outcomes, diminishes pain and restores quality of life.

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CP213 ORTHODONTIC TREATMENT OF A PATIENT WITH CLEIDOCRANIAL DYSOSTOSIS: A CASE REPORT

Miss Angeliki Anna Gkinosati[1], Dr. Zoi Nicolaou[2], Miss Elli Laspou[3], Dr. Christodoulos Laspos[1]; [1]*School of Dentistry, European University Cyprus,* [2]*Cyprus Cranio-Maxillofacial Center,* [3]*Universitat Internacional de Catalunya*

AIM: Cleidocranial dysplasia (CCD) or cleidocranial dysostosis, is an inherited, autosomal-dominant condition that is characterized by several skeletal defects including cranial malformations, underdevelopment, absence of clavicles and multiple supernumerary and impacted teeth as well as Angle's Class III malocclusion. It is usually caused by a mutation in the RUNX2 gene, affecting osteoblast differentiation. The aim of this study is to present the orthodontic management of a young female with CCD.
METHODS: An 8-year-old female aware of her condition, was admitted to our clinic along with her mother which was also diagnosed with CCD. The intraoral examination of the patient revealed delayed exfoliation of primary teeth along with presence of severe attrition. A panoramic X-ray showed multiple supernumerary and impacted permanent teeth, characteristic for this condition.
RESULTS: The treatment provided was comprised from a combination of orthodontics and surgical exposure of impacted teeth along with extraction of supernumeraries. In the initial phase of treatment, a transpalatal arch was used. Later, tooth alignment with fixed orthodontic appliances took place to facilitate surgical exposure of impacted teeth and orthodontic traction into the oral cavity. Surgical exposure of impacted teeth by quadrant along with simultaneous extraction of supernumerary teeth was performed. The duration of treatment was 7 years. After treatment completion, fixed retainers were placed in the upper and lower anterior teeth and removable clear retainers were given to the patient with instructions to wear them every night for a year and then once a week. A regular check-up every 6 months was performed. Follow-up showed minor changes of the final Class I relationship and an esthetically pleasing result.
CONCLUSIONS: Early diagnosis and initiation of orthodontic treatment in CCD patients is essential for achieving optimum results. Patients with CCD benefit from a multidisciplinary approach, necessary for achieving ideal function as well as smile and facial aesthetics, which will greatly improve the patient's self-esteem.

Abstract citation ID: cjae081.281
CP214 A LOCAL 2-CYCLE AUDIT OF LABORATORY WORK PROVIDED TO A HOSPITAL ORTHODONTIC DEPARTMENT.

Miss Evelyn Marie Richmond[1], Mr Andrew McBride[1], Mr Christopher Johnston[1]; [1]*School of Dentistry*

BACKGROUND: An audit of laboratory services provided by the in-house and commercial dental laboratories to the orthodontic department in the School of Dentistry, XXXXXXX, was carried out to ensure optimal standards of patient care.
AIMS: To assess the quality of laboratory work against locally agreed gold standards, to identify potential areas for improvement, and to make recommendations to improve the quality of laboratory work.
METHODS: The first cycle ran from 03/01/23 to 07/02/23 (n=55), and the second cycle ran from 30/05/23 to 03/07/23 (n=63). Data was collected prospectively using a standard proforma.
RESULTS: During the first cycle, the in-house laboratory provided 56.4% of laboratory work, and a commercial dental laboratory provided the remaining 43.6%. Orthodontic trimmed study models were the most frequently requested item of laboratory work. 66.7% of study models, 93.8% of vacuum-formed retainers (VFRs) and 66.7% of orthodontic appliances met all locally agreed gold standards.
During the second cycle, the in-house laboratory provided 68.3% of laboratory work, and a commercial dental laboratory provided the remaining 31.7%. Orthodontic trimmed study models remained the most frequently requested item of laboratory work. 83.9% of study models, 84.0% of VFRs and 100.0% of other orthodontic appliances met all locally agreed gold standards.
CONCLUSIONS: Laboratory services continue to be outsourced due to in-house laboratory staffing levels. Additionally, the commercial dental laboratory constructs orthodontic appliances on articulated working models, which reduces the need for excessive chairside adjustment and may increase patient comfort. Outsourcing orthodontic appliances may be a more time and cost-effective long-term solution when balanced against the cost of employing an additional in-house laboratory technician.
Orthodontic trimmed study models were the most frequently requested laboratory work item in both cycles. Poor quality and incorrectly trimmed study

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models can hinder diagnosis, treatment planning, progress monitoring and pre-orthognathic surgical assessment. The quality of study models significantly improved between the first and second cycles.
In both cycles, the in-house laboratory provided all VFRs; this is advantageous as VFRs are quick and easy to fabricate, allowing for same-day de-bond and retainer fitting and rapid refabrication if issues are encountered.

Abstract citation ID: cjae081.282
CP215 TORQUE CONTROL OF THE UPPER SECOND MOLARS WITH MINISCREW PLACED ON MIDPALATAL SUTURE – A CASE REPORT

Miss Guleser Akdemir[1], Mrs Banu Saglam Aydinatay[1]; [1]*Department of Orthodontics, Faculty of Dentistry, Hacettepe University*

AIM: The aim of this case report is to present the correction of the positive crown torque of upper second molars with the help of a miniscrew placed on the midpalatal suture.
SUBJECT AND METHOD: A 21 year old male patient applied to our clinic with the complaints of deepbite and crowding in the lower teeth. In clinical extraoral examination, he had no asymmetry and had a slightly concave profile. According to the intraoral examination, the patient had Class I molar and canine relationships on both side. There was moderate crowding in the maxilla and severe crowding in the mandible (Fig 1). The lateral cephalometric analysis showed that he had skeletal Class I and brachyfacial growth pattern. The upper and lower incisors were palatally inclined. The overjet and overbite were 3 mm and 7.2 mm, respectively. The treatment of the patient was planned as the correction of deep bite, incisor inclinations and crowding in the mandible with ARS (Air Rotor Stripping). At the beginning of the treatment, bite turbos were placed in the palatal region of the upper central incisors in order to allow the eruption of molar teeth and correction of deepbite. With the increase of crown torque of the upper second molars during the treatment, the need for torque control arose. 1.6-6 mm miniscrew (Jeil Medical) was placed in the midpalatal suture at the level of the palatal cusp of the upper first molars. Force was applied by using elastic chain to the upper second molars through the buttons bonded to their palatal surface (Fig 2).
RESULTS: At the end of the treatment, Class I molar and canine relationships, ideal overjet and overbite were obtained. Positive crown torque of upper second molars were reduced (Fig 3). The treatment lasted 13 months.
CONCLUSION: The miniscrew placed on the midpalatal suture was effective in torque control of the molars.

Abstract citation ID: cjae081.283
CP216 ORTHODONTIC TREATMENT OF CLASS II MALOCCLUSIONS USING INVISALIGN WITH MANDIBULAR ADVANCEMENT: A CASE SERIES

Miss Tara Maroke[1], Ms Aisling Byrne[1]; [1]*Walsall Manor Hospital*

BACKGROUND: Orthodontic correction of Class II malocclusions with mandibular retrognathia has long been considered challenging. In a growing patient, a functional appliance is usually the modality of choice for overjet reduction by means of growth modification. However in 2017, Align Technology introduced Invisalign with mandibular advancement, the first clear aligner solution for the correction of Class II malocclusions in growing tween and teen patients. This encourages overjet reduction alongside alignment of the teeth to create one simplified phase of treatment without the need for a traditional functional appliance. Functional appliance therapy usually involves multiple treatment phases, including a fixed appliance phase and the overall treatment time can take a number of years. Invisalign with mandibular advancement can be completed in as little as 18 months and is more patient friendly, leading to high patient compliance rates. This case series aims to demonstrate the ease of correction of Class II malocclusions in 7 patients with mandibular retrognathia using Invisalign with mandibular advancement.
DESIGN & SETTING: A case series of 7 patients presenting with a Class II malocclusion and an increased overjet who were treated on a non-extraction basis using Invisalign clear aligners with mandibular advancement. The mean start age of the patients was 11 years and 11 months and the mean start overjet was 10.1mm. A single specialist Orthodontist in a primary care setting in Birmingham, U.K, carried out all treatment.
RESULTS: All patients underwent successful correction of their malocclusion and finished with a Class I incisal relationship. The mean final overjet was 2.4mm with an average overjet reduction of 7.7mm. The average treatment time was 22 months, ranging from 17 to 30 months.
CONCLUSIONS/IMPLICATIONS: Orthodontic correction of Class II malocclusions using Invisalign with mandibular advancement is an effective, efficient, and patient-friendly method of reducing substantial overjets whilst simultaneously aligning teeth. This has the advantage of offering an overall reduced total treatment time in comparison to traditional functional appliance treatment.

Abstract citation ID: cjae081.284
CP217 THE USE OF PASSIVE SELF-LIGATING APPLIANCES IN THE FUNCTIONAL TREATMENT OF CLASS II/2 ANGLE

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BACKGROUND: The philosophy of orthodontic treatment with passive self-ligating (PSLB) appliances asserts that this technique employs brackets with lower frictional resistance compared to other fixed appliance systems. It has been claimed that the Damon system, which utilizes the PSLB technique, offers several advantages over other bracket systems in terms of efficiency and effectiveness. However, there are studies that question the efficacy and efficiency of passive self-ligating appliances compared to other orthodontic appliance systems.
AIM: The purpose of this oral presentation is to demonstrate the effectiveness of PSLB in the functional treatment of Class II/2 Angle anomalies.
CASE PRESENTATION: An 11-year-old adolescent presented to the Orthodontic Clinic without significant dental history, expressing concern about the aesthetic appearance of her teeth. The orthodontic diagnosis indicated a Class II div 2 malocclusion, with narrow maxillary and mandibular dental arches, a convex profile, no overjet, and a covered deep bite with distalized relationships on both sides. After case evaluation, therapy with light intraoral elastics was chosen as the appropriate treatment plan. Treatment progress included the use of various sizes and ratios of Class II elastics, archwire changes, and the use of specific brackets for each part of the dental arch.
CONCLUSION: Treatment with PSLB led to the improvement of the shape of the maxillary dental arch and the correction of dental crowding.

Abstract citation ID: cjae081.285
CP218 A NOVEL METHOD FOR 3D MEASUREMENTS OF SOFT TISSUE CHANGES IN FACIAL ORTHODONTIC AND ORTHOPAEDIC THERAPY

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BACKGROUND: 3D soft tissue measurements are crucial in orthodontic/orthopaedic therapy for comprehensive treatment planning and evaluation. Existing methods are 2D soft tissue evaluations on cephalometric images or often face limitations in precision. In response, the team at the KU Leuven developed an innovative method, that was implemented at the University of Ghent, representing an inter-university collaboration.
OBJECTIVES: The primary aim of this novel method is to have precise 3D soft tissue measurements in facial orthodontic and orthopaedic therapy, by utilizing MATLAB® and Python® scripts, instead of 2D radiographic images. This allows unlimited comparisons to the initial image for clear colour-mapped soft tissue changes to highlight changes of therapy excluding variations attributed to natural growth.
METHODS: Commencing with standardized 3D image acquisition, the images undergo meticulous cropping in a Python script, focusing solely on facial soft tissues. Landmarks are strategically placed in a specific order to ensure accurate orientation in 3D, preventing inversion in Matlab. Following this, the Python script cleans the images, eliminating noise like accidental hair. Open-source software MeshMonk in Matlab is then utilized for mesh creation, converting cleaned images into structured surfaces. Quasi-landmark identification is applied to pinpoint anatomically meaningful points on the mesh, allowing analysis of specific soft tissue zones. Non-rigid mapping within Matlab involves deforming the initial facial mesh to account for shape changes over time. Comparative analysis via Iterative Closest Point (ICP) registration aligns two meshes, revealing disparities and representing facial alterations as vectors.
RESULTS: Key features include data cleanliness, precise landmark placement, and distance measurements. The combination of MATLAB and Python Scripts contributes to noise reduction and creates a dataset for evaluating soft tissue changes. The interaction between these scripts offers a solution for 3D measurement in facial orthodontic/orthopaedic therapy.
LIMITATIONS: While promising, limitations include potential influences from image quality and facial anatomy complexity.
CONCLUSION: This innovative method represents a significant step forward in 3D soft tissue measurements for facial orthodontic and orthopaedic therapy. Overcoming existing limitations, it offers a reliable tool for orthodontic

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practitioners, holding potential to revolutionize the assessment of soft tissue changes.

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CP220 OPTIMIZING ORTHODONTIC CARE: ADVANCED TECHNIQUES FOR ACCELERATING TOOTH MOVEMENT. SCOPING REVIEW

Mrs Evdokia Tampakopoulou[1], Dr Panagiotis Galanis; [1]*National And Kapodistrian University Of Athens*

BACKGROUND/OBJECTIVES/AIMS: The prolonged duration of orthodontic treatment often leads patients, especially adults, to seek alternatives, driving the need to accelerate tooth movement in order to reduce treatment times and mitigate adverse effects associated with prolonged orthodontic therapy. Various methods, spanning invasive to non-invasive, have emerged aiming to expedite orthodontic processes.
OBJECTIVE/AIMS: The primary aim of this presentation is to explore techniques and interventions designed to accelerate tooth movement within orthodontics. This includes investigating techniques that facilitate quicker orthodontic treatment while considering the scope of mitigating potential adverse effects related to prolonged therapy.
MATERIALS/METHODS: A comprehensive review was conducted using multiple databases including PubMed, Google Scholar, Scopus, and Cochrane to explore techniques for expediting orthodontic tooth movements. English-language studies across invasive, minimally invasive, and non-invasive categories were the focus, aiming for a thorough examination of contemporary methodologies.
RESULTS: Invasive approaches such as interseptal alveolar surgery, corticotomy, and Periodontally Accelerated Osteogenic Orthodontics (PAOO) involve surgical techniques to accelerate tooth movement. Minimally invasive methods like Piezocision and Micro-Osteoperforations (MOPs) stimulate bone with minimal tissue invasion, promoting faster tooth movement. Non-invasive techniques include vibration devices, low-level laser therapy (LLLT) (photobiomodulation) and biological substances, each contributing to expediting tooth movement in orthodontics.
LIMITATIONS: Constraints on accessing non-English studies and the rapid evolution of the field may limit the review's comprehensiveness. Additionally, variability in study methodologies and techniques could influence the overall assessment and generalizability of the findings.
CONCLUSIONS/IMPLICATIONS: Contemporary orthodontics presents a rich array of tools and techniques, providing a multitude of options to enhance treatment approaches and minimize treatment time. The importance of individualized treatment strategies remains paramount. Staying abreast of these innovations empowers practitioners to significantly enhance the landscape of orthodontic care. However, continued research and development are crucial to further refine these methods and ensure continued advancements in orthodontic treatments and patient outcomes

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CP221 MAXILLARY MOLAR DISTALIZATION ACHIEVED WITH INVISALIGN ALIGNERS

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AIM: The aim of this presentation is to study the efficacy of the Invisalign protocol concerning the upper molar distalization in cases of class II non-extraction adult patients.
MATERIALS AND METHODS: Two case reports of adult patients with class II are presented. Both cases were treated with Invisalign clear aligners. Intraoral photos and lateral cephalograms were taken before and after treatment. The first case was about a female adult patient with class II division 1 and the second case concerned a male adult patient with class II division 2. Both cases were treated with Invisalign clear aligners without extractions for two years. All the attachments we used were engineered by Align Technology to achieve predictable tooth movements. The vertical and transverse positions of the attachments on the tooth surfaces were done according to Align Technology's treatment protocol (for incisor torque and molar distalization) or automatically by the software. Maxillary molar distalization was achieved with attachments and class II elastics throughout the treatment.
RESULTS: The exact force systems and their progressions generated by Invisalign clear aligners have not been investigated thoroughly. In our cases the distalization of upper molars was an effective movement, with high accuracy achieved with Invisalign treatment protocol.
CONCLUSIONS: As described in the literature, one of the most difficult movements to perform with an aligner is the molar distalization. To date, no scientific study has evaluated the exact efficacy of molar distalization using aligners. More studies focusing on a number of cases should be conducted in order to properly examine the capability of Invisalign aligners in molar distalization and their ability to be used in more complex cases.

Abstract citation ID: cjae081.288
CP222 CRANIOFACIAL CHARACTERISTICS IN CONGENITAL MYOPATHY: A CASE REPORT

Mrs Isidora Christopoulou[1], Mrs Ioanna Pouliezou[2], Mrs Artemis Doulgeraki[3], Mr Iosif Sifakakis[1]; [1]*Department of Orthodontics, National And Kapodistrian University Of Athens,* [2]*Medical Research Methodology, School of Medicine, Aristotle University of Thessaloniki,* [3]*Department of Bone and Mineral Metabolism, Institute of Child Health, Agia Sophia Children's Hospital*

BACKGROUND: Congenital myopathy is a diverse group of clinically, genetically, and histologically heterogeneous disorders that mainly affect muscle tissue. The estimated prevalence is around 3:100000. More than 30 genes are related with congenital myopathies, with RYR1 being the most frequently involved. Clinical phenotype consists of hypotonia, muscle atrophy, dysphagia, physical disability and significant loss of muscle mass. The craniofacial area is also affected by the impairment of muscle function with an increased prevalence of malocclusions and aberrant craniofacial morphology.
AIM: To present a rare case of congenital myopathy and the associated craniofacial characteristics.
METHODS: A 14-year old female patient was referred to the Orthodontic Department of the School of Dentistry, Athens, seeking orthodontic treatment. Diagnosis of autosomal dominant congenital myopathy was confirmed 22 months prior to arriving to our clinic, via WES, identifying RYR1 mutation. Diagnostic orthodontic records were obtained and included extraoral and intraoral photographs, a panoramic and a lateral cephalometric xray, as well as dental casts.
RESULTS: Onset of the congenital myopathy occurred in infancy, with muscle hypotonia being the first symptom. The patient presented cardiorespiratory insufficiency, positive Gowers sign and muscle atrophy. Scoliosis, flat feet and decreased bone mineral density were also reported. Neurologic involvement consisted of delayed walking and areflexia. Clinical examination of the craniofacial complex revealed a vertical growth pattern with an elongated face, midface deficiency, skeletal Class III, lip incompetence and a high arched palate. The patient had also cleft palate, which was surgically treated at one-year of age. A combination of orthodontics and orthognathic surgery was considered the treatment of choice once skeletal maturity has been reached, however the impairments that result from myopathy should be carefully considered before orthodontic treatment initiation.
CONCLUSIONS: The primary goal of orthodontic treatment in patients with myopahy is to address any dental or skeletal issues while considering the patient's muscular condition and overall health, as well as the high risk of relapse due to muscle atrophy. Collaboration among healthcare professionals and clear communication with the patient and their family are essential for a successful orthodontic outcome while prioritizing the patient's comfort.

Abstract citation ID: cjae081.289
CP223 INVASIVE CERVICAL RESORPTION FOLLOWING ALVEOLAR BONE GRAFTING IN CLEFT LIP AND PALATE PATIENTS: A LITERATURE REVIEW AND CLINICAL CASE

Mrs Rachel Hutchinson[1], Dr Chris Johnston[1]; [1]*School of Dentistry, Royal Victoria Hospital*

AIM: To evaluate the available literature regarding invasive cervical resorption (ICR) following alveolar bone grafting (ABG) in patients with cleft lip and palate (CLP), and to illustrate the assessment and surgical repair of ICR through a clinical case.
METHODS: Literature on database MEDLINE via PubMed to November 2023 was reviewed, with a time restriction of 20 years.
RESULTS: Only four articles met the search criteria. Of the four articles available, only two were specifically related to ICR following ABG. One case of near-complete resorption of a supernumerary tooth within an ABG site was documented. Only one investigational study was identified in the literature search, which reported that 14 out of 588 CLP patients reviewed were diagnosed with ICR, 93% of whom had undergone surgical bone grafting. No statistical

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evaluation or meta-analysis of prevalence or treatment outcomes can be undertaken due to the scarcity of clinical outcome studies on this topic.
CASE SUMMARY: An 11-year-old male presented with a previously repaired bilateral cleft of the lip and palate, Class III incisor relationship on a skeletal III base, a 2mm reverse overjet and hypodontia of the upper permanent lateral incisors. Right-sided ABG was completed at age 14 without complications. Repair of the left side was subsequently completed at age 15, and ICR was identified on the mesial aspect of the upper left permanent canine at the 6-month radiographic review. A multidisciplinary approach was employed for further management. Investigation with CBCT confirmed a 2x3mm defect, extending into the crown and involving the coronal third of the root. Surgical repair involved marginal bone removal to access the defect, debridement of the cavity and restoration with Biodentine. Repair of the ICR defect has been successful to date, and the patient has subsequently commenced fixed appliance orthodontic treatment.
CONCLUSIONS: ICR is a rare, but significant, potential complication following ABG procedures which patients and parents should be informed about during the consent process. Surgical restorative repair is possible, although there remains a need for clinical outcome studies of this type of repair in affected ABG patients to assess the rates of success.

Abstract citation ID: cjae081.290
CP224 APPROPRIATENESS OF NEW PATIENT ORTHODONTIC REFERRALS- A MULTI CENTRED AUDIT

Ms Kirandeep Nandhra[1], Mr Mohamed-Saeed Seedat, Mr Ali Payam Sattarzadeh, Ms Natasha Wright, Mr Huw Jeremiah; [1]*Cambridge University Hospitals NHS Trust*

BACKGROUND: NHS orthodontic services have been increasingly stretched in recent years, worsened by the disruption to dental services during the Covid pandemic. As a result, waiting lists for new patients to be seen are ever increasing, making it paramount that referral pathways are used as efficiently and effectively as possible. Patients referred in for consideration of orthodontic treatment should be dentally fit and motivated for treatment. Additionally, the NHS have released guidance on commissioning dental specialities, which sets out 4 complexity descriptors of care (level 1-3b) with the recommended setting and practitioner competency for each.
METHOD: A 6 month retrospective single cycle multi-centered audit was undertaken at 2 UK NHS hospitals March- August 2022, recording the following primary outcome measures: Unplanned caries status (i.e the referrer hasn't requested advice on it), motivation for treatment and commissioning complexity level. Based on current guidance, we set a gold standard of >80% appropriate referrals, which was defined as patient's motivated for treatment without any unplanned caries, and commissioning complexity level 3a or 3b.
RESULTS: At site 1 (n=173), 76% referrals were deemed appropriate based on the above criteria, and site 2 (n=192), 86% were appropriate. Site 1 had higher (17% Vs 5%) unplanned caries status, and lower levels (86% Vs 92%) of patient motivation.
LIMITATIONS: Site 1 had a significantly higher (67% Vs 38%) number of referrals from primary care orthodontists, which may have resulted in an increased length of time since seeing a general dentist (if the referral pathway was completed twice), reflected in a higher caries incidence. Also, site 2 has a referral proforma on which referrers have to specifically comment on dental health status and motivation, site 1 does not.
CONCLUSIONS: The audit found mixed compliance with our standards for appropriate referrals, with site 1 meeting the standard and site 2 not. Referring clinicians need to consider the extent of waiting lists, and the impact of inappropriate referrals on valuable clinical time. We need to ensure that our referring providers are therefore educated on the above factors in order to improve this process in the future.

Abstract citation ID: cjae081.291
CP225 MAXILLARY CENTRAL INCISOR SUBSTITUTION WITH LATERAL INCISORS FOLLOWING THE REMOVAL OF PRE-EXISTING BRIDGE RESOTRATION IN AN ADULT CLASS II MALOCCUSION

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AIM: Our aim of this case report is to describe and discuss that customized extraction schemes instead of premolar extraction may be necessary especially in aged adults when multiple missing, hopeless teeth, edentulous sites or bridge restorations are pre-existing. We report a case with conservative orthodontic treatment for tooth substitution by space closure of edentulous sites. This case illustrates how the bilateral pontic space of the maxillary central incisors was substituted with lateral incisors and laterals with canines as well as the hopeless second maxillary molar with the third molar instead of premolar extraction to improve protrusion in a middle-aged adult.
MATERIALS AND METHOD: A 47-year-old female was referred from the Dep. conservative dentistry for protraction of the third molar to replace the hopeless maxillary second molar. She indicated Skeletal Class II, hyperdivergent facial profile with lip protrusion, retruded mandible and hyperactivity of mentalis muscle. Maxillary central incisors were missing and restored with a 4-unit bridge supported by her maxillary lateral incisors. Mandibular lateral incisors were congenitally missing as well. To improve her protrusive profile and the overall occlusion, maxillary bridge restoration was removed and pontic space was closed instead of premolar extraction. The third molar was protracted after the extraction of the hopeless second molar. The lower arch was distalized with TADs.
RESULTS: Proper occlusion was obtained by substitution of edentulous sites and total arch distalization with TADS. After the orthodontic treatment, teeth whitening and periodontal surgery was performed. Single crown restoration was done on the lateral incisors substituting the missing central incisor. Canines were reshaped as lateral incisors. Counterclockwise rotation of the mandible, which improved her profile, was induced by total arch intrusion of the maxillary arch.
CONCLUSIONS: Orthodontic treatment by space closure of edentulous sites and substitution of teeth with conservative interdisciplinary team approach improved the occlusion as well as micro, mini and macro-esthetics in a middle-aged Class II malocclusion.

Abstract citation ID: cjae081.292
CP226 OROFACIAL FINDINGS AND ORTHODONTIC TREATMENT CONDITIONS IN PATIENTS DIAGNOSED WITH DOWN SYNDROME.

Prof Stephan Christian Möhlhenrich[1], Priv.-Doz. Dr. Peter Schmidt[2], Dr. Sachin Chhatwani[1], Priv.-Doz. Dr. Kirstian Kniha[3], Prof. Dr. Gholamreza Danesh[1]; [1]*University Of Witten/Herdecke, Department of Orthodontics,* [2]*University Of Witten/Herdecke, Department for Special Care Dentistry,* [3]*University Hospital of Aachen, Department of Oral and Maxillofacial Surgery*

BACKGROUND: Down syndrome/Trisomy 21, the most prevalent chromosomal anomaly, is often linked to diverse levels of intellectual disability and physical malformations. This study outlines distinctive orofacial traits related to orthodontic treatment considerations and features, drawing insights from a patient cohort at Witten/Herdecke University in Germany.
MATERIALS/METHODS: This study analyzed data from 20 patients (14 boys and 6 girls, mean age: 11.69 ± 3.94 years) who underwent orthodontic treatment from July 2011 to May 2022. The assessment included baseline skeletal and dental conditions, the presence of hypodontia, displacements, and treatment-related root resorptions. Treatment needs were evaluated using the German KIG classification, with treatment success determined based on patient compliance.
RESULTS: The patient cohort was predominantly characterized by a class III relationship (ΔANB: −2.07 ± 3.90°; ΔWITS: −3.91 ± 4.33 mm) and a brachyfacial cranial configuration (ΔML-NL: −4.38 ± 7.05°, ΔArGoMe: −8.45 ± 10.06°). The transversal discrepancy in dental arch width from maxilla to mandible was −0.91 ± 3.44 mm anteriorly and −4.4 ± 4.12 mm posteriorly. Among the orthodontic indication groups, hypodontia emerged as the most prevalent initial finding and treatment indication (85%), followed by frontal (75%) and unilateral lateral (35%) crossbite. Tooth shape was regular in 55% of cases, while 35% exhibited generalized and 15% isolated hypoplasia. A fixed multiband appliance was applicable to only 25% of patients due to satisfactory cooperation. In this subset, various degrees of root resorptions were observed during treatment, and 45% of all treatments had to be prematurely concluded due to insufficient cooperation from patients or parents.
CONCLUSIONS: The notable prevalence of dental and skeletal malformations, coupled with a high incidence of treatment-worthy findings in individuals with Down syndrome, emphasizes the significant need for orthodontic intervention, as evident in the KIG classification. However, this imperative stands in contrast to the supposedly heightened risk of root resorption and a notable decrease in patient cooperation. Anticipating compromised treatment outcomes and processes, it becomes essential to approach orthodontic treatment with simplicity and realism, aiming for a swift and therapeutically satisfactory result.

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SCIENTIFIC POSTERS

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SP1 GENDER DISTRIBUTION TRENDS OF PRACTICING ORTHODONISTS IN GREECE THROUGHOUT THE YEARS

Miss Alice Angelopoulos[2], Dr Gerassimos Angelopoulos[1], Dr. Vasileios Stathopoulos; [1]*National and Kapodistrian University of Athens,* [2]*European University of Cyprus*

BACKGROUND/AIM: Traditionally, most orthodontists have been men. In recent years, however the number of women in orthodontics, has increased dramatically. The trends of actual gender distribution of Orthodontists practicing in Greece has yet to be published. We aimed herein, to identify trends of gender distribution of Orthodontists in Greece from 1988 -when orthodontic specialty was officially recognized - until December 2023. Additionally, gender distribution in postgraduate students and faculty members was recorded.
MATERIALS/METHODS: The records kept in the secretariat of the Greek Association for Orthodontic Study and Research crosschecked from 1988 until 2020 with the records of the Hellenic Dental Association and the Dental Societies throughout Greece (verified thrice) were used. The data was updated in December 2023 through mail to Dental Societies throughout Greece and verified via personal communication. Orthodontists listed in the database but not practicing in Greece were excluded. Nine datasets gender distribution, from 1988 until 2023, were analyzed. Additionally, students and faculty gender distribution in both Orthodontic Departments of Athens and Thessaloniki were recorded.
RESULTS: Out of a total registered 578 practicing orthodontists in Greece 44,8% are women (December 2023). The percentage of female orthodontists gradually increased to become more balanced (1988: 31,4%, 1997:32,54, 2001:35,74, 2005:38,12, 2020:43,84%). Indeed, from 2001 until today female orthodontists outnumbered their male colleagues with 54,9% females compared to 45,1% males entering orthodontic practice. Today, 83,33% of the postgraduate students of Orthodontics in University of Athens and Thessaloniki are female. In regard to faculty the current distribution is balanced with 50% women (34,81% is female faculty, data from all dental Departments in Greece).
LIMITATIONS: For the database of 2023 out of 52 Dental Societies 10 did not respond to the e-mails, 9 of them confirmed through personal communication that no change from the last verified list of 2020 in regard to the orthodontists practicing within their jurisdiction has occurred.
CONCLUSIONS: In Greece, especially in the dental specialty of Orthodontics, it seems that the trend of the last decades is more and more females to become orthodontists. During the last 22 years females entering orthodontic practice outnumber their male colleagues.

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SP2 ORTHODONTIC MINI-IMPLANT EFFECTIVENESS AT THE ROYAL LONDON HOSPITAL

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BACKGROUND: A recent Cochrane (2014) review found moderate quality evidence that anchorage reinforcement using Temporary anchorage devices (TADs) is more effective than conventional methods such as headgear and transpalatal arches. A number of factors can affect mini-screws success including patient, site, and operator variables. The success rate of TADs must be evaluated on a continuous basis to identify problems, encourage learning, and most importantly, provide high-quality patient care.
OBJECTIVES: To determine the efficacy of orthodontic mini-implants used at The Royal London Hospital (RLH) NHS Trust, evaluate rates of success/failure, and failure types. To explore factors affecting success/failure of TADs. And to evaluate RLH's success rate in relation to the findings of the published British Orthodontic Society (BOS) national audit (2019).
MATERIALS AND METHODS: Data was collected retrospectively on (84) TADs placed (post COVID-19) by orthodontic consultants, specialty registrars, and post-CCST at the RLH. Data was gathered from records of standardized data collection sheet in the orthodontic department's database folder, which included information on (patient age, TADs specification, date of placement and removal, success or failure, failure type, re-insertion, reason for TADs use, and position of placement).
RESULTS: Failure rates for mini-screws were (41%), which is higher than the incidence of TADs failure from the national BOS audit report (<20%). Success rates could not be determined as (33%) of TADs were still in situ. Most of the failed mini-screws were loose/mobile (74%), placed by specialty registrars (56%) in patients aged 20-30 years (59%) in the buccal maxilla (62%). TADs size (L6mm D1.5mm N1.5mm) showed the majority of failure (47%). A greater number of TADs were re-inserted following failure (68%).
CONCLUSIONS AND RECOMMENDATIONS: Reaffirmed the importance of all trainees attending a high-quality training course before using mini-screws. Ensure patients are provided with specific oral hygiene instructions after mini-screw placement. All TADs placed are recorded in the database to ensure an accurate reflection of their use and success rates. Ensure the use of appropriate mini-screw dimensions for the particular bone site and the insertion protocol is followed correctly. Clinicians should reconsider the use of the anterior palate site to achieve higher success rates.

Abstract citation ID: cjae081.295
SP3 LONG-TERM STABILITY AND ANTI-BACTERIAL EFFECT BY FUCOSTEROL IN RESIN BONDING BIOMECHANICS

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AIM: Fucosterols have been widely studied for their antioxidant, anticancer, and anti-inflammatory properties, however, they have not yet been studied in the field of dentistry. This study aimed to determine whether pretreatment with fucosterol before resin restoration enhances bond stability and has an anti-bacterial effect.
MATERIALS & METHODS: After applying 0.1, 0.5, and 1.0 wt% fucosterol to demineralized dentin, microtensile bond strength (MTBS) and nanoleakage tests were performed, and the surface was observed using scanning electron microscope (SEM). The inhibition of matrix metalloproteinases (MMP) by fucosterol was analyzed using in situ zymography. Antibacterial activities of fucosterol were measured by live/dead assay and methylthiazol tetrazolium (MTT) assays of Streptococcus mutans.
RESULTS: The fucosterol-treated group showed better bond strength and less nanoleakage, and the corresponding structures were confirmed using SEM. MMP zymography confirmed that the activity of MMPs was relatively low along the concentration gradient of fucosterol. In addition, fucosterol exhibits excellent cytotoxicity against Streptococcus mutans, a major oral bacterium.
CONCLUSION: The results of this study validate that fucosterol pretreatment before resin restoration improves bond strength and reduces nanoleakage, and has excellent antibacterial activity. This study shows that fucosterol contributes to long-term resin bond stability, showing the potential to be used as restorative materials, including orthodontic resins, in the future.

Abstract citation ID: cjae081.296
SP4 THREE-DIMENSIONAL ANALYSIS OF PHARYNGEAL AIRWAY VOLUME IN CLASS I, II, III MALOCCLUSION

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AIMS: This study aimed to evaluate pharyngeal airway dimensions using cone beam computed tomography (CBCT) in patients with class I, II, and III malocclusions and normal growth patterns.
METHODS AND MATERIALS: All CBCT images were categorized into three groups: class I (0° < ANB < 4°, 0 < Wits < -1 millimeters mm), class II (ANB angle > 4°, 0 < Wits mm), and class III (ANB < 0°, Wits < -1 mm). CBCT images were obtained from individuals with normal growth patterns (32±5° = GN/GO – SN). Measurements were taken for total pharyngeal volume (TP), velopharyngeal volume (VP), glossopharyngeal volume (GP), oropharyngeal volume (OP), and the narrowest area of the airway. ANOVA and Tukey's post hoc test were used to compare the airway dimensions among skeletal classes I, II, and III
RESULTS: The CBCT images comprised 90 patients (45 males and 45 females) aged 17 to 39. The total pharyngeal airway volume was 19,483 ± 3,071, 16,091 ± 2,788, and 23,235 ± 5,684 mm3 in class I, II, and III malocclusions, respectively ($P < 0.001$). The TP, VP, GP, OP, and most constricted area volume in class II malocclusion was less than class I and III malocclusions ($P < 0.001$). The independent t-test showed that there was not any significant difference between males and females in class I and III malocclusions regarding the pharyngeal space. However, there was a significant difference between females and males in class II malocclusion.
LIMITATIONS: The limitation of this study was that CBCT scans of patients with horizontal or vertical growth patterns were not included due to the insufficient number of such cases.
CONCLUSIONS AND IMPLICATIONS: The mean volume of the TP, VP, GP, OP, and most constricted area in class III is significantly greater than in patients

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with skeletal class II and class I malocclusion with normal growth patterns. Pharyngeal space in female class II malocclusion was higher than that in males.

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SP5 INDICATORS FOR PROGNOSIS OF CANINE IMPACTION IN THE UPPER JAW

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INTRODUCTION: The canine teeth play a leading role in the formation of the dental arch and occlusion. The high risk of impaction of the canine teeth requires monitoring of their eruption and early diagnosis of their tendency to impaction.
AIM: The aim of this study is to explore alterations in angular and linear parameters, assessing the likelihood of canine teeth impaction, even during the early mixed dentition phase.
MATERIALS AND METHODS: A retrospective, longitudinal study was conducted on panoramic x-rays of patients taken during the period from early mixed to permanent dentition. The clinical group consisted of 85 patients with 110 impacted canines in the upper jaw and the control group consisted of 70 patients with 140 normally erupted upper canines. The study data were processed using SPSS for Windows 10.0. Various statistical methods, including Logistic Regression Analysis (LRA), ROC analysis, and Student's t-test et.al., were employed for analysis.
RESULTS: Logistic Regression Analysis revealed three indices with high predictive value regarding the likelihood of canine tooth impaction: α1 (axis angle3/axis1), β (axis angle3/axis2), and the ratio between the vertical NL and the canine crown. In early mixed dentition, a propensity for impaction was observed with mean values for α1 =>24.41° (P=0.0001) and β =>29.86 ° (P=0.005). In late mixed dentition phases 1 and 2, the values were as follows: for phase 1, α1 =>29.21 ° and β =>37.84 ° (P=0.0001); for phase 2, α1 =>29.09 ° and β =>35.78 ° (P=0.0001). The intersection of the vertical NL with the entire clinical crown of the canine germ indicates canine impaction from early mixed dentition, persisting into late mixed dentition with increasing statistical significance.
CONCLUSION: Following the mean values of the inclination of the permanent canine axis with respect to the two incisors and the vertical Nl makes it possible to determine the probability of canine impaction already in the early mixed dentition with good prediction accuracy. This makes it possible to determine the tendency of the canine teeth to impact and to take timely prophylactic measures to prevent impaction or at least to improve the position of the canine tooth.

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SP6 "LIP-TIES" -TO SEE OR NOT TO SEE? A TWO-YEAR RETROSPECTIVE STUDY OF PAEDIATRIC REFERRALS OF SYMPTOMATIC ISOLATED MAXILLARY LABIAL FRENUMS.

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BACKGROUND: The term "lip tie" is commonly used to describe an abnormal maxillary frenum. In normal anatomy, this refers to a fold of mucous membrane attaching from the upper labial mucosa to the free gingival margin between the central incisors which migrates apically as the primary teeth erupt and the maxillary alveolar height develops. The site at which the frenum attaches varies between individuals, however when this impacts function, we may consider this to be abnormal and restricted thus requiring surgical intervention.
AIMS: To assess referrals, indications for surgery and outcomes of "lip-ties" to provide a baseline measurement prior to implementation of a referral protocol.
METHOD: A two-year retrospective data collection was conducted for all patients under the age of 16, referred with a symptomatic "lip-tie" to paediatric OMFS.
RESULTS: 41 referrals were received and accepted for a face-to-face assessment. 2 patients were excluded for failure to attend and were discharged. The predominant referrers were GPs(84.6%). The ages of patients ranged from 4 months-14 years, with 77.0% of patients below 36 months. Only 7 patients(17.9%) underwent frenectomy leaving 0% planned for review and 82.1% discharged to primary care. Reasons for referral included feeding issues (38.5%), speech development concerns(28.2%), oral hygiene difficulties and trauma(35.9%), midline diastema (30.8%). All 7 patients undergoing frenectomy under general anaesthetic were under 4-years. Oral hygiene difficulties and a traumatic frenulum were the commonest indications for surgery, accounting for 6 of these patients. Those referred with a midline diastema were advised to seek an orthodontic opinion first.
CONCLUSION: This study highlights the high volume of infant referrals and likelihood of conservative management. This questions the need for patients to be reviewed in secondary care as it impacts waiting list and costs to the NHS. To improve the appropriateness of referrals, an information leaflet describing the normal development of the primary dentition in relation to a maxillary labial frenum, and indications for frenectomy, was created as an education tool for both GPs and parents. A copy was sent to each referrer and patient for rejected referrals when triaged by the Consultants. Re-referrals for further concerns would be accepted.

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SP7 SURFACE CHARACTERISTICS OF CALCIUM CHLORIDE SURFACE-TREATED MINI IMPLANT

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OBJECTIVE: This study aimed to investigate the surface characteristics of surface-treated titanium orthodontic mini-implant (MI) with acid etching and immersion in different conditions (concentrations, temperature and duration) of calcium chloride ($CaCl_2$).
METHODOLOGY: Surface roughness was assessed qualitatively and quantitatively with a scanning electron micrograph (SEM)(at 50x,500x and 1000x magnifications) and energy-dispersive spectrometer (EDS) (Fei Quanta FEG 450 Environmental Electron Microscope) of the surface-treated MI with different conditions of $CaCl_2$ immersions; concentrations (0.01 M, 0.1 M & 1.0 M), temperature (5°C,15°C and 25°C) and duration (1hour, 7 hours and 24 hours).
RESULTS: Surface topography changes observed due to increase insurface roughness by surface treatments by acid etched and various conditions of CaCl2 immersions. There was a significant difference in surface topographic changes seen by various irregularities with small cavities and protrusions were observed on surface of the MIs at different magnifications. The highest level of Ca2+ concentration detected was in 0.1 M at 5°C for 7 hours of immersion.
CONCLUSION: Mini implant surface modification using CaCl2 surface treatment provided a significant difference in surface topographic changes seen between the MI groups. Hence, it increased the potential surface area of osseointegration and enhanced tissue renewal and repair. The physicochemical characteristics analysis showed a significant presence of calcium ions by % wt on the MI surface. Different temperatures, concentrations, and times of immersion did affect the availability of $CaCl_2$ on the MI surface and $CaCl_2$ condition of 0.1 M at 5°C for 7 hours of immersion was the optimum condition for that.

Abstract citation ID: cjae081.300
SP8 OBSTRUCTIVE SLEEP APNEA ON PATIENTS TREATED WITH MANDIBULAR ADVANCEMENT DEVICES: COMPARISON OF POLYSOMNOGRAPHIC RESULTS

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BACKGROUND: Obstructive sleep apnea should be treated by a team of specialists: respiratory physician, orthodontist, maxillofacial surgeon, nutritionist and ENT. It is caused by a nasopharyngeal obstruction that results in hypoxia. OSA is treated by continuous positive airway pressure devices (CPAP), mandibular advancement devices, bimaxillary surgery and changing patient's lifestyle habits. Mandibular Advancement Devices (MADs) is commonly given in patients with mild apnea-hypopnea index (AHI), increases the anteroposterior diameter of the throat and thus making breathing easier by preventing the obstruction of the airway.
OBJECTIVES / AIMS: To determine the efficacy of MADs in patients with mild AHI based in polysomnographic studies and identify any tooth alterations prior and after the use of the device.
MATERIALS/METHODS: A polysomnographic study was performed by the respiratory physician on thirty patients who presented with symptoms such as daytime somnolence, snoring and morning headaches. The test was used to determine the severity of OSA, and all patients presented mild AHI. They were proposed to use the mandibular advancement device. When the MAD was adjusted to the patient, they were asked to repeat the polysomnographic test with the MAD in place. A comparison of the data from the two polysomnographic tests was done in order to determine the impact of MADs on patients with mild AHI. In order to identify any undesirable tooth movements, all 3d mouth scans were taken before and after the use of MADs.
RESULTS: In this study the results showed a significant improvement in both Apnea Hypopnea Index and the symptomatology of each individual. Some complications were noted, including increased sialorrhea, transient mucosal irritation

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and temporomandibular pain during the first two to three days of treatment. Without any significant tooth movement, slight alterations in the dentition throughout time were noted in terms of the tip and the torque.
CONCLUSIONS/IMPLICATIONS: Despite minor complications experienced in some patients using the device, this study shows that the use of MADs is a simple, affordable and efficient modality to treat patients with mild OSA.

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SP9 THE EFFECTS OF DIFFERENT MOUTHWASHES ON ORTHODONTIC APPLIANCES AND ACCESSORIES: A SYSTEMATIC REVIEW OF CLINICAL STUDIES

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BACKGROUND/AIM: Mouthwashes are commonly prescribed in dentistry and may impact orthodontic appliances and accessories during treatment. This study aimed to systematically investigate and evaluate the quality of evidence from clinical studies on this topic.
MATERIALS AND METHODS: Comprehensive electronic and manual searches were conducted. Controlled clinical studies assessing the effects of chlorhexidine (CHX), fluoride, or Persica-containing mouthwashes on orthodontic appliances and/or accessories were included. Data were extracted, and the bias risk was evaluated using RoB 2 for RCTs and ROBINS-I for non-RCTs.
RESULTS: Eleven studies were included. Using a 0.12% CHX mouthwash for one week before bonding did not affect the shear bond strength of polycarbonate brackets with composite resin adhesive. Compared to regular oral hygiene, rinsing with a 0.20% CHX mouthwash for 2 weeks induced minor changes in the surface topography of stainless-steel brackets. However, surface roughness of stainless-steel arch wires and maximum dynamic friction increased. Conversely, a 3-month administration of a 0.12% CHX solution did not significantly change NiTi wire properties. Corrosion in Haas expanders was unaffected by a 4-month use of a 0.12% CHX rinse. A 4-week use of a 0.20% CHX solution reduced Streptococcus mutans colonization in elastomeric modules compared to an alcohol-based mouthwash. Fluoride-containing mouthwash did not result in significant metal ion release from stainless steel orthodontic brackets, but acidulated fluoride solutions influenced corrosion on NiTi archwires. Increased metal ion release was observed in NiTi wires and brackets exposed to fluoride agents. Regarding rhodium-coated NiTi wires, fluoride increased yield strength and surface roughness but did not significantly affect unloading force and stiffness.
CONCLUSIONS: Chlorhexidine, fluoride, or Persica-containing mouthwashes may impact orthodontic appliances during treatment. Despite study limitations, clinicians should consider potential treatment-related ramifications.

Abstract citation ID: cjae081.302
SP10 IMPROVING ACCESS AND QUALITY OF PATIENT INFORMATION RESOURCES FOR ORTHOGNATHIC TREATMENT: A QUALITY IMPROVEMENT PROJECT.

Miss Evelyn Marie Richmond[1], Mr Andrew McBride[1], Dr Christopher Johnston[1], Prof John Marley[1]; [1]*School of Dentistry*

BACKGROUND: Before commencing the quality improvement project (QIP), clinicians noted limited patient engagement with the British Orthodontic Society (BOS) 'Your Jaw Surgery' online resources and that the existing BOS patient information leaflet (PIL) could be customised and developed to meet local requirements.
AIMS: To improve patients' understanding of orthognathic treatment by ensuring at least 90% of patients had read the new in-house PIL and a minimum of 50% of patients had accessed the BOS' Your Jaw Surgery' online resources before attending the joint orthognathic multidisciplinary clinic by June 2023.
METHODS: The QIP was undertaken in the orthodontic department of the School of Dentistry, XXXXXXX. Data was collected during a 6-month period from January to June 2023 for 3 PDSA cycles. Eligible patients were identified at new patient clinics. Baseline data was collected during PDSA cycle 1. The change ideas implemented in PDSA cycles 2 and 3 were a poster with a QR code directing patients to the BOS' Your Jaw Surgery' website and a new in-house PIL with a QR code directing patients to the BOS' Your Jaw Surgery' website. Following initial consultation for orthognathic treatment, patients were contacted to complete a questionnaire.
RESULTS: In PDSA cycle 1, 86.7% of patients were verbally directed to the BOS' Your Jaw Surgery' website, 53.3% reported accessing the online resources, 100.0% of patients reported reading the existing BOS PIL, but only 64.3% felt that it discussed the risks of orthognathic treatment in sufficient detail. By PDSA cycle 3, 100.0% of patients reported being directed to the BOS' Your Jaw Surgery' website, 58.3% engaged with the online resources, 83.3% of patients reported reading the new in-house PIL and 100.0% felt that the new PIL discussed the risks of orthognathic treatment in sufficient detail.
CONCLUSIONS: The small improvement in patient engagement with the BOS online resources indicates that patients may not necessarily choose to access information online. The uptake of the new PIL was greater than reported patient engagement with the BOS' Your Jaw Surgery' website, which indicates patients still value written information despite the availability of online resources.

Abstract citation ID: cjae081.303
SP11 IS IT NECESSARY TO USE ACRYLIC CAP SPLINT DURING SKELETAL MAXILLARY PROTRACTION IN UNILATERAL CLEFT LIP AND PALATE PATIENTS? A FINITE ELEMENT MODEL ANALYSIS

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AIM: In skeletal maxillary protraction techniques, usage of intraoral appliances isn't mandatory, as the protraction forces are applied from the skeletal units. However, the effects of skeletal anchored protraction on maxillary segments are unknown in patients with unilateral cleft lip and palate. The aim of this study was to evaluate the displacement effects of skeletally anchored maxillary advancement protocols on maxillary bone segments of the patients with unilateral cleft lip and palate, with or without posterior acrylic cap splint.
MATERIALS AND METHODS: Four models with unilateral cleft lip and palate were created for finite element analysis. Two treatment groups were created, and in each group two models were used: one model with, and the other without acrylic cap splint. Elastics were given from the miniplates placed at the infrazygomatic crest region to the facemask with a 30° angle to the occlusal plane (Group 1), or to the menton plate placed in the mandible (Group 2).
RESULTS: When acrylic cap splint was not used, contractive forces were observed in both groups, in transverse dimension. However, when acrylic cap splint was used, the contractive forces were less prominent in both groups. Regarding the sagittal and frontal planes, no difference was observed in relation to the acrylic cap splint usage.
CONCLUSIONS: In individuals with unilateral cleft lip and palate, it should be considered that narrowing of maxillary arch may occur during skeletal anchored maxillary protraction techniques, when the segments are not supported by a posterior acrylic cap splint. Therefore, this issue should be taken into consideration in patients with maxillary transverse deficiency. In both protocols, usage of acrylic cap splint can decrease the side effects in transverse dimension by merging the maxillary segments and creating a single unit.

Abstract citation ID: cjae081.304
SP12 A RETROSPECTIVE AUDIT OF THE SUPERVISION OF ORTHODONTIC THERAPISTS AT WALSALL MANOR HOSPITAL

Miss Tara Maroke[1], Ms Aliza Jesani[1]; [1]*Walsall Manor Hospital*

BACKGROUND: Orthodontic therapists are an integral part of the Orthodontic team since their introduction in 2007. They assist with the provision of Orthodontic care by carrying out reversible procedures under the prescription of a Dentist competent in Orthodontics or an Orthodontist. Their safe supervision requires a clear understanding of their scope of practice, as outlined by the General Dental Council in the United Kingdom. In April 2017, a best practice guidance document released by the British Orthodontic Society and Orthodontic National Group states that patients should be reviewed by the supervising Dentist at least every other visit.
AIM: To identify how often patients treated by Orthodontic therapists at Walsall Manor Hospital are reviewed by the supervising Orthodontist, whether a comprehensive written prescription was included in the patient notes if the supervising Orthodontist cannot be present and to assess whether the therapist is working within their scope of practice as outlined by the General Dental Council.
DESIGN & SETTING: A retrospective audit in the Orthodontic unit at Walsall Manor Hospital, United Kingdom. Local targets of 100% compliance with patients being reviewed by the supervising Orthodontist at every visit, availability of a comprehensive written prescription and all treatments being carried out within an Orthodontic therapists' scope of practice were set.
METHOD: A random retrospective analysis of 50 patients in treatment with all Orthodontic therapists at Walsall Manor Hospital in July 2023 was undertaken.

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RESULTS: The gold standard of adequate supervision was not met. Patients were reviewed by the supervising Orthodontist every other visit in only 38% of cases and a comprehensive written prescription was provided for the Orthodontic therapist when the supervising Dentist was not present in 48% of cases. The gold standard of Orthodontic therapists carrying out treatment within their scope of practice was met in 100% of cases.
CONCLUSIONS/IMPLICATIONS: Orthodontic therapists are vital members of the Orthodontic team, improving access to Orthodontic services and so improving patient care. Their safe supervision is essential to ensure patients are treated safely with the use of appropriate Orthodontic mechanics.

Abstract citation ID: cjae081.305
SP13 TRANSVERSE MAXILLARY DEFICIENCY: A CONE-BEAM COMPUTED TOMOGRAPHY RETROSPECTIVE STUDY

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AIM: This study aimed to assess the disparity between clinical evaluations of lateral crossbites and tomographic discrepancies in patients exhibiting various malocclusion patterns.
MATERIAL AND METHODS: A total of 120 consecutive CBCT images, comprising 60 high-resolution (isotropic voxel size 0.125x0.125x0.125 mm) and 60 medium-resolution (isotropic voxel size 0.35x0.35x0.35 mm), were selected from patients aged 24.2±10.4 years. These images were obtained from two orthodontic offices between January 2021 and September 2023. Transverse maxillary deficiency was measured using the Penn CBCT analysis and compared with the clinical assessment of lateral crossbite. Subsequently, patients were categorized into three groups: Group 1 - no tomographic discrepancy and no clinical crossbite, Group 2 - tomographic discrepancy and no clinical crossbite, and Group 3 - tomographic discrepancy and clinical crossbite. Statistical analysis was performed using SPSS 27.0.
RESULTS: Out of the total 120 patients, Group I (no tomographic discrepancy and no clinical crossbite) comprised 12 (10%) patients. Among them, Class I - 8 (6.66%), Class II - 4 (3.33%), and Class III - 0 (0%). Group 2 (tomographic discrepancy and no clinical crossbite) included 66 patients (55%) with Class I - 20 (16.66%), Class II - 44 (36.66%), and Class III - 2 (1.66%). Group 3 (tomographic discrepancy and clinical crossbite) consisted of 42 (35%) participants, with Class I - 6 (5%), Class II - 26 (21.6%), and Class III - 9 (7.5%).
CONCLUSIONS: This study underscores the importance of careful diagnosis and treatment planning, particularly in Class II anomalies where there is no clinical cross-sectional discrepancy but a tomographic discrepancy persists.

Abstract citation ID: cjae081.306
SP14 PILOT STUDY WITH PROVISIONAL RESULTS OF 3D SOFT TISSUE MEASUREMENTS IN ORTHODONTIC FUNCTIONAL THERAPY

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BACKGROUND: Treatment of Class II malocclusions poses challenges in achieving both dental alignment and favourable soft tissue changes. This ongoing study investigated the 3D soft tissue effects of orthodontic functional therapy, focusing on a limited sample of Class II division 1 patients (n=12). The aim was to have an indication how facial soft tissues respond to fixed (The Forsus™ Fatigue Resistant Device) and removable functional appliances.
METHODS: Soft tissue measurements were collected at the University Hospital Ghent through 3D imaging (Vectra® H1), capturing data both before and one year after the start of the functional therapy. The current sample size consisted of 12 individuals with an Angle Class II division 1 occlusion and an overjet of ≥ 4mm. Among the participants, there were 7 male patients aged between 8.8 and 12.7 years and 5 female patients aged between 12.3 and 16.1 years. The active treatment duration was from 5 to 12 months.
The measurement method was executed with Python® Scripts and MATLAB®. The Python scripts facilitated the cleaning of 3D images, while Matlab was key in creating structured surfaces, generating quasi-landmarks, and employing non-rigid mapping for facial mesh comparison over time.
RESULTS: Our innovative 3D measurement approach in facial orthodontic therapy unveiled a pronounced retrognathic movement of the soft tissues of the maxilla (-1 to -4mm) and forward movement of the mandibular soft tissues (1 to 4mm) with flattening of the labial fold. These results underscored the treatment's impact on reshaping the spatial dynamics between the upper and lower jaws. Examination of facial regions adjacent to the upper and lower lips revealed discernible colour variations, indicative of a probable influence of incisor inclination. Further exploration is essential for a thorough comprehension of these observations.
LIMITATIONS: Limitations included a currently limited sample size, and a lack of long-term follow-up data (beyond 1 year).
IMPLICATIONS/CONCLUSION: The pilot study showed significant association between beneficial outcomes on short-term soft tissues changes in functional therapy: a distalization of soft tissues of the upper jaw and advancement in the mandible. Future research aims to investigate the long-term effects of orthodontic functional therapy on facial soft tissues.

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SP15 INSIGHTS INTO DENTAL MORPHOLOGY AND FACTORS IN PALATALLY DISPLACED CANINES: A SYSTEMATIC REVIEW AND META-ANALYSIS

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BACKGROUND: Palatally displaced canines (PDC) represent a common anomaly in dental positioning, where the canine teeth are found in a palatal position rather than their normal alignment in the dental arch. This condition poses challenges in orthodontic treatment and may lead to various dental complications if not addressed promptly.
OBJECTIVES/AIMS: This presentation aims to investigate the underlying factors contributing to the occurrence of palatally displaced canines and provide insights into the morphological characteristics of dentitions exhibiting palatally displaced canines to aid in treatment planning and preventive strategies for this dental anomaly.
MATERIALS/METHODS: A search was conducted on PubMed for studies published from 2000 to 2023, focusing on the Intermolar Width (IMW) measured from the mesio-buccal cusp tips of the first molars and Interpremolar Width (IPW) recorded with the calliper tips placed into the deepest portion of the central fossae of the upper first premolars at their junctions with the most lingual aspect of the buccal cusp tip. Mesiodistal dimensions of maxillary central incisors (MD1), lateral incisors (MD2) and first molars (MD6) and SNA angle were also measured. Differences in Patatally Displaced Canines (PDC) group and Control (C) group were analyzed using t-tests and weighted means following the PRISMA guidelines.
RESULTS: Twelve studies involving 1705 patients were analyzed. The confidence intervals and risk ratios for the indices ($P < 0.001$) were IMW -0.174 (-0.753, 0406), IPW -3.071 (-10.246,4.105), MD1 -0.224 (-0.334,-0.114), MD2 -0.307 (-0.450,-0.164), MD6 0.060 (-0.149, 0.268) and SNA 0.765 (-1.614,3.145). Statistically significant differences were observed in IMW, IPW, MD6 and SNA between the PDC and the control group. LIMITATIONS: Some studies may not have accounted for all potential confounding variables, such as previous orthodontic treatments, genetics, or other dental anomalies, which could impact the relationship between measured dimensions and canine displacement. Also, the measurement precision and techniques vary from study to study CONCLUSIONS/IMPLICATIONS: To improve accuracy and reliability, future research should aim for standardized measurement protocols. Studies investigating the dynamic changes in dental morphology and their impact on canine displacement could further enhance our understanding and guide more effective preventive and treatment interventions.

Abstract citation ID: cjae081.308
SP16 DEVELOPMENT OF A GEOMETRIC MORPHOMETRIC METHOD TO EVALUATE CHIN MORPHOLOGY IN 3D

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BACKGROUND: The chin is one of the most distinctive anatomical traits of modern humans. It is found only in our species, Homo sapiens, and its exact function still remains unknown. Comprehensive and quantitative evaluation of chin shape and size is required for assessment of sexual dimorphism and age-related effects.
AIM: The present study aims to develop a new method to examine chin morphology.
MATERIALS AND METHODS: Electronic databases were searched for methods of evaluating chin morphology. Two-dimensional methods focus on the lateral cephalogram, whereas 3D methods use computed-tomography (CT) images or skeletal specimens. Most studies have used linear measurements between anatomic landmarks and a few have used geometric morphometric (GM) methods, again based on a small number of landmarks. We decided on a 3D GM method, but including a large number of sliding semilandmarks, in order to capture

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anatomy that might have been missed in previous studies, such as the mental tubercles and the digastric fossae. One hundred CBCT images of patients of both sexes and covering a wide age range were used. The images were segmented to create mesh surfaces of the exterior mandibular anatomy.
RESULTS: The mental region was defined as the area between the mental foramina. A 3D template of 200 points was created to capture the morphology of this area. The majority of landmarks are semilandmarks, allowed to slide along curves and surfaces towards minimizing the bending energy. After sliding, landmarks and semilandmarks can be treated as homologous points between specimens and superimposed by Procrustes alignment. Principal components analysis (PCA) allows for extracting the most prevalent morphological patterns. Differences between sexes and age groups can be investigated with permutation tests and visualized with Procrustes superimposition.
CONCLUSIONS: In this study, we suggest a new method to address an old problem in anthropology: chin morphology. By utilizing geometric morphometric methods, researchers can obtain a detailed model of chin morphology, exploring its function, possible variations attributed to gender or age and potential implications in fields such as forensics and evolutionary biology.

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SP17 A THREE-CYCLE PROSPECTIVE AUDIT OF REFERRAL LETTER QUALITY

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AIM: To improve the quality of written referrals and accuracy of clinical information received at the Orthodontic Department, School of Dentistry, RVH Belfast; in the absence of a proforma-based referral system. The gold standard was set at 100% compliance with a set of 10 defined data points, which were deemed as mandatory components for orthodontics referrals.
METHOD: A prospective audit was conducted between February and November 2023. All new referrals received during the 4-week cycles were analysed and scored against the 10 mandatory data points, to determine their percentage compliance. Following Cycle 1 in February/March 2023, an action plan to enhance the standard and quality of referrals was implemented. Actions consisted of the creation and circulation of specific guidelines to local referring practices, stipulating the mandatory components for any new referrals. Subsequently, Cycle 2 was conducted in June 2023, to assess the immediate impact and response to these disseminated guidelines. A recent third cycle in November 2023 evaluated the long-term improvements and the need for further action.
RESULTS: Across 34 referrals audited in Cycle 1, the mean compliance result was 54%. None of the letters met the gold standard. Specifically, the areas 'Oral health' and 'Social history' scored less than 15%. In Cycle 2, 20 new referral letters were audited, and the mean compliance score increased to 69%. Following this, Cycle 3 resulted in a mean compliance score of 70% across 31 letters reviewed; a further increase of 1%. On this occasion, 5 individual letters met the gold standard. Most notably, 'Enclosure of radiographs and photographs if available, with appropriate identification' showed 36% increase by Cycle 3.
CONCLUSIONS: An overall improvement was seen in referral letter quality between Cycle 1 and Cycle 3, however, the gold standard for this audit was not met. Positively, the initial improvements that were gained in the second cycle were sustained, indicating that some meaningful change within the habits of referring clinicians has been achieved. Further action is still required, with recommendations including the development and use of a proforma-based system for referrals, to ensure any mandatory details are specified.

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SP18 AN AUDIT OF PERIODONTAL ASSESSMENT AND APPROPRIATE MANAGEMENT AT NEW PATIENT ORTHODONTIC CLINICS

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BACKGROUND: The British Society of Periodontology (BSP) states that the Basic Periodontal Examination (BPE) is a minimum standard of care for initial periodontal assessment, and a BPE should be undertaken for all new patients aged 7+ years. All patients accepted for orthodontic treatment should display oral hygiene to an exemplary standard with no active disease as there is a well established correlation between gingival inflammation and orthodontic appliances. It is therefore critical to diagnose and manage pre existing periodontal conditions prior to commencing orthodontic treatment, and recording BPE and oral hygiene status are quick and effective screening tools to aid this.
METHOD: A retrospective 6 month audit of all new patient orthodontic assessments at a single UK NHS hospital was recorded with analysis of the following outcome measures: Record of BPE and oral hygiene status, and whether appropriate action was taken. We created a standard based on current guidance that 100% of patients aged 7+ years should have BPE and oral hygiene status recorded, and appropriate subsequent management based on the BSP guidance. Following cycle 1, the team was educated and the new patient assessment proforma has been modified in preparation for a second cycle of data collection.
RESULTS: Cycle 1 of this audit (n=177, March- August 2022) showed 71% patients had BPE recorded, 96% had oral hygiene status recorded and 41% had appropriate action taken based on the BPE.
LIMITATIONS: Data was collected by retrospectively reviewing digital clinical records, which therefore relies on each clinician's documentation of the above factors. It came to light following dissemination of results that clinician's do not always record oral hygiene instruction delivery, which therefore impacted the results.
CONCLUSIONS: Our results demonstrate we are not sufficiently recording BPE and oral hygiene status or advising patients on appropriate management. All clinicians have a duty to consider the implications of orthodontic treatment on periodontal health, and should therefore screen and educate patients accordingly. By improving and maintaining our current practice to the desired gold standard, there will be a long term clinical benefit to our patient care.

Abstract citation ID: cjae081.311
SP19 EVALUATION OF THE DIMENSIONAL ALTERNATION OF THE ALVEOLAR BONE IN PATIENTS WITH A CONGENITALLY MISSING MANDIBULAR LATERAL INCISOR USING CONE-BEAM COMPUTED TOMOGRAPHY

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Prof Chooryung J. Chung[1,2], Prof Kyung-Ho Kim[1,2]; [1]*Department of Orthodontics, Gangnam Severance Dental Hospital, College Of Dentistry, Yonsei University,* [2]*Department of Orthodontics and Institute of Craniofacial Deformity, College of Dentistry, Yonsei University*

AIM: This study aimed to examine the arch perimeter, tooth axis, and alveolar bone thickness (ABT) in patients with a unilateral congenitally missing mandibular lateral incisor using cone-beam computed tomography.
MATERIALS AND METHODS: Twenty-three individuals (8 males aged 17.8 ± 2.85yrs, 15 females aged 22.7 ± 5.53yrs) with a congenitally missing mandibular incisor on one side were selected as the subjects. The control group comprised 23 adults without any missing teeth or crowding issues). First, the difference in the arch perimeter between the groups was compared at the cementoenamel junction (CEJ) level and the root apex (RA) level. Next, the root divergence of the anterior teeth in the M group was observed. Finally, the alveolar bone thickness ratio was compared between the M and C groups at different vertical levels.
RESULTS: The arch perimeter of the anterior mandibular bone decreased at the CEJ level and RA level in patients with a missing mandibular lateral incisor. Root divergence was observed adjacent to the missing site. There was a reduction in total ABT ratios at the 3-, 6-, and 9-mm positions. The buccal cortical ABT ratios decreased at the 3- and 6-mm positions, while the lingual ABT ratio increased at the 9-mm position.
CONCLUSIONS: The congenitally missing mandibular lateral incisor caused a reduction in the arch perimeter in the CEJ area and the RA area. The root divergences were observed in the teeth adjacent to the missing areas. A significant decrease in the buccal cortical bone and cancellous bone was observed in the missing area.

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SP20 COMPARATIVE ASSESSMENT OF OSTEOTOMY TECHNIQUE AND AMOUNT OF MANDIBULAR DISPLACEMENT ON BONE CONTACT AREA AND INTERCONDYLAR DISTANCE IN THE CONTEXT OF ORTHOGNATHIC SURGERY

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BACKGROUND: The objective of this study was to evaluate how bilateral sagittal split osteotomy (BSSO), high oblique sagittal split osteotomy (HSSO), as well as displacement distances and directions, impact both the expected and achievable bone contact area (BCA), along with alterations in the intercondylar distance (ICD).
MATERIALS/METHODS: Totally, 80 mandibular displacements were carried out using 20 fresh cadavers (four displacements per cadaver). Pre- and

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postoperative CBCT scans were conducted for surgical planning and to examine the expected and achievable BCA and ICD.
RESULTS: Concerning a maximum mandibular displacement of 8mm, the expected BCA for HSSO and BSSO were 352.58 ± 96.55mm2 and 1164.00 ± 295.50mm2, respectively, following advancement, and 349.11 ± 98.42mm2 and 1344.70 ± 287.23mm2, respectively, after setback. The achieved BCA for HSSO/BSSO were 229.37 ± 75.90mm2 and 391.38 ± 189.01mm2, respectively, post-advancement, and 278.03 ± 97.65mm2 and 413.52 ± 169.52mm2, respectively, after setback. In terms of the expected ICD for HSSO/BSSO, values were 4.51 ± 0.73mm and 3.25 ± 1.17mm after advancement, and -5.76 ± 1.07mm and -4.28 ± 1.58mm after setback. The achieved ICD for HSSO/BSSO were 2.07 ± 2.9mm and 1.7 ± 0.60mm after advancement, and -2.57 ± 2.78mm and -1.28 ± 0.84mm after setback. Differences between HSSO and BSSO in BCA were observed at each displacement ($p<0.001$), except for the achieved BCA after 8-mm setback and advancement ($p\geq0.266$). However, there were no significant differences regarding ICD, except for the expected ICD after 8-mm setback and advancement ($p\leq0.037$).
CONCLUSIONS: In contrast to the virtual planning, the predictability of BCA ICD was constrained. ICD demonstrated minor clinical alterations, with a notable decrease in BCA observed in the BSSO group. The significance of BCA and ICD in determining the appropriate split technique in orthognathic surgery might be less pronounced.

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SP21 MEASUREMENT OF MESIODISTAL WIDTH OF MANDIBULAR CANINES AND INTER-CANINE WIDTH IN YOUTH ALBANIAN POPULATION OF SOUTH EAST KOSOVO AND THEIR SIGNIFICANCE IN SEX DIFFERENTIATION

Prof Miranda Sejdiu Abazi[1]; [1]*Ubt College Higher Education Institution*

BACKGROUND: Teeth, as the strongest tissue in the human body, are important in the prediction of gender. When postmortem records are few, then the measurement of teeth may give accurate differentiation between males and females. Canines showed the greatest sexual dimorphism, so these attributes make them reliable in the evaluation of sexual dimorphism.
AIM: The main objective of the study was to acquire odontometry data from the young population in the southeastern part of Kosovo and use it to identify gender and assess the inter-canine width (ICW) and mesio-distal width (MDW) of both mandibular canines.
MATERIALS AND METHODS: This cross-sectional study involved 100 adolescents aged 12 to 18 years, girls and boys, who were selected from schools located in the southeastern part of Kosovo. Each subject signed an informed consent prior examination. The odontometric measurement was conducted using a digital Vernier caliper on the dental models of the lower jaw.
RESULTS: The left mandibular canine was larger than the right in both female and male subjects. Furthermore, in the mesio-distal parameter, the left mandibular canine exhibits greater sexual dimorphism than the right.
CONCLUSION: This study revealed that odontometric measurements are accurate and reliable in determining gender.
KEYWORDS: Odontometry, sexual dimorphism, dimorphism, teeth, forensic odontology

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SP22 COMPARATIVE ASSESSMENT OF TWO-PHASE CLASS II TREATMENT WITH ACTIVATOR OR BIONATOR FOLLOWED BY FIXED APPLIANCES: A CONTROLLED BEFORE-AND-AFTER STUDY

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BACKGROUND/AIM: Two-phase treatment for children with Class II malocclusion with several functional appliances is still performed by many orthodontists, while the Activator and the Bionator appliances are two of the most popular ones. Aim of this study was to compare the skeletal and dentoalveolar effects of treatment with these two appliances.
MATERIAL/METHOD: Class II children treated with Activator or Bionator in the first phase, followed by a phase of fixed appliances were included. Skeletal and dentoalveolar parameters were assessed from lateral cephalograms and analyzed with linear regressions at 5%.
RESULTS: A total of 89 patients (mean age 10.0 years; 47% female) were included. During the first phase, Bionator increased less the SNB (-0.7°; 95% Confidence Interval [CI] -1.3 to -0.2°; P=0.01) and decreased less the ANB angle (0.6°; 95%-CI 0 to 1.1°; P=0.03) compared to Activator. Activator slightly increased the facial axis and Bionator reduced (-1.6°; 95%-CI -2.3 to -0.8°; P<0.001). Compared to Activator, the Bionator retroclined more the upper incisors (-2.4°; 95%-CI -4.6 to -0.2°; P=0.03) and increased more the interincisal angle (2.9°; 95%-CI 0.5 to 5.4°; P=0.02). After the second phase (6.2 years after baseline), the only differences were a reduced facial axis (-1.3°; 95%-CI -2.2 to -0.3°; P=0.008) and an increased maxillary rotation (0.9°; 95%-CI 0 to 1.8°; P=0.04) with Bionator compared to Activator.
CONCLUSIONS: Similar dentoalveolar effects were seen overall with two-phase treatment with either appliance, with Bionator being associated with more vertical effects compared to Activator.

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SP23 EVALUATION OF THE ORTHODONTIC COMPONENT OF THE HYPODONTIA CARE PATHWAY AT THE EASTMAN DENTAL HOSPITAL

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BACKGROUND/AIMS: Hypodontia care pathways are established to ensure best delivery of multi-disciplinary care to patients. This service is costly, often with long and complex treatment provided by multiple specialist teams. The quality of service provided from a patient's perspective, is generally under-reported in the literature. The aims of this project were:
1. To evaluate patient satisfaction with the service provided for the orthodontic component of their hypodontia care pathway.
2. To evaluate the patients' experience of their treatment journey at the Eastman Dental Hospital, UCLH.
3. Information gained to be used to enhance the service and future patient care.
MATERIALS AND METHODS: A prospective, questionnaire-based project was conducted at the Eastman Dental Hospital (EDH). The questionnaire used to collect information regarding the service was developed and validated in previous MClinDent projects. The questionnaire was uploaded onto the Survey Monkey® platform and was given to 53 hypodontia patients who completed their orthodontic treatment at the Eastman Dental Hospital between the period January 2023-March 2023.
RESULTS: Fifty-two subjects fully completed the survey (98% completion rate). The last patient only partially completed the survey, and their data was therefore excluded. Forty percent of subjects were males. Three quarters of the subjects were 20 years or older. The majority of patients reported high levels of satisfaction with the service provided and with their treatment outcome and experience. They also reported very positive interactions with all staff groups, and no concerns when their treating orthodontic clinician changed during care. Lastly, they reported they would recommend the service to friends and family. Satisfaction levels were reduced where patient expectations were not met with regards to treatment duration, increased waiting time on the waitlist and difficulty changing appointments.
CONCLUSION: Findings from this project suggest that patients generally have high expectations from their orthodontic treatment. Most hypodontia patients at the EDH were generally happy with the service provided, the treatment experience and outcome. The main suggested areas for improvement are related to lengthy waiting times and patient-clinician communication regarding treatment duration.

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SP24 ENHANCING TOOTH SEGMENTATION IN CBCT SCANS THROUGH CONTEXT-RICH AUTOMATIC METHODS.

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BACKGROUND: Accurate segmentation of teeth from CBCT scans is crucial for advancing digital workflows in orthodontics. Manual segmentation, while effective, is time-consuming and relies on specialized software. Many existing automatic segmentation methods lack contextual awareness, performing segmentation without considering the spatial position of teeth within the dental arch. This limitation results in a loss of global context, hindering the model's ability to capture intricate anatomical interrelations among teeth.
OBJECTIVES: This study seeks to develop an innovative segmentation framework that integrates global context to enhance tooth segmentation accuracy and broaden its clinical applications. Additionally, our objective is to validate a dentition-based deep learning approach for automatic tooth segmentation and classification from CBCT images.

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METHODS: We propose a model based on the Vision Transformer U-Net architecture, capable of simultaneous segmentation and classification of all teeth. Trained on a dataset of 98 CBCT volumes annotated into 32 teeth classes according to the FDI system, the model incorporates a morphological information based on the normal dentition's geometry for males and females. Evaluation involves testing the algorithm on a separate dataset comprising 20 CBCT scans from two different centers not included in the training set.
RESULTS: Our results demonstrate the superior performance of the proposed framework compared to local single-tooth segmentation methods, particularly in qualitatively segmented roots. The accuracy metrics include a Dice coefficient of 97.13 ± 1.87%, IoU coefficient of 97.75% ± 3.28, ASD coefficient of 0.11 ± 0.10 mm, and F1 coefficient for tooth detection accuracy at 97.90 ± 2.76%. Statistically, our method significantly outperforms the second-best V-Net method by 3.04% for the Dice coefficient, 5.36% for the IoU coefficient, and 0.1 mm for the ASD coefficient ($p < 0.05$, t-test).
CONCLUSIONS: Our approach's effectiveness is validated on a multi-site external dataset, showcasing its capacity to generate morphologically accurate segmentations beyond traditional local approaches. This work highlights the potential utility of our dentition-based learning AI framework in enhancing dental imaging and treatment planning, particularly in the accurate segmentation and classification of root apices.

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SP25 TIME-EFFICIENT GRADING OF INDEX OF ORTHODONTIC TREATMENT NEED WITH CONVOLUTIONAL NEURAL NETWORK AND KNOWLEDGE-BASED SYSTEM

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BACKGROUND: The Index of Orthodontic Treatment Need (IOTN) is instrumental in assessing the necessity of orthodontic interventions. Prompt recognition of orthodontic needs mitigate the adverse effects of malocclusions and hastens the commencement of treatment. Conventional diagnostic approaches, however, are laborious and error-prone. The integration of a machine learning algorithm would refine the assessment, particularly in classifying occlusal characteristics within the IOTN's dental health component.
AIM: The study developed and assessed a Convolutional Neural Network (CNN) and Knowledge-Based System (KBS)-powered IOTN grading system. The comparison focused on the grading speed and precision between manual evaluations and the automated solution.
METHODS: A total of 1,180 intraoral images from 236 patients were acquired from the Centre of Paediatric Dentistry and Orthodontics Studies, Faculty of Dentistry, UiTM, and assessed by two calibrated raters for initial IOTN grading. Image pre-processing involved standardisation and augmentation. The ResNet-50 architecture facilitated the system development, with several iterations tested to fine-tune performance and precision. The system's rapid scoring of images aimed to efficiently evaluate patient eligibility for orthodontic care. Validation entailed comparing the model's grading speed against that of 89 dental students on ten sets of intraoral clinical photographs.
RESULTS: The students took an average of 27.2 ± 56.9 seconds, whereas the automated system required 7.8 ± 3.5 seconds per set. While accuracy rates were 60% for the IOTN system and 81% for students, the automated system significantly reduced the grading time ($p<0.001$).
IMPLICATIONS: This system offers accelerated IOTN assessment, potentially streamlining patient self-evaluation and eligibility for orthodontic care. It is poised to lessen orthodontist consultation wait times and reduce clinical visits, thus benefiting public healthcare. The system is protected under IP registration number IP/CR/04158.

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SP26 ASSESSING THE ACCURACY AND QUALITY OF ACTIVITY CODING IN THE ORTHODONTIC DEPARTMENT

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AIMS AND OBJECTIVES:
1. To assess the department's accuracy and quality of clinical coding
2. Identify common coding errors, areas requiring improvement and implement changes to improve orthodontic activity coding
3. Raise awareness of the importance of coding
METHODS: A sample of 30 patient's appointments were randomly selected between January 2023- March 2023 (Cycle 1) and June 2023-August 2023 (Cycle 2) and were reviewed to check accuracy of activity coding. Data collected included: codes selected, actual procedure carried out and codes missing.
Data was recorded and analyzed on Microsoft Excel
RESULTS: Cycle 1: 5 appointments were incorrectly coded (16.7%). Of these, 2 (40%) had been incorrectly coded for and 3 (60%) of them failed to include all the procedure codes. For patients whereby all the relevant codes weren't included, the coder failed to add codes for x-rays (66.7%) as well as clinical photos (33.3%). The incorrect codes were for the procedures of impressions (F14.3 coded but correct code is F15.1) and insertion of orthodontic appliances (F15.5 coded, but F14.3 is correct).
Cycle 2: 3 appointments were incorrectly coded (10%). Of these, 2 of them, failed to include all procedure codes. For both appointments X-rays were not coded for. For the other appointment, the incorrect code was inputted (F15.5 coded for a bond up as opposed to F14.1).
Accuracy of coding improved overall by 6.7%: 6.7% incorrectly coded and 10% failure to include all codes in cycle 1 vs 3.3%% incorrectly coded and 6.7% failure to include all codes in cycle 2.
CONCLUSIONS: Orthodontic activity coding meets the 90% target after cycle 2. Errors in clinical coding are multifactorial and have significant impacts on healthcare resource allocation. It's important to ensure there is training for all staff, as it impacts not only financial reimbursement rates but also public health planning.

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SP27 ASSESSING THE COMPLIANCE OF RETAINER REVIEW APPOINTMENTS

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AIMS AND OBJECTIVES:
1. Assess the level of compliance among orthodontic patients at Leeds Dental Institute in bringing their retainers to their retainer review appointments
2. Identify any common reasons for non-compliance
3. Implement a quality improvement initiative to enhance patient compliance
METHODS: A data collection form was created and the following data was collected from a sample of 25 consecutive retainer review appointments:
1. Type of retainer and if wearing upper and lower
2. Did the patient bring their retainer to the appointment today (Y/N)
3. Reason given for not bringing retainer if applicable
4. Wear regime for the patient: Does the patient wear their retainer full time or part time, or alternate night wear
RESULTS: Cycle 1 (September 2023) - Of the 25 patients with retainer review appointments sampled, 11 patients (44%) failed to bring their retainers to their appointment, which fell below the standard.
Of these 25 patients, 4 had both Hawley and Essix retainers, of which 3 patients (75%) forgot one type of their retainer.
Common reasons for not bringing retainers included not being aware to bring and forgot.
Cycle 2 (November 2023) - Of the 25 patients with retainer review appointments sampled, 3 patients (12%) failed to bring their retainers to their appointment, falling below the standard, however is compared favourably to cycle 1.
Of these appointments where the retainers were not brought, the retainers were more likely to be brought if being worn full time and forgetting them was the most common reason for not having them at the appointment.
CONCLUSION: Although the gold standard was not reached there was significant improvement in patient compliance for bringing their retainers from 56% to 88%. This represents an improvement in patient care as retainer problems can be detected and resolved and helps to reduce the need for further appointments.

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SP28 SOCIAL MEDIA AND ORTHOGNATHIC SURGERY: FRIEND OR FOE?

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AIM: To assess advice sought on social media by individuals who are considering or undergoing orthognathic treatment.
METHOD: Design: cross-sectional study undertaken at the University of Leeds 2022-2023. Ethical approval obtained from the University of Leeds Dental Student Ethics Committee (10/10/2022).
A systematic search of social media posts October-December 2022 on Facebook, Instagram and Reddit was undertaken using the following search terms:
'Orthognathic surgery', 'Orthognathic treatment', 'OGN surgery', 'OGN treatment', 'Orthodontic surgery', 'Jaw surgery'

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Social media posts were selected using a predefined eligibility criteria: individuals who are undergoing or considering orthognathic surgery, posts in English text and video transcription.
Written content of posts and associated comments were coded and analysed.
RESULTS: A total of 130 posts were included (442 posts initially identified). The majority of users used social media for reassurance and support seeking. This related to the clinical aspects of the orthognathic surgery journey and whether it is 'worth it'. Many expressed concerns over decision making and used the online 'community' to help aid this – 'I need advice from people … that have gone through this to determine the best course of action'.
A large number of posts related to the clinical aspects of orthognathic surgery. This included but was not limited to advice about clinical outcomes, treatment and recovery process and complications including nerve damage. Several posts related to financial queries.
LIMITATIONS: Limiting data collection to posts in English and from three social media platforms reduced number of posts and diversity of posts. Results may not fully represent all views of patients undergoing or considering orthognathic surgery. Results limited to 3-month period and results from a different timescale may differ.
Direct quotes (n=54) from private Facebook groups were not used due to issues with consent therefore results may be subject to some interpretation.
CONCLUSION: Many patients considering or undergoing orthognathic surgery use social media to seek advice. Information sought may highlight a gap in clinical communication. By identifying commonly asked questions, this may help guide future consultations and assist in the development of further supportive materials.

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SP29 COMPARISON OF CLEAR ALIGNER ATTACHMENTS IN TERMS OF BOND STRENGTH TO DIFFERENT TOOTH SURFACES USING FLOWABLE AND PACKABLE COMPOSITES

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BACKGROUND: To evaluate aligner attachments obtained by two different composite resins and bonded to different tooth surfaces in terms of shear bond strength and adhesive remnant index(ARI) score.
MATERIALS AND METHODS: 90 upper premolars were divided into 3 groups (N=30) (Group1: tooth surface without restoration, Group 2: tooth surface with Class V composite resin restoration, Group 3: tooth surface prepared with IPS emax CAD). In Group 1 and 2 enamel surfaces were etched with 37% orthophosporic acid, thereafter Adper Single Bond 2 was applied. In Group 3, after lithium disilicate glass ceramic (IPS emax CAD) surfaces were etched with 9.6% hydrofluoric acid, Assure Plus was applied. The specimens in each group were divided into 2 subgroups (N=15) according to composite types (FiltekTM Z350 XT flowable and FiltekTM Z350 packable). Shear bond strength and ARI score were measured. Data were analyzed with Oneway Anova, Student's t tests, and Fisher Freeman Halton test (P =.05).
RESULTS: The highest shear bond strengths were obtained in Group 1 bonded with packable composite attachments (19.63±6.65 MPa) and the lowest were obtained in Group 2 bonded with flowable composite attachments (7.30±1.81 MPa). Considering the results for flowable composite resin attachments, the mean bond strength of Group 2 was lower than the mean of Group 1 (15.86±5.31 MPa) and Group 3 (14.53±5.59 MPa) ($p<0.001$). The results for packable composite resin attachments, Group 1 showed significantly higher bond strength value than Group 2 (10.41±2.42 MPa) and Group 3 (15.37±3.74 MPa). Comparison of 3 groups within themselves in terms of bond strength according to the composite resin factor, the mean bond strength measurement of Group 2 for packable resin type factor was higher than the measurement for flowable resin type factor ($p<0.001$). ARI scores did not show significant correlation either with tooth surface or composite resin type.
CONCLUSIONS: For the bonding of aligner attachments on tooth surfaces restored with composite resin, packable composite resin type would be recommended instead of flowable resins. On the other hand, it seems possible to use both flowable and packable composite resins for both tooth surfaces without restoration and prepared with IPS emax.

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SP30 *EX VIVO* VALIDATION OF IMAGING PERIODONTAL BONE LOSS USING VARIOUS LOW-DOSE CONE BEAM COMPUTED TOMOGRAPHY VOLUMES

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AIM: Precise depiction of teeth-adjacent bone is crucial for planning orthodontic treatments. While larger acquisition volumes provide more information, they also result in heightened scattered radiation, potentially compromising image quality and increasing patient radiation exposure. This study explores whether there is a clinically relevant distinction in measuring bone loss between small and larger volumes in Low-Dose (LD) -Cone Beam Computed Tomography (CBCT).
METHODS: CBCT scans of four human cadaveric specimens were captured in LD modes, with two different fields of view: 8x8cm² (LV) and 5x5cm² (SV). A total of 43 sites on 15 teeth were randomly selected, and bone loss was measured twice at each site by a single calibrated investigator. Agreement in measurements was assessed using Bland-Altman plots and Lin´s concordance correlation coefficient (CCC).
RESULTS: Bland-Altman analysis showed that in 95% of the cases, the bone-loss measruements obtained using SV were up to 0.65mm lower and 0.59mm higher than with LV. CCC of bone-loss measruements obtained using SV vs. LV was 0.963, indicating excellent agreement between the two volumes.
CONCLUSION: Within the limitations of this ex-vivo setting, The results indicate that there are no clinically relevant differences based on CBCT volumes in this study. The study suggests that there is no notable benefit in using SV compared to LV in respect to visualizing vertical periodontal bone loss. However, further in vivo studies are needed to validate these findings.

Abstract citation ID: cjae081.323
SP31 EVALUATION OF NASAL SEPTAL DEVIATION, MAXILLARY BONE AND NASAL AIRWAY DIMENSIONS AND VOLUMES USING CONE BEAM COMPUTED TOMOGRAPHY IN PATIENTS WITH UNILATERAL PALATAL CANINE DISPLACEMENT

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AIMS: to detect any association between palatally displaced canine (PDC) and nasal septal deviation (NSD), palatal bone thickness and volume, and nasal airway dimensions and volume.
MATERIALS AND METHODS: A total of 92 patients were included in the study and subdivided into 2 groups; Group 1: unilaterally PDCs in 44 patients (34 females and 10 males; 26 on the right side and 18 on the left side, age averaged 25.30±3.37years) and Group 2: normally erupted canines in both sides in 48 subjects (37 females and 11 males; age averaged 28.00±4.50years). This study was reviewed and approved by the Institutional Review Board. CBCT images were taken between January 2014 to December 2022. Inclusion criteria were age ≥ 18 years, non-syndromic and non-cleft patients, no history of any surgical intervention in the nose, no history of trauma, no previous orthodontic treatment, no buccal crossbites, all permanent teeth are present, non-smokers and no presence of cysts or other pathologies. The following variables were measured using cone beam computed tomography (CBCT); presence and type of NSD, nasal width, inferior conchae, hard palate and nasal septum thickness, maxillary bone, and nasal airway volumes.
RESULTS: NSD was detected in 77% and 50% of PDC and NDC subjects, respectively. Within the PDC subjects, significant differences between the displaced and non-displaced sides were detected. Palate thickness is increased in the canine region and reduced in the molar region. Compared to the control group, PDC subjects have reduced palate thickness and lower nasal airway volume. Two predictors were significant for predicting the odds of PDC occurrence: NSD and the maxillary bone volume.
CONCLUSIONS: NSD is more frequent in PDC subjects. PDC subjects have reduced palate thickness and lower nasal airway volume. In the presence of NSD, the odds of developing PDC increase by 3.35 times, and for each one-unit increase in the maxillary bone volume, the odds of developing PDC decrease by 20%

Abstract citation ID: cjae081.324
SP32 THE EFFECT OF FLUORIDE VARNISH ON WHITE SPOT LESION IN CLEAR ALIGNER ORTHODONTIC PATIENTS: PROSPECTIVE RANDOMIZED CONTROLLED CLINICAL TRIAL

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BACKGROUND: The preventive effect of fluoride varnish on white spot lesions (WSLs) during clear aligner treatment has not been investigated in the literature. Hence this was the purpose of this study.
MATERIALS AND METHODS: Quantitative light-induced fluorescence (QLF) images were taken for the two randomly allocated groups (Group 1, n=22;

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Group 2, n=22) of patients undergoing clear aligner therapy at the start of the treatment (T0) and after 4 months onto treatment (T1). At (T0) Fluoride varnish was applied to the subjects in Group 1, while normal saline was applied to the subjects in Group 2 as a control. The QLF images were analyzed using dedicated software to quantitatively analyze each tooth. Four parameters were included in the statistical analysis: The lesion area (Pixels), Mean amount of fluorescence loss (ΔF), Maximum fluorescence loss (ΔFMax), and plaque surface area (ΔR30). Additionally, the number of newly developed lesions in each group was investigated.
RESULTS: More new lesions developed in the control group, but this was not statistically significant. Additionally, more lesions have been cured at (T1) in Group 1. WSLs in both groups got worse with time. However, the lesion area, ΔF and ΔFMax increased significantly more in Group 2 (P<0.05), (P<0.001), (P<0.001), respectively. There was no significant difference in (ΔR30) within or between groups at the two-time points.
LIMITATIONS: Short duration of the study and most participants were females.
CONCLUSION: The prevalence of WSLs increased in both study groups. However, less number of WSL and smaller lesions occurred in Group 1.

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SP33 LEVERAGING ARTIFICIAL INTELLIGENCE FOR PRECISE EVALUATION OF TEMPOROMANDIBULAR JOINT DISC DISPLACEMENT IN MAGNETIC RESONANCE IMAGING: A PILOT STUDY

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BACKGROUND/AIM: Temporomandibular joint disorder is a general term for conditions that manifest with pain and dysfunction of the temporomandibular joint. The study aimed to develop a fully automated articular disc detection system to support the diagnosis of sagittal and coronal disc displacement on magnetic resonance imaging (MRI).
METHODS: The database consisted of MRI images taken from 50 patients with a diagnosis of temporomandibular joint disc displacement. The algorithm was trained on 300 sagittal and coronal images. In the sagittal view, the following clinical situations were encountered: normal disc position, anterior disc displacement with reduction, and anterior disc displacement without reduction. In the lateral view, normal disc position, and medial or lateral displacement were identified.
RESULTS: The accuracy of the fully automated articular disc detection system was 84%.
LIMITATIONS: The study's limitations lie in the fact that the size of the database was relatively small, and the MRI images originated from a single center, raising concerns about result generalizability.
CONCLUSION: The study shows a promising approach for an automatic and more detailed analysis of disc displacement, with the inclusion of its lateral and medial sections. The need for future research on diverse datasets and imaging sources is emphasized.

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SP34 PERCEPTIONS AND UTILIZATION OF TELE-ORTHODONTICS: A SURVEY OF THE MEMBERS OF THE AMERICAN ASSOCIATION OF ORTHODONTISTS

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AIM: To explore American Association of Orthodontists (AAO) members' utilization and perceptions of tele-orthodontics.
METHODS: An online 30-question survey was distributed to AAO members. Questions covered areas related to the orthodontists' utilization, perceptions, clinical applications, limitations, and concerns related to tele-orthodontics. Descriptive statistics were performed. Responses of users and non-users were compared using Wilcoxon rank-sum tests and Fisher's exact tests.
RESULTS: A total of 152 members completed the survey, with 70% being users of tele-orthodontics. Users displayed more positive perceptions of the system's benefits compared to non-users ($p < 0.05$). Users were more aligned with the belief that tele-orthodontics facilitates effective communication (mean ± standard deviation (SD): 4.06 ± 0.83 vs. 3.33 ± 0.94, $p < 0.001$). Both groups concurred on the necessity of patient charges for tele-orthodontic visits (mean ± SD: 3.62 ± 1.11 for users vs. 3.74 ± 1.02 for non-users, $p = 0.659$), and on the potential of the system to reduce inappropriate referrals ($p = 0.20$). The majority of respondents recognized the system's utility in monitoring clear aligners' patients (89% in users vs. 61% in non-users, $p < 0.001$). Non-users had greater concerns about privacy risks related to online data sharing (mean ± SD: 3.06 ± 0.97 for users vs. 3.57 ± 0.86 for non-users, $p = 0.002$). Both groups emphasized the importance of obtaining informed consent prior to utilizing tele-orthodontics.
CONCLUSIONS: The popularity of tele-orthodontics among AAO members was evident; this was reflected in their appreciation of its potential efficiency. Perception of tele-orthodontics varied significantly between users and non-users. The findings of the study provide insight into the potential benefits and drawbacks integrating this technology into clinical practice from providers' perspective.

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SP35 COMPARATIVE ANALYSIS OF CROWN-ROOT ANGLE, ALVEOLAR BONE THICKNESS, AND TEETH MORPHOLOGY IN DIFFERENT ANTERIOPOSTERIOR SKELETAL PATTERNS: A CONE-BEAM COMPUTED TOMOGRAPHY STUDY.

Dr OBADA AL-RAWWAQA[1], Prof. Kazem Al-Nimri[1], Prof. Elham Abu alhaija[2]; [1]*Jordan University Of Science And Technology,* [2]*Qatar University*

AIMS: To compare the collum angle (CA), crown and root dimensions and the buccal and lingual alveolar bone thicknesses of teeth among various anteroposterior skeletal classifications.
SUBJECTS AND METHODS: CBCT images of 89 patients were obtained from patients' records at Jordan University of Science and Technology and divided into (38 Class I, 31 Class II and 20 Class III). The following variables were measured: (CA), crown mesiodistal width, root length and buccal and lingual alveolar bone thickness.
RESULTS: The CA was larger in upper (P=0.007) and lower first premolars (P=0.011) in class II compared to class I. In females, the mesiodistal crown width in upper first premolars and upper first molars were larger in Class II than Class I (P<0.05). The root length among males was significantly longer in lower first premolars and central incisors in Class III compared to Class II, in upper lateral incisors in Class I compared to Class III, and in the lower second premolars in Class III compared to Class I. In females, longer roots were found in upper central incisors and upper first premolars, lower premolars and canines in Class III compared to Class I, in upper first premolars and lower first premolars within Class III compared to Class I, and lower second premolars within Class I compared to Class II. The palatal bone width (at 5 mm level) in Class II was greater than Class I and Class III. In the lower arch, thicker bone was found in second molars buccally at 2 mm level in Class II (P= 0.029). Lingually, thicker bone was found in Class II compared to Class I and Class III except for molars. However, the significance was only in premolars and incisors compared to other groups and in canines at 5 mm level compared to Class III.
CONCLUSIONS: (CA) of premolars were increased in Class II and Class III malocclusions. Root length of the premolars was the longest in Class III female subjects.

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SP36 INFLUENCE OF LIP POSITION ON ESTHETICS PERCEPTION WITH RESPECT TO PROFILE DIVERGENCE USING SILHOUETTE IMAGES

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OBJECTIVES: To determine the facial divergence and lip position combinations that are most and least preferred, and to investigate whether age or gender has an impact on these preferences.
METHODS: A sample of 1077 individuals were included who were not experts in the field (253 men and 824 females). The research employed black silhouette photographs of profiles featuring different lip locations and profile divergences. The recruitment of participants was conducted in order to assess the attractiveness of the profiles, employing a Likert scale. The various positions of the lips and variations in facial profiles were thoroughly categorized. Results were analyzed using the Chi-square test.
RESULTS: Aesthetic perceptions displayed diversity when considering different lip locations and profile divergences. It was shown that neutral lip positions were predominantly favored, accounting for approximately 40.2% of the total frequencies in the anterior diverging group. It is noteworthy to highlight the aesthetically pleasing features exhibited by those with the most prominent lip position, occurring at a frequency of 10.9% in straight-diverging group. In the posterior divergent group, the most protruded lip position, showed very attractive aesthetics with frequency (7.1%). Gender, age, region, and level of education had significant influence on aesthetic perception.
CONCLUSIONS: The variety of aesthetic preferences is influenced by the location of the lips and the divergence of the facial profile, resulting in different outcomes within the categories of anterior, straight, and posterior divergence.

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Clinicians are advised to customize the treatment regimen in order to correspond with the unique desires and preferences of the patient.

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SP37 AN ANALYSIS OF INDEX OF ORTHOGNATHIC FUNCTIONAL TREATMENT NEED (IOFTN) CHANGE IN CLASS III ORTHOGNATHIC PATIENTS FROM PRE-TREATMENT TO COMPLETION OF PRE-SURGICAL ORTHODONTICS

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OBJECTIVES/AIMS: The primary aim of this study was to assess the change in the Index of Orthognathic Functional Treatment Need (IOFTN) grade in Class III orthognathic patients from pre-treatment to completion of pre-surgical orthodontics. The secondary aim was to assess if a Ballard conversion of the incisor inclination on the pre-treatment Lateral Cephalogram would be predictive of the actual pre-surgical decompensation.
METHODS/MATERIALS: This was a retrospective study of 31 consecutive class III orthognathic surgery patients who attend the Edinburgh Dental Institute. Pre-treatment (T0) and Pre-surgical (T1) clinical records including Lateral Cephalograms were compared for each patient. A Ballard conversion was also performed on the pre-treatment Lateral Cephalogram (BC) and compared with the actual orthodontic decompensation at T1. Cephalometric tracing was performed using Dolphin Imaging Software and the overjet was used to categorize Class III malocclusions according to the IOFTN. All measurements were performed by one examiner, and they were repeated to assess the intra-examiner reliability. Intraclass Correlation Coefficients (ICCs) were used to evaluate the reliability and reproducibility. Descriptive statistics and a Chi-Square test were used to compare T0-T1 and T1-BC IOFTN grades.
RESULTS: ICC ranged from 0.80 to 0.99 indicating good to excellent reliability for cephalometric measurements. IOFTN at T0 were as follows: grade 1-2 = 4 (13.9%), grade 3-4 = 13 (41.9%), and grade 5 = 14 (45.2%). At T1 grade 5 cases increased to 24 (77.4%), p=0.03. Predictive BC overestimated the degree of decompensation as this led to 30 (96.8%) grade 5 cases, but this was not statistically significant (p=0.07)
CONCLUSION: IOFTN is likely to underestimate the extent of treatment need in class III orthognathic cases which is more accurately reflected after orthodontic decompensation. A Ballard conversion on the pre-treatment Lateral Cephalogram may be a useful tool to predict orthodontic decompensation and functional treatment need for Class III orthognathic patients.

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SP38 A QUALITY IMPROVEMENT PROJECT ENHANCING THE ORTHODONTIC POSTGRADUATE STUDENT INDUCTION AT UNIVERSITY DENTAL HOSPITAL MANCHESTER, UNITED KINGDOM

Dr Nadine Amin[1], Dr Saskia Schwabe[1], Dr Victoria Elton[1]; [1]*University Dental Hospital of Manchester*

BACKGROUND: Induction is the process of acquainting trainees to their new roles and educating them on clinical and non-clinical processes. It is an integral component of clinician training and can increase confidence in clinical protocols, allowing for optimal patient-centred care. Most new postgraduate orthodontic students at University Dental Hospital of Manchester (UDHM) come from abroad and lack familiarity with UK dental indices (e.g. BPE and IOTN), data protection regulations and consent taking. Recognising this, this project aimed to assess and enhance new orthodontic trainees' understanding of dental domains specific to orthodontic care in the UK by implementing a more robust induction programme.
METHODS: In 2023, all new orthodontic trainees completed a pre-induction questionnaire assessing their knowledge and awareness of certain domains. These included; awareness and confidence in performing a BPE, awareness of IOTN, orthodontic new patient clinics, data protection and consent taking policies. A comprehensive induction programme covering these topics was developed and delivered. Subsequent evaluations included an immediate post-induction questionnaire and a follow-up questionnaire after two months of clinical experience to assess confidence levels in each domain. Trainee answers were analysed.
RESULTS: Before the induction, only 25% of trainees knew the purpose of an orthodontic new patient clinic and the majority were not confident in using the IOTN. All trainees knew what a BPE was, however only 25% were confident performing one. Only 50% of trainees knew what constitutes patient identifiable data and were confident with the consent taking process. Trainees did not yet know how to apply for leave and 50% were not confident about the uniform policies. Following immediate completion of the induction there was 100% awareness and confidence in each domain, demonstrating a significant positive impact. A follow-up questionnaire after two months of clinical experience demonstrated sustained 100% confidence in all domains and 100% of trainees felt the induction was beneficial to their clinical work.
CONCLUSIONS: Starting a postgraduate degree may be a daunting experience, especially for international dental graduates. A well-structured induction not only bridges knowledge gaps but also fosters confidence, facilitating a smoother transition into a new clinical environment.

Abstract citation ID: cjae081.331
SP39 STUDY OF THE FIRST PERMANENT MOLAR MESIODISTAL ANGULATION IN RELATION TO FACIAL PATTERN, AGE, SKELETAL CLASS, AND GENDER OF THE PATIENTS

Extrañar Laura Angullo Santos[1], Prof Carolina Nieto-Moraleda[2], Prof. MARIA JOSE MARTINEZ-LOZANO[2], Prof. LAURA DE LA SEN-GUTIERREZ[2], Prof. MARTIN ROMERO[3]; [1]*Postgraduate Student in Rey Juan Carlos University,* [2]*Associate Professor in Rey Juan Carlos University,* [3]*Chairman of Orthodontic Departmen in Rey Juan Carlos University*

OBJECTIVES: This study aims to investigate the relationship between the mesiodistal angulation of the first permanent molars and various factors such as facial pattern, gender, age, and skeletal class.
MATERIALS/METHODS: The research involved an observational cross-sectional study using a sample of 114 (60 women and 54 men) lateral skull teleradiographs from patients at the Rey Juan Carlos University Clinic before starting orthodontic treatment.The mesiodistal angulation of the upper first molar is based on the palatal plane with the axial axis of the permanent upper first molar, and the mandibular plane with the axial axis of the permanent lower first molar. The samples were categorized by gender, age (≤12 years and >12 years), skeletal class (ANB°) and facial pattern (Vert index).
RESULTS: The mean difference in the angulation of the upper first molar to the palatal plane is 0.71 between males and females. The mean difference of the angulation of the lower first molar to the mandibular plane is 1.46° between males and females. There is no statistically significant difference in gender.
No significant relationship was observed between first molar angulation and skeletal class. The mean axial angulation of the upper first molar varied across facial patterns, with values of 77.83° (brachyfacial), 77.15° (mesofacial), and 74.61° (dolichofacial). Similarly, the mean angulation of the lower first molar in relation to the mandibular plane differed among facial patterns: 85.56° (brachyfacial), 80.80° (mesofacial), and 76.64° (dolichofacial). Brachyfacial patients displayed greater mesial angulation, while dolichofacial patients exhibited greater distal angulation.
CONCLUSION: No statistically significant differences was found between molar angulation and gender and skeletal class. However, age influenced the mesiodistal angulation of the upper first molar, with a trend towards a more distal angulation in younger patients. The angulation of the lower first molar remained stable over time. Brachyfacial patients tended towards greater mesial angulation, while dolichofacial patients displayed a tendency towards greater distal angulation.

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SP40 ORTHODONTIC TREATMENT OF PATIENTS WITH DISABILITIES IN NORWAY: A SURVEY

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BACKGROUND: Despite a high prevalence of malocclusions, patients with disabilities are not proportionally represented in the patient population at orthodontic practices.
OBJECTIVE: To elucidate orthodontic treatment of patients with disabilities in Norway, as well as to identify barriers to such treatment, seen from the orthodontists' perspective.
MATERIAL & METHOD: A digital questionnaire was sent out to the 220 registered members of the Norwegian Orthodontic Society. In addition to gathering respondents' demographic information, the survey also collected data on their experiences with treating disabled patients and encountered potential barriers to treatment.
RESULTS: 90 orthodontists participated in the survey, resulting in a 40% response rate. The majority (92%) had received referrals for patients with disabilities, 53%

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reported treating up to ten patients, while 37% reported treating up to 50 patients in the last five years.
A total of 64% expressed a willingness to treat more disabled patients. This interest was significantly associated with years in practice (p=0.02 for chi-squared test). Key barriers to treatment encompass insufficient referrals, challenges in patient cooperation, apprehensions about imposing burdens on patients, and the demand for a significant time commitment. 64% of orthodontists express a need for more referrals to increase their uptake, and enhancement of financial incentives is deemed relevant by 43% in this context.
Concerning their preferred venue for orthodontic treatment for patients with disabilities, 66% suggest retaining the current arrangement with treatment in private practices, while 34% favor treatment in specialized centers. A notable association exists between this perspective and the readiness to treat additional patients (p=0.009), with the majority in the latter group expressing an unwillingness to accept more patients (53% vs 25%).
In the free text field, the orthodontists expressed a willingness to provide care for patients with disabilities, yet highlighted challenges such as the prolonged time commitment and a reimbursement system that neglects this aspect.
CONCLUSION: Most orthodontists in Norway have received referrals for patients with disabilities. To enhance their acceptance of these patients, it is crucial to increase referrals and provide improved financial incentives.

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SP41 CLINICAL AND RADIOGRAPHIC FINDINGS OF THE TEMPOROMANDIBULAR JOINT IN PATIENTS WITH CARTILAGE-HAIR HYPOPLASIA

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BACKGROUND: Cartilage-hair hypoplasia (CHH) is a rare autosomal recessive metaphyseal chondrodysplasia with an incidence of 1:23,000 live births in Finland 1,3. CHH is characterized by short stature, sparse hair, and joint laxity 1,2,3. Osteoarthritis is also a frequent finding 3.
Joint hypermobility has been reported as a risk factor for temporomandibular joint disorders (TMD)4. Diagnosis of temporomandibular joint osteoarthritis is based on radiographic findings and clinical symptoms, including pain, restriction in function, and joint sounds5. Panoramic radiographs can be used for screening of bony alterations of the condylar head, such as flattening, erosion, osteophytes, and sclerosis.
OBJECTIVE: To investigate clinical and radiographic findings related to the temporomandibular joint in individuals with CHH.
METHODS: In total, 21 individuals with CHH (9 males, 12 females) were examined clinically, and a panoramic radiograph was obtained. Average age of the patients was 43 years (range 11-70 yrs). Clinical examination recorded masticatory system and/or joint pain, joint sounds (clicking and crepitation), range of motion, and deviations 6.
RESULTS: TMD was detected in four patients (19%). None of the study subjects had limited range of jaw movement or locking of the jaws. One individual had a deviation of movement and two a clicking joint. Masticatory muscle or temporomandibular joint pain was reported by one. Flattening of the articular surface of the condyle and deviation in form was detected in radiographs of nine patients (43%), but the findings did not correlate with symptoms (rs=-0.175, p=0.448).
LIMITATIONS: Due to the rarity of the disorder, the sample size was small.
CONCLUSIONS: TMD affect up to 25% of the general population7, yet their etiology and progression are poorly understood. In our CHH cohort, the prevalence of TMD was lower suggesting no functional involvement of the temporomandibular joint in this type of skeletal dysplasia.

Abstract citation ID: cjae081.334
SP42 CHANGES IN BUCCAL ALVEOLAR BORDER HEIGHT AFTER LOWER ARCH EXPANSION AND INCISOR PROCLINATION: A PROSPECTIVE CLINICAL STUDY

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AIM: To evaluate buccal alveolar height changes in lower incisors and canines on CBCT scans of patients treated with orthodontic expansion and proclination, and correlate these modifications to (a) the degree of incisor proclination; (b) changes in the lower intercanine width; and (c) gingival biotype.
METHODS: Adult patients (27.7 ± 11.3 years) with lower arch discrepancy greater than 3 mm and moderate or pronounced curve of Spee composed the experimental group (n=15). The control group (n=7) consisted of patients (19.4 ± 2.0 years) with no lower arch discrepancy. These patients had their dental arches completely aligned and leveled to a.020"stainless steel archwire. Mandibular cone-beam computed tomography, with a field of view of 6 cm and 0.25 mm voxels, were the only radiographic images taken before treatment and after leveling and alignment. Buccal alveolar border heights (AB) of the lower incisors and canines were digitally measured from the incisal border to the most apical buccal alveolar contour on 3D reconstructions. AB were compared between treatment times and between groups, by paired and independent Student´s t-test, respectively. Changes in AB were correlated with the degree of incisor proclination (IMPA) and intercanine width (ICW) using the Pearson correlation test. Association between AB and gingival biotype (GB) was evaluated with the chi-square test.
RESULTS: Lower canines and incisors in both groups presented buccal alveolar bone loss after leveling and alignment, but only teeth #43, #33 and #32 in the experimental group presented significant decrease in AB (Mean final-initial values: 2.88 mm, 2.66 mm and 2.66 mm respectively, p<0.001). No significant differences were found between initial and final AB measurements for all teeth in the control group. When AB was compared between groups, only the lower canines presented significant differences (p<0.005), with a 21% buccal alveolar bone loss in the experimental group. No correlation was found between changes in AB and IMPA, ICW and GB.
CONCLUSIONS: Alignment and leveling with continuous archwires increases lower incisor inclination and intercanine width, and this type of arch expansion seems to promote greater buccal alveolar bone loss on lower canines than on lower incisors.

Abstract citation ID: cjae081.335
SP43 IMPACT OF SIMULATED BIMAXILLARY PROTRUSION IN BOTH PROFILE AND FRONTAL PERSPECTIVES

Prof FLAVIA ARTESE[1], Dr Julia Petruccelli Rosar, Dr Luana Amaro, Dr Sergio Caetano; [1]*Rio de Janeiro State University*

INTRODUCTION: This study evaluated the aesthetic perception of varying degrees of simulated bimaxillary protrusion in both lateral and frontal views. Additionally, the correlation between the degree of bimaxillary protrusion and the perception of the emotion expressed by the face was examined.
MATERIAL AND METHODS: Two young adults (man and woman), with balanced and symmetrical faces, were chosen. Dental casts and sequential setups were made by projecting the anterior teeth 1 and 2 mm, simulating bimaxillary protrusion. For the original model and at each degree of projection, vacuum-formed clear retainers (1 mm) were made. With the retainer in mouth, bimaxillary protrusion was simulated (labial projection of 1-, 2, and 3-mm). Frontal and lateral facial photographs were taken without and with each of the three retainers, and the aesthetic perception was evaluated online by 48 orthodontists, 40 prosthodontists, and 42 laypeople, using a Visual Analog Scale (0 to 100). In the frontal view, the examiner also selected one emoticon from an adapted emotion rating scale, with options of joy, neutral, sadness, or anger. The data were compared using the student's t-test, and Pearson correlation test.
RESULTS: In the assessment of the profile, mean scores were 75.86 ± 19.57 (without intervention), 63.25 ± 21.84 (1mm), 56.66 ± 22.79 (2mm), and 27.98 ± 18.34 (3mm), indicating that bimaxillary protrusion received lower scores compared to without intervention. Similarly, in the frontal evaluation, mean scores were 60.26 ± 20.76 (without intervention), 51.11 ± 22.42 (1mm), 36.56 ± 18.65 (2mm), and 27.98 ± 18.34 (3mm), with lower scores associated with increased labial projection. There were no significant differences in evaluations among dentists and laypersons. Images with the highest degree of protrusion exhibited a significant correlation with evaluations in both frontal and lateral views (p < 0.05), indicating consistent aesthetic impact when protrusion degrees were higher. An increased frequency of perceiving the emotion of anger was observed with the greater degree of protrusion.
CONCLUSION: There was a negative impact on the perception of facial aesthetics, both in the frontal and lateral views, and there is an increased perception of anger with greater labial protrusion in the frontal view.

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SP44 THE NORMAL VALUE OF THE LATERAL INCISORS IN THE MAXILLA: A PROSPECTIVE STUDY

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BACKGROUND/AIM: dental anomalies are clinical alterations that originate during the tooth formation process, leading to aesthetic and functional issues. Crown height and width exhibit significant heterogeneity across different patient populations in the available literature.
This prospective study aims to establish the norm and hypoplasia values for maxillary lateral incisors. Additionally, we aim to describe the relationship between the width of the lateral incisor and that of the central incisor.
MATERIALS AND METHOD: the first 103 consecutive patients meeting the inclusion criteria were included in the study. The upper jaw of each patient was scanned, and the scans were saved as standard tessellation language (STL) files. The upper incisors of each digital casts were measured on the computer. Two examiners independently performed the same measurements. Each tooth was measured in a total of six times.
RESULTS: A total of 51 women (49.5%) and 52 men (50.5%) participated at the study. The average size of the maxillary central incisor was 8.59 ± 0.51 mm, while the average size of the maxillary lateral incisor was 6.64 ± 0.46 mm. No statistically significant difference was found between the left and the right maxillary lateral incisor. However, a statistically significant difference was observed between the left and right maxillary central incisors (p=0.428 and p=0.038 respectively). A formula establishing a relationship between the central (x) and lateral (y) incisors was defined with a linear regression analysis y= 1.88 + 0.55 * x. No statistically significant difference was found between the maxillary incisors in men and women. A statistically significant relationship between the body height and the width of all the maxillary incisors was found (p = 0.028, p = 0.016, p = 0.016, p = 0.046).
LIMITATIONS: the number of participants was limited to a European population of 103 patients.
CONCLUSIONS: hypoplasia of the maxillary lateral incisor can be defined for teeth with a mesiodistal width smaller than 6.18 mm. A relationship between the maxillary lateral and central incisors can be established using a formula.

Abstract citation ID: cjae081.337
SP45 PHENOTYPIC CHARACTERISTICS IN ADULT PATIENTS WITH OBSTRUCTIVE SLEEP APNEA COMPARED TO HEALTHY ADULTS

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AIMS: To compare a group of adult obstructive sleep apnea patients (OSA) with a group of healthy adults (controls) in relation to the following parameters: craniofacial morphology, including skull thickness, posterior cranial fossa dimensions, length of the nasal bone, sella turcica morphological deviations, head posture and upper spine morphological deviations.
SUBJECTS AND METHODS: In 51 OSA patients (17 women, 34 men, mean age 51.92 years, mean BMI 26.74kg/m2, and mean AHI 21.8) and 74 healthy adults with neutral occlusion and no previous history of sleep disordered breathing (55 women, 19 men, mean age 38.74 years, mean BMI 24.15kg/m2), craniofacial morphology, head posture and upper spine morphological deviations were assessed on lateral cephalograms according to standard, validated methods. The differences between the two groups were analyzed by general linear model adjusted for age, gender and BMI and Fischer´s Exact test.
RESULTS: Maxillary and mandibular prognathism was significantly less pronounced in OSA patients compared to controls (P=0.02 P= 0.032 respectively). Headposture was significantly more extended (craniocervical angles, P=0.002, P 0.001 respectively) and significantly more forward inclined (cervicohorisontal angles, P=0.001, P=0.001 respectively) in OSA patients compared to controls. Length (Iodp-iop P<0.001, s-iop P= 0.002) and depth (iodp-iod, P<0,001) of the posterior cranial fossa was significantly larger in OSA patients compared to controls. The total number of upper spine morphological deviations was significantly higher in OSA patients (P=0.013) and fusions and blockfusions occurred significant more often in OSA patients compared to controls (P= 0.048 and P= 0.009 respectively) Skull thickness, length of the nasal bone and occurrence of sella turcica morphological deviations did not differ significantly between the two groups.
CONCLUSION: The results indicate that there are phenotypic differences in the craniofacial morphology including posterior cranial fossa dimensions, head posture and upper spine morphological deviation in adult OSA patient s compared to healthy controls. The findings may prove valuable in the etiology of OSA and hence in the diagnosis, subclassification of OSA and treatment outcome.

Abstract citation ID: cjae081.338
SP46 THE EFFECT OF HYGIENE INSTRUCTION VIA SMART TABLET FOR IMPROVING ORAL CARE IN PATIENTS WITH ORTHODONTIC FIXED APPLIANCES

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AIMS: To determine whether using smart tablet for adolescent orthodontic patients improves oral hygiene more than written hygiene instructions.
MATERIALS AND METHODS: 75 subjects undergoing fixed orthodontic treatment were assigned to written or smart tablet instruction methods. Both methods included information on tooth brushing technique, why tooth brushing was necessary, and detailed information about other auxiliary dental cleaning tools. In Group 1, 38 patients (mean age:15.29±1.63 years) were given oral hygiene information in written paper. In Group 2, “powerpoint” presentation was shown to 37 patients (mean age:14.89±1.82 years) on smart tablet. Patients in both groups filled out a questionnaire to measure oral hygiene knowledge level before oral hygiene information was given (T0), and 1 month after orthodontic therapy began (T1). Maxillary and mandibular total plaque scores (PS) were assessed at T0 and T1 using plaque staining tablets. Mann-Whitney U, Independent Samples-t-test, and Wilcoxon tests were used for statistical evaluations. Difference was significant at.05 level.
RESULTS: Maxillary (Group 1:-0.25±0.19; Group 2:-0.25±0.23) and mandibular (Group 1:-0.24±0.19; Group 2:-0.25±0.25) total PS significantly reduced from T0 to T1 in both groups (p<0.01), with no significant difference between the groups. The level of knowledge scores from T0 to T1 regarding questions “Which oral care products do you think people with fixed appliances should use? (Group 1:0.18±0.51; Group 2:0.32±0.53)”, “What do you think are the benefits of using an interdental brush, dental floss and an oral irrigator in addition to a toothbrush with fixed appliances? (Group 1:0.16±0.50; Group 2:0.17±0.41)”, “Do you know how to use floss (Group 1:0.34±0.48; Group 2:0.43±0.50), oral irrigator (Group 1:0.34±0.58; Group 2:0.30±0.52) with your fixed appliances?” significantly increased in both groups. The level of score for question “Do you know how to use interdental brushes with your fixed appliances?” increased from T0 to T1 in only Group 1 (0.29±0.46; p=0.001). The total score changes for all questions did not significantly differ between the groups.
CONCLUSIONS: The oral hygiene motivation methods were not significantly different from each other regarding oral hygiene knowledge level and PS changes. Both methods can be used safely depending on the preferences of the orthodontist and patient.

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SP47 DETECTING ORTHODONTIC MINI-IMPLANT POSITIONS FROM INTRAORAL SCANNING, SILICONE IMPRESSION OR FROM INITIAL DIGITAL PLANNING: WHICH TECHNIQUE YIELDS THE HIGHEST ACCURACY? – A CBCT-STUDY IN HUMAN CADAVERS

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AIM: Orthodontic mini-implants (OMIs) are frequently used as a skeletal anchorage in the anterior palate. For the fabrication of orthodontic appliances, the position of OMIs can be detected by a silicone impression or an intraoral scan. Alternatively, in case of digital planning, their position can be retrieved from the planning, thus allowing the placement of the OMIs and the appliance in a single appointment. However, deviations between the detected or planned position and the actual one can lead to stress and overloading of the OMIs. Aim of this study was to investigate the accuracy of these three techniques and to evaluate whether there is a correlation with the insertion angle.
MATERIALS AND METHOD: Two mini-implants were first digitally planned and then placed in the anterior palate of 11 human cadavers with different insertion angles (0°, 5°, 10°,15°, 20°, 25°, 30° referred to the occlusal plane) using a tooth-borne insertion guide. Subsequently the position of each OMI was detected by means of a cone-beam computed tomography (CBCT), an intraoral scan and a silicone impression. The position of the OMIs in the CBCT was set as “real position”. The measurements of the accuracy were performed between the CBCT data as a reference and the preoperative digital planning, the intraoral scan and the plaster model, manufactured from the silicone impression. Twenty-one OMIs (n=3 per insertion angle) were considered in the analysis.
RESULTS: The intraoral scanning tended to be more accurate in detecting the Top (mean deviation: 0.37 mm) and the Apex (mean deviation: 0.97 mm) of the OMIs, but the differences were not significant (P=0.248). The insertion angle had no influence on the accuracy of position detecting (P=0.263). As regards angular deviation, the lowest mean deviation was achieved using digital planning (3.7°), which performed less accurate as compared to intraoral scanning (P<0.001).
CONCLUSION: Within the limitations of this study, clinicians should be aware that inaccuracy can be slightly higher if the position from digital planning is

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utilized instead of performing additional impression or intraoral scanning after implant placement. Despite, all methods were associated with clinically irrelevant deviations and appear suitable for clinical application.

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SP48 *IN VIVO* EVALUATION OF THE DIFFERENCES IN OXIDATIVE-REDUCTIVE PROCESSES IN SALIVA DURING TREATMENT WITH CONVENTIONAL BRACKETS AND CLEAR ALIGNERS

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AIM: The purpose of this prospective observational study is to evaluate the differences in oxidative-reductive processes and the degree of inflammation in saliva during treatment with conventional brackets and clear aligners, through the evaluation of the following salivary values, total oxidant status (TOS), total antioxidant status (TAS), and 8-hidroxy-2'-deoxyguanosine (8OHdG).
MATERIALS AND METHODS: A total of 26 patients, 13 treated with multibrackets fixed orthodontic appliances (FO), and 13 with clear aligners (CA), ranging between 9 and 18 years, were recruited at the Orthodontic Program of the University of Campania Luigi Vanvitelli, Naples (Italy). Samples of saliva were collected three times: before starting the treatment (T0), considered as the control sample (T0), after one month (T1), and three months (T2).
The TOS and TAS in the saliva samples were measured using a novel colorimetric and automated measurement method developed by Erel.16, whereas the 8OHdG values were determined with the enzyme-linked immunosorbent assay (ELISA). On the collected data, descriptive statistical analysis was performed with the calculation of the mean and standard deviation.
RESULTS: Significant statistical differences were detected in the inflammatory levels between the two groups of patients, with the FO group having a higher inflammation index than the CA one at T1 and T2. Conversely, no specific significant differences regarding the redox changes in saliva between the patients of the two groups were revealed in any of the evaluated time points.
CONCLUSIONS: Our results confirmed that there were significant variations in patients treated with fixed appliances at T1 and T2 compared to clear aligner treatments, revealing more inflammation in the first group of patients, probably due to the more difficult hygiene control with multibracket appliances.

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SP49 A QUALITATIVE MEASUREMENT PHYSICAL PROPERTY CHANGES ON FIXED ORTHODONTIC APPLIANCES IMMERSED IN PREPROCEDURAL OXIDIZING MOUTHWASH

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AIMS: To compare the effects of artificial saliva, 1.5% hydrogen peroxide, and 0.5% povidone-iodine on surface morphology on fixed orthodontic appliances.
MATERIAL AND METHODS: The fixed appliance consists of 20 brackets, 4 buccal tubes, upper and lower 0.018" x 0.025" nickel titanium archwires, and 0.019" x 0.025" stainless steel archwires were immersed in artificial saliva, 1.5% hydrogen peroxide and 0.5% povidone-iodine study solutions separately based on specific conditions to mimic the duration and condition in the oral cavity. The immersion was 12 hours for brackets and buccal tubes and 6 hours for archwires. A qualitative measurement was made by scanning electron microscope (SEM).
RESULTS: The SEM images in both 1.5% hydrogen peroxide solution and 0.5% povidone iodine solution revealed pitting on samples as compared to artificial saliva SEM images, with deeper groove and rougher surface demonstrated by the samples immersed in 0.5% povidone iodine solution
CONCLUSION: Metal fixed orthodontic appliances subjected to 0.5% povidone iodine mouthwash had caused more pitted and significantly rougher surfaces toward brackets, buccal tubes, 0.018" x0.025" nickel titanium archwire and 0.019" x 0.025" stainless steel archwires. Furthermore, using povidone iodine mouthwash may have a destructive effect as compared to the effect of 1.5% hydrogen peroxide mouthwash.

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SP50 CAN CORROSION PRODUCTS OF METALLIC APPLIANCES MODIFY EFFICACY OF MANAGEMENT OF BIOFILM-INDUCED GINGIVITIS DURING ORTHODONTIC TREATMENT?

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BACKGROUND: Bracket placement can increase biofilm formation and metabolic activity of oral microflora resulting in gingival enlargement and bleeding. Plaque accumulation and gingivitis and their management was analysed in subjects with metallic and non-metallic appliances.
MATERIALS AND METHODS: 68 adolescents with malocclusions aged 12-18 (50% females) were randomized into groups: I) metallic appliance (steel brackets with nickel-titanium wire, II) non-metallic appliance (ceramic brackets with polymeric thread (same diameter). After two months of standard oral hygiene (toothbrush and paste) (T1), one-month chlorhexidine (CHX) mouthwash was added to half of the participants in each group (T2). Plaque accumulation and extent of gingivitis were recorded before (T0) and during treatment (T1 and T2).
RESULTS: Plaque accumulation significantly increased in two months on teeth with metallic appliance (p=0.017), but not with non-metallic appliance. At T1 plaque accumulation was higher in metallic than non-metal appliance (p=0.045). No significant change was visible in the extent of gingivitis in either group. In the standard oral hygiene group plaque accumulation increased over time, while in CHX non-metal group decreased but not reaching statistical significance. No significant differences were seen in gingivitis extent. Plaque accumulation on teeth correlated significantly between periods (p=0.454-0.658; p<0.001). Gingivitis extent before orthodontic treatment did not correlate with that during orthodontic treatment, but gingivitis during treatment (T1-T2) correlated (r=0.415; p=0.001). Plaque accumulation on teeth during treatment correlated with gingivitis extent (r=0.302; p=0.015 at T1 and r=0.450; p<0.001 at T2), but it did not correlate before treatment. Biomass on metallic and non-metallic appliances did not correlate with plaque accumulation on teeth nor gingivitis extent.
CONCLUSION: Accumulation of plaque on teeth is greater in adolescents with metallic than non-metallic fixed appliances. It appears that corrosion products of metal appliances do not influence the efficacy of treatment of biofilm-induced gingivitis.

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SP51 EFFECT OF FIXED AND REMOVABLE RETAINER AFTER COMPLETED ORTHODONTIC TREATMENT ON ORAL HYGIENE AND GINGIVAL HEALTH: TWO YEARS FOLLOW-UP

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AIM: To evaluate the effect of three retention protocols in mandible on oral hygiene and gingival health.
MATERIALS AND METHODS: The data of 81 subjects (72% women) who were followed during two years of retention after completion of active orthodontic therapy, were analyzed. At the time of completion of orthodontic therapy, the subjects were 12-23 years old (median 16). They were randomly assigned to 3 groups: I) rectangular 0.027x0.011'' retainer wire bonded from canine to canine in mandible, II) round 0.016'' and III) vacuum-formed retainer (VFR). Plaque Control Record, Calculus Surface Index and Bleeding on Probing were used to assess oral conditions in mandibular anterior segment after 6 months and 2 years in retention.
RESULTS: Over time, calculus accumulation increased between 6 months and 2 years of retention in all retention groups. There was a significant increase in a group with rectangular wire retainer and VFR, with a greater effect in rectangular wire group (p<0.001; r=0.680 and 0.570). Differences in the extent of plaque and gingivitis were not statistically significant. The amounts of change did not differ significantly between the three groups, but there was a tendency for VFR to accumulate more plaque, for the round wire to have less gingivitis, and for the rectangular wire to have more calculus accumulation compared to the others. The condition and changes did not depend on gender and age, damage of the retention appliance or the occurrence of irregularities of the mandibular incisors.
CONCLUSION: The effect of fixed and removable retainers on gingival health is similar.

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SP52 INJECTABLE PERIODONTAL LIGAMENT STEM CELL-METFORMIN-CALCIUM PHOSPHATE SCAFFOLD FOR BONE REGENERATION AND VASCULARIZATION IN RATS

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OBJECTIVES: Injectable and self-setting calcium phosphate cement scaffold (CPC) capable of encapsulating and delivering stem cells and bioactive agents

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would be highly beneficial for dental and craniofacial repairs. The objectives of this study were to: (1) develop a novel injectable CPC scaffold encapsulating human periodontal ligament stem cells (hPDLSCs) and metformin (Met) for bone engineering; (2) test bone regeneration efficacy in vitro and in vivo.
METHODS: hPDLSCs were encapsulated in degradable alginate fibers, which were then mixed into CPC paste. Five groups were tested: (1) CPC control; (2) CPC + hPDLSC-fibers + 0% Met (CPC + hPDLSCs + 0%Met); (3) CPC + hPDLSC-fibers + 0.1% Met (CPC + hPDLSCs + 0.1%Met); (4) CPC + hPDLSC-fibers + 0.2% Met (CPC + hPDLSCs + 0.2%Met); (5) CPC + hPDLSC-fibers + 0.4% Met (CPC + hPDLSCs + 0.4%Met). The injectability, mechanical properties, metformin release, and hPDLSC osteogenic differentiation and bone mineral were determined in vitro. A rat cranial defect model was used to evaluate new bone formation.
RESULTS: The novel construct had good injectability and physical properties. Alginate fibers degraded in 7 days and released hPDLSCs, with 5-fold increase of proliferation ($p<0.05$). The ALP activity and mineral synthesis of hPDLSCs were increased by Met delivery ($p<0.05$). Among all groups, CPC+hPDLSCs+0.1%Met showed the greatest cell mineralization and osteogenesis, which were 1.5 to 10 folds those without Met ($p<0.05$). Compared to CPC control, CPC+hPDLSCs+0.1%Met enhanced bone regeneration in rats by 9 folds, and increased vascularization by 3 folds ($p<0.05$).
CONCLUSIONS: The novel injectable construct with hPDLSC and Met encapsulation demonstrated excellent efficacy for bone regeneration and vascularization in vivo in an animal model. CPC+hPDLSCs+0.1%Met is highly promising for dental and craniofacial applications.

Abstract citation ID: cjae081.345
SP53 A STUDY TO ASSESS THE REPRODUCIBILITY OF FACIAL EXPRESSIONS USED IN THE SUNNYBROOK FACIAL GRADING SCALE USING 4D MOTION CAPTURE TECHNOLOGY

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AIM: To assess the reproducibility of facial expressions used in the Sunnybrook scale using 4D motion capture technology over a 6-month interval.
MATERIALS AND METHODS: 20 participants meeting the inclusion criteria were imaged performing the six facial expressions stated in the Sunnybrook scale (eyebrow lift, eye closed gentle, maximum smile, snarl, lower teeth show and lip pucker) at T1 and T2 (6 months later). All facial expressions were carried out from repose and the volunteers were imaged using a 4D facial motion capture system on both occasions. Upto 8 landmarks were digitally placed on the images, depending on the facial expression, which were then automatically tracked throughout the recording.
The Euclidian distance of each landmark, between T1 and T2, for each facial expression were analysed to determine the magnitude of displacement of the landmarks and determine their reproducibility over the two time points. A threshold of 2mm was set as being clinically significant different.
RESULTS: Based on the Euclidian distances, the results of this study showed four of the six facial expressions i.e., snarl, pucker, maximum smile, and eyebrow lift were reproducible. The other two expressions, eye closed gentle and lower teeth show, had differences in Euclidian distance which were statistically significantly different between the two-time intervals.
On further assessment of the x, y and z directions, the eyes closed gentle expression was associated with the least reproducibility error, with all distances being statistically significantly less than 2.0mm ($p>0.05$). None of the six facial expressions had mean absolute differences statistically significantly greater than 2.0mm.
CONCLUSIONS: Four of the facial expressions showed acceptable reproducibility over a 6-month interval, snarl, eyes closed gentle, maximum smile, and eyebrow lift. Lip pucker and lower teeth show were the least reproducible in the x, y and z directions, with the majority of the landmarks being clinically significantly greater than the 2.0mm threshold. The clinical impact of the study is that any changes in facial movement, because of an intervention, need to be greater than 3.0mm to be a true change and not a result of decreased reproducibility of the facial expression over time.

Abstract citation ID: cjae081.346
SP54 COMPARISON OF MESIODISTAL ROOT ANGULATION OF TEETH BY CONVENTIONAL PANORAMIC AND CONE BEAM COMPUTED TOMOGRAPHY IMAGES - A CROSS-SECTIONAL STUDY

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BACKGROUND/AIM: Accurate bracket positioning is required for proper root parallelism and for stable orthodontic treatment outcomes. This study aimed to determine the difference in mesiodistal root angulation of teeth measured on three different radiographic images.
MATERIAL AND METHODS: A cross-sectional study was conducted using orthopantomogram (OPG), panoramic images of cone beam computed tomography (Pan-CBCT) and cone beam computed tomography (CBCT). An occlusal plane was constructed in OPG and Pan-CBCT for angular measurements. The axial and sagittal views were used for assessing the mesiodistal root angulation on CBCT. Mesiodistal root angulation differences among three radiographic images were assessed using the Kruskal Wallis test. Mann-Whitney U test was applied for pairwise comparison and multinomial logistic regression was used to determine the association of sexual dimorphism with the direction of root angulation.
RESULTS: On comparing the mesiodistal root angulation in degrees (DE) among all three groups, upper right (UR2) and left lateral incisors (UL2) were found to be statistically significant with $p = 0.033$ and $p = 0.050$ respectively. On pairwise comparison, we found a statistically significant difference for upper right lateral incisor (UR2) between OPG and Pan-CBCT ($p = 0.045$). Upper left lateral (UL2) ($p = 0.024$) was significant in OPG and Pan-CBCT while upper left first molar (UL6) ($p = 0.043$) in OPG and CBCT group. On comparing the sexual dimorphism in the direction of root angulation, females showed a greater tendency of mesial root angulation (5.62) times for upper right second premolar (UR5) as compared to males.
CONCLUSIONS: There were no significant difference in mesiodistal root angulation between panoramic CBCT and CBCT images. Upper lateral incisors' angulation was found to be significant between OPG and panoramic CBCT images, whereas upper right lateral incisor and left first molars' angulation in OPG and CBCT images. Based on sexual dimorphism females showed a greater mesial angulation of teeth as compared to males.
IMPLICATIONS: OPG suffices in assessing the mesiodistal root angulation during bracket positioning which minimizes the radiation exposure based on ALARA. Any differences found between radiographic images can be mitigated by careful finishing at the end of treatment.

Abstract citation ID: cjae081.347
SP55 COMPARISON OF BRACKET FAILURE BETWEEN CAD/CAM AND CONVENTIONAL BRACKETS – A SYSTEMATIC REVIEW AND META-ANALYSIS

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BACKGROUND/AIM: Fixed brackets are classified into various types among which the most recently used are CAD/CAM (Insignia). They have customized slot, exhibit tooth movement independent of bracket position, and demonstrate enhanced bond strength. Therefore, the objective of this systematic review was to evaluate the bracket failure between CAD/CAM and conventional brackets.
SEARCH METHODS/SELECTION CRITERIA: Online databases (PubMed, Dental and Oral Science, CINAHL, Cochrane Central Register of Controlled Trials and Livivo) were systematically searched. Randomized clinical trials on human subjects were considered regardless of language or year of publication. Orthodontic patients in which CAD/CAM brackets were used as intervention and conventional brackets as control group were included. The outcome assessed was bracket failure. The risk of bias in clinical trials was assessed using the Cochrane Collaboration tool. The meta-analysis was conducted using the RevMan software V.5.4. The outcome was estimated using weighted average difference and 95% confidence intervals (CIs). The studies' heterogeneity was assessed using Cochrane's heterogeneity test (I2 Test).
RESULTS: Three articles fulfilling the inclusion criteria were included in qualitative and quantitative synthesis. Bracket failure was analyzed in a total number of 242 patients. It was found that the the bracket failure was slightly higher in the customized group. However, this difference was not statistically significant (95% CI,-1.83, 4.14).
CONCLUSIONS: Within the limitations of insufficient evidence, this systematic review and meta-analysis concluded that the bracket failure was higher in the customized group. It was also noted that this difference was not statistically significant. Due to the scarcity of available data, further studies are needed to establish definitively one's clinical benefit over the other.
REGISTRATION: PROSPERO (CRD42023434102)

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SP56 3D ANALYSIS OF MOLAR AND INCISOR MOVEMENTS AFTER MAXILLARY DISTALIZATION USING A MULTIBRACES TECHNIC ASSISTED BY 2 MINISCREWS

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BACKGROUND/OBJECTIVES: Even if superimpositions on digital models have described usable results, almost all of the studies evaluating dental movements obtained from mini-implant anchorages use superimposition methods on profile

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teleradiography. Their reliability remains poor and does not allow 3D movements to be appreciated. Our own orthodontic technique is based on 2 mini-screws in the maxilla. Our objective was to assess the movements at the end of the distalization phase. We have developed a superimposition protocol on numerical models using a tripod built up of the 3rd ruggae and the two mini-screws revealing precisely the displacement obtained on each upper tooth. Here we report results on first molars and central incisors.

MATERIALS/METHODS: We selected a prospective cohort of 33 patients, average age = 14.5 years. A 3D impression was made at T0 (beginning of treatment) and T1 (end of distalization step) by an intra-oral scan (3Shape). Our sample size was calculated for a precision of 0.10 at 0.05 alpha risk. After formatting and export (.stl) files (OrthoAnalyser, Meshmixer), the segmentation of the overlapping zones and surfaces was done on a imaging data analysis software (Avizo) at T0 and T1. The surface overlays used an Iterative closest proximity algorithm encompassing the head of the screws and the 3rd ruggae. The movements of the teeth are given by their 4x4 transformation matrix between T0 and T1 which, mathematically decomposed into translation and Euler angles, makes it possible to determine the variation of the teeth in 3D.

RESULTS: absolute linear error of worst case = 5.6 microns; relative error = 2.81%. Inter-rater reliability R= 0.998.

On average, Molar Intrusion=1.7mm(+/-0.4), backward Translation=2.9mm(+/-0.7), distal Rotation=13.8°(+/-3.6), positive Torque=6.3°(+/-1.55), distal Tipping = 4.8°(+/-2.1);

Incisor intrusion = 0.65, backward Translation = 1.75mm, positive Torque = 0.2°. Difference T1-T0 = 7.2 months

CONCLUSIONS/IMPLICATIONS: 1) this superimposition method makes it possible to measure displacements with great precision and highlights the effects of the technique in 3D. 2) The orthodontic technique used gives, no longer than eight months, a very interesting range of molar movements for the good achievement of multi-bracket treatment and the control of orthodontic mechanics.

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SP57 A NEW YARDSTICK FOR RATING NASOLABIAL APPEARANCE IN CHILDREN WITH COMPLETE BILATERAL CLEFT LIP AND PALATE

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BACKGROUND: Nasolabial appearance is essential for social interaction and quality of life of patients with clefts and their parents' perception of stigma and diversity. Furthermore, it is a significant goal for the cleft surgeon to restore the cleft lip and distorted nose.

OBJECTIVES: To establish assessment criteria, or 'yardsticks' for evaluating nasolabial treatment outcome in children with bilateral cleft lip, alveolus, and palate (BCLP) at 6, 9, and 12 years of age.

MATERIALS/METHODS: Cropped facial photographs (N=366) of patients with BCLP in three different views (frontal, profile, and worm's eye) at 6, 9, and 12 years of age were scored by 11 orthodontists from 4 cleft centers, focusing on three features of the upper lip and three of the nose. Weighted kappa statistics was applied to calculate the intra- and inter-rater reliability.

RESULTS: Different assessment criteria were developed for each specific feature of the upper lip and nose for each age group. The interrater reliability was fair to good for most features:

For lip variables:

Vermillion: ranged from k=0.61-0.70 at 6 yrs, k=0.48-0.68 at 9 yrs, to k= 0.39-0.67 at 12 yrs

Lip skin: ranged from k=0.50-0.64 at 6 yrs, k=0.45-0.67 at 9 yrs, to k= 0.43-0.61 at 12 yrs

Length: ranged from k=0.49-0.68 at 6yrs, k=0.43-0.68 at 9 yrs, to k= 0.35-0.62 at 12 yrs

For nose variables:

Columella: ranged from k=0.39-0.57 at 6 yrs, k=0.33-0.62 at 9 yrs, to k= 0.38-0.71 at 12 yrs

Tip: ranged from k=0.64-0.75 at 6 yrs, k=0.53-0.77 at 9 yrs, to k= 0.41-0.75 at 12 yrs

Shape: ranged from k=0.45-0.64 at 6 yrs, k=0.37-0.68 at 9 yrs, to k= 0.40-0.65 at 12 yrs

The intrarater reliability ranged mostly from 0.4 to 0.75

CONCLUSIONS: The new yardstick showed fair to good reproducibility, with vermilion, upper lip skin, and nose tip being the most reliable parameters. Upper lip parameters were more reliable in the youngest age group. Frequent evaluations in patients with BCLP are crucial for ensuring optimal treatment outcomes and favor surgeon's learning skills. This yardstick can facilitate intercenter aesthetic outcome comparisons and help identify surgical techniques that yield the best outcomes.

Abstract citation ID: cjae081.350

SP58 QUALITY, RELIABILITY AND CONTENT ASSESSMENT OF YOUTUBE VIDEOS ASSOCIATED WITH ORTHODONTIC BRUSHING AND HYGIENE

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AIM: Health related videos on web data make it easy to share information on orthodontic brushing and hygiene and address a wide audience. However, there is doubt among the reliability, quality, and whether they contain correct information. The present study aimed to evaluate the quality of the information provided by searching videos for orthodontic hygiene and brushing topics.

MATERIAL/METHODS: The results of the top 10 Youtube videos were examined using the keywords "orthodontic brushing" and "orthodontic hygiene". Video reliability was evaluated by DISCERN, overall quality was measured with Global Quality Score (GQS). Information accuracy, flow and quality were evaluated with Video Information and Quality Index (VIQI). Finally, meta-data includes the number of views, likes, dislikes and comments.

RESULTS: A total of 20 videos were taken for assessment, %90 of the videos were uploaded by healthcare institutions and specialists and %10 by laypeople. The mean DISCERN score was 2.5 for brushing videos and 0.8 for hygiene videos. The GQS score was 2.9 for brushing videos and 1 for hygiene videos. The VIQI score was 2.6 for brushing and 0.9 for hygiene videos. All scores were higher for the keyword "orthodontic brushing". %50 of the videos include tooth brushing, flossing and interproximal brush for orthodontic hygiene maintainance. %10 of the videos mentioned orthodontic brushes, %15 mentioned electronic brushes and %15 mentioned interspace brushes. %10 of the videos suggested floride tooth paste, % 15 suggested floride rinse. Just one of the videos suggested water flosser and tongue scraper.

CONCLUSION: The videos about orthodontic brushing and hygiene on Youtube were determined to have moderate scores in terms of quality, information accuracy and reliability. Videos mostly uploaded by healthcare professionals and specialists. In order to maintain the oral hygiene with orthodontic treatment videos are suggested brushing, flossing and interproximal brush.

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SP59 CORRELATION AND MAXILLARY TRANSVERSAL DEFICIENCY RESPONSIVENESS OF THE THREE ANALYSES PERFORMED ON CONE-BEAM COMPUTED TOMOGRAPHY

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OBJECTIVE: To evaluate the correlation of three maxillary transverse analyses (Andrews element 3 analysis (AE), Yonsei University analysis (YU) and Pennsylvania University analysis (PU)) by comparing their results with the values measured after rapid maxillary expansion on cone-beam computed tomography (CBCT).

MATERIALS AND METHODS: The study performed on the CBCT images before treatment (T0) and 3 months after maxillary expansion (T1) of 25 patients treated with rapid maxillary expansion whose maxillary expansion amount was clinically performed until the palatal cusp of maxillary molar teeth touch the buccal cusp of mandibular molar teeth. Comparisons of the maxillary transversal deficiency responsiveness were made in T1-T0 changes of three analyses and actual maxillary expansion amount (MxEx-measured by trifurcation of first molars) with the Friedman test followed by pairwise comparisons with the Wilcoxon matched-pairs signed rank test. Correlations between actual maxillary expansion amount and analyses were evaluated by Pearson correlation coefficient (r).

RESULTS: Changes of all three analyses were moderately linearly correlated to MxEx (r>0.5). The highest correlation coefficient (0.691) was in the PU and MxEx. PU analysis also showed strong linear correlation with AE (r=0.795) and YU (r=0.714). In the responsiveness comparisons of the analyses, AE revealed significantly more transversal deficiency (p<0.05, 8.59±5.26mm) than all other measurements. There was no statistically significant difference between

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transverse deficiency rate of YU analysis (6.76±2.30mm) and MxEx (p>0.05, 7.08±2.09mm), and PU (p>0.05, 6.08±3.48mm).
CONCLUSIONS: Although the results of all three analyzes showed a moderate relationship with the actual maxillary expansion amount, Yonsei University analysis gave the closest result to the expansion amount in terms of expansion need. Andrews Element analysis, on the other hand, showed a higher amount of expansion need than both the actual amount of expansion and that of the other analyses.

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SP60 IMPACT OF BODY MASS INDEX (BMI) ON FACIAL SOFT TISSUE SIZE AND SHAPE IN DEVELOPING CHILDREN

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BACKGROUND: Understanding the impact of body mass index (BMI) on facial size and shape is important for orthodontic treatment, since growth acceleration and greater pre-pubertal facial dimensions are seen in children with elevated BMI.
AIM: The study aims to assess the association (covariation) between facial soft tissue shape and size and BMI in developing children.
MATERIALS/METHODS: Facial morphology of 113 children (57 girls, 56 boys) with a mean age of 11.8 (SD=1.9) years, from schools in the Olomouc Region, Czech Republic, was captured using a 3-dimensional stereophotogrammetric scanner. BMI was calculated from recorded body height and weight. Geometric morphometrics analyzed facial size and shape, utilizing 14 fixed points and 400 semilandmarks in Viewbox v. 4.1 software. Semi-landmarks were adjusted to minimize bending energy between facial configurations. Descriptive statistics characterized the sample, and Generalized Procrustes analysis and principal component analysis (PCA) assessed face size and shape. Multivariate multiple regression models evaluated associations between facial size/shape and age and BMI.
RESULTS: In the sample, mean height 155cm (SD=11.8), weight 46.5 (SD=13.3) and calculated BMI 18.94 (SD=3.4). No difference in face size and shape was found between boys and girls (p=0.07). Only four first principal components (PCs) explained over 5% variance each: PC1 (27.3%), PC2 (19.9%), PC3 (9.1%), and PC4 (6.1%). No association was found between centroid size (corresponding with facial size) and BMI or age (p=0.20905). Regression models with PC1 to PC4 as dependent variables and BMI and age as independent variables revealed no effect of these variables on facial shape (p > 0.05 for all models).
LIMITATIONS: The majority of children were likely pre-pubertal, i.e., before the growth spurt.
CONCLUSIONS: In growing non-obese children, BMI, age, and sex were not correlated with facial size and shape. This suggests that BMI may not adequately capture facial dimensions in children with these demographic and maturational characteristics.

Abstract citation ID: cjae081.353
SP61 PATIENT PERSPECTIVE IN CLEAR ALIGNER AND FIXED APPLIANCE TREATMENTS

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OBJECTIVE: This study aimed to compare the pretreatment expectations and motivations for choosing the treatment system, satisfaction, and psychosocial and physical discomfort levels of patients who seek orthodontic treatment with clear aligner (CA) or labial fixed appliances (LFA).
METHODS: The study included 44 participants who were over 16 years old, had no severe transverse or vertical problems, had mild-to-moderate severity of malocclusion, and required non-extraction treatment in both arches. Patients were divided into CA and LFA groups according to their treatment preferences. Demographic data, motivations, and expectations of the treated patients were assessed through a pretreatment questionnaire. A visual analog scale was used to evaluate the results of the questionnaires obtained at the end of the first (T1), third (T2), and sixth months (T3) of treatment.
RESULTS: The pretreatment motivations of the patients in the CA group were aesthetics, less physical discomfort, and less pain experience, whereas those in the LFA group had economic, reliable, and shorter treatment expectations. The impact on social life, difficulty in adapting to the treatment system, discomfort due to appearance, and difficulty in maintaining oral hygiene were found to be lower in the CA group than in the LFA group. The pain level was similar between the groups at all periods. Lip and cheek discomfort were more frequent in the LFA group. The degree and duration of speech change were highest at T1 in the CA group but became similar in both groups over the following months. Satisfaction with the treatment process was found to be similar between the groups. The most disturbing procedure for the patients was observed to be interproximal reduction in the CA group and bracket and archwire applications for the LFA group.
LIMITATION: The six-month observation period of our study may lead to limited results since patient compliance, which may decrease over time in long-term treatments, may cause changes in patient satisfaction.
CONCLUSION: In both groups, patients experienced similar pain levels and a similar degree of satisfaction in line with their expectations but reduced psychosocial and physical discomfort with clear aligners than with labial fixed appliances over the 6-month observation period.

Abstract citation ID: cjae081.354
SP62 FROM NASION TO SELLION: A CORRELATION STUDY FOR THREE-DIMENSIONAL CEPHALOMETRIC ANALYSIS

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AIM: To three-dimensionally evaluate the correlation between skeletal landmark Nasion (N) and soft tissue point Sellion (Se) and their related cephalometric measurements.
MATHERIALS: 214 CBCT, carried out from patients of the Orthodontics and Maxillofacial Surgery department of the IRCCS Fondazione Ca' Granda Ospedale Maggiore Policlinico of Milan, were imported into a dedicated software and manually annotated by two independent and qualified observers; a total of 8 landmarks, resulting in 6 skeletal (N) and 6 cutaneous/skeletal (Se) angular measurements, were exported and analyzed. This retrospective study was approved by the Ethical Committee of the University of Milan (protocol number 71/22, 21st July 2022). The coordinates of each point were analyzed through a computational software and the Pearson correlation coefficient was used to assess the correlation between the angular measurements obtained using Nasion or Sellion. Inter-observer reliability for landmark localization was analyzed through the Intraclass Correlation Coefficient (ICC).
RESULTS: ICC revealed a substantial degree of consistency confirming the reliability of the two independent observers. All measurements showed highly significant (p<0.001) and clinically relevant correlations, but the highest Pearson coefficient was found between N^Me^Go vs Se^Me^Go (r=0.989, p<0.001) while the lowest was among SNA vs SSeA (r=0.814, p=<0.001). Furthermore, linear regressions provided the new norm range values for Sellion related measurements.
LIMITATIONS: The study was limited to Caucasians, therefore it might not be applicable to a broader population.
CONCLUSIONS: Results suggested that Sellion was a reliable alternative to Nasion in 3D cephalometric analysis. The use of a soft tissue reference point, in place of a skeletal one, might allow to evaluate skeletal craniofacial structures, decreasing the radiographic exposure for the use of a reduced FOV. Sellion landmarks showed high intraclass correlation coefficients, indicating inter-observer reliability. Furthermore, Sellion-related measurements exhibit significantly higher Pearson's correlation coefficients compared to Nasion-related ones, making them valuable for innovative 3D orthodontic analyses.

Abstract citation ID: cjae081.355
SP63 CARIES AND WHITE SPOT LESIONS TRAJECTORIES OF ORTHODONTIC PATIENTS ACROSS AN OBSERVATION PERIOD OF 20 YEARS

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AIM: Fixed orthodontic appliances impair oral hygiene and may thus increase the risk for caries and white spot lesions (WSL). However, to date there is little longitudinal data on the course of dental hard tissue diseases during and especially after orthodontic treatment. Aim of our study was therefore to determine the long-term associations between caries and WSL and to identify risk indicators for both conditions.
SUBJECTS AND METHODS: 103 patients aged 36.6±6.5 years whose fixed appliance orthodontic treatment had finished ≥ 15 years ago. Current clinical data and photos (T3), orthopantomograms and photos from before treatment (T0), after debonding (T1) and a 2-year follow-up (T2) were available. Parameters of interest were dentine caries, "Missing or Filled Teeth" (MFT) index, WSLWSL index and "Periodontal Screening index" (PSI; T3 only). Non-parametric statistical procedures were used; Relative risk (RR (95% CI)) was computed to analyse relationships between parameters of interest.

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RESULTS: At T0, 30.4% had no caries experience decreasing to 25.6%, 22.4% and 6.8% at T1, T2 and T3 resp. The median MFT (95% CI) at T0, T1, T2 and T3 was 2 (1;3), 3 (2;4), 3 (2;4) and 7 (6;9) resp. increasing significantly at each time point (p<0.001 each); 30.1% had WSL at debonding. Patients with caries experience at T0 had an increased risk (RR 2.36 (1.02;5.50)) for WSL at debonding. Dentine caries (RR 4.33 (1.14;16.47)), caries experience (RR 2.75 (0.93;8.12)) and WSL (RR 2.91 (1.59;5.29)) at debonding were significantly associated to incident caries short term (T2), but not long term (T3). PSI at T3 had a significant association with previous caries incidence and WSL.
CONCLUSIONS: Caries experience prior to orthodontic treatment may constitute a risk indicator for WSL, while caries experience and WSL at the end of orthodontic treatment may constitute a risk indicator for caries incidence short term. This may help identifying orthodontic patients with special need for prevention and counselling. The retrospective relationships of the PSI to caries and WSL indicate that the individual oral hygiene level is a permanent condition, which suggests the need for more efforts to improve oral hygiene already at a young age.

Abstract citation ID: cjae081.356
SP64 IS MANDIBULAR ADVANCEMENT POSSIBLE AFTER PUBERTAL PEAK? A PILOT STUDY WITH ACRYLIC SPLINT HERBST APPLIANCE ANCHORED TO 4 MINISCREWS (STM4 TECHNIQUE)

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BACKGROUND: The treatment of skeletal Class II malocclusion, caused by mandibular retrusion, often involves the use of Herbst Appliance, due to its effectiveness, efficiency and reduced need for compliance. This appliance has both dental and skeletal effects, including anterior displacement of the mandible, reduced sagittal growth of the maxilla, mesialization of the lower arch and distalization of the upper one. While skeletal effects can be considered favorable for the purpose of a proper aesthetic correction, dental effects, caused by anchorage loss, could reduce the functional overjet for a significant mandibular advancement, especially after the pubertal peak. The aim of this pilot study was to evaluate whether the combination of MTH Herbst appliance with Skeletal Anchorage and elastic chains in both, upper and lower arch (STM4 protocol), could overcome the limitations of traditional functional treatment in skeletal class II patients with CVM4-5.
METHODS: This retrospective controlled study was conducted on a sample treatment group of 10 skeletal class II patients (6 males [M], 4 females [F]; mean age of 15.5 years) treated with HA combined with four miniscrews inserted in the upper and lower arch, as anchorage reinforcement.
Lateral cephalograms taken at the beginning of the treatment and at the end of the Herbst phase were analyzed and compared with those of untreated patients with equal sex, age, malocclusion, and skeletal maturation.
RESULTS: According to Pancherz analysis the treated group of patients showed a significant advancement of the Pogonion (+4.75mm), with significant reduction of ANB angle (-3.3°) and Wits (-4.15mm). Similarly, this protocol allowed labial tipping of upper incisors (+6.65°) and limited the labial flaring of lower ones (+3.05°), preserving the overjet needed for a proper mandibular advancement.
LIMITATIONS: a larger sample size, a long-term evaluation and the presence of a control group with post-pubertal patients treated by traditional HA, without skeletal anchorage are necessary to confirm these results.
CONCLUSIONS: The STM4 technique may represent an effective protocol for the skeletal correction of class II malocclusion after the pubertal peak, since it significantly reduces unfavorable dental compensations and increases the skeletal effects and the aesthetic outcome of class II functional treatment.

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SP65 IS GONIAL ANGLE A PREDICTOR FOR MANDIBULAR RESPONSE WHEN GROWING SKELETAL CLASS II PATIENTS ARE TREATED WITH ACRYLIC SPLINT HERBST APPLIANCE AND LOWER SKELETAL ANCHORAGE (STM2 PROTOCOL)?

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BACKGROUND: Despite some contradictions in literature, a gonial angle (CoGoMe) threshold of 125.5° is considered a cephalometric predictor for mandibular response in functional treatment of Class II malocclusion. However, since most of the studies have not evaluated the role of skeletal anchorage, the aim of this investigation was to reevaluate this predictive parameter in growing skeletal Class II patients treated with acrylic splint Herbst Appliance and two miniscrews with elastic chains in the lower arch (STM2 protocol).
METHODS: 35 skeletal class II patients (20 M, 15 F; mean age 11.37 ± 1.82 years) with mandibular retrusion and consecutively treated with STM2 protocol were classified into two groups according to their CoGoMe baseline value (<125.5° for Group 1, and >125.5° for Group 2). A cephalometric analysis was performed by the same operator for each patient at baseline (T0) and at the end of Herbst phase (T1). Cephalometric variables were tested by the Student's t-Test P value adjusted by using Bonferroni method or Mann-Whitney U test P value adjusted by using Bonferroni method.
RESULTS: The mean duration of the treatment was 9.5 months. No statistically significant differences between groups were detected at baseline, except from expected SN/GoMe° (p < 0.001) and Co-Go mm(p=0.028). Despite a good increase in Pogonion projection (3.34 ± 2.34 mm in Group 1 and 4.34 ± 2.41 mm in Group 2), no statistically significant changes between groups, due to the treatment, were found considering mandibular sagittal and vertical skeletal parameters. Similarly, no statistically significant differences were evaluated in dental changes between high-angle and low-angle subjects, apart from upper molar sagittal position (p=0.014).
LIMITATIONS: Despite the achieved results, a larger sample size and a long-term evaluation would be necessary to assess the stability of the results.
CONCLUSIONS: The 125.5° threshold in the CoGoMe value could not be confirmed as reliable predictive parameter for mandibular response in class II patients, when treated with MTH Herbst and lower skeletal anchorage. The STM2 technique, thanks to its effective control in sagittal and vertical planes, may be an appropriate protocol in treatment of skeletal class II patients, regardless from the growth pattern.

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SP66 IN VITRO SHEAR BOND STRENGTH OF METAL BRACKETS USING DIFFERENT - CHEMICAL AND LIGHT CURING - ADHESIVE SYSTEMS

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AIM: The shear bond strength (SBS) of orthodontic brackets should be sufficient to withstand chewing forces and correspondingly low to remove the brackets without damaging the tooth surface. Clinically relevant SBS should be between 6-8 MPa, which is influenced by several factors, including the adhesive system used.
The aim of this study was to investigate the SBS of three different adhesive systems (Transbond XT, 3M Science, St. Paul, Minnesota, USA = control group; Opal Bond, Opal Orthodontics, South Jordan, Utah, USA and Rely-A-Bond, Reliance Orthodontic Products, Itasca, Illinois, USA = test groups) on bovine incisors using metal brackets. Transbond XT and Opal Bond are light-curing composites whereas Rely-A-Bond is a chemically curing composite.
MATERIAL AND METHODS: A total of n=90 Avex® MX brackets (Opal Orthodontics, USA) were bonded to bovine enamel and the SBS as well as the adhesive remnant index (ARI score) was subsequently examined in the three test groups (n=30, each group) after debonding (universal testing machine, Schalkau, Germany; 0.5mm/min; Leica MZ12, Leica, Wetzlar, Germany; 3.5 x magnification). Statistical analysis was performed using ANOVA and Kruskal-Wallis test (significance level p≤ 0.05). The distribution of the ARI scores was also evaluated using regression analysis in order to check for a possible correlation with the SBS values determined.
RESULTS: Although the highest SBS values were identified using Rely-A-Bond (26.48 MPa), the highest means SBS values were found in the control group (Transbond XT: 16.55 MPa +/- 3.94 [SD]), followed by Opal Bond (15.76 MPa +/- 5.68 [SD]) and Rely-A-Bond (15.35 MPa +/- 4.73 [SD]) with no significant differences between the three groups. Significant differences could be found when looking at ARI scores with Rely-A-bond showing the most favorable distribution (86,67%, score 1). Any correlations between the ARI scores and the SBS values could not be established.
CONCLUSIONS: All adhesive systems showed mean SBS values within the range for clinical use. No enamel cracks could be identified. As this was an in vitro study and SBS as well as ARI values are also influences by other factors despite those investigated here, results should be looked with caution directly projecting into clinics.

Abstract citation ID: cjae081.359
SP67 SPEECH AND BURDEN OF SECONDARY SURGICAL INTERVENTIONS FOLLOWING ONE-STAGE REPAIR OF UNILATERAL CLEFT LIP AND PALATE AND ALVEOLAR BONE GRAFTING PERFORMED AT DIFFERENT TIMINGS

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A comprehensive assessment of the treatment outcome in cleft lip and palate (CLP) involves evaluating speech and the impact of speech-correcting surgical interventions. To our knowledge, the existing literature lacks information regarding the correlation between speech outcomes and the timing of alveolar bone grafting (ABG). Therefore, our objective was to evaluate the speech outcomes and the need for secondary speech-related surgical interventions in patients with unilateral CLP who underwent one-stage closure of the entire cleft with early ABG (i.e., before 6 years of age) compared to late ABG (i.e., after 6 years of age). This retrospective case-control study compared the speech outcomes of 37 boys and 19 girls with unilateral cleft lip and palate (UCLP) who underwent one-stage cleft repair at an average age of 8.1 months and alveolar bone grafting either before or after 6 years of age, with a non-cleft control group at an average age of 10 years. Two experienced speech and language pathologists conducted perceptual speech assessments using a specialized test of 27 sentences designed for Polish-speaking cleft patients.
The results revealed that 5.3% had severe hypernasality, 1.8% had severely impaired speech intelligibility, 10.7% exhibited retracted compensatory articulations, and 7.1% displayed facial grimacing. Mild hyponasality was observed in 12.3% of patients, while 16.1% exhibited voice abnormalities. Additionally, 12.5% of patients required orofacial fistula repairs, 3.6% underwent pharyngoplasties, and 28.6% received ear ventilation tube insertions.
The study indicates that speech abnormalities in UCLP patients were relatively infrequent and not highly severe, suggesting that the primary UCLP repair method presented effectively reduced the need for further surgical interventions, leadIng to positive speech outcomes.

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SP68 MAXILLARY GROWTH ANALYSIS OF NEWBORNS WITH UNILATERAL CLEFT LIP AND PALATE

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AIM: The aim of the study was to develop a growth curve model based on the growth of the maxillary segments of infants with unilateral cleft lip and palate prior to the primary surgical cleft closure.
MATERIALS AND METHODS: 195 digital maxillary models of 50 infants with unilateral cleft lip and palate were collected during their preoperative alveolar molding therapy period. Intraoral scans were taken shortly after birth, at the monthly checkups and just before the surgical cleft closure at approximately 6 months of age. Surface measurements of maxillary segments were conducted using the diagnostic program Onyx Ceph3TM.
In order to create the growth curve model, mixed-effects regression models (linear, quadratic, squared root, B-splines, fractional polynomials) with patients' age (days) as predictor and the surface measurement as a random effect were fitted to the data. The best fit was selected according to the Akaike Information Criterium. A likelihood ration test was performed for comparing the selected model with the intercept-only model. Statistical analysis (ethics No. 2023-1250) was performed by the Institute for Biostatistics and Mathematical Modeling of the _____ University in _____.
RESULTS: The linear regression with mixed effects model showed the best fit for the total area, the area of the large segment and the area of the small segment. A highly significant association between the surface area and patients' age was observed ($p<0.001$). An increase of the area with time was estimated 2.88 mm2 per day for the total area, 1.62 mm2 per day for the area of the large segment and 1.25 mm2 per day for the area of the small segment. The likelihood ratio test indicated that the linear regression models were significantly better than the intercept-only models for all of the measured areas ($p<0.001$).
CONCLUSION: The growth pattern for the jaw segments of patients with unilateral cleft lip and palate in the preoperative alveolar molding period can be predicted best using a linear regression model. The growth curve model developed by the present study can be used in future treatment planning of patients with unilateral cleft lip and palate.

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SP69 DIAGNOSIS OF TRANSVERSE DISCREPANCY IN GROWING PATIENTS USING TAC CONE BEAM 3D: A PILOT STUDY.

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AIM: The aim of this pilot study is to propose a new method to be able to assess the transverse discrepancy of the maxilla in growing patients through the use of bony landmarks observable by CBCT. We started from the analysis of CBCT from the University of Pennsylvania. The latter always turns out to be valid in adult patients. In growing patients it has anatomical limitations that may lead to underestimate of the real expansion.
MATERIALS AND METHODS: A retrospective study was conducted on 13 patients, 6 females (mean age T0 8a and T1 10.6a) and 7 males (mean age T0 8.3a and T1 12a). The sample was randomly selected from a group of Rapid Palatal Expander-treated subjects in the dental clinic of the University of L'Aquila, who were prescribed pre(T0) and post(T1)-treatment scans. Measurements were performed for the maxilla and mandible at T0 and T1 by 2 different operators (E.B., F.S.) using BlueSkyPlan v4.0 software. Measurements were taken at two different times (15 days apart).
It was decided to identify a new method in growing patients. The transverse dimension was obtained by calculating the distance between two points on the inner cortical at the mesio-vestibular root of the upper permanent first molar. In the mandible, two points on the inner cortical at the center of resistance of the lower first molars were considered. The anatomical limitation of the Penn analysis was overcome by using, in the case of anatomical variations, segments to simulate the inner cortical at the end of growth. For the maxilla, the segment was drawn at the point where the cortical changed from convex to concave to where it changed from concave to convex. In the mandible, the segment was traced tangent to the inner cortical starting at the first premolar. The ICC (coefficient of intraclass agreement) was used to conduct the inter and intra-operator statistical analysis.
RESULTS: The ICC shows excellent reliability for both intra- and inter-operator measurements (ICC>0.9).
CONCLUSIONS: The CBCT is a valuable tool for evaluation and the results concluded that our method is reproducible and repeatable.

Abstract citation ID: cjae081.362
SP70 ASSESSMENT OF CHANGES IN OCCLUSAL CONTACT AREAS AFTER ORTHODONTIC TREATMENT IN PATIENTS WITH DIFFERENT VERTICAL GROWTH PATTERN

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AIM: This prospective study aimed to evaluate the changes in posterior occlusal contact areas during the 1-year retention period in individuals with different vertical growth patterns.
METHODS: Thirty low-angle and 30 high-angle patients who received non-extraction fixed orthodontic treatment were enrolled in the study groups. The control group consisted of 30 individuals with normal growth pattern who did not receive orthodontic treatment. After the treatment (T1), 6 months later (T2), and at the end of the 1-year retention period (T3), all patients were scanned with a 3D intraoral scanner. Occlusal contact areas were measured in mm2 using image analysis software on digital models. Statistical analysis was performed.
RESULTS: A statistically significant difference was observed between the initial mean occlusal contact area of the control, low, and high-angle groups ($p<0.001$). The mean occlusal contact area of the control group at T1, T2, T3 was significantly higher than the low-angle and high-angle groups ($p<0.001$). No statistically significant difference was observed between the mean occlusal contact area of the low-angle and high-angle groups at T1 ($p>0.05$) whereas the mean occlusal contact area of the low-angle group was significantly higher than that of the high-angle group at T2 and T3 ($p<0.001$). The changes in the occlusal contact areas were significantly higher in low angle group compared to high angle group from T1 to T2 ($p<0.001$), with significantly greater changes in the first 6 months compared to the second 6 months of the retention period in both groups ($p<0.001$).
CONCLUSION: At the end of the active orthodontic treatment, the posterior occlusal contact areas of the treated patients were smaller than those of untreated subjects. There was no difference between high and low-angle patients. However, a significant occlusal settling occurred in the first year after orthodontic treatment. Low-angle patients exhibited greater occlusal contact areas at each period and the increase in contact areas was higher compared to the high-angle patients in the first 6 months.

Abstract citation ID: cjae081.363
SP71 VERTICAL EFFECTS OF CERVICAL HEADGEAR IN GROWING PATIENTS WITH CLASS II MALOCCLUSION: A SYSTEMATIC REVIEW AND META-ANALYSIS

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BACKGROUND/AIMS: Cervical headgear (cHG) has been shown to be effective in Class II correction both with dental and orthopaedic effects but has traditionally been associated with vertical adverse effects in terms of posterior mandibular rotation. Aim of this systematic review was to assess the treatment effects of cHG treatment in the vertical dimension.
METHODS: Unrestricted literature search of five databases was conducted up to May 2023 for randomized/non-randomized clinical studies comparing cHG to untreated controls, high-pull headgear (hp-HG), cHG adjuncts, or other Class II treatment alternatives (functional appliances or distalisers). After duplicate study selection, data extraction, and risk-of-bias assessment according to Cochrane, random-effects meta-analyses of mean differences (MD)/standardized mean diffences (SMD) and their 95% confidence intervals (CIs) were performed, followed by meta-regressions, sensitivity analyses, and assessment of certainty on existed evidence.
RESULTS: Two randomized/16 non-randomized studies (12 retrospective/4 prospective) involving 1094 patients (mean age 10.9 years and 46% male) were included. Compared to natural growth, cHG treatment was not associated on average with increases in mandibular (eight studies; SMD 0.22; 95% CI -0.06, 0.49; P = 0.11) or maxillary plane angle (seven studies; SMD 0.81; 95% CI -0.34, 1.95; P=0.14). Observed changes translate to MDs of 0.48° (95% CI -0.13, 1.07°) and 1.22° (95% CI -0.51, 2.94°) in the SN-ML and SN-NL angles, respectively. No significant differences were seen in y-axis, facial axis angle, or posterior face height (P > 0.05). Similarly, no significant differences were found between cHG treatment and (i) addition of a lower utility arch, (ii) hp-HG treatment, and (iii) removable functional appliance treatment (P > 0.05 for all). Meta-regressions of patient age, sex, or duration and sensitivity analyses showed relative robustness, while our confidence in these estimates was low to very low due to the risk of bias, inconsistency, and imprecision.
CONCLUSIONS: cHG on average is not consistently associated with posterior rotation of the jaws or a consistent increase in vertical facial dimensions among Class II patients.

Abstract citation ID: cjae081.364
SP72 INFLUENCE OF ELASTOMERIC AND STEEL LIGATURES ON PERIODONTAL HEALTH DURING FIXED APPLIANCE ORTHODONTIC TREATMENT: A SYSTEMATIC REVIEW AND META-ANALYSIS

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AIMS: Metallic and elastomeric ligatures are widely used in orthodontics to secure the archwire within the bracket slots, but elastomeric ligatures have traditionally been associated with increased microbial colonization, which could adversely affect periodontal health. Aim of this systematic review was to compare the effects on periodontal health of elastomeric and steel ligatures used on fixed appliances.
METHODS: Unrestricted literature search of 7 databases up to July 2023 were performed for randomized / non-randomized clinical studies on humans comparing the two ligation methods during fixed-appliance therapy. After duplicate study selection, data extraction, and risk-of-bias assessment according to Cochrane guidelines, random-effects meta-analyses of Mean Differences (MD) or Standardized Mean Differences (SMD) and their 95% confidence intervals (CIs) were carried out, followed by assessment of certainty on existed evidence.
RESULTS: A total of 11 studies (3 randomized / 6 non-randomized) with 354 patients (mean age 14.7 years and 42% male) were included. No statistically significant differences were seen for plaque index (5 studies; SMD=0.48; 95% CI=-0.03 to 1.00; P=0.07), gingival index (2 studies; MD=0.01; 95% CI=-0.14 to 0.16; P=0.89), probing pocket depth (2 studies; MD=0; 95% CI=-0.17 to 0.16; P=0.97), or Streptococcus mutans counts (4 studies; SMD=0.40; 95% CI=-0.41 to 1.20). Elastomeric ligatures were associated with moderately increased total bacterial load (3 studies; SMD=0.43; 95% CI=0.10 to 0.76; P=0.03). Our confidence in these estimates was low in all instances due to the inclusion of non-randomized studies with high risk of bias.
CONCLUSIONS: The ligature method does not seem to influence the periodontal health during fixed treatment, even if elastomeric ligatures are associated with a moderate increase of bacterial load.

Abstract citation ID: cjae081.365
SP73 CONCERN WITH SMILE APPEARANCE: A PROPOSAL FOR A NEW PSYCHOMETRIC SCALE

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AIMS: To adapt and estimate psychometric properties of the Utrecht Questionnaire for Aesthetic Outcome Assessment in Rhinoplasty (OAR) for evaluating the concern about smile appearance in adults. Additionally, the study aimed to estimate the impact of demographic characteristics on the concern about smile appearance.
MATERIAL AND METHODS: This was a cross-sectional observational study among 2.523 Brazilians aged 18 to 40 years [mean age=32.9 (SD=11.4) years, 68.1% female]. The Portuguese version of the OAR was adapted for smile assessment in dental practice. This new version was called Questionnaire for Outcome Assessment of Smile Aesthetic (OA-Smile). Data validity was estimated using Confirmatory Factor Analyses. Reliability was measured using the alpha ordinal (α) and the omega coefficient (ω). Measurement invariance of the factor model was tested using multigroup analysis (ΔCFI) across samples with different characteristics (sex, marital status, economic level, use of dental prostheses, being a dental patient). A structural model was elaborated to evaluate the impact of demographic characteristics on concern regarding smile appearance. The fit of the structural model was assessed, and the significance of the path estimates (β) was evaluated using a z-test (α=5%).
RESULTS: The factor model of the OA-Smile presented an adequate fit to the data (CFI=0.99; TLI=0.99, SRMR=0.04, α=0.96, and ω=0.94). Strict invariance (|ΔCFI|<0.01) was observed across subsamples with different characteristics. The structural model presented an adequate fit (CFI=0.97; TLI=0.99 and SRMR=0.05). Concern about smile appearance was higher among women, younger individuals, singles, those with lower income, individuals using dental prostheses, undergoing dental treatment, and those who don't like their smile.
LIMITATIONS: The cross-sectional design does not allow to establish a causal association between the variables in the structural model.
CONCLUSION: The OA-Smile was a suitable scale to assess the concern about smile appearance. The data obtained with this scale were valid and reliable. Demographic characteristics should be considered when assessing this concern. The finding highlights the importance of considering individual characteristics when assessing and addressing concerns about smile appearance in dental practice.

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SP74 OBSTRUCTIVE SLEEP APNOEA/HYPOPNOEA SYNDROME: A REVIEW OF HOSPITAL CARE AND NATIONAL CLINICAL GUIDELINES

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BACKGROUND: Obstructive sleep apnoea/hypopnoea syndrome (OSAHS) is a sleep-related respiratory condition, causing repeated collapse of the airway. It affects approximately 8 million people in the UK and contributes to multiple co-morbidities. There has been new National Institute for Health & Care Excellence (NICE) guidelines in the UK for the management of this complex syndrome, however it was unclear how many professionals are aware of these.
AIMS: To assess the care pathway for OSAHS patients at St George's Hospital (SGH), and if this was complying with current National Guidelines.
METHODS: A retrospective case-note analysis of 50 adult patients in SGH diagnosed with OSAHS, who attended the 'Sleep Clinic' in 2022. Patients notes were reviewed to determine if key criteria of NICE guidelines were followed.
RESULTS: The clinic follows some of the NICE guidelines, which were recorded in the notes for 40% of the criteria and standards reviewed.
Patients had a range of treatment modalities including: Continuous-Positive-Airway-Pressure (CPAP) (70%); Mandibular Advancement Splint (MAS) (24%); Neuromuscular Stimulator (4%); Surgery (2%); with varying compliance to treatment provided.
10 out of the 25 standards reviewed were met and recorded in clinical notes. Criteria not recorded consistently was: lifestyle advice such as sleep hygiene & alcohol reduction (58% patients had no record of advice given); treatment options discussed (36% patients did not have options discussed); and parameters for monitoring treatment efficacy. NICE recommended recall intervals were not adhered to: 22% of patients provided with MAS and 0% of patients provided with CPAP had review appointments within the timeframes advised.
LIMITATIONS: This service evaluation relied on quality of patient record keeping by clinicians, which can vary, meaning that even if advice or discussions regarding care were had but not recorded, the standard was not met.

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CONCLUSIONS: There's a need to raise awareness of the recent guidelines and improve record keeping to ensure NICE guidance is followed. Patient education for preventative and conservative management is key for patients to understand their involvement in improving symptoms for OSAHS, as well overall health. Further discussion is needed to ensure efficient pathways and funding for patients requiring alternative therapies for OSAHS.

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SP75 THREE-DIMENSIONAL CHANGES IN CLASS II PATIENTS TREATED WITH THE TWIN BLOCK FUNCTIONAL APPLIANCE: A CASE-CONTROL STUDY

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AIM: To visualize and quantify the three-dimensional skeletal and dental changes in circum-pubertal Class II patients after treatment with the Twin Block and fixed appliances, compared to Class II controls treated with fixed appliances and Class II elastics.
MATERIALS AND METHODS: Ethics approval for this retrospective study was obtained by the competent ethics committee. Records of 22 patients treated with Twin Block were selected from an existing practice data-set. Records included CBCTs taken before treatment, upon completion of the Twin Block and after subsequent fixed appliance treatment. Records of 22 matched patients treated with fixed appliances and Class II elastics and who had CBCTs taken before and after treatment were used as controls. The images were orientated and registered on the anterior cranial base and mandibular cortex. Treatment outcomes were quantified using point-point measurements. Three-dimensional models of the maxilla and mandible were generated to visualize the skeletal changes using semi-transparencies. Differences in the skeletal and dental changes between the groups were computed with linear mixed effects models.
RESULTS: After adjusting for baseline characteristics (sex, maturation, verticality, age of first CBCT and total treatment time), on average the Twin Block group exhibited more anterior displacement of the anterior fossa (1.38 mm/year), pogonion (1.39 mm/year) and B point (1.79 mm/year); and more superior condylar growth (1.35 mm/year), compared to the Control group. Within the Twin Block group, more posterior condylar growth occurred during the Twin Block phase, with minimal growth in the subsequent orthodontic phase. The Twin Block group displayed greater extrusion of the lower incisors and molars, 2.99 and 2.07 mm more per year, respectively.
CONCLUSION: The Twin Block group had additional superior and posterior condylar growth resulting in greater anterior repositioning of Pogonion and B-point, compared to the Control group. Greater incisor and molar extrusion were also induced in the Twin Block group.

Abstract citation ID: cjae081.368
SP76 EVALUATION OF FACIAL SOFT TISSUE ANGLES IN DIFFERENT MALOCCLUSIONS

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OBJECTIVES: Determine and evaluate differences of soft tissue angles between malocclusions in growing patients, using three-dimensional (3D) Slicer image computing multi-platform.
MATERIALS AND METHODS: The study included 284 patients with Class I, II and III malocclusion (first molar relation) (182 females, 102 males; age range 5-45 years; mean age 16,1±7,56 y), who underwent clinical examination from January 2008 to December 2018. Coordinates were placed on patients profile images, using 3D Slicer platform a software application for visualization and analysis of medical image computing data sets. 7 anthropometric landmark position were used to determine 5 angles: Nasion-Nose tip-Pogonion (Na-T-Pg), Glabella-Subnasale-Pogonion (Gl-Sn-Pg), Pogonion-Nasion-Upper lip (Pg-Na-Ls), Pogonion-Nasion-Lower lip (Pg-Na-Li) and Pogonion-Subnasale-Upper lip (Pg-Sn-Ls). Patients were divided on 3 age groups: Group 1 (5-17 years), Group 2 (18-25 years) and Group 3 (26-45 years). The changes were compared between gender, malocclusion, age and 5 profile facial angles. All data has been analyzed by R project for statistical computing.
RESULTS: The statistical analysis showed significant difference between Class I, II and III in different age and gender groups. 102 females and 42 males had Class I (mean age 16,33±8,3 y), 60 females and 52 males had Class II (mean age 15,72±7,09 y) and 20 females and 8 males had Class III (mean age 16,46±5,17 y). In Class I, Na-T-Pg value was less (mean degrees 126,32±4,5 deg) than in Class III (mean degrees 131,44±4,63 deg) and in Class II it was less than in Class I (mean degrees 124,74±4,47 deg). However, Pg-Na-Li in Class III patients was found to be less (mean degrees 3,33±2,08 deg), than in Class I (mean degrees 4,46±2,01 deg) and Class II (mean degrees 4,87±2,13 deg).
CONCLUSIONS: Soft tissue angles significantly differs between malocclusions. Growth is a determinant factor for soft tissue differences in different malocclusion.

Abstract citation ID: cjae081.369
SP77 SEXUAL DIMORPHISM AND SHAPE VARIATION OF THE HUMAN ADULT MANDIBLE EVALUATED BY GEOMETRIC MORPHOMETRICS

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OBJECTIVES: To create a 3D atlas of human mandibular shape variability and explore sex and age effects in an adult sample using a dense landmark configuration, uniformly covering the mandibular surface.
METHODS: The sample comprised 50 adult male and 50 adult female mandibular meshes segmented from CBCT images. Age ranged from 18.9 to 73.7 years (mean age: 47). Nine fixed landmarks and 496 sliding semilandmarks were digitized on the mandibular surface, then slid by minimizing the bending energy against the average. Principal component analysis was used to extract the main shape patterns of variation. Sexes were compared with permutation tests and allometry was assessed by regressing on the log of the centroid size.
RESULTS: Almost 49% of the shape variation in the pooled sample was described by the first 3 principal components. Shape variation of the pooled sample was related to width, height and length proportions, variation of the angle between ramus and corpus, height of the coronoid process and inclination of the symphysis. Significant sexual dimorphism was detected, both in size and shape. Males were about 8% larger than females in centroid size and 25% larger in volume. Males had a higher ramus, more pronounced gonial angle, larger intergonial width, and more distinct antegonial notch. Accuracy of sexing based on the first two principal components in form space was 91%. The degree of edentulism was weakly related to shape.
CONCLUSIONS: Dense landmarking of the mandible and geometric morphometrics allowed comprehensive description of shape and size variation. Sexual dimorphism was evident in this adult sample, however, age effects were not significant.

Abstract citation ID: cjae081.370
SP78 ASSOCIATION BETWEEN SOFT TISSUE FACIAL PROFILE AND DENTOSKELETAL CHANGES IN HIGH-ANGLE SKELETAL CLASS II PATIENTS BEFORE AND AFTER ORTHODONTIC TREATMENT: A RETROSPECTIVE CEPHALOMETRIC STUDY

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BACKGROUND: High-angle skeletal class II patients pose a challenge to orthodontists due to the potential of resulting in an unsatisfactory facial profile. No previous study has examined the association between soft tissue facial profile changes and dentoskeletal changes in high-angle skeletal class II orthodontic patients.
AIM: To investigate the relationship between changes in the soft tissue facial profile and changes to the dentoskeletal structures in high-angle skeletal Class II patients before and after fixed-appliance orthodontic treatment.
MATERIALS/METHODS: This retrospective study analysed twenty-one Southern Chinese patients, aged 19.8 ± 3.1 years, with skeletal Class II (ANB>5°) and high mandibular plane angle (SN-MnP>38.5°). All patients had completed orthodontic fixed appliance treatment at the Orthodontic Department of the University of Hong Kong. Lateral cephalograms of the patients taken before and after fixed appliance treatment were retrieved and analysed. Soft tissue facial profile and dentoskeletal changes were assessed using linear, angular, and proportional parameters. Pearson correlation coefficients were calculated to study the relationship between different pairs of soft tissue facial profile changes and dentoskeletal changes.
RESULTS: Strong correlations were found between changes in the soft tissue facial angle and changes in the skeletal facial angle ($r=-0.77$, $p<0.001$) and skeletal Y-axis ($r=0.83$, $p<0.001$). Changes in the soft tissue facial convexity significantly ($p<0.001$) correlated with changes in the sagittal positions of the skeletal supramentale ($r=0.7$), gnathion ($r=0.82$), and menton ($r=0.81$). A moderate but significant correlation was detected between soft and hard tissue facial proportions ($r=0.57$, $p<0.01$). Significant correlations were found between changes in the nasolabial angle and changes in sagittal position ($r=-0.75$, $p<0.001$) and inclination ($r=-0.52$, $p<0.05$) of the upper incisal edge. However, there were no

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significant correlations between the sagittal changes to the skeletal subspinale and pogonion and changes in the soft tissue facial convexity and facial angle ($r<0.3$, $p>0.05$).
CONCLUSIONS: Changes in the facial angle, facial convexity, facial proportion and nasolabial angle significantly correlated with dentoskeletal changes in high-angle skeletal Class II patients who underwent orthodontic fixed-appliance treatment. However, no significant correlations were detected between soft tissue facial profile changes and hard tissue changes in the sagittal position of the skeletal subspinale and pogonion.

Abstract citation ID: cjae081.371
SP79 TRENDS IN THE USE OF VIRTUAL SURGICAL PLANNING AND 3D PRINTING IN ORTHOGNATHIC SURGERY

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AIM: The objectives of this study were to examine the utilization of virtual surgical planning (VSP) versus traditional surgical planning (TSP) for patients undergoing orthognathic surgery (OGS) and to evaluate factors contributing to the use of VSP over TSP.
MATERIAL AND METHOD: The records of patients who had undergone OGS over a 10-year period (2012-2021) at a national specialist dental hospital in Singapore were reviewed. Patient data was de-identified by an appointed institutional trusted third-party. Cases with cleft deformities, craniofacial syndromes and with history of cranio-maxillofacial trauma were excluded. Information on the use of VSP, 3D printed guides and TSP was recorded. Types of dentofacial deformities, osteotomies performed as well as age and experience of surgeons were also recorded.
RESULTS: A total of 1184 OGS cases were included in this study. Overall, there was an increasing trend in VSP use over the past decade. There was a relatively slow pick-up rate of VSP in the first three years between 2012 and 2014, with the utilization below 50% of the total case load. In contrast, there was a rapid increase in the number of cases employing VSP after 2015, with utilization rates rapidly climbing to 100% by 2019. The use of computer-aided designed and 3D printed guides only started to pick up from 2015. By 2017, 90% of VSP cases were using 3D printed guides.
Between 2012 and 2017, there was preferential use of VSP for cases presenting with asymmetry. This then levelled out from 2018 to 2021, as almost all cases presented were planned with VSP. Age and experience of surgeons have no obvious effect on the adoption of VSP.
CONCLUSION: There was an overall increasing trend of VSP utilization, with an adoption pattern that paralleled the technology adoption curve, supported by an increasing body of evidence suggesting greater accuracy of VSP. At the end of the decade, there was an overwhelming dominance of VSP over TSP, with a utilization rate of close to 100%. This reflected a paradigm shift in which clinicians completely integrate digital planning and 3D printing into standard clinical practice.

Abstract citation ID: cjae081.372
SP80 CONDYLAR DISPLACEMENT BETWEEN CENTRIC OCCLUSION AND CENTRIC RELATION IN PATIENTS WITH AND WITHOUT TEMPOROMANDIBULAR DISORDERS

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AIM: In this study, the displacement of the condyles between centric occlusion and centric relation was determined in 26 patients with temporomandibular disorders (TMD) and 17 asymptomatic patients in order to investigate whether the condylar position can have an influence on the etiology of TMD.
MATERIAL AND METHODS: Diagnostic models, bite registration in habitual occlusion and with power-centric bite registration according to Roth were obtained from 43 patients (26 CMD symptomatic, 17 asymptomatic).
Manual functional diagnostics of the masticatory muscles were performed in all patients. Patients without pain and without pain on palpation in the area of the temporomandibular joint or masticatory muscles were assigned to the asymptomatic group. The TMD patients were determined from a pool of patients who presented to our practice of their own accord due to TMD symptoms. Painless patients with only isolated clicking were excluded from this group.
After arbitrary hinge axis transfer using a face bow, the maxilla and mandible were mounted in an articulator using the centric bite registrate. A mandibular position indicator was used to record the displacement of the condyles utilizing the habitual wax bite. Sagittal and horizontal changes were determined for the left and right sides and the transversal displacement of both condyles was also determined.
RESULTS: There was no significant difference in the sagittal and horizontal changes for the respective condyle of the left or right side ($p>0.05$). The number of patients in the symptomatic group (62%) with a transverse displacement of more than 0.5 mm was significantly higher than in the control group (12%) ($p<0.05$).
CONCLUSION: There is a significant difference in condylar transversal displacement between centric relation and centric occlusion in symptomatic and asymptomatic CMD patients. This indicates that the position of the condyle can have an influence on the development of CMD - but does not rule out individual patient adaptation. The transversal displacement cannot be determined on hand-held models

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SP81 FACTORS INFLUENCING THE SUCCESSFUL ERUPTION OF THE MAXILLARY THIRD MOLAR AFTER EXTRACTION OF THE MAXILLARY SECOND MOLAR

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AIM: The objective of this study was to assess the final position of the maxillary third molar that erupted after maxillary second molar extraction on study models using the Objective Grading System of the American Board of Orthodontics(ABO) as a clear evaluation criterion and investigate the factors that influenced the occlusion of maxillary third molar.
MATERIALS AND METHODS: 136 upper 2nd molars from 87 patients(age 12.9 – 17.7 years) were extracted and the eruption of 3rd molars were followed up. The patients regularly visited the hospital and verified the time of complete eruption of the maxillary third molar. Panoramic radiographs, lateral cephalometric radiographs, and study models were taken from the time of maxillary second molar extraction to the complete eruption of the maxillary third molar. The study model was assessed by ABO grading system. The position of maxillary third molar was evaluated according to panoramic radiographs. The maxillary tuberosity space was measured using lateral cephalometric radiographs.
RESULTS: The success rate of upper 3rd molar eruption was 100%. Among them, 47.8% exhibited good occlusion(G group), 17.6% was acceptable(A group), and 34.6% showed poor occlusion(P group). The G group had a higher proportion of Nolla stages 4~7.
The distance between the PTM and upper 1st molar, as well as the Nolla stage of the 3rd molar, influenced the ultimate occlusion. Whereas the initial status of upper 3rd molar did not have any impact on the final occlusion.
CONCLUSIONS: Good-to-acceptable occlusion was seen in 65.4% of the maxillary third molars after maxillary second molar extraction. Insufficient increase in the maxillary tuberosity space and higher tooth development stage at the time of maxillary second molar extraction negatively influenced the maxillary third molar eruption.

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SP82 CHANGES OF PROXIMAL CARIES DURING ORTHODONTIC TREATMENT DETECTED WITH INTRAORAL SCANS WITH NEAR-INFRARED IMAGING (NIRI)

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AIM: Intraoral scanning with near-infrared imaging (NIRI) was suggested as a viable non-invasive option to detection of early caries lesions. The aim was to quantify the prevalence and development of proximal caries in orthodontic patients by applying serial full mouth intra-oral scans with NIRI.
MATERIALS AND METHODS: Active orthodontic patients with serial full mouth intraoral scans with NIRI at initial(T0) and at least 6-month into treatment (T1, 6-33 months) were collected at Dep. Orthodontics, Gangnam Severance Hospital (N=153; age, 10-73Y; 57 males, 96 females). Interproximal sites of fully erupted/unrestored teeth were monitored. NIRI Positive (NIRI+) whitish interproximal lesion detected in the intraoral scan, which reached/surpassed the dentinoenamel junction (DEJ), was defined as proximal caries. Prevalence (%, more than one NIRI+ site/subject), pattern and clinical factors (age, sex, type of

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orthodontic appliance) associated with new developed NIRI+ lesion during treatment were evaluated.
RESULTS: The prevalence of one or more NIRI+ at T0 was 56.9% (87/153). Among the total of 3252 interproximal sites evaluated, 215 NIRI+ lesions were detected at T0 in the order of maxillary 1st molars (24.7%; 53/215), 2nd premolars (15.3%; 33/215), mandibular 1st molars (14.0%; 30/215), and maxillary 1st premolars (13.0%; 28/215). The prevalence of NIRI+ lesion significantly increased from 56.9%(T0) to 67.3%(103/153) at T1($p<0.05$). Compared to T0, new developed NIRI+ lesions were noted in 47.7% (73/153) of subjects at T1. New NIRI+ lesions were noted in 54.6%, 45.5%, and 34.4% of subjects among conventional fixed appliances, clear aligners, and customized appliances, respectively. A total of 133 new NIRI+ lesions developed at T1 from T0. New caries lesions were noted most frequently in the order of maxillary 1st molars (21.8%; 29/133), maxillary 1st premolars (20.3%; 27/133), maxillary 2nd premolars (13.5%; 18/133) and mandibular 1st molars (12.0%; 16/133). The subjects with predisposing NIRI+ lesion at T0 were more likely to develop new NIRI+ lesion at T1 than NIRI- subjects($p<0.05$).
CONCLUSIONS: The prevalence of proximal caries lesions detected in daily orthodontic practice using non-invasive full mouth-intraoral scans with NIRI was 56.9%. Development of one or more proximal caries lesion during active orthodontic treatment was estimated as 47.7%.

Abstract citation ID: cjae081.375
SP83 TEMPERATURE-DEPENDENT SHAPE MEMORY PROPERTIES OF DIRECT-PRINTED CLEAR ALIGNERS

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BACKGROUND: Traditional thermoformed clear aligners have limitations in terms of biomechanical effectiveness. This study introduces a new biocompatible material specifically designed for 3D printing of orthodontic aligners, aiming to overcome these limitations.
OBJECTIVES: This study evaluated the mechanical and viscoelastic properties of this novel material, a photocurable resin known as TC-85. The evaluation considered various clinical conditions and assessed how temperature changes affect the material's behavior. Additionally, the shape memory characteristics of TC-85 were investigated to explore its potential for clinical applications.
MATERIALS/METHODS: TC-85 specimens were 3D printed using a digital light processing (DLP) printer. Their thermo-mechanical properties, including tensile modulus, stress relaxation, creep effect, and storage modulus, were analyzed at different temperatures (30°C, 35°C, 40°C, and 45°C) using dynamic mechanical analysis (DMA). Furthermore, the shape recovery ratio was evaluated to assess the shape memory properties.
RESULTS: At colder temperatures (30°C), TC-85 exhibited stiffer behavior, lower stress relaxation, and gradual strain recovery. However, across all temperature ranges, the material demonstrated improved residual static force and faster strain recovery speed with repeated loading and recovery cycles. Notably, at and above 40°C, TC-85 showed a significant decrease in storage modulus, indicating a transition to a more flexible state with consistent strain recovery, suggesting volumetric stability.
CONCLUSIONS/IMPLICATIONS: The 3D-printed photocurable resin, TC-85, exhibits versatile mechanical and viscoelastic properties, enabling it to apply a consistent, gentle force on teeth. Additionally, the material displays interesting creep behavior, where the applied force actually increases with repeated loading, potentially reducing force decay during aligner removal and wear. Furthermore, the volumetric stability and shape memory properties at higher temperatures (above 40°C) offer two key benefits: improved hygiene for patients through easier cleaning and increased comfort for patients experiencing discomfort, achievable by simply drinking warm water or beverages. These unique characteristics suggest that TC-85 could be a promising treatment option for orthodontic patients.

Abstract citation ID: cjae081.376
SP84 COMPARING OCCLUSAL OUTCOMES IN REMOTELY SUPERVISED ORTHODONTIC TREATMENT WITH FIXED APPLIANCES: DENTISTS VS. ORTHODONTISTS

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BACKGROUND AND AIM: In regions with a shortage of experienced orthodontists, providing treatment by remotely supervised dentists may be a beneficial solution. Current studies examining the outcomes of remotely monitored therapy with aligners, have not yielded conclusive results. To our knowledge, no research has compared the effects of orthodontic treatment with fixed appliances. The aim of this study was to compare occlusal outcomes resulting from orthodontic treatment performed by remotely supervised dentists and orthodontists.
METHODS: Peer Assessment Rating (PAR) scores were blindly assessed by two evaluators on pre- and post-treatment digital models. The study involved 69 randomly selected patients treated by 9 general dentists with limited orthodontic experience (DENT group) and 48 randomly selected patients treated by 2 orthodontists with over 10 years of orthodontic experience (ORTHO group). Treatment plans were prepared by two orthodontists using standardized patient records, considering patient/dentist expectations. Orthodontists positioned brackets on virtual models and prepared transfer trays, which were then sent to dentists for appliance placement following a standardized and trained procedure. Remote supervision involved the periodic submission of photographs and scans depicting treatment progress. Progress documentation was used to prepare guidelines, sent and implemented by dentists who could communicate with supervising orthodontists as needed.
RESULTS: Females constituted 66.7% of both groups. The mean age at the start of treatment in DENT group was 24.3 years (SD=11.1, range: 11-50), while it was 21.5 years (SD=9.2, range: 12-41) in ORTHO group. Class I malocclusion was in 62.3% (DENT) and 58.3% (ORTHO) of patients. Transversal problems were present in 13% (DENT) and 20.5% (ORTHO), while vertical problems, primarily deep bite, affected 52.1% (DENT) and 54.2% (ORTHO) of patients. Pre-treatment overall PAR scores were 15.8 (SD=8.5) in DENT and 19.5 (SD=10.4) in ORTHO groups ($p=0.037$, 95%CI = 0.22…7.17; t-test), while post-treatment scores were 5.5 (SD=4.8) and 6 (SD=5.3) in DENT and ORTHO groups, respectively. Intergroup differences were not statistically significant ($p=0.589$; 95%CI = -1.35…2.36; t-test).
LIMITATIONS: Many orthodontic treatments were required for restorative purposes
CONCLUSIONS: While remotely planned and supervised orthodontic treatment appears viable, especially considering comparable post-treatment outcomes, further research is essential to fully substantiate its value.

Abstract citation ID: cjae081.377
SP85 COMPARING BONDED SPURS AND MYOFUNCTIONAL TRAINING FOR EARLY INTERVENTION IN ANTERIOR OPEN BITE: A RANDOMIZED CLINICAL TRIAL

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BACKGROUND: Anterior open bite has various causes, including skeletal or dental malformations, thumb-sucking, tongue thrusting, prolonged pacifier use, or a combination of causes. Limited research exists on interceptive treatment during mixed dentition, involving collaboration between speech therapists and orthodontists.
OBJECTIVE: This randomized clinical trial aimed to compare the impact of bonded spurs (S) and myofunctional training (M) on dentoalveolar development in anterior open bite patients. Additionally, evaluate bonded spur acceptance and overbite (OB) differences at T0 (Baseline), T1 (6 months), and T2 (1 year).
METHODS: Initially, 25 patients were screened, with nine meeting criteria (4 boys, 5 girls, 8-12 years), randomized into S (n=5) or M (n=4). Data were collected at T0, T1, and T2, and bonded spur acceptance was assessed through questionnaires. Speech therapist evaluations were conducted at baseline, with follow-up for the myofunctional group.
RESULTS: At T0, mean OB was -4.0 mm (SD: 1.15) for M and -4.4 mm (SD: 0.89) for S, with no significant difference. Groups were similar in age, gender, angle classification, overjet, and overebite(OB) at baseline. Both groups showed OB reduction at T1 and T2, significantly greater in S at T2 (-2 mm, SD: 0.0) compared to M (-3.25 mm, SD: 0.5). Improvement occurred between T0 and T2 ($p < 0.005$) for both groups. Larger sample sizes needed for conclusive results.
In the inter-group comparison, a significant difference in OB reduction was observed between the M and S groups, attributed to potential compliance issues with myofunctional training. Compliance issues in the M group were trouble remembering to practice and exercises being boring.
Bonded spur acceptance was favorable, with common complaints including difficulty in speaking, eating, and swallowing. Only 20% required analgesics on the first day, and by day 3, there was a significant improvement in discomfort reduction.
CONCLUSION: Both bonded spurs and myofunctional training were effective in improving overbite in anterior open bite patients during mixed dentition. Bonded spurs showed greater efficacy and were less compliance dependent.

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Further research is needed, especially for myofunctional training compliance. The study underscores the importance of early interdisciplinary intervention involving speech therapists and orthodontists.

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SP86 DOES EXTRACTION OR NON-EXTRACTION TREATMENT IMPACT THE 3D FACIAL SOFT TISSUES IN ORTHODONTIC PATIENTS? A PROSPECTIVE STUDY

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AIMS: To investigate the impact of extraction and non-extraction treatments on the soft tissues evaluated on 3D stereophotogrammetric images, and the possible difference in soft tissues changes comparing extraction of two upper premolars versus two upper and two lower premolars.
MATERIALS/METHODS: Consecutive patients were enrolled provided that they: 1) were scheduled for full fixed appliance either with a non-extraction approach, or with extraction of two upper premolars or four premolars; 2) were ≥ 15 years of age; 3) had an upper or lower Little Irregularity Index of ≥5 mm. All patients had a 3D image taken before bonding (T0) and after debonding (T1) with 3D white-light scanner 3dMD. Seven angular and 8 linear measurements were performed with the 3dMDvultus Software. Since normality of the data was confirmed, paired t-tests were used to compare T0 and T1 values within the non-extraction, two premolar extraction and four premolar extraction subjects. ANOVA followed by Tuckey post-hoc tests were used to compare the treatment effect between the 3 groups.
RESULTS: Twenty-two non-extraction patients (mean age 23.5 ± 10.1 years), 16 two premolar extraction patients (mean age 18.9 ± 3.1 years) and 15 four premolar extraction patients (mean age 21.6 ± 8.6 years) were enrolled. From T0 to T1, the most clinically significant finding was the change in nasolabial angle (4.0 ± 0.5°, P=0.015) in the four premolar extraction group. Comparing the treatment effect between the three groups, a statistically significant difference in the upper lip height was found (P=0.033) between the non-extraction and the two upper premolar extraction groups. A statistically significant difference in LI-N-SN (P=0.02) and nasolabial angle (P=0.02) was found between the group treated with four premolar extractions and the non-extraction group.
CONCLUSIONS: The Nasolabial and LI-N-SN angles increased in four-premolar extraction subjects, while they reduced in non-extraction subjects, this difference being statistically significant. By contrast, no significant differences in those angles' changes could be found between two-premolar extraction subjects, and four premolar extraction or non-extraction subjects. The upper lip height increased significantly more after treatment with two premolar extractions, compared to non-extraction treatment.

Abstract citation ID: cjae081.379
SP87 CUSTOMISED VERSUS PREFORMED ERUPTION GUIDANCE APPLIANCES: SKELETAL AND DENTO-ALVEOLAR CHANGES IN EARLY MIXED DENTITION

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AIM: To describe the skeletal and dento-alveolar changes produced by customised and preformed eruption guidance appliances (EGA) in class II growing patients with mixed dentition, highlighting differences between the devices.
METHODS: The study sample included 69 patients, divided into case group (CS) (17 M and 19 F, 7.9±0.7 y.o.) and control group (CT) (15 M and 18 F, 7.7±0.5 y.o.). Participants were retrospectively randomly selected according to the following inclusion criteria: (1) fully erupted upper central incisors and first molars; (2) early mixed dentition; (3) age 7 to 9 y.o.; (4) Angle class I or class II malocclusion; (5) overjet > 4 mm; (6) deep bite (≥ 2/3 incisal overlap); (7) no previous orthodontic treatment except maxillary expansion. CS received treatment with customized EGA whereas CT was treated with preformed EGA. Digital dental models and lateral cephalogram were recorded at the beginning (T1) and after 1 year of treatment (T2). A blinded observer performed cephalometric tracings. Cephalometric changes between T1-T2 were investigated with paired t-test. Sagittal molar and canine relationship and anterior crowding in T1 and T2 were compared through Chi-Square test. Study groups were compared by independent sample t-test.
RESULTS: Overjet decreased from 5.28 to 2.62mm ($p<0.01$) (CS) and from 4.97 to 2.75mm ($p<0.01$) (CT). Overbite decreased from 4.19 to 2.33mm ($p<0.01$) (CS) and from 3.66 to 2.42mm ($p<0.05$) (CT). The number of patients presenting palatal impingement decreased from 17 to 2 (CS) and from 15 to 3 (CT) ($p<0.05$). Customized EGA was more effective in correcting overbite (1.94mm; $p<0.05$) and upper anterior crowding ($p<0.05$). Subjects presenting lower anterior crowding decreased from 27 to 7 (CS) and from 23 to 11 (CT). Significant changes between T1 and T2 were observed in both groups for SNB, ANB, Ans-Pns/Go-Gn, Ans-Me, Interincisal angle, U1/S-N. S-N/Go-Gn variation was significant in CS, L1/Go-Gn was significant in CT ($p<0.05$).
LIMITATIONS: retrospective design of the study and lack of follow-up on the long-term.
CONCLUSIONS: Both appliances resulted effective in correcting class II, anterior crowding, overjet and overbite in short time. EGA may be considered a simple and efficient early therapeutic option, especially if custom-made.

Abstract citation ID: cjae081.380
SP88 ORTHODONTIC PATIENTS AND THE INFORMATION FOUND ON THE WEB: A CROSS-SECTIONAL MULTICENTRIC STUDY

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BACKGROUND: The Web has recently become a major source of information for patients, even though online contents can be inaccurate or qualitatively inadequate. This study aims to understand the relevance of online information for prospective orthodontic patients and to investigate the effect of digital research on patients' decision-making process, highlighting generational differences.
METHODS: An anonymous questionnaire was developed, validated in a pilot study and submitted to 986 orthodontic patients in Rome (Italy), Oulu (Finland), Chapel Hill (North Carolina, USA) and Madinah (Saudi Arabia). Participants were divided in "digital natives" (DN) (born since 1985) and "digital immigrants" (DI) (born before 1985). Univariate analysis was used to investigate the correlation between respondents' demographics and their answers.
RESULTS: 64.6% surveyed patients got informed online (75.4% DN – 52% DI). Google was the most common platform (81%), used in a similar extent by DN and DI, whereas usage of other platforms varied with age. The perceived reliability of online sources differed with age ($p=0.007$) and was higher among DI. Gender differences were observed ($p<0.05$): 78.6% men trusted their orthodontist, while 31.2% women would either propose what found online, get a second opinion or refuse treatment. Decisional processes resulted to be significantly correlated to patient's satisfaction with online research ($p=0.002$) and to perceived reliability ($p<0.001$): 80% participants unsatisfied with online information relied on the orthodontist's opinion, 35.6% patients who believed digital information to be reliable did not trust their orthodontist.
LIMITATIONS: Due to COVID-19 pandemic, survey distribution varied among centers; it was impossible to investigate differences between Countries. Differences between public and private offices were not investigated.
IMPLICATIONS: The majority of patients get informed online, therefore orthodontists should recommend reliable and accurate Websites for further searches. When discussing treatment plan options, men are more likely to rely on the orthodontist than women, and patients who perceive digital contents as useful or reliable tend to distrust the orthodontist. A solid doctor-patient relationship is pivotal, as the tendency to trust the orthodontist appears to not be correlated to the perceived consistency between online information and dentist's opinion, but only to the degree of satisfaction with online searches.

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SP89 INDIRECT DIGITAL BONDING: COMPARATIVE EVALUATION OF TWO METHODS

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AIMS: To measure and compare the transfer accuracy of two common indirect digital bonding (IDB) methods.
MATERIALS AND METHODS: A total of 4 patients (80 teeth) underwent a second premolar to second premolar IDB. Study subjects were recruited according to the following inclusion criteria: 1) full permanent dentition, 2) integer clinical crowns; exclusion criteria were: 1) crown fractures/abrasions, 2) restorations, 3) severe crowding, 4) anomaly of shape/dimension.
Split mouth technique was adopted: in each patient, 3D printed trays (3D14) were used in 1st and 4th quadrant, while double trays vacuum-formed on a 3D printed transfer model (TS23) were used in the 2nd and 3rd.
The software 3Shape OrthoAnalyzer was used to determinate the bracket position on virtual models and to realize the 3D printed trays.

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After the IDB, for each patient, scans were acquired and superimposed on the virtual models used for bracket placement planning. Using Rhinoceros software, the linear and angular discrepancies were assessed digitally by measuring the difference between expected and achieved bracket position through six different variables: occluso-cervical, mesio-distal and bucco-lingual translation, tip, rotation, and torque. Statistical analysis was performed through a linear model with mixed effects (significance set at p>0.05).
RESULTS: No significant discrepancies were observed between the two methods for five of the six dimensions analyzed. The only significant difference was in the bucco-lingual dimension (p=0.0093): the TS23 (0,20±0.12 mm) showed fewer transfer discrepancies than 3D14 (0,28±0.14 mm).
Both techniques presented 92% of measurements within the American Board of Orthodontics (ABO) range of 0.5 mm for linear measurements and 2° for angular ones.
LIMITATIONS: The invigilator performing measurements was not blinded.
CONCLUSION: Although overall differences in bracket position were relatively small, the TS23 double-vacuum forms trays scored better in terms of accuracy than the 3D printed trays.

Abstract citation ID: cjae081.382
SP90 DENTOFACIAL CHARACTERISTICS OF CHILDREN AND ADOLESCENTS WITH FETAL ALCOHOL SYNDROME DISORDERS

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AIM: To evaluate the oral health, the presence of malocclusion and the dentofacial characteristics of children and adolescents with Fetal Alcohol Syndrome Disorders (FASD).
SUBJECTS AND METHODS: All children and adolescents below 18 years of age, who had a confirmed FASD diagnosis were enrolled. The sample was collected with the help offered by foundations for disabled children, FASD diagnostic centers, associations of adoptive and foster families, and orphanages. Participation in training courses and support group meetings for families with FASD children, as well as announcements about this particular study in social media, was also applied. Oral health status, presence of dysfunctions or parafunctions, occlusion and the IOTN were evaluated and compared to the results obtained from a national monitoring survey on the oral health conditions. If available, cephalometric radiographs were evaluated and compared using the general linear model for repeated measures with the results of the cephalometric analysis performed in non-syndromic, orthodontically untreated children with normal occlusion matched with age and gender.
RESULTS: A total of 67 participants (29 males and 38 females) aged 2.5-17.8 years with FASD were included. Dysfunctions and parafunctions such as mouth breathing and thumb sucking were frequently recorded. Children with FASD had an increased prevalence of malocclusions compared to the general population, especially distal occlusion and crossbite. Borderline need for orthodontic treatment was more frequent in children with FASD compared to controls. In 35 individuals with FASD including 21 with Foetal Alcohol Syndrome (FAS) the cephalometric comparisons confirmed statistically significant differences from the controls in 15 out of 18 of the cephalometric measurements (83%). In children with FASD the mandible was more retrusive, the incisors were more proclined and the mandibular incisors and the lips were more protruded when compared with controls. There was no significant evidence of an influence of age, gender or FASD type. CONCLUSIONS: Dentofacial characteristics of children and adolescents with FASD significantly differ from controls. Early orthodontic diagnosis and prophylaxis should play a part of the interdisciplinary care of patients in this group.

Abstract citation ID: cjae081.383
SP91 DETECTING INITIAL ENAMEL CARIES IN ORTHODONTIC PATIENTS. A PILOT STUDY OF BLUECHECK.

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BACKGROUND: Initial enamel caries is seen commonly in patients with fixed orthodontic appliances. Early diagnosis of such initial enamel caries is critical to prevent further progression and minimise associated compromise of aesthetic outcomes. Currently clinicians routinely rely on unaided visual examination. BlueCheck is a new caries detection technology that functions by reversibly binding to hydroxyapatite crystals exposed in porous enamel. It may facilitate caries detection and diagnosis by reacting with lesions below the visibly perceptible level, because blue colouration is readily perceptible wet or dry, and by not reacting with the dense surface layer of inactive lesions.
AIM: To investigate BlueCheck's ability to detect active initial enamel caries in a cohort of at-risk patients with fixed orthodontic appliances.
METHODS: Healthy patients aged 12 years or older with fixed appliances and at least one visible initial carious lesion on the anterior teeth were recruited through 3 private orthodontic clinics. Following professional cleaning, a first examiner visually inspected labial surfaces of anterior teeth for carious lesion presence and activity. A second examiner then applied BlueCheck and assessed the labial surfaces again for areas marked blue. Agreement was analysed with each surface divided into mesial, distal, gingival, and incisal sections and visual inspection used as the reference standard.
RESULTS: Data for 35 patients were obtained; negative agreement was 73% and positive agreement 55%. BlueCheck positive detections were more than twice as numerous as visual detections.
CONCLUSIONS/IMPLICATIONS: Positive agreement results suggest that BlueCheck is not reacting with all visible lesions, which may be a limitation of the technology or an indication that it can more accurately determine lesion activity status than visual inspection. The higher number of BlueCheck detections may be attributed to detection of enamel defects and dental plaque, and/or greater sensitivity of BlueCheck compared to the reference standard, i.e., an ability to detect pre-visible enamel caries. BlueCheck demonstrates promise as an initial caries detection tool, and further investigation of clinical performance is recommended.
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*Disclosure of financial interest – F. Crombie declares independent contractor payments received from the company developing BlueCheck, Incisive Technologies

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SP92 THE CORROSION PRODUCTS OF PROPRIETARY AND GENERIC ORTHODONTIC FIXED LINGUAL RETAINERS AND THEIR IN-VITRO CYTOTOXICITY

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AIM: The aims of this study were to assess the cytotoxicity of generic and proprietary fixed lingual retainers (FLRs) and to analyse the concentration of corrosion products leaching off.
MATERIALS/METHODS: Four proprietary and three generic branded FLRs were investigated. Conditioned media was prepared by submersion of the wires in solution for 34 days, at 37 C, under constant agitation. A proportion of this solution was analysed to determine the concentration of metallic ions leaching off the wires. The remainder of this conditioned media was diluted to 5%, 10% and 20% followed by exposure to human gingival fibroblasts (HGFs) to analyse of cytotoxicity of the wires. The statistical analysis of the cytotoxicity data was conducted using a general linear model, ANOVA for the adjusted % cytotoxicity. Wire (seven brands) and concentration (5%, 10%, 20%) were fixed factors and a full factorial model with all interactions was fitted. To further examine the differences between the groups, post-hoc pairwise comparisons were tested at the 0.05 level of significance with Bonferroni adjustment for multiple testing. Dunnett's test was employed to analyse the data against positive controls groups.
RESULTS: Three wires (Dentaflex, Universal and AZDent) released excessive concentrations of lead, two wires (MeshMark and Orthoflex) released excessive concentrations of nickel and one wire (Universal) released excessive concentrations of molybdenum into solution. Slight cytotoxicity was noted in one wire only (Dentaflex) at a 20% dilution of eluent. This was also the wire which released the highest concentration of lead into solution. All other wires, at all concentrations were deemed non-cytotoxic.
CONCLUSION: Metals were released in differing quantities from all wires with some elemental concentrations measuring in excess of that deemed acceptable in drinking water. There was a trend towards increased cell viability following exposure of HGFs to the conditioned media with only one wire demonstrating cytotoxicity. There was no indication that generic FLRs were more or less biocompatible than their proprietary counterparts. Further long-term in-vivo investigations are necessary to establish a full biosafety profile for these appliances.

Abstract citation ID: cjae081.385
SP93 IN VITRO EVALUATION OF THE SHEAR BOND STRENGTH OF METAL BRACKET BONDING TO GLASS CERAMIC AND ZIRCONIA: PROPOSAL OF A UNIVERSAL BONDING PROTOCOL

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OBJECTIVE: The aim of this in vitro study was to evaluate the shear bond strength (SBS) of metal brackets to glass ceramic and zirconia and to propose a bonding protocol applicable for both ceramic types. Material and Methods: Sixty glass ceramic specimens (IPS Emax, Ivoclar-Vivadent) and sixty zirconia specimens (Katana zirconia UTML, Kuraray) were prepared for SBS tests and randomly divided into 6 groups (n=10): group 1 (sandblasting + Scotchbond Universal, 3M ESPE + Transbond XT (3M Unitek), group 2 (sandblasting + Transbond XT primer (3M Unitek) + Transbond XT), group 3 (sandblasting + Monobond Plus (Ivoclar-Vivadent) + Scotchbond Universal + Transbond XT), group 4 (sandblasting + Monobond Plus (Ivoclar-Vivadent) + Transbond XT primer + Transbond XT), group 5 (sandblasting + hydrofluoric acid 9% + Monobond Plus + Scotchbond Universal + Transbond XT), group 6 (sandblasting + hydrofluoric acid 9% + Monobond Plus + Transbond XT primer + Transbond XT). Metallic brackets were bonded, and specimens were stored in saline solution at 37° for one week. SBS test was performed using a universal testing machine (LRX, Llyod Instrument) at cross speed of 1 mm/min. Debonded specimens were observed under a binocular microscope (BZH10 Olympus) at ×30 magnification and the failure modes were determined. A one-way ANOVA followed by Tukey's post hoc test were used to compare SBS between groups and Fisher's exact test for analyzing the failure modes. The significance for all statistical tests was $p < 0,05$. Results: Mean values of SBS showed statistically significant differences between groups. No statistically significant difference was noted for the failure modes observed. Conclusion: It was concluded that the combination of a universal primer and a universal adhesive after sandblasting could be proposed for orthodontic bonding to glass ceramic or zirconia.

Abstract citation ID: cjae081.386

SP94 TEMPOROMANDIBULAR JOINT EVALUATION IN JUVENILE IDIOPATHIC ARTHRITIS: ULTRASOUND VS. MAGNETIC RESONANCE IMAGING - A SYSTEMATIC REVIEW.

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AIM: The objectives of this systematic review were to evaluate the correlation between ultrasound (US) and magnetic resonance imaging (MRI) in patients with juvenile idiopathic arthritis (JIA) and to investigate the association with temporomandibular disorders (TMD).
METHODS: The protocol was registered in PROSPERO (N° CRD42022312734). Databases Medline, Embase, Cochrane Central Register of Controlled Trials, Scopus, Web of Science, Latin American and Caribbean Health Sciences Literature were searched. Eligibility criteria were patients with JIA subjected to diagnostic evaluation using US and MRI. No language restrictions were applied. After duplicate study selection, data extraction and risk of bias assessment according to Cochrane were conducted. Data extraction of patients was conducted by two independent authors.
RESULTS: Five observational studies were included with 217 participants (153 females and 64 males; mean age 11.3 years). The quality of the studies was overall satisfactory.
The correlation between US and MRI in children with JIA was moderate in acute arthritis while chronic arthritis correlated positively in two studies.
CONCLUSIONS: Even if MRI remains the more accurate imaging modality for the detection of TMD in patients with JIA, the US may be useful to early detect pathological conditions and to address the patient with JIA and putative TMJ involvement to a more accurate diagnosis with MRI and consequently appropriate treatment management.
MRI should be deemed necessary only after the less-invasive assessments with the US to confirm the diagnosis of TMD, or to increase the sensitivity, and accuracy of positive predictive values detected.

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SP95 TEMPOROMANDIBULAR DISORDERS AND SEROLOGICAL TESTS IN PATIENTS WITH RHEUMATOID ARTHRITIS.

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AIM: Rheumatoid Arthritis (RA) is a systemic and chronic autoimmune disease with inflammation at the synovial joints. The purposes of this study were to evaluate the correlation between serological variables and temporomandibular disorders (TMDs) in patients diagnosed with RA, evaluated through diagnostic criteria for temporomandibular disorders (DC/TMD), and to check the influence of comorbidities on the different TMD signs and symptoms, or any serological variables.
METHODS: This observational cohort research study included seventeen patients affected by RA. The comorbidities and some variables from the initial serological analyses were collected from the clinical rheumatological charts. Then, the presence of any of the following TMD signs/symptoms, temporal myalgia, temporomandibular joint arthralgia, click, or crepitus, was evaluated through the symptom questionnaire of the DC/TMD during clinical evaluation following the DC/TMD examination form.
RESULTS: Rheumatoid factor (RF), anticitrullinated protein antibodies (ACPA), and anti-nuclear antibody (ANA) positivity were present in 82.4%, 52.9%, and 41.2% of patients, respectively. Indicators of tissue inflammation were evaluated with median values of 21 mm/h for erythrocyte sedimentation rate (ESR) and 0.50 mg/dL for C-reactive protein (CRP). The RA patients presented comorbidities such as hypertension in 70.6% and diabetes in 23.5%. Negative ACPA had a significant association with myalgia ($p = 0.03$), and positive ANA was significantly associated with crepitus ($p = 0.05$).
CONCLUSIONS:
ANA and ACPA evaluation can be considered predictive serological tests associated with specific TMDs. Conversely, no influence of any comorbidities was found between different TMD signs and symptoms, or any serological variables.

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SP96 ORAL CLEFTING AND DELAYED DENTAL AGE – IMPACT OF CLEFT TYPE AND A SNP IN VITAMIN-D-BINDING PROTEIN

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AIM: Patients with non-syndromic cleft lip and palate (NSCL/P) tend to have delayed dental development. Vitamin D is reported to be involved in dental development and it is known that the vitamin-D-binding protein (VDBP) plays a role in several tissues of the human body. Thus, this gene may also present a function in dental development timing. This cross-sectional study aimed to evaluate the association between variations in dental age in children with NSCL/P and the polymorphism rs4588 in VDBP.
METHOD: One hundred and forty-one (n = 141) children with NSCL/P with a mean age of 8.54±1.70 years old were recruited from a Brazilian reference center for oral cleft treatment (Curitiba, Paraná, Brazil). The type of cleft was classified into cleft lip only, cleft lip and palate, and cleft palate only. Panoramic radiographs were used and dental age was examined according to Demirjian's method. The difference between dental and chronological age (DA-CA) was calculated. Genomic DNA was extracted from buccal cells. The genetic polymorphism rs4588 was genotyped by real-time PCR and Taqman assay. ANOVA one-way test was performed to evaluate the association between variations in dental age and rs4588 (α=5%).
RESULTS: Forty-one children (n=41) presented cleft lip only, eight-three (n=83) cleft lip and palate, and seventeen (n=17) cleft palate only. Patients with cleft lip and palate had dental age more delayed than with only a cleft palate ($p=0.030$). Genotype distributions were within the Hardy-Weinberg equilibrium. No significant association was found between dental age variations and rs4588 in VDBP ($p=0.212$).
CONCLUSION: Combined cleft lip and palate is associated with a more delayed dental age than a cleft palate by itself, which should be considered in orthodontic and interdisciplinary diagnosis and treatment.

Abstract citation ID: cjae081.389

SP97 DENTOSKELETAL EFFECTS OF MINI-SCREW ASSISTED, NON-SURGICAL PALATAL EXPANSION IN ADULTS USING A MODIFIED FORCE CONTROLLED POLYCYCLIC PROTOCOL: A SINGLE-CENTRE RETROSPECTIVE STUDY

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OBJECTIVES: This study assessed the dental and skeletal effects of pure bone-borne, non-surgical maxillary expansion, using a modified force controlled polycyclic protocol.

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METHODS: Records of 17 adult patients, mean age 24.1 years; range 18-39 years, who had undergone maxillary expansion using a bone borne Quad-expander (with 4 mini-screws), were analysed. In all patients, 0.17mm/day of expansion was completed for 1 week, followed by a cyclic protocol of expansion of forward and backward turns until the force needed to turn the expander was below 400cN, assessed weekly. After this, expansion continued at a rate of 0.17mm/day until the desired amount of expansion was achieved. Cone beam computer tomography scans were taken pre- and post- expansion.
RESULTS: The mid palatal suture was successfully opened in 100% of patients included in this study. Axially, the amount of skeletal opening at the posterior nasal spine was 61% of the anterior nasal spine. Expansion was pyramidal in the coronal plane. Significant increases at the dental and skeletal level were achieved, with changes at the skeletal level reaching 73%. The alveolar bone angle increased more than the angular changes at the molars and premolars.
LIMITATIONS: This is a retrospective study with short term results.
CONCLUSION: The Quad-expander, with a force-controlled polycylic expansion protocol, effectively produced significant increase in maxillary width in skeletally mature subjects in the short term.

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SP98 A COMPARISON OF SHORT-TERM TREATMENT OUTCOMES WITH NON-EXTRACTION AND EXTRACTION ORTHODONTIC TREATMENT MODALITIES IN BORDERLINE CLASS I AND MILD CLASS II MALOCCLUSIONS

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BACKGROUND: Borderline cases are critical when attempting to discern between effects of extraction and non-extraction treatment.
PURPOSE: To identify factors influencing clinicians' decision to extract by examining a sample of 204 Class I and mild Class II cases using Discriminant Analysis. The effects of premolar extractions on profile esthetics and quality of the occlusal outcome were explored.
RESEARCH DESIGN: This retrospective cohort study analyzed 30 extraction and 30 non-extraction borderline cases treated at the University of Toronto for occlusal outcomes via model analysis, soft tissue and incisor changes via cephalometric analysis, and these results were correlated with subjective esthetic ratings of these patients' profile tracings by 90 laypeople, 40 orthodontists, and 40 general dentists.
RESULTS: Discriminant Analysis identified maxillary crowding, overjet, lower incisor position, and facial angle as key factors influencing the extraction decision. The extraction cases saw an increase in nasolabial angle, more ideal overbite, and retraction of upper and lower lips and incisors, while no significant differences were observed in molar occlusal relationship, and overjet. Survey results indicated an overall preference for treated profiles, with orthodontists slightly favoring the extraction profiles and general dentists and laypeople slightly favoring the non-extraction profiles.
CONCLUSIONS: The utilization of extraction treatment affects the soft tissue profile and incisor position. This study suggests the importance of communication and involvement with patients and referring dentists, given the discrepancy in preferences among the different groups.

Abstract citation ID: cjae081.391
SP99 DEFECTIVE INCISOR DEVELOPMENT IN SMAD INTERACTING PROTEIN 1 (SIP1) NULL MICE.

Mevr Marie De Laet[1]; [1]*Uz Leuven*

AIM: To histologically and morphologically describe the dental and craniofacial manifestations of a novel mouse model involving a conditional mutation in Sip1 gene.
MATERIALS AND METHODS: Since targeted inactivation of Sip1 results in early embryonic lethality, tissue-specific inactivation of Sip1 was carried-out by using Prx1-Cre mice. Embryos at 14.5 dpc, 15.5 dpc, 16.5 dpc and 18.5 dpc were analysed, as well as newborn and five-month-old Sip1 null mice, by means of immunohistochemistry (primary Ab: β-catenin and Ki67) and microscopic morphological examination, comparing them with wild-type mice. The Mann-Whitney U test was used to analyse the dentofacial measurements of the differences between knock-out and wild-type mice.
RESULTS: Differences in incisor position and shape were detectable at embryonic stage 15.5dpc. Mutant newborns presented broadened calvarial sutures, hypoplastic mandibles, serrated alveolar processes and shorter lower incisors, 10% of them with an extra cusp. Five-month-old mutants presented total suture disappearance, skeletal Class III malocclusion and long, curved lower incisors.
CONCLUSION: These observations suggest that Sip1 is involved in epithelial-mesenchymal interactions during dental and craniofacial development, leading to several tooth and skull malformations.
KEYWORDS: Prx1-Cre Sip1 mice, neural crest cells, craniofacial and dental abnormalities

Abstract citation ID: cjae081.392
SP100 CORRELATION BETWEEN ORAL MUSCLE PRESSURE AND MALOCCLUSION IN MIXED DENTITION: A CROSS-SECTIONAL STUDY.

Ms Louise Declercq[1]; [1]*Ku Leuven*

BACKGROUND: Malocclusion is a complex condition with multiple etiological factors, including environmental influences such as perioral muscle pressure. Research investigating the relationship between oral muscle pressure and malocclusion remains scarce. An objective way of linking the cause-effect relationship between myofunction and malocclusion is missing.
AIM: To investigate the relationship between oral muscle pressure and malocclusion (posterior crossbite and class II malocclusion) in the mixed dentition.
MATERIALS AND METHODS: Maximum tongue, lip and cheek pressure was measured before the start of orthodontic treatment by using the Iowa Oral Performance Instrument (IOPI) in 3 patient cohorts: patients with (1) posterior crossbite, (2) Class II relationship and (3) a control group of patients without malocclusion. Linear models were used to compare the mean differences in muscle pressure between groups, with correction for age and sex. The imbalance between lips and tongue and between lips and cheeks was also calculated by the Delta z-scores of each group.
RESULTS: A total of 146 participants were included, 46 (mean age 8.71±0.85), 41 (mean age 11.74±1.17) and 35 (mean age 10.71±1.92) in groups 1, 2 and 3 respectively. Patients with malocclusion showed significantly higher lip and cheek pressure and imbalance favouring the lips over the tongue compared to controls without malocclusion. Class II,1 patients showed significantly higher tongue pressure than Class II,2. No differences were found in muscle pressure or imbalance between crossbite and class II nor between crossbite types.
CONCLUSION: These findings suggest that oral muscle pressure may play a role in the development of malocclusion. This highlights the importance of functional diagnosis and its implications on the prevention and treatment of malocclusion, as well as on orthodontic stability.

Abstract citation ID: cjae081.393
SP101 EVALUATION OF FACTORS AFFECTING ORAL HEALTH OF 12-15 YEAR OLD ADOLESCENTS IN BOSNIA AND HERZEGOVINA: A CROSS-SECTIONAL STUDY

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BACKGROUND: The objective of this investigation was to assess the oral health (OH) of Bosnia and Herzegovinian adolescents in relation to gender differences and socioeconomic status (SES). Material and methods: This cross-sectional study comprised 306 school children from high schools located in the region of Tuzla Canton (Bosnia and Herzegovina). The sample consisted of 183 females who slightly predominated over 123 participants of male gender, with ages between 15 and 18 years (mean of 16,82 years). The study was conducted between December 2019 and March 2020, using an Annex 8 questionnaire of the World Health Organization (WHO) which provided an information about the oral-hygienic habits and risk factors responsible for OH of each subject. Interview format of questionnaire gave additional information about some questions reducing the possibility of subject's erroneous answers. All statistical procedures were performed with the statistical package IBM Statistics SPSS v 23.0. Cross-tabulations were evaluated according to gender and socioeconomic status (SES), using Chi-square test. Results: Based on the findings over 40% of subjects consume sweets, cakes and biscuits on daily base, while 41,5% of the sample visit the dentist just in case of pain. Consumption of sweets (p=0,024) and cakes and biscuits (p=0,011) on daily base was significantly more frequent in females in comparison to males. Females were more satisfied with their appearance compared to males (p=0,008). Females also reported a more frequent occurance of an occasional pain and discomfort than males (p=0,001). Frequency of flossing (p=0,001) and use of wooden toothpicks (p=0,023) was more significant in females when

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compared to males. There was not found an association between the different levels (below average, average, above average) of SES and factors affecting OH status of adolescents. Conclusion: This study showed a significant gender differences for a several factors affecting OH and proved that SES status had no relation to the factors which have an impact on OH in 12-15 years aged adolescents in Bosnia and Herzegovina. Data obtained from this study might help in creation of a new prevention programmes aimed at improving OH status of adolescents in Bosnia and Herzegovina.

Abstract citation ID: cjae081.394
SP102 IMPACT OF STABILIZATION SPLINT THERAPY ON FINAL ORTHODONTIC DIAGNOSIS AND PLAN OF TREATMENT IN PATIENTS WITH SIGNS AND SYMPTOMS OF TEMPOROMANDIBULAR DISORDERS

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AIM: To evaluate the effect of stabilization splint therapy on final orthodontic diagnosis and plan of treatment in individuals with a large centric relation (CR) - maximum intercuspation (MI) disrepancy. Also, the objective of this study was to determine if there is a relationship between the condylar axis position as determined by the occlusion and signs and symptoms of temporomandibular disorders (TMD), using the condylar position indicator (CPI).
MATERIALS AND METHODS: A sample consisted of 60 non-deprogrammed individuals who had increased horizontal or vertical mandibular incisor movements between the CR and MI. A clinical assessment for temporomandibular disorders was performed according to research diagnostic criteria for TMD (RDC/TMD). The CR bite registration was taken according to Roth's power centric technique. Tracking of the condyles to an orthopedically stable musculoskeletal position by deprogramming of the neuromuscular system was performed with the use of stabilization splint therapy during the period of 6 months. Condylar displacements in all three spatial planes were measured with the CPI. The effect of CR-MI discrepancy on dentofacial morphology was evaluated by analysis of 16 variables on cephalometric tracings. The data were evaluated using Wilcoxon signed rank test, Chi-square test and Fisher's exact test.
RESULTS: The mean values of condylar displacements obtained after deprogramming of the neuromuscular system proved to be significantly lower than those attained before the neuromuscular deprogramming ($p < .001$). The greatest amount of condylar displacement before deprogramming of the neuromuscular system was in postero-inferior direction. When the pretreatment and post-treatment RDC/TMD scores of all participants were compared, an 90 % reduction in signs and symptoms of TMD was found after treatment. Analysis of cephalometric values demonstrated that after the stabilization splint therapy mandible moved more posteriorly and rotated more in a clockwise direction.
CONCLUSIONS: Stabilization splint therapy should be used in individuals with a large CR - MI discrepancies in order to find reliable centric positions through muscle deprogramming and to reduce the signs and symptoms of TMD. Positioning of the condyles in an orthopedically stable musculoskeletal position with splint therapy resulted in more accurate orthodontic diagnosis and plan of treatment.

Abstract citation ID: cjae081.395
SP103 CRANIOFACIAL MORPHOLOGY AMOUNG YOUNG SERBIAN POPULATION

Mrs Aleksandrija Djordjevic[1], mrs Dijana Sinikovic[1], prof Jasna Pavlovic[1]; [1]*University of Priština/Kosovska Mitrovica, Faculty of Medicine,*Department of Orthodontics, Kosovska Mitrovica*

AIM: Analysis of cephalometric value of profile radiographs are very important for orthodontic diagnosis and planning of therapy. These values differ morphologically in dependence of ethic and racial affiliation. Aim of this study was to confirm variations of cephalometric norms and extent of their value, and according to them confirm the harmony concept of craniofacial morphology among young Serbian population in Kosovo and Metohia, Serbia.
METHODS: This retrospective study comprised 183 profile radiograms of patients from Serbia, aged 8-33, from which Class I was ascertained among 82 patients (53 female and 29 male). Five cephalometric angles were measured and analysed. Pearson correlation coefficients was used to define the strength of correlation between the five variables. Bivariable linear regression was used to form harmonious combinations of individual values in insight of craniofacial harmonious form. Multiple regression and standard error were used to form harmonious schema.
RESULTS: Linear regression equations were used to define cephalometric floating norms. They have helped us form a harmonious box and harmonious schema of craniofacial norms of the participants. Extent of harmonious value for orthognathic profile varies for SNA 78° - 81°, SNB 75.1° - 78.1°, NL-NSL 11.5° - 5.5°, NSBa 134.7° - 125.8° and ML-NSL 40.5° - 30.6°.
LIMITATIONS: We were limited by the number of research papers on this topic. We had limited ability to gain access to more number of participants.
CONCLUSION: Cephalometric floating norms that describe the individual craniofacial pattern among young Serbian population in Kosovo and Metohia, Serbia, determined and defined of five cephalometric variables, are presented in the form of harmonious box and harmonious schema and can accurately determine the craniofacial pattern.
KEYWORDS: Craniofacial morphology, Profile radiographs, Floating norms.

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SP104 COMPARATIVE STUDY OF THE FORCE AND DISTRIBUTION OF THE OCCLUSAL CONTACTS BEFORE AND AFTER ORTHODONTIC TREATMENT WITH FIXED TECHNIQUE AND CLEAR ALIGNERS

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AIM: To establish and compare the changes in distribution, area and force of the occlusal contacts in central occlusion in patients with different types of malocclusion before and after orthodontic treatment with clear aligners and fixed appliances.
MATERIALS/METHODS: The study included 138 patients in permanent dentition divided in two groups - 66 patients treated with fixed braces and 72 patients treated with clear aligners. After analysing clinical records, cephalometric tracings, photographs and intraoral scan images they were divided in groups according to their initial malocclusions – 24% Class I, 43% Class II, 19% Class III and 14% open bite. Evaluating colour scheme range from 0 to 1.2 mm of space between maxillary and mandibular teeth we compared, observed and estimated ($p<0.05$) digital intra-oral scans, OrthoCAD data and T-Scan occlusal analysis system records in maximum intercuspation before and after orthodontic treatment and combined orthodontic/orthognathic surgery treatment.
RESULTS: We observed uneven and unequal distribution of the occlusal contacts including much higher force areas (red color) and full absence of occlusal contacts (blue color) in all initial malocclusions.
After completing the orthodontic treatment we found occlusal equilibration between left and right halves (51% - 48%), increase of the occlusal force (12-15% frontal area) in distal direction (34-42%) and the number of the occlusal contacts from 2.65 (frontal) to 14.91 (distal) in both group of appliances. Maximal bite force in braces group was 90-98%, higher than the aligner group at the time active treatment was completed. Much higher force in central incisors area - 12-15.6% and second molars - 14.1% was observed in braces group compared to the aligner group.
CONCLUSIONS: Overall contact changes after orthodontic treatment result significant improvement, equilibration of the occlusal contact areas, number and distribution in all groups compared to the initial malocclusions.
Clear aligner therapy reduced the force of the occlusal contacts after the active treatment. Increase in force and number of the occlusal contacts in posterior direction was observed in the retention period.
The comparison showed no determination of occlusal contacts beyond normal force level after orthodontic treatment with clear aligners compared to the fixed braces.

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SP105 ATTITUDES TO REMOTE PATIENT MONITORING AMONG ORTHODONTISTS IN IRELAND - A QUALITATIVE STUDY

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AIMS: The aim of the study was to explore the attitudes to remote patient monitoring among orthodontists in Ireland
METHODS: A descriptive, qualitative study was conducted involving a purposive sample of orthodontist working in private and public orthodontic practices across Ireland. A topic guide was developed. Six focus groups and a single interview involving 16 participants were undertaken. Semi-structured interviews were audio-recorded and transcribed verbatim with Sonix™

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software. A thematic analysis approach was carried out for data analysis using MAXQDA™ software.
RESULTS AND DISCUSSION: Following data analysis, seven main themes were identified. Factors influencing adoption of RPM include patient-driven factors, peer influence, settings/systems, cost-effectiveness, clinical applications, misuse and oversight, attitude for potential adoption of RPM technology. These factors were found to exert important roles as influencers, barriers or both. Orthodontists anticipate broad adoption of RPM technologies in the future allied with an increased array of applications and available technologies. An increased acceptance and penetration of RPM was acknowledged; however, not all non-users participants would be willing to embrace this. Users of RPM technology have a positive attitude towards RPM technology whilst non-users have ambivalent attitudes. Users positively perceive a positive influence of RPM on their practices through increased efficiency, broad usage, financial and time savings. Non-users perceive lack of patient desire, fixed appliances, public orthodontic setting, cost, time, public perception of profession as barriers. Remote monitoring of oral hygiene of patients with fixed appliances may become imbedded into routine care.
CONCLUSIONS: This qualitative study highlights the multifaceted nature of RPM as perceived by the participants with a range of facilitators and barriers identified.

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SP106 ACCURACY OF ANTERIOR CRANIAL BASE SURFACES ACQUIRED FROM THREE-DIMENSIONAL RADIOGRAPHS

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AIM: To investigate the accuracy of three-dimensional (3D) anterior cranial base surface models segmented from radiographic volumes acquired from different machines and settings.
MATERIALS AND METHODS: Ten human dry skulls were scanned with two Cone Beam Computed Tomography (CBCT) units, including an ultra-low radiation protocol, a CT unit, and a highly accurate optical surface scanner that provided the true reference models. Water-filled head shells were used for soft tissue simulation during radiographic imaging. Reproducibility was tested on repeatedly segmented 3D surface models from the radiographic volumes through a visually defined single-threshold approach. Additionally, trueness was measured through comparisons with the true reference model following the application of 3D surface approximation techniques, using an iterative closest point algorithm. Differences between surface models were assessed through the calculation of mean absolute distances (MAD) between corresponding surfaces and through visual inspection of colour-coded distance maps.
RESULTS: The median absolute difference between the threshold values of repeated segmentations was small (intra-operator median: 29.0, IQR: 30.5, $p > 0.05$) and did not differ between machines ($p > 0.05$). The reproducibility of the segmented surface models was very high, with the maximum MAD being 0.09 mm and 0.02 mm, before and after superimposition of the repeatedly segmented models, respectively. The trueness of the radiographically derived surface models was also very high (median MAD: 0.12 mm, IQR: 0.07 mm, maximum MAD: 0.29 mm). No differences were detected between radiographic scanners or settings ($p > 0.05$).
CONCLUSIONS/IMPLICATIONS: The current results confirm that employing reduced radiation cone-beam computed tomography (CBCT) imaging protocols can yield anterior cranial base 3D surface models with validity comparable to conventional CT images. Additionally, the study demonstrated that a lower radiation CBCT protocol performs acceptably and comparably to standard CBCT imaging protocols. This observation contributes to a more favourable cost/benefit ratio in terms of radiation exposure for our patients.

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SP107 LONG TERM OCCLUSAL TOOTH WEAR AT THE ONSET OF PERMANENT DENTITION

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OBJECTIVES: This study quantified the long-term occlusal wear in the natural posterior teeth and the associations per tooth type within the dentition.
METHODS: The sample included 70 orthodontically treated subjects (52 females and 18 males, median age: 14.3 years), followed for a 12.7-year period. They were consecutively selected with no tooth wear-related criteria. Post-treatment (T1) and follow-up dental casts (T2) were scanned and superimposed through three-dimensional best-fit approximation methods. The occlusal wear volume of the posterior teeth comprised the primary outcome. Individual tooth wear patterns and associations between different tooth types were also investigated. Non-parametric statistics and analysis of covariance were applied.
RESULTS: There were no significant differences between contralateral teeth. The average occlusal wear per posterior tooth was 2.3 mm3, with 65.2% of teeth showing values greater than 1 mm3. All but one subject had at least one such tooth. Males showed slightly higher wear amounts than females (median: 2.57 and 2.21 mm3, respectively; $p=0.005$), as mandibular than maxillary teeth, and first molars than first and second premolars. In all first premolars and in the mandibular second premolars, the buccal cusps were primarily affected with no other distinct patterns observed. There were weak to moderate correlations between tooth types, apart from certain strong correlations detected in males.
CONCLUSIONS: Posterior tooth wear was highly prevalent after a thirteen year period starting at the onset of permanent dentition. The detected patterns are in accordance with the concept of canine guidance occlusion that is transforming to group synergy through function. In almost all subjects, at least few posterior permanent teeth are expected to present occlusal wear higher than 1 mm3, already at early adulthood. Despite few specific patterns, the high intra- and inter-individual variability underlines the need for individual patient monitoring to identify high-risk patients at early stages.

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SP108 LASER INDUCED BREAKDOWN SPECTROSCOPY ANALYSIS FOR EVALUATION OF THE EFFECT OF MICROABRASION AND REMINERALIZATION TECHNIQUES ON WHITE SPOT LESIONS AROUND ORTHODONTIC BRACKETS

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OBJECTIVES: Aim of this study to evaluate effect of microabrasion technique on remineralization of artificially induced white spot lesions on enamel surface in-vitro.
MATERIALS AND METHODS: Twenty sound premolars free from cracks, decay and hypocalcification, the sample was divided into control group CG of 4 premolars and demineralization group DG of 16 premolars which divided into two groups each subdivided into 2 subgroups of 4 premolar each. Group 1 MACP: enamel surface treated with microabrasion and Amorphous Calcium Phosphate ACP application. Group 2 MAS: enamel surface treated with microabrasion and kept in artificial saliva AS. Group 3 DACP: no microabrasion only demineralization followed by application of ACP. Group 4 DAS: demineralization with no remineralizing material teeth kept in artificial saliva. The calcium and phosphorous ions percentage was measured after demineralization and after remineralization using ACP with or without microabrasion. Methods of evaluation include laser induced breakdown spectroscopy LIBS, scanning electron microscope SEM and energy dispersive x-ray EDX.
RESULTS: After demineralization the teeth showed the least percentage of calcium and phosphorous ions and a very black pitted enamel surface and loss of homogenecity.Calcium level in DACP group has the highest median (34.4) while the DAS and MACP groups have similar medians (29.16 and 29.4) and the MAS group had the lowest median (28.05) among the remineralization groups. Phosphorous levels showed that DACP and DAS groups had similar medians (16.2 and 16.1) while the MACP and MAS groups have similar medians (15.2 and 15.1).
CONCLUSION: Amorphous calcium phosphate ACP as a material explained that it is very efficient regarding remineralization than the artificial saliva. DACP group which was not treated with microabrasion and subjected to ACP directly showed the most highly significant regression of WSL and the higher Ca wt %and Ph wt % while the MAS group which was treated with microabrasion and kept in artificial saliva showed the least significant regression of WSL and the least Ca wt% and Ph wt %.

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SP109 AN EVALUATION OF ORTHODONTIC SYSTEMATIC REVIEWS PUBLISHED IN 2021

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BACKGROUND: Systematic reviews are highly regarded in evidence-based orthodontics, but their quality must always be considered. Quality assessment tools exist to help clinicians appraise systematic reviews, but these are mainly research orientated rather than being appropriate for use by clinicians on a day-to-day basis.
AIMS: To explore the outcomes of systematic reviews, with meta-analyses, published in 2021 and to develop a straightforward, user-friendly method of assessing quality.
MATERIALS AND METHODS: This study was undertaken at the UCL Eastman Dental Institute. An electronic search identified orthodontic systematic reviews with meta-analyses published in 2021, excluding animal studies and reviews considering sleep apnoea or cleft lip/palate. Characteristics of each review were recorded and also the outcomes, particularly focusing on whether the conclusions aligned with the stated aims and whether it was felt the outcomes could potentially impact on clinical practice.
RESULTS: A total of 56 systematic reviews with meta-analyses were assessed. Temporary anchorage devices (TADs) were the most frequently published topic (18%). Interestingly, only 46% (n=26) of reviews provided an overview of the overall quality of evidence. More than two thirds of the reviews (70%, n=39) explicitly stated (n=33) or implied (n=6) that more studies were required in that particular subject area. Almost half of the reviews (46%, n=26) were assessed as having the potential to provide some limited clinical impact, but the findings needed to be interpreted with caution due to limitations such as high heterogeneity, low quality of evidence, or low/inadequate number of studies. 30% (n=17) of reviews were assessed as being unlikely to have a clinical impact, due to reasons such as the authors not being able to report a conclusion. A quality assessment tool, the 'Clinician Tool for Assessing Systematic Reviews' (CSTAR), was developed specifically tailored for use by clinicians in their everyday practice.
CONCLUSIONS: Variation in reporting practices in systematic reviews calls for more standardisation. A number of reviews in the present study were considered to have limited clinical impact, emphasising the need for more high-quality primary studies. Further testing of CSTAR is needed to validate its effectiveness.

Abstract citation ID: cjae081.402
SP110 IMPACT OF MATERIAL TYPE OF ORTHODONTIC ALIGNERS (THERMOFORMED AND 3D PRINTED) ON FORCE DISTRIBUTION

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AIMS: To investigate the effect of material type of aligners on the intensity and distribution of force they delivered to the tooth surface, which may have significant implications for orthodontic tooth movement. Additionally, the effect of thermomechanical aging on force decay was recorded.
MATERIALS/METHODS: We have employed Pressure-sensitive sheets and a biomechanical custom-made setup (OMSS) for force measurements. Thermoformed single-layered material (Duran), thermoformed multi-layer material (CA Pro), and 3D printed aligner mate-rial (Tera Harz TC-85) were investigated. The force was recorded before and after a 48-hour thermomechanical aging.
RESULTS: At room temperature, using pressure-sensitive sheets, TC-85 recorded force magnitude at (159.4 N), followed by Duran (131.9 N), while CA Pro recorded (83.1 N) over the facial tooth 11 surface. Regarding the force distribution, the highest force was recorded at the middle third, followed by the incisal, and then the cervical. The force difference between incisal and cervical thirds (FI-FC) was insignificant between different materials. But, when comparing incisal and middle thirds, the net force (FI-FM) was higher when using single-layered material in favor of the bodily tooth movement. The thermoformed materials showed a significant force drop after 48 hours of thermomechanical aging, while 3D-printed materials showed a slight force reduction.
LIMITATIONS: The technique-sensitivity of pressure-sensitive films and the absence of PDL and bone in such experimental studies.
CONCLUSIONS/IMPLICATIONS: While multi-layered aligner materials exert gentle forces in contrast to their single-layered counterparts, single-layered materials promote bodily tooth movement, more than multi-layered aligner materials. 3D-printed aligner material exhibits greater resistance to the effects of aging. An exchangeable protocol for aligner treatment is recommended involving using the flexible multi-layered material followed by the rigid single-layered material within each treatment step.

Abstract citation ID: cjae081.403
SP111 IMPACT OF DIFFERENT ATTACHMENT CONFIGURATIONS AND TRIMMING LINE DESIGNS ON FORCE SYSTEM OF ORTHODONTIC ALIGNERS

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AIM: To study the biomechanical effects of various attachment configurations and trimming line designs in orthodontic aligners during different directions of displacement, using the finite element method (FEM).
METHODS: We used a 3D model of an upper jaw which was imported into 3-matic software, with an upper right central incisor (Tooth 11) and its periodontal ligament (PDL), and bone structures were made mobile. Aligners were modeled with three attachment configurations (No attachment, Rectangular horizontal, Rectangular vertical) and two trimming line designs (Scalloped and Straight extended), each with a homogeneous thickness of 0.6 mm. These models were imported into a FE package (Marc/Mentat), and simulations were conducted for facial translation, distalization, and extrusion movements.
RESULTS: Forces ranging from 1.3 N to 2.6 N during facial translation, 1.4 N to 5.9 N in distalization, and 0.0 N to 2.0 N in extrusion. The straight extended trimming line consistently generated higher forces than the scalloped design, with attachments proving significance in reducing unwanted force components during distalization and extrusion. The combination of a straight-extended trimming line with horizontal attachments exhibited superior retention, favorable stress distribution at the PDL, and control of the tooth displacement.
LIMITATIONS: The idealized situation in such numerical studies.
CONCLUSIONS/IMPLICATIONS: Rectangular attachments have limited benefits in facial translation, while horizontal attachments are advantageous for force generation in distalization and extrusion, with a preference for horizontal over vertical attachments. Additionally, the straight-extended trim line enhances control over tooth movement and can substitute attachments in specific cases.

Abstract citation ID: cjae081.404
SP112 APPROPRIATENESS OF ORTHODONTIC EXTRACTIONS CARRIED OUT UNDER GENERAL ANAESTHETIC AT A DISTRICT GENERAL HOSPITAL: A SERVICE EVALUATION.

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BACKGROUND: General Anaesthetic (GA) is used to facilitate dental treatment when other forms of behaviour management are unsuccessful or due to the complexity of the procedure. The British Society of Paediatric Dentistry and the Royal College of Anaesthetists do not recommend GA for simple orthodontic extractions. Although, GA is generally safe, there is a 1 in 100,000 risk of death in a healthy child having non-emergency surgery. This service evaluation stemmed from a case where a child underwent 2 GA procedures within a 2-year period, initially for interceptive extraction of deciduous canines and then for exposure and bond of the impacted canines which failed to erupt following the initial intervention. The referring orthodontist was unaware that the original procedure was carried out under a GA. This service evaluation, therefore, aimed to assess the appropriateness of orthodontic extractions carried out under GA.
OBJECTIVES:
1. Assess the number of children having simple orthodontic extractions in the department under GA.
2. Assess the justification for carrying out orthodontic extractions under GA and if the procedure was already attempted under local anaesthetic/conscious sedation.
MATERIALS/METHODS: Approval from the hospital Clinical Governance team was obtained.Patients undergoing orthodontic extractions under GA were identified and clinical notes evaluated. The data collected included age, number/type of teeth extracted and justification for GA.
RESULTS: The 3.5-year review identified 124 patients; with an average age of 13 years 10 months, who had undergone orthodontic extractions under GA with 14% having simple extractions of deciduous or fully erupted permanent premolar teeth. All patients had been referred by their General Dentist. Anxiety was listed as justification for the GA in 15 out of the 17 patients. There was no information that any of the referring orthodontists were aware that their patients were having the extractions for orthodontic purposes under a GA.

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CONCLUSION: Extractions should only be carried out under GA if the risks outweigh the benefits and the decision whether the treatment should proceed under GA should be made by the orthodontist in consultation with the parent/guardian in an informed consent process.

Abstract citation ID: cjae081.405

SP113 DISTRIBUTION OF APPLIANCES USED FOR POSTERIOR CROSS BITE TREATMENT

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BACKGROUND: The posterior cross bite can be unilateral, bilateral, single-tooth or entire segment, dental or skeletal. The crossbite can be diagnosed in different dentitions – early mixed, late mixed or permanent. Depending on the type of the cross bite and the dentition, a different clinical protocol and appliances are required.
OBJECTIVE: To determine the distribution of the appliances used for posterior crossbite treatment in different dentitions.
MATERIALS AND METHODS: The analysis included 78 patients aged between 7 and 16 years - 32 (41.0%) were in permanent dentition, 10 (12.8%) in late mixed and 36 (46.2%) in early mixed dentition. Every patient was diagnosed with posterior cross bite and has full documentation. The gender distribution is 33 (42.5%) male and 45 (57.5%) female. All of the patients were treated with maxillary expansion as first treatment phase.
RESULTS: The patients in early mixed dentition had multiphase treatment. From 36 of the patients, 26 (72.2%) had a phase with Rapid maxillary expansion (RME), 6 (16.7%) – RME with maxillary incisor protrusion, 4 (11.1%) with transpalatal arch (TPA). In the phase of late mixed dentition some of the patients treated with RME, had second appliance: 3 (11.5%) patients with Pendulum; 4 (15.4%) with Twin block and 3 (11.5%) patients with Myobrace. Almost all of them (32 – 88.9%) had final phase with braces.
From the 10 patients in late mixed dentition, 6 (60.0%) of them started with RME and 4 (40.0%) with TPA. All of them finished with a braces phase.
All of the patients in permanent dentition started treatment with RME and finished with braces.
Almost all of the patients finished treatment with braces (74 – 94.9%). The remaining 4 of them were in early mixed dentition and had corrected maxillary constriction. Due to that they did not need orthodontic treatment in permanent dentition.
CONCLUSION: The advantages of the interceptive orthodontic treatment are correcting the occlusal disharmonies and normalizing growth and development. It is possible that the patient would not need an orthodontic treatment in permanent dentition phase.

Abstract citation ID: cjae081.406

SP114 NASAL WIDTH CHANGES AFTER RAPID MAXILLARY EXPANSION WITH TOOTH-BORNE EXPANDER EVALUATED ON CONE BEAM COMPUTED TOMOGRAPHY

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BACKGROUND: Rapid Maxillary Expansion is used to increase the transversal dimension of the maxilla and to correct the constriction of the jaw by splitting the midpalate suture. By increasing the width of the hard palate of maxilla, changes in the nasal floor also occur.
OBJECTIVE: To determine the changes in the nasal floor width (NFW), anterior and posterior nasal width (ANW and PNW) after RME with digitally printed tooth-borne expanders.
MATERIALS AND METHODS: The pilot study included 12 patients aged between 11 and 15 years treated at the clinic during this year. The gender distribution is 9 (75%) male and 3 (35%) female. All of them are in permanent dentition with maxillary constriction and treated with digitally printed tooth-borne rapid maxillary expanders.
Two CBCTs were made on each patient. One before the expansion and the other in the end of the retention phase - 3 month after the expansion finished.
The following parameters were measured - nasal floor width (NFW), anterior and posterior nasal width (ANW and PNW).
NFW is defined as the distance between the 2 furthest points on the nasal base.
ANW is measured on coronal slice that bisects the maxillary canines. It is defined as the widest transverse portion of the lateral walls of the nasal cavity.
PNW is measured on coronal slice that bisects the maxillary first molars. It is defined as the widest transverse portion of the lateral walls of the nasal cavity.
RESULTS: The mean values of the initial measurement were: NFW-T1 – 31.32mm; ANW-T1 – 22.56mm and PNW-T1 – 27.56mm. After the second CBCT the mean values were: NFW-T2 – 33.41mm; ANW-T2 – 24.55mm and PNW-T2 – 29.86mm. The average increasement of the nasal width values was: NFW – 2.09mm (6.67% - increasement); ANW – 1.99mm (8.82% - increasement) and for PNW – 2.3mm (8.35% - increasement). The biggest transverse gain was in the posterior region compared to the anterior, but percent wise the anterior region increased more from its initial size.
CONCLUSION: The use of RME increases the transverse dimension of the nasal cavity leading to upper airway volume enlargement.

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SP115 INFLUENCE OF EVALUATOR GENDER ON THE ASSESSMENT OF NASAL FRONTAL AESTHETIC CHANGES AFTER LE FORT 1 MAXILLARY ADVANCEMENT OSTEOTOMY

Prof Natascha Fernandes[1], Prof Joana Godinho[1], Prof Rui Pereira[1], Prof Luis Jardim[1]; [1]*Faculty Of Dentistry, University Of Lisbon*

AIM: To determine the influence of evaluator gender on the assessment of frontal nasal aesthetics change, after orthodontic combined with orthognathic treatment including a Le Fort 1 maxillary advancement osteotomy.
METHODS: The study sample consisted of 61 adult patients of European ancestry with skeletal Class III malocclusions, corrected by Fort 1 maxillary advancement, rigid fixation, and alar cinch and VY sutures. Four orthodontists of each gender evaluated the difference in nasal attractiveness before and after treatment, using close-up frontal photographs of the nose and a visual analogue scale. Changes in nasal attractiveness were evaluated with a one sample t-test. Differences between the evaluations of male and female orthodontists were assessed by a paired sample t-test. The relation between the change in nasal attractiveness and objective nasal morphometric measurements on the photographs were determined by multiple regression analysis. The level of statistical significance was fixed at 5%.
RESULTS: For male evaluators, surgery significantly deteriorated nasal aesthetics ($P < 0.05$). Regression analysis showed that for each millimeter of increase in morphological nasal width or decrease in alar base width and for each degree of reduction in the superior alar angle, nasal attractiveness improved by 8.86%, 5.49% and 5.37% respectively ($P<0.05$), while the surgical procedure itself reduced attractiveness by 0.7%. The change in these variables explained 18% of the variation in the change of nose attractiveness. For female evaluators, attractiveness was enhanced 5.51%, 6.12% and 6.37% for each millimetre increase in morphological nasal width and decrease in frontal nasal length and by each degree of reduction in the superior alar angle, respectively ($P<0.05$), and reduced 8.6% by the surgical procedure. The change in these variables explained 14% of the variation in the change of attractiveness with treatment.
CONCLUSIONS/IMPLICATIONS: Le Fort 1 maxillary advancement surgery can deteriorate perceived frontal nasal aesthetics in some patients, especially by male orthodontists. Surgical procedures should be adapted to minimize deleterious nasal morphometric changes and patients need to be aware of these possible changes before undergoing surgery.

Abstract citation ID: cjae081.408

SP116 INFLUENCE OF LE FORT 1 MAXILLARY ADVANCEMENT OSTEOTOMY ON NASAL MORPHOLOGY IN CLASS III MALOCCLUSIONS

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AIM: To evaluate the changes in nasal morphology produced by Le Fort 1 maxillary advancement osteotomy, evaluated in lateral radiographs and frontal photographs.
MATERIALS/METHODS: Pre-surgical and post-treatment lateral cephalograms and frontal facial photographs of 80 adult Caucasian patients, with skeletal Class III malocclusions, corrected by Le Fort 1 maxillary advancement surgery, rigid fixation, alar cinch and VY sutures, were measured and compared on this study, using a cephalometric program. The magnitude and the effect of maxillary advancement on the nasal variables were determined by a one sample t-test and multiple regression analysis. The level of statistical significance was set at 5%.
RESULTS: A point was significantly advanced ($P<0.001$) and impacted ($P<0.05$). The morphological width, alar base width, bilateral width of the nostril floor, right and left diagonal nostril widths, columella width, alar slope angle, superior alar angle ($P<0.001$) and inferior alar angle ($P<0.05$) increased significantly. Frontal nasal length, frontal nasal length/morphological width ratio ($P<0.001$)

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and lateral alar angle (P<0.01) decreased significantly with surgery. Regression analysis determined that sagittal advancement of point A was responsible for 9% of the variation in morphological width and 8% of inferior alar angle variation. A point vertical change explained 10% and 8% of the variations in alar slope angle and superior alar angle, respectively. Change in maxillary inclination was not an explanatory factor for any variable. The morphological width and alar base width increased with A point advancement with ratios of 0.60:1 and 0.61:1, respectively.
CONCLUSIONS/IMPLICATIONS: Skeletal maxillary movement accounted for less than 10% of change in any nasal variable. Individual variation in soft tissue morphology, surgical manipulation and healing might contribute for the low correlation between skeletal and soft tissue changes. Orthognathic patients should be informed of the possible nasal morphological changes with maxillary advancement, and of the eventual need of a future rhinoplasty.

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SP117 CLEAR ALIGNER TREATMENT: A BIBLIOMETRIC ANALYSIS OF THE 50 MOST-CITED ARTICLES.

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AIM: To identify and critically assess the 50 most cited articles on Clear Aligner (CA) and investigate the achievement and development of scientific research about the topic through a bibliometric analysis.
METHODS: On May 23, 2023, a computerized database search (Scopus) was performed to detect papers published in the scientific literature about CA from 2013 to 2023. The 50 manuscripts most cited were selected. The Scopus database was used to obtain author-based parameters, while the article-based parameters and the journal-based parameters were identified using the Incites Journal Citation Reports (Clarivate Analytics) data set. Keywords were automatically collected from the selected articles to improve the visualized analysis.
RESULTS: From a total of 1405 papers screened by searching the database, a list of the top 50 most cited articles was created. The total number of citations collected by the 50 most cited articles in CA was 2862. Among the 50 most cited articles on CA, 35 were original research papers (70.0%) and 15 were reviews (30.0%). As shown by the keyword–network analysis, the Removable Orthodontic appliance was identified as the larger node.
CONCLUSIONS: The findings of this bibliometric study showed an increasing number of citations for papers on CAT, accompanied by a simultaneous rise in scientific interest in this topic in the past decade. This work focuses on identifying the most influential articles, highlighting the journals, authors, and topics that are addressed.

Abstract citation ID: cjae081.410
SP118 MAXILLOMANDIBULAR SURGERY FOR OBSTRUCTIVE SLEEP APNEA: A SCOPING REVIEW OF PATIENT REPORTED OUTCOMES

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BACKGROUND: Obstructive sleep apnea (OSA) is a respiratory sleep disorder that affects 9% to 38% of the adult population worldwide. This condition is discreetly debilitating, as it can reduce intellectual performance in adulthood, but can also be a risk factor for other pathologies, namely hypertension, metabolic disorders and cognitive dysfunction. OSA can be treated with maxillomandibular advancement surgery.
OBJECTIVES: The aim of this study was to analyse all Patient Reported Outcome Measurements (PROMs) in order to better understand the perspective of OSA patients after undergoing maxillomandibular surgery.
MATERIALS AND METHODS: This scoping review was carried out by following the extensions for scoping reviews by the Joanna Briggs Institute methodology. A thorough search of several online databases was executed, namely on Medline (Pubmed), Web of Science (all databases), Embase, Cochrane, and gray literature, with the last search being performed on the 7th of July 2023. The studies to be included were randomized and controlled trials, cohort, case-control and cross-sectional studies. Inclusion criteria encompassed studies that involved patients with OSA who had undergone orthognathic surgery and that assessed those patients' perceptions of their quality of life, satisfaction, treatment experience and side effects at any given time of the process.
RESULTS: Of the 1407 articles analyzed, sixteen studies were included. Regarding the type of studies included, four were cohorts, eight were retrospective cohorts, three were prospective cohorts and one article was a retrospective case-control study. To evaluate their patients' perspective, eleven studies included various questionnaires, while five used only a single questionnaire to evaluate quality of life. The most used questionnaires were: Epworth Sleepiness Scale, SF-36, Functional Outcomes of Sleep and Ottawa Sleep Apnea. The outcomes evaluated were, generally: daytime function, sleep quality, facial aesthetics, dental function and emotional health.
CONCLUSIONS: The results of the present study revealed a divergence in the array of patient-reported outcome measures used for the assessment of Oral Health-Related Quality of Life. It is imperative that collaborative efforts are taken in the near future to promote uniform adoption of patient outcome reports in research of Obstructive Sleep Apnea.

Abstract citation ID: cjae081.411
SP119 A COMPARISON OF MORPHOLOGICAL CHANGES OF FAKE BRACES AND CONVENTIONAL BRACES IN VITRO

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BACKGROUND: There is a growing demand among communities around the world for orthodontic treatment. Unfortunately, fake braces have also become popular which can be purchased via online shopping platforms. These braces are potentially harmful as we do not really know its composition.
OBJECTIVE: The aim of study is to determine the morphological changes of conventional versus fake braces at different pH values and time points.
METHODS: Samples of fake braces (bonded and click type) and conventional braces were prepared in triplicates. The samples were immersed in artificial saliva at 2 different pH values (pH 4.9 and pH 6.7) and kept at 37°C. The samples were then extracted at 1-day (T1) and 7-day (T2) and were analysed using surface profilometer to determine the changes in its surface roughness (Ra).
RESULTS: Fake braces, both the bonded and click type shows statistically significant higher surface roughness (p<0.05) compared to conventional braces at pH 6.7 at T2 (95% CI [0.818, 0.983]) and at pH 4.9 at T2 (95% CI [0.395, 0.932]).
CONCLUSIONS: Both the bonded and click type fake braces show higher morphological changes in surface roughness as compared to conventional braces when immersed in artificial saliva at different pH levels. These may be interpreted as the low quality of alloy used in the manufacturing of fake braces.
KEYWORDS: fake braces, conventional braces, morphological changes, surface roughness

Abstract citation ID: cjae081.412
SP120 AN EVALUATION OF THE ELASTIC RECOVERY OF NICKEL TITANIUM ARCHWIRES FOLLOWING LIGATION IN PALATALLY-DISPLACED LATERAL INCISORS

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INTRODUCTION: Orthodontic alignment involves the use of nickel titanium archwires with small cross-sectional diameters.
AIMS: To compare permanent deformation of a range of superelastic 0.012" and 0.014" nickel titanium archwires following ligation in a simulated set up. To compare the maximum force imparted by these archwires at various magnitudes of tooth displacement.
MATERIALS/METHODS: 3D-printed models, incorporating conventional brackets, were created with palatally displaced lateral incisors (3-,4-,5- mm). A total of 288 archwires from two brands (Euroform(EO) and American Orthodontics(AO)) of two cross-sectional diameters (0.012" and 0.014") were tested for plastic deformation. Deformation was measured objectively using linear and angular measurements and subjectively using a validated index categorising archwires on deformation and clinical usability. 3-point bending tests were used to examine the load deflection characteristics of 72 archwires and determine the maximum and unloading force generated at archwire displacements of 3-, 4- and 5- mm.
RESULTS: Shapiro-Wilk normality tests showed the majority of the data was not normally distributed so therefore non-parametric Kruskal-Wallis testing was used for the first part. EF archwires had lower distortion compared to AO archwires (P=0.008). There was no statistically significant difference in deformation noted between 0.012" EF and AO archwires (P=0.89). However, the 0.014" EF archwire had significantly lower deformation than AO archwires (P=<0.001). Wide variation in force levels at maximum archwire displacement was observed, influenced by archwire size and type, with differences also noted within wire batches. Using

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independent samples Mann-Whitney U Tests, the mean force produced by the 0.012" archwires was significantly less than 0.014" archwires. Mean force produced by the AO archwires was significantly less than EF archwires at the same magnitudes of displacement for both 0.012" and 0.014" sizes.
CONCLUSIONS: Based on this artificial set-up, the use of an 0.012" archwire for tooth displacements of 3 mm or more may be considered to deliver lighter forces. EF archwires underwent a lesser deformation than AO archwires. A high degree of variability in the performance of narrow dimension nickel titanium archwires can be expected and is influenced by manufacturer, dimension and degree of tooth displacement. Susceptibility to deformation appears to vary within batches of identical wires.

Abstract citation ID: cjae081.413
SP121 THE EFFECT OF ORAL FUNCTION ON THE OCCURRENCE OF CROWDING IN JAPANESE CHILDREN -EPIDEMIOLOGICAL STUDY USING LONGITUDINAL STUDY DATA OF THE GENERAL POPULATION-

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AIM: The purpose of this study was to investigate the morphological and functional causes of crowding by examining the temporal aspect of maxillary first molar tooth movement from the mixed dentition to the permanent dentition.
MATERIALS AND METHODS: The subjects were 240 identical individuals (boys: 129, girls: 111) collected over a 9-year period at Kogasaki Elementary and Junior High Schools in Matsudo City, Chiba Prefecture. Measurement periods were T1: central incisor, lateral incisor, and first molar eruption complete and deciduous canine remaining, and T2: canine tooth eruption complete or later. Dental models were scanned, and the subjects were divided into three groups according to the amount of crowding in the anterior discrepancy: improved group, aggravated group, and caused group. The morphological parameters were width of palatal, arch, and intercanine, length of arch, and aspect of first molar movement, and the functional parameters were masticatory path width, occlusal force, and lip closure force.
RESULTS: In all groups, palatal width, dental arch width, maxillary first molar buccolingual inclination angle, and lip closure force significantly increased from T1 to T2, while dental arch length significantly decreased. In the improved group, the dental arch width and masticatory path width increased significantly, and the maxillary first molars rotated significantly more distally.
The results of multiple regression analysis indicated that the growth of dentition width may have influenced the improvement of crowding. Spearman's rank correlation analysis showed that there was a significant relationship between the anterior arch width, masticatory path width, and occlusal force.
CONCLUSION: In the general population, the occurrence of anterior crowding was related to the masticatory path, occlusal force, dental arch width, and rotation of the maxillary first molars during the growth period.

Abstract citation ID: cjae081.414
SP122 CLEANSING EFFICACY OF AN ORAL IRRIGATOR WITH MICROBURST TECHNOLOGY IN ADOLESCENT ORTHODONTIC PATIENTS. A RANDOMIZED-CONTROLLED CROSSOVER STUDY.

Dr Hanna Gänzer[1]; [1]*Medical University of Innsbruck*

OBJECTIVES: Simplifying interdental space cleaning is a constantly discussed topic. The present study aimed to compare the cleansing efficacy of an oral irrigator with that of dental flossing in adolescent patients with fixed braces after four weeks of home-use.
MATERIALS AND METHODS: The study design is a randomized, single-blinded cross-over study. Following a twenty-eight-day period of product utilization in a home setting, a comparative analysis was conducted on hygiene indices, specifically the Rustogi Modified Navy Plaque Index (RMNPI) and the Gingival Bleeding Index (GBI), between the test group (oral irrigator) and the control group (dental floss).
RESULTS: Seventeen adolescent individuals finalized the study. After 28 days of cleaning with the oral irrigator, RMNPI was 58.81% (55.31 – 66.47) compared to 59.46% (52.68 - 68.67) with dental floss (p = 0.070). Subgroup analyses did not classify either of the two methods as superior. GBI after the test phase with the oral irrigator was 28.93% (23.21 – 33.97) and insignificant higher compared to 26.40% (21.01 – 31.41) with dental floss (p = 0.1585).
CONCLUSIONS: None of the two products proved significantly superior in terms of cleaning efficiency. Therefore, no recommendation can be made in favor of one over the other. It is evident that through special attention to home oral hygiene, improved index values were achieved, leading to the conclusion that paying careful attention to daily dental cleaning is of highly importance.
CLINICAL RELEVANCE: It´s less about the tool but more about oral hygiene instruction and motivation provided by the orthodontist or the responsible guardians at home.

Abstract citation ID: cjae081.415
SP123 AUGMENTED REALITY-BASED TECHNOLOGY TO VISUALIZE AND FACILITATE TREATMENT PLANNING OF IMPACTED CANINE

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BACKGROUND/AIMS: Efficiently aligning impacted canines within the dental arch without causing damage poses challenges, especially when roots are intertwined or the impacted canine's crown contacts adjacent roots. Planning the traction's direction and force delivery could benefit from 3D data visualization using augmented reality (AR). We propose a method utilizing AR goggles (Hololens 2, Microsoft) to facilitate impacted canine alignment planning and assess its acceptance among clinicians treating impacted teeth.
MATERIALS/METHODS: A patient's CBCT scan, featuring isometric resolution and low noise-to-signal ratio, was semi-automatically segmented in Inobitec software and exported as the 3D mesh (OBJ file). The mesh was then optimized for the HoloLens 2. Using the Unreal Engine environment, we developed an application for the HoloLens 2, implementing HoloLens SDK and UX Tools. Adjustable pointers were added for planning attachment placement, traction direction, and point of force application by orthodontists. The visualization was presented to participants of the course on impacted teeth treatment, followed by a 10-question survey using a 6-point scale (1- totally agree to 5 – totally disagree, 6 – don't know) addressing potential advantages ranging from improved precision of attachment placement to reduction of adverse effects to improved education and communication with a patient.
RESULTS: Out of 38 respondents, 44.7% were orthodontists, 34.2% dentists, 15.8% dental students, and 5.3% dental technicians. Most respondents (44.7%) were between 35 and 44 years old, while only 1 (2.6%) respondent was in 55-64 years age group. Median answers for six questions were "totally agree" (25th percentile 1, 75th percentile 2), while four questions received a median of "agree" (25th percentile 1, 75th percentile 2). No correlation was found between age, profession, and responses.
CONCLUSIONS: Our method has generated substantial interest among clinicians. The initial responses affirm the potential benefits, supporting the continued exploration of AR-based techniques in the field of impacted teeth treatment. However, the recommendation for widespread use awaits validation through clinical trial(s).

Abstract citation ID: cjae081.416
SP124 EFFECTS OF AGING ON THERMAL BEHAVIOR OF NI-TI MULTIFORCE ORTHODONTIC ARCHWIRES.

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BACKGROUND: Each Ni-Ti alloy has a specific temperature range in which the phase transition from martensite to austenite and vice versa takes place, and the so-called thermoelastic behavior occurs. Multiforce orthodontic archwires possess different transitional temperatures between the three regions which may lead to some changes in the elastic modulus of each segment, resulting in a variable force release along the archwires without changing the cross-sectional size. Orthodontic materials are constantly exposed to physical and chemical agents from the environment. The processes of alloy's aging may cause changes in specific temperature range.
AIM: To evaluate the difference between specific temperature range over time separately for each archwire section.
MATERIALS AND METHODS: Two types of multiforce orthodontic archwires TriTanium® (American Orthodontics, Sheboygan, Wisconsin, USA) and Bio-Active® (TOMY Inc, Japan) with dimensions 0.016 x 0.022 inches, rectangular cross-section, were studied. Differential scanning calorimetry is a thermal method used to study the phase transformation, behavior and structure of Ni-Ti multiforce orthodontic archwires. Evaluation of the temperatures at which a transformation occurs between the two phases and the associated enthalpy changes serve to

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reveal the interaction between the phase transitions and the mechanical properties of the studied archwires.
RESULTS: The data depending on the duration of use for the archwires was not determined to be statistically significant. The thermal behavior is not changed after clinical exposure.
LIMITATIONS: Thermal properties of the studied thermodynamic multiforce archwires, depends on external factors. So, the sudden changes of the environmental temperature such as eating and/or drinking cold or hot foods and beverages by patients, cannot be predicted and controlled.
CONCLUSIONS: The investigated as-received and retrieved Bio-Active® and Tritanium orthodontic archwires had different temperature range in the three segments, which do not show changes after clinical use.

Abstract citation ID: cjae081.417
SP125 DOCTORS' AND PATIENTS' ATTITUDES TOWARDS THE INTRODUCTION OF ARTIFICIAL INTELLIGENCE IN ORTHODONTIC AND SURGICAL DENTAL DIAGNOSTICS

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BACKGROUND: The artificial intelligence (AI), through the algorithms of deep learning and statistical models can in a short time process data and derive a diagnosis of the patient's dental condition. These processes are of great importance in Orthodontics and Oral surgery, where the problems are endless and have individual characteristics.
AIM: To check the attitude towards the use of AI in the patient's diagnostic among the patients and doctors (oral surgeons, orthodontists and general practitioners).
MATERIAL AND METHOD: An anonymous questionnaire survey using the recall method of an average of 165 patients (average age 39.28 years) and 53 dental doctors (surgeons, orthodontists and general practitioners) with an average age of 45.79 years was conducted. Gender was comparable between the two groups: among the doctors - 24.5% men and 75.5% women, among the patients - 32.1% men and 67-9% women.
RESULTS: Among the doctors the trust on the diagnosis set entairely by the AI, met great skepticism. Only 3.8% of them gave a positive answer, while for the patients the percentage was 12.7%. 86.8% of doctors rely on their knowledge and capabilities, while for the patients, who have confidence in medical diagnostics, the percentage was 69.1%. Quite a few of the patients 18.2% and 9.4% of the doctors still cannot judge. However, when the asked question defines that the AI shall only support the diagnostic process, the opinions of the both groups of respondents changed in favor to AI. - 41.5% of doctors and 47.9% of patients completely rely on AI to help reading the diagnostic data. From the analysis of the study, it is found that the patient group, which is younger in age, has more confidence in the new digital methods.
LIMITATIONS: With AI diagnostics, the doctor's assessment of the patient's mental state and the prognosis of his cooperation are omitted. Not all the people want to answer what they really have on their mind.
CONCLUSION: The artificial intelligence is an excellent tool for personalization of the diagnosis and the patient care, but the public is still skeptical about its routine implementation in dental practice.

Abstract citation ID: cjae081.418
SP126 ESTABLISHING THE MEAN AGE OF PATIENTS IN THE EARLY, LATE MIXED AND PERMANENT DENTITION WHO SOUGHT ORTHODONTIC TREATMENT

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Normal growth and development of the dental arches is a major factor in the formation of occlusion. The aim of early orthodontic treatment is to guide the formation of the dental arches during growth and to provide normal development of functional and morphological occlusion. Through interceptive orthodontics the discrepancies in the individual arch are corrected, the perimeter is normalized and the biological resources for the development of the facial bones are activated.
AIM:To determine the average age and dentition type of patients starting orthodontic treatment and the percentage of interceptive orthodontic therapies.
Matherials:The analysis included 485 growing patients with a mean age of 10.88 ± 2.74 years (from 6 to 18 years), diagnosed and with fully documented orthodontic treatment. The gender distribution of patients was: 206 (42.5%) male and 279 (57.5%) female.
According to the phase of dentition formation, the patients are divided into three groups: permanent dentition - the largest group (227 or 46.8%); Late mixed dentition – the smallest group (76 or 15.7%) and early mixed represented by 182 or 37.5%.
The included criteria are complete documentation, written informed consent for an accepted orthodontic treatment plan, and consent for usage the data for scientific purposes without revealing the identity.
There were 182 patients undergoing interceptive treatment in the period of early mixed dentition (84 – 46.2% male and 98 – 53.8% female) with an average age of 8.19 years. Patients treated directly with primary (corrective) orthodontic treatment were 227 in permanent dentition (86 – 37.9% male and 141 – 62.1% female) with an average age of 13.12 years and 76 in late mixed dentition (36 – 47.4% male and 40 – 52.6 % female) with an average age of 10.61 years. In more than 1/3 (37.53%) of the orthodontic patients, a problem disturbing the natural eruption and growth processes was discovered early, and treatment was required, potentially reducing the need for further or more complex orthodontic treatment.
Conclusion:Development of digitally designed and printed orthodontic appliances have expanded treatment options in the interceptive phase, using individualized early phase expanander and distalizer appliances, custom mandibular medialization appliances, and more.

Abstract citation ID: cjae081.419
SP127 ARRANGEMENT OF DEFORMITIES TREATED WITH INTERCEPTIVE TREATMENT

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BACKGROUND: Interceptive treatment aims to minimize the unfavorable characteristics of occlusal development. With carefully-planned and conducted interceptive treatment in the second treatment phase, an optimal result is possible to be achieved without the use of long-term, complex or extraction orthodontic therapy.
OBJECTIVE: To determine the percentage distribution of orthodontic deformities requiring early orthodontic treatment.
MATERIALS/METHODS: The study included 485 patients aged between 7 and 18 years, treated at the clinic during the last 3 years. Of them, 206 (42.5%) were male and 279 (57.5%) were female. Interceptive orthodontic treatment was carried out in 182 (37.5%) patients in the period of early mixed dentition, and in corrective treatment after formation of permanent dentition.
RESULTS: Deformities that are treated in the early phase are associated with:
Most often with occlusal disorders blocking growth processes in the Maxilla is anterior cross bite - 51 (28%), takes second place distal cross bite – 36 (19.8%); anterior open bite, associated with the changed position of the tongue - 24 (13.2%); Changes in the sagittal development of the upper or lower jaw - Class II1 - 27 (14.8%), Class II2 - 7 (3.8%), Class III - 10 (5.5%); Established follicular cyst in germs of permanent teeth – 27 (14.8%); Proven retention of permanent teeth in the early phase - upper incisor - 5 (2.7%), canine - 4 (2.2%), second premolar, due to early loss of temporary molar and medialization of first molar - 7 (3.8%); Change in the number of teeth - Hypodontia in the frontal segment – 24 (13.2%), Hyperdontia in the frontal segment (mesiodens) – 6 (3.3%). For patients undergoing interceptive treatment, the goals are two: achieving an orthopedic and less often orthodontic effect, by unblocking natural genetic predispositions and eliminating harmful habits leading to dysfunctions.
CONCLUSIONS/IMPLICATIONS: Interceptive orthodontic treatment achieves control and directs the eruption of permanent teeth, creates conditions for harmony in the growth of both jaws and eliminates functional disorders.

Abstract citation ID: cjae081.420
SP128 PREVALENCE OF MALOCCLUSIONS IN THE PRESCHOOL POPULATION 3-6 YEARS OLD IN ALBANIA

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AIMS: The current epidemiological study had the objective of determining the extent to which malocclusions are prevalent among the Albanian population.
MATERIALS: To ensure a sample that accurately represents preschoolers, we employed a multistage stratified sampling method. Eight districts were selected (Tirana, Shkoder, Durres, Vlore, Kruje, Elbasan, Pogradec, Korce) using

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probability proportional to size sampling (PPS) to accurately reflect the distribution of socioeconomic conditions. The study included a sample of 1100 children. The following parameters were assessed during an intraoral examination: Sagittal anomalies, vertical anomalies, transversal anomalies, and space discrepancies.
RESULTS: Class II malocclusion was observed in 19% of the cases, whereas class III malocclusion was detected in 1.5% of the cases. The most prevalent issue, occurring in 21.4% of cases, is an increased overbite. The prevalence of patients with an open bite has increased from three to six years, constituting 4.6% of the overall cases. The prevalence of transversal issues related to lateral crossbites, with and without shift, is 2.2% and 1.7% respectively. Additionally, the absence of midline coincidence occurred in 9.5% of cases. Age-related diastemas were present in 91.4% of patients, while dental crowding was observed in 6.4% of patients.
CONCLUSIONS: The current study provides evidence for the notion that malocclusion is a significant concern among preschool-aged Albanian children, thereby indicating that it is a noteworthy public health issue within the Albanian population.

Abstract citation ID: cjae081.421
SP129 COMPARISON OF THREE-DIMENSIONAL FACIAL SOFT TISSUE CHANGES FOLLOWING TWIN-BLOCK AND BUTTON & BEAD APPLIANCES: A SINGLE-CENTRE RANDOMISED CLINICAL TRIAL

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BACKGROUND: A single-centre randomised clinical trial carried out at Birmingham Dental Hospital to compare the 3D facial soft tissue changes following orthodontic treatment with the Modified Clark's Twin-Block and the Button and Bead Class II corrector.
AIMS: The aim of the study was to determine whether there is a statistically significant difference in the soft tissue horizontal mandibular advancement produced by the Twin-Block and the Button and Bead appliance.
OBJECTIVE: To compare changes in soft tissue pogonion between patients undergoing functional appliance treatment with a Modified Clark's Twin-Block or a Button and Bead Class II corrector.
METHOD: A sample size of 64 orthodontic patients from Birmingham Dental Hospital were randomly selected aged between 10-14 years. Of these, 32 patients received treatment with a Twin-Block appliance and 32 were allocated to the Button and Bead treatment group. Following this, pogonion soft tissue changes were recorded using three-dimensional facial soft tissue images (3dMD) which allowed the results of both functional appliance treatment groups to be compared.
RESULTS: The results showed a statistically significant difference in anterior horizontal movement at pogonion (mean difference 1.9mm, p=0.001) and B-point (p=0.012) in the Twin-Block compared with the Button and Bead group. However, there was no statistically significant difference in upper lip movement between the two groups.
CONCLUSION: In conclusion, there was a greater horizontal anterior movement of the soft tissue pogonion in the Twin-Block group when compared with the Button and Bead group. Having said that, the Button and Bead group showed a more clinically significant increase in the vertical dimensions of the chin and lower lip compared to the Twin-Block. Despite their different modes of action, both appliances improved the soft tissue profile, however the Twin-Block appliance was more effective in the horizontal advancement of soft tissue pogonion.

Abstract citation ID: cjae081.422
SP130 HOW CAN THE OUTCOMES OF FIXED-APPLIANCE ORTHODONTIC TREATMENT BE IMPROVED: A SYSTEMATIC REVIEW AND META-ANALYSES OF CLINICAL EVIDENCE FROM RANDOMIZED TRIALS

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AIMS: Several appliances or treatment protocols are marketed to either patient or orthodontist as being associated with improved orthodontic outcomes. However, clinical decision-making should be based on robust scientific evidence and not marketing claims or anecdotal evidence. Aim of the present study was to identify appliances/protocols being associated with improved outcomes of fixed-appliance treatment.
METHODS: Unrestricted literature search of 7 databases up to October 2023 were performed for randomized clinical trials on humans assessing the outcome of fixed-appliance therapy with either the Peer Assessment Rating (PAR) or the American Board of Orthodontists Objective Grading System (ABO-OGS). After duplicate study selection, data extraction, and risk-of-bias assessment according to Cochrane guidelines, random-effects meta-analyses of Mean Differences (MD) and their 95% confidence intervals (CIs) were carried out, followed by assessment of certainty on existed evidence.
RESULTS: A total of 14 randomized clinical trials were included, which covered a total of 1116 patients. The average expected treatment outcomes were calculated at 7.19 PAR points (95% CI: 5.38 to 9.00 points) and at 25.54 ABO-OGS points (95% CI: 32.98 to 36.22 points). No significant differences were seen between 0.022" and 0.018" slot bracket for either PAR (MD=-1.40; 95% CI=-2.91 to 0.11; P=0.07) or ABO-OGS (MD=-0.20; 95% CI=-3.46 to 3.06). No significant differences in ABO-OGS were seen between aligners and fixed appliances (MD=-0.38; 95% CI=-9.79 to 9.03; P=0.94). No significant differences were seen in PAR between customized and non-customized appliances (MD=-0.55; 95% CI=-1.64 to 0.54; P=0.32). Indirect bonding was associated with improved ABO-OGS compared to direct bonding (MD=-5.00; 95% CI=-6.18 to -3.82; P<0.001). 2-Phase Class II treatment was associated with worse PAR scores than 1-phase treatment (MD=5.61; 95% CI=1.79 to 9.43; P=0.004). Skeletal anchorage reinforcement was not associated with significantly improved PAR scores (MD=-1.35; 95% CI=-5.28 to 2.58; P=0.50). Both self-ligating brackets (MD=0.62; 95% CI=-2.71 to 3.95; P=0.72) and adjunct vibration were not associated with improved PAR scores (MD=0; 95% CI=-0.57 to 0.57; P=1.00).
CONCLUSIONS: The outcome of comprehensive fixed-appliance orthodontic treatment is generally not primarily determined by the appliances used. The orthodontist's clinical expertise and baseline malocclusion severity might be more clinically relevant.

Abstract citation ID: cjae081.423
SP131 RISK FACTORS ASSOCIATED WITH IMPACTED CANINES AND NEED FOR SURGICAL EXPOSURE

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BACKGROUND AND AIM: Orthodontic treatment of impacted maxillary canines can be very difficult, costly and time-consuming. To identify clinically relevant factors associated with canine impaction, the aim of the study was to identify clinically recognisable conditions associated with a higher likelihood of maxillary canine impaction and to evaluate factors that increase the risk of surgical exposure of the canines
METHODS: Seventy-five participants were enrolled in the case-controlled study (43 girls, 32 boys). The impacted canine group consisted of 32 participants who had at least 1 impacted maxillary canine. Forty-three participants of similar age, skeletal maturity and gender without major orthodontic malocclusions were assigned to the control group. Three-dimensional study models were created (Trios 3, 3Shape) and panoramic radiographs were taken. When clinically indicated, CBCT radiographs were taken. Several morphological signs were noted (deep bite, hypoplastic incisors, rotated adjacent teeth and the presence of ankylotic deciduous teeth).
The data was recorded using a Microsoft Office Excel spreadsheet and statistically analysed using SigmaPlot 14.0. Chi-square test, Mann-Whitney test and logistic regression were used to determine statistical differences between the groups.
RESULTS: There were no differences between the groups in terms of gender, age or skeletal maturity. The group with impacted canines was more likely to have a deep bite (chi-square test; p=0.004; OR=5.01), hypoplastic lateral incisor (chi-square test, p=0.004; OR=5.47) and a rotated neighbour (p=0.017; chi-square test; OR=3.56). However, patients with ankylotic deciduous teeth do not have a higher risk of impaction. (p=0.304; Fisher exact test: OR=4.44).
The group with impacted canines required surgical fenestration more frequently if a persistent deciduous canine was present (P < 0.001; chi-square test; OR: 10.15), if the position of the canine was palatal (p < 0.001; chi-square test; OR: 7.5) or if the angle of the canine position was steeper (P < 0.001; logistic regression)
CONCLUSIONS: The results showed that patients with impacted canines were significantly more likely to have deep bite, hypoplastic lateral incisors and rotated adjacent teeth. The presence of a deciduous tooth, palatal position, and a steeper canine angle are local factors that increase the risk of the need for surgical fenestration.

Abstract citation ID: cjae081.424
SP132 MANDIBULAR MORPHOLOGY IN DUCHENNE MUSCULAR DYSTROPHY USING A MOUSE MODEL

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AIM: Duchenne muscular dystrophy (DMD) is a destructive X-linked recessive skeletal muscle disorder affecting 1 in 3,500-6,000 live-born males. DMD affects orofacial function, as the maximum bite force and lip force decreases related to the affected muscle groups. Additionally, macroglossia and difficulties in swallowing might be observed. The aim of this study was to evaluate the effects of DMD on mandibular morphology of 3- and 6-month-old affected mice.
MATERIALS AND METHODS: Two groups of mice, namely a DMD group and a wild-type control group, were sacrificed at two ages, 3-months (representing young adulthood) and 6-months (representing mature adulthood). The D2/5Cv murine DMD model was used, with n=7 at 3-months (cf. n=9 control) and n=8 at 6-months (cf. n=8 controls). This chosen model shows enhanced muscular fibrosis and a decrease in regenerated myofibres in the masseter muscle, which may affect mandibular morphology. Mandibles were dissected and separated using enzyme maceration and subsequently photographed using transillumination under an optical microscope with 50x magnification and digitized. Morphometric linear and angular measurements were then performed using Image J software. Mann-Whitney U test was used for intergroup comparisons, with $p<0.05$ considered statistically significant. Mean values (with 95% confidence intervals) will be presented below.
RESULTS: No significant differences in mandibular morphology were measured when comparing 3-month-old mice with DMD and control animals. However, concerning 6-month-old mice, the condylar process was shorter in the DMD group [DMD=2608.1µm (2510.2µm, 2706.1µm); control=2758.0µm (2669.7µm, 2846.2µm); p=0.015] as was the distance between the mental foramen and condyle [DMD=8254.7µm (8084.0µm, 8425.4µm); control=8643.8µm (8428.1µm, 8859.6µm); p=0.008]. On the contrary, the coronoid process height was significantly increased in the DMD group [DMD= 2490.3µm (2331.0µm, 2649.7µm); control=2286.7µm (2138.6µm, 2434.7µm); p=0.046].
CONCLUSIONS: Although DMD in the D2/5Cv murine model does not seem to have any effect on mandibular development until early adulthood (3-months), significant alterations are observed at 6-months of age. The most significant alterations were a decrease in condylar process size, and an increase in coronoid process height. These outcomes might result from differences in the loading of the condyle, and masticatory muscle functioning, related to the pathology on the masticatory muscles and tongue.

Abstract citation ID: cjae081.425
SP133 POSITIONAL ASPECTS OF FIRST MAXILLARY MOLARS IN RELATION TO THE ENTITY OF TRANSVERSAL DIMENSION: RETROSPECTIVE STUDY ON CBCT.

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AIM: In this study, we evaluated whether the Haas-type rapid palatal expander, anchored on the upper second molar deciduous teeth to correct transverse deficit, could influence first permanent molars's position regarding the amount of vestibular torque tipping and the quality of palatal expansion, thus using this expansion method while avoiding dental offsets to the upper sixth.
MATERIALS AND METHODS: These data were collected by studying a sample of 16 patients, (8M,8F) with an average age at T0 of 7,94±0,64. CBCT before and after treatment were studied and measured.
Orientations of the evalutated CBCT on X,Y,Z axes were oriented previously, parallel at the palatal plane (X), parallel at palatal suture (Z), tangent nasal floor (Y). After agreeing on the orientation of the CBCTs, coronal, axial and sagittal cuts were chosen.
For our study we used the coronal cut which was performed as soon as the roots of the upper first permanent molars of both hemiarches were visible.
The ICC (Intraclass Correlation Coefficient) shown a good reproducibility of the results (from 0,89 to 0,99).
Crown expansion (CR) was considered by linear measurement between the middle fossae of the right and left upper sixths; nasal floor expansion (NF) by measuring the distance given by the line tangent to the outer cortical bone of the nasal floor and the right and left jugular point. As for angular measurements, tooth inclination (TI), given by the internal angle formed by the intersection of the line passing through the long axis of the tooth and NF; alveolar inclination (AI) given by the line tangent the palatal alveolar bone and intersecting NF.
RESULTS: The results reported a difference in measurements at T0 and T1 (Δ T1-T0) equal to 3.53 ±3.41 for NF; 1.92 ±2.38 for CR; -3.38 ±6.19 for TI DX; -3.55 ±6.13 for TI SX; 0.06 ±7.19 for AI DX; -1.29 ±5.547 for AI SX.
CONCLUSIONS: In this clinical study, no direct forces were exerted on permanent teeth. It can, therefore, be inferred that the permanent teeth followed the orthopedic movement of the basal bones, while the deciduous teeth were influenced by both orthopedic and orthodontic forces.

Abstract citation ID: cjae081.426
SP134 BIOMECHANICAL ANALYSIS OF THE STRENGTH OF ANGLE-STABLE MINI-IMPLANTS IN RAPID MAXILLARY EXPANSION - AN IN VITRO STUDY

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AIMS: Hybrid-Hyrax-appliance is widely used to perform rapid-maxillary-expansion (RPE) in conjunction with skeletal anchorage. In 2019 a new mini-implant (Benefit DIRECT PSM Medical Solution) was introduced comprising an angle-stable thread around its head. This implant enables placing the appliance before inserting the mini-implant. This study examines whether the angle-stable thread would stand the large forces encountered in the initial phase of RPE.
MATERIALS/METHOD: In an in-vitro-setup performing 25 loading tests, Benefit mini-implants (CG; control group, PSM Medical Solution) were compared with Benefit DIRECT mini-implants (DG; direct group), both with 9mm length and 2mm diameter. Two artificial bones (Sawbone, 40pcf, 15x10x10mm) were mounted on the test apparatus, one fixed and the other movable in one direction. After pre-drilling, a mini-implant was inserted in an artificial bone block using a printed insertion guide centered and spaced 8mm to the other mini-implant. DG were placed at different angles of 0°, 5°, 10°, 15° (DG 1-4) through the corresponding abutments of BMX expansion screws (BMX; PSM Medical Solution). CG were inserted at 0° and connected to the BMX with a fixation screw. All implants were inserted using an electric screw driver delivering a maximum torque of 40Ncm. During BMX activation, forces on the coupling and mini-implants and also activation displacement were electronically recorded. Activation halted due to plastic deformation or decoupling.
RESULTS: Statistically significant different maximum forces were observed regarding different insertion angles of DG. DG were more resistant to expansion forces with total mean maximum force of 243N (0° M=280N SD=44; 5° M=226N SD=26; 10° M=226N SD=23; 15° M=240N SD=29) than CG with 114N (SD=21). Significant maximum forces were found between DG 1-4 and CG but not in-between DG 1-4. DG yielded higher mean deformation limit than CG (0° M=183N SD=1; 5° M=183N SD=1; 10° M=203N SD=8; 15° M=202N SD=0; CG M=94N SD=2). Mean of DG 3 and DG 4 was significant different to DG 1 and DG 2.
LIMITATIONS: In-vitro study
CONCLUSION: DG withstand higher forces than CG during expansion. DG 1 withstood the highest maximum forces and DG 3 and 4 had the highest deformation limit. DG seems suitable for RPE.

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SP135 ACCURACY OF FACIAL SKELETAL SURFACES SEGMENTED FROM CT AND CBCT RADIOGRAPHS

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AIM: The aim of this study was to investigate the accuracy of three-dimensional (3D) facial skeletal surface models derived from radiographic volumes acquired from different machines and settings.
MATERIALS AND METHODS: For this, ten human dry skulls were scanned with two Cone Beam Computed Tomography (CBCT) units, a CT unit, and a highly accurate optical surface scanner that provided the true reference models. Water-filled head shells were used for soft tissue simulation during radiographic imaging. The 3D surface models that were repeatedly segmented from the radiographic volumes through a single-threshold approach were used for reproducibility testing. Additionally, they were compared to the true reference model for trueness measurement. Comparisons were performed through 3D surface approximation techniques, using an iterative closest point algorithm. Differences between surface models were assessed through the calculation of mean absolute distances (MAD) between corresponding surfaces and through visual inspection of facial surface colour-coded distance maps.
RESULTS: The median difference between repeated, visually defined segmentation threshold values was small (intra-operator median: – 9.0, IQR: 47.5, $p > 0.05$; inter-operator median: 1.5, IQR: 35.7; $p > 0.05$) and did not differ between machines ($p > 0.05$). Intra-operator reproducibility of the visually segmented surface models was high, with the maximum MAD being 0.067 mm and 0.027 mm, before and after superimposition of the repeatedly segmented models, respectively. There was very high trueness of the radiographically derived surface models (0.12 mm on average, with deviations extending locally to 0.5 mm), with the

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inaccuracies evenly distributed over the entire facial surface, and no difference between radiographic scanners or settings.
CONCLUSIONS/IMPLICATIONS: The present findings establish the validity of lower radiation CBCT imaging protocols at a similar level to the conventional CT images, when 3D surface models are required for the assessment of facial morphology. Furthermore, a lower radiation CBCT protocol was shown to perform adequately and similarly to the standard CBCT imaging protocols, shifting the cost/benefit ratio of a given acquisition to a more favourable level for our patients.

Abstract citation ID: cjae081.428
SP136 THE GENERAL PUBLIC'S PERCEPTION OF CLEAR ALIGNERS PROVIDED BY DIRECT-TO-CONSUMER COMPANIES VERSUS CLEAR ALIGNERS PROVIDED BY A DENTIST OR ORTHODONTIST

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BACKGROUND: The recent rise of direct-to-consumer (DTC) clear aligners has caused a major concern for dental professionals and organisations. This study aimed to evaluate the public's perception of clear aligners provided by direct-to-consumer companies compared to clear aligners provided by a dentist or orthodontist. It also aimed to evaluate the most important factors that influence users' choice of treatment provider in the United Kingdom.
METHODS: A 32-question online survey was designed and participants were recruited for 3 months (March-May 2023) from different social media platforms (Facebook, Instagram and Reddit) related to clear aligners. A total of 151 responses were analyzed.
RESULTS: The majority of respondents were females (86.8%), between 26-50 years of age (82.7%) and employed full-time (61.6%). Forty-nine percent of respondents reported that they were currently using or had previously used clear aligners provided by a dentist or orthodontist, whereas 46.4% of respondents were current or previous users of direct-to-consumer aligners. The majority of respondents (83.4%) believed that it is necessary to have a physical, clinical assessment by a dentist or orthodontist before commencing clear aligner treatment. Similarly, 78.1% of respondents thought that radiographs were a crucial element before the start of treatment. Ninety-five percent believed that it was necessary to have regular reviews, whether in-person or virtually, with a dentist or orthodontist during treatment to monitor treatment progress. Fifty-one percent of respondents believed that clear aligners provided by a direct-to-consumer company carries a higher risk compared to clear aligners provided by a dentist or orthodontist. Despite that, respondents selected direct-to-consumer aligners for their lower cost.
CONCLUSION: Dental professionals should consider offering patients more cost-effective treatment options and should actively work on continually educating patients on the potential dangers and risks of direct-to-consumer aligners.

Abstract citation ID: cjae081.429
SP137 THE SOFT TISSUE CHANGES IN THE LOWER FACE AFTER MANDIBULAR SETBACK SURGERY

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AIMS: To identify the bony points and vectors that have the greatest impact on soft tissue changes in the lower face after mandibular setback surgery
METHODS: The present retrospective study involved patients who had undergone mandibular setback surgery combined with or without maxillary advancement. Multivariable analysis was done to evaluate the association between the 3 hard tissue landmark (predictor variables) changes and 4 soft tissue responses (outcome variables) in the lower face using the x and y coordinates assessed from superimposed pre- and postoperative 3-dimensional computed tomography images.
RESULTS: A total of 61 patients (53 patients had undergone 2-jaw surgery; 8 patients had undergone 1-jaw surgery; mean age 24 ± 3 years) were included in the present study. Our statistical models demonstrated that the horizontal hard tissue changes had a greater influence on the soft tissue responses than did the vertical changes. The horizontal change in the lower lip contour affected positively by the horizontal changes in B point of 73.0% (explanatory power = 78.4%). The horizontal change in soft tissue B point was affected by the horizontal change in B point of 90.8% positively (explanatory power = 84.0%). The horizontal change in soft tissue pogonion (Pog) was affected by a horizontal change in Pog of 79.6% positively and a vertical change in Pog of 28.3% negatively (explanatory power = 91.0%).
LIMITATIONS: Recruiting more patients can lead to more reliable results.
CONCLUSIONS: In certain areas, changes in both horizontal and vertical bone tissue affected corresponding alterations in horizontal and vertical soft tissues. Our study demonstrates that the soft tissue response is not linear but rather a more intricate and dynamic reaction.

Abstract citation ID: cjae081.430
SP138 THE EFFECT OF HEADGEAR TIMING ON NUMBER OF APPOINTMENTS, PERSONNEL COSTS AND ORTHODONTIC OUTCOME – A RANDOMIZED CONTROLLED TRIAL

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AIM: The aim of this study was to assess the effect of cervical headgear (CHG) timing on number of appointments, personnel costs, and orthodontic outcome.
MATERIAL AND METHODS: A total of 67 participants with a Class II malocclusion were randomized into two groups. CHG was started at the age of 7.8 (SD 0.53) in the earlier group and at the age of 9.7 (SD 0.59) in the later group. The treatment was active until Class I molar relationships were achieved and reduced use was applied when needed. The extraoral force was 500g. Participants were instructed to use the CHG for 8-10 h/night.
The impressions for dental casts were taken at the age of 7.3 (T0, SD 0.56), at the age of 9.5 (T1, SD 0.50) and at the age of 11.5 (T2, SD 0.62). The dental casts were scanned into 3D-models (3Shape, R700, Denmark). The Peer Assessment Rating (PAR-index) scores at T2 were determined from the 3D-models with analyzing software to assess the orthodontic outcome (3Shape, Ortho Analyzer 2012, Denmark). The personnel costs of orthodontists, general dentists, dental hygienists, and dental nurses were calculated by using average salaries from 2021. Mann-Whitney U-test were used to evaluate the differences between groups.
RESULTS: The number of appointments during CHG treatment was 2.9 higher in the earlier group compared to the later group (P 0.01). The personnel costs were 65.3€ higher in the earlier group compared to the later group (P 0.004). There were no significant differences in PAR scores between the groups (P 0.146).
CONCLUSIONS: The later timed CHG treatment requires less appointments and produces less personnel costs compared to the earlier timed CHG treatment. The CHG timing has no statistically significant effect on the orthodontic outcome.

Abstract citation ID: cjae081.431
SP139 OPEN BITE AND OROFACIAL DYSFUNCTION RELATED TO CHEWING EFFICIENCY IN NEUROMUSCULAR DISEASES

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BACKGROUND/OBJECTIVES/AIMS: Open bite malocclusion and orofacial dysfunction are common findings in neuromuscular diseases (NMD) and may affect the chewing efficiency in these individuals. The aim of this study was to investigate the chewing efficiency in NMD and its relation to malocclusion, jaw opening capacity and orofacial dysfunction as well as self-reported chewing ability.
MATERIALS/METHODS: A total of 24 individuals with NMD (13-77 years, mean age 34 ± 19.4, 7 females and 17 males) were included in the study. All individuals were examined by a dentist and a speech and language pathologist. A two-coloured chewing gum and software that measures the colour mixing capacity (ViewGum) was used to assess chewing efficiency. During the chewing cycles, the jaw motions were video recorded with a 3D tracking motion analysis system (SmartEye Pro – MME). The orofacial function as well as the chewing ability was assessed using the Nordic Orofacial Test- Screening. The data was analysed using a non-parametric statistical test.
RESULTS: Lateral open bite showed the strongest relation with chewing inefficiency in NMD patients (r=-0.523, p=.009), whereas anterior open bite did not correlate (r=0.574, p=.106). The jaw opening capacity (r=-0.432, p=0.035), the range of motion during the chewing cycles (lateral; r=-.414 p=.044, vertical; r=-0.421, p=.040) and self-reported chewing ability (r=0.509 p=.011) also showed an association with chewing efficiency while the total NOT-S score did not (r=0.338, p=.106).
LIMITATIONS: The sample included a wide age range and the participants had different neuromuscular diseases, many of them progressive. No correlation was however found between age and chewing efficiency in this sample.
CONCLUSIONS/IMPLICATIONS: Lateral open bite and a reduced jaw opening capacity may be contributing factors to inefficient chewing in NMD patients. Early orthodontic interventions as well as detection of reduced jaw opening capacity may facilitate low-intensity oral motor training to sustain or improve

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chewing efficiency in NMD patients. Functional gastrointestinal disorders are common in this patient group; however, more research is needed regarding the consequences of chewing inefficiency in relation to general health.

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SP140 SAFEGUARDING OF CHILDREN, YOUNG PEOPLE AND ADULTS: HOW KNOWLEDGEABLE ARE THE ORTHODONTIC TEAM?

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BACKGROUND/AIM: There have been significant cases in healthcare settings where clinicians have failed to escalate safeguarding concerns with subsequent serious consequences. Healthcare teams have a legal and professional responsibility to recognise and raise concerns to protect the welfare and safety of patients. The orthodontic team are routinely exposed to children, young people and adults who may be vulnerable, highlighting the need for all to be vigilant, equipped with the knowledge and expertise to action any concerns. The aim of this audit was to assess the knowledge of orthodontic clinicians and nurses on safeguarding policies and legislation.
MATERIALS/METHODS: A questionnaire-based audit on the knowledge of safeguarding services available for children, young people and adults was distributed to orthodontic consultants, registrars and nurses within the Orthodontic department at the Eastman Dental Hospital. This questionnaire was constructed following a review of current published guidelines on safeguarding within the National Health Service (NHS) and local policies from the University College London Hospitals NHS Foundation Trust (UCLH). Sixteen multiple choice questions were devised, with compulsory questions being agreed on by the Trust children and adult safeguarding leads. Audit standards were locally agreed on as 100% of compulsory questions to be answered correctly (n=8) by each participant and at least a 90% collective score of the remaining questions (n=8) to be answered correctly
RESULTS: Overall, the audit standards were not met. Thirty one percent (n=11) of participants had been involved in a safeguarding referral. Fifty percent (n=18) of participants were familiar with the protocol for logging safeguarding incidents and 86% (n=31) knew how to make a referral using the electronic patient record database. Fifty three percent (n=19) of participants recognised the urgent safeguarding referral scenario.
LIMITATIONS: A low response rate (48%) with some participants failing to answer all questions, perhaps due to uncertainty of the answer.
CONCLUSIONS: The audit standards were not met; therefore, further education has been delivered and a re-audit is planned. Reinforcement of key information can help future concerns to be raised efficiently and sensitively so patients are adequately safeguarded.

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SP141 PATIENT MOTIVATIONS AND EXPECTATIONS OF ORTHOGNATHIC TREATMENT: A LONGITUDINAL AUDIT

Ms Claudy Henein[1], Mr Justin Shute, Professor Nigel Hunt, Professor Susan Cunningham; [1]*Eastman Dental Hospital*

BACKGROUND: Understanding patient motivations, pre-treatment expectations and post-treatment satisfaction are important for patient-centred care, especially since orthognathic treatment is elective. Time-points for data collection are often heterogenous and can be a confounding factor and source of recall bias.
AIMS:
1. Identify motivating factors for orthognathic treatment and establish changes over time
2. Measure how confident patients were pre-treatment that they would be satisfied with their final treatment outcome, the "pre-treatment confidence score"
3. Assess overall treatment satisfaction
GOLD STANDARDS: Standard 1. 90% of patients will give a pre-treatment confidence score of 80% or greater
Standard 2. 90% of patients will report satisfaction with the overall treatment outcome at 60% or greater
METHODOLOGY: This prospective, longitudinal audit was conducted at the Eastman Dental Hospital, London. Questionnaires were given to consecutive patients, at the initial appointment (T1), prior to surgery (T2), and 1- (T3), and 2-years (T4) post-surgery. The pre-surgery questionnaire asked patients to list their motivations for treatment and score their pre-treatment confidence. The post-surgery questionnaire asked patients to score their satisfaction with the outcome for each of their motivating factors and for overall treatment outcome, to determine whether expectations were met.
RESULTS: Eighty-three patients had complete data for T1 and T2, and 61 patients for T2, T3, T4. The principal treatment motivations were, in order, aesthetics, function and psychosocial factors. The total number of motivating factors changed minimally between T1 and T2, but individual patient variations were observed.
Audit standard 1: 88% (73/83) (T1) and 89% (74/83) (T2) of patients had a pre-treatment confidence score of 80% or more. The audit standard was not met but was very close.
Audit standard 2 was met at T3 and T4. All patients (61/61) rated their satisfaction with overall treatment outcome at 60% or more. Median satisfaction scores were 100% at T3 and T4 (mean values: 95.30% and 95.39%, respectively). There were 6 outliers with lower satisfaction scores at T3, but none at T4.
CLINICAL IMPLICATIONS: This audit may help identify patients with very low or very high pre-treatment confidence scores, allowing for targeted support.
Post-treatment satisfaction remained consistently high across follow-up appointments.

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SP142 WHEN TO STOP A FUNCTION-LESS APPLIANCE? A SINGLE-CENTRE RETROSPECTIVE CLINICAL AUDIT.

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BACKGROUND: The reported effectiveness and efficacy of functional appliances varies in the literature. Previous audits have reported success rates of functional appliances ranging from 39% to 77%.
PRIMARY AIM: Assess the overall success rate of functional appliance treatment at the Eastman Dental Hospital, UCLH NHS Foundation Trust, London. SECONDARY AIMS Assess duration of active functional treatment, explore the types of appliances worn and potential reasons for non-compliance in unsuccessful cases.
GOLD STANDARD: Seventy percent of the functional appliances should be effective at reducing the overjet by at least 50% within the first 6 months of treatment. This audit also assessed the overjet reduction by the end of functional appliance treatment, defined as the timepoint at which the patient was instructed to start part-time wear or cease wearing the appliance.
METHODOLOGY: Retrospective data collection of 100 consecutive patients treated with a Class II removable functional appliance. Inclusion criteria comprised of all patients diagnosed with a Class II malocclusion with a minimum overjet of 7mm at initial presentation.
RESULTS: The mean patient age was 11.9 years (8-15 years), and the gender distribution was equal. The mean active functional treatment duration was 11.2 months (2-24 months). Clinician preference at the Eastman Dental Hospital was the modified Twin Block appliance (87%), followed by the Median Opening Activator (10%).
The overall success of functional appliance treatment within the first 6 months was 54% and this rose to 67% by the end of active functional appliance treatment. Hence, the gold standard was not met. Male patients and those under the age of 11 years exhibited the greatest percentage of success. Cancelled appointments appeared to have the greatest correlation to an unsuccessful treatment outcome.
CLINICAL IMPLICATIONS: Patients who had not achieved 50% overjet reduction by 6 months were unlikely to achieve any further significant reduction if the functional treatment continued, irrespective of treatment duration. Hence, the six-month benchmark appears to be a good indicator of overall success and proves to be a sensible time-point to re-evaluate the treatment progress and outcome. Particularly since clinical resources are finite, cost efficiency plays a crucial role in contemporary healthcare.

Abstract citation ID: cjae081.435
SP143 MANDIBULAR GROWTH AND CHARACTERISTICS ARE DETERMINED BY GENETIC AND ENVIRONMENTAL FACTORS: A RETROSPECTIVE COHORT STUDY ON MONO- AND DIZYGOTIC ADOLESCENT TWINS

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AIMS: This study aimed to discover the genetic and environmental factors that contribute to the mandibular development of untreated monozygotic and dizygotic twins.
MATERIAL/METHODS: The sample, taken from the Forsyth Moorrees Twin Study, included 52 untreated monozygotic twins (36 male, 16 female) and 46 untreated dizygotic twins (23 male, 23 female). At the ages of 12 and 17, lateral cephalograms were collected and traced to assess total mandibular length,

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mandibular ramus length, mandibular corpus length, gonial angle, SNB, and bony chin prominence. The genetic and environmental components of variation were assessed using multilevel mixed-effects structural equation modeling.
RESULTS: At 12 years of age, high additive genetic influences were observed for total mandibular length (74%), gonial angle (76%), SNB (41%), and bony chin prominence (64%), whereas strong dominant genetic components were observed for corpus length (72%), and mandibular ramus length was under unique environment influence (54%). At 17 years of age, only total mandibular length (45%), ramus length (53%), gonial angle (76%), and bony chin prominence (68%) were under strong additive genetic control, while the remainder were under strong dominant genetic control.
CONCLUSIONS: Although monozygotic and dizygotic twins share at least a portion of their DNA, additive, dominant, or environmental components were discovered during adolescence. Nonetheless, by the age of 17, the majority of the mandibular traits are under either additive or dominant genetic impact.

Abstract citation ID: cjae081.436
SP144 SUBJECTIVE AND OBJECTIVE EVALUATION OF PERCEPTION BY SMILE INTENSITY: QUANTITATIVE EVALUATION USING NEAR-INFRARED SPECTROSCOPY (NIRS) AND EYE TRACKING

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AIMS: The patient's smile is essential diagnostic information in orthodontic treatment. However, there are no established criteria for smile intensity in diagnosis. To ensure proper treatment progress, it is essential to objectively and scientifically assess patients' everyday smiles, considering the distinct aspects between daily life and clinical settings. Many studies on smiling often rely on subjective assessments by observers when it comes to evaluation methods. Recently, there has been a notable advancement in the utilization of near-infrared spectroscopy (NIRS) technology. This technology measures changes in blood flow within the cerebral cortex, providing an objective and quantitative means to assess the elusive and intricate facets of human emotions and cognitive processes.
The aim of this study is to investigate the relationship between the intensity of smiles, perceptual changes, and the corresponding impact areas by combining eye-tracking (ET) and NIRS. Through detailed tracking of gaze movements using ET and measuring blood flow changes in the cerebral cortex using NIRS, the study aims to obtain objective and quantitative data regarding patients' smiles. This study contributes to the refinement of assessment methodologies, bridging the current gap in objective evaluation within the realm of orthodontic diagnosis and treatment planning.
METHODS: Videos were taken of 20 men aged 18 to 50 (Skeletal Class I) changing intensity of their smiles. Morphometric measurements were made with face mesh technology (motion recognition device), and images were created in three stages, from non-smiling to maximum smiling. The visual materials were shown to 60 observers aged 25 to 40 years using head mount display (HMD) and evaluated using an eye tracking device (FOVEO; NeU, Tokyo, Japan) and NIRS (HOT-2000; NeU, Tokyo, Japan).
RESULTS: Cerebral blood flow was lowest in stage 1 and higher in stages 2 and 3. During eye tracking, in Stage 1, there was a diffuse distribution of gaze across the cheeks, nose, and mouth. In contrast, during Stages 2 and 3, the gaze exhibited a heightened concentration specifically on the mouth.
CONCLUSIONS: The anatomical structures that others pay attention to, as well as the level of interest, are influenced by the intensity of the smile.

Abstract citation ID: cjae081.437
SP145 CONE BEAM COMPUTED TOMOGRAPHY OF THE RERATIONSHIP BETWEEN ATLANTODENTAL INTERVAL, CRANIOCERVICAL POSTURE AND SKELETAL FACIAL MORPHOLOGY IN ADULT JAPANESE FEMALES

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INTRODUCTION: The craniocervical junction is vulnerable to trauma due to its structural and anatomical complexity. But examination of this area isn't still popular in the diagnosis of orthodontic treatment. A structural change in one is expected to also cause changes in other structures. Cone beam computed tomography (CBCT) evaluation of the atlantodental area in adults plays a role in clarifying the importance of examination of this area.
OBJECTIVES: The aim of this study was to evaluate the relationship between atlantdental interval, craniofacial posture and skeletal facial morphology in adult Japanese females using CBCT.
METHODS: Eighty-two females aged 20-36 years (mean age: 27.0 years) were included in the study. The anterior, lateral and posterior atlantodental intervals, and vertical and anteroposterior dimensions of the first (C1) and second vertebrae (C2) were evaluated using 9 parameters from CBCT images. Craniocervical posture and facial morphology were evaluated using 7 parameters on lateral cephalometric images. Spearman's correlation coefficient was used to examine relationship between non-normally distributed variables.
RESULTS: Anterior atlantodental interval showed a moderate negative correlation with ANB angle ($p = 0.001$). A weak positive correlation was observed between posterior posture of odontoid and ANB angle ($p = 0.001$), posterior posture of odontoid and N-ANS distance ($p = 0.001$) and N-ANS distance and C2 vertical length ($p = 0.001$). A weak negative correlation was observed between GoGn/SN angle and posterior atlantodental interval ($p = 0.01$).
CONCLUSIONS: The maxillomandibular relationship may affect atlantodental interval. Therefore, examination of atlantodental area in addition to skeletal facial morphology is beneficial to understand the craniofacial features in the diagnosis of orthodontic treatment. Further assessments with samples of any ages and genders are needed to reach more definitive conclusions.

Abstract citation ID: cjae081.438
SP146 TREATMENT OF CONGENITALLY MAXILLARY LATERAL INCISOR AGENESIS – A NATION-BASED SURVEY. IS DECISION-BASED EVIDENCE THE DAILY PRACTICE?

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AIM: To survey orthodontic and prosthetic treatment concepts for patients with congenitally maxillary lateral incisor agenesis (CMLIA). Furthermore, to identify determinants on currently available evidence for treatment decision-making between orthodontic space closure with canine substitution or space opening and prosthodontic rehabilitation.
MATERIALS AND METHODS: The online survey included a multiple-choice questionnaire sent via email. German orthodontists working in private practices or university hospitals participated in the study. The analysis comprised descriptive statistics and the chi-square test ($p < 0,05$).
RESULTS: Almost 80% of the participants prefer space opening bilaterally or unilaterally, depending on the tooth agenesis pattern, and favour implants for longevity (70,8%). Implants (52,8%) and adhesive bridges (47,2%) were equivalent for the aesthetic outcome and patient satisfaction. The most cost-effective option was the adhesive bridge (57,9%), which was also used as a temporary restoration (75%) since the orthodontic treatment decision was made at 12-14 years of age. A statistically significant correlation (p=0,004) was observed between participants' graduation year (before/after 2013) and the treatment concepts in bilateral CMLIA. Younger orthodontists decided significantly more often (80,5%) for orthodontic space closure than their senior colleagues (67,5%). This choice was supported by the contemporary skeletal anchorage trend. An interdisciplinary treatment approach was made by 66% of the respondents. Only 20% of the participants expressed a need for better interdisciplinary communication or a lack of adequate specialists. Based on the available evidence and considering primary (skeletal and dental classification, dental crowding, and profile) and secondary (craniofacial growth cessation, smile line, and canine aesthetics) parameters, the treatment concept of the participants was based on personal preferences rather than scientific evidence. Most respondents (76,1%) favour a guideline to support therapeutic decision-making.
CONCLUSIONS: The decision for space opening or closure for patients with CMLIA is orthodontists' preference rather than an evidence-based process. The treatment is complex and requires experience and optimal multidisciplinary cooperation. No long-term treatment outcome can be reported because of a lack of post-therapeutic recall programs. Implementing standardized treatment procedures for CMLIA would be helpful for an optimal integrated, customized, and interdisciplinary approach.

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SP147 CRANIOFACIAL- AND UPPER SPINE MORPHOLOGY AS WELL AS CRANIOFACIAL GROWTH IN PATIENTS WITH MUCOPOLYSACCHARIDOSIS TYPE I COMPARED TO CONTROLS

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AIMS: The aims were to 1) describe differences in craniofacial- and upper spine morphology between patients with mucopolysaccharidosis type I (MPS-I) and a

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non-syndromic matched control group and to 2) describe craniofacial growth in an MPS-I patient compared to a non-syndromic matched control group.
SUBJECTS AND METHOD: In 5 patients with MPS-I (3 boys, 2 girls, mean age 11.27 years) and 22 non-syndromic age and gender matched controls with neutral occlusion (12 boys, 10 girls, mean age 11.3 years) craniofacial morphology and upper spine morphological deviations were assessed on lateral cephalograms according to standard, validated methods. Craniofacial growth changes between 11 years (T1) and 17 years (T2) were assessed in an MPS-I patient (age at T1 11.0 years, age at T2 17.3 years) and in 6 non-syndromic age matched controls (mean age at T1 11.61 years, mean age at T2 17.44 years) on lateral cephalograms according to Björk's structural superimposition method. Differences in craniofacial and upper spine morphology between the groups were analysed by general linear model adjusted for age and gender and Fisher's exact test. Growth changes from T1 to T2 between the groups were assessed by independent T-test.
RESULTS: Cranial base angle (p=0.038), gonial angle (p<0.001), mandibular plane angle (p<0.001), vertical jaw relationship (p<0.001), lower jaw zone (p=0.034), inclination of upper (p=0.003) and lower incisors (p=0.041) and occipital skull thickness (p<0.001) were significantly increased in MPS-I. Dimensions of first and second cervical vertebrae were significantly different in MPS-1 compared to controls. Occipitalization (p=0.003), dehiscence (p=0.003) and more than one upper spine morphological deviation (p=0.001) occurred significantly more often in MPS-I compared to controls. During growth mandibular prognathism (p=0.029) and upper incisor inclination (p=0.030) increased significantly more in MPS-I. Mandibular rotation was insignificantly more anterior in MPS-I compared to controls (p=0.055).
CONCLUSION: The results indicate that patients with MPS-I exhibit significantly different craniofacial and upper spine morphology compared to controls. Furthermore, the craniofacial growth in MPS-I was significantly different from controls. These results may contribute to further understanding of MPS-I and thus have implications for diagnostics and treatment of such patients.

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SP148 FACIAL ASYMMETRY PHENOTYPES IN ADULT PATIENTS WITH UNILATERAL CLEFT LIP AND PALATE AND SKELETAL CLASS III MALOCCLUSION USING PRINCIPAL COMPONENT ANALYSIS AND CLUSTER ANALYSIS.

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OBJECTIVES: The purpose of this study was to classify and characterize facial asymmetry (FA) phenotypes in adult patients with unilateral cleft lip and palate (UCLP) and skeletal class III malocclusion.
MATERIALS/METHODS: The samples comprised 52 adult UCLP patients (36 men and 16 women; mean age, 22.43 y) who had undergone orthognathic surgery for correction of class III malocclusion. After measurement of 22 cephalometric parameters in posteroanterior cephalograms taken 1 month before orthognathic surgery, principal component analysis was performed to obtain 5 representative parameters [deviation (mm) of ANS (ANS-dev), maxillary central incisor contact point (Mx1-dev), and menton (Me-dev); cant (degree) of the maxillary anterior occlusal plane (MxAntOP-cant) and mandibular border (MnBorder-cant)]. K-means cluster analysis was conducted using these representative parameters. The differences in cephalometric parameters among the clusters were statistically analyzed.
RESULTS: The FA phenotypes were classified into 4 types: No-cant-and-No-deviation type (cluster-4, n = 16, 30.8%); MxMn-cant-MxMn-dev to the cleft-side type (cluster3, n = 4, 7.7%); Mx-cant-Mn-shift to the cleft-side type (cluster-2, n = 15, 28.8%); and Mn-cant-Mn-dev to the noncleftside type (cluster-1, n = 17, 32.7%). Asymmetry in the maxilla and/or mandible were observed in 70% of patients. One third of patients (cluster-2 and cluster-3; sum, 36.5%) exhibited significant cant of MxAntOP induced by cleft and cant or shift of the mandible to the cleft side. Another one third of patients (cluster-1, 32.7%) demonstrated significant deviation and cant of the mandible to the noncleft-side despite cleft in the maxilla.
CONCLUSIONS: This FA phenotype classification might be a basic guideline for diagnosis and treatment planning for UCLP patients.

Abstract citation ID: cjae081.441
SP149 EFFECT OF ORTHODONTIC TREATMENT ON THE PERIORAL MUSCLE PRESSURE OF PATIENTS WITH ATYPICAL SWALLOWING

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BACKGROUND: Atypical swallowing is a myofunctional problem in which the maturation process from infantile to adult swallowing does not occur. Functional abnormalities of the perioral muscles may interfere with their craniofacial growth and development.
OBJECTIVES: To longitudinally study perioral muscle pressure before, during and after orthodontic treatment in patients with atypical swallowing, in order to examine the therapeutic effects of orthodontic treatment on these values.
MATERIALS AND METHODS: Patients with atypical swallowing in need of orthodontic treatment were invited to participate. The diagnostic criteria for atypical swallowing were: visualization of low tongue position during swallowing and resting, visible tongue interposition between the teeth and/or peri-oral muscle contraction. Tongue, lip and cheek pressure values were assessed with the Iowa Oral Performance Instrument before, during and after completion of orthodontic treatment. Patients were divided into two groups: Group 1 consisted of patients treated only with fixed appliances and Group 2 was treated with functional appliances first and fixed appliances afterwards. Group 2 was subdivided into headgear and activator therapy. Linear mixed models were used for data analysis, modelling the pressure as the response variable. The main effects model includes time, treatment and the interaction between them. Age and sex were included as covariates to correct for possible confounding. A random intercept for subject was modelled to account for the longitudinal data structure.
RESULTS: 84 patients were included in Group 1 (mean age 15.89 years-old) and 98 in Group 2 (mean age 13.00 years-old), from which 28 were treated with headgear and 70 with activator. When the whole sample is considered, results show a significant increase in lip (p<0.001) and left (p=0.001) and right (p=0.009) cheek pressure over time. No significant differences were seen between groups.
LIMITATIONS: A key limitation is the lack of an universally accepted protocol for diagnosing atypical swallowing.
CONCLUSIONS: Orthodontic treatment led to significant increase in lip and cheek pressure in patients with atypical swallowing, while tongue pressure did not rise significantly. This may indicate the need for logopedic intervention to adjust the low resting position of the tongue. Further research with a larger sample needs to be conducted.

Abstract citation ID: cjae081.442
SP150 RELATIONSHIP BETWEEN EARLY STAGE PERIODONTAL LIGAMENT COMPRESSION AND ORTHODONTICALLY INDUCED ROOT RESORPTION IN RATS

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BACKGROUND: It has been reported that the magnitude of orthodontic force and the narrowing of the periodontal ligament (PDL) space on the compression side are involved in the orthodontically induced root resorption (OIRR). However, the correlation between the PDL compression ratio and root resorption induction has not previously been investigated.
OBJECTIVES: To determine the effect of orthodontic pressure on PDL compression in rats and assess correlation between PDL compression and OIRR. In addition, it was examined whether the type of tooth movement (bodily or tipping) affects the amount of periodontal ligament space narrowing, root resorption, and their correlations.
MATERIALS AND METHODS: Eight female Wistar rats aged 10 weeks underwent surgery to place 2 mini-screws at the center of the palatal plate. 25 cN coil springs connecting the maxillary first molars and mini-screws were applied bilaterally to generate mesial force. Maxillary first molars were assigned to undergo either bodily or tipping tooth movements. Micro-computed tomography (μCT) scans were taken on days 0, 3, 7, and 14, and histological sections were taken on day 14. OIRR was measured from histological sections, and the corresponding PDL compression ratio was quantified using μCT images.
RESULTS: The PDL was compressed by approximately 76% in tipping tooth movement and 55% in bodily tooth movement after 3 days, and by approximately 47% in both bodily and tipping tooth movements after 7 days of orthodontic force application. The extent of OIRR in tipping tooth movement was significantly greater than that in bodily tooth movement. A strong positive correlation between OIRR and PDL compression ratio was observed on day 3 regardless of the tooth movement type (bodily or tipping); however, no correlation was observed on day 7.
CONCLUSIONS: A strong correlation between PDL compression ratio and OIRR was observed at an early stage after the application of orthodontic force regardless of the tooth movement type (bodily or tipping), implying the importance of early stage PDL compression in the induction of OIRR. A lower PDL compression ratio and decreased OIRR were observed in bodily tooth movement than in tipping tooth movement.

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Abstract citation ID: cjae081.443
SP151 INHIBITION OF 12/15-LIPOXYGENASE REDUCES ORTHODONTICALLY INDUCED ROOT RESORPTION BY SUPPRESSING HYALINE DEGENERATION AND SUBSEQUENT ODONTOCLAST DIFFERENTIATION IN RATS

Ms Yukako Nashiro-Oyakawa[1], Dr Yuka Hotokezaka[1], Dr Hitoshi Hotokezaka[1], Dr Mariko Funaki-Dohi[1], Dr Noriaki Yoshida[1]; [1]*Nagasaki University*

BACKGROUND/OBJECTIVES: Orthodontically induced root resorption (OIRR) is assumed to occur through hyaline degeneration and the subsequent appearance of odontoclasts. 12/15-lipoxygenase (12/15-LOX), one of the core enzymes of the arachidonic acid cascade, has been reported to be involved in natural degeneration and osteoclast differentiation.
Objectives is to investigate whether the inhibition of 12/15-LOX suppresses OIRR and examine the involvement of the hyaline degeneration of periodontal ligament (PDL) cells and odontoclast differentiation.
MATERIALS/METHODS: The left maxillary first molars of 10-week-old male Wistar rats were moved mesially for 14 days using a closed-coil spring (25 cN) inserted between the first molar and incisor. The rats were intraperitoneally administered with a 12/15-LOX specific inhibitor (ML-351; 0.05 mmol/kg) daily in the experimental group or vehicle (dimethyl sulfoxide) in the control group. Three parameters of tooth movement were measured using micro-computed tomography on day 14: (1) the shortest distance between the left maxillary first molar and second molar; (2) the distance between the contact points of the left maxillary first molar and the second molar; and (3) the change in the mesial root inclination of the first molar before and after tooth movement in the sagittal images. The appearance of OIRR, hyaline degeneration, osteoclasts, and odontoclasts was evaluated via histological analysis. Immunohistochemical staining for receptor-activated NF-kB ligand (RANKL) and osteoprotegerin was performed.
RESULTS: Three parameters of tooth movement were lower in the experimental group than those in the control group; however, no significant differences were observed. OIRR observed on day 14 in the control group was strongly suppressed by ML-351 treatment. Hyaline degeneration observed on the compression side on day 3 and the appearance of osteoclasts and odontoclasts on days 3 and 14 were significantly suppressed by ML-351. RANKL expression on day 3 was significantly suppressed by ML-351. These key processes in OIRR were substantially suppressed by ML-351 treatment.
CONCLUSIONS: Inhibition of 12/15-LOX by ML-351 reduced OIRR by suppressing hyaline degeneration of PDL cells, subsequent odontoclast differentiation, and RANKL expression in rats.

Abstract citation ID: cjae081.444
SP152 INFLUENCE OF 3D PRINTING AND STERILIZATION ON THE DIMENSIONAL STABILITY OF MINI-IMPLANT INSERTION GUIDES

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AIMS: Computer-aided planning enables the insertion of mini-implants and the orthodontic appliance in one session. For this purpose, the mini-implants must be inserted precisely in terms of location, depth and angulation. To make this possible, an insertion guide is used, which is sterilized beforehand using steam autoclaving. The aim of the present study was therefore to investigate the extent to which 3D printing and sterilization have an effect on the accuracy of insertion guides made of different resins.
MATERIAL AND METHODS: 50 insertion guides were produced using 5 resin/3D printer combinations (10 per group). All guides were sterilized using steam autoclaving, half with cycle 1 (121°C, 1 bar, 20.5 min) and half with cycle 2 (134°C, 2 bar, 5.5 min). Before (T0) and after (T1) steam autoclaving, all guides were subjected to structured light 3D scanning (SLS). On the original STL files and on the T0 and T1 SLS scans, linear measurements were taken in the X-, Y- and Z-directions at incorporated landmarks.
RESULTS: Compared to the original STL files, the resins in the 3D-printed samples showed slight but significant deformation in the X- and Y- direction ($P < 0.001$), namely 0.21 ± 0.18 mm in the X- and 0.12 ± 0.19 mm in the Y-direction. There was no significant shrinkage in the Z-axis. In X- and Y-axis, there were no differences between T0 and T1, neither for Cycle 1 nor Cycle 2. In Z-axis, there was a significant difference from T0 to T1 at both cycle 1 ($P < 0.01$) and cycle 2 ($P < 0.05$). Both for the comparison between the STL file and 3D printed guides as well as for the comparison before and after sterilization clear differences were found between the resins.
CONCLUSIONS: Both 3D printing and steam autoclaving resulted in a slight but significant shrinkage of the insertion guides, whereby the difference between the various resins was considerable. Whether these changes are also clinically significant remains to be investigated.

Abstract citation ID: cjae081.445
SP153 HYPOMINERALISED TEETH: PERSPECTIVES FROM FOCUS GROUP INTERVIEWS WITH NEW ZEALAND ORTHODONTISTS

Dr Charlotte HURST[1], Professor Ben Daniel[1], Associate Professor Mani Ekambaram[1], Professor Mauro Farella[1], Dr Fiona Firth[1]; [1] *Sir John Walsh Research Institute, Faculty of Dentistry*

BACKGROUND: Hypomineralised first permanent molars (FPMs) are a clinical challenge. Planned extraction is often considered a viable alternative to complex restorative treatment. It is beneficial to seek an orthodontist's opinion on extraction timing, impact on the developing dentition, and future management of extraction spaces beforehand. While orthodontists frequently advise on FPM management, no research has been conducted to gather their perspectives on this condition. This study used focus group interviews to explore New Zealand-based orthodontists perceptions of molar hypomineralisation and its impact on orthodontic clinical practice. It deployed a descriptive case study using qualitative research methods.
METHODS: Sixteen orthodontists with at least two years of experience practising in New Zealand (NZ) voluntarily participated in one of two focus group interviews: Group One (N=7) and Group Two (N=9). A single researcher conducted face-to-face semi-structured focus group interviews. Focus group interviews were recorded, and a third party manually transcribed de-identified audio files verbatim. NVivo software was used for qualitative data analysis. During the first analysis stage, initial codes were created based on the topics identified in the transcripts. These topics were later defined and grouped to form themes. Refining, collapsing, and merging themes resulted in the final set of themes.
RESULTS: Five core themes were identified. These are typical referrals, the idea referral, orthodontic planning considerations, the current management system and future solutions. Orthodontists manage severely hypomineralised FPMs monthly. Most of the referrals to orthodontists come from the Community Oral Health Service (COHS) and lack sufficient detail. Orthodontists believe the opinion regarding long-term restorability in borderline extraction cases should lie with the referrer or a dentist. Immediate improvement is needed in referral pathways and education among dental professionals. Financial barriers to orthodontic care and inconsistencies in NZ management pathways were also identified.
CONCLUSIONS: The orthodontist plays a significant role in managing children who have been recommended to extract their hypomineralised FPMs. A national overhaul is required to reduce inequalities and inconsistencies. Interdisciplinary management and standardisation of services throughout NZ are also necessary to ensure quality of care and favourable outcomes for FPMs.

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SP154 HYPOMINERALISED TEETH: PERSPECTIVES OF THOSE SEVERELY AFFECTED USING FACE-TO-FACE INTERVIEWS

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BACKGROUND: Molar hypomineralisation (MH) affects 1 in 5 children worldwide and may cause pain and psychosocial distress. This study qualitatively explored the impact of severe MH on children and their caregivers. Caregivers perceptions regarding their child's care and suggestions for future improvements in management pathways were also sought.
METHODS: Children aged from 6 to 12 years (N=15) and caregivers (N=14) were recruited from the Southern region of New Zealand. All child participants had either received general anaesthesia (GA) (N=10) or were planned to have GA (N=5) for extraction of severely affected hypomineralised first permanent molars (FPM). A single researcher conducted face-to-face semi-structured interviews for both children and caregivers. Of the children who planned to have extractions, three attended an additional follow-up interview after tooth removal. Interviews were recorded, transcribed and analysed using NVivo software. During the first stage of analysis, initial codes were created based on topics identified in the transcripts and grouped in themes. Refining, collapsing and merging themes formed the final themes.
RESULTS: Twenty-one core themes were identified. Hypomineralised molars did not affect children's self-esteem; however, girls had negative feelings about anterior defects. Any reported changes in self-esteem were not meaningful enough to affect the desire to socialise. Caregivers were uncertain about tooth removal

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under GA, while children were more worried about pain afterwards. All participants considered tooth removal to be the right decision. Children's most commonly reported concerns were cold sensitivity and loss of enjoyment during eating. Children disliked the cold air from the triplex and suction tubes and most children acquired self-management strategies for pain. Poor communication, lack of support and quality of care were commonly reported system challenges among caregivers. The need for publicly funded orthodontics and educational resources were suggested by caregivers for improvement of existing services.
CONCLUSIONS: Children and caregivers perceive the impact of severely affected FPMs requiring extraction as significant. There were notable concerns about financial constraints and a need for more communication and integration between primary and secondary care providers. Funding, educational resources and a nationalised structured pathway are required to better support children affected with MH across New Zealand.

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SP155 IMPACT OF HEAD TITLING AND INCISOR INCLINATIONS IN THE QUANTIFICATION OF ROOT RESORPTION IN 2D RADIOGRAPHIC RECORDS: A CLINICALLY USEFUL CONVERSION FACTOR

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OBJECTIVE: The orientation of patients' head tilt and the inclination of upper incisors during panoramic radiograph capture can significantly impact the apparent external apical root resorption (EARR). Therefore, we aimed to develop a mathematical correction method and a validation process to ensure accurate EARR measurements in upper central incisors.
MATERIAL/METHODS: lateral and panoramic RX records were used to carry out mathematical derivations based on vector projections and angular translations. Angular factors, specifically dental angulation and cephalic inclination, were analyzed and quantified with reference to the axis of the upper incisor (incisal edge-apex), the Frankfurt Plane (FH), and a plane parallel to the ground. The beta angle was defined as the angle formed between patient's FH and the plane parallel to the ground, whereas alpha angle represented the angle between FH and the axis of the upper incisor. It was determined that: Real Size=Observed Size in the Panoramic/sin(α); Real Size (perpendicular structures to FH)=Observed Size (perpendicular to the ground)/cos(β) in lateral rx; Real Size=Observed Size/cos(α–90+β). The method underwent 100 numerical validations to obtain a clinically useful conversion factor to apply in clinical scenarios.
RESULTS: A theoretical conversion factor was established to correct effects of dental and cephalic angulation on measuring root length using routine orthodontic records. Dental angulations exceeding 110° relative to FH resulted in >1 mm discrepancy in root length measurements compared to the actual length. With typical dental inclinations (120° to FH), a head tilt of ≥ 3.8° led to an error >1 mm in root resorption measurements. Inclinations of the upper incisor from 108° relative to FH were found to introduce clinically relevant errors. A clinically useful conversion factor and direct conversion table was developed for routine application in clinical setting.
CONCLUSIONS: 1) Dental angulation significantly influences EARR measurements following orthodontic treatment; 2) Clinicians should take into account the clinically conversion factor for dental angulation when determining root length pre/post-orthodontic treatment; 3) Slight head inclinations during radiographic image acquisition do not have clinically significant effects on RR measurements in panoramic radiographs; however, radiology technicians should be aware of this impact and minimize it.

Abstract citation ID: cjae081.448
SP156 COMPARISON OF FOUR DIFFERENT INDICES FOR ORTHODONTIC TREATMENT OUTCOMES IN SUBJECTS WITH CLASS I MALOCCLUSION TREATED BY THREE DIFFERENT METHODS: A CROSS-SECTIONAL STUDY

Dr Wafa Idrees[1], Dr Mubassar Fida[1], Dr Rashna Sukhia[1]; [1]*The Aga Khan University Hospital*

INTRODUCTION: Various treatment modalities exist to improve and correct class I malocclusion. This study was conducted to evaluate the outcomes of non-extraction (NE), premolar extraction (PME) and mandibular incisor extraction (MIE) treatment modalities in subjects presenting with class I malocclusion.
MATERIALS AND METHODS: A cross-sectional study was conducted at a tertiary care hospital using pre and post-treatment dental casts along with intra-oral photographs of 90 orthodontic subjects. These subjects were divided equally into NE, PME and MIE groups and scored using the IOTN, ICON, PAR and ABO-GS indices. Non-parametric tests were run to compare pre and post-treatment scores and to evaluate the percentage and categorical changes for the treatment modalities. Pairwise comparisons were performed using the Mann Whitney U-test.
RESULTS: Statistically significant differences ($p \leq 0.001$) were seen between the pre and post-treatment scores for all modalities. Statistically significant differences were found in scores among the three groups for PAR ($p = 0.002$) and IOTN ($p = 0.000$). In contrast, there were no significant differences found for ICON ($p = 0.156$), ICON and ABO scores ($p = 0.148$). On a pair-wise comparison, no significant results were seen between the NE and PME groups while in contrast, statistically significant differences were seen between NE with MIE and PME with MIE groups.
CONCLUSIONS: After treatment, all indices showed a significant reduction in scores. Significant differences were evident among the treatment modalities for all indices, excluding PAR and IOTN. A pairwise comparison revealed high-optimal functional results with the NE group while there was no significant difference between ABO outcome scores between the three treatment modalities.

Abstract citation ID: cjae081.449
SP157 EFFECTS OF THREE DIFFERENT TREATMENT MODALITIES ON DENTAL ARCH DIMENSIONS IN SKELETAL CLASS II MALOCCLUSION – A CROSS-SECTIONAL STUDY

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OBJECTIVE: Patients with class II skeletal malocclusion usually present with transverse issues. This study aimed to compare the effects of Clark's twin block appliance therapy (CTB), upper first premolars extraction (U4) and non-extraction (NE) treatment modalities on dentoalveolar width and buccolingual inclinations in the transverse dimension.
MATERIALS AND METHODS: A cross-sectional study was conducted on a sample of 45 skeletal class II subjects, aged 10-35 years, ideally treated with CTB, U4 and NE. Transverse arch dimensions were manually measured on the pre- and post-treatment dental casts using a digital vernier caliper and a universal bevel protractor. A paired t-test was used to compare the pre- and post-treatment values of dental arch width changes. The one-way ANOVA was applied to compare dental arch width changes among the treatment groups which were further evaluated by post-hoc Tukey for comparing the pre- and post-treatment dental arch changes between groups.
RESULTS: Statistically significant differences for upper arch width dimensions were found between CTB and U4 groups ($p < 0.001$). Highly statistically significant differences were found for lower arch width dimensions between NE and U4 groups ($p < 0.001$) with the U4 group showing the greatest increase. There was a statistically significant difference in the buccolingual inclinations among all three groups.
CONCLUSIONS: Upper arch transverse dimensions were observed to be increased in patients treated with CTB, while in the upper first premolars extraction group lower arch width showed a significant increase. The non-extraction group showed the least changes in the pre- and post-treatment transverse dimensions.

Abstract citation ID: cjae081.450
SP158 ORAL HEALTH RELATED QUALITY OF LIFE IN PATIENT TREATED WITH SURFACE-TREATED MINI IMPLANT, A SPLIT MOUTH RANDOMISED CONTROL TRIAL

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OBJECTIVES: The purpose of this study is to evaluate the quality of life of orthodontics patients who had been allocated with surface -treated mini implant (MI), Calcium Chloride ($CaCl_2$), acid etch and machined surfaced in a split mouth randomised control trial.
MATERIALS AND METHOD: Fifteen eligible patients participated in the study and were assigned to Group 1, who received machined and acid-etched MI, while Group 2 received $CaCl_2$-treated and machined MIs. Patients were randomised into the two groups and followed by randomisation for left and right intervention. Clinicians and patients were blinded to the interventions.Mini implants measuring 1.4mm in diameter and 8mm in length (AbsoAnchor® System) were used for the purpose of indirect anchorage during alignment. The evaluation of patients' oral health-related quality of life regarding effects of surface treated MI was conducted through the modified Oral Health Impact Profile (S-OHIP-14) questionnaires. The questionnaires were administered at two distinct time points: one day (T1) and seven days (T2) after the insertion of the designated MI insertion.
RESULT: According to the ANOVA analysis, there is no statistically significant difference among the groups on day 1 ($p = 0.09$) and day 7 ($p = 0.55$) following MI insertion. However, a notable finding is the significant difference in quality of life between day 1 and day 7 for the acid etch and control groups ($p = 0.02$ and

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p = 0.008, respectively). Additionally, individual domains such as social ability, functional limitations, physical pain, and disability show significant differences between day 1 and day 7.
CONCLUSION: Quality of life in orthodontic patients, evaluated 24 hours and 7 days post mini-implant (MI) insertion, shows no difference between $CaCl_2$, acid etch, and machined control treatments. Thus, the method to enhance primary stability does not affect overall patient well-being.
LIMITATION: More samples and increase duration of study may further improve the robustness of the findings.
SUPPORTING AGENCY AND GRANTS: Internal grant from UITM
The authors declare no competing or financial interests in relation to this research.

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SP159 INFLUENCE OF FACIAL STRUCTURES ON THE PERCEPTION OF SMILE ESTHETICS BETWEEN LAYPERSONS AND ORTHODONTISTS – A CROSS-SECTIONAL ANALYTICAL STUDY

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INTRODUCTION: During social interactions, a person concentrates on facial components, such as the eyes. Therefore, it can be contemplated that factors other than smile parameters can influence an attractive smile. The objective of this study was to compare the role of facial structures in the perception of smile esthetics between laypersons and orthodontists.
MATERIALS AND METHODS: Seventy-four raters evenly distributed across two panels of raters [orthodontic residents, orthodontists (OD), and laypersons (LP)] participated in this cross-sectional study. Frontal smile and frontal close-up smile photographs of adult male and female subjects were shown to the two panels of raters. The raters evaluated those photographs on a visual analogue scale (VAS). Mann-Whitney U test was applied to compare smile attractiveness between the raters. Linear regression was applied to determine the factors influencing smile esthetics.
RESULTS: There was no statistically significant difference between the ratings of the two panels regarding perceived smile esthetics ($p \leq 0.05$). There was a significant positive correlation between the perceived smile esthetics of all photographs. Young raters were significantly less critical while rating the photographs.
CONCLUSIONS: There was no significant influence of facial components on the perception of smile attractiveness between laypersons and orthodontists. Facial structures may not play an important role in the judgement of an esthetic smile. Young people are less stringent regarding the judgement of perceived smile esthetics.

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SP160 KNOWLEDGE AND AWARENESS OF ORTHODONTIC TRIAGE AND ITS USES AMONG DENTAL HEALTH CARE PROFESSIONALS – A CROSS-SECTIONAL STUDY

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INTRODUCTION: Triage comes from a French word ´tier´ which means `to sort´. Triage has been historically used in wars and in cases of disasters where mass casualties occur, and only limited resources are available.. In orthodontics, the triage system is used to assess the preadolescents in order to rule out interventions needed earlier and to assess the nature of orthodontic problems as complex or moderate. The objective of this study is to determine the Knowledge and Awareness of Orthodontic Triage and its Uses Among Dental Health Care Professionals (DHCP).
MATERIALS AND METHODS: A validated triage awareness questionnaire was circulated online among 400 DHCP. The questionnaire consisted of nine components that assessed the current knowledge and usage of orthodontic triage among dental community. The response rate was 28.2% with majority of participants being generalists. Percentages were reported for each component of the questionnaire. Chi square was run to compare the responses across different variables.
RESULTS: There was a statistically significant association between speciality and management of supernumerary teeth (p = 0.031), type of practice and performance of visual inspection (p = 0.012), experience and management of crossbites in young population (p = 0.024)
CONCLUSIONS: Dentists prefer extraction of additional teeth over evaluation by specialists. There exists an ambiguity between knowledge of orthodontic triage and use of its individual components. Nonetheless, dental community seems to be well aware of necessity of referral of orthodontic patients to specialists. Further probing is necessary to differentiate the gap between understanding the orthodontic triage and utilizing it´s individual components.

Abstract citation ID: cjae081.453
SP161 BIOLOGICAL PROPERTIES OF NANOCOATED NITINOL ARCHWIRES

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OBJECTIVES: Despite clinically desirable mechanical properties such as shape memory effect and superelasticity, the major limitation to safe orthodontic treatment is the chemically or microbiologically induced corrosion of NiTi archwires. The bacterial strains may have affect the corrosion process directly by the adhesion on the surface of NiTi archwires or indirectly by producing metabolites that create acidic environment. As a result of the corrosion processes, Ni ions are released into the oral cavity which may have different health implications. The necessity for developing coatings that would decrease Ni release and improve biological properties is of a great importance. The aim of this investigation was to synthetize the coatings on the surface of NiTi archwires with antibacterial properties.
METHODS: Copper doped titanium nitride coatings (TiN-Cu) on the surface of NiTi archwires were obtained by combination of the cathodic arc evaporation and DC magnetron sputtering. The physicochemical characterization was performed using energy-dispersive X-ray spectroscopy (EDS) and X-ray diffraction (XRD). Ion release was assessed using inductively coupled plasma optical emission spectrometry (ICP-OES). The cytotoxicity of TiN-Cu-nanocoated archwires in comparison with NiTi archwires and stainless steel (SS) archwires was investigated using Neutral red assay. For biofilm formation, Streptococcus mutans and Streptococcus mitis were seeded onto investigated archwires.
RESULTS: Copper particles were evenly distributed over the samples, mostly spherical-like with 20-130 nm in diameter. TiN-Cu-nanocoated archwires presented the lowest release of Ni during 28 days period ($p < 0.05$). The Ni release increased in acidic conditions, while Ti release was constant and very low. As expected, the release of copper was the highest regarding TiN-Cu nanocoated archwires but decreased during the observation time ($p < 0.05$). TiN-Cu-nanocoated archwires exhibited the lowest cytotoxicity regarding the 28-day eluates ($p < 0.05$). The most evident decrease of Streptococcus mitis adhesion and growth was noted in the case of TiN-Cu-nanocoated archwires ($p < 0.05$).
LIMITATIONS: Due to the complex conditions present in the oral cavity, extensive clinical investigations must be conducted.
CONCLUSIONS: Taking into account the results of ion release, biocompatibility test and bacterial adhesion, TiN-Cu-nanocoated archwires may be considered as a favourable candidate for further in vivo investigations.

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SP162 PREDICTIVE GENES FOR SKELETAL CLASS II MALOCCLUSION: A LITERATURE REVIEW

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OBJECTIVES: The identification of a possible malocclusion before it even appears is of crucial importance and of huge help once it comes to developing the treatment plan, and to prevent the malocclusion getting worse. The aim of this study is to investigate and determine the genes as predictive factors for the skeletal class II.
MATERIALS AND METHODS: The study was conducted using the electronic database Pubmed. The keywords used were: genetic skeletal class II; predictors skeletal class II; gene expression skeletal class II malocclusion.
Articles published from 2013 till 2023 were selected: of the 213 screened articles, 194 were excluded by the title or abstract. From the 19 remaining articles, all downloaded in full-text, 7 were excluded due to the following exclusion criteria: absence of genetic predictive factors, skeletal class I and III, case reports and statistical irrelevance. The 12 remaining articles were assessed as eligible.
RESULTS AND CONCLUSIONS: Genes, loci, proteins modulators/regulators affirm their influence in the relationship between phenotype and genotype expression specifically in class II malocclusion formation. These genetic factors modulate the function and the structural organization of maxilla and mandible in different ways according to its function they can influence muscle or bone's growth, formation, density and strength. In particular, the ones affecting bone are: WNT3A, WTN11,BMP2, BMP4, SMAD6, RUNX2, MATN1, FGFR2, MSX1, GHR, COL2A1, NOG, TWIST1, SNAIL, Edn1, EDN1, whereas the ones controlling muscles are: KAT6B, HDAC4, ACTN3, MYO1H, AJUBA.
Additional studies are needed to strengthen the correlation between the previously mentioned genetic factors and development of skeletal class II.

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Abstract citation ID: cjae081.455
SP163 PREDICTION OF UNERUPTED CANINE AND PREMOLAR SIZE IN A PORTUGUESE POPULATION: A REGRESSION AND VALIDATION STUDY

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BACKGROUND/OBJECTIVES: The applicability of Tanaka & Johnston´s (TJ) prediction analysis to children of different ethnic origins is questionable. This study aimed to develop simple linear regression equations (SLREs) optimized for the Portuguese population (PP) and compare the prediction power of the new equations with the original TJ equations through a process of validation.
MATERIALS/METHODS: Study models of 125 Portuguese individuals (61 males and 64 females, aged 20.2±6.6 and 21.6±7.3 years, respectively) were scanned with the iTero 5D Element Plus TM scanner. Mesiodistal tooth widths were measured using MeditLink software. SLREs following the TJ approach were computed for the combined sample and for each sex separately and validated in a sub-sample of thirty individuals. Descriptive statistics of the actual and predicted values were carried out on this sub-sample. Mean absolute error (MAE) and mean bias error (MBE) were calculated for the PP and original TJ equations and compared with non-parametric tests.
RESULTS: New SLREs developed to predict the MD tooth size of canines and premolars based on lower incisor size for both sexes were y=8.08 + 0.60x (maxilla) and y=6.21 + 0.66x (mandible). Correlation coefficients (CC) and standard error of the estimates (SEE) were similar for the combined equations (0.97≤SEE≤1.01, 0.647≤r≤0.669) and the sex-adjusted equations (0.90≤SEE≤1.00, 0.601≤r≤0.71). When tested in the validation sub-sample, no statistically significant differences (p=0.648) were observed between MAE values for the new combined (0.60-0.71 mm) or sex-adjusted (0.58-0.67 mm) PP equations and the classic TJ equations (0.63-0.68 mm). MBE showed a non-significant (p>0.05) tendency for overestimation with the original TJ equations (0.08-0.12 mm) and underestimation with PP SLRE (0.11-0.25 mm). In all cases, absolute error was below the clinically significant 2mm threshold.
CONCLUSIONS/IMPLICATIONS: 1) Both the new PP and the original TJ equations allow the prediction of the size of unerupted canines and premolars in both arches with MAE less than 0.70mm. 2) Prediction error was similar for equations for both sexes combined and those adjusted by sex. 3) Prediction models may perform differently when applied to new individuals. Therefore, validation studies are required to confirm the applicability and accuracy of tooth size prediction equations.

Abstract citation ID: cjae081.456
SP164 MACHINE LEARNING VS HUMAN – WHO CAN PREDICT FACIAL GROWTH MORE ACCURATELY? PRELIMINARY RESULTS

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AIM/BACKGROUND: To compare the human assessment of facial growth prediction to machine learning (ML) algorithms which was developed previously and presented at European Orthodontic Society Congress (EOS) 2022 Limassol. The ML algorithms based on cephalometric measurements from two radiograms: at the age 9 and 12 and was predicting the direction of facial growth at the age of 18. The best model was multilayer perceptron with the accuracy of 72.37±1.87%.
METHODS: During EOS 2023 and Polish Orthodontic Society Congress (PTO) 2023, orthodontists and orthodontic residents were asked to complete as many cases as possible in the proprietary Predigrowee web application (http://predigrowee.agh.edu.pl) which allows the evaluation of 447 cases. The cases are from the same database that was used to establish the ML model. The participants' task was to indicate the direction of facial growth at the age of 18, based on two cephalometric radiographs and cephalometric measurements at the age of 9 and 12. There were three options to choose from: anterior, vertical or mixed (physiological). The categories were divided based on SN/MP measurement.
RESULTS: Twenty-two people took part in the survey; 11 people responded to fewer than 10 cases, so were excluded from further analysis. Among the 11 participants were: 2 orthodontic specialists working in orthodontics for more than 10 years, and 9 people working in orthodontics for less than 3 years (3 general dentists and 6 orthodontic residents). On average, participants responded to 29±14 case and, on average, users spent 42.76s to solve one case. The mean prediction accuracy among all participants was 47.5±10.5%. The prediction accuracy among orthodontic specialists was 54.9±13.8% and among residents and general dentists was 45.8±9.9%. The highest prediction accuracy was achieved by an orthodontics specialist with more than 10 years of experience (64.7%). All the results obtained by humans were lower than the predictions obtained previously by machine learning algorithms (72.37±1.87%).
CONCLUSIONS: In comparison to experienced orthodontists, machine learning models obtained higher accuracy. However, this conclusion should be treated with caution, as the group of specialist orthodontists was small, and these are preliminary results. More volunteers are needed for higher quality results.

Abstract citation ID: cjae081.457
SP165 COMPARISON OF MORPHOLOGICAL CHARACTERISTICS IN CEPHALOMETRIC ANALYSIS OF ADULT ORTHODONTIC PATIENTS WITH NON-SYNDROMIC OLIGODONTIA

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AIMS: Oligodontia is defined as the congenital absence of six or more permanent teeth, excluding the third molars. Adult patients with oligodontia often require a multidisciplinary treatment approach, including orthodontic and prosthetic treatment, and treatment planning requires the analysis of craniofacial morphology. As the number of missing teeth increases, the severity of the patient's condition also intensifies; however, the characteristics of craniofacial morphology in adults with non-syndromic oligodontia remain unclear. Therefore, this study aimed to analyze the craniofacial morphology of adult orthodontic patients with non-syndromic oligodontia and compare it in relation to severity.
SUBJECTS AND METHODS: This study included 53 patients with non-syndromic oligodontia (33 females, 20 males) aged 18 years or older who visited the Orthodontic Department of The Nippon Dental University Hospital at Tokyo from April 2011 to April 2023. The severity of oligodontia was determined by panoramic radiographs. The subjects were divided into a mild oligodontia group with 6-8 missing teeth per patient (32 patients, mean age 28.0 ± 8.9 years) and a severe oligodontia group with 9-28 missing teeth per patient (21 patients, mean age 24.2 ± 7.4 years). Eight skeletal and 8 dental cephalometric measurements were made for each patient. Medians and quartile deviation were calculated for each parameter, and the nonparametric Mann-Whitney U test (P<0.05) was used for between-group comparisons.
RESULTS: For the skeletal measurements, the severe group showed significantly smaller values than the mild group for the ANB angle, maxillary protrusion, and Wits appraisal (P<0.05). For the dental measurements, the severe group showed significantly larger values than the mild group for the FMIA and the U1 to SN plane angle (P<0.05) and showed significantly smaller values for the angle of convexity (P<0.05).
CONCLUSIONS: Adult orthodontic patients with non-syndromic oligodontia with a relatively high number of missing teeth show the characteristics of skeletal mandibular protrusion and lingual inclination of the mandibular central incisors. Therefore, it is recommended that these skeletal and dental characteristics be taken into account when planning treatment.

Abstract citation ID: cjae081.458
SP166 HOW DID THE PROFESSIONAL PRACTICE OF ORTHODONTISTS IN EUROPE RESPOND TO THE COVID-19 PANDEMIC? INSIGHTS FROM THE EUROPEAN FEDERATION OF ORTHODONTISTS SURVEY

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BACKGROUND: Viral transmission and pandemics, illustrated by Covid-19, present major public health challenges. Global measures, like social distancing and self-isolation, aimed to curb the virus, impacting diverse sectors, including healthcare and orthodontic practices.
OBJECTIVES/AIMS: To investigate the effects and consequences of the Covid-19 pandemic on the professional practice of orthodontists in Europe.
MATERIALS/METHODS: The European Federation of Orthodontics (FEO) task force designed a survey to investigate COVID-19's impact on orthodontic practices in Europe. The survey was sent to its member societies and covered demographic details, experiences during the pandemic, infection control strategies, practice and financial implications, and patient management. Data analysis involved calculating central tendency and variability indices, along with frequencies. Mann-Whitney, Kruskall-Wallis, and X2 tests assessed differences based on

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gender, country, practice type, and years of experience. IBM SPSS v.29.0 facilitated statistical analysis, with a predetermined significance level of a = 0.05 ($p \leq 0.05$).
RESULTS: Despite the various and sometimes negative effects, the professional condition of orthodontist in Europe seems to have returned to the pre-pandemic situation. While gender and vaccination status had minimal effects, the country of practice significantly influenced responses, including patient waiting lists and stress levels. Changes in clinic schedules, limited economic aid, and varied patient management strategies were noted, reflecting differing impacts across countries.
CONCLUSIONS: The effects of the COVID-19 pandemic on orthodontic practices in Europe were diverse, with professionals showing overall resilience the challenges posed by the exceptional circumstances.

Abstract citation ID: cjae081.459
SP167 THREE-DIMENSIONAL SOFT TISSUE CHANGES IN ORTHODONTIC PATIENTS WITH AND WITHOUT FIRST PREMOLAR EXTRACTIONS: A SYSTEMATIC REVIEW AND META-ANALYSIS

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BACKGROUND/OBJECTIVES/AIMS: To assess the available evidence regarding the three-dimensional (3D) soft tissue changes in orthodontic first premolar extraction vs. non-extraction patients.
METHODS/MATERIALS: Fifteen electronic databases were systematically searched up to October 2023, with additional manual searches. The eligibility criteria included prospective or retrospective studies on orthodontic patients treated with extraction of first premolars, including also control groups with patients without extractions. Outcomes were measured by means of alterations of 3D soft tissue measurements. Data extraction and risk of bias assessment was independently conducted by two authors.
RESULTS: Five studies (2 prospective, 3 retrospective) with low to moderate risk of bias met the eligibility criteria, with only two of them providing sufficient data for the conduction of pertinent exploratory analyses. According to the latter, no significant changes could be detected for the positions of A' and Pg' points, whereas point B' was significantly retruded in the z' axis in the extraction group ($p = 0.01$). Regarding the results from the qualitative analyses, the nasiolabial angle was reported to be significantly increased in the extraction group ($p = 0.02$), while the vermilion angle, vermilion height, central bow angle, height/width ratio, and vermilion surface area decreased significantly only in the extraction group. Anterior retraction induced significant changes of the lips, perioral tissues, and the nasiolabial fold when compared with the controls ($p < 0.01$). In one study the perioral soft tissues were retracted from 0.5 to 1.5 mm in the extraction group. Ratios of upper incisor to upper lip retraction ranged from 1.41 to 1.05:1, and lower incisor to lower lip retraction ranged from 0.88 to 1.2:1. In the non-extraction group, lower incisors moved forward by 0.46 to 0.7 mm, while upper lip retraction and lower lip protrusion were both less than 1 mm.
LIMITATIONS: Heterogeneity among studies and non-comparable variables.
CONCLUSIONS/IMPLICATIONS: According to existing evidence, it seems that extraction treatment seems to cause some significant changes in the soft tissues, yet these results must be interpreted with caution due to existing methodological limitations.

Abstract citation ID: cjae081.460
SP168 USING MICROCT IMAGING TECHNIQUE FOR STUDYING THE CRANIOFACIAL STRUCTURES OF HUMAN FETUSES. A SCOPING REVIEW.

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BACKGROUND: The study aims to assess the suitability of various imaging methods commonly employed in fetal research as a prelude to our forthcoming MicroCT investigation focusing on the craniofacial features of human fetuses with Trisomy 21.
METHODS: a scoping review of published literature was performed. PubMed, Embase, Scopus, Medline and Cochrane were utilized and studies were selected following the PRISMA guidelines. Population, exposition, comparison and outcome (PECO) was applied as follows: P: human fetuses; E: MicroCT imaging technique; C: other imaging techniques O: hard and soft tissue image analyses of the available imaging techniques that have been used. Two independent reviewers performed the data extraction.
RESULTS: 9 out of 391 studies were included. Only studies with human fetus samples using MicroCT and/or other imaging techniques such as MRI, high field-MRI and ultrasound, were included. After analyzing the included literature, MicroCT has shown to be most suitable, with its high sensitivity (93.8%), high specificity (100%) and good applicability, providing very detailed images up to a sub-micron level even of embryo's in a very early stage of gestation (6 - 24 weeks).
CONCLUSIONS: MicroCT is found to be a suitable, accurate and available imaging technique for imaging human embryonic anatomy. Staining is a crucial step when studying human fetuses aiming for both, hard and soft tissue.

Abstract citation ID: cjae081.461
SP169 FACIAL SHAPE AND SELF-PERCEIVED PERSONALITY IN YOUNG ADULTS

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AIM: To investigate the association between facial shape and personality traits in young adults.
METHODS: The study population consisted of 613 young adults, 21-35 years old. 3D facial photographs of all participants were obtained using the 3dMD camera system (3dMD, Atlanta, USA). Digitization of 3D images, and geometric morphometric analysis of landmark configurations were performed using ViewBox 4 software (dHAL software, Kifissia, Greece). Self-assessments of participants' personalities were performed using the Big-5 personality test and their self-esteem was evaluated with the Single-Item-Self-Esteem Test (SISE).
Facial shape was described with 1021 landmarks and semi-landmarks that were digitized on the three-dimensional photographs with a semi-automated method. Landmark configurations were then superimposed with Procrustes Superimposition. A Principal Component Analysis was performed to reduce the amount of shape coordinates into Principal Components of shape (shape PCs), which were then used in all subsequent analyses.
The association between personality traits and facial shape was examined with multivariate regression models. In the regression model, shape PCs were considered as the dependent variables and personality scores as the independent factors. A 5% error was accepted for all statistical analyses.
RESULTS: The reliability of the Big-5 questionnaire results was tested with Cronbach's-α and was found to be very good (α=0.754). Random and systematic errors were tested with Bland-Altman plots that showed minimal method error. Multivariate regression models showed significant associations between certain personality traits and facial shape in the entire sample population. Extraversion, conscientiousness and agreeableness had a significant effect on facial shape, ranging between 4.6% - 6.8% (P-values < 0.02). Self-esteem was also significantly associated to facial shape, showing an effect of 4.9% on total shape variability (P= 0.012). Individuals with higher self-esteem presented with a narrower face width and larger eyes.
CONCLUSION: There appears to be an association between facial shape and self-perceived personality traits in young adults. Possible biological explanations might be related to overlapping genetic information for facial shape and certain subcortical brain regions, such as the putamen and the caudate, or to effects of facial functioning associated with certain personality traits on facial shape.

Abstract citation ID: cjae081.462
SP170 RETENTION PROTOCOLS AND RELAPSE APPROACHES OF ORTHODONTICS SPECIALISTS IN TURKEY

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OBJECTIVE: The aim of this study is to determine what retention protocols and relapse approaches orthodontists in Turkey prefer to practice after their orthodontic treatments.
MATERIALS/METHODS: The web - based survey prepared consisted 33 questions: 3 to identify the demographic characteristics of the participants and 26 to examine how orthodontists manage the retention phase also 4 to how orthodontists approach to relapses.The survey was sent to the e-mail addresses of orthodontists who are registered to the Turkish Orthodontics Association.
In comparison of qualitative data, Chi-Square test, Fishers Exact test and the Fisher –Freeman Halton test was used. ($p<0.05$)
RESULTS: The survey return rate was 65.4%. Pretreatment malocclusion status (77%), oral hygiene status (82%), and presence of third molars (56%) were reported to be the most important factors in determining the type of retainer. A 66% of participants advised their patients to wear the removable appliances on

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a full-time basis during the first 6 months. Between months 6–12 of the retention period, 55% of the orthodontists prescribed night-time wear with partial daytime wear, while fewer orthodontists (39%) preferred only night-time wear. After one year of follow-up, 63% of the participants recommended only night-time wear. The source of the relapse after orthodontic treatment was found to be due to patients not applying the retention protocols (76%)
CONCLUSIONS: According to answers considerable divergence with regard to duration of retention and timing of scheduled appointments during retention, which is in accordance with studies from other countries. The survey results indicate that those cases with excessive rotation of teeth at the beginning are the most commonly relapsed. The most commonly used retention protocol among Turkish orthodontists was fixed retention with bonded retainers.
CONFLICT OF INTEREST: The authors have no conflict of interest to declare.

Abstract citation ID: cjae081.463
SP171 APPROACHES TO MALOCCLUSIONS AND DIRECTIONS OF PEDIATRIC DENTISTS AND GENERAL DENTISTS IN TURKEY TO ORTHODONTIC TREATMENT

Dr Osman Bilal Kandaz[1], Dr İpek Şavkan, Prof Evren S. Öztaş; [1]*Istanbul Kent University Faculty Of Dentistry, Department of Orthodontics*

OBJECTIVE: This study aims to assess the orthodontic diagnostic skills, referral patterns and the perceptions of orthodontic benefits of pediatric and general dentists
MATERIALS/METHODS: The web-based survey prepared consisted 37 questions. The surveys included questions about the type of orthodontic treatment provided, referral trends and timing; presumed benefits associated with successful orthodontic treatment and diagnosis and treatment plans of six cases representing different malocclusions.
Chi-Square test and Fisher's Exact test were used to compare qualitative data will be used. The results are within the 95% confidence interval, significance is at $p<0.05$
RESULTS: The survey return rate was 65.4%. Pretreatment malocclusion status (77%), oral hygiene status (82%), and presence of third molars (56%) were reported to be the most important factors in determining the type of retainer. A 66% of participants advised their patients to wear the removable appliances on a full-time basis during the first 6 months. Between months 6–12 of the retention period, 55% of the orthodontists prescribed night-time wear with partial daytime wear, while fewer orthodontists (39%) preferred only night-time wear. After one year of follow-up, 63% of the participants recommended only night-time wear. The source of the relapse after orthodontic treatment was found to be due to patients not applying the retention protocols (76%)
CONCLUSIONS: According to answers considerable divergence with regard to duration of retention and timing of scheduled appointments during retention, which is in accordance with studies from other countries. The survey results indicate that those cases with excessive rotation of teeth at the beginning are the most commonly relapsed. The most commonly used retention protocol among Turkish orthodontists was fixed retention with bonded retainers.
CONFLICT OF INTEREST: The authors have no conflict of interest to declare.

Abstract citation ID: cjae081.464
SP172 TREATMENT EFFICACY OF DIRECT VERSUS INDIRECT BONDING OF FIXED APPLIANCES IN ORTHODONTIC PATIENTS. A SYSTEMATIC REVIEW.

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OBJECTIVES: To retrieve and assess the available evidence for the difference in treatment efficacy between direct and indirect bonding of orthodontic braces.
MATERIALS AND METHODS: Electronic database searches of published and unpublished literature and hand searches of the eligible studies were performed up to May 26th, 2023. The following electronic databases with no language or publication date restrictions were searched: MEDLINE, EMBASE, the Cochrane Oral Health Group's Trials Register and CENTRAL. Two review authors performed data extraction independently and in duplicate using customized data collection forms. Risk of bias of the included studies was assessed using the Cochrane risk of bias tool (Rob 2) for randomised clinical trials (RCTs) and ROBINS-I tool for non-randomised studies.
RESULTS: Thirteen eligible studies were included in this systematic review. Seven were RCTs, 4 were prospective non-randomised, 1 was retrospective and one was of cross-sectional design. Risk of bias ranged from unclear to high. Due to substantial clinical and methodological heterogeneity, a meta-analysis was not feasible. Nevertheless, there was considerable agreement among studies that indirect bonding provided faster placement of braces. However, orthodontic treatment duration, as well as the number of appointments, was found to be similar between the techniques. Concerning bracket placement accuracy, no technique demonstrated absolute accuracy. Clinical periodontal parameters were not affected by the bonding method. Finally, regarding the formation of white spot lesions, findings were conflicting.
CONCLUSION: Although the quality of evidence varied among studies and was generally low, considerable amount of evidence suggests that both techniques present advantages and disadvantages, when different clinical aspects are evaluated.
KEYWORDS: Direct bonding, Indirect bonding, Fixed orthodontic appliances, Orthodontic brackets

Abstract citation ID: cjae081.465
SP173 THREE-DIMENSIONAL MORPHOMETRIC ANALYSIS OF SELLA TURCICA IN PATIENTS WITH PALATALLY IMPACTED CANINES

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AIM: To evaluate sella turcica (ST) shape in patients with palatal canine impaction by means of geometric morphometrics.
METHODS: Twelve patients with palatally impacted canines (bilateral or unilateral) were retrieved from patient archives with strict inclusion/exclusion criteria. Every subject was matched by gender and age to one control, following the same criteria, apart from the canine impaction. ST shape was three-dimensionally reconstructed from Cone Beam Computed Tomography images, and traced with 8 curves, 6 fixed landmarks and 185 surface and curve semi-landmarks. Semi-landmarks were allowed to slide so that the bending energy against a reference configuration was minimized. Geometric morphometric methods were applied (Procrustes superimposition, principal component analysis). Permutation tests without replacement were performed to identify ST shape difference between the two groups. Furthermore, the minimum distance between the anterior and the posterior clinoid processes on both sides was measured.
RESULTS: The first 7 Principal Components (PCs) were considered to be statistically meaningful, accounting for 75.5% of the total variance. Of the PCs describing ST shape, the first three, accounting for 22.7, 16.3 and 10.2 % of the total variance respectively, were found to represent shape patterns encountered in clinical practice. PC1 described the concavity of the hypophyseal fossa floor contour, PC2 referred to sella width and PC3 described the association between ST width and the concavity of the hypophyseal fossa floor contour. Permutation tests showed no statistically significant difference in ST shape between the two groups of the present sample (P=0.086, 100000 permutations). No statistically significant difference was also observed between the two groups regarding the minimum anterior-posterior clinoid distances on both sides (right side: P= 0.843; left side: P= 0.786).
LIMITATIONS: The sample size was limited to 12 matched subjects in order to meet the need for age and gender matching between the impacted canines and the control group, as well as the CBCT image quality standards.
CONCLUSIONS: ST shape was not found to differ between patients with palatally impacted canines and patients with no canine impaction. An association between ST bridging and presence of an impacted canine was not established.

Abstract citation ID: cjae081.466
SP174 EVALUATION OF THE MANDIBULAR BUCCAL SHELF FOR ORTHODONTIC ANCHORAGE: A SYSTEMATIC REVIEW

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BACKGROUND: Cortical bone thickness and bone width are important factors when planning and placing orthodontic mini-screw implants. The objective of this systematic review was to critically assess the evidence derived from studies on humans providing Cone Beam Computed Tomography data regarding the bone anatomy of the mandibular buccal shelf region.

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METHODS AND MATERIALS: A systematic search using the databases PubMed, Science Direct, Cochrane Library, and Google Scholar, as well as a hand search was conducted to identify relevant articles up to October 4, 2023. The risk of bias in included studies was assessed according to Cochrane guidelines with the RoB 2.0 tool for the one randomized clinical trial and the JBI (Joanna Briggs Institute) tool for the rest cross-sectional, non-randomized studies.
RESULTS: The search strategy revealed the identification of 3.608 articles and after excluding the duplicates and applying specific selection criteria, only 12 articles were included in the current qualitative analysis, in which a total of 1.229 patients (672 females; 557 males) were included.
CONCLUSIONS: The region buccal to the distal root of the second molar is the ideal location for miniscrew implant insertion in the mandibular buccal shelf. Hypodivergent individuals had higher MBS bone thickness values than hyperdivergent patients. Due to the existing high risk of bias, the results of this investigation should be taken into consideration with caution.

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SP175 EVALUATION OF ROOT RESORPTION AND THE VALUE OF INTERMEDIATE PERIAPICAL RADIOGRAPHY IN NON-EXTRACTION TREATMENT WITH FIXED APPLIANCE OF ADOLESCENTS WITH CROWDING: A MULTICENTRE RCT

Ms Sofie Karlsson, Dr Kristina Johansson[1], Dr Helena Christell[1], Dr Liselotte Paulsson[1]; [1]*Malmö University*

BACKGROUND/AIM: External apical root resorption (EARR) is a common adverse effect of orthodontic treatment. Self-ligating brackets have been suggested to reduce frequency and severity of adverse effects compared to conventional bracket systems, albeit weak evidence levels. Clinical practice regarding prediction of severe EARR during orthodontic treatment differs between practitioners resulting in varying radiation dosage between patients. One study using cone beam computed tomography, showed no correlation between severity of EARR at six months and end of treatment. Hence, the aim of this study is to compare frequency and severity of EARR when treated with conventional or self-ligating brackets during and after orthodontic treatment and to estimate the prediction value of examination with intraoral radiography at insertion of rectangular stainless steel archwires for severe to extreme EARR at end of treatment.
MATERIAL/METHODS: This study was approved by regional Ethical Review Boards and Radiation Ethics Committees according to the Declaration of Helsinki. 132 patients from four centres with Class I malocclusion were randomized into two intervention groups according to CONSORT-guidelines: Passive self-ligating Damon QTM or conventional VictoryTM bracket systems. Periapical radiographs of the upper incisors obtained at baseline, insertion of 0.019x0.025 stainless steel archwires and at end of treatment were evaluated (n=288). EARR during and after orthodontic treatment was estimated according to Linge & Linge's formula for correction factor.
RESULTS: Statistically significant mean value differences ($p < 0,05$) were found in EARR of lateral incisors at the radiographic examination during the orthodontic treatment, favouring self-ligating brackets. No differences, however, were found at end of treatment between the two orthodontic systems. EARR of ≥2 millimetres at end of treatment ranged from 10,6 % to 20,5 % in the four incisor groups; highest incidence found in upper right laterals. Whether EARR was present at insertion of rectangular stainless steel archwires in these cases was inconsistent between patients.
LIMITATIONS: Multicenter trials imply increased risk of operator-bound differences.
Displaced teeth present difficulty when identifying the cementoenamel junction on two-dimensional radiographs.
CONCLUSIONS: No difference was found between self-ligating or conventional bracket systems regarding EARR after orthodontic treatment. Low predictive value of the intermediate radiographic examination was found.

Abstract citation ID: cjae081.468
SP176 CHARACTERISTICS OF ORTHODONTIC TREATMENT IN CANCER SURVIVORS: A SYSTEMATIC REVIEW

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BACKGROUND/OBJECTIVE: Globally, survival rates for cancer patients have increased across all age groups. Challenges arising from irregularities in craniofacial growth, as well as dental anomalies, may necessitate modifications to conventional orthodontic treatment plans. This review aims to systematically and critically assess the literature to identify the key features of orthodontic treatment in individuals who have survived cancer.
MATERIALS AND METHODS: A comprehensive search of seven databases was conducted to identify studies on survivors of malignant tumors who underwent orthodontic intervention with fixed appliances after completing cancer therapy, up to August 2023. Quantitative data on various aspects of orthodontic therapy and the retention phase constituted the primary outcomes of interest. The Newcastle-Ottawa scale was employed to assess individual bias risks. The eligibility criteria adhered to the Population, Intervention, Comparison, Outcome, and Study design (PICOS) framework.
RESULTS: Out of a total of 347 records, four cohort studies were ultimately included in the qualitative synthesis. Leukemia emerged as the most prevalent cancer type, primarily treated with chemotherapy and/or radiation therapy. The duration of orthodontic therapy varied among cancer survivors, with overall positive outcomes, satisfaction, and quality of life comparable to their healthy peers. However, certain survivor groups experienced shorter treatment durations and influenced outcomes. Root resorption and oral mucositis were reported among the cancer survivors, along with decreased occlusal result stability during the retention period.
CONCLUSIONS: In summary, the duration of orthodontic treatment varied among cancer survivors, with occlusal outcomes generally comparable to their healthy counterparts. While some variations and challenges were noted, the reported results by patients did not indicate a significant difference between cancer survivors and healthy individuals undergoing orthodontic treatment.

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SP177 A 3RD CYCLE AUDIT OF THE RATE OF UNSCHEDULED ORTHODONTIC APPOINTMENTS AT CHESTERFIELD ROYAL HOSPITAL

Dr Zinab Kassir[1], Professor Jonathan Sandler; [1]*Nhs*

BACKGROUND: Emergency appointments in orthodontics are commonly caused by issues with fixed appliances and retainers. They are costly to clinicians and to the National Health Service. The unscheduled orthodontic appointment rate at Chesterfield Royal Hospital (CHR) has been previously reported at 5.96% in 2019, and 6% in 2011.
AIMS: To establish the frequency, pattern and causes for emergency orthodontic appointments at CRH. As there are no established national guidelines, we applied a local standard set by previous audits at CHR, that no more than 5% of total appointments should be unscheduled appointments.
METHODS: Data was collected between 2nd April 2019 and 10th January 2023. A data collection form should be completed by the treating clinician for every unscheduled appointment. 8,937 patients attended the orthodontic department for scheduled appointments during this time. 783 of these were unscheduled appointments. 247 forms were completed and analysed retrospectively.
RESULTS: The unscheduled appointment rate at CHR was 8.76%. This is 3.76% higher than the set standard, and 2.8% higher than in 2019. The most common cause of unscheduled appointment was due to issues with fixed appliances (75%) such as de-bonded brackets (35.2%) or wires digging in (11.9%), followed by removable retainers (8.9%). 23.5% of patients had never previously attended an unscheduled orthodontic appointment. 8.1% of patients had attended 3 or more unscheduled appointments.
LIMITATIONS: We included months where the department was shut down due to COVID-19. The cancellation of review appointments would have reduced the maintenance of appliances, possibly affecting patients' compliance with dietary and appliance care instructions. Only 31.55% of clinicians completed a form after an unscheduled appointment. Some forms had missing data or were completed incorrectly.
IMPLICATIONS:
- Ensure correct techniques and moisture control is used when bonding brackets.
- Provide dietary advice and appliance care instructions to patients and carers at each appointment.
- Modification of the data collection form to improve data analysis, and include details such as treatment completed.
- Encourage team members to correctly complete forms to allow for high data recovery.
- Identify and counsel patients attending multiple unscheduled appointments.
- Re-audit in 12 months

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Abstract citation ID: cjae081.470
SP178 HOSPITALS VS OUTREACH CLINICS: REDUCING SOCIOECONOMIC INEQUALITIES IN ACCESS TO ORTHODONTIC TREATMENT.

Dr Zinab Kassir[1]; [1]*Nhs*

BACKGROUND: It is established that there are socioeconomic inequalities in oral health. Sheffield is a divided city; life expectancy is nearly 10 years greater for postcodes in southwest Sheffield than in northeast Sheffield. The Charles Clifford Dental Hospital (CCDH) is the only provider of orthodontic treatment to complex patients in Sheffield. The incidence of complex malocclusions is assumed to be the same across all socioeconomic levels.
AIM: To examine a cohort of patients referred to the CCDH orthodontic department, and determine if there is an equal distribution across all socioeconomic levels.
METHODS: Data for new patient referrals from October 2019 - March 2020 were gathered. There were 342 patients who had been accepted for orthodontic assessments. The postcode was used to calculate their level of deprivation using the English Indices of Deprivation (IoD) 2019 Deciles. The postcodes were mapped to see their geographical distribution. The accessibility of the CCDH was considered by randomly selecting a postcode in the least and most deprived areas and assessing the cost and availability of different modes of transport.
RESULTS: The range of IoD's shows that there were patients from all socioeconomic levels. 51% of patients lived in the 21-40% most deprived areas in England. Only 3% of patients came from the 20% most deprived neighbourhoods. More patients are referred from northeast Sheffield, which has low socioeconomic levels. Patients from more deprived postcodes have to travel further, for longer and pay more to attend their appointments. The CCDH and 75% of primary orthodontic practices are located in southwest Sheffield.
LIMITATIONS: The English IoD's are used widely in healthcare research to assess patients' socioeconomic levels. A potential limitation is miscategorising patients as we are assuming their socioeconomic level from their postcode.
CONCLUSION: There is an unequal distribution, with more patients being referred from northeast Sheffield, with high levels of deprivation. The most deprived patients are not accessing hospital orthodontic treatments.
IMPLICATIONS: A reconfiguration of location and spread of orthodontic services was recommended. An outreach orthodontic clinic, staffed by CCDH clinicians, was set up in northeast Sheffield, in one of the 20% most deprived areas in England.

Abstract citation ID: cjae081.471
SP179 THE PREVALENCE OF SUPERNUMERARY TEETH IN A SAMPLE OF NON-SYNDROMIC YOUNG PATIENTS IN GREECE

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AIM: To investigate the prevalence of supernumerary teeth in a sample of non-syndromic young patients in the Lesvos Island of Greece.
MATERIALS AND METHODS: The panoramic radiographs of children 9 to 16 years old, attending orthodontic and general/pediatric dental practices were reviewed. The sample included 621 children. The prevalence of supernumerary permanent teeth was determined. Descriptive statistics were calculated and the comparison of the prevalence of supernumerary teeth in the maxilla and the mandible was performed with SPSS software.
RESULTS: The prevalence of supernumerary permanent teeth was 2% in total, 6 females showed hyperdontia corresponding to 0.9%, and 9 males corresponding to 1%. In the sample, 8 mesiodentes, 3 lateral incisors, 2 paramolars, and 2 central incisors were identified as supernumerary. The prevalence in the maxilla (1.93%) was greater in comparison to the mandible (0.48%).
CONCLUSIONS: In the specific sample originating from the geographic area of Lesvos Island, the prevalence of hyperdontia was approximately 2%. The most common supernumerary tooth was the mesiodens.

Abstract citation ID: cjae081.472
SP180 AN INVESTIGATION UTILIZING THE PSYCHOSOCIAL IMPACT OF DENTAL AESTHETICS QUESTIONNAIRE TO EVALUATE ORTHODONTIC-RELATED FACETS OF THE QUALITY OF LIFE AMONG UNDERGRADUATE DENTAL STUDENTS IN CYPRUS

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BACKGROUND: Dental aesthetics and malocclusion may impact oral health-related quality of life (OHRQoL).
OBJECTIVES/AIMS: To assess the self-perceived impact of malocclusion in a sample of European University Cyprus undergraduate dental students using the Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ).
MATERIALS/METHODS: This cross-sectional survey, conducted among undergraduate dental students at the European University Cyprus (EUC) School of Dentistry, utilized a self-administered, anonymous questionnaire delivered via email and Google Forms. The survey comprised demographic details, the completion of PIDAQ, and self-rating of Index of Orthodontic Treatment Need – Aesthetic Component (IOTN-AC). Data analysis involved calculating central tendency and variability indices, with Mann-Whitney and Kruskall-Wallis tests assessing the impact of gender, year of study, orthodontic treatment history, and IOTN-AC on PIDAQ responses.
RESULTS: A total of 163 undergraduate dental students (66.9% females, 32.5% males, 0.6% other) participated. Overall, gender and study year had no significant influence on PIDAQ responses. Previous orthodontic treatment increased dental self-confidence. Active treatment negatively affected social, psychological, and aesthetic aspects. Better dental aesthetics self-ratings correlated with increased self-confidence and reduced social, psychological, and aesthetic concerns.
CONCLUSIONS: Orthodontic treatment history and self-perceived aesthetics interplay with the psychosocial aspects of dental self-perception.

Abstract citation ID: cjae081.473
SP181 THE PROCESS OF TRANSLATION OF THE PAEDIATRIC SLEEP QUESTINNAIRE INTO CROATIAN LANGUAGE

Prof Visnja Katic[1,2], Dr Andrej Pavlić[1], Ms Sara Crnković[1], Mr Anđelo Svirčić[1], Prof Magda Trinajstić Zrinski[1]; [1]*Faculty Of Dental Medicine,* [2]*Clinical Hospital Centre*

AIM: The aim of this study was to translate the Paediatric Sleep Questionnaire (PSQ) into Croatian and to analyse the reliability and content validity of the translated questionnaire in a pilot study.
SUBJECTS/METHODS: Two experts fluent in the English language independently translated the instrument into Croatian. Afterwards, two different independent bilingually fluent experts performed the back translation from Croatian to English. A committee of three additional experts performed a synthesis of the previous variants of the instrument and reached a consensus for the translation of the 22 items. The translated instrument was administered to parents/guardians of 51 participants who were directed for orthodontic consultation from their primary care dentists. Internal consistency and content validity of the PSQ were estimated using Cronbach's alpha and Pearson correlations, respectively. Participants were asked to report doubtful formulations or otherwise problematic issues.
RESULTS: The sample consisted of 51 participants (51% male), median age 11.8 years (IQR 9.4-12.9). Six of the 51 participants (11.7%) revealed positive symptoms of sleep-disordered breathing. The reliability analysis yielded a Cronbach's alpha of 0.67 (95% CI: 0.45-0.839) of the total items in the study. Regarding the subdomains, "Snoring" and „Sleepiness" were moderately reliable, with Cronbach's alpha of 0.52 (95% CI: 0.21–0.74), and 0.62 (95% CI: 0.42–0.77), respectively. The subdomain "Behaviour" showed high reliability, with Cronbach's alpha of 0.83 (95% CI: 0.74–0.90). Significant correlations were moderate (r= 0.37-0.76), while some items (snoring, stopping of breathing, headache at awakening) did not show significant correlation with the total score. Some parents reported that item "Does your child: Wake up feeling unrefreshed in the morning?" could be misinterpreted, because they didn't have enough time to sleep, and not because they had problems with breathing during sleep. Therefore, we added "even if they had enough time for sleeping?" to the original question.
CONCLUSION: Further sample collecting and interviewing is needed to adjust the Croatian translation, so that it could become a reliable instrument in research regarding the obstructive sleep-related breathing disorders in children.

Abstract citation ID: cjae081.474
SP182 EFFECT OF RAPID PALATAL EXPANSION ALONE OR WITH THE FACE MASK ON THE AIRWAY DIMENSIONS

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AIMS: To explore the effect of the rapid palatal expansion (RPE) procedure alone, or in association with the face mask (FM), on the airway dimensions, as measured on latero-lateral (LL) cephalograms, prior to, and at the end of treatment.
SUBJECTS/METHODS: Two experimental groups were formed, one treated with the RPE appliance (N=11, 73% male, median age 11.3 years, [IQR 10.3-11.8 years]) and the other treated with the RPE appliance in combination with

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the FM (N=13, 31% male, median age 10.9 years [IQR 9.7-11.9 years]). The decision on adding the FM was based on the findings: wits appraisal ≤-2mm, an anterior crossbite or incisor end-to-end relationship. The sample size was estimated based on a previous study. A minimum of 11 participants were required for a power of 0.80 and alpha of 0.05 to detect a difference of 2.4 mm in the airway dimensions.
The LL cephalograms were taken prior to treatment, and at the end of treatment, median treatment duration was 11.0 months (IQR 9.0-12.0 months) in the RPE group and 11.0 months (IQR 9.5-12.5 months) in the RPE+FM group. Following upper airway dimensions were measured: upper airway, upper adenoid, lower airway, lower adenoid, upper pharynx (McNamara), lower pharynx (McNamara). The normality of distribution was tested with the Shapiro-Wilk test. The dependent samples t-test and the Wilcoxon signed rank test were used for comparisons between T0 and T1 for normally and non-normally distributed data, respectively. Differences in airway dimension changes (delta T1 and T0) between the experimental groups were tested with the independent samples t-test.
RESULTS: A significant increase of the upper pharynx was found after treatment in both the RPE group (p=0.033) and the RPE+FM group (p=0.016) The increase of the upper airway in the RPE group was borderline significant (p=0.048). No significant differences were found between experimental groups for changes in airway dimensions after treatment.
LIMITATIONS: No control group.
CONCLUSIONS: Both RPE and RPE+FM treatments induced increase in the upper pharynx dimensions, as the distance between the upper soft palate dorsum and upper posterior pharynx wall increased.

Abstract citation ID: cjae081.475
SP183 THE INVESTIGATION OF THE DAMAGE THAT OCCURS ON ENAMEL SURFACE DUE TO THE REMOVAL OF METAL AND DIFFERENT TYPE CERAMIC BRACKETS: AN IN-VITRO STUDY

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AIM: To determine the influence of the debonding process applied to remove fixed orthodontic appliances on the enamel surface.
METHODS: 105 extracted premolar teeth were randomly divided into 5 groups. The enamel surfaces were evaluated in-vitro, before bonding and after removal of 5 types of brackets. The roots of these teeth were embedded in acrylic blocks, leaving the crowns outside. SEM images were obtained from the buccal tooth surfaces. Metal brackets (Master Series) were used in group A, monocrystalline ceramic brackets (Inspire Ice) in group B, silane coated monocrystalline ceramic brackets (Inspire Ice) in group C, polycrystalline ceramic brackets (Symetri) in group D, and silane coated polycrystalline ceramic brackets (Symetri) in group E. All brackets were bonded using adhesive resin (Transbond XT). SBS (shear bond strength) test was applied using universal test machine following the bonding procedure and SBS values were noted in MPa unit. The residual adhesive amount was determined by ARI scoring. After cleaning the tooth surfaces with a tungsten carbide bur, SEM images were obtained once again to determine the effect of debonding on the enamel surfaces. The changes in the number of enamel cracks and the length of the longest enamel crack were examined. Shapiro-Wilk test was used for testing the normality of variable distribution, One Way ANOVA test was used for the comparisons between the groups and Pearson correlation analysis was used for testing the relationship between the variables.
RESULTS: The highest SBS value was obtained in group E (20.59 MPa), whereas the lowest in group A (12.22 MPa). The difference between the groups for SBS values was significant (p<0.001). The highest ARI score was seen in group A (4.1), showing a significant difference (p<0,001) between all other groups. The changes observed both in Enamel Crack Number and in Enamel Crack Length from T0 to T1 were significantly higher (p<0,001) in groups D and E, compared to groups A, B, C.
LIMITATIONS: The in-vitro study design and debonding the brackets using universal test machine rather than debonding pliers.
CONCLUSIONS: Polycrystalline ceramic brackets caused more enamel surface damage, in comparison to metal and monocrystalline ceramic brackets.

Abstract citation ID: cjae081.476
SP184 ACCURACY OF INTRAORAL SCANS IN PATIENTS WITH CLEFT LIP AND PALATE: A PROSPECTIVE NON-RANDOMIZED COMPARATIVE CLINICAL TRIAL

Dr Christiane Keil[1], Sheila Keil[1], Dr Michaela Buckova[2], Prof Dr Dr Theodosia Bartzela[1], Prof Dr Dr Günter Lauer[2]; [1]*Department Of Orthodontics, University Hospital Carl Gustav Carus, Technische Universität Dresden,* [2]*Department of Oral Maxillofacial Surgery, University Hospital Carl Gustav Carus, Technische Universität Dresden*

AIM: Patients with cleft lip and palate (CLP) form a group of patients with special requirements for impression taking. Intraoral scanners offer a comfortable and faster process for impression taking. However, there are currently only a few studies on the use and accuracy of intraoral scans in newborns with this condition. The aim of this study was to compare and evaluate the dimensional accuracy of digital dental impressions from intraoral scanning compared to conventional impressions of the maxilla of patients with CLP.
MATERIALS AND METHOD: For the comparison and evaluation of the dimensional accuracy of digital and conventional impressions, 37 infants with CLP were selected. Conventional impressions were constructed, and digital casts using the Trios® 4 Wireless PodPen (3Shape, Copenhagen, Denmark) were acquired from each patient prior to lip and/or palate surgical closure. Plaster models were digitized using the intraoral scanner. Nine reference points were marked for the measurements of eight linear distances using the computer software OnyxCeph3™ (image-instruments, Chemnitz, Germany). The individual measurements were compared in pairs by carrying out an equivalence test. For each measured distance, a difference of 100 µm was defined that could have clinical relevance.
RESULTS: Twenty-one infants had intraoral scans and alginate impressions taken prior to lip closure, and 21 infants prior to surgical palatal closure. Children with isolated cleft lip, unilateral, and bilateral complete CLP were considered. All measured values determined fulfilled the required condition in the Anderson-Darling test so that a normal distribution within the samples was assumed. Equivalence could be demonstrated for all measured values. The conventional plaster models and the intraoral scans correspond, whereby the measured distances for the plaster models were mostly slightly larger. The differences were 10 to 90 µm and were, therefore, not clinically relevant.
CONCLUSION: In patients with cleft lip and palate, the accuracy of the intraoral scan was equivalent to that of the alginate impression. The practical limitation of intraoral scanners for use on patients with cleft lip and palate is currently reflected primarily in the size of the scan head.

Abstract citation ID: cjae081.477
SP185 CORRECTION OF METAL ARTEFACTS AROUND ORTHODONTIC MINI-IMPLANTS – A MICRO-CT STUDY IN THE RAT TAIL MODEL

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BACKGROUND: Micro-CT enables volumetric analysis of peri-implant tissue, but grey value alterations due to metal artefacts can impair analyses.
AIMS: The present study aimed to assess (1) to which extent peri-implant grey values are affected by metal artefacts at increasing distance to the implant, and (2) whether mathematical correction is possible.
SETTINGS AND DESIGN: In nine rats, two orthodontic mini-implants (OMIs) were placed in a single tail vertebra. Ex-vivo micro-CT scans were performed before (T0) and after (T1) careful removal of the OMIs.
METHODS AND MATERIALS: Micro-CT scans with (T0) and without (T1) OMI were registered and differences in local grey values were computed at increasing distance to the implant (10.4 µm to 405.6 µm). Correction coefficient (CC) computation was performed using a piecewise polynomial function (PPF), with the distance to the implant as the independent and the grey value difference as the dependent variable. To validate the effectiveness of the CC, the amount of calcified bone volume per total volume (BV/TV) was assessed within nine standardized volumes of interest (VOIs) reaching up to 1 mm around the OMIs before and after the application of CC, and the agreement with scans without OMI (T1-T0 differences) were assessed between corrected and uncorrected scans using the Wilcoxon signed-rank test.
RESULTS: The grey-value-agreement between uncorrected T0 and T1 scans was low in proximity to the implant (32.7%±6.11%) and improved (93.4%±4.46%) at more distant positions. Most of the impairments were observed up to a distance of 100 µm. CC computation revealed a satisfactory fit (R2=0.989, RMSE=0.031) and agreement in grey values was significantly higher after correction (p <.001), but overcorrection was observed in three out of nine VOIs.
CONCLUSION: Within the limitations of this study, metal artefacts decreased with increasing distance to the OMIs, and significant improvement was possible using the CC.

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SP186 QUANTITATIVE LIGHT-INDUCED FLUORESCENCE FOR IN VIVO CARIES DIAGNOSTICS IN ORTHODONTIC PATIENTS

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BACKGROUND/OBJECTIVES/AIMS: Dental caries in the permanent dentition is the most prevalent chronic infectious health condition and additionally the most prevalent side effect of orthodontic treatment. Early detection of dental caries is considered a primary goal to maintain a minimally invasive approach. Moreover, diagnostic methods are needed to address the issues of predicting, preventing and treating caries. The overall objective of this study was to compare caries diagnostic methods for caries registration on the smooth buccal surfaces.
MATERIALS/METHODS: Baseline caries on the smooth buccal surfaces were recorded in orthodontic patients (n=485) from 10 National Specialist orthodontic clinics using the 1-, 4- and 8 site indices through a) clinical visual-inspection (VI), b) on 3 intra-oral photos (Canon, Sigma EM-140 DG), and c) on 3 intra-oral quantitative light-induced fluorescence photos ((QLF) Qraycam device, AIOBIO, Seoul, Republic of Korea) after calibration on orthodontic patients with low, medium and high caries profiles (n=30).
RESULTS: There was a high intra- and inter-variability for all three methods (0.97 vs 0.96). There was a significant difference between 1 site vs 4 and 8 sites (p=.002,.002 and.008). The sensitivity differed significantly by means of registered number of lesions in the order of QLF > Photo > visual inspection (p<.001). In the cohort study 55.5%, 77.1% and 92.8% of the patients displayed WSL, respectively.
LIMITATIONS: Calibrated caries teams performed the clinical visual inspection while registration on photos and QLF photos were performed by one calibrated examiner.
CONCLUSIONS/IMPLICATIONS: QLF allows for the early detection i.e. induction of dental caries. Photos and visual-inspection are advantageously used as complementary detection methods for caries differential diagnosis. Sensitive methods open up possibilities to distinguish between the induction and progression of caries, which hypothetically may have different etiologies, where induction has a genetic cause, and progression is lifestyle-dependent.

Abstract citation ID: cjae081.479
SP187 THREE-DIMENSIONAL MICROMORPHOLOGY OF HUMAN MIDPALATAL SUTURE AND PTERYGOMAXILLARY ARTICULAR COMPLEX

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BACKGROUND: Patency of human sutures has been of great interest in orthodontics and dentofacial orthopedics, but the pattern of maturation and synostosis of facial sutures is largely unknown.
OBJECTIVES: The present study aimed to investigate the three-dimensional micromorphology of human midpalatal suture (MPS) and pterygomaxillary articular complex using micro-computed tomography.
MATERIALS AND METHODS: Human midpalatal suture (MPS) and pterygomaxillary articular complex from eight subjects' (five males, three females, 72–88 years old) autopsies were longitudinally scanned with micro-computed tomography. Sutural micromorphology was assessed by interdigitation index (II), obliteration index (OI) and obliteration number. Intergroup comparisons were performed with Kruskal-Wallis and Mann-Whitney U with Bonferroni correction (α= 0.005). Correlation with anteroposterior and craniocaudal gradients was assessed with Spearman's correlation test (α = 0.05).
RESULTS: The examined specimens showed overall regional obliteration throughout the entire suture area, with greater obliteration observed in the pterygomaxillary region. Maxillary region of MPS presented a higher II (1.50) and obliteration number per slice (8). OI was the highest in palatomaxillary (35%), followed by pterygopalatine suture (25%) (P < 0.005). The II and OI of MPS exhibited only a weak anteroposterior gradient, with relatively low correlations.
CONCLUSION: The findings of the present study contradict the previously known stages of maturation and imply that the success of nonsurgical maxillary expansion may predominantly depend on individual variations in sutural morphology and maturation, rather than specific appliance design.

Abstract citation ID: cjae081.480
SP188 GENES ENCODING MEMBERS OF THE WNT SIGNALLING PATHWAY AND THE RISK OF THIRD MOLAR AGENESIS

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AIM: Tooth agenesis is the most common craniofacial congenital anomaly. Many genes and pathways have been involved in tooth agenesis aetiology, including genes in the Wnt signalling pathway. Although genes involved in tooth agenesis have been extensively studied, third molar agenesis is commonly excluded from these analyses. Therefore, in the present genotype-phenotype study, we investigated if polymorphisms in WNT genes are involved in non-syndromic third molar agenesis aetiology.
METHODS: This cross-sectional study evaluated orthodontic patients. DNA extracted from saliva was used for genotyping analysis and panoramic radiographs were used to identify third molar agenesis. Patients with other types of tooth agenesis and/or born with oral cleft were excluded. To minimize genetic bias, only one patient per family was included. The genetic polymorphisms rs10177996, rs3806557 and rs7349332 in WNT10A and rs6754599 in WNT6 were selected. Allelic discrimination analysis was performed using real-time PCR. Allele, genotype, and haplotype frequency were compared between third molar agenesis and control groups with an established alpha of 5%.
RESULTS: A total of 159 patients were included. Among them, 41 (25.8%) patients presented at least one third molar agenesis, while 118 (74.2%) patients presented all 32 teeth and were used as controls. Gender was not significantly different among third molar agenesis and control groups (p=0.967). Genotype and allele distributions for the studied genetic polymorphisms in WNT10A and WNT6 were not significantly associated with third molar agenesis (p>0.05).
CONCLUSION: The studied genetic polymorphisms in WNT10A and WNT6 were not involved in third molar agenesis risk.

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SP189 FIBROBLAST GROWTH FACTOR RECEPTOR 2 IS ASSOCIATED WITH MANDIBULAR RETROGNATHISM

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AIM: Fibroblast growth factor receptor 2 (FGFR2) polymorphisms regulate transcriptional expression and osteogenic differentiation of FGFR2. Genes in FGFR2 have been associated with skeletal malocclusions. Thus, in this study we aimed to investigate the association of candidate polymorphisms in FGFR2 and mandibular retrognathism in Germans.
METHODS: This cross-sectional study evaluated orthodontic patients. DNA extracted from saliva was used for genotyping analysis and digital pre-orthodontic treatment lateral cephalograms were examined to measure the SNB and ANB. Patients with a retrognathic mandible (SNB < 78°) were included as cases, while patients with an orthognathic mandible (SNB = 78°– 82°) were included as controls. Six candidate genetic polymorphisms in FGFR2 (rs2162540, rs2162540, rs10736303, rs1078806, rs11200014 and rs1219648) were selected based on previous studies and genotyped using real-time PCR. Allele, genotype, and haplotype frequency were compared between mandibular retrognathism and orthognathic groups with an established alpha of 5%.
RESULTS: Finally, 146 patients were included in this study (50 orthognathic mandible, 96 retrognathic mandible). The studied genetic polymorphisms were within the Hardy-Weinberg equilibrium. The genetic polymorphism rs2981578 was associated with mandibular retrognathism in the co-dominant (p=0.029), dominant (p=0.009) and allele (p=0.023) models, in which patients carrying the C allele had an increased chance to present mandibular retrognathism.

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CONCLUSION: The genetic polymorphism rs2981578 in FGFR2 is associated with mandibular retrognathism. Our results support the hypothesis that FGFR2 could be a biomarker for mandibular retrognathism.

Abstract citation ID: cjae081.482
SP190 VALIDITY OF DIGITAL OCCLUSAL RELATIONSHIP ANALYSIS

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BACKGROUND / AIM: When using digital model analysis, the different programs offer convenient standard projections. Whether these are accurate for occlusal relationship analysis, has never been assessed. Therefore, the aim of this study was to compare the sagittal occlusal relationship diagnosed by means of physical models and two different projections of digital models.
MATERIAL AND METHODS: The sagittal molar and canine relationship of 21 models was assessed by 20 experienced orthodontists using a rating scale. Overjet was estimated by single-choice-categories. The conventional diagnosis was based on physical printed models and defined as gold standard. For the digital models, two different 2D-projections were presented: 1) "standard projection" perpendicular to the midsagittal plane and 2) "individualized projection" perpendicular to a line connecting the upper cuspid tip with the distobuccal cusp of the first molar. All models and the projections were presented in randomized order, respectively. Besides descriptive analysis, assessment methods were compared using the Mann-Whitney-U-test.
RESULTS: The response rate was 95% (n=19). Within every method, the assessment of sagittal occlusal relationships showed only minimal deviations up to 1/10 cuspid widths (CW) for canines and first molars. Using the "standard projection", molar occlusion was assessed more distal ($p>0.001$) compared to physical models (first molars: mean 0.09±0.09 CW, max. 0.33 CW / canines: mean 0.11 ± 0.10 CW, max. 0.30 CW). Using the "individualized projection", molar occlusion was assessed more mesial compared to physical models (first molars: mean 0.11±0.09 CW ($p<0.001$), max. 0.37 CW / canines: mean 0.05±0.07 CW ($p=0.006$), max. 0.21 CW). The overjet was estimated larger (+0.14±0.44 categories) using the "standard projection" and smaller (-0.14±0.45 categories) using the "individualized projection" compared to the plaster model.
CONCLUSION: Even if the mean differences seem to be small, differences larger than ¼ cusp widths in the assessment of sagittal occlusal relationships using standard projections of digital models compared to physical models were obtained in 24% of projections. All in all, standardized 2D-projections of digital models are not sufficiently accurate for diagnosis of sagittal occlusal relationships, especially for outcome quality assessment.

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SP191 CROWN SIZE AS A MAJOR CAUSE OF MANDIBULAR CANINE IMPACTION

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AIM: As a first study ever to measure dimensions of impacted mandibular canines and to evaluate them as a major etiologic factor in mandibular canine impaction
MATERIALS AND METHODS: 65 patients diagnosed with impacted mandibular canine were recruited from maxillofacial surgery and orthodontic department. All obtained proper CBCT scans. 26 patients were removed from research because of their clearly obvious aetiology of impaction (odontoma, cyst, supernumerary teeth and overretained deciduous canine). Finally, 39 patients (23 males, 16 females), aged 10-19 years old were included into research. All 39 CBCT scans were imported into imaging software InVivo6 (Anatomage, Santa Clara, USA) where mandibular canine dimensions were measured: mesio-distal (M-D), bucco-lingual (B-L) measurements of the crown, length of the crown (Lc) and length of root (Lr). Beside this, software enables to calculate volume of tooth (Vt), volume of the crown (Vc) and root (Vr) separately. Impacted canines were compared with canines from contralateral side and control group.
RESULTS: Impacted mandibular canines had significantly larger dimensions of crown (M-D 6,802mm, B-L 7,35mm, Lc 10,43mm, Lr 12,98 mm) than canines from control group (M-D 6,655mm, B-L 7,224mm, Lc 10,16mm, Lr 14,05 mm), but they had almost the same size as canines from contralateral side (M-D 6,842mm, B-L 7,39 mm, Lc 10,36mm, Lr 14,11 mm). Impacted mandibular canines had shorter and smaller root than canines from contralateral side and canines from control group. Volume of their root (Vr 359,07mm3) was approximately equal to the volume of the crown of impacted canines (Vc 359,28mm3). Canines from contralateral side (Vr 391,9mm3) had equal volume of root as roots from control group (Vr 391,53mm3). Overall, canines (crown plus root together) from contralateral side (Vt 753,73mm3) are bigger than canines from control group (Vt 718,89mm3).
CONCLUSIONS: Crown size should be considered as a major etiologic factor in mandibular canine impaction, especially for canines with seemingly unknown aetiology.

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SP192 INTERPRETABILITY OF DEEP LEARNING-BASED ANGLE CLASSIFICATION BASED ON INTRAORAL PHOTOS

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OBJECTIVES: We aimed to employ deep learning for classifying sagittal dental malocclusions based on digital intraoral photos according to the orthodontic Angle classes, and to explain the reasoning for the classification using visualizations (explainable AI/XAI)
MATERIALS AND METHODS: 5266 clinical RGB images showing the dental occlusion from the lateral view were classified into Angle classes I (44%), II (36%) and III (20%) by orthodontic experts. The dataset was divided into separate training, validation and test sets (4280/474/512 images respectively). A VGG-11 model was trained and evaluated on this dataset. Three different XAI methods were applied (Layerwise Relevance Propagation (LRP), PatternNet and PatternAttribution) to obtain heatmaps highlighting the relevant areas for the classification.
RESULTS: The deep learning-based model correctly classified 75% of the images of the test set. The model achieved a high predictive performance across all three Angle classes, with the area-under-the-receiver-operating-characteristic-curve being 0.91, 0.90 and 0.91 for Angle class I, II and III respectively. The most frequent misclassifications were for Angle class I as Angle class III, and Angle classes II and III as Angle class I. XAI highlighted the area surrounding the first molars being decisive for classification across classes, while different XAI methods yielded different additional relevant areas being utilized for image classification.
CONCLUSION: Deep learning was suitable to classify sagittal dental malocclusion into the respective Angle classes I, II and III on intraoral photos. XAI found the classification to be based on clinically relevant features.
IMPLICATIONS: Explainability of AI is crucial for a successful implementation in clinical practice. Different XAI methods reflected on different features; combining different XAI methods may allow comprehensive assessment of a model's classification logic and may accelerate the transfer into clinical application.
KEYWORDS: Artificial Intelligence, Deep Learning, Digital orthodontics, Orthodontic malocclusions, Angle classification, digital photography.

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SP193 THREE-DIMENSIONAL ASSESSMENT OF UPPER MOLAR DISTALIZATION USING ORTHODONTIC ANCHOR SCREW AND PALATAL LEVER ARM

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AIM: This study aimed to assess upper molar distalization using orthodontic anchor screws and palatal lever arms in three dimensions.
MATERIALS AND METHODS: Model teeth of a heat induction typodont system (Dentos, Daegu, S. Korea) ideally aligned with 0.022-slot brackets and a 0.019×0.025-inch stainless steel archwire were used in this study. Two orthodontic anchor screws were fixed in the median palatal region, and a palatal lever arm was placed. The lever arm tip was positioned distal to the second molar, and the hook length was 7 mm apical to the archwire. According to the retraction hook length of the first molar, the 3 mm, 7 mm, and 11 mm groups were defined. Two-millimeter distalization of the upper molars was performed using chain elastics, thereby applying a force of 300 g per side using a heat induction device. This process was performed 10 times. Upper dental arches were scanned using an intraoral scanner. The 3D images before (T0) and after (T1) distalization were superimposed on the orthodontic anchor screw. The variables of the first molar position were measured as follows: lateral displacement, vertical displacement,

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mesiodistal displacement, lateral angulation, and mesiodistal angulation. A statistical analysis was performed to test changes in tooth position based on the length of the retraction hook.
RESULTS: All groups demonstrated significant buccal displacement. The 3 mm and 7 mm groups showed significant intrusion, while the 11 mm group showed significant extrusion. All groups showed significant distal displacement. The 7 mm and 11 mm groups showed significant buccal tipping. The 3 mm and 7 mm groups showed significant distal tipping, while the 11 mm group showed mesial tipping. In the 7 mm group, the mesiodistal displacement was close to the parallel displacement.
CONCLUSIONS: Distalization from the 7-mm length hook of the palatal lever arm to the 7-mm length retraction hook is suggested to be highly similar to the bodily movement of the first molar.

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SP194 LEVELS OF VITAMIN D3 AND THYROID STIMULATING HORMONE IN PREADOLESCENT SCHOOL-AGED CHILDREN WHO WERE BORN PPE-TERM: A PROSPECTIVE PRELIMINARY STUDY.

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AIM: To compare the levels of Vitamin D3 [25-(OH)D] and thyroid stimulating hormone (TSH) between preadolescent school- aged children that were born full-term and pre-term.
MATERIALS AND METHOD: Initially, a power analysis for sample size calculation was performed, and subjects were recruited prospectively in a consecutive order and divided into two groups according to gestational week of birth. The first group [PRE-TERM] included 38 school-aged children prematurely born at 37 gestational weeks or less, evaluated on their regular check-up. The second group [FULL-TERM] included 35 full-term children, born at 38 gestational weeks or later. The first group was further divided into two subgroups, [EARLY PRETERM], consisting of 12 pre-term children born at 32 gestational weeks or less and [LATE PRETERM], including 26 children who were born pre-term between 33 and 37 gestational weeks. In all patients a medical history exam, a complete perinatal history with all hospitalization factors in Neonatal Intensive Care Unit was recorded, and venous blood samples were collected. The samples were tested for the levels of Vitamin D3 and of the TSH. A Vitamin D3 concentration of below 24 ng/ml was considered as inadequate. Based on Vitamin D3 levels subjects were characterized as exhibiting a serious deficiency, adequacy, inadequacy, or toxicity of Vitamin D3. Regarding the TSH, based on its normal values ranging from 0.7 to 4.17 μIU/ml, children were characterized as displaying inadequacy, adequacy, or toxicity of TSH. Data was tested for normality using the Kolmogorov-Smirnov test. A logistic regression model was adopted to study differences between groups. The level of statistical significance was set to 0.05.
RESULTS: Pre-term birth was associated with statistically significant decreased values of Vitamin D3 and higher TSH values. For both Vitamin D3 and TSH, statistically significant differences were found between the FULL-TERM and PRE-TERM groups as well as between the FULL-TERM group and EARLY PRETERM group. Nonetheless, no statistical differences were found between EARLY and LATE PRETERM groups.
CONCLUSIONS: In this preliminary study, a weak association was found between pre-term birth and levels of Vitamin D3 and TSH. Further research should be rendered to elucidate the findings of this study.

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SP195 RESEARCH ON THE SELECTION OF CHEWING GUM SUITABLE FOR MASTICATION TRAINING BY FOOD TEXTURE ANALYSIS

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BACKGROUND: In recent years, it has been pointed out that there is a relationship between soft foods and the increase of malocclusion and stunted growth of the jawbone in Japanese children. This is due to the fact that soft foods allow children to eat without fully exercising their masticatory function, and chewing hard foods well is recommended for the growth and development of the jaw. However, "hardness" is expressed in terms of various physical characteristics (food texture), and it remains to be elucidated what kind of mechanics are involved in the growth and development of the jaw.
OBJECTIVES: To investigate the effects of different physical characteristics (food texture) of gum and develop effective chewing gum for mastication training.
MATERIALS & METHODS: The subjects were 30 members of our medical department (14 males and 16 females, mean age 28±3.28 years), and the test foods were four kinds of gum with different properties (A, B, C, and D). Texture was measured using a SHIMADZU EZ-SX compact table-top tester. Measurement items were masticatory movement (masticatory path width, masticatory speed: DigiGnatho Corporation Rise) and average muscle activity (masseter muscle, temporal muscle: NORAXON electromyograph, Ultium Corporation Sakai Medical) when the various gums were chewed. Dunnet's multiple comparison test ($p<0.05$) and Spearman's rank correlation coefficient ($p<0.05$) were used for statistical analysis.
RESULTS: In the texture analysis, Gum A had the highest food texture in all items. The chewing path width and muscle activity of masticatory muscles tended to be the highest in chewing gum A, indicating grinding type chewing. From these results, it is considered that the chewing path width was increased by the gum with higher texture parameter, and the grinding type mastication was promoted. In this study, we reported that grinding-type mastication is important for the prevention of malocclusion by increasing the width of the mandibular dentition, which causes buccal up righting of the mandibular molars.
CONCLUSIONS: The study suggests that chewing gum with high physical characteristics such as chewability is effective for mastication training during growth and development period by inducing gliding type mastication.

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SP196 ORTHODONTICS AFTER CORONAVIRUS PANDEMIC - CHALLENGES AND CHANGES IN SLOVENIA

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AIM: The aim of survey was to examine and evaluate how orthodontists, members of Slovenian Orthodontic Society (SOS) and teams tackled new conditions, strategies and measures during and after the coronavirus pandemic. The emergence of new conditions has posed many workflow challenges to orthodontic teams to cope with. The interest in specialization in ortodontics among graduates doctors of dental medicine and changes in national public health system among orthodontists after pandemic were also observed.
SUBJECTS AND METHODS: All active members of SOS were invited to participate in survey by mailing list. Subjects were orthodontists working either in public or private practices. Questionnaires were prepared and online survey was performed five times: at T0 (general lockdown), at T1 (reopening), at T2 and T3 (6 months and 2 years after reopening), at T4 (end of epidemic). Questions adressed protective measures, protective equipement, triage protocols, infection prevention control, staff training, appointment schedule and lenght, treatment techniques changes, digital procedures implementation: scanning, in-office printing, remote screening, teleorthodontics, dental monitoring and artificial intelligence approach. Data about interest in specialization in ortodontics among dental graduates and changes in national public health system teams after pandemic were collated. Data were analysed using SPSS programme.
RESULTS: In survey participated 56 active orthodontists, aged 30-75 years. Results confirmed that orthodontic field was severely affected during coronavirus pandemic, because of high potential of pathogen transmission, missed apointmets due to strict safety measures and fear, long orthodontic treatment duration and its elective nature. Among the most important challenges alongside treatement safety were accelerated transition to digitized procedures, remote consultations and monitoring, shift to aligner treatments and teleorthodontics. Interest for specialization among young graduates and exit of specialists from public services are both extremely high.
CONCLUSIONS: Safe conditions in orthodontics require understanding of pathogen transmission in aerosol generating clinical procedures. Although orthodontics has esthetic and elective aspects, it does not mean that no emergency would occur. Teleorthodontics and remote monitoring should be offered only temporarily. Although there is a high interest in specialization of orthodontics among graduates, appropriate measures to retain orthodontic specialists in national public services should be prepared and adopted.

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SP197 RECOGNITION ACCURACY OF FACIAL RECONSTRUCTIONS: 3D PHOTOGRAPHIES COMPARED TO FACIAL RECONSTRUCTIONS COMPOSED FROM CONE BEAM TOMOGRAPHIES AND AVERAGE SOFT TISSUE DEPTHS

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AIM: To examine the recognition accuracy of patients' facial reconstructions, generated using data from Cone Beam Computed Tomography (CBCT) scan in comparison to the patients' 3D photos.

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MATERIALS & METHOD: CBCT scans and 3D photos from fourteen subjects (3 male, 11 female) were included in this study. For each of the included subjects, three different digital facial reconstructions were made using the open-source software Blender and data from a standardized soft tissue depth database containing information about mean soft tissue depths at different craniofacial anatomical landmarks in various sex, age, and body-mass-index (BMI) in a Caucasian population. The digital facial reconstructions generated represented three different body types with varying BMI. Seventeen participants, dentists undergoing postgraduate orthodontic education, were asked to compare the developed facial reconstructions to the "true" corresponding 3D photographs of the patients. Initially, each participant was presented with 130 unique combinations pairings the "true" 3D photo and a suggestion for an associated reconstruction. The participants were asked to determine whether each reconstruction accurately matched the 3D photograph. Subsequently, participants were also required to identify the most accurate reconstruction of a patient from three variations (slender, normal, and obese) based on the patient's body type as depicted in the 3D photograph.
RESULTS: Out of 130 possible combinations (CBCT & 3D photos), the mean recognition accuracy rate among the 17 participants was 66,1%. When comparing the three body type reconstructions (slender, normal, and obese) to the actual body type as shown in their 3D photograph, the correct identification of the matching body type reconstruction was achieved with a recognition accuracy rate of 42.0%.
CONCLUSSION: Participants demonstrated a moderate ability to recognize patients in facial reconstructions created from Cone Beam Computed Tomography (CBCT) scans using a large-scale soft tissue thickness database. However, their capability to accurately match the reconstructions with the patients' actual body types was notably less effective. The method used for making the reconstructions showed the possibility to create reconstructions with fairly resemblance to the patient's "true" 3D photo. Facial traits as perceived by dentists and orthodontists seems to be recognizable on reconstructions based on standardized soft tissue depths.

Abstract citation ID: cjae081.490
SP198 THREE-DIMENSIONAL PLANNING IN BILATERAL SAGITTAL SPLIT OSTEOTOMY: COMPARISON OF THE PLANNED VERSUS ACTUAL JAW MOVEMENT

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AIM: The aim of this prospective study was to assess the precision of 3D-planned movements of proximal and distal segments in Bilateral Sagittal Split Osteotomy (BSSO) operation.
MATERIALS AND METHODS: The study group consisted of 15 patients who underwent BSSO at the Department of Oral and Maxillofacial Diseases, Helsinki University Hospital, Helsinki, Finland from 2018 to 2022. All of the 15 patients (4 males and 11 females) were treated orthodontically with fixed appliances before and after BSSO operation. The mean age of the study sample was 32.5±10.6 years. During the virtual planning special focus was put on deciding the movements of the condyles to avoid excess rotations and postoperative condylar relapse.
Surgical movements were investigated, with specific focus on proximal segment rotations (pitch, roll and yaw) as well as the positional changes of the Pogonion in the vertical and sagittal planes after navigation guided BSSO using patient specific implants (PSI).
Cone beam computed tomography (CBCT) scans were taken at three different time points: Pre-surgery (T0), immediately post-surgery (T1). The scans were analyzed with Dolphin Imaging ® 3D (12.0.958) and Q3DC, 3D Slicer Software (5.6.0).
RESULTS: The average mandibular advancement was 7.6±3.3mm. A mean vertical movement was 2.7±1.5mm. Patients were divided into two groups. Group 1 consisted of patients whose planned jaw movement was <6mm and Group 2 consisted of patients whose planned jaw movement was >6mm. In Group 1 and Group 2 a real Pogonion movement sagittally differed from planned movement 0.68±0.33mm and 1.23±0.77mm, respectively.
Mean rotations of proximal segments were found to be 2.8°±1.26° (roll), 1.8°±1.01°(pitch) and 1.4°±0.52°(yaw). The mean difference between planned and measured real rotations were 1.2°±0.74° (roll), 1.2°±0.70° (pitch) and 1.5°±0.58° (yaw).
LIMITATIONS: This prospective study consisted of only 15 patients.
CONCLUSIONS: 3D planning of BSSO is predictable for movements of mandible.

Abstract citation ID: cjae081.491
SP199 CANCER HISTORY AND THIRD MOLAR AGENESIS – AN ASSOCIATION IN ORTHODONTIC PATIENTS

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BACKGROUND: Tooth agenesis is a common congenital anomaly observed in orthodontic practice. Current literature supports that the congenital absence of one or more teeth may share the same genetic background with the development of some types of cancer. Thus, the aim of the present study was to evaluate the association between third molar agenesis and a family history of cancer in orthodontic patients.
METHODS: In this cross-sectional study dental treatment records from orthodontic patients were evaluated. Third molar agenesis of one or more molars were diagnosed in panoramic radiographs. For data collection, a questionnaire asking for demographic information such as age and gender was used. Detailed information about the family cancer history of the patients including the degree and number of relatives affected (up to the second generation) and the types of cancer was recorded. Patients with oral cleft, syndromes or other tooth agenesis besides third molars were excluded. Statistical analysis was performed using the chi-square test and Fisher's exact test with an established alpha of 5%.
RESULTS: A total of 41 patients with third molar agenesis and 118 controls (with all 32 permanent teeth) were included. Gender and age were not statistically significant different among the groups ($p > 0.05$). None of the probands/patients presented with cancer history. A statistical significance was observed only for the positive self-reported history of cancer in the first degree-relatives, in which patients with third molar agenesis had a higher chance to report family history of cancer than controls ($p = 0.030$; odds ratio = 3.26, confidence interval 95% = 1.15 - 9.10).
CONCLUSIONS: In the present study, third molar agenesis was associated with self-reported family history of cancer in the orthodontic patients. Future larger studies are necessary to confirm this association.

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SP200 POLYMORPHISMS IN ORAL-CLEFT-RELATED GENES ARE INVOLVED IN FACIAL MORPHOLOGY

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BACKGROUND: Facial shape and size variations are one of the most significant phenotypes in humans. However, research concerning the genetic basis of facial morphology is uncommon. It is possible that polymorphisms in oral cleft-related genes are involved in facial morphological variations in non-cleft patients. Therefore, the present study aimed to evaluate the association between genetic polymorphisms in oral cleft-related genes and facial traits variations in non-cleft individuals.
METHODS: Biologically unrelated Brazilians were screened. Patients with no craniofacial anomalies such as oral cleft and oligodontia, without facial trauma history or previous orthodontic treatment were included. Linear measurements from standardised facial photographs taken prior to orthodontic treatment were examined and facial proportions were calculated for facial traits evaluation. Genomic DNA was extracted from buccal cells from saliva. Polymorphisms in the oral cleft-relates genes BMP2 (rs235768 and rs1005464), BMP4 (rs17563), WNT3A (rs708111) and WNT11 (rs1533767) were analysed by real-time polymerase chain reaction. The deviation of the Hardy–Weinberg equilibrium was evaluated using the Chi-square test. The associations between facial proportions and genotypes were analysed. ANOVA was carried out to establish the significance of means differences among genotypes with an established alpha of 5%.
RESULTS: A total of 58 orthodontic patients were included (27 males and 31 females). the studied polymorphisms were in Hardy-Weinberg equilibrium. A whole series of associations were found, namely the ratio of lip proportions (Ch-Ch: Ls-Li) was associated with rs17563 ($p = 0.034$), the polymorphism rs1533767 was associated with lower face proportion (N-Gn: Sn-Gn) ($p = 0.035$) and the polymorphism rs1533767 was associated with the ratio G-Sn: Sn-Gn ($p = 0.028$) as well as the ratio Sn-Gn: Tr-Gn ($p = 0.039$).
CONCLUSIONS: BMP4 and WNT11 were associated with facial traits. Oral cleft-related genes might be involved in facial morphology in non-cleft subjects.

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SP201 SUCCESS AND FAILURE RATES OF MINI-IMPLANT-SUPPORTED MOLAR INTRUSION APPLIANCES BASED ON INDICATION

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BACKGROUND: Molar intrusion is a significant orthodontic challenge. Possible indications include anterior open bites and overerupted molars. Mini-implant-supported appliances have emerged as a viable option to implement intruding mechanisms while eliminating undesirable side effects.
The aim of this study was to evaluate the failure rates of palatal mini-implants used in skeletally anchored molar intrusion appliances and to compare their use in the treatment of anterior open bites and overerupted molars. In addition, the success of molar intrusion as a method of closing open bites and vertical correction of overerupted molars was evaluated.
MATERIALS AND METHODS: A retrospective review was performed of patients from the University Hospital of Düsseldorf, Germany, divided into two groups based on medical indication: anterior open bite correction (OB group, n=33) and overerupted molars due to missing antagonists (OM group, n=37). Case records and photographic documentation were analysed. Implant failure was defined as malfunction leading to loss before successful completion of treatment. Therapeutic success was determined by either correction of the anterior open bite or restoration of the physiologic vertical dimension of overerupted molars.
RESULTS: Both groups had a similar gender distribution, but a significant difference in mean age was observed (OB=18.98 years; OM=28.57 years). There was a significant difference in treatment success rates ($p<0.03$), with 97.3% in the OM group and 81.8% in the OB group. The rate of implant loss was lower in the OM group at 2.7% compared to 9.1% in the OB group. However, these differences did not reach statistical significance.
CONCLUSION: The results of this study demonstrate a generally high success rate of mini-implant-supported palatal mechanics for molar intrusion, accompanied by low rates of mini-implant loss. In particular, the correction of anterior open bites with mini-implant-supported palatal appliances appears to be more challenging than isolated molar intrusion.

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SP202 CHARACTERISTICS OF INNOVATIVE DOUBLE-HINGED FAN TYPE EXPANSION SCREW (DHFES): FINITE ELEMENT STUDY

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INTRODUCTION: Fan type expansion screw used to improve Maxillary transverse discrepancy. Conventional Fan type expansion screw (CFES) has the disadvantage of large anteroposterior diameters, limiting of target patients. Therefore, a Double hinged fan type expansion screw (DHFS) was developed to compensate for the shortcomings of CFES. Finite Element Method (FEM) is useful to evaluate the stress distribution and morphological changes in the dentition and skeleton associated with the activation of the expansion screw. Therefore, the purpose of this study was to compare DHFS with CFES and Hyrax type expansion screw (HES) and to evaluate their effectiveness.
METHODS: ANSYS version 17.0 (Canonsburg, PA, USA) was used for the finite element analysis. A skull FEM model was created using an adult female dry skull as a reference, reproducing the suture around the maxillary bone. Three rapid expansion FEM models were created to compare cranial changes in magnification.
RESULTS: The highest stress accumulation was observed in the zygomatico maxillaris suture area with all 3 appliances. In the median palatine suture, the maximum posterior expansion was achieved with HES, whereas the maximum anterior expansion was observed with CHFE. An increase of stress was noted at the pterygomaxillary fissure and medial and lateral pterygoid plates of the sphenoid bone and the nasal areas.The results of CHFE and DHFS are similar, but the stress accumulation is more pronounced in DHFS.
CONCLUSIONS: Lateral expansion deformity of the maxillary bone was observed with all 3 appliances. CHFE and DHFS have greater anterior maxillary expansion compared to HES. DHFS has better expansion efficiency than CHFE. Forward movement of ANS and PNS was observed in all rapid expansion devices. The stress accumulation was observed in the sphenoid bone. The sphenoocciital synchondrosis was separated.Therefore, DHFS is useful as an appliance to compensate for the shortcomings of CHFS in clinical environment.

Abstract citation ID: cjae081.495
SP203 DIGITAL SETUP ACCURACY FOR MODERATE CROWDING CORRECTION WITH FIXED ORTHODONTIC APPLIANCES: A PROSPECTIVE STUDY.

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AIM: The aim of this study was to evaluate the accuracy of a semi-automatic 3D digital setup process in predicting the orthodontic treatment outcome achieved by labial fixed appliances.
MATERIALS AND METHODS: Twenty-five adult patients (18 to 24 years old) with class I malocclusion and moderate crowding were prospectively enrolled and received treatment on both jaws through the straight-wire technique. Prior to treatment commencement, a semi-automatic digital setup simulating the predicted treatment outcome was performed for each patient through Orthoanalyzer software (3Shape®, Copenhagen, Denmark) to obtain the prediction model (PDM). This was compared to the final outcome model (FDM) through 3D superimposition methods. Metric variables and inspection of color-coded distance maps were used to detect how accurately the digital setup predicts the actual treatment outcome.
RESULTS: The mean absolute distances (MAD) between the superimposed dental arches of the predicted and the final models were: 0.77±0.13 mm following superimposition on the palate, 0.52±0.06 mm following superimposition on the maxillary dental arch, and 0.55±0.15 mm following superimposition on the mandibular dental arch. The MAD at the palatal reference area was 0.09±0.04 mm. Visualization of color-coded distance maps indicated that the digital setup predicted accurately the final teeth position in few cases. Almost half of the cases had posteriorly wider upper and lower dental arches and palatally/lingually positioned or inclined anterior teeth, whereas the rest still showed errors within 2-3 mm, distributed over the entire dental arches with no distinct pattern.
CONCLUSIONS/IMPLICATIONS: The accuracy of semi-automatic prediction of the labial fixed appliance treatment outcome in Class I cases with moderate crowding is not yet sufficient. While average measures showed deviations less than 1 mm, examination of individual color-coded distance maps revealed significant disparities between the simulated and the actual results. Consequently, the tested digital setup procedure needs further improvement to accurately predict the actual treatment result on an individual basis and facilitate treatment planning

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SP204 SELLA TURCICA MORPHOLOGY ASSOCIATION WITH SKELETAL MALOCCLUSION

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AIM: There are some studies suggesting that sella turcica patterns and dimensions are associated with different types of skeletal malocclusion. The aim of the study was to investigate the association between sella turcica morphology and sagittal skeletal malocclusions in German patients.
METHODS: This study evaluated lateral cephalometric radiographs of orthodontic patients. Pre-orthodontic treatment lateral cephalograms were examined to measure the ANB and to assess the sella turcica pattern and calcification. The ANB was used to determine skeletal class I, II and II. The sella calcification was classified according to the calcification of the interclinoid ligament (no calcification, partial calcification, and incomplete calcification) and sella turcica pattern was classified as follow: normal sella turcica, bridge type A—ribbon-like fusion, bridge type B—extension of the clinoid processes, incomplete bridge, hypertrophic posterior clinoid process, hypotrophic posterior clinoid process, irregularity in the posterior part, pyramidal shape of the dorsum, double contour of the floor, oblique anterior wall, and oblique contour of the floor. The sella turcica patterns were compared among groups using chi-square or Fischer exact tests with an established alpha of 5%.
RESULTS: A total of 159 patients were included in this study. 71 patients were skeletal class I, 71 patients were skeletal class I, 78 patients were skeletal class II, and 10 patients were skeletal class III. Calcification was not associated with skeletal malocclusion ($p=0.594$). The sella turcica patterns was associated with the skeletal malocclusion. The prevalence of 'normal sella turcica' was 22.5% in

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skeletal class I, 17.9% in skeletal class II and 60% in in skeletal class III. 'Normal sella turcica' pattern was almost 6 times more common in skeletal class III patients (Odds ratio=5.95, Confidence Interval 95%= 1.59-19.35; p=0.009)
CONCLUSION: Sella turcica pattern differs according to the type of skeletal malocclusion. A larger multicentre study should be performed to investigate this association.

Abstract citation ID: cjae081.497
SP205 AUTOPHAGY REGULATION BY MECHANICAL STIMULATION VIA REACTIVE OXYGEN SPECIES IN HUMAN PERIODONTAL LIGAMENT FIBROBLASTS

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AIM: Autophagy is triggered in response to cellular stress. Reactive oxygen species (ROS) play an important role in mediating the autophagic response, for example in hypoxia and microbial stress. Therefore, the aim of this study was to investigate whether ROS also regulate autophagy as a second messenger with respect to mechanical stress in human periodontal ligament fibroblasts (hPDL cells). Further involved signaling pathways and molecules were to be detected.
METHODS: For 45 min hPDL cells were exposed either to mechanical stress (2 or 8 g/cm2) or hypoxia (1% O2). Unstimulated cells served as a control. ROS and autophagy were quantified via Flow cytometry using Cyto-ID® for autophagy and CellROX™ for ROS as fluorogenic probes. Both ROS scavengers (N-acetylcysteine (NAC) and dimethylurea (DMTU)) and specific antioxidants (Mito-Tempo) were applied to assess the influence of ROS on autophagy. To investigate which signaling pathways could be mediated by ROS, High-throughput phosphorylation antibody arrays were employed. Statistical analysis comprised ANOVA and post-hoc tests (GraphPad Prism).
RESULTS: There was a significant increase in autophagy in both mechanical stress groups on the one hand and a significant decrease in autophagy in the hypoxia group on the other. ROS were significantly decreased in the mechanical stress groups and significantly increased in the hypoxia group and thereby showing an opposing effect. NAC caused a reduction in autophagy in the mechanically stressed cells, while DMTU, which specifically targets hydroxyl radicals, either showed no significant effects (2 g/cm2) or even increased autophagy (8 g/cm2). Mito-Tempo, on the other hand, led to a significant reduction in autophagosomes in every group tested. In 304 phosphorylation sites examined, 26 changes were detected in 22 molecules, 15 of which were associated with autophagy and ROS signaling pathways. The strongest shift to phosphorylation by mito-tempo occurred at the nuclear factor 'kappa-light-chain-enhancer' of activated B-cells (NF-κB) during both mechanical and hypoxic stimulation.
CONCLUSION: ROS quite obviously play a role in mediating mechanically induced autophagy, although autophagosomes and ROS were regulated adversely in PDL Fibroblasts. Among others, especially the NF-κB signaling pathway appears to be involved in ROS-mediated autophagy regulation in hPDL cells.

Abstract citation ID: cjae081.498
SP206 THREE-DIMENSIONAL SOFT TISSUE CHANGES IN ORTHODONTIC PATIENTS AFTER MAXILLARY ADVANCEMENT TREATMENT WITH FACEMASK: A SYSTEMATIC REVIEW

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BACKGROUND/OBJECTIVES/AIMS: The effectiveness of facemask treatment in Class III patients has been extensively evaluated via two-dimensional imaging; however, three-dimensional (3D) imaging techniques can be a valuable tool in assessing soft tissue alterations in the three planes of space. This systematic review aimed to assess the existing evidence regarding 3D soft tissue changes following maxillary protraction with the use of facemask.
MATERIALS/METHODS: Systematic search of 12 electronic databases and additional manual searched were performed up to October 2023. The eligibility criteria included prospective and retrospective studies on humans undergoing orthodontic treatment with maxillary advancement with the use of a facemask, including also control groups of untreated individuals. The outcomes were assessed in terms of alterations of 3D soft tissue measurements.
RESULTS: Two studies, one prospective and one retrospective, were finally included in current review. Both studies compared 3D soft tissue changes resulting from treatment with the protraction facemask compared to untreated control groups. The retrospective study revealed that the lower lip and chin region were directed posteriorly, the midface region and upper lip differed significantly and the pogonion moved downward compared with the control group. In the prospective study, all variables recorded in the study group differed significantly from those recorded in the control group, apart from point B, the pogonion, the cheek areas and the infraorbital points. Both studies were classified as moderate risk of bias.
LIMITATIONS: Heterogeneity among studies and small number of included studies.
CONCLUSIONS/IMPLICATIONS: The evidence of the facemask effects in Class III patients through 3D records is scarce and heterogenous. Further high-quality studies are required to evaluate the three-dimensional effect of facemask on soft tissues in Class III patients, provided that the variables under examination are standardized.

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SP207 BIOMECHANICAL ANALYSIS OF MINISCREW-ASSISTED MOLAR DISTALIZATION WITH CLEAR ALIGNERS: A THREE-DIMENSIONAL FINITE ELEMENT ANALYSIS

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BACKGROUND/OBJECTIVES: To compare the biomechanical characteristics of maxillary molar distalization with clear aligners in conjunction with three types of miniscrew anchorage.
MATERIALS/METHODS: Three-dimensional (3D) finite element models of maxillary molar distalization with clear aligners and three types of miniscrew anchorage were established, including (A) control group, (B) direct buccal miniscrew anchorage group, (C) direct palatal miniscrew anchorage group, and (D) indirect buccal miniscrew anchorage group. The 3D displacement of maxillary teeth and the principal stress (maximum tensile and compressive stress) on the root and periodontal ligament (PDL) during molar distalization were recorded.
RESULTS: The tooth displacement pattern during maxillary molar distalization in the four groups showed similarities, including labial tipping of anterior teeth, mesial and buccal tipping of premolars, and distal and buccal tipping of molars, but with varying magnitudes. Group C exhibited the greatest molar distalization, with the first molar achieving 0.1334 mm of crown distalization. Group D demonstrated a notable buccal crown movement (0.0682 mm) and intrusion (0.0316 mm) of the first premolar. Compared to Groups A and B, Groups C and D showed less labial crown tipping of the central incisor. Group B showed the greatest amount of maxillary incisor intrusion (central incisor: 0.0145 mm, lateral incisor: 0.0094 mm). Moreover, Groups C and D displayed significantly lower levels of compressive and tensile stress in the roots and PDL of the maxillary central and lateral incisors.
LIMITATION: Molar distalization is a dynamic process involving sequential tooth movement stages; however, our research primarily examined the tooth movement patterns in the initial aligner.
CONCLUSION/IMPLICATION: The use of miniscrew anchorage, especially direct palatal miniscrew anchorage, may enhance the treatment efficacy of maxillary molar distalization with clear aligners, leading to increased molar distalization, reduced mesial movement of premolars, and minimized labial tipping of anterior teeth.

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SP208 EVALUATION OF CLINICAL TREATMENT OUTCOMES AFTER EXTRACTION OF FIRST PERMANENT MOLARS IN ORTHODONTICALLY TREATED PATIENTS

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AIM: To assess the orthodontic treatment outcomes of patients treated with extraction of at least one first molar (M1) compared to non-extraction patients.
METHODS: Pre- (T1) and post-treatment (T2) dental casts of 50 patients were evaluated using the PAR index (peer assessment rating). Twenty-five orthodontic

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patients (16 female, 9 male, mean age 12.8 ± 2.9 years) were treated with extraction of at least one M1 (Ex). The second group of 25 orthodontic patients (12 female, 13 male, average age 15.9 ± 8.2 years) was treated non-extraction (Non-ex) and comprised the control group. Patients with distalization mechanics, craniofacial anomalies or syndromes, and clinically or radiographically apparent asymmetries were excluded from the study. The independent t-test was used for PAR score comparisons between the groups (Ex, Non-ex) at the two evaluation time points (T1, T2). Statistical significance was set at $p < 0.05$.

RESULTS: The mean weighted PAR score was 22 at T1 in both groups ($p = 0.95$). The average PAR score at T2 in the Ex group was PAR = 4. In 64% of the Ex-group patients, the PAR reduction was over 70%. In 68% of the Non-ex group, a reduction of over 70% was achieved with an average PAR = 5. The PAR scores were not significantly different between the groups at T2 ($p = 0.45$). The treatment duration was significantly different between the groups, as expected ($p < 0.001$).

LIMITATIONS: Accepting the restrictions of the PAR index, factors such as the treatment duration, prognosis of the third molar eruption, and complexity of the orthodontic treatment mechanics were not considered.

CONCLUSIONS AND IMPLICATIONS: Proper patient selection and the orthodontist's experience in biomechanic challenges yield significantly improved orthodontic outcomes in M1 extraction patients, comparable to the Non-ex orthodontic treatment. M1 extraction and orthodontic space closure should be a therapeutic alternative for orthodontic patients with compromised M1 or molar incisor hypomineralization. These treatment outcomes and the ideal timing of the M1 extraction should guide the clinical practice management of these patients.

Abstract citation ID: cjae081.501

SP209 THE ACCURACY (TRUENESS AND PRECISION) OF BELLUS3DARC-7 AND IN-VIVO ANALYSIS OF INTRA AND INTER-EXAMINER RELIABILITY OF DIGITAL AND MANUAL ANTHROPOMETRY

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BACKGROUND: Three dimensional (3D) facial imaging is becoming a popular method of facial analysis and a means ofanthropometry. There is potential for 3D imaging to provide enough diagnostic information to parallel lateral cephalograms,which could, in time, reduce the need for radiation exposure to patients. The present study aimed to assess the accuracy of theBellus3D ARC-7 (Bellus) camera by comparing the measurements of soft tissue facial landmarks obtained from Bellus scans to themeasurements taken using Vernier callipers.

METHODS: Nineteen anatomical points were located on four subjects using a standard black ballpoint pen on a white, circularsticker. Distances were measured between these points using digital callipers, with the subject in a resting pose. This wasrepeated twice by two examiners for each subject. Two examiners subsequently performed measurements of each subject in asmiling pose. Following landmark identification, images were captured under standard conditions, using the Bellus camera. Thesame measurements were obtained digitally, repeated twice by two examiners for each subject in both resting and smiling poses.

RESULTS: There was high precision in repeated measurements on the digital models, with less than 1.5 mm deviation betweenmeasurements. Both intra-examiner and inter-examiner reproducibility were greater following the digital measurements comparedto manual measurements, with 100% of the digital measurements of landmarks falling within a set threshold deviation of ≤1.5 mm. When comparing the manual and digital measurements, the greatest deviations (>1.0 mm) occurred in regions around the cheeksand lower third of the face, while the measurements for the ears and midline structures (forehead and nose bridge) deviated theleast (≤1.0 mm). This was demonstrated in models at rest and smiling.

LIMITATIONS: A small sample size of 4 subjects was used in this study.

CONCLUSIONS: The Bellus system produced an accurate and true image of the face from which reproducible measurementscan be made within and between examiners. 3D facial images from the Bellus3D ARC-7 system were comparable to directanthropometry, therefore the use of 3D facial scanning in orthodontics for diagnosis and treatment planning appears promising

Abstract citation ID: cjae081.502

SP210 KNOWLEDGE OF LEARNING DISABILITY AND AUTISM OF ORTHODONTIC STAFF AT A UK DENTAL HOSPITAL

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BACKGROUND: Dental procedures, including orthodontic treatment, can be challenging for people on the autistic spectrum or with a learning disability. Previous studies have found that dental professionals may be inadvertently contributing to health inequalities due to lack of understanding and training in providing care to patients with additional needs. In an attempt to address this imbalance in the UK, the Health and Care Act 2022 introduced a legal requirement for all health and social care staff to receive learning disability and autism training.

AIM: The aim of this cross-sectional study was to explore the knowledge of learning disability and autism of staff at a UK Dental Hospital and their self-reported confidence in managing these patients.

METHODS: An 18-item knowledge questionnaire was developed covering four domains: (a) understanding of learning disability, (b) understanding of autism, (c) communication and (d) reasonable adjustments. The questionnaire was piloted prior to distribution to all clinical staff within the Orthodontic Department at the Eastman Dental Hospital in London.

RESULTS: Thirty-five responses were received with representation from all staff groups (consultant orthodontists, specialist orthodontists, specialty registrars/postgraduates and orthodontic nurses). The response rate was 66%. Moderate levels of knowledge of learning disability (average score: 65%) and autism (average score: 62%) were demonstrated by the respondents. The knowledge questions in the communication and reasonable adjustments domains were 50% and 45% respectively, indicating scope for development. Only 54% of respondents felt confident in treating autistic patients, while 46% of respondents were confident with treating patients with a learning disability.

LIMITATIONS: The response rate was 66%, which means the results may not be fully representative of the entire Orthodontic Department.

CONCLUSIONS: Orthodontic staff demonstrated moderate levels of knowledge of learning disability and autism. The two domains with greatest scope for improvement were in communication and reasonable adjustments. As a newly developed formal training in learning disability and autism is currently being rolled out nationally in the UK (the 'Oliver McGowan Training'), it is hoped that this programme will improve both knowledge and confidence of orthodontic practitioners in managing patients with learning disability or autism.

Abstract citation ID: cjae081.503

SP211 FRONTAL POSED SMILE AESTHETICS IN MALAYSIAN MALAY FEMALE PATIENTS

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OBJECTIVE: To compare smile aesthetics diagnostic components in pre- and post-orthodontic cases of the frontal posed smile in Malaysian Malay female patients treated with non-extraction and extraction treatment with pre-adjusted edgewise fixed appliances.

MATERIALS AND METHODS: Subjects were of Malaysian Malay origin, aged between 19 and 40. Photographs of frontal posed smiles of 120 Malaysian Malay females before and after orthodontic treatment were grouped into extraction and non-extraction groups. Twelve smile aesthetics diagnostic components were assessed by measuring inter-canine width, width of visible teeth, smile width, intervermillion distance, right and left buccal corridor spaces, inter-labial gap, incisor and gingival show, lower lip to incisor distance, smile arc and lip line. Means and standard deviations were compared between the groups using the independent t-test and chi-square test with a significance level of $P<0.05$.

RESULTS: The mean values pertaining to the inter-labial gap, inter-vermilion distance, and lower lip to incisor within the post-treatment cohort demonstrated a statistically significant reduction compared to the corresponding metrics observed in the pre-treatment group. ($P <0.05$). A notable disparity was also evident in the smile arc before and after orthodontic treatment. No statistically significant distinctions were detected in any variables between the groups subjected to extraction and those without extraction among Malaysian Malay females, both prior to and after orthodontic treatment.

LIMITATIONS: This study's cross-sectional design may have selection biases in participant selection. Thoughtful selection, guided by clearly outlined inclusion and exclusion criteria, mitigates bias. Further research and longitudinal studies are warranted to elucidate the long-term implications of these observed metrics.

CONCLUSIONS: In conclusion, the discerned substantial variances in parameters encompassing the inter-labial gap, inter-vermilion distance, lower lip to the incisor, and smile arc underscore the noteworthy impact of the observed factors in orthodontic treatment. These findings contribute to a deeper comprehension of the intricate dynamics influencing facial features in the observed population.

KEYWORDS: Smile analysis, Frontal posed smile

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SP212 PHOTOGRAMMETRICAL INVESTIGATIONS ON RICKETTS ESTHETIC LINE IN MALAYSIAN MALAY FEMALE ADULTS.

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BACKGROUND AND OBJECTIVE: The current norms are limited to the baseline of different populations, albeit not applicable to particular populations. The objective is to establish the measurement of the Ricketts Esthetic Line for Malaysian Malay female adults and set a standard value for assessing the relationship between the upper and lower lip to the Ricketts Esthetic Line.
MATERIALS AND METHODS: This research investigation adopted a cross-sectional approach and included a sample of 120 pre-existing photographs of Malaysian Malay females exhibiting skeletal Class I traits, ranging in age from 19 to 40. Subjects were carefully selected from the Orthodontic Clinic of Universiti Teknologi MARA (UiTM). A comprehensive examination of the upper and lower lips was conducted using photogrammetric techniques, specifically focusing on the Ricketts Esthetic Line. The analytical process employed the Image J software version 1.54d, National Institutes of Health in Bethesda, Maryland, USA. The means and standard deviations of the parameters obtained were compared to the Caucasian norms using a one-sample t-test with a significance level of $P<0.05$.
RESULTS: The measurement of the upper lip was significantly higher than the Caucasian norms at -4mm. The upper lip value was 0.03 (2.17), with the mean difference observed at 4.03 mm with p-value <0.001. The value of the lower lip was significantly higher than the Caucasian norms at -2mm. The mean was 2.00 (2.72), and the mean difference observed was 4.00 mm with p-value <0.001.
LIMITATIONS: Limitations of the present study include its cross-sectional design, with the results being represented by female subjects.
CONCLUSIONS: The photogrammetric analysis of the upper and lower lips among Malaysian Malay female adults concerning the Ricketts Esthetic Line unveiled a discernible forward positioning of both labial structures when juxtaposed with Caucasian standards. This vital knowledge would enable the clinician to effectively build an ideal treatment plan for the investigated population and anticipate the profile aesthetics post-orthodontic treatment.
KEYWORDS: Malaysian Malay's profile, Ricketts Esthetic Line, Soft tissue analysis.
FINANCIAL SUPPORT AND SPONSORSHIP: The work has been carried out by the Universiti Teknologi MARA through MyRA Grant (600-RMC/GPM ST 5/3 (004/2021)) for financial support.

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SP213 COMPARING WEAR RESISTANCE OF THREE-DIMENSIONALLY PRINTED AND CONVENTIONAL THERMOPLASTIC MATERIALS FOR CLEAR ORTHODONTIC RETAINERS: A LABORATORY STUDY

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BACKGROUND: Clear thermoformed retainers are one of the most common types of orthodontic retainers. They are popular due to their superior effectiveness, aesthetic appearance, increased patient comfort, and ease of fabrication. However, they present with problems such as development of cracks, fractures, wear, and perforations. The application of three-dimensional (3D) printing in the fabrication of clear retainers is of particular interest. By capitalising on a fully digital workflow, the retainer can be fabricated at increased ease, speed, and comfort to the patient. However, it has yet to be shown if 3D printed clear retainers are more resistant to wear than thermoformed retainers, producing a more lasting product.
AIM: To compare in-vitro the wear and fracture resistance of commercially available 3D printed and conventional thermoplastic materials for clear retainer fabrication
METHODS: Three different thermoplastic materials, Copyplast C (polyethylene), Duran (polyethylene glycol terephthalate), and Essix C+ (polypropylene), and one 3D printed material, Ortho Clear (acrylate-based resin), were tested. Thermoplastic materials were thermoformed according to manufacturers' guidelines over a standard block and trimmed to obtain a sheet. The 3D printed material was used to additively fabricate a similar sheet directly according to manufacturer's instructions. Four samples per group were fabricated. Each sample was subjected to 1000 cycles of wear in a custom apparatus under 30 N of load with an alumina ball abrader while immersed in a water bath at 37 °C to simulate oral conditions. Wear depths were determined by surface profilometry.
RESULTS: Among the thermoplastic materials, Copyplast C experienced the smallest wear depth (216.3 ± 40.8 µm), followed by Duran (265.2 ± 30.8 µm), and Essix C+ (297.6 ± 18.6 µm). Ortho Clear experienced greater wear depth than all thermoplastic materials (499.3 ± 108.2 µm). This was statistically significant when compared to Copyplast C.
LIMITATIONS: Some 3D printing parameters, such as print angle, thickness, and curing conditions, could be altered to improve the physical properties of the fabricated product, but were not explored.
CONCLUSIONS: Under the controlled conditions of this study, Ortho Clear was less resistant to wear than thermoplastic materials, and was significantly less resistant to wear than Copyplast C.

Abstract citation ID: cjae081.506
SP214 COCHRANE LIVING SYSTEMATIC REVIEWS IN ORTHODONTICS: DOES THE EVIDENCE CHANGE?

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BACKGROUND: Cochrane systematic reviews are regularly updated to reflect new evidence. There are suggestions that recent trends in research illustrate a lack of high-quality research, meaning updates rarely change, but are onerous and costly to undertake.
OBJECTIVES: To assess trends over time in the quantity, quality and recency of new evidence recruited to Cochrane living systematic reviews relevant to orthodontics.
METHODS: Systematic reviews relevant to orthodontics were identified by searching the "Dentistry & Oral Health" section of the Cochrane Database of Systematic Reviews. Only reviews that had undergone at least one update since initial publication were included. The number of trials, risk of bias grade and year of publication were recorded for each updated review.
RESULTS: 17 titles totalling 43 systematic reviews were identified. The average number of included trials was 7.7 per review and this increased over time. 5 reviews (11.6%) included no studies at all, and 38.5% of review updates included no new evidence compared to the predecessor. 55.7% of included studies were considered high risk of bias and there was only marginal reduction in the proportion of high-risk studies over time across more recent versions. The proportion of low risk of bias studies also reduced, whilst the proportion of unclear risk of bias studies increased between updates. Regarding newly included studies in updates, 55.2% (85/154) studies were considered high risk of bias. And only 16.2% of new studies were considered low risk of bias. On average, newly included evidence was published within 5 years of the updated systematic review.
CONCLUSION: There is little high quality research intervening updates of orthodontic Cochrane systematic reviews that results in meaningful changes to the conclusions drawn. Undertaking updates of systematic reviews are a drain on resources and should be limited to only when new evidence emerges. These finding support the notion that specific recommendations on how evidence could be improved, as well as a written up "ideal" study protocol, should be published as part of the review to enable researchers to undertake high quality research.

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SP215 GENDER REPRESENTATION AMONGST ORTHODONTIC EDITORIAL BOARDS: TRENDS OVER TIME.

Mr Samuel Reeves[1], Miss Catherine Liu[1], Mr Gavin Mack[1]; [1] *King's College Hospital*

OBJECTIVES: To assess trends in gender representation within editorial boards of European and North American orthodontic journals from 2000-2023.
METHODS: Retrospective analysis of editorial boards of orthodontic journals. The first issue of volumes of identified journals from the years 2000, 2010 and 2023 were investigated to demonstrate trends over time.
RESULTS: 8 journals were included. Across the period investigated, a total of 810 editorial board positions were identified with most positions held by men (657/810; 81.1%). The proportion of female editorial board members increased from 14.7% (36/245) in 2000 to 24.5% (73/298) in 2023. The number of female Editor-in-Chief increased from zero in 2000 to two in 2023. Three journals demonstrated a reduction in female representation from 2000 to 2023.
CONCLUSION: Females remain underrepresented within editorial boards of orthodontic journals, particularly when compared to proportional representation in the orthodontic workforce. Presence on editorial boards is a key metric of leadership in orthodontic academia.

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Abstract citation ID: cjae081.508
SP216 RELATIONSHIP BETWEEN BODY POSTURE AND MALOCCLUSION: A PILOT STUDY

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BACKGROUND: A growing number of patients are seeking orthodontic treatment and they have postural disorders. The anatomic and functional link between the maxillofacial complex and the whole body is evaluated, controversial results have been reported.
AIM: The aim is to evaluate the relationship between malocclusion traits and body posture.
MATERIAL AND THE METHODS: The study sample comprised 50 participants, aged 18 – 35 years (26,4 ±6,4 years), 33 female and 17 male. Previous orthodontic treatment, trauma or operations in maxillofacial region, and congenital syndromes were not reported. The questionnaire of 6 questions was provided for the participants. During clinical examination the main traits of malocclusion were evaluated. Body posture was analyzed in four directions: the front, back, left and right sides, detailed evaluation was performed with Posture Screen mobile app. All subjects were evaluated by a single examiner. The statistical analysis was done using nonparametric Mann-Whitney test and nonparametric Spearman correlation coefficient, the significance level was set to $p<0.05$.
RESULTS: Unilateral posterior cross bite was found in 24 % of participants, and statistically significant association between unilateral cross bite and the inclination of head in the frontal plane was reported, $p<0.01$. Dental crowding in the upper dental arch was found in 32 % of the subjects, in the lower dental arch in 44 % participants was diagnosed. Dental crowding in upper and lower dental arches in our study was related with changes of body posture, a statistically significant correlation between the degree of maxillary dental crowding and the inclination of hips in the frontal plane ($r=0.265$, $p<0.05$) was found; a statistically significant correlation between the degree of mandibular dental crowding and the inclination of hips in the frontal plane ($r=0,428$, $p<0.01$) was reported. Evaluating relationship between sagittal vertical malocclusions and body posture, no statistically significant association was found.
CONCLUSIONS: Malocclusion traits as posterior cross bite, dental crowding correlated with the changes of body posture in the frontal plane. Relationship between increase of overbite and overjet and changes in the body posture was not found.

Abstract citation ID: cjae081.509
SP217 CLINICAL RETROSPECTIVE ANALYSIS OF SKELETALLY ANCHORED APPLIANCES FOR MAXILLARY EXPANSION

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Skeletally anchored appliances for maxillary expansion are a less invasive alternative to surgery. They are chosen increasingly often as a method of expanding the maxillary dental arch where its narrowing has resulting in unilateral or bilateral crossbite. The purpose of this study was to retrospectively evaluate the efficacy of maxillary expansion using distractors supported by temporary orthodontic implants, depending on the gender and age of the patients.
MATERIAL AND METHOD: Patients of both genders who had been treated with distractors anchored to temporary orthodontic intraosseous implants between July 2019 and June 2022 were included in the study. The group was divided into the adolescent patients (under eighteen years of age) and the adult patients (eighteen and over). The timing of the distraction process, in the form of a diastema between the upper incisors, was evaluated at follow-up visits one and two weeks after the distractors were installed, as was the timing of the completion of distraction. The results were analyzed statistically.
RESULTS: Thirty-nine patients were treated during the analysis period, which included 21 women and eighteen men, ranging in age from 13 years and 1 month to 39 years and 4 months for women, and from 11 years and 10 months to 42 years and 10 months for men. Eight girls and nine boys of below eighteen years were eligible for analysis. The adult group contained thirteen women and nine men. The presence of diastema at the first follow-up visit (one week after the distraction was started) was observed in all girls and in eight of the boys, as well as in seven women and in none of the men. At the second follow-up visit, no diastema was found in one woman, whereas diastema was noted in three men. At the completion of distraction, diastema was observed in all the girls and in twelve women, as well as in eight out of nine boys and in three men.
CONCLUSION: The effectiveness of the distraction procedure in adolescents is positive, regardless of gender. However in adults, the procedure has limited effectiveness in males. The mechanism behind this phenomenon requires further research.

Abstract citation ID: cjae081.510
SP218 CANDIDA ALBICANS ENRICHED IN ORTHODONTIC DERIVED WHITE SPOT LESIONS AND SHAPED SUPRAGINGIVAL MICROBIOME IN DISEASE SITES

Dr Yansong Ma[1], Dr Hao Yang[1], Dr Xianju Xie[1], Dr Hongmei Wang[1], Dr Yuxing Bai[1]; [1]*Beijing Stomatological Hospital, Capital Medical University*

White spot lesions (WSLs) are common infectious side effects in fixed orthodontic treatment. The dysbiosis of the supragingival plaque microbiome might contribute to the development of WSLs. Besides, the carriage of Candida albicans and its correlation with oral bacteriome in WSLs disease still remained unclear. This study aimed at investigating the differences of the supragingival plaque microbiome and the C. albicans infection in the plaque, to explore the potential role of interkingdom interaction in orthodontic WSLs. In this study, 31 patients with WSLs (WSLs) and 23 healthy patients (Health) undergoing fixed orthodontic treatment were enrolled. The bacterial composition of the supragingival microbiota in both groups was determined using 16S rRNA gene sequencing. Colonization and abundance of C. albicans in the plaque were studied via culture-dependent and -independent methods. Among WSLs patients, how the carriage of C. albicans affects bacteriome, as well as interaction with oral bacteria, was analyzed under QIIME2-based bioinformatics and Spearman's correlation coefficient. The raw reads were deposited into the NCBI Sequence Read Archive (SRA) database (Accession Number: SRP404186). Significant differences in microbial diversity, as well as composition, were observed between WSLs and Health groups. Leptotrichia remarkably enriched in the WSLs group, while bacteria such as Neisseria and Cardiobacterium significantly enriched in the Health group. In addition, 45% of WSLs patients were C. albicans carriers but none in the Health group. Beta diversity and microbial composition were distinguished between C. albicans carriers and non-carriers. Corynebacterium matruchotii and Streptococcus mutans significantly enriched in C. albicans carriers, and Saccharibacteria_TM7_G-1 with its two species significantly enriched in C. albicans non-carriers among all WSLs patients. The positive correlation was examined between the abundance of C. albicans and S. mutans, while the negative correlation was detected between the abundance of C. albicans and bacteria such as Actinomyces naeslundii. Our study elucidated that the supragingival plaque microbiome was significantly different between orthodontic patients with and without WSLs. C. albicans was more frequently detected and enriched in patients with WSLs. The existence of C. albicans could shape the bacteriome and might play a role in WSLs pathogenesis.

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SP219 CHANGES IN LOWER INCISORS' INCLINATION AND MANDIBULAR SYMPHYSIS MORPHOLOGY IN GROWING PATIENTS, ACCORDING TO THEIR VERTICAL PATTERN, TREATED WITH PALATAL EXPANDER AND FACE MASK

Miss Marta Margarit[1], Ariadna Colom-Monés, Nuria Molina-Berlanga, Nuria Clusellas, Andreu Puigdollers; [1]*Universitat Internacional De Catalunya*

OBJECTIVE: The aim of this study was to compare the changes in the inclination of the lower incisors and morphology of the mandibular symphysis in growing patients, according to their vertical pattern, before and after treatment with a palatal expander and a face mask.
MATERIAL AND METHODS: Lateral cephalometric x-rays of a group of 41 growing patients with skeletal class III malocclusion (20 females, 21 males) were taken before orthodontic treatment (T0) and after treatment with a palatal expander and face mask (T1). The inclination of lower incisors was evaluated using the IMPA. The dimensions of mandibular symphysis were assessed using Handelman's criteria (LP being the bone posterior to the apex of the incisor; LA the bone anterior to the apex of the incisor; LH the bone inferior to the apex of the incisor). Patients were categorized based on their facial pattern; 7 with short face, 24 with average face and 10 with long face.
RESULTS: The IMPA significantly decreased from T0 to T1 in short face and average face groups ($p<0.001$), while no change was observed in the long face group ($p=0.342$). The posterior bone (LP) significantly increased with treatment ($p<0.001$), with a similar magnitude in all facial groups. The inferior bone (LH)

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significantly increased with treatment in all three facial patterns. And the anterior bone (LA) significantly decreased with treatment (p=0.005).
CONCLUSIONS: Even though, treatment with palatal expander and face mask corrects the class III occlusion and the negative overjet, it has been observed that the dentoalveolar class III compensation continues to increase, except in long facial patterns where it remains compensated as it initially was.

Abstract citation ID: cjae081.512
SP220 PROPOSAL OF A PROTOCOL FOR ADJUSTING THE VALUE OF THE SN-GOGN ANGLE IN STEINER CEPHALOMETRY.

Dr matthieu lambert martel[1], Dr Thomas Mourgues[1], Prof. María José González-Olmo[1], Prof. Martín Romero[1]; [1]*Universidad Rey Juan Carlos*

AIM: The objective of this study was to analyze the facial pattern based on Steiner's cephalometric analysis, comparing it with the other measures of facial patterns from the Ricketts, Björk-Jarabak and McNamara cephalometric study.
METHODS: Two hundred (200) patients treated in an orthodontic University Clinic were selected. The following measurements were collected from each of the subjects: Ricketts facial axis, Steiner cephalometric SN-GoGn value, Björk-Jarabak cephalometric PFP/AFH ratio value and McNamara vertical dimension. The variables were compared with each other using the proportions of the standard deviations originally given by the authors.
RESULTS: Significant differences were found between Steiner SD (0.81±3.06) and Gold Standard SD (-0.43±4.35) (t=5.71, p<0.01). No difference in error was found between the mixed and permanent dentition groups (p=.992). The error in the brachyfacial group is 54.8%, the error in the mesofacial group is 80% and the error in the dolichofacial group is 14.5%.
CONCLUSION: The mandibular angle norm used in the Steiner study statistically swings more to the dolichofacial side than the mean of the other three cephalometrics. A protocol is proposed to be able to adjust the value of Steiner's mandibular angle to the three other authors in a Spanish population.

Abstract citation ID: cjae081.513
SP221 INFERIOR NASAL TURBINATES AND FACIAL MORPHOLOGY

Dr Ana Avelar[1], Prof Maria Cristina Pollmann[1], Dr Joana Silva[2], Prof Eugénio Martins[1]; [1]*FMDUP,* [2]*UCM*

INTRODUCTION: Mouth breathing has a complex etiology, from tonsil or adenoid hypertrophy, septal deviation, nasal polyps, hypertrophied nasal turbinates, allergic rhinitis, and dysfunctional oral habits, and occurs when nasal breathing is replaced by oral or mixed breathing for more than 6 months. Mouth breathing requires several muscular and postural adjustments and has a negative effect on craniofacial morphology. A recent study by Florez et al. concluded that the facial type is related to the hypertrophy of the inferior nasal turbinates. Despite this, the literature in this area is very limited, since most studies focus on the correlation between adenoids and/or tonsils with dentoskeletal variables.
OBJECTIVE: The aim of this investigation is to study the correlation between nasal turbinate hypertrophy and facial morphology in a sample of patients who attended an appointment for orthodontic evaluation.
MATERIALS AND METHODS: A retrospective study was carried out in which 80 patients treated at a private orthodontic clinic were evaluated. Dentoskeletal variables and airway variables were measured, which were later statistically analyzed and correlated with each other. For the study of the variables, the computer programs used were NemoStudio® and Romexis®.
RESULTS: We observed the existence of weak/moderate positive correlations between Palate Depth and General Turbinate and Right and Left Turbinates in different planes (axial, frontal-height and frontal-width). The Greatest Airway Constriction measure had correlations with almost all dentoskeletal variables. Specially, correlations were more significant in the Total Sample and in the group Without Adenoids.
CONCLUSIONS: Maximum Airway Constriction – Ana Avelar measure, showed to be the most relevant factor when correlated with the dentoskeletal variables studied. More studies will be necessary to relate the values of oropharyngeal obstruction measured in CBCT and the real functional obstruction evaluated by an otorhinolaryngologist.

Abstract citation ID: cjae081.514
SP222 EVALUATION OF THE CORROSION BEHAVIOR OF TWO DIFFERENT METAL ALLOYS USED FOR FABRICATION OF CUSTOM-MADE ORTHODONTIC AUXILIARIES IN ARTIFICIAL SALIVA: A PRELIMINARY LABORATORY STUDY

Dr Omar Mashaly[1], Dr Amal M. Abdel-karim[2]; [1]*Orthodontic Department - New Giza University,* [2]*Physical Chemistry Department, National Research Centre*

OBJECTIVES/AIMS: This in-vitro study aims to evaluate the corrosion behavior of two metal alloys; (Co-Cr) and stainless steel 316L (SS) produced by subtractive manufacturing (milling) and additive manufacturing (selective laser melting) (SLM) respectively immersed in artificial saliva solution pH5.
MATERIALS/METHODS: Total of six metal specimens with equal dimensions were produced. Two specimens were milled from Co-Cr remanium® star blank (group I) and the rest four specimens were SLM printed using austenitic medical grade stainless steel(SS)316L. Two specimens were printed along the X-axis (group II) and the two other specimens were printed along the Y-axis (group III). The bioactive stability of the surfaces was investigated by open circuit potential (OCP), potentiodynamic polarization (PDP), and electrochemical impedance spectroscopy (EIS). The morphology and chemical composition of the prepared surfaces were examined with scanning electron microscopy (SEM) and energy dispersive X-ray (EDX) analysis.
RESULTS: From the Tafel diagrams, group III records the most electropositive values of corrosion potential, the highest polarization resistance (Rp) and the lowest corrosion current density(icorr), and corrosion rate (CR). This indicates that group III is the most corrosion resistant. Nyquist plots of EIS show the same tendency as the polarization results but due to the high resistance value, the three groups were almost identical.
LIMITATIONS: As within any in-vitro study, there are limitations that the clinical situation is not fully simulated. Due to the absence of Co-Cr SLM printing in our country, Co-Cr specimens in this study were produced with a different technology from the SS316L specimens, this can lead to some doubts but the composition of the Co-Cr blank used is exactly similar to the Co-Cr powder used for SLM printing.
CONCLUSIONS/IMPLICATIONS: Stainless steel alloys have always been used in fabrication of orthodontic auxiliaries but were never explored in the digital orthodontic workflows. Different printing orientation can cause anisotropy; hence will affect the corrosion behavior of similar metal alloy. As customized orthodontic 3D printed metal auxiliaries are becoming widely used, it is urgent to assess different properties of the available alloys by altering their production parameters then test their mechanical, electrochemical and biological properties before being used intra-orally.

Abstract citation ID: cjae081.515
SP223 TELE-ORTHODONTICS EDUCATION MODEL FOR ORTHODONTIC RESIDENTS: A PRELIMINARY STUDY

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OBJECTIVES: Tele-orthodontics is an important medium to use for diagnosis and treatment planning and to refer patients for specific treatment when deemed necessary. The effectiveness of the Tele-orthodontics Education Model serves to improve resident's knowledge, confidence, and skills in delivering tele-orthodontic patient care. The purpose of this educational single-arm pre-test–post-test interventional study was to assess and educate orthodontic residents (6 year-one, and 6 year-two) to appropriately use tele-orthodontics.
METHODS: The Tele-orthodontics Education Model utilizes three learning modules, a questionnaire before and after the training to assess participant knowledge, confidence and skills levels, three online multiple-choice questionnaires, three explanatory videos and an in-person simulation session. The Blackboard Learning Management System (virtual learning platform) facilitates access to the various modules of the program. Within each learning module, a participant's knowledge level was determined by utilizing five multiple-choice questions before and after each module. The various modules were introduced to the participants and then evaluated by reviewing the participant's responses to the multiple-choice questions.
RESULTS: Twelve orthodontic residents completed the model in one session. Everyone fully completed the questionnaire. Post-test results showed higher mean scores for all questions addresses knowledge, the mean confidence, and skills score for post-test showed no change when compared to pre-test.
CONCLUSIONS: This education model was effective in improving basic knowledge in tele-orthodontics among first, and second-year orthodontic residents. We hypothesize that the residents are more informed and prepared for future tele-orthodontic practices.

Abstract citation ID: cjae081.516
SP224 EVALUATION OF CHANGES IN UPPER AIRWAY DIMENSIONS FOLLOWING EXTRACTION AND NON-EXTRACTION ORTHODONTIC TREATMENT

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OBJECTIVE: The objective of this study is to evaluate the effects of extraction therapy on the upper airway dimensions in growing patients with Class I skeletal relationship.
METHODS: One hundred and twenty adolescents who underwent orthodontic treatment were divided into two groups. The first group was a group of patients treated with extraction of four premolars. The second group was a group of patients treated without any extraction. All patients were growing and presented a Class I skeletal pattern. Pre- and post-treatment lateral cephalograms were collected and analyzed digitally by computer software. Cephalometric variables before and after orthodontic treatment were evaluated and compared. Data was analyzed by IBM SPSS statistical software.
RESULTS: Even though most of the post-treatment means were increased, there was no significant difference in upper airway measurements before and after orthodontic treatment.
CONCLUSION: Present study showed no significant changes in upper airway dimensions after therapeutic orthodontic treatment with extractions in comparison with a non-extraction treatment.

Abstract citation ID: cjae081.517
SP225 EVALUATION OF QUALITY OF LIFE QUESTIONNAIRES IN PATIENTS WITH CLEFT LIP AND/OR PALATE AND/OR ALVEOLUS

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OBJECTIVES: This systematic scoping review aims to systematically identify and evaluate both validated and non-validated questionnaires utilized in scientific literature for assessing the Oral Health related quality of life (OHRQoL) among individuals affected by cleft lip and/or alveolus and/or cleft palate. Furthermore, this study aims to delineate the specific domains covered in these surveys and highlight areas that are unexplored, to improve current questionnaires and presenting opportunities for future research.
METHOD: Employing a PICOS (Population, lntervention, Comparison, Outcome, Study Design) framework, we conducted an extensive search across multiple databases, including PubMed, Embase, PsychlNFO, CINAHL, and Google Scholar.
RESULTS: The systematic scoping review identified a total of 15 non-cleft-specific surveys and 10 cleft-specific surveys, collectively encompassing five distinct domains related to the oral health related quality of life among individuals with orofacial clefts. The most frequently utilized OHRQol survey was found to be the Children's Oral Health Impact Profile (COHIP). The findings revealed a high degree of heterogeneity among the studies, including variability in the measures employed to assess OHRQoL. The 5 identified domains include Oral health (symptoms), Functional well-being, Socio-emotional well-being, School/environment, Self-esteem/Self-image.
LIMITATIONS: The study's focus on selected databases may introduce selection bias, limiting generalizability. Potential publication bias and high heterogeneity in OHRQoL measures may impact result synthesis, as does the varying study quality. Recognizing these limitations is crucial for guiding future research on orofacial clefts' quality of life.
CONCLUSIONS: This scoping review provides a thorough overview of questionnaires used in assessing the OHRQoL of individuals with orofacial clefts. While certain QoL domains, notably those linked to physical appearance, have been extensively studied, non-clinical subdomains such as social relationships remain underexplored. The identified gaps in current research not only signal areas for future investigation but also emphasize the necessity for more comprehensive and nuanced tools to thoroughly evaluate the Oral Health related Quality of Life in this specific population.

Abstract citation ID: cjae081.518
SP226 ANALYZING THE PERCEPTION OF SKELETAL MANDIBULAR PROGNATHISM FACIAL APPEARANCE: AN OBJECTIVE METHOD USING NEAR-INFRARED SPECTROSCOPY (NIRS) AND EYE TRACKING

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AIMS: Patients with mandibular prognathism often seek improvements in aesthetic aspects of their face. Photos of the front, side, and angled views of the face are often used to check the aesthetics of patients with jaw deformities. However, what we see in these photos might not match how they look. Facial appearance is influenced by various factors, including subcutaneous tissue, facial muscles, and bones. In addition, the perception of the face can vary significantly when observed from different angles. However, no studies have been conducted objectively to evaluate the three-dimensional perception of facial appearance in patients with mandibular prognathism. The primary objective of this study was to use photographs of patients with skeletal mandibular prognathism, taken from various angles. By using eye tracking and NIRS (Near-Infrared Spectroscopy) which is used to measure cerebral blood flow in evaluators, the study aims to objectively analyze how the areas of focus and aesthetic evaluations of the facial appearance change depending on the viewing angle.
METHODS: Visual materials were created using facial photographs of skeletal Class III patients from Tokyo Dental College, who were scheduled for surgical orthodontic treatment. These photos were taken at seven different angles, increasing by 15° each time, ranging from 0° to 90°. The subjects were 60 people aged 25-40 years. They viewed visual materials using VR goggles, and their recognition of facial appearance at different angles during the viewing was evaluated using an eye tracking device (FOVE0; NeU, Tokyo, Japan) and near-infrared spectroscopy (HOT-2000; NeU, Tokyo, Japan).
RESULTS: The most significant increase in cerebral blood flow was observed when examining images taken at a 75° angle. It is suggested that photographs taken at angles greater than 75° accentuate the midface depression by hiding the contralateral soft tissue, thus increasing the subject's attention. Simultaneously, eye tracking showed an increase in gaze dwell time in the lower face as the angle increased from 0° to 90°.
CONCLUSIONS: As the viewing angle increases, discomfort experienced by observers may intensify when looking at a skeletal Class III patient.

Abstract citation ID: cjae081.519
SP227 CONSIDERATION OF THE OPTIMAL ROOT CANAL FILLING MATERIAL BEFORE ORTHODONTIC TREATMENT

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AIM: In recent years, there has been a rise in demand for adult orthodontic treatment. In this study, we performed root canal treatment with three types of root canal filling materials (gutta-percha/zinc oxide eugenol [GP/ZOE]-based sealer, gutta-percha/Bioceramic Root Canal Sealer [GP/BCS], and mineral trioxide aggregate [MTA]) and aimed at comparing the differences in their reactions after completing orthodontic treatment.
METHODS: We included 34 teeth in 19 adults aged 27–57 years who were scheduled for orthodontic treatment. All subjects had endodontically treated teeth with periapical radiolucency on preoperative radiographs. The teeth were divided into the following groups: Group 1, lateral condensation using zinc oxide eugenol root canal sealer (n=13); Group 2, single point using BioCeramic root canal sealer (n=7); and Group 3, root canal filling with MTA only (n=14). We comparatively investigated the following parameters before starting and after completing orthodontic treatment: (1) protrusion of the root canal filling material, (2) presence/absence of an apical lesion, and (3) root resorption rate.
RESULTS: Mean root resorption rate was 11.01%, 2.54%, and 2.22% for Group 1 (GP/ZOE), Group 2 (GP/BCS), and Group 3 (MTA), respectively. The root resorption rate was significantly lower in Group 3 than in Group 1 (p=0.02039). Radiographs taken after orthodontic treatment showed root canal filling material protrusion in 8, 2, and 0 teeth in Group 1, 2, and 3, respectively.
CONCLUSION: The results show that ①Root canal treatment should be performed before orthodontic treatment. ②When anticipating future orthodontic treatment, gutta-percha should be avoided due to the possibility of material protrusion. ③Currently, root canal filling using MTA alone appears to be the most reliable treatment method.

Abstract citation ID: cjae081.520
SP228 RELATIONSHIP BETWEEN ROOT FORMATION STAGES AND ROOT RESORPTION DUE TO IMPACTED MAXILLARY CANINE

Ms Yukari Mizoguchi[1], Mr Yuji Ishida[1], Mrs Aiko Ishizaki[1], Mrs Chiyo Shimizu[1], Prof Takashi Ono[1]; [1]*Department of Orthodontic Science, Graduate School of Medical and Dental Sciences, Tokyo Medical and Dental University (TMDU)*

OBJECTIVES: Impacted maxillary canine (IMC) is one of the risk factors for root resorption of the adjacent teeth. Despite the identification of several relevant factors, clear criteria for determining the timing of treatment intervention remain elusive. This study aims to explore the hypothesis that a correlation exists between root resorption caused by the IMC of adjacent teeth and their formation stages.
METHODS: This study comprised 40 subjects (13 males and 27 females) aged 9-18 years, all presenting with IMC. Utilizing CBCT images taken prior to

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orthodontic treatment, measurements of the diameter of the apical root foramen for the maxillary central (U1) and lateral (U2) incisors, canine (U3), and first premolar (U4) were recorded. Additionally, the root formation stages (classified into 5 stages) and the distance between the crown and apical sides of U2 and U4 were assessed. Group-wise data and the measurements between the root resorption side and the non-resorption side were compared using a t-test ($p<0.05$).
RESULTS: Root resorption was observed in at least one adjacent tooth in 72.5% of subjects. The root formation stage U4 on the resorption side was significantly higher than on the non-resorption side. Furthermore, the apical root foramen diameter of U1 and U3 on the resorption side was significantly smaller than that of the non-resorption side. These findings suggest that the risk of root resorption in adjacent teeth due to an IMC may be associated with the growth stage of the adjacent teeth's roots. Additionally, while no significant difference was found in the distance between U2 and U4 on the crown side, the distance between U2 and U4 of the root resorption side was significantly smaller on the apical side. This suggests that the surrounding environment of an IMC may play a role in determining root resorption in adjacent teeth.
CONCLUSIONS: Assessing the root formation stage of adjacent teeth of IMC may provide insights into the risk of root resorption and optimal timing for treatment intervention.

Abstract citation ID: cjae081.521
SP229 THE HERITABILITY ESTIMATES OF PALATAL RUGAE FOR ORTHODONTICS: A MORPHOMETRIC APPROACH

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BACKGROUND: Palatal rugae are irregular ridges located on the anterior part of the palate. The unique characteristic renders it useful in forensic medicine for individual identification. Palatal rugae have emerged as an alternative reference area for lateral cephalogram superimposition, which alleviates concerns about radiation exposure. This structural characteristic may associated with hereditary factors and can trigger related facts. A study on the heritability of palatal rugae characteristics could shed light on the genetic basis of their stability, reinforcing their potential as a reliable reference area in orthodontics and identification tool in forensics. Heritability estimate (h^2) is a statistical concept used to estimate the extent to which the development of a particular quantitative trait is influenced by genetic factors, as opposed to environmental factors. It measures the relative significance of both these influences.
AIM: To determine the heritability estimates (h^2) of palatal rugae among siblings' group.
METHOD: This cross-sectional study examined 25 pairs of siblings, divided into three groups: male-male (MM), female-female (FF), and female-male (FM). A total, of 75 pairs of digital casts were analyzed., focusing on six palatal rugae located in three positions on both sides of the dental arch. The data was evaluated using Stratovan Checkpoint software (Stratovan Corp, USA).
RESULTS: The second rugae exhibited strong h^2 for the landmarks ($h^2 > 0.800$) and interlateral distance ($h^2 > 1.000$) in all sibling groups. Similarly, the third rugae showed $h^2 > 0.800$ of intermedial distance for all the sibling groups while landmarks $h^2 > 0.700$ and interlateral $h^2 > 1.000$ for the same-sex sibling groups (MM and FF).
CONCLUSION: Significant genetic influence is suggested by second and third palatal rugae, which affirms the reliability of these structures for clinical applications in orthodontics.
GRANT: This study was supported by Geran Universiti Penyelidikan (GUP-2019-029)

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SP230 ASSESSEMENT OF TIME-LIMITED VIDEO-BASED LEARNING MODULES FOR THE PREPARATION OF SMALL GROUP SEMINARS: A CASE STUDY IN THE TECHNICAL-PROPADEUTIC COURSE OF ORTHODONTICS

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BACKGROUND: Blended learning concepts are considered an effective teaching method in medical education. A flipped classroom is also a type of blended learning but explicitly reverses traditional teaching, where students independently engage with didactic content before attending face-to-face teaching. This allows for the preparation of theoretical content and to focus face-to-face courses on interactive clinical discussions.
AIM: The aim was to evaluate a novel flipped classroom concept with preparative video-based, interactive learning modules (VBLMs) within an orthodontic undergraduate dental student setting.
MATERIALS/METHODS: From October 2022 to July 2023, 38 undergraduate dental students participated during two consecutive semesters. The technical-propaedeutic course in orthodontics was enhanced with preparative VBLMs that had to be completed before six out of 12 small group seminars. The VBLMs were provided through ILIAS (local learning management system), and these VBLMs were accessible for a seven-day duration. Students had to complete each VBLM the day before face-to-face teaching. The attitude towards digital learning and satisfaction with the new learning concept were surveyed by means of a digital questionnaire at the beginning and the end of each semester. Learning success was determined by comparing the final exam scores from questions thematically querying VBLM content against the remaining ones.
RESULTS: Overall, all students showed extremely high motivation and satisfaction with the novel learning concept. 80 % of the students requested preparatory VBLMs for the remaining small-group seminars. 93.4 % of the students welcomed the self-assessed improved acquisition of competencies, and 77.35 % the flexibility regarding time and location. In the final exam, students performed significantly better in the exam questions that thematically queried content that the VBLMs had covered than in the remaining exam questions (85.8% vs. 78.4%, $p < .001$).
CONCLUSIONS: Within the limits of the present study, the usage of time-limited VBLMs for the preparation of interactive small-group seminars seems to be an effective future-oriented concept.

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SP231 AGE-RELATED CHANGES IN THE HUMAN PERIODONTAL FIBRE SYSTEM- A HISTOMORPHOMETRIC STUDY

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OBJECTIVE: Age-related changes in the human periodontium are of significance for orthodontically induced tooth movement. The aim of this study was therefore to record age-related changes in the periodontal fibre system with regard to the number, diameter and spacing.
MATERIALS AND METHOD: 33 human specimens of the lateral maxilla from deceased patients aged 7 to 63 years were obtained for the study. The specimens were extracted from the region of the first maxillary molar and sectioned in the transversal plane with the thin sectioning technique according to Donath (1988) and morphometrically analysed. The examination of the cement surface was carried out on a side length of 216.65 µm at 390.06 -x magnification. To study the age-related periodontal fibre structure, the specimens were categorized into decades. The results were analysed statistically.
RESULTS: The mean number of fibre bundles on the cementum decreased significantly with age. A significant reduction was observed between the 2nd and 3rd as well as the 3rd and 4th decade. The mean diameter of the fibre bundles increases with age from x = 3.1 µm in the 2nd decade to x = 5.1 µm in the 6th/7th decade. The mean distance between the fibre bundles declined with increasing age.
CONCLUSION: The results suggest that the anchoring area of the fibre bundles to the cementum in a tooth under function remains essentially the same with increasing age, while the geometric distribution of the anchoring area changes.
KEYWORDS: human periodontium, age-related changes, tooth movement, periodontal fiber system

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SP232 ACCURACY OF BASELINE ORTHODONTIC RECORDS - DO THEY ADD UP?

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BACKGROUND: Diagnostic orthodontic records should include radiographs, study models and clinical photographs. Treatment planning may take place remotely using orthodontic records without the physical presence of the patient. It is therefore, essential that orthodontic diagnostic records accurately replicate the patient's true occlusion to prevent potential errors in treatment planning.
AIMS: This audit aimed to establish if the occlusal relationships recorded in the patient's clinical records are accurately reproduced by plaster study models and clinical photographs.
DESIGN: This is a retrospective single-cycle audit of 40 orthodontic patients undergoing treatment at Dundee Dental Hospital. A Gold Standard was established which stated 100% of study models and clinical photographs should match the clinically recorded occlusal molar and canine relationships within a ¼ unit.
MATERIALS AND METHODS: Following Caldicott Guardianship approval 40 patients were randomly selected from the patient management system and anonymised. The occlusal relationships for each patient on the clinical photographs and study models were assessed by two assessors independently. A third team member recorded the occlusal relationships documented in the clinical record. Data were captured and analysed in MS Excel. Any disagreements greater than ¼ unit between the two assessors were resolved by the third assessor.
RESULTS: 17 Male and 23 Female patients with a mean age 17.98 (Range 10-37). Both assessors agreed clinical photographs were non-diagnostic for molar relationship in 15% (Right) and 22.5% (Left) of patients. The most common reason for this finding was the photograph not being in focus or the molar relationship not being visible on the clinical photograph due to insufficient retraction. Overall, Occlusal relationships documented in the patient records were accurately reproduced within a ¼ unit in 78% of photographs and 83% of models thus falling short of the audit standard.
CONCLUSIONS: Orthodontic records must reproduce the occlusal relationships observed clinically to allow for accurate diagnosis and treatment planning. Poor quality records which are not diagnostic of the malocclusion offer little value and could lead to potential issues when treatment planning. Plaster study models were shown to have greater diagnostic accuracy than clinical photographs within this audit cycle.

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SP233 HELPING GENERAL DENTAL PRACTITIONERS USE THE INDEX OF ORTHODONTIC TREATMENT NEED: AN ASSESSMENT OF AVAILABLE EDUCATIONAL APPS

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BACKGROUND: The Index of Orthodontic Treatment Need (IOTN) defines those patients who can receive NHS funded Orthodontic Treatment within the United Kingdom. Accurate and timely referral from our colleagues in the general dental service is necessary to deliver an ideal orthodontic service. Previous studies highlighted a need for greater support and resources to help General Dental Practitioners (GDP) use the IOTN more accurately.
OBJECTIVES/AIMS: The aim of this study is to investigate the quality of the "Easy IOTN" app and any alternative mobile apps developed to aid a dentist's ability to use IOTN successfully.
MATERIALS/METHODS: The App Store and Google Play were searched to identify available apps which provide an educational resource for IOTN. Any app identified was assessed using the Mobile App Rating Scale (MARS) and the Royal College of Physicians Health Informatics Unit Checklist. The 'Easy IOTN' app continuous professional development section was assessed for accuracy using a focus group made up of local Orthodontic Consultants and Specialists.
RESULTS: One App was found from our search carried out on two App Databases. The only healthcare app which exists as a resource to support the training and use of IOTN is called the "Easy IOTN" developed by the British Orthodontic Society. The quality of the app was assessed using the validated MARS which provided an overall mean MARS score of 3.6 which is deemed average. The highest scoring domains were functionality (4.5/5) and information (4.2/5) with engagement the poorest scoring domain (2.2/5). Significant errors were found to exist within the CPD activity of the "Easy IOTN" App.
LIMITATIONS: MARS scoring was only undertaken by one author within this study and is therefore, a recognised limitation of this study.
CONCLUSIONS: The "Easy IOTN" app is the only available app based IOTN training resource for GDPs. MARS assessment shows the App is of an acceptable standard and can be a useful adjunct for primary care practitioners to determine if a patient qualifies for NHS Funded Orthodontic Treatment. The CPD aspect of the app is flawed and therefore, should not be used until it is updated.

Abstract citation ID: cjae081.526
SP234 VALIDITY AND RELIABILITY OF DENTAL CROWDING MEASUREMENTS ON RETROSPECTIVE INTRAORAL OCCLUSAL PHOTOGRAPHS

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BACKGROUND: Intraoral occlusal photographs (IOPs) are routinely captured for orthodontic records, offering a practical alternative to plaster models for measuring dental crowding.
OBJECTIVE: This study aimed to evaluate the validity and reliability of dental crowding measurements on retrospective IOPs using Adobe Acrobat Reader Pro (AARP).
MATERIALS AND METHODS: Plaster models (PMs) and retrospective IOPs of 52 dental arches were obtained from orthodontic postgraduate records at Faculty of Dentistry UiTM. For each dental arch, three sets of IOPs were created. Set A consisted of the original-sized photographs whereas Set B and Set C consisted of resized photographs. Calibration of photo size in Set B was based on the average mesiodistal width of the right central incisor within the same arch, while in Set C, calibration was based on the actual mesiodistal width of the right central incisor within the same arch, measured from the plaster model. Dental crowding measurements were conducted by two calibrated dental students based on a method by Profit, using digital calipers for PMs and AARP, for IOPs.
RESULTS: The intraclass correlation coefficient (ICC) demonstrated excellent agreement between crowding measurements on PMs and IOPs in Set B (0.96) and Set C (0.98), but fair agreement in Set A (0.42). Intra-examiner reliability and inter-examiner reliability were excellent, with ICC scores between 0.8 and 0.9.
CONCLUSION: Dental crowding measurements on retrospective IOPs are valid and reliable when the photograph size is calibrated. Using the average mesiodistal width of a central incisor for calibration is more practical and convenient.

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SP235 CLINICAL APPROACHES OF PAEDIATRIC DENTISTS TO BALANCING AND COMPENSATING PRIMARY TOOTH EXTRACTIONS IN DIFFERENT CLINICAL SCENARIOS

Dr Eser Rengin Nalbantoglu[1], Prof Parmjit Singh[2]; [1]*Biruni University, Faculty of Dentistry,* [2]*Ulster University, College of Medicine and Dentistry*

BACKGROUND: The employment of balancing and compensating extractions (BCEs) of primary teeth aims to minimize the need for subsequent complex orthodontic treatment.
AIMS: To assess the demographics, practice characteristics, and adherence of UK paediatric dentists to national guidelines for BCEs of primary teeth and to determine whether they refer patients to orthodontists for such procedures. The study also aimed to examine the clinical preferences of paediatric dentists concerning BCEs in primary teeth in a range of clinical scenarios.
METHODS: This was a cross-sectional survey with an email invitation sent to members of the British Society of Paediatric Dentistry. A pre-tested, self-administered electronic questionnaire was accessed through a secure website. Most questions offered frequency options (Never, Rarely, Sometimes, Often, Frequently, Always), including those presenting clinical scenarios. Descriptive statistics in the form of percentages were utilized by the data type. To compare single population/sample percentages, a Pearson Chi-square goodness-of-fit (GOF) test with post hoc pairwise binomial analysis and Bonferroni adjustments was performed.
RESULTS: Of the 288 specialists invited, 67 (23.3%) completed the questionnaire. Respondents included 12 males (17%) and 55 females (82%), with the vast majority working in secondary care (77.3%; n=51). The majority (81.8%; n=54) supported the application of guidelines for primary tooth extractions. Thirty paediatric dentists (44.8%) frequently encountered BCEs, with 22 (32.8%) performing BCEs on over 40 patients in the past year. Twenty-nine respondents (43.3%) reported frequent compliance with national clinical guidelines for primary teeth extractions. A significant majority of "Never" (44.6%; n=29) or "Rarely" (41.5%; n=27) referred to orthodontists for a second opinion. The Chi-square GOF test indicated a significant difference between the proportions of referrals ($p < 0.001$). Except for balancing extractions in the early loss of a primary canine in a spaced arch, there was a lack of agreement in all decisions made for BCEs in various clinical scenarios ($p < 0.001$).

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CONCLUSIONS: The results reveal significant decision variation across clinical scenarios, with high adherence to guidelines in BCEs of primary teeth among paediatric dentists. However, there is limited interdisciplinary collaboration, as indicated by the infrequent referral to orthodontists in decisions concerning BCEs in primary teeth.

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SP236 PREFERENCES FOR BALANCING AND COMPENSATING PRIMARY TOOTH EXTRACTIONS IN THE UNITED KINGDOM: A CROSS-SECTIONAL STUDY

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BACKGROUND: Balancing and compensating extractions (BCEs) of primary teeth can improve tooth alignment, occlusion, and aesthetics.
AIMS: To investigate UK paediatric dentists' clinical preferences for BCEs in primary teeth for patients up to 5 years and those 6–9 years in various clinical scenarios. The study also aims to determine if decisions are affected by clinicians' gender, age, and clinical setting. Information on whether paediatric dentists consult orthodontists for BCEs of primary teeth was also sought.
METHODS: The cross-sectional survey utilized a secure pre-tested online questionnaire emailed to 288 members of the British Society of Paediatric Dentistry. The 48-question survey was aligned with national clinical guidelines on balancing extractions (BEs) and compensating extractions (CEs). To assess the percentage disparities within a single population or sample, the Pearson Chi-square goodness-of-fit (GOF) test was conducted, followed by post hoc pairwise binomial analysis with Bonferroni adjustments.
RESULTS: The 23.3% (n=67) response rate was made up of 12 (17%) males and 55 (82%) females aged 30 to 64, with 77.3% in secondary care. There was a general trend for males to undertake BEs more frequently in those up to 5 years (16.7% - 36.4% males vs. 0% - 5.6% females) and those 6-9 years (16.7% - 50% males vs. 1.8% - 21.8% females). Older respondents were less likely to perform BEs with patients up to 5 years (p=0.001; Cramér's V=0.44) and 6-9 years (p=0.01; Cramér's V=0.38). BEs of canines in 6–9-year-olds were more likely in secondary care compared to primary care (p=0.005; Cramér's V=0.50). A similar pattern was seen for BEs of first molars (p=0.043; Cramér's V=0.42). First molar CEs in patients up to 5 years (p = 0.014; Cramér's V=0.40) and second molar BEs were more common in primary care (p=0.002; Cramér's V=0.43). A significant majority of respondents (67.7%; n=44) indicated "Rarely" or "Never" consulting orthodontists for a second opinion, with none stating "Frequently" or "Always."
CONCLUSIONS: Clinical settings significantly influence the decision of BCEs, with gender and age showing varied effects in different scenarios. Consulting for a second opinion is not common practice and appears independent of gender, age, and clinical setting.

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SP237 FACIAL SYMMETRY IN POSITIONAL POSTERIOR PLAGIOCEPHALY: AN EIGHT-YEAR FOLLOW-UP STUDY COMPARING SURGICAL AND CONSERVATIVE TREATMENTS

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AIM: This study examines facial symmetry development in positional plagiocephaly (PPP) children for eight years, comparing surgical and conservative treatments. The sagittal position of the temporomandibular joint and the symmetry of the maxilla and mandibula were followed for eight years and compared between these two groups.
PATIENTS AND METHOD: Seven conservative treatment PPP children (mean age at T0 1y 4mth, T1 5y 6mth) were compared to 21 sex- and age-matched surgical treatment PPP children (mean age at T0 1y 2mth, T1 7y 5mth). All children were treated at the Helsinki Cleft and Craniofacial Centre. Using Dolphin 3D software on preoperative and 8-year follow-up CT scans, parameters such as mandibular condyle (Co), maxillary anterior nasal spine (ANS), and mandibular symphysis (Pgn) were analyzed. Furthermore, the mandibular length (Co-Pgn) was measured and the antero-posterior and vertical positions of the ears. The effect of growth on facial symmetry was compared between both PPP groups.
RESULTS: Results show both positive and negative effects of growth on facial symmetry in both groups, with no significant intergroup differences. Despite increased asymmetry in mandibular condyle (Co) and vertical ear position, growth generally improved facial symmetry in the eight-year follow-up.
CONCLUSIONS: PPP is linked to facial asymmetry, and growth tends to positively influence facial symmetry over time.

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SP238 EFFECT OF ORTHOGNATHIC SURGERY ON THE ORAL-HEALTH RELATED QUALITY OF LIFE AND PERSONALITY DIMENSIONS OF PATIENTS WITH ORAL CLEFTS.

Mrs Virginie Neyt[1]; [1]*Ku Leuven*

OBJECTIVES: This prospective cross-sectional study aims (1) to compare the Oral Health-related Quality of Life (OHRQoL) and personality dimensions of cleft patients before (Group A) and after (Group B) undergoing orthognatic surgery and (2) to compare the OHRQoL and personality dimensions of cleft patients who underwent orthodontic treatment with (Group B) and without (Group C) orthognatic surgery after completion of treatment.
MATERIALS AND METHODS: OHRQoL and personality dimensions were respectively evaluated by the Child's Perception Questionnaire (CPQ) and the NEO-five factor inventory (NEO-FFI). Three groups were defined: (Group A) cleft patients in presurgical orthodontic treatment phase, (Group B) cleft patients after completion of combined orthodontic-orthognathic treatment and (Group C) cleft patients after completion of non-orthognathic orthodontic treatment. Linear models were used for statistical analysis of both questionnaires, with scale scores as response variables and group (before/after surgery and with/without surgery) as factor.
RESULTS: Cleft patients after completion of a combined orthodontic-orthognathic treatment (Group B) had lower total CPQ-scores (p 0.0202) and therefore higher OHRQoL than patients in presurgical orthodontic treatment. No significant differences in CPQ-scores were found between group B and C. Regarding personality, the results of the NEO-FFI scores (both norm-scores and raw-scores) between group A versus group B and group B versus group C show no statistical differences.
CONCLUSIONS: After completing orthognathic-orthodontic treatment, cleft patients show better OHRQoL than those in presurgical orthodontic treatment. No statistically significant differences were found between de CPQ-scores of cleft patients with versus without combined orthognathic-orthodontic treatment. Personality was not influenced by the type of orthodontic treatment in cleft patients.

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SP239 INFLUENCE OF ORAL RESPIRATION UPON THE FRONTAL TEETH INCLINATION

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BACKGROUND: Having in mind the frequent repeating in literature of the existence of the correlation between the respiration type and frontal teeth inclination, and the divided opinions on whether oral respiration brings to a protrusion or retrusion of frontal teeth, we dedicated a part of our examinations to this problem.
AIM: The goals of this examination were to compare the inclination of incisors in relation to the basic planes of the upper and lower jaw and the interincisal angle at persons with oral and nasal respiration.
MATERIALS AND METHODS: Samples were obtained from 100 lateral cephalograms of both sexes, ages 8-18, divided into two groups according to the type of breathing, who were not treated orthodontically before. Within the groups, the patients were divided into three subgroups by skeletal classes, based on the ANB angle.
The following structures were drawn in: the plane of the front cranial basis (N-S), the basic plane of the upper jaw (SpP), the basic plane of the lower jaw (MP), the prolonged axes of the upper and lower incisors and the external angles made by them (I/SpP and i/MP) and the internal interincisal angle were measured. The ANB angle was also drawn in because of the selection by subgroups.
RESULTS: The achieved results for the whole sample show that the average value of the inclination of maxillary incisors in patients with oral respiration is lower (65.10^0) with an interval of maximum values (58^0-78^0). The obtained difference in mean values is statistically significant ($p<0.001$).
The average value of inclination of mandibular incisors is lower in the samples with oral respiration (84.36^0). The obtained results show the existence of a statistically significant difference ($p<0.001$) of the average angle value of i/MP with an interval of maximum values (70^0-98^0).
The average values of the interincisal angle are smaller in the samples with oral respiration (123.84^0). The obtained difference in mean values is statistically significant ($p<0.001$).
CONCLUSIONS: This study's results show an essential difference in the degree of inclination of frontal teeth among persons with oral and nasal respiration.
KEYWORDS: nasal respiration, oral respiration, incisor inclination

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SP240 RIDGE PRESERVATION USING OCTACALCIUM PHOSPHATE COLLAGEN TO INDUCE NEW BONE CONTAINING A VASCULAR NETWORK OF MAINLY TYPE H VESSELS IN RATS

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PURPOSE: Ridge preservation (RP) is crucial to prevent alveolar bone resorption before dental implant surgery. This study focuses on type H blood vessels, discovered in 2014, which play a role in the interaction between angiogenesis and osteogenesis. We used OCP/Collagen (OCP/Col), commonly used in implant placement, to assess its impact on angiogenesis, bone volume, and healing in the extraction socket.
METHODS: Four-week-old male Wistar rats underwent RP (0, 1, 4, 7, 14, and 28 days post-extraction; n=6) or extraction alone (control; n=6). β-TCP was the bone filler for RP. Micro-CT imaging measured bone morphology and BMD. Histochemical stains examined bone and vascular cell dynamics, and collagen fiber bundles.
RESULTS ANDS CONCLUSIONS: OCP/Col significantly increased bone volume (BV/TV) compared to other groups, promoting robust bone regeneration. At 28 days post-extraction, the OCP/Col group exhibited greater bone width (Tb.Th) and reduced bone spacing (Tb.Sp). On Day 4, Type H blood vessels around the OCP/Col extraction site showed high expression, accompanied by heightened Runx2 expression. In later stages, OCP/Col resulted in minimal graft material replacement, substantial bone formation, and an abundance of vascular components and collagen fiber bundles. RP with OCP/Col fosters osteogenesis by establishing a robust Type H vascular network early in the healing process, with minimal residual material post-healing, indicating effective bone replacement.

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SP241 COMPARISON OF THREE CONE BEAM COMPUTED TOMOGRAPHY SOFTWARES FOR DETECTION OF EXTERNAL ROOT RESORPTION ASSOCIATED WITH IMPACTED CANINE

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BACKGROUND: Cone Beam Computed Tomography (CBCT) is widely used to identify the location and prognosis of impacted canine (IC) and its risk of external root resorption to the adjacent tooth. The purpose of this study is to compare the reliability of three CBCT softwares in determining the external root resorption associated with IC.
METHODS: 181 CBCT images with IC acquired from Planmeca and iCAT machine were included in this study. The presence and amount of external root resorption at the adjacent tooth associated with IC were determined and measured using supplier's recommended software (iCAT Vision and Planmeca Romexis (PR)). This process was repeated using Planmeca Romexis for CBCT images acquired from iCAT machine and The RadiAnt DICOM (RD) software viewer for CBCT images acquired from Planmeca machine
RESULTS: The incidence of external root resorption was 24.3% (44) with 3.47±0.85mm of RR. Majority (56.8%) had grade 3 (>2mm) of RR. The highest incidence of RR observed at tooth 14 (25%) followed by 12(23%). Significantly higher RR observed in crowding cases ($p<0.05$). There is a significant association between types of tooth and incidence of RR ($r=0.913$, $p<0.05$). There was no significant difference in the incidence and amount of RR measured by PR and RD as well as iCat and PR ($p>0.05$). There is significant correlation in the incidence and amount of RR measured by PR and RD ($r = 0.97$, $p < 0.01$) as well as iCat and PR ($r = 0.96$, $p < 0.01$).
CONCLUSIONS: iCAT Vision, Planmeca Romexis and RadiAnt DICOM are all reliable in determining the incidence of external root resorption associated with an impacted canine. Nevertheless, factors such as technical settings of the software and the skill of the operator to manipulate the CBCT must be considered as these affect the diagnosis and treatment plan of an impacted canine case.

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SP242 USABILITY OF THE INDEX FOR INTERCEPTIVE ORTHODONTICS REFERRAL (IIOR) AND ITS PERCEPTION AMONG DENTAL FRONTLINERS IN MALAYSIA

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BACKGROUND: Malocclusion is a common oral disorder in children. The developing malocclusion can manifest early, and treatment can be commenced at an appropriate stage if they were referred to the orthodontist timely. There was a lack of guideline that can assist in referring developing malocclusion in late mixed dentition and early permanent dentition among dental frontliners. Hence, this led to the difficulty to identify developing malocclusion that can benefit from interceptive orthodontic treatment among frontliners. Therefore, a novel index, the Index for Interceptive Orthodontics Referral (IIOR) was developed and validated.
AIMS: To assess the usability of IIOR and its perception among dental frontliners in Malaysia.
METHODS: This index was piloted on thirteen participants who were dental frontliners (6 dental officers, 3 dental postgraduate students, and 4 dental therapists from UiTM, Sungai Buloh, Selangor, Malaysia) were shown a recorded video on the use of IIOR. Participants were asked to grade 10 study models of various malocclusion using the IIOR with a summary of each case provided. The participant's IIOR grades were compared to the expert opinions grading that was established earlier. The time taken for the participants to grade the study models were also recorded. After the grading, they answered a questionnaire on their perception of IIOR through an interactive interview. Subsequently, the IIOR usability is being test among 197 dental frontliners in Malaysia.
RESULTS: The mean time taken for participants to grade the study models was two minutes. Fleiss Kappa grading by the participants resulted in moderate agreement of 0.5. A total of 79.23% of participants matched the expert opinion grading. 92.3% of participants would like to have an index such as IIOR and use it during patient screening. The pilot study displayed positive result and we continued the study among dental frontliners in Malaysia.
CONCLUSIONS: According to the initial study, dental frontliners found the index to be very user-friendly, simple, and easy to use. The IIOR may become a useful tool to help identify and refer developing malocclusions timely to increase the possibility of interceptive orthodontic provision.

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SP243 PREVALENCE AND DEVELOPMENT OF OCCLUSAL ASYMMETRIES: A LONGITUDINAL COHORT STUDY

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AIM: The aim of this study was to investigate the prevalence and development of molar relationship and dental midline coincidence in non-orthodontic subjects from 9-12-15 years of age and assess if present asymmetries are affected by time, gender, Bolton ratio and dental width symmetry.
SUBJECTS AND METHODS: The study sample is part of the Nittedal growth study material from the University of Oslo, Norway. Inclusion criteria were presence of panoramic radiographs, documented journals, and plaster casts at the ages of 9, 12, and 15 years. Exclusion criteria were presence of agenesis and early extraction of milk teeth. The sample consisted of 251 subjects (113 females, 138 males). The molar relationship, midline coincidence and tooth width measurements were made on plaster models by a single operator using a digital caliper measuring to the nearest 0.1 mm. Distal or mesial molar relationship of more than ¼ unit was considered Class II or Class III, respectively. Midline discrepancy of >0.5mm was considered non-coincident. To analyze longitudinal data at 3 time points, with a binary outcome and categorical variables, generalized estimating equations (GEE) with a logistic regression model was used.
RESULTS: The prevalence of Class I molar relationship at age 9 was 33%, and steadily increased to 68% at age 15. The odds-ratio of having Class I molar relationship was significantly influenced by time and decreased when Bolton discrepancy was present. Gender had no significant effect on molar relationship, nor did dental width. However, dental width symmetry in the mandible was associated with higher prevalence of Class I molar relationship. At age 9, 44% of the sample demonstrated coincident midlines, which was maintained until age 12 (45%). The midline coincidence was not significantly influenced by any of the factors analyzed, but its frequency increased with the presence of Class I molar relationship.
CONCLUSION: In subjects with no orthodontic treatment need, prevalence of neutral molar relationship increases with age and with the presence of correct tooth size ratio and symmetrical mesio-distal dental width in both jaws. The prevalence of coincident dental midline increases with the presence of Class I molar relationship.

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SP244 A BIBLIOMETRIC ANALYSIS OF ARTIFICIAL INTELLIGENCE IN ORTHODONTICS: CURRENT STATUS, DEVELOPMENT, AND FUTURE RESEARCH DIRECTIONS

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AIM: The rapid advancement of artificial intelligence (AI) in orthodontics has produced substantial knowledge to assist orthodontic diagnostics and treatment planning. This analysis aims to identify and describe the scientific literature pertaining to application of AI in orthodontics, in terms of the manuscript origin, research domain and study type.
MATERIALS AND METHODS: Various programmes were employed, including Microsoft Excel to perform the frequency analysis, VOS viewer aided in data visualization, and Harzing's Publish or Perish to calculate and analyse citation metrics. The research encompassed descriptive analysis of bibliographic data, collaboration network assessment, and keyword co-occurrence analysis. Articles were further classified according to the field of interest, main research question and type of study.
RESULTS: The study found 146 dental scientific papers across 80 journals, co-authored by 287 individuals from 43 countries in the field of 'AI in orthodontics'. Prior research focused on computer science and biology. The rise in publications reflects technology's impact on healthcare, yet applying AI in orthodontics poses challenges. Key research areas include automated models aiding orthodontic decisions, landmark identification in lateral cephalographs, and teeth extractions. This signifies the evolving role of AI in orthodontics, highlighting its potential to assist in decision-making while acknowledging the hurdles in its implementation within the field. Conclusion: The published dental literature on 'AI in orthodontics' consists principally of articles with a moderate level of scientific evidence which provides sufficient reliable high-quality evidence that is essential in pursuing AI in clinical dental practice.

Abstract citation ID: cjae081.537
SP245 COMPARISON OF BIMAXILLARY PROTRUSION OCCLUSION MORPHOLOGY: A GEOMETRIC MORPHOMETRIC ANALYSIS

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OBJECTIVE: To compare the craniofacial shape and size of bimaxillary protrusion morphology according to its severity by application of geometric morphometric technique.
METHOD: Lateral cephalometric radiographs of 92 bimaxillary protrusion patients (24 males, 68 female) aged between 21±2 years old were classified into mild, moderate and severe. Eleven landmarks were incorporated by geometric morphometric shape analysis using TPSUtil© software which then underwent Procrustes superimposition and subjected to canonical variate analysis (CVA), discriminant function analysis (DFA) and Procrustes ANOVA assessments under MorphoJ© software. Principal components analysis in shape and form spaces was used for evaluating shape patterns.
RESULTS: The differences of skeletal and dental components of bimaxillary protrusion occlusion can be classified into its severity of craniofacial morphology (mild, moderate or severe). The CVA illustrated that the clusters of each group as slightly overlapping indicating a marked separation between these groups. The Procrustes ANOVA showed that the dental aspect has significant differences ($p<0.05$) suggesting that these groups have distinct variation, which can be categorized appropriately. However, it can be seen that skeletally, there was no significant difference ($p>0.05$), which signifies similarities of bimaxillary protrusive skeletal structures across all groups. The DFA showed a percentage of 70±10% within the classification of bimaxillary occlusions upon cross validation which demonstrates the accuracy in classifying these groups.
CONCLUSIONS: Craniofacial shape and size of bimaxillary protrusion occlusion and its diversities are identifiable particularly in the dento-alveolar regions. Geometric morphometric analysis can be used as an alternative tool to classify bimaxillary protrusion patients according to its severity.

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SP246 DOES ENDODONTIC TREATMENT OF DECIDUOUS MOLARS HAVE ANY EFFECT ON DEVELOPING LOWER PREMOLAR INCLINATION ANGLE? A COHORT RETROSPECTIVE STUDY.

Ms Eva Novickaitė[1], Mrs Rūta Almonaitienė[1]; [1]*Vilnius University Zalgiris Hospital*

BACKGROUND: Changes in eruption pathway is one of the reasons to extract primary molars early for angulated premolars to erupt correctly. Uneven root resorption of treated primary teeth might be a reason for the change in angulation, if so, it is significant to know whether endodontic treatment of primary teeth can influence the inclination angle of premolar bud to detect eruption problems early.
AIM: To determine whether endodontic treatment of deciduous molars has effect on developing premolar teeth inclination angle.
OBJECTIVES: To compare the premolar bud's inclination angle under endodontically treated and untreated primary molars in panoramic x-ray.
MATERIAL AND METHODS: 88 Panoramic X-rays, done from 2013 to 2023 years from Vilnius University Zalgiris Hospital database where selected to form two groups: group 1(G1) - 44 patients with endodontically treated deciduous molars, group 2 (control group CG) 44 patients with healthy deciduous molars. In both groups only mandibular teeth were included.
Premolars germs inclination was measured according to the long axis of the primary tooth and the angle between primary tooth and permanent tooth long axes was measured. Comparisons between healthy and affected sides in G1 and CG were made. Statistical analysis was performed using SPSS v. 29.0 software using paired T-test with a significance level set at 5% ($p<0,05$).
RESULTS: 88 patients from 6 to 13 years were included (154 mandibular teeth in total): 77 teeth in each group respectively with a Nolla development stage of 6 and 7. The inclination angle in G1 was significantly larger compared to the CG ($p<0,001$) - the mean inclination angle in G1 was 12.82 degrees and in CG – 3.42 degrees. No statistically significant difference between premolar germs inclination angle and patients age ($p>0,05$) was found.
CONCLUSIONS: the inclination angle of developing mandibular permanent premolar significantly larger if the deciduous molar has been treated endodontically.

Abstract citation ID: cjae081.539
SP247 A NOVEL APPROACH TO SEGMENTAL MAXILLARY MOLAR DISTALIZATION EVALUATING THE EFFICACY OF THE FACILITATOR PROTOTYPE COMPARED TO AN UNTREATED CONTROL

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AIM: This study aims to demonstrate a novel technique for segmental maxillary molar distalization using a precision-made intraoral sliding device, the Facilitator. The objective is to control translational and tipping movements during active orthodontic treatment and evaluate the proof of concept of the Facilitator compared to an untreated normal population.
BACKGROUND: Prior research emphasized the necessity for an effective molar distalization device addressing criteria such as non-compliance, unidirectional force application, minimal anchorage loss, patient comfort, and ease of use. The Tweed sliding jig was introduced but had limitations. The Facilitator improves on this design, offering a telescopic, rigid appliance that applies unidirectional light, continuous force to maxillary molars. It ensures ease of insertion and minimal interference with occlusion, enhancing distalization outcomes.
METHODOLOGY: Twenty Facilitators were placed in 10 Angle class II female patients (Group 1, G1), with a mean age of 15 years seven months. Ten untreated female patients from the AAO foundation Craniofacial Growth Legacy Collection served as the control group (Group 2, G2). Cephalometric analysis measured anteroposterior, vertical, and angular changes. Statistical analysis employed the Wilkinson Signed Rank Test and Mann-Whitney U-Test, with a significance level of ($P<0.05$).
RESULTS: In Facilitator group, (G1), maxillary second molars distalized 2.3 mm ($P = 0.003$), maxillary first molars distalized 2.4 mm ($P = 0.014$), and maxillary incisors moved lingually 2.8 mm ($P = 0.014$). In non treated control group (G2) maxillary second molars mesialized 1.5 mm., maxillary first molar mesialized 1.3 mm. and maxillary incisors labially 1.4 mm. Significant differences in maxillary molar distalization were observed in the Facilitator group compared to the control group, indicating proof of concept.
CONCLUSION: The development of the Facilitator represents a significant advancement in molar distalization techniques, providing a non-compliant, efficient, and comfortable solution for orthodontic treatment. Further clinical research is essential to validate efficacy and long-term stability.

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IMPLICATIONS: This innovative approach holds the potential to revolutionize molar distalization procedures, offering benefits to both orthodontic practitioners and their patients.

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SP248 A REVIEW AND EVALUATION OF ORTHODONTIC BRACKETS, MOLAR BANDS AND ORTHODONTIC AUXILIAIRES DURING ORTHOGNATHIC SURGERY – A PROSPECTIVE COHORT STUDY

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OBJECTIVE: The primary aim of this study was to provide a review of the types and frequency of orthodontic brackets, molar bands and orthodontic auxiliaries used for patients undergoing orthognathic surgery. The secondary aim was to evaluate the risk of failure of these items during orthognathic surgery.
METHODS: From 3 Dutch hospitals, 124 adult patients were included in this prospective cohort study. Five independent researchers collected the data during surgery using a specifically created data extraction form. The type of surgery, surgeon, orthodontist and the type of orthodontic bracket, molar band or auxiliary, was noted for each tooth. To evaluate their failure risk, the following variables were noted: failure and site, type and cause of failure.
RESULTS: Stainless steel brackets were the most frequently used bracket type seen in patients undergoing orthognathic surgery. Ceramic brackets were seen in 24.2% of the cases and only applied in the anterior region. Molar bands were present in 58.9% of the patients and mostly with bands on the first molars in combination with bonded tubes on the second molars. In 32.2% of all cases, one or more failures were noted. One third of all failures were described as detachment of the molar tube on the most posterior molar. Kobayashi ligatures and Powerpins showed the highest risk of failure (OR 95% CI 1.91-7.15). No significant difference in failure rate was found between stainless-steel brackets, molar bands (OR 95% CI 0.08-1.43) and ceramic brackets (OR 95%, CI 0.14-1.45).
CONCLUSION: Stainless steel brackets, ceramic brackets, molar bands and surgical hooks are suitable for orthognathic cases. Kobayashi ligatures and power-pins had significantly higher risk or failure so are not recommended for temporary intra operative maxillomandibular fixation (TIO-MMF).

Abstract citation ID: cjae081.541
SP249 UNILATERAL POSTERIOR CROSSBITE TREATMENT WITH QUAD-HELIX APPLIANCE OR EXPANSION-PLATE IN THE MIXED DENTITION: A 5 YEAR FOLLOW-UP STUDY OF STABILITY AND NEED FOR A SECOND PHASE ORTHODONTIC TREATMENT

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OBJECTIVES: To investigate the stability and the need for second phase orthodontic treatment in patients with former unilateral posterior cross bite (UPC) treated with either Quad Helix appliance (QH) or Expansion Plate (EP).
STUDY DESIGN: Long-term observational follow-up study.
MATERIALS AND METHODS: 57 patients, 27 males and 30 females, were called for a follow-up assessment. The patients were previously participants in a multicenter RCT on early correction of unilateral posterior crossbite by either QH or EP. Study models were made at the end of treatment, including a retention period of 3 months (T1). At the follow-up appointment (T2) intraoral digital photographs and digital study models were taken. Analogue study models from T1 were scanned and digitalized. Measurements were made on 2D and 3D models using Orthoanalyzer software. Primary outcome measurements were transverse maxillary stability (relapse of crossbite on first molars), intermolar-width changes and the need for a second phase orthodontic treatment with fixed appliance.
RESULTS: The mean age at the follow-up was 15. 4 years in QH-group and 16. 2 years in EP-group and the follow-up period was 60 months in both treatment groups. At T2, 79. 8% of the patients had normal transverse relationship between the first molars regardless of previous treatment method. In the former QH group 11.8% of the patients had a crossbite relapse and the corresponding number for the former EP-group was 21.7%. In the QH group 29.4% of the patients had received treatment with fixed appliance between T1 and T2. In the EP group the corresponding number was 30.4%. The most common IOTN-index was 4d (contact-point displacement > 4mm) among the patients who went through a second phase of treatment with fixed appliance.
CONCLUSION: When treating unilateral posterior crossbite in the mixed dentition with either QH or EP appliance an overall favourable stability can be expected 5 years after treatment. Approximately one third of the patients who receive dental expansion with either QH or EP in the mixed dentition will need a second treatment with fixed appliance in the permanent dentition which is aligned with the corresponding population.
CLINICAL TRIAL REGISTRATION: research web-org nr 220751

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SP250 INTERCEPTIVE MAXILLARY EXPANSION TO RELIEF ANTERIOR CROWDING IN THE MIXED DENTITION: A LONGITUDINAL, RANDOMIZED CONTROLLED TRIAL

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BACKGROUND/AIM: Anterior crowding in the maxilla is established in the early mixed dentition when the lateral incisors erupt. The less severe cases of anterior crowding can resolve itself with normal growth of the maxilla and therefore the treatment of crowding is often done in the permanent dentition. One interceptive treatment method is serial extraction but there are drawbacks. Early expansion with a rapid maxillary expander is a promising treatment in the early mixed dentition.
The primary outcome of this trial is to evaluate whether there is a difference in the degree of crowding between subjects treated with rapid maxillary expansion and a control group after a 5-year follow-up period.
METHOD: This ongoing study is a 2-arm parallel-group, randomized controlled trial with a 1:1 allocation ratio conducted at three centers. Consecutive inclusion of subjects. Inclusion criteria: Anterior crowding of at least 6 millimeters between the upper deciduous canines. Normal transversal relations of permanent first molars.
The subjects are randomized to either experimental group or control group. The subjects in the experimental group are treated with a rapid maxillary expander with bands on the second deciduous molars and arms to the deciduous canines. The expansion protocol is activation once a day (0.20 mm) for 14 days and then once every second day until adequate space for the lateral incisors is obtained. Subjects in the control group are not receiving any treatment.
All subjects will be recalled and followed-up until all permanent teeth have erupted for photographs and study casts. At the final recall the subjects will fill out the Psychosocial Impact of Dental Aesthetics Questionnaire. The subjects will be evaluated to determine if further treatment is necessary.
RESULT: At 1-year follow-up the subjects in the experimental group showed adequate space for the upper laterals compared to the controls.
CONCLUSION: At the one-year follow-up there is a clinical difference between the two groups in favour of the RME group.

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SP251 DEVELOPMENT OF DEEP BITE: A LONGITUDINAL STUDY CORRELATING AN INCREASE IN OVERBITE WITH A CLOSING GROWTH PATTERN

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BACKGROUND: In Finland, deep bite is one of the most common deviations in occlusion. Finns exhibit a more hypodivergent growth pattern of the jaws compared to other populations, with boys displaying a greater degree of mandibular forward rotation.
AIM: To investigate the development of deep bite in Finnish children from the primary to the permanent dentition, utilising a longitudinal dataset collected in Helsinki between 1967-1994. Additionally, the study explores whether there is a difference in the development of deep bite according to growth pattern and if certain cephalometric features differ in hypodivergent and neutrally growing subjects.
METHODS: The overbite of 37 orthodontically untreated subjects was measured using dental casts obtained between ages 5 and 25. On average, 10 casts per subject were available. The subjects were divided into two groups according to the vertical overbite: normal (0-3,5mm) or deep bite (>3,5mm at any time point). Their vertical growth pattern was determined from the cephalogram taken at 12 years. Fisher's exact test was employed to examine whether deep bite was associated with a closing pattern of growth. Mann-Whitney U-test was used to see whether cephalometric variables differed between hypodivergent and neutrally growing subjects, and the Wilcoxon signed rank test was utilised to determine if

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there was a difference in the overbite of individuals in early childhood and at the time of the last records.
RESULTS: We observed a significantly higher prevalence of deep bite in individuals exhibiting a hypodivergent growth pattern compared to those with a neutral growth pattern (83% vs. 42%, respectively, $p < 0.01$). Hypodivergent children concluded the study period with an overbite of 3.6 mm, while children with a neutral growth pattern exhibited an overbite of 2.9 mm. The change in overbite during growth was statistically significant among hypodivergent subjects ($p < 0.02$). Examination of the cephalometric data revealed significant differences between individuals with a normal overbite and a deep bite in intermaxillary angle, gonial angle, lower anterior face height, and interincisal angle ($p < 0.05$).
CONCLUSIONS: Cephalometric traits of a closing growth pattern were associated with deep bite. Vertical overbite increases during growth in hypodivergent individuals.

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SP252 ULTRASONOGRAPHIC EVALUATION OF TONGUE POSTURE AND FUNCTION CHANGES IN PREPUBERTAL CHILDREN

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BACKGROUND: The role of tongue posture and swallowing pattern in the aetiology of dentofacial abnormalities has not yet been fully explained. Mainly due to the lack of studies that would longitudinally monitor their physiological changes during the period of growth and development.
OBJECTIVES: The aim was to evaluate the changes in the tongue posture and swallowing pattern during the transition from deciduous to the mixed dentition, to determine whether the eruption of the incisors affects the swallowing pattern and whether there is a connection between the tongue posture and its function during swallowing.
MATERIALS AND METHODS: The study included 57 subjects aged 5.87 ± 0.5 with normal occlusion, no sucking habits, no history of trauma or orthodontic treatment. Ultrasonography was used for the assessment of tongue posture and swallowing pattern, where spontaneous act of swallowing was recorded. To evaluate the possible effect of incisors' eruption, the swallowing pattern and tongue posture ultrasonograms were compared at the deciduous (DD), early mixed (EMD), and intermediate mixed (IMD) timepoints.
RESULTS: The highest prevalence of tongue posture on the palate was present in the EMD, while the prevalence of somatic swallowing pattern was highest in the IMD, however without statistically significant differences. No statistically significant association between the dentition period and tongue posture was found, however a significant association was found between swallowing pattern and tongue posture. In addition, it was found that tongue posture on the mouth floor statistically significantly increases the risk of visceral swallowing pattern (OR=5.020), while a prolonged phase IIa decreases the risk of a visceral swallowing pattern occurance (OR=0.071).
CONCLUSIONS: There were no statistically significant changes in the swallowing pattern and tongue posture, during the transitional period, when physiologically an anterior interincisal gap appeares. Swallowing pattern has matured from visceral to somatic in only half of the subjects from DD to IMD. However, a significant relationship between swallowing pattern and tongue posture, in subjects with normal occlusion was detected.

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SP253 CLINICAL EFFICIENCY OF EARLY TREATMENT OF CLASS II MALOCCLUSION WITH FUNCTIONAL APPLIANCES

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AIM: To compare the dental, skeletal and soft tissue changes after treatment of Class II division 1 in early mixed dentition using the myofunctional appliance in the prospective clinical study.
MATERIALS AND METHODS: 12 patients of both genders aged between 6 and 9 years old were included in the investigation. All patients were in the early mixed dentition with increased overjet and no history of previous trauma or previous orthodontic treatment. On the cephalometric radiograph, skeletal Class II and protrusion of the upper incisors, with decreased sum of the posterior angles were detected. According to cervical vertebral maturation stage patients were in CS1 and CS2 stages. Treatment was conducted with an LM-Activator™. Patients were instructed to wear the appliance during night and two hours per day. Cephalometric radiographs before and after the treatment were analyzed in the software OnyxCeph3™. Statistical analysis was performed using paired sample T tests.
RESULTS: Mean age of patients was 8.33±1.43. Parameters that showed statistically significant increased after the treatment were SNB angle (from 74.75±3.77 to 76.72±4.24), SGo (from 61.59±3.78 to 66.81±4.68), NMe (from 96.98±4.62 to 101.19±5.07), maxillary length (from 42.58±4.12 to 45.42±2.87), mandibular length (from 61.58±3.92 to 64.42±3.85) and ramus length (from 41.17±4.06 to 46.25±6.18). Parameters that were statistically significant decreased after the treatment were ANB angle (from 6.6±2.22 to 5.32±2.61), ML/NSL angle (from 34.42±5.40 to 31.09±6.35), ANSPtm-MeGo angle (from 27.46±5.89 to 24.92±5.26), sum of the posterior angles (from 394.88±5.3 to 392.48±6.16) and distance of the upper lip to the Ricketts esthetic line (from 0.5±2.31 to -1.27±1.85). No statistical significant adverse proclination of the lower incisors nor significant retrusion of the upper incisors were detected.
LIMITATIONS: This pilot study included a small sample size. Larger sample size should be included in the future investigation with the control group.
CONCLUSION: Myofunctional appliances in the early treatment of the Class II malocclusion could be used in order to improve skeletal parameters and to correct the malocclusion.

Abstract citation ID: cjae081.546
SP254 THE EFFECT OF PRINTING ORIENTATION ON MECHANICAL PROPERTIES OF 3D-PRINTED ORTHODONTIC ALIGNERS

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AIMS: The purpose of this study was to assess differences in the fundamental mechanical properties of resin-made three dimensional (3D) printed orthodontic aligners according to the printing orientation.
MATERIAL/METHODS: Twenty resin 3D printed dumbbell-shaped specimens and twenty orthodontic aligners were fabricated and post-cured in nitrogen. Half of the specimens and aligners were built in horizontal (H), the other half in vertical (V) directions. The dumbbell-shaped specimens were loaded in a tensile testing machine, while parts of the aligners were embedded in acrylic resin, grinded, polished and then underwent Instrumented Indentation Testing (IIT). Mechanical properties that were assessed included the yield point (YS), breaking strength (BS), plastic strain (ε), Martens Hardness (HM), indentation modulus (EIT), elastic index (ηIT) and indentation relaxation (RIT). Data were analyzed statistically with independent t-tests or Mann-Whitney tests at alpha=5%.
RESULTS: No significant differences were found between specimens or aligners printed either in a horizontal or a vertical direction (P>0.05 in all instances). Overall, the 3D printed aligners showed acceptable mechanical propertied in terms of YS {mean 19.2 MPa; Standard Deviation [SD] 1.7 MPa), BS {mean 19.6 MPa; SD 1.2 MPa), ε {mean 77%; SD 11%), HM (median 89.0 N/mm2; Interquartile Range [IQR] 84.5 to 90.0 NN/m2), EIT (median 2670.5 MPa; IQR 2645.0 to 2726.0 MPa), ηIT (median 27.5%; IQR 25.9 to 28.1%), and RIT (mean 65.1%; SD 3.5%).
CONCLUSIONS: Printing direction seemed to have no effect on the mechanical properties of 3D printed resin aligners, which seem promising for orthodontic use.

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SP255 EFFECT OF HEAT TREATMENT AND NITROGEN ATMOSPHERE DURING POST CURING ON MECHANICAL PROPERTIES OF 3D PRINTED ORTHODONTIC ALIGNERS

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BACKGROUND/AIMS: Three-dimensional (3D) printed aligners present a promising orthodontic treatment modality, whose clinical success is largely dependent on the material's mechanical properties. The aim of this study was to evaluate the fundamental mechanical properties of resin made 3D printed aligners and assess the effect of two different post-curing conditions.
MATERIAL/METHODS: Forty dumbbell-shaped specimens and forty resin aligners were 3D-printed and divided into four equal groups according to post-curing conditions: presence or absence of oxygen during post-curing and water heat treatment at 85^{0}C for 15 seconds or none. Samples from the central incisor are of the aligner (n=5/group) were studied by Attenuated Total Reflection Fourier-transform infrared spectroscopy (ATR-FTIR). The dumbbell-shaped specimens were loaded up to fracture under tensile mode and yield strength, ultimate tensile strength, elastic and plastic strain were calculated. The first mandibular

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molar area from 3D printed aligners (n=10/group) were cut off and embedded in acrylic resin, and then underwent metallographic grinding and polishing followed by instrumented indentation testing to determine the following mechanical properties: Martens Hardness, indentation modulus, elastic index, and indentation relaxation. After descriptive statistics, differences according to each post-curing protocol, as well as their combination were analyzed with linear regression modelling at a 5% significance level.
RESULTS: All groups show identical ATR-FTIR spectra, while no statistically significant effects were seen for either post-curing protocol (N2-presence and heat-treatment) or their combination (P > 0.05 in all instances).
CONCLUSIONS: The mechanical properties of 3D printed resin aligners were not considerably affected either by post-curing in N2 atmosphere or heat treatment.

Abstract citation ID: cjae081.548
SP256 PALATAL CANINE IMPACTION IS NOT RELATED TO THIRD MOLAR AGENESIS.

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AIM: To investigate the occurrence of third molar agenesis in individuals with palatally impacted canines.
MATERIALS AND METHODS: The sample for this investigation comprised 312 individuals (190 females and 122 males). Half of these presented with unilateral or bilateral palatal impaction of maxillary canines confirmed clinically and radiographically using panoramic and/or peri-apical radiographs. The other half represented the control group and had no impacted canines. The two groups were matched for sex and age. No individuals presented agenesis of any other permanent teeth nor other dental anomalies with a known genetic background. The primary research question was assessed with chi-square test to compare the frequency of third molar agenesis between study group and control group. A secondary univariate regression analysis was performed to test if the presence of a palatally impacted canine could predict the number of third molars present, when age and sex are taken into consideration. All statistical tests were performed assuming a 5% type I error.
RESULTS: Individuals with palatally impacted canines did not present a higher incidence of third molar agenesis (P=0.169). Furthermore, the presence of one or two palatally impacted canines could not predict the number of third molars, namely the presence of full or partial third molar agenesis ($\eta 2 = 0.003$, P=0.364) when the effect of age and sex was controlled.
CONCLUSIONS: Palatal canine impaction is not associated to third molar agenesis, after accounting for age and sex. These results indicate that these two dental phenotypes do not share a common biological mechanism for their occurrence, although they are both associated to specific craniofacial shape variations. Considering the strong genetic background of third molar agenesis, a distinct, less impactful genetic etiology of palatal canine impaction is indicated by the present findings.

Abstract citation ID: cjae081.549
SP257 PALATAL CANINE IMPACTION IS RELATED TO CRANIOFACIAL SHAPE.

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AIM: To assess the shape of the maxilla, the mandible and the entire craniofacial configuration in individuals with palatally impacted canines using geometric morphometric methods.
MATERIALS AND METHODS: The study sample comprised 404 individuals (232 females and 172 males). Half of these presented with palatal impaction of maxillary canines confirmed clinically and radiographically using panoramic and/or peri-apical radiographs. The other half represented the control group with no impacted canines. The groups were matched for sex and age to account for sexual dimorphism and for the effect of growth on craniofacial shape. The shape of the craniofacial configuration as well as the individual jaws was outlined on cephalometric images using 15 curves and 127 landmarks (11 fixed and 116 semi-landmarks). Digitization was performed with Viewbox 4 software (dHAL software, Kifissia, Greece). In order to reduce the positional variation of semi-landmarks between individual shape configurations and achieve homology, semi-landmarks were allowed to slide repeatedly along their respective curves. Shape configurations were then superimposed using Procrustes Superimposition and the mean Procrustes distances were calculated in order to assess differences in shape. This was done separately in females and males and for each shape configuration (maxilla, mandible, craniofacial complex). Statistical tests were all preformed assuming a 5% type I error.
RESULTS: There were significant differences in the shape of the maxilla in both females and males (P<0.001). In cases with palatally impacted canines, the maxilla was rotated more counterclockwise and the premaxillary area was wider when compared to controls.
In regards to the entire craniofacial configuration, females with palatally impacted canines presented a shorter anterior facial height with the mandible being rotated more counterclockwise (P<0.001). Although the same findings was evident in males, the difference was not statistically significant (P=0.07). In regard to mandibular shape, differences were more notable in females than males, but were not significant (p>0.05).
CONCLUSIONS: Palatal canine impaction is significantly associated with the shape of the craniofacial structures in females, but not in males, where the effect appears to be more localized. It is speculated that palatally impacted canines follow, at least partially, a sex-linked genetic pathway for their occurrence.

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SP258 ACCURACY OF ORTHODONTIC ACTIVITY CODING: A TWO CYCLE RETROSPECTIVE AUDIT

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AIM: The aim of this audit is to assess the accuracy of orthodontic activity codes submitted after treatment compared to the actual orthodontic procedures undertaken. Accuracy of activity coding is important as it has an impact on showing output of clinical activity, tariff setting, and the income related to the activity in hospital dentistry.
METHODS: A standard was set that 90% of all orthodontic procedures should be accurately coded according to the activity coding guidance developed by the Consultant Orthodontist Group of the British Orthodontic Society (BOS) and published by BOS, Royal College of Surgeons (RCS) and Getting it Right First Time (GIRFT) (1). A sample size of 100 patients were randomly selected from the orthodontic clinic lists in February 2023. Patients' clinical notes were retrospectively reviewed and cross-referenced with the GIRFT guidelines to check if the correct clinical code was used.
RESULTS: Results from the first cycle showed the accuracy of orthodontic activity coding was 70%, with 40% of these having multiple coding errors. A teaching session highlighting key mistakes as well as providing an improvement strategy via a physical aide memoire was implemented as the intervention. A second cycle was carried out three months later with the same methodology. Results of the second cycle showed an increase in accuracy of coding from 70% to 79%. The percentage of multiple coding errors also decreased from 40% to 14%.
CONCLUSION: Although there was a significant improvement in the accuracy of coding, the standard of 90% accuracy was not met by the department. Therefore, further recommendations have been implemented, such as the outcome form being adapted to increase ease of use and all staff receiving further sufficient training. A third audit cycle will be carried out to ensure that the 90% standard has been attained.

Abstract citation ID: cjae081.551
SP259 PROPHYLAXIS DURING MULTIBRACKET APPLIANCE TREATMENT – A SURVEY AMONG GENERAL DENTISTS IN GERMANY

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BACKGROUND: Accomplishing good oral hygiene represents a major challenge during multibracket appliance (MBA) treatment. In Germany, children, and adolescents between 6 and 18 years of age can attend an individual prophylaxis (IP) program twice a year free of charge. As part of this, they undergo training and receive recommendations to enhance oral hygiene. However, it remains unclear whether the general dentist feels responsible for prophylaxis during MBA treatment and how they adapt the IP sessions compared to patients without fixed appliances.
AIM: To assess how general dentists manage IP in children and adolescents undergoing MBA treatment.

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METHOD: A questionnaire was sent to 2744 general dental practices in the region of Hesse, Germany. Dentists were asked regarding their opinion on the responsibility for prophylaxis during MBA treatment, the oral hygiene recommendations given to those patients and how they adapt the prophylaxis sessions to special MBA needs.
RESULTS: The response rate was 37 % (n = 1015). While only 8 % of the respondents consider the orthodontist as primarily responsible for IP in MBA patients, the majority considers the general dentist (46 %) or both, the general dentist, and the orthodontist (46 %) to be responsible for IP in MBA patients. The vast majority of respondents answered that compared to patients without fixed appliances, MBA patients receive different oral hygiene recommendations during IP sessions. These recommendations are mostly related to 1. a longer toothbrushing duration (> 3 minutes) and 2. the use of additional tools for mechanical plaque removal (interdental brushes).
CONCLUSION: The majority of respondents perceive the general dentist as having primary or shared responsibility for IP during MBA treatment and adapt oral hygiene recommendations to the special requirements. However, the large proportion of perceived shared responsibility also suggests considerable room for improvement. Furthermore, analysis showed a large range regarding oral hygiene recommendations, indicating the need of standardized clinical guidelines.

Abstract citation ID: cjae081.552
SP260 THREE-DIMENSIONAL SOFT TISSUE CHANGES INDUCED BY EXPERIMENTAL POSTERIOR EXPANSION OF THE UPPER AND LOWER DENTAL ARCHES IN YOUNG ADULTS.

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AIM: To evaluate the 3D perioral soft tissue changes induced by simulated posterior expansion of the upper and/or lower dental arches using 3D printed veneers.
MATERIALS AND METHOD: 10 young adults (5 women, 5 men, age 25±1,7 yrs.) with neutral occlusion and physiological overbite and overjet were examined. 3D-printed veneers with thicknesses of 1-4 mm were bonded to the labial tooth surfaces. 3D face scans with and without veneers were obtained to evaluate soft tissue changes using 44 landmarks. Face scans were repeated three times and aligned at the forehead, temples and nose bridge. Estimates for soft-tissue changes were determined using linear mixed-effect models.
RESULTS: Positioning of veneers only on upper posterior teeth resulted in adjacent buccal soft tissue displacement of 0.26 mm (CI: 0.23 to 0.29 mm) per mm of veneer thickness. Positioning of veneers only on lower posterior teeth resulted in adjacent buccal displacement of 0.21 (0.18–0.24) mm/mm. With veneers positioned on both the upper and lower posterior teeth, displacements increased to 0.38 (0.35–0.42) mm/mm in the upper arch and 0.40 (0.37–0.44) mm/mm in the lower arch.
CONCLUSIONS: The cheek displacement per mm arch expansion appears to be smaller than the anterior lip displacement per mm incisor protrusion. These experimental results may contribute to increased accuracy of predictions and simulations of soft tissue changes resulting from expansion of the upper and/or lower arches during orthodontic treatment and orthognathic surgery, respectively.

Abstract citation ID: cjae081.553
SP261 180-DEGREE ROTATED PREMOLARS: A POSSIBLE ADDITION TO THE DENTAL ANOMALY PATTERN?

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BACKGROUND: The rare dental anomaly of 180-degree rotated premolars has garnered limited attention. Some environmental aetiological factors, such as prolonged deciduous molar retention and crowding, are still debated. However, the genetic origin of this anomaly is another plausible explanation.
AIM: To investigate the possible association between the presence of 180-degree rotated premolars and other dental anomalies within the "dental anomaly pattern".
MATERIALS AND METHODS: Twenty-eight healthy subjects exhibiting at least one 180-degree rotated premolar were identified from the archives of the division of orthodontics of the University of Geneva. Inclusion criteria for this experimental group, in addition to the presence of a 180-degree premolar, were the availability of panoramic radiographs, dental study casts and intraoral photographs. The concomitant occurrence of additional dental anomalies were evaluated based on the "dental anomaly pattern" as defined by Peck, including tooth agenesis, infraocclusion of deciduous molars, peg-shaped lateral incisors, palatally-displaced canines and transpositions, and comparisons were made to a control group using independent sample t-tests. An equal number of randomly-selected subjects from the same University clinic archives comprised the control group.
RESULTS: The experimental group displayed a higher prevalence of dental anomalies, specifically dental agenesis and infraocclusion of deciduous molars, in comparison to the control group. Eleven patients in the experimental group exhibited dental agenesis, while only three were noted in the control group (p=0.029). Infraocclusion of a deciduous molar was observed in five patients in the experimental group, contrasting with none in the control group (p=0.023). Although canine impaction was more frequent in the experimental group (4 cases, versus one case in the control group), this difference was not significant.
CONCLUSION: Our findings reveal significant associations between the presence of 180-degree rotated premolars and the occurrence of other dental anomalies, namely dental agenesis and infraocclusion of deciduous molars. These observations suggest a shared genetic origin for these anomalies.

Abstract citation ID: cjae081.554
SP262 NEW METHOD OF EARLY ORTHOPAEDIC TREATMENT OF SKELETAL CLASSES III MALOCCLUSION IN DECIDUOUS DENTITION OR EARLY MIXED DENTITION: A RETROSPECTIVE STUDY CASE-CONTROL

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AIM: The study's goal is to evaluate the skeletal and dental effects of III class malocclusion's early orthopaedic treatment, for children with deciduous and/or early mixed dentition, through application of a new therapeutic protocol.
MATERIALS AND METHODS: Treated Group (TG): 10 patients (6 f and 4 m, age at T0 77.60±10.33 months) with a diagnosis of Class III skeletal malocclusion underwent treatment with Delaire and Petit masks in conjunction with two types of extra-oral elastics (8oz and 16oz) for a duration of 12 months. No activation of the mid-palatal suture was planned during the initial 12 months of therapy. Following orthopedic treatment, the patients underwent a new lateral cephalometric radiograph.
Control Group (CG): 10 patients (6 f and 4 m, age at T0 81.30±14.83 months) who didn't receive treatment for Class III malocclusion. This sample was selected from the AAOF Craniofacial Growth Legacy Collection (Bolton Brush Growth collection).
The CG (T0-T1) was selected to ensure age and gender homogeneity with the TG. 19 variables (9 angular, 10 linear) were identified for each cephalometric analysis based on Jacobson, McNamara and Steiner. Cephalometric analysis was manually performed by an experienced operator. A descriptive analysis of the sample characteristics was conducted. The individual and combined effects of observation time and treatment on cephalometric measurements were assessed using analysis two-way ANOVA p<0,05.
RESULTS: The results obtained indicate that the TG vs. CG showed improvement at the sagittal level of the maxillary complex (Co-A 12.90 vs. 5.20, p=0.004) (Co-Gn 18.80 vs. 13.40, p<0.001).
OVJ (3.55 vs. 0.05, p<0.001) and OVB (2.68 vs. 1.05, p=0.007) at the end of the observation period were significantly higher in the TG vs CG. The maxillary/mandibular difference variation was significantly higher in the CG (p<0.001). Molar's ratio variation was negative in the CG (Δ=-0.75) and positive in the TG (Δ=1.85) (p=0.043).
CONCLUSION: Based on the data obtained, it can be concluded that in patients with primary and/or early mixed dentition, multiple circummaxillary suture activations are not necessary for orthopedic treatment of Class III skeletal malocclusions. The clinician should focus on compliance to effectively manage the cooperation of the young patient.

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SP263 THE CHANGE IN INCISAL ANGLE WITH PATIENTS UNDERGOING SURGICALLY ASSISTED RAPID MAXILLARY EXPANSION (SARME) OPERATION

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AIM: The aim of this retrospective study was to investigate if it is possible to retrocline proclined incisors with SARME operation and fixed appliances.
MATERIALS/METHODS: The study group consisted of 63 patients who were treated with SARME operation and fixed appliances at the Department of Oral and Maxillofacial Diseases, Helsinki University Hospital, Helsinki, Finland from

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2010 to 2021. We retrospectively examined patient records, including photographs and lateral radiographs. The study group consisted of 32 females (mean age 24.05±8.0 years) and 31 males (mean age 35.5±9.2 years), total mean age of 29.2±9,0 years. The indications for SARME operation were narrow maxilla and/or labial incisors and/or crowding and/or crossbite. Patients were divided into two groups. Group 1 consisted of patients whose initial incisal angle (upper incisors (UI)-Palatal plane (PL)) was labial (>110 degrees). In Group 2 incisors were not labial (≤110 degrees). 56 of the patients were treated with roth-torque brackets and 7 with standard brackets. We measured the SNA angle before and after the treatment. The cephalometric analyses were done with Dolphin Imaging®-software.

RESULTS: Maxilla was widened on average 7.4mm±1.9mm and teeth were aligned and/or retracted in the gained space. In Group 1 the initial incisal angle (UI; upper incisors - PL; palatal plane) was 119.3° ±6.6° and (UI; upper incisors - SN; Sella-nasion) 113.5°±7.3°. In Group 2 initial UI-PL 104.3° ±4.9° and UI-SN was 97.8° ±4.6°. After orthodontic treatment in Group 1 UI-PL was 113.2° ±7,1° and UI-SN was 107.2° ±6.6°. In Group 2 post-treatment UI-PL was 106.0° ±4.5° and UI-SN was 99.5° ±5.4°. The change of UI-PL in Group 1 and Group 2 was -6.13° and +1.57°, respectively. SNA angle changed from 80.01° ±3.41° to 79.34° ±3.17°.

LIMITATIONS: This is a retrospective study.

CONCLUSIONS/IMPLICATIONS: With SARME operation and fixed appliance alignment proclined incisors were able to be retroclined 6 degrees on average. SNA angle change was not clinically significant.

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SP264 CEPHALOMETRIC EFFECTS EVALUATION OF PREFABRICATED MYOFUNCTIONAL APPLIANCES IN PATIENTS WITH PRIMARY AND EARLY MIXED DENTITION

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The balanced muscle function is a prerequisite for balanced growth and development in the maxillofacial area. Incorrect muscle function can cause malocclusion, but it can also be a consequence of improper occlusion. Early orthodontic myofunctional treatment is focused on correcting sagittal malocclusion and improvement of the muscle function and tonicity. Soft tissues should not be perceived only as an envelope of the facial skull.

The AIM of the present study is to evaluate the cephalometric effects of the prefabricate myofunctional appliance in the treatment management of the patient with primary and early mixed dentition.

MATERIALS AND METHODS: We used 40 profile cephalograms on which 16 cephalometric measurements were estimated.

Two groups of 10 growing patients with primary or early mixed dentition were observed. The patients in the first group, with skeletal Class II malocclusion, were treated with T4K myofunctional appliance. The patients in the second group, with skeletal Class III malocclusion, were treated with I-3 myofunctional appliance. The first phase of the treatment continued for 9 to 12 months.

All patients had lateral cephalometric x-ray at the beginning of the treatment and at the end of the active treatment. All cephalometric x-rays were traced using Audax® software program and the results were statistically analysed.

RESULTS: Most of the sagittal skeletal dimensions showed significant changes between pre- and post-treatment in both patient groups. The two groups have shown improvement in the incisor inclination. No big influence on the facial height and vertical growth pattern is registered.

CONCLUSION: Most of the removable functional appliances have a similar mode of action. They position the mandible in edge to edge bite sagittally, stimulate dentoalveolar changes and produce small but statistically significant growth remodeling. Myofunctional appliance's indications are limited to the mild cases. Their advantages are reduce cost and chair time.

Abstract citation ID: cjae081.557

SP265 3-YEAR FOLLOW-UP OF A RCT. CAD/CAM FIXED RETAINERS VS. CONVENTIONAL MULTISTRANDED FIXED RETAINERS IN ORTHODONTIC PATIENTS - COMPARISON OF RETAINER FAILURE RATE AND ADVERSE EFFECTS

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BACKGROUND: Keeping the occlusion and alignment after an orthodontic treatment has always been a challenge, and the search for the ideal retention protocol is constantly evolving and investigated. Severe complication in the form of unexpected posttreatment changes have heightened the awareness of the downside of fixed retainers, and new materials, designs and techniques have evolved.

OBJECTIVES: This randomized clinical trial aims to compare the clinical effectiveness of computer-aided design and Manufacturing (CAD/CAM) customized nitinol retainer versus conventional multistranded fixed retainers according to their failure rate and adverse effects, 3 years after retainer placement

METHODS: Patients from the postgraduate orthodontic clinic at the section of Orthodontic, Aarhus University, were randomly assigned to either CAD/CAM or conventional multistranded fixed retainers at the end of treatment. Eligibility criteria were the presence of all anterior teeth with normal size and shape in patients between 12-25 of age. The patient underwent a clinical investigation including intraoral photos and scan at several timepoints, up to a 3-year follow-up, with special focus on failures and unexpected posttreatment changes.

RESULTS: 98 patients were randomized: 48 in CAD/CAM and 50 in conventional group. 92 patients attended 3-year follow-up. Within 36 months, 62% maxillary CAD/CAM FRs and 60% maxillary conventional FRs failed, along with 60% mandibular CAD/CAM FRs and 49% mandibular conventional FRs. No harms were observed. No unexpected post-treatment changes related to the retainers were observed in any of the groups.

CONCLUSIONS: CAM/CAM retainers demonstrate similar failure rates as conventional multistranded retainers after 3 years. No unexpected post-treatment changes related to the retainers were observed in any of the groups.

Abstract citation ID: cjae081.558

SP266 EXPLORING PATIENT PERCEPTIONS AROUND INFORMED CONSENT IN ORTHODONTIC TREATMENT: A COMPARATIVE ANALYSIS BETWEEN CLINICAN WRITTEN AND ARTIFICIAL INTELLENCE

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BACKGROUND: In the rapidly evolving landscape of healthcare, the integration of artificial intelligence (AI) is transforming various facets of patient care, including the vital area of patient education. The question has arisen how AI can be utilised, including how patients perceive and engage with this technology in the context of obtaining informed consent for their orthodontic treatment.

AIM: The primary objective is to understand patient preference and attitudes towards AI generated information, specifically related to side effects of orthodontic treatment.

MATERIALS & METHODS: A quantitative questionnaire was employed to 46 patients to gauge their attitudes and perceptions to the presentation of the orthodontic side effects. Included were two documents informing about side effects related to orthodontics:

1) Standard clinician written document
2) ChatGP4 generated document

The questionnaire was designed to evaluate how useful and understandable the information was, alongside how nervous it made the participant feel about orthodontic treatment. A likert scale was utilised to identify patient preference. Inclusion criteria identified orthodontic patients to be 13 years or older and could be in the pre-treatment, ongoing treatment or post treatment (retention) phase. Subjects were identified from a university care setting.

RESULTS: Out of the 43 patients who responded (Girl n=33, Male n= 10), 7 patients (15.2%) preferred clinician written standard document while 36 patients (78.3%) preferred the AI generated information. Of this percentage, there was a significant tendency for participants to feel less nervous when given the ChatGPT information regarding side effects in orthodontic treatment, compared to our clinician derived standard information.

LIMITATIONS: Alongside ethical and legal concerns, AI may lack the emotional intelligence, personalisation and empathy required for individual orthodontic treatment considerations, particularly with complex case discussion.

CONCLUSIONS: This comparative analysis contributes a valuable insight into the field of orthodontics by examining the intersection of AI and patient engagement in the informed consent process. The findings conclude that AI/ChatGPT is a valid technique for patient education regarding orthodontic side effects and can balance the advantages of technological advancement with the importance of maintaining trust and communication in the patient-focused approach to orthodontic care.

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SP267 SAFETY OF GUIDED MINISCREW INSERTION PLANNING WITH THE USE OF LATERAL CEPHALOGRAMS EVALUATED ON CORRESPONDING CONE-BEAM COMPUTER TOMOGRAPHS

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BACKGROUND/OBJECTIVES: Lateral cephalograms have been proposed for guided miniscrew insertion planning. Thus, the purpose was to assess the safety of such planning on corresponding cone-beam computer tomographs (CBCTs).
MATERIALS/ METHODS: Intraoral scans, lateral cephalograms and CBCT images of 52 subjects (even sexes distribution), aged 15.1±2.5 years, were included. Planning of 104 miniscrews was done by the use of lateral cephalograms superimposed on maxillary intraoral scans, while the assessment of their bicortical placement, length in bone, contact with adjacent teeth, incisive canal and nasal floor perforation was done on corresponding superimposed CBCTs. Moreover, maxillary incisor inclination, crowding, and the maxillary intercanine width were measured.
RESULTS: Bicortical placement was seen in 58.7% of the sample (38.5% of subjects). Incisive canal and nasal floor perforation was seen in 25% and 21.2% of subjects, respectively. No contact of the miniscrew with adjacent teeth was recorded. A negative significant interaction was seen between the miniscrew length in bone, the percentage of total miniscrew length and maxillary anterior teeth crowding (β, -0.10, P =0.047 and β, -0.90, P =0.006, respectively). Besides, a positive significant interaction was seen between the incisive canal perforation and maxillary anterior teeth crowding (OR =1.32, P =0.021).
LIMITATIONS: Exclusion of subjects with impacted teeth.
CONCLUSIONS/IMPLICATIONS: Miniscrew insertion planning using lateral cephalograms is safe in preventing contact with adjacent teeth, while it is limited in achieving bicortical placement and insufficient in completely avoiding incisive canal and nasal floor perforation.

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SP268 THE ANTEGONIAL NOTCH: A REFLECTION ON THE STRUCTURE OF THE HUMAN MANDIBLE

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The antegonial notch (AgN) is a concavity on the inferior-posterior surface of the mandibular body located anterior to the gonial process. This anatomical location contains important neuro-vascular structures and is used as a reliable landmark during orthognathic surgeries. The proportions of the AgN in humans is highly variable, and its formation and function are still not fully understood. Revealing factors associated with AgN presence and size may contribute a better understanding of its function which may contribute to improved and more individualized orthodontic approaches.
The objective of the present study was to elucidate the skeletal, muscular and dental features associated with AgN size.
The study was performed using head and neck CT scans of 311 healthy adult individuals (163 males, 148 females). AgN area was measured and corrected for general mandibular size. Facial type, skeletal, muscular metric and dental measurements were recorded. An independent samples t-test was run to find differences between AgN presence groups and skeletal, muscular and dental parameters. Chi-square test was applied to find differences between facial types. Binary logistic regression analysis was performed to find factors associated with AgN presence.
The AgN in the male group was found to be significantly larger compared with females (42.4 mm2 vs. 20.2 mm2) ($p<0.0001$). No significant changes in AgN size after the age of 18 was found in both sexes ($p>0.067$). Long facial types were characterized with significantly greater prevalence of AgN (84%) compared with short facial types (59%) ($p=0.027$). AgN was significantly associated with the chin width and projection, condylar length and area, gonial width, body height and facial angle ($p=0.002$). Chin and gonial width and body height were found as strong predictors for AgN presence ($R2= 0.394$, $p<0.001$). No significant associations were found between AgN and masticatory muscles size and dental parameters ($p>0.08$).
Our results suggest a complex relationship between AgN and other anatomical features of the mandible and facial types. A better understanding of the influence of these associated factors may provide a diagnostic tool as well as an aid in treatment planning especially in patients where growth modification and prediction of mandibular growth is important.

Abstract citation ID: cjae081.561
SP269 VALIDATION OF INDEX OF ORTHODONTIC TREATMENT NEED (IOTN) GRADING USING CONVOLUTIONAL NEURAL NETWORK (CNN) AND KNOWLEDGE-BASED SYSTEM (KBS)

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BACKGROUND: Index of Orthodontic Need (IOTN) is used to measure the orthodontic need of a patient. Early detection of orthodontic treatment needs can minimise the long-term complications of malocclusion. However, the detection process is time-consuming, and there are instances of misdiagnosis. Therefore, a Machine Learning (ML) algorithm is useful to aid in accurately detecting and classifying the occlusal traits of the dental health component of IOTN.
AIM: The project aims to design, develop, and validate a grading system for IOTN using a Convolutional Neural Network (CNN) and Knowledge-Based System (KBS). The validation was done by comparing IOTN grading manually and using the IOTN system.
METHODS: A total of 1,180 intraoral images of 236 orthodontic patients were acquired from the Centre of Paediatric Dentistry and Orthodontics Studies, Faculty of Dentistry, UiTM. Two calibrated raters graded the IOTN of each set of clinical photographs. The dataset was subjected to pre-processing, which included image size standardisation and several augmentation procedures. ResNet-50, a trained Residual Network model, was utilised to develop the system. Several different parameters and training and validation ratios were used during testing. The model with the highest degree of precision was implemented in the system. The IOTN grading system was used to score for all five intraoral image views of each patient and indicate the user's eligibility for orthodontic treatment. For validation purposes, 10 sets of intraoral photographs were tested using this model and given to 100 clinical dental students for grading.
RESULTS: The average accuracy of IOTN grades using the IOTN system and assessments by clinical students was 65% and 81% respectively. There was no statistical significance for both methods with $p>0.05$.
IMPLICATIONS: This novel system can assist patients in conducting an early self-assessment of their malocclusion and indicate their eligibility for treatment in public healthcare services using tele-orthodontic methods. Consequently, it can reduce unnecessary waiting time to see an orthodontist and lessen the number of appointment visits. Intellectual property (IP) registered reference number: IP/CR/04158.

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SP270 EVALUATION OF GAPS BENEATH ORTHODONTIC BANDS CEMENTED USING DIFFERENT ORTHODONTIC MATERIALS AND METHODS

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INTRODUCTION: This study aimed to evaluate gaps remaining beneath orthodontic bands cemented using two different methods and three different band adhesives under in vitro conditions.
METHODS: The study consisted of one hundred-twenty identical feldspathic ceramic molar teeth. Prior to cementation, the ceramic tooth surfaces were conditioned (9.6% hydrofluoric acid), and isolation material was applied to the inner surface of the bands. Polyacid-modified composite resin (Transbond Plus), resin-modified glass ionomer cement (Multi-Cure), and conventional glass ionomer cement (Ketac Cem) were prepared. One half of each band was cemented using an occlusal barrier, the other half was not covered with any barrier. Voids in the cervical region were filled with a polyvinyl siloxane material to demarcate the cervical borders of the bands. Areas below the cervical border of the bands were covered with wax. Then bands were removed from the tooth surface. The samples were scanned with a dental scanner and transferred to SolidWorks 2016 software for surface area measurements.
RESULTS: For all three types of cement, the surface area of the gaps in the occlusal barrier (-) groups were nearly twice as large as those in the occlusal barrier (+) groups ($p < 0.05$). The type of cement used was not associated with a statistically significant difference in gaps beneath the bands ($p > 0.05$).
CONCLUSIONS: In all groups tested, gaps beneath the band material was detected. However, cement type was not associated with differences in gaps beneath the orthodontic bands. Based on the findings of this study, the use of an occlusal barrier during band cementation, a common procedure, is recommended.

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SP271 INVESTIGATION OF OXIDATIVE-STRESS IMPACT ON ORTHODONTIC TOOTH MOVEMENT USING AN IN VITRO TENSION MODEL

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AIM: In recent years, there is a growing number of adult orthodontic patients with periodontal disease. As in many other inflammatory disorders, its progression is well linked to oxidative stress (OS). However, the impact of OS on orthodontic tooth movement (OTM) is not fully clarified. Therefore, we applied an OS in vitro-model utilising H2O2 to study its effect on tension-induced mechanotransduction in human osteoblasts (hOBs). Suitable experimental parameters were established based on cell viability and proliferation. Gene expression related to bone remodelling, inflammation, apoptosis, and autophagy was examined.
MATERIALS/METHODS: hOBs were stimulated with H2O2 concentrations ranging from 20μM to 500μM, and 100μM was identified as the lowest concentration showing a cytotoxic effect without affecting cell viability. To simulate the effect of OTM on OS compromised cells, hOBs were first cultured with or without 100μM H2O2 for 24h, followed by mechanical stimulation using tension force (10% and 15%) for further 24h. Cells cultured for 48h without any stimulation but otherwise treated identical served as controls. Cell viability was determined using a commercial kit. Cell proliferation and cytotoxicity was assessed using alamarBlue®. Apoptosis detection was done by CellEvent™ Caspase-3/7 Detection Reagent. Gene expression of CASP3, LC3, BECN1, RUNX2, OPG, IL6, COX2 were analysed by RT-qPCR.
RESULTS: We found that stimulation with 100μM H2O2, followed by tensile strain application did not affect cell viability and proliferation. The apoptosis related CASP3 gene and Autophagy related LC3 gene were upregulated in all groups except the one receiving H2O2 stimulation and 10% tension. Autophagy related gene BECN1 was significantly upregulated in all groups. Cells that were previously cultured in OS environment and then subjected to tension showed more pronounced inflammation related COX2 gene expression and downregulation of bone formation related genes activity (RUNX2 and OPG) in contrast to cells exposed to tensile force alone.
CONCLUSION: Herein presented results suggest that OS might have significant impact on OTM through regulation of bone remodelling, inflammation, autophagy, and apoptosis-related genes. To get a more in-depth understanding of the molecular events, further studies are necessary.

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SP272 CARE PATHWAYS FOR PATIENTS WITH IMPACTED TEETH AT QUEEN MARY'S HOSPITAL SIDCUP: A SERVICE EVALUATION

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BACKGROUND AND AIMS: Management of impacted teeth requires prompt diagnosis and intervention to mitigate against complications, such as root resorption of adjacent teeth. This project measured the efficiency of care pathways for patients presenting with impacted teeth, in terms of time taken from referral to 1) initial assessment, 2) treatment decision, and 3) placement on surgical waiting list.
METHODS: List of patients attending New Patient Clinics at the Gillies Unit, Queen Mary's Hospital Sidcup (QMH) between 01 April and 30 September 2022 was obtained from hospital appointment software. Patients' medical records were inspected to collect patient data (demographics, treatment, referral and appointment dates) on a Microsoft Excel® spreadsheet for analysis.
RESULTS: 71 patients with impacted teeth requiring orthodontic treatment at QMH were identified, of which 61% (n=43) additionally required surgical exposure or extraction under general anaesthesia. The average time taken between referral and first appointment was 35.6 weeks, and further 17.4 weeks was taken until treatment decision was made. The main causes of delays in treatment decisions were appointment non-attendance/cancellations, and patients requiring additional time to consider treatment options. Four pathways were taken by patients requiring surgery under general anaesthesia, which showed difference in time taken from their first appointment to placement on surgical waiting list (Pathway 1 = 18.0 weeks, Pathway 2 = 28.0 weeks, Pathway 3 = 35.0 weeks, Pathway 4 = 51.4 weeks).
CONCLUSIONS: The findings show that care pathways for patients with impacted teeth can be delayed by various internal and external factors, which can be addressed by introducing a new pathway protocol and raising awareness amongst staff at QMH. It is hoped that this change will reduce the number of weeks taken until treatment decisions are made, which will be prospectively assessed (January-June 2024).

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SP273 LONGITUDINAL BIBLIOMETRIC INVESTIGATION OF TRENDS IN ORTHODONTIC RESEARCH TOPICS, OUTCOMES AND STUDY DESIGNS

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BACKGROUND: Trends in research publication topics reflect variation in researchers' and clinicians' priorities, as well as contemporaneous innovations and events. Understanding this is valuable to direct future research efforts and resources.
AIMS: To identify most published topics and highlight trends in orthodontic research papers over the past decade. Secondly, to identify types of outcomes used in orthodontic research, specifically focusing on patient-centred outcomes. Lastly, to identify the breakdown of types of study design used and relate this to research topic.
METHODS: A literature search was performed in May 2023 in the Scopus database, returning all indexed articles with relevance to orthodontics published between 2013 to 2023, inclusive. Article parameters (title, year, author names, source title, citation count, author keywords, and index keywords) were recorded. Further analysis of articles' abstracts was performed on the most highly cited papers per year: the main topic, types of outcomes measured, and study design were extracted.
RESULTS: 14,397 documents were returned. Papers on orthodontic bonding made up 7.02% of the publication pool, followed by orthodontic materials (5.88%) and tooth movement (5.42%). Amongst the most cited papers, the most frequently published topics were aligners (12.5%), tooth movement (9.45%) and digital workflow (9.09%). Machine learning was highly researched in 2020 and 2022, and Covid-19 was the subject of many papers in 2020 and 2021. The most frequently used outcome type was morphological features of malocclusion (26.9%), followed by clinical measures of health or disease (13.6%) and patient-reported measures (12.7%). The topic of orthodontic tooth movement had the most randomised controlled trials (RCTs) (n=21) but only 2 systematic reviews within the 50 most-cited papers, whereas the topic of aligners had the most systematic reviews (n=3) but only had 5 RCTs. 26% of all RCTs included in the 50 most-cited papers used patient-reported measures as one of their study outcomes.
LIMITATIONS: Subjectivity in allocating a single topic to each paper and conducting analyses for the secondary aims on only the 50 most-cited papers are limitations.
CONCLUSIONS: Orthodontic research trends over the past decade are dynamic but show consistent research interest in certain topics (orthodontic tooth movement, bonding, and materials).

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SP274 BONE- AND TOOTH-BORNE MAXILLARY PROTRACTION WITH MINISCREWS AND CLASS III ELASTICS

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INTRODUCTION: Treating skeletal Class III malocclusion in a growing patient is a challenge and our traditional method of using facemask on tooth-supported framework has many limitations. The unwanted side effects include proclination of maxillary incisors, retroclination of mandibular incisors, maxillary molars mesialisation, and clockwise rotation of the mandible increasing the lower anterior facial height. The introduction of bone anchored maxillary protraction (BAMP) with miniplates and Class III elastics maximise the skeletal effects and minimise dentoalveolar compensation. However, patient requires general anaesthesia (GA) for miniplates' placement and removal. An alternative treatment option was recently reported where maxillary and mandibular appliances supported by miniscrews and the posterior dentition, are connected by Class III elastics for maxillary protraction. This method is less invasive as the miniscrews are placed under local anaesthesia (LA).
AIM: To assess the dental and skeletal changes during treatment of skeletal Class III patients using bone- and tooth-borne maxillary protraction with miniscrews and Class III elastics.
METHODS: Fifteen consecutive pre-pubertal skeletal Class III patients with retrusive maxilla were enrolled. Custom-made CAD/CAM maxillary and mandibular frameworks were supported by 4 miniscrews. Patients were instructed to use Class III elastics full-time. Lateral cephalogram were taken before, 6-month progress, and after treatment, to evaluate dental and skeletal changes.
RESULTS: The maxilla showed statistically significant advancement. There was no significant difference in the sagittal position of the mandible, indicating good control of mandibular growth. The mandible showed no clockwise rotation. Maxillary incisors were slightly retroclined but the mandibular incisors were slightly proclined.
LIMITATIONS: The findings are based on a brief period of observation under the constraints of a small sample size. Longer observation period of these patients would be beneficial in order to make long-term conclusions of this treatment protocol.
CONCLUSION: This treatment allows for true skeletal changes without significant dental side effects. The treatment provided excellent vertical control. It can

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be successfully carried out in patients with late mixed to early permanent dentition, who have missed the ideal timing for effective treatment with facemask therapy.

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SP275 TWO-CYCLE AUDIT ON THE QUALITY OF CONSENT FOR ORTHODONTIC TREATMENT PLANS IN A REGIONAL TEACHING HOSPITAL

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AIM: This audit aimed to assess the quality of consent for patients and whether a treatment plan consent form had been completed for each patient prior to commencing their orthodontic treatment, as per Trust standards.
MATERIALS AND METHOD: 30 case notes of patients already treatment planned were randomly selected for auditing across July 2019. Half the records were taken from orthodontic consultant's lists and half from registrar's lists. In the first cycle (C1), records were assessed for the presence of a treatment plan consent form, documentation of risks/benefits and estimated treatment duration. Audit results were disseminated in September 2019, and a new Orthodontic Treatment Plan Consent form created and implemented for use in the department. This new consent form included a clear outline of the treatment plan, templates of treatment risks/benefits and estimated treatment duration. Re-auditing for the second cycle (C2) involved a random sample of 30 new orthodontic patients treatment planned from July 2021; with equal split between consultant's and registrar's list. Anonymised data from both cycles was collated onto Microsoft Excel.
RESULTS: In the first cycle, 20% of records did not include a treatment plan consent form, and half these records did not have any documented treatment plan. 30% of records documented risks/benefits of treatment, and only 10% included estimated treatment duration. Since the implementation of the new orthodontic treatment plan consent form, 10% more records had a consent form present (C1=80%, C2=90%). There was a significant improvement in the use of the new consent forms, as all were correctly filled, compared to 30% of old consent forms which were incorrectly filled. Documentation of risks/benefits of treatment saw a 70% improvement since introducing the new consent form (C1= 30%, C2= 100%). Documentation of estimated treatment duration also substantially improved from the first to the second cycle (C1=10%, C2=90%). In both cycles, registrars conformed better than consultants with using the consent form.
CONCLUSIONS: Findings of the first cycle demonstrated poor compliance with Trust and GDC standards for consenting patients. However, since implementing the new consent form, considerable improvements are seen in the quality of consent for the second cycle.

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SP276 COMPARISON BETWEEN TWO-DIMENSIONAL AND THREE-DIMENSIONAL IMAGING FOR PHARYNGEAL AIRWAY SPACE EVALUATION

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AIM: To compare the width of the pharyngeal airway space (PAS) on the axial slices of cone-beam computed tomography images (CBCTs) to the PAS width, as measured on the midsagittal plane of lateral cephalograms (LCs) recreated from CBCTs. Additionally, to assess the correlation between the PAS width linear measurements of the LCs and the total area of the airway.
METHODS: In this retrospective study, DICOM files from 50 patients were analyzed using the Viewbox software. A LC image was reconstructed and upper airway features, such as the path and the borders, were determined from every CBCT. The slice corresponding to the minimum airway area was detected and linear measurements of the anteroposterior width were taken on both the LC image and the CBCT slice. Intraobserver and interobserver measurement errors were evaluated in a sample of 20 cases. Agreement between the two modalities (LC and CBCT) was assessed using the Bland-Altman method. The correlation between LC linear measurements and CBCT-slice minimum airway area was evaluated by linear regression analysis.
RESULTS: Mean airway width in LC images was 11.10 mm (SD=4.06) and 10.50 mm (SD=4.03) in CBCT slices. A significant difference between LC and CBCT measurements was detected, with LC linear measurements exceeding the CBCT measurements (p=0.001) by 0.60 mm. Although the correlation coefficient was high (0.96), Bland-Altman 95% limits of agreement were wide (-1.66 to 2.87). The correlation coefficient between LC linear measurements and minimum airway area was R=0.836 (p<0.001).
LIMITATIONS: The retrospective design of the study. Airway measurements were sensitive to airway segmentation in the CBCT images. The inclination of the airway path may influence the determination of the airway cross section minimum area.
CONCLUSION: LC measurements tend to overestimate the airway width in comparison to the CBCT measurements. Using LC for the estimation of airway dimensions should be given careful consideration.

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SP277 LONG-TERM STABILITY OF FACE HEIGHT INCREASE IN DEEP BITE PATIENTS AFTER ORTHOGNATIC SURGICAL TREATMENT

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AIMS: To study the long-term stability of increase in the total anterior face height (TAFH) and straightening of the curve of Spee (COS) in patients with a skeletal Class II deep bite treated with mandibular surgical advancement.
METHODS: A group of 27 patients with mean age 43.4 years (range 22-63 years). Eligible patients had undergone mandibular advancement with bilateral sagittal split osteotomy (BSSO) at the Oral and Maxillofacial Unit of Tampere University Hospital, Tampere, Finland. At the operation the mandible was rotated clockwise with mandibular advancement to reduce overbite and increase TAFH. COS was not straightened pre-surgically, and immediately post-surgery, the patients had tooth contacts in the front and on the second, and sometimes also on the first, molars. Open bite in premolar and molar areas was closed with orthodontics post-surgically by extruding lower premolars and molars. Pre-operative (T1), post-operative (T2) and at least four years after surgery (T3) lateral radiographs and patient's files were used in the study. Statistical significance of changes between different time points (T1, T2 and T3) were analyzed with Wilcoxon signed-rank test.
RESULTS: Based on the cephalometric measurements at T2 mean mandibular advancement (condylion-gnathion) was 6.2mm (SD 2.08) and TAFH (nasion-menton) increased 3.8mm (SD 2.05 average) with statistically significant (p<0.001) mean relapse of 1.4mm and 1.8mm at T3, respectively. Overbite reduced from mean 6.2mm to 1.6mm at T2 and increased statistically significantly (p<0.001) to 3.2mm at T3. Deepness of the COS, measured as the distance from the lowest premolar cusp tip to the lower occlusal plane, reduced by 1mm from T2 to T3 being 0.5mm indicating straightening of COS. Initial overjet of 7.8mm reduced to 3.3mm at T2 and increased to 4.1mm at T3. LIMITATIONS: Despite small sample of the study, the strengths of the study are the similarity of the patient data, same surgical and orthodontic technique used in all cases with long-term follow-up.
CONCLUSIONS: The study indicates that TAFH can be increased and maintained in the long-term with BSSO mandibular advancement + posterior rotation and post-surgical orthodontic straightening of the COS. Some clinically non-significant relapse is to be expected both skeletally and dentally.

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SP278 THE SKELETAL AND DENTO-ALVEOLAR CHANGES IN MINISCREW-ASSISTED RAPID PALATAL EXPANSION(MARPE) AND BONE-BORNE RAPID PALATAL EXPANSION

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AIM: The purpose of this study was to evaluate the success rate of suture opening and the skeletal and dento-alveolar changes of bone-borne rapid palatal expansion (Bone-borne RPE) in adults.
METHODS: The subject population consisted of 15 patients (aged 21.9 ± 3.2; over 18 years; 6 males, 9 females) treated with Bone-borne RPE, and 15 patients (aged 22.1 ± 3.2 years; over 19 years; 8 males, 7 females) treated with MARPE. The success rate of mid-palatal suture opening was evaluated for each group. CBCT scans were taken before treatment (T1) and 3 months after active

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expansion (T2). Fast voxel gray scale based superimposition was performed with automatic registration at the anterior cranial base, and two skeletal variables and five dento-alveolar variables were measured.
RESULTS: There was no statistically significant difference in the success rate of suture opening. In the bone-borne RPE group, the interalare width and interprocessus zygomaticus width increased by 2.45 mm (SD 0.8) and 2.30 mm (SD 0.9) respectively, and in the MARPE group, they increased by 2.95 mm(SD 0.6) and 3.34 mm (SD 0.8) respectively. For the bone-borne RPE group, the interfurcation width and interectomolare width increased by 3.34 mm (SD 0.8) and 3.02mm (SD 1.2) respectively, and for MARPE group, increased by 4.27 mm (SD 0.9) and 5.35mm (SD 0.5).
CONCLUSION: Bone-borne RPE does not increase the dento-skeletal maxillary width as much as MARPE does. Bone-borne RPE can be applied in patients with mild to moderate transverse discrepancy and overexpansion needs to be considered.

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SP279 KNOWLEDGE, USE, AND CONFIDENCE IN ARTIFICIAL INTELLIGENCE APPLICATIONS AMONG ORTHODONTISTS IN THE UK AND IRELAND

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BACKGROUND: Artificial intelligence (AI) has been applied in orthodontics using different applications, including cephalometric tracing, remote and initial assessment, remote monitoring of treatment progress, and extraction decision-making. This study aims to assess knowledge, usage, confidence, and future interest in AI applications amongst orthodontists in the United Kingdom and Ireland.
MATERIALS AND METHODS: A cross-sectional study was conducted amongst orthodontists in the United Kingdom and Ireland. A self-reported questionnaire was used. Data was collected on participant demographics, as well as knowledge, usage, confidence, and future use of different AI applications. Pearson chi-square tests were used to assess if demographics, region of work, sector of work, and years of experience influenced responses.
RESULTS: A total of 331 responses were received. There was a general awareness that AI can be used in orthodontics in 80.4% of respondents. In addition, the overall mean knowledge, usage, and confidence levels of the examined AI applications were 51.3%, 16.6% and 18.7% respectively. Knowledge, usage, and confidence levels for specific AI applications differed, with the greatest familiarity, usage, and confidence observed in AI applications for cephalometric tracing and remote monitoring. Alternatively, the lowest awareness, usage, and confidence were attributed to AI applications that assisted in identifying the need for extractions. Additionally, most orthodontist (81%) consider AI to be beneficial for future use and the majority (96.7%) was open to learning about it. Statistically Significant associations (P >0.05) were discovered between knowledge, usage, and confidence in various AI applications and between multiple factors including healthcare sectors, practice regions, and gender.
CONCLUSION: This study revealed differing levels of knowledge, usage, and confidence in various AI applications among practitioners in the UK and Ireland. The findings suggest a knowledge-implementation gap that might be beneficial to be targeted by educational means to increase the adoption of AI technology in the orthodontic practice.

Abstract citation ID: cjae081.572
SP280 EFFECT OF TRANSFORMING GROWTH FACTOR-BETA RECEPTOR INHIBITORS ON MYOTUBE FORMATION IN VITRO

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BACKGROUND: Skeletal muscle injury often occurs after trauma, tumor resection or cleft palate surgery. Despite the fact that surgery restores tissue integrity, optimal muscle function is often not achieved because of incomplete regeneration. In the process of muscle regeneration myoblasts fuse together to form new, multinucleated myofibers. Often regeneration is impaired by fibrosis. A key process in fibrosis is transforming growth factor ß (TGFß) signaling. Many small molecules that inhibit the TGFß receptor are investigated for their anti-fibrotic activity. However, their possible side-effects on myofiber formation are unknown.
AIM: To investigate the effect of transforming growth factor-beta receptor inhibitors on myotube formation in vitro.
MATERIALS AND METHODS: Five small molecule TGFßRI inhibitors were investigated: Galunisertib, SM16, AZ12799734, SB431542 and IN1130. First, the toxicity of the inhibitors on C2C12 cells was determined in a live/dead assay with concentrations from 0 to 100 µM. Next, different concentrations (0-20µM) of the inhibitors were added to C2C12 cell cultures to determine the fusion index (% of total nuclei in myotubes). Immunofluorescence staining for myosin heavy chain was used to determine the fusion index using ImageJ (NIH). Data analysis and statistics were performed with Graphpad Prism software.
RESULTS: SM16 and IN1130 had no significant toxic effects. Galunisertib and AZ12799734 were toxic from 10 µM on ($p<0.05$) and SB431542 only at 100 µM ($p<0.05$). SM16 and IN1130 significantly reduced the fusion index at a concentration of 1 µM and higher ($p<0.05$). SB431542 reduced the fusion index starting from a concentration of 5 µM ($p<0.05$) and AZ12799734 starting from a concentration of 10 µM ($p<0.05$). Galunisertib had no significant effect on the fusion index.
CONCLUSION: These results show that Galunisertib does not impair the formation of myotubes from C2C12 cells and might be suitable for further investigation as an anti-fibrotic therapy in muscle regeneration.

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SP281 UNIQUE BONES IN THE CRANIUM -OSSIFICATION MECHANISMS OF THE PTERYGOID PROCESS OF THE SPHENOID-

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BACKGROUND/AIM: The cranial bones are formed from cells derived from the cranial neural crest(CNC) and the cranial paraxial mesoderm(CPM). It is generally accepted that most of the cranium are formed from CNC-derived cells, and only the parietal and occipital bones are formed from the CPM-derived cells. However, it has been reported that the sphenoid bone at the center of the base of the skull possibly originates from these two cell types. Previous studies have reported that the medial pterygoid process(MPP) in sphenoid bone develops later than the cranial base, and that the main part of the sphenoid bone is formed by cartilage during the embryonic period. On the other hand, the MPP is ossified by a combination of cartilage and membranous bone. However, it is unclear whether the MPP is derived from CNC- or CPM-deriverd cells. In this study, therefore, we decided to identify the cells of origin in order to further pursue the ossification mechanism of the MPP.
MATERIALS/METHODS: We used C57BL6J mice (wild type), Wnt1Cre;tdTomato mice (luminesce of CNC-derived cells) and Wnt1Cre;Sox9fl/+ mice (inhibits osteogenesis by CNC-derived cells) at 14.5, 16.5 and 18.5 days of gestation. We prepared Paraffin and freeze blocks using standard methods, and cut a series of 7-µm-thick tissue sections. After H-E staining and fluorescent immunohistochemical staining for them, we observed under various microscopes.
RESULTS: The cross-sectional area of the MPP of wild type mice significantly increased at each stage. Wnt1Cre;Sox9fl/+ mice were divided into two phenotypes: mice with concomitant cleft palate (CLP+) and those without (CLP-). The CLP+ mice had a disorganised cellular arrangement of the MPP margins and a clearly defective its morphology. The CLP- phenotype showed less morphological changes in the MPP, but areas of hypoplastic membranous bone were observed. Wnt1Cre;tdTomato mice revealed that the anterior part of the MPP was composed of CNC-derived cells, while the posterior part had fewer CNC-derived cells.
CONCLUSIONS: The results of this study suggest that the MPP is an unusual site in the cranium where cells derived from the CNC and CPM form in concert.

Abstract citation ID: cjae081.574
SP282 REVOLUTIONIZING ORTHODONTICS? IN VIVO EXPLORATION OF DIRECTLY PRINTED ALIGNERS

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AIM: To examine the impact of intraoral aging on the mechanical properties and surface roughness of directly printed aligners (DPA) compared to thermoformed aligners (TA).
MATERIALS AND METHODS: This prospective in vivo experiment included three types of aligners: DPAs (group DP) fabricated from Tera Harz TC-85 DAC resin (Graphy, Korea), TA (group INV) made from a polyurethane based polymer (Align Technology, Inc., CA, USA), and TA (group DUR) made from polyethylene glycol terephthalate based polymer (Scheu-Dental, Germany). Each group was categorized into retrieved (Clin) and unused aligners (Ctr).

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For examination of mechanical properties 30 patients (10 per group) wore the aligners for 7 days, thereby generating the retrieved samples. 30 unused aligners were employed as control samples. Martens Hardness (HM), indentation modulus (EIT), elastic index (ηIT), and indentation relaxation (RIT) were then determined. Intergroup comparisons were conducted using ANOVA/Kruskal-Wallis-test. Comparisons between retrieved and control samples were done using Wilcoxon-Mann-Whitney-U /Student's t-test/ Welch's test.
For surface roughness evaluations fours groups of DP-Clin, DP-Ctr, INV-Clin and INV-Ctr were investigation and 34 samples per group were included. After one week of intra-oral usage, the aligners were retrieved from the patients. Following surface roughness and porosity parameters were measured: Sa, Sq, Sp, Sv, Sz, Vvv and Vvc. Median (quantile) regression model was used for data analysis.
RESULTS: The mechanical properties did not differ significantly between unused and retrieved INV- and DUR-aligners, whereas for DP-aligners significant differences for ηIT and RIT were found following intraoral service. One week of intra-oral usage increased the surface roughness and porosity of the DP-aligners significantly. On the contrary, a significant reduction in the surface parameters of INV-aligners was recorded following intra-oral service.
CONCLUSIONS: The much higher RIT and EIT in DP-aligners suggest their higher rigidity and force decay, which could compromise their clinical efficacy. The increase in the surface roughness and surface porosity of DP-aligners might lead to an increase in bacterial adhesion and biofilm formation.

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SP283 NON-SURGICAL TRANSVERSAL DENTOALVEOLAR COMPENSATION WITH COMPLETELY CUSTOMIZED LINGUAL APPLIANCES VERSUS SURGICALLY ASSISTED RAPID PALATAL EXPANSION -THE INCIDENCE OF GINGIVAL RECESSIONS

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AIM: The aim of this study was to compare the number of gingival recessions after non-surgical transversal dentoalveolar compensation with completely customized lingual appliances (DC-CCLA) versus surgically assisted rapid palatal expansion (SARPE).
SUBJECTS AND METHODS: This retrospective cohort study included 81 adult patients with uni- or bilateral posterior crossbites. The DC-CCLA group (n = 38; f/m 25/13; mean age 30.4 ± 12.9 years) was treated with dentoalveolar compensation via completely customized lingual appliances. The SARPE group (n = 43; f/m 19/24; mean age 27.6 ± 9.5 years) was treated with SARPE and buccal straight wire appliances. The number of gingival recessions was recorded on digital models before treatment (T0) and after removal of fixed appliances (T1). To determine if there were differences in the number of gingival recessions between the groups, the Pearson' s chi-squared test was used with $\alpha = 5\%$.
RESULTS: In 4140 teeth evaluated, n = 49 (5.1%) new recessions were found with DC-CCLA and n = 30 (2.8%) with SARPE. However, there was no statistically significant difference ($p > 0.05$) in the number of new gingival recessions between the groups. In the maxilla, recessions were more localized in the posterior region with DC-CCLA and in the anterior region with SARPE.
CONCLUSION: Dentoalveolar compensation with CCLAs does not cause a significantly higher number of gingival recessions than SARPE.

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SP284 ACCURACY AND TRACING TIME OF CEPHALOMETRIC ANALYSES ON A TABLET OR DESKTOP COMPUTER

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AIM: To evaluate the influence of the computer type (tablet or desktop) on accuracy and tracing time of cephalometric analyses.
METHODS: Dental students used a web-based application specifically developed for this purpose to perform cephalometric analyses on tablet and desktop computers. Landmark locations and timestamps were exported to measure the accuracy, successful detection rate and tracing time. Reference landmarks were established by six experienced orthodontists. Statistical analysis included reliability assessment, descriptive statistics, and linear mixed effect models at a significance level of 0.05.
RESULTS: Over a period of 8 semesters a total of 277 cephalometric analyses by 161 students were included. The interrater reliability of the orthodontists establishing the reference coordinates was excellent (ICC > 0.9). For the students, the mean landmark deviation was 2.05 mm and the successful detection rate for the clinically acceptable threshold of 2 mm suggested in the literature was 68.6%, with large variations among landmarks. No effect of the computer type on accuracy ($p = 0.32$) and tracing time ($p = 0.22$) of the cephalometric analyses could be found.
CONCLUSIONS: The use of tablet computers for cephalometric analyses can be recommended.

Abstract citation ID: cjae081.577
SP285 THREE-DIMENSIONAL SOFT TISSUE CHANGES AFTER SIMULATED PROTRUSION OF UPPER AND/OR LOWER INCISORS IN YOUNG ADULTS

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AIM: To evaluate three-dimensional changes of the perioral soft tissue contour after experimentally simulated incisor protrusion to improve predictions of profile changes after orthognathic surgery and/or orthodontic treatment.
MATERIALS AND METHOD: Ten young adults (5 women, 5 men, age 25±1,7 yrs.) with physiologic incisor relations were evaluated. 3D-printed acrylic veneers with thicknesses of 1-4 mm were reversibly bonded to the labial surfaces of the upper and lower incisors. 3D face scans with and without veneers were taken to evaluate perioral soft tissue changes using 44 landmarks. Face scans were repeated three times and superimposed at the forehead, temples and nose bridge. Estimates for soft-tissue changes were determined using linear mixed-effect models.
RESULTS: Iinterrelations between simulated incisor protrusion and resulting soft tissue changes were nearly linear. Positioning of veneers only on maxillary incisors resulted in a labial upper lip displacement of 0.57 mm (CI: 0.53-0.61 mm) per mm veneer thickness. Positioning of veneers only on mandibular incisors resulted in a lower lip forward positioning of 0.41 (0.36-0.47) mm per mm veneer thickness. With veneers positioned on both upper and lower incisors, lower lip displacement increased to 0,63 (0.57-0.69) mm/mm, upper lip displacement decreased to 0.48 (0.44-0,52) mm/mm, vertically the upper lip moved 0.17 (0.13-0.2) mm/mm upwards and the lower lip 0.54 (0.46-0.61) mm/mm downwards. The anterior lip displacement correlated negatively with lip thickness.
CONCLUSIONS: Upper lip forward positioning per mm simulated incisor protrusion is significantly larger after isolated protrusion of the upper incisors compared to protrusion of both upper and lower incisors. These quantitative data may contribute to increasing the accuracy of predictions of perioral soft tissue changes following differentiated protrusion of upper and/or lower incisors during orthodontic treatment and orthognathic surgery, respectively.

Abstract citation ID: cjae081.578
SP286 MOVEMENT OF LOWER ANTERIOR TEETH DURING THE INITIAL ORTHODONTIC TREATMENT PHASE – A CLINICAL DENTAL MAGNETIC RESONANCE IMAGING (MRI) STUDY

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AIM: Superelastic archwires are frequently used to correct the horizontal, vertical and rotational positioning of teeth during the orthodontic alignment and levelling phase. Despite the seemingly straightforward geometry of straight superelastic wires, their insertion may cause complex and statically indeterminate multi-tooth mechanics, leading to undesirable buccal movement of the lower anterior teeth. This prospective clinical study aims to assess the lower anterior tooth movement in the initial stage of orthodontic treatment using dental magnetic resonance imaging (MRI).
METHODS: Ten adolescents with mandibular crowding were consecutively recruited. The inclusion criteria comprised a fully erupted permanent dentition in the mandible and mandibular crowding of ≥ 3mm. Prior to the bonding of the fixed appliance in the mandibular arch, MRI appointments were scheduled. Subsequently, another MRI was taken five months after initiating orthodontic treatment. A standardized sequence of 0.014-inch NiTi and 0.016x0.022-inch NiTi archwires were used for levelling and aligning of the teeth. The study utilized 3D imaging software to evaluate the 3D bucco-lingual movement of the roots, bucco-lingual tipping of the teeth (including canines, central and lateral incisors), and the thickness of gingiva and buccal alveolar bone.
RESULTS: The preliminary findings indicate that the initial levelling and alignment resulted in an average buccal tipping of the teeth of 2.11±2.28 degrees.

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Consequently, the apex moved 0.91±0.27 mm lingually. The lingual apex movement and buccal tipping of the corresponding tooth showed a correlation (r=0.70, p=0.12). Subcrestal gingival thickness was reduced by 0.19±0.18mm and had a correlation with the lingual movement of the apex (r=0.77, p=0.07). The decrease in height of the alveolar bone was found to correlate with the degree of buccal tipping (r=0.78, p=0.07).
CONCLUSION: Dental MRI offers a promising, non-ionizing technique for the assessment of orthodontic tooth movements. Radiographic measurements can provide new insights into tooth movements during the initial phase of orthodontic treatment.

Abstract citation ID: cjae081.579
SP287 3D PRINTED VERSUS CAD/CAM MILLED SURGICAL GUIDES FOR PALATAL TADS: TRANSFER ACCURACY EVALUATED IN A PRECLINICAL MICRO CT STUDY

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BACKGROUND: Temporary anchorage devices (TADs) have become an integral part of comprehensive orthodontic treatments. In recent years, their virtual planning has gained significant interest. This study evaluates the transfer accuracy of 3D printed and CAD/CAM milled surgical guides for orthodontic TADs using Micro CT imaging in a preclinical trial.
METHODS: 30 surgical guides were used to place TADs into typodonts. The maxillary typodonts were equipped with artificial bone and gingiva masks. One half of the guides was produced using 3D printing technology, while the other half was produced by CAD/CAM milling. All TADs were aimed to be inserted in a parallel, paramedian position. The virtual target position (T0) of the TADs was compared to the actual position (T1) in terms of spatial and angular deviation by digital superimposition. Micro CT imaging was used to detect the position and orientation of the mini screws. To ensure the reliability of our results, two investigators collected all measurements twice. Intra-rater and inter-rater reliability were tested by comparing the first and second runs of both raters.
RESULTS: A total of 60 palatal TADs were inserted into typodonts. The mean coronal deviations for the print group ranged from 0.15 mm (SD 0.20) to 0.71 mm (SD 0.22), while for the mill group, a range from 0.09 mm (0.15) to 0.83 mm (SD 0.23) was observed. At the apical tip, the overall deviations for the print group ranged from 0.14 mm (SD 0.56) to 1.27 mm (SD 0.66), whereas for the mill group they ranged from 0.15 mm (SD 0.57) to 1.09 mm (SD 0.44). The minimum deviation was 0.06 mm at the head and -0.01 mm at the tip, whereas the maximum deviation at the head was 1.29 mm and at the tip it was 2.37 mm. The mean intra- and interclass correlation coefficient ranged from 0.904 to 0.987. No statistically significant differences were found between the groups.
CONCLUSIONS: CAD/CAM milled guides yielded spatial and angular accuracy comparable to 3D printed guides, but both showed notable deviations in vertical TAD position.

Abstract citation ID: cjae081.580
SP288 THE USE OF PHARMACOLOGICAL AGENTS FOR ANCHORAGE CONTROL IN ORTHODONTICS: A SYSTEMATIC REVIEW ON HUMAN STUDIES

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BACKGROUND/OBJECTIVES/AIMS: Anchorage control in orthodontics is crucial for achieving optimal treatment outcomes and several pharmacological agents have been administrated for enhancing anchorage control. This systematic review aims to comprehensively evaluate the efficacy of pharmacological agents used to control orthodontic anchorage in humans.
MATERIALS/METHODS: Twelve electronic databases were searched up to October 2023, complemented by supplementary grey literature exploration. The eligibility criteria were prospective and retrospective studies on humans undergoing orthodontic treatment. The intervention under evaluation included the use of local pharmacological agents for anchorage control, while in the control group of patients, no adjunct pharmacological intervention was used for anchorage reinforcement. Outcomes were assessed in terms of anchorage control, i.e. mesial movement of 1st permanent molar.
RESULTS: One eligible randomized control trial was finally selected, scrutinizing the effects of a pharmacological agent on orthodontic dynamics. This study was classified as having a low risk of bias. According to the split-mouth design of this investigation assessing the effect of the pharmacological agent Denosumab, it was found that during anterior teeth retraction this agent reinforced maxillary anchorage in the short-term compared to sterile water. However, in the latter half of the 6-month treatment interval, no differences could be found between the two groups regarding maxillary and mandibular loss of anchorage or rate of anterior tooth retraction.
LIMITATIONS: Small number of included studies.
CONCLUSIONS/IMPLICATIONS: According to the existing limited evidence, the influence of pharmacological factors used for orthodontic anchorage reinforcement in humans remains unknown and the need for further well-designed pertinent studies is essential.

Abstract citation ID: cjae081.581
SP289 PREVALENCE OF DENTAL ANOMALIES IN VARIOUS CATEGORIES OF MALOCCLUSION AMONG ORTHODONTIC PATIENTS IN THE KOSOVO REGION- A RETROSPECTIVE STUDY

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OBJECTIVES: The objective of this retrospective research was to investigate the prevalence and the association of dental anomalies and malocclusion in a subset of the Kosovo's population.
MATERIALS & METHODS: This retrospective descriptive study was conducted by recruiting 557 patient records; of them, 215 (38.6%) were males, and 342 (61.4%) were females. The age range was from 7-44 years. Exclusion criteria were employed for the sample size. Malocclusion groups were divided through Angle's classification, and dental anomalies were defined according to the literature. Pre-treatment panoramic radiographs, medical and dental history, study casts, and photographs were included in the study to categorize malocclusion and identify dental anomalies (i.e., hypodontia, ectopic eruption, impaction, and diastema. The data were analyzed with IBM SPSS software version 16.0. The Chi-square test was utilized to calculate the frequency and percentages of malocclusion and dental anomalies. P-value was set statistically significant at 0.05.
RESULTS: Five hundred and fifty-seven patient records were included from 2015-2020. An increased prevalence of ectopic eruption (24.8%) was found in this study, whereas the least common was hypodontia (7.0%). The most common malocclusion was Class I (46.9%). Vertical plane malocclusion demonstrated that 31.4% had a deep bite and 9.5% had an open bite. Most of the dental anomalies were significantly associated with Class I malocclusion and least associated with Class III. Transversal malocclusion exhibited that 14% had anterior crossbite and 10.8% had posterior crossbite. Posterior crossbite was significantly less in the Class III group of malocclusion (p-value: 0.019).
CONCLUSION: Prevalence of the selected dental anomalies was overall high in our study; all of the 557 patients had one or the other type of dental anomaly. Malocclusion, especially Class I, was also highly prevalent. An association was seen between malocclusion and dental anomalies in the Kosovan population especially with Class I. This study was created to provide a baseline for future studies with large sample sizes. Treating dental anomalies is critical to ensure a smooth orthodontic journey. Complications may arise if dental anomalies are not treated and can lengthen the duration of treatment.

Abstract citation ID: cjae081.582
SP290 DOES AGE IMPACT THE EFFECTIVENESS OF PROTRACTION HEADGEAR AND RAPID MAXILLARY EXPANSION IN TREATING CLASS III MALOCCLUSIONS ASSOCIATED WITH MAXILARY RETROGNATHIA.

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AIMS/BACKGROUND: Protraction headgear and rapid maxillary expansion (RME) are commonly employed for treating class III malocclusions in children under the age of ten, since immature circum-maxillary sutures may favour treatment success. However, there is a limited research focus on the effectiveness of this treatment modality for children aged 11 and above. This study aims to investigate the impact of age on the outcomes of protraction headgear and RME in patients with skeletal class III malocclusion associated with maxillary retrognathia.
MATERIALS/METHODS: The records of 20 class III patients undergoing protraction headgear and RME treatment were compiled, with all individuals falling within the 11-15 age range, designated as the late group. To establish a comparative baseline, a group of children treated between eight to ten years of age,

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referred to as the early group, were identified in the literature. Analysis of study models and cephalometric tracings was undertaken to evaluate overall treatment effects. This encompassed a comparison of pre-treatment and post-treatment differences in various parameters, including overjet and various cephalometric angles. Visual representations of these differences were created using composite cephalometric tracings.
RESULTS: The maxilla exhibited forward displacement, and the mandible underwent clockwise rotation in both the early and late treatment patient groups. There were no significant differences observed in skeletal changes between the two groups. Correction of a class III incisor relationship was evident in both groups. While maxillary incisor proclination and mandibular incisor retroclination were present in all patients, these were more pronounced in the late treatment group.
CONCLUSIONS: In selected cases, protraction headgear and RME can successfully correct a class III incisor relationship to a class I relationship in adolescent patients. This treatment approach is effective in reducing the need for orthognathic surgery in these individuals. The influence of orthopaedic forces on the maxilla remained consistent in both early and late treatment groups. However, dental effects were slightly more pronounced in the late treatment group. Opting for later treatment has the advantage of a seamless transition to fixed appliances immediately following protraction headgear use. More research is required into the limits of this treatment approach.

Abstract citation ID: cjae081.583
SP291 SATISFACTION WITH LIFE AND DENTOFACIAL APPEARANCE AFTER ORTHODONTIC TREATMENT

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BACKGROUND/OBJECTIVES: Patient satisfaction is a primary aim of orthodontic treatment and can determine whether the treatment is a success or failure. The aim of this study was to investigate correlations between satisfaction with life and dental/facial appearance after orthodontic treatment in the postgraduate orthodontic clinic of the Dental School, Athens, Greece. The effects of age, sex and severity of initial orthodontic malocclusion on these variables were also investigated.
MATERIALS/METHODS: Patients (aged 12+ years), who have completed comprehensive orthodontic treatment during the last year, excluding orthognathic surgery and craniofacial anomalies, have filled out the Greek versions of 2 questionnaires: a) a 37-item questionnaire, validated to assess orthodontic treatment satisfaction in population aged 12–15 years on completion of fixed orthodontic treatment and b) the 5-item satisfaction with life scale, a valid and reliable measure of life satisfaction, suited for use with a wide range of age groups and applications. A sum was created for each questionnaire by adding the scores per patient. Demographic details such as age, gender were collected from participants in the study along with the initial dental and esthetic components of the index of orthodontic treatment need (IOTN) and the duration of the retention period. Multiple regression analysis was undertaken to assess the relationship between the questionnaires and the evaluated variables.
RESULTS: 152 questionnaires were filled out by 84 (55%) women and 68 (45%) men. Mean age of patients was 18.87 ± 5.97 (min.–max.: 12-47) years. Most patients were satisfied with treatment. Satisfaction with orthodontic treatment was significantly correlated to satisfaction with life (p=0.002) and sex (p<0.001) but not to age, components of IOTN or the duration of the retention period.
LIMITATIONS: The duration of the retention period was 1 year; usually, patients are more enthusiastic about the outcome of treatment immediately after or within a short time after its completion. Race/ethnicity was not an exclusion criterion; a subconscious comparison with the health care system of the country of origin is inevitable.
CONCLUSIONS/IMPLICATIONS: Satisfaction with orthodontic treatment was significantly correlated to satisfaction with life. Women were less satisfied with the results of the treatment than men.

Abstract citation ID: cjae081.584
SP292 THE ROLE OF OPTICAL JAW TRACKING SYSTEMS ON TEMPOROMANDIBULAR DISORDERS DIAGNOSIS AND ITS IMPORTANCE IN ORTHODONTICS

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BACKGROUND: The evaluation of condylar position discrepancy has proved to be a key factor in orthodontic diagnosis and planning as 19% of patients present a clinically significant discrepancy. New technologies have been developed to assess functional occlusion and condylar position discrepancy that could be applied to orthodontics.
OBJECTIVES: to evaluate the accuracy of an optical jaw tracking system on the diagnosis of temporomandibular disorders and the assessment of condylar discrepancy on an orthodontic population.
MATERIALS/ METHODS: a sample size calculation has been performed and a minimum of 102 patients with complete orthodontic records including optical jaw tracking system have been selected. The same patients were screened for temporomandibular disorders with a validated questionnaire where a value of "0" meant "no temporomandibular disorders signs or symptoms" and "1" meant "temporomandibular disorders signs/ symptoms". All centric relation/ centric occlusion discrepancies assessed with an optical jaw tracking systems higher than 2mm on a vertical or sagittal plane or higher than 0,5mm on the transversal plane were considered as clinically significant and, therefore, as "1". A receiver operating characteristic curve analysis was then performed to assess the accuracy of the optical jaw tracking system on the diagnosis of temporomandibular disorders. A comparison between condylar discrepancy on an orthodontic population using optical jaw tracking system was also performed.
RESULTS: Modjaw proved to be effective on the diagnosis of temporomandibular disorders of an orthodontic population with an area under the curve of 83%.
There were no statistical significant differences between the group presenting signs and symptoms of temporomandibular disorders and the group without on the condylar discrepancies. There were also no statistical significant differences between different skeletal classifications concerning condylar discrepancy.
LIMITATIONS: further investigations should include other aspects of mandibular kinematics such as, Bennett angles and condylar slopes.
CONCLUSIONS: optical jaw tracking systems present as an accurate tool on the diagnosis of temporomandibular disorders on an orthodontic population and treatment planning.

Abstract citation ID: cjae081.585
SP293 PREVALENCE OF OVERJET AND OVERBITE DEVIATIONS AND ORTHODONTIC TREATMENT IN THE NORTHERN FINLAND 1986 BIRTH COHORT STUDY

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AIM: To study the prevalence of overjet and overbite deviations and orthodontic treatment in a Finnish adult population.
MATERIAL AND METHODS: The study population consisted of 1748 adults (age, 35 years; 630 men, 989 women, 129 other/missing information) of the Northern Finland 1986 Birth Cohort (NFBC1986). Overjet and overbite were measured during a clinical examination. Overjet and overbite were classified as four categories: decreased (0 mm or less), normal (1–4 mm), increased (5–6 mm) and severely increased (≥7 mm) overjet/overbite. Data on previous orthodontic treatment were collected based on a questionnaire.
RESULTS: Majority (88.0%) of the adults had normal overjet, prevalence of decreased, increased and severely increased overjet being 2.8%, 7.3% and 1.8%, respectively. Of the study population 69.4 % had normal overbite, prevalence of decreased, increased, and severely increased overbite being 4.2 %, 23.1 % and 3.2%, respectively. Approximately half (52.2%) of the study population had received orthodontic treatment, mostly before the age of 20. Normal overjet and overbite were slightly more common in those without orthodontic treatment history than in those with previous orthodontic treatment ($p = 0.004$, $p = 0.022$, respectively). Distributions of overjet and overbite differed between men and women; increased overjet and overbite being more prevalent in women, and decreased overjet and overbite in men ($p < 0.001$, $p < 0.002$, respectively).
CONCLUSION: Majority of 35-year-old Finnish adults had normal overjet and overbite, and the severe deviations were relatively rare. Higher prevalence of overjet and overbite deviations among those who had received orthodontic treatment may result in more severe initial malocclusion or lower compliance for orthodontic treatment in some individuals.

Abstract citation ID: cjae081.586
SP294 EFFECTS OF CLEAR ALIGNER TREATMENT IN GROWING PATIENTS: A SYSTEMATIC REVIEW

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OBJECTIVE: the aim of the present study was to systematically search the literature and summarize the current available scientific evidence regarding the effects of clear aligners (CA) treatment in children and adolescent patients.

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MATERIALS AND METHODS: An electronic search without time or language restrictions was performed (last update September 2023) on the following electronic databases: Medline (via PubMed), Scopus, The Cochrane Library and LILACS. Studies including children and adolescent patients (< 18 years) teated with CA were selected. Dentoskeletal effects were considered as primary outcomes. The "Risk of Bias 2" (RoB 2) and the "Risk of Bias In Non-randomized Studies of Interventions" (ROBINS-I) tools were applied to assess the quality of the individual studies.
RESULTS: The search resulted in 32 papers, of which three randomised studies, and the risk of bias ranged between moderate and serious for most of the included studies. Dentoskeletal and periodontal effects, after CA treatment were the main reported outcomes. Significant changes in transverse maxillary arch width after treatment with CA were reported in few studies. Most of the included studies reported that CA provide good control of incisors inclination during sagittal correction of Class II malocclusion, both with MA and with intermaxillary elastics. However, while dentoalveolar effects have been reported consistently, controversial findings were found regarding the changes of skeletal sagittal parameters after treatment with CA. Results of the included studies regarding the periodontal effects of CA therapy in growing patients are conflicting.
CONCLUSIONS: In case of a mild transverse maxillary deficiency, CA produce dentoalveolar expansion during mixed dentition, with no effects on skeletal bases. The current existing literature does not support the effectiveness of CA with mandibular advancement feature in correcting dentoskeletal Class II, compared to traditionally functional appliances. A good control of upper and lower incisor inclination might be offered by CA during the sagittal correction, when needed.

Abstract citation ID: cjae081.587
SP295 EVALUATION OF ORTHODONTIC RETAINER POSTS ON TIKTOK

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AIM: To evaluate the content of orthodontic retainer posts on TikTok posted by orthodontic patients and orthodontic treatment providers.
MATERIAL AND METHODS: A search was conducted on TikTok using six hashtag terms associated with orthodontic retainers: retainer, fixed retainer, removable retainer, orthodontic retainer, clear retainer and straight teeth. The presence of nine domains related to retainers and retention were assessed in the relevant uploaded posts. All data analyses were carried out using IBM SPSS for Windows (version 26). Descriptive statistics were computed and presented as means with standard deviations and medians with interquartile ranges for quantitative variables, while frequencies with percentages were reported for qualitative variables. The Shapiro-Wilk test was used to assess the normality of distribution of the quantitative variables.
RESULTS: Thirty posts met the inclusion criteria, and more than half were uploaded by orthodontic patients (n=19; 63.3%). All posts included both text and videos. The domain most included in posts by orthodontic patients related to "quality of life", (n=16; 84.2%) and "importance of retainer wear", (n=12; 63.2%) and those posted by orthodontic treatment providers related to "types of retainers", (n=5; 45.5%). Most orthodontic patient posts were positive, (n=12; 63.2%). These were generally expressing satisfaction with the alignment of their teeth after having had fixed appliances removed several years ago, attributing the alignment to the use of retainers. Negative orthodontic patient posts related to discomfort whilst talking and pain whilst wearing retainers. Orthodontic treatment providers demonstrated a tendency to provide instructions or descriptions regarding orthodontic retainer types in their posts.
LIMITATIONS: The dynamic nature of TikTok means a list of posts is forever changing. Not all TikTok users would use the same search terms that were used in this study and the small sample size cannot be ignored.
CONCLUSIONS: Orthodontic patients are more actively engaged in creating TikTok posts related to orthodontic retainers compared to orthodontic treatment providers. Orthodontic treatment providers should be attentive to the content of TikTok posts related to retainers to gain better understanding of orthodontic patient issues with retainers so they can effectively address them.

Abstract citation ID: cjae081.588
SP296 EVALUATION OF ALIGNERS ON TIKTOK: WHAT INFORMATION ARE PATIENTS GETTING?

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INTRODUCTION: Clear aligners were introduced as an orthodontic tool in the early 1990's. The largest group of patients receiving clear aligner therapy is patients in the age range 18-35, with over 71% of European patients in this demographic.
TikTok was introduced globally in 2017 (China only in 2016, named Douyin) and is reported to have over 1.3 billion monthly active users. 71% of TikTok's users fall into the age range of 18-34 years old.
The aims of this study are:
- Ascertain whether information on TikTok regarding clear aligner orthodontic systems is reliable and reasonable.
- Gain an understanding of the public's opinion on clear aligners.
- Find what content regarding clear aligners generates the most engagement.

METHODOLOGY: Popular hashtags garnered via Google Trends, associated with clear aligners were: Invisalign, Smile Direct Club, Invisible braces, and Diamond White Aligners.
Analysis of 400 videos was carried out. Metrics recorded were: number of views, number of likes, whether made by a dental professional, whether professional claims were reasonable, whether the post received financial incentive, words and phrases used, emotions expressed, and overall viewpoint.
RESULTS: #invisalign had the highest mean views per post but had the second lowest engagement (1.4% of posts "liked"). #clearaligners had the lowest mean view count but the highest rate of engagement (5.8% of posts "liked").
There was a significantly higher proportion of positive posts than negative or neutral posts (t-test P=0.009 and P=0.001 respectively). The only hashtag to have more negative expressions (cumulative) than positive was #smiledirectclub (36 positive, 37 negative).
107 posts were made by dental professionals and only 6 contained claims deemed unreasonable or inaccurate.
CONCLUSION: The public's perception of clear aligners on TikTok is overwhelmingly positive. Dental professionals contribute over 25% of posts highlighting and discussing clear aligner systems, with the majority presenting clear, reasonable claims or information within their videos.
An increased understanding of how to better engage the public is needed by dental professionals as their posts on the app represent a far bigger share of the available content than they themselves represent as a proportion of the population.

Abstract citation ID: cjae081.589
SP297 MASTER OF ORTHODONTICS GRADUATES IN THE UNITED KINGDOM: WHERE ARE THEY NOW?

Dr Jade Homfray-Jones[1], Prof Parmjit Singh[1]; [1]*Ulster University, College Of Medicine And Dentistry*

BACKGROUND: The orthodontic speciality has a clear training pathway, however, degree courses that do not contribute to specialist training also exist for the dentist that wishes to enhance their orthodontic knowledge and skills without becoming a specialist orthodontist. It is not known to what extent orthodontics features in the clinical practice of these graduates.
AIM: To analyse the demographics, educational experiences, and patterns of orthodontic service provision by Master of Orthodontics graduates from BPP University in London, United Kingdom.
METHODS: The study was a total population survey. A pre-tested online questionnaire using the Online Surveys platform was distributed to all 64 graduates from BPP University. Data analysed was gender, age, and number of year's practicing orthodontics. Educational experiences and patterns of orthodontic service provision by participants was evaluated along with job satisfaction after their training.
RESULTS: Forty-five (70%) of the 64 graduates returned a completed questionnaire. Twenty-three (51%) participants were female, with the average age being 42 years (range=41-50). The mean number of years qualified as a dentist was 17 (range=10-19). Seven (15%) participants had already completed a postgraduate orthodontic qualification (Certificate, Diploma or Master) when starting their course and eight (18%) had applied unsuccessfully for specialist orthodontic training. A high number of participants (n=36; 80%) reported satisfaction with the course and 35 (78%) participants rated the course quality as excellent. Participants indicated they wanted more clinical cases, treatment planning and hands-on experience during the course. After completing the course, 12 (27%) graduates spent over 80% of their time treating orthodontic patients and 25 (56%) graduates spent at least 40% their time on orthodontic treatments. Those working in specialist practice increased from 6 (13%) to 18 (40%) participants. Job satisfaction was high after completing the course with working conditions and working with colleagues being cited as the two main reasons for this.
LIMITATIONS: Although this was a total population survey, 30% did not respond.
CONCLUSIONS: With increasing demand for orthodontic treatment in general practice, high quality part-time postgraduate Master level programmes can play an essential role in training dentists to deliver appropriate orthodontic treatment as non-specialists.

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SP298 MINIMISING CRACK PROPAGATION IN THERMOFORMED RETAINERS: A LABORATORY-BASED COMPARATIVE STUDY

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BACKGROUND: Thermoformed retainers (TRs) are a widely used type of orthodontic retainer, known for their ease of fabrication, fitting, and cost-effectiveness. However, TRs are prone to failure due to cracks that commonly develop in the incisor region.
AIM: This study aimed to investigate the potential to limit crack propagation in TRs by placing a "stop-hole" using a laboratory-based comparative study design.
MATERIALS AND METHODS: Thirty-two TRs, fabricated from 1mm thick ICONIC® polyethylene blanks, were subjected to fatigue testing within a purpose-built fatigue tester. The TRs underwent vertical deflection as they rotated against a fixed deflector connected to a load cell. Once the initial crack length reached 3mm, the TRs were divided into three groups: a control group (C) and two experimental groups based on the method of stop-hole placement. The first experimental group utilised a carbide bur on a slow-speed handpiece (ES), while the second group utilised a heated CPITN probe (EH). Following the placement of a stop-hole at the crack-tip in the experimental groups, all thirty-two TRs resumed testing until the final crack length reached 10mm.
RESULTS: There was no significant difference in the time taken to reach the initial crack length among the three groups (p=0.896). However, stop-hole placement significantly delayed crack re-initiation in the experimental groups when compared to the control group (p<0.001). The mean crack re-initiation times for the ES and EH groups were 104.50 and 129.50 minutes, respectively, while the control group was 28.94 minutes. Consequently, this difference was reflected in the total testing times, with both experimental groups requiring significantly longer time to reach the final crack length (p<0.001). No significant differences were observed between the two stop-hole placement methods regarding either the crack re-initiation (p=0.149) or total testing times (p=0.248).
LIMITATIONS: Potential limitations included the artificial experimental setting, a lack of temperature control during the heating of the probe, and inconsistent speed and torque of the handpiece during stop-hole placement.
CONCLUSION: Placing a 1mm diameter stop-hole at the crack-tip using either of the two methods significantly extended the fatigue life of a TR. Further research is warranted in a clinical setting.

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SP299 INTERDISCIPLINARY TREATMENT CONCEPT AND FINAL OUTCOME EVALUATION OF PATIENTS WITH APERT AND CROUZON SYNDROMES

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BACKGROUND/AIMS: Apert syndrome (AS) and Crouzon syndrome (CS) are congenital developmental craniofacial malformation syndromes. Both conditions share common clinical features, including premature fusion of the calvarial sutures, exophthalmos, hypertelorism, midfacial hypoplasia, cleft palate, open bite, and severe dental crowding. The highly abnormal craniofacial growth and development requires an interdisciplinary treatment approach. The aims of this study were to determine the initial dentoalveolar severity of AS and CS, the improvement of the malocclusion after combined orthodontic and orthognathic surgery treatment, and to compare the two clinical entities before and after treatment.
MATERIALS/METHODS: The study groups consisted of 10 patients with AS (8 females, 2 males) and 13 patients with CS (2 females, 11 males) with Caucasian ethnic background. Dental stone models of these patients were evaluated by the application of the Peer Assessment Rating (PAR) index before comprehensive orthodontic treatment (mean age AS: 15.7 years, CS: 14.6 years) and after combined orthodontic and orthognathic surgery procedures (mean age AS: 19.3 years, CS: 18.9 years). The most important variables examined were the change in PAR and weighted PAR (wPAR) values and the percentage improvement in PAR and wPAR values. The comparison between the groups was determined by the t-test. The PAR score reduction indicated the success of treatment.
RESULTS: Intragroup statistically significant differences (p<0.001) were found for all of the main variables assessed. More specifically, the mean post-treatment reduction change in PAR and wPAR scores for AS were 22 and 41 points, and for CS 18 and 39 points, respectively. The mean post-treatment percentage improvement in PAR and wPAR values for AS were 72% and 78%, and for CS were 72% and 80%, respectively. No differences were found between the groups before and after treatment.
LIMITATIONS: The small sample size of the study groups.
CONCLUSIONS/IMPLICATIONS: The PAR index improved by around 70% both for AS and CS, due to a good standard of care for these patients. The PAR index is an important tool for combined orthodontic and orthognathic treatment outcome evaluation for patients with craniofacial defects.

Abstract citation ID: cjae081.592
SP300 SURVEY OF ORTHODONTIC POSTGRADUATE STUDENTS IN EUROPE ON THE USE OF TEMPORARY ANCHORAGE DEVICES

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BACKGROUND AND OBJECTIVES: Limited data exists on the attitude on TADs among European orthodontic postgraduate students. The aim of the study was to assess European orthodontic postgraduate students' education and attitude on TADs.
MATERIALS AND METHODS: A web-based survey comprising 39 questions was distributed by email to European Universities offering orthodontic postgraduate programs. Questions were related to the students' training and use of TADs, their intention for implementation of TADs in their professional life, common complications and treatment modalities used. Participation was voluntary and anonymous. Chi-square and Fischer's exact tests were used for statistical analysis. Ethical approval was given by The National Research Ethics Committee in Norway.
RESULTS: A total of 102 responses were received from 29 universities in 16 countries. Most of the respondents were 25-30 years old and had short experience as general dentists. Fifty nine percent of the respondents had received both clinical and theoretical training about TADs. Eighty percent would like to receive more clinical training and information in the form of "hands-on courses" (86%), "lectures" (46%) and "literature seminars" (25%). Feeling of competence was significantly related to use of TADs during the studies (P <0.001), the number of patients treated using TADs (P=0.002), their wish for more information (P <0.001) and more clinical training (P <0.001). The most common indication for using TADs was molar mesialization (64 %) and molar distalization (69 %). The most common complication encountered was screw loosening (64%). This variable was significantly related to the number of treated patients (P=0.04)
LIMITATIONS: The response rate was unknown due to the indirect, via program director access to the students. The uneven distribution of answers from various universities and countries set limits for generalization of the results.
CONCLUSIONS/IMPLICATIONS: Education on TADs is well established in postgraduate education and almost all students intend to use TADs in their professional life. Differences among European regions related to education and candidates` attitude on TADs were detected. Most postgraduate students wished for more information by hand-on courses and clinical training. Residents` competence on TADs significantly increased by use and number of treated patients.

Abstract citation ID: cjae081.593
SP301 PALATAL MORPHOLOGICAL CHANGES IN PATIENTS WITH MAXILLARY TRASVERSE DEFICIENCY TREATED WITH CLEAR ALIGNERS AND REP – A GEOMETRIC MORPHOMETRIC ANALYSIS

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AIM: In the present investigation, the Geometric Morphometric Analysis, was used to evaluate the morphological changes of the palatal surface in patients in mixed dentition, with maxillary transverse deficiency, treated with Invisalign® First (FG - First Group) and Rapid Palatal Expander (EG – Rapid Palatal Expander Group). The GMA is a method that does not use traditional linear distances and angles but allows to study the entire shape enabling a more complete understanding of shape changes.
MATERIALS AND METHODS: 15 children treated with REP (EG: n = 15, 8 males, 7 females; mean age 8.5 ± 1.1 years) and 15 children treated with the Invisalign® First system (FG: n = 15, 7 males, 8 females; mean age 8.4 ± 1.1 years) were included. The 3D maxillary digital models of the pre-treatment (T0) and post-treatment (T1) were superimposed using Generalized Procrustian Superimposition (GPS) and Procrustian shape coordinates were obtained. Principal Component Analysis (PCA) and Between-Groups PCA were applied to Procrustian coordinates to reveal the main patterns of variation in palatal

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morphology in both the FG and EG at both time points. All analysis was conducted with Viewbox 4.0 (dHAL Software, Kifissia, Greece).
RESULTS: Through PCA, in both groups, were identified more frequent patterns of palatal morphological variation, before and after treatment: the widening of the lateral walls of the palatine vault, the lowering of the height of the palatine vault and the increase in the convexity of the palatal arch. In the EG we detected a morphological pattern consisting of an asymmetrical variation.
CONCLUSIONS: within the limitations of this pilot study and its small sample size, in mixed dentition patients, both expanders and aligners could modify the morphology of the palatine vault, inducing its widening and lowering. Aligners seem to allow the entire shape of the upper arch to be increased in a more symmetrical way.

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SP302 EVALUATION OF THICKNESS OF DIRECTLY PRINTED AND THERMOFORMED ALIGNERS: A PROSPECTIVE IN VIVO AGING EXPERIMENT

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BACKGROUND: To compare and investigate the effects of intraoral aging on the thickness of one group of directly printed and two groups of thermoformed aligners.
MATERIALS/METHODS: Six groups (12 samples per group) were included in this prospective in vivo experiment. Groups DP-Clin, INV-Clin, and CA-Clin consisted of directly printed (Tera Harz TC-85 DAC resin), thermoformed (Invisalign, PU based polymer) and in house thermoformed (CA-Pro, PET-G based polymer) aligners, retrieved after one week of intraoral service. Groups DP-Ctr, INV-Ctr, and CA-Ctr included unused aligners samples. Thickness measurements were conducted using confocal laser scanning microscopy (CLSM). Data underwent long-10 transformation was analyzed by multiple linear regression analysis ($p < 0.05$).
RESULTS: Statistically significant differences were found between the materials in both Clin and Ctr categories ($p < 0.001$). Group DP had the highest thickness among the groups and the least thickness was observed in the CA group ($p < 0.001$). However, intraoral aging did not significantly affect the aligner thickness of any groups.
CONCLUSIONS: Both thermoforming and direct printing of clear aligners led to thickness deviations in terms of increase for printed aligners and decrease for thermoformed aligners.

Abstract citation ID: cjae081.595
SP303 INVOLVEMENT OF INFLAMMASOME IN ORTHODONTIC TOOTH MOVEMENT AND ACCELERATION BY MOPS

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BACKGROUND: Micro-osteoperforations (MOPs) have been reported to accelerate orthodontic tooth movement. We reported that MOPs induce inflammation of the compressed periodontal ligament tissue in an experimental rat model, via activation of apoptosis and increase of the cell cycle, thereby accelerating tooth movement. On the other hand, it has been reported that the mechanism of inflammatory reaction progression is through activation of inflammasome, a protein complex formed in cells, but the relationship between inflammasome and inflammasome during tooth movement is not clear. In this study, we examined the expression of NLRP3 and caspase-1 which forms inflammasome, IL-1β, an inflammatory cytokine, is activated by inflammasome, and RANKL, the essential cue for differentiation and maturing of osteoclasts in a rat experimental model using MOPs by immunohistochemical staining.
MATERIALS / METHODS: Eleven-week-old male Wistar rats were classified into two groups: the optimal force (OF) group and the OF+MOP group (n=5). MOPs were cut into three alveolar bone sites 5.0 mm from the proximal buccal surface of the traction tooth using a 0.25 mm diameter round bar at a depth of 0.25 mm in the cortical bone. After measuring the distance of tooth movement by micro-CT imaging, thin sections were prepared and stained to observe the periodontal ligament and surrounding tissues on the side of compression.
RESULTS: The distance of tooth movement after 7 days was significantly greater in the OF+MOP group than in the OF group. NLRP3 positive rate was maximal after 1 day in the OF group and decreased over time, but was significantly higher in the OF+MOP group from 1 to 7 days compared to the OF group; Caspase-1 was maximal after 4 days in the OF group but was significantly higher in the OF+MOP group from 1 to 7 days compared to the OF group; IL-1β and RANKL were maximal after 7 days in the OF group, but were significantly higher in the OF+MOP group from 1 to 7 days compared to the OF group.
CONCLUSIONS: MOPs increased inflammasome activity in the periodontal ligament cells on the compression side, which may promote tooth movement through the expression of NLRP3, caspase-1, IL-1β and RANKL.

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SP304 A STUDY OF THE EQUATION FOR PREDICTING TOOTH SIZE FROM MIXED DENTITION ANALYSIS IN THE JAPANESE PEOPLE

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AIM: One of the goals of early orthodontic treatment is to smooth exchange to permanent teeth. For successful diagnosis and treatment planning, it is necessary to estimate the mesiodistal width of unerupted permanent canines and premolars, and tooth size can vary widely depending on ethnic group. The aim of this study was to evaluate the size of permanent teeth in Japanese people and to develop an equation to predict the size of permanent canines and premolars teeth.
MATERIALS/METHODS: The subject were 151 Japanese patients (59 males (22.6 ± 5.1 years) and 92 females (24.5 ± 5.4 years) who visited Nakanishi Orthodontics Office and Hayami Orthodontics Office from 2021 to 2023. Mesial and distal tooth widths on dental models were measured and evaluated. Student's t-test was performed to determine correlations and gender-specific differences in tooth size and correspondence within the dental arch. Standard linear regression was performed to create a simple equation representing the prediction of canines-premolars relationship.
RESULTS: No significant differences were observed between the left and right teeth in all teeth, regardless of gender. It was revealed that the width diameter of the upper and lower canines was significantly larger in males than in females, but no significant difference was observed in the total width of canines and premolars. A new regression equation was developed to estimate the dimensions of unerupted canines and premolars in Japanese people. (Males: Upper: $y = 0.477x + 12.15$, Lower: $y = 0.56x + 9.39$) (Females: Upper: $y = 0.529x + 10.6$, Lower: $y = 0.558x + 9.07$).
CONCLUSIONS: This study developed a new equation that was derived separately for males and females. This suggests that it may be possible to predict underdeveloped canines and premolars with high accuracy.

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SP305 INTERGENERATIONAL COMPARISON OF PALATAL MORPHOLOGY IN JAPANESE (MODERN PERIOD AND 300 YEARS AGO)

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BACKGROUND: We have reported that modern Japanese have an increased number of crowding dentitions, based on a comparison between about the 3,000 years ago (Jomon period) and the modern period. Jomon era people have edge-to-edge occlusion and wide dental arch. However, They are not same race today. We have investigated the dentition of the Edo period (300 years ago), which is closer to the modern era than to the Jomon era.
OBJECTIVES: In this study, we examined the changes in palatal morphology between modern Japanese and Edo period Japanese.
SUBJECTS & METHODS: Modern Japanese(MJ) group consisted of 20 patients (10 males and 10 females), Edo period(EP) group consisted of 20 they were Skeletal grade I.
IOS was used to scan the palate from the EP's skulls. CT was used to scan the palate of MJ.
Palatal depth was defined by a line to the deepest point measured from the reference plane at the mid-point of the inter-pre-molar or inter-molar line.
This line was then divided into 10 equal sections in order to created 10 different depths for each palatal width. Each palatal width was divided into anterior and posterior areas.
RESULTS: The palatal widths of middle area and deep area in the MJ group were significantly smaller than in the EP group.
The palatal depth of the inter-pre-molar and the inter-molar line of the MJ group were significantly deeper than in the EP group.
CONCLUSIONS: These results indicate that the palatal morphology of the Japanese has changed significantly over a period of about 300 years.
It is difficult to imagine genetic changes occurring over a period of 300 years, and it is speculated that palatal morphology may have been greatly influenced by oral functions and eating habit.

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SP306 SMILE ESTHETIC EVALUATION IN ORTHODONTIC PATIENTS TREATED BY PREMOLAR EXTRACTION AND NON-EXTRACTION FIXED MECHANOTHERAPY

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INTRODUCTION: The orthodontic community has long been engaged in a contentious debate regarding the use of extraction versus non-extraction fixed (NEF) treatment. The objective of this study was to explore differences in smile variables and ABO-OGS scores between subjects treated with premolar extraction (PME) and NEF treatment.
MATERIALS AND METHODS: A cross-sectional study was conducted on a sample of 80 skeletal class I subjects ideally planned for PME. The study subjects were divided into two groups: 40 cases treated with PME and 40 cases treated with NEF as decided by the patient. The smile variables were measured on pre- and post-treatment frontal closeup smile photographs. Laypersons and orthodontists evaluated those photographs on visual analogue scale. Wilcoxon signed-rank test was used to compare the pre- and post-treatment smile variables. Mann-Whitney U test was used for the comparison between NEF and PME groups. ABO-OGS scores were compared between both the groups. Simple linear regression was performed to identify the factors associated with esthetic smile scoring.
RESULTS: Significant differences were found among smile variables between extraction and non-extraction groups. On comparison of ABO-OGS scores between NEF and PME groups, we found highly statistically significant values ($p \leq 0.001$) with better scores in PME group.
LIMITATIONS: More smile variables should be studied. The study should be multi-centered.
CONCLUSIONS: All the smile parameters improved significantly in the premolar extraction group. Adhering to the optimal approach of premolar extraction results in enhanced smile variables, which is favorable for the patient and yields improved ABO-OGS scores.

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SP307 EFFECTS OF FORCE MAGNITUDE PERMANENT UPPER CANINES IN CERVICAL HEADGEAR TREATMENT – A PANORAMIC STUDY

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AIMS: To study the effect of force magnitude on the permanent upper canines in cervical headgear (CHG) therapy.
MATERIAL AND METHODS: Subjects with Class II or end-to-end molar relationship, mixed dentition and moderate crowding to be treated with CHG were recruited for the study. Patients were allocated to light (L,300g) or heavy (H,500g) force in the CHG. Adjustment in the CHG was made while patient was sitting and looking forward. The inner bow of the CHG was expanded (3-4mm) and the long outer bow bent upwards 10-20° in relation to the inner bow. Patients were asked to wear CHG for 10 hours/day. CHG use was controlled and adjusted every 6-8 weeks till end of the study at 10 months. Adherence to instructions and force magnitude in CHG use was monitored by an electronic module (Smartgear, Swissorthodontics, Switzerland). Panoramic radiograph was taken before (T1) and after (T2) the treatment. The angle between long axis of the permanent upper canine to condylar line (Angle3/Co) and to midline (Angle3/Mid) were measured on both sides. Mann-Whitney U and Wilcoxon test were used for statistical analysis. This study is based on 40 children, 15 male and 25 female; L group: n=22, mean age 9.7±0.7 years; H group: n=18, mean age 9.9±0.7 years.
RESULTS: Children in the L group used CHG statistically significantly more than in the H group (10.0h ±1.5h, and 8.3h ±2.1h, respectively, p=0.002). At T1 and T2 no statistical difference was found between the groups.During T1-T2 on the right the Angle3/Co increased by 7.3°± 6.5°; p=0.000 and 8.2°±6.2°; p=0.000 and on the left by 7.0°±7.5°; p=0.000 and 6.6°±6.3°; p=0.001 in L and H groups; respectively. The Angle3/Mid decreased on the right by -4.6°±6.7°; p=0.012 and-5.4°±5.3°; p=0.002 and on the left -5.5°±6.0°; p=0.000 and -4.1°±7.2°; p=0.031 in L and H groups; respectively.
CONCLUSION: According to the panoramic analysis eruption path of the upper permanent canines changed to more upright position during the cervical headgear treatment without statistically significant difference between the groups in terms of force magnitude. Great individual variability was found in the position change of the canines in both groups.

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SP308 FAMILIALITY OF PALATAL DIMENSIONS AMONG SIBLING GROUPS- A PRELIMINARY STUDY

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BACKGROUND: Maxillary transverse discrepancy can result in unilateral or bilateral crossbite. Orthodontic treatment often involves a palatal expansion for crossbite correction and improved occlusal function. The desirable approach is skeletal expansion through the opening of the mid-palatal suture. However, most appliances provide mainly dentoalveolar effects that are prone to relapse. A better understanding of the factors influencing palatal growth and development will allow improvement of malocclusion analysis and effective treatment planning. This study aims to investigate the contribution of genetics and environment in the variation of palatal dimensions among sibling groups.
METHOD: This cross-sectional study was conducted among siblings from five different states in Malaysia. A total of 60 sibling pairs (20 male-male, 20 male-female and 20 female-female) were included. The dental casts were digitized with a Cameo Intra Oral Scanner (Aidite, China), and the digital images were obtained in the form of stereolithographic (STL) files. These images were then exported into Sprutcam 11 Software (SprutCAM Tech Ltd, Cyprus) for further analysis. The palate was divided into an anterior and posterior plane, and measured for depth, and width at different depths in each plane. Palatal dimensions among sibling groups were compared using the One Way ANOVA test. Heritability estimates (h^2) were calculated as twice the intraclass correlation coefficient ($h^2 = 2ri$).
RESULTS: Palatal width and palatal depth do not differ significantly between sibling groups ($p>0.05$). In the posterior plane, palatal width showed high heritability ($h^2 > 0.76$), while palatal depth showed moderate heritability ($h^2 > 0.54$). In the anterior plane, zero heritability was found for palatal width, while palatal depth showed high heritability ($h^2 > 0.83$)
CONCLUSION: Palatal morphology has a higher genetic contribution in the posterior plane. In the anterior plane, palatal width has more environmental influence compared to palatal depth.

Abstract citation ID: cjae081.601
SP309 MANAGING THE GAP: AN AUDIT OF HYPODONTIA PATIENTS

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BACKGROUND: Congenitally missing teeth can bring aesthetic and functional complications for patients. The treatment and management of hypodontia often require a multidisplinary approach involving orthodontic and restorative treatment. Often there is a delay between completing active orthodontic treatment and commencing restorative treatment, either due to biological or system reasons. Whilst waiting for restorative work after cessation of active orthodontic treatment, there can be challenges such as retainer failure, relapse or loss to follow up.
AIMS: To assess the time taken for hypodontia patients in a tertiary dental hospital setting to receive restorative treatment after completion of orthodontic treatment.
METHODS: This was a retrospective audit. Eligible patients were identified by screening laboratory records for patients requiring retainers with pontics from August 2021 onwards. Once identified, electronic clinical records of the patients were reviewed to fulfill the inclusion criteria (patients who completed both orthodontic and restorative treatment at the Eastman Dental Hospital). The exclusion criteria were patients who completed restorative treatment outwith the hospital and patients with missing teeth not due to hypodontia.
RESULTS: 289 records were analysed and 21 patients met the inclusion criteria. The mean age at debond was 19.6 years (range 13 to 36 years). The number of missing teeth ranged from 1 to 21 with a mean of 5 missing teeth per patient. Upper lateral incisors were the most commonly missing teeth. The average time taken for patients to be seen for restorative assessment was 8.2 months after debond, whereas it took 22 months for patients to have restorative treatment completed after debond. The majority of the restorative treatment provided was resin bonded bridges.
CONCLUSIONS: On average, patients commenced restorative treatment within one year of debond. Hypodontia patients should be informed of the average waiting times before restorative treatment can be completed from the outset and the importance of good compliance with retention regime in that period and beyond. A team approach with other specialties is required to facilitate an efficient transition to restorative phase after completion of orthodontic treatment and minimise complications.

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SP310 ELUCIDATING THE IMPACT OF IL-17A ON THE TEMPORAL DYNAMICS OF OSTEOCLASTS AND INTERACTIONS BETWEEN IMMUNE CELLS AND BONE HOMEOSTASIS IN PORPHYROMONAS GINGIVALIS-INDUCED PERIODONTITIS

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BACKGROUND: Periodontitis is a chronic inflammatory disease characterised by an intricate interplay of immune cells and bone cells within the periodontium. The role played by IL-17A in the temporal changes of osteoclasts and cell–cell interactions between immune cells and bone cells during the progression of P. gingivalis-induced periodontitis remains controversial and largely unexplored.
METHODS: Periodontitis was established by placing silk ligatures infiltrated with live P. gingivalis (ATCC 33277) on the bilateral upper molars of wild-type (WT) and IL-17A knockout (KO) mice for 14 days. Periodontal tissues were harvested and processed for scRNA-seq. We identified several unique cellular subtypes and differential gene expressions. Gene set variation analysis (GSVA), gene ontology (GO) pathway enrichment analysis, and SCENIC analysis were adopted to analyse differentially expressed genes and differential pathway activities. Pseudotime analysis was performed using Monocle3. CellChat analysis was adopted to explore the involvement of osteoclastogenesis in the inflamed periodontal microenvironment.
RESULTS: We investigated the distinct characteristics of myeloid cell clusters and osteoclasts in inflamed periodontal tissues and their developmental trajectories. We observed an increased role of myeloid cells in osteoclastogenesis in the absence of IL-17A, suggesting a potential compensatory mechanism. The absence of IL-17A was associated with increased osteoclast proliferation and differentiation, as well as increased expression of NFATc1 and CTSK, which are key players in osteoclast differentiation. Moreover, we discovered a novel role of T cells in the enhancement of osteoclastogenesis by upregulation of the RANKL pathway in the absence of IL-17A.
CONCLUSIONS: Our study provides novel insights into the complex interplay between different cell types in P. gingivalis-induced periodontitis and the important role of IL-17A in these processes. These findings pave the way for further research that fully reveals the underlying mechanisms and explores potential therapeutic strategies for periodontitis.

Abstract citation ID: cjae081.603
SP311 EFFECTS OF UNILATERAL NASAL OBSTRUCTION DURING THE GROWTH PERIOD ON CEREBELLAR NEURAL CIRCUIT AND FUNCTION

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BACKGROUND/OBJECTIVES/AIMS: There is accumulating evidence that nasal obstruction induces cognitive dysfunction, such as memory and learning impairment. However, little is known about the effects of nasal obstruction during brain development on neural circuit formation and brain functions other than memory and learning. In this study, we elucidated the effects of nasal occlusion on the development of cerebellar neural circuits, the activity of cerebellar networks, and behaviors.
MATERIALS/METHODS: Unilateral nasal occlusion (UNO) was performed in 3-day-old mice. To analyze the effects of UNO on cerebellar neural circuit formation and function, we performed synaptic analysis and calcium imaging in both of developmental and adult stages. In addition, behavioral experiments, such as the open-field test, social interaction test, Rota-rod test, and forced swimming test, were conducted to assess motor function/learning, repetitive movements, depression, activity, and anxiety.
RESULTS: UNO in mice resulted in the impairment of synapse elimination and adequate innervation pattern in the cerebellum. Additionally, UNO led to decreased neuronal activity and abnormal neuronal activity pattern. UNO mice showed motor dysfunction in the Rota-rod test and depressive-like behavior in the forced swim test. UNO mice did not show significant changes in activity levels or anxiety-related behaviors in the open-field test.
CONCLUSIONS/IMPLICATIONS: Our findings suggest that adequate nasal respiration is crucial for the development of cerebellar circuits, motor function, and mental health.

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SP312 ORTHODONTIC OFFICE IN THE POST-PANDEMIC ERA: PATIENTS' PERCEPTION OF HYGIENE AND SAFETY

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AIM: To investigate and analyze the patients' perception and perspective as regards the issues of Hygiene and Safety (H&S) in the Orthodontic office in the post-pandemic era.
MATERIALS AND METHODS: The study was carried out with the use of questionnaires on a sample of one hundred (100) orthodontic patients and accompanying persons of a private Orthodontic Office in the region of East Attica, Greece.
The present study was conducted within the Hygiene and Safety Postgraduate Program framework of the Democritus University of Thrace Medical School.
RESULTS: According to the study, an overall 93% of patients stated that implementing adequate H&S measures influences their choice of orthodontic specialist.
91% require the specialist to undertake and become certified in relevant training processes.
68% are willing to communicate their positive or negative experience of H&S issues in the Orthodontic practice to their social circle, and 24% are disposed to follow litigation procedures if the expected standards are unmet.
42% of the patients believe they can evaluate themselves the adequacy of H&S measures, and 54% are willing to communicate any observed deficiencies to the Orthodontist and staff.
A total of 74% expressed an increased awareness of H&S issues due to the recent COVID-19 pandemic.
87% would like to be informed personally by the Orthodontist regarding the H&S protocols implemented in the practice. Interestingly, the role of the classic media (TV and print media) as a source of valid information regarding H&S was found to be low, 14%, compared to the role of the Orthodontist (61%).
CONCLUSIONS: The results of this questionnaire-based research showed that patients visiting an Orthodontic Office exhibit increased awareness and sensitivity in matters of Hygiene and Safety, especially following the recent COVID-19 pandemic.
Patients prefer to be informed by the Orthodontist, who is also expected to be updated and adequately trained on these matters.
Further research regarding patients' criteria and expectations concerning Hygiene and safety issues in the Orthodontic Practice is considered necessary.
Conflict of Interest: The authors declare no conflict of interest.

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SP313 DOES VERTICAL CRANIOFACIAL MORPHOLOGY INFLUENCE THE SMILE LINE AT THE END OF ORTHODONTIC TREATMENT? A RETROSPECTIVE STUDY

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AIM: The present study aimed to evaluate if the smile line achieved after orthodontic treatment with fixed appliances is associated with pre-treatment vertical craniofacial characteristics.
METHODS: This retrospective longitudinal study investigated 168 patients who underwent fixed orthodontic treatment at the division of orthodontics at the University clinics of dental medicine in Geneva. Lateral cephalometric radiographs were evaluated pre-treatment to determine vertical skeletal divergence (via the intermaxillary angle). Using these data, the patients were divided into four groups (n=42 patients in each group), namely hypodivergent (SpaSpp-MeGo<19°), normodivergent (SpaSpp-MeGo 24-25°), hyperdivergent (SpaSpp-MeGo>31°) and extreme hyperdivergent (SpaSpp-MeGo>36°). Facial photographs of the smile from post-treatment records were used to evaluate the harmony of the smile line. The curvature of the lower lip and the curvature of the smile line were approximated using a quadratic function on the traced points. The two curves were then compared for concordance based on the maximum curvature of the obtained functions, with 0 denoting a consonant smile (perfect concordance between the lower lip and smile line) and 1 a non-consonant smile. Two-way ANOVA with post-hoc tests was carried out to identify potential differences in smile line consonance between patient groups including sex as an independent variable. Additionally, linear regression analysis was used to investigate

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the relationship between skeletal divergence (as a continuous variable) and smile line consonance, including patient pre-treatment age and sex as covariables.
RESULTS: In the present sample of 168 patients, 62 were male while 106 were females. Two-way ANOVA showed that there were differences between the hypodivergent group and all other groups (normodivergent, p=0.049; hyperdivergent, p=0.015; extreme hyperdivergent, p=0.021) with hypodivergent patients consistently showing a less consonant smile line. Linear regression analysis showed a similar trend with hyperdivergent patients showing a more consonant smile line (p=0.006), while females also showed a more consonant smile line (p=0.002).
CONCLUSIONS: The present data suggest that a more harmonious and consonant smile line is easier to achieve in hyperdivergent female patients, whereas in hypodivergent patients this will be less consonant following fixed orthodontic treatment. Orthodontists should consider the patient's skeletal vertical divergence and sex when planning fixed appliance treatment.

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SP314 PATIENT´S PERSPECTIVE ON MINISCREWS DURING ORTHODONTIC TREATMENT: SYSTEMATIC REVIEW WITH META-ANALYSES

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BACKGROUND/OBJECTIVES/AIMS: The biopsychosocial model of health includes a complete physical, mental and social well-being. During orthodontic treatment, undesired reciprocal forces are generated during dental movement, necessitating the use of anchorage strategies to mitigate their adverse effects. Miniscrews are intraoral devices used for temporary skeletal anchorage. In comparison to other anchorage techniques, these devices are small in size, posing no aesthetic concern, and are easy to place and remove. However, some studies report adverse effects such as inflammation, pain and discomfort. The fear of discomfort and postoperative complications can negatively influence patient acceptance and cooperation with the treatment plan. This systematic review aims to synthesize the available evidence on the use of miniscrews during orthodontic treatment from the patient's perspective.
MATERIALS/METHODS: The systematic review protocol was registered in PROSPERO and was performed according to Preferring Items for Systematic and Meta-Analyses. The research was carried out covering the following databases: PubMed via Medline, Cochrane Library, Web of Science Core Collection and Embase. Grey literature was also explored. Data extraction was independently performed by two authors. Cochrane's risk of bias tools was employed to assess the quality of the included studies.
RESULTS: Thirty-two articles analyzed the patient's perspective and experience with orthodontic treatment using miniscrews. Furthermore, eight studies assessed the patient's outcome, namely pain and discomfort, in the relation to anesthesia during miniscrew placement and removal. The location of the miniscrew influenced the experienced pain, with interradicular locations showing less pain than extra-alveolar miniscrews (infrazygomatic crest, buccal shelf and palatal). Interradicular miniscrews caused more pain in the mandible. Regarding patient-reported outcome measurements, questionnaires were used in all studies, with twenty using the visual analog scale.
LIMITATIONS: This systematic review has some limitations that may affect the interpretation of the results, namely: 1) small samples sizes; 2) absence of groups with an equal number of females and males and 3) the absence of a significant sample that allows assessing the influence of age.
CONCLUSIONS/IMPLICATIONS: Orthodontists should pay special attention to individual patient characteristics, such as pain, tolerance and discomfort, to maximize treatment efficacy when using miniscrews and improve individual adherence.

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SP315 ACCURACY OF THE CLINCHECK® PREDICTION OUTCOME FOR ORTHODONTIC TREATMENT WITH INVISALIGN: A 3D DIGITAL EVALUATION.

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AIM: To prospectivelly evaluate the overall efficacy of tooth movement with Invisalign® by comparing the predicted tooth movement planned with the initial ClinCheck® (Align Technology, Santa Clara, CA) to the actual tooth movement occurred after treatment of moderate cases.
METHODS: The sample consisted of 17 patients (34 dental arches) treated in the Postgraduate Clinic of the Department of Orthodontics. At the beginning of treatment and before the first refinement stage, polyvinylsiloxane impressions were acquired and sent to Align Technology to produce 3D digital casts in STL file format. All STL files were extracted from the ClinCheck® Software (T1: Initial situation, Tp: ClinCheck Prediction Outcome, To: Actual Treatment Outcome). All aligners included the Invisalign® compliance indicator for evaluation of patients' compliance. Patients were instructed to wear the aligners 22 hours a day, 7 days a week, and change them every 2 weeks. The T1 digital casts were superimposed over the Tp digital casts and the To digital casts using stable structures as reference (posterior teeth that have not moved during treatment). Finally, the Tp digital casts were compared with the To digital casts. The Geomagic Control X (3D Systems) software was used to superimpose and measure anterior tooth displacement between the digital casts. RMS value was used to measure any differences between T1-Tp, T1-To, and Tp-To. Accuracy was calculated using the formula: [(To-T1)/(Tp-T1)]*100. When accuracy exceeded 100%, the excess was subtracted from 100%, for better interpretability. The one-sample t-test was used to compare the ClinCheck Prediction Outcome (Tp) vs. the Actual Treatment Outcome (To) after testing the normality assumption (test value was set to 0).
RESULTS: Statistically significant differences were found between the ClinCheck Prediction Outcome (Tp) vs. the Actual Treatment Outcome (To) (mean deviation=0.51, 95% Confidence Interval (0.45, 0.57), p-value<0.001). The accuracy of the prediction outcome was 83.21%.
CONCLUSION: According to the results of this study, it seems that following treatment of moderate cases with Invisalign®, although the level of accuracy of the virtual prediction ClinCheck® outcome has been improved to 83.21%, there are still some limitations that keep it far from ideal.

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SP316 IN VITRO BISPHENOL A RELEASE FROM FIBER GLASS VS. CONVENTIONAL STAINLESS STEEL FIXED RETAINERS.

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AIM: To investigate the amount of BPA release from two common fiber-glass fixed lingual canine-to-canine retainers and to compare these amounts with those released from a conventional multistranded stainless steel orthodontic retainer.
MATERIAL AND METHODS: 44 recently extracted teeth, divided into groups of 6 teeth each, were embedded in plaster in an arch shape. A light-cured adhesive was used to bond a different canine-to-canine fixed retainer in each group: Ribbond, Everstick Ortho, or a multistranded stainless steel wire. 3 specimens were constructed for each retainer type.
The specimens were placed in 80 ml glass vials filled with distilled water and kept at 37 °C for 1 month. Five ml of the aqueous medium were sampled at the following time points: 1 hour, 24 hours, 7 days, 14 days and 1 month after immersion. Three replicates were conducted for each experiment and one blank sample – without specimen - for each time point providing in total 50 samples.
BPA was determined with validated liquid chromatography – tandem mass spectrometry method. Quantification was performed with matrix-matched calibration curve and isotope labeled internal standard. The method limit of detection and quantification was 0.32 ng/mL and 0.96 ng/mL, respectively
A two-way mixed repeated measures analysis of variance, with Greenhouse-Geisser's correction was employed to verify the existence of any significant differences between the systems over time.
RESULTS: At the Ribbond group, the mean concentration M (ng/mL) and standard deviation (SD) of BPA was 0.16(0.27) at the first 24h, 1.74(1.17) at 7 days, 25.43(13.30) at 14d and 71.29(30.90) at 30 days.
At the Everstick group, the M(SD) were 0.16(0.27), 2.20(2.98), 44.2(59.50) and 91.64(49.50) respectively.
At the Wildcut group, the M(SD) were 0.32(0.27), 0.66(0.31), 14.21(6.70) and 62.21(30.40) respectively.
The differences between the systems over time were not statistically significant (p = 0.69 for the interaction of time with the system and p = 0.6 for the main effect of system).
LIMITATIONS: The increase of the sample size could possibly reveal more subtle differences between the tested specimens.
CONCLUSIONS: In vitro BPA release during the first month did not differ between fiber-glass and conventional multistranded stainless steel retainers.

Abstract citation ID: cjae081.609
SP317 VALIDATION OF A SCREENING TOOL FOR PEDIATRIC OBSTRUCTIVE SLEEP APNEA: A PILOT STUDY

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BACKGROUND: The prevalence of pediatric obstructive sleep apnea (POSA) is reported as 1-4%. Therefore, early diagnosis of POSA is of paramount importance.
OBJECTIVE: The aims of this study were: 1) to compare a new, short questionnaire (PM-STOP-Bang) score with the validated Pediatric Sleep Questionnaire (PSQ), 2) to determine the ability of the PM-STOP-Bang and the PSQ to accurately detect cases at high risk by confirming POSA with an at-home sleep apnea test (HSAT).
METHODS: Orthodontic patients aged 7-17 years determined to be at high risk for POSA based on the PM-STOP-Bang score were enrolled in the study (n=5). The participants completed a one-night HSAT by wearing a monitor recording the sleep apnea events. Five age-matched subjects deemed by PM-STOP-Bang not at risk for POSA completed the HSAT and PSQ as controls. The PM-STOP Bang questionnaire scores were compared to those of the validated PSQ. The results were also compared to the findings of the HSAT. Sensitivity, specificity, positive and negative predictive values, and their 95% confidence intervals were reported for all comparisons.
RESULTS: Four of the five subjects previously determined to be at high risk from the PM-STOP-Bang questionnaire were also considered high risk from PSQ. PM-STOP-Bang had a sensitivity of 67% and a specificity of 75% compared to PSQ. The positive and negative predictive values were 80% and 60%, respectively. Compared to the HSAT results, the PM-STOP-Bang had a sensitivity of 100% and a specificity of 71%. The positive and negative predictive values were 60% and 100%, respectively. The PSQ sensitivity was 67% and specificity 43% compared to HSAT.
LIMITATIONS: Due to the small sample size of this pilot study, future research with a larger sample size is needed.
CONCLUSIONS: The PM-STOP-Bang showed high accuracy in identifying children at increased risk for POSA. It also achieved a greater sensitivity and specificity than the PSQ when comparing the accuracy of the two instruments with the HSAT data.
IMPLICATIONS: This pilot study showed promising results that PM-STOP-Bang may be a valuable tool for identifying patients at risk for POSA if administered in dental offices.

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SP318 UPPER AIRWAY CHANGES FOLLOWING BONE ANCHORED RAPID MAXILLARY EXPANSION IN ADULTS- A RETROSPECTIVE STUDY

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OBJECTIVES: The objective of this study was to evaluate the effect of bone-anchored rapid maxillary expansion (RME) in the volume of the right maxillary sinus, left maxillary sinus and nasal and maxillary sinus airway complex, through bone anchored maxillary expansion devices (BAME); in addition, the influence of gender and age in the volume changes was also analyzed.
MATERIALS/ METHODS: Eighteen patients between 19 and 31 years of age have undergone RME treatment with a jackscrew based on 4 miniscrews which were placed in the palate on both sides of the midpalatal suture. Cone-beam computed tomography (CBCT) scans were taken before and after suture palatine expansion and datasets were uploaded into therapeutic digital planning software to measure the volume (mm3) of the right maxillary sinus, left maxillary sinus (mm3) and nasal and maxillary sinus airway complex (mm3). The airway volumes were isolated after selecting the anatomical area in the axial, coronal and sagittal space plane and ensuring the air density measurement by reference points placement inside the selected area. Statistical analysis between preoperative and postoperative measurements was performed using the statistical analysis of the t-test.
RESULTS: Statistically significant differences were shown between preoperative and postoperative volumes of the right maxillary sinus ($p<0.001$), left maxillary sinus ($p<0.001$) and nasal and maxillary sinus airway complex ($p<0.001$). In addition, statistically significant differences were shown between the preoperative and postoperative volumes of the left maxillary sinus according to the gender ($p = 0.02$).
LIMITATIONS: The limitations of the present study are the relatively small number of patients and the lack of long term results due to postoperative CBCT scans were taken shortly after the operation was done.
CONCLUSIONS: Bone-anchored rapid maxillary expansion procedures through bone anchored rapid maxillary expansion (BAME) devices increase the volume of the right maxillary sinus, left maxillary sinus and nasal and maxillary sinus airway complex in adults; specially, in women.

Abstract citation ID: cjae081.611
SP319 CHANGES IN THE UPPER AIRWAY AFTER BIMAXILLARY ADVANCEMENT SURGERY IN PATIENTS WITH OBSTRUCTIVE SLEEP APNEA, A RETROSPECTIVE STUDY

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BACKGROUND: The airway complex is modified by bimaxillary advancement surgery performed in patients suffering from obstructive sleep apnea (OSA). The aim of the present study is to analyse the volume of nasal and maxillary sinus airways after bimaxillary advancement surgery in patients suffering from OSA. The maxillary sinus and nasal complex of eighteen patients with OSA was measured through cone-beam computed tomography (CBCT) before and after they were treated with bimaxillary advancement surgery. Digital planning software was used to effectively measure the upper airway changes, as well as, statistical analysis of the results was performed.
METHODS: Eighteen patients were diagnosed with OSA the severity of which was measured by the apnea hypopnea index and were selected and submitted to preoperative and postoperative CBCT scans. Afterwards, datasets were uploaded into therapeutic digital planning software (Dolphin Imaging) to measure the volume of the right and left maxillary sinus and nasal and maxillary sinus airway complex. Statistically analysis between preoperative and postoperative measures was performed by Student t-test statistical analysis.
RESULTS: The paired t-test showed statistically significant volumetric reductions in the left maxillary sinus ($p = 0.0004$), right maxillary sinus ($p< 0.0001$) and nasal and maxillary sinus airway complex ($p = 0.0009$) after bimaxillary advancement surgery performed in patients suffering from OSA.
LIMITATIONS: The limitations of the present study are the relatively small number of patients and the lack of long term results due to postoperative CBCT scans were taken shortly after the operation was done.
CONCLUSIONS: The results showed that bimaxillary advancement surgery reduces the maxillary sinus airway volume as well as, the fossa nasal and sinus complex volume.

Abstract citation ID: cjae081.612
SP320 ORTHODONTIC EMERGENCIES AT A POSTGRADUATE CLINIC BEFORE, DURING AND AFTER COVID-19 RESTRICTIONS: A RETROSPECTIVE STUDY

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BACKGROUND: By the end of 2019 a new coronavirus (SARS-CoV-2) was detected and rapidly spreading around the world. In Norway, lockdown was declared on March 12, 2020, with national and local restrictions, including dental healthcare. The aim of this retrospective study was to register the number and reasons for orthodontic emergencies at the postgraduate clinic at the Department of Orthodontics, University of Oslo before, during and after COVID-19 restrictions, and to compare their yearly and annual distribution.
MATERIALS AND METHODS: All visits with emergency coding from 2015 through 2022 were registered and manually screened. Orthodontic emergencies were categorized as emergencies during 1) active treatment, 2) retention and 3) miscellaneous. Number of emergencies, reasons for emergencies, age, and gender were registered and evaluated according to the project description approved by the Regional Committee for Medical and Health Research Ethics.
RESULTS: A total of 7206 appointments were screened, out of which 3593 fulfilled the inclusion criteria. They concerned 1657 patients, 685 males and 972 females. The mean number of emergencies per individual was 2.17, with no significant difference in female proportions between years. Most of the patients seeking orthodontic emergencies were either between 10-14 years or older than 20 years. The number of yearly emergencies varied from 313 in 2015 to 639 in 2022, with statistically significant variation. The distribution during the year was significantly smaller on average in July, with least number of emergencies ($p<0.0001$). Orthodontic emergencies in active treatment were the most common (n=2049), followed by emergencies during retention (n=1353) and few miscellaneous (n=191). During active treatment, full fixed appliance related problems, like displaced/fractured archwires, mucosal ulcerations and brackets detachment were the most common reasons for emergencies. During retention, fixed retainer related problems were the most common reasons for emergencies.

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LIMITATIONS: Retrospective study with its known limitations. Usage of many emergency codes might result in incorrect registration of emergencies and thus lead to biased interpretation of data.
CONCLUSION: It is difficult to discern a specific pattern during the COVID-19 pandemic since similar variations were observed in other years, indicating maybe that restrictions did not have a particular influence.

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SP321 MINI-IMPLANT PLACEMENT AT THE BUCCAL SITE OF POSTERIOR MAXILLA BASED ON CORRELATION BETWEEN HEIGHT AT THE ATTACHED GINGIVA AND CORTICAL BONE THICKNESS AND DENSITY

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BACKGROUND: Several studies have measured the thickness and density of the cortical bone at the maxilla and mandible, as these are important factors for the primary stability of mini-implants.
AIM: This study aims to investigate the possible correlation between the height on the attached gingiva at the buccal site of posterior maxilla and the underlying cortical bone thickness and density and thus propose a clinical guide for mini-implant placement.
MATERIALS AND METHODS: A CBCT was acquired for diagnostic reasons in 23 female patients. In these cases, mostly impacted teeth were involved. Mini-implants were scheduled to be placed between 1st molar and 2nd premolar at the buccal site of the maxilla for anchorage purposes. Plaster models of the patients' maxilla were acquired and a digital scanning of them was performed. DICOM and STL files were combined creating a digital model. On that model, three height levels (lower, middle, upper) on the attached gingiva were defined as were transferred from the scanned plaster models. On these three axial slices, cortical bone thickness and density, as well as trabecular bone density, were measured. Pearson and eta correlation tests were performed to investigate possible correlations between height in the attached gingiva and corresponding cortical bone thickness and density.
RESULTS: A strong correlation was found between corresponding cortical bone thickness and density (Pearson correlation: right side p=0.018, left side p=0.001), while a medium correlation was recorded between the height level in the attached gingiva and the cortical bone thickness (right side Eta value=0.490, left side Eta value=0.526) and a weak correlation between height level and cortical bone density (right side Eta value=0.251, left side Eta value=0.353).
LIMITATIONS: A limitation of the study is the small sample size. Only female patients were examined to avoid heterogeneity regarding the gender of the patients.
CONCLUSIONS: It is proposed for mini-implants to be placed at the upper level of the attached gingiva at the buccal site of the maxilla, as cortical bone thickness and density are probably greater than at the lower and middle level.

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SP322 PREVALENCE AND PREDICTORS FOR EXTRACTION OF IMPACTED MAXILLARY CANINES

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BACKGROUND: Impacted maxillary canines are second most commonly impacted teeth, with incidence up to 3,5% in general population. Treatment options are surgical exposure and orthodontic traction, surgical removal, autotransplantation or no treatment. Most common predictors for severity of canine impaction are: localization (sector), angulation to sagittal medial plane (alpha angle) and distance of the canine to occlusal plane (vertical position). Literature is scarce of evidence how often and in which cases is surgical removal of impacted maxillary canines necessary. Aim of this study was to evaluate prevalence and predictors for maxillary canine extraction.
MATERIALS/METHODS: 76 patients with 91 impacted maxillary canines were included in this study. Descriptive variables such as gender, side of impaction, localization, treatment option (orthodontic extrusion or extraction), alpha angle and its vertical position measured for all impacted teeth. Patients were followed until impacted canines emerged in the mouth.
RESULTS: Seventeen canines (18.7%) were indicated for extraction, 12 (13.2%) before beginning of the treatment, and 5 (5.5%) during treatment since there was no progress in orthodontic traction. Impacted maxillary canines that were extracted appeared more commonly in females and unilaterally, as expected, and same as in general population. No statistically significant difference was observed in prevalence of extraction between sexes, considering almost every fifth impacted maxillary canine was extracted. Palatally impacted maxillary canines were extracted in almost 19% of cases, compared to 23% of extracted buccaly positioned impacted teeth. Alpha angle was similar between extracted teeth (41.06 ±16.99°) and orthodontically extruded (40.31±12.71°, p=0.867). Vertical position of extracted teeth was significantly higher (8.88±2.41mm) compared to orthodontically extruded teeth (6.88±2.89, p=0.038).
LIMITATIONS: Further research and comprehensive study with a larger sample size is needed.
CONCLUSIONS/IMPLICATIONS: In almost 20% of impacted maxillary canines extraction is treatment option. Vertical distance to occlusal plane can be predictor for the need for extraction as when impaction of maxillary canine is diagnosed.

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SP323 ULTRASOUND EVALUATION SAMPLE IN PATIENT WITH JUVENILE IDIOPATHIC ARTHRITIS

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AIM: This research aimed to demonstrate the hypothesis that ultrasound examination might be reliable to diagnose early pathological changes of temporomandibular joint (TJ) in pediatric patients with juvenile idiopathic arthritis (JIA).
METHODS: In this study 65 pediatric patients with JIA were included: 10 males and 55 females (average age: 9.87±3.78; range: 5-17 years). All patients were clinically examined collecting extraoral, intraoral and functional records; in addition, an ultrasound examination was carried out for all the sample by the same doctor. All patients were examined with the same ultrasound platform (branded GE model Logic E9) and high-frequency linear array transducer (12 to 18 MHz depending on the age of the patient). For each patient, both TJ were analyzed, and 2-3 oblique and axial scans were performed, taking as reference point the head of condyle.
RESULTS: 70 ultrasound evaluations were overall collected, 11 instrumental tests showed no pathological changes (16% of total); 21 detected bilateral alteration (30%); 31 patients had an unilateral alteration (44%); finally, 7 instrumental records showed anomalies not strictly linked to condylar structure (10%).
LIMITATIONS: Although ultrasound is a safe and radiation-free method, it requires trained personnel able to perform the technique properly. Moreover, the study was limited to the Caucasian population thus maybe not applicable to a broader population. Further studies are needed to confirm the results found.
CONCLUSIONS/IMPLICATIONS: According to these results, it can be stated that ultrasound evaluation is able to intercept early alterations in condylar structure in patients with JIA. Although, ultrasound does not allow a three-dimensional evaluation of the whole structure, it is a reliable toll that can be repeated without biological costs; moreover, ultrasound is well-accepted by patients, especially by children, who constantly increase in number over years.

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SP324 THE EFFECT OF STATINE ON TOOTH MOVEMENT: SYSTEMATIC REVIEW

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AIM: To ascertain, through a systematic review of the literature, the repercussions statin assumption might have on orthodontic tooth movement (OTM).
METHODS: The following databases were scouted: PubMed, Scopus, Cochrane Library. The search was carried out using the following terms: ("drug" OR "drugs") AND ("orthodontic" OR "tooth") AND ("movement" OR "movements") AND ("therapy" OR "relapse"). The search covered the time period ranging from the starting of the databases to April 2023 and only research on statins, written in English, was analyzed. Exclusively clinical trials (CT) and randomized clinical trials (RCT) on animal model were included. In addition, to better understand the molecular effect of statins therapy on bone metabolisms, research performed only in vitro was excluded whereas studies designed to have both an in vivo and in vitro investigation were included.
RESULTS: A total of 705 papers were retrieved from the systematic search. After duplicates removal and screening for language and study design, 610 papers remained. Of those articles, only 8 investigated statins. Eligible papers were read full-text, and another article was discarded. Therefore, a total of 7 papers were analyzed, including 6 focused on the role of simvastatine and 1 centered on the role of atorvastatine. Statins proved to be effective in decreasing bone resorption whilst increasing bone formation; the underlying biochemical mechanisms might

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imply an upregulation of osteoprotegerin (OPG) and RANKL. However, the effects of statins on OTM, remain controversial, as an inhibition of relapse after OTM was observed in 5 of the analyzed papers, whereas no statistically significant differences were observed in 2 articles. Unfortunately, due to inhomogeneity of data reporting, metanalysis of the results could not be performed.
LIMITATIONS: The observations made on animal model might not be accurate for humans; metanalysis of the results was not carried out.
CONCLUSIONS/IMPLICATIONS: Statins alter bone metabolism, reducing bone resorption and increasing bone formation. Their repercussions on OTM remain unclear, but a promising effect in reducing relapse after OTM was noticeable in rats and rabbits. Further studies are required.

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SP325 EVALUATION OF TEMPOROMANDIBULAR JOINT'S ADAPTATIVE CHANGES AND ARTICULAR DISC POSITION DETERMINED BY MAGNETIC RESONANCE IMAGING EXAM: SURGERY MANDIBULAR ADVANCEMENT VS FUNCTIONAL MANDIBULAR ADVANCEMENT – SYSTEMATIC REVIEW.

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BACKGROUND: Mandibular advancement has repercussions on the temporomandibular joint (TMJ). Nowadays, we have limited knowledge of the exact mechanism by which the TMJ responds to functional and orthognathic treatment.
AIMS: To evaluate the available scientific evidence regarding the adaptive changes of the temporomandibular joint and the position of the articular disc assessed by MRI, comparing adult orthognathic patients undergoing bilateral sagittal split osteotomy (BSSO) and growing patients treated with functional appliances.
MATERIALS AND METHODS: Two independent systematic reviews were made of the bibliography in 5 databases: Medline, Scopus, Embase, Web of Science and Cochrane. The first to identify studies related to functional mandibular advancement (FMA) and the second to BSSO. Randomized clinical trials (RCTs), non-randomized clinical trials (nRCTs), prospective, and retrospective studies were included. Study selection, data extraction, and risk of bias assessment were performed individually and in duplicate. The first electronic search yielded 256 articles, of which 99 were eliminated because of duplication and 128 based on their titles and abstracts or summaries. The remaining 29 papers were read in their entirety, and 27 were included in the final selection. The second electronic research were carried out in the same way and the total selected studies were 12.
RESULTS: There were 32 prospective and 7 retrospective studies included. The lack of standardized protocols and the high amount of heterogeneity precluded a valid interpretation of the actual results through pooled estimates. A certain linearity was noted in stating that most of the adaptive changes in TMJ structures, allow axial repositioning of the disc-condyle-fossa complex. The level of evidence was found to be low given the high/serious risk of bias in all included studies.
LIMITATIONS: To be certain of the changes that took place after mandibular advancement on the TMJ, studies with long-term follow-up are required.
CONCLUSIONS: FMA in the growing patient and BSSO in the adult present similarities, resulting in adaptive changes of the TMJ of a predominantly positional nature and secondary remodelling, without causing adverse effects. However, these changes of TMJ need precautious interpretation owing to the low level of evidence and the high heterogeneity of studies.

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SP326 ANALYSIS OF THE RELATIONSHIP BETWEEN BODY MASS INDEX (BMI) AND DENTO-SKELETAL MATURATION. CROSS-SECTIONAL CASE-CONTROL STUDY

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AIM: The aim of this cross-sectional study was to establish if it exists a relationship between body mass index (BMI) and skeletodental development, in young obese patients in comparison with normal weight patients.
MATERIALS AND METHODS: The sample consisted of 178 individuals (115 normal weight, 37 overweight and 26 obese), aged 6 to 16 years, with a mean biological age of 11.96 years ± 2.44 years. Dental maturation was determined by using Demerjian's method; craniofacial pattern and skeletal class were determined by using cephalometric measurements; skeletal maturation by using Baccetti's method. Data were statistically analysed.
RESULTS: According to Demirjian's method, the mean dental age of the overweight and obese subjects was significantly higher than that of the of normal-weight subjects (p=0.001 and p=0.02 respectively). Higher rate of dental class III was detected in the overweight group (p=0.002). Concerning cephalometric records, statistically significant differences (p=0.018) were observed in the distribution of SNA and SNB values, which in obese subjects are increased. Respecting craniofacial pattern, no significant differences were found between the groups. Children with obesity presented more advanced skeletal maturation, reaching statistically significant differences (p=0.02), in comparison with the normal weight subjects.
LIMITATIONS: The lack of comparisons and generalization for ethnicities and the underestimation of age of the Demirijian method in certain populations.
CONCLUSION: Obese children showed increased tooth and skeletal development in comparison to the normal weight subjects. These findings may be of interest for the orthodontists who should consider weight status to perform correct orthodontic treatment in children and adolescents.

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SP327 CLEAR ALIGNER: UPPER CANINE RETRACTION IN PREMOLAR EXTRACTION CASE

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OBJECTIVES: This clinical research was to investigate the accuracy of preliminary canine tooth movement using In-House clear aligner in first premolar extraction case.
MATERIALS AND METHODS: 16 patients (mean age: 23.4±4.6) with upper first premolars extraction were recruited. They received 12 pairs of In-house clear aligner (6 sets of PETG of 0.5 and 0.75 mm thickness) treatment. Canine distalization was classified into 2 groups, the power arm (PA) group and the control (CT) group. The pre-treatment models and actual during-treatment models were superimposed using the best-fit algorithm in special 3D analysis software (GOM Inspect) to assess the accuracy. Paired t-test was used to compare the differences between actual and designed tooth movements in maxillary canines, second premolars, and first molars.
RESULTS: Maxillary canines on the power arm and control side were predicted to be distalized (2.01±0.26, 2.08±0.46 mm) with compensatory distal root tipping (4.37±1.86, 4.42±1.34 degrees), respectively. But both groups of the canines achieved more distalization (2.78±0.63, 2.66±0.77) and distal crown tipping (-6.30±3.10, -4.31±2.25) than predicted. When compared between power arm and control showed significant differences in tipping and rotation. In premolars, there was no significant difference between predicted and achieved changes in all directions when comparing the power arm and control side. In molars, there was a statistically significant in mesial displacement and rotation. We hypothesized that using auxiliary power arm, in conjunction with class II elastics may cause more distal crown tipping of upper canine in our clear aligner treatment.
CONCLUSIONS: Canine distalization and anchorage control with In-house clear aligners were not fully achieved as predicted. Significant differences between the power arm and control for canine retraction were found at tipping and rotation.

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SP328 HYOID BONE POSITION, TONGUE POSITION AND PHARYNGEAL AIRWAY DIMENSION ACCORDING TO SKELETAL MALOCCLUSION IN MOUTH BREATHING CHILDREN

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INTRODUCTION: Nasal breathing is a basic physiological process interacting with other functions such as chewing and swallowing. Nasal obstruction leads to mouth breathing, which causes a change in the position of the tongue and lower jaw.
AIM: The aim of this study is to determine the relationship between the position of the hyoid bone, the position of the tongue and the skeletal class of malocclusion in mouth breathing children.
MATERIALS AND METHODS: A total of 120 lateral cephalometries of mixed dentition children were studied and analyzed. Depending on the type of breathing of the studied children the radiographs were divided into three groups:
- 50 lateral cephalometries of children with nasal breathing difficulties
- 18 lateral cephalometries of children with an abnormal habit of standing and sleeping with the mouth open
- 52 lateral cephalometries of nasal breathing children

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RESULTS: When examining and comparing the type of hyoid triangle, there was a statistically significant difference between children with oral and nasal breathing ($\chi 2=24.97$; $p<0.001$). In children nasal breathing difficulties, a characteristic negative hyoid triangle is present, whereas in healthy nasal breathing children a positive one is present. There was a statistically significant difference in relation to the skeletal growth pattern and hyoid bone position ($\chi 2=22.08$; $p<0.001$). In children with nasal breathing difficulties, skeletal class II predominates. The hyoid bone was positioned downward and forward in skeletal class I, downward and backward in skeletal class II. When the mean value of the superior pharyngeal width ($F=26.69$; $p<0.001$) and inferior pharyngeal width ($F=6.30$; $p<0.05$) was examined, there was a significant difference between the different groups of children studied.
CONCLUSION: Mouth-breathing children, as opposed to nasal-breathing children, exhibited a lower and posterior positioning of the hyoid bone and a negative hyoid triangle. A skeletal class II and a hyperdivergent type of growth was more characteristic in mouth breathing children. In children with nasal breathing difficulty there is a change in the size of the pharyngeal widths.

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SP329 THE INFLUENCE OF MUSICTHERAPY DURING ORTHODONTIC TREATMENT

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BACKGROUND/OBJECTIVES/AIMS: Despite the well-documented benefits of music therapy in alleviating anxiety during dental procedures like root canals, extraction procedures, and implant surgeries, there is little evidence concerning its impact on anxiety levels during orthodontic treatments. The primary objective of this research is to contribute valuable insights into the potential therapeutic role of music in mitigating anxiety during orthodontic interventions.
MATERIALS/METHODS: This study used a randomized and prospective cross sectional design, involving a sample of 100 patients within the age range of 11 to 56 years old. One group consisted of 80 individuals from the normal population of patients treated by postgraduate orthodontic residents, while a second group consisted of 20 patients with specific orthodontic needs, such as cleft lip and/or palate, oligodontia, health-related issues, and special needs. The two participant samples were randomly divided, the control group did not wear headphones during placement of fixed orthodontic appliances, while the experimental group received treatment while wearing headphones with music of their preference. Participants completed a questionnaire containing a validated Dutch version short-form of the state scale of the Spielberger State-Trait Anxiety Inventory (STAI).
RESULTS: In both groups, no statistical significant difference was found on the anxiety level between the control group and the group utilizing music therapy. Additionally, there are no statistically significant differences on anxiety levels between age, sex, and the 2 groups.

Abstract citation ID: cjae081.622
SP330 EFFECTS OFTHE RADIOGRAPHIC CONDITION ON MEASUREMENTS OF ALVEOLAR BONE MINERAL DENSITY USING INTRAORAL RADIOGRAPHS

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AIM: In orthodontic practice, it is important to measure alveolar bone mineral density (BMD) quantitatively, as the number of orthodontic adult patients with periodontal involvement has recently increased. The present study therefore investigated the effects of radiographic conditions on the measurement of alveolar BMD using intraoral radiographs.
MATERIALS AND METHODS: Intraoral radiographs of three dry mandibular bone segments between the first premolar and first molar were obtained using an imaging phosphor plate and a DentalSCOPE indicating device (MEDIA, Tokyo, Japan). This device includes reference objects made of calcium carbonate and is used for comparisons with the target bone for measurement. The radiographs were obtained with an orthoradial projection, 7° from the mesial and distal projections, and 5° from the upward and downward projections. The BMD in the alveolar septum region between the mandibular second premolar and first molar was calculated using the DentalSCOPE software program. The procedure was repeated five times for each of the five projections. The mean value between the mesial and distal projections was defined as the mesio-distal value. The mean value between the upward and downward projections was defined as the up-down value. Significant differences between the BMD for the orthoradial projection, mesiodistal, and up-down values were statistically analyzed using a one-way analysis of variance.
RESULTS: The BMD value for the mesiodistal projection was significantly larger than that for up-down projection, while the BMD value for up-down projection was significantly larger than that for orthoradial projection.
CONCLUSIONS: The alveolar BMD in the oblique projection radiographic condition was higher than that in the orthoradial projection, possibly due to the larger bone width in the oblique projection than that in the orthoradial projection.

Abstract citation ID: cjae081.623
SP331 EVALUATION OF NEW PATIENT ORTHODONTIC REFERRALS TO THE ROYAL LONDON DENTAL HOSPITAL

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BACKGROUND: British NHS commissioning guidance states that patients with an Index of Orthodontic Treatment Need (IOTN) grades 4 and 5 are eligible to access NHS funded orthodontic treatment. Additionally, referrals to secondary care should be of greater treatment complexity (level 3b or 3a with modifying factors). The orthodontic department at the Royal London Hospital (RLH) is a busy training unit. New patient referrals are triaged to reduce numbers of inappropriate referrals which impact waiting times and resources. Patients undergo an initial assessment and are either accepted for treatment in the department if appropriate or discharged.
AIMS: Evaluate new patient referrals sent to RLH orthodontic department. Determine the case mix of:
- Presenting malocclusion according to IOTN and treatment complexity level
- Referrals rejected or accepted for treatment

STANDARDS:
- 100% of patients should have IOTN and treatment complexity recorded at the initial assessment
- 80% of patients accepted for treatment in the department should be of level 3b complexity

METHODS: Retrospective record-based audit completed from new patient referrals received over a one-month duration. Data were collected from 104 records.
RESULTS: 71.2% (n=74) of new patient referrals were accepted for an initial orthodontic assessment. IOTN was recorded in 83.8% (n= 62) of assessments. From this group, 12.9 % (n = 8) were IOTN grades 2 and 3, 51.6% (n=32) IOTN 4 and 35.5 % (n=22) IOTN 5. Treatment complexity was recorded in 63.5 % (n= 47) of assessments. 19.1% (n=9) were level 1 and 2 complexity, 46.8% (n=22) level 3a, 4.3% (n=2) level 3a with modifying factors and 29.8% (n=14) level 3b. Overall, 31% (n=22) of patients assessed were accepted for treatment. Of the patients where IOTN/treatment complexity were recorded, 100% (n=18) were IOTN grades 4 or 5 and 45.5% (n=10) were level 3b complexity.
RECOMMENDATIONS: Provision of additional guidance for training grade clinicians on IOTN and treatment complexity scale is recommended with re-audit in 6 months.
CONCLUSION: The recording of IOTN and level of complexity at initial orthodontic assessment requires improvement. A greater proportion of patients with lower levels of complexity were accepted for treatment compared to the set standard.

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SP332 A REASSESSMENT OF MAXILLARY GROWTH ROTATION AND ITS IMPORTANCE IN FACIAL GROWTH

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BACKGROUND: Although mandibular growth rotation (MGR) is considered an important feature of facial growth, its maxillary counterpart (MxGR) is thought to be much smaller and of little clinical importance. MxGR was first reported by Björk and Skieller in 1972 who found a strong correlation with MGR, but with only about half the magnitude. However, their measurements were subject to two uncorrected sources of error: i) mathematical coupling during cephalometric superimposition; and ii) foreshortening and angular change of maxillary implant line in the sagittal plane due to maxillary rotation in the transverse plane. These errors could possibly lead to an overestimation of the correlation with MGR and an underestimation of the magnitude of MxGR.
PRIMARY AIM: To examine the relationship between foreshortening of the maxillary implant line during sagittal growth rotation and the magnitude of transverse mutual rotation (TMR). SECONDARY AIM: To examine the association between the magnitude and direction of MxGR and MGR, with and without the mathematical coupling induced by shared errors of superimposition.
MATERIAL: Serial lateral and frontal cephalometric radiographs of 17 untreated subjects from the Mathews Growth Study (University of California), each having a minimum of three stable tantalum implant markers in each maxilla and in the left hemi-mandible.

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METHOD: Six linear and angular variables were measured after superimposing earlier (mean 7.79 yrs; SD 1.02) and later (mean 13.92 yrs; SD 2.03) radiographs of each subject using Adobe Photoshop™. Descriptive statistics and correlation analyses were performed to assess the degree of association between variables.
RESULTS:
1. Foreshortening of the projected length of maxillary implant line was strongly correlated with increasing TMR. Consequently, previous studies potentially underestimated MxGR.
2. TMR did not correlate with the sagittal rotations of either jaw. Treatment-induced changes in TMR may minimally impact MxGR.
3. MxGR correlated with MGR using a single act of superimposition, but not with two independent superimpositions. The difference between MxGR and MGR is less than previously reported, suggesting equal clinical relevance.
CONCLUSION/IMPLICATIONS: This investigation underscores the importance of re-evaluating MxGR and addressing known methodological errors. MxGR is of greater magnitude and probably of greater clinical relevance than previously thought.

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SP333 CARIES INFILTRATION OF WHITE SPOT LESIONS DURING MULTIBRACKET TREATMENT. A RANDOMIZED CLINICAL TRIAL

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AIM: Fixed orthodontic treatment must often be discontinued because white spot lesions (WSL) develop around multibracket appliances (MBA). This is mainly due to insufficient oral hygiene and behavioural risk factors. "Icon vestibular" caries infiltrant and topical fluoride applications have been used to arrest non-cavitated enamel caries. The aim of this study was to evaluate the efficacy of early treatment of WSL with "Icon vestibular" to stop caries progression and improve the aesthetic outcome, compared to a standard treatment with a fluoride varnish.
METHODS: The study included 116 anterior teeth from 36 patients aged 12-17 years with at least one WSL during an active MBA orthodontic treatment. A visual examination system (ICDAS) was used to assess the WSL. Only patients with ICDAS scores 1 or 2 were randomly assigned to one of the treatment methods, "Icon vestibular" or fluoride. Participants with cavitated lesions, filled or restored teeth, enamel abnormalities, and deciduous teeth were excluded. Standardized digital images were obtained before and after infiltration/fluoridation using a DSLR camera and a matching polarisation filter. A grey reference card was used for colour standardization. The colour difference (ΔE) between adjacent healthy enamel and infiltrated/fluoridated WSL was measured before infiltration/fluoridation, after treatment, and six months later. Using a Matlab routine, ΔE00 values were calculated based on CIELAB color space.
RESULTS: The ΔE between the "Icon" treated WSL and the adjacent sound enamel was smaller (T1G2 5.0 ±1.4) than in the fluoride group (T1G1 8.4 ±3.2). Caries infiltration significantly improved the aesthetic appearance of demineralized areas around the brackets ($p < 0.001$). The study showed good colour assimilation from infiltrated WSL to adjacent sound enamel. The aesthetic outcome remained satisfactory six months after the infiltrant application (T5G2 5.2 ±1.6).
CONCLUSIONS: Caries infiltration is an alternative intervention to fluoridation for preventing the progression of enamel lesions. Microinvasive WSL infiltration management during orthodontic treatment was found to be better compared to topical fluoridation in not only arresting the enamel lesions, but also significantly improving the aesthetic appearance of demineralized regions around the brackets. The aesthetic outcome of resin infiltration maintained adequate durability over a six-month observation time.

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SP334 DATA TRANSPARENCY AND GOOD RESEARCH PRACTICES AMONG CLINICAL TRIALS PUBLISHED IN ORTHODONTICS

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BACKGROUND/AIMS: The appropriate delivery of evidence-based dentistry is reliant on the methodological rigor, comprehensive reporting, and transparency of clinical trials. These elements are fundamental for evaluating the internal validity of individual studies and for the effective synthesis of multiple studies into a single estimate. The present cross-sectional bibliographical study aimed to assess data transparency and key methodological characteristics of clinical trials published in orthodontics.
MATERIAL/METHODS: All clinical trials assessing orthodontic interventions published between 2019-2021 were identified through literature searches. Data extraction was performed in duplicate by two authors and covered study demographics, transparency characteristics, and reporting quality of included trials. Statistical analysis included logistic regression of Odds Ratios (OR) with 95% Confidence Intervals (CI) at alpha=5%.
RESULTS: The included 254 trials originated from 41 countries, with the greatest contributing countries being India (11.5%), Brazil (9.1%), and Turkey (8.3%), and the greatest contributing continents being Asia (44.3%) and Europe (39.9%). Journals receiving the most clinical trials were the Eur J Orthod (20.2%), AJO-DO (10.7%), Int Orthod (7.1%), and Orthod Craniofac Res (4.0%). Research transparency was very poor, with only 2.4% openly providing their full dataset, 40.1% describing a research protocol, 18.3% involving a statistician, and 55.8% blinding the outcome assessor. Having a research protocol was significantly ($P<0.05$) associated with improved reporting of funding (OR=1.97; 95%-CI=1.02-3.81), sample size calculation provision (OR=2.07; 95%-CI=1.10-3.87), reporting of randomization (OR=3.12; 95%-CI=1.31-7.45) or outcome assessor blinding (OR=1.61; 95%-CI=1.00-2.70), and provision of a flow diagram (OR=3.41; 95%-CI=1.88-6.17). Trials published in the Eur J Orthod were more transparently reporting funding (OR=3.05; 95%-CI=1.15-8.10), having a protocol (OR=3.75; 95%-CI=1.97-7.13), having a sample size calculation (OR=2.85; 95%-CI=1.15-7.06), and being registered (OR=3.81; 95%-CI=1.73-8.39).
CONCLUSIONS: Good research practices of open data provision and transparent reporting were very poor among orthodontic trials. Although trials published in the European Journal of Orthodontics demonstrated relatively better reporting standards, there is a compelling need for broader initiatives to enhance the credibility and reliability of research in the orthodontic field

Abstract citation ID: cjae081.627
SP335 LEVELLING EFFECTIVENESS OF CLEAR ALIGNERS AND RELATED MAXILLOFACIAL FACTORS IN PATIENTS WITH A DEEP OVERBITE: A MULTIPLE REGRESSION ANALYSIS

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INTRODUCTION: This study assessed the effectiveness of clear aligners in levelling the curve of Spee (COS) and the influence of various maxillofacial indices, to guide treatment in patients with a deep overbite.
METHODS: Forty-two patients underwent phased treatment with clear aligners for both arches. Intraoral scanning to create digital dental models was performed before and after treatment, predicted outcomes were obtained, and dental cast measurements were made. Lateral cephalometric and panoramic radiographs were obtained and analyzed. The predicted amount of tooth movement was compared with that achieved after treatment. Associations between levelling effectiveness and clinical indicators were assessed, and prediction equations for levelling effectiveness were established.
RESULTS: Clear aligners reduced COS depth. However, the degree of levelling effectiveness was related to the vertical skeletal pattern, angulation of the mandibular incisors to the mandibular plane, axial inclination of the mandibular anterior teeth, and pretreatment COS depth. No significant relationships were found between levelling effectiveness and other maxillofacial variables. The regression model explained 88.5% of the variance in levelling effectiveness.
CONCLUSION: Clear aligner levelling effectiveness was positively related to the Frankfort-mandibular plane angle, pre-treatment COS depth, and incisor-mandibular plane angle. The parallelism of the mandibular incisors was negatively associated with levelling effectiveness.

Abstract citation ID: cjae081.628
SP336 THE ROLE OF AUTOPHAGY ON AGING CHANGES OF OSTEOGENESIS ON TENSION SIDE DURING ORTHODONTIC TOOTH MOVEMENT

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OBJECTIVES: Increasing number of adults are willing to seek orthodontic treatment nowadays, but treatment duration for them is commonly longer. Studies have shown that autophagy is involved in regulating orthodontic tooth movement and plays an important role in aging-related changes. Therefore, we aimed to explore the role of autophagy on aging changes of osteogenesis on tension side during orthodontic tooth movement by establishing a rat orthodontic tooth movement model.
METHODS: We selected 6-week-old and 8-month-old male Sprague-Dawley rats to represent adolescents and adults and measured the tooth movement distance, alveolar crest height loss by micro-computed tomography and the expression level of osteogenesis, autophagy and aging factors on tension side of periodontal membrane of left upper first molar during orthodontic tooth movement by immunohistochemistry and immunofluorescence.
RESULTS: We found that tooth movement in the adult rats was slower and the alveolar bone crest height was lower. Aging factor levels in the periodontal membrane were higher in adult rats and that autophagy factor levels were lower. The levels of osteogenesis factors were lower on the tension side in adult rats comparing to the adolescent rats.
CONCLUSIONS: Autophagy may play a substantial role on aging changes of osteogenesis on tension side during orthodontic tooth movement
KEYWORDS: Tooth movement; Bone remodeling; Autophagy; Aging

Abstract citation ID: cjae081.629
SP337 DEVELOPMENT OF AN INTRAORAL SpO2 MEASUREMENT METHOD USING A MOUTHPIECE DEVICE

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AIM: SpO2 is an essential vital indicator of the health of cells and tissues. Measurement of SpO2 is widely used in the management of general health. However, current measurement methods are subject to problems such as time delays and light interference. To date, the measurement of SpO2 in the oral cavity has not been investigated. In this study, we focused on the oral cavity as a measurement site and the development of measurement methods for SpO2 in the oral cavity.
SUBJECTS AND METHOD: The optimal measurement points and optimal pressure for measurement in the oral cavity were verified using perfusion index (PI) values. To examine the distinct characteristics of SpO2 values in the oral cavity, a mouthpiece-type SpO2 measurement device was placed in the oral cavity of 14 subjects, and changes in SpO2 in the oral cavity and fingers were compared and verified by instructing them to hold their breath (Approval No.: 21-005-A). Statistical analysis was performed using Wilcoxon's signed rank test.
RESULTS: The highest PI values were found in the palatal gingiva of the maxillary canine teeth, and higher PI values were found at pressures ranging from 0.3 to 0.8 N. It was found that changes in SpO2 values could be detected in the oral cavity approximately 7 seconds earlier than in the fingers.
CONCLUSIONS: Because the oral cavity is closer to the heart than the extremities of the body, the time delay for changes in SpO2 values is expected to be small. Additionally, because the oral cavity is dark, it is a suitable area for SpO2 measurement as it is less affected by visible light. Furthermore, the blood flow in the oral mucosa is higher than in the skin, enabling values and changes to be measured that mirror the deep blood oxygen concentration of the living body more accurately than conventional methods. This study provides strong evidence for the usefulness of the oral cavity as a biological sensing area.

Abstract citation ID: cjae081.630
SP338 INFLUENCES OF IMAGE PROCESSING ON THE CLASSIFICATION OF CERVICAL VERTEBRAL MORPHOLOGY USING DEEP LEARNING

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AIM: This study aimed to investigate whether image processing influences the classification of cervical vertebral morphology by using a deep learning system.
MATERIALS AND METHODS: Seven hundred ninety-nine cephalometric radiographs obtained for the diagnosis of orthodontic conditions were used in the present study. The images were visually classified into six groups (CS1, CS2, CS3, CS4, CS5, and CS6) based on the cervical vertebral maturation (CVM) by an orthodontic specialist. To automatically classify CVM using a deep learning program, 641 and 158 images were defined as the learning and test data, respectively. A rectangular image, including the second, third, and fourth cervical vertebrae, was cropped. The cropped image was defined as a standard image. The density of the standard image decreased, and it was defined as a low-density image. The areas inside the second, third and fourth cervical vertebrae were painted yellow and assigned to "label." The labels composited with the standard image and the low-density image were defined as a standard labeling image and a low-density labeling image, respectively. The label composited with the black background image was defined as a two-color labeling image. Alex Net Neural Network Console architectures (Sony, Tokyo, Japan) were used to classify the images into six groups based on the CVM. The accuracy of classification using deep learning was evaluated for each image.
RESULTS: The average accuracies of the classification of CVM using standard and low-density images were 46.8% and 48.7%, respectively. The average accuracies of the classification of CVM using the standard labeling image, low-density labeling image, and two-color labeling image were 82.3%, 81.0%, and 88.0%, respectively.
CONCLUSIONS: The deep learning system using the two-color labeled image showed the highest accuracy in classifying images into six groups based on cervical vertebral maturation.

Abstract citation ID: cjae081.631
SP339 CHANGES OF ALVEOLAR BONE STRUCTURAL CHARACTERISTICS DURING TOOTH MOVEMENT AFTER RIDGE PRESERVATION IN RATS

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AIM: It is common to move teeth into extracted spaces in orthodontic treatment. However, many cases have been reported in which orthodontic treatment after tooth extraction is difficult due to alveolar bone resorption or root resorption of the moving tooth. On the other hand, one method to prevent alveolar bone resorption is Ridge Preservation (RP), in which a bone graft material is placed into the socket immediately after extraction. Among these, OCP/Col is attracting attention as a bone graft material that speeds up the healing of extraction sockets and at the same time inhibits alveolar bone resorption. Therefore, the aim of this study was to clarify the extraction socket and surrounding bone structural characteristics after RP using OCP/Col as a bone graft material, and to determine whether it is useful for orthodontic treatment with tooth extraction.
METHODS: 4-week-old rats (n=72) were randomly assigned to 3 groups to receive OCP/Col (Toyobo), β-TCP(Osferion, Olympus, Tokyo, Japan)or no graft (CTL), after the extraction of the mandibular right first molar. Immediately after extraction, the mandibular right second molar was moved to the extraction site. After 7, 14, 21, and 28 days of tooth movement, the animals were sacrificed, and the mandible was harvested. The amount and speed of second molar movement were evaluated using μ-CT. The alveolar bone surrounding second molar was evaluated using histological techniques, including H-E staining.
RESULTS: The amount of tooth movement in the OCP/Col group reached a maximum between 14 and 21 days after tooth movement and was significantly higher than that in the CTL group and β-TCP group. This suggests that the OCP/Col group had smooth tooth movement due to newly bone formation with an abundant vascular network. Root resorption was not observed in all groups.
CONCLUSIONS: The tooth movement into the extraction socket with OCP/Col loaded was more effective than the CTL and β-TCP groups, and there was no root resorption of the moved tooth.

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SP340 DECIPHERING THE SINGLE-CELL RNA LANDSCAPE OF THE IL-17A-MODULATED IMMUNE MICROENVIRONMENT IN PORPHYROMONAS GINGIVALIS-INDUCED PERIODONTITIS

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BACKGROUND: Our previous study suggests a protective role for IL-17A in live P. gingivalis-induced periodontitis. To gain a more extensive understanding of the complex immune cell interactions and the role of IL-17A, we adopted single-cell RNA sequencing (scRNA-seq) for analysis of the periodontium in a mouse model of live P. gingivalis-induced periodontitis in this study.
METHODS: Periodontitis was established by placing silk ligatures infiltrated with live P. gingivalis (ATCC 33277) on the bilateral upper molars of wild-type (WT) and IL-17A knockout (KO) mice for 14 days. Periodontal tissues were harvested and processed for scRNA-seq. We performed scRNA-seq analysis, specifically targeting the diversity of immune cell subsets. The cellular proportions and the list of marker genes of each immune cell subset in mice were also obtained.

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We identified several unique cellular subtypes and genes with differential expression. Gene set variation analysis (GSVA) was adopted for pathway analysis, focusing on 50 hallmark pathways and metabolic pathways. Monocle3 was used for pseudotime analysis, exploring the potential differentiation trajectories of PMN and B cell clusters.
RESULTS: A total of 44,228 cells were analysed, revealing six major cell groups and 11 immune cell subgroups, with the most dominant being PMNs, B cells, macrophages, and T cells. The inflamed periodontium of KO mice exhibited a notable shift in the relative abundance of the PMN and B cell populations, characterised by a decrease in PMNs and an increase in B cells relative to those in WT mice. In the case of PMNs, KO mice with periodontitis exhibited enhanced angiogenesis, tissue damage, cell proliferation, Notch signalling, and epithelial–mesenchymal transition, whereas WT mice with periodontitis had enhanced IL-6/JAK/STAT3 signalling and a greater interferon-alpha response.
CONCLUSIONS: We observed a significant shift in the cellular composition of the inflamed periodontium in the IL-17A-deficient mice, indicating a crucial role of IL-17A in shaping the immune response in live P. gingivalis-induced periodontitis. This work fills a crucial knowledge gap in our understanding of the role of IL-17A in the regulation of immune cellular responses in P. gingivalis-induced periodontitis, offering novel perspectives into the pathophysiology of periodontitis for future research and potential therapeutic strategies.

Abstract citation ID: cjae081.633
SP341 SURFACE WEAR OF ATTACHMENTS IN PATIENTS DURING CLEAR ALIGNER THERAPY

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BACKGROUND: This prospective clinical study aimed to quantitatively evaluate the surface wear of attachments and investigate the associated risk factors.
METHODS: Participants were recruited from the population of patients who received clear aligner therapy from October to December 2022. Intraoral scanning was performed on eligible participants before treatment (T0), immediately after initial bonding of attachments (T1), and at 2 months (T2), 4 months (T3), 6 months (T4), and 8 months (T5) after starting treatment. The attachment volume was measured using superimposed digitized models. The Kruskal–Wallis test was performed to compare data between multiple groups. Multiple linear regression analyses were performed to evaluate risk factors for the volume of attachment wear.
RESULTS: A total of 47 patients with 617 attachments were included. As treatment time increased, the attachment volume decreased significantly ($P = 0.003$). The initial attachment volume was positively related to the volume of attachment wear ($\beta = 0.527$, $P < 0.001$). The volume of attachment wear was significantly greater in females than in males ($\beta = 0.147$, $P = 0.020$) and in optimized attachments than in conventional attachments ($\beta = 0.308$, $P < 0.001$).
CONCLUSIONS: The volume of attachment wear increased gradually with treatment time. Sex, attachment type, and initial attachment volume were risk factors for the volume of attachment wear.
KEYWORDS: Wear, Attachment, Clear aligner, Intraoral scanning, Superimposition

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SP342 ORTHODONTIC AND SURGICAL ASPECTS OF RETENTION IN PERMANENT SECOND MOLARS

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The eruption process can be disturbed due to various factors such as mechanical obstacles (odontomas), reduced arch space, ankylosis or third molar position. The complete failure of eruption leads to impaction.
The aim of the pilot study was to evaluate the clinical manifestation and treatment of impacted second molars.
MATERIAL: The study included 13 patients (with full documentation and informed consent) treated by the team during the last one year with impacted lower and upper second molars (MM2, MM2) on age from 12 to 19 years.
RESULTS: Impacted MM2 were found in 2(15.4%) patients with medial inclination, which were displaced from their eruption path by third molar pressure. MM2 was diagnosed in 11(84.6%) patients, in 6 of them unilaterally and in 5 of them bilaterally. In two (18.2% of MM2) patients with unilateral presentation, there was ankyloses of the first, second and third molars, while in all the others, it due to a medial inclination caused by the position of the third molar germ. In the patients with ankyloses, a compactosteotomy, bone replacement and prosthetic restoration of the lost molars were performed. In 2(18.2%) patients aged up to 14 years after germectomy of MM3, a spontaneous breakthrough of MM2 was observed. In 4(36.4%) patients (with unilateral and bilateral manifestation) aged 17-19 years, the antagonist had grown and upraighting of MM2 was not possible before levelling the molars in the maxilla. Two of these patients had previous orthodontic treatment that was completed without involving the second molars in occlusion. In 3(27.3%) of the patients after germectomy, orthodontic treatment was performed for upraighting and vertical traction of MM2. For anhorage, a custom digitally printed grid was used that engages the molars on both sides and ends distally in the retromolar space with a traction supporting point. Except for ankylosed MM2, all the impacted second molars were introduced into the dental arch after germectomy of the third molars.
CONCLUSION: The early evaluation for the second molars' retention may decrease the severity of the problem. The retention of these teeth aggravates the accompanying orthodontic deformation and often involves additional surgical intervention.

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SP343 COMPARISON OF THE ACCURACY OF MEASUREMENTS MADE WITH DIFFERENT ORTHODONTIC SOFTWARE

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Intraoral scanning currently creates virtual models, stored in STL format and can be processed and measured biometric parameters with different orthodontic software. The diagnosis of the patient is possible immediately, but the question of its reliability arises when using different scanners and software.
OBJECTIVE: The present study compares the accuracy of measurements made with different orthodontic software - Planmeca Romexis 3D Ortho studio and Medit Design app 2.1.4, Measurement Mode.
MATERIALS: With the two orthodontic panels, 259 identical measurements were made on 3D models of patients (with full documentation and informed consent) treated over a period of 3 years. Inclusion criteria is: models in STL format with high quality, without double images and missing sections. Biometric measurements of the perimeter of the upper dental arch were made by the same operator, using the same methodology and identical points. Data were entered and processed with the statistical packages IBM SPSS Statistics 25.0. and MedCalc Version 19.6.3.
RESULTS: The mean values of the measured upper dental arch perimeter with Planmeca Ortho Studio was 44.87 mm with a standard deviation of 3.10 mm, and with Medit 44.77 mm with a standard deviation of 3.12 mm. There is a significant difference between the values measured with the two scanners. A statistically significantly higher mean value was found for those measured with the Emerald scanner.
A variation analysis of the results obtained with the two software was made, which shows that the range (interval) of the difference values in the measurements of the two scanners is 7.41 mm, and the average value is 0.1 mm, and the standard deviation value is 0.69 mm.
A Bland-Altman graphical analysis of the agreement of the measurements of the two scanners was performed, which found that the arithmetic mean of the differences in the measurements (Mean) was close to zero, consequently there is agreement between the results achieved with the two scanners.
CONCLUSION: The present study proves that there is a significant difference between the measurements made with the two scanners, but it is less than 1 mm and is of no value for clinical practice.

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SP344 ANTERIOR DENTAL AESTHETICS IN SUBJECTS WITH STAGE III AND IV PERIODONTITIS

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BACKGROUND: The demand for orthodontic treatment in subjects with stage IV periodontitis is increasing, however literature on anterior dental aesthetics is scarce.
AIM: The aim of the present study was to evaluate anterior dental aesthetics (ADE) in subjects with stage III and IV periodontitis.
METHODS: ADE was assessed in 120 subjects ≥30 years with stage III and IV periodontitis during clinical examination. Intraoral and extraoral photographs of anterior teeth (AT) were used for additional evaluation. Qualitative evaluation

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of anterior dental aesthetics was assessed using 3 scores: 1) good looking AT; 2) visible spacing/crowding; 3) AT flaring or overall advanced unesthetic smile.
RESULTS: Stage IV periodontitis was found in 39.2% and stage III in 60.8% of subjects. Gingival AT inflammation was observed in 63.3% of subjects (similar both periodontitis stages (PTS); p>0.05). Gingival retraction/exposed roots were found in 65.8% maxillary AT (80.9% stage IV, 56.2% stage III periodontitis) (p<0.01). Lack of maxillary papilla due to gingival retraction was observed in 34.2%, due to spacing/flaring of AT in 55.8% of subjects.
Discoloration of maxillary AT was observed in 45.8%, microcracks in 50% of subjects (similar both PTS; p>0.05). Maxillary central line shift >2 mm was found in 45% (50.7% stage III, 36.2% stage IV periodontitis) and missing incisor in 5.8% of subjects (all stage IV periodontitis) (p<0.05). Proclination of AT was found in 51.7%, visible prosthetic crowns/restorations of AT in 82.5%, both significantly more in stage IV periodontitis subjects (p<0.05).
Isolated visible spacing of maxillary AT was found in 27.4% stage III and 38.3% stage IV, AT flaring in 21.9% stage III and 27.7% stage IV periodontitis subjects (p>0.05). Extrusion of maxillary AT was diagnosed in 40% (similar both PTS; p>0.05). Crowding was found in 32.5% of maxillary AT (similar both PTS; p>0.05). 69.9% stage III, 25.5% stage IV periodontitis subjects had good looking AT, 17.8% stage III, 34.1% stage IV had visible spacing/crowding and 12.3% stage III, 40.4% stage IV periodontitis subjects had AT flaring or overall advanced unaesthetic smile (p<0.01).
CONCLUSIONS: Deterioration of ADE was observed significantly more in subjects with stage IV (74.5%) compared with stage III (30.1%) periodontitis.

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SP345 RAPID PALATAL EXPANDER THERAPY AND SLEEP DISORDERS: CLINICAL AND RADIOGRAPHIC PARAMETERS FOR INTERCEPTIVE THERAPY OF OBSTRUCTIVE SLEEP APNEA SYNDROME

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AIM: The current study involves the evaluation of the change in clinical and cephalometric respiratory parameters as well as a questionnaire before and after Rapid Palatal Expander (ERP) expected during orthodontic therapy in growing patients with diagnostic suspicion of sleep-related breathing disorders.
The aim of the work is to consider a possible use of these parameters as appropriate and accurate indices to measure the improvement of intercepted sleep disorders and possibly reduce the probability of their future development in adulthood.
MATERIALS AND METHODS: 40 patients from the orthodontics department of the Rho Hospital, aged between 6 and 11 years, who needed ERP therapy and who showed suspected sleep breathing disorders, were included in the study. For each, Mallampati Index and Tonsil Grading, Cephalometric Parameters including PAS (posterior airway space), MP-H, SNP-P, the hyomental distance (HMD) were recorded and a questionnaire, was given to the parents, regarding the child's sleep habits and any systemic, neurocognitive and behavioural consequences related to sleep disorders at three different time points: T0, before treatment; T1, after the active expansion phase; T2 at the end of treatment.
RESULTS: Mallamapati score I was found in 15% of patients, score II in 27%, score III in 37%, score IV in 21%. The presence of sleep disorders reported by parents was found in 14% of patients.
At T1 a significant improvement was found: 72% of score III evolved in score II, 10% of score III became score I and the questionnaires showed sleep disorders disappear in almost all cases.
LIMITATIONS: The results are partial and the sample size is small, as the study is still in course.
CONCLUSIONS: The improvement of these parameters leads us to argue that these can be considered valid tools not only in the early diagnosis of clinical cases that can evolve into sleep disorders in orthodontic patients, but that they could also replace in some cases the execution of more investigative and expensive examinations such as polysomnography, which is not always easy to administer in young patients and difficult to prescribe in local health structures. This thesis needs further investigation to be definitively confirmed.

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SP346 COMPARISON OF STRESS RELAXATION PROPERTIES OF THERMOPLASTIC MATERIALS WITH DIFFERENT COMPOSITIONS UNDER SIMULATED ORAL ENVIRONMENT

Prof Ning Zhang[1]; [1]*Beijing Stomatological Hospital, Capital Medical University*

OBJECTIVE: To study the influence of oral environment and composition on the stress relaxation properties of thermoplastic materials, and to provide a reference for selecting appropriate thermoplastic materials to make invisible appliances.
MATERIALS AND METHODS: The selection includes 5 brands of thermoplastic materials that are commonly available on the market, whose compositions are TPU, PETG, and PCTG. The experimental group was divided into a non-water bath group and a water bath group. The non-water bath group was tested for 3 hours of stress relaxation in a room-temperature atmosphere. The water bath group was aged for 24 hours and then tested for 3 hours of stress relaxation under a simulated oral environment. Compared the initial stress, residual stress, and stress relaxation rate of materials.
RESULTS: Compared with PETG and PCTG, TPU has a faster stress relaxation rate (P<0.01) and a larger initial stress at room temperature in the atmosphere (P<0.01). Compared with TPU and PETG, PCTG has a larger residual stress (P<0.01) and a slower stress relaxation rate (P<0.01) under a simulated oral environment. Under a simulated oral environment, the initial stress and residual stress of the 5 brands of thermoplastic materials were all reduced (P<0.05 and P<0.01) and the stress relaxation rate of TPU and PETG was accelerated (P<0.05), while there was no significant change in the stress relaxation rate of PCTG (P> 0.05).
CONCLUSION: Different components have different mechanical properties. The simulated oral environment will decrease the initial stress and residual stress of thermoplastic materials.
KEYWORDS: thermoplastic materials, invisible appliance, mechanical properties, stress relaxation, simulated oral environment

Abstract citation ID: cjae081.639
SP347 BONE TISSUES EVALUATION FOR SKELETAL ANCHORAGE PLANNING IN ORTHODONTIC TREATMENT OF PERIODONTAL PATIENTS

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AIM: The aim of this study was to evaluate the thickness and density of the alveolar bones in periodontal patients which require orthodontic treatment, in order to individually adapt the choice of the temporary anchorage device and the most favorable insertion area.
MATERIAL AND METHODS: 48 patients from the Department of Orthodontics of State University of Medicine and Pharmacy of Republic of Moldova were studied. A cross-sectional study was designed, presenting two subgroups: orthodontic patients with periodontal bone loss, stage 2-3 (n=24) and with healthy periodontal status (n=24). All the patients were referred to a private radiology center in Chisinau for CBCT imaging. The bone density and thickness in the crest and middle areas of the lateral maxillary teeth and the zygomatic area was measured and the difference between the two groups was investigated. The CBCT evaluation was performed with Planmeca ProMax 3D Max (Planmeca) by Planmeca Romexis 5.3.4 software, with 200 µm Voxel size and Fov 90 × 60 mm. SPSS 21 software and student's t-tests was used for the analysing the obtained results.
RESULTS: In this study, two groups of 48 patients with a mean age of 39.65 ± 2.4 years with periodontal disease with bone loss and with healthy periodontal tissues were examined. The main inclusion criteria in study was the orthodontic treatment with an improved anchorage biomechanics need. It was found that the mean bone thickness of the lateral maxillary alveolar bone in the non-periodontal group (6.65 ± 0.25 mm) was higher than in the periodontal group (4.56 ± 0.20 mm), with a statistically significant difference (p <0.05). Also, the bone density showed a significant difference between the 2 groups, the perio patients presenting a higher porosity. In the infrazygomatic crest, there were no significant differences in bone density, but the thickness of the crest was decreased in perio group.
CONCLUSIONS: Bone thickness and density is an objective criterion for evaluating the condition of the skeletal areas selected for anchorage devices insertion. The infrazygomatic crest shows more stable parameters, therefore it can be the election area for a TAD in orthodontic treatment of the periodontal patients.

Abstract citation ID: cjae081.640
SP348 EFFECTIVENESS OF EARLY CLASS III TREATMENT APPROACHES: A SYSTEMATIC REVIEW AND NETWORK META-ANALYSIS

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AIM: To assess the effectiveness of various treatment approaches used for the early correction of Class III malocclusion, by means of a network meta-analysis (NMA).

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MATERIALS AND METHODS: Only randomized controlled trials (RCTs) and non-RCTs reporting on angular lateral cephalometric variables regarding early Class III treatment were considered eligible. Sixteen electronic databases were searched up to July 2022, complemented by manual searches. Mean differences and the respective 95% confidence intervals were calculated. Random-effects NMA was performed according to a graph theoretical approach within a frequentist framework, using untreated Class III patients as common comparators, identifying thus the "pure" effects of each used approach.
RESULTS: Thirteen non-RCTs were included in current NMA, assessing 698 subjects (467 treated Class III patients and 231 matched untreated controls) reporting on outcomes after 8-36 months of treatment. Based on the NMA, the use of facemask without rapid palatal expansion was found most effective in improving Class III malocclusion (as interpreted by the increase of the ANB angle), compared to all included appliances, especially through maxillary advancement, as indicated by the respective increase of the SNA angle. Functional appliances were found more effective in producing slight mandibular retrusion according to the pertinent reduction of the SNB angle. Regarding the vertical plane, both facemask and functional appliances proved to be effective in controlling the mandibular plane angle, while the SEC III approach was the most effective regarding the palatal - mandibular plane angle. Furthermore, functional appliance treatment led to significant flaring of the upper incisors and retroclination of the lower incisors, which are both considered as undesirable effects. In contrast, these unwanted tooth movements were minimal with facemask treatment.
CONCLUSIONS: The use of facemask without rapid palatal expansion seems to be quite effective for early Class III treatment due to its favourable effects regarding the maxillary advancement and the restriction of unwanted tooth movements. Even though functional appliances had more pronounced effects of the mandible, they also produced more evident upper incisor proclination and lower incisor retroclination. Finally, the SEC III approach was found more efficient in controlling the vertical plane.

Abstract citation ID: cjae081.641
SP349 EFFECTIVENESS OF CLASS II DISTALIZATION APPLIANCES SUPPORTED BY SKELETAL ANCHORAGE: A SYSTEMATIC REVIEW AND NETWORK META-ANALYSIS

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AIM: To assess the effectiveness of Class II distalization appliances supported by skeletal anchorage, by means of a network meta-analysis (NMA) and according to pre-specified biomechanical principles.
MATERIALS AND METHODS: Only randomized controlled trials (RCTs) or non-RCTs providing angular measurements on lateral cephalometric radiographs assessing maxillary molar distalization were included. A systematic search of 16 electronic databases up to October 2023 was performed. The various distalizers were classified according to the following criteria: type of anchorage (skeletal, dentoalveolar, hybrid and extraoral), location of anchorage elements (palatal, buccal), distalization force vector (at the band level, close to molar center of resistance), and side where the distalization force was applied (buccal, palatal, both). Mean differences and the respective 95% confidence intervals were calculated. Random-effects NMA was performed according to a graph theoretical approach within a frequentist framework.
RESULTS: In current NMA, 14 non-RCTs were included, assessing 522 subjects reporting on outcomes after 4-10 months of distalization. According to the NMA, the appliances causing the least distal tipping of both first and second upper molars are the ones which produce a force vector close to the molar centre of resistance, regardless of the type of anchorage or the location of the anchorage devices. Regarding the premolar inclination, when these were incorporated in the anchorage unit (hybrid or dentopalatal anchorage), they were significantly mesially tipped (which is a considered as anchorage loss), compared to the skeletal anchorage devices where the premolars were distally tipped due to the pull of the transseptal fibres. Furthermore, flaring of the incisors was significantly more evident with the dentopalatal distalizers, compared to skeletal and hybrid ones. Regarding the skeletal variables, the produced changes were minimal, and no differences could be found between the various distalizers.
CONCLUSIONS: It seems that in Class II distalization treatment, the type of anchorage plays an important role on the anchorage loss of the anterior teeth, while the type of distalization movement of the molars depends only on the applied biomechanics, i.e., the relation of the distalization force vector with the centre of resistance of molars. Furthermore, the produced pertinent skeletal effects post-distalization are minimal.

Abstract citation ID: cjae081.642
SP350 EFFECTIVENESS OF MANDIBULAR ADVANCEMENT WITH INVISALIGN IN DIFFERENT AGE GROUPS: RETROSPECTIVE CEPHALOMETRIC COHORT STUDY

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OBJECTIVE: The aim of this study was to investigate the effectiveness of the Invisalign mandibular advancement (MA) in treating skeletal Class II malocclusions, across different age groups.
METHOD: The study included a total of 200 patients with skeletal Class II malocclusion. Four groups of patients of specific ages (11, 12, 13, and 14 years) were selected, with each group comprising 50 patients (25 males and 25 females). The primary selection criteria were healthy individuals, SNB<78, ANB>4, no prior orthodontic treatment, no history of extraction, and Cervical vertebral maturation stage (CVM) <CS5. Pre and post-treatment final lateral cephalograms from patients treated with MA were traced by a single expert operator who was blind to the groups. To ensure accuracy, twenty cephalograms were randomly selected and traced by another operator to check the operator's reliability and reproducibility. Intra-operator reliability was satisfactory. The study used descriptive statistics to calculate the means and differences for each cephalometric component, as well as patient data such as age, treatment time, and aligner number. To evaluate the differences between measurements taken from patients before treatment (T1) and after final treatment (T2) with the MA feature, an ANOVA test was performed to check the variability between all four groups.
RESULTS: The statistical analysis revealed significant differences between T1 and T2, indicating successful Class II correction. Various parameters, such as ANB (decreased 2.8°, 2.3°, 1.6°, and 0.9° from 11-14 years respectively), WITS appraisal (decreased 0.81, 0.72, 0.62, 0.46 respectively), facial convexity (decreased 2.1°, 1.86°, 1.51°, 0.97° respectively), and mandibular length (increased 1.92, 1.64, 1.28, 1.07 respectively), showed significant differences (P<0.05) among different groups. The study showed that skeletal changes decreased as patients aged from 11 to 14 years old, with more dentoalveolar correction and less skeletal correction observed. Also, the younger patients required a significantly longer treatment duration due to eruption compensations than the older patients.
CONCLUSION: Invisalign treatment with Mandibular Advancement is a good alternative option to conventional Class II appliances. The study suggests that starting Class II correction at an earlier age can lead to better results, as the skeletal effects decrease with increasing patient age.

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SP351 ESTABLISHING CEPHALOMETRIC NORMS FOR THE INDIAN POPULATION USING STEINER'S AND DOWN'S CEPHALOMETRIC ANALYSES

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OBJECTIVE: Current cephalometric norms are based on an untreated Caucasian sample and may not be applicable to other ethnic groups. It is important to establish standard norms for different populations.
AIM: To create cephalometric norms for the Indian population by utilizing Steiner's and Down's analyses, to aid in diagnosis and treatment planning.
METHOD: The sample consisted of 200 adult subjects of Indian ethnic origin (100 males and 100 females). To avoid regional bias, samples were collected from four metropolitan cities: Delhi, Mumbai, Calcutta, and Chennai. The primary inclusion criterion required the participants to have a Class I molar relationship and an aesthetically pleasing profile (assessed through intra-oral and extra-oral profile photographs). All the radiographs were traced digitally using Dolphin (version, 11.95) in random order by a single operator to reduce bias. To check the operator's reliability and reproducibility, fifty cephalograms were randomly selected and retraced by another operator. No differences were determined (P > 0.05), and intra-operator reliability was deemed satisfactory. Steiner's and Down's cephalometric analyses were utilized to compare cephalograms for each participant, calculating the means and standard deviations for all variables. Unpaired t-tests were used to determine differences in variable means between the Indian and Caucasian populations. The probability value (P value) of 0.05 was considered a statistically significant level.
RESULTS: Significant variations in specific parameters of Steiner's and Down's cephalometric analyses were found between Indian and Caucasian populations. Steiner's analysis showed a significant increase (P<0.05) in SNA (84°), SNB (82°), SND (79°), U1 to NA (8mm), U1 to NA (28°), L1 to NB (7mm), L1 to NB (28°),

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and reduced Go-Gn to SN (26°), Interincisal angle (122°), Occ plane to SN (12°) while ANB remained constant. Down's analysis exhibited a significant increase (P<0.05) in facial angle (91°), angle of convexity (2°), reduction in Y-axis (54°), Cant of occlusion (4°), and interincisal angle (116°), with no considerable differences in MPA and AB plane relative to the Caucasian norms.
CONCLUSIONS: This study emphasizes the necessity of establishing cephalometric norms for the Indian population. Understanding cephalometric differences in norms for various ethnic groups is critical for customized diagnosis and treatment.

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SP352 EXPOSURE OF PALATALLY IMPACTED CANINES IN CHILDREN-A RANDOMIZED CONTROLLED PILOT TRIAL ON TWO CLOSED SURGICAL TECHNIQUES

Dr Katja Hashemi Elses, Dr Krister Bjerklin, Dr Ann Marie Roos- Jansåker, Dr Mikael Sonesson; [1]*ortodontilundAB*

INTRODUCTION: Impacted canines are one of the most time consuming and expensive treatments in orthodontics. Untreated conditions are associated with severe complications.
The prevalence is approximately three percent. Therefore, it is important to identify which treatment techniques reduce treatment time, pain and discomfort for the patients and the costs for the society.
TRIAL DESIGN: A randomized controlled trial
AIM: To evaluate the effectiveness and patient experiences between two traction techniques to treat palatally impacted maxillary canines.
HYPOTHESIS: During closed exposure of impacted canines, the treatment time will be reduced if the chain that creates the traction penetrates the mucosa inferiorly to the crown compared to the conventional method when the chain runs under the mucosa. The patients will experience less pain and discomfort as well.
MATERIAL AND METHODS: Thirty consecutive patients between 9 and 19 years, with palatally impacted or ectopic erupted maxillary canines were recruited at the orthodontic clinics in county of Skåne Sweden. The patients were randomized into two groups Group A) receive a chain running under the flap, entering the cavity at the incision on the crest (control) and Group B) receive a chain penetrating the muco-periosteal flap inferiorly to the crown of the impacted canine (test)
The treatment time for the canine to erupt in the palate as well as the total orthodontic treatment time were investigated. The patient experience of pain and discomfort during treatment were assessed by questionnaires.
RESULTS: Preliminary results indicate less patient discomfort and shorter treatment time in the test group.
Generalizability and limitations: Although a small sample size, the results indicate that one of the novel traction techniques seems to be more effective and create less pain, which will benefit the patients with palatally impacted canines. Treatments were conducted by one operator. Therefore, operator-related errors might not have influenced the results.
CONCLUSION: A modified closed exposure technique with the chain running through the mucosa in the area of the crown seems to reduce treatment time and patient´s pain and discomfort. New studies with larger sample size are needed to verify the results.

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SP353 INVISALIGN CLINCHECK AND PREDICTION OF TOOTH MOVEMENTS: A RESEARCH INVESTIGATION

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OBJECTIVES: Studies evaluating how the planned treatment is related to the actual result are useful for clinicians who remain skeptical regarding clear aligner therapy. The purpose of this study was to provide a comprehensive assessment of the accuracy of tooth movement and dental arch changes (linear and angular) in 21 consecutively treated patients using dual arch Invisalign Therapy by comparing achieved movements with those that were predicted. As a secondary outcome, the effectiveness of different auxiliaries, such as attachments, and interproximal reduction (IPR) was evaluated. The null hypothesis was that there would be no significant difference between the movements that were predicted in Clincheck and the actual tooth movements measured (performance).
METHODS: Digital impressions of 21 subjects treated were taken and analyzed. Patients were analyzed: at T0, before starting therapy and at T1, after 28 weeks of treatment with Invisalign with a 2-weeks change interval. Changes that occurred between T0 and T1 were compared to predicted changes T0-Ts (setup/Clincheck).
RESULTS: In both maxillary and mandibular arches, the two teeth that exhibited the least accurate expression of torque were the central incisors (-1.9°; -0.9° respectively). Tipping was not accurate on maxillary central incisors (-1.9°) and canines (-1.9°), mandibular central incisors (-2.0°), lateral incisors (-1.3°), first premolars (-2.2°), second premolars (-1.8°), first molars (-2.0°). Rotations were under expressed on maxillary lateral incisors (-4.2°), canines (-4.0°), second premolars (-2.0°), on mandibular central incisors (-1.3°), canines (-2.6°), first premolars (-3.0°), second premolars (-2.6°), first molars (-1.8°). The overall angular changes showed a tendency to underperformance (-1.2° on average for torque changes, -1.7° for tipping, -2.3° for rotations). Transverse linear changes were accurate with a significant overperformance on maxillary and mandibular first molars.
LIMITATIONS: Clinician's experience could have some influence in the results of the study in obtaining the predicted movements.
CONCLUSIONS: Torque correction of maxillary central incisors, as well as rotational correction of most of the teeth, showed significant differences between what was planned and what was obtained. The presence of attachments is helpful in enhancing the expression of rotational correction.

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SP354 EFFECTIVENESS OF CLASS III MALOCCLUSION TREATMENT WITH ORTHODONTIC TEMPORARY ANCHORAGE DEVICES VERSUS CONVENTIONAL FACEMASK: A SYSTEMATIC REVIEW AND META-ANALYSIS

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AIM: This study compares the effectiveness of using temporary anchoring devices (TADs) to conventional facemask (CFM) for treatments of children with Class III malocclusion.
METHODS: We searched five electronic databases until May 2022. Only prospective RCTs and non-RCTs studies were included. The risk of bias was assessed using the Cochrane RoB-2 for RCTs and ROBINS-1 for non-RCTs. The main outcomes were the skeletal and dentoalveolar changes after treatment. Meta-analyses were undertaken using Revman, version5.4. A fixed-effects model was used. Quality assessment using Grading of Recommendations Assessment, Development, and Evaluation.
RESULTS: Six trials (five non-RCTs and one RCT) with 266 participants out of a total of 652 studies were included. Four studies employed lateral cephalometry while 2 used 3-dimensional radiographs. None of the included studies was rated an overall low risk of bias. Two studies (91 participants) assessed the impact of maxillary placed TADs in conjunction with facemask (TADs/FM) when compared to CFM. The SNA angle increased significantly in the TADs/FM group MD= 0.92°, 95%CI [0.41, 1.43] and Co-A length MD= 0.82 mm, 95%CI [0.08, 1.57]. One study reported less maxillary incisor proclination in the TADS/FM group. Four studies (175 participants) assessed the impact of the use of bimaxillary TADs in conjunction with inter-arch elastics (TADs/IAEs) when compared to CFM. The TADs/IAE showed a significant increase in the effective Co-A length of the maxilla MD= 2.01 mm, 95%CI [1.26, 2.76]. There was no significant difference in the correction of the reversed overjet however the TADs/IAE showed less maxillary incisors proclination to the maxillary plane MD= -2.25°, 95%CI [-4.14, -0.37] while the mandibular incisors showed less retroclination to the NB plane MD=1.26 mm, 95%CI [0.72, 1.81]. The TADs exhibited a range of problems from limited movement to failure.
CONCLUSIONS: There is low to very low evidence to suggest that the use of TADs in correction of Class III malocclusion in children can cause skeletal and dentoalveolar improvement compared to the conventional face mask however, the clinical significance is considered minimal. More meticulously planned, long-term follow-up RCTs are needed.

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SP355 MINISCREW POSITION CHANGES DURING BONE-BORNE EXPANSION IN YOUNG AND LATE ADOLESCENT PATIENTS: A THREE-DIMENSIONAL ANALYSIS

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AIM: Maxillary expansion in patients at the end of their growth relies on the possibility to use miniscrew supported expanders to apply expansion forces directly to

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the midpalatal suture. Although miniscrews provide a stable anchorage unit, several studies have reported that they do not remain in exactly the same position during treatment. The aim of the present study was to analyze miniscrew position changes after the expansion using bone-borne appliances in late adolescent patients.

METHODS: Nineteen patients (13 females, 6 males), with a mean age of 17.81 (SD=4.66), were treated with a BoneBorne Expander Device. The appliance was designed with 4 miniscrews: 2 in the anterior palatal area, at the third rugae level; 2 in the posterior area. A CBCT and an intraoral scan were obtained before treatment (T0), and then, a second CBCT was obtained after the expansion (T1). Data on peri-suture bone thickness were collected at T0, then the CBCTs were superimposed, and changes between mini-screws position on T0 and T1 were evaluated, both by linear and angular displacements.

RESULTS: Significant longitudinal differences were found in the distance of the head and the tip of miniscrews measured at the occlusal plane, as well as angular changes. Correlations between displacement measurements and peri suture bone thickness and height measurements were found as well.

CONCLUSIONS: While acting as bone anchor units, miniscrews do not remain in the same position during bone-borne expansion. The amount of displacement was related to peri-sutural total bone height and cortical thickness, especially in the anterior area of the naso-frontal maxillary complex.

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