European Journal of Orthodontics, 2025, **47**
https://doi.org/10.1093/ejo/cjaf073
EOS 2025 Abstracts

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Houston, oral and poster abstract presentations from the 100th Congress of the European Orthodontic Society, Krakow, Poland, 2-6 June 2025

The abstracts marked ‡‡‡ have been published previously.
Author designated with underline was the presenting author.

Houston Oral Presentations

Abstract citation ID: cjaf073.001
HO2 HEAD POSTURE BEFORE AND AFTER THE CORRECTION OF UNILATERAL FUNCTIONAL POSTERIOR CROSSBITE IN GROWING CHILDREN: A PROSPECTIVE CONTROLLED CLINICAL TRIAL

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AIMS: To evaluate the impact of functional unilateral posterior crossbite, as well as its correction, on head posture in growing children in comparison to children without crossbite.
MATERIAL AND METHODS: A prospective longitudinal controlled trial included 40 children aged 8-11 years, assigned into a treatment group with functional unilateral posterior crossbite (n=20) and a control group without malocclusion (n=20). Head posture was assessed pre-treatment (T0) and 2.5 years post-treatment (T1) using an inertial measurement unit measuring pitch (forward/backward head inclination), roll (left/right tilting), and yaw (left/right head rotation). Dominant-eye determination was performed using the Battista Della Porta aiming test to evaluate its potential influence on head posture.
RESULTS: No significant differences in head posture were observed between the crossbite and control groups pre- (T0) or post-treatment (T1). Within the crossbite group, an increased pitch post-treatment (p=0.008, with reservation after Bonferroni adjustment) was noted. No significant changes were found in the roll or yaw axes or between groups or across time points. Eye dominance influenced yaw orientation, with right-eye-dominant participants showing higher yaw angles compared to left-eye-dominant participants.
CONCLUSIONS: No difference in head posture with functional unilateral posterior crossbite in respect to non-crossbite individuals. Orthodontic correction did not influence head posture in growing children. The results question a systematic cause-effect relationship between crossbite and head posture, though eye dominance was identified as a factor affecting yaw orientation.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.002
HO3 AN ARTIFICIAL INTELLIGENCE MODEL FOR PREDICTION OF TEMPOROMANDIBULAR JOINT INVOLVEMENT IN SUBJECTS WITH JUVENILE IDIOPATHIC ARTHRITIS

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OBJECTIVE: Juvenile idiopathic arthritis (JIA) often involves the temporomandibular joint (TMJ). Timely diagnosis and initiation of treatment are crucial for optimizing outcomes in the management of JIA-related dentofacial deformities. Clinical examination remains the primary screening method, yet the accuracy is limited, increasing the risk of late diagnosis of TMJ involvement. This study aims to investigate the utility of an artificial intelligence (AI) for the prediction of TMJ involvement in newly diagnosed subjects with JIA. Additionally, the study validates model predictions as the main outcome against clinicians' assessments and identifies key clinical features influencing the model's decisions.
MATERIALS AND METHOD: A longitudinal dataset comprising data from 6153 standardized consecutive clinical examinations in 1054 subjects with JIA was utilized for training of the machine learning model. Data from an additional cohort of 55 newly diagnosed subjects was used for validation of the model. 26 features relevant to TMJ involvement were found eligible and preprocessed for model input. An Extreme Gradient Boosting (XGBoost) model was trained and evaluated for its predictive performance (i.e. classification). Model predictions were compared with clinicians' assessments. Model explanations were derived using Shapley additive explanations.
RESULTS: The XGBoost model demonstrated an overall accuracy of 87.3% in predicting (i.e. classifying) TMJ involvement. The predictions of the model showed significant agreement with expert clinicians' assessments, but it predicted a higher prevalence of TMJ involvement compared to assessments of experts. Key features influencing model prediction included reduced condylar translation, facial asymmetries, protrusion, patient-reported orofacial pain, and reduced mouth opening capacity.
CONCLUSIONS: The developed XGBoost model is able to predict TMJ involvement in patients with JIA based on clinical examination, hence demonstrating clinical relevance. The model has potential to assist early diagnosis of TMJ involvement based on the clinical examination, facilitating timely intervention and potentially improving patient outcomes.
Disclosure of interest: None declared

Oral Presentations

Abstract citation ID: cjaf073.003
OP2 ORTHODONTIC TREATMENT EFFECT ON MAXILLARY AND MANDIBULAR ANTERIOR TEETH IN SUBJECTS WITH STAGE III-IV PERIODONTITIS. A CLINICAL AND CBCT STUDY

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AIM: To analyze the effects of orthodontic treatment (OT) on periodontal status of maxillary and mandibular anterior teeth (AT) in patients with stage III-IV periodontitis.
METHODS: Fifty patients with stage III-IV periodontitis (mean age 45.40, SD 9.95) who underwent periodontal-orthodontic treatment were included in a prospective clinical study. CBCT was performed before (T1) and after (T2) OT. Probing depth (PD), gingival recession (GR), clinical attachment level (CAL) and alveolar bone level (ABL) were measured before (T1) and after (T2) OT on mesial, distal, lingual and buccal surfaces of all AT. Outcomes were compared between maxillary and mandibular AT.
RESULTS: All AT showed improvement in mean PD (0.48 mm; SD 0.45; $p<0.05$). No difference was found on any surface or between maxillary/mandibular AT ($p>0.05$).

All AT showed improvement in mean GR (0.21 mm, SD 0.40; $p<0.05$). Significantly larger ($p<0.05$) mean GR improvement on mesial (0.39; SD 0.52) and distal (0.41; SD 0.54) surfaces of maxillary AT compared with mandibular AT (mesial 0.09; SD 0.46; distal 0.15; SD 0.39) was observed. However, maxillary mean buccal (0.17; SD 0.40) and lingual (0.31mm; SD 0.47) surfaces showed improvement compared with mandibular buccal (-0.03; SD 0.39) and lingual (-0.01; SD 0.45) surfaces with tendency to GR worsening ($p<0.05$).

All AT showed improvement in mean CAL (0.62 mm; SD 0.33, $p<0.05$). Greater ($p<0.05$) mean CAL improvement on mesial surfaces of maxillary AT (0.94 mm (SD 0.74) compared to mandibular AT (0.64 mm; SD 0.51) was observed.

All AT showed no change in mean ABL (0.11 mm; SD 0.52; $p>0.05$). Mean ABL improvement was greater ($p<0.05$) on mesial (0.72; SD 0.96) and distal (0.50; SD 0.87) surfaces of mandibular AT compared with mesial (0.25; SD

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0.80) and distal (0.17; SD 0.69) surfaces of maxillary AT. On the contrary, mean ABL change on buccal and lingual surfaces of all AT was not significant (p>0.05), however with tendency of ABL loss.
CONCLUSIONS: OT resulted in improved mean PD, GR and CAL in all AT. Maxillary AT showed improvement of all parameters, however mandibular AT showed the risk for GR worsening on buccal and lingual surfaces compared with maxillary AT.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.004
OP3 INFLUENCE OF GENETIC AND ENVIRONMENTAL FACTORS ON SOFT TISSUE MORPHOLOGY IN A TWIN POPULATION

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AIM: Genetic and environmental factors influence facial growth and craniofacial morphology. The study aimed to evaluate the influence of genetics and environmental factors on soft tissue morphology in a twin population with completed craniofacial growth.
MATERIALS AND METHOD: The study sample consisted of 40 pairs of twins (14 monozygotic and 26 dizygotic), aged 18-31 years. Zygosity was determined using 15 specific DNA markers. The morphology of soft tissue was analyzed using extraoral photos and lateral head cephalograms. The computerized photos and cephalometric analysis included linear and angular measurements of the nose, lips, and other soft tissue parameters. Statistical analysis was performed using the SPSS program, and the relationship between factors was evaluated by performing dispersion regression analysis.
RESULTS: Evaluating the morphology of soft tissues in monozygotic twin pairs measurements of nose, lips, and chin are similar. In dizygotic twins, these measurements differed significantly (p<0.05). There were determined significant strong correlations in soft tissue morphology of monozygotic twins; upper and lower face height, upper and lower lip height, distance from the upper and lower lip to E line, and thickness of the chin (correlation coefficient r varied 0.48-0.79; p<0.05). Soft tissue dimensions statistically significantly differed in the pairs of dizygotic twins: depth of the nose and the expressiveness of the chin. Analyzing dizygotic twins' soft tissue morphology correlation, it was found a correlation of lower face height, thickness of lower lip, and distance from the upper to E line (correlation coefficient r varied 0.52-0.79; p<0.05). The dispersion regression analysis model was used to determine the influence of genetic, environmental, and complex factors in the morphology of soft tissue. The complex of genetics and the environment influence soft tissue morphological features: the height and thickness of the upper and lower lips, the expressiveness of the chin and the height of the chin (p<0.05).
CONCLUSIONS: Facial soft tissue morphological differences are influenced by a complex of genetic and environmental factors.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.005
OP4 LOCAL PLATELET RICH PLASMA IMPACT ON BONE REMODELING DURING ORTHODONTIC TOOTH MOVEMENT IN DOGS

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AIMS: Platelet-rich plasma (PRP) has been utilized to stimulate bone formation. This study aims to investigate the effects of PRP on bone formation and remodeling during orthodontic treatment.
MATERIAL AND METHODS: In six male dogs, one maxillary quadrant was randomly selected as the experimental group and the other as the control group. After the extraction of maxillary first premolars, a titanium-nickel spring (200 g) was inserted between the second premolar and the canine. Activated PRP was administered to the experimental group on days 0, 21, and 42, while a placebo was administered to the control group. After 63 days, new bone formation was assessed through histological measurements, with a significant level set at 0.05.
RESULTS: There was a significant increase in new bone formation in the experimental group compared to the control group (p-value=0.028). Both woven (p-value=0.028) and lamellar (p-value=0.042) new bone, as well as osteoblast cell numbers (p-value=0.027), were significantly higher in the experimental group. Although the number of osteoclast cells was higher in the control group than in the experimental group (p-value=0.288), this difference was not statistically significant.
CONCLUSION: The local administration of PRP enhances bone remodeling during orthodontic tooth movement
Disclosure of interest: None declared

Abstract citation ID: cjaf073.006
OP5 PERIO-ORTHO INTERFACE IN GINGIVAL RECESSION DEVELOPMENT: A COMPREHENSIVE EVIDENCE MAPPING

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AIM: Evidence mapping (EM) of systematic reviews (SRs) is an approach aiming at comprehensive evaluation of scientific evidence in a field based on the highest level of scientific evidence. The objective of the present EM review is to evaluate and summarise existing knowledge and identify knowledge gaps related to the connection between the development of gingival recessions and orthodontic diagnosis and intervention.
METHODOLOGY: Domains and subdomains were identified based on the qualitative research of relevant thematic resources and expert consensus. A comprehensive search was conducted in 7 databases with the use of selected MeSH terms combinations without restrictions related to the language and year of publication. Gray literature search was also performed. Self-designed data extraction sheet was used to extract data from included studies. The evaluation of each publication and data extraction was carried out independently by 2 reviewers. Included were SRs on subjects relevant to the phenomenon of GRs development in relation to all areas orthodontic diagnosis, treatment planning and intervention.
RESULTS: The initial search retrieved 3036 publications. After reviewing titles and abstracts, 147 publications were qualified for full-text reading. Finally, a total of 37 SRs published between 2008 and 2024 were included for qualitative analysis. Established were 8 main domains: epidemiologic, diagnostic, therapeutic, prognostic, psychosocial aspects, preventive, research methods and others. Within each domain, thematic sub-domains were identified. The largest number of studies were primarily categorized to the therapeutic domain (n=26), followed by epidemiologic (n=10) and prognostic (n=1). Out of all included studies, 12 (32%) were evaluated as conclusive, 5 (14%) as partially conclusive and 20 (54%) as inconclusive.
CONCLUSIONS: The majority of SRs published in the field of the interface of orthodontics and periodontal soft tissues defects relate to the therapeutic or epidemiological aspects. High level of scientific evidence is lacking in the fields of prevention, diagnosis, psychocial aspects and research methods of this intercorrelation. The outcomes of this research point on the areas in which high-quality research should be undertaken.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.007
OP6 PREVALENCE AND ASSOCIATED RISK FACTORS OF GINGIVAL RECESSIONS IN YOUNG ADULTS IN TROMS COUNTY, NORWAY. A PROJECT BASED ON THE POPULATION-BASED COHORT STUDY FIT FUTURES

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AIMS: To describe the prevalence of gingival recessions (GR) and associated risk factors in young adults 26-28-year-old.
MATERIAL AND METHODS: The study was based on data from 550 participants enrolled in the population-based cohort study Fit Futures. GR was assessed from intra oral scans and clinical pictures. GR were measured digitally on scans in mm from the cemento-enamel junction to the deepest gingival margin on four surfaces on all teeth, excluding the third molar. Analysis of specific segments of the dentition was done, because potential risk factors can be associated with specific sites

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within the oral cavity. On surfaces with GR, measures of periodontal pocket depths were used to calculate clinical attachment loss (CAL). Sex, prior treatment with fixed orthodontic appliances, tooth brushing frequency and snuff habits over the past 10 years were included as explanatory variables. Snuff (Scandinavian) refers to a small tobacco pouch placed in the buccal/labial sulcus. Associations between GR and explanatory variables were analyzed with descriptive statistics, chi-square tests and non-parametric testes. Linear and logistic regression analysis was conducted.
RESULTS: 58,4 %(N=321) of the 550 participants had one or more GR and 41,6 % (N=229) had none. Of the 60402 investigated surfaces, 2,5 % had a GR, of which 85.5% were buccal, 13.5 % lingual and 0.9 % approximal. Buccal GR occur 76.3% in the upper arch and 23.7% in the lower arch. In the upper arch, 37% affect anterior teeth and 63% posterior teeth. In the lower arch, 20.5% are on anterior teeth and 79.5% on posterior teeth. The mean value of GR was 0,81mm (min 0.19mm, max 4.17mm), mean median value 0,76mm. Of the buccal surfaces registered with GR, 19 % (N=249) had a CAL >3mm, and only nine buccal surfaces >5mm. Regression analysis showed that prior orthodontic treatment, having a snuff habit and high brush frequency were statistically significant predictors of GR.
CONCLUSIONS: The prevalence of GR was limited, and the severity of the gingival recessions was small. Prior orthodontic treatment, having a snuff habit and a high brush frequency were predictors of gingival recession.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.008
OP7 TIMING MATTERS: THE IMPACT OF ALVEOLAR BONE GRAFTING ON ORTHODONTIC OUTCOMES - A CLINICAL AND RADIOGRAPHIC EVALUATION

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AIMS: To evaluate the impact of secondary alveolar bone grafting (SABG) timing, based on the canine mineralization stage, on orthodontic space closure in patients with cleft lip and palate (CLP).
MATERIAL AND METHODS: This study retrospectively assessed CLP patients who received SABG. Inclusion criteria encompassed patients with unilateral or bilateral CLP, irrespective of lateral incisor agenesis. Orthopantomograms taken pre- and post-SABG and post-orthodontic treatment were analyzed to evaluate canine root mineralization stage (R: 0.25, 0.5, 0.75, 1), canine inclination angle and impaction rate, height of bone graft and limbus alveolaris on adjacent teeth. Reflex microscopy was used to measure orthodontic space closure (OSC) on plaster models. Student's t-test was conducted.
RESULTS: The study involved 104 patients (127 cleft regions, mean age 9.9 ± 1.6 years at SABG). A visible bone bridge on radiographs six months post-SABG indicated successful surgery. Among these patients, 77 cleft areas underwent OSC, and 44 received prosthodontic rehabilitation. Lateral incisor agenesis was registered in 82 cleft regions.

SABG performed at R ≤ 0.5 enabled successful OSC in 69% of the cleft regions with lateral incisor agenesis. In advanced root mineralization stages (R≥0.75), orthodontic closure to the cleft regions dropped to 23.4%.

Early SABG (R≤0.5) significantly (t=3,272) decreased canine inclination in the agenesis cohort, with an 8.4° inclination difference compared to the non-agenesis group.

The mesial canine movement ranged from 1.7 mm (SABG at R=0.25) to 6.2 mm (R=1).

The gap between the cleft-sided central incisor and canine (M) was 2.6 mm larger in prosthodontic rehabilitation (M=12.0 mm) compared to OSC (M=9.4 mm).

Patients with lateral incisor agenesis undergoing OSC experienced significantly less bone graft resorption compared to those treated with prosthodontic rehabilitation (t=5.406). A similar trend was observed in regions with lateral incisors present, but without statistical difference.
CONCLUSIONS: Patients with lateral incisor agenesis benefit most from SABG performed at or before R=0.5, as it provides favorable canine inclination, a stable bone graft and limbus height. However, early SABG (R≤0.5) combined with lateral incisor agenesis presents a 76.9% risk of canine displacement and impaction, often requiring surgical exposure and extrusion.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.009
OP8 THE EFFECT OF LINGUAL APPLIANCES IN THE REDUCTION OF LABIAL GINGIVAL RECESSION AND ROOT PROMINENCE CAUSED BY THE WIRE SYNDROME IN THE ANTERIOR MANDIBLE – A MULTICENTER STUDY

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AIMS: The wire syndrome (WS) or X-effect/twist-effect describes undesired long-term tooth movements following fixed retainer placement and includes root torque changes that might cause gingival recession. Aim of this study was to assess the effectiveness of fixed orthodontic treatment with completely customized lingual appliances (CCLA) and continuous archwires in the reduction of labial gingival recessions and root prominence (ROP) caused by the wire syndrome (WS) in the anterior mandible.
MATERIAL AND METHODS: This retrospective cohort study from three centres included 20 consecutively recruited patients with labial gingival recession at lower incisors and canines due to WS. A total of 25 teeth were assessed. CCLA treatment with a standardised archwire sequence (0.014" Niti, 0.016"x0.022" Niti, 0.018"x0.018" Beta-TMA with optional extra-torque) was identical in all three centres. Primary endpoints of recession depth (RD), recession width (RW), and recession surface (RS) were assessed on 3D-digital models at debonding (T1) and compared to baseline (T0) both as absolute differences (T0-T1), and as ratios ((T0-T1)/T0) by one-sample t-tests with $p<0.05$. As a secondary endpoint, the reduction of root prominence (ROP) relative to the gingival surface of the alveolar yoke of the two neighbouring teeth was measured in millimetres.
RESULTS: Treatment resulted in a significant reduction in all dimensions of gingival recession. The mean reduction in RD was 1.86 mm (44.9%) and in RW 0.70 mm (35.6%). The mean RS was reduced from 10.77 mm^2 to 3.93 mm^2, indicating a mean RS reduction of 61.4%. All changes were statistically significant ($p<0.001$). The range of RS reduction was from 25.4% to 100%, while 18 out of the 25 recessions showed a reduction of more than 50%. The maximum reduction in ROP amounted to more than three millimetres.
CONCLUSIONS: The use of completely customized lingual appliances to torque roots of the lower anterior teeth, exposed by the wire syndrome, towards the middle of the alveolar process reduces the dimensions of subsequent labial gingival recession and the root prominence of the affected teeth substantially. This is considered as a critical step in optimising the predictability of the surgical recession coverage.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.010
OP9 THREE-DIMENSIONAL EVALUATION OF SECONDARY ALVEOLAR BONE GRAFTING IN PATIENTS WITH BILATERAL CLEFT LIP AND PALATE: A 2 TO 3 YEAR POST-OPERATIVE FOLLOW-UP

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OBJECTIVES: To quantify secondary alveolar bone graft (SABG) resorption in 3D in patients with bilateral cleft lip and palate (BCLP) at specific pre- and postoperative time points, taking into account potential confounding factors such as agenesis of the lateral incisors, the surgeon, the type of grafting tissue and the eruption path of the maxillary canines.
METHODS: Patients with BCLP were prospectively included. CBCT scans were taken at following time points: pre-operative (T0), approximately 6 weeks (T1), 6 months (T2), 1-2 years (T3) and >2 years post-operative (T4). Low quality CBCTs due to motion artifacts were discarded. Volumetric assessment of the bone grafts was performed by registering the CBCT scans across the time points. Then, bone graft was segmented at T2 and its volume was compared to the segmented volumes at T3 and T4 to calculate the resorption rate. Additionally, the eruption path of the canine at cleft side was assessed by marking its cusp and apex on the CBCT scans at all time points, determining its angulation towards the midline and its horizontal and vertical position, which were compared with the healthy side of a historical control group of patients with UCLP.

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RESULTS: Significant SABG resorption was observed among the 16 patients with BCLP included in the study (mean age at T0: 8.49 ±1.02 years). At T2, 43,8% of the graft volume was resorbed. In patients whose canines had not erupted yet by T3, resorption rates were 49,2% and 55,5% at T4. For erupted canines at T3, resorption rates were 52,4% at T3 and 84% at T4. No significant difference in resorption rates was observed when comparing these finding to those observed in patients with UCLP reported by Doucet et al. (2024). The canines at cleft side demonstrated a tendency to migrate more towards the midline and with a higher angle compared to the historical control group. However, vertical movement towards the occlusal plane was similar.
CONCLUSIONS: This study highlights significant rates of SABG resorption in patients with bilateral clefts. The findings confirm that the SABG facilitates successful eruption of the canine, with comparable vertical migration towards the occlusal plane.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.011
OP11 ‡‡‡ CONE-BEAM COMPUTED TOMOGRAPHY ANALYSIS OF MANDIBULAR CONDYLES' DIAMETERS IN PATIENT WITH JUVENILE IDIOPATHIC ARTHRITIS

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AIMS: Juvenile idiopathic arthritis (JIA) is a common childhood rheumatic disease that can significantly impact the temporomandibular joint (TMJ), leading to complications such as condylar resorption and facial deformities. This retrospective study aimed to evaluate changes in the transverse (TR_Diam) and axial (AX_Diam) diameters of the mandibular condyles in JIA patients using cone beam computed tomography (CBCT), and to compare them with those of healthy controls.
MATERIAL AND METHODS: The study included 159 subjects aged between 7 and 25 years (112 with a diagnosis of JIA and TMJ involvement based on the International League of Associations for Rheumatology (ILAR) criteria documented in patient records, and 47 healthy controls). Inclusion criteria required no prior orthodontic/orthopedic treatment, no history of craniofacial trauma, and no congenital birth defects involving the craniofacial area. All subjects underwent CBCT imaging, and scans were analyzed using 3Diagnosys® software to measure the TR_Diam and AX_Diam of both right and left mandibular condyles. As the data were normally distributed, parametric tests were used for statistical analysis. The sample was divided into three groups: (1) bilateral JIA, (2) unilateral JIA, and (3) healthy controls.
RESULTS: The results showed significant reductions in the TR_Diam of the affected condyles, with an average decrease of 1.7 mm compared to healthy controls ($p < 0.0001$). The AX_Diam exhibited a smaller, non-significant reduction of 0.1 mm in affected condyles. In unilateral JIA patients, the unaffected condyle was slightly smaller than that of healthy controls, though the difference was not statistically significant. Additionally, it was observed that mandibular condylar growth in both male and female JIA patients tends to cease earlier compared to healthy individuals.
CONCLUSIONS: These findings indicate that JIA not only affects the involved condyle but may also alter the contralateral condyle in unilateral cases, impairing overall mandibular development. Early diagnosis and treatment are critical to prevent irreversible TMJ damage and associated facial deformities. This study highlights that JIA significantly alters mandibular condylar dimensions in both unilateral and bilateral cases and impairs growth, underscoring the importance of timely detection and treatment.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.012
OP12 EVALUATION OF THE DENTAL AND SKELETAL EFFECTS OF THE MINI SCREW SUPPORTED HERBST APPLIANCE

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AIMS: This study aims to evaluate the dental and skeletal effects of skeletal anchorage-supported and conventional Herbst appliances in the functional treatment of patients with skeletal Class II malocclusion, using lateral cephalometric radiographs.
MATERIAL AND METHODS: The material for this retrospective study was obtained from pre-existing lateral cephalometric radiographs of patients who had previously undergone functional treatment with the Herbst appliance. A total of 28 patients with skeletal Class II malocclusion were included and divided into two equal groups: the 'Conventional Herbst Group' (mean age: 12.23±0.9 years) and the 'Miniscrew-Supported Herbst Group' (mean age: 12.03±1.047 years). In the second group, a 1.6x8 mm miniscrew was placed interradicularly between first and second premolars in the mandible to provide skeletal anchorage. A wire ligature was attached from the miniscrews to the hook of lower segment of the Herbst appliance, which was positioned at the level of lower canines. Lateral cephalometric analysis was performed before treatment (T0) and after the completion of treatment with the Herbst appliance (T1). Paired t-test was used to evaluate changes within each group before and after treatment, while independent samples t-test was employed for comparisons between the two groups. Statistical significance was set at $p<0.05$.
RESULTS: The total treatment duration was 13.38±2.39 months in the first group and 12.85±2.59 months in the second group. When evaluated within each group, changes in SNB, ANB, Wits appraisal, effective mandibular length, and IMPA values were found to be statistically significant ($p<0.05$). Both treatment groups exhibited similar effects in correcting overjet. In the comparison between the groups, changes in SNB and ANB values were statistically greater in the miniscrew-supported Herbst group ($p<0.05$). Although the amount of change in the IMPA value was approximately 2 degrees higher in the conventional Herbst group (6.44±2.64°) compared to the miniscrew-supported Herbst group (4.54 ±3.38°), this difference was not found to be statistically significant.
CONCLUSIONS: In Class II functional treatments performed with the Herbst appliance, it was found that skeletal anchorage enhances the orthopedic effect. Although the miniscrew-supported Herbst appliance was more effective in controlling the protrusion of the lower incisors, both appliances demonstrated statistically similar effects.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.013
OP13 OVERJET REDUCTION IN RELATION TO WEAR TIME OF THE NEW-T ACTIVATOR FUNCTIONAL APPLIANCE: A RETROSPECTIVE STUDY

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AIM: This retrospective study investigates the effect of New T-appliance activator wear time, monitored with a Theramon® microsensor, on overjet reduction in growing individuals with Class II Division 1 malocclusion. It further determines whether this effect is influenced by age or gender.
MATERIALS AND METHOD: The data was retrospectively collected from patients' files at an orthodontic practice in the Netherlands. At each orthodontic appointment, the overjet and daily mean wear time were recorded. The following data was collected: gender, age, overjet, daily mean wear time, total treatment mean wear time and duration of the treatment. Statistical analysis was performed using the Multivariate Regression Analysis, one-way ANOVA, Tukey's Multiple Comparison Post Hoc, and the Pearson Correlation Coefficient.
RESULTS: In total, 705 patients were included. The daily mean wear time was 8.3 hours/day. Statistically significant associations were found between overjet reduction and daily wear time, total mean wear time and age. Significantly higher overjet reduction was found in patients younger than 12 years compared to older patients. Furthermore, no significant gender-related associations were found.
CONCLUSIONS: Longer wear times leads to greater overjet reduction. This effect is influenced by age. Patients starting orthodontic treatment at a younger age had a longer wear time and showed greater overjet reduction. This suggests that starting orthodontic treatment with functional appliances before the age of 12 is beneficial. In the Dutch school system, patients usually attend primary school unit the age of 12. The patient's gender has not been identified as an influencing factor.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.014
OP14 LONG-TERM CHANGES IN OVERJET OVER A 30-YEAR PERIOD WITH OR WITHOUT ORTHODONTIC TREATMENT: A COHORT STUDY

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AIMS: Large overjet increases the risk of traumatic dental injury. The aim of this study was to investigate long-term changes in overjet with or without orthodontic

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treatment and to evaluate whether correction of large overjet can reduce DMFT scores of maxillary incisors.
MATERIAL AND METHODS: From an initial cohort of 667 primary school children who underwent a systematic orthodontic examination including plaster casts at baseline (T0) between 1981 and 2001 (mean age 8.0 ± 1.0 years), 73 subjects could be enrolled in this follow-up cohort study. Data collection at follow-up (T1) included a clinical examination including DMFT index, history of dental trauma, history of orthodontic treatment, and intraoral scans. Two groups were formed: The group without orthodontic treatment (untreated group) consisted of n=23 participants (female/male: 10/13; mean age 39.1 ± 6.0 years), and the group with orthodontic treatment (treated group) consisted of n=50 participants (female/male: 27/23; mean age 38.3 ± 5.1 years). Overjet was measured at T0 and T1 and DMFT scores were analysed in both groups. Mann-Whitney U tests were used to assess intergroup differences and paired t-tests were used to assess intragroup differences with $\alpha = 0.05$.
RESULTS: The mean observation period (T1-T0) was 30.0 ± 5.3 years. Anterior dental trauma occurred in 30.0% (n=15) of the treated group and 8.7% (n=2) of the untreated group. At T0, mean overjet in the untreated group was 2.6 mm (SD 0.79) compared to 4.0 mm (SD 1.78) in in the treated group. This difference was statistically significant (p=0.002). The treated group experienced a significant overjet reduction from T0 to T1 (p<0.001), whereas changes in the untreated group were not significant (p=0.107). The overjet differences between the two groups were no longer significant at T1 (p=0.105). Mean DMFT scores were 13.9 (SD 5.5) in the untreated group and 12.1 (SD 5.14) in the treated group. However, there was no statistically significant difference in the DMFT scores of the maxillary incisors between the groups (p=0.276).
CONCLUSIONS: Orthodontic treatment can effectively improve overjet in the long-term. However, orthodontic treatment did not reduce the DMFT scores of the maxillary incisors in this sample.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.015
OP15 TEMPOROMANDIBULAR DISORDERS IN ADULT ORTHODONTIC PATIENT BEFORE AND AFTER ORTHODONTIC TREATMENT

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AIMS: To investigate 1) temporomandibular disorders (TMD), bite force and teeth in occlusal contact in orthodontic patients before orthodontic treatment in comparison with healthy controls with neutral occlusion and to compare 2) TMD, bite force and teeth in occlusal contact in orthodontic patients before and after orthodontic treatment.
MATERIALS AND METHOD: 70 orthodontic patients with malocclusion before orthodontic treatment (aged 18-64 years, mean: 29,5 years) and 75 healthy controls with neutral occlusion and no indication for orthodontic treatment (aged 20-71 years, mean: 38,9 years) were included. Clinical examinations according to Diagnostic Criteria for Temporomandibular Disorders (DC/TMD), registration of teeth in occlusal contact and bite force were carried out before treatment (T0), after removal of fixed appliance (T1) and after 6 months in retention (T2). Statistical analyses for testing single symptoms and signs and diagnoses of TMD included logistic and linear models adjusted for age and gender, penalized likelihood ratio as well as false discovery rate regarding correction of p-values for multiple testing.
RESULTS: No significant differences in bite force and number of occlusal contacts between groups at T0, but significant differences at T1 and T2 with lower bite force in patients compared to controls were found. Bite force was significantly lower in women compared to men. Mandibular mobility was significantly larger in controls compared to the patients at T0, T1 and T2, but no significant differences were found between patients at T0, T1 and T2. Men had a larger mandibular mobility compared to women at T0, T1 and T2. The occurrence of pain with maximum opening was significantly higher in patients at T0. Pain upon palpation of the temporalis and masseter muscles were significantly lower from T0 to T2 in the patients. Myalgia occurred significantly more often in patients at T0 compared to controls, and degenerative joint disease occurred significantly more often in controls. There were no significant differences in TMD-diagnoses in the patient group at T0, T1 and T2.
CONCLUSION: Significant differences in TMD between the groups were found. The findings may prove valuable for the information given to adult patients before treatment, in treatment planning and during treatment.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.016
OP16 SEXUAL DIMORPHISM IN AGE-RELATED DENTOSKELETAL AND SOFT TISSUE PROFILE CHANGES: 50-YEAR FOLLOW-UP

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AIM: Sex standards are essential in orthodontic, prosthodontic, and maxillofacial diagnosis and treatment planning. However, limited information is available on sexual dimorphism of age-related dentoskeletal and soft tissue changes. Therefore, this 50-year follow-up study aimed to investigate sexual dimorphism in age-related dentoskeletal and soft tissue profile changes using a new superimposition-based method.
MATERIALS AND METHOD: 60 subjects were included in this study. 30 untreated subjects, with a Class I normal occlusion at early adolescence. In addition, 30 subjects had all first premolars removed in early adolescence to relieve crowding in a Class I malocclusion without subsequent orthodontic treatment. Data were derived from cephalograms taken at 12 (T1), 15 (T2), 30 (T3) and 62 (T4) years of age. 46 angular and linear variables were measured using the superimposition-based cephalometric method to assess age-related dentoskeletal and soft tissue profile changes for men and women. The independent samples t-test was used to test differences in changes compared between sexes at different time points.
RESULTS: Men and women showed significant anterior growth of the jaws from T1 to T2, with significant differences between the sexes. From T3 to T4, both sexes revealed retrognathism of the jaws, but with no significant sex differences. Men showed anterior mandibular rotation until T3, and women until T2. However, from T3 to T4, significant posterior mandibular rotation was demonstrated in both sexes without significant sex differences. Upper and lower incisors exhibited significant retroclination from T3 to T4 without significant sex differences. A straighter facial profile was also shown throughout the observation period without significant sex differences.
CONCLUSIONS: The 50-year follow-up period of this reference cohort demonstrated continued dentoskeletal and soft tissue changes up to the sixth decade of life. For most of the studied variables, the direction of the changes was consistent for both sexes, but the extent of changes was less in females than in males throughout the observation period.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.017
OP17 LONG-TERM STABILITY ASSESSMENT AFTER ORTHODONTIC TREATMENT

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AIMS: To investigate factors affecting stability after orthodontic treatment with fixed appliances, focusing on patient-related (growth patterns), treatment-related (with or without extraction), and retention-related factors (failure).
MATERIAL AND METHODS: Ninety-five orthodontic patients (66 females, 29 males, mean age 14 years) treated with fixed appliances at Ghent University Hospital were retrospectively included, excluding craniofacial syndromes or cleft patients.

Dental casts were analysed to assess the Peer Assessment Rating (PAR) score, Little's Irregularity Index (LII) for lower front teeth, overjet, and overbite. The ANB angle (sagittal growth pattern), GoGn-SN angle (vertical growth pattern), and LI to NB angle (inclination of lower incisors) were measured on cephalometric radiographs. Data were collected pre-treatment (T0), post-treatment (T1), 2 years post-treatment (T2), and ≥4 years post-treatment (T4). Patient records were screened on data regarding the treatment/retention protocol and retention failures. Statistical analysis using linear mixed models evaluated the effects of treatment approaches, patient-related factors, and fixed retainer failure on the post-treatment stability ($\alpha \leq 0.05$).
RESULTS: The analysis of weighted PAR scores revealed no significant effects of extraction treatment or time. Similarly, the LI-NB angle was unaffected by extractions ($p = 0.469$), but decreased significantly during the short-term retention period (T2-T1) ($p = 0.031$). Vertical or sagittal growth pattern did not affect the stability in overbite or overjet significantly ($p = 0.273$ and $p = 0.159$).

In 29.5 %, the fixed lingual retainer in the lower jaw failed on ≥1 tooth during T1-T2 and 27.4% during T2-T4, but in only 3.2% of the study population an increase of ≥1mm in LII during T1-T4 was found. The mixed model analysis showed

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no significant effect of these failures or time on LII (p = 0.713 for failure, p = 0.255 for time).
CONCLUSIONS: Within the limitations of this study, it is concluded that (non-) extraction treatment, patient-related factors, and fixed retainer failure had minimal impact on long-term stability.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.018
OP18 AN ASSESSMENT OF STABILITY AND SATISFACTION BETWEEN TWO MANDIBULAR LINGUAL RETAINERS IN ORTHODONTIC PATIENTS. A TWO-YEAR FOLLOW-UP, SINGLE PRACTICE-BASED RANDOMIZED TRIAL

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INTRODUCTION AND AIM: A potential strategy to mitigate the risk of development of an 'active retainer'—likely caused by the untwisting of round multistrand wires—is to use rectangular wires, which are less prone to untwisting and subsequent activation. However, due to their sharper edges compared to round wires, rectangular retainer wires may cause increased discomfort for patients. Additionally, it remains unclear whether rectangular wire retainers provide retaining capabilities comparable to those of round wire retainers. Therefore, this study aimed to compare the stability of mandibular dental arch dimensions and patient satisfaction between two types of fixed retainers: 3-strand round twisted (RT) and 8-strand rectangular braided (RB) wires, both bonded to six anterior mandibular teeth.
TRIAL DESIGN: 2-arm parallel, two-centre randomized controlled trial.
METHODS: A total of 133 orthodontic patients (median age 24.6 years, 25th percentile = 17.2 years, 75th percentile = 32.4 years) were randomly assigned to receive either an RT or RB wire retainer at a 1:1 ratio. The primary outcome was the change in the irregularity index, with secondary outcomes including arch length; intercanine, interpremolar, and intermolar widths; and patient satisfaction. Randomization was achieved using random permuted blocks of sizes 4, 6, or 8, which were concealed in sequentially numbered, opaque, sealed envelopes. Evaluations were performed at baseline and at 3, 6, 12, 18, and 24 months after retainer placement. Dental cast measurements were analyzed using random effects linear regression, and satisfaction was assessed at each time point.
RESULTS: Cast measurements remained relatively stable from T1 to T6, with no significant difference attributed to the retainer type (RT or RB; $p > 0.1$ for each measurement). Overall, time significantly affected arch widths ($p < 0.05$) but not irregularity index ($p>0.1$) and arch length ($p>0.1$). There was no significant correlation between retainer type (p=0.63, 95%CI: 0.75 to 1.61) and satisfaction questionnaire responses, although the responses varied by question. Differences in questionnaire responses in some timepoints were statistically but not clinically significant. No harms were observed.
CONCLUSIONS: Both RT and RB wire retainers effectively maintain mandibular arch alignment and are equally well tolerated by patients in the medium term.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.019
OP19 A COMPARISON OF TWO BONDED LINGUAL RETAINERS REGARDING EFFECTIVENESS, COMPLICATIONS, AND PATIENT SATISFACTION AFTER SIX MONTHS

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AIM: To compare the effectiveness, complications, and patient satisfaction between two bonded lingual retainers, multi-stranded stainless steel (*PENTA-ONE COAXIAL*) and gold chain (*ORTHO-FLEXTECH*), for the six anterior mandibular teeth (canine to canine) after six months of retention.
MATERIALS AND METHODS: Eighty orthodontically treated subjects with a mean age of 16.7 years were included. They had been orthodontically treated with fixed appliances and blindly randomized into two equal cohorts, each receiving one type of retainer after providing informed consent. Intraoral scanning was performed after retainer bonding (T0) and again six months later (T2). Additionally, clinical inspections and patient satisfaction questionnaires were conducted at retainer bonding (T0), three months (T1), and six months (T2).

Teeth stability was assessed using Little's Irregularity Index, intercanine distance, maximum rotation, overjet, and overbite, measured using digitized scans with the *ONYXCEPH* program. Complications (e.g., detachment, breakages) were recorded at and between follow-up appointments. Statistical analyses included the Shapiro-Wilk test for normality, Levene's test for variance homogeneity, and the Mann-Whitney U test for group comparisons.
RESULTS: No significant differences were observed between the two retainer groups from T0 to T2 regarding Little's Irregularity Index, overjet, and overbite. However, a statistically significant difference (P-value < 0.05) in maximum rotation, defined as the angle of rotation of each mandibular anterior tooth relative to the sagittal plane, was found in the gold chain retainer group at T2.

The rate of detachment complications was 2.9% for the gold chain group and 2.6% for the multi-stranded stainless steel group. No significant differences were identified in patient satisfaction between the two groups.
CONCLUSION: Aside from the statistically significant (but clinically insignificant) increase in gold chain maximum rotation, no other significant differences were observed between the two retainer groups after six months of retention. A further follow-up period is currently ongoing for two years after retainer bonding.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.020
OP20 ACCURACY OF MACHINE BENT 3- AND 6-STRANDED TWISTFLEX RETAINERS – AN IN-VITRO-STUDY

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AIMS: The purpose of the present study was to analyze, how precise a retainer bending machine can realize the planned CAD/CAM retainer design.
MATERIAL AND METHODS: On 20 digitized debonding casts (10 upper, 10 lower), a canine-to-canine retainer was designed using the CAD/CAM software FixR™ (YOAT Corp., Lynnwood, WA, USA). Each retainer design was bent 10 times each using the Bender II™ retainer bending machine (YOAT Corp.) and 3- or 6-stranded twistflex wire (0.0018 inch Dentaflex®, Dentaurum, Ispringen, Germany), respectively. By exporting the CAD/CAM coordinates out of FixR™, a master-retainer for each model was created (Fusion 360, Autodesk, San Francisco, CA, USA) and saved as STL file. All bent retainers were digitized using a laboratory scanner (ATOS, Zeiss metrology, Oberkochen, Germany) and also saved as STL-files. The files of the retainers were digitally superimposed with the master-retainer using a best-fit-algorithm. Subsequently, the deviations between machine bent and master-retainer were recorded in millimeters: *transversal retainer extension* (widest outer contours), *sagittal retainer extension* (most anterior outer contour perpendicular to the connecting line of the transverse measurement points) and *vertical retainer deviation* (widest distance between the retainer and the horizontal plane). Statistical analysis was undertaken as mixed linear model with fixed factors (jaw, wire quality, number of retainer) and the number of casts as random factor.
RESULTS: In all three planes of space, lower retainers were bent more precisely than upper retainers (transverse: lower 0.04 ± 0.23mm vs. upper 0.40 ± 0.83mm, p<0.001; sagittal: lower 0.05 ± 0.18mm vs. upper 0.08 ± 0.43mm, p<0.05; vertical: lower 0.36 ± 0.17mm vs. upper 0.60 ± 0.23mm, p<0.001). Additionally, 3-stranded twistflex retainers were bent more accurately than 6-stranded wires (transverse: 3-stranded 0.19 ± 0.43mm vs. 6-stranded 0.25 ± 0.79mm, p<0.05; sagittal: 3-stranded 0.001 ± 0.24mm vs. 6-stranded 0.02 ± 0.4mm, p<0.05; vertical: 3-stranded 0.42 ± 0.22mm vs. 6-stranded 0.54 ± 0.23mm, p<0.001).
CONCLUSIONS: The Bender II™ retainer bending machine manufactured digital CAD/CAM retainer designs more accurately in lower than in upper jaws, respectively with 3-stranded twistflex wires compared to 6-stranded wires. The deviations could be clinically relevant for upper retainers in the transverse and vertical dimension.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.021
OP21 AUTOMATED CERVICAL VERTEBRAL MATURATION CLASSIFICATION USING AN OBJECT DETECTION-DRIVEN DEEP CONVOLUTIONAL NEURAL NETWORK FOR PUBERTAL GROWTH ASSESSMENT

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AIM: This study aims to develop and evaluate an automated system for cervical vertebral maturation (CVM) classification using an object detection-driven deep convolutional neural network (DCNN) to assess pubertal growth stages in lateral cephalometric radiographs. The objective is to enhance the precision and consistency of CVM stage identification, improving orthodontic treatment planning and decision-making.
MATERIALS AND METHOD: A dataset of 1047 lateral cephalometric radiographs from patients aged 6 to 17 was analysed across six CVM stages. Images were labelled by two experienced orthodontists using the Computerized Vision Annotation Tool (CVAT) and processed with a DCNN model that integrates object detection and classification. The approach follows a two-step framework: an object detection model identifies and localizes cervical vertebrae in the radiographs, while morphological features of the detected vertebrae are extracted, enhanced, and analysed using a classification model to determine the CVM stage. This method ensures the analysis is focused on relevant anatomical structures, improving classification performance. The dataset was split into training (70%), validation (20%), and testing (10%) subsets, with model reliability assessed using intra-observer and inter-observer agreement metrics, including the intraclass correlation coefficient (ICC) and weighted Cohen's kappa.
RESULTS: The proposed model demonstrated high reliability, achieving an intraclass correlation coefficient (ICC) of 0.973 and a weighted Cohen's kappa of 0.870, reflecting excellent agreement between observers. The object detection model successfully identified all three cervical vertebrae with an accuracy exceeding 99%. Morphological analysis of the detected vertebrae resulted in a CVMS classification training performance of 98%. The model achieved an overall validation rate of 96%, with minor variations observed in Stage 3 and Stage 4 (misclassification rates of 8.7% and 5%, respectively). On an unseen dataset, the model performed well, yielding 80% accuracy in testing.
CONCLUSION: This object detection-driven DCNN model offers a highly accurate and automated solution for classifying CVM stages, providing orthodontists with a reliable tool for optimizing treatment timing. Fine-tuning the image enhancement thresholds could further enhance classification performance, demonstrating the significant potential of AI-driven tools to improve efficiency and reliability in pubertal growth assessment.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.022
OP22 RELIABILITY AND REPRODUCIBILITY OF A BEST-FIT SUPERIMPOSITION METHOD FOR DIGITAL DENTAL MODELS OF ADULT PATIENTS

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AIMS: Cone Beam Computed Tomography (CBCT) is the gold standard for 3D superimposition when assessing tooth movement in orthodontic treatments. However, due to guidelines aimed at minimizing radiation exposure, this study had the purpose to evaluate the reliability and reproducibility of a new superimposition method for digital orthodontic models that does not rely on tomography.
MATERIAL AND METHODS: This retrospective study analyzed records from 10 adult patients who underwent comprehensive orthodontic treatment without extractions. Each patient had initial and final full-skull CBCT scans and digital models of their upper and lower arches. Two evaluators assessed the new method, which involved superimposing .stl files with the Geomagic Qualify program (Raindrop Geomagic, Inc, Cary, NC) using the palatal rugae as reference points for the upper arch and the occlusal plane for the lower arch. To determine accuracy, this superimposition method was compared with the CBCT-based gold standard for specific landmarks: central fossa of the first molars, cusp tip of the canines and middle of the incisal edge of the central incisors. Differences and reliability between methods were evaluated using a paired T-test and intraclass correlation coefficient, respectively. Reliability between evaluators was assessed by the intraclass coefficient. Reliability between methods was illustrated with Bland-Altman and Kaplan Meyer plots.
RESULTS: The mean variation of reference landmarks was similar across all three spatial planes for both arches with no significant differences between methods. Additionally, agreement between the new method and the gold standard was high, as indicated by intraclass correlation coefficients (ICCs) ranging from 0.88 to 0.98. Differences between evaluators (Δ) ranged from -0.07 to 0.06 mm, which are clinically insignificant. Statistical analysis using paired Student's t-test showed no significant differences between evaluators for any spatial axis in either method ($p > 0.05$).
CONCLUSIONS: Three-dimensional digital model superimposition using palatal rugae for the upper arch and the occlusal plane for the lower arch as reference areas is a reliable and reproducible technique. This method is effective for evaluating orthodontic movements in non-growing patients submitted to non-extraction treatments and eliminates the need for CBCT imaging, thereby reducing radiation exposure while maintaining accuracy.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.023
OP23 ASSOCIATION BETWEEN MANDIBULAR THIRD MOLAR IMPACTION AND MANDIBULAR VOLUME: A RETROSPECTIVE CONE BEAM CT PILOT STUDY

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AIMS: This retrospective study sought to determine if there is an association between mandibular volume and mandibular third molar impaction. We compared two groups of individuals: one group with bilaterally impacted or partially erupted mandibular third molars and another group with bilaterally fully erupted mandibular third molars.
MATERIAL AND METHODS: Subjects comprised of 60 adult patients (37 males and 23 females) who were divided into two groups: impaction group (30 subjects with bilaterally impacted third molars) and control group (30 subjects with bilaterally erupted third molars). Mandibular volume was measured from cone-beam computed tomographic analyzed with Mimics Materialise version 26 software (Materialise, NV, Belgium) using artificial intelligence enabled segmentation with manual refinement and compared between groups.
Seven other variables (6 linear and 1 angular) were determined and measured. Mann-Whitney U tests were employed to compare these measurements between the two groups.
RESULTS: No significant differences in mandibular volume were observed between the impacted and control groups ($56576.90mm^3 \pm 10861.61$ vs. $59406.85mm^3 \pm 9012.56$, $p = 0.223$). However, the impacted group exhibited a smaller retromolar space distance, mandibular body length and coronoid length compared to the control group ($7.84mm \pm 2.23$ vs. $13.76mm \pm 1.77$, $p = <0.0001$, $83.71mm \pm 5.27$ vs. $86.60mm \pm 4.81$, $p = 0.041$, $15.62mm \pm 2.95$ vs. $17.09mm \pm 3.16$, $p = 0.038$). There were no significant differences for the variables of ramus height, total ramus height, condyle length and Co-Go-Me angle.
CONCLUSIONS: This study showed that mandibular volume is not associated with the presence of third molar impaction. Mandibular body length, coronoid length, and retromolar space distance, were found to be associated with mandibular third molar impaction.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.024
OP24 SOFT TISSUE FACIAL PROFILE CHANGES IN ADULT ORTHODONTIC PATIENTS WITH DIFFERENT EXTRACTION PATTERNS

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AIMS: The aim of the study was to evaluate the effect of different extraction patterns on the soft tissue facial profile (STFP) in adult orthodontic patients.
MATERIAL AND METHODS: The study sample consisted of 80 adult patients (mean age: 30.99±9.87) who underwent orthodontic treatment with and without extraction of permanent teeth. The patients were divided into 3 groups: extractions of maxillary posterior teeth (30 patients, 24 females, 6 males), extractions of maxillary and mandibular posterior teeth (25 patients, 22 females, 3 males) and a control sample without any extractions (30 patients, 22 females, 8 males). The exclusion criteria included presence of dentofacial deformities or any facial soft tissue augmentation procedures. The lateral head radiographs before and after orthodontic treatment were used to evaluate the soft tissue profile changes

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in the nasolabial angle, upper lip Z-angle, lower lip Z-angle and labio-mental angle. Comparison between groups was performed using ANOVA with Tukey's post hoc test ($p \leq 0.05$).
RESULTS: In the group with maxillary extractions, the mean values of the nasolabial angle, the upper lip Z-angle, the lower lip Z-angle and the labio-mental angle have increased in comparison to pre-treatment values, but the differences were not statistically significant. In the group with extractions in both jaws, the mean value of the nasolabial angle and the Z-angle of the upper lip increased in comparison to the pre-treatment values. A statistically significant difference was found for the nasolabial angle and the Z-angle of the upper lip. There were no statistically significant changes in the lower lip Z-angle and the labio-mental angle. In the control group, the mean values of the nasolabial angle, the upper lip Z-angle and lower lip Z-angle decreased, while the mean values of the labio-mental angle increased but none of these differences were statistically significant.
CONCLUSIONS: No significant changes in the soft tissue facial profile were present in adult orthodontic patients treated with tooth extractions, except for the upper lip position after extractions in both jaws. Therefore, the adult orthodontic treatment with extractions does not have a negative impact on the facial profile.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.025
OP25 EFFECTS OF ORTHODONTIC TREATMENT ON TEETH WITH A HISTORY OF DENTAL TRAUMA: A 4 YEAR FOLLOW UP

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AIM: To evaluate the effects of orthodontic treatment on patients with a history of dental trauma to the incisors, followed up an average of 4.7 years.
METHODS: Patients with previous dental trauma to the upper or lower incisors, orthodontically treated at University Hospitals Leuven, Belgium were prospectively followed up. Patient characteristics (occlusion, oral habits), type of trauma and orthodontic treatment were noted, together with esthetic parameters, pulpal condition and presence/degree of root resorption (RR) of the affected incisors before (T1), at completion of treatment (T2) and at least one post-treatment follow-up moment (T3). The odds ratio of the degree and probability of root resorption at T2 depending on the type of trauma were calculated with cumulative logistic regression. Pulpal outcomes at T1 and T2 were compared between teeth with and without trauma with Fisher's Exact test. The relation between oral habits and RR according to Malmgren and the impact of incisor extraction on treatment duration, patient satisfaction and esthetic outcomes were descriptively reported.
RESULTS: A total of 141 patients were included (79 male, 62 female, mean age at T1 13.7±5.9 years). 56.8% presented Class II with mean overjet 5.7±3 mm. 33% of cases involved incisor extraction. Patients with trauma had significantly higher RR rates (58.4%) and pulpal complications (8.56%) than patients without (23.86% and 0.9%, respectively), especially when the trauma involved hard or periodontal tissue. Nail-biting was associated with increased RR. Esthetic outcomes such as gingival line and papilla integrity worsened with incisor extraction, although patient satisfaction remained high (>70%). The odds ratio of developing RR was significantly higher when the trauma involved PDL damage compared with uncomplicated fractures (OR 0.470, p=0.024 and 0.574, p=0.05). The longer the orthodontic treatment (involving incisor extraction or different treatment phases with removable and fixed appliances) the higher the frequency of RR.
CONCLUSIONS: Incisors with prior dental trauma should be carefully evaluated before orthodontic treatment. Long courses of treatment should be avoided, especially in severe traumata, and if the teeth are kept, removable appliances should be preferred to limit RR. Patients should be informed that incisor extraction can lead to less optimal esthetic outcomes.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.026
OP26 THE EFFECT OF LOWER INCISOR EXTRACTION ON OCCLUSAL OUTCOME OF SURGICALLY TREATED MALOCCLUSIONS

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AIMS: Crowding or proclination of lower incisors may require tooth extraction during presurgical orthodontic treatment. The aim of this study was to examine how the extraction of a lower incisor affected the outcome in malocclusions treated with orthognathic surgery.
MATERIAL AND METHODS: The material included 84 patients treated at the Helsinki University Hospital between 2013-2024. Each patient had a lower incisor extracted during preoperative orthodontics and went through orthognathic surgery and postsurgical orthodontics. They were divided into three groups based on surgical treatment: upper jaw surgeries (Group 1; n = 13), bilateral sagittal split osteotomy (Group 2; n = 36) or surgery of both jaws (Group 3; n = 35). The analyzed variables were age, gender, treatment duration, malocclusion diagnoses, and changes in horizontal overjet, vertical overbite and Angle classifications before and after treatment. The mean age was 30.5 years. The average treatment duration was 43.3 months.
RESULTS: Group 1 started with the mean overjet 0.88 mm, overbite -1.00 mm and most patients had either class I (4/13) or class III (6/13) occlusion. After treatment the mean overjet was 2.5 mm, overbite 1.75 mm and class I was registered in 4 patients. In Group 2 the initial mean overjet was 7.23 mm, overbite 5.22 mm and most of the patients were representing class II (18/36) or asymmetric molar relationship (10/36). After treatment the mean overjet was 3.00 mm, overbite 2.65 mm and class I occlusion was achieved by 21 patients. In Group 3 the beginning mean overjet was 5.41mm and overbite 0.19 mm. They had variable molar relationships. At the end the mean overjet was 3.04 mm, overbite was 1.84 mm, and 15 patients had class I occlusion. Altogether 18 of 84 patients obtained ideal occlusion (class I, overjet 1-3 mm and overbite 1-3 mm). 40 patients had class I molar relationship, and 42 patients had ideal overbites after treatment.
CONCLUSIONS: As part of a comprehensive treatment including orthodontics and orthognathic surgery, removal of a lower incisor can lead to a favorable occlusal outcome regardless of the type of orthognathic surgery.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.027
OP27 EVIDENCE-BASED ASSESSMENT OF SLEEP QUALITY IN PATIENTS WITH ANKYLOGLOSSIA IN TERMS OF RISK OF OBSTRUCTIVE SLEEP APNEA

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AIMS: Sleep Breathing Disorder (SBD) in growing patients contributes to a higher incidence of disorders such as depression, anxiety and Attention Deficit Hyperactivity Disorder. One form of SBD is Obstructive Sleep Apnea (OSA). The literature cites a number of morphological abnormalities from the head and neck area that may be associated with OSA, e.g. a lowered and posterior position of the hyoid bone (HY). Although, in line with previous studies, ankyloglossia is significantly more likely to coexist with an upward displacement of the HY, it seems to be important to study the variability of muscle tension and its potential relationship to OSA in the case of ankyloglossia.
MATERIAL AND METHODS: The study enrolled 30 healthy children (8–10 years old), divided according to the length (mm) of the free tongue part as well as the tongue range of motion ratio (TRMR). Position of the HY was determined in their lateral cephalograms. Each child was tested with a Bruxoff device. Statistical analysis of the results was conducted using the chi-squared and Mann-Whitney test, assuming a significance level of $\alpha = 0.05$ as well as analysis with odds ratio.
RESULTS: Compared to the control group, the following was shown: among patients with ankyloglossia classified as grade: a) 1 or 2 in Kotlov's scale, the odds ratio of SBD was 10 times higher, b) 2 of TRMR, the risk of SBD was statistically significantly higher.
CONCLUSIONS: Higher position of the hyoid bone in patients with ankyloglossia potentially protects the airway, however generates the muscle tension or Sleep Bruxism (SB) triggering a risk of SBD development. Therefore, ankyloglossia must be treated, however determining if frenulotomy or myofunctional therapy is more efficient requires further research. The functional assessment of ankyloglossia has advantages over Kotlov's classification in the context of SBD diagnosis. Nonetheless, as the study groups are small, it would be necessary to increase their numbers to make the results more reliable.
Disclosure of interest: None declared

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Abstract citation ID: cjaf073.028
OP28 AIRWAY DIMENSIONS, CRANIOFACIAL AND UPPER SPINE MORPHOLOGY, AND HEAD POSTURE IN PATIENTS WITH HYPOPHOSPHATASIA

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AIMS: The aims were to: 1) analyze upper airway and craniofacial morphology in patients with hypophosphatasia (HPP) and compare them to a healthy control group and to 2) analyze upper spine morphology and head posture in patients with HPP and compare them to a healthy control group.
SUBJECTS AND METHOD: The power calculation indicated that 24 participants should be included in each group. A total of 26 HPP patients (21 women, 5 men, mean age 51.88 years, mean BMI 27.09 kg/m²) and 31 healthy controls (27 women, 4 men, mean age 48.61 years, mean BMI 24.80 kg/m²) were included. Upper airway dimensions including airway volume and minimum cross-sectional airway were assessed on Cone Beam Computed Tomography (CBCT) and analyzed in three-dimensions (3D). Morphological deviations of the upper spine were assessed on CBCT and analyzed by visual assessment in 3D. The craniofacial morphology and head posture were assessed by lateral cephalograms taken in natural head position, the mirror position, and analyzed by linear measurements in two-dimensions. All the methods were standard, validated method with small method errors and high reliability. Statistical analysis was performed using a general linear model and logistic regression analysis adjusted for age, gender and BMI. Because many comparisons between the groups were included in the study, the p-values were corrected for multiple testing comparing groups by the False Discovery Rate (FDR).
RESULTS: No statistical significance was found between the two groups for head posture, upper airway dimensions , craniofacial morphology or morphological deviations of the upper spine when adjusted for age, gender and BMI and p-values corrected for multiple testing comparing groups.
CONCLUSION: Airway dimensions, craniofacial and upper spine morphology, and head posture were not significantly affected in patients with HPP when compared to controls.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.029
OP29 PREMOLAR EXTRACTIONS IN FIXED APPLIANCE ORTHODONTIC TREATMENT HAVE NO NEGATIVE EFFECT IN THE UPPER AIRWAY VOLUME AND DIMENSIONS

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AIMS: The aim of this study was to evaluate the effect of orthodontic fixed appliance treatment with or without premolars' extraction on the pharyngeal airway volume and minimum cross-sectional area (minCSA) in growing and adult patients.
MATERIALS AND METHODS: Seven databases, unpublished gray literature, and the references list of the identified articles were electronically searched for relevant studies up to November 2024. Included studies assessed the effect of premolar extraction on pharyngeal airway volume or minCSA based on cone-beam computerized tomography. After duplicate study selection, data extraction, and risk of bias assessment with the ROBINS-I tool, random-effects meta-analyses were conducted followed by subgroup, meta-regression, and sensitivity analyses at 5%.
RESULTS: In total 11 studies, 817 treated patients with a mean age of 18.5 ± 7.1 years were included. Compared with the control group of non-extraction fixed-appliance orthodontic treatment, no statistically significant difference was found in upper airway volumes of the nasopharynx, palatopharynx, oral cavity, oropharynx, glossopharynx, and in the minCSA of these compartments. The only exception was the minCSA of the oropharynx, where extraction-based orthodontic treatment was associated with increased minCSA compared to non-extraction treatment (mean difference 23.84 mm^2; 95% confidence interval 12.99 to 34.69mm^2; P=0.006), which was of moderate magnitude.
CONCLUSIONS: Based on existing evidence from controlled clinical studies, extraction of premolars during orthodontic treatment with fixed appliances is not associated with negative effects on the upper airways' dimensions. Future studies with better quality could significantly affect the direction and strength of the results.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.030
OP30 DETERMINING THE OPTIMAL INDICATOR FOR FACIAL SIZE CHANGES: HEIGHT, WEIGHT, OR BODY MASS INDEX (BMI) ALTERATIONS?

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AIMS: The study seeks to determine the relationship between changes in facial soft tissue size and changes in height, weight, and BMI in developing children.
MATERIAL AND METHODS: The study involved 113 children (57 girls, 56 boys) with an average age of 11.8 years (SD = 1.9), recruited from schools in the Olomouc Region, Czech Republic. Facial morphology was captured at two 1-year intervals using a 3D stereophotogrammetric scanner, and height and weight were recorded annually for each child. BMI was calculated using the formula: weight (kg) / height (m²). Geometric morphometrics, incorporating 14 fixed landmarks and 400 semi-landmarks, was applied to evaluate facial size. Centroid size (CS) was used as a measure of facial size. Descriptive statistics were utilized to summarize the sample, and Generalized Procrustes analysis along with multivariate regression models were employed to analyze the relationship between annual changes in CS (dependent variable) and changes in height, weight, BMI, sex, and age (independent variables).
RESULTS: In the sample, the mean annual changes in CS were 35.6 (SD=23.1) and 53.4 (SD=27.9), mean annual height changes were 6.8 cm (SD=1.9) and 7.1 cm (SD=2.7), mean annual weight changes were 4.7 kg (SD=2.8) and 6.8 kg (SD=4.1), and mean annual BMI changes were 0.5 (SD=1) and 1.1 (SD=1.6). Regression models showed that the best predictor of CS change was weight change (R^2=0.26, p<0.001), followed by height change (R^2=0.15, p<0.001), and BMI change (R^2=0.09, p=0.003). Age had no significant effect on CS change, but sex was associated with CS change, with boys showing more CS changes than girls (R^2=0.15, p=0.003).
CONCLUSIONS: Monitoring changes in body weight appears to be a better indicator of facial size changes than tracking height in children.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.031
OP31 ASSESSMENT OF EXTRAORAL SOFT TISSUE, THREE-DIMENSIONAL AIRWAY VOLUME AND QUALITY OF LIFE: A MANDIBULAR MONOBLOCK APPLIANCE THERAPY IN OBSTRUCTIVE SLEEP APNEA

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AIMS: 1) To assess the efficacy of mandibular monoblock appliance (MMA) in treating mild to moderate obstructive sleep apnea (OSA) patients in terms of three-dimensional pharyngeal airway measurement and extraoral soft tissue for pre-and post-treatment using a cone beam computed tomogram imaging (CBCT) data set.
2) To evaluate changes in quality of life (QoL) among patients six months post-treatment.
MATERIAL AND METHODS: Mild to moderate OSA patients underwent polysomnography at ENT clinic, Universiti Malaya Medical Centre (UMMC) who met the inclusion and exclusion criteria were recruited. A disease-specific Malay version Sleep Apnea Quality of Life Index (SAQLI) questionnaire was given at T0, T1, T2 and T3 visit. Single operator was calibrated with a gold standard clinician. Patients received a MMA, titrated at 60% of maximum mandibular protrusion with 5mm vertical opening between upper and lower incisors. CBCT taken at T1 and T3 without appliance in-situ. Data were analysed with Materialise Interactive Medical Image Control System (MIMICS) software. Post-treatment data, T3 were collected after six months of treatment. Parameters were airway

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volume, chin throat-lower face angle, and QoL changes between pre and post-treatment. Results were presented as a comparison of mean with standard deviation and paired t-test data for all parameters. Statistical significance was set at $p < 0.05$ with data analysed using intention to treat analysis protocol.

RESULTS: Twenty patients (n=8 male, n= 12 female) were recruited. At T3, six patients drop out with 14 subjects remains. All four domains of SAQLI showed significant improvement in QoL after six months of MMA wear (p-value < 0.05). Overall mean score at T0=3.3, T3=5.8. No significant changes in oropharyngeal three-dimensional airway volume and extraoral soft tissues (p-value > 0.05). The inter and intracorrelation coefficient of three-dimensional airway volume was 0.98 and 0.99 respectively. The intercorrelation coefficient of the extraoral soft tissue assessment, the angle between Sn-Pog, and C point-Me was 0.98 and intra coefficient correlation was 0.99.

CONCLUSIONS: There was no difference in three-dimensional oropharyngeal airway volume and extraoral soft tissue with MMA use in mild to moderate OSA patients. Significant improvement reported in patient's QoL with MMA therapy assessed using SAQLI

Disclosure of interest: None declared

Abstract citation ID: cjaf073.032

OP32 A NATIONAL QUESTIONNAIRE-BASED STUDY ASSESSING INFORMATION PROVISION FOR ORTHOGNATHIC TREATMENT

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AIM: Orthognathic treatment is relatively common in the United Kingdom (UK) with over 3,000 patients having this treatment annually. Whilst it is an elective procedure which provides benefits for the majority of patients, it also carries significant risks. This national study of consultant orthodontists in the UK and Republic of Ireland (RoI) was designed to explore the information they provide for patients both considering and undergoing treatment with a combined orthodontic-orthognathic surgery approach.

MATERIALS AND METHODS: A bespoke questionnaire was developed by the research team and piloted with four consultant orthodontists. Distribution of the questionnaire was electronic via the Qualtrics XM online survey tool (https://www.qualtrics.com/uk/) in March 2024 to members of the British Orthodontic Society (BOS) who undertake orthognathic treatment in a national health service hospital setting. Questions were asked to obtain demographic information related to the respondent, alongside the timing and nature of what information is provided to patients. Respondents were asked whether they used nationally available information resources and finally what risks and benefits of orthodontics and orthognathic surgery were discussed.

RESULTS: Fifty-six responses were received (approx. 28% response rate) and all participants said that their patients attended an interdisciplinary clinic, with orthodontists and surgeons present, prior to commencing treatment. Nationally available resources, mainly from the BOS, were used by 98% of respondents. The three benefits of treatment that were most frequently discussed included improvement in occlusion (93% of respondents), improvement in facial aesthetics (91%) and improvement in dental aesthetics (84%). A number of risks were routinely discussed and there was marked consistency, with more than 90% of respondents routinely discussing the same 9 orthodontic risks and 11 surgical risks.

CONCLUSIONS: In the UK and RoI, patients contemplating orthognathic treatment routinely visit an orthognathic interdisciplinary team clinic before starting active treatment. Nationally available resources are used to share information with these patients, and for those consultant orthodontists who responded, there was consistency in the risks and benefits of orthognathic treatment discussed with prospective patients to assist them in making informed decisions.

Disclosure of interest: None declared

Abstract citation ID: cjaf073.033

OP33 SUCCESS RATES OF MENTOPLATES FOR SKELETAL ANCHORAGE IN ORTHOPAEDIC AND ORTHODONTIC INDICATIONS: A RETROSPECTIVE STUDY

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AIMS: Mentoplates, inserted in the supramental region, are used as mandibulary anchorage for maxillary protraction and as a stable anchor for comprehensive orthodontic tasks in the mandible. Given the extended duration required for many of these treatments, long-term stability of these devices is crucial. This study evaluates the survival rates of Mentoplates, therapy success, and the influence of plate design on long-term outcomes.

MATERIAL AND METHODS: The treatment records of 106 patients were analysed and categorised into orthopaedic (n = 67) and orthodontic (n = 39) groups. Success rates were further stratified by Mentoplate design, including V-shaped 3-hole (VM3), V-shaped 4-hole (VM4), and T-shaped (TM) plates.

RESULTS: The average therapy duration was 2 years, 1 month (± 1 year, 8 months) and showed no significant difference between the orthopaedic (2 years, 0 months ± 1 year, 7 months) and orthodontic (2 years, 3 months ± 1 year, 11 months) groups (p = 0.586). Similarly, the time to plate removal was consistent across groups (p = 0.619), with an average period of 3 years, 7 months (± 2 years, 2 months).

The overall therapy success rate was 90%, with no significant difference between the orthopaedic (88.1%) and orthodontic (92.3%) groups (p = 0.495). Plate design influenced success rates, with V-shaped Mentoplates showing higher success than T-shaped Mentoplates (p = 0.143). The success rates were 89.1% for VM3, 94.9% for VM4, and 75.0% for TM. The overall survival rate of Mentoplates was 95%, with similar rates in the orthopaedic (96%) and orthodontic (95%) groups (p = 0.887). Plate design also influenced survival rates, though the differences were not statistically significant (p = 0.116). Survival rates were 96.4% for VM3, 97.4% for VM4, and 83.3% for TM.

CONCLUSIONS: Mentoplates demonstrated high success and survival rates in both orthopaedic and orthodontic applications. V-shaped Mentoplates, achieved higher success and survival rates than T-Mentoplates, suggesting their preferred use in clinical practice. These findings underscore the reliability of Mentoplates as very reliable temporary anchorage devices.

Disclosure of interest: None declared

Abstract citation ID: cjaf073.034

OP34 DETERMINING IMPACTS OF ORTHOGNATHIC JAW SURGERY ON SPEECH AND LINGUAL GESTURES IN PATIENTS WITH CLASS III DENTOFACIAL DISHAROMY AND CLEFT LIP AND PALATE

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AIMS: Patients with severe jaw disproportions (e.g. Class III 'underbites', Dentofacial Disharmony (DFD)) have a twenty-fold higher prevalence of speech disorders. However, it is unknown the degree to which surgical correction yields speech improvements and by what mechanism speech changes, precluding clinical guidelines. Class III patients with repaired cleft lip and palate (CLP) can also develop velopharyngeal insufficiency (VPI) and hypernasality after maxillary advancement, impacting speech. Our investigation aimed to determine effects of jaw surgery on speech, lingual gestures, and VP function of Class III patients with DFD and CLP.

MATERIAL AND METHODS: A prospective observational cohort study was conducted of Class III patients (N=84 DFD, 12 CLP, Ages 15-40). Patients were recorded before and after surgery (at 1-2 months pre-operation, 2-6 months post-operation (short-term) and 9-14 months post-operation (long-term)) to evaluate speech perceptually and quantitatively using spectral analyses of consonants. Lingual gestures were imaged in a subset of patients (n=20 DFD, 9 CLP) using ultrasound before and after surgery, with measurement of Tongue Dorsum Excursion Index (TDEI) and Tongue Constraint Position Index (TCPI). VPI indices were obtained using pressure-flow assessments (to estimate VP-gap size) and compared with qualitative perceptual ratings of resonance by speech pathologists. Reference Class I controls (N=60) were similarly evaluated. Mixed-effects linear models were used to determine significant differences.

RESULTS: Spectral features, perceived distortions and self-reported speech outcomes significantly improved at both short- and long-term visits post-operatively for patients with Class III DFD. Alterations in lingual gestures were seen. Patients with CLP presented with lower TDEI and TCPI (p=0.001) when compared to controls, suggesting a more anterior tongue position. Pressure-flow data showed evidence of VPI after maxillary advancement for patients with CLP, with variable perceptual and self-reported speech outcomes.

CONCLUSIONS: TDEI and pressure-flow data suggest greater compensatory articulations and VPI after surgery for patients with CLP, negatively impacting their speech. However, findings indicate positive effects of jaw surgery on speech of Class III DFD patients without CLP. Consonant production relies on well-positioned articulatory structures, and surgery can provide longitudinal improvement in speech for patients with jaw disproportions and no history of clefting, informing treatment recommendations.

Disclosure of interest: None declared

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Abstract citation ID: cjaf073.035
OP35 CHILDHOOD CANCERS AND ORTHODONTIC TREATMENT: A CROSS-SECTIONAL SURVEY OF CLINICIANS' VIEWS

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AIM: With great advances in cancer therapy, the survival rate of childhood cancers has improved significantly. Cancer therapy given to growing patients can have an impact on their dental and craniofacial development, however there is a paucity of research on the impact of childhood cancer on orthodontic treatment. To our knowledge, this is the first study in UK which aims to ascertain orthodontic clinicians' experience and perceptions of the management of these patients.
MATERIAL AND METHODS: Local and British Orthodontic Society governance approval was obtained. A novel questionnaire was developed and piloted. This was then disseminated electronically via British Orthodontic Society to all members. The questionnaire contained questions on: (i) clinicians' experience in managing patients with cancer diagnosed during active orthodontic treatment (ii) clinicians' experience in providing orthodontic treatment for patients with a past history of childhood cancer (iii) clinicians' self-efficacy, perceptions and self-perceived confidence in managing cancer patients.
RESULTS: There were 193 responses. The majority of the respondents (76.7%) reported that they have experience with treating childhood cancer patients. The main reported challenges with managing patients diagnosed with cancer during active orthodontic treatment were: not knowing when orthodontic treatment should recommence after completion of cancer therapy (34.7%) and not being able to access clear guidance (29.3%). In terms of providing orthodontic treatment for patients with a history of childhood cancer, the main reported challenges were: unable to place metal fixed appliances due to the need for periodic CT or MRI scans (37.3%) and having to modify the initial treatment plan (33.3%). 80.6% of respondents perceived that they did not have sufficient knowledge about managing patients diagnosed with cancer during active orthodontic treatment, whereas 67.5% perceived a lack of sufficient knowledge on providing orthodontic treatment for patients with a past history of childhood cancer. 78.3% of respondents preferred an online e-learning module to help support them on this topic.
CONCLUSIONS: Clinicians perceived low confidence in treating patients with childhood cancer. The results identified the knowledge gap in managing cancer patients and provide important information for future development of guidance and education regarding cancer patients and orthodontic treatment.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.036
OP36 "JAW DROPPING, TIKTOK'ING" - AN EVALUATION OF TIKTOK AS A SOURCE OF INFORMATION FOR ORTHOGNATHIC PATIENTS

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AIMS: As social media platforms like TikTok become increasingly popular, patients are turning to them for information about surgical procedures, including Orthognathic surgery. This study aimed to evaluate the content quality, reliability, and educational value of videos related to Orthognathic surgery on TikTok.
MATERIALS AND METHODS: A total of 84 videos were analysed using two standardized assessment scales: the modified 5-point DISCERN scale and the Global Quality Score (GQS). These videos were sourced through search terms #JawSurgery and #OrthognathicSurgery, and the data were extracted using a web-scraping tool.
RESULTS: The analysis revealed that TikTok videos on Orthognathic surgery had a mean DISCERN score of 1.6/5 and a mean GQS of 2.2/5, indicating generally poor quality. Most videos were patient-uploaded (55%), while 39% came from healthcare professionals, particularly Maxillofacial surgeons and Orthodontists. Despite the high viewership (246 million views across all videos), many videos were limited in content, with 62% not containing any information on the procedure, and only 4% mentioning risks beyond swelling and bruising. Notably, 97% of videos had patients interacting in the comments, seeking advice or sharing experiences.
CONCLUSIONS: While TikTok serves as an important information platform, it also highlights a significant gap in reliable, comprehensive content. Healthcare professionals should engage with social media to provide accurate, high-quality information to mitigate the risks of misinformation and anxiety for prospective patients. This study emphasizes the need for healthcare teams, particularly in the field of Orthognathic surgery, to contribute educational content on platforms like TikTok to ensure patients are well-informed.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.037
OP37 POLYGRAPHIC EVALUATION OF THE EFFECTS OF FUNCTIONAL ORTHODONTIC TREATMENT WITH TWIN BLOCK AND HERBST APPLIANCES ON SLEEP QUALITY: A RANDOMIZED CLINICAL TRIAL

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AIM: This clinical study aimed to investigate the effects of Twin block (TB) and Herbst functional appliances on sleep quality in children with obstructive sleep apnea (OSA) and mandibular retrognathia.
MATERIALS AND METHOD: A total of 46 patients diagnosed with mandibular retrognathia and OSA were randomly divided into two treatment groups: Twin Block (TB) and Herbst appliances. Changes in sleep parameters (Apnea-hypopnea index (AHI), supine AHI, Oxygen Desaturation Index (ODI), minimum oxygen saturation) detected by polygraphy and Pittsburg Sleep Quality Index (PSQI) at baseline (B/L) and an avarage of 8-month follow-up (F/U) were the primary outcomes. Changes in mandibular skeletal parameters were the secondary outcomes. Shapiro Wilk test and Q-Q graphs were used to examine the distribution assumptions of variables according to groups. Mann Whitney U test was used to evaluate two independent group means of measurements. Paired sample t test was used to evaluate the differences between the B/L and F/U times at $p<0.05$ significance level.
RESULTS: The average PSQI values were decreased significantly in both groups following functional treatment (95%(CI), $p<0.05$). AHI changed significantly from B/L to F/U in Herbst group (1.08(-0.47–2.63), p=0.031). However, there was no significant difference between the two groups from B/L to F/U (95%(CI), p=0.312). While the change from B/L to F/U in the supine AHI was significant in Herbst group (3.29(-0.20–6.78), 95%(CI), p=0.001), this value did not reach statistical significance in TB group (0.39(-0.59–1.37), 95%(CI), p=0.531). ODI altered significantly from B/L to F/U in Herbst group (2.09(0.58–3.60), p=0.013). There was no change in minimum oxygen saturation from B/L to F/U in both groups (3.81(-1.38–9.00), p=0.166; 0.87(-3.17–4.91), p=0.680, respectively) with no inter-group difference (95%(CI), p=0.382). In both groups, the F/U values of SNB, ANB and Wits were statistically significantly higher than the baseline values (95%(CI), $p<0.001$). However, the change in SNA from B/L to F/U was not significant (0.34(-0.24–0.91),p=0.260; 0.44(-0.18–1.06),p=0.260).
CONCLUSIONS: Significant improvement was observed in sleep parameters with Herbst appliance. Functional orthodontic treatment was found to be effective as an adjunctive treatment for OSA. Changes in sagittal skeletal measurements were significant in all groups.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.038
OP38 LIMITED PERFORMANCE OF THE MALOCCLUSION IMPACT QUESTIONNAIRE (MIQ) IN A POLISH POPULATION

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AIMS: To assess relationship between MIQ scores and severity of malocclusion in a Polish sample
MATERIAL AND METHODS: 60 children (29 boys) with a mean age of 11.5 years (SD=1.2, range: 9.5–14) participated in the study. They were asked to complete the validated Polish version of the Malocclusion Impact Questionnaire (MIQ-PL). The questionnaires were administered during consultation visits at a university dental clinic before the initiation of any orthodontic treatment.

The pre-treatment severity of malocclusion was evaluated twice: (1) on 3D scans of the dental arches using the Peer Assessment Rating (PAR) Index and (2) on intra-oral photographs using the Aesthetic Component of the Index of Orthodontic Treatment Need (AC-IOTN).

Internal consistency of the MIQ-PL responses was analyzed using Cronbach's

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alpha, and intraclass correlation coefficients (ICCs) were used to determine method error in PAR and AC-IOTN scoring. Correlation analyses were conducted to assess the association between PAR and AC-IOTN scores and the MIQ global question 1 (MIQ_{GQ1}), MIQ global question 2 (MIQ_{GQ2}), and the MIQ overall score (MIQ_{OS}).
RESULTS: The Cronbach alpha =0.88 and ICCs >0.9 indicated very good reliability. The mean $MIQG_{Q1}$ = 1.5 (SD=1), mean MIQ_{GQ2} = 1 (SD=1.2), and MIQ_{OS} = 7.6 (SD=5.8), while the mean PAR = 18.2 (SD=9.2) and mean AC-IOTN = 4.9 (SD=2.1). The correlation coefficients between PAR scores and $MIQG_{Q1,}$ MIQ_{GQ2}, and MIQ_{OS} were 0.06, 0.19, and 0.2, respectively. The correlation coefficients between AC-IOTN scores and $MIQG_{Q1,}$ MIQ_{GQ2} , and MIQ_{OS} were 0.2, 0.31, and 0.26, respectively.
CONCLUSIONS: The weak correlation between indices reflecting the severity of malocclusion and MIQ scores suggests that the MIQ-PL may not be a suitable tool for assessing the impact of malocclusion on the OHRQoL of Polish teenagers.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.039
OP39 DENTAL AND OCCLUSAL FEATURES BEFORE AND AFTER BONE ANCHORED MAXILLARY PROTRACTION TREATMENT: A RETROSPECTIVE-STUDY

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AIMS: The aim of this retrospective study was to evaluate the effectiveness of bone anchored maxillary protraction (BAMP) treatment of class III occlusion. In Finland, orthodontic treatments for underaged patients are publicly funded. Considering that the placement of miniplates is an invasive procedure for the patients and costly for society, the treatment should be effective.
MATERIAL AND METHODS: The study group consisted of 73 BAMP treated patients, treated in the four different wellbeing service counties in Helsinki University Hospital (HUH) region. The BAMP treatments were conducted between January 2010 and December 2022. The patient records were retrospectively screened. Data was collected on gender, age, and intraoral dental features before and after the BAMP treatment.
RESULTS: At the start of the treatment, the patients' mean age was 12.8 (range 10.6-14.8) years, the mean overjet was 0.63 (range -1-3) mm, overbite was 0.53 (range -5.5-4), class I occlusion was registered in 27 patients, class II in none of the patients, class III in 26 patients, cusp-to-cusp in 2 patients, and asymmetric molar relationship in 11 patients. Molar relationship had not been recorded in 7 patients. The mean treatment time was 32 months. At the end of the treatment the mean overjet was 1.05 (range -6-6.5) mm, overbite was 1.01 (range -4-6) mm, class I occlusion was registered in 38 patients, class II in 4 patients, class III in 16 patients, cusp-to-cusp in 2 patients, asymmetric molar relationship in 11 patients and information was missing of 2 patients. 27/73 (37%) of the patients had fixed appliances or a removable plate with incisor protraction springs during BAMP treatment.
CONCLUSIONS: The effect of BAMP treatment measured as the change in overjet and overbite was small on average and clinically of little significance. However, for individual patients, the BAMP treatment might be beneficial. Future studies should aim to find patient characteristics predicting successful treatment outcome to support patient selection for BAMP treatment.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.040
OP41 VERY LONG-TERM ORAL HEALTH AFTER ADULT CLASS II TREATMENT

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AIMS: To investigate very long-term (≥ 15 years) oral health in former Class II patients who underwent Herbst and subsequent multibracket appliance treatment as young adults (age ≥ 18 years or age ≥ 16 years and skeletal growth completed according to handwrist radiographs).
MATERIAL AND METHODS: 31 out of 55 eligible former patients (18 II:1, 13 II:2) attended a recall at age 43.4±7.5 years and therefore 19.8±3.6 years after treatment which had started at an average age of 21.8±7.3 years.

A clinical examination was performed and the current data (T2) on dental and gingival health were compared to the records from before (T0) and immediately after active Tx (T1) - as far as available - to assess the long-term changes. In addition, data from the population representative German Oral Health Study DMS V for the age group 35-44 years were considered for comparison.
RESULTS: The "Missing and Filled Teeth Index" (MFT) changed from 5.0±5.07 at T0 to 5.3±5.12 at T1. Very long-term (T2) the MFT was 8.7±5.67 and thus lower than the DMS V value of 10.7 (SD unfortunately not available).

The mean "Community Periodontal Index" (CPI) maximum score was 1.0 ±0.52 at T2 with only 13% of the participants exhibiting a maximum score >2 implying periodontal disease; the corresponding value from the DMS V examination is 61%.

The prevalence of lower incisor labial gingival recessions ≥ 0.25 mm changed from 3.2% at T0 over 2.4% at T1 to 4% at T2. The mean extent changed from 0.0±0.07 mm at T0 over 0.0±0.08 mm at T1 to 0.3±0.19 mm at T2.
CONCLUSIONS: Very long-term former adult Class II patients exhibit better oral health in comparison to population representative data from the same age-cohort.

The study was financially supported by the German Society of Dentistry and Oral Medicine (DGZMK).
Disclosure of interest: None declared

Abstract citation ID: cjaf073.041
OP42 THE EFFECTS OF DIFFERENT STORAGE CONDITIONS ON THE PHYSICAL AND CHEMICAL PROPERTIES OF CLEAR ALIGNER MATERIALS

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AIMS: The study aimed to investigate the effects of different storage conditions (humid environment, dry environment, and room temperature) on the physical and chemical properties of clear aligner materials. Specific objectives included analyzing changes in mechanical durability, surface roughness, and chemical stability.
MATERIAL AND METHODS: This in vitro study included 60 clear aligner samples, divided equally between Invisalign and ClearCorrect brands. The samples were randomly assigned to three storage condition groups: Humid environment (100% relative humidity, 37°C), Dry environment (room temperature in a dry setting), and Room temperature (50% relative humidity, 25°C). Samples were stored for 1 week, 2 weeks, and 4 weeks under these conditions. After storage, the following analyses were performed: Mechanical Durability: Maximum load-bearing capacity was measured using a tensile testing machine. Surface Roughness: Atomic Force Microscopy (AFM) was used to analyze changes in surface roughness. Chemical Stability: Energy Dispersive Spectroscopy (EDS) was employed to evaluate elemental composition. Data were statistically analyzed using ANOVA for group comparisons, followed by post-hoc tests to identify significant differences. A p-value of <0.05 was considered statistically significant.
RESULTS: Mechanical Durability: Significant reductions in tensile strength were observed in humid-stored samples, with decreases of 15% after 2 weeks and 25% after 4 weeks compared to baseline ($p < 0.05$). Dry and room temperature groups exhibited no significant changes ($p > 0.05$).

Surface Roughness: Surface roughness increased by 22% in the dry environment group after 4 weeks, compared to minimal changes in the humid and room temperature groups.

Chemical Stability: EDS analysis revealed a 10% reduction in carbon content and a 7% reduction in oxygen content in humid-stored samples. Dry and room temperature groups maintained stable elemental composition.
CONCLUSIONS: Different storage conditions significantly influence the physical and chemical properties of clear aligner materials. Humid environments reduced mechanical durability and chemical stability, while dry environments caused increased surface roughness. Room temperature storage with 50% relative humidity was identified as the optimal condition for maintaining material integrity. These findings emphasize the importance of appropriate storage guidelines in clinical practice and provide a foundation for future research on long-term aligner performance under varied environmental conditions.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.042
OP43 THE IMPACT OF MALOCCLUSION SEVERITY ON THE NUMBER OF PRESCRIBED, USED ALIGNERS AND TREATMENT DURATION; A RETROSPECTIVE COHORT STUDY

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AIMS: The aim was to assess the impact of baseline malocclusion severity on the number of prescribed and used Invisalign aligners as well as on treatment duration.
MATERIAL AND METHODS: An unrestricted, independent to the treating clinicians, search was conducted on the Invisalign ClinCheck database of a private practice for patients without any missing anterior teeth and whose treatment was finished between April 2021-December 2024. Descriptive statistics were generated and the feature selection Boruta algorithm (random forest algorithm) was implemented in order the identify important predictors for the number of aligners (prescribed and used) and treatment duration.
RESULTS: A total of 411 patients with all types of malocclusions were treated with Invisalign. Seven patients were excluded because of missing anterior teeth leaving 404 for inclusion [277 females, 127 males, age: 29.57(10.7) years]. Only 4 patients received full fixed appliances to completion while 18 received some type of adjunctive interventions (TADs or partial sectional fixed appliances). Mean maxillary and mandibular crowding were 3.02(2.52) mm and 4.22(2.89) mm. Mean overjet and overbite of all incisors were 2.96(1.41) mm and 2.65(1.80) mm. Anterior (1-5 teeth) and posterior (1-6 teeth) crossbite presented in 36 and 52 patients respectively while 47 patients had various missing or extracted posterior teeth.

Mean numbers of prescribed, used and unused aligners were 72.21(37.52) (range:14- 313), 65.63(30.40) (range:1-192) and 6.57(14.09) (range 0-164) respectively. Important predictors on the numbers of the prescribed and used aligners were relatively similar and included molar and canine relationships, maxillary crowding, overjet, missing or extracted posterior teeth and their number, overbite and the presence of posterior crossbite with the relative number of teeth. Treatment duration was associated with baseline maxillary crowding, molar and canine relationships, overjet, overbite, midline discrepancies and the presence of missing or extracted posterior teeth.
CONCLUSIONS: Factors related to the baseline malocclusion severity significantly affect the number of prescribed and used aligners as well as the treatment duration. This information could be used for informed practice and patient communication, including future evaluation of aligners biologic and environmental footprint.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.043
OP44 BIOCOMPATIBILITY OF POLYMERIC MATERIALS USED FOR 3D DIRECT PRINTING OF ORTHODONTIC ALIGNERS

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AIM: Cell proliferation and cell adhesion assays were performed to evaluate the biological safety of the proposed materials.
MATERIALS AND METHOD: Tera Harz TC-85 and Senertek Clear-A were examined. Disk-shaped samples were prepared (diameter 22 mm, thickness 0.5 mm) following the manufacturer's instructions (20 minutes polymerization, print resolution 100 microns). Samples were preserved in 70% ethanol for 24 hours and then transferred to a sterile fetal bovine serum solution for the following 24 hours. The samples were kept for a week in a growth medium without any contamination being detected. Four samples per set were maintained in a sterile condition, and human MG-63 osteosarcoma cells, previously expanded under standard culture conditions (DMEM/F12 medium 50%/50%, supplemented with 2 mM glutamine and 10% fetal bovine serum), were inoculated. Twelve-well plates with 1% Agarose coating were used to prevent cell adhesion to the plastic of the well and to maximize any potential adhesion to the materials. The cells (15,000 cells/sample of material/well) were seeded and allowed to adhere by gravity for 48 hours in an incubator at 37°C, under standard humidity conditions and in the presence of 2 mL of medium. After two washes in phosphate buffered saline solution (PBS), the materials were fixed in 4% paraformaldehyde and stained for 5 minutes at room temperature with a Methylene Blue solution to highlight any remaining attached cells. The materials were then rinsed with PBS five times and photographed using a Nikon SMZ1000 binocular microscope, equipped with a Nikon DS5 camera and the corresponding management software. Cell viability and metabolic activity were assessed using the Presto Blue™ assay. The analysis was conducted on both samples in direct contact with the cells seeded in the wells and on cultures set up in transwell systems.
RESULTS: Both materials did not exhibit cytotoxic effects that would impair cell viability or proliferation. None of them allowed for cell adhesion.
CONCLUSIONS: Both materials appeared to be safe. The lack of cell adhesion to the materials can be considered beneficial, especially if they are to be used for the production of appliances contacting the oral epithelium.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.044
OP45 PREDICTABILITY AND EFFECTS OF DEEP BITE CORRECTION USING INVISALIGN®-G5 VERSUS INVISALIGN®-G8 WITH SMARTFORCE ALIGNER ACTIVATION

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AIMS: The aims of this study were to 1) assess the predictability of Invisalign®-G8 in deep overbite reduction between predicted and actual outcomes within the first set of aligners; 2) compare the predictability between G5 and G8 protocols; 3) investigate the dental and skeletal effects achieved by deep overbite reduction with G8; and 4) compare three different measurement methods of obtaining overbite values.
MATERIALS AND METHOD: A retrospective cohort study was conducted using initial, predicted and actual stereolithography files following initial set of aligners. Overbite measurements were taken from the ClinCheck table, and Geomagic Control X® software. Lateral cephalograms taken pre-treatment and post-treatment were also collected. Fifty-eight adult patients with initial overbite ≥ 4mm were included in this study; 29 patients treated with Invisalign®-G8 were matched using initial overbite to 29 patients treated with G5 protocol. Wilcoxon signed rank tests or one sample t-tests were used to compare 2 dependent groups of continuous variables. Student's t-test was used to compare predictability between the two different protocols.
RESULTS: The mean (± SD) predictability of Invisalign®-G8 ranged from 46.4% (± 19.8) to 48.5% (± 25.1) using all three measurement methods. This was not statistically significant for the predictability of overbite reduction with Invisalign®-G5. Ten of 28 subjects treated with G8 protocol exhibited an increase in overbite compared to pre-treatment. There were no statistically significant cephalometric changes except for an opening of the mandibular plane angle (by a mean of 0.6°); but this was of low clinical significance. Mean difference in overbite values between the three measurement methods was no more than 0.3mm, which was not clinically significant.
CONCLUSIONS: Invisalign®-G8 expressed less than half of the deep overbite reduction that was predicted by ClinCheck. G8 and G5 protocols did not significantly differ in their predictability in overbite reduction; rather, 34.5% of patients treated with Invisalign®-G8 exhibited a deepening of their overbite throughout the course of treatment. Dental and skeletal outcomes when using Invisalign®-G8 for deep overbite correction were insignificant. Finally, ClinCheck is a validated tool for attaining overbite measurements.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.045
OP46 FAILURES AFTER AUTOTRANSPLANTATION OF IMMATURE TEETH IN ORTHODONTIC PATIENTS

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AIMS: The aim of the study was to evaluate the prevalence of failures after autotransplanation of immature teeth in orthodontic patients in relation to the donor type and the recipient site.
MATERIAL AND METHODS: All orthodontic patients, who were scheduled for autotransplantation of immature teeth by one orthodontist were included in the study. The exclusion criteria included observation time shorter than 1 year. Orthodontic and surgical records of all patients were evaluated including the reason for autotransplantation, the donor type and the status of the recipient site. The same orthodontist treated all patients. Clinical and radiological examinations of the transplanted tooth, if present, were performed and included assessment of

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its hard tissues and periodontal status. The criteria for failures included presence of any root resorption, signs of periodontal pathology and crown-to-root ratio<1.
RESULTS: The study group included 118 autotransplanted teeth in 90 orthodontic patients (46 females, 45 males). The mean age at the surgery was 14 years 10 months. Three oral surgeons performed the autotransplantation; one of them performed 88% of surgeries. Premolar agenesis, maxillary incisors' trauma and eruption disturbances were the reasons to transplant 86 developing premolars, 26 molars, 4 canines and 2 incisors. The mean observation time after surgery was 7 years 8 months (range: 1-24 years). Thirteen teeth (11%) in 4 females and 9 males were estimated as failures. The reasons included ankylosis (6), root resorption (3), ICR (1), caries and root resorption (1) and short root (1). One tooth was lost due to root resorption and bone loss (survival 99,2%). Failures after autotransplantation of immature premolars were 8,4%, third molars 11,5%, canines 25% and incisors 50%. The highest number of failures was after trans-alveolar transplantation of impacted teeth (37,5%) while the lowest have been registered when premolars or third molars were transplanted to premolar agenesis sites (6,8%) and to maxillary incisor regions (8,7%). No effect of the orthodontic treatment (pre- or post-surgery) on failure rate was noticed.
CONCLUSIONS: Autotransplantation of immature teeth in orthodontic patients is a predictable treatment long-term, however more failures were registered in males and for teeth with eruption disturbances.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.046
OP47 PREMOLAR AUTOTRANSPLANTATION TO THE ANTERIOR MAXILLA REGION - AESTHETIC OUTCOME AND PATIENT SATISFACTION

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AIM: The aim of this study was to assess the aesthetic results and patient satisfaction of premolars transplanted to the maxillary incisor region.
MATERIALS AND METHOD: In this multicentre study, 192 patients were included, with a minimum 3-year follow-up.
The aesthetic evaluation comprised two parts:

- Assessment of the PES/WES score using standardized intra-oral photographs
- Patient perspective (VAS-questionnaire)

At the time of assessment, all premolars were restored to maxillary incisor morphology with an (in)direct composite resin build-up.
SPSS Statistics (Version 28.0) (IBM, Armonk, N.Y.) was used for all statistical analyses. The results were considered statistically significant at a value of p<0.05. The Interclass and Intraclass Correlation Coefficient (ICC) were calculated to determine the inter- and intra-rater reliability. A mean-rating, absolute-agreement, 2-way mixed-effects model was used to obtain ICC estimates and their 95% confidence intervals. A multiple linear regression analysis was conducted to find potential correlations between the PES and WES scores and a set of independent variables.
RESULTS: The mean PES score was 6.94 (range, 2-10), and the mean WES score was 7.44 (range, 2-10). Most patients' aesthetic results were clinically acceptable (64.6%) or nearly perfect (9.4%). Significant correlations were found between PES and the position of the transplant at the receptor site (p=0.038) and level of oral hygiene (p<0.001). For the WES, there was a significant correlation with the prosthodontist (p<0.001).
The response rate for the VAS questionnaire was 61.9%. 85.1% of the patients perceived the aesthetic outcome of the transplanted premolar the same as other teeth, 15.7% was not satisfied with the restorative treatment and 12.4% was not satisfied with the surrounding tissues.
CONCLUSIONS: Premolars transplanted to the maxillary incisor region give good aesthetic results from both the professional and patient's perspective.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.047
OP48 WHITE SPOT LESIONS CAUSED BY ENERGY DRINKS – IS THERE A DIFFERENCE BETWEEN LABIAL AND LINGUAL TOOTH SURFACES

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AIMS: Despite the detrimental health effects associated to Energy Drink consumption only a few European countries have restricted their distribution to minors. Recent studies show that excessive Energy Drink intake also effects dental health and may lead to caries and erosion, with direct consequences for any orthodontic therapy. The aim of this study was to find out if there is a difference in the development of white spot lesions (WSL) on labial and lingual tooth surfaces during treatment with a fixed lingual appliance in patients with high Energy Drink consumption.
MATERIAL AND METHODS: 38 adolescent patients (m26/f 12) presented at least one new labial WSL on their upper and lower front teeth during lingual fixed appliance treatment and admitted excessive consumption of Energy Drinks. These patients with high carious risk were further investigated: High quality standardised intraoral pictures before (T1) and after (T2) fixed lingual therapy were used to evaluate the prevalence and incidence of WSL on labial and lingual surfaces of their 456 front teeth.
RESULTS: 75 teeth (70 (15.4%) labial/5 (1.1%) lingual) presented at least one WSL at T1. During lingual treatment 174 new WLS were detected on the unbonded labial surfaces compared to 40 new WLS on the bonded lingual surfaces. After debonding (T2) 51% of the labial tooth surfaces and 10% of the lingual tooth surfaces presented at least one WSL. The incidence of WSL from T1 to T2 was statistically significant on labial and lingual surfaces (paired t-test, alpha = 0.05).
CONCLUSIONS: Excessive consumption of Energy Drinks leads to more WSL on unbonded labial compared to bonded lingual tooth surfaces. These results underline the higher resistance of lingual tooth surfaces against enamel demineralisation.
Disclosure of interest: Dirk Wiechmann DW is the inventor of completely customized lingual appliances , Frauke Beyling: None declared

Abstract citation ID: cjaf073.048
OP49 ‡‡‡ SPONTANEOUS SPACE CLOSURE IN PATIENTS TREATED WITH EARLY EXTRACTION OF THE FIRST PERMANENT MOLAR: A RETROSPECTIVE COHORT STUDY USING RADIOGRAPHS

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AIMS: To assess the success rate of spontaneous space closure after extraction of the first permanent molar (FPM) in the maxilla and the mandible, and to identify the factors that make spontaneous space closure most favorable in each.
MATERIAL AND METHODS: A retrospective records-based cohort study was conducted through a search of the database of the Public Dental Service, Stockholm County Council, Stockholm, for young adults born between 2000 and 2001, who underwent extraction of one or more FPM between 2006 and 2016. A total of 995 extracted teeth were identified, of which 203 teeth in 155 patients met the inclusion criteria. The General Estimation Equations (GEE) procedure was adopted for multilevel analyses with success rate as a binary outcome variable. Single values were used and the results were considered to be statistically significant at $P < .05$. The forward selection procedure was used to choose predictive variables.
RESULTS: Of the 203 extracted teeth, 166 (81.8%) did not receive any orthodontic treatment. The success rate for space closure in orthodontically treated patients was 91.9%. The success rate for spontaneous space closure was 84.3%. All unsuccessful spontaneous space closure in the maxilla occurred in patients older than 12 years. The dental developmental stage of the second permanent molar (SPM) had a statistically significant association with spontaneous space closure in the mandible ($P < .001$).
CONCLUSIONS: The success rate of spontaneous space closure was high (84.3%) and was higher in the maxilla (94.1%) than the mandible (74.1%). Age at time of extraction and dental developmental stage of the SPM were significant factors for successful spontaneous space closure in the maxilla and mandible, respectively.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.049
OP50 A CROSSOVER RANDOMISED CONTROLLED TRIAL ON THE USE OF TELEORTHODONTICS & ARTIFICIAL INTELLIGENCE FOR ORTHODONTIC SCREENING

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AIMS: Was to investigate the validity of tele-orthodontics and artificial intelligence (TAI) in orthodontic screening for eligibility in comparison to face-to-face screening in a public dental health setting.

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MATERIAL AND METHODS: A single-centre crossover randomised controlled trial design was used. 255 patients referred for public orthodontic treatment were randomised into: Control: face-to-face screening first (F2F) and Test: TAI screening first. 178 participants completed the trial, 95 participants enrolled to the F2F and 83 to TAI as the initial screening method. For TAI screening, patients submitted intra-oral scans using Dental Monitoring™ (DM), extra-oral photos and an online patient history survey. After a 2-month washout period, participants were screened again using the comparison method. The primary outcome was the validity of TAI screening in referral acceptance or rejection based on a minimum Index of Orthodontic Treatment Need (IOTN) Dental Health Component threshold of ≥3. Secondary outcomes were comparison of teleorthodontic assessments of skeletal and dental classifications, overjet, overbite and crowding with F2F assessment. Blinding: Investigators and participants could not be blinded to sequence allocation. Investigators were blinded to all primary and secondary outcome assessments.
RESULTS: As a screening tool to determine referral acceptance or rejection, TAI triage had 0.98 sensitivity, specificity of 1.0 and overall diagnostic accuracy of 0.98. Negative predictive value (NPV) was 0.67, with 3 referrals incorrectly rejected by TAI. Artificial intelligence could not detect OB & OJ for all patients and did not measure important traits including crossbite, contact point displacement and functional shift. Teleorthodontic triage duration was 2.9 times faster for the clinician. Limitations: This study was conducted in a public orthodontic clinic and results apply to this setting, when using IOTN.
CONCLUSIONS: TAI triage is a valid tool to screen orthodontic patients based on malocclusion severity in the public system for severe and mild malocclusions. However, care should be taken for borderline malocclusion patients using IOTN, because the assessment of certain malocclusion traits may not be precise enough with tele-orthodontics and artificial intelligence, depending on the quality of scan submitted by the patient. The duration of screening is significantly shorter using TAI.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.050
OP51 EFFECT OF ORTHODONTIC TREATMENT, SELF-REPORTED NEED FOR ORTHODONTIC TREATMENT, AND SOCIAL MEDIA COMPARISONS ON SELF-ESTEEM IN BRAZILIAN ADULTS

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AIMS: Estimate the effect of having undergone orthodontic treatment, self-reported need for orthodontic treatment, time spent on social media, self-comparisons of body and appearance on social media, age, and sex on the self-esteem of Brazilian adults.
MATERIALS AND METHOD: This online cross-sectional study collected data using a demographic questionnaire and measures of social media use derived from the Social Media Use Scale (SMUS). Self-esteem was measured using Rosenberg Self-Esteem Scale (RSES). The psychometric properties of RSES were attested using confirmatory factor analysis (CFA: Comparative Fit Index [CFI]=0.94; Tucker-Lewis Index [TLI]=0.92; Standardized Root Mean Square Residual [SRMR]=0.078; α=0.92). A structural equation model was used to estimate the effects of independent variables on self-esteem. The fit of the model was assessed, and the significance of standardised path estimates (β) was evaluated using the z-test (α=5%). A stepwise procedure was employed and independent variables with non-significant β ($p>0.05$) were removed from the model. The effect size was measured by the proportion of variance explained (r^2).
RESULTS: The study included 251 Brazilian adults (mean age=28,1 [SD=9,6] years, 175 women [69,7%]). The initial structural model, considering all the independent variables, had acceptable fit indices (CFI=0.93; TLI=0.96; SRMR=0.08). However, some variables did not have a significant effect on self-esteem: having undergone orthodontic treatment (β=-0.06, p=0.356), time spent on social media (β=-0.05, p=0.454), age (β=0.01, p=0.879), and sex (β=0.01, p=0.868). These variables were removed from the model. The refined model had an adequate fit to the data (CFI=0.93; TLI=0.94; SRMR=0.08). Self-reported need for orthodontic treatment exhibited a weak negative effect on self-esteem (β=-0.10, p=0.013), whereas self-comparisons of body and appearance on social media had a moderate negative effect (β=-0.30, $p<0.001$). The model explained 11.4% of the variance in self-esteem.
CONCLUSION: Brazilian adults who self-reported a greater need for orthodontic treatment and compared their body and appearance more frequently on social media exhibited lower levels of self-esteem. Having undergone orthodontic treatment did not affect the self-esteem of the studied sample. Future studies are required focusing on populations actively undergoing orthodontic treatment to provide better evidence into the broader impacts of orthodontics on psychological well-being and quality of life.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.051
OP52 DIAGNOSTIC PERFORMANCE OF ARTIFICIAL INTELLIGENCE NETWORKS ON AUTOMATIC TOOTH SEGMENTATION FROM PANORAMIC RADIOGRAPHS: A SYSTEMATIC REVIEW

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AIMS: To appraise the available evidence on the diagnostic performance, in terms of accuracy, sensitivity and specificity, of different artificial intelligence (AI) networks on automatic tooth segmentation from panoramic radiographs.
MATERIAL AND METHODS: Unrestricted searches of 6 databases (Pubmed, CENTRAL, Cochrane reviews, Scopus, Web of Science, and ProQuest) and grey literature were conducted from inception until October 2024. Risk of bias assessment was performed using the QUADAS-2 tool.
RESULTS: From the initially identified records, 32 studies, of variable risk of bias, were included. All proposed networks showed high-performance metrics. Sixteen studies investigated a completely new neural network. The panoramic radiographs used for training and validation ranged between 40 and 16317. The networks were tested on 20 to 1500 radiographs. Overall, the most studied neural networks showed increased diagnostic performance, with U-Net and VGG-16 reaching even 99.86% in accuracy. Sensitivity ranged above 98% and specificity reached 99.93% in U-Net. Even newly proposed neural networks showed an accuracy over 95%.
CONCLUSIONS: Contemporary AI networks demonstrate increased diagnostic performance regarding tooth segmentation from panoramic images. These models show potential for clinical application, providing diagnostic accuracy, workflow efficiency, result consistency, predictive analytics as well as research opportunities and innovative educational tools.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.052
OP53 ‡‡‡ SKELETAL EFFECTS AND COST EFFECTIVENESS OF POSTERIOR CROSSBITE TREATMENT. A RANDOMIZED CONTROLLED TRIAL COMPAIRING QUAD HELIX WITH RAPID MAXILLARY EXPANSION ON DECIDUOUS TEETH IN THE EARLY MIXED DENTITION

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AIMS: The study aimed to assess the skeletal effects and side effects of maxillary expansion using two different appliances immediately after expansion and one year post-expansion. Additionally, a health economic evaluation was conducted to compare the costs between treatments.
MATERIAL AND METHODS: Forty-two patients from two centers, all in the early mixed dentition stage (mean age 9.5 ± 0.9 years) with unilateral posterior crossbite, were randomized to receive either rapid maxillary expansion (RME) bonded to the deciduous teeth or Quad Helix (QH) bonded to the permanent first molars. Cone beam computed tomography (CBCT) was used to record data at baseline, immediately after posterior crossbite correction, and one year post-expansion. An additional 30 patients, randomized without CBCT, were included in the cost-effectiveness analysis, resulting in a total of 72 patients for this aspect of the study.
RESULTS: All patients were analyzed. No opening of the midpalatal suture was observed in the QH group following expansion. In contrast, the RME group

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demonstrated opening of the midpalatal suture, with the largest separation occurring anteriorly and inferiorly (4.1 mm ± 2.2), and less posteriorly and superiorly (1.0 mm ± 0.8) (P < 0.001). The QH group experienced a significantly greater decrease in buccal bone width compared to the RME group (P < 0.001). Additionally, the QH group had a higher prevalence of buccal fenestrations immediately post-expansion (33% on both the right and left sides) compared to 0% in the RME group (P = 0.0086). By the 1-year follow-up, the prevalence of fenestrations in the QH group had decreased to 19%, which was no longer statistically significant (P = 0.11). The RME treatment was €32 more costly than QH from a healthcare perspective (P = 0.58) and €32 more costly from a societal perspective (P = 0.74).
CONCLUSIONS: RME on deciduous teeth effectively opens the midpalatal suture and results in less buccal bone loss and fenestrations compared to QH. With no significant cost differences, RME on deciduous teeth appears to be the preferred treatment compared to QH for correcting unilateral posterior crossbites in this age group.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.053
OP54 PERFORMANCE OF AN ARTIFICIAL INTELLIGENCE-BASED PLATFORM IN IDENTIFYING IMPACTED CANINES IN PANORAMIC RADIOGRAPHS

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AIMS: To assess the effectiveness of an artificial intelligence-based (AI) platform in detecting impacted canines in panoramic radiographs (OPGs).
MATERIAL AND METHODS: This study analysed two sets of panoramic radiographs, each containing 50 OPGs obtained for orthodontic evaluation from two private clinics. One set included 50 patients with impacted canines, while the control group consisted of 50 patients without canine impactions. The images were independently reviewed by two human observers, who reached a consensus, and by Diagnocat (Diagnocat Ltd., San Francisco, CA, USA), a cloud-based AI platform. The AI platform's performance was compared to human assessment (gold standard) using the Wilcoxon Signed Rank and McNemar's tests. Agreement between the methods was evaluated using Cohen's Kappa, while sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) were also calculated.
RESULTS: For identifying impacted canines, Cohen's Kappa was 0.28, indicating low agreement between the AI platform and human evaluation. Additionally, the Wilcoxon Signed Rank and McNemar's tests revealed significant differences between the methods (p<0.001). The sensitivity, specificity, PPV, and NPV of the AI platform in comparison to the gold standard were 28%, 100%, 100%, and 58%, respectively.
CONCLUSIONS: Although the AI-based platform demonstrates potential, it is not yet suitable to replace human evaluation as the standard for detecting impacted canines on panoramic radiographs. Further refinement and validation are necessary to improve its sensitivity, reliability, and overall performance.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.054
OP55 DENTAL DEDICATED MAGNETIC RESONANCE IMAGING IN ORTHODONTICS: IMAGE QUALITY AND LANDMARK VISUALIZATION

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AIMS: To evaluate the diagnostic image quality of three-dimensional dental-dedicated magnetic Resonance Imaging (ddMRI) in visualizing essential tissue landmarks commonly used in orthodontics for diagnosis and treatment planning.
MATERIAL AND METHODS: The study involved 10 consecutive volunteers, imaged using a ddMRI system based on a 0.55T magnet. Ethical approval and informed consent were obtained. Two custom-developed ddMRI pulse sequences, optimized for orthodontic landmark identification, were utilized to acquire high-resolution 3D images of head and facial structures. Three evaluators individually assessed the images using a 5-point Likert scale (ranging from 1 - very good to 5 – very poor) to determine diagnostic image quality and the visibility (visible / not visible) of pre-defined key anatomic landmarks. Results were compared among evaluators (kappa statistics).
RESULTS: The ddMRI protocols demonstrated good diagnostic image quality (mean overall ratings ranged between 1.3 and 1.9, depending on the observer), with an average score of 1.6 for orthodontic landmark identification. Most anatomical structures were visible in all cases, with perfect agreement among observers (kappa = 1) for landmarks such as Sella, Nasion, and Point A. For some landmarks like Nasion (Na) and Point A (A), the visibility ranged between 90 and 100% of the cases, and inter-observer agreement was still high (kappa > 0.8).
CONCLUSIONS: ddMRI provided high-quality diagnostic images that are reliable for orthodontic evaluation. The tailored ddMRI pulse sequences allowed clear visualization of key hard and soft tissue landmarks, with excellent inter-observer agreement. The results support the use of ddMRI as a reliable tool for orthodontic diagnosis. These findings support that ddMRI could serve as a viable alternative to traditional imaging methods in orthodontic care.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.055
OP56 EFFECTS OF FIXED RETAINERS ON LINGUAL MARGINAL GINGIVA POSITION - A TWO-YEAR FOLLOW-UP, SINGLE PRACTICE-BASED RANDOMIZED TRIAL

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BACKGROUND: Most clinical studies on gingival recession focus on its development on the labial surface. Orthodontic patients with fixed retention arches are theoretically more likely to develop gingival recession on the lingual surface. However, this issue remains under-researched.
AIM: To evaluate and compare changes in clinical crown height (CCH) on the lingual aspect in patients using two types of fixed retainers: 3-strand round twisted (RT) and 8-strand rectangular braided (RB), both bonded to all six anterior mandibular teeth.
METHODS: In this two-arm, parallel, two-center randomized controlled trial, 133 orthodontic patients (median age: 24.6 years; 25th percentile: 17.2 years; 75th percentile: 32.4 years) were randomly assigned to receive either an RT or RB wire retainer in a 1:1 ratio. The primary outcome was the change in CCH, defined as the distance from the incisal margin (in incisors) or cusp tip (in canines) to the lowest point of the gingival margin on the lingual side. Randomization used permuted blocks of sizes 4, 6, or 8, concealed in sequentially numbered, opaque, sealed envelopes. Measurements were taken from dental casts by 3 raters at pre-treatment (T0), retainer placement (T1), and 3 (T2), 6 (T3), 12 (T4), 18 (T5), and 24 (T6) months post-placement. Data were analyzed using Friedman tests and multiple linear regression. Intra- and inter-rater reliability was assessed via the intraclass correlation coefficient (ICC).
RESULTS: Intra- and inter-assessor reliability was excellent (ICC > 0.89). CCH remained stable from T0 to T6, with changes in individual observation periods (e.g., T0–T1) not exceeding 0.3 mm. Regression analysis showed no association between retainer type (RT or RB) and changes in CCH. However, age and sex affected crown height changes between T0 and T1: each additional year of age reduced crown elongation by 0.02 mm, and males exhibited 1.18 times greater crown elongation than females. These effects were not observed in later periods. No adverse events were reported.
CONCLUSIONS: Fixed retainers have no clinically significant impact on CCH measured from the lingual aspect.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.056
OP58 PALATAL CANINE IMPACTION AND CRANIOFACIAL SIZE

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AIM: To compare the size of the maxilla, the mandible and the entire craniofacial configuration between individuals with palatally impacted canines and those with normal eruption.

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MATERIALS AND METHODS: The study sample comprised 404 individuals (232 females and 172 males). Half of the participants had palatally impacted 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 control for sexual dimorphism and growth effects. The shapes of the craniofacial configuration and the individual jaws were 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). To achieve homology and reduce positional variation of semi-landmarks between individuals, semi-landmarks were allowed to slide iteratively along their respective curves. The sizes of craniofacial configurations were determined by the natural logarithm of the centroid size (ln(CS)) to ensure data normality and isotropic landmark variation. The primary research question was assessed using multivariate regression models, with size variables as dependent variables and age, sex, and palatal canine impaction as predictors. All analyses were done assuming a type-1 error of 5%.
RESULTS: There was no association between palatal canine impaction and the sizes of the cranial base (η^2=0.009; P=0.167), the maxilla (η^2=0.009; P=0.165), the mandible (η^2=0.001; P=0.826), or the entire craniofacial configuration (η^2=0.004; P=0.426). Craniofacial sizes were significantly affected by age and sex ($p<0.05$).
CONCLUSIONS: There are no craniofacial size differences between individuals with palatally impacted canines and those without. This implies a different etiological background between palatal canine impaction and other phenotypic dental anomalies, such as tooth agenesis.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.057
OP59 EVALUATION OF ERUPTION PATTERNS AT AGE 11 FOLLOWING EARLY EXTRACTION OF THE FIRST PERMANENT MOLAR DUE TO MIH: A SPLIT-MOUTH RCT

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AIMS: This study aimed to investigate how the early extraction of the first permanent molar, due to Molar-Incisor Hypomineralisation (MIH), affects the eruption patterns of adjacent and opposing teeth in children at age 11.
MATERIAL AND METHODS: This split-mouth randomized controlled trial, included patients aged 6–9 with severe MIH of the FPM. Panoramic radiographs were taken pre-extraction (T0) and at age 11 (T1) to measure eruption length and angulation of SPMs and SPs using reference lines in the maxilla and mandible. Radiographs were analysed using Facad software, with measurement reliability assessed via ICC. Imaging errors were recorded for quality control. Paired t-tests were used to compare extraction and non-extraction sides.
RESULTS: This study included 46 patients (31 maxillary and 25 mandibular FPM extractions; mean age at extraction 8.1 years for maxilla and 8.2 years for mandible) with an average follow-up of 3.2 and 3.1 years, respectively. At T0, no differences in eruption length or angulation of SPM or SP were observed between extraction and non-extraction sides.

At T1, maxillary SPMs showed faster eruption on the extraction side (13.5 mm vs. 10.8 mm, $p<0.001$) and more upright angulation (72.9° vs. 62.1°, $p<0.001$). Maxillary SPs had increased mesial angulation on the extraction side (82.5° vs. 89.3°, $p<0.05$) but no differences in eruption length. In the mandible, no differences in eruption length or angulation of SPM or SP were found. No overeruption of antagonistic FPMs was observed.

Measurement reliability was excellent (ICC: 0.997–0.999), despite 75/94 radiographs showing imaging errors.
CONCLUSIONS: Evaluation at age 11 following early extraction of the first permanent molar (FPM) due to Molar-Incisor Hypomineralisation (MIH) revealed significant effects in the maxilla, including more perpendicular eruption of the second permanent molar (SPM) and second premolar (SP) and accelerated SPM eruption. In the mandible, no significant changes in eruption length or angulation were observed, and no overeruption of the opposing FPM was detected. These findings, based on panoramic radiograph measurements, provide insights into the eruption process at this developmental stage.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.058
RISK FACTORS FAVORABLE TO PROMOTE INTRA- AND POSTSURGICAL COMPLICATIONS ACOMPANYING THE MICROSCREWS INSERTION FOR DISTALIZATION OF THE MAXILLARY DENTITION

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AIMS: To determine whether the patient's gender, the side of insertion and the implantation technique (self-drilling or self-tapping) are favorable to promote complications such as the microscrew loss or fracture, the tooth root perforation, as well as postoperative pain and periimplantitis.
MATERIAL AND METHODS: A randomized-control study involved 1008 patients (552 women and 456 men) aged between 20 and 40 years, in whom Temporary Intraoral Skeletal Anchoring Devices (TISADs) were planned to reinforce anchorage in the maxilla during en block distalization.

The same, right-handed operator performed all procedures in accordance with the principles of Wroclaw protocol. The self-drilling or self-tapping technique was applied alternately in consecutive quadrants. Each patient received two SH 1312-08 microimplants (Absoanchor, Daegu, South Korea), at the border of the attached gingiva and the oral mucosa in maxilla, inserted between the alveolar sockets of the second premolar and the first molar.
RESULTS: In total, 489 complications occurred, namely the TISADs loss (n = 168) or fracture (n = 17), the dental root perforation (n= 5), postoperative pain (n = 170) and periimplantitis (n = 129).

As for the risk factors, male gender was statistically significantly correlated with the more frequent occurrence of TISADs fracture. No statistically significant correlation was determined between the quadrant of the TISAD insertion and any of the complications. Self-drilling or self-tapping technique was related to 210 and 279 investigated complications, respectively. Statistical analysis allowed to conclude that the self-drilling method is associated with the lower incidence of complications; however, only postoperative pain and periimplantitis were significantly correlated ($p < .05$) with the self-tapping insertion technique. Root perforation resulting from the self-tapping technique occurred 4 times more often than after the self-drilling one; nonetheless this complication was observed too rarely to be considered a statistically significant result.
CONCLUSIONS: The risk of microimplant fracture is greater in men, therefore in their treatment a larger diameter TISADs should be used. As for reduction of the tooth root perforation incidents, as well as to reduce the risk of complications such as pain and periimplantitis, the self-drilling method is recommended.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.059
OP61 EFFECTIVENESS OF MINI-SCREW AND NANCE PALATAL ARCH FOR ANCHORAGE CONTROL FOLLOWING SEGMENTAL MAXILLARY CANINE RETRACTION IN ADOLESCENTS WITH ANGLE CLASS I CROWDING USING 3D DIGITAL MODELS: A RANDOMIZED CLINICAL TRIAL

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AIMS: The objective of this "two-arm parallel" trial was to compare the anchorage control and treatment duration following segmental maxillary canine retraction with mini-screw and Nance palatal arch in adolescents.
MATERIAL AND METHODS: Fifty patients were randomly allocated in a 1: 1 ratio into Group 1 (Nance palatal arch) and Group 2 (Mini-screw). Eligibility criteria included Angle's Class I molar relation, tooth material arch length discrepancy more than 10mm, requiring first premolar extraction, and age range from 11-18 years. Simple randomization and opaque sealed envelopes, sequentially numbered were used for allocation concealment. Pre-treatment and stage digital models were superimposed after complete canine retraction with Burstone's T-loop using 3-matic software. Paired and unpaired T-test was used to evaluate the changes in tooth movement. Mann-Whitney Test was used to evaluate the treatment duration of complete canine retraction. The level of significance was set at a P-value < 0.05.
RESULTS: During canine retraction, there were no drop out in Group 1 whereas four mini-screws in two patients became loose and thus, could not be included in the final evaluation. Mean differences in the distal movement of 13 and 23 between Groups 1 & 2 were statistically non-significant. The mesial movement of

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16 and 26 in Group 1 was 1.68 and 1.61 mm respectively and in Group 2 was 0.68 and 0.41mm, respectively and the intergroup mean differences were statistically significant. The treatment duration for complete canine retraction in Groups 1 & 2 was 186.0 and 173.182 days and the differences were statistically significant. None of the patients reported any adverse effects due to intervention in either group.
CONCLUSIONS: Although the mesial movement of molars was significantly less for the mini-screws, the Nance palatal appliance was clinically equally effective in reinforcing the distal movement of canines. The differences in anchorage loss between the two modalities were small and clinical judgment is thus imperative for decision-making and planning for absolute anchorage with TADS.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.060
OP62 IN VITRO EXAMINATION OF PRIMARY STABILITY OF DIFFERENT DIAMETER MINI SCREWS AND RE-INSERTION IN BONES WITH DIFFERENT DENSITIES

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AIMS: The aim of this study was to evaluate the impact of bone density, mini-screw diameter, re-insertion, and sterilization on the primary stability of mini-screws.
MATERIAL AND METHODS: A total of 120 bone blocks were prepared from fresh-frozen human femoral heads and divided two groups based on cortical bone density as below or above 800 HU, measured using a Multislice Computed Tomography. Bracket-headed, self-drilling 120 mini-screws (Ti6Al4V titanium alloy) with diameters of 1.5 mm (60) and 2 mm (60) were placed into the blocks for initial and repeated placements. Subgroups were formed based on the decontemination method used prior to the re-insertion (either mechanical cleaning alone or chemical cleaning followed by sterilization). For both placements, measurements of maximum insertion torque (MIT), removal torque (MRT), fracture torque, micromobility, and resistance to force were performed. Additionally, scanning electron microscopy (SEM) images were obtained at three different time points—initial, after the first placement and second placement—to morphologically evaluate screw deformation. Two-way ANOVA was used to assess the effects of density and diameter on MIT, MRT, Periotest values, and resistance to force in the first placement. Three-way ANOVA was employed to evaluate the effects of density, diameter, and cleaning method on the changes in these parameters.
RESULTS: For 1.5 mm mini-screws, the MIT mean was significantly higher in dense bone compared to low-density bone ($p=0.001;p<0.05$). Similarly, 2mm screws showed higher MIT in dense bone ($p=0.001;p<0.05$). In low-density bone, the MIT of 2mm screws was significantly higher than that of 1.5 mm screws ($p=0.001;p<0.05$). However, in dense bone, no significant difference in MIT was observed between the two diameters ($p:0.106;p>0.05$). In low-density bones subjected to sterilization, significant changes in insertion torque between the first and second placements were found between diameters ($p:0.001;p<0.05$), with 1.5 mm screws showing an increase and 2mm screws showing a decrease. In dense bones, no significant changes were observed between placements ($p:0.436;p>0.05$).
CONCLUSIONS: Larger diameter screws are more suitable for low-density bones, while screw diameter has minimal impact on primary stability in dense bone. Re-insertion affects stability in low-density regions, but stability remains unchanged in dense bones after re-insertion.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.061
OP63 COMPARATIVE THREE-DIMENSIONAL ANALYSIS OF PRESURGICAL PALATAL MORPHOLOGY OF CHILDREN WITH DIFFERENT CLEFT TYPES

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AIM: Palatal morphology in patients with clefts should be assessed during the presurgical period, providing insights into how cleft type can affect palatal development. Intraoral scanning gives us a safe and valuable tool in collecting, processing and analyzing data for these observations. The study aimed to identify differences in palatal morphology among untreated patients with various cleft types before surgery.
MATERIALS AND METHOD: Digital impressions from 150 patients (97 males, 53 females), 6-12 months old, were grouped by cleft type: cleft lip (CL), cleft soft palate (CSP), complete cleft palate (CP), unilateral cleft lip and palate (UCLP), bilateral cleft lip and palate (BCLP), and non-cleft controls (30 patients). The scans have been performed just before primary cleft surgery, using an intraoral scanner - Medit i500 and Materialise 3-matic software for measurements. Generalized least squares model was applied to the rank-transformed data of the measurements to account for non-normality of residuals, heteroscedasticity, and outliers.
RESULTS: Analysis using the generalized least squares model, with age and weight as covariates, indicated that for all measurements, weight influenced comparisons among the groups, while age did not. The inter-canine distance in the UCLP group differed significantly from that in the control group and all cleft types except BCLP. Additionally, the inter-canine in groups with CL and with complete CP showed statistically significant differences. The inter-tuberosity vertex distance in UCLP was significantly different from both the control group and all other cleft groups, except BCLP. A difference in the inter-tuberosity vertex distance was also observed between the groups with CL and with complete CP. Patients with BCLP had the largest palate size due to the prominent premaxilla, but palatal surface area was similar in all groups. The posterior palate was wider in UCLP and BCLP, while the width at the canine position was narrower in patients with isolated cleft palate.
CONCLUSIONS: Palatal surface areas remain consistent across all cleft types, indicating that surgical challenges stem from the need to cover wider clefts during repair, rather than managing tissue deficits. The results of the study could constitute a reference for further studies about presurgical infant orthopedics.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.062
OP64 NASOLABIAL SHAPE AND AESTHETICS IN UNILATERAL CLEFT LIP AND PALATE: ANALYSIS OF 3D FACIAL IMAGES

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BACKGROUND: Typical individuals without a cleft exhibit subtle facial asymmetries that generally do not significantly impact facial aesthetics. However, in patients with cleft lip and palate, asymmetry and abnormal morphology in the nasolabial region are linked to lower aesthetic ratings. The connection between nasolabial shape and aesthetics remains unclear.
AIM: To assess how deviations in nasolabial shape from the average affect aesthetic ratings.
MATERIALS AND METHODS: 3D stereophotogrammetric images were taken of 53 children with unilateral cleft lip and palate (UCLP) (34 boys, mean age 10.5 years, SD = 0.6, range: 9.1–11.4) and 53 children without cleft (34 boys, mean age 10.5 years, SD = 0.7, range: 8.8–12.3). UCLP repair was performed by three experienced surgeons in a single stage at an average age of 8.2 months (SD = 2.3, range: 5–16.1 months). A composite image representing the average nasolabial shape of non-cleft individuals was created using geometric morphometrics, with 10 fixed points and 100 semi-landmarks on the nasolabial surface. The Procrustes distance defined the difference between a cleft and non-cleft composite nasolabial shape, representing nasolabial dysmorphology. Nasolabial aesthetics were rated by 15 laypersons on a 100-mm visual analogue scale (VAS), where lower ratings indicated poorer aesthetics. Internal consistency among raters was assessed using the intraclass correlation coefficient (ICC), and correlation analysis examined the relationship between aesthetic ratings and nasolabial dysmorphology in the cleft group.
RESULTS: The mean ICC of 0.85 (95% CI 0.78–0.91) indicated high consistency among raters. The average aesthetic rating for the cleft group was 42.2 (SD = 16.5, range: 4–94; 25th percentile = 30, 75th percentile = 52). The mean Procrustes distance was 0.0993 (SD = 0.0205, range: 0.0656–0.1621). A negative correlation was found between nasolabial dysmorphology and aesthetic rating, indicating that greater deviation from the average non-cleft shape was associated with lower aesthetic ratings ($R = -0.282$, $p = 0.041$).

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CONCLUSIONS: Nasolabial aesthetics is influenced by the degree of deviation from the average non-cleft shape, though this relationship explains only a small portion of the variance ($R^2 = 0.08$). Other factors likely contribute to nasolabial aesthetic ratings.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.063
OP65 THREE-DIMENSIONAL QUANTIFICATION OF POSTOPERATIVE FACIAL SOFT TISSUE ASYMMETRY IN ADULT CLEFT PATIENTS USING STEREOPHOTOGRAMMETRY

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AIMS: Patients with cleft lip and palate (CLP) may suffer from marked asymmetry with an impact on attractiveness and psychosocial aspects. The aim of this study was to assess postoperative facial soft tissue asymmetry in adult CLP patients compared to non-cleft controls of similar age and sex.
MATERIAL AND METHODS: In CLP patients with different cleft forms and in healthy non-cleft subjects (control group) a three-dimensional stereophotogrammetric face scan was performed, and an objective root-mean-squared-error (RMSE) was calculated for the whole face and nasolabial region to quantify asymmetry. Data normality was evaluated using the Kolmogorov-Smirnov test. Categorical variables were analysed with Chi-square and Fisher exact tests. Metric data were assessed using Kruskal-Wallis H or Mann-Whitney U tests for non-normally distributed data, and ANOVA with post hoc Tamhane T2 or t-tests for normally distributed variables. The level of significance (α) was set at 0.05.
RESULTS: In total, 57 subjects were included: 26 CLP patients (12 male, 14 female, mean age 27.0 ± 4.9 years) and 31 healthy controls (12 male, 19 female, mean age 27.4 ± 2.0 years) ($p > 0.05$). In 18 patients, the cleft was unilateral (12 UCLP patients, 6 UCL patients), 8 patients suffered from a bilateral cleft type (8 BCLP patients). CLP patients exhibited significantly greater facial and nasolabial asymmetry than controls ($p < 0.001$), with the highest asymmetry observed in UCLP cases. The asymmetry was primarily located in the nasolabial region. Among the cleft groups, the BCLP group exhibited the least asymmetry in the nasolabial region. Additionally, male patients demonstrated more pronounced asymmetry compared to female patients in almost all groups. Asymmetry was present to a lesser extent in the control group.
CONCLUSIONS: A comprehensive and carefully designed treatment strategy is crucial for improving facial symmetry in CLP patients. However, achieving symmetry comparable to that of healthy non-cleft individuals remains a challenge.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.064
OP66 INTRAORAL SCANNING: A COMPLEMENTARY TOOL IN THE ASSESSMENT OF ALVEOLAR CLEFT BEFORE AND AFTER BONE GRAFT

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AIMS: Secondary alveolar bone graft (SABG) is commonly performed in cleft lip and palate (CL/P) patients aged 8 to 11, prior to canine eruption. Pre-operative CBCT scans are essential for defect and eventually, donor site assessments, in case mandibular bone is used. However, SEDENTEX CT guidelines restrict post-surgical CBCT use, unless there is a clinical doubt regarding graft success. As well-known, 2D radiography often overestimates bone-fill and fails to depict the labio-palatal dimension. This study aims to evaluate whether intraoral scanning (IOS) can supplement 3D information in post-SABG evaluations.
MATERIAL AND METHODS: This retrospective pilot study involved 45 non-syndromic patients with unilateral cleft lip and alveolus/palate (UCLA/UCLP). Data included IOS at T0 (pre-SABG) and T1 (3–4 months post-SABG), intraoral X-rays at both time points, and CBCT scans at T0. Exclusion criteria included syndromic conditions, bilateral CLA/CLP. The Ortho-Analyzer© (3Shape A/S) software has been used for bone thickness and height assessment, along with superimpositions of models for visualizing volume changes. A standardized coordinate system was established to perform linear measurements of alveolar thickness and alveolar height at four levels. Additionally, qualitative analysis is performed on 2D X-rays using the Bergland, Chelsea, and SWAG scales, while quantitively bony coverage on cleft neighboring tooth, relations of the canine, and volume assessment was conducted through CBCT scans.
RESULTS: Thickness B (distal to cleft) increased in 56.67% of cases, while height C and height D decreased (from cleft fundus to horizontal plane) in 73.33% and 90% of cases respectively. The persistence of a concavity on the dentoalveolar bone apical to the mucogingival line was observed in cases with Bergland type G post-alveolar bone graft (ABG). A high gingival margin occurred when there is no bone attachment on the neighbouring tooth at the cementoenamel junction (CEJ), such as in Chelsea type C/D cases, resulting in an increase or no change in height B.
CONCLUSIONS: IOscans offer a non-invasive radiation-free tool to complement 2D radiographic information on SABG results from a 3D point of view. However, comparison with preSABG CBCT is needed to conclude on the reliability of the method.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.065
OP67 CRANIOFACIAL INTEGRATION AND MODULARITY IN UNTREATED CLEFT LIP AND PALATE PATIENTS

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AIMS: This study aimed to quantify craniofacial variation, integration and modularity in both untreated adults with orofacial clefts, and unaffected controls.
MATERIAL AND METHODS: Fourteen cephalometric landmarks representing the skull base, maxilla and mandible were identified on lateral cephalograms of 293 adult individuals of Proto-Malayid descent. The sample included 243 individuals with unoperated clefts - 177 with complete unilateral cleft lip and alveolus (UCLA, mean age 23.7 years) and 66 with complete unilateral cleft lip, alveolus, and palate (UCLAP, mean age 24.5 years), as well as 50 unaffected controls (NORM, mean age 21.2 years). Geometric morphometrics were used to analyze craniofacial shape variability, integration, and modularity. Principal component analysis (PCA) was applied to assess shape variability, while canonical variates analysis (CVA) was used to evaluate group differences by calculating Mahalanobis and Procrustes distances. Integration and modularity were tested for five different scenarios: (1) skull base vs. maxilla vs. mandible, (2) skull base with maxilla vs. mandible, (3) skull base with mandible vs. maxilla, (4) skull base vs. maxilla with mandible, and (5) anterior vs. posterior modules. The RV coefficient and covariance ratio were used to assess covariation strength.
RESULTS: The first 6 principal components (PC1-PC6) explained 72% of the total shape variability, with vertical shape variation and sagittal relationships being the primary sources of variability. Craniofacial shape varied significantly among the groups, with the largest Mahalanobis and Procrustes distances observed between the NORM and UCLAP groups ($p<0.001$), and the smallest between the UCLA and UCLAP groups ($p<0.001$). Modularity and integration patterns differed between cleft-affected individuals and controls: Those with clefts exhibited anterior and posterior modules separated by the pterygomaxillary plane, while controls showed distinct modules for the skull base, maxilla, and mandible or combined skull base-mandible and maxilla.
CONCLUSIONS: Unoperated unilateral UCLA and UCLAP affect craniofacial integration and modularity.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.066
OP68 THE IMPACT OF LOWER INCISOR DISPLAY ON SMILE AESTHETICS AS PERCEIVED BY ORTHODONTISTS, SPECIALISTS IN AESTHETIC DENTISTRY AND LAYPERSONS

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AIMS: This study aimed to evaluate the perceptions of orthodontists, aesthetic dentistry specialists, and laypersons regarding the attractiveness associated with varying levels of lower incisor exposure in smiles.
MATERIAL AND METHODS: A young adult female with completed orthodontic treatment, well-aligned dentition, and adequate smile aesthetics parameters was selected as the subject. Standardized photographs of posed and spontaneous smiles were taken, and digital manipulations were performed to vary the mandibular incisor exposure to five levels: 0%, 25%, 50%, 75%, and 100%. Evaluations were conducted using both full-face photographs and close-up images of the smile. Intra-examiner reliability was assessed with the intraclass correlation coefficient. Comparisons of attractiveness scores across the different levels of lower incisor exposure among the three groups of evaluators were analyzed using the Kruskal-Wallis test, followed by post-hoc Mann-Whitney tests with Bonferroni correction. Within each evaluator group, comparisons of attractiveness across the image categories were performed using Friedman's test with Dunn's post-hoc multiple comparison test. The Wilcoxon signed-rank test was applied to compare median visual analog scale (VAS) scores between full-face and close-up smile images at varying levels of lower incisor exposure.
RESULTS: The findings indicated that close-up smile images with occluded teeth and 25% lower incisor exposure received the highest attractiveness ratings. Conversely, images showing 75% or 100% of lower incisor exposure were rated as least attractive. Differences in aesthetic preferences between full-face and close-up smile images were minimal.
CONCLUSIONS: Smiles with slight lower incisor exposure, specifically 25%, were perceived as the most aesthetically pleasing. Among the evaluator groups, orthodontists assigned the highest attractiveness scores, while laypersons gave the lowest. The perspective—whether evaluating full-face or close-up images—had negligible influence on the aesthetic assessments.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.067

OP69 ASSESSMENT OF ENAMEL SURFACE ROUGHNESS AFTER ORTHODONTIC DEBONDING: AN IN VITRO STUDY

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AIMS: This *in vitro* study aims to evaluate the roughness changes of the enamel surface following different techniques of residual orthodontic adhesive removal after molar tubes debonding.
MATERIAL AND METHODS: Forty extracted human molars were divided into four groups (n=10) based on residual orthodontic adhesive removal technique: group 1 (G1) – carbide bur (CB); group 2 (G2) – CB and Enhance polishing points; group 3 (G3) – CB and OneGloss polishing points; group 4 (G4) – CB and SuperSnap polishing disks. All samples (n=40) were evaluated using a laser scanning microscope to determine the average enamel surface roughness. A scanning electron microscopy (SEM) analysis was performed on one sample from each group to determine changes in enamel surface integrity. The evaluations were performed before bonding (T1) and after orthodontic adhesive removal (T2). The time required for orthodontic adhesive removal was measured in all groups. The data analysis was performed with SPSS 27.0 using Shapiro-Wilk, Wilcoxon, Spearman's correlation, Kruskal-Wallis H, and Dunn's tests. A value of $p<0.05$ was considered as significant.
RESULTS: The mean enamel surface roughness at T1 was 15.94 (SD 2.68) µm. At T2, a significant increase in the mean enamel roughness value to 23.18 (SD 7.59) µm was observed ($p=0.000$). The G3 group showed the least alteration in enamel roughness. The greatest change in enamel surface roughness was observed in G1 (9.43 µm), followed by G2 (8.55 µm), G4 (7.43 µm), and G3 (3.55 µm). A significant difference was observed in the duration of orthodontic adhesive removal between the G1 and G2 ($p=0.034$), G1 and G4 ($p<0.001$), G1 and G3 ($p<0.001$), G2 and G3 ($p=0.007$). Spearman's correlation test showed a significant correlation between the duration of orthodontic adhesive removal and enamel surface roughness assessed at T2 ($p<0.05$). SEM analysis revealed alterations in enamel surface integrity across all techniques.
CONCLUSIONS: The use of a carbide bur to eliminate the thick excess of orthodontic adhesive, followed by OneGloss polishing point to remove the residual orthodontic adhesive, resulted in the lowest enamel surface roughness and minimal changes to enamel integrity; however, this technique was the most time-consuming among those tested.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.068

OP70 EXTERNAL ATTRACTIVENESS RATINGS ARE INFLUENCED BY FACIAL SHAPE

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AIM: To investigate the effect of facial shape on facial attractiveness, as perceived by external evaluators using three-dimensional shape information and geometric morphometric methods.
MATERIALS AND METHODS: The study population comprised 601 young adults (393 females; 208 males), aged 21-35 years old. Three-dimensional facial photographs were captured for every participant using a stereophotogrammetry system (3dMD, Atlanta, USA). The acquired three-dimensional surface scans were imported in "ViewBox 4.1" software (dHAL Software, Kifissia, Greece) for digitization and shape analyses. Facial shape was described with 29 curves and 1021 landmarks and semi-landmarks that were placed by calibrated operators using a semi-automated method. After initial placement, semi-landmark were allowed to slide on their respective curves or surface in order to minimize positional variation between corresponding landmarks and optimize homology among all shape configurations. Landmark coordinates were subsequently transformed into shape coordinates using Procrustes Superimposition. In order to allow for better interpretation of the results, shape coordinates were then reduced into Principal Components (PCs) of shape, which were used in all statistical analyses as shape variables. Facial attractiveness was evaluated by six external evaluators (3 males and 3 females) who were within the same age group of the participants. External evaluators rated facial attractiveness using 100 mm VAS scales. The association between facial shape and facial attractiveness was evaluated with multivariate regression models, with shape PCs being treated as dependent variables and VAS scores and age treated as predictors. Analyses were performed separately for males and females due to significant sexual dimorphism in facial shape. For all statistical tests, a type-1 error of 5% was accepted.
RESULTS: There was a significant association between facial shape and facial attractiveness ratings in females ($\eta^2= 0.075$; $P<0.001$). In males, the effect size was similar, but the association was not found to be statistically significant ($\eta^2= 0.070$; $P=0.106$).
CONCLUSIONS: Facial attractiveness, as assessed by external evaluators, is associated to facial shape, particularly in females. The results support previous findings regarding self-perceived facial attractiveness and highlight the importance of facial appearance in societal perceptions about attractiveness.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.069

OP71 ‡‡‡ DIGITAL ANALYSES OF BOLTON TOOTH SIZE RATIOS AND THEIR ASSOCIATION TO GENDER, ANGLE CLASS, AND OTHER OCCLUSAL TRAITS: A STUDY USING A PARTIALLY AUTOMATED DIGITAL 3D MODEL ANALYSIS

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AIMS: This study aims to verify Bolton's values for tooth size ratios and to evaluate possible relationships to different occlusal traits using precise digital measurement methods.
MATERIAL AND METHODS: Including 1000 consecutively selected patients from three study centres a digital, partially automated model analysis was performed utilizing the software OnyxCeph. The measurements comprised tooth width for calculation of anterior (AR) and overall ratio (OR) as a percentage, arch width, length, perimeter, overjet, overbite, space analysis in millimetre and the assessment of the angle classification.
RESULTS: AR and OR were significantly increased compared to Bolton's ratios of 77.2% (AR) and 91.3% (OR). In the gender comparison, male patients showed larger tooth size ratios, especially in the OR. Patients with Angle Class II/1 and II/2 had smaller tooth size ratios than patients with Angle Class III and I. Thus, patients with Angle Class II/1 had the largest tooth diameters in all maxillary teeth and with Angle Class II/2 the smallest tooth sizes in the mandible. The largest tooth widths in the lower jaw were observed in the Angle Class III patient group. Furthermore, a negative correlation from AR/OR to overjet, overbite, and available space in lower jaw as well as a positive correlation to available space in upper jaw was detected.

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CONCLUSIONS: There is a clear correlation between the tooth size ratios and the present dysgnathia as well as other orthodontically relevant occlusal traits. This prior knowledge about our patients is extremely important to create an individualized treatment plan and enable sufficient occlusion. To achieve a functionally good occlusion with correct overjet and overbite, it is essential that the maxillary and mandibular teeth are proportional in size. Any deviation from the ideal patient in terms of tooth size, number, shape, or arch must be considered in the pre-therapeutic treatment plan in combination with the existing dysgnathia in order to be able to achieve a stable anterior and posterior occlusion with appropriate adjustments to the therapy post-therapeutically.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.070
OP72 AESTHETICS (MICROESTHETICS) AND CURRENT ORTHODONTICS

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AIM: To assess the impact of the esthetics and microesthetics in orthodontics.
INTRODUCTION: Improving dental and facial esthetics has been the main focus of orthodontic treatment for the majority of patients. Regarding the importance of esthetics in orthodontics, the categorisation of esthetics made by Sarver and Ackerman, who divided it into three sections.

The objective of this systematic review was to evaluate the existing literature on the impact of the microesthetics on orthodontic treatment . Microesthetics comprises the concept of ideal dental dimensions and its correlation with the periodontium. The esthetic procedure will be complete if there is stability in dental occlusion.
MATERIAL AND METHODS: Utilizing the key concepts of " esthetics orthodontics" , " microesthetics in orthodontics" , " orthodontics smile design" , within the PubMed database led to the inclusion of two studies: articles published between 2011 - 2022 from a meta - analysis and another one , published in 2014. Patients included were undergoing orthodontic treatment for esthetic and functional reasons, such as surgical treatment of Class II division 1 and 2.
RESULTS: The meta-analysis found a statistically significant improvement in microesthetic parameters due to orthodontic treatment. In the article of Roberto Carlos Bodart Brandão it is considered fundamental to discuss the analysis of Bolton discrepancy as a decisive finding for orthodontic treatment and beyond numbers, it presents clinical unfolding. A careful analysis of the relation of the inclinate planes of the teeth in the clinical evaluation, as well as the analysis of the models can determine if there is significant Bolton discrepancy.
CONCLUSIONS: The meta - analysis, point to a statistically significant and clinically meaningful difference in the microesthetics parameters between individuals who received orthodontic treatment and those who did not. Microesthetics cannot be seen in isolation, but rather as the key to establish a pleasant smile in addition to harmonious face and human being, with high self - esteem.
Disclosure of interest: None declared

Houston Poster Presentations

Abstract citation ID: cjaf073.071
HP1 COMPARISON OF VARIOUS APPLIANCES USED FOR EARLY CLASS III MALOCCLUSION TREATMENT: A SYSTEMATIC REVIEW AND NETWORK META-ANALYSIS

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AIMS: To assess the effectiveness of various appliances used of the early treatment of Class III malocclusion, by performing a network meta-analysis.
MATERIAL AND METHODS: Only randomized (RCTs) or non-randomized controlled trials (non-RCTs) providing angular measurements on lateral cephalometric radiographs were considered eligible. A systematic search of 16 electronic databases up to November 2024, complemented by manual searches was performed. Risk of bias assessment was performed with the Cochrane ROBINS-I tool. Mean differences (MDs) and the respective 95% confidence intervals (95% CIs) were calculated for primary outcomes. Random-effects network meta-analysis was performed according to a graph theoretical approach within a frequentist framework. The quality of the study (confidence on effect estimates) was rated according to the GRADE approach.
RESULTS: Two RCTs and nine non-RCTs were included in the network meta-analysis, assessing 518 subjects and reporting on skeletal and dentoalveolar variables following 7.2-22.8 months of treatment. According to the results of the network meta-analyses, the combination of Hybrid RME with Mentoplates was found more effective in maxillary advancement, as well as in preventing loss of anchorage of the upper and lower incisors. Furthermore, even though the Hybrid RME with Mentoplates, the facemask and the SEC III appliance produced favorable changes on the vertical level, these changes were not clinically significant. The overall confidence on the effect estimates for the primary outcomes ranged from low to very low.
CONCLUSIONS: According to the results of this network meta-analysis, it can be concluded that the combination of Hybrid RME with Mentoplates seems to be the most effective approach for improving the sagittal skeletal relationships, while functional appliances and facemask (with or without RME) produce significant dentoalveolar side-effects.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.072
HP2 ARTIFICIAL INTELLIGENCE-ASSISTED RADIOGRAPHIC PREDICTION OF LOWER THIRD MOLAR ERUPTION AFTER EXTRACTION OF THE FIRST PERMANENT MOLARS

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AIMS: To evaluate the role of Artificial Intelligence (AI) in predicting lower third molar eruption (LM3) following lower first permanent molar (LM1) to extraction and non-extraction orthodontically treated patients.
MATERIAL AND METHODS: This retrospective study analysed 68 patients, of which 31 (16 females, 15 males, mean age: 13.5 years) were treated with LM1 extraction, and 37 (23 females, 14 males, mean age: 14.5 years) with non-extraction orthodontic treatment. For each patient, pre- (T1) and post-treatment (T2) panoramic radiographs were used, resulting in a sample of overall 136 radiographs to evaluate angular and positional changes of LM3 and to assess the available retromolar space and hygienic cleansability. Follow-up of 40 patients (T3: 23±13.1 months) provided clinical evidence of LM3 eruption or surgical removal. The collected dataset included 50 important variables that determine the prediction of LM3 eruption and involved 68 patients. With the dataset size being considered limited for AI algorithm training, the proposed work opted for synthetic data augmentation to enlarge the dataset. Generative Adversarial Networks were thus utilized for augmenting the dataset effectively up to 20 times in comparison with its original size. The dataset was then deployed for the training of an SVM (Support Vector Machines) classification algorithm with the main outcome being the prediction for clinical eruption of the LM3.
RESULTS: Upon an 80%/20% training test split of the augmented dataset, validation results of the SVM algorithm indicated a prediction accuracy of up to 85% for both the right and left LM3, for extraction and non-extractions orthodontically treated groups. In addition, covariance and statistics analysis indicated that the generated synthetic data are similar and resemble the real dataset to an approximation of 90%; a percentage sufficient for data augmentation and AI model training. Validation tests were further conducted for different dataset sizes indicating that synthetic data can potentially outscore real datasets accurately.
CONCLUSIONS: The findings of this study suggest that AI can be effectively implemented for the prediction of the eruption of LM3 in orthodontically treated patients. In addition, synthetic data can sufficiently address the issues of data shortage in the medical sector and patient privacy.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.073
HP3 IMPROVING CERVICAL VERTEBRAL MATURATION CLASSIFICATION: A DEEP CONVOLUTIONAL NEURAL NETWORK APPROACH WITH RANDOM OVERSAMPLING AND MEMORY-EFFICIENT TRAINING

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ABSTRACT N°: 226

PRESENTATION TYPE: Houston poster presentation

Improving Cervical Vertebral Maturation Classification: A Deep Convolutional Neural Network Approach with Random Oversampling and Memory-Efficient Training

OBJECTIVE: This study aims to develop and evaluate a customized deep convolutional neural network (DCNN) for automatically determining cervical vertebral maturation stages (CVMS) from lateral cephalometric radiographs.

METHODS: A dataset of 922 radiographs from individuals aged 7–20 years was analysed, with CVM staging independently assessed by two orthodontists. Image quality was verified for clarity and absence of artifacts, focusing on the C2–C4 vertebrae. To address class imbalance, random oversampling (ROS) was applied. The dataset was split into 70% training, 30% validation, and an additional 10% unseen test set to evaluate model generalization. A custom DCNN model was designed with hyperparameters optimized via random search and trained using Adam optimizer and categorical cross-entropy loss. Early stopping was implemented to prevent overfitting and ensure optimal model convergence. Additionally, a memory reset function was applied before each training session to release memory and reset the model's weights, optimizing memory usage, and preventing any unwanted bias accumulation during the training process.

RESULTS: Initially, the model showed high training accuracy (98%) but low validation accuracy (57%) due to dataset imbalance. After applying ROS, dataset restructuring, and early stopping, the model's validation accuracy improved to 88%. On unseen data, the model achieved 76% accuracy, demonstrating better generalization. The recall analysis revealed significant underestimation for CVMS 4 and CVMS 5 (21% and 15% misclassifications), while CVMS 1 and CVMS 6 exhibited minimal misclassifications (8%), mainly within adjacent stages, indicating reasonable stage progression accuracy.

CONCLUSION: This study highlights the potential of a fully automated DCNN for CVM stage classification with promising results. Future work will focus on enhancing stage differentiation, improving classification accuracy, and leveraging advanced AI techniques to enhance model robustness and generalization.

Disclosure of interest: None declared

Abstract citation ID: cjaf073.074

HP4 SHAPE VARIABILITY AND SEXUAL DIMORPHISM OF THE CHIN: A THREE-DIMENSIONAL GEOMETRIC MORPHOMETRIC ANALYSIS

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ABSTRACT

AIMS: The chin is a distinctive anatomical trait, found only in Homo sapiens, with an unclear origin and function. Our aim was to comprehensively evaluate chin morphology, quantify shape variability and identify potential differences between the sexes.

MATERIAL AND METHODS: The sample consisted of 95 CBCT images, from university archives. Inclusion and exclusion criteria were: age above 21 years, absence of craniofacial deformities, no missing or extracted teeth in the anterior mandibular area and no alveolar bone resorption due to tooth loss. The raw DICOM data were converted into mesh surfaces. The method comprised three steps, one manual, entailing the digitization of three curves and two landmarks, and two automated, finally resulting in comprehensive coverage of the chin by 600 semilandmarks, free to slide along the surface. Principal component analysis extracted the main patterns of shape variation. Sexes were compared with permutation tests and allometry was assessed by regressing on the logarithm of the centroid size.

RESULTS: Almost 58% percent of shape variation was described by the first 3 principal components. Shape variation was mainly linked to the height to width ratio and the thickness of the symphysis. Significant sex differences were detected, both in shape and size. Male symphyses were larger than female by 8.7%. Notable sex-related shape differences concerning the prominence of mental tubercles and the mandibular curvature were found. However, these were significantly weakened after removing the allometry effect.

CONCLUSIONS: We suggest a new 3D semi-automated method, based on geometric morphometrics, to assess chin morphology, which proved fast and user-friendly. We identified the main symphyseal shape patterns and the differences between sexes, which were mostly related to size, exhibiting a pronounced allometric effect. The method may be of use in scientific fields such as plastic surgery, forensics, anthropology and human biology.

Disclosure of interest: Isidora Christopoulou: None declared, Georgios Kanavakis: None declared, Demetrios Halazonetis Author DH has financial interest in the Viewbox software.

Flash Poster Presentations

Abstract citation ID: cjaf073.075

FP1 SURFACE ROUGHNESS OF FELDSPAR CERAMIC AFTER USING DIFFERENT ORTHODONTIC ADHESIVE REMOVAL TECHNIQUES

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AIMS: This study aimed to assess and compare surface roughness of ceramic after orthodontic adhesive removal with different methods.

MATERIAL AND METHODS: 24 blocks of monochromatic fine-structure feldspar ceramic (VITABLOCS® Mark II, VITA Zahnfabrik H. Rauter GmbH & Co. KG, Germany) were used. All of samples were evaluated initial surface roughness through 3D profilometer and randomly divided into three groups (n = 8 for each group). Then, they were bonded and removed adhesive by three different methods: tungsten carbide bur with low-speed handpiece, white stone with high-speed handpiece, and P5 Newtron prophylaxis scaling Tip. After removal, 3D profilometer was applied to measure final surface roughness. Surface roughness data were assessed using the average surface area roughness (Sa) parameter and analyzed using one-way ANOVA to compare surface roughness among groups and paired t-test to compare between initial and final surface roughness within group. The level of significance was set at $p<0.05$.

RESULTS: The initial ceramic surface roughness was 0.880.16 μm. After adhesive removal, a significant difference in ceramic surface roughness was detected among groups (p=0.000). The greatest roughness ±observed in white stone bur with high-speed handpiece group (1.73±0.09 μm), followed by scaling tip (1.42±0.12 μm) and tungsten carbide bur with low-speed handpiece (1.11±0.18 μm), respectively. Moreover, all groups showed a significant increase in surface area roughness compared to the initial surface roughness.

CONCLUSIONS: Removal orthodontic adhesive remnant on ceramic surface using tungsten carbide bur with low-speed handpiece showed the lowest surface roughness compared to white stone bur with high-speed handpiece and scaler tip.

Disclosure of interest: None declared

Abstract citation ID: cjaf073.076

FP2 THE QUANTITATIVE ASSESSMENT OF THE INTERPROXIMAL ENAMEL IN LOWER INCISORS – A CBCT ANALYSIS

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AIM: Stripping (Inter Proximal enamel Reduction - IPR) is considered a relevant method of alleviating dental crowding. Severe crowding in anterior segment of lower dental arch proves particularly challenging as the possibilities of dental expansion in this area remain limited. As up to 50% of the enamel present can removed without increased risk of caries, the aim of our study was to measure the average amount of enamel that can be safely removed during the IPR from the mesial and distal areas of mandibular incisors.

MATERIAL AND METHODS: 112 CBCT (Men = 44, Female =68, mean age 15 +/- 3,4) scans performed due to the other clinical indications were chosen from our institution database. Four lower, previously untreated and caries-free incisors with no signs of attrition were measured so the maximal interproximal width of dental crowns, amount of enamel at this level from mesial and distal side and the interproximal width at the cemento–enamel junction was established. The relation between the widest diameter of dental crowns and the interproximal width at cemento-enamel junction was used to categorize clinical crowns morphology into three groups: parallel, rounded and triangle – shaped.

RESULTS: There was no statistical difference between the measurements of the contra-lateral incisors. The width of dental crowns was larger in lateral incisors (LI) than in central (CI) – (5,9 mm - vs CI – 5,34 mm). In both centrals and laterals

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the amount of enamel was significantly larger on distal surfaces than on mesial (LI mesial enamel -0,66 mm -; LI distal enamel – 0,72 mm vs CI mesial enamel – 0,61 mm; CI distal enamel – 0,66 mm). Width of clinical crowns was positively correlated with the amount of enamel. Triangle – shaped dental crowns were the widest among all shapes.
CONCLUSIONS: CBCT proved to be reliable tool for repeatable measurements of enamel. Cautiously performed stripping in lower incisors segment might alleviate the crowding by 2,4 mm. In cases of severe crowding resulting from the increased incisors crown size the amount of enamel that can be removed is even larger.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.077
FP3 ‡‡‡ BLENDED LEARNING APPROACH IN ORTHODONTICS IS FAVOURED BY UNDERGRADUATE DENTAL STUDENTS

Heidi Arponen[1] and Emma Juuri[1]; *[1]University of Helsinki, Helsinki University Hospital, Helsinki, Finland*

AIMS: University students' wellbeing and mental load are affected by several factors, including learning experience, relationships between students and staff, and study progression. This longitudinal study aimed to assess undergraduate dental students' opinion on remote teaching of orthodontics and the effect of teaching method on subjective wellbeing.
SUBJECTS AND METHODS: For two consecutive years, an orthodontic course, spanning four months during the third year of dental education, was conducted using a blended teaching approach. All the simulation laboratory teaching, included in the course and half of the 19 theory lectures were delivered in-person, whereas half of the lectures were delivered remotely as either live online lecture or a video recording. The main topics of the course were craniofacial growth, development of the occlusion, etiology and classification of malocclusions, clinical examination and diagnosis, cephalometrics, cellular basis of tooth movement, managing developing dentition, fixed and removable orthodontic appliances, missing and impacted teeth in orthodontics, orthodontic first aid, and screening of malocclusions in public health care. In total, 102 students were enrolled in the course. At the end of the course, a volontary anonymous questionnaire was completed by the students to explore their preferred teaching method. The findings were descriptively analysed.
RESULTS: Eventually, 80 students (78%) responded to the questionnaire. Of them, 26% reported that traditional classroom teaching supports best their learning, while 6% favoured remote teaching, and 79% a blended approach. Study load was most effectively reduced by traditional classroom teaching according to 10% of the students, by remote teaching according to 33% of the students, and by blended teaching approach according to 48% of the students.
CONCLUSIONS: Majority of the students prefered blended learning approach in learning theory of orthodontics, although notable individual differences in opinions were observed. When planning an orthodontic curriculum, incorporating partial remote teaching could be a beneficial strategy to enhance students' wellbeing.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.078
FP4 EXPLORING UNDERGRADUATE DENTAL STUDENTS' PERCEPTIONS AND EXPECTATIONS OF POST-COVID-19 LEARNING ENVIRONMENTS: INSIGHTS FOR ENHANCING DIGITAL EDUCATION IN DENTISTRY

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AIMS: The COVID-19 pandemic profoundly impacted global educational systems, including dental education, necessitating significant changes to maintain teaching and learning continuity. Understanding the attitudes and perceptions of dental students towards the shifting educational landscape after the pandemic is essential for refining future educational approaches. This study sought to examine the perspectives of undergraduate dental students on the evolving learning environments in post-COVID-19 dentistry, to support the development of the virtual, OrthoCampus learning platform (ORCA.nrw).
MATERIAL AND METHODS: An online survey with 29 questions was distributed to undergraduate dental students from five universities in Germany (Aachen, Berlin, Bonn, Cologne, Düsseldorf). The questions focused on (1) current teaching concepts in undergraduate dentistry courses, (2) students' learning behavior post-COVID-19, and (3) students' expectations for improvements in future dental education. This analysis includes the baseline survey results conducted from April until September 2024.
RESULTS: 318 students (30.19% male and 69.18% female) from all five universities participated in the survey. The majority (91.80%) reported that most of their learning content was delivered synchronously through traditional lectures, often attended by groups of more than 10 students (59.62%). Despite this, 60.25% of students noted that these lectures lacked interactivity, and 35.65% indicated the use of blended learning formats. Approximately 17.72% of instructional time was dedicated to interactive learning. Regarding learning habits, all respondents owned at least one mobile device, with smartphones (93.35%), laptops (73.42%), and tablets (85.13%) being the most common devices. Notably, tablets were predominantly used for educational purposes (82.28%). Looking ahead, 60.26% of students expressed a preference for more asynchronous online courses, while 34.70% favored additional synchronous online learning. A significant majority (82.97%) supported the idea of teaching practical dental skills through online platforms.
CONCLUSIONS: Understanding students' perceptions, behaviors, and expectations is vital for effectively developing and implementing more student-centered teaching approaches. The majority of students showed a strong preference for accessing innovative digital learning content in the future.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.079
FP5 THE ASSOCIATION OF MALOCCLUSIONS WITH MASSETER MUSCLE THICKNESS BASED ON ULTRASONOGRAPHY MEASUREMENTS: A RETROSPECTIVE COHORT STUDY

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AIM: To investigate if the functional capacity of elevator masticatory muscles expressed by the thickness of the masseter muscle is associated with malocclusions in the sagittal, vertical, and transverse axes.
MATERIAL AND METHODS: 670 consecutive cases treated in a single orthodontic clinic were evaluated. Pre-treatment dental casts were examined for characteristics of the malocclusion (overjet, sagittal molar relationships, overbite, posterior crossbite), and ultrasonographic measurements of the masseter muscles were used for muscle thickness measurements. Gender and age were also recorded. A multiple linear regression analysis was conducted to investigate the association of masseter muscle thickness with age, gender, and malocclusions. Concerning unilateral posterior crossbite, a paired t-test was performed to investigate the possible asymmetry in masseter muscle thickness between the crossbite and non-crossbite sides.
RESULTS: Males showed thicker masseter muscles compared to females by 0.46mm. Older-growing individuals also presented thicker muscles. Patients with Class III malocclusions tended to have thinner masseter muscles compared to those with Class I sagittal dental relationships by 0.68mm. Patients with increased overbite and overjet showed increased muscle thickness. Patients with unilateral posterior crossbite showed thinner muscles (0.27mm) compared to patients without transverse malocclusions, with thinner masseter muscles on their crossbite side (11.15mm) than the non-crossbite side (11.42mm).
CONCLUSIONS: Masseter muscle thickness was greater in males and older-growing individuals. Patients with class III malocclusions presented thinner muscles while those with deep bite showed thicker masseter muscles. Patients with unilateral posterior crossbite showed decreased values in muscle thickness, with thinner muscles on their crossbite side than on the non-crossbite side.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.080
FP6 PERIPHERAL HYPOTONIA AND OROFACIAL DYSFUNCTION ARE RISK FACTORS FOR OPEN BITE IN RARE DISEASES

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AIMS: The aim was to investigate the prevalence of different types of open bite in a large sample of individuals with rare diseases and to explore associated risk factors.

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MATERIAL AND METHODS: Data from 787 individuals aged 3 to 77 years, representing 164 different rare diseases, were collected from the MHC database between 2013 and 2019. All participants were screened for orofacial dysfunction using the Nordic Orofacial Test – Screening (NOT-S). The sample was divided into two groups: 142 individuals with open bite (OB) (mean age 14.2 ± 13.0 years; 81 men and 61 women) and 557 individuals with normal vertical relations (mean age 15.1 ± 12.9 years; 292 men and 265 women). Open bite cases were further categorized into anterior open bite (AOB), lateral open bite (LOB), and severe anterior open bite with molar contacts only (SAOB). All items from the NOT-S test were analysed to calculate the odds ratio (OR) for open bite, with the significance level set at 0.05.
RESULTS: The prevalence of open bite was 18% (n=142). AOB was the most common (58%) followed by SAOB (15%) and LOB (13%). Of those with OB, 81% had a neuromuscular disease. Apert syndrome (56%), Beckwith-Wiedemann syndrome (44%) and Turner syndrome (42%) also showed a high prevalence of OB. The risk of having an open bite when scoring on NOT-S items was statistically significant for "Deviant tongue posture" (OR 6.6), "Breathing support" (OR 4.4), "Unable to open mouth wide" (OR 3.1), "Unable to breathe through nose" (OR 2.0), "Saliva on chin daily" (OR 1.6) and "Deviant lip posture" (OR 1.4).
CONCLUSIONS: Individuals with rare diseases that are characterized by peripheral hypotonia, or craniofacial abnormalities have a high prevalence of open bite malocclusion. Individuals with deviant tongue posture had the greatest risk for open bite. Early assessment of orofacial dysfunction and targeted interventions may improve occlusal development and function for this patient group.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.081
FP7 PREVALENCE OF DENTAL ANOMALIES IN 10-18 YEARS OLD ADOLESCENTS: A CROSS-SECTIONAL EPIDEMIOLOGICAL STUDY IN NORTHEAST GERMANY

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AIM: Orthodontic treatments are frequently prompted by the presence of dental anomalies. Aim of this study is to investigate the prevalence of dental anomalies in school adolescents in the District of Greifswald, Germany.
MATERIALS AND METHODS: Cross-sectional data were collected between 2021 and 2023 as part of the compulsory dental school examinations in the District of Greifswald, Northeast Germany (ethical approval: reg. no.BB 129/20/Greifswald University). A detailed orthodontical examination was performed by one of two experienced and calibrated examiners with the aid of a dental mirror and an Overbite-Ruler. The findings were directly documented into an excel sheet and exported to Stata for statistical analysis.
RESULTS: A total of 5,888 adolescents (48.6% females) aged between 10-18 years were examined (mean age 14.5 ±2). As the school dental examinations are mandatory, only children absent on the day of the examination were missing. In total 37.2% (n=2192) of the whole study population showed at least one indication for an orthodontic treatment according to the categorization of the German Health System (KIG), with 14.6% having a combination of at least 2 dental anomalies (n=863). The most common orthodontic anomaly was anterior crowding (12.8%, n=752) followed by increased overjet (>6mm; 9.6%, n=562), while the least common cases were craniofacial anomalies including cleft patients (0.2%, n=9) and open bite (>2mm; 1.6%, n=95). The other orthodontic anomalies according to frequency were frontal spacing (9.1%), eruption problems such as impacted teeth (6.9%), posterior cross bite (6.8%), posterior crowding (6.6%), anterior crossbite (4.8%), scissor bite (4.6%), deep bite (3.2%), posterior spacing (2.1%) and missing teeth (2.1%). The assessment of the occlusion of the first permanent molars showed an increased prevalence of Angle class II (28.1%, n=1655) compared to Angle class III with only 14.4% (n=729).
CONCLUSION: One third of the examined adolescents have at least one orthodontic anomaly. Dental crowding and spacing are one of the most common orthodontic anomalies observed in the study population, which are mainly developmental conditions. A great proportion of the adolescents in Northeast Germany have Class II malocclusion according to Angle classification.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.082
FP8 THE IMPACT OF MALOCCLUSION ON GENERAL AND ORAL-HEALTH-RELATED QUALITY OF LIFE IN ADOLESCENTS AND ON THEIR CAREGIVERS' PERCEPTION

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AIMS: This study assessed the influence of malocclusion on adolescents' oral health-related quality of life (OHRQoL) and health-related quality of life (HRQoL), considering both patients' and parents' perspectives.
MATERIAL AND METHODS: A cohort of 238 patients, aged 10 to 18 years, was enrolled during their initial orthodontic consultation at the University of Naples Federico II (Naples, Italy). Prior to the consultation, both the patient and one parent/caregiver completed the following questionnaires in the waiting room: Oral Health Impact Profile-14 (OHIP-14) and Pediatric Quality of Life Inventory Generic Core Scales (PedsQL) for the patient; Parental Perception Questionnaire-16 (PCP-Q-16), Family Impact Scale-8 (FIS-8), and Pediatric Quality of Life Inventory Generic Core Scales-Parents' version (P-PedsQL) for the parent. The malocclusion was scored by one trained operator using the Dental Health Component of the Index of Orthodontic Treatment Need (IOTN-DHC). OVJ and OVB were measured on digital dental casts. Comparisons of continuous variables were made using ANOVA or Kruskal-Wallis tests based on data distribution, and chi-square tests were used for categorical variables. Correlations between variables were assessed using Spearman's rho and visualized by scatter plots. Statistical significance was set at $p < 0.05$.
RESULTS: No significant differences were found in questionnaires' scores across the IOTN-DHC groups (all p> 0.05). Reduced OVJ was linked to poorer physical function (p= 0.026) according to patients' reports, while parents reported that both increased and reduced OVJ correlated with lower overall OHRQoL (p= 0.043) of the children. Moderate positive correlations were found between OHIP-14 and PCP-Q-16 Total scores (rho= 0.335) and also between PedsQL and P-PedsQL Psychosocial and Physical Health Domains and Total scores (rho= 0.2798, 0.3295, 0.300, respectively).
CONCLUSIONS: OVJ variations significantly influence adolescents' OHRQoL, highlighting the importance of addressing this occlusal factor early in orthodontic treatment. Caregivers' perceptions moderately correlate with adolescents' self-reports, suggesting the need for integrating both perspectives into personalized orthodontic care.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.083
FP10 ASSESSMENT OF PATIENT PERCEPTIONS FOLLOWING ORTHOGNATHIC SURGERY: HEALTH-RELATED QUALITY OF LIFE SURVEY

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AIMS: Dentofacial deformity is a disharmony in the proportions of the craniofacial complex that disrupts intermaxillary and/or interdental relationships, negatively affecting both facial aesthetics and the functional component of the stomatognathic system, with treatment often requiring orthodontic with surgical intervention, particularly in cases of severe impairment. Therefore, this study aims to evaluate the impact of orthodontic-surgical treatment on the oral health-related quality of life (OHRQoL) of patients with dentofacial deformities.
MATERIAL AND METHODS: A prospective clinical study was conducted with 35 patients undergoing orthodontic-surgical treatment at the Institute of Orthodontics, Faculty of Medicine, University of Coimbra.

The assessment of quality of life was carried out using the Oral Health Impact Profile (OHIP-J54), at two evaluation points: before the orthognathic surgery (T0) and 6 months after the surgical intervention (T1). The analysis was carried out using IBM® SPSS® v28, with a significance level of 0.05.
RESULTS: Out of the 35 participants in the study, 18 showed improvements in quality of life following orthodontic-surgical-orthognathic treatment. The domain with the worst initial values was psychological discomfort, which also showed the highest improvement six months post-surgery. Additionally, improvements were observed in the domains of functional limitation, physical disability, psychological disability, and social disability. Women presented worse quality of life scores in various domains compared to men.
CONCLUSIONS: Orthognathic surgery has shown promise in improving both functional and psychosocial aspects of patients' lives, underscoring the

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importance of comprehensive care approaches. This study contributes to understanding the extent of these improvements, which may guide future orthodontic-surgical protocols and patient-centered care strategies.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.084
FP13 LABIAL FRENECTOMY: CURRENT CLINICAL PRACTICE OF ORAL SURGEONS AND ORAL AND MAXILLOFACIAL SURGEONS IN THE UNITED KINGDOM

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AIMS: Following a previous cross-sectional study on the clinical practice of orthodontists in the United Kingdom (UK) with respect to aberrant labial frenums, this follow-up study aimed to obtain the views of oral surgeons (OS) and oral and maxillofacial surgeons (OMFS) in the UK on labial frenectomies regarding their indication, timing and preferred surgical techniques.
MATERIAL AND METHODS: A 20-item online questionnaire was sent to members of the British Association of Oral Surgeons (BAOS) and British Association of Oral and Maxillofacial Surgeons (BAOMS). It included demographics of the respondents, diagnosis and clinical management of labial frenectomies as well as surgical techniques. Descriptive statistics were used to summarise the study sample characteristics and questionnaire responses. Demographic variables were cross-tabulated with the responses. Tests of association were carried out using Chi-square and Fisher exact tests. Since multiple tests were performed using the data, a Bonferroni correction was applied.
RESULTS: Based on the 139 OS and 41 OMFS who responded, 84.4% of OS believed that a low and hypertrophic frenum can be an important aetiological factor in median diastema formation, compared to only 68.3% of OMFS who shared the same perspective. The number of years of specialist practice was not statistically significant in influencing this perspective (OS: P=0.832; OMFS: P=0.980). 57.8% of OS and 51.2% of OMFS routinely carried out a blanche test to diagnose aberrant labial frenums. If a labial frenectomy was to be carried out as part of orthodontic treatment, the preferred timing amongst OS was just before closure of the median diastema (37.0%) while the majority of the OMFS felt that timing did not matter (37.0%). More than half (54.4%) of the respondents used the Archer and Kruger classical technique exclusively for frenectomies and a large majority (92.2%) preferred the use of a scalpel over electrosurgery or lasers.
CONCLUSIONS: Considerable variation was found in the diagnostic approach to aberrant frenums and preferred timing of frenectomies amongst OS and OMFS; however, strong consensus was noted in their choice of surgical technique and instrument. Further studies are required to develop a set of national guidelines regarding the management of aberrant labial frenums.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.085
FP14 OPTIMIZING ORTHODONTIC TREATMENT TIMELINES: A COMPARATIVE ANALYSIS OF SURGICAL AND NON-SURGICAL TECHNIQUES TO ACCELERATE TOOTH MOVEMENT

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AIMS: Orthodontic treatment can be time-consuming, as the orthodontic tooth movement (OTM) is influenced by various factors, including age, gender, dental arch characteristics, and bone quality. Prolonged treatment durations may lead to adverse effects, highlighting the importance of optimizing treatment timelines. To address this, both surgical and non-surgical techniques have been developed to accelerate OTM.

Piezocision, corticotomy, micro-osteoperforations (MOPs), and low-level laser therapy (LLLT) are surgical and non-surgical procedures designed to enhance the response and speed of treatment. However, their efficacy and reliability remain subjects of ongoing debate. This work presents a comparative analysis of the various techniques used to assist OTM. By examining their advantages, disadvantages, and impacts on the speed and dental movement stability, this poster aims to provide an overview of current practices for maximizing clinical efficiency while minimizing risks.
MATERIAL AND METHODS: A literature review was conducted using PubMed, Scopus, NCBI, and ResearchGate. Keywords such as "Piezocision," "Corticotomy," "Micro-osteoperforations," and "LLLT" were combined with Boolean operators "AND" and "OR." Inclusion criteria included full-text availability and publication within the last five years. Exclusion criteria included in-vitro studies and research focused on orthognathic treatment. A total of 48 articles were included in the analysis.

A qualitative analysis was performed to address the study objectives.
RESULTS: Surgical and non-surgical techniques aimed at accelerating OTM have shown mixed results in reducing treatment duration. Among these, corticotomy demonstrates the most predictable outcomes but is limited in application due to its invasive nature. Minimally invasive surgical techniques, such as piezocision, are considered among the most effective approaches, offering favorable periodontal tissue response and excellent aesthetic outcomes. Conversely, MOPs appear to be the least effective option. LLLT provides a non-invasive alternative by stimulating bone remodeling and cellular activity, though its efficacy depends on factors such as laser type, intensity, and protocol.
CONCLUSIONS: Efforts to reduce treatment time by accelerating tooth movement have yielded promising results with specific techniques, though their effectiveness varies depending on the type of movement. Given the advantages and disadvantages associated with each approach, further research is necessary to identify the most effective methods for accelerating orthodontic tooth movement.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.086
FP15 ‡‡‡ LNCRNA MALAT1 PROMOTES OSTEOGENIC DIFFERENTIATION THROUGH THE MIR-93-5P/SMAD5 AXIS

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AIMS: Promoting the osteogenic differentiation of periodontal ligament stem cells (PDLSCs) is a way to regenerate periodontal bone. This study aimed to determine whether lncRNA MALAT1 promotes the osteogenic differentiation of human PDLSCs in vitro.
MATERIAL AND METHODS: Human PDLSCs were extracted from the human periodontal ligament, and after osteogenic differentiation was induced using osteogenic medium, the human PDLSCs were transfected with siRNA-MALAT1, miR-93-5p mimics, and miR-93-5p inhibitors. The expression of osteogenesis-related genes was assessed by RT–qPCR and western blotting, alkaline phosphatase (ALP) activity was assessed by ALP activity assay, and the formation of mineralized nodules was assessed by alizarin red S (ARS) staining. RNA immunoprecipitation (RIP) and luciferase assays were performed to assess the binding of MALAT1, miR-93-5p, and SMAD5.
RESULTS: The expression of lncRNA metastasis-associated lung adenocarcinoma transcript 1 (MALAT1) was upregulated, while that of miR-93-5p was downregulated after PDLSC osteogenic differentiation. Knockdown of MALAT1 inhibited the osteogenic differentiation of PDLSCs, and MALAT1 expression negatively correlated with miR-93-5p expression. miR-93-5p inhibited the osteogenic differentiation of human PDLSCs by specifically binding to SMAD5.
CONCLUSIONS: MALAT1 regulates human PDLSC differentiation by regulating the miR-93-5p/SMAD5 axis.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.087
FP16 PROXY-REPORTED OBSTRUCTIVE SLEEP APNEA AND ITS RELATIONSHIP WITH OROFACIAL ANATOMY IN CHILDREN AND ADOLESCENTS

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AIM: Obstructive Sleep Apnea (OSA) is an condition affecting mainly adult males. However, prevalence in the young population is also observed. Controversial findings can be find in the literature supporting correlations between craniofacial and dentofacial morphology and the presence of OSA. This retrospective study aims to assess the association between dentoskeletal variables and the presence of questionnaire based-OSA diagnosis, in a population of patient seeking orthodontic treatment.
METHODS: A cohort of children and adolescents (<18 years) who attended the Orthodontic Clinic of the University of Naples Federico II (Naples, Italy) for a first orthodontic consultation in the last 5 years, and who present with orthodontic

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baseline records, was considered for the purpose of the present study. The self-assessment of OSA was performed with the OSA-18 questionnaire. Patients with craniofacial syndromes and patients who had already undergone orthodontic treatment were excluded. Cephalometric measurements were performed on lateral caphs and occlusal variables were computed from the analysis of digital models. Unpaired sample T-test was used to compare subjects with an OSA-18 total score<60 vs OSA-18 total score ≥ 60 (cut-off value for positive OSA diagnosis). Statistical significance was set at P<0.05.

RESULTS: Records of four-hundred fifty-five (444) patients (217 males and 227 females; mean age was 11.8 years ± 2.8) were included. 14 subjects (3.1%) had an OSA-18 total score ≥60. Dentoalveolar cross-bite and skeletal cross-bite were significantly associated with the presence of OSA. In particular, subjects with bilateral posterior crossbite presented 4-times fold increased risk of positive diagnosis of OSA, according to the OSA-18 questionnaire. (OR: 4.06; 96% C.I. 1.22-13.41).No statistical significance was found for all the remaining study variables.

CONCLUSION: Skeletal and dentoalvolar crossbite are the craniofacial characterstics significantly associated with parental reported diagnosis of OSA in growing patients.

Clinicians should introduce a routine OSA screening test in growing subjects with a posterior crossbite.

Disclosure of interest: None declared

Abstract citation ID: cjaf073.088
FP17 EFFECT OF ORTHODONTIC-SURGICAL TREATMENT ON ATTRACTIVENESS OF THE FACE PROFILE AND NOSE IN ADULTS WITH CLASS III MALOCCLUSION

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AIMS: This investigation aimed to study the change in face and nose attractiveness in the profile view after orthodontic-surgical treatment of individuals with class III skeletal malocclusion, as assessed by orthodontists.

MATERIAL AND METHODS: Eight orthodontists used a visual analogue scale to evaluate the difference in attractiveness between initial and post-treatment photographs of 61 Caucasian adults with skeletal Class III malocclusions treated by Le Fort 1 maxillary advancement or bimaxillary surgery with rigid fixation, use of the alar cinch and VY sutures. Change in attractiveness was evaluated for the facial profile, for the nose within the facial profile and for the isolated, cropped nose profile image.

The significance of the effect of surgical treatment on the attractiveness of the nose and face was determined using a one-sample t test. A multiple step-by-step regression analysis was performed to determine the contribution of changes in the attractiveness of the face and the isolated nose to the change in the attractiveness of the nose within the face. Pearson´s correlation coefficient was calculated to determine the correlation between the change in attractiveness of the face and the nose. The influence of patient and evaluator gender on the evaluation of the nose and face was calculated using a repeated measures ANOVA. The level of statistical significance was set at 5%.

RESULTS: Orthodontic-surgical treatment significantly improved the attractiveness of the facial profile and of the nose profile, evaluated by orthodontists, both within the face and the nose isolated ($p<0.001$). A significant moderate correlation was verified between the changes in attractiveness of the facial profile and of the profile view of the nose within the face ($p<0.001$). No significant correlation was observed between the change in the attractiveness of the isolated nose profile and the facial profile. Patient gender was not a significant factor of influence for change in attractiveness.

CONCLUSIONS: 1) Orthodontists found that orthodontic-surgical treatment improved the face and nose profile attractiveness 2) Overall facial changes influenced orthodontists' evaluation of nose profile attractiveness in full facial profile photographs 3) Female orthodontists were less positive than their male colleagues about the aesthetic improvement associated with surgery.

Disclosure of interest: None declared

Abstract citation ID: cjaf073.089
FP18 SUBJECTIVE ORTHODONTIC TREATMENT NEED AMONG 7–17-YEAR-OLD FINNISH CHILDREN AND ADOLESCENTS

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AIMS: In Finland, orthodontic treatment is provided free of charge within a publicly funded healthcare system to individuals with the greatest functional need. We aimed to investigate patients' own perceptions of treatment need in the Wellbeing services county of Vantaa and Kerava, and to see if it is in concordance with objective evaluation.

MATERIAL AND METHODS: In total, 95 voluntary 7–17-year-old children and adolescents completed a questionnaire on self-evaluated treatment need prior to an orthodontic treatment need screening appointment. The response options for the question "Do you think you need orthodontic treatment?" were yes, no, I don't know. After giving a response, an oral examination by a specialist orthodontist was carried out and the malocclusion was assessed according to the national Treatment Priority Index criteria. The study was approved by the Helsinki University Hospital District Ethical board and the Wellbeing services county of Vantaa and Kerava.

RESULTS: We analyzed the results with descriptive statistical methods. Of the respondents, 27 (28%) considered that they need orthodontic treatment, while 11 (12%) felt that they had no treatment need. Majority, 57 of the respondents (60%) were unsure of their treatment need. The orthodontist judged that 70 of the children and adolescents (74%) had either a definite or possible need of orthodontic treatment (58 and 12 respectively). A chi-square test of independence showed that there was no significant association between the participants' answers and the objective treatment need evaluation of the orthodontist (p=0.355).

CONCLUSIONS: Children and adolescents' perceptions of the treatment need did not correlate with a professionally evaluated treatment need.

Disclosure of interest: None declared

Abstract citation ID: cjaf073.090
FP20 ARE WE DOING ENOUGH TO PROVIDE SUSTAINABLE DENTISTRY? A DOCUMENTARY ANALYSIS

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AIM: To understand whether enough is being done to provide sustainable dentistry, to identify barriers and to determine actions required to achieve this goal.

MATERIALS AND METHOD: Data was acquired using a search strategy of the grey literature. Keywords were used and screening of the documents was carried out. Documents that met all the eligibility criteria were included. Data was analysed using a thematic inductive analysis. The thematic analysis involved familiarisation with the data, coding, generation of themes, review of the themes and defining and naming themes. The qualitative data was critically assessed to extract the meaning and relevance to the selected theme. Themes and sub-themes were refined in line with the study aim. Barriers and enablers for fostering environmental sustainability in health systems were highlighted. Actions that could be taken to provide sustainable dentistry were outlined.

RESULTS: A total of 51 potentially relevant documents were identified. Following the screening process, 11 documents were excluded while 40 publications met all eligibility criteria and were included in the documentary analysis. The type of documents included in the documentary analysis were dental websites (32.5%), other (17.5%), organisations (15%), associations/academy (12.5%), government agency/department (12.5%) and dental providers (10%). Seven themes emerged from the documentary analysis. Sub-themes were also generated to aid the analysis. Theme 1: culture change (sub-themes: consumer trends, greenwashing, lifestyle change and education). Theme 2: dental equipment, materials and products (sub-themes: supplies and equipment, decontamination, amalgam, product recommendations to patients). Theme 3: digital dentistry. Theme 4: building and infrastructure. Theme 5: dental waste (subthemes: types of dental waste, the four Rs, waste management). Theme 6: procurement and healthcare supply chain. Theme 7: preventive and high-quality dentistry.

CONCLUSION: Sustainable dentistry entails creating a culture that consistently seeks new opportunities to improve efficiency and environmental performance. There is increasing awareness and information available about the topic. However, information concerning action that has been taken towards sustainability and the positive outcomes of such actions is lacking. This implies that there are barriers to change. More needs to be done to empower stakeholders in dentistry to be more sustainable.

Disclosure of interest: None declared

Scientific Poster Presentations

Abstract citation ID: cjaf073.091
SP1 EFFECTIVENESS OF THE ACTIVATOR IN OVERJET REDUCTION: IMPACT OF WEAR TIME AND CEPHALOMETRIC FEATURES IN CLASS II/1 PATIENTS

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AIMS: The treatment success of Angle Class II malocclusion correction using functional appliances has been found to be highly variable. The aim of this study was to investigate the relation between overjet reduction and wear time of activators, measured using a microsensor, and the patient's skeletal and dental cephalometric features.
MATERIAL AND METHODS: The study group consisted of 96 moderate to severe Class II/1 patients treated with activators. The reduction in overjet was calculated as distance (mm), and as a percentage (%). The mean wearing time at the appointments during treatment with the activator was measured using a TheraMon® microsensor. The lateral cephalometric radiographs taken before treatment were analyzed. By applying a multivariable analysis, it was analyzed whether the mean activator wear time per day and the skeletal and dental cephalometric features are predictive of the overjet reduction (%).
RESULTS: The medians of overjet were 8,0 mm at the start of treatment and 2,0 mm after activator treatment. The overjet reduction (%) was found to be only moderately correlated to the activator wear time per day (R = 0,31; P = 0,0019). The mean activator wear time per day was found to have a positive predictive value (estimate = 2,418; P = 0,0009), while the SNA angle was found to have a negative predictive value (estimate = -1,992; P = 0,0134) for the reduction in overjet (%).
CONCLUSIONS: The level of compliance is only partial predicting the overjet reduction after treatment with the activator. The patient's skeletal characteristics also appeared to determine the overjet reduction. A significant reduction in overjet percentage is correlated with a smaller SNA angle. In patients with maxillary protrusion, the effectiveness of the activator may be reduced.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.092

SP2 EXPERT CONSENSUS ON CURRICULUM GUIDELINES FOR THE ORTHODONTIC COMPONENT OF DENTAL STUDENT EDUCATION WITHIN AUSTRALIA AND NEW ZEALAND USING A MODIFIED E-DELPHI METHOD

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AIMS: This study aimed to develop expert consensus on curriculum guidelines for the orthodontic component of dental student education in Australia and New Zealand, with the goal of promoting greater consistency and improving educational outcomes.
MATERIAL AND METHODS: A modified e-Delphi method was employed, involving three rounds of quasi-anonymous questionnaires, with a consensus threshold set at 70%. The expert panel comprised orthodontic academic teaching staff, international experts, and recent dental graduates. The initial questionnaire was developed based on a comprehensive review of current literature and available guidelines, with learning objectives categorized using Bloom's taxonomy. A pilot study was conducted to refine the proposed guidelines before launching the Delphi rounds.

Custom surveys were created using Key Survey, where participants rated the importance of each learning objective on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). Free-text boxes were included for additional comments. Learning objectives that achieved a consensus of agreement were included in the final proposed curriculum guidelines, while those that reached a consensus of disagreement were excluded. Learning objectives that did not gain consensus were carried forward to the next Delphi round for further review, where t-tests were used to analyse differences in perspectives between orthodontic academic staff and recent dental graduates.
RESULTS: A total of 55 participants responded (77% response rate), including equal representation from academic teaching staff and recent dental graduates. Of the 57 proposed learning objectives, 54 achieved consensus after three Delphi rounds. For the learning objectives that did not achieve consensus, discrepancies were noted between the perspectives of academic staff and recent graduates.
CONCLUSIONS: This study successfully established expert-driven guidelines for orthodontic education in Australian and New Zealand dental schools, which can be used as a model in other parts of the world. The strong overall consensus among participants supports the adoption of these guidelines to enhance the planning and delivery of orthodontic education.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.093

SP3 DISTINCT EXPANSION PATTERNS IN ADOLESCENTS WITH CROWDED TEETH TREATED WITH FIXED APPLIANCES WITHOUT EXTRACTIONS: A MULTICENTER RANDOMIZED CONTROLLED TRIAL

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AIMS: To assess and compare outcomes of orthodontic treatment using a conventional bracket system (CB) and a self-ligating system (SL) in adolescents with crowded and displaced teeth treated without extractions.
MATERIAL AND METHODS: This multicenter randomized controlled trial consecutively enrolled 132 adolescents (12-17 years old) awaiting treatment. Participants were randomly assigned to non-extraction treatments with either SL (Damon Q™) or CB (Victory APCplus™) at four orthodontic clinics.

3D study models and cephalometric radiographs were collected at the start of treatment (T0), post-alignment (T1), and post-treatment (T2). Assessments included the weighted Peer Assessment Rating index (wPAR), Little's irregularity index (LII), transversal width at canines, premolars and molars (mm), incisor inclination to NA, NL, NB and ML (°), incisor position to NA and NB (mm), and treatment duration (months). Statistical evaluation of intergroup differences was performed using Student's t-test and Mann-Whitney U test. The effect of orthodontic clinic was controlled for using a two-way ANOVA.
RESULTS: Both CB and SL resulted in successful occlusal treatment outcomes according to wPAR, with mean score reductions of -24.07 and -22.11 points, respectively. The mean LII score reductions were -9.02 and -8.44 in the upper arch, and -5.95 and -5.29 in the lower arch, with mean total treatment times of 21.74 and 24.35 months, respectively, for CB and SL. Intergroup differences in wPAR, LII and total treatment time were non-significant (NS). Statistically significant differences in posterior and anterior expansion were observed during alignment (T0 to T1). SL expanded dental arches more than CB from T0 to T1 at maxillary intercanine (mean difference (MD) = 1.35), first interpremolar (MD = 1.21), and mandibular first (MD = 0.75) and second interpremolar widths (MD = 0.76) (p<0.001-0.019). CB proclined medial incisors more during T0 to T1 (L1NB, MD = 2.28; ILiML, MD = 2.23), resulting in a greater interincisal angle reduction (MD = -4.97) compared to SL (p = 0.007-0.040). Intergroup differences during total treatment were NS.
CONCLUSIONS: Different expansion patterns were observed during alignment, suggesting an opportunity to individualize the orthodontic treatment by choosing a system based on the desired treatment effects.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.094

SP4 ‡‡‡ EFFECTS OF PASSIVE PRESURGICAL PLATE THERAPY ON PALATAL MORPHOLOGY IN PATIENTS WITH UNILATERAL CLEFT LIP AND PALATE – THREE-DIMENSIONAL STUDY

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AIMS: The aim of the study is to quantify the effects of passive presurgical plate therapy on presurgical palatal morphology in patients with unilateral cleft lip and palate (UCLP).
MATERIAL AND METHODS: The study compared two groups of patients with UCLP at two European cleft centers. The dimensions of cleft width and cleft area (true cleft and palatal cleft) in these patients were measured prior to UCLP repair, and their three-dimensional intraoral morphology was recorded either conventionally or digitally. Center A performed single-stage cleft lip and palate repair in 8-month-old infants without any presurgical orthopedic treatment. Center B initiated passive presurgical plate therapy in infants immediately postnatally, followed by single-stage cleft lip and palate repair at 8 months of age.
RESULTS: The group from Center A and the group from Center B comprised 28 and 12 patients with complete UCLP, respectively. There was a statistically significant difference between mean true cleft area (TCA) values in groups A and B, with the value lower in group B by 32.7% (p=0.008). The mean value of palatal cleft area (PCA) was also significantly reduced in group B compared to group A by 36.0% (p<0.001). The mean true cleft width was significantly lower in group B than group A in the anterior (by 32.6%; p=0.001) and mid-palatal (by 29.7%;

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p=0.007) regions, but not in the posterior one (-7.7%; p=0.5). Nonetheless, the mean palatal cleft width was significantly smaller in group B than in group A in all palatal regions (p<0.001, p=0.001, and p=0.03, respectively). The mean presurgical true cleft area amounted to 106.8 mm^2 (SD=42.4 mm^2) at Center A and 71.9 mm^2 (SD=32.2 mm^2) at Center B, corresponding to a reduction of the true cleft area by 32.7% after use of passive presurgical plate for the first 8 months of patients' life.

CONCLUSIONS: Passive presurgical plates used in patients with UCLP significantly reduced the cleft area that was subsequently closed in two layers in single-stage surgery together with the lip. Therefore, presurgical plate therapy can serve as a substitution for early isolated lip repair facilitating the subsequent single-stage cleft lip and palate repair.

Disclosure of interest: None declared

Abstract citation ID: cjaf073.095

SP6 COMPARISON OF EXTERNAL ROOT RESORBTION AND SELF-REPAIR LEVELS INDUCED BY POWERSCOPE AND FORSUS FATIGUE RESISTANCE DEVICE APPLIANCES: A LONG-TERM FOLLOW-UP STUDY

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AIMS: To assess the impact of PowerScope and Forsus-FRD appliances on orthodontically induced external apical root resorption (OIEARR) and self-repair in the posterior teeth of maxilla and mandible.

MATERIAL AND METHODS: This study involved 39 patients (23F and 16M) treated due to Angle Class II malocclusion either with PowerScope (n=20, mean age:14.6±2.1y) or Forsus-FRD (n=19, mean age:15.3±1.7y), who had excellent-quality orthopantomographic X-rays (OPG) obtained at pretreatment (T0), post-treatment (T1), and retention (T2) alongside dental cast models. Teeth with incomplete root development at T0 or with apical pathologies emerging during treatment or retention were excluded, resulting in the evaluation of 545 roots at three different time points. OIEARR was assessed using Kinzinger's method: the magnification coefficient of each tooth was calculated as the ratio of its actual mesiodistal width measured on dental casts to its mesiodistal width measured on OPGs. Using this magnification coefficient, the actual lengths of teeth were calculated individually. Vestibular lengths of maxillary and mandibular premolars and the mesial and distal of first molars were measured and compared across T0, T1, and T2. Statistical analysis was performed using Wilcoxon and Mann-Whitney U tests.

RESULTS: The mean retention period was 39.8±19.2 months. No significant difference was observed between the two groups in age, sex, treatment duration, or initial lengths except tooth 4.6-distal. Significant OIEARR was noted at T1 across all evaluated teeth compared to T0, while nearly all teeth demonstrated significant self-repair at T2 relative to T1. However, the lengths at T2 remained significantly shorter than those at T0. OIEARR was significantly greater, particularly for teeth 2.4, 4.5, the mesial and distal of 1.6 and 2.6, and mesial of 3.6 in the Forsus-FRD group (ranged between 0.7mm-1.5mm) compared to PowerScope group (ranged between 0.5mm-0.8mm). Although self-repair was observed in both groups, teeth in the Forsus-FRD group exhibited significantly reduced lengths at T2 compared to T0.

CONCLUSIONS: OIEARR occurred in all teeth treated with fixed functional appliances, with self-repair observed during retention. However, the teeth in the Forsus FRD group, particularly the maxillary molars, exhibited greater length reductions due to their direct involvement as anchorage points for the appliance.

Disclosure of interest: None declared

Abstract citation ID: cjaf073.096

SP7 ‡‡‡ COMPARISON OF THE SHEAR BOND STRENGTH BETWEEN A SELF-ETCHING CERAMIC PRIMER AND CONVENTIONAL BONDING SYSTEMS USED IN BONDING METAL BRACKETS TO A CERAMIC SURFACE

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AIMS: The purpose of this study was to compare the shear bond strength (SBS) of metal brackets bonded to ceramics with a self-etching ceramic primer (Monobond Etch & Prime™) versus other bonding systems, and to evaluate changes to the ceramic surface with bonding.

MATERIAL AND METHODS: Fifty ceramic discs were divided into five groups (n=10); After Group A-D were etched with 9.5% hydrofluoric acid (HF), they were pre-treated with Monobond N™ (Group A), silane (Group B and C), and Scotchbond Universal Adhesive™ (Group D). Group E was pre-treated with Monobond Etch & Prime™ (MEP) but without etching. Transbond XT Light Cure Primer™ was applied to all groups except for Group C, in which Assure Plus™ was used instead. SBS was measured with a universal testing machine. Surface roughness and topography of the ceramic surfaces conditioned with an HF only, an HF and silane, and MEP was evaluated using a confocal laser scanning microscope and a scanning electron microscope.

RESULTS: Group E achieved a clinically adequate SBS. Group D showed significantly higher SBS than Groups A and E (P<0.05).

CONCLUSIONS: The ceramic surfaces conditioned with MEP showed less surface roughness and etching pattern than those etched with HF. The MEP showed appropriate SBS like those seen with other bonding systems, but there was less ceramic surface damage than on those treated with HF.

Disclosure of interest: None declared

Abstract citation ID: cjaf073.097

SP8 EVALUATION OF THE RELIABILITY OF DIGITAL CEPHALOMETRIC ANALYSIS IN COMPARISON WITH THE MANUAL METHOD IN DIFFERENT SEVERE SKELETAL MALOCCLUSIONS

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AIM: The aim of this study was to determine the reliability and accuracy of digital cephalometric software by comparing three different methods, in different severe skeletal malocclusions.

SUBJECTS AND METHODS: Two digital (Dolphin ceph tracing, Chatsworth USA and WebCeph, Seongnam Republic of Korea) and a manual (conventional hand tracing) cephalometric analysis of 66 patients were utilized. A total of 18 cephalometric landmarks were defined on each pretreatment cephalogram, which were randomly selected from the orthodontic department archives by a single investigator. A total of 9 angular and 9 linear skeletal and dental measurements were calculated. Manual tracing was referred as the reference method, i.e., the golden standard. The IBM SPSS version 22.0 program was utilized for statistical analysis. A two-way ANOVA test was used to analyze the data. Tukey HSD was used as a post-hoc analysis; 0.05 was used as the significance level; p<0.05 represents a significant difference.

RESULTS: A statistically significant difference (p<0.05) was found in the ANB angle between the three methods, i.e., the highest value was at the Webceph group, followed by the Dolphin group when compared to the conventional method.

1-NA (mm/deg), 1-NB (mm/deg), interincisal angle, NaPerp-A, NaPerp-Pg, Co-A, and ANS-Me parameters also showed a statistically significant difference between the three cephalometric analysis groups (p<0.05).

CONCLUSION: Considering the accuracy of digital cephalometric analysis, the methods should be used cautiously, particularly in severe cases. The reason being the inconsistencies between the 2 digital cephalometric analysis methods.Therefore, the manual method should possibly be preferred in the treatment planning of severe cases, such as orthognathic surgery.

Disclosure of interest: None declared

Abstract citation ID: cjaf073.098

SP9 EFFECTIVENESS OF TIMELY REFERRAL OF ECTOPIC CANINES TO THE SPECIALIST ORTHODONTIST

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AIMS: The demonstration of importance of timely referral of ectopic canines by dentist to specialist orthodontist for appropriate management is the aim of this audit. The impacted canines are one of the most commonly referred teeth to specialist care for treatment as it requires robust knowledge, proper diagnosis with the help of radiographs and more recently cone beam CT imaging and then personalized treatment plan for the patients depending on the complexity of the case and patient choice.

MATERIAL AND METHODS: A retrospective audit was done at two different sites was done to assess the mean age of referral of impacted maxillary canines, both the audits revealed late referrals which leads to much more complex management of the canines. Impacted maxillary canines are present in almost 3% of

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population, 30 referrals for impacted canines were assessed by one clinician, only maxillary canines were included in the audit. An unerupted canine by age of 12 years should be considered impacted and radiographic assessment should be carried out for either interceptive extraction of the retained Cs if the canine is in line of the arch or should be triaged to a specialist orthodontist. Impacted canines should be referred by 10-13years of age as a gold standard. Failure to timely refer increases the chances of failed treatment, morbidity risking the root resorption of the adjacent teeth, and at times loss of the impacted tooth
RESULTS: More than 55% of the referrals were considered late at the time of the referral. 15% of referral did not mention the impaction of canines as the reason of referral for orthodontic assessment and therefore, could not be triaged properly.
CONCLUSIONS: It is duty of care of all primary care dentist to diagnose an ectopic maxillary canine at a reasonable time so that delay in management can be prevented. A delay in referrals causes

1. Increased risk of root resorption of the lateral incisors
2. Deviation from the normal path of eruption
3. Less predictability of success of treatment
4. More burden on health care system if treatment is funded by state.

Disclosure of interest: None declared

Abstract citation ID: cjaf073.099
SP12 EARLY PREDICTORS OF MAXILLARY CANINE IMPACTION ON PANORAMIC RADIOGRAPHS IN PRIMARY DENTITION

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AIM: The purpose was to find early predictors of maxillary canine impaction (MCI) using panoramic radiographs of the primary dentition.
SUBJECTS AND METHOD: This study included 40 patients with unilateral MCI who underwent two panoramic radiographs, one of the primary dentition and one of the mixed or permanent dentition. Contralateral non-impacted canines from the same patients were used as controls. That is, forty impacted canines (impacted canine group, IG) and 40 non-impacted canines (control group, CG) were evaluated. The presence of MCI was determined using panoramic radiographs taken in the mixed or permanent dentition. Parameters for the early prediction of MCI were assessed using the same patients' panoramic radiographs taken in the primary dentition. Four angular variables and sector classification methods were applied to assess the angulation and root apex's position of the tooth germ of maxillary canines (MC).
RESULTS: The differences in all angular variables between the IG and CG were significant (P<0.001). The midline angle, which most affected the odds of the MCI, was significantly larger in the IG (19.5 ± 7.4°) than in the CG (6.4 ± 2.2°). The optimal cutoff value of this angle was 12.7°, yielding a specificity of 100% and a sensitivity of 85%. A significant correlation between sector position and MCI was observed (P<0.001). The root apex of the tooth germ of the impacted canine was observed more frequently in sectors 4 and 5.
CONCLUSIONS: If the midline angle of the MC is more than 12.7° or the root apex of the MC is located toward the first premolar, there is a higher chance of it being impacted.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.100
SP14 PULP VOLUME OF THE PERMANENT CENTRAL INCISORS IN SUBJECTS WITH DIFFERENT ANTEROPOSTERIOR INCISOR CLASSIFICATIONS

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AIMS: Malocclusion has been reported to influence dental pulp dimensions where an increased dental pulp volume was associated with an anterior open bite. The aim of this study is to assess and compare permanent central incisor pulp volume in subjects with different anteroposterior incisor relationships.
MATERIAL AND METHODS: This study was reviewed and approved by the Institutional Review Board/ Jordan University of Science and Technology. A total of 184 cone beam computed tomography with 420 permanent incisors were included in the study. The Cone beam computed tomography (CBCT) images were taken between January 2016 to December 2022. Subjects were divided into 4 groups based on anteroposterior incisor relationships; Group 1: Class I (177 teeth), Group 2: Class II division 1 (83 teeth), Group 3: Class II division 2 (64 teeth), and Group 4: Class III incisors (96 teeth). Inclusion criteria were age ≥18 years, sound upper central incisors, no history of trauma, no previous orthodontic treatment, healthy periodontium, and no presence of cysts or other pathologies. The following variables were measured using the ITK_SNAP software: central incisor crown and pulp chamber height, pulp chamber and total pulp volume, and length of central incisor tooth.
RESULTS: The central incisor pulp volumes were increased in Class II Div 2 incisors. The pulp chamber volume averaged 3.00, 3.3, 5.1, and 3.3 mm^3 and the total pulp volume averaged 5.4, 5.5, 8.00, and 5.6 mm3 in Class 1, Class II Div 1, Class II Div 2, and Class III incisors, respectively (P<0.001).
CONCLUSIONS: Pulp volumes of the central incisors are larger in subjects with Class II Div 2 incisors compared to other incisor classifications.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.101
SP15 DOES FUNCTIONAL TREATMENT AFFECT NASOPHARYNGEAL AIRWAY AND CRANIOCERVICAL POSTURE?

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AIMS: The aim of this study was to evaluate the effects of functional treatments on skeletal, dental, soft tissue changes, nasopharyngeal airway, and craniocervical posture in Angle Class III individuals during the growth period using cephalometric analysis.
MATERIAL AND METHODS: This retrospective study included two main treatment groups: one treated with Class III activator appliances and the other with Class III twin-block appliances, with an untreated Class III group as the control. Group 1 consisted of 11 individuals treated with an activator (mean age 11.14±1.43 years), Group 2 included 12 individuals treated with a twin-block (mean age 11.42±1.24 years), and Group 3, the control group, consisted of 8 untreated individuals (mean age 9.94±1.94 years). Inclusion criteria were functional Class III malocclusion with anterior crossbite, Angle Class III molar and/or canine relationships, non-high-angle growth patterns, and no prior orthodontic treatment.

Group 1 was treated with an activator for an average of 14.5 months, and Group 2 with a twin-block for 14 months. Treatment effects were evaluated by comparing cephalometric data before treatment (T1) and after treatment (T2) for Groups 1 and 2. For Group 3, longitudinal data at T1 and T2 were used to observe natural growth effects. Statistical analysis was done using paired t-tests for within-group comparisons and one-way ANOVA for intergroup comparisons, with post-hoc Duncan tests to identify significant differences (p<0.05).
RESULTS: Both treatment groups showed significant increases in SNA and ANB values, with a decrease in SNB. The activator treatment caused forward movement of the maxilla, while the twin-block caused backward movement of the mandible. Both groups showed proclinational movement of the upper incisors, with no significant changes in the lower incisors. Linear airway dimensions increased in both treatment and control groups, with more significant changes in the treatment groups. Significant improvements in airway area were observed in the activator and twin-block groups, while the control group showed no significant changes. Craniocervical angles increased significantly in the treatment groups, indicating head extension.
CONCLUSIONS: The effects of functional treatment on postural and nasopharyngeal airway changes during growth are clearly evident, with increased airway space in both treatment groups.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.102
SP16 AESTHETIC EVALUATIONS OF CLASS I, CLASS II, AND CLASS III FACIAL MODELS CREATED FROM FACIAL SCANS

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AIMS: The aim of this study was to compare the aesthetic evaluations of Class I, Class II, and Class III facial models, created from the facial scan of an individual with ideal cephalometric values, among different evaluator groups.
MATERIAL AND METHODS: An individual with ideal cephalometric values was scanned using the Shinning MetiSmile facial scanner, and the STL file was processed in Blender software. To simulate Class III appearances, the mandible was advanced by 2 mm, 4 mm, and 6 mm, and similarly retracted for Class II appearances. Seven models were created, 3D-printed with a Phrozen Mega 8KS

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printer, and randomly numbered from 1 to 7. These models were aesthetically evaluated using a VAS-like scale by three groups: dentists (40), dentistry students (100), and non-professionals (60).
RESULTS: The mean values and standard deviations were calculated, and the results of the Kruskal-Wallis test were analyzed. A statistically significant difference was found between the groups for Model 7 ($p = 0.026$), where dentists (Group 1) gave lower average scores compared to dentistry students (Group 2) and non-professionals (Group 3), who assigned higher scores. For Models 2, 4, and 6, the results were close to statistical significance ($p = 0.069$, $p = 0.076$, and $p = 0.055$, respectively), indicating potential differences between the groups for these models. However, for the remaining models, specifically Models 3, 5, and 8, no statistically significant differences were observed among the groups.
CONCLUSIONS: In the study, the most notable difference in aesthetic evaluations was observed in Model 7. This result indicates that professional dentist's approach certain aesthetic features more critically compared to dentistry students and non-professionals.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.103
SP17 ARTIFICIAL INTELLIGENCE-ASSISTED IDENTIFICATION AND ASSESSMENT OF MANDIBULAR ASYMMETRY ON ORTHOPANTOMOGRAPHY

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AIMS: This study aims to establish an artificial intelligent (AI) model which automatically identifies mandibular landmarks and assesses level of mandibular asymmetry on orthopantomography (OPG)
MATERIAL AND METHODS: A total of 1038 OPGs, which include 451 mixed dentitions and 587 permanent dentitions, were collected and annotated in order to develop an AI model. Landmarks on OPGs which are relevant to mandibular asymmetry were chosen to be annotated. The mesio-distal widths of lower first molar was compared to differentiate horizontally distorted and non-distorted OPGs. The efficacy and robustness of the AI model was evaluated in terms of landmark identification accuracy, measurement accuracy and asymmetry diagnostic performance using descriptive statistics, successful detection rates (SDR), interclass correlation coefficient (ICC), Bland Altman plots and Mann-Whitney U test
RESULTS: The AI model achieved an average landmark detection error of 0.86 ± 0.95mm, with an average error of 0.97mm on bony landmarks and 0.54mm on dental landmarks. The SDR within 1mm, 2mm and 3mm levels were 75.33%, 93.11% and 96.72% respectively. 15 out of 16 landmarks showed no statistical difference in mean error between left and right side ($P>0.05$). Region-specific variations in accuracy were detected in the model. Vertical and horizontal errors were larger in condylar landmarks and mandibular gonial angle respectively. Additionally, condylar landmarks were more accurately identified in permanent dentition while mandibular angle landmarks were more accurate in mixed dentition. Furthermore, high consistency was observed in all measurements in both AI and manual identifications ($ICC>0.983$). The model achieved 82.52% and 75.24% accuracy in asymmetry detection when using gonial angle and total ramal height as diagnostic criteria.
CONCLUSIONS: The AI models developed is highly accurate in anatomical landmarks identification and mandibular asymmetry assessment on OPGs. The model's generalisability and robustness allow it to potentially be a promising diagnostic tool for mandibular asymmetry in clinical practice.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.104
SP18 INVESTIGATION OF CHANGES IN HYOID BONE POSITION WITH CHIN CAP AND FACE MASK THERAPY IN INDIVIDUALS WITH SKELETAL CLASS III ANOMALY: A CEPHALOMETRIC ANALYSIS

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AIMS: This study retrospectively examined the effects of chin cup and face mask appliances on hyoid bone position in the treatment of skeletal Class III malocclusions and compared the outcomes of these treatments.
MATERIALS AND METHODS: The study included 66 individuals divided into two treatment groups (chin cup and face mask, 18 each) and two control groups (Class I and Class III, 15 each). The mean ages in the treatment groups were 10.25 ± 2.08 years (chin cup) and 10.99 ± 1.98 years (face mask). In the chin cup group, 700 g of force was applied through the condyle and chin tip. In the face mask group, 400 g of protraction force was applied per side at a 30° angle to the occlusal plane. Cephalometric and hand-wrist radiographs were taken before (T0) and after (T1) treatment or observation. Treatment durations were 15.89 ± 4.39 months (chin cup) and 14.39 ± 4.65 months (face mask). The observation periods for the Class I and III controls were 15.8 ± 3.76 and 13.93 ± 3.17 months, respectively. Wilcoxon signed-rank, Kruskal-Wallis, and Mann-Whitney U tests were used.
RESULTS: The hyoid bone was positioned more anteriorly in the treatment groups compared to the controls. The sagittal relationship between the hyoid bone and cervical vertebrae remained stable. Class I and III skeletal patterns showed different mandibular growth directions and magnitudes, influencing hyoid movement. In the chin cup group, greater restriction of mandibular sagittal growth was associated with more pronounced inferior displacement of the hyoid bone. While the inferior movement of the hyoid bone was significant within the treatment groups, it did not differ significantly from changes attributed to natural growth and development.
CONCLUSIONS: The movement of the hyoid bone cannot be solely attributed to mandibular rotation caused by chin cup or face mask treatment. However, in chin cup treatment, the hyoid bone tends to move inferiorly as mandibular sagittal growth is restricted. These findings align with studies suggesting that inferior hyoid displacement may be a reflexive adaptation to maintain airway patency.
Keywords: Hyoid bone, Chin cup, Facemask
Disclosure of interest: None declared

Abstract citation ID: cjaf073.105
SP20 A CROSS-SECTIONAL STUDY ON THE UTILIZATION OF DENTAL FLUORIDE APPLICATION SERVICES FOR CHILDREN IN URBAN AND RURAL AREAS OF TAIWAN

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AIM: This study aims to investigate disparities in the utilization of dental fluoride application services for children under six years old in Taiwan, focusing on the impact of these services in urban and rural areas. The research seeks to provide evidence-based insights for policy enhancements that support oral health promotion and reduce dental caries among children.
MATERIALS AND METHOD: Data were sourced from the National Health Insurance Medical Quality Information Open Network, covering fluoride application services delivered by medical institutions from 2021 to 2023. A total of 18,336 data points from medical centers, regional hospitals, and primary clinics were analyzed. Descriptive statistics and independent sample T-tests were employed to assess differences in service utilization between urban and rural settings, aiming to determine statistical significance and regional disparities using SPSS 22.0 software.
RESULTS: The analysis revealed significant disparities in service utilization between urban and rural regions ($F=5.444$, $p<0.001$). In rural areas, service execution rates at regional hospitals declined significantly from 61.98% in 2021 to 48.17% in 2023, while primary clinics exhibited an increasing trend from 64.95% to 69.53%. In contrast, urban medical centers maintained stable rates, whereas primary clinics saw an increase from 67.76% to 70.11%. The data suggest that primary clinics have a critical role in service delivery, particularly in rural areas where healthcare resources are limited.
CONCLUSIONS: The findings underscore the importance of strengthening fluoride service accessibility through primary clinics, particularly in underserved rural areas. The Ministry of Health and Welfare is encouraged to expand mobile fluoride services, enhance dentist involvement in preschools, and integrate comprehensive oral health education into early childhood programs. These measures could effectively reduce the high caries rates among young children and align with WHO's oral health targets by 2025, contributing to long-term public health improvements.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.106
SP21 OCCLUSAL CONTACT AREA AT FOUR CLENCHING INTENSITIES RECORDED BY 3D DIGITAL INTRAORAL SCANNER

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AIMS: To compare occlusal contact areas recorded from a 3D intraoral scanner across four clenching levels. (20-<40%, 40-<60%, 60-<80%, and 80-100% maximum voluntary clenching (MVC))
MATERIAL AND METHODS: The study included 30 participants aged between 20 and 35 years (mean age 27.60 ± 5.50 years) comprising 18 females (60.0%) and 12 males (40.0%) with full dentition, excluding third molars. Upper and lower arches were scanned and registered using a 3D intraoral scanner. Electromyograms with visual biofeedback technique were utilized to determine the clenching intensity. Scans commenced at 20-<40% MVC, with a rest period of at least 2 minutes between bite changes to minimize muscle fatigue. Scanned images were processed to calculate occlusal contact areas at an interocclusal distance of 50 micrometers using Geomagic software, and the procedure was repeated for higher clenching intensities up to 80–100% MVC. Each scanned file was analyzed twice, with a minimum interval of two weeks. Intra-examiner reliability was assessed using the intraclass correlation coefficient. Friedman test was used for non-normally distributed data at a significance level of 0.05.
RESULTS:

1. There was a tendency for occlusal contact areas to increase with higher levels of clenching intensity.
2. The occlusal contact area at 20–<40% and 40–<60% MVC were significantly different from the higher clenching levels ($p < .05$).
3. The occlusal contact area at 60–<80% MVC did not differ significantly from that at 80–100% MVC ($p > .05$).

CONCLUSIONS: Using a 3D intraoral scanner to register occlusion, clenching at 60% MVC or higher produced consistent amount of occlusal contact area.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.107
SP22 GENETIC BIOMARKERS ASSOCIATED WITH CLASS III MALOCCLUSIVE SKELETAL PHENOTYPES: A STUDY IN SPANISH FAMILIES

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AIMS: The sagittally advanced position of the mandible by reference to the maxilla is influenced by genetic and epigenetic factors with a familial transmission supporting its etiology as a polygenic trait; therefore, the aim of this study is the identification of markers associated with genetic variants linked to skeletal class III and their inheritance pattern among families of Spanish origin.
MATERIAL AND METHODS: A total of 91 individuals of southern european origin (46 affected and 44 unaffected) belonging to 21 families were recruited. Clinical and cephalometric records and 2 mL of saliva were obtained from each subject. Family cluster analysis was used to capture and classify the phenotypic diversity of this skeletal malocclusion. DNA genotyping was performed via multiplex analysis to assess the presence of 14 candidate genes and 31 SNPs.
RESULTS: The most prevalent cluster among affected subjects (39.13%) was C4 representing a mandibular skeletal class III. An autosomal dominant inheritance pattern with incomplete penetrance was observed among spanish population. The three genes with the highest penetrance were BMP3 (4q21.21- SNP rs1495643) - 67% -, RUNX2 (6p21- SNP rs1997992) -61%- and the FGF10 gene (5p12- SNP rs593307) -100%- being the only one to be considered as a risk allele. Homozygosity of the minor allele of the SNP rs2277071 (IGF2R, 6q25. 3), rs2249492 (COL1A1, 12q13.13), rs11200014 (FGFR2, 10q26), rs10850110 (MYOIH, 12q24.11), rs2205181 and rs1012861 (TGFB3, 14q24.3) was identify among spanish individuals affected by skeletal class III.
CONCLUSIONS: The presence of susceptible genes in southern european population and their autosomal dominant transmission with incomplete penetrance supports the role of genetics in the development of the skeletal class III malocclusion. Therefore, its identification is crucial to clarify its etiology enhancing a more accurate diagnosis and the establishment of treatment decision-making protocols.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.108
SP23 DOES INTERCEPTIVE MAXILLARY EXPANSION HAVE AN EFFECT ON THE CLINICAL OUTCOME OF MAXILLARY IMPACTED CANINES IN PATIENTS WITH POSTERIOR CROSSBITE?

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AIMS: To investigate the effect of slow maxillary expansion (SME) with removable plates on impacted maxillary canines in patients with early mixed dentition and dental crossbite. The primary objective was to assess the change in canine position after 18 months of follow-up (study period). Additionally, the study examined canine eruption and the need for orthodontic intervention 18-60 months after the study period (long-term follow –up)
MATERIAL AND METHODS: In this longitudinal trial, 5 variables were used to assess canine position on panoramic radiographs at 0 (T1) and 18 (T2) months: sector, canine-to-midline angle, canine-to-first-premolar angle, canine-cusp-to-midline distance and canine-cusp-to-occlusal-plane distance. Patients with upper canines angled >15° towards the dental midline were classified as impacted and compared to those without (control group). Upper intermolar and intercanine distance and lack of space (measured with Moyers' tables) were assessed on digital dental casts. The mean change of the studied variables between T2 and T1 per group were compared with linear mixed models. Logistic regression analysis was used to analyze the predictive value of dental and radiographic characteristics at T1 for binary outcomes at long term follow-up.
RESULTS: 171 patients were included in the impaction group (342 canines, mean age at T1 8.53 years, 40.35% male, mean follow-up 1.85 years) and 26 patients were included in the control group (52 canines, mean age at T1 8.02, 65.38% male, mean follow-up 1.85 years). After SME (T2), canine-to midline angle, canine-to-occlusal plane distance and lack of space significantly decreased and intercanine and intermolar distance significantly increased. Only sector and lack of space were predictive for canine eruption during the study period. Canine-cusp-to-midline and intermolar distance were predictive for canine eruption during the long-term follow-up.
CONCLUSIONS: SME during early mixed dentition improves canine position and significantly increases intercanine and intermolar distance in patients with posterior crossbite.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.109
SP24 ‡‡‡ SLEEP-DISORDERED BREATHING AND DIMENSIONS OF THE MAXILLARY DENTAL ARCH AND HARD PALATE IN CHILDREN WITH CLASS II AND LARGE OVERJET

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OBJECTIVES: The first aim was to examine sleep-disordered breathing (SDB, including snoring) and maxillary dental arch and hard palate dimensions (maxillary dimensions) in children with class II and large overjet ≥6 mm (study group) compared to a control group with neutral occlusion. The second aim was to examine the general relation between SDB and maxillary dimensions of the total group of all participants (both of study and control group).
METHODS: The study group included 37 children (19 boys; 18 girls; median age 12.3 years) and the control group included 32 children (16 boys; 16 girls; median age 12.2 years). SDB was assessed by respiratory polygraphy and manually scored. Intraoral scans were used to measure the distances between maxillary canines and first permanent molars and the vertical dimensions of the hard palate at the level of the maxillary canines and first permanent molars. The general relation between SDB and maxillary dimensions was examined on the total group of participants. Chi-square, general linear model adjusted for age, gender, and body mass index (BMI), and Mann-Whitney test were used for analyses.
RESULTS: No significant difference in SDB measurements was found but snore index was almost significantly higher in the study group ($p=0.051$) compared to the control group. Significantly reduced distances between both canines and first molars ($p<0.001$) were found in the study group. No significant differences in dimensions of the hard palate were found between the two groups. No general significant associations between SDB measurements and maxillary dimensions were found in the total group of participants.

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CONCLUSIONS: No difference in SDB was found besides that snore index tended to be higher in the study group. Significantly reduced transversal dimensions of the maxillary dental arch were found in the study group. No significant difference regarding dimensions of the hard palate was found, nor between SDB and maxillary dimensions. However, the results may contribute to an interdisciplinary approach of risk assessment of SDB in children with class II and large overjet and, in the future, intraoral scans may be useful in risk assessment of early signs of pediatric SDB in orthodontic patients.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.110
SP28 CLEAR ALIGNER TREATMENT– A SURVEY ON AESTHETIC ORTHODONTIC TREATMENT AMONG CITIZENS AND DENTAL PRACTITIONERS IN DENMARK

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AIMS: This study investigates clear aligner treatment (CAT) of adult patients in private dental practice and aims to identify: 1) The awareness of and knowledge about CAT among citizens, 2) How citizens who have received CAT experience the treatment and 3) How general dentists and orthodontists assess CAT.
MATERIALS AND METHOD: The study was based on an observational cross-sectional questionnaire investigation. A pilot test was performed prior to distribution of two separate online questionnaires which were sent out to all private dental clinics in Denmark and to a group of 2000 citizens with the age ≥18 years. The responses from the questionnaires were mainly analysed by descriptive statistics.
RESULTS: 217 citizens and 200 practitioners were included in the analysis. The citizens' awareness of CAT was poor in general, and younger citizens were more aware of CAT. The citizens most often became aware of CAT through their own dentist or through their friends and family. Aesthetics was the most common reason for citizens to commence or consider CAT. The citizens in general felt well informed ahead of CAT except for information about risks and adverse effects as well as information on the consequences of not receiving any treatment or receiving information about alternative treatment options. The citizens were in general satisfied with their treatments and outcomes. The practitioners always/often informed about all parameters possible[a]. The most frequent indication for CAT was cosmetics. The orthodontists more often included a lateral cephalometric x-ray in the diagnostics before CAT and more often made changes and more comprehensive changes to the digital treatment plan. The orthodontists were less satisfied with CAT compared to the general dentists.
CONCLUSIONS: This study has provided valuable knowledge on the awareness and satisfaction of CAT among the citizens and indicated how practitioners assess CAT of adult patients in private dental practice in Denmark. The results from the present study can probably be applied to similar countries.

[a]Purpose, practicalities, treatment duration, retention, oral hygiene instructions, possible adverse effects, consequences of not receiving treatment, alternative treatment options, price, examples of before/after treatment and visualisation of the expected result.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.111
SP29 ANALYSIS OF THE MESIODISTAL ANGULATION OF THE FIRST PERMANENT MOLAR BASED ON GENDER, AGE, SKELETAL CLASS, AND FACIAL PATTERN

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AIMS: This study aims to investigate the relationship between the mesiodistal angulation of the first permanent molars and factors such as facial pattern, patients' sex, age, and skeletal class. It emphasizes the role of facial analysis in orthodontic diagnosis, highlighting the influence of soft tissues, which are often overlooked in cephalometric evaluations.
MATERIAL AND METHODS: A cross-sectional observational study was carried out using 114 lateral cephalogram radiographs (60 females and 54 males) of patients from the *Clínica Universitaria Rey Juan Carlos* who had never been treated with orthodontics and had never lost any teeth. The statistical analysis used SPSS v28, including descriptive statistics, Kolmogorov-Smirnov test, Student's t-test, ANOVA, and Scheffé post hoc tests.
RESULTS: No statistically significant difference was found between the mean values of upper (P=0.486) and lower (P=0.164) molar angulation as a function of sex. Age was determinant for the upper molar, which showed more distal angulation in patients ≤12 years and a shift towards mesial angulation in older patients (P<0.001). The lower molar angulation remained stable regardless of age. No significant relationship was found between skeletal class and molar angulation (P=0.323). However, facial pattern had a significant influence on angulation: brachyfacial patients had a greater mesial angulation (upper molar: 77.83°, lower molar: 85.56°), while dolichofacial patients exhibited more distal angulation (upper molar: 74.61°, lower molar: 76.64°). Mesofacial patients showed intermediate values.
CONCLUSIONS: Molar angulation is a key factor in planning individualized orthodontic treatment. While skeletal class and gender did not significantly influence molar angulation, age and facial pattern were determining factors. Younger patients presented more distal angulation of the upper molar, tending to mesial angulation with age, while the lower molar angulation remained constant. Facial pattern was critical, with brachyfacial patients exhibiting mesial angulation and dolichofacial patients showing more distal angulation. These findings underscore the necessity of tailoring orthodontic approaches to individual anatomical and developmental characteristics.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.112
SP30 IMPACT OF TWIN BLOCK AND MOTION CLASS II APPLIANCES ON HYOID BONE POSITION

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AIM: The aim of this study was to compare the effect of Twin Block and Carrière Motion 3D Class II appliances in the Hyoid bone position and its impact on the airway with skeletal class II.
MATERIALS AND METHOD: Firstly, the Ethical Committee of the Faculty of Health Sciences was accepted. A total of 82 children aged between 10 and 16 years were included in this study, divided into two groups, 41 children in each group. They underwent a pre- and post-treatment lateral cephalometric radiographs. All results were analyzed using a general linear model (GLM) statistical analysis. Anteroposterior measurements included C3-RGn, H-RGn, H-C3Chor, HC3, G-C3Chor, H-Sper, and H-PTRper. Vertically, H-H' was measured. Regarding angulation, Heje-PTRper and Heje-C3Chor were measured. For the airway, H-LPF was used.
RESULTS: Anteroposterior measurements revealed a non-significant anterior displacement of the hyoid bone for each value, based on gender and biotype

(C3-RGn: (p=0,991), gender (p=0.984), biotype (p= 0.456); H-Sper; H-RGn (p=0.374), gender (p= 0.912), biotype (p= 0.770); H-PTRper, H-C3Chor, H-C3: (p= 0.400), gender (p= 0.821), biotype (p= 0.453); C3-Chor), the hyoid bone tends to move forward.

No statistically significant changes were shown either vertically, angular, or airway measurement (H-LPF:p=0.065), according to gender and biotype.

Vertically measurement (H-H': (p=0.755), gender (p= 0.798), biotype (p= 0.316)), the Twin Block tends to move the hyoid downward, while the Motion 3D appliance shows an upward tendency. Angular measurements (Heje C3/Chor: (p= 0.221), the gender (p=0.959, biotype (p=0.946)) and (Heje/PTRper) showed a posterotation movement of the hyoid.
CONCLUSIONS: No statistically significant differences were observed in the change of hyoid bone position between both appliances regarding gender and biotype.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.113
SP31 THE ACCURACY OF WEB-BASED ARTIFICIAL INTELLIGENT PLATFORM FOR CEPHALOMETRIC ANALYSIS: A SYSTEMATIC REVIEW

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AIMS: Artificial intelligence has become an increasingly integral component of orthodontics, particularly in cephalometric analysis. Numerous programs now

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leverage AI for cephalometric analysis, offering enhanced convenience and the ability to operate entirely through web-based platforms. This systematic review aimed to evaluate the accuracy of web-based automated cephalometric landmark identification and analysis platforms, comparing to manual landmark identification through traditional tracing or the software.
MATERIAL AND METHODS: The systematic review was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. A comprehensive electronic search of multiple databases, including PubMed, Scopus, EMBASE (via OVID), and Cochrane, was performed to identify relevant studies published up to November 2024. Additionally, a manual search of the reference and citation lists of eligible articles and existing systematic reviews was also performed to identify additional relevant studies. The search strategy incorporated key terms related to (1) lateral cephalometrics, (2) web-based artificial intelligence for automated cephalometric landmark identification, (3) landmarks, and (4) orthodontics. Two independent reviewers screened the studies, extracted data, and evaluated the risk of bias using the QUADAS-2 (Quality Assessment of Diagnostic Accuracy Studies-2).
RESULTS: A total of 377 studies were identified from electronic databases, with an additional 8 studies included through manual searching of grey literature. After duplicates were removed and a full-text review was conducted, 14 relevant studies published from 2020 to 2024 met the eligibility criteria and were included in this systematic review. All selected studies utilized web-based artificial intelligence platforms for cephalometric analysis. The results of this systematic review showed that the intraclass correlation coefficient (ICC) values reported in most studies were greater than 0.75, indicating moderate reliability and agreement. The risk of bias assessment using the QUADAS-2 tool revealed that a high risk of bias was primarily associated with patient selection and the index test.
CONCLUSIONS: It can draw a conclusion from this review that web-based artificial intelligence platforms for cephalometric analysis are clinically viable and offer time-saving advantages over traditional manual tracing. Nevertheless, they require careful attention and manual refinement of specific landmarks to ensure high levels of accuracy and optimize efficiency in a cephalometric diagnosis.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.114
SP32 SKELETAL AGE AND THE RELATIONSHIP TO MIDPALATAL SUTURE MATURATION STAGES. A RETROSPECTIVE RADIOGRAPHIC STUDY IN A PORTUGUESE POPULATION

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AIMS: The primary aim of this study was to evaluate the degree of correlation between chronological age (CA), cervical vertebrae maturation (CVM) and midpalatal suture maturation (MPSM) in a Portuguese population. A secondary objective was to evaluate the CVM method as a predictive indicator in estimating the degree of MPSM.
MATERIAL AND METHODS: Thirty-three lateral cephalograms and Cone Beam Computed Tomography (CBCT) scans from the same patients aged 9-29 years (20 females and 13 males) were analysed. The CVM stages were assessed on the lateral cephalograms and classified according to the modified method of Baccetti et al.: CVS1 - CVS6. The MPSM stages were evaluated on CBCT scans according to Angelieri et al.'s classification system: Stages A - E. A weighted Kappa coefficient was calculated for intra–and intra-examiner reproducibility. Spearman's Rank Correlation coefficient (rho) and Diagnostic Performance tests were applied as statistical analysis tools, considering a 5% significance level ($p<0.05$).
RESULTS: A weak and non-significant correlation was found between CA and MPS stages (rho=0.248, p=0.164). A positive moderate significant correlation was observed between CA and CVM for the whole group (rho=0.625, $p<0.001$), with more relevance in males (rho=0.872, $p<0.001$) compared to females (rho=0.463, p=0.040). A positive moderate significant correlation was also observed between CVM and MPS for the total sample (rho=0.433, p=0.012) and males (rho=0.603, p=0.029). The diagnostic performance tests indicated that only when the CVM stages CVS5 and CVS6 are used to assess the MPS stages D and E, a positive likelihood ratio (LHR+) value greater than 10 was observed, indicating a high and often conclusive increase in the likelihood that the CVM corresponds to the specific maturational stage of the MPS.
CONCLUSIONS: The CA is not a reliable indicator for the MPSM stage among adolescents and young adults. The CVM method could be a good predictor of MPSM in the post-pubertal maturation stages.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.115
SP33 SHEAR BOND STRENGTH OF THE ORTHODONTIC BRACKETS ON HYPOMINERALIZED TEETH BEFORE AND AFTER APPLICATION OF RESIN INFILTRANT REMINERALIZING AGENT: IN-VITRO STUDY

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AIMS: One of the early indications for the demineralization is white spot lesions (WSLs) and it is highly potential to be a caries lesion. The prevalence of WSLs is 30-70 % as a side effect of orthodontic treatment. Many studies showed resin (ICON, DMG, Hamburg, Germany) infiltration significantly penetrates deeply in the lesion compared to conventional adhesives. The aim of this study is to evaluate hypocalcified enamel treated with resin infiltration could provide better shear bonding strength (SBS) in debonding.
MATERIAL AND METHODS: Thirty extracted, permanent bovine incisors were collected, inspected for no damage during extraction, divided into three groups, Group 1 as Control, Group 2 as EXP 1 (demineralized enamel pre-treated with ICON), and Group 3 as EXP 2 (demineralization only) (n=10 each). Demineralization protocol composition was 2.2 mmol/L $CaCl_2$, 2.2 mmol/L NaH_2PO_4, and 50 mmol/L acetic acid adjusted to a pH value of 4.5 with NaOH. SS-OCT (OCT-2000, Santec, Komaki, Japan) measurements were taken up to 21 days. Lower incisor plastic brackets (Esther MB, Tomy, Fuchu, Tokyo, Japan) were positioned at the center of the prepared surface with the adhesive applied on the bracket base by using Super-Bond/Clear (fluoride-free 4-META/MMA-TBB resin self-cure adhesive). To test the specimen in the universal testing machine, an acrylic resin mold was used so the tooth has been embedded inside it. After debonding, the enamel surface of each tooth and the brackets were examined using a microscope to check adhesive remnant index (ARI). Shapiro-Wilk normality test and Dunn's test with Bonferroni correction were used in the statistical analyses.
RESULTS: ARI showed no significant difference between the Control group and Group 1, whereas there is a significant difference between the Control and Group 2 Moreover, there was a significant SBS values differences between the Control and Group 1 and between Group 1 and Group 2, whereas there was no significant difference between the Control and Group 2.
CONCLUSIONS: Demineralized enamel pre-treated with ICON significantly increased SBS values. These *in vitro* effects should be evaluated in clinical studies.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.116
SP34 MIXED REALITY VISUALIZATION OF IMPACTED TEETH: A SURVEY OF UNDERGRADUATE DENTAL STUDENTS

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AIMS: Integrating 3D visualization technologies, such as mixed reality (MR), into dental education has the potential to significantly enhance students' understanding of facial anatomy and improve their clinical skills. This study aimed to assess dental students' perceptions of using MR for three-dimensional visualizations of impacted teeth.
MATERIAL AND METHODS: Five cone-beam computed tomography (CBCT) scans of patients with impacted teeth were retrospectively selected from a university clinic database: 2 cases with impacted canines, 2 with impacted wisdom teeth, and 1 with an impacted incisor. The CBCT images were processed to adjust contrast for optimal visualization before being uploaded to MR goggles (HoloLens 2).

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A total of 47 final-year dental students participated, each manipulating the 3D images in space using the goggles. Following this, they completed a 7-question survey on a 5-point Likert scale (1 = strongly agree, 5 = strongly disagree), evaluating image quality and the usefulness of 3D visualization. Descriptive statistics were used for analysis.
RESULTS: Participants included 9 males and 38 females, with a mean age of 24.17 years (SD = 1.5; range: 22–30). All students were in their final year of study with at least two years of clinical experience. The median response for 4 survey questions was 1 (strongly agree), indicating a highly positive opinion, while for three questions, the median was 2 (agree), reflecting a generally positive opinion. The most favorable responses were for enhanced visualization of the impacted tooth's position relative to adjacent structures and the inclusion of 3D image visualization as a teaching aid, with median scores of 1 and mean scores of 1.38 and 1.3, respectively.
CONCLUSIONS: MR-based 3D visualization is a promising educational tool that can improve dental students' understanding of impacted tooth positioning, aiding in both treatment planning and execution. Its incorporation into the curriculum could enhance the learning experience for future dental professionals.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.117
SP36 IMPACT OF ADENOTONSILLECTOMY AND RAPID MAXILLARY EXPANSION ON UPPER AIRWAY DIMENSIONS AND AIRFLOW IN A NON-OBESE PEDIATRIC SAMPLE WITH OBSTRUCTIVE SLEEP APNEA: A CROSS-OVER RANDOMIZED CONTROLLED TRIAL

Carlos Flores Mir, Maria Monteiro Magalhaes, David Normando, Ki Kim, Guilherme de Araujo Almeida

AIM: Adenotonsillectomy (AT) and rapid palatal expansion (RPE) are commonly proposed management approaches for pediatric obstructive sleep apnea (OSA). However, when both procedures are indicated, the optimal sequence and their relative effectiveness—particularly regarding their impact on upper airway (UA) dimensions and airflow—remain unclear. In non-obese pediatric patients with a confirmed diagnosis of obstructive sleep apnea (OSA), what is the impact of adenotonsillectomy (AT) and rapid palatal expansion (RPE) on UA dimensions and airflow, and what is the optimal sequence for these interventions?
SUBJECTS AND METHOD: Thirty-two non-obese children (mean age of 8.8 years), balanced maxillomandibular relationships, and presenting with grade III/IV tonsillar hypertrophy and maxillary constriction, participated in a cross-over randomized controlled trial. In the first phase, one group underwent AT, while the other received RPE. After six months, the interventions were switched, but only for participants with an apnea-hypopnea index (AHI) greater than 1 following the first treatment. CBCT was performed before treatment (T0), six months after the first intervention (T1), and six months after the second intervention (T2). The impact of intervention type and sequence on UA dimensions and airflow was assessed by evaluating the volumes of the nasal cavity, nasopharynx, buccopharynx, and hypopharynx, as well as computational fluid dynamics (CFD) analysis. Intra- and inter-group comparisons of UA dimensions and airflow were performed using two-way MANCOVA and repeated measures ANOVA.
RESULTS: As the first intervention, AT resulted in a volumetric increase in all UA areas, with a significant increase in the buccopharynx compared to RPE. As the second intervention, AT also led to a substantial increase in the nasopharynx and buccopharynx volumes compared to RPE. Volumetric changes induced by RPE as a second intervention were not significant. AT primarily reduced airflow resistance in the UA, particularly when performed as the first intervention.
CONCLUSIONS: AT as the first intervention was responsible for most of the improvements in both UA volume and airflow. The generalization of these results should be limited to children fulfilling the inclusion criteria. These findings should not be extrapolated to all types of expanders or expansion rates in adolescents and adults.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.118
SP37 EFFECTS OF LIGHT COLOR ON 3D FACIAL MEASUREMENTS CAPTURED USING A 3D FACIAL SCANNER

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AIMS: To study the effect of light color on the measurement of three-dimensional facial distances along the X, Y, and Z axes obtained from a 3D facial scanner.
MATERIAL AND METHODS: Facial scanning was performed on a sample group of 26 individuals with a mean age of 26.66 ± 3.64 years, all having no facial abnormalities. The scans were conducted in a closed, sealed room under controlled light intensity of 500 LUX. Scanning conditions were varied using a softbox with two light color settings: daylight and cool white. The obtained 3D facial scan images were used to measure distances along the X, Y, and Z axes. The differences were tested using the paired samples t-test at a significance level of 0.05.
RESULTS: Different light colors in 3D facial scanning affect the distance of the lower lip anterior to true vertical line through the alar base (LLA-TVL), with scans under daylight showing a greater distance than those under cool white color.
CONCLUSIONS: In facial scanning using a structured-light 3D facial scanner, light color affects the lower lip protrusion along the Z-axis.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.119
SP38 THE EFFECT OF PHOTODYNAMIC THERAPY ON DENTAL PLAQUE IN ORTHODONTIC PATIENTS

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AIMS: To determine the influence of photodynamic therapy on the accumulation and bacterial composition of supragingival plaque in orthodontic patients.
MATERIAL AND METHODS: This four-arm parallel study was conducted on 40 subjects undergoing fixed orthodontic treatment randomly assigned into four groups. Participants in the first test group were subjected to photodynamic therapy. 155 mg/mL toluidine blue was applied on the enamel around brackets and irradiated with a 660 nm diode laser. Participants in the second test group received Cervitec® Plus varnish, and those in the third Clinpro™ White varnish. The rest of subjects were allocated to the negative control group. Interventions were performed right after bonding (T0), 6 (T1), and 12 weeks (T2) later. Silness and Löe plaque index and total bacteria count were assessed at T0, T1, T2, and T3 (at 18 weeks). Kolmogorov-Smirnov, repeated measures ANOVA, and post-hoc LSD tests were performed in IBM SPSS software.
RESULTS: At T2, in the photodynamic therapy (PDT) and Cervitec® groups, significantly lower values of plaque scores in comparison to the control group were observed ($p=0.002$, $p<0.001$). Similar findings were noted at T3 ($p=0.005$, $p<0.001$). The final values of plaque index were slightly increased compared to the baseline ones in the PDT group. Significant growth of plaque scores was observed in the Clinpro™ varnish and control groups during the study period ($p=0.007$, $p=0.002$). Colony forming unit/μL (CFU/μL) in the PDT, Cervitec®, and Clinpro™ groups was significantly lower compared to the control group 6 and 12 weeks after bonding ($p<0.001$). CFU/μL significantly reduced during the study period in the PDT, Cervitec®, and Clinpro™ groups ($p<0.001$).
CONCLUSIONS: Photodynamic therapy significantly reduced plaque accumulation and decreased total bacteria count compared to the control group. Its effects were comparable to the Cervitec® Plus and Clinpro™ White varnish.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.120
SP39 DEEP LEARNING-BASED PREDICTION OF ORTHOGNATHIC SURGICAL NEEDS IN JUVENILE IDIOPATHIC ARTHRITIS

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AIMS: 1) To assess the prevalence of orthognathic surgery need in juvenile idiopathic arthritis (JIA) patients after transition to adulthood. 2) Identify JIA-specific predictors that contribute to the development of severe dentofacial deformities requiring orthognathic surgical correction. 3) Create a novel prediction model employing deep learning algorithms.
MATERIAL AND METHODS: A comprehensive population-based cohort analysis was undertaken for patients diagnosed with JIA, spanning the years 2000-2018 (n=613 patients). The collected data comprised longitudinal information about orofacial health, encompassing disease-specific background details, JIA- related temporomandibular joint (TMJ) involvement, JIA-induced dentofacial deformities, and orofacial symptoms. Python programming language was used for all data processing. Utilizing Random Forest; a machine learning

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prediction model, 25 variables were analyzed using 10-fold cross-validation to identify JIA-specific orthognathic surgery predictors. The whole dataset underwent balancing data algorithm for neural network training to prevent skewed categorization. Subsequently, a deep neural network (Multilayer Perceptron) was trained to predict the need for orthognathic surgery.
RESULTS: The prevalence of JIA-related orthognathic surgery need was 5.4% of the cohort. The most robust surgery predictors were the presence of antinuclear antibodies (ANA), reduced TMJ translation, presence of dentofacial deformity, treatment with disease modifying antirheumatic drugs and the administration of intra-articular steroid injections into the TMJ. The proposed deep learning-based prediction model demonstrates an accuracy rate of 93.4%, recall of 96.7%, specificity of 90%, and precision level of 90.8%.
CONCLUSIONS: TMJ involvement, particularly in combination with reduced translation, dentofacial deformities and ANA antibodies, emerge as notable risk factors for future orthognathic surgery need among JIA patients. The research findings prove that the proposed novel Multilayer Perceptron can be utilized as a data-driven, pre-diagnosis screening tool to assess an individual's propensity or risk of future orthognathic surgery need in JIA patients.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.121
SP40 PATIENTS' AND PARENTS' PERCEPTIONS OF A "GOOD" ORTHODONTIC TREATMENT

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AIMS: To investigate 1) the factors that paediatric orthodontic patients perceive as important for a "good" orthodontist and a "good" treatment process, and 2) to identify core items related to a "good" orthodontic treatment amongst young patients and their parents.
MATERIAL AND METHODS: Children and adolescent orthodontic patients were prospectively interviewed in the presence of a parent and the treating orthodontist at the postgraduate clinic of Aarhus University, Denmark. The interviews followed a reconstructive grounded theory approach. The first part included four open-ended questions for patients, which were then grouped into main domains. The second part was a closed-ended questionnaire, aligned with the World Health Organization's paediatric healthcare quality framework, answered by both patients and parents. It featured seven treatment-related items rated on a Likert scale (1 = Not important at all to 5 = Very important) to assess significance.
RESULTS: Thirty-six patients (mean age 13.7yrs, SD 1.9yrs) and their parents were enrolled and interviewed. Most of the open-ended qualitative responses of a "good" orthodontic treatment referred to the following subdomains: "Communication" (n=52), "Information at the right time" (n=43), "Pain during treatment" (n=21), "Competence" (n=19) and "Respect and mutual trust" (n=18). In the closed-ended questionnaire parents rate it with higher importance than the patients that the orthodontist is an expert ($p = 0.01$).
CONCLUSIONS: Young orthodontic patients look at the whole treatment process when evaluating a "good treatment" and a "good orthodontist". The two main factors they value most are having a friendly orthodontist and being provided valuable information on their orthodontic treatment at the right time. The findings of the current project can be used to improve the overall quality of care and increase patient satisfaction.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.122
SP41 DETERMINING EFFECTS OF ANIMAL ASSISTED THERAPY ON PEDIATRIC DENTAL PATIENTS

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AIMS: A notable 6-22% of children suffer from dental anxiety which can contribute to disruptive behavior, dental care avoidance, and negative health sequelae. Evidence from medical settings indicates reductions in pain and stress after canine therapy. To identify a low-risk, non-pharmacological approach for anxiety, fear and pain management in dentistry, a prospective randomized clinical trial was conducted to determine best practices for evaluating efficacy of animal assisted therapy (AAT) in pediatric dental populations.
MATERIAL AND METHODS: The effects of AAT on pediatric patients were measured through physiologic, objective measures (e.g., heart rate, salivary α-amylase and cortisol, video coding) and validated self-reported scales of anxiety, fear, and pain, during routine and invasive dental procedures. Children aged 4-8 years were consecutively enrolled and randomized into a long AAT (dog is present throughout visit), short AAT (dog meets the child at the visit start), or an active control group (N=120, 40 per group). Participants underwent a routine dental visit including simulated radiographs, an intraoral exam and a dental cleaning. In a separate pilot study, children aged 7-14 years were consecutively enrolled into a short AAT or control group (N=40, 20 per group) before undergoing an operative or surgical (e.g., extraction) dental procedure. Descriptive and bivariate statistics were used to compare objective and self-reported measures of anxiety, fear, and pain between experimental groups.
RESULTS: Participants in the AAT groups had significantly different salivary stress hormones relative to controls ($p<0.0001$) and reported less pain ($p=0.001$). Participants receiving short and long AAT reported more positive next visit expectations ($p=0.04$). Objective video coding revealed that AAT participants had significantly longer durations of relaxed lower bodies than controls. Physiologic and self-reported measures are feasible for use in future clinical studies.
CONCLUSIONS: Physiologic and self-reported measures indicate positive effects of AAT in children, warranting additional study. Canine therapy may be an effective therapy in dentistry for anxiety, pain and behavior management of children and adolescents, with applications in pediatric and orthodontic clinical practice.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.123
SP42 INTERDENTAL ACCURACY OF CAD/CAM MACHINE CUT, MACHINE BENT AND MANUALLY BENT RETAINERS – AN IN-VITRO-COMPARISON

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AIMS: The purpose of the present study was to compare the interdental accuracy (IA) of two different CAD/CAM manufactured and conventionally bent retainers.
MATERIAL AND METHODS: On 20 digitized debonding casts (10 upper, 10 lower), a canine-to-canine retainer was designed using two different CAD/CAM software: OnyxCeph® (Image Instruments, Chemnitz, Germany) and FixR™ (YOAT Corp., Lynnwood, WA, USA). Each design was bent using the Bender II™ retainer bending machine (YOAT Corp.) and 3- or 6-stranded twistflex wire (0.0018 inch Dentaflex®, Dentaurum, Ispringen, Germany), respectively. For each cast one CAD/CAM machine cut retainer was fabricated by an external provider and one retainer was bent manually by a dental technician using the 6-stranded wire. All retainers were waxed on the dental casts and digitized using a laboratory scanner (ATOS, Zeiss metrology, Oberkochen, Germany). For each of the five interdental areas, IA was measured (1) as horizontal distance between the interproximal contact point and the retainer and (2) as vertical distance between the retainer and the horizontal plane in millimeters. Statistical analysis was performed using Mann-Whitney-U- and Kruskal-Wallis test.
RESULTS: In the horizontal plane, interdental accuracy (median values are given) differed significantly between jaws (upper 1.41mm>lower 1.10mm, $p<0.001$), planning software (OnyxCeph 1.35mm>FixR 1.16mm, $p<0.001$), settings (upper jaw: CAD/CAM cut 1.50mm>CAD/CAM bent 1.34mm>manually bent 1.21mm, $p<0.001$; lower jaw: CAD/CAM bent 1.08mm>CAD/CAM cut 1.06mm>manually bent 0.96mm, $p<0.001$) and location of interdental area in the upper jaw (3-2 1.63mm>2-1 1.32mm>1-1 1.27mm, $p<0.001$).

In the vertical plane, significant differences (median) were seen between jaws (upper 0.25mm>lower 0.18mm, $p<0.001$), planning software (FixR 0.25mm>OnyxCeph 0.21mm, $p=0.03$) and settings (upper jaw: CAD/CAM bent 0.32mm>manually bent 0.27mm>CAD/CAM cut 0.17mm, $p=0.001$; lower jaw: manually bent 0.18mm>CAD/CAM bent 0.13mm>CAD/CAM cut 0.10mm, $p=0.004$). The wire quality had no significant impact in both dimensions.
CONCLUSIONS: Interdental accuracy in the horizontal plane was achieved best by manually bent retainers, while vertically, CAD/CAM cut retainers were the most accurate ones. Overall, lower retainers had a higher interdental accuracy within a clinically acceptable range, while upper retainers presented a larger variability especially in the more proximal interdental areas.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.124
SP44 THE IMPACT OF THE CORONA PANDEMIC ON DENTAL AND ORTHODONTIC CARE FOR CHILDREN AND ADOLESCENTS- A QUALITATIVE STUDY

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OBJECTIVE: The COVID-19 pandemic led to the implementation of extensive regulations aimed at controlling the virus's spread, affecting not only social life but also the medical sector. Dental and orthodontic practices introduced additional hygiene measures to ensure patient and staff safety. During this period, prevention-focused dental and orthodontic check-ups for children and adolescents occurred less frequently. This study investigates how the pandemic has influenced dental and orthodontic care for children and adolescents in the short and medium term.
MATERIAL AND METHOD: Qualitative interviews with dentists and orthodontists in northern Germany were conducted to investigate their experiences and opinions. The material is analysed using content analysis with the help of Nvivo14. Twelve interviews have been conducted and partially analyzed.
RESULTS: The initial results show that there was a great deal of uncertainty among both dentists and orthodontists, especially in the initial phase of the pandemic. The colleagues would have liked more support during this time, e.g. from professional policy stakeholders. They also reported a significant drop in the number of preventive medical check-ups in the beginning of the pandemic. Group prophylactic measures were notably reduced throughout this period. According to dental and orthodontic practitioners, children from socially disadvantaged families were particularly affected by the pandemic's consequences, especially regarding their oral health.
CONCLUSION: The qualitative analysis of the experiences gained during the coronavirus pandemic provides valuable insights and lessons for the future. These findings can contribute to improving preparedness for similar challenges and strengthening resilience in the healthcare system. In this context, professional institutions bear a particular responsibility to implement these lessons and to support healthcare providers effectively in navigating future crises.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.125
SP45 CHANGES OF MASSETER MUSCLE THICKNESS DURING FIXED ORTHODONTIC TREATMENT: A PROSPECTIVE CONTROLLED STUDY IN GROWING CHILDREN

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AIM: During orthodontic treatment with fixed appliances the neuromuscular system undergoes adaptations in response to the mechanical forces applied on the teeth and the mechanoreceptors of their periodontal ligament. The aim of this study was to examine the effect of orthodontic treatment with fixed appliances on masseter muscle thickness in growing children.
SUBJECTS AND METHOD: Thirty-eight children (14 boys; 24 girls) with mild or moderate malocclusions were treated with fixed appliances. The mean age of the treatment group at the start of treatment was 12.9±1.2 years. Forty untreated children (17 boys; 23 girls) served as a control group, with mean age 9.1±0.9years. Masseter muscle thickness in contraction was measured using ultrasonography in the patient group, at treatment start and one year later, during the fixed appliance treatment. Similar ultrasonographic recordings of the masseter muscle were performed in the control group with12 months difference. Paired *t*-tests were used to assess changes in the masseter thickness within each group. The comparison between the two groups regarding masseter muscle thickness at baseline, after one year, and the changes between the two measurements were evaluated with independent sample *t*-tests.
RESULTS: Masseter thickness at the beginning of the study was smaller ($p<0.05$) in the control group (10.57±1.04mm) than in the treatment group (11.19±1.00mm), an observation that can be partly explained by the initial age difference between the groups.One year later, masseter muscle thickness increased in the control group (0.39±0.50mm, $p<0.001$) while no statistically significant changes were found in the treatment group (-0.07±0.56mm, $p=0.22$). The observed change in masseter muscle thickness in the two groups during the twelve-month period presented statistically significant difference (0.46±0.12mm, $p<0.001$), demonstrating that masseter muscle in the control group got thicker than in the treatment group.
CONCLUSIONS: The thickness of masseter muscle in growing children is normally increasing annually, with an average of 0.39mm. Fixed appliance treatment however, seems to interfere with masseter muscle growth, restraining the increase in its thickness during a one-year treatment period. This information should be taken into consideration when evaluating the progress and stability of the treatment of certain malocclusions.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.126
SP46 COMPARISON OF THE SHEAR BOND STRENGTH OF BASE MONOMER LIGHT-CURED ADHESIVE WITH VARIED PHOSPHORIC ACID CONCENTRATIONS ON METAL BRACES: A PILOT STUDY

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AIMS: To compare the shear bond strength and adhesive remnant index (ARI) of a base monomer light-cured adhesive using different phosphoric acid concentrations with a conventional total-etch orthodontic adhesive system on metal braces.
MATERIAL AND METHODS: Thirty-six maxillary premolars were randomly divided into three groups (n=12):

1. Transbond XT: conventional total-etch 3-step system: 37XT
2. Orthomite LC with 65% phosphoric acid: 65LC
3. Orthomite LC with 37% phosphoric acid: 37LC

Metal brackets were bonded using respective adhesive systems. Shear bond strength was assessed using a universal testing machine at 1 mm/min crosshead speed. ARI scores were evaluated under 10X microscope magnification.

Statistical analysis included one-way ANOVA for shear bond strength with significance set at $p<0.05$ and descriptive statistics for ARI scores.
RESULTS: The shear bond strength analysis revealed variations among three groups. The 37LC group demonstrated the highest mean bond strength at 21.34 ± 4.75 MPa while the 37XT group showed a mean of 19.86 ± 5.29 MPa, and the 65LC group exhibited the mean at 17.2 ± 4.7 MPa. Although the 37LC group showed the highest mean and the 65LC group the lowest, these differences were not statistically significant at the alpha level of 0.05.

ARI analysis revealed distinct patterns among groups: 37XT showed predominantly score 1 (10/12 samples) with minimal complete adhesive retention (2/12), 65LC demonstrated a more uniform distribution across scores 1-3 (5,4,3/12), while 37LC exhibited mainly partial adhesive remnants with scores 1 and 2 (7,5/12) and no complete adhesive remnant.
CONCLUSIONS: The 37LC group achieved comparable shear bond strength to the conventional system, while the higher acid concentration (65LC group) showed the lowest bond strength. These findings indicated that the 37LC group may offer a clinically acceptable bond strength compared to conventional systems. The recommendation from the manufacturer which using 65% phosphoric acid with base monomer light-cured adhesive may not be essential. However, the varying adhesive remnant patterns suggested that careful consideration should be given to debonding procedures when using these systems.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.127
SP47 IRETAIN: A NEW BONDED RETAINER WHOSE DESIGN ALLOWS THE CONTROL OF QUANTITATIVE PARAMETERS HAVING AN IMPACT ON ITS MECHANICAL BEHAVIOR

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AIMS: Bonded retainers have a high failure rate, especially on the upper jaw. This new technical approach aims to design and produce a bonded retainer by replacing the usual composite pads, which constitute the weak link of the existing technique, with metal pads which, in addition to being easy to bond, behave like a protection shield for the wire and the bonding interface
MATERIAL AND METHODS: stl files of dental arches are uploaded on a software with a graphic interface. Geometric construction algorithms are used to design semi automatically all the pads and the wire. The software allows to adjust both the position and shape of the wire and the pads. The pads are 3d printed in Ni-Cr 3D and assembled with a wire which can be either multi-stranded or nickel-titanium. The retainer is bonded using a transfer splint like lingual brackets.
RESULTS: The upper retainer is designed away from the mandibular incisal edges, therefore avoiding future occlusal interferences and wire fracture. The retainers are designed away from the gum. The metal pads allow a smooth surface and a minimal thickness of 0,4mm. The software allows a control of quantitative parameters having an impact on the mechanical behaviour of the retainer, such as

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the quantitative value of the bonding surface of each pad, in square millimeters, and the wire length between two neighboring pads
CONCLUSIONS: This new retainer is a promising alternative to the existing technique since it allows optimal shape, dimensions and mechanical properties.
Disclosure of interest: Ali Atrtchine Kachi The author is the inventor of the retainer

Abstract citation ID: cjaf073.128
SP49 ETHICAL CONSIDERATIONS IN ADVERTISING ORTHODONTIC TREATMENT ON SOCIAL MEDIA

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AIMS: **The aim** of this study is to assess whether ethical norms are being followed in marketing campaigns on social media.
MATERIAL AND METHODS: A survey was conducted among dental practitioners (53 participants, average age 45.79±12.35), dental students (192 participants, average age 22.93±1.58), and patients (251 participants, average age 39.29 ±10.29). The collected data were analyzed using the statistical software IBM SPSS Statistics 27.0.1.0.
RESULTS: Dishonest advertising of orthodontic services on social media is rejected by 49.1% of surveyed dentists; 26.4% believe that patients should verify information themselves before trusting it; 9.4% think that all advertising is important, while 15.1% are undecided. Among younger future dental practitioners, 51.6% disapprove of dishonesty, followed by 22.9% who believe patients should verify information, and 18.8% who consider all advertising important.

Among patients, 38.2% admit to trusting information found online, 21.9% always seek a second opinion, 22.3% trust an orthodontist recommended by their general dentist, and 17.6% are undecided.

More than half of the dentists and students surveyed stated that they would adhere to ethical standards and avoid misleading patients with false information about their qualifications. However, a significant percentage acknowledged the potential for inaccurate information to be used for promotional purposes.
CONCLUSIONS: Legal frameworks should aim to reduce the sense of impunity regarding the dissemination of misleading information to patients through social media.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.129
SP50 CHANGES IN NICKEL ION CONCENTRATION OF TWO MULTIFORCE NI-TI ORTHODONTIC ARCHWIRES

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AIMS: The aim of the present study was to evaluate the changes of Nickel ion concentration in two types multiforce Ni-Ti orthodontic archwires during clinical use.
MATERIAL 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. The semi-quantative analysis of the elemental composition and the surface morphology of the archwires was determined using a SEM/EDX apparatus. For each measurement on the wire we have compared the quantitative measurements of the Nickel Content for the three groups of wires (as received, retrieved up to 8 weeks, retrieved more than 8 weeks)
RESULTS: Bio-Active showed an initial increase in Ni ion concentration, suggesting surface or internal enrichment, possibly due to a reversible phase transformation typical of Nickel-Titanium alloys. The sharp drop indicates a structural limit for high Nickel content, potentially affecting mechanical properties or forming new compounds. TriTanium exhibited a concentration drop around the 4th week, followed by a steady increase, indicating a complex, multi-phase structure with Nickel migration in response to external variables.
CONCLUSIONS: Tritanium is suitable for long-term use due to stable Nickel content, while Bio-Active is effective for treatments lasting up to 4–6 weeks.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.130
SP51 AESTHETIC PREFERENCES FOR ORTHODONTIC APPLIANCES AMONG BRAZILIAN YOUTH

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AIMS: This study aimed to investigate how children and adolescents perceive the aesthetic appeal of various orthodontic appliances. Additionally, it evaluated differences in preferences based on participants' age, gender, and socioeconomic background.

MATERIAL AND METHODS: A photo album comprising eight images of different orthodontic appliances, including metallic brackets, esthetic brackets and clear aligners, was created. These appliances were modeled on a consenting adult with an aesthetically pleasing smile. A total of 276 participants, aged 8 to 17 years, evaluated the attractiveness of each image using a visual analog scale (VAS). Statistical analyses were conducted using nonparametric methods. Friedman's test and Dunn's post-hoc analysis were used to compare attractiveness ratings, while Spearman's correlation analysis examined relationships between participants' socioeconomic status, age, gender, and aesthetic preferences for the appliances.
RESULTS: Aesthetic preferences for orthodontic appliances showed slight variations between children and adolescents. Among children, the preferred ranking of appliances was as follows: traditional metallic brackets with green elastomeric ligatures > traditional metallic brackets with gray elastomeric ligatures > sapphire esthetic brackets. Adolescents, on the other hand, favored sapphire esthetic brackets > clear aligners without attachments > traditional metallic brackets with green elastomeric ligatures. A significant negative correlation was identified between socioeconomic status and the perceived attractiveness of certain appliances, such as golden orthodontic brackets and traditional metallic brackets with green elastomeric ligatures.
CONCLUSIONS: Traditional metallic appliances were generally rated as highly attractive, whereas clear aligners were less appealing to both children and adolescents. Participants with higher socioeconomic status prioritized aesthetic appeal more strongly, rating golden orthodontic brackets and traditional metallic brackets with green elastomeric ligatures as the least attractive options.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.131
SP52 MANAGEMENT OF DEEPLY IMPACTED CANINES: SAFER AND ACCELERATED UPRIGHTING PROCESSES WITH SKELETAL ANCHORAGE

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AIMS: The aim of this study was to evaluate the alignment of deeply impacted canines in the maxilla and mandible using skeletal anchorage. The focus was on minimizing root resorption of adjacent teeth, optimizing the movement direction of the impacted tooth, and reducing treatment time with fixed multibracket appliances.
MATERIALS AND METHODS: The study included over 60 patients aged between 9 and 17 years. The exact position and orientation of the impacted canines were determined using digital volume tomography (CBCT). Additionally, the risk of root resorption during the alignment process was assessed.

Alignment of the impacted teeth was performed following surgical exposure. Mini-implants were used for skeletal anchorage, and TMA Helix springs were employed prior to the placement of the fixed multibracket appliance.
RESULTS: Most impacted canines were successfully aligned without the need for a complete multibracket appliance. Instead, mini-implants, a single band, and TMA wires were sufficient. No radiologically detectable root resorption occurred in adjacent teeth.
CONCLUSION: The integration of modern diagnostics, such as digital volume tomography, and the use of skeletal anchorage provides an innovative and effective approach to treating deeply impacted canines. Key advantages include:

- Precise localization of the impacted tooth.
- Reduction of root resorption risk.
- Improved planning and control of tooth movement.
- Shorter treatment duration with fixed appliances.

The results demonstrate that skeletal anchorage significantly enhances both the safety and efficiency of treatment for impacted canines.

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Keywords: Impacted canines, mini-implants, root resorption, skeletal anchorage.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.132
SP53 EVALUATION OF CRANIO-DENTO-FACIAL CHANGES IN ADULT CLASS II MALOCCLUSIONS TREATED WITH NON-EXTRACTION CAMOUFLAGE THERAPY

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AIMS: Class II malocclusions that frequently encountered in orthodontic practice are characterized by protrusion of the upper jaw and/or upper dental arch, retrusion of the lower jaw and/or lower dental arch, or combinations. Generally the treatment options of adult class II malocclusion are camouflage treatment with or without permanent tooth extraction or orthognathic surgery. The aim of this study was to evaluate the skeleto-dento-fasiyal changes of adult with skeletal Class II malocclusion who had treated non-extraction camuflage treatment by self ligating system.
MATERIAL AND METHODS: A total of 26 patients were selected for inclusion in the study. All participants exhibited skeletal Class II malocclusion(mean ANB:5.6) characterized by mandibular retrognathia, convex profile, Angle class 2 molar and canine relationship. Individuals who did not prefer tooth extraction or orthognathic surgery as part of their treatment were included in the study. Treatment plans included the use of self-ligating system to achieve camouflage without tooth extraction. Pre- and post-treatment cephalometric radiographs were analyzed to assess cranio-dento-facial changes. Paired t-tests were used to determine the of the treatment changes, at level $p<0.05$ considered statistically significant.
RESULTS: The treatment resulted in significant improvements in dental, skeletal and some soft tissue parameters. The mean overjet decreased from 6.8±1.2 mm to 2.1±0.9 mm($p<0.05$) and overbite from 4.2±0.8 mm to 2.5±0.6 mm($p<0.05$) at the end of the treatment. But there was a mild increase in mandibular incisor proclination(L1-NB and IMPA) by the use of class 2 elastics. Palatal root torque of upper incisors was acomplished following maxillary molar distalization and/or distal tipping of them(U6-PP). The occlusal plane showed mild posterior rotation due to maxillary incisor retraction($p<0.05$). There was only numerical change in ANB values while MP(GoGnSN) angle was stable.
CONCLUSIONS: It was seen camouflage treatment is effective approach for adult skeletal class II malocclusion. The mechanics use appropriately in treatment, ideal overjet overbite and balanced occlusion with can be achieved. Moreover satisfactory improvements in upper and lower lip positions have been obtained. These findings suggest the use of non-extraction camouflage treatment with self ligating system as alternative manner to surgical correction in appropriately selected cases.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.133
SP54 EXTERNAL APICAL ROOT RESORPTION AND THE RELEVANCE OF ROUTINE INTERMEDIATE RADIOGRAPHY IN NON-EXTRACTION FIXED APPLIANCE TREATMENT FOR ADOLESCENTS WITH CROWDING: A MULTICENTER RANDOMIZED CONTROLLED TRIAL

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AIMS: To assess the severity and the frequency of clinically relevant external apical root resorption (EARR) during orthodontic treatment with Damon passive self-ligating and Victory conventional standardized fixed appliance systems. In addition, to evaluate the relevance of routine intermediate radiographic examinations for early prevention of severe EARR.
MATERIAL AND METHODS: Adolescents aged 12-17 years with crowded and displaced teeth planned for non-extraction treatment were recruited from three orthodontic clinics. Participants were randomly allocated in a 1:1 ratio to treatment with either Damon Q™ (n = 35) or Victory™ (n = 40) using stratified blocks, with allocation concealed. EARR was assessed for all roots from incisors to molars using multiplanar reconstruction in cone beam computed tomography (CBCT) images acquired (from various CBCT machines) before treatment, after the insertion of the first 0.019x0.025 stainless steel archwire, and after treatment.
RESULTS: Sixty-two patients were included in the EARR analysis. The upper incisors were the most affected tooth group, with mean EARR values of 0.20 mm for Damon and 0.51 mm for Victory (NS, alpha 1%). The frequency of clinically relevant EARR (≥ 2 mm) in this tooth group was 5.0% for Damon and 7.2% for Victory (NS, alpha 5%). Of the patients with EARR ≥ 2 mm after treatment, only one case was identified in intermediate radiographic examinations.
CONCLUSIONS: The overall severity and frequency of EARR were below clinically relevant levels in both treatment groups. The results strengthen the evidence that routine intermediate radiography appears to be of limited relevance for early prevention of severe EARR in non-extraction treatments for adolescents with crowded teeth.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.134
SP56 ORTHODONTIC TREATMENT OF ADOLESCENTS WITH CONGENITAL ABSENCE OF MAXILLARY LATERAL INCISORS – SPACE CLOSURE AS AN ALTERNATIVE TO IMPLANTATION

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AIMS: The aim of this study was to evaluate the effectiveness and long-term outcomes of orthodontic treatment using the space closure method as an alternative to implantation.
MATERIAL AND METHODS: The study included several patients aged 8 to 25 years with congenital absence of maxillary lateral incisors (hypodontia) who underwent orthodontic treatment at "Villa Nova Orthodontics by Kiworkowa & Brandt." The primary treatment method involved closing spaces left by the missing second maxillary incisors using the Mesialslider appliance (Benefit System), followed by reshaping canines to mimic lateral incisors.

Patient records, including clinical photographs, dental casts, and radiographs, were analyzed to assess aesthetic outcomes, functional results, and the stability of occlusal changes. In addition, patient satisfaction was evaluated through a standardized questionnaire administered post-treatment.
RESULTS: The results of the study demonstrated that the space closure method using the Mesialslider appliance was highly effective in achieving proper occlusion and improving overall dental aesthetics. The reshaping of canines into lateral incisors provided a natural appearance that closely resembled the missing teeth and good function.

In terms of patient satisfaction, 90% of the participants reported high levels of contentment with both the aesthetic and functional outcomes.
CONCLUSIONS: The findings of this study indicate that the space closure method using the Mesialslider appliance is a highly effective and advantageous alternative to dental implants for treating congenital absence of maxillary lateral incisors in adolescents. Given the positive outcomes and the absence of major adverse effects, space closure should be considered the preferred treatment option for children and adolescents with missing lateral incisors, regardless of the type of malocclusion. However, it is essential to adopt an individualized approach for each patient, considering their specific clinical needs, aesthetic concerns, and functional requirements.

Future studies with larger sample sizes and longer follow-up periods are recommended to further validate the long-term stability and effectiveness of this treatment modality.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.135
SP58 INVESTIGATING THE ASSOCIATION BETWEEN GENETIC POLYMORPHISMS IN FIBROBLAST GROWTH FACTOR RECEPTOR 2 AND FACIAL MORPHOLOGY

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AIM: Studies from animal models and investigations of Fibroblast growth factor receptor -related craniosynostosis syndromes supports the crucial role of FGFR2 (Fibroblast growth factor receptor 2) in craniofacial development. Therefore, it is possible to hypothesize that genetic polymorphisms in *FGFR2* are involved in face characteristics. Therefore, the present study evaluated if functional genetic polymorphisms in the gene encoding FGFR2 are associated with facial morphology variations in boys.
SUBJECTS AND METHOD: Pre-orthodontic records and saliva samples from patients were screened. Healthy boys, age ranging from 11 to 14 years old, were included. Girls, patients with any syndrome, facial trauma, previous orthodontic

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treatment, or oral cleft were excluded. Frontal pictures from the pre-orthodontic records of the patients were analysed by using photogrammetric and facial proportions were measured using Image J. Genomic DNA extract from cells in saliva samples was used to evaluate seven genetic polymorphisms in *FGFR2* (rs2162540, rs2981578, rs10736303, rs1078806, rs11200014, rs1219648 and rs4752566) through Real time polymerase chain reaction (PCR). ANOVA or t-test were used to evaluate the association between genotypes and sagittal frontal facial proportions with an alpha of 5% ($p<0.05$).
RESULTS: A total of 40 boys were included in this study. Lip proportion, eye canthal proportions and nose proportion presented a normal distribution. The genetic polymorphisms were in Hardy-Weinberg equilibrium. The mean values distribution was similar among the genotypes in rs2162540, rs2162540, rs10736303, rs1078806, rs11200014, and rs1219648. All genetic polymorphisms were not associated with frontal facial proportions ($p>0.05$).
CONCLUSION: Genetic polymorphisms in *FGFR2* were not associated with sagittal frontal facial proportions. Variations in *FGFR2* may have an impact in other facial dimensions.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.136
SP60 COMPARISON OF HYDROFLUORIC ACID AND LASER ETCHING ON FELDSPATHIC PORCELAIN AND MONOLITHIC ZIRCONIA SURFACES

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AIMS: To compare the in vitro effects of different etching methods applied to feldspathic porcelain which has been used for many years, and monolithic zirconia which has become widespread in recent years, on bracket bonding strength.
MATERIAL AND METHODS: 6 study groups (n=15) were constructed from 90 ceramic samples (45 feldspathic porcelain, 45 monolithic zirconia). The glaze layer was removed with a diamond bur, then one of the 3 etching methods was applied (Laser [L], Hydrofluoric acid [HF], Laser + Hydrofluoric acid [L+HF]). Er,Cr:YSGG laser (frequency: 20 Hz, power: 3 watts) was applied for 30 seconds. 9% hydrofluoric acid was applied for 90 seconds. After etching, metal brackets were bonded on all samples and subjected to thermocycling. The bonding strength (SBS) of the brackets was measured with a Universal testing machine, and the values were recorded as MPa. The amount of adhesive resin remaining on the samples was examined under a stereomicroscope using ARI. SEM images of the etched surfaces were taken at x3000 magnification for examination. Mann-Whitney U test was used for two-group comparisons and Kruskall-Wallis H test was used for three-group comparisons.
RESULTS: SBS and ARI values were found to be higher ($p<0.05$) on feldspathic porcelain surfaces (SBS: 11.11 MPa, ARI: 3.1) than monolithic zirconia surfaces (SBS: 4.23 MPa, ARI: 0.6). SBS values on feldspathic porcelain surfaces were found to be higher ($p<0.05$) in L (11.04 MPa) and L+HF (13.97 MPa) techniques than HF (8.32 MPa) technique. ARI values on feldspathic porcelain surfaces were found to be higher ($p<0.05$) in HF (4.13) and L+HF (4.07) techniques than L (1.13) technique. SBS values on monolithic zirconia surfaces were found to be higher ($p<0.05$) in L (4.58 MPa) and HF (5.69 MPa) techniques than L+HF (2.42 MPa) technique.
CONCLUSIONS: Optimum bonding strength was achieved with all etching techniques applied to feldspathic porcelain, but none of them provided sufficient and reliable bonding strength on monolithic zirconia. Er,Cr:YSGG laser can be a successful alternative to hydrofluoric acid in etching feldspathic porcelain, and bonding strength can be increased when used together. Further studies are needed to improve the bonding strength on monolithic zirconia.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.137
SP61 EXPLORING THE IMPACT OF PROFESSIONAL TITLES ON ORTHODONTIC PATIENT CONFIDENCE IN MARKETING - A SURVEY

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BACKGROUND: A patient's decision to begin treatment is key to the orthodontic practice's success. However, the patient's choice of an orthodontist is influenced by many factors such as online opinions, professional titles, and availability. To increase chances to be "chosen" by a patient, practitioners without formal orthodontic specialization often use alternative titles like "orthodontist" or "Curriculum in orthodontics" in advertisements to compensate for the lack of certification.
OBJECTIVE: To identify which professional title in medical advertisements is perceived as most credible by patients.
MATERIAL AND METHODS: A questionnaire was distributed via Google Forms in three orthodontic Facebook groups (>60,000 users). The anonymous survey ran from January to March 2023. It included:

1. Demographic data (age, sex, education, residence, prior orthodontic treatment).
2. Assessment of seven orthodontic titles (e.g., "Master of Orthodontics," " Specialist in Orthodontics")
3. Criteria for selecting an orthodontist (e.g., recommendations, cost, communication skills).
4. Additional patient-specified factors.

Responses were rated on a 0–10 scale, with higher scores indicating more positive perceptions. Statistical analyses included descriptive statistics, the Mann–Whitney test for two-group comparisons, and the Kruskal–Wallis test with Dunn's post hoc analysis for comparisons among three or more groups.
RESULTS: A total of 217 respondents participated, predominantly females (95.9%) aged 18–35 (83.4%), with higher education (64.5%), and mainly living in large cities (43.8%). Most were undergoing orthodontic treatment (74.7%). The most preferred title was "Orthodontist" (mean = 7.8), followed by "Specialist in orthodontics" (mean = 7.7). Communication and openness (mean = 8.2) were the most valued factors, while "Orthodontist age" and "Social media presence" were the least important. Younger respondents also favored titles like "Curriculum in orthodontics." Education influenced preferences for recommendations and social media use, while residence and treatment history had no significant effect.
CONCLUSIONS: Clear professional titles and interpersonal skills are crucial in building patient trust and influencing orthodontist selection. While traditional titles like "Orthodontist" and "Specialist in orthodontics" are preferred, communication and openness were rated as the most critical factors in patient decision-making.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.138
SP62 EVALUATION OF THE EFFICACY OF SELF ASSEMBLING PEPTIDE AND CASEIN PHOPHOPEPTIDE-AMORPHOUS CALCIUM PHOSPHATE FLORIDE IN THE PREVENTION AND TREATMENT OF WHITE SPOT LESIONS

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AIMS: The aim of this study was to assess the efficacy of self-assembling peptide P11-4 (Curodont Repair™ Fluoride Plus (Curodont FP)) and casein phosphopeptide amorphous calcium phosphate (CCP-ACFP) varnish (MI Varnish™) in the management of white spot lesions (WSLs), a prevalent issue encountered during orthodontic treatment.

MATERIAL AND METHODS: Eighty bovine enamel specimens were divided into five groups, receiving different treatment protocols with Curodont FP and MI Varnish pre- and post-demineralization. Specimens were analyzed using micro-computed tomography (micro-CT), field emission scanning electron microscopy (FE-SEM), and energy-dispersive X-ray spectroscopy (EDX). Micro-CT was used at three different time points (T0, T1 and T2) to assess lesion depth, volume, area, mineral density, and surface morphology. FE-SEM and EDX analyses were conducted on four randomly selected specimens from each group, along with sound enamel as a positive control. Generalized linear models (GLMs) was used to determine the depth, volume, area and mineral density of enamel according to the application groups and different time periods. One-way ANOVA was used to determine the differences between elemental composition values, and multiple comparisons were performed with Tukey Test. The significance level was set of p-value<0.050.
RESULTS: The lowest lesion depths were in the MI Varnish groups applied twice (0.14) and once (0.15) and the Curodont FP group applied twice (0.15), all significantly lower than other groups (p=0.003). Lesion depth and mineral density improved notably overtime, especially after agent application (T2). The negative control group (saliva) showed the lowest mineral density (2.28), while the both

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MI Varnish and twice-applied Curodont FP groups exhibited the highest mineral density values (2.54, 2,52, 2.56, respectively) and the lowest lesion depth. Ca/P ratios in the Curodont FP groups were significantly higher than in the once-applied MI varnish, negative control and sound enamel groups.
CONCLUSIONS: The application of MI varnish before orthodontic treatment protects the enamel against demineralization. Both MI Varnish and Curodont FP have demonstrated considerable efficacy in remineralizing early carious lesions based on metrics of volume, area, depth, and mineral density following a 28-day experimental period, suggesting their clinical utility.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.139
SP63 FINITE ELEMENT ANALYSIS OF MAXILLARY MOLAR INTRUSION MECHANICS USING SEGMENTED ARCHWIRE AND MINISCREW ANCHORAGE

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AIMS: This study investigated the effects of maxillary molar intrusion using miniscrew anchorage and the segmented archwire technique through finite element analysis.
MATERIAL AND METHODS: 3D models of the maxillary bone, maxillary teeth, periodontal ligament, orthodontic archwire, and brackets were constructed using imaging and CAD software. The models were arranged to achieve 14 well-align maxillary teeth (excluding the third molars). The anterior teeth were intruded and the posterior teeth were extruded to replicate the characteristics of an anterior open bite. Orthodontic brackets were placed on all teeth and the archwire was engaged only at the premolar and molar teeth to replicate the segmented archwire technique. Additional attachments were placed on the palatal surfaces of both first molars. The intrusive force was set at 100 gF, 150 gF and 200 gF per quadrant. The directions of the intrusive force were set to replicate one miniscrew in the infrazygomatic area and one miniscrew in the interradicular area of the palatal surface of the first molar and second premolar on both sides. Finite element analysis was employed, and the maximum equivalent Von Mises stress on the roots of the first molar teeth and the displacement of the first molar teeth were recorded.
RESULTS: At an intrusive force of 100 gF, the maximum equivalent Von Mises stresses on the roots of the first molars were 0.052 MPa and 0.064 MPa, and the displacements of the first molars were 0.043 mm and 0.047 mm.

At an intrusive force of 150 gF, the maximum equivalent Von Mises stresses on the roots of the first molars were 0.076 MPa and 0.090 MPa, and the displacements of the first molars were 0.057 mm and 0.059 mm.

At an intrusive force of 200 gF, the maximum equivalent Von Mises stresses on the roots of the first molars were 0.104 MPa and 0.123 MPa, and the displacements of the first molars were 0.070 mm and 0.074 mm.
CONCLUSIONS: Increasing intrusive force resulted in an increase in the maximum Equivalent Von Mises Stress and the displacement of the first molars.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.140
SP65 COMPARING IMPACT OF BRACKET ARCHITECTURE AND DEBONDING METHOD ON PAIN AND DISCOMFORT DURING ORTHODONTIC TREATMENT

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AIM: The fear of pain during the various stages of orthodontic treatment with fixed appliances is a common concern of patients. The aim of the study was to investigate the impact of bracket architecture on pain perception during active treatment, debonding, and adhesive removal.
MATERIAL AND METHODS: 100 consecutive patients who completed treatment with one of two bracket systems (2-slot brackets with an integral base or conventional twin brackets with foil mesh) were included in this prospective clinical trial. Prior to the removal of brackets, participants were asked to evaluate the level of pain encountered throughout their orthodontic treatment with the fixed appliances, utilizing a 0-10 numerical rating scale, and to indicate the main cause of pain. Subsequently, the brackets on the right side of both dental arches were debonded using a lift-off debonding instrument, while on the left side, the bracket removal pliers. The residual adhesive was removed through two methods (manual in the upper arch and rotary in the lower). The same scale was used to assess pain levels during bracket and adhesive removal.
RESULTS: Our study revealed moderate and comparable levels of pain during active treatment in both groups (4.4±1.6 in the 2-slot group and 3.9±1.9 in the Twin group). However, participants reported less common soreness of teeth caused by placement or activation of the appliance with 2-slot brackets, but at the same time, 2-slot brackets were more likely to irritate soft tissues. The debonding of brackets with anchor pylons caused more discomfort than did the debonding of brackets with foil mesh, and the use of BRP elicited more pain sensations than did the use of LODI pliers. Patients are likely to prefer adhesive removal methods involving rotary instruments.
CONCLUSIONS: The bracket architecture, particularly the construction of the bracket base, affects the level of discomfort experienced during debonding. However, as pain and discomfort levels during debonding were typically low, the clinical significance of this difference may only be relevant in patients with reduced periodontal support or with a low pain sensitivity threshold.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.141
SP66 CANINE RETRACTION RATE OF VARIOUS SURGICAL APPROACHES IN ACCELERATING CANINE RETRACTION: A SYSTEMATIC REVIEW AND NETWORK META-ANALYSIS

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AIMS: This systematic review and network meta-analysis aimed to compare the canine retraction rate of various accelerated surgical approaches used in orthodontic treatment.
MATERIAL AND METHODS: An electronic search was conducted across four databases—PubMed/MEDLINE, Scopus, EMBASE, and The Cochrane Library (clinical trials)—to identify English-language articles published up to June 2023. Study selection and data extraction were performed in duplicate by three reviewers. A meta-analysis of eligible randomized controlled trials (RCTs) was performed to estimate the canine retraction rate and the surface under the cumulative ranking curve (SUCRA). The weighted mean difference (WMD) and 95% confidence interval were calculated using both direct and indirect evidence for the effect estimate.
RESULTS: A total of 700 records were screened in full text, and 15 RCTs met our inclusion criteria. Data from a total of 323 patients were included in this review. Corticotomy and micro-osteoperforations (MOPs) showed a significantly higher canine retraction rate compared to the control. Corticotomy was ranked first for all canine retraction rates (WMD = 0.96 [95% CI: 0.16 to 1.75]), Piezocision: (WMD = 0.43 [95% CI: -0.10 to 0.96]), and MOPs: (WMD = 0.41 [95% CI: 0.12 to 0.71]). The comparison funnel plot suggested no evidence of a small study effect.
CONCLUSIONS: Corticotomy tends to accelerate canine tooth movement the most, followed by Piezocision and MOPs.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.142
SP67 ‡‡‡ ORTHODONTICALLY INDUCED ROOT RESORPTION – NEW OUTCOME

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AIMS: To assess the influence of the arch and slot used, incisive canal anatomy and bone density on the risk of orthodontically induced root resorption (OIRR).
MATERIAL AND METHODS: Analysis of hydrostatic pressure parameters in the periodontal ligament using an innovative nonlinear finite element model, together with a literature review and anatomical measurements of the incisive canal on CBCT in non-orthodontically treated patients.
RESULTS: The values of pressure generated in PDL during en masse retraction using TISAD after extraction of first premolars and during full arch distalization in slot 0.018 on arch 0.017*0.025 SS using different hook heights and different

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force values in the range of applied forces from 50 g to 300 g range from 0.37 kPa to 2.5 kPa . They increase linearly with the increase in applied force. At Young's modulus E=27.5, the pressure in periodontal ligament reaches a critical value of 4.7 Kpa after applying a force of about 900 g, while at modulus E=12.5 the same value is reached already at a force of about 600 g. A clear relationship was found between the width of the canal and its AP length. Analysis of the incisor inclination and incisal canal inclination showed a very strong relationship. The shortening of the upper incisor roots after retraction was statistically greater in the case of contact with the incisive canal.

CONCLUSIONS: The 0.017*0.025 archwire in the 0.018 slot brackets provides excellent torque control. The density of the alveolar lamina has a significant effect on the hydrostatic pressure in the periodontal ligament. The application of triple orthodontic forces (600-640 g/side) can initiate the resorption process and it depends on bone density. The anatomy of the incisive canal has a significant impact on treatment planning and justifies the performance of a use of pre-orthodontic CBCT. Contact of the incisor roots with the incisal canal increases the risk of root resorption. The palatal cortical plate should be treated as a wall limiting the range of planned incisor movement. Canal remodeling is observed in the adolescent group.

Disclosure of interest: None declared

Abstract citation ID: cjaf073.143

SP68 DEVIATION OF PALATAL MORPHOLOGY AND OCCLUSION IN CLEFT LIP AND PALATE

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BACKGROUND: Scarring of the palatal surface following cleft palate repair can contribute to abnormal dental occlusion. Macroscopically, scar tissue presents as an uneven, irregular surface characterized by raised areas and furrows. Given its accessibility, the palate provides a convenient site for analysis and holds potential as a predictor for maxillary growth deficiency.

AIM: To examine the association between deviations in palatal morphology and dental occlusion in children with unilateral cleft lip and palate (UCLP).

MATERIAL AND METHODS: Palatal morphology was analyzed using 239 digitized landmarks on digital models of 50 children with UCLP (mean age 10.8 years, SD 1.5, 33 boys) who underwent one-stage cleft repair at 8 months (SD 2), and 60 non-cleft controls (mean age 8.6 years, SD 1.2, 25 boys). Geometric morphometrics (Procrustes superimposition, principal component analysis) characterized the sample and quantified deviations in palatal morphology in UCLP as Procrustes distance (ProcDist) from the average non-cleft palate. Dental occlusion was scored with the Huddart-Bodenham index (H-DI) by 2 assessors. The error of digitization was assessed through repeat digitization of 25 UCLP cases, while the error of H-DI scoring was evaluated by double assessment of 25 UCLP models. Intraclass correlation coefficient (ICC) was used for method error assessment. Regression analysis evaluated the effects of sex, age, and ProcDist on the H-DI score.

RESULTS: Digitization error was 4.81% of total variability. The inter-assessor agreement had an ICC of 0.85 (95% CI LL: 0.69), while intra-assessor agreement had an ICC >0.95 (95% CI LL: 0.88). The mean H-DI across 2 assessors was -7.8 (SD: 5.8; range: -20.5 to 3; P_{25} -11.8; P_{75} -3.5). The first 5 principal components (PCs) accounted for 69.9% of the total palatal shape variability: PC1 (30%), PC2 (10.9%), PC3 (9%), PC4 (7.9%), and PC5 (7.2%). None of the independent variables - sex, age, and ProcDist - showed a significant effect on the H-DI score ($p > 0.1$).

CONCLUSION: In the current sample, palatal morphology does not appear to be associated with the occlusal outcomes assessed using the H-DI. However, further research is needed to explore this relationship in other samples treated with different palatoplasty techniques.

Disclosure of interest: None declared

Abstract citation ID: cjaf073.144

SP69 FACIAL HARMONY IMPROVEMENT IN ADULTS WITH A NOVEL MINISCREW-ASSISTED RAPID PALATAL EXPANSION (MARPE) TECHNIQUE: A CASE SERIES

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AIM: To evaluate a novel hybrid MARPE technique with interradicular microimplants and minimally invasive surgery for optimizing facial harmony in adults.

MATERIALS AND METHODS: Thirteen adult patients (mean age: 30.6 years, range: 20-41 years) with transverse maxillary deficiency were treated using a hybrid bonded acrylic expander (MSE, Myungsung) and six microimplants (Myungsung, 1.8mm diameter, 10-14mm length). Four microimplants were placed 2.5mm paramedially to the palatal suture. Interradicular microimplants between the maxillary first and second molars were placed, aiming for an apical depth of 10-15mm from the gingival margin. A minimally invasive piezotome osteotomy of the infrazygomatic crest was performed to facilitate expansion, with appliance activation at one turn per day (0.2 mm per turn) for 40-50 days. Pre-expansion and post-retention CBCT scans assessed maxillary expansion at the nasal floor, inter-first molar width (IMW) at the palatal cusps and centers of resistance.

RESULTS: Implementation of the presented MARPE protocol yielded a substantial mean nasal floor expansion of 3.40 mm (SD 1.22), a mean IMW increase of 8.26 mm (SD 2.41) at the level of the palatal cusps, and a mean furcation expansion of 5.95 mm (SD 1.39), with no apparent vestibular bone loss.These results compare favorably with a recent meta-analysis by Kapetanović et al. (2021), which reported 2.33 mm and 6.55 mm for mean skeletal and IMW expansion, respectively, in adult MARPE patients. All changes demonstrated statistical significance ($p<0.05$).

CONCLUSIONS: This novel hybrid MARPE technique, employing interradicular microimplants and minimally invasive piezotome surgery, achieved substantial maxillary expansion at multiple levels in adults, while the improved anchorage from the lateral miniscrews contributed to preserving vestibular cortical bone integrity at the furcation level. New approach represents a promising advance for optimizing facial harmony in patients with transverse maxillary deficiency.

Disclosure of interest: None declared

Abstract citation ID: cjaf073.145

SP70 IMPACT OF SELF-PERCEPTION OF OROFACIAL APPEARANCE ON HEDONIC AND EUDAIMONIC WELL-BEING OF BRAZILIAN ADULTS

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AIM: To estimate the impact of self-perception of orofacial appearance (OA) on hedonic (life satisfaction and emotional) and eudaimonic (psychological and social) well-being in Brazilian adults, considering the indirect effect of having received orthodontic treatment.

SUBJECTS AND METHODS: This was a cross-sectional online study conducted in 2024, with 710 Brazilian adults [mean age: 28.5 (DP= 8.9) years; 74% women]. Demographic data were collected, and OA was measured using Orofacial Esthetic Scale (OES), Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ), and Questionnaire for Outcome Assessment of Smile Aesthetic (OA-Smile). Well-being was measured with Satisfaction with Life Scale (SWLS) and Mental Health Continuum-Short Form (MHC-SF). Data validity and reliability were confirmed via confirmatory factor analysis [CFA: Comparative Fit Index (CFI)≥0.96, Tucker-Lewis Index (TLI)≥0.95, Standardized Root Mean Square Residual (SRMR)≤0.05; and ω≥0.86]. A single OA dimension was derived from the mean scores of the OES, PIDAQ, and OA-Smile factors (CFI=0.98, TLI=0.97, SRMR=0.02). Structural equation modeling assessed the impact of OA (independent variable) on well-being dimensions (dependent variables: SWLS and MHC-SF factors). "Having received orthodontic treatment" was tested as an intermediate variable (indirect effect). Model fit and standardized path coefficients (β) were evaluated (α=5%), and the effect size was estimated by explained variance (r^2).

RESULTS: Receiving orthodontic treatment had no significant indirect effect on the impact of OA on well-being (proportion of indirect effect≤0.5%, p≥0.725) and was removed from the model. The refined model showed adequate fit to the data (CFI=0.94, TLI=0.93, SRMR=0.06). Self-perception of OA significantly impacted life satisfaction (β=0.32, $p<0.001$, $r^2=0.105$) emotional (β=0.19, $p<0.001$, $r^2=0.037$), psychological (β=0.22, $p<0.001$, $r^2=0.049$) and social well-being (β=0.15, p=0.001, $r^2=0.022$), although the variance explained was low.

CONCLUSION: Brazilian adults who perceived their OA more positively and experienced fewer psychosocial impacts and concerns with smile appearance

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reported higher levels of hedonic and eudaimonic well-being. Orthodontic treatment did not mediate these relationships. However, the variance explained by OA in well-being outcomes was low, highlighting the need for future investigations in different contexts, considering other clinical and psychological characteristics where orthodontic treatment might have an effect.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.146
SP71 EVALUATION OF THREE-DIMENSIONAL FACIAL IMAGES TAKEN IN DIFFERENT HEAD POSITIONS

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AIMS: With recent advancements in digital technology, the development of three-dimensional (3D) imaging techniques has greatly progressed. 3D facial scanners are now being utilized in the esthetic analysis of the face, offering benefits such as the reproduction of facial color and texture. However, connective tissue, unlike hard tissue, varies depending on the patient's position. The aim of this study was to determine whether head position affects 3D facial images.

MATERIAL AND METHODS: This study evaluated 3D facial images of 10 mannequins. Frontal image of each mannequin was obtained as standard head position image. Then, facial images were taken with variations in head rotation; the head of the mannequin was rotated to the left, right, up, and down directions. The images with changed head position were superimposed onto the standard head position image, and the difference assessed using One-sample t-test between the two images was used to evaluate deformations in images. Then, data were organized into four groups; ipsilateral and contralateral in lateral rotation group and left and right in vertical rotation group. After performing Analysis of Variance (ANOVA) on the four subgroups, post-hoc analyses were conducted.
RESULTS: Analyzing the overall average of differences in 3D facial images, there were statistically significant differences in the same direction when rotated 5 degrees to the left or right. However, for the two head positions rotated up and down, there were no statistically significant differences. The ANOVA results for the four subgroups showed statistically significant differences ($P<0.05$) across average, RMS, positive average, and negative average measures.
CONCLUSIONS: This study showed that 3D facial images can deform based on head position, with different areas affected depending on the position. Therefore, it is essential to consider head position during image acquisition in clinical settings.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.147
SP72 ORTHODONTIC CLINICIANS' KNOWLEDGE OF MAGNETIC RESONANCE IMAGING IN ORTHODONTIC PATIENTS

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AIMS: In the UK, there is currently a paucity of guidance on the management of patients requiring Magnetic Resonance Imaging (MRI) scans during orthodontic treatment. The aim of this study was to evaluate orthodontic clinicians' knowledge of MRI physics, risks associated with orthodontic appliances during MRI scans and awareness of relevant guidelines.
MATERIAL AND METHODS: A two-cycle prospective knowledge-based audit was conducted at the Eastman Dental Hospital. Thirty orthodontic clinicians, including trainees, specialists and consultants, were invited to complete a novel online questionnaire. The questionnaire was administered before and after a targeted teaching session. Ten true/false and multiple-choice questions assessing knowledge of MRI physics, the effects of orthodontic appliances on MRIs and existing guidelines were included. Based on previous literature, a locally agreed standard was set, requiring clinicians to achieve an overall knowledge score of 80%.
RESULTS: Response rates were 93% (n=28) for the baseline questionnaire (Cycle 1) and 80% (n=24) for the follow-up questionnaire (Cycle 2). Baseline knowledge of MRI physics and the impact of orthodontic appliances was suboptimal, with an overall knowledge score of 61.5%. Over half of clinicians (54%) incorrectly thought MRIs impart radiation and half selected the incorrect units of strength of the magnetic field (50%). Artefacts, thermal trauma and projectile debonding were correctly identified as risks of orthodontic appliances when undergoing an MRI by 86%, 46% and 32% respectively.

Currently in Europe, the only available guideline on the management of orthodontic patients undergoing MRI scans was published by the Polish Orthodontic Society. 0% of clinicians in this study were aware of the guideline.

A targeted teaching session significantly improved clinicians' overall knowledge score in Cycle 2 to 89.5% with awareness of the Polish Orthodontic Society guidelines increasing to 70%.
CONCLUSIONS: Orthodontic clinicians demonstrated limited knowledge of MRI principles, associated orthodontic risks and guidelines available. Further development and better signposting of evidence-based guidelines on management of orthodontic patients undergoing MRI scans is required.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.148
SP73 EFFECTIVENESS OF CUSTOMIZED LINGUAL APPLIANCES IN CONTEXT OF ORTHOGNATHIC THERAPY - AN INITIAL ASSESSMENT

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AIMS: The aim of this study was to examine the treatment outcomes, particularly the orthodontic decompensation before surgery, in patients who underwent combined orthodontic and surgical treatment and were treated with completely customized lingual appliances (CCLAs).
MATERIAL AND METHODS: Twenty-five patients who underwent orthodontic–orthognathic treatment for skeletal Class II (N=10) or Class III (N= 15) malocclusion were retrospectively investigated. Study models from before treatment (T0), immediately before surgery (T1) and after treatment (T2), as well as digitized setup and operation models, were analyzed using PAR Index and by measuring tooth pairs in contact.
RESULTS: The initial PAR scores were comparable (T0: Class II: 33.30 ±7.85; Class III: 35.90 ±1.20; $p = 0.539$), and significant improvements were observed following treatment (T0 vs. T2: Class II: $p = 0.002$; Class III: $p = 0.002$). Excellent final PAR scores were recorded, with no statistical differences between the groups (T2: Class II: 1.60 ±2.80; Class III: 0.80 ±2.08; $p = 0.246$). The PAR scores for setup and operation models were 0.00 ±0.00 and 4.20 ±3.29 for Class II malocclusion and 0.07 ±0.26 and 2.47 ±1.92 for Class III malocclusion, respectively. Thus, all final PAR scores were within the excellent PAR score range. Tooth pairs in contact demonstrated similar results.
CONCLUSIONS: Using CCLAs in combined orthodontic–orthognathic treatment is efficient and leads to high-quality treatment outcomes in Class II and III patients. Moreover, it enables excellent dental arch alignment before surgery.
Disclosure of interest: Stephan Möhlhenrich: None declared, Jannik Steur: None declared, Sachin Chhatwani: None declared, Gholamreza Danesh: None declared, Dirk Wiechmann Inventor of the WIN system. The WIN system is manufactured by Dirk Wiechmann Lingual Systems and Dirk Wiechmann is the owner of this company. All other authors declare that they have no competing interests.

Abstract citation ID: cjaf073.149
SP74 A SYSTEMATIC REVIEW AND META-ANALYSIS OF SUPPLEMENTARY VIBRATION ON CANINE MOVEMENT ACCELERATION

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AIM: This study aims to compare the rate of canine movement with and without supplementary vibration under orthodontic force.
MATERIALS AND METHODS: A database search was carried out in PubMed, Embase, Cochrane, and Scopus, with the last search completed on October 3, 2024. RCTs examining the effect of vibration on canine movement rates in orthodontic patients were eligible for inclusion. Study quality was evaluated using the Risk of Bias 2.0 framework. A random-effects model, based on the DerSimonian and Laird method, was used to estimate mean differences (MDs) and 95% confidence intervals (CIs) for each comparison.
RESULTS: From the 1,359 studies screened, fourteen RCTs were selected to assess the impact of supplementary vibration. Conducted between 2015 and 2024, these trials included 453 participants and evaluated 739 teeth. The pooled analysis revealed that supplementary vibration significantly accelerated tooth movement with a mean difference (MD) of 0.14 mm (95% CI [0.02, 0.25]). Despite notable

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heterogeneity, no serious issues related to transitivity or consistency were detected. Egger's regression test found no significant evidence of publication bias.
CONCLUSIONS: The use of supplementary vibration in conjunction with orthodontic force effectively accelerates tooth movement. However, further research is needed to establish more consistent and definitive conclusions.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.150
SP75 CORRELATION BETWEEN LARGE MULTINUCLEATED CELLS AND BONE RESORPTION ACTIVITY IN CAFFEINE-MODULATED OSTEOCLASTOGENESIS IN RAW 264.7 CELLS

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AIMS: Caffeine is a widely consumed compound, but its impact on bone metabolism remains incompletely understood. The effects of caffeine on the formation of large multinucleated cells (MNCs) and their osteoclastic activity are underexplored. This study aimed to investigate the relationship between the formation of large MNCs and bone resorption activity and how these are modulated by varying concentrations of caffeine in RAW 264.7 cells.
MATERIALS AND METHODS: RAW 264.7 murine monocyte cells were treated with caffeine at concentrations (3, 30, 300 μM), combined with RANKL, for 4 days. Cell viability was assessed using the MTS assay, and osteoclast differentiation was evaluated through tartrate-resistant acid phosphatase (TRAP) staining. Large MNCs (defined as cells with ≥10 nuclei) were quantified. Bone resorption activity was analyzed by measuring pit resorption area on calcium phosphate-coated plates after 6 days of treatment. The relationships between caffeine concentration, large MNC formation, and resorption pit area were examined.
RESULTS: At 3 μM caffeine, the formation of large MNCs and bone resorption pit area significantly increased compared to the control group. However, these effects diminished progressively with higher caffeine concentrations (30, 300 μM), where both osteoclast differentiation and pit formation were inhibited. A strong correlation was observed between the number of large MNCs and the extent of bone resorption activity.
CONCLUSIONS: Our findings suggest that large multinucleated cells contribute to enhanced bone resorption activity, and their effects are modulated by caffeine concentrations. At low caffeine concentrations promote bone resorption, while higher concentrations suppress osteoclastogenesis and resorption activity.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.151
SP76 INFLUENCE OF ORTHODONTIC APPLIANCES AND NITRATE CONTAINING JUICE CONSUMPTION ON THE SUBGINGIVAL, TONGUE AND SALIVA MICROBIOTA

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AIM: The aim of this study was to assess the effect of daily administration of a nitrate containing beet juice during orthodontic therapy in a randomized controlled clinical trial on the subgingival, tongue and saliva microbiota.
MATERIALS AND METHOD: In this randomized controlled clinical trial we investigated the bacterial changes introduced on the subgingival, tongue and saliva microbiota during fixed orthodontic treatment, with or without daily administration of nitrate containing beet juice for two weeks in 22 individuals with good general health. We followed clinical parameters in combination with microbiota changes before, after two weeks and after 6 months of treatment with fixed orthodontic appliances. A 2-step PCR-approach was used to amplify the V1-V2 variable region of the 16S rRNA gene of the subgingival, tongue and saliva microbiota and sequenced on an Illumina MiSeq (2X300 cycles, San Diego, USA). Taxa differentially distributed over time or trending to be differentially distributed were further assessed by Dunn`s post-hoc test. A two-way repeated measurement ANOVA of square root relative abundance data to normalize skewed distributions was used to assess the effect of juice consumption on microbial communities. Statistically significant pairwise differences were corrected by the Sidak post-hoc test.
RESULTS: In accordance with variations in community composition at the sampling sites, effects to orthodontic treatment differed. Subgingival communities responded promptly to orthodontic treatment with no additional structural changes over time whereas saliva and tongue communities were affected only after extended treatment. Periodontal pathogens such as *Selenomonas sputigena* were enriched in subgingival communities whereas *Streptococcus mutans* was enriched in saliva. The effect of beet juice on microbial composition was significant in subgingival samples ($p<0.05$).
CONCLUSIONS: We conclude that subgingival microbiota are rapidly affected by fixed orthodontic appliances and can be positively influenced by regular administration of nitrate containing juice.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.152
SP77 THE RELATIONSHIP BETWEEN MAXILLARY TRANSVERSE DIMENSION AND IMPACTED CANINES

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AIMS: To compare the transverse dimension of an individual's maxilla between the sides with and without impacted canine using cone-beam computed tomography (CBCT).
MATERIAL AND METHODS: A total of 104 CBCT images of patients with unilaterally impacted maxillary canines (79 palatally impacted and 25 buccally impacted) were examined. The maxillary transverse dimensions were measured at the dental, alveolar, basal, and nasal levels at the first premolar and the first molar on both sides of the maxilla using 3D Slicer software. Differences between the sides with and without impaction were assessed using paired-sample t-tests. Correlations between variables were evaluated using Spearman's correlation test with additional linear regression analysis.
RESULTS: Statistically significant differences were observed in the premolar alveolar width (0.35 mm, $p = 0.029$) and basal width (0.47 mm, $p = 0.021$), regardless of the impacted canine position, with the canine impaction side being narrower. In the palatal canine impaction group, the premolar basal width on the impaction side was significantly narrower by, on average, 0.4 mm ($p = 0.027$). No significant differences in total maxillary widths were found between the palatal and buccal canine impaction groups. The premolar alveolar width in females and the premolar basal width in males were significantly narrower on the impaction side (by, on average, 0.38 mm, $p = 0.019$ and 1.03 mm, $p = 0.004$, respectively). In males, age was positively correlated with the differences in premolar dental width ($r = 0.504$, $p = 0.005$), molar dental width ($r = 0.533$, $p = 0.004$), premolar alveolar width ($r = 0.441$, $p = 0.015$), and molar alveolar width ($r = 0.481$, $p = 0.011$). With each year of life, the difference in premolar dental width, molar dental width, and premolar alveolar width increases by 0.041 mm ($p = 0.037$), 0.045 mm ($p = 0.028$), and 0.118 mm ($p = 0.003$), respectively.
CONCLUSIONS: Canine impaction is associated with a local narrowing of the maxilla in the premolar region, which is influenced by gender and age.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.153
SP80 ‡‡‡ FAVOURABLE DENTOALVEOLAR CHANGES AFTER LOWER PREMOLAR EXTRACTIONS FOR CLASS III CAMOUFLAGE WITH COMPLETELY CUSTOMIZED LINGUAL APPLIANCES

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AIMS: The aim of the investigation was to evaluate if the inclination of the lower anterior teeth can be controlled reliably after lower premolar extraction for Class III camouflage treatment with completely customized lingual appliances (CCLAs). Treatment outcome was tested against the null hypothesis that lower premolar extractions for non-surgical camouflage treatment of a Class III malocclusion will lead to further compensation by retroclining mandibular incisors during CCLA treatment.
MATERIAL AND METHODS: This retrospective study included 25 patients (f/m 12/13; mean age 20.7 years, SD 9.5 years) with uni- or bilateral Class III molar relationship and a Wits value of ≤ -2 mm. In all consecutively debonded patients, lower premolars were extracted to correct the sagittal relationship with a non-surgical camouflage approach. Lateral head films prior to (T1) and at the end of lingual orthodontic treatment (T2) were used to evaluate skeletal and dentoalveolar effects. A paired t-test with alpha = 5% was used to define differences between

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the endpoints. The linear correlation between the inclination of the mandibular incisors at T1 and the achieved correction was measured with the Pearson correlation coefficient (PCC). A Schuirmann's TOST equivalence test was used to check if the final lower incisor inclination was within the defined norms.
RESULTS: The null hypothesis was rejected as the mean lower incisor inclination was improved by 1.8° despite lower premolar extractions (T1: 86.8°/ T2: 88.6°). There was a strong correlation (-0.75) between the lower incisor inclination at T1 and the achieved correction indicating a controlled correction towards the norm regardless of the initial incisor position. At T2, the interincisal angle as well as the lower incisor inclination were within the norm.
CONCLUSIONS: Lower premolar extractions for non-surgical camouflage treatment of a Class III malocclusion will not lead to undesired retroclining of mandibular incisors during CCLA treatment even in severe cases.
Disclosure of interest: Dirk Wiechmann DW is the inventor of completely customized lingual appliances

Abstract citation ID: cjaf073.154
SP81 SIGNIFICANCE OF DRILLING GUIDES FOR THE INSERTION OF ORTHODONTIC IMPLANTS IN THE ANTERIORE PALATE - A RANDOMIZED CONTROLLED TRIAL

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AIMS: In recent years, template-guided insertion of orthodontic mini-implants (OMIs) in the anterior palate has become an established procedure to reduce risks and shorten treatment times. This research project aims to investigate the transfer accuracy of two different insertion templates compared to freehand insertion.
MATERIAL AND METHODS: Intraoral scans and corresponding cephalometric radiographs from a total of 45 patients were superimposed using software support, and the positions of two OMIs in the anterior palate were planned (TADmatch, OnyxCeph Lab, Image Instruments GmbH, Germany). Based on the virtual planning, two types of surgical guides (SG) were created - either indirect (3D-printed, N = 15) or direct (conventional pressure molding-formed, N = 15) on printed working models. Subsequently, the implants were inserted. The control group underwent freehand insertion following the same prior virtual planning (N=15). To determine the impact of the insertion protocol, scan bodies were used and captured using intraoral scanning. Overlaying with the corresponding planning allowed the determination of angular and linear deviations in relation to the longitudinal axis as well as the frontal, sagittal, and horizontal planes.
RESULTS: All guided insertions showed maximum linear deviations of ≤ 1 mm, while deviations for freehand insertion ranged between 2.52 ± 1.51 mm (shoulder) and 4.44 ± 2.06 mm (tip). Deviations regarding the implant axis were also significantly higher without the use of a SG. Thus, the most significant deviations from the plan occurred with freehand insertion. Significant differences between both SGs and the control group were found at the implant shoulder and axis. In contrast, both guided insertions showed smaller and comparable deviations to each other. While no differences between median and paramedian implant positions were found in guided-supported implantations, these differences were observed with freehand insertion. A common finding across all insertion types was that the defined implant position, particularly regarding insertion depth, was not always achieved.
CONCLUSIONS: Guided OMI insertion allows for a more accuracy of the planned position compared to freehand insertion. The manufacturing process (direct vs. indirect) and the type of position (median vs. paramedian) appear to be of secondary importance.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.155
SP82 LEARNING OUTCOMES OF SLEEP DENTISTRY EDUCATION AND IMPACT OF MANDIBULAR ADVANCEMENT DEVICE TREATMENT ON OBSTRUCTIVE SLEEP APNEA

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AIMS: This research examined students' learning outcomes in obstructive sleep apnea (OSA) and subjective treatment response of patients referred to the Odontology Education Unit for mandibular advancement device (MAD) therapy.
MATERIAL AND METHODS: Each student in the University of Eastern Finland's orthodontic curriculum completes a sleep dentistry course and conducts a treatment for OSA patient using MAD. A six-part questionnaire with a scale from 4 (the least possible impact, skill, or confidence) to 10 (the maximum impact, skill, or absolute confidence) was used to assess students' perceptions on their ability to treat OSA.

The second part examined patient´s subjective treatment outcome using Epworth Sleepiness Scale (ESS). The ESS consists of eight questions that ask the respondent to rate the likelihood of falling asleep on a scale of 0–3, with a total score above 10 indicating abnormal daytime sleepiness. The questionnaire was completed as part of the initial assessment and at the checkup visit once MAD had been used for one month.

23% of the patients (n=31) had normal weight, 45% overweight, and 32% were obese. 71% had mild (AHI 5–15), 26% moderate (AHI 15–30), and 3% severe sleep apnea (AHI over 30).
RESULTS: Most students (n=24) reported that they had learned much from education (8.9±0.8). The sleep dentistry curriculum reduced the threshold to prepare a MAD (8.4±1.6). Most believed they could prepare a MAD in their first summer of bachelor's work (7.0±2.0). The majority (75%) of the patients had ESS scores less than ten, meaning that daytime sleepiness was not significant before treatment. Half of the patients whose ESS baseline scores were ten or higher had their scores dropped below ten after one month of MAD treatment. ESS scores were reduced by an average of 25% after one month of MAD use, which change is statistically significant (paired t-test, $p < 0.001$).
CONCLUSIONS: The study indicates that teaching sleep dentistry improves students' readiness to treat OSA patients with MAD. Based on ESS scores, the patients had mainly mild sleep OSA with little daytime sleepiness. Yet, a statistically significant reduction in the ESS scores was found.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.156
SP83 ACCURACY OF TOOTH MOVEMENT WITH CLEAR ALIGNER DURING TREATMENT IN VERTICAL DIRECTION

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AIMS: To study the accuracy of tooth movement with clear aligners during treatment in vertical direction.
MATERIAL AND METHODS: This study included 10 participants aged 20–40 years, all diagnosed with mild to moderate dental crowding and was being treated with Invisalign® full-mouth aligners without tooth extractions and wearing 14 days per aligner. The achieved digital models were superimposed on the clinical stereolithography (STL) models at various stages by using the Geomagic® Control X™ software. Superimposition was using medial two-third of third rugae and the area 5 mm dorsal to them. The predicted digital models were superimposed on models at various stages by using the ClinCheck® software. Statistical analysis was performed using IBM SPSS Statistics Version 23 (IBM Corp., Armonk, N.Y., USA). Friedman's ANOVA with post hoc test by multiple comparison was used to compare the percentage of accuracy of tooth movement in each stage of treatment. Spearman correlation was used to analyze the correlation between each stage. The level of significance was set at $p < 0.05$.
RESULTS: The mean age of participants was 29.80 ± 3.80 years, with wearing time 12.80 ± 1.93 days per aligner. The percentage of accuracy in the vertical direction during T2 was highest at the central incisor with a value of 47.12 and lowest at the second premolar with a value of 40.08. During T4, the highest accuracy was at the central incisor with a value of 53.07, and the lowest was at the first molar with a value of 48.49. In T6, the highest accuracy was at the central incisor with a value of 58.24, and the lowest was at the second premolar with a value of 50.97. During T8, the highest accuracy was at the lateral incisor with a value of 64.61, and the lowest was at the second premolar with a value of 58.93. The percentage of accuracy was positive correlations only at certain stages.
CONCLUSIONS: The percentage of accuracy was positive correlations only at certain stages. However, it was found that the percentage of accuracy in tooth movement during treatment increased progressively across all teeth.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.157
SP85 CONCLUSIONS REPORTED IN EUROPEAN ORTHODONTIC CONGRESS POSTER ABSTRACTS: ARE THEY BASED ON CLINICAL OR STATISTICAL SIGNIFICANCE?

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AIMS: The aim of this study was to determine the frequency of reporting clinical or statistical significance in European Orthodontic Society (EOS) Congress scientific poster abstracts and to ascertain whether the conclusions drawn are based on either clinical or statistical significance.
MATERIAL AND METHODS: Poster abstracts published between 2014-2024 were included. Pre-piloting and calibration were undertaken prior to data collection (100% agreement). Abstract characteristics were extracted independently by two reviewers. Any discrepancies were resolved by discussion with a third reviewer. Descriptive statistics and frequency distributions were calculated.
RESULTS: A total of 3654 abstracts were analysed. The highest number of abstracts was presented in 2014 (n=419,11.5%). Epidemiological studies (cross-sectional, case-control, cohort, survey) (n=2000, 54.7%) were frequently presented, followed by laboratorial studies (n=635, 17.4%) and systematic reviews (n=283, 7.7%). No inferential statistics were commonly reported (n=2136, 58.5%). Within the cohort of studies reporting statistical significance (n=1503, 41.1%), typically only p-values were reported (n=1189, 32.5%), followed by the term "statistically significant" stated only (n=135; 3.7%), p-values in conjunction with estimates and 95% confidence intervals (CI) (n=61, 1.7%), p-values and 95% CI (n=52, 1.4%), 95% CI (n=29, 0.8%), estimates and 95% CI (n=21, 0.6%) and p-values and estimates (n=16, 0.4%). When interpretating the reported results in the conclusion section, these were typically based on p-values (n=1139, 31.2%) or the term "statistically significant" only stated without consideration of outcomes between groups (n=538, 14.7%). 95% CI (n=27, 0.7%), p-values and 95% CI (n=49, 1.3%), p-values in conjunction with estimates and 95% CI (n=57, 1.6%) and estimates and 95% CIs (n=19, 0.5%) were infrequently considered. Across the study timeframe (per year), the results and author conclusions tended to based on considering p-values primarily.
CONCLUSIONS: Clinical significance is often under-reported in abstracts and author conclusions tend to be drawn based on p-values primarily. While p-values are important in determining if a result is statistically significant, its clinical relevance is limited. The reporting of clinical significance in the conclusion of poster abstracts should be stipulated as this allows clinicians to both gauge the size and range of the observed differences between groups and the relevance to their clinical practice.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.158
SP86 IMPACT OF ETHNIC BACKGROUND ON CRANIOFACIAL VARIATION, INTEGRATION AND MODULARITY

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AIMS: To quantify craniofacial variation, integration, and modularity in subjects with Class I dental arch relationships from Indonesian and Polish populations.
MATERIAL AND METHODS: Fourteen landmarks representing the skull base, maxilla, and mandible were identified on lateral cephalograms of 99 Indonesians (INDO group: 17 males, 82 females; mean age: 23.6 years, SD = 4.1) and 91 Poles (POL group: 27 males, 64 females; mean age: 24.8 years, SD = 3.3), all with Class I malocclusion. Craniofacial shape variability, integration, and modularity were analyzed with geometric morphometrics. Principal component analysis (PCA) assessed shape variability and group differences using Procrustes distances. Integration and modularity were tested in five scenarios: (1) skull base vs. maxilla vs. mandible, (2) skull base with maxilla vs. mandible, (3) skull base with mandible vs. maxilla, (4) skull base vs. maxilla with mandible, and (5) anterior vs. posterior regions. Covariation strength was evaluated using the RV coefficient and covariance ratio. The method error was evaluated by re-digitizing 20 cephalograms and calculating the Procrustes distance between the re-digitizations in shape space relative to the total shape variance.
RESULTS: The error accounted for less than 8% of the total shape variation. The first six principal components accounted for 70% of craniofacial shape variability, with vertical dimensions and sagittal relationships as key contributors. Significant but subtle group differences were noted ($p < 0.001$), with Indonesians exhibiting longer faces and more prominent mandibular protrusion than Poles. Modularity and integration patterns differed: Indonesians displayed three relatively independent modules (RV = 0.299, p = 0.006; covariance ratio = 0.086, p = 0.002), while this configuration was absent in Poles (RV = 0.431, p = 0.237; covariance ratio = 1.015, p = 0.046). Other modularity scenarios showed similar results across groups.
CONCLUSIONS: The Indonesian and Polish groups exhibit distinct patterns of craniofacial integration and modularity, reflecting differences in their ontogenetic craniofacial development.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.159
SP88 ‡‡‡ MAXILLARY BASAL ARCH FORMS IN OPERATED ADULT PATIENTS WITH CLEFT LIP AND PALATE USING ROOT APICES: A PILOT STUDY

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AIM: The purpose was to identify the maxillary basal arch forms utilizing the root apices and to compare the maxillary basal arch form of groups with cleft lip and palate (CLP) and normal group.
SUBJECTS AND METHOD: This study included 30 patients (21.8±3.5 years old) with unilateral CLP (ULCP group) and 30 patients (20.9±2.2 years old) with bilateral CLP (BCLP group). The normal group consisted of 30 non-cleft patients (21.2±2.3 years old) with normal occlusion. Three-dimensional (3D) Cartesian coordinates of the root apices of each tooth were determined using cone-beam computed tomography. The 3D coordinates were projected onto the palatal plane to create the 2D coordinates. Thereafter, the basal arch forms were constructed by the Procrustes superimposition. Finally, For the basal arch form comparisons among groups, the inter-root widths were measured.
RESULTS: Both CLP groups had a narrower inter-root width than the normal group. The BCLP group had significantly narrower premolar and molar widths than the UCLP group ($P < 0.05$). Especially, the inter-first molar width of the UCLP and BCLP groups was 3.7±0.7 ($P<0.001$) and 6.6±0.8 ($P<0.001$) mm smaller than that of the normal group, respectively.
CONCLUSIONS: We used the root apices to identify the basal arch forms. The basal arch form of patients with CLP was narrower than that of the normal group. The basal arch form of patients with BCLP was narrower than that of patients with UCLP. Our findings may help clinicians better comprehend basal arch forms in patients with CLP and transverse discrepancies.
Orthod Craniofac Res. 2024;27(Suppl. 1):35–41
Disclosure of interest: None declared

Abstract citation ID: cjaf073.160
SP89 EFFECT OF THE PALATAL SHAPE ON DENTAL ARCH RELATIONSHIP IN UNILATERAL CLEFT LIP AND PALATE

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BACKGROUND: Palatoplasty is a critical surgery for restoring structure and function in patients with cleft palate. However, scarring from palatoplasty is considered a major factor in maxillary growth deficiency and abnormal dental arch relationships. While indices assess maxillary growth deficiency, quantitative evaluation of palatal shape remains underexplored.
AIM: To investigate the relationship between palatal shape and dental arch relationships in children with unilateral cleft lip and palate (UCLP).
MATERIAL AND METHODS: Palatal shape was analyzed using 239 digitized landmarks on digital models of 50 children with UCLP (mean age 10.8 years, SD 1.5, 33 boys) who underwent one-stage cleft repair at 8 months (SD 2), and 60 non-cleft controls (mean age 8.6 years, SD 1.2, 25 boys). Geometric morphometrics (Procrustes superimposition, principal component analysis) characterized the sample and quantified deviations in palatal shape in UCLP as Procrustes distance (ProcDist) from the average non-cleft palate. Dental arch relationships were scored with the Goslon Yardstick by 4 assessors twice. The error of digitization was assessed through repeat digitization of 25 UCLP cases, while kappa

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statistics was used to assess agreement among and within raters. Regression analysis evaluated the effects of sex, age, and ProcDist on the Goslon score.
RESULTS: Intra- and interrater agreement for Goslon scoring exceeded 0.67 (LL 95% CI = 0.61). Digitization error accounted for 4.81% of total variability. The mean Goslon score was 2.95 (SD 0.83). The first five principal components (PCs) explained 69.9% of palatal shape variability: PC1 (30%), PC2 (10.9%), PC3 (9%), PC4 (7.9%), and PC5 (7.2%). Only ProcDist significantly affected the Goslon score ($p = 0.048$; $R = 0.28$), while sex and age showed no effect.
CONCLUSION: Palatal shape deviations showed limited correlation with Goslon scores. Further research is required to assess the utility of palatal shape analysis in predicting maxillofacial growth outcomes in UCLP.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.161
SP90 BONDING PROPERTY OF CUSTOMIZED AND ENLARGED BRACKET BASE

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AIMS: Customized brackets enable precise positioning, but the bonding base thickness and area have increased compared to conventional systems (Journal of Clinical Orthodontics, 2013;47:42-49). The aim of this study is to evaluate the bond strength when bonding base thickness and area change.
MATERIAL AND METHODS: One hundred and thirty-five bovine mandibular incisors were randomly divided into 9 groups based on three bonding surface areas (ø 3mm, 5mm, 10mm) and three thicknesses (0.5 mm, 2.0 mm, 5.0 mm). Progressively finer polishing of the enamel surface was performed with 120 to 2400 grit waterproof abrasive papers. Bonding bases for customized brackets were made using resin (KommonBase resin, GC Co. Ltd., Japan). Standardized disks with specified thickness and area were made using silicon molds, with metal brackets bonded using the same resin. Each specimen was bonded to finished bovine mandibular incisors using resin-reinforced glass ionomer cement (RGIC, Fuji ORTHO LC, GC Corp., Japan). RGIC was handled according to manufacturers' instructions. Each bracket was exposed for 20 seconds to the light curing unit at incisal and gingival margins. After storage at 37 °C for 24 hours, bond testing was performed using a universal testing machine (Shimadzu Co. Ltd., Japan) to measure shear bond strength. Statistical analysis was performed using two-way ANOVA with a 5% significance level.
RESULTS: Bond strength significantly decreased with increasing thickness. On the other hand, bond strength significantly increased with increasing surface area. Even with a 5.0 mm thickness, a bonding surface of ø10 mm (78.5 mm²) showed a bond strength of 279±35 (N), which is clinically sufficient.
CONCLUSIONS: In customized bracket bases, there is a potential reduction in bond strength due to the distance between bracket base and the tooth surface. However, increasing the bonding surface area can achieve sufficient bond strength.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.162
SP91 ASSESSING DENTIST SATISFACTION WITH REMOTE SUPERVISION OF ORTHODONTIC TREATMENT WITH FIXED APPLIANCES - A PILOT STUDY

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AIMS: To evaluate dentist satisfaction with remote supervision by experienced orthodontists.

Patients in areas with a shortage of experienced orthodontists may benefit from treatment provided by less experienced dentists under remote supervision by expert orthodontists. Beyond achieving good treatment outcomes, dentist satisfaction with supervised treatment is crucial. Satisfied dentists are more likely to adopt and expand this treatment model, gaining valuable experience with fixed appliance therapy
MATERIAL AND METHODS: An anonymous survey was distributed online via Google Forms to 20 dentists treating patients under remote supervision by experienced orthodontists. The supervised treatment process included:

1. Treatment plans created by two orthodontists based on standardized patient records and patient/dentist expectations.
2. Bracket positioning and transfer trays prepared by orthodontists and sent to dentists for placement following trained protocols.
3. Periodic submission of photographs and scans showing treatment progress for evaluation.
4. Guidelines prepared based on progress documentation, implemented by dentists with continuous access to supervising orthodontists for communication.

The survey consisted of 14 questions, including three open-ended questions and 11 rated on a 1–10 scale (higher scores indicating more positive perceptions). These questions addressed the quality of treatment plans, supervision, satisfaction with outcomes, and financial arrangements. Statistical analyses included descriptive statistics (means, medians, ranges, 25th and 75th percentiles).
RESULTS: The quality of treatment plans was rated highly, with a mean and median score of 9 (range: 5–10). The quality of supervision, including clarity of guidelines and response time to dentists' inquiries, also received high ratings (mean and median = 9, range: 5–10). Satisfaction with treatment outcomes, based on subjective assessments, was similarly rated high (mean and median = 9, range: 5–10). However, dentists were more critical of the financial arrangements, which received lower scores (mean = 6, median = 5, range: 2–10).
CONCLUSIONS: Remote supervision of orthodontic treatment by experienced orthodontists was highly rated for quality of treatment plans, supervision quality, and treatment outcomes, indicating overall satisfaction among dentists. However, financial arrangements were a notable area of concern.
Disclosure of interest: Anna Cichoń- Modzelewska: None declared, Ewa Węgrodzka Shares in the company using supervised orthodontic treatment, Piotr Fudalej Shares in the company using supervised orthodontic treatment

Abstract citation ID: cjaf073.163
SP93 ORTHODONTIC AND SURGICAL TREATMENT IN ADULTS ACCORDING TO RICKETTS AND STEINER ANALYSIS

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INTRODUCTION: Orthodontic diagnosis is fundamental to analysing the functional and esthetic needs of each patient for a successful treatment.
OBJECTIVE: To study of facial growth, morphological anomalies, malocclusions and the evaluation of the possible results of orthodontic treatment, through the analysis of Ricketts and Steiner
METHODOLOGY: We have used datas generated from our patients at Isufi Royal Dental Clinic
RESULTS: Cephalometric are distinguished by a specific use, and each analysis provides ideal advantages for study and diagnosis, Ricketts analyzes and predicts facial growth, Steiner has dental, skeletal parameters and influence of band tissues.However, the main disadvantage of cephalometrics are studies obtained by means of radiographs that involve a percentage of radiation.
CONCLUSIONS: With cephalometries of we can predict and analyze facial growth data, obtain a surgical or orthopaedic approach, analyze anatomical structures with respect to the cranial base and the influence of the airways on the facial biotype.
Keywords: Cephalometric analysis ; Ricketts ; Steiner
Disclosure of interest: None declared

Abstract citation ID: cjaf073.164
SP95 COMPARISON OF TWO METHODS FOR CROSS- SECTIONAL DISCREPANCY DIAGNOSIS: CAC VS CBCT

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AIMS: The aim of this study is to evaluate which between the method of models (CAC) and the method of CBCTs can lead to underestimation or overestimation of the amount of expansion required
MATERIAL AND METHODS: A retrospective study was conducted on a sample of 32 patients (11 females and 21 males) (mean age T0: 7.1±0.65a; T1: 10 ±1.33a) who, following an initial orthodontic specialist examination at the Od. Clinic of the University of L'Aquila, presented with a cross-bite-free transverse deficit. They were treated with Haas expander on the E. Level II radiological investigations (CBCT) were prescribed for reasons unrelated to our protocol at two different times (T0, T1). They were obtained with the i-CAT FLX V17 scanner and performed by a single operator. For a total of sixty-four CBCTs. The program

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used to read the CBCTs was Bluskyplane v4.7.5. Two operators (E.B. and F.S.) performed the orientations of the CBCTs. The ALARA principle was adhered to.
CAC METHOD: Evaluation is performed by considering localizable points on the occlusal surfaces of the first permanent molars in mixed dentition or permanent dentition.
CBCT METHOD: The cross-sectional 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, on the other hand, 2 points on the internal cortical at the center of resistance of the lower first molars were considered.

The Bland-Altman test allowed us to test whether there was concordance between the measurements taken with the two different diagnostic methods used.

The sample mean and standard deviation of the Differences column for each variable was calculated; the limits of the confidence interval (Differences ±1.96×DS) were calculated. We constructed a scatter plot by placing Means on the horizontal axis and Differences on the vertical axis.
RESULTS: The CAC method underestimates the extent of expansion needed by an average of 6 mm.
CONCLUSIONS: Further studies will be needed to identify a value that relates CAC and CBCT so that skeletal discrepancy can be assessed using models alone.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.165
SP97 A COMPARATIVE ANALYSIS OF TRACING RELIABILITY AND ACCURACY: SMARTPHONE APPLICATION, DESKTOP SOFTWARE, AND MANUAL METHOD IN LATERAL CEPHALOMETRIC ASSESSMENT

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AIMS: Cephalometric radiography analysis assists in orthodontic diagnosis and treatment planning. Compared to conventional manual cephalometric tracing, advancements in technology and artificial intelligence in the development of digital programs have revolutionized cephalometric analysis. However, there is a need to evaluate the accuracy and reliability of the digitized methods. This study aimed to evaluate the accuracy and reliability of WebCeph, using smartphone applications and desktop versions, and investigate the analysis duration between different methods.
MATERIAL AND METHODS: This retrospective study compared cephalometric analysis of 110 pre-orthodontic lateral cephalometric radiographs using the smartphone and desktop versions of WebCeph cephalometric program, and manual tracing. Seven angular and two linear parameters were measured. Intra-Class Correlation Coefficient was used for intra-examiner reliability and validity testing. Paired *t*-test and Wilcoxon Signed Ranked Test were employed to determine the inter-method accuracy, while ICC was used to determine the intra-method reliability.
RESULTS: The inter (validity) and intra-examiner (reliability) results ranged from very good to excellent (>0.8). The paired *t*-test was statistically significant ($p < 0.05$) for five parameters, of which three of the parameters (SNA, ANB, and MMPA) were in Pair 1 (Manual-Smartphone), and two parameters (ANB and MMPA) were in Pair 2 (Manual-Desktop). For intra-method reliability, the ICC score ranged from good to excellent (>0.8) in all the parameters. The lowest score was the SNA manual tracing method (0.837), and the highest score was the inter-incisal angle desktop tracing method (0.996). The fastest tracing method was on smartphones (32.6±3.1s), followed by desktops (34.0±1.8s), and manual tracing was the slowest (520.7±15.4s).
CONCLUSIONS: The use of smartphone applications and desktop software for cephalometric analysis offers convenience and efficiency but poses challenges in landmark identification, underscoring the need for cautious interpretation and clinician verification in cephalometric analysis in orthodontics.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.166
SP98 CONDYLAR VOLUME CHANGES IN CLASS II DIVISION 2 PATIENTS TREATED BY UNLOCKING THE MANDIBLE USING CLEAR ALIGNERS

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AIMS: To assess the possible three-dimensional changes in condylar volume in Class II Division 2 growing patients following using Invisalign® clear aligners to "unlock" the mandible. Unlocking the mandible was done by proclining the maxillary incisors, correcting the overbite, and expanding the maxillary arch.
MATERIAL AND METHODS: Cone-beam computed tomography (CBCT) data of 22 adolescent patients with Class II Division 2 (11, treatment group; 11, control group) were obtained at time points T1 (before the start of treatment) and T2 (1.5-2 years after T1). Dolphin imaging software was used for cephalometric tracing while 3D Slicer and ITK-SNAP software were used to obtain the condylar volume at T1 and T2 for all the study participants. Using the SPSS software package, repeated measures ANOVA was used to compare the change in condylar volume (mm^3) for both groups. Pearson's Correlation Coefficient was used to correlate the percentage of condylar volume change with the ANB angle change in the treatment group.
RESULTS: The increase in the condylar volume between T1 and T2 was significant for both groups, treatment ($p < 0.001$, 127.45 ± 30.97) and control ($p = 0.015$, 98.8 ± 36.31), with no significant difference between the mean condylar volume in both groups at T1 ($p = 0.289$, 89.19 ± 81.2) and T2 ($p = 0.167$, 117.9 ± 81.7). The decrease in ANB angle between the two time points for the treatment group did not show a strong linear correlation with the increase in condylar volume (Pearson's Correlation Coefficient = -0.15, $p = 0.681$).
CONCLUSIONS: Both groups, treatment and control, of Class II Division 2 growing patients showed comparable increase in condylar volume upon the use of Invisalign® clear aligners to unlock the mandible. We hence attributed the increase in condylar volume to the normal growth of the patients rather than the introduced aligners' treatment. The change in condylar volume was not correlated with the clinical correction of Class II malocclusion.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.167
SP99 ‡‡‡ IMPACT OF DENTAL MIDLINE SHIFT ON THE PERCEPTION OF FACIAL ATTRACTIVENESS IN YOUNG ADULTS

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AIMS: The aim of this study was to quantify the threshold of a dental midline shift which would compromise the facial attractiveness and indicate a need for treatment from the layperson's and dental professional´s point of view.
MATERIAL AND METHODS: Whole face natural photographs of a male and a female model were digitally manipulated to create various degrees of upper and lower dental midline shifts through bodily movement of the upper or lower midlines as well as alteration of the axial inclination of the upper teeth. The samples were then assessed by two groups of observers (laypeople (LP) and dental professionals (DP).
RESULTS: The lower midline shift did not negatively affect the perception of smile attractiveness of DP and LP. The first significant loss of attractiveness was registered by DP at upper midline shift of 1 mm in the female model. However, the LP registered this at 2 mm. The DP registered the necessity of treatment at a threshold of 2 mm in the female model and 3 mm in the male model. LP identified the need for treatment at 3 mm for both males and females. The female model was judged more critically than her male counterpart by both female and male observers.
CONCLUSIONS: DP assess the midline deviation more critically than LP. Both DP and LP were more sensitive to midline deviations in the female model regardless of their own gender. Both groups registered the need for treatment at higher threshold than the reduction in smile attractiveness.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.168
SP100 ORAL DYSFUNCTION AS A PREDICTOR OF MALOCCLUSION IN EARLY MIXED DENTITION: A MATCHED CASE-CONTROL STUDY

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AIMS: Orofacial myofunctional disorder impacts craniofacial development, yet its role in malocclusion etiology remains unclear, driving debates in early

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orthodontic treatment decisions. The study aims to assess the impact of oral dysfunction on malocclusion and identify malocclusion predictors in children with early mixed dentition.
MATERIAL AND METHODS: A 1:1 matched case-control study was conducted with 111 pairs of 6-8-year-old schoolchildren in Vietnam, matched by age and gender. Cases and controls were recruited from a previous cross-sectional study with a two-phase random sampling to screen oral dysfunction in schoolchildren. Cases included children with the Index of Orthodontic Treatment Needs with Grade 3 or higher and at least one of malocclusion traits: Angle class III, increased overjet (>3 mm), anterior crossbite, deep overbite (>2/3 overlap), open bite, midline displacement, posterior crossbite, scissors bite, crowding (>2mm) and spacing (>4mm). Oral function was assessed, including sleep-disordered breathing symptoms via the Pediatric Sleep Questionnaire, tongue mobility with the Tongue Range of Motion Ratio, tongue strength using the Iowa Oral Pressure Instrument, and upper airway dimension through lateral cephalogram. Logistic regression identified predictors contributing to malocclusion, with a significance set at less than 0.05 and a 95% confidence interval.
RESULTS: Multivariable condition logistic regression identified key oral function with significant associations with malocclusion after adjusting for age, gender, and intermaxillary sagittal relationship, of which the adjusted odds ratio and 95% confidence intervals were: the number of sleep-disordered breathing symptoms 1.15 (1.02-1.29, p=0.020); tongue mobility 0.96 (0.93-1.00, p=0.050); tongue strength 0.94 (0.91-0.98, p=0.002); hyoid- C3 vertebra distance 0.79 (0.67-0.93, p=0.005); upper airway length 1.14 (1.03-1.27, p=0.016); soft palate length 0.78 (0.66-0.92, p=0.004); and soft palate thickness 1.40 (1.03-1.27, p=0.016).
CONCLUSIONS: Malocclusion is linked to dysfunction of the stomatognathic system. Key predictors associated with an increased risk in the early mixed dentition are sleep-disordered breathing symptoms, restricted tongue mobility and reduced tongue strength, a hyoid bone position closer to the third cervical vertebrae, longer upper airway length, and a shorter, thicker soft palate. Early oral dysfunction signs should be integrated into malocclusion screening with multidisciplinary assessment and parental involvement to inform prevention and early intervention options.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.169
SP102 THE RELATIONSHIP BETWEEN PERIODONTAL DISEASE AND OCCLUSAL STATUS IN PATIENTS STARTING ORTHODONTIC TREATMENT

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AIMS: In recent years, the number of adults seeking orthodontic treatment in Japan has been increasing; moreover, the need for orthodontic treatment in patients with periodontal disease is also simultaneously growing. If orthodontic treatment is carried out without proper management of periodontal disease, the periodontal tissues will deteriorate and orthodontic treatment will ultimately damage the periodontal tissues. Therefore, we investigated the periodontal disease and occlusion statuses of patients seeking orthodontic treatment at our clinic and evaluated the importance of early periodontal treatment before performing the orthodontic treatment.
MATERIAL AND METHODS: We investigated the periodontal evaluation (PPD(probing pocket depth), BOP(bleeding on probing), mobility of teeth, and radiographs) and occlusal evaluation(Angle classification, overjet, overbite, and crowding) of 143 patients aged ≥ 15 years who visited our clinic for orthodontic treatment at the first visit. We also investigated whether they regularly visited a general dentist at the time of their visit.
RESULTS: The patients who did not regularly visit a general dentist had significantly higher prevalence of periodontal disease compared to those who regularly visited a general dentist. A significant correlation was found between the amount of crowding, overjet, and PPD in the group that did not regularly visit a general dentist.
CONCLUSIONS: The prevalence of periodontal disease in adult patients who did not regularly visit a general dentist was higher than that in adult patients who did, indicating the importance of regular visits to a general dentist. Therefore, at the start of orthodontic treatment patients who do not regularly visit a general dentist should undergo initial periodontal treatment to prevent periodontal disease.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.170
SP103 ASSOCIATION OF ORAL BEHAVIORS, ANXIETY, AND DEPRESSION WITH PAIN SEVERITY IN TEMPOROMANDIBULAR DISORDER PATIENTS

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AIM: To investigate the relationship among oral behaviors, anxiety, and depression with the severity of pain in patients diagnosed with temporomandibular disorder (TMD).
MATERIALS AND METHODS: This cross-sectional study included 26 participants aged 18–45 years, all diagnosed with TMD based on the Diagnostic Criteria for Temporomandibular Disorders (DC/TMD) 2014. Data were collected using three questionnaires: the Thai Brief Pain Inventory, which assesses pain severity; the Oral Behaviors Checklist (OBC), a self-reported questionnaire designed to evaluate oral behaviors; and the Thai Hospital Anxiety and Depression Scale (Thai HADS), which identifies anxiety and depression levels. Statistical analysis was performed using IBM SPSS Statistics Version 23 (IBM Co.). Multiple regression analysis was used to explore potential relationships contributing to the severity of pain in TMD. The level of significance was set at $p < 0.05$.
RESULTS: The mean age of participants was 27.27 ± 8.07 years, with 14 females and 12 males. A significant association was observed between the severity of pain in TMD and several independent variables, including oral behaviors during nighttime—such as clenching or grinding teeth during sleep and sleeping in positions that put pressure on the jaw ($r = -0.306$, $p = 0.01$)—and anxiety ($r = 0.193$, $p = 0.033$). Both variables moderately explained the variation in pain severity ($R^2 = 0.384$, $p = 0.031$).
CONCLUSIONS: Within the limitations of this study, anxiety showed a positive correlation with the severity of pain in TMD patients, while oral behaviors during nighttime demonstrated a negative correlation. The moderate strength of R^2 highlights the multifactorial nature of TMD pain occurrence.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.171
SP104 DOCUMENTATION OF COMPLICATIONS ASSOCIATED WITH MAXILLARY ADVANCEMENT IN CLASS III PATIENTS USING HYBRID HYRAX DISTALIZER AND MENTOPLATE

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AIM: This study aims to evaluate the complications or incidents associated with bone-anchored maxillary protraction using a hybrid hyrax distalizer combined with a mentoplate in Class III patients. Additionally, it seeks to determine whether incident rates differ when the Alt-RAMEC (alternate rapid maxillary expansion-constriction) protocol is used alongside maxillary elastic protraction.
MATERIALS AND METHODS: This retrospective study reviewed records of 54 Class III patients who underwent orthopedic treatment with a hybrid hyrax distalizer combined with a mentoplate over a three-year period. Among these, 25 patients received the Alt-RAMEC protocol, while the remaining 29 did not undergo Alt-RAMEC. Incidents were classified into three groups based on a severity index. A minor incident was one that resolved satisfactorily with minimal or no invasive intervention. A moderate incident was one that resolved satisfactorily with moderate clinical intervention. A major incident was one that did not resolve or could not be resolved with surgical intervention, thereby compromising treatment outcome.
RESULTS: The percentage of minor, moderate and major incidents were 38%, 24% and 0% respectively. The most frequently reported complications were difficulty in device activation (17%), infection in relation to mini-implants (14.1%), loosening of mini-implants (14.1%), device deformation or breakage (5.6%) and pain due to activation (9.9%). Notably, no patients reported loosening of the mentoplate despite the occurrence of infection in relation to the hooks of the mentoplate (6%). A graphical display of the results indicated an association between the Alt-RAMEC protocol and complication rates, with a higher incidence of complications in patients who underwent the Alt-RAMEC protocol.

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CONCLUSION: Maxillary advancement with hybrid hyrax distalizer in combination with mentoplate can be considered as a safe and predictable approach in managing patients with maxillary deficiency. Although minor incidents were observed, these did not impact the overall efficacy or safety of the procedure and were manageable within standard clinical practice. The Alt-RAMEC protocol may be a factor influencing the likelihood of complications in this treatment approach.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.172
SP105 INTERPROXIMAL REDUCTION WITH CLEAR ALIGNER THERAPY: A SCOPING REVIEW

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AIMS: Interproximal reduction (IPR) is commonly used in clear aligner therapy (CAT) for space provision and to address dental and gingival aesthetics. This scoping review aimed to collate and synthesise the evidence regarding the use of IPR in CAT, focusing on its applications, effects, and perceptions among clinicians and patients.
MATERIAL AND METHODS: On 29th August 2024, a systematic electronic search was conducted across five databases and grey literature using controlled vocabulary and free-text keywords according to the Preferred Reporting Items for Systematic reviews and Meta-Analysis for Scoping Reviews guidelines.
RESULTS: Thirty-one studies satisfied selection criteria. These included retrospective observational studies, prospective interventional trials, and clinician and patient surveys. The results were categorised into five groups: surveys on clinical use, patient and clinician perceptions, clinical studies on its application, effects, and the accuracy of IPR within the context of CAT. The findings were presented in both descriptive and tabular formats. The primary reasons for IPR prescription included addressing black triangles, relief of crowding, and correction of tooth size discrepancies. General dentists and orthodontists managed IPR similarly, with orthodontists expressing confidence in performing IPR on anterior teeth. Patients generally tolerated IPR well, with anxiety levels diminishing post-procedure.

IPR was most often planned for the lower anterior teeth and was less frequently required in refinement or retreatment cases. While IPR enhanced rotational accuracy and reduced incisor proclination, concerns related to root resorption and bone changes persisted. Manual methods were less precise than motor-driven ones, highlighting the need for accurate tools and expertise to optimise IPR predictability in CAT.
CONCLUSIONS: IPR in CAT was found to be commonplace. Findings regarding its clinical application, associated outcomes, and the perceptions of clinicians and patients were varied. Key findings underscore the importance of technical precision and the need for further high-quality research to refine protocols and enhance treatment outcomes.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.173
SP106 WITS APPRAISAL AMONG THE MONGOLOID PATIENTS

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AIMS: Lateral cephalometric radiographs are crucial in orthodontics for evaluating skeletal discrepancies. Key landmarks, including points A, B, and N, assess jaw disharmony, though point N's accuracy is compromised by growth-induced variations. The Wits appraisal method, lacking specific data for Mongoloid patients, warrants focused investigation. This study aimed to establish Wits appraisal values for Mongoloid patients by quantifying values in Class I cases, exploring gender dimorphism, and comparing Malay and Chinese ethnic groups.

MATERIAL AND METHODS: This was a retrospective and prospective study. One hundred eighty-four samples of adult Chinese and Malay patients' records were chosen based on Angle Molar Class I, Class I skeletal pattern and average FMPA at the Faculty of Dentistry, Universiti Malaya. The lateral cephalometric radiographs were traced manually, and the Wits appraisal was measured using the Mitutoyo Digimatic Point Caliper. SPSS was used for statistical analysis.
RESULTS: The mean Wits appraisal value among Mongoloid subjects was -0.31 mm (SD: 2.18). Males averaged -0.10 mm (SD: 2.18) and females -0.50 mm (SD: 2.17), with non-significant p-values ($p = 0.221$). Malay males and females had values of 0.30 mm (SD: 2.12) and -0.64 mm (SD: 1.90), while Chinese males and females had -0.60 mm (SD: 2.19) and -0.35 mm (SD: 2.42), with no significant difference ($p = 0.351$) between races.
CONCLUSIONS: Wits appraisal scores showed no significant gender dimorphism among Mongoloid patients. Values demonstrated minimal variability across ethnicity and gender, establishing the mean Wits appraisal value of -0.31 mm (SD: 2.18) as a robust benchmark for the Mongoloid population.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.174
SP107 CROSS-CULTURAL ADAPTATION AND VALIDATION OF THE CHILD PERCEPTIONS QUESTIONNAIRE (CPQ8-10) FOR MALAYSIAN CHILDREN

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AIMS: This research focuses on translation, content and face validation of the CPQ_{8-10}, a widely used instrument to assess the impact of malocclusion on child's OHRQoL and to assist in planning for early interceptive treatment. The aim is to adapt CPQ_{8-10} cross-culturally into Malay and English languages, ensuring comprehensibility and clarity to be used across different linguistic and socio-cultural contexts of Malaysian children.
MATERIAL AND METHODS: The first phase of the research involved the forward-backward translation processes. The CPQ_{8-10} was translated from its original English language into Malay followed by backward translation into English involving bilingual translators, and received input from a committee of experts consisting of oral health specialists, clinical psychologist and forward translators. In the second phase, content validation was done to assess the relevance and clarity by nine content validators consisting of oral health specialists. Discrepancies were revised to create culturally appropriate and context-sensitive versions of both languages. Face validation conducted by testing the translated questionnaires on 8 to 10 years old children by conducting interviews to examine their understanding, identify ambiguities, and assess the appropriateness.
RESULTS: The Malay and English versions of the CPQ_{8-10} were successfully translated and culturally adapted. Both questionnaires achieved the minimum I-CVI score of 0.78 for relevancy and clarity after modifications were made to item number 11. Ten children aged between 8 to 10 years old were interviewed for face validation of each questionnaire.
CONCLUSIONS: The CPQ_{8-10} has successfully been translated and adapted into the Malay and English languages to assist clinicians in assessing the impact of the oral condition on the OHRQoL in children. Future validation processes on construct and criterion are recommended to enhance the reliability of research findings thus supporting the applicability of the translated instrument for Malaysian children.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.175
SP108 COLOR STABILITY OF VARIOUS TYPES OF ORTHODONTIC CLEAR ALIGNER SYSTEMS EXPOSED TO STAINING AGENTS: A SYSTEMATIC LITERATURE REVIEW

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AIMS: Despite recommendations from orthodontists and manufacturers, patients often continue to wear clear aligners during the consumption of food and beverages. The aim of this systematic review was to access the color stability of different types of clear aligner systems exposed to staining agents.
MATERIAL AND METHODS: The systematic review adhered to PRISMA guidelines. An electronic search was conducted using PubMed, Scopus, and Google Scholar databases up to November 22, 2024, with the following search terms: color stability, colorimetry, clear aligners, orthodontic aligners, and aligner materials. Eligibility criteria: full-text research articles written in English, analyzing the color changes of various clear aligner systems exposed to staining agents. The QUIN tool was used to assess the risk of bias of the included studies.
RESULTS: Out of 393 identified records, 5 were included in the final analysis. All studies were performed *in vitro*. A total of 571 clear aligners were analyzed. Fourteen aligner systems were included, with Invisalign® featured in 3 studies.

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Color changes were characterized in accordance with the Commission Internationale de l'Eclairage L*a*b* color system. The National Bureau of Standards system was used to express color differences in 4 studies. The periods for assessing color parameters varied across the studies. Polyurethane-based aligners were more prone to discoloration than polyethylene terephthalate glycol-based aligners. Aligners exposed to staining agents such as coffee, red wine, and turmeric showed notable increases in total color change (ΔE) values, with turmeric causing the most pronounced discoloration. In all studies, longer exposure duration to staining agents resulted in greater color changes. Two studies demonstrated that manual cleaning combined with specific cleaning agents, can partially reverse staining.
CONCLUSIONS: Reviewed studies revealed that color stability is influenced by the aligner material, the type of staining agents, and the duration of exposure to these agents. Patient education and proper cleaning routines are crucial to maintaining the aesthetic appeal of clear aligners.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.176
SP109 RELIABILITY OF ALGINATE IMPRESSION MATERIALS IN ORTHODONTIC MODEL CONSTRUCTION: A CROSS-SECTIONAL STUDY

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AIMS: To evaluate the reliability of linear measurements taken from orthodontic cast models produced with Kromopan Type I Lascod® (KTI) in relation to those produced with Aroma Fine Plus GC® (AFP) alginates. Additionally, the rate of failures occurring during the impression procedures for patients using each type of alginate will be compared.
MATERIAL AND METHODS: A cross-sectional study was carried out involving a cohort of 30 patients recruited from the Orthodontics Postgraduate Clinic at the Faculty of Dentistry, Universiti Malaya. Each of the participants was given two upper impressions using two different types of impression materials. The order of materials usage was randomly assigned by rolling a fair six-sided dice. For odd numbers, KTI was used first followed by AFP, while for even numbers, AFP was first followed by KTI. Arch widths and tooth dimensions were measured on the cast models by a single operator (MJHS) manually using Advanced Onsite Sensor (AOS) Absolute Scale Digital Caliper (Mitutoyo 500-196-30). Inter-rater reliability was evaluated against a gold standard, an orthodontist from the department (AAA). Six orthodontic cast models were randomly selected using Random Numbers Generator Software from CalculatorSoup®. Measurements were repeated after two weeks by MJHS to assess intra-rater reliability. The intra and inter-raters reliabilities were analyzed using the Interclass Correlation Coefficient (ICC), while the collected research data were analyzed using an independent t-test, with a significance level set at $p < 0.05$.
RESULTS: Intra- and inter-rater reliability demonstrated excellent agreement. Generally, KTI cast models show a smaller value compared to AFP for the buccopalatal width. However, there were no significant differences in arch width and tooth dimension measurements analyzed on cast models made from alginate KTI and AFP impressions. The number of failures during the impression procedures for patients using alginates KTI and AFP was minimal and not statistically significant.
CONCLUSIONS: The absence of statistically significant differences between the alginate KTI and AFP, indicates that they performed similarly in a clinical environment. Therefore, KTI is more cost effective and can be considered as an alternative to AFP due to its cheaper price compared to AFP without compromising the quality of impressions.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.177
SP110 OCCUPATIONAL HEALTH HAZARDS AMONG DENTISTS IN MALTA

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AIM: To investigate the types and prevalence of occupational hazards among dentists in Malta.
MATERIAL AND METHODS: A cross-sectional survey was conducted among practising dentists in Malta. Participants were invited through an online questionnaire distributed via dental association and public health databases, with an option for hard copy submissions. This mixed-mode approach ensured comprehensive participation. Responses were compiled into an anonymised dataset and analysed using SPSS. Statistical tests, including the Friedman test, the Chi-Square test and the Independent Sample T-test, were used to analyse the data. The null hypothesis - that there is no significant difference in the prevalence of occupational hazards or associations between variables - was tested against the alternative hypothesis.
RESULTS: Ninety-nine dentists participated, yielding a response rate of 55%. Reported occupational hazards included musculoskeletal injuries (93.8%), infections (84.5%), percutaneous injuries (70.1%), allergies (67%), psychological effects (66%), chemical exposure (59.8%) and radiation (38.1%). Significant differences in mean risk ratings ($p<0.001$) indicated that some hazards are more prevalent. Over one-third of respondents required time off work due to occupational hazards, primarily musculoskeletal injuries, with lower back (77.9%) and neck pain (74.4%) being the most common issues. Psychological effects included stress (96%), burnout (77%), anxiety (66%), depression (22%) and sleep disorders (19%). No significant associations were found between hazard prevalence and demographic factors like age, gender, field of practice, practice type or work experience.
CONCLUSIONS: The high prevalence of musculoskeletal disorders among Maltese dentists highlights the need for research and ergonomic innovations. Recommendations include maintaining accessible instrument placement, using indirect vision for maxillary treatments, incorporating stretching exercises, taking micro-breaks and alternating working positions to mitigate risks.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.178
SP112 THE ROLE OF DENTAL ARCH DIMENSIONS AND IMPACTED THIRD MOLARS ON MANDIBULAR ANTERIOR SEGMENT CROWDING

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AIMS: This study aimed to investigate the potential impact of arch dimensions and unerupted third molars on mandibular anterior segment crowding.
MATERIAL AND METHODS: This study included a total of 240 subjects with an average age of 18 years seeking orthodontic treatment. Panoramic radiographs, alginate impressions, and study models were taken for measurements. This study utilized the Ganss ratio to calculate the ratio of retromolar space to the width of the crown of the third molar, along with other measurements such as intercanine and intermolar widths, arch perimeter, and arch length to assess dental arch dimensions
RESULTS: We found that the Ganss ratio and angle B values on both the right and left sides were significantly different between the noncrowding and crowding groups, suggesting a potential role for third molars in mandibular anterior segment crowding. Additionally, there was an increase in angle A on both sides in the crowding group, indicating a more acute angle between the anterior teeth. This study also observed a reduction in the retromolar space on the third molars in the crowding group, further supporting the potential role of third molars in mandibular anterior segment crowding.
CONCLUSIONS: The findings of our study provide substantial evidence to suggest that third molars may contribute to mandibular anterior segment crowding. These findings highlight the importance of carefully evaluating dental arch dimensions and the presence of third molars when assessing and treating mandibular anterior segment crowding.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.179
SP115 CHANGES IN THE SHAPE OF THE UPPER DENTAL ARCH AFTER RAPID MAXILLARY EXPANSION

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AIMS: Mouth breathing has been shown to alter the maxillary growth pattern. Children with mouth breathing have upper dental arch compression, often accompanied by distal bite and crossbite in the posterior segments. The aim is to determine the changes in the width and the shape of the upper dental arch of mouth breathing patients that were treated with a digitally designed maxillary expander.
MATERIAL AND METHODS: The study included 33 patients (12 males and 21 females) with a mean age of 11.39±3.97 years. All patients were diagnosed with upper airway obstruction, that changed the normal air flow. The patients were

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treated with digitally designed maxillary expanders. Data analysis was done using IBM SPSS Statistics 25.0 software.
RESULTS: The width of the maxillary dental arch was increased in the area of the first premolars (PP2-PP1) by an average of 3.3 mm and in the area of the first molars (MM2-MM1), the increase was 4.41 mm. The whole length of the dental arch was reduced by 0.52 mm. The most significant reduction of the length was in the anterior segment by 0.54 mm. The changes in the upper dental arch parameters determine the changes in the shape of the arch. The shape of the maxillary dental arch changed from a narrow V-shape to an ovoid shape. The high palatal vault was lowered and occlusal relationship was improved.

The regression analysis (curve estimation), found a significant linear relationship between PP2-PP1 and MM2-MM1, which can be presented by the following equation: PP2-PP1 = 0.719×(MM2-MM1) + 0.900.
CONCLUSIONS: Mouth breathing patients with transversal discrepancies have a compensatory increasement in the upper dental arch length. After the rapid maxillary expansion, the upper dental arch changes, the anterior arch length decreases and the arch shape becomes ovoid.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.180
SP116 ASSOCIATION AMONG SEROLOGICAL TESTS, JUVENILE ARTHRITIS DISEASE ACTIVITY SCORE AND TEMPOROMANDIBULAR DISORDERS THROUGH DC/TMD IN JUVENILE IDIOPATHIC ARTHRITIS

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AIMS: To evaluate the correlation between serological variables and the main signs and symptoms of temporomandibular joint disorders (TMD) evaluated through the Diagnostic Criteria for Temporomandibular Disorders (DC/TMD) in patients with Juvenile Idiopathic Arthritis (JIA), and to check the possible influence of the questionnaire Juvenile Arthritis Disease Activity Score (JADAS-10) with the different TMD, or any serological variables.
SUBJECTS AND METHOD: This controlled cohort study included patients aged 5 to 16 diagnosed with JIA. The comorbidities, Juvenile Arthritis Disease Activity Score (JADAS)-10, and the initial serological tests were collected. Through the DC/TMD symptoms questionnaire, the headache, TMJ arthralgia, and joint noises were assessed. The clinical examination evaluated the mandibular movements, clicking, crepitus, arthralgia, and myalgia of the masticatory and additional muscles.
RESULTS: Ninety patients with JIA were divided into two groups: 51 with TMD symptoms and 39 controls without symptoms. Antinuclear antibodies were present in 78.4% of patients while rheumatoid factor and anti-cyclic citrullinated peptide antibodies were present in 5 and 1 of patients, respectively. The indicators of inflammation were evaluated with average values of 30 mm/h for the erythrocyte sedimentation rate and 4 mg/dL for the C-reactive protein. The JADAS-10 score mean values were 11 in the JIA group and 13 in controls. Tensive headache showed a significant value in correlation with a JADAS-10 score >20; no serological value was correlated with the other symptoms of TMD.
CONCLUSIONS: Females with oligoarticular ANA+, RF-negative, and ACPA-subtypes are more at risk of TMJ arthritis in our cohort. Temporal headache showed a significant correlation with the JADAS-10 in JIA patients. No serological values were correlated with TMD evaluated according to DC/TMD.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.181
SP117 ‡‡‡ INSTAGRAM AND CLEAR ALIGNER THERAPY: A CONTENT ANALYSIS OF PATIENT PERSPECTIVES

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AIMS: The popularity of clear aligner treatment (CAT) has been on the rise. Improving treatment satisfaction with CAT requires an in-depth understanding of the patient's perspectives. Nowadays, patients use social media to share authentic treatment experiences. This study aimed to explore the content of CAT-related Instagram posts before, during, and after CAT.
MATERIAL AND METHODS: This study used mixed quantitative and qualitative methods. A social media monitoring software, AwarioTM, was used to collect Instagram CAT-related posts over 4 weeks and categorize them as positive, negative, and neutral ones. Three investigators manually reviewed this categorization. The sentiments of posts before, during, and after treatment were compared using Chi-square tests. Qualitative analysis of post content was carried out to extract themes relevant to patient experiences.
RESULTS: A total of 2015 posts were included in the analysis, including posts before (n=422), during (n=1503), and after (n=90) CAT. The majority of posts (90%) before CAT were positive in sentiment analysis. In contrast, there were more negative than positive posts during CAT (54.8% and 45.2% respectively). Among notable sources of negative sentiments there were pain, unfavorable esthetic appearance of attachments, and sleep difficulties. While 60% of post-treatment posts contained positive sentiments about treatment outcomes and the patient-clinician relationship, 40% were negative and focused on the length of treatment being longer than expected.
CONCLUSIONS: High expectations among the public are prevalent before using CAT. Discrepant negative sentiments are revealed during treatment due to pain, attachments, sleep difficulties, and other factors. Patients reflect negatively on the treatment duration after the treatment is concluded. Clinicians should focus on these patient perceptions when counseling them before and during CAT.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.182
SP118 FRACTAL ANALYSIS OF MANDIBULAR BONE CHANGES FOLLOWING TREATMENT WITH FIXED AND REMOVABLE FUNCTIONAL APPLIANCES IN CLASS II PATIENTS

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AIMS: This retrospective study aimed to evaluate changes in the trabecular bone of the mandible after treatment with removable and fixed functional appliances in skeletal Class II malocclusion patients during the pubertal growth period.
MATERIAL AND METHODS: Panoramic and cephalometric radiographs of 120 normodivergent skeletal Class II malocclusion patients in the pubertal growth period were analyzed and divided into four groups. The treatment groups included 30 patients each treated with Monoblock, Twinblock and Herbst appliances. The control group consisted of 30 untreated individuals. Changes in the mandibular condyle, angulus, corpus, and symphysis regions following functional treatment were examined using the Fractal Analysis (FA) method.
RESULTS: All functional appliances significantly increased cephalometric values indicative of mandibular growth, including SNB, effective mandibular length, mandibular corpus length, and Pog-N ⊥ ($p<0.05$). Fractal dimension (FD) values in the condyle, corpus, and symphysis regions showed statistically significant reductions in all treatment groups ($p<0.001$). FD values in the angulus region demonstrated a statistically significant increase in all treatment groups ($p<0.001$). No statistically significant differences were observed in pre- and post-treatment FD values in the control group ($p>0.05$)
CONCLUSIONS: Functional appliance treatments during the pubertal growth period facilitate remodeling of the mandibular condyle, resulting in a more forward position of the mandible. Additionally, the angulus region of the mandible, influenced by the masseter muscle fibers, appears to resist bone resorption. In removable appliance treatments, reductions in trabecular bone density in the corpus region of the mandible were attributed to the acrylic bulk of posterior segments and selective grindings performed to induce posterior teeth extrusion. The increase in lower incisor angulations observed as a side effect of both removable and fixed functional treatments is thought to cause a reduction in trabecular bone density on the buccal aspect of the incisor roots.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.183
SP119 ANALYSIS OF PUBLICATION OUTCOMES AND INFLUENTIAL FACTORS OF ABSTRACTS PRESENTED AT EUROPEAN ORTHODONTIC SOCIETY CONGRESSES 2017-2022

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AIMS: To investigate publication rates and influencing factors of abstracts presented at European Orthodontic Society (EOS) congresses between 2017 and 2022.
MATERIAL AND METHODS: Abstracts from EOS congresses (2017-2022) were retrieved and searched in PubMed, Scopus, Web of Science, and Google Scholar databases in September 2024. Data on presentation type, author information, research method, and geographical location were recorded. Descriptive statistics, chi-square tests, multivariate linear and multinomial logistic regression analyses were performed.
RESULTS: Of 1938 presentations, 829 (42.8%) were published as full-text papers, including 693 poster and 136 oral presentations. Observational studies were most frequent (48.8%). European-origin studies showed a significantly higher publication rate (68.0%). The median publication time was 15.38 months (IQR: 7.14-25.66 months). Chi-square tests revealed significant associations between journal scientific index category and presentation type (p=0.003), single/multi-centered studies (p=0.015), and author's continent (p=0.014). Journals of impact factor groups were significantly associated with single/multi-centered studies (p=0.040) and author's continent (p=0.001). Multivariate linear regression analysis showed that author's geographical origin significantly influenced the journals of impact factor (p<0.05). Multinomial logistic regression revealed that presentation type, study design, and author's geographical origin significantly influenced the likelihood of publication in different journal scientific index categories (all p<0.05).
CONCLUSION: This study demonstrates that presentation type, multicentricity, and geographical origin of authors significantly influence the journal scientific impact factor and journal index categories of published orthodontic studies. Researchers should consider collaborating on multi-center studies and presenting their studies as oral presentations to potentially increase their chances of publication in higher-impact journals.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.184
SP120 ‡‡‡ IMPACT OF RESIN COMPOSITE TYPE ON ENAMEL SURFACE DAMAGE DURING ROTARY INSTRUMENT REMOVAL IN ALIGNER THERAPY: AN IN VITRO STUDY

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AIMS: Attachments are composite structures that help clear aligners move teeth and must be removed at the end of treatment. Made from various composites, they are sometimes replaced during therapy. This study evaluates enamel damage after removing attachments made from three different composites, aiming to determine whether the type of resin affects the extent of damage caused by rotary instruments.
MATERIAL AND METHODS: This in vitro study used 30 extracted teeth, divided into three groups: A (packable composite), B (flowable composite), and C (orthodontic composite). Before bonding (T0), each tooth was duplicated in epoxy resin. Attachments were applied using a consistent protocol, then removed with a tungsten carbide bur. After removal (T1), teeth were finished with sandpaper discs and polished with pumice paste. Impressions were taken to create resin replicas. Enamel damage was assessed using scanning electron microscopy (SEM), and a modified enamel damage index (EDI) was applied. Data were analyzed with a Chi-square test ($P < 0.05$).
RESULTS: Groups A (packable composite) and C (orthodontic composite) showed a significant difference in enamel damage ($P = 0.0235$) at T1. However, there were no significant differences between Group B (flowable composite) and the other groups ($P > 0.05$).
CONCLUSIONS: Attachment removal causes enamel damage, with greater damage observed in the packable composite group compared to the orthodontic composite group. These results suggest that the type of composite used for attachments influences enamel surface integrity during removal.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.185
SP121 CLINICAL IMPACT AND STATISTICAL BIAS IN DIGITAL BIOMETRIC MEASUREMENTS WITH DIFFERENT DENTAL SOFTWARE

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AIMS: There are a number of intra-oral scanners (IOS) on the market that use a variety of 3D scanning technologies and processing algorithms. Each scanner comes with software that has different measurement tools and can create digital models. The differences in scanning technology, 3D image construction and data measurement tools raise the question of whether there is a clinically significant difference between the measurements made by different IOS and their software. The aim is to evaluate whether there is a clinically significant difference in the measurements of biometric parameters on digital models created and processed with different software.
MATERIAL AND METHODS: The maxillary dental arch of 130 patients was scanned using two different intraoral scanners (IOS) – Planmeca Emerald and Medit i700. Intermolar distance (MM) was measured on the 260 digitally created models with their respective software – Ortho Studio (Planmeca) and Medit Design (Medit).
RESULTS: The results obtained from the two different IOS and their software show a statistically significant difference between the mean values of the intermolar width (MM) - Emerald - MM1=44.87mm and Medit i700 - MM2=44.77mm. The difference, in the measurements obtained with the two software, is from (-4.02 mm) to (+3.39 mm). The value range is 7.41 mm. The difference between the mean values is only 0.10 mm, which is not clinically relevant. The Bland-Altman graphical analysis of measurement agreement between the measurements of the two IOS (MM1 and MM2) found that the mean of the measurement differences (Mean) had a value close to zero, which gives us reason to claim that there is agreement (identity) between the results of the two scanners.
CONCLUSIONS: Results obtained with Planmeca Emerald IOS and Ortho Studio software have higher mean values by 0.10mm compared to those obtained with Medit i700 IOS and Medit Design App 2.1.4 and its Measurement Mode. The small statistical mean difference of 0.10 mm between the two software has its statistical significance from a mathematical point of view, but from a clinical point of view it is a negligible value with no clinical relevance.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.186
SP123 ‡‡‡ DENTAL TRAUMA SCREENING PRIOR TO ORTHODONTIC TREATMENT

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AIMS: The aim of this study was to assess whether new patients at Kingston Hospital Orthodontic Department were screened for dental trauma prior to commencing orthodontic treatment, as per National Guidelines for the Orthodontic Management of the Traumatised Tooth. A secondary aim was to evaluate if appropriate special tests, such as vitality testing and radiographs, were conducted for patients with a positive trauma history.
MATERIAL AND METHODS: A retrospective, criterion-based study using data from 50 new patients who attended initial and records appointments between October 2022 - February 2023. Data was collected from electronic patient records and included details on trauma history screening, documentation of trauma history, and whether special tests like radiographs and sensibility tests were performed for patients with a positive trauma history. An action plan to address identified deficiencies was implemented after the results were presented at a departmental meeting, followed by a review of the departments performance.
RESULTS: Initially, only 36% of patients were screened for dental trauma, and 22.2% of those screened had a positive trauma history. For those with a positive history, 100% had trauma details documented, and 75% received appropriate radiographs and special tests. Orthodontic trainees conducted screenings 100% of the time, while consultants screened only 4% of patients. After the implementation of the action plan, the same data was collected to review adherence to guidelines and showed significant improvement, with 98% of patients screened for

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trauma. Additionally, 100% of patients with a positive trauma history had the trauma diagnosis recorded and received the necessary special tests.
CONCLUSIONS: This study highlighted initial gaps in trauma screening and documentation, which could lead to complications during orthodontic treatment, such as root resorption or pulp necrosis. However, following departmental education, training, and a new documentation proforma, there was a significant improvement in the results. This study underscores the importance of regular trauma screening as part of the orthodontic assessment to prevent potential treatment complications and ensure informed consent. As well as highlighting the value of continuous education and awareness of clinical guidelines.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.187
SP124 ‡‡‡ GINGIVAL MICROCIRCULATION DURING ORTHODONTIC MOVEMENT WITH FIXED MULTIBRACKET APPLIANCES VS. ALIGNERS. PILOT STUDY

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AIMS: To identify gingival microcirculation using Laser Speckle Contrast Imaging, determining if there are differences in the gingival vascularization of incisors in patients undergoing fixed orthodontic treatment and patients with aligners; regarding probing depth, recessions, gingival index, and plaque index; the influence of phenotype on vascularization; the influence of age, and the pain associated with both types of treatment.
MATERIAL AND METHODS: Records of perfusion units were taken from 5 patients ≥ 14 years old, with moderate crowding without orthodontic treatment at least 5 years ago, before the start of orthodontic treatment (T0), at 15 minutes after activation (T1), 30 minutes, and 30 days.

The significance level was set at p=0.05. Statistical analysis was performed using t Test comparing data by groups.
RESULTS: Baseline values show that before treatment, there are no statistically significant differences (p<0.05) between both groups (aligners and fixed appliances), further comparisons will be presented.

There is a trend (p=0.09) to find differences when comparing T0 and T1 in the aligner group.
CONCLUSIONS: It can be suggested that differences in the gingival vascularization of incisors may be found during orthodontic movement with multibracket fixed appliances and with aligners.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.188
SP125 ASSOCIATIONS BETWEEN SHORT LINGUAL FRENUM AND SKELETAL CLASSIFICATION: A COMPARATIVE REVIEW

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AIMS: To analyse the effects of a shortened lingual frenum on the skeletal class, and to investigate, how different classifications of the ankyloglossia affect these results.
MATERIAL AND METHODS: Articles were searched from March to April 2024 from seven databases (Embase, PubMed, Scopus, Cochrane library, Base-Search.net, Lilacs and Clinical trials.gov) and screened according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. The risk of bias was assessed by two independent researchers using the Joanna Briggs Institute's Critical Appraisal Tools. The inclusion criteria included patients of any age with ankyloglossia and any clinical measurement method and classification for the length of lingual frenum.
RESULTS: From the 193 retrieved publications, six fulfilled the inclusion criteria and compared ankyloglossia and the skeletal class. Of them, two were case-control studies and four cross-sectional studies. In all studies, the subjects were divided into three groups according to the ANB angle (Class I: 0°<ANB<4°, Class II: ANB >4°, Class III: ANB<0°).

The total number of examined patients with ankyloglossia was 828 (age range 6–67 years) and total number of controls without ankyloglossia 85 (age range 14–21 years). For the length of the lingual frenum, three measurement methods were used: Kotlow´s method (3 studies), Ruffoli´s method (1 study) and the method by Lee et al. (2 studies). In three of the studies using the methods by Lee and Ruffoli, a longer lingual frenum was associated with skeletal class III, while one of the studies using Kotlow's method found no association. Two studies using Kotlow's method suggested a higher tendency of ankyloglossia in skeletal class II.
CONCLUSIONS: The results of the association between skeletal class and ankyloglossia were not totally in line. However, the variability may reflect differences for example between the study samples. The differences in the three included methods for measuring lingual frenum's length may not be decisive.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.189
SP126 THE EFFECTS OF DIFFERENT LIGHT FORCES APPLIED IN BONDING WITH METAL AND PORCELAIN BRACKETS

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AİMS: Aim of this study was to investigate the effect of light curing time and intensity on the bond strength and shear resistance of different adhesives with metal and porcelain brackets.
MATHERIALS AND METHODS: One hundred twenty extracted premolar teeth were divided into eight groups (15 teeth each). Orthodontic brackets were bonded using Valo Ortho Cordless LED curing light with Transbond XT and Ivoclar adhesives, varying polymerization times (3, 6, and 20 s) and intensities (1000 and 3200 mW/cm²). Microhardness was measured with a Vickers tester, and ARI scores were evaluated using a stereomicroscope after debonding. ANOVA analyses were conducted to assess the significance of bracket type (Ceramic/Metal), adhesive type (Transbond/Ivoclar), and duration (3 s, 6 s, 20 s) on ARI scores.
RESULTS: The highest hardness value was 45.04 HV (Transbond 20 s), and the lowest was 12.96 HV (Ivoclar 3 s). In compressive tests, the lowest bond strength for metal brackets with Transbond adhesive was 3.02 MPa, while the highest was 44.11 MPa. For ceramic brackets, bond strengths ranged from 13.82 MPa (lowest) to 19.84 MPa (highest) with Transbond adhesive. Curing time significantly affected bond strength, with 20-second applications generally yielding higher bond strengths ($p < 0.001$).
CONCLUSİON: Longer polimerisation duration Transbond and Ivoclar adhesives generally resulted in higher hardness values. In metal and ceramic brackets, Transbond adhesive provided higher bond strengths. Curing times and adhesive types had a significant effect on bond strength.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.190
SP127 INHERITANCE PATTERN AND GENETIC BASIS OF EXCESSIVE GINGIVAL DISPLAY IN EASTERN MEDITERRANEAN FAMILIES

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AIM: To investigate the inheritance pattern of excessive gingival display (EGD), identify the candidate genes and loci responsible for the development and familial transmission of EGD, and evaluate the cephalometric characteristics of affected individuals.
MATERIALS AND METHOD: Recruitment criteria included documentation of EGD in at least 2 generations and minimal EGD of 3mm in females and 2mm in males. Pedigrees of 25 consenting participants (15 affected, 10 non-affected) in 4 Mediterranean families were generated. Records taken included calibrated extraoral photographs for facial evaluation, lateral cephalographs to assess dentoskeletal features, and 5cc of blood from affected and some non-affected members. Upper lip elevation, height of clinical crowns, and incisor display at rest were measured on photographs. Upper lip length, position and vertical divergence pattern of the jaws, maxillary height, and the inclination of maxillary and mandibular incisors were measured on the cephalographs. A cephalometric control group was matched with the affected group for age, gender and the ANB angle. Next Generation Sequencing and Whole Exome Sequencing were applied to gauge the genetic determinants of EGD. Statistical analyses were performed to assess differences in cephalometric measurements between the EGD affected and control groups.
RESULTS: A Mendelian inheritance pattern was observed segregating in either autosomal dominant or X-linked modes. Pedigree analysis revealed female predominance among affected individuals. Extraoral photographs demonstrated

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that EGD is transmitted with different levels of penetrance. Upper lip lengths in affected persons were within the normal range or slightly increased. The probands had the most severe EGD, ranging from 6.67 to 11mm (average 8.54 mm). A normal or slightly increased upper lip length was measured among individuals having EGD. The cephalometric analysis of affected subjects revealed increased lower facial height and hyperdivergence, increased anterior vertical maxillary height, a tendency towards Class II malocclusion, and retroclined maxillary incisors. Three novel genes recognized as possibly affecting skeletal and muscular development could impact the transmission of EGD: HERC2, LDB3, and ELF2.
CONCLUSIONS: This study revealed familial patterns of EGD and potential candidate genes. Vertical maxillary excess is the main determinant of the condition that is not necessarily related to the long face syndrome.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.191
SP128 ORTHODONTIC TREATMENT IN PATIENTS WITH FEATURES OF BODY DYSMORPHIC DISORDER (BDD): A SCOPING REVIEW

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AIMS: To scope the prevalence of BDD in orthodontic population, to describe diagnostic tools for early detection of BDD and to suggest ways for clinicians to manage persons with this disorder
MATERIAL AND METHODS: A systematic search was conducted up to October 2024 using PubMed, Scopus and Dentistry & Oral Sciences. The search strategy was based on two terms: Orthodontics and BDD, and publications written in English. Opinion papers not including orthodontics, conference abstracts and papers of only orthognathic surgery were excluded. Two independent reviewers assessed the abstracts and extracted data, which was then synthetized. The study followed the guidelines of Joanna Briggs Institute methodology for scoping reviews (JBI, 2015). The flow diagram for selection of studies was done according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extensions for scoping reviews (PRISMA-ScR).
RESULTS: Following screening of 79 articles, 17 studies were included. The prevalence of BDD in the orthodontic population varied from 3% to 34% while in the general population 3%. In most of the study settings the prevalence of BDD seemed to be higher in females, younger and single persons. The head and facial area including dental aesthetics seemed to be the most concerned part of the body among BDD subjects. Those individuals are likely to seek multiple orthodontic consultations, which increase the risks for unnecessary treatment, dissatisfaction with the treatment outcome and thus are potential for litigation. Since orthodontists are often unaware of this disorder, it is recommended to use questionnaires to identify potentially high-risk patients. The Yale-Brown Obsessive-Compulsive Scale Modified for Body Dysmorphic Disorder (BDD-YBOCS) has been mostly used. Besides the psychological consultation a careful assessment of subject´s expectations before initiating any orthodontic treatment are of vital importance.
CONCLUSIONS: Orthodontists should be aware of the features of BDD, and not start any treatment before careful psychiatric evaluation if BDD doubt has been aroused.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.192
SP129 PREVALENCE OF MALOCCLUSION IN THE POLISH POPULATION – SYSTEMATIC REVIEW

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AIMS: Background: Populations can differ in the types and severity of common malocclusions. A comprehensive understanding of the prevalence of malocclusions is essential to guide public health interventions, inform healthcare professionals about treatment needs, and ultimately improve orthodontic care. However, the prevalence and characteristics of malocclusions in the Polish population have not yet been systematically described.
OBJECTIVE: To determine the prevalence of malocclusion in the Polish population
MATERIAL AND METHODS: Search methods: Literature searches were conducted in four databases (including two Polish databases) for studies published in Polish and English up to November 2023.

Selection criteria, data collection and analysis: Original studies involving healthy individuals of any age from the Polish population were included. Two reviewers independently conducted duplicate study selection, data extraction, risk of bias assessment, and data analysis. All analyses were performed in R software (version 4.4.0) using the "Metafor" package.
RESULTS: A total of 54 studies comprising 63.790 individuals were finally selected from initial 2762 results (34 PubMed, 2390 Google Scholar, 170 from Polska Platforma Medyczna, and 168 from Polska Bibliografia Lekarska). Inter-reviewer agreement in selection was substantial (kappa = 0.74, 95%CI 0.62-0.85). Due to variability in malocclusion identification among authors, the overall prevalence of malocclusion was estimated at 58.7% (95%CI 55.5 – 61.9). The Class II malocclusion was found in 36% individuals (95%CI 29.9 - 42), Class III in 4.3% individuals (95%CI 3.1 - 5.5), deep bite – 13.6% (95% CI 10.5 – 16.8), and open bite 7.8% (95%CI 5.6 – 9.7). No significant trend in malocclusion prevalence was observed between 1982 and 2019. The prevalence in urban areas (63.6%, 95% CI 59.1–68.1) was higher compared to combined urban and rural areas (52.3%, 95% CI 47.8–56.8). No studies exclusively focused on rural areas were identified. Age-specific prevalence rates were: 50.8% in 3-7-year-olds, 70.2% in 8-11-yeard-olds, 58.8% in 12-15-year-olds, and 58% in individuals older than 16 years. Egger's test suggests the presence of a slight publication bias (p=0.039).
CONCLUSIONS: The prevalence of malocclusion in the Polish population is comparable to other European populations. However, these findings should be interpreted with caution due to the lack of standardization in malocclusion classification.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.193
SP130 ‡‡‡ THE QUALITY OF ORTHOGNATHIC SURGERY INFORMATION ON SOCIAL MEDIA: A SCOPING REVIEW

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AIM: Orthognathic surgery combined with orthodontic treatment is commonly performed to address facial and dental disharmony. The information communicated through social media platforms may serve as an important source of online health information. A scoping review was conducted to collate and synthesise the quality of information available on these platforms.
MATERIALS AND METHOD: A systematic search was conducted across five databases and grey literature, with no restrictions on location and year published. The PCC (Population, Concept, Context) framework was adopted to select eligible studies. The review was conducted in line with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews guidelines. Eligible studies were those that evaluated the quality of social media content related to orthognathic surgery in conjunction with orthodontic treatment.
RESULTS: A total of 12 cross-sectional studies satisfied the selection criteria. The most investigated social media platform was YouTube. Across all platforms, the quality of information ranged from poor to moderate. Patient-generated content, which often shared personal treatment experiences, attracted the highest levels of engagement and views, but generally provided limited practical information. Conversely, content created by healthcare professionals was of higher quality, but received less engagement and fewer views. The least frequently mentioned topics were found to be complications and their duration, costs, and postoperative expectations. Certain search terms such as "#jawsurgery", "#surgeryfirst" and "#genioplasty" may resonate more with the public. There was heterogeneity across the methodologies and quality of information instruments used.
CONCLUSIONS: Social media content regarding orthognathic surgery combined with orthodontic treatment is generally poor to moderate quality. Orthodontic professionals should be aware of the limitations of health information on these online platforms and guide individuals to more accurate sources.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.194
SP131 A SCOPING REVIEW OF WEBSITE-BASED ORTHOGNATHIC SURGERY INFORMATION

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AIM: Dentofacial disharmony is commonly addressed with orthognathic surgery. To enable individuals to make well-informed healthcare decisions, the availability

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of high-quality, accessible information is crucial. This scoping review aimed to collate and synthesize the literature regarding website-based information on orthognathic surgery.
MATERIALS AND METHOD: A comprehensive search was conducted across five databases and grey literature, without location or publication year restrictions. Study eligibility was determined using the PCC (Population, Concept, Context) framework following Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews guidelines. The inclusion criteria consisted of literature that assessed quality and readability of website-based information regarding orthognathic surgery combined with orthodontic treatment.
RESULTS: Nine cross-sectional studies satisfied inclusion criteria. The studies revealed that website-based information about orthognathic surgery varied in quality, ranging from low to moderate. Much of the website content was too complex for the average reader to comprehend. Key information regarding risks and complications was commonly omitted. Websites with higher search rankings were frequently associated with lower Ensuring Quality Information for Patients scores. The search terms "orthognathic surgery" and "jaw operation" yielded more accurate information compared to alternative terms. However, variability in the methodologies used across studies was a limitation.
CONCLUSIONS: Low to moderate quality and high readability scores were identified on websites containing information regarding orthognathic surgery, presenting challenges to effective patient understanding. Addressing these deficiencies is important for supporting patients in making informed decisions about their orthognathic surgery treatment.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.195
SP132 COMPARISON OF TWO MAXILLARY PROTRACTION PROTOCOLS: TOOTH-BORNE VERSUS BONE-ANCHORED PROTRACTION FACEMASK TREATMENT

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AIMS: Protraction facemask has been advocated for treatment of class III malocclusion with maxillary deficiency. Studies using tooth-borne rapid palatal expansion (RPE) appliance as anchorage have experienced side effects such as forward movement of the maxillary molars, excessive proclination of the maxillary incisors, alteration in occlusal plane and an increase in lower face height. Recently Bone-anchored RPE appliance (MARPE)are being advocated to minimize the side effects of maxillary expansion and protraction. A retrospective study was conducted to compare the skeletal and dentoalveolar changes in patients treated with these two protocols.
MATERIAL AND METHODS: Twelve class III patients (6 males and 6 females, mean age 10.2± 1.6 years) who were treated with the tooth-borne maxillary RPE and protraction device were compared with 12 class III patients (5males, 7 females, mean age 10.2± 1.2 years) who were treated with Maxillary skeletal expand which is a modified version of Mini screw assisted rapid palatal expansion appliance along with protraction device . Cone beam computerized tomography (cbct) was taken at the start of treatment and at the end of maxillary protraction. The pre and post treatment Cbct's were compared using Voxel based superimposing and cephalometric analysis were also performed on cephalometric images reconstructed from cbct to determine skeletal and dental changes. Data were analyzed using a one-way analysis of variance.
RESULTS: Significant differences between the two groups were found in 8 out of 20 cephalometric variables ($p < .05$). Subjects in the tooth-borne facemask group had more proclination of maxillary incisors (OLp-Is, Is-SNL), increase in overjet correction, and correction in molar relationship. Subjects in the bone-anchored facemask group had less downward movement of the "A" point, less opening of the mandibular plane (SNL-ML and FH-ML), and more vertical eruption of the maxillary incisors.
CONCLUSIONS: The bone-anchored RPE appliance minimized the side effect encounter by tooth-borne RPE appliance for maxillary expansion and protraction and may serve as an alternative treatment appliance for correcting class III patients with a hyperdivergent growth pattern
Disclosure of interest: None declared

Abstract citation ID: cjaf073.196
SP133 THE EFFECTS OF BITE RAISERS ON JAW FUNCTION IN ORTHODONTIC PATIENTS

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AIMS: After bite-raising, the occlusal contact areas decrease, and the occlusal vertical dimension increases. These changes consequently affect the function of the masticatory system. Therefore, this study aimed to investigate the effects of bite raisers on jaw function.
MATERIAL AND METHODS: This study included 30 participants who were divided into two groups of 15 each. Patients who received fixed orthodontic appliances combined with bite raisers using a light-cured orthodontic band on the maxillary first molars bilaterally were assigned to the experimental group (BR). Patients who received only fixed orthodontic appliances were assigned to the control group (FA). Patient-reported outcomes regarding functional jaw disturbances were assessed using the 20-item Jaw Functional Limitation Scale, which is divided into three parts: mastication, mobility, and verbal and non-verbal communication. Data were collected at eight time points: days 0, 1, 3, 5, 7, 14, 21, and 28. Statistical analyses were conducted using SPSS software version 26.0 that included a descriptive analysis, the Shapiro-Wilk test, Kruskal-Wallis test, Friedman test, and pairwise comparisons. The significance level was set at 0.05.
RESULTS: On day 1 after the placement of orthodontic appliances, the FA group showed an increase in mastication limitation only ($p = 0.000$), while the BR group showed increases in both mastication ($p = 0.000$) and mobility limitations ($p = 0.025$). Mastication limitation decreased to a level that was not significantly different from day 0 to day 7 in the FA group ($p = 1.000$) and to day 14 in the BR group ($p = 0.204$). Mobility limitation in the BR group was not significantly different from day 0 to day 3 ($p = 1.000$). However, no significant increase in verbal and non-verbal communication limitation was observed in either group ($p \geq 0.05$). When comparing both groups, no significant differences were found in any parts of jaw functional limitations at any time point ($p \geq 0.05$).
CONCLUSIONS: The BR group may not exhibit differences in jaw function compared to the FA group. However, the BR group may require a longer period for jaw functional adaptation than the FA group.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.197
SP134 EFFECTS OF DECREASED UPPER POSTERIOR DENTAL HEIGHT ON DENTAL, SKELETAL, AND SOFT TISSUE PROFILES IN THAI SKELETAL CLASS I PATIENTS: A RETROSPECTIVE STUDY

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AIMS: Posterior dental height plays a significant role in the vertical growth pattern of the face and overall harmony of facial esthetics. Many studies have reported on the correlation of dentoalveolar height and facial proportion. However, there is a lack of information on the influence of posterior dental height on soft tissue profiles. This study aimed to investigate the influence of short upper posterior dental height (short-UPDH) on the dental, skeletal, and soft tissue profiles in skeletal Class I patients.

MATERIAL AND METHODS: Sixty pretreatment lateral cephalometric radiographs of skeletal Class I patients were categorized into two groups: normal upper posterior dental height (normal-UPDH) ($n = 30$) and short-UPDH ($n = 30$). The skeletal, dental, and soft tissue characteristics from lateral cephalometric radiographs were compared between the groups using the Mann-Whitney U test at a significant level 0.05.

RESULTS: All cephalometric radiographs were Class I from the ANB angle. SNA and SNB were not significantly different, and the ages of the patients were not significantly different between the groups ($p \geq 0.05$). Vertical skeletal measurements found that posterior facial height and anterior facial height were significantly shorter in the group with short-UPDH ($p < 0.05$). However, the upper anterior facial height between the groups was not significantly different ($p \geq 0.05$). From the dental parameters, only dentoalveolar height, which included UADH, UPDH, LADH, LPDH, were significantly shorter in the short-UPDH group than in the normal-UPDH group ($p < 0.05$). No significant differences were observed in nearly all of the soft tissue parameters between the groups ($p \geq 0.05$). However, in the vertical dimension, we found significant differences in lower facial height, upper lip length, and lower lip length that were significantly shorter in the short-UPDH group ($p < 0.05$). Interlabial gap, throat length and lip-chin-throat angle were not significantly different between the groups ($p \geq 0.05$).

CONCLUSIONS: Insufficient posterior teeth eruption decreases the total anterior facial growth, which results in a decreased vertical facial dimension. This

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also affects the soft tissue profile in the vertical dimension. However, in the anteroposterior dimension, no significant differences were observed.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.198
SP136 COMPARISON OF DIMENSIONAL ACCURACY OF DIFFERENT DENTAL MODELS SCANNED WITH DESKTOP AND INTRAORAL SCANNERS

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AIMS: This study aimed to evaluate the dimensional accuracy of three different dental model materials scanned using desktop and intraoral scanners and to analyze the effects of scanner performance and material type.
MATERIAL AND METHODS: Three different dental models made of silicone, acrylic, and plaster were scanned using the 3Shape R-700 Desktop Orthodontic Scanner (Copenhagen, Denmark) and the Panda 2 Intraoral Scanner (Pengtum Technologies, Shanghai, China). The resulting STL files were superimposed using the Medit Design (Medit Corp., Seoul, South Korea) program, and dimensional deviations were analyzed. The parameters analyzed included standard deviation (SD), maximum and minimum deviations (range), and the percentage of points remaining within the accepted tolerance range (±0.1 mm). Statistical analyses were performed to evaluate the differences between materials and scanners.
RESULTS: The silicone model showed the highest percentage of points within tolerance (97.86%) but exhibited the largest standard deviation (0.114 mm), indicating more irregular distribution of deviations. The acrylic model demonstrated the lowest standard deviation (0.090 mm) and the narrowest range of deviations, presenting the most consistent performance, though the percentage within tolerance was 81.67%. The plaster model had the lowest percentage of acceptable range (76.66%) and the widest deviation range, with positive deviations reaching up to 0.945 mm. In all three models, the most significant deviations were observed in the embrasure regions of the teeth. Notable differences in scanner performance were observed depending on the material type.
CONCLUSIONS: The dimensional accuracy of desktop and intraoral scanners varied depending on the dental model material. The silicone model showed the highest percentage of points within tolerance, while the acrylic model exhibited more consistent minimum and maximum deviations. The plaster model provided the least reliable results. These findings highlight the importance of material selection and tolerance settings in dental modeling applications and emphasize that deviations in the embrasure regions can affect the overall accuracy.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.199
SP137 ASSESSMENT OF PAIN LEVELS IN ORTHODONTIC PATIENTS TREATED WITH DIFFERENT TYPES OF INTERMAXILLARY ELASTICS: A PILOT STUDY

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AIMS: The aim of this prospective study was to evaluate and compare the pain characteristics associated with different types of intermaxillary elastics.
MATERIAL AND METHODS: The study population consisted of randomly selected patients requiring intermaxillary elastics, who were divided into two distinct groups: triangular elastics group (Group 1, n=15) and Class II intermaxillary elastics group (Group 2, n=10). The study investigated the distribution of pain according to time and function. Pain intensity was evaluated utilizing a visual analog scale. Assessment protocols included measurements at 2 and 6 hours post-application on the first day, followed by twice-daily evaluations (morning and evening) for the subsequent fifteen days, during which patients recorded both spontaneous pain levels and pain intensity during mastication. Visual analog scale measurements were quantified using digital calipers. Statistical analysis employed the Mann-Whitney U test for comparing pain levels between the two groups. A p-value of less than 0.05 was considered statistically significant.
RESULTS: Statistical analysis of the inter-group comparisons revealed a significant difference in pain levels during mastication in the morning following elastic application (p=0.036). No statistically significant differences were observed in any other measured parameters. Pairwise comparative analysis demonstrated statistically significant differences between the measurements taken on day fifteen compared to all other time points ($p<0.05$).
CONCLUSIONS: The comparative analysis of pain levels between different elastic types demonstrated that patients experienced similar pain intensities across most parameters, with the notable exception of mastication-related pain on the day following elastic application. Longitudinal analysis of pain levels revealed a significant decrease by day 15. These findings suggest that the pain sensation induced by intermaxillary elastic use demonstrates a notable reduction after the fifteenth day of application, potentially indicating an adaptation period in orthodontic patients.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.200
SP138 TRANSFER ACCURACY OF SILICONE AND 3D-PRINTED TRAYS FOR INDIRECT BONDING OF ORTHODONTIC BRACKETS

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AIMS: The ideal positioning of brackets is one of the most time-consuming procedures in orthodontics. The wrong bracket location can lead to unplanned tooth movements. Nowadays the digital indirect bonding technique makes it possible to place the brackets on digital models and print the transfer tray without a physical model. The aim of this study was to compare the transfer accuracy between digitally planned bracket positions of additively manufactured trays (ADT) and polyvinyl-siloxane trays (PST). In addition a comparison between practitioners was made.
MATERIAL AND METHODS: 25 pre-existing digital mandibular dental casts were selected according to previously defined inclusion and exclusion criteria. The position of the brackets (discovery smart, Dentaurum) was planned digitally. Additively manufactured trays were printed. Kylix models were then produced for the correct position of the brackets on physical models (OnyxCeph^{3TM}). These were then used for the fabrication of polyvinyl-siloxane trays. Two examiners with different levels of experience placed the brackets on the 25 models once with ADTs and once with PSTs. The initial position of the brackets in the digital planning was then compared with the position obtained after the transfer with the two different tray designs (GOM Inspect). A linear deviation of < 0.25 mm and angular deviation of $< 1°$ are defined as clinically acceptable.
RESULTS: A total of 1.400 buccally bonded brackets and tubes were analyzed for deviations from the digitally planned original position. In terms of linear deviations, a total of 97,58% of the transferred brackets were within the clinical acceptable values in the PST and 96,75% in the ADT respectively, 90,79% and 96,42% for the angular deviations. No statistically significant difference was found for the transfer of the brackets between the two examiners ($p = 0.227$). No difference was found between the accuracy of ADT and PST ($p = 0.102$) and between the tooth groups ($p = 0.299$).
CONCLUSIONS: ADT and PST are both valid methods for indirect bonding of orthodontic brackets. The transfer accuracy between ADT and PST is not determined by the practitioner experience. The transfer accuracy is the highest for the incisors, followed by premolars, canines and molars.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.201
SP140 ‡‡‡ CONTROL OF ANTERIOR ANCHORAGE WITH MINISCREWS AND SLIDING MECHANICS IN AN ADOLESCENT WITH MISSING SECOND PREMOLARS: A CLINICAL REPORT WITH BIOMECHANICAL VALIDATION

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AIMS: Congenital missing second premolars in growing patients should be accurately evaluated in order to establish a suitable treatment plan. An effective use of miniscrews associated with efficient sliding mechanics can represent an elective way to successfully treat such cases where the objective is to closing spaces.
MATERIAL AND METHODS: A 14-year-old female patient presented with an asymmetrical molar relationship showing a full Class II on the right side and an end-to-end Class II on the left one. From a cephalometric point of view, she was

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a skeletal Class I with a normal inclination of the maxillary and mandibular incisors. The lower facial height and the mandibular plane angle were recorded as being within normal standards. The patient showed a facial asymmetry with a slight chin deviation towards the right. Both upper and lower second premolars were congenitally absent. Three deciduous second molars persisted in the arch and evidenced a massive root resorption. The treatment plan consisted of closing the agenesis spaces. A sliding Bidimensional System was selected to enhance anterior anchorage control. Considering the relevant amount of space to be closed in the lower arch without losing anterior anchorage, two miniscrews were inserted distally to the lower canines. In addition, a pair of Ni-Ti closed coil springs exerting a 250gr force were applied between the screws and the power arms inserted into the band of the lower first molars.
RESULTS: By the end of treatment, a molar and canine Class I relationship was achieved on both sides. The spaces in the lower arch were efficiently closed thanks to the use of the miniscrew-supported system. Long-term 2-year follow-up records after debonding show how the occlusion had remained stable in terms of alignment, intercuspation and symmetry. The patient's profile seemed to have been positively affected by residual growth throughout the post-treatment period.
CONCLUSIONS: In conclusion, treatment of patients with congenitally missing second premolars should be made concerning several factors including biomechanical aspects, facial profile and long-term perspectives. However, space closure offers several advantages such as avoiding the insertion of future implants and favoring the proper eruption of third molars.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.202
SP141 PIEZOSURGERY VERSUS CONVENTIONAL BURS IN ORTHOGNATIC SURGERY

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Abstract

PIEZOSURGERY VERSUS CONVENTIONAL BURS IN ORTHOGNATHIC SURGERY: The aim of the study was to compare in a randomized controlled clinical trial the use of the piezoelectric osteotomy as an alternative to the conventional approach in terms of surgery time, intraoperative blood loss, cut quality, nerve injury, and costs.55 patients who had orthognathic surgery procedures with bimaxillary osteotomy were divided into 2 groups: group A was treated with a piezosurgery device, and group B, with a bur.The piezosurgical bone osteotomy permitted individualized cut designs. All patients in group A had a low blood loss versus patients of group B who had a medium to high blood loss . Inferior alveolar nerve sensation was retained in 98.2% of group A versus 92.7% in group B at 6 months postoperative testing.Piezoelectric osteotomy reduced surgical time, blood loss, and inferior alveolar nerve injury in bimaxillary osteotomy. Absence of macrovibrations makes the instrument more manageable and easy to use and allows greater intraoperative control with higher safety in cutting in difficult anatomical regions.

Keywords : Piezosurgery ; Orthognathic Surgery ; Treatment
Disclosure of interest: None declared

Abstract citation ID: cjaf073.203
SP142 CLINICAL COMPARISON OF DIFFERENT DEBONDING TECHNIQUES OF CLEAR ALIGNER ATTACHMENTS: A SPLIT-MOUTH CLINICAL TRIAL

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AIMS: To evaluate the effectiveness of different debonding techniques for aligner attachments regarding pain level, attachment removal time, and adhesive remnant amount.
MATERIAL AND METHODS: Thirty-two patients (13 female and 19 male with a mean age of 26.0±7.9 years) who underwent aligner attachment debonding were included, and attachments were debonded using two different techniques with a split-mouth design. For each patient, the attachments in two diagonal quadrants were debonded with 24-blade tungsten carbide bur (Bur group, n=294 attachments) and with adhesive remover plier (Plier group, n=298 attachments) in the contralateral diagonal quadrants. In Plier group, 24-blade carbide bur was used to remove the remaining adhesive following debonding with plier. A numeric rating scale (NRS) tool was used to rate the level of pain both in the anterior and posterior segments of each quadrant. The average removal time per attachment for each quadrant was recorded. In Plier group, after removing the attachments with the plier, the remaining adhesive was scored using ARI (adhesive remnant index) for each tooth. The data were analyzed using Wilcoxon Signed Rank, Mann Whitney U, and Pearson's $\chi 2$ tests. The significance level was set at $p<0.05$.
RESULTS: For both upper and lower arches, although attachment removal time per tooth was slightly longer in the Bur group compared to the Plier group, this difference was not statistically significant. There was no statistically significant difference in median values of pain scores between Plier and Bur techniques in the upper posterior, upper anterior, and lower anterior segments. However, in the lower posterior segments, the median pain scores were significantly higher in the Bur group (2.0 (1.0-4.0)) than in the Plier group (1.0 (0.5-3.0)) (p=0.028). After debonding with plier according to attachment types, the rate of ARI score "1" was higher in those with optimized (60.8%) compared to conventional (43.5%) attachments (p=0.004).
CONCLUSIONS: Both debonding technique results were clinically comparable. Bur technique resulted in significantly higher pain levels compared to Plier technique, only in the lower posterior segments. For both optimized and conventional attachments, adhesive remover plier was almost effective by leaving less than half of the adhesive amount mostly.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.204
SP143 THE USE OF ER,CR:YSGG LASER IN ORTHODONTIC BRACKET DEBONDING. A SYSTEMATIC REVIEW

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AIMS: To evaluate the efficacy and effects of the use of Er,Cr:YSGG laser (2780 nm) for the debonding of orthodontic brackets.
MATERIAL AND METHODS: An unrestricted systematic electronic search of 7 databases (MEDLINE via PubMed, the Cochrane Library, Web of Science, Ovid, Scopus, CRD/DARE, Virtual Health Library), supplemented by manual searches of trial registries and grey literature sources, was performed, up to November 2024. The eligibility criteria included prospective/retrospective in vivo and in vitro studies, with outcomes pertaining to objective measurements of the effects of the method. All processes were performed in duplicate by two independent researchers.
RESULTS: The search strategy yielded 1232 references. Ultimately, 11 in vitro studies were eligible for qualitative synthesis. Six studies exclusively pertained to the debonding of ceramic brackets, two focused on metallic brackets, while two other studies included both. One study was limited to the effect of Er,Cr:YSGG irradiation as an adjunct for adhesive removal after debonding. The outcome measurements included the shear bond strength, the adhesive remnant index (ARI) scores, the presence of bracket or tooth cracks, and the thermal effect of laser irradiation. The exhibited advantages of the procedure comprised effective debonding of both ceramic and metallic brackets with minimal thermal pulp changes, respect towards the enamel topography with little to no enamel microcrack formation, and low ARI scores.
CONCLUSIONS: Bracket debonding with Er,Cr:YSGG laser (2780 nm) appears to be a safe and effective modality. Further research, with a robust methodology, large sample sizes and a variety of different laser settings is required to minimise potential bias, further establish the safety profile, and allow future human studies with laser-assisted debonding.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.205
SP144 EFFECT OF THE TWIN BLOCK APPLIANCE TREATMENT ON THE DIMENSIONAL CHANGES OF DENTAL ARCHES

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AIMS: To explore the effect of the Twin block appliance treatment on the dimensions of dental arches, as measured on dental scans, prior to, and at the end of treatment with Twin Block.
MATERIAL AND METHODS: Experimental group was treated with the Twin Block appliance (N=19, 63 % male, median age 12.8 years). The dental scans

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were taken prior to treatment (T0), and at the end of treatment (T1), average treatment duration was 1.1 year. Dental scans were than measured on MeshLab (MeshLab_64bit version 1.3.4BETA, Pisa, Italy). Measurements taken were: anterior arch width of the upper and lower jaw, posterior arch width of the upper and lower jaw and sum of mesiodistal width of four mandibular incisors (LSI). All measurements were taken in millimeters. Sum of four maxillary incisors (USI) was calculated via Tonn's formula (LSI×4)/3+0,5). Ideal anterior and posterior arch width for both upper and lower jaw was calculated with Harth index.

The normality of distribution was tested with the Shapiro Wilk test. The dependent samples t-test was used for comparisons between T0 and T1. Differences in dental arches dimension changes (delta T1 and T0 between the experimental groups) were tested with the dependent samples t-test. Intraclass correlation coefficient (ICC) was calculated to test reliability of measurements.

RESULTS: The ICC indicated excellent reliability (ranging between 0.924-1.0 for all measured variables). Borderline significant change was observed between the upper anterior arch width before and after the TB treatment as increase of 0.37 ±0.75mm, (t(18)=2.133, p=0.047). Other parameters did not change significantly. 42% of subjects had narrow anterior upper arch before treatment, frequency was reduced after treatment to 26%. Upper posterior arch width was increased in one subject after the treatment, while lower anterior arch width decreased in one subject. The lower posterior arch width was narrower both before and after treatment in 47% of subjects.

CONCLUSIONS: The TB appliance treatment caused borderline significant change in upper anterior arch width. Other changes in transverse dimension of both upper and lower dental arch were not significant. Nearly half of the sample had narrow upper anterior and lower posterior dental arch width.

Disclosure of interest: None declared

Abstract citation ID: cjaf073.206

SP145 ACCURACY OF INTEGRATING DIGITAL DENTAL MODELS IN 3D FACIAL STEREOPHOTOGRAMMETRIC IMAGES

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AIMS: Integrating the intraoral dental scan into a 3D-stereophotogrammetric facial image offers the possibility to construct a radiation-free virtual face model with integrated dentition. This study aimed to evaluate the accuracy of positioning digital dental models relative to a patient's three-dimensional facial mesh using an intermediate facial scan exposing the dentition with cheek retractors.

MATERIALS AND METHODS: Data were collected from 27 maxillofacial surgery patients (mean age 27.1 years), including intra-oral scans, two 3D facial meshes (at rest and dentition-exposed with cheek retractors), and full field-of-view CBCT scans. The intra-oral scans were superimposed onto the dentition of the cheek-retractor-facial-mesh in Viewbox (www.dhal.com). This combined structure was then aligned with the facial-mesh-at-rest using the less deformed upper facial region. The ground truth was constructed by first repositioning the intra-oral scans in the segmented CBCT using artificial intelligence (https://www.creator.relu.eu), after which the facial-mesh-at-rest was fitted onto the CBCT's soft-tissue outline. As a final step, the facial meshes at rest of the ground truth and the cheek holder superimposition were superimposed as well. The accuracy of the proposed method could then be determined by measuring the translation and rotation (in Euler angles) required to perfectly fit the intra-oral scans of the cheek retractor superimposition onto those of the ground truth. Statistical significance was determined using random permutation tests with identical standard deviations and zero mean, after confirming normality of the distributions using the Shapiro-Wilk test.

RESULTS: Linear errors varied from -0.16 mm along the x-axis (SD 0.50) to 1.11 mm for the z-axis (SD 1.06). The average y-axis shift was 0.36 mm (SD 0.85). Significant differences were observed along the y-axis ($p = 0.017$) and z-axis ($p = 0$). The x-axis rotational error exhibited the smallest mean error (-0.09°) but the largest standard deviation (1.50°). The mean values for the y and z axis were 0.14° (SD 0.56) and -0.79° (SD 1.01) respectively. None of the rotational error values were statistically significant.

CONCLUSIONS: The method demonstrated sufficiently low error values for clinical applications, although inter-individual variability was relatively large.

Disclosure of interest: None declared

Abstract citation ID: cjaf073.207

SP147 ASSOCIATION BETWEEN MALOCCLUSION SEVERITY AND ADOLESCENTS' PSYCHOSOCIAL STATUS

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AIMS: To explore the relationships between dentoskeletal malocclusion and adolescents' self-esteem, perception of dento-facial aesthetics, and psychosocial impacts of dental aesthetics.

MATERIAL AND METHODS: The sample was recruited among adolescents (aged 10-18 years old) who attended the University Clinic in Naples (Italy) for an orthodontic consultation. Patients with ongoing or previous orthodontic treatment, who underwent previous maxillo-facial surgery or who had facial trauma, genetic syndromes or craniofacial alterations, and neurological diseases were excluded. Objective assessment of the malocclusion was measured with the Dental Health Component of the Index of Orthodontic Treatment Need (IOTN-DHC). Furthermore, OVJ, OVB were measured on digital dental casts, and vertical and sagittal skeletal relationship was established with a cephalometric tracing on lateral x-rays. The Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ), the Orofacial Esthetic Scale (OES) and the Rosenberg Self-Esteem Scale (RSES) and the Aesthetic Component of the IOTN (AC-IOTN) were administered to the adolescents. Between groups comparisons were performed using ANOVA, Kruskal-Wallis tests, or Chi-square test.

RESULTS: The study included a total of 196 adolescents (88 males,112 females, mean age 13.01 ±2.39 years). More than half of the adolescent (58.2%) were classified by clinicians as having a definite need for orthodontic treatment (IOTN-DHC 4 or 5). However, most of the participants perceived their own need for orthodontic treatment as low or non-existent (64.3%, IOTN-AC between 0 and 4). Among the three subgroups of malocclusion severity measured with the IOTN-DHC, no significant difference were found concerning the self-perception of the malocclusion (IOTN-AC), the PIDAQ, the OES, and the RSES (all $p>0.05$). Reduced OVJ was the only value associated with a reduction of self-esteem ($P=0.042$). All the cephalometric variables were not associated with the studied outcomes (all $p>0.05$).

CONCLUSIONS: The assessment of orthodontic treatment need as measured by the orthodontic clinicians with a standardizes index differ from patients' own perception. Malocclusion during adolescence seem not to have a determinant role the psychosocial domains, although inverted OVJ is relevant for their self-esteem.

Disclosure of interest: None declared

Abstract citation ID: cjaf073.208

SP148 ASSOCIATION BETWEEN GENETIC POLYMORPHISMS IN VITAMIN D RECEPTOR GENE AND EXTERNAL APICAL ROOT RESORPTION OF MANDIBULAR PREMOLARS IN ORTHODONTIC PATIENTS

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AIM: There is some evidence in the literature that variations in the gene encoding Vitamin D Receptor (VDR) might be involved in external apical root resorption. Therefore, the current study aimed to evaluate the association between genetic polymorphisms in VDR and the amount of external apical root resorption in mandibular premolars linked to orthodontic treatment.

MATERIAL AND METHODS: A total of 144 orthodontic patients were assessed and screened. The amount of external apical root resorption in left and right second premolars were evaluated in digital panoramic radiographs. All measurements were performed in Image J software by the same investigator. The root length (linear measurement in pixels) was obtained by subtracting the coronal height from the total length of the tooth, both in the initial treatment radiograph (T1) and the final one (T2). Coronal height was used to correct enlargement differences between T1 and T2 radiographic images, assuming this distance remained constant during treatment. Patients with syndromes, metabolic diseases and previous orthognathic surgery were excluded. Teeth with root canal treatment and incomplete root formation at the beginning of treatment were not evaluated. Genomic DNA extracted from saliva was used. Four genetic polymorphisms (rs731236, rs7975232, rs1544410 and rs2228570) were genotyped across *VDR* using real time PCR. The Kruskal-Wallis test and Dunn's post-hoc test were used for data analysis, with a significance level of 5%.

RESULTS: A total of 93 left second premolar and 95 right second premolar were investigated. A statistical association was not observed for none of the studied genetic polymorphisms ($p>0.05$). Only a borderline association was observed for the polymorphisms rs731236 ($p=0.09$).

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CONCLUSION: The studied genetic polymorphisms in *VDR* were not associated with external apical root resorption.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.209
SP149 UPDATE ABOUT MONITORING ORTHODONTIC TOOTH MOVEMENT BY ASSESSING GINGIVAL CREVICULAR FLUID WITH FT-IR SPECTROSCOPY IN ATR GEOMETRY

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AIM: Fourier Transform Infrared (FT-IR) spectroscopy on gingival crevicular fluid (GCF) gives interesting information on the changes occurring in protein, lipid, and carbohydrate contents during orthodontic treatment (OTM). This study aimed to shorten the spectra acquisition times and optimize the data analysis procedures.
SUBJECTS AND METHOD: Patients aged between 13 and 21 years with anterior moderate dental crowding with no gingivitis were recruited, and .014 Nichel-Titanium archwires with multibracket appliances were applied. PerioPaper strips were used for GCF collection before (T0), after 2 (T1) and 14 (T2) days of treatment, then directly used for analysis. The spectra were acquired by using a Perkin Elmer SpectrumOne spectrometer equipped with the Universal Attenuated Total Reflection (UATR) accessory. Strips were placed in contact with the diamond crystal of UATR. All spectra were collected using 64 scans in the range from 4000 to 600 cm^{-1} with a 4 cm^{-1} spectral resolution. Spectra differences between the average spectra collected of OTM have been evaluated. Statistical analysis was performed using an ANOVA test with a .05% significance level.
RESULTS: The area of the peaks centered at about 1260 cm^{-1} increases in both the T1 and T2 spectra, while the other main mode intensities decrease. For contributions located at 1420 cm^{-1}, 1540 cm^{-1}, and 1642 cm^{-1}, a small signal recovery is visible in the T2 average spectrum. A change in the lipids is confirmed by the ratio related to the 2922 cm^{-1} and 2852 cm^{-1} bands.
CONCLUSION: The use of the UATR approach allows short operational time and avoids risks of sample contamination because it does not need preliminary fluid extraction processes.

The expectations are to provide clinicians with quick analysis and monitoring of GCF useful in the assistance of specific categories of patients with higher negative prognoses of root resorption, avoiding the use of multiple x-rays or other more invasive procedures.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.210
SP151 PERIODONTAL EVALUATION AFTER SURGICAL-ORTHODONTIC TREATMENT OF LABIALLY MAXILLARY IMPACTED CANINES: A SYSTEMATIC REVIEW

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AIMS: This study aims to systematically review the literature on the effect of combined surgical-orthodontic treatment on the periodontal health of labially maxillary impacted canines, comparing the results between the three available surgical approaches.
MATERIAL AND METHODS: Seven electronic databases and three registers were searched until September 2024 and reference lists of relevant publications were used to identify studies evaluating the periodontal status of labially maxillary impacted canines after combined surgical-orthodontic treatment.

The outcomes assessed were plaque accumulation, gingival inflammation, gingival recession, probing depth, keratinized gingiva width, attached gingiva width, and crestal bone loss.
RESULTS: 1829 studies were identified, and seven were included in the review (one controlled clinical trial and six observational studies). Soft tissue was shown to have the most negative outcomes compared to all evaluated periodontal parameters, especially when excisional uncovering was implemented. However, it did not reach clinical significance. When an apically positioned flap or closed eruption technique was performed, the periodontal outcomes were similar to those of untreated teeth.
CONCLUSIONS: The current systematic review indicated no clinically significant adverse effects on periodontium after combined surgical-orthodontic treatment of labially impacted canines. High-quality clinical trials with less risk of bias should be conducted to allow reliable conclusions regarding the periodontal status of labially maxillary impacted canines after surgical-orthodontic treatment.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.211
SP152 A COMPARATIVE ASSESSMENT OF THE BIOBITECORRECTOR® AND HERBST APPLIANCES COMBINED WITH FIXED APPLIANCES IN CLASS II PATIENTS: A RETROSPECTIVE COHORT STUDY ON OCCLUSAL INDICES

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AIM: The BioBiteCorrector® (BBC) appliance was introduced as a further development of the Herbst appliance; however, there aren't any studies directly comparing their treatment outcomes.
SUBJECTS AND METHODS: Caucasian healthy patients with at least 5 mm overjet were included and treated with either Herbst or BBC, both combined with fixed appliances, by one experienced orthodontist at a private practice in Switzerland. Treatment effectiveness was evaluated in terms of occlusal outcomes via the Peer Assessment Rating (PAR) and Index of Orthodontic Treatment Need (IOTN) indices, for which groups were matched at baseline. Data collection took place before bonding and after debonding and data was statistically analyzed with linear / logistic regressions at 5%.
RESULTS: Each group was comprised of 58 patients. Patient and treatment related characteristics did not demonstrate any clinically relevant differences at baseline. The overall treatment duration was 19.3±5.3 and 22.9±5.7 months for the Herbst and BBC respectively ($P<0.001$). The main outcomes of absolute PAR reduction, % PAR reduction, PAR improvement, or great PAR improvement were not statistically significant between groups ($P>0.05$ in all instances); however, patients treated with Herbst had slightly worse overall IOTN scores ($P<0.03$). The findings did not significantly change after controlling for confounders.
CONCLUSIONS: Both Herbst and BBC appeared to be equally effective in improving Class II malocclusion, yet the BBC appliance led to slightly longer overall treatment duration.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.212
SP153 A NOVEL METHOD TO EVALUATE SHAPE VARIABILITY OF UPPER CENTRAL INCISORS

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AIM: To propose a geometric morphometric-based method for evaluating shape variability of maxillary incisors and to assess its reliability.
MATERIALS AND METHODS: Comprehensive assessment of tooth shape requires dense landmarking of the crown surface. We developed a template that included three curves, each following the incisal edge, the labial, and the palatal cervical margins, and 40 landmarks on each of the labial and palatal surfaces. Digitization commenced with manual placement of the three curves and was followed by automatic placement of eight landmarks on each curve and the 80 surface semi-landmarks, for a total of 104 landmarks per tooth.

Testing of the method was performed in a pilot study, using digital dental casts of nine subjects. The left and right maxillary central incisors were digitized. Calculation of the average shape was achieved using Procrustes superimposition. An iterative sliding and projection procedure of the semi-landmarks was conducted to minimize bending energy and achieve landmark correspondence between the specimens. Shape-space Principal Component Analysis was used to detect shape variability patterns.
RESULTS: Based on the results of the pilot study, the method proved to be accurate and reliable at evaluating shape variability, giving comprehensive and quantitative 3D information about central incisors' geometric diversity. The first three Principal Components cumulatively described 77% (PC1: 48%, PC2: 18%, PC3: 11%) of shape variability. The major shape variation patterns were related

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to the height/width ratio and the overall curvature or flatness of the surfaces and edges of the clinical crown.
CONCLUSIONS: This method may provide further information on shape variability of incisor teeth, as it offers dense landmarking, is quantitative, and can be applied semi-automatically, thus affording high reliability and ease of use.
Disclosure of interest: Filippos Mikelis: None declared, Demetrios Halazonetis Author DH has a financial interest in the software used for the development of the method.

Abstract citation ID: cjaf073.213
SP154 ‡‡‡ HYBRID TREATMENTS COMBINING ALIGNERS AND LINGUAL ORTHODONTICS: ENHANCED PREDICTABILITY AND TREATMENT EFFICIENCY

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AIMS: This study investigates the benefits of hybrid orthodontic treatments combining aligners with lingual appliances. The focus is on improving treatment predictability, reducing the number of aligners required, and enhancing overall efficiency.
MATERIAL AND METHODS: A retrospective analysis was conducted on patients with complex malocclusions requiring precise control of tooth movements. Hybrid treatment involved using a limited number of aligners for initial alignment and targeted lingual orthodontics for challenging movements. Key metrics, including treatment duration, aligner usage, clinical outcomes, and patient satisfaction, were assessed through digital simulations and follow-up evaluations.
RESULTS: The hybrid approach significantly reduced the number of aligners required, with an average reduction of 30%-50% compared to standard aligner-only treatments. Treatment duration was shortened by approximately 30%, and movements such as rotations, inclination and torque adjustments were executed with greater predictability using lingual appliances. Patient satisfaction was high, with many appreciating the comfort and discreet aesthetics of the treatment.
CONCLUSIONS: Hybrid treatments combining aligners and lingual orthodontics offer an effective solution for managing complex orthodontic cases. This method enhances control over challenging movements, reduces aligner use, and increases efficiency while maintaining aesthetic appeal. These findings highlight the potential of hybrid strategies to provide predictable, efficient, and patient-centered orthodontic care.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.214
SP155 ASSESSMENT OF SLEEP QUALITY INDEX BETWEEN ORTHODONTIC PATIENTS WITH CLASS I AND II SKELETAL RELATIONSHIPS

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AIMS: To evaluate and compare the Pittsburgh Sleep Quality Index (PSQI) of orthodontic patients with skeletal I and II relationships.
MATERIAL AND METHODS: The 62 Thai orthodontic patients were included in this study. Lateral cephalometric radiographs were analyzed using Dolphin Imaging software. Participants were classified into skeletal I (Sk-I) and II (Sk-II) relationship groups. The Thai-Pittsburgh Sleep Quality Index (Thai-PSQI) was used to evaluate their sleep quality. Then participants were defined as having good sleep quality (PSQI score ≤ 5) and poor sleep quality (PSQI score > 5). Normality of the data was tested using the Shapiro-Wilk test. The Mann-Whitney U test was applied to compare PSQI scores between two groups. The frequencies of good and poor sleepers between Sk-I and Sk-II groups were determined using the Chi-square test. Demographic characteristics and variations in sleep-related parameters (gender, age, BMI, and ANB) between good and poor sleepers were determined using the Chi-square test and Mann-Whitney U test ($\alpha = 0.05$).
RESULTS: The PSQI of the Sk-I group was 6.42 ± 2.71, and 6.68 ± 3.39 in the Sk-II group. The Sk-I group had been categorized into 13 good sleepers (41.9%) and 18 poor sleepers (58.1%), while there were 16 good sleepers (51.6%) and 15 poor sleepers (48.4%) in the Sk-II group. There was no significant difference in PSQI scores and the frequency of good and poor sleepers between the Sk-I and Sk-II groups ($p > 0.05$). In addition, there was no significant difference for demographic characteristics and sleep-related parameters between good and poor sleepers ($p > 0.05$).
CONCLUSIONS: Despite knowing that Skeletal II relationship usually has a higher incidence of airway-related sleep quality, the results indicated that the quality of sleep was concealed among orthodontic patients, and sleep quality assessment is required to be taken as a determinant for orthodontic treatment planning.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.215
SP157 ‡‡‡ ACCURACY AND CLINICAL FIT OF MILLED VERSUS RAPID PROTOTYPED ORTHOGNATHIC SURGICAL SPLINTS

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AIM: The primary aim of this *in vitro* study was to compare the differences in trueness between the milled and 3D-printed splints, while the secondary aim was to compare the difference in clinical fit of these splints.
MATERIAL AND METHODS: A sample of 8 patient cases was selected, and STL files of the final orthognathic surgical guide were used to fabricate three guides for each of the 8 cases. The first was fabricated by subtractive milling (SM), while the second and third guides were 3D printed with Digital Light Processing (DLP) and Laser Stereolithography (SLA) technology respectively. Paired superimposition of the scans was performed against a reference model. Clinical fit of the splints against printed models were also assessed.
RESULTS: The mean RMS deviation for the SM, SLA and DLP were 0.11 ± 0.02, 0.16 ± 0.02 and 0.14 ± 0.02 respectively. Post-hoc analysis showed that SM splints had the highest accuracy ($p<0.01$). However, DLP splints showed the best clinical fit, followed by SM and lastly SLA.
CONCLUSION: Splints fabricated by SM were found to be more accurate than those fabricated by 3D printing, although this difference may not be clinically significant. The site, rather than the magnitude of errors, may have a greater effect on clinical usability of splints. In general, SM and DLP splints demonstrated good clinical fit and are suitable for fabrication of surgical splints.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.216
SP159 ASSOCIATION BETWEEN THIRD MOLAR AGENESIS AND DENTAL DEVELOPMENT MATURITY

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AIMS: This study aimed to investigate if patients with third molar agenesis present a delayed dental development maturity.
MATERIAL AND METHODS: A retrospective study was performed on a sample of panoramic radiographs taken from 134 German orthodontic patients (65 girls, 69 boys, 7 – 15 years old). Only healthy patients with no syndromes, no oral clefts and without tooth agenesis (excluding third molars) were included. Patients with at least one third molar agenesis were classified as cases and patients with 32 permanent teeth as controls. The dental age was assessed according to the Demirjian method, in which seven left mandibular teeth are used to calculate the dental age. The panoramic radiographs were used to assess the dental age, using the "Dental Age" mobile application for smartphones. To calculate dental maturity, a delta was calculated (Dental Age – Chronological age). A statistical analysis was performed using class I patients as controls. The Shapiro–Wilk test was used to verify normal distribution of the data and the t-test was used for the dental maturity mean comparison among groups with an alpha of 5%.
RESULTS: A total of 32 patients had at least one third molar congenitally missing and were allocated in the case group. 102 patients had all teeth and were allocated in the control group. Patients with third molar agenesis had a slightly delayed dental maturity although a statistical significance difference was not observed ($p=0.10$). The mean dental maturity (Dental Age – Chronological age) was -0.19 (standard deviation = 1.12) in patients with third molar agenesis, and 0.17 (standard deviation = 1.12) in patients from the control group.
CONCLUSIONS: There was no statistically significant difference of the dental maturity among the groups, however, our results suggest that dental maturity in patients with third molar agenesis could be delayed. Future studies with a larger sample size should be performed.
Disclosure of interest: None declared

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Abstract citation ID: cjaf073.217
SP160 RELATIONSHIP BETWEEN CLASS II MALOCCLUSION SEVERITY AND 3D FACIAL MORPHOLOGY

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BACKGROUND: The treatment of Class II malocclusion aims to improve facial shape, including increasing chin prominence. Success is often judged by post-treatment 3D facial shape. However, 2D cephalograms are typically used to assess malocclusion severity and plan treatment, and the relationship between cephalometric measurements and 3D facial size and shape remains unclear.
AIM: To assess relationship between severity of class II malocclusion and facial size and shape
SUBJECTS AND METHODS: 42 children (21 boys) with Class II malocclusion at a mean age of 11.3 years (SD=1.2, range: 7.3–14.1) participated in the study. At initial appointment heigh and weight were registered in addition to orthodontic records including 2D cephalograms and 3D facial scans made with stereophotogrammetric technique.

The severity of class II malocclusion was assessed on 2D cephalograms with SNA, SNB, ANB, SN/MP angles, WITS index, OJ registration and Maxillary/Mandibular length measurement.

3D facial scans were used to analyze facial size and shape using geometric morphometric methods: Procrustes superimposition and principal component analysis (PCA). Facial size was determined by centroid size (CS), while facial shape was described by principal components (PCs) with corresponding visualizations of individual PCs. Statistical analysis included descriptive statistics and multiple regression models with age, sex, weight, height, SNA, SNB, ANB, SN/MP, WITS, OJ, and mandibular length as independent variables and lnCS, PC1, PC2 or PC3 as dependent variables, respectively.
RESULTS: Cephalometric measurements for Class II malocclusion were ANB = 5.80° (SD = 2.6), WITS = 3.4 mm (SD = 3.9), and OJ = 5.3 mm (SD = 2.6). The first three PCs accounted for 41.9% of shape variation: PC1 (21.2%) reflected facial height, PC2 (11.9%) antero-posterior relationships, and PC3 (8.7%) a combination of height and antero-posterior relationships. Regression models identified weight ($R^2 = 0.32$, $p = 0.003$), mandibular length ($R^2 = 0.32$, $p < 0.001$), OJ ($R^2 = 0.11$, $p = 0.002$), and SN/MP ($R^2 = 0.04$, $p = 0.039$) as predictors of facial size (adj. $R^2 = 0.58$, $p < 0.001$). No significant relationships were found for facial shape.
CONCLUSIONS: The soft tissue facial shape is relatively independent of cephalometric measurements for Class II malocclusion.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.218
SP161 ALTERATIONS IN UPPER AIRWAY VOLUME AFTER BONE-ANCHORED RAPID MAXILLARY EXPANSION IN ADULTS: A PROSPECTIVE STUDY

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AIMS: This study aimed to evaluate the impact of bone-anchored rapid maxillary expansion (RME) on the volumes of the right maxillary sinus, left maxillary sinus, and the combined nasal and maxillary sinus airway complex. Additionally, the study investigated the influence of gender and age on these volume changes using bone-anchored maxillary expansion (BAME) devices.
MATERIAL AND METHODS: Eighteen patients aged 19 to 31 underwent RME treatment using a jack screw system anchored by four mini-screws placed bilaterally in the palate along the mid-palatal suture. Cone-beam computed tomography (CBCT) scans were obtained before and after palatal suture expansion. The scans were processed using therapeutic digital planning software to measure the volumes (in mm^3) of the right maxillary sinus, left maxillary sinus, and the nasal and maxillary sinus airway complex. The anatomical regions were isolated using axial, coronal, and sagittal planes, and air density was verified through reference point placement. Statistical analysis of preoperative and postoperative measurements was conducted using paired t-tests.
RESULTS: Significant increases in volume were observed postoperatively for the right maxillary sinus ($p < 0.001$), left maxillary sinus ($p < 0.001$), and the nasal and maxillary sinus airway complex ($p < 0.001$). Gender analysis revealed that the left maxillary sinus volume change was significantly greater in women compared to men ($p = 0.02$).
CONCLUSIONS: Bone-anchored rapid maxillary expansion (BAME) effectively enhances the volumes of the right maxillary sinus, left maxillary sinus, and nasal and maxillary sinus airway complex in adult patients. These changes are particularly pronounced in the left maxillary sinus of female patients.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.219
SP162 COST-MINIMIZATION ANALYSIS OF VACUUM-FORMED RETAINERS VERSUS BONDED LINGUAL BRAIDED RECTANGULAR AND MULTISTRANDED ROUND WIRE RETAINERS IN THE MANDIBLE OVER A TWO-YEAR PERIOD

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AIMS: To assess the stability in relation to costs of three retention techniques: vacuum-formed retainers (VFR) with lingual-bonded braided and multistranded wire retainers in the mandible.
MATERIAL AND METHODS: A total of 93 participants, aged 12–21 years (median age: 16 years; 66% females) were analyzed at the start of the retention phase. Analysis included costs associated with retention procedures only in mandible (time, personnel salary and charged amount) and mandibular incisor irregularity.
RESULTS: Incidence of incisor alignment relapse differed between groups ($p<0.001$) being significantly higher in VFR (70%) than both round wire (35%) and rectangular wire groups (17%), with no significant differences between the last two. Amount of irregularity of mandibular incisors was minimal overall but was highest in the VFR group compared to both wire types ($p<0.001$). Total time spent on retention during 2-year (retainer fabrication, check-ups, bonding of detached wire and fabrication of new VFR) was shorter for the VFR group (median: 61.1 min) than both rectangular and round wire group (80.6 and 79.6 min, respectively; $p=0.001$). The total gross salary costs of personnel were also lower for VFR (31.16 €) than rectangular and round (41.11 and 40.60 €, respectively; $p=0.002$). The total costs of retention for mandible charged to patients or insurance was higher in the VFR group (median: 146 €) compared to the other two groups (median: 119.44 in rectangular and round wire group; $p<0.001$).
CONCLUSIONS: All retainers maintained alignment effectively, with slight differences in stability. VFR incurred lower production costs, but higher income.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.220
SP163 LONG-TERM EFFECTS OF MAXILLARY EXPANSION ON SLEEP DISORDERED BREATHING SYMPTOMS IN CHILDREN: A PROSPECTIVE EVALUATION

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AIM: To investigate the long-term effects of maxillary expansion and of different types of subsequent comprehensive orthodontic treatment on sleep disordered breathing (SDB) symptoms in children.
MATERIAL AND METHODS: Children needing early maxillary expansion were asked to fill the Pediatric Sleep Questionnaire (PSQ) at three time points: before the start of maxillary expansion (T0; N = 404), after active expansion (T1; N = 309) and after the completion of the comprehensive orthodontic treatment (T2; N = 113). Early maxillary expansion was mostly achieved using a removable expansion plate. The comprehensive orthodontic treatment consisted of fixed appliances alone (group 1) or combined with a class II functional appliance (group 2), a headgear (group 3) or a hyrax (group 4). Linear mixed models corrected for age were used to compare the PSQ results per time point.
RESULTS: Significant reductions in the total PSQ scores ($p<.0001$), breathing ($p<.0001$), behavior ($p=0.0026$) and loudness of snoring ($p=0.0107$) were observed between T0 and T1, which maintained between T0 and T2 ($p=0.0275$; $p=0.0281$; $p=0.0243$). Between T1 and T2 and T0 and T2, sleepiness significantly increased ($p<.0001$; $p=0.0004$). No significant interaction was found between the four different types of comprehensive orthodontic treatment and the symptoms of SDB.

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CONCLUSIONS: Early maxillary expansion with removable plates has general a positive effect on SDB symptoms. These improvements exhibit a long-term stability, regardless of the type of subsequent comprehensive orthodontic treatment. Therefore, the orthodontist plays an important role in the early detection and multidisciplinary treatment of pediatric OSAS.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.221
SP164 COMPARISON OF RETENTION PRACTICE OF ORTHODONTISTS IN TWO NEIGHBORING COUNTRIES ON BALKANS - KOSOVA AND NORTH MACEDONIA

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AIMS: To compare retention protocols after orthodontic treatment and their influencing factors among orthodontists in two different countries.
MATERIAL AND METHODS: In 2023 questionnaires were distributed by e-mail to 125 orthodontists in one country (group A) (100% of practicing orthodontist) and 150 in another country Group B) (78% of practicing orthodontist) and response rate was 58% respectively 62%.
RESULTS: Orthodontists in Group A, compared to Group B, scheduled more check-ups in the first year with both removable (5 vs. 4; p<0.001) and fixed retainers (5 vs. 3; p<0.001), as well as more check-ups after the first year (4 vs. 2; p<0.001). The orthodontist's years of experience or weekly patient workload were not associated with the duration of retention or number of check-ups during the first and subsequent years. Orthodontists in Group B more frequently used only removable retainers in both the maxilla and mandible (95% and 74%, respectively) compared to Group A (0%; p≤0.001). Conversely, Group A more frequently used a combination of fixed and removable retainers in the maxilla and mandible (67% and 80%, respectively) compared to Group B (19% and 15%; p<0.001). Information on retention was primarily given orally in both groups (100% Group A and 95% Group B), and monitoring after three years was mainly performed by orthodontists (92% Group A and 99% Group B; p=0.044). Malocclusion was the primary factor influencing retainer choice in Group B (77% vs. 13% in Group A; p<0.001), whereas age or completion of growth was more significant in Group A (88% vs. 42% in Group B; p<0.001). Decision-making was most influenced by personal experience (60% Group A vs. 75% Group B; p=0.004).
CONCLUSIONS: Although the groups share similar geographic proximity, retention practices differ, likely reflecting variations in educational background.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.222
SP165 HOW DOES PATIENT-HARM AFFECT THE ORTHODONTIC PROVIDERS?

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AIMS: This study aimed to explore the impact of patient-harm in orthodontic care on orthodontic providers, focusing on its effects on their psychological well-being and professional identity.
MATERIAL AND METHODS: A total of 295 participants completed a survey comprising 22 questions centred on patient harm. The group of participants consisted of orthodontic specialists(n=128), general dentists (n=18), dental hygienists (n=36), clinical assistants (n=104). Other professions (n=9) all working with orthodontics.

The survey was structured as follows: 1) Demographics (n=4). 2) Experience with patient harm events and their perceived impact (n=4 questions). 3) Open-Ended question allowing participants to describe their personal experiences with instances of patient harm related to orthodontic treatment (n=1). 4) Emotional and psychological impact of patient-harm on the orthodontic team members (n=8 questions). 5) Workplace attitudes towards patient safety and strategies for managing incidents (n= 5).
RESULTS: The survey results indicated that 46% of respondents reported involvement in an orthodontic-related patient-harm event. Furthermore, 53% of these professionals expressed feelings of shame regarding their involvement in such incidents, while 33% reported fear of disclosing the event to colleagues and the leadership. Being involved in a patient-harm event had a psychological impact on 51% of the professionals, with varying levels of severity. Notably, 16% of respondents indicated that the experience made them consider leaving their patient-care roles entirely.
CONCLUSIONS: The survey demonstrates that patient harm resulting from orthodontic care not only compromises patient safety but also significantly affects the mental and emotional well-being of healthcare professionals, consistent with the "second victim" phenomenon. Commonly reported experiences include feelings of shame, fear, and psychological distress, with 16% of respondents indicating they considered leaving clinical practice. These findings highlight the critical need for comprehensive support systems aimed at promoting both patient safety and the well-being of healthcare providers.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.223
SP166 EFFECT OF OPEN BITE CLOSURE WITH TADS: A QUALITY ASSESSMENT IN A CLINICAL SETTING

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AIMS: The aim of this retrospective study was to conduct a quality control assessment of orthodontic treatment in patients with anterior open bite, treated with molar intrusion assisted by temporary anchorage devices (TADs).
MATERIAL AND METHODS: Data from 30 patients age ranging from 12.5 to 34.3 years undergoing orthodontic treatment with TAD-assisted molar intrusion were evaluated retrospectively evaluated retrospectively using lateral cephalograms and model superimpositions taken at T_0 (baseline) and T_1 (at debonding). Descriptive statistics about patient characteristic, clinical findings and information about treatment (medians, percentiles, and proportions) were used to summarize cohort characteristics. Outcome variables included changes between T_0 – T_1 in model analysis: vertical overbite, vertical tooth positions, and cephalometric changes (Mann-Whitney/paired t-tests). Linear regression and scatterplots evaluated the relationship between vertical overbite changes and active molar intrusion time.
RESULTS: There was a significant increase in vertical incisal overbite from T_0 (median -2 mm) and T_1 (median 2 mm) (p=0.000). Regression analysis indicated that treatment duration with intrusion did not significantly predict changes in vertical overbite (0.037 mm per month, $p = 0.640$, $R^2 = 0.009$). The only significant difference (p=0.0001) in the cephalometric values was the NL_Ols° indicating a dentoalveolar effect with a decrease of the maxillary zone. Superimposition of the palatal rugae on the scanned models revealed intrusion of the upper first molars (mean: -0.53, SD: 1.64) and the first (mean: -0.35, SD: 1.20) and second premolars (mean: -0.65, SD: 1.32), along with extrusion of the second molars (mean: 0.28, SD: 2.05), canines (mean: 0.47, SD: 1.24), and lateral (mean: 0.88, SD: 1.04) and central incisors (mean: 0.52, SD: 1.04).
CONCLUSIONS: In conclusion, the study demonstated significant changes in vertical incisal overbite between T_0 and T_1. Upper molar intrusion was modest with notable variation in the observed effect. Cephalometric analysis revealed dentoalveolar effects, particularly a decrease in the maxillary zone. Other cephalometric variables did not change significantly during treatment. The conclusion is that molar intrusion accounts for a limited part of the closure of the open bite, while incisor extrusion also contributes to closure of the anterior open bite.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.224
SP167 FEATURES OF PRIMARY STABILITY OF MINI-IMPLANTS USED FOR ORTHODONTIC ANCHORAGE

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AIMS: to identify the most important characteristics of mini-implants and installation parameters that affect their primary stability.
MATERIAL AND METHODS: The study was conducted as an experiment using orthodontic miniimplants "Cut" with a diameter of 1.2 mm, a length of 8 mm with a standard neck of 1.5 mm, 10 mm with a neck of 1.5 mm, 8 mm with a neck of 3 mm (company Connect (Ukraine) and a bone tissue preparation from calf ribs. The most significant parameters affecting primary stability were analyzed: the length of the intraosseous part, the size of the external interface (neck), the value of the torque. 10 miniimplants of each size with different torque (5 Ncm, 10 Ncm) and submerged neck were installed in a separate calf rib using an angled surgical tip 20:1 and a physiodispenser. The bone type was determined

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using spiral computed tomography on the Hounsfield scale (HU) and was 400-1200 HU, which corresponds to 2 and 3 types of bone.
RESULTS: The greatest influence on primary stability is the immersion of the mini-implant neck into the bone tissue. The average primary stability of mini-implants, installing into the bone tissue to the level of a neck was determined within 45-47 units for mini-implants of different lengths (8, 10 mm with a neck of 1.5 mm or 3 mm), and different torque (5 Ncm, 10 Ncm). The primary stability of mini-implants with neck submerged by 1 mm into the bone tissue were higher and significantly different from the indicators of implants installed to the level of the neck.

No close correlations were identified with the length of the implant ($r=0.218$; $p>0.05$), the length of the mini-implant neck ($r=-0.084$; $p>0.05$), or the torque value ($r=0.034$; $p>0.05$), which indicate that these characteristics of the mini-implant do not affect its primary stability in bone tissue.
CONCLUSIONS: A significant increase in primary stability was observed when the neck of the mini-implant was submerged by 1 mm into the cortical bone plate. The torque, length of the intraosseous part and neck of the mini-implant did not have a statistically significant impact on its primary stability.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.225
SP169 SALIVARY LEPTIN LEVELS DURING ORTHODONTIC TOOTH MOVEMENT INDUCED BY INTERMAXILLARY ELASTIC TRACTION

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AIMS: The aim of this study was to analyse the salivary leptin hormone expression during Class II and Class III intermaxillary orthodontic elastic traction.
MATERIAL AND METHODS: Fifteen orthodontic patients were recruited based on the inclusion and exclusion criteria, which comprised of 5 patients for each Class I, Class II, and Class III malocclusions. Class II and III malocclusion patients underwent premolar extractions., whereas Class I patients were treated on a non-extraction basis. Class II malocclusion group was given Class II intermaxillary elastics, while the Class III malocclusion group was given Class III intermaxillary elastics. The Class I group received no elastic traction and acted as the control. 5ml of unsimulated saliva samples were collected at three different time points: T_0 (before elastic traction), T_1 (24-48 hours post-traction), and T_2 (1 week post-traction). The samples were analysed using the Human LEP (Leptin) ELISA kit. The optical density (OD) of leptin was measured using a microplate reader at a wavelength of 450nm, with OD values proportional to leptin concentration.
RESULTS: The level of leptin hormone expression was highest at T_1. However, there was no statistically significant difference in the mean leptin concentration when compared between the different groups of malocclusion ($p>0.05$), regardless of whether the groups involved extraction cases (Class II and III) or non-extraction cases (Class I).
CONCLUSIONS: There were no significant differences in salivary leptin hormone concentrations across all malocclusions, suggesting that intermaxillary elastic traction does not influence leptin hormone levels in Class I, II, and III malocclusions.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.226
SP171 OBJECTIVE AND SUBJECTIVE AIRFLOW ANALYSIS OF THE UPPER AIRWAY AFTER MAXILLARY EXPANSION AND MANDIBULAR ADVANCEMENT IN GROWING PATIENTS. A RANDOMIZED CROSSOVER CLINICAL CONTROLLED TRIAL

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AIMS: The main objective of this study is to explore how the utilization of Hyrax and Twin Block appliances in growing patients affects UA function, measured objectively by PNIF and POIF, and subjectively by the PSQ and NOSE questionnaires and VAS scale, and correlate those measures with volumetric and minimal cross-sectional area changes. The second objective is to determine if the sequence of interventions - the Hyrax followed by the Twin Block versus the Twin Block followed by the Hyrax - affects breathing function differently.
MATERIAL AND METHODS: This is a prospective cross-over randomized controlled clinical trial. The study included patients aged 8 to 14 who presented with Class II malocclusions and skeletally constricted maxilla. Participants were randomly assigned to one of three groups. The first intervention group received a Hyrax appliance before the Twin Block appliance. The second intervention group followed the reverse order, beginning with the use of the Twin Block appliance, followed by the Hyrax appliance. The control group did not undergo any orthodontic interventions for about 15 months. Descriptive statistics and Repeated Measures MANOVA were applied at a 0.05% significance level and 95% confidence interval.
RESULTS: The statistical analysis comprised ten participants in the Control group, twelve in Hyrax, and ten in the Twin Block group. The control and Hyrax groups showed statistically significant PNIF mean changes (p-values 0.001 and 0.034 respectively for Control and Hyrax). But not the Twin Block group (p-value 0.682). For POIF, all three groups showed statistically significant mean changes, although the Control group showed a p-value borderline between statistically significant and non-statistically significant ($p=0.049$). (Hyrax p-value 0.001; and Twin Block p-value 0.022). Regarding NOSE, PSQ, and VAS none of the groups showed statistically significant mean changes (all p-values >0.05).
CONCLUSIONS: Statistical differences were found in airflow (PNIF) in growing patients treated with Hyrax followed by Twin-Block and in the Control group. No differences were seen through subjective assessment of breathing between the order of employment of Hyrax and Twin-Block.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.227
SP172 'WAS NOT BROUGHT': AUDIT OF MISSED CHILDREN'S AND YOUNG ADULT'S APPOINTMENTS IN A UK HOSPITAL ORTHODONTIC DEPARTMENT

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AIMS: To encourage "Was Not Brought" (WNB) documentation for missed appointments by patients ≤17 years instead of "Did Not Attend" (DNA). To ensure documentation of follow-up measures which should include contacting the family/carer to ascertain reasons for the missed appointment, identifying possible safeguarding issues and re-booking where appropriate.
MATERIAL AND METHODS: Data was collected retrospectively from all patients ≤17 years who missed their orthodontic appointment at St George's Hospital during the audit period. The 1st cycle (10/01/24-10/04/24), assessed documentation in notes, whether recorded as WNB/DNA, evidence of family/carer contact, possible safeguarding issues, and re-booking where appropriate. Following the 1st cycle, a flowchart was developed by amalgamating the local hospital policy and the British Dental Association's (BDA) 'Implementing WNB in your Practice Toolkit' (2024). Laminated copies of the flowchart were placed in clinical areas and 1st audit cycle findings were presented at the departmental meeting and supplemented with teaching on how to use the flowchart. The locally agreed target was 100% compliance for managing missed appointments. The 2nd cycle was undertaken from 01/07/24-11/10/24 with all data collection and analysis undertaken on Microsoft Excel spreadsheet.
RESULTS: In the second cycle, total WNB appointments more than doubled compared to the first cycle (n=101 and n=45 respectively). The percentage of WNB appointments with no clinical documentation decreased from 16% to 7.9% between cycles. Documented calls to guardians increased from 34% to 58%, with the main reason for WNB being the lack of appointment awareness (70%).

Documentation of WNBs increased (13% to 42.6%), with 19.8% were marked as both WNB & DNA in the second cycle, suggesting a need for improving clinician awareness. The rebooking rate for orthodontic treatment WNBs remained high (98%). In both cycles, 44% of discharged patients lacked discharge letters. Safeguarding concerns were noted in three cases in each cycle, which were followed-up appropriately during the 2nd cycle.
CONCLUSIONS: This audit highlights the importance of identifying missed appointments as "Was Not Brought" to standardise management and address possible safeguarding concerns. Documentation and follow-up improved after implementation, but gaps remain in sending discharge letters. A third audit cycle is planned.
Disclosure of interest: None declared

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Abstract citation ID: cjaf073.228
SP173 A PRELIMINARY QUALITATIVE ANALYSIS ON THE OBSERVATION OF ORTHODONTIC INFORMED CONSENT DELIVERY PROCESS

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AIMS: This paper aims to present insights into how clinicians experience and navigate the process of providing Informed Consent (IC) in Orthodontics, focusing on their communication strategies and approaches in ensuring patient understanding and engagement.
MATERIAL AND METHODS: A qualitative case study approach was employed in which observation was one of the methods used. Participants for this study were recruited through purposive sampling, including specialist orthodontists and postgraduate residents of the Doctor in Orthodontics program at the International Islamic University Malaysia (IIUM). A non-participant, structured, and overt observation approach was used, with the researcher seated discreetly to avoid influencing the clinician-patient interaction. Twelve observations were conducted in clinical orthodontic settings during treatment planning consultations, and prior written consent was obtained from both clinicians and patients. Sessions were either observed in real-time or video-recorded, focusing on verbal and non-verbal communication strategies, the use of educational tools, and patient engagement. A structured observation guide was employed to systematically document key elements of the consent process and contextual details. Fieldnotes were recorded within 24 hours after each session, capturing detailed descriptions, reflections, and analysed using constant comparative method to ensure the rigor and accuracy of the data.
RESULTS: The observations revealed that while each clinician has a unique style and flow of explanation, they consistently covered all essential aspects, using teaching aids like PowerPoint presentations, patients' study models supported by brace models, and layman terms to simplify complex dental terms. They blended Bahasa Malaysia and English effectively to ensure patient understanding. Patient engagement varied, with some actively participating by asking questions and sharing concerns, while others exhibited limited interaction, relying on non-verbal cues such as nodding and brief verbal affirmations. The consent process was systematic, involving frequent prompts for questions and review of consent form prior signing. Clinicians maintained direct eye contact, clarified misunderstandings, and encouraged patient involvement through supportive, patient-centred interactions. Incomplete video recordings in some cases limited the ability to fully capture patient responses and decision-making processes.
CONCLUSIONS: Clinicians utilised structured, bilingual communication and patient-centred strategies to deliver IC effectively.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.229
SP174 COMPARISON OF LIP-CLOSING FORCE BEFORE AND AFTER SURGICAL ORTHODONTIC TREATMENT

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AIMS: The aim of the present study was to evaluate the changes in maximum lip-closing force (LCF) and control directional between before and after surgical orthodontic treatment.
MATERIAL AND METHODS: The subject group included 23 skeletal class III female patients(Average age: 24.0 years old). The skeletal class III patients were further divided into two groups based on whether or not there was mandibular deviation was 4.0mm or more at menton by using postero-anterior cephalogram. (deviation group :7 patients and non-deviation group: 16 patients). The control group been comprised of 23 female with normal occlusion (normal occlusion group, Average age: 25.6 years old). Each group of the maximum LCF and the accuracy rate were measured twice which is before treatment and six months after surgical orthodontic treatment. The deviation group, non-deviation group, and normal occlusion group were compared using statistical analysis (t-test).
RESULTS: The results suggesting that:

1. The accuracy rate of the deviation group had increased by the surgical orthodontic treatment. In particular the lower lip of deviation side finds different significant (lower lip : p=0.038).We found that the lower lip of right and left directions were similar to normal occlusion group.
2. The accuracy rate of the non-deviation group was significantly higher than the surgical orthodontic treatment before. Especially the upper lip finds significant difference(upper lip : p=0.029, right of upper lip :p=0.0025)
3. The maximum LCF was slightly increased after surgical orthodontic treatment in both group of the subjects, and the date shows that it was significantly lower than the normal occlusion group.

CONCLUSIONS: The study shows that: Regardless of whether it is related to deviate or not, the accuracy rate was higher than before, and close to the normal occlusion group after surgical orthodontic treatment. Although both of skeletal Class III subject group of the maximum LCF was higher than before, they were weaker than normal occlusion group
Disclosure of interest: None declared

Abstract citation ID: cjaf073.230
SP175 COMPARING AI AND MANUAL METHODS IN DENTAL MODEL SEGMENTATION : A DEEP NEURAL NETWORK APPROACH

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AIMS: Accurate dental model segmentation is essential for orthodontics space analysis. Traditional manual methods are labor-intensive and inconsistent. Artificial Intelligence, especially deep learning, can automate segmentation effectively. In this study, an AI-based multi-view segmentation model for 3D dental meshes is developed and its accuracy, speed and clinical applicability evaluated.
MATERIAL AND METHODS: This study used a dataset of 1,200 maxillary and mandibular intraoral scans (IOS) from the 3D Teeth Challenge. A multi-view rendering approach was used to generate 2D projections of 3D dental meshes from selected viewpoints to reduce redundancy and improve the performance. These viewpoints were selected based on key locations such as occlusal surfaces and gingival margins. The AI-based segmentation model is based on the Mask2Former architecture. The model was trained and its performance validated with average Intersection over Union (mIoU) and Dice scores. The results were compared against other methods, including PointNet++, DilatedTSN, and MeshSegNet. The model's clinical applicability was also assessed by evaluating it on an independent set of clinical data.
RESULTS: Segmentation results demonstrate high accuracy with the multi-view approach. The Mask2Former-SwinB model achieves an overall mIoU of 93.75 and a Dice score of 95.12. This model also showed the ability to generalize beyond the training data, achieving good alignment between the model outputs and manual measurements of the clinical test data. Model performance in areas such as mIoU, and Dice scores with the clinical test data, showed the performance of the model to be at clinically acceptable level.
CONCLUSIONS: This work evaluates the use of AI in a multi-view dental model segmentation scenario. The technique aims to maximize the accuracy of the dental model analysis, as well as the efficiency, so that the results have practical clinical applicability. The strengths of the method include strategic selection of viewpoints to reduce redundancy, incorporation of a robust segmentation model and integration of clinical datasets. Future work will improve the model, validate it further in clinical settings and expand its use across multiple patient populations to optimize dental care outcomes.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.231
SP176 EFFECT OF DIFFERENT ENAMEL PRETREATMENT METHODS ON ENAMEL MICROHARDNESS AFTER DEMINERALIZATION: AN IN VITRO STUDY

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AIMS: This *in vitro* study aimed to evaluate the effects of enamel pretreatment methods with fluoride varnish, resin infiltration and flat resin sealant on enamel demineralization.

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MATERIAL AND METHODS: Fifty maxillary first premolar teeth were prepared and randomized into 5 groups. Group 1: control, Group 2: demineralization without enamel pretreatment, Group 3-5 were treated with different enamel pretreatment methods before demineralization; fluoride varnish (Duraphat™), resin infiltration (ICON™) and flat resin sealant (Pro Seal™). Group 2-5 were immersed in demineralization solution for 96 hours. The demineralization solution contained 2.2 mM $CaCl_2$, 2.2 mM KH_2PO_4 and 0.05M acetic acid. pH was 4.4. The solution was renewed daily. After that, Vickers hardness (VH) was tested with a FM-800 microhardness tester™. Differences between Vickers hardness number (HV) were analyzed with Kruskal-Wallis followed by post-hoc multiple comparison. Statistically significant was set at $P < 0.05$.
RESULTS: The mean±SD HV of the Group 1-5 were 390.91±6.21, 154.61 ±15.88, 331.79±25.80, 249.11±19.39, 244.18±11.77, respectively. There was significant difference in HV among all groups compared to control except Duraphat™ group. However, there was no significant difference in HV of Duraphat™, ICON™ and Pro Seal™ groups. In addition, HV of Duraphat™ group was significantly higher than demineralization group.
CONCLUSIONS: In order to achieve acidic enamel resistance in orthodontic patient, enamel pretreatment with Duraphat™ is recommended to be performed.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.232
SP177 THE EVALUATION OF HEAD AND NECK POSTURE, HYOID BONE POSITION AND AIRWAY DIMENSIONS IN PATIENTS WITH PEDIATRIC OBSTRUCTIVE SLEEP APNEA

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AIMS: The aim of this cross-sectional study was to compare the head and neck posture, hyoid bone position, nasal and pharyngeal airway dimensions between the orthodontic patients diagnosed with pediatric obstructive sleep apnea (OSA) and patients without risk of OSA.
MATERIAL AND METHODS: The OSA group consisted of 35 individuals (mean age= 12±2.1 years; 16 female, 19 male) with an apnea-hypopnea index (AHI) greater than 1 according to polysomnography results (AHI= 6.3±6.0), younger than 18 years of age and had lateral cephalometric films taken in the natural head position. The control group consisted of 35 individuals (mean age= 12.1±2.1 years) with no risk of OSA according to the Pediatric Sleep Questionnaire: Sleep-disordered breathing subscale (score=0), who were age and gender matched with the individuals selected in the study group, and had lateral cephalometric films taken in the natural head position. The exclusion criteria for both groups were being older than 18 years of age and having a BMI in the 95th percentile or above (children with obesity). Regarding head and neck posture, cranio-cervical (SN-CVT°, SN-OPT°), cranio-vertical (SN-VER°, NL-VER°, ML-VER°) and cervico-vertical (OPT-VER°, CVT-VER°) angles, regarding hyoid bone position H-Mp, H-C3 and H-Me distances, regarding airway dimensions NAS, SPAS, MPAS, IPAS, PNS-U and Sp1-Sp2 distances were measured. Independent samples-t test or Mann-Whitney U test was used for intergroup comparisons, with $p<0.05$ considered statistically significant.
RESULTS: No statistically significant differences were found between the groups regarding hyoid bone position and airway dimensions. In the OSA group, SN-CVT angle (OSA group= 111.3°±10.4°; control group= 106.6°±8.0°; p=0.018), SN-VER angle (OSA group= 103.7°±3.5°; control group= 100.7°±5.4°; p=0.007) and NL-VER angle (OSA group= 95.4°±3.8°; control group= 92.8°±5.0°; p=0.018) were significantly larger than the control group.
CONCLUSIONS: Cranio-cervical and cranio-vertical angles were increased indicating a more extended head posture in pediatric patients between 9 and 16 years of age with OSA. Therefore, a more extended head posture in pediatric population can be considered as a clinical sign for orthodontists regarding OSA.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.233
SP178 IMPORTANCE OF THE EARLY PHASE OF ORTHODONTIC FORCE APPLICATION IN THE INDUCTION OF ROOT RESORPTION

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AIMS: Orthodontically induced root resorption (OIRR) is a common and significant problem in orthodontics, impacting patient outcomes. OIRR is initiated by ischemia-induced apoptosis of periodontal ligament (PDL) cells during the early phase of orthodontic force application (OFA). This process leads to the differentiation of osteoclasts and odontoclasts, leading to root resorption. Recent studies have demonstrated a strong correlation between the degree of PDL compression during the early phase and OIRR, suggesting that early-phase ischemia and apoptosis are critical triggers, although the underlying mechanisms remain poorly understood. Lithium (Li), clinically used for bipolar disorder, has shown potential in reducing OIRR by preventing PDL apoptosis and suppressing odontoclast differentiation. This study examines whether short-term Li administration during the early phase of OFA can prevent OIRR and explores its underlying mechanisms.

The aim is to evaluate the effectiveness of early and short-term Li administration in preventing OIRR during OFA and to investigate the critical role of the early phase in OIRR induction.
MATERIAL AND METHODS: Bilateral maxillary first molars of 10-week-old male Wistar rats were moved for 14 days using a closed coil spring between the first molar and the incisor. Rats were randomly divided into three groups: (1) short-term Li (first 4 days), (2) long-term Li (14 days), and (3) vehicle (saline). Orthodontic tooth movement (OTM) was measured using micro-computed tomography on day 14. Histological analyses assessed OIRR, osteoclasts, and odontoclasts. Immunohistochemical staining was performed for receptor-activated NF-kB ligand and osteoprotegerin.
RESULTS: The OTM distance did not differ among the groups. However, the pattern of OTM shifted from tipping to bodily movement in both Li-treated groups. Early and short-term Li administration effectively suppressed OIRR on day 14, achieving results comparable to long-term administration. The number of odontoclasts observed on days 4 and 14 was significantly reduced in both Li-treated groups. Additionally, osteoprotegerin expression was significantly higher on day 14 in Li-treated groups compared to the vehicle group.
CONCLUSIONS: Early and short-term Li administration significantly suppresses OIRR, emphasizing the importance of the early phase of OFA in OIRR induction. These findings suggest a novel therapeutic strategy to reduce OIRR during orthodontic treatment.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.234
SP179 MAGNETIC RESONANCE IMAGE FINDINGS IN TEMPOROMANDIBULAR JOINTS BEFORE AND AFTER ORTHODONTIC-SURGICAL TREATMENT

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AIMS: To analyse magnetic resonance image (MRI) findings in temporomandibular joints (TMJs) in prospective orthodontic-surgical patients at the baseline (T1) and after orthodontic-surgical treatment (T2). To compare findings between female patients' and controls' and male and female patients' TMJs.
MATERIAL AND METHODS: The MRI study was performed on 20 patients (15 females, 5 males) at T1 and T2 and on 12 controls (12 females) at T1 and 4 years later, corresponding to T2. Standard non-contrast TMJ protocol with 2D and 3D sequences without surface coil were used. Both mouth-open and mouth-closed sequences were obtained. The MRI findings were categorized by one radiologist having over 20 years' experience in TMJ MR imaging. The outcome was assessed as the change between normal and abnormal MRI findings from T1 to T2. Categorical variables were described with proportions and continuous variables with mean and range. Categorized changes were evaluated using the likelihood ratio test. The z-test was used for comparisons within each change category between genders. Similarity between joints within patients and controls were evaluated with the eta.
RESULTS: At T1, the most common findings were anterior disc displacement in 40% of patients' and 58% of controls' TMJs (n=40 and n=24, respectively), abnormal findings in condylar cortex (patients 63%, controls 8%) and in disc position (patients 25%, controls 21%). At T2, the status had improved in 25%, was unchanged in 45% and had worsened in 30% of patients. For controls, the shares were 42%, 33% and 25%. In female patients' TMJs (n=30), improvement was seen in anterior disc displacement (24% of TMJs) and in condylar cortex (20% of TMJs) and worsening in disc position (23% of TMJs). In males' TMJs (n=10), condylar cortex improved in 40% and in controls, the disc form worsened

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in 26% of TMJs. No statistically significant differences were seen between patient and control females or between male and female patients.
CONCLUSIONS: During orthodontic-surgical treatment, the status of TMJs improved in one of four patients. Worsening was comparable in patients and controls.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.235
SP181 PERCEPTIONS OF CLASS II MALOCCLUSIONS

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AIMS: To investigate if Oral Health Related Quality of Life (OHRQoL), self-esteem and perception of orthodontic treatment need differ in children/adolescents with Class II division 1 malocclusion (II/1M) compared to children/adolescents with Class II division 2 malocclusion (II/2M).
MATERIALS AND METHODS: Following ethical approval and consent, 120 children/adolescents aged 10-16-years (60 with II/1M, 60 with II/2M) completed a generic (Child Oral Health Impact Profile, COHIP) and condition-specific questionnaire (Malocclusion Impact Questionnaire, MIQ) to assess OHRQoL, a self-esteem questionnaire (Child Health Questionnaire-Self-Esteem, CHQ-SE) and self-assessed orthodontic treatment need (IOTN-AC). Demographic and clinical variables were also recorded for each child/adolescent which included age, gender, socioeconomic status (SES), caries, dental trauma, overjet, overbite, severity of crowding, as well as IOTN both dental health and aesthetic components.

Perceived orthodontic aesthetic treatment need was compared between II/1M and II/2M groups using ordinal logistic regression models. $P < 0.05$ was considered as statistically significant.
RESULTS: OHRQoL, self-esteem and perception of orthodontic treatment need didn't differ significantly between II/1M and II/2M malocclusion groups (MIQ p=0.1480; COHIP p=0.8067; CHQ-SE p=0.9505; Child IOTN-AC p=0.8987).

Increased age and female gender negatively impacted child-reported OHRQoL (p=0.0001, p<0.0001, respectively) and self-esteem (p<0.0001, p=0.0016, respectively).

Younger age and lower SES had a significantly negative impact on child-reported perceived orthodontic treatment need (p=0.0365, p=0.0174, respectively). Child perceived orthodontic aesthetic treatment need were significantly lower than clinician-reported ($p < 0.05$).
CONCLUSIONS: There was no significant difference between II/1M and II/2M in relation to child-reported OHRQoL, self-esteem or perception of orthodontic treatment need.

Other variables, however, were found to impact perceptions, such as age, gender and SES. Increased age and female gender negatively impacted child-reported OHRQoL and self-esteem. Clinician-reported perceived orthodontic aesthetic treatment need was more severe than child perceptions, regardless of malocclusion type.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.236
SP182 DENTAL HEALTH COMPONENT OF THE INDEX OF ORTHODONTIC TREATMENT NEED AND REFERRAL ACCURACY AMONG GENERAL DENTAL PRACTITIONERS IN THE PUBLIC HEALTHCARE FACILITIES IN MALAYSIA

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AIMS: The high demand for orthodontic treatment in the Malaysian public oral healthcare services creates a need to prioritize those who have high orthodontic treatment needs. This study aims to assess the knowledge of general dental practitioners in the primary oral health care services when using the Dental Health Component of the Index of Orthodontic Treatment Need (DHC-IOTN) and how accurately they are able to identify cases that need referral for orthodontic care.
MATERIAL AND METHODS: This study was a cross-sectional study consisting of two parts. The first part consists of a self-administered questionnaires with three sections: demographic information on participants; frequency of IOTN use; training on IOTN. The second part consists of assessment of 20 study models by the participants to score the DHC-IOTN and determine the need for orthodontic referral.
RESULTS: A total of 103 dental officers with the mean age of 29.4 years (SD 3.33) participated. 82.5% of them were females. Majority of the participants (53.4%) had 3 years or less of work experience. 83.5% of the participants worked in a primary dental care facility while the remaining were from a dedicated oral health promotion team. The overall knowledge of DHC-IOTN and referral agreement were at a moderate (k=0.44; SD 0.12) and substantial (k=0.62; SD 0.20) level respectively. All mean kappa scores for knowledge of DHC-IOTN were lower than referral scores. The overall sensitivity was 84.5 (SD 11.6) and specificity was 95.1 (SD 13.9).
CONCLUSIONS: Level of agreement when using DHC-IOTN was below the acceptable level of agreement. Referral agreement however was above the acceptable level. All groups had better levels of specificity than sensitivity. Those who used IOTN more frequently had better mean kappa scores. Work experiences had a positive effect on the ability to assess need for referral.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.237
SP183 VIRTUAL PLANNED ORTHODONTIC IMPLANTS TRANSFERRED BY CAD/CAM MILLED SURGICAL GUIDES ARE SUPERIOR COMPARED TO FREEHAND: A PRECLINICAL MICRO CT STUDY

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AIM: This preclinical study firstly compares the transfer accuracy of CAD/CAM milled guides for orthodontic TADs to freehand implantation.
MATERIALS AND METHOD: Software-based positioning of temporary anchorage devices (TAD) was used as the target position for both intervention groups (freehand versus mill). High-resolution micro CT scans were made of the 30 typodonts to display the TADs location. Vector calculations were used to calculate the transfer deviation of the target versus the actual position in the vertical, horizontal, and transversal planes, as well as angular deviation.
RESULTS: 60 Temporary Anchorage Devices (TADs) were successfully implanted in 30 models with no fractures or failures. Spatial deviations at the TAD head were significantly lower ($p = 0.0008$) in the mill group (- 0.03 ± 0.08 mm to 0.95 ± 0.20 mm) compared to the freehand group (- 0.01 ± 1.68 mm to 1.55 ± 1.25 mm). Three-dimensional deviations at the TAD tip ($p < 0.0001$) were also significantly lower in the mill group (1.64 mm to 1.69 mm) compared to the freehand group (3.72 mm to 4.04 mm). Likewise, angular deviations were significantly lower in the mill group ($p < 0.0001$). Inter- and intrarater observation showed an excellent correlation between 0.82 and 0.99.
CONCLUSIONS: CAD/CAM milled transfer guides for orthodontic temporary implants are significantly more accurate compared to the conventional freehand method in all dimensions and angles. This preclinical study demonstrates the superior accuracy of milled guides compared to the conventional freehand method, which sets the stage for future clinical investigations.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.238
SP184 THE DIFFERENCE IN HINGE AXIS POSITION DETERMINED BY VIRTUAL VERSUS CONVENTIONAL PLANNING IN ORTHOGNATHIC SURGERY

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AIMS: Comparison of the hinge axis position (Ax) determined by virtual (VSP) versus conventional orthognathic surgery planning (CSP).
MATERIAL AND METHODS: This retrospective cohort study included 320 (f/m = 204/116, median age 24.0 years) adult patients who received single- or two-jaw surgery originally planned using the CSP method and subsequently reevaluated using the VSP method. Three parameters (alpha: angle between the occlusal and axis-orbital plane, AxV: perpendicular distance between the point Ax and the occlusal plane, AxH: perpendicular distance between the upper incisor edge and

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AxV) for determining Ax were measured, both in VSP and CSP. Paired t-tests and Bland-Altman plots were used for statistical analysis.
RESULTS: Both methods differed significantly with a bias of -1.83° (95% CI -2.04 to -1.62) for alpha, -0.24 mm (95% CI -0.41 to -0.08) for AxV and 0.46 mm (95% CI 0.27 to 0.65) for AxH, with negative values indicating an overestimation by the CSP method. All differences were within the range considered as clinically acceptable.
CONCLUSIONS: Since the differences are due to the systematic error of the conventional method, the virtual method investigated in this study appears to be superior to conventional planning methods.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.239
SP185 ‡‡‡ EFFECT OF RAPID MAXILLARY EXPANSION ON NASOMAXILLARY STRUCTURE AND SLEEP DISORDERED BREATHING IN CHILDREN WITH OBSTRUCTIVE SLEEP APNOEA

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AIMS: The aim of this study was to assess the effect of RME on upper airway structure and its relationship to improvements in sleep disordered breathing.
MATERIAL AND METHODS: The study was conducted in 23 children with malocclusion and OSA. Clinical assessment check-ups, daytime sleepiness questionnaire, polysomnography, and orthognatodontic examination were performed before (T0) and 4 (T1) and 12 (T2) months after RME. Cone Beam (CBCT) scans with 2D and 3D reconstructions were performed before (T0) and 12 (T2) months of RME treatment. The relationship between airway changes and improvements in sleep disordered breathing were evaluated.
RESULTS: In all cases, the opening of the mid-palatal suture was successfully achieved. Volume of the total upper airways, nasal cavity, nasopharynx and oropharynx increased significantly, along with the nasal osseous width. The increase in posterior suture, pterygoid process, maxillary and nasal cross-sectional width was significantly correlated with total upper airway volume, nasal cavity volume, nasopharyngeal airway volume, oropharyngeal airway volume. The improvement in AHI was correlated with the increase in total upper airway volume at 12 months.
CONCLUSIONS: This study confirmed the therapeutic benefit of RME as a treatment for OSA in accurately selected children with malocclusion. The study provides important details about the effect of RME on upper airway structure, including an enlarged posterior suture, pterygoid process, maxillary width, nasal cross-sectional width, and enlarged airway volume.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.240
SP186 CHANGES IN PATIENT-REPORTED CHIEF COMPLAINTS WITH ORTHOGNATHIC SURGERY

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AIMS: Evaluation of the changes in patient-reported chief complaints during orthognathic surgery treatment.
MATERIAL AND METHODS: This prospective cohort study included patients undergoing orthognathic surgery at the University Hospital Münster between 2019-2023. Patient-reported chief complaints were recorded on a visual analog scale (VAS) before treatment (T0), and reevaluated after presurgical orthodontic treatment (T1) and 6-9 months after surgery (T2). Chief complaints were grouped into three main categories (pain, function, aesthetics) and ten subcategories, and their intensity was quantified over time.
RESULTS: A total of 217 patients were enrolled in this study (f/m = 126/91, median age 24.28 years). Dental function, facial aesthetics, and dental aesthetics were the most frequently reported complaints at T0. From T0 to T1, there was a statistically significant improvement in cervical pain (-1.0, $p = 0.003$) and dental aesthetics (-2.9, $p < 0.001$). From T0 to T2 a statistically significant reduction in the intensity for each of the 10 subcategories (facial pain -3.1, $p < 0.001$; occipital pain -3.9, $p < 0.001$; cervical pain -2.9, $p < 0.001$; other pain -4.1, $p = 0.005$; dental function -4.7, $p < 0.001$; facial function -2.5, $p < 0.001$; other function -3.5, $p = 0.002$; dental aesthetics -2.9, $p < 0.001$; facial aesthetics -5.4, $p < 0.001$) was recorded except for dental pain ($p = 0.348$).
CONCLUSIONS: Orthognathic surgery patients most frequently report dental function, facial aesthetics, and dental aesthetics as their chief complaints, and these complaints were significantly improved after treatment.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.241
SP187 DO CEPHALOMETRIC CHANGES AFFECT THE OCCLUSAL ACCEPTABILITY IN ORTHODONTIC-SURGICAL PATIENTS?

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AIMS: To assess how changes in cephalometric values influence the quality of orthodontic-surgical treatment outcome.
MATERIALS AND METHODS: Fifty-two consecutive patients in one university hospital were included in the study upon completion of their active orthodontic-surgical treatment. The pre- and post-treatment changes in cephalometric measurements and all clinical assessments using the Occlusal Morphology and Function Index (OMFI) were performed by one orthodontist. A total of 37 acceptable pairs of patients' pre- and post-treatment study models (Subgroup SM) were assessed using the Peer Assessment Rating Index (PAR) and the Index of Complexity, Outcome and Need (ICON) by another orthodontist.
RESULTS: Of all patients (n=52), thirty-eight (73%) had bilateral sagittal split osteotomy (Group 1), six (11.5%) had LeFort I osteotomy (Group 2) and eight (15.4%) had bimaxillary surgery (Group 3). In Group 1, post-treatment changes in the interincisal angle and in angles SNB, ANB, SN/ML and in Harvold difference were statistically significant ($p<0.05$). In Group 2, statistically significant changes were found in angles SNA, ANB and SN/ML and in Group 3, in the interincisal angle and in SN/ML angle. According to OMFI, the improvement in occlusal acceptability was statistically significant in all groups. In Group 1 the improvement in morphology was 83.3% and in function 83.3%, in Group 2 92.1% and 46.2% and in Group 3 75.0% and 62.5%, respectively. According to the ICON and PAR scores, the improvements were 60.5% and 63.2%(Group 1_{SM} n=1), 50% and 83.3% (Group 2_{SM} n=12) and 62.5% and 75.0% (Group 3_{SM} n=2), respectively.
CONCLUSIONS: The results show that orthodontic-surgical treatment post-treatment changes in skeletal and interincisal angles are clearly reflected in occlusal assessments made using OMFI, PAR and ICON. Changes towards more normal cephalometric values indicate higher occlusal acceptability.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.242
SP188 EARLY CLASS III TREATMENTS IN ORTHODONTICS

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AIMS: Several therapeutic methods have been proposed for early class III maloclusion treatment; however, the existing literature does not provide evidence of the most recommended techniques or materials. The aim of the present systematic review and network meta-analysis (NMA) is to summarize the clinical evidence on the efficacy of each method.
MATERIAL AND METHODS: The PRISMA recommendations were followed. Four databases were searched in February 2024. Clinical trials and retrospective studies with a minimum follow-up of 8 months were included. The risk of bias was assessed using the Cochrane Collaboration tool. Inconsistency was assessed with the Q test, with a significance level of $p < 0.05$, and a Forest plot.
RESULTS: A total of 61 articles were identified, and 8 were included in the NMA, which examined 3 parameters (SNA, SNB and ANB values).Conventional disyunction and maxilla traction, it's Alt-Ramec version, chincup and reverse Twin-block were included in the review.
CONCLUSIONS: Alt-Ramec version was proved to be the most efficient method in comparaison to others regarding skeletal class III treatment in growing patients. There is a lack of standarization of Alt-Ramec protocols. Future investigations should focus on detemining most effictive Alt-Ramec protocol.
Disclosure of interest: None declared

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Abstract citation ID: cjaf073.243
SP189 A 3D ASSESSMENT OF DENTAL AND PALATAL CHANGES AFTER AN EARLY FUNCTIONAL POSTERIOR CROSSBITE CORRECTION: A PROSPECTIVE STUDY

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AIMS: The aim of this study is to evaluate the effects of interceptive, slow maxillary expansion using a removable appliance on the palatal dimensions and morphology in children with unilateral posterior crossbites. A second aim was the evaluate the influence of oromyofunctional therapy (OMT) in enhancing long-term stability.
MATERIAL AND METHODS: Nineteen children (13 girls, 6 boys; mean age: 8 years, 4 months) with functional unilateral posterior crossbites and dental midline deviation were included.

Data were collected at four time points: pre-treatment (T0), post-treatment following slow maxillary expansion with a removable acrylic appliance (T1), after retention (T2), and 6-months post-follow-up (T3). Intra-oral scans were obtained to assess palatal changes (surface area and volume) and transverse dental dimensions (intercanine and intermolar). The STL files were imported into 3Matic software (Materialise, Leuven, Belgium) for measurements.
RESULTS: During the active expansion phase (T0–T1), all participants showed increases in palatal and dental parameters. In the retention phase (T1–T2), completed by eleven subjects, relapse ocurrred, with decreases of 14.7% in palatal surface area and 38.9% in intercuspidal width. There was less relapse of the intercuspidal width at gingival levels (14.8%). In contrast, palatal volume increased by 18.9% and intermolar width by 7.7% during retention. At the 6-month follow-up (T3-T2), decreases in parameters were noted: 10.9% relapse in palatal surface, 5.6% in palatal volume, 29% in intercuspidal width, and 57.7% in intermolar width compared to T2. There was again less relapse at the level of the gingiva. However, based on a small sample size, the amount of relapse in patients with OMT seemed to be reduced.
CONCLUSIONS: Slow maxillary expansion leads to significant initial increases in palatal and dental parameters, but varying degrees of relapse occur during retention and follow-up periods. Preliminary trends indicate that incorporating OMT could help reducing relapse enhancing long-term stability in managing posterior crossbites.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.244
SP190 CLASS II TREATMENT: COMPARISON BETWEEN THE ORIGINAL DISTALIZATION PROTOCOLS PROPOSED BY DIFFERENT ALIGNER COMPANIES

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AIMS: The aim of this study was to analyze the differences in the distalization protocols among three Aligner Companies before any direct changes were made by the orthodontist.
MATERIAL AND METHODS: The study included twenty patients, mean age 16.1±4.3 years, recruited in a private practice and treated with different aligners by one orthodontist holding great experience in aligner technique. (Department of Orthodontics, "Tor Vergata" University of Rome).

Inclusion criteria were: Caucasian ethnicity, permanent dentition, no previous orthodontic treatment, skeletal Class I or mild Class II, bilateral or unilateral molar Class II, upper molar mesial rotation and a treatment plan based on a conventional sequential distalization protocol.

The analyzed data included: amount of cuspid, bicuspid and molar distalization, number of aligners, arch expansion, and upper molar distal-rotation.

Pre-treatment (T0) and final virtual digital models (T1) were analyzed. The Aligner Companies included Angel Aligner, Spark Aligner, and ClearCorrect. For statistical purposes, analysis of variance (ANOVA) with Tukey's post hoc tests was conducted. The significance level was set at 5%.
RESULTS: The statistical analysis of mesio-distal movements revealed significant differences among the analyzed groups. The most notable differences were observed in the posterior segments where dental elements in the Spark group evidenced greater movement compared to Angel and ClearCorrect.

The average number of aligners required for treatment was similar across the different aligner companies.

Arch expansion did not show statistically significant differences, while molar distal rotation revealed significant variations among the three groups.

The results highlighted variations among the different groups in the original treatment plan. Differences in terms of mesio-distal tooth movements, molar rotation and aligner number suggested a diverse approach to Cl.II malocclusion solutions, depending on which Aligner Company was involved.
CONCLUSIONS: The different ways to program the treatment reflect the existence of diverse technical features in the planning software and/or in the aligner material of the manufacturers. However, this study would require more patients and treatments without direct changes on behalf of the orthodontist to understand the real points of force or weakness of different aligner systems and to select the best devices for diverse kind of Cl.II malocclusions.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.245
SP191 EVALUATION OF PATIENT-REPORTED OUTCOMES ASSOCIATED WITH THE USE OF OCCLUSAL SPLINTS: A COMPARISON BETWEEN 3D-PRINTED AND ANALOG DEVICES

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AIMS: The adoption of 3D technologies in dentistry transformed device fabrication processes. The aim of this study was to compare patients' experience with occlusal splints fabricated using digital workflows versus traditional analog methods.

MATERIAL AND METHODS: Adult patients requiring occlusal splints were randomly divided into two groups: Analog group (alginate impression, plaster model development, and additive resin splint fabrication) and Digital group (intraoral scanner impression, CAD/CAM design, and 3D LCD printing). Patient-reported outcomes on tooth and soft tissue pain, discomfort, stability, and removal difficulty were collected using written questionnaires with NRS scales at device delivery (T0) and after one month (T1). Results were analyzed as means ± standard deviations and frequencies. Student's T-test were computed to assess the intra and inter-groups differences. Significance was set at $p<0.05$.
RESULTS: The Digital group included 16 patients (2 males, 14 females, mean age: 41.2 ± 19.7 years), while the Analog group included 12 patients (4 males, 8 females, mean age: 39.4 ± 14.9 years). At T0, pain when removing the device and difficulty in removing the splint were significantly higher in the Analog group (P=0.027 and P=0.000, respectively). At T1, the Analog group reported significantly worse outcomes across all variables: pain while wearing the splint (P=0.005), pain during removal (P=0.000), and removal difficulty (P=0.001). Patients belonging to the Analog group also experienced greater soft tissue pain, discomfort, and higher maximum and average pain levels over the previous 30 days, although device stability was comparable between groups (P=0.960). Compliance was significantly better in the Digital group. No soft tissue injuries were observed in either group at any time point.
CONCLUSIONS: Patients treated with digitally planned and 3D-printed occlusal splints reported better overall experiences compared to those receiving analog-fabricated splints. The digital approach reduced pain and discomfort and improved compliance, while maintaining comparable stability.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.246
SP193 SHORT-TERM EFFECTS OF ANTERIOR AND POSTERIOR BITE BLOCKS ON THE ELECTROMYOGRAPHIC ACTIVITY OF THE MASTICATORY MUSCLES IN HEALTHY VOLUNTEERS: AN ANALYSIS OF VARIABILITY

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AIMS: This study aims to examine the variability in the effect of anterior and posterior bite blocks on masticatory muscles activity in healthy participants. Additionally, it explores the potential to minimize response variability through cluster analysis.
MATERIAL AND METHODS: Study sample consisted of 24 adult volunteers with good general and oral health. The study was carried out in a crossover design. Half of the participants wore a removable passive clear aligner with anterior bite

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blocks followed, after one week of washout, by a removable passive clear aligner with posterior bite blocks. The other half received the bite blocks in the reverse order. Electromyographic activity was recorded at baseline, 24, 48 hours, and one week after. Parameters evaluated were: the overall work of the analyzed muscles (IMPACT), and the ratio of anterior temporalis to masseter muscle activity (ATTIV). The participants filled-in questionnaires analyzing psychosocial profile. Variability was tested at different time points, clustering analysis was used to identify patterns in the data. The differences in questionnaire responses were analyzed using Student's t-test.

RESULTS: Data showed great variability only in the responses to anterior bite blocks in the IMPACT index. Hierarchical clustering analysis identified two distinct and divergent patterns in response to anterior bite blocks. The two clusters could account for the high variability observed in the overall sample before the clustering analysis. Cluster 1 and 2 showed differences in psychosocial profile.

CONCLUSIONS: Electromyographic analysis suggests that there are distinct individual responses to short-term anterior bite block wear.

Disclosure of interest: None declared

Abstract citation ID: cjaf073.247

SP195 COMPARISON OF THE EFFECTS OF DIFFERENT INTRAORAL SCANNERS WITH EXTRAORAL SCANNER ON ALIGNER ATTACHMENT PLACEMENT ACCURACY: A PILOT STUDY

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AIMS: To evaluate the difference of Trios, iTero, and Cerec Primescan in means of aligner attachment placement accuracy by comparing with a laboratory scanner (Smart Optics Vinyl).

MATERIAL AND METHODS: One participant underwent intraoral scans with Trios, iTero, and Cerec Primescan, as well as conventional alginate impression. The dental model was scanned with a laboratory scanner. Four master models were printed to create realistic upper arches (N:14 teeth for each group) to reproduce the realized aligner attachment placement procedure. The STL images of the intraoral scanner Group 1 (Trios), Group 2 (iTero), Group 3 (Cerec Primescan), and Group 4 (laboratory model scanner) on which the virtual attachments were placed were superimposed with the STL image of the laboratory scanner which included the realized attachments. The accuracy of the attachments was calculated by using Geomagic software on each tooth. The average differences of deviations between each intraoral scan and its corresponding model scan were calculated at all points on the surfaces. The statistical evaluation was performed by the Friedman test. The significance level was taken as 0.05.

RESULTS: The smallest deviation was found with a median value of 0.03 mm for Group 4 and the largest deviation was found with a median value of 0.14 mm for Group 3. The deviation amounts did not show significant differences among the groups.

CONCLUSIONS: Three different intraoral scanners had similar effects on the accuracy of attachments and did not differ from the results obtained with the laboratory scanner. Four different scanner types can be used safely in attachment production.

Disclosure of interest: None declared

Abstract citation ID: cjaf073.248

SP198 EVALUATION OF YOUTUBE VIDEO CONTENT ON INVISALIGN FIRST TREATMENT

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AIMS: Invisalign First®, a clear aligner treatment designed for children in the mixed dentition period, offers a more comfortable alternative to traditional orthodontic methods. The internet and social media have become primary sources of information, with video content platforms like YouTube being among the most preferred. This study aimed to evaluate the reliability, content, and quality of YouTube videos about Invisalign First®.

MATERIAL AND METHODS: A search for "Invisalign First" was conducted on YouTube with ranking filters applied. Based on exclusion criteria, 29 videos were included in the study and evaluated under various criteria. A 10-item scoring table was used to determine the video content (TCS), a modified version of the DISCERN tool was applied to assess information reliability (RS), the Global Quality Scale (GQS) and Video Information and Quality Index (VIQI) were used to measure video quality. Mann-Whitney U and Kruskal-Wallis tests were used for data analysis, Spearman correlation was applied to assess correlations and Pearson chi-square tests were used for group comparisons. Post-hoc tests were conducted to identify the source of significant differences. The significance level was $p<0.05$.

RESULTS: Out of 201 videos reviewed, 29 were included in the study. Significant differences were found in RS, GQS, TCS and VIQI scores between videos classified as low information content and those with medium/high information content ($p<0.05$). A significant difference was also observed between medium/high information content videos and low information content videos regarding definition and purpose, indications/contraindications, advantages/disadvantages, comparisons with other treatments, and discussions of psychosocial effects ($p<0.05$). Grouping by purpose revealed that patient education videos had significantly higher RS scores than general informational videos. A very high correlation was observed between GQS and VIQI scores.

CONCLUSIONS: The videos about Invisalign First® reviewed in this study were not sufficiently informative. Most of the videos focused solely on the basic definition, purpose, biomechanics, and advantages of the treatment. Psychological impacts on children, usage instructions, and economic aspects were not adequately addressed. In this context, it is recommended that parents seek information directly from experts or reliable health platforms to obtain accurate information about innovative orthodontic treatments like Invisalign First®.

Disclosure of interest: None declared

Abstract citation ID: cjaf073.249

SP199 ‡‡‡ EFFECTS OF SECONDARY ALVEOLAR BONE GRAFTING ON MAXILLARY GROWTH IN CLEFT LIP OR PALATE PATIENTS: A SYSTEMATIC REVIEW AND META-ANALYSIS

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AIM: To investigate the effects of secondary alveolar bone grafting (SABG) on maxillary growth and development among non-syndromic patients with cleft lip or palate.

MATERIAL AND METHODS: This systematic review followed the PRISMA guidelines and registered with international prospective register of systematic reviews (CRD42021249061). Pubmed, Cochrane Library, Embase, Scopus, Web of Science and manual search was performed (until 30th April 2022) to assess the maxillary growth following SABG in UCL/P patients by two investigators independently. The maxillary growth between patients with UCL/P who underwent SABG and UCL/P patients who had not undergone SABG or non-cleft control were compared.

Two examiners evaluated the risk of bias and the quality assessment in individual studies using ROBINS-I Tool. Data were statistically pooled and meta-analysis was performed using Review Manager (RevMan, Ver. 5.3).The Mean Difference and Standard Error of individual studies were combined using the inverse variance weighted approach. The treatment effect was weighted mean difference using calculations based on a random-effects-model. Wherever heterogeneity was high, sensitivity analysis was performed.

RESULTS: 39/233 articles were assessed for inclusion and exclusion criteria after duplicate removal and title and abstract reading. 7 articles (1 prospective, and 6 retrospective studies) were included in the qualitative analysis and 2 articles were subjected to quantitative analysis. Four studies had a low-risk and three studies had a moderate-risk of bias. Meta-analysis revealed a significant reduction of SNA and non-significant difference in ANB in the SABG group compared to the non-cleft control group ($I^2=0\%$). There was no significant difference in ANB between SABG and non-cleft control. However, results showed high heterogeneity($I^2=83\%$). Meta-analysis of SNA and ANB showed non-significant difference between SABG and the cleft control group; however, there was high heterogeneity.

CONCLUSIONS: The studies showed a low- to moderate-risk of bias. Hence within the domain of this systematic review, it can be concluded that SABG causes inhibition of maxillary growth among patients with cleft lip or palate when compared with patients with non-cleft control. Due to high heterogeneity, comparison to cleft control showed insufficient evidence. RCTs on homogenous samples are required to draw conclusive evidence.

Disclosure of interest: None declared

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Abstract citation ID: cjaf073.250
SP201 MAXILLARY GROWTH AND PREVALENCE OF ORTHOGNATHIC SURGERY IN UNILATERAL CLEFT LIP AND PALATE PATIENTS FOLLOWED FROM AGE 5 TO 21 YEARS

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AIMS: Patients with cleft lip and palate (CLP) exhibit altered dentofacial growth, and knowledge of this growth is essential for treatment planning. The aim of this study is to describe longitudinal craniofacial growth and development in 82 patients with complete unilateral cleft lip and palate (UCLP), focusing particularly on maxillary growth and the need for orthognathic surgery, using consecutive lateral cephalograms at ages 5, 8, 10, 12, 16, and 18-21 years.

MATERIAL AND METHODS: The study cohort includes 82 patients with complete UCLP from the large randomized Scandcleft trial. All patients underwent primary surgical closure of the lip and soft palate at 3–4 months of age, with hard palate closure performed at either 1 or 3 years. A standard protocol with sagittal and transverse orthodontic treatment before bone grafting to the alveolar cleft was performed on all patients, as well as orthodontic treatment in late mixed dentition with full fixed appliances. The dataset includes a total of 492 lateral cephalograms. For the cephalometric analysis, the Björk analysis was used comprising 54 hard and soft tissue landmarks. To assess maxillary growth, this study focuses on two specific angular measurements: the ANB-angle and the SNA-angle.
RESULTS: The ANB-angle in early childhood is comparable to that of normal children, but gradually decreases over time, reaching lower values during adolescence and continuing to decline slightly in later years. Similarly, the SNA-angle starts higher, shows some variation, and stabilizes after adolescence with only minor fluctuations thereafter. No significant differences were observed between the groups with different timing of hard palate closure. Following growth cessation, seven patients underwent orthognathic surgery to address skeletal discrepancies. Intra- and inter-observer reliability assessments demonstrated good results.
CONCLUSIONS: Despite orthodontic treatment with sagittal expansion, both ANB- and SNA-angles show a consistent declining trend over time, indicating restricted maxillary growth in patients with complete UCLP, unaffected by the timing of hard palate closure. While useful for evaluating craniofacial growth, these angles alone cannot predict the need for orthognathic surgery.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.251
SP202 ASSESSMENT OF PATIENT SATISFACTION WITH ORTHODONTIC CARE: A MULTIDIMENSIONAL QUESTIONNAIRE

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AIMS: Patient satisfaction questionnaires (PSQs) are crucial for evaluating healthcare quality and improving patient outcomes. They provide insights into patient experiences and perceptions, capturing Patient-Reported Outcomes (PROs) essential for assessing patient satisfaction beyond clinical measures. However, there is currently a lack of tools available to assess patient satisfaction with the orthodontic care process.

Therefore, this study aims to develop and validate a PSQ to assess the multidimensional aspects of the orthodontic care process from a patient's point of view in accordance with the World Health Organization (WHO) Standards for Improving the Quality of Care for Children and Young Adolescents in Health Facilities.
MATERIAL AND METHODS: The study encompassed a multi-phased methodology, incorporating the following: (1) a conceptual phase and pilot study comprising a semi-structured interview with both open- and closed-ended questions, incorporating qualitative and quantitative components, conducted with 36 children undergoing orthodontic treatment, and their parents, (2) item generation based on the pilot study outcome with a proposal of 22 preliminary questionnaire items (i.e., face validity), (3) four rounds of cognitive script interviews were conducted to correct content and wording of questionnaire (i.e., content validity; 5-12 orthodontic patients per round), (4) assessment of content validity and reliability (i.e., convergence and divergence; based on 26 orthodontic patients, asked to complete the questionnaire at two different time points. Additionally, the patients were requested to evaluate the questionnaire's relevance using a Likert scale), and (5) test of clinical performance and psychometric characteristics in 132 orthodontic patients from the postgraduate orthodontic clinic at the Section of Orthodontics, Aarhus University.
RESULTS: The proposed patient questionnaire showed acceptable validity (content validity ratio of 4.35, scale 1-5) and acceptable levels of reliability for patient questionnaire outcomes. The clinical testing displayed the psychometrics of the questionnaire.
CONCLUSIONS: We developed and validated a multidimensional patient questionnaire to evaluate various aspects of patient satisfaction with the orthodontic care process, aligning with WHO standards.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.252
SP203 EVALUATING THE ASSOCIATION BETWEEN DENTAL DEVELOPMENT MATURITY AND SKELETAL CLASS II MALOCCLUSION

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AIMS: The aim of this study was to investigate if patients with skeletal class II malocclusion present a variation in the dental development maturity.
MATERIAL AND METHODS: A retrospective study was performed on a sample of radiographs taken from 129 German orthodontic patients (65 girls, 64 boys, 7 – 15 years old). Only health patients with no syndromes, no oral clefts and without tooth agenesis (excluding third molars) were included. Patients with skeletal class III malocclusion (ANB < 0°) were excluded. The dental age was assessed according to the Demirjian method, in which seven left mandibular teeth are used to calculate the dental age. The panoramic radiographs were used to assess the dental age, using the "Dental Age" mobile application for smartphones. To calculate dental maturity, a delta was calculated (Dental Age – Chronological age). Lateral cephalograms were examined to measure SNB and ANB. The sample was classified according to the ANB angle as class I (0°-4°) or class II (> 4°). A statistical analysis was performed using class I patients as controls. The Shapiro–Wilk test was used to verify normal distribution, and the t-test was used for the dental maturity mean comparison among groups with an alpha of 5%.
RESULTS: A total of 58 patients with skeletal class I malocclusion and 71 patients with skeletal class II malocclusion were included. The Demirjian method overestimated the age by 0.65 years (standard deviation = 1.15) in the studied population. Patients with skeletal class I malocclusion had a slightly delayed dental maturity, while patients with skeletal class II malocclusion had an advanced dental maturity, although a statistical significance difference was not observed (p=0.169). The mean dental maturity (Dental Age – Chronological age) was -0.09 (standard deviation = 0.98) in patients with skeletal class I malocclusion, and 0.19 (standard deviation = 1.26) patients with skeletal class II malocclusion.
CONCLUSIONS: Although a statistical difference was not observed, our results suggested that dental maturity may differ in patients with skeletal malocclusion class II compared to class I. Future studies with a larger sample size should be performed in Germans.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.253
SP207 A REVIEW OF THE LITERATURE: THE ROLE OF DENTAL MONITORING IN ENHANCING EFFICIENCY, OPTIMIZING WORKFLOWS, AND IMPROVING PATIENT EXPERIENCE IN ORTHODONTIC PRACTICES

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AIMS: This literature review examines the role of Dental Monitoring (DM) in integrating into orthodontic practices by enhancing efficiency, optimizing workflows, and improving patient experiences. DM consists of three AI-powered remote monitoring platforms and uses patients' smartphones to obtain consistent videos and photos for orthodontists and clinicians to monitor and give real-time feedback on treatment progress.

This review highlights the strengths, challenges, and areas for further investigation into the integration of DM into modern orthodontic practices.
MATERIAL AND METHODS: A search was conducted in PubMed, Google Scholar, Web of Science, and ScienceDirect for the studies, using a combination of specific keywords and Boolean operators to ensure comprehensive coverage.
RESULTS: Twelve studies met the search criteria and focused on evaluating the accuracy and effectiveness of Dental Monitoring (DM). Moreover, three studies surveyed patient experience and satisfaction, while another investigated DM application in unique clinical cases.
CONCLUSIONS: Studies reveal DM's ability to reduce in-office visits, ensure accurate monitoring of dental movements to a clinical acceptance threshold of <0.05

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mm, and support timely interventions, thereby streamlining orthodontic workflows. Additionally, patient satisfaction and feedback with DM are mixed, and patient compliance tends to reduce at the end of the observation. Further large-scale, heterogeneous studies are recommended to strengthen the evidence base and explore the software's full range of applications.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.254
SP208 THE ART OF SMILE RESTORATION: AESTHETIC EVALUATION OF TREATMENT STRATEGIES FOR MISSING MAXILLARY LATERAL INCISORS

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AIM: This study explores the aesthetic impact of four treatment approaches for rehabilitating missing maxillary lateral incisors: a) canine substitution without build-up, b) canine substitution with build-up, c) resin-bonded fixed dental prostheses, and d) dental implants. Objective aesthetic outcomes were measured and compared with a control group with intact lateral incisors who underwent full fixed non-extraction orthodontic treatment.
MATERIALS AND METHODS: A total of 144 digital intraoral photographs from expert clinical archives were analyzed and divided into five groups, including a control group. Aesthetic outcomes were objectively assessed using ImageJ software based on Recurring Esthetic Dental (RED) proportion, vertical position of the maxillary lateral incisor, black triangles, gingival zenith, color, and apparent contact dimensions. Rigorous statistical analyses were performed to determine significant differences among the treatment groups.
RESULTS: RED proportion: The canine substitution groups (both with and without build-up) showed significantly better results compared to the resin-bonded fixed dental prostheses. Vertical Position: Resin-bonded fixed dental prostheses were superior to canine substitution with build-up. Black Triangles: Canine substitution groups (both with and without build-up) and the control group had fewer black triangles than resin-bonded fixed dental prostheses. Gingival Zenith: The canine substitution groups (both with and without build-up) were less favorable compared to resin-bonded fixed dental prostheses and the control group. Colour: The canine substitution groups (both with and without build-up) and resin-bonded fixed dental prostheses had poorer colour outcomes compared to the control group. Apparent Contact Dimensions: The canine substitution with build-up group and control group had better central-lateral incisor contact dimensions than the canine substitution without build-up. The contact dimensions: lateral incisor-canine was better in the canine substitution (both with and without build-up) and control groups compared to resin-bonded fixed dental prostheses and dental implants.
CONCLUSIONS: No single treatment approach excelled across all parameters, emphasizing the importance of tailoring treatment plans to align with each patient's aesthetic priorities. Collaborative decision-making between clinicians and patients is vital for optimizing satisfaction and outcomes.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.255
SP209 PERCEPTION OF FACIAL PROFILES: SELF-RECOGNITION AND PREFERENCE TRENDS AMONG ORTHODONTISTS, PATIENTS, AND LAYPEOPLE

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AIMS Soft tissue features are central to orthodontic diagnosis and treatment planning, as they can significantly influence clinical decisions. Clinicians focus on achieving ideal facial profiles which are believed to be important for facial attractiveness. Mandibular excess or deficiency tends to diminish attractiveness and increase the likelihood of seeking surgical correction. Research indicates that clinicians, due to their expertise, have stricter standards for aesthetic acceptability than orthodontic patients or laypersons. Therefore, this study aimed to explore whether differences in self-recognition and preferences of facial profiles with regards of mandibular chin prominence exist among orthodontist, orthodontic patients and laypeople.

MATERIALS AND METHODS Participants in this prospective study were enrolled from the Section of Orthodontics Aarhus University, Denmark and comprised participants from three distinct groups including 46 orthodontic specialists or postgraduate students, 35 orthodontic patients and 35 laypeople. All participants had a left-sided profile photograph taken, which was digitally altered in Adobe Photoshop, to move the soft tissue pogonion -6, -3 pixels backward and +3 and +6 pixels forward, which corresponds to minor or moderate chin retrusion and protrusion respectively. The pictures were then converted to black and white silhouettes and the participants completed a questionnaire that collected demographic information and assessed their self-recognition and self-preference regarding the modified profile silhouettes, which were numbered 1–5 and presented in a randomized order. Chi-Square and the Fishers exact tests were used to assess intergroup differences.

RESULTS The three groups were comparable in regards of age and sex. No inter-group differences were observed in regards of self-recognition (p=0.373). Less than 50 % were able to their own actual profile in all three groups. Regarding self-preference, most participants preferred their own or minor altered profiles. No intergroup differences were seen (p=0.139). The more extreme altered profiles were the least preferred and the moderate protrusive profile was the least preferred in all groups. No gender differences were observed both in regards of self-recognition and self-preference.
CONCLUSIONS: In conclusion, this study showed that the awareness of own actual facial profile is limited among both orthodontists, orthodontic patients and laypeople.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.256
SP210 IMPACT OF ORTHODONTIC MINI-IMPLANT LENGTH ON STABILITY

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AIM: Orthodontic mini-implant stability is a crucial factor to consider when planning orthodontic treatment. This systematic review aimed to determine the implant length that ensures optimal stability.
MATERIALS AND METHOD: A systematic review was conducted in compliance with PRISMA requirements. An electronic search with the keywords: "mini-implant", "mini-screws", "length", "orthodontic", and "stability" was performed up to December 1, 2024, in PubMed, Science Direct, Scopus, and Google Scholar. The inclusion criteria were: full-text research articles written in English, published from 2014 to 2024, in vivo and in vitro trials analyzing the stability of mini-implants of different lengths.
RESULTS: Out of 247 identified records, 8 were included in the final analysis. Two studies were conducted in vivo, and six studies were conducted in vitro. A total of 434 orthodontic mini-implants were analyzed (340 in vitro; 94 in vivo). The studies examined mini-implants with lengths of 6 mm, 8 mm, 8.5 mm, 9 mm, 10 mm, 11 mm, and 13 mm. One in vivo study showed that, in the upper dental arch, the stability of 8 mm mini-implants was better than 6 mm; two in vitro studies reached the same conclusion. Two studies reported no difference in stability between 6 and 8 mm, and one study showed no difference between 8 mm and 10 mm mini-implants and emphasized that stability is more determined by the width of the mini-implant and the thickness of the periosteum. One in vivo study analyzed the stability of palatal mini-implants with lengths of 9 mm and 11 mm. Additionally, when threaded into the midpalate area, both 9 mm and 11 mm mini-implants exhibited good stability; however, it was recommended to use 9 mm mini-implants to avoid damaging the incisive canal. One in vitro study mentioned that there is no difference in stability between mini-implants with lengths of 8.5, 10, and 13 mm.
CONCLUSIONS: All evaluated orthodontic mini-implants, regardless of length, demonstrated stability. For midpalate placement, 9 mm implants are recommended to reduce the risk of damage to anatomical structures such as the incisive canal.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.257
SP211 DENTIN HYPERSENSITIVITY AFTER INTERPROXIMAL ENAMEL REDUCTION IN PATIENTS TREATED WITH CLEAR ALIGNERS: DESENSITIZING EFFECT OF DIODE LASER VS SODIUM FLUORIDE

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AIMS: This study evaluated dentin hypersensitivity and gingival health after interproximal enamel reduction (IPR) in patients treated with clear aligners and compared the desensitizing effect of laser diode versus sodium fluoride.
MATERIAL AND METHODS: The study was a triple-blinded randomized controlled clinical trial. To be eligible for inclusion, patients had to respect for the following criteria: permanent dentition and good oral and general health. Patients with a previous history of hypersensitivity, enamel defects, cervical caries, periodontal disease, or pregnancy were excluded.

A total of 45 patients with an orthodontic treatment plan including clear aligners and IPR (aged 14–63 years) were randomly assigned to three groups: Group A (treated with acidulated sodium fluoride gel: 0.33% NaF), Group B (treated with a diode laser: Soft Touch, 810 nm, 0,5W), and Group C (control, no treatment). In all groups, the response to air stimuli and the gingival indices were recorded before (T0) and immediately after IPR (T1), one week (T2), one month (T3), and three months post-treatment (T4). Dentin hypersensitivity (DH) was assessed using a visual analog scale (VAS) by a blinded operator, while gingival health was evaluated using Silness and Löe Plaque and Gingivitis Indices. Longitudinal effects were analyzed with Linear Mixed Models, and repeated measures ANOVA with Holm's adjustment was used for comparisons.
RESULTS: All groups showed an increase in DH immediately after IPR compared to baseline, which subsequently decreased at T2, T3, and T4. The laser group exhibited a statistically significant 10% reduction in DH, with rapid improvement one week post-treatment and sustained benefits over time. The gingival index improved or remained stable across all groups, with the laser group showing the most pronounced improvements. Moreover, the Plaque index was reduced in all groups.
CONCLUSIONS: The application of diode laser, after IPR, effectively reduced DH without adversely affecting gingival health. This finding supports the use of laser therapy to manage DH in orthodontic patients undergoing IPR.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.258
SP212 ‡‡‡ KERATINIZED AND ATTACHED GINGIVA WIDTH CHANGES THAT FOLLOW ORTHODONTIC EXTRUSION

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AIMS: To examine the effect of orthodontic tooth extrusion on the width of the keratinized and attached gingiva
MATERIAL AND METHODS: The study included 28 patients, with the age range from 19 to 30 years, who presented to the Clinic for Orthodontics, School of Dental Medicine, University of Belgrade for orthodontic treatment. Only patients with completed dental and skeletal growth (above 18 years of age) were included to avoid possible passive eruption of teeth that can occur in young patients. There were 15 patients (6 male and 9 female) who underwent orthodontic treatment. Control group consisted of 13 patients (3 male and 10 female) that did not accept orthodontic treatment. Patients with periodontal disease and periodontal pockets in the frontal region, and patients allergic to iodine were excluded from the study.

Extrusion was achieved using fixed orthodontic straight wire appliances (conventional metal brackets, Roth prescription, slot 0.022").

Extrusive orthodontic force was measured using a dynamometer and was ≤ 50 g Gingivomorphometric measurements were performed on two occasions in both groups (24 extruded, 30 agonists and 66 teeth in control group).

Statistical analysis of the obtained data was performed using the software package SPSS version 26.0.
RESULTS: Orthodontic extrusion induced statistically significant increase of the width of the keratinized gingiva. The attached gingiva width value showed slight increase but there was no statistically significant difference compared control group.
CONCLUSIONS: Orthodontic tooth extrusion may have a positive effect on the periodontium in the observed region. Vertical orthodontic force, directed towards coronary, effects the surrounding soft oral tissues.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.259
SP213 ASSESSMENT OF CLINICAL PREDICTABILITY OF OVERBITE REDUCTION AND CURVE OF SPEE LEVELING IN CLEAR ALIGNER TREATMENT

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AIMS: This study evaluated the accuracy of clear aligner therapy (CAT) in reducing the Overbite (OVB) and leveling the Curve Of Spee (COS) in growing and non-growing patients with deep bite malocclusion. The aims were to determine whether the predicted movements in the ClinCheck treatment plan match the actual movements achieved in practice, and whether overcorrections are necessary for optimal results.
MATERIAL AND METHODS: This retrospective study included 36 patients (19 males, 17 females, mean age: 23.6 ± 10.8 years) who underwent Invisalign treatment between January 2018 and 2023. Patients with an overbite between 4 mm and 8 mm, and a prescribed COS and OVB reduction in their ClinCheck plan, who did not require extractions or surgery and who had all mandibular teeth erupted, were included in the study. Digital models (STL files) of the maxillary and mandibular arches were acquired at pre-treatment (T0), from the virtual treatment plan (T1), and at post-treatment (T2). COS depth and OVB were measured using Geomagic Control X software, and the accuracy of the achieved movement was compared to the planned movement. Statistical analysis was performed using paired t-tests and linear regression models.
RESULTS: The study found that on average, the planned overbite reduction was 3.23 mm, while the achieved reduction was 2.00 mm (accuracy of 61%). The planned COS was 1.18 mm, while the achieved COS was 1.61 mm (accuracy of 62%). The second molars showed the highest accuracy (83%), while the second premolars had the lowest (57%). Statistical analysis revealed significant differences between the planned and achieved movements for both OVB and COS. Age did not significantly influence accuracy, although the first premolar showed a decrease in accuracy with age.
CONCLUSIONS: The results indicate that clear aligners, specifically Invisalign, achieve approximately 61% accuracy in OVB reduction and 62% accuracy in COS leveling, with no significant difference between growing and non-growing patients. Overcorrections turn out to be necessary to improve treatment outcomes, as the planned movements tend to overestimate the actual results. Further research is needed to compare different protocols and aligner brands, as well as to investigate the amount of overcorrection required.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.260
SP214 COMPARISON OF THE ACTIVATOR AND FIXED FUNCTIONAL APPLIANCES – EFFECTS ON SKELETAL, DENTOALVEOLAR AND AIRWAY IN SKELETAL CL II DIV 1 INDIVIDUALS

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AIMS: It has been showed that functional appliances used in the treatment of skeletal Class II malocclusions associated with inadequate development of the mandible may have positive effects on the skeletal structure and airway by positioning the mandible anteriorly. The aim of this study is to compare the effects of fixed functional (Forsus FRD) and activator appliances on skeletal, dentoalveolar and nasopharyngeal airway in patients with skeletal Cl 2 Div 1 anomalies caused by mandibular retrognathia.
MATERIAL AND METHODS: In this retrospective study, the sample group was obtained from the archives of the Department of Orthodontics, Faculty of Dentistry, Ankara University. The study was conducted on a total of 40 patients with skeletal Cl 2 anomalies originating from the mandible (ANB>4°) who were in the growth and development period. 1st group (G1) consisting of 20 patients was treated with activator (10 female, 10 male, mean age 11.9 ± 0.71 years), and 2nd group (G2) consisting of 20 patients was treated with Forsus FRD (6 female, 14 male, mean age 12.7 ± 1.49 years). The mean treatment duration was 12 months. The effects were evaluated on lateral cephalometric radiographs obtained at the beginning (T0) and at the end of the treatment (T1).
RESULTS: With Forsus FRD and activator appliances, a non-significant decrease in SNA and a significant increase in SNB and ANB values were obtained. While no

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change was observed in SN/GoGn values in G2, a decrease in Gonial Angle values was observed; in G1, a significant increase was observed in the same values. In addition, a significant increase was observed in Co-Gn, Go-Gn values in both groups. A significant increase in PNS-Ad2, MAS values were observed. In G1 group, a significant increase was also observed in PNS-Ad1, SPAS, IAS, OAW1 and OAW2 values used in airway measurements.
CONCLUSIONS: For both treatment methods, significant changes were observed in the skeletal, dentoalveolar and airway. Although not significant, the change in the sagittal direction was greater in the activator group for the skeletal effect and as a result, more effect was obtained on the pharyngeal airway.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.261
SP215 ORTHODONTIC TREATMENT ACCESS IN 10-18 YEARS OLD ADOLESCENTS: A CROSS-SECTIONAL EPIDEMIOLOGICAL STUDY IN NORTHEAST GERMANY

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AIM: Orthodontic treatment plays an important role in managing malocclusion and enhancing oral health. This study investigates the orthodontic treatment access among adolescents in the district of Greifswald, Germany.
MATERIALS AND METHODS: Cross-sectional data were collected between 2021 and 2023 as part of the compulsory dental school examinations in the District of Greifswald, Northeast Germany (ethical approval: reg. no.BB 129/20/Greifswald University). Two calibrated examiners conducted an intraoral examination using a dental mirror and an overbite-ruler. A brief interview gathered orthodontic treatment history. Findings were documented in Excel and analyzed in Stata using chi-squared tests for statistical evaluation.
RESULTS: A total of 5888 adolescents (48.6% females), aged 10–18 years (mean age: 14.5 ± 2 years), were examined between 2021 and 2023 in Greifswald and surrounding municipalities. Four participants refused to answer the questions regarding orthodontic treatment. Overall, 64.7% (n=3810) had not received orthodontic treatment, 14.1% (n = 828) were currently undergoing treatment, and 21.2% (n = 1246) reported earlier treatment. Gender was significantly associated with orthodontic treatment ($p<0.001$): 44.1% of untreated participants were female (n=1682) and 55.9% were male (n=2128). Among those currently undergoing orthodontic treatment, 53.9% were female. Additionally, 58.6% of participants who had completed treatment were female. The proportions of adolescents undergoing or having completed orthodontic treatment were similar in public (35.8%) and private (33.1%) schools ($p=0.19$). However, depending on the age of participants, orthodontic treatment history differed between different school types. Up to the age of 13, there were no significant differences; but from the age of 14 and above (n=3108), the proportion of children without orthodontic treatment was 66.5% for "Regionalschule", 62.0% for "Gesamtschule", 49.3% (n=724) for "Gymnasium" and 56.4% (n=137) for vocational schools ($p<0.001$).
CONCLUSION: The findings reveal that more females have earlier and ongoing orthodontic treatment than males, potentially reflecting gender differences in health-seeking behavior. Access to orthodontic care appears similar between private and public schools, but varies across school types. This suggests equitable treatment opportunities within Germany's healthcare and insurance systems, regardless of income.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.262
SP216 THE EFFECTIVENESS OF A NOVEL BIODEGRADABLE POLYMER AS A PROTECTIVE BARRIER FILM AGAINST BACTERIAL THREATS

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AIMS: This study assessed whether an innovative biodegradable polymer film efficiently inhibits bacterial penetration (leakage).
MATERIAL AND METHODS: A novel polysaccharide-based biodegradable polymer film was fabricated by crosslinking (CL) with glutaraldehyde: 0h (no CL) (n=9), 3h CL (n=6), and 6hr CL group (n=7). The conventional plastic barrier film used in dental offices was a control (n=1). The experimental design was adapted from the International Organization for Standardization 22196. The filter paper was placed on a sterile petri dish, the experimental film was put on top of the filter paper, and *S. aureus* was placed on the plastic sample. A plastic covering was placed over the bacteria and plastic sample to distribute the inoculum and prevent the liquid from leaking over the sides of the sample. The samples were set aside for three hours, and the number of bacteria leaked through the sample was counted after incubating the plates overnight. The number of CFUs/ml was compared using Kruskal-Wallis tests, and leakage rates were compared using Fisher's exact chi-squared test.
RESULTS: A total of 23 samples were evaluated, including one sample of a negative control, which demonstrated no leakage, and two samples of a positive control, which both demonstrated apparent leakage. The median CFU/ml was 0 for the samples with 6h CL, 114 for those with 3h CL, and 66 for those without CL. The difference in CFU/ml for the three cross-linking levels was not statistically significant ($p=0.6743$). When comparing leakage rates, 33% of the films with 6h CL showed leakage, while 60% with 3h CL exhibited leakage. Additionally, 56% of 0h samples without CL showed leakage. The differences were not statistically significant ($p=0.7272$).
CONCLUSIONS: These results suggest that crosslinking may impact bacterial leakage, with the 6h films exhibiting the lowest values. The novel biodegradable polymer may have the potential to inhibit harmful bacteria and their growth. However, further research is required to validate these findings.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.263
SP217 COMPARISON OF PAIN DURING RAPID MAXILLARY EXPANSION AND DENTAL ANXIETY BETWEEN GROWING INDIVIDUALS WITH UNILATERAL CLEFT LIP AND PALATE AND NONCLEFT CONTROLS

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AIMS: This study aimed to compare pain perception during rapid maxillary expansion (RME) and dental anxiety between patients with unilateral cleft lip and palate (UCLP) and noncleft individuals.
MATERIAL AND METHODS: The prospective case–control study included 18 Caucasian patients (10 with UCLP, 8 noncleft; among them 14 males and 4 females) treated at the Department of Maxillofacial Orthopaedics and Orthodontics in Wroclaw, Poland. Participants required maxillary expansion and were aged 8–16 years (mean 10.37). Patients with other craniofacial abnormalities or conditions impairing cooperation were excluded. Treatment used rapid maxillary expanders with bands on first permanent molars and clasps on deciduous or permanent canines. Devices were activated daily (0.2 mm) until desired expansion was achieved, with patients advised to use nonprescription analgesics if needed.

Dental anxiety was assessed pre-treatment using the Modified Child Dental Anxiety Scale-Facial Version (MCDAS-f), an 8-question index with scores ranging from 8 (no anxiety) to 40 (severe phobia). Patients completed the questionnaire anonymously via a custom mobile application. The app also collected pain data during the first seven activations, using a VAS scale (0–10) for pain intensity and additional questions about pain while eating, biting, and analgesic use. Results from incomplete entries were excluded.
RESULTS: A mediation analysis explored the effects of group, gender, and age on pain, mediated by anxiety level. No statistically significant relationships were identified. Even when the factors' influence was mediated by anxiety level, their effects remained nonsignificant.
CONCLUSIONS: The results show no difference in experiencing pain and dental anxiety between patients with clefts and non-cleft individuals. The findings suggest subtle relationships between the variables, requiring further investigation with a larger sample size.
Disclosure of interest: None declared

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Abstract citation ID: cjaf073.264
SP219 ENHANCING ORTHODONTIC TREATMENT EFFICIENCY WITH LOW-INTENSITY PULSED ULTRASOUND (LIPUS) AND CLEAR ALIGNERS

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AIMS: his study evaluated the impact of Low-Intensity Pulsed Ultrasound (LIPUS) on orthodontic treatment outcomes when used with clear aligners, focusing on treatment duration, refinement frequency, and bone radio density.
MATERIAL AND METHODS: A retrospective analysis was conducted on 68 orthodontic cases treated at a private clinic. Patients were divided into two groups: 34 received LIPUS treatment (Aevo System), and 34 served as controls. All patients were treated exclusively with clear aligners. Treatment complexity was categorized using the ABO Discrepancy Index (DI). LIPUS adherence rates and aligner usage patterns were recorded. Treatment outcomes, including duration, refinement count, and changes in bone radio density (measured in Hounsfield units via CBCT), were statistically analyzed using t-tests and Mann-Whitney U tests.
RESULTS: The LIPUS group experienced a 43.58% reduction in treatment time (544.68 ± 238.97 days vs. 964.82 ± 417.9 days; $p < 0.001$). A significant decrease in tray change intervals (5.42 ± 1.02 vs. 10.17 ± 3.18 days; $p < 0.001$) and refinements (1.56 ± 1.11 vs. 2.41 ± 1.28; $p = 0.0045$) was observed. LIPUS-treated patients exhibited increased bone radio density in maxillary regions ($p < 0.001$) with no reported side effects.
CONCLUSIONS: LIPUS enhances orthodontic treatment by reducing treatment duration and the number of refinements while improving bone radio density, although further research is recommended to validate these outcomes in diverse populations.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.265
SP220 ‡‡‡ FACIAL FEATURES OF CARTOON CHARACTERS AND THEIR PERCEIVED ATTRIBUTES

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AIMS: The aim of this study is to investigate the relationship between skeletal antero-posterior profile of popular family cartoon characters and their perceived personal characteristics.
MATERIAL AND METHODS: The Internet Movie DataBase (IMDB) was used to identify popular animated family movies released since 2000. Cartoon characters were identified and classified based on their gender (male/female), skeletal profile (Class I, II or III) and character assessment (protagonist / antagonist). Descriptive statistical analysis was carried out. Chi Square analysis was used to assess the differences (p-value) between gender and character assessment against the skeletal profile.
RESULTS: Fifty popular animated family movies were identified. Within these 88 humanoid cartoon characters were identified made up of 32 male protagonists, 27 female protagonists, 22 male antagonists and 7 female antagonists. 40, 30, 21 were assessed as having Class I, II and III skeletal profiles respectively. Statistically significant differences were observed in both female protagonists/ female antagonists' and male protagonists/ female protagonists' values for Class III characters ($P = 0.009$ and $P = 0.006$, respectively). However, no significant variations were noted when comparing the remaining groups.
CONCLUSIONS: Female antagonists and male protagonists were most likely to be portrayed with a Class III skeletal pattern when compared to female protagonists and male antagonists respectively.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.266
SP221 COLOR STABILITY OF TWO TYPES OF CLEAR THERMOPLASTIC RETAINERS: A COMPARATIVE STUDY

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AIMS: The purpose of the study was to compare the color stability of two types of clear thermoplastic retainers (Essix® ACE and Vivera®) and their discoloration after a span of 3 months using ΔE values based on the CIELAB system to evaluate color changes.
MATERIAL AND METHODS: Patients were randomly allocated into two groups following the completion of active orthodontic treatment. Group 1 were patients who received the Essix® ACE retainers while Group 2 were patients with the Vivera® retainers. Each patient was provided with one fabricated retainer. The CIELAB parameters of the upper central incisors were measured using a VITA Easyshade Advance 4.0 spectrophotometer immediately after retainer placement (T0), 7 days (T1), 1 month (T2), and 3 months (T3). Measurements were also taken on teeth without retainers. ΔE values were calculated, and statistical analysis was performed using the Friedman test for intragroup comparisons and the Mann-Whitney U test for intergroup comparisons.
RESULTS: No significant color changes were observed within either group throughout the study period. In the Essix® group, ΔE values at T1, T2, and T3 showed no differences compared to baseline (T0), with a *p-value* of 0.174. Similarly, the Vivera® group demonstrated no significant color changes over time, with a *p-value* of 0.323. When comparing the two groups, no significant differences in ΔE values were found between Essix® and Vivera® at any time point. The *p-values* were 0.069 for T1-T0, 0.931 for T2-T0, and 0.488 for T3-T0.
CONCLUSIONS: Essix® ACE and Vivera® retainers both demonstrated excellent color stability over a 3-month period, with no significant differences between the two materials. These findings suggest that both types of retainers are reliable for clinical use where aesthetic considerations are essential.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.267
SP224 ACCURACY OF LARGE LANGUAGE MODELS IN THE GENERATION AND INTERPRETATION OF SPACE ANALYSIS AND DIAGNOSTIC SUMMARY DERIVED FROM TEXT-BASED ORTHODONTIC ANATOMIC INFORMATION

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AIMS: This study compares the accuracy in the generation and interpretation of space analysis and diagnostic summary generated by four general Large Language Models (LLMs) – *ChatGPT o1, Gemini Advanced 1.5 Pro, Claude 3.5 Sonnet and Perplexity Pro*, specifically focusing on the description, distillation and discernment of abnormal anatomic and spatial abnormalities from text-based information.
MATERIAL AND METHODS: The calculation method of space analysis and template of diagnostic summary based on lateral cephalometric values were input into each LLM.

One hundred identical sets of anatomical data detailing various anatomical abnormalities were analysed by each LLM. The accuracy of each response was scored as "1" if correct and "0" if incorrect. Statistical analyses, including t-tests and ANOVA, were conducted to compare the performance of the four LLMs, and intra-rater reliability was assessed ($p<0.05$).
RESULTS: Claude 3.5 Sonnet, Perplexity Pro and ChatGPT o1 demonstrated excellent performance in space analysis with perfect score of 100% each, while Gemini Advanced 1.5 Pro did not manage to provide accurate calculation of space analysis, scoring 5% ($p<0.05$).

Claude 3.5 Sonnet topped the capabilities of LLMs in generating accurate diagnostic summary based on lateral cephalometric values scoring 95%, followed by Perplexity Pro (85%), ChatGPT o1 (70%) and Gemini Advanced 1.5 Pro (50%) ($p<0.05$).
CONCLUSIONS: Claude 3.5 Sonnet excelled in generating and interpreting space analysis and diagnostic summary. This study offers insights on how to explore the potential integration of LLMs in clinical settings.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.268
SP225 MAXILLARY AND MANDIBULAR GROWTH ASSESSMENT IN SKELEATL CLASS III KOREANS ACCORDING TO SKELETAL MATURATION: A LONGITUDINAL RESTROSPECTIVE STUDY

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AIM: Treatment of class III malocclusion is challenging. Due to the rapid mandibular growth during the growth phase, relapse of crossbite can occur after phase 1 treatment. Residual growth after puberty also can exacerbate

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posterior occlusion. This study aims to analyze mandibular growth patterns according to skeletal maturity in Korean patients with skeletal Class III malocclusion, providing clinical insights for orthodontic treatment.
METHODS: The study included patients (Class III: 39 males, 29 females; Class I: 30 males, 30 females) with serial radiographs from SMI stages 1–11. Class III was defined by an initial ANB ≤ 1°, and Class I by an ANB angle between 1° and 5°. Patients with congenital anomalies or undergoing growth hormone therapy were excluded. Mandibular and maxillary dimensions were measured using WebCeph (ver 2.0, Assemblecircle). Independent t-tests and Cohen's d were used to assess group differences.
RESULTS: Despite undergoing facemask therapy, the maxillary length (ANS-PNS) in the Class III group was smaller than in the Class I group across all stages. Class III males exhibited significantly greater mandibular length(Co-Gn) and higher mandibular growth velocity compared to Class I males from SMI 1 through SMI 11.

In contrast, Class III females showed no significant differences in mandibular length and growth velocity compared to Class I females up to SMI 8. After the pubertal growth peak (beyond SMI 9), late growth occurred, resulting in clinically significant differences compared to Class I females.

In both males and females, the mandibular size gap between Class III and Class I groups widened as growth progressed. Notably, major mandibular growth was observed in Class III patients even after the pubertal growth spurt, with late growth of approximately 2.27 mm in males and 2.51 mm in females during SMI 10–11.
CONCLUSION: Class III males had consistently larger mandibles and faster growth throughout all SMI stages. In Class III females, significant differences in mandibular size compared to Class I females emerged after SMI 9. Late mandibular growth is a critical consideration in Class III treatment planning.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.269
SP226 THE EFFECT OF GENDER ON ESTHETIC PERCEPTION OF MAXILLARY LATERAL INCISOR WIDTH RATIOS AMONG ORTHODONTISTS

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AIMS: To study the effect of gender on the esthetic perception of the width ratios of maxillary lateral incisors in orthodontist.
MATERIAL AND METHODS: This study included 50 orthodontic specialists aged between 29 and 55 years, equally divided between males and females. Data were collected through an online questionnaire. A frontal smile image was selected as the standard reference, where the width ratio of the maxillary lateral to central incisors was adjusted to achieve a 7:10 or 70% Recurring Esthetic Dental proportion. Subsequently, the size of the maxillary lateral incisors was modified using Adobe Photoshop CC 2019 to achieve the following width ratios: 5:10, 6:10, 7:10, and 8:10, resulting in a total of four ratios. Participants rated the esthetic appeal of each smile image using a Numerical Rating Scale ranging from 0 to 10. The data were analyzed using IBM SPSS Statistics version 29.0. Mann-Whitney U test was performed to compare the esthetic scores between male and female participants for each image, with statistical significance set at $p < 0.05$.
RESULTS: The mean age of the participants was 38.92 ± 7.40 years. The 7:10 ratio received the highest esthetic scores, with a mean score of 8.12 ± 1.17 among males and 8.24 ± 1.27 among females. The 5:10 ratio received the lowest scores, with a mean score of 5.04 ± 2.22 among males and 4.96 ± 2.05 among females. No statistically significant differences in esthetic scores between male and female participants were observed for any of the width ratios.
CONCLUSIONS: It could be concluded that gender had no significant influence on the perception of the esthetic proportions of maxillary lateral incisor width among orthodontists.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.270
SP228 STATUS OF EAR, NOSE AND THROAT IN CHILDREN WITH UNILATERAL POSTERIOR CROSSBITE. CONTROLLED CLINICAL TRIAL WITH 4-YEAR FOLLOW-UP

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AIMS: The objective of this study was to examine the ENT structures, orofacial dysfunctions, and speech disorders in children with unilateral posterior crossbite (ULCB) during the early mixed dentition phase. Additionally, the study aimed to compare these factors with those of healthy control subjects and assess the changes in these parameters following treatment with a rapid maxillary expander.
MATERIAL AND METHODS: The study included 31 children (15 boys, 16 girls) with ULCB (mean age 7.62±1.3 years), who were referred for orthodontic treatment, and 31 age-matched controls (15 boys, 16 girls) without malocclusion (mean age 7.63±0.67 years) from a local primary school. Clinical examinations were performed by an orthodontist, an ENT specialist, and a speech therapist. Children with ULCB were treated with a Haas-type maxillary expander, and follow-up examinations were conducted by the ENT specialist. The data were analyzed using chi-square, Mann-Whitney, and Wilcoxon tests.
RESULTS: Significant differences were found between the ULCB and control groups at baseline. The ULCB group had a significantly higher prevalence of impaired nasal breathing ($P<0.001$), enlarged adenoids ($P=0.005$), tongue posture at the floor of the mouth ($P=0.001$), incompetent lip seal ($P=0.026$), and articulation disorders ($P<0.001$). After treatment with the maxillary expander, significant improvements were observed in nasal breathing ($P=0.001$), tongue posture ($P<0.001$), adenoid size ($P<0.001$), mentalis muscle hyperactivity ($P=0.025$), upper lip competence ($P=0.014$), and swallowing patterns ($P=0.031$).
CONCLUSIONS: Unilateral posterior crossbite in early mixed dentition is associated with articulation disorders, impaired nasal breathing, altered tongue posture, and enlarged adenoids. Maxillary expansion significantly improved nasal breathing, reduced adenoid size, and corrected tongue posture, highlighting the positive impact of this treatment on orofacial and ENT function in these children.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.271
SP229 CHANGES IN UNTREATED CUSP-TO-CUSP OCCLUSION WITH MIXED DENTITION

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AIMS: To study changes in the dental arches and molar relationships in untreated patients with cusp-to-cusp molar relationships in the mixed dentition stage.
MATERIAL AND METHODS: Data for this study were collected retrospectively at Vaasa Health Care (Vaasa, Finland). There was standard practice to obtain orthodontic records (study models, panoramic and lateral X-rays) from patients once they met the public health criteria for the eligibility to orthodontic treatment. However, due to a lengthy waiting time before actual treatment started the records became outdated and required updating.

The study included 19 patients (9 female, 10 male). At the baseline (T1) all patients had cusp-to-cusp molar relationship and mixed dentition, mean age was 9.9 years (range 7.7-12.2 years). The mean period the second set of records were obtained was 3.3 years (range 2.2-5.0 years). That time (T2) 10 patients had permanent dentition. Linear measurements on dental arches were made on digital study models (Romexis Model Analyser, Planmeca, Finland). Wilcoxon test was used for statistical analysis.
RESULTS: At T1 mean overjet was 4.2 mm (± 1.9 mm) and overbite 2.9 mm (± 1.9). Overjet and overbite tended to increase, although this was not statistically significant.

The only statistically significant change in the upper arch was an increase in canine-canine dimension (mean 2.0 mm, ± 2.4 mm, $P = 0.001$)

In the lower arch, the length of the posterior segment significantly decreased (left mean -1.8 mm, ± 1.8 mm, $P = 0.003$; right mean -1.8 mm, ± 1.3 mm, $P = 0.000$). Total arch length decreased by 2.8 mm (± 2.8 mm, $P = 0.001$).

Cusp-to-cusp relationship shifted to Class II in 7.9 % of cases, to Class I in 39.5 %, and remained unchanged in 52.6 %.
CONCLUSIONS: During the mixed dentition stage, the lower dental arch shortens, and upper canine width increases. Lower arch shortening likely results from the loss of Leeway space and mesial drifting of 1st permanent molars, while the increase in upper canine width is due to permanent canine eruption. In this dataset, cusp-to-cusp molar relationship often remained unchanged. Changes in the overjet and overbite were minor.
Disclosure of interest: None declared

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Abstract citation ID: cjaf073.272
SP230 CURVE OF SPEE LEVELING BY USING THREE DIFFERENT CLEAR ALIGNER SYSTEMS

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AIMS: To evaluate curve of Spee (COS) leveling in deep bite patients by using three different clear aligners: Invisalign Aligner, Spark Clear Aligner, and Angel Aligner.
MATERIAL AND METHODS: Three groups (I, S, A) of patients in a private dental office were selected on specific criteria: age between 16 and 25, Cl.I dental relationship, permanent dentition, no periodontal problems, and no third molars.

All patients were treated by the same operator, having certified experience in the use of the clear aligner technique, following the standardized protocol for deep bite resolution: use of conventional rectangular attachments, bite ramps, aligner change every 10 days, number of aligners ranging from 20 to 40, no overcorrection nor auxiliaries.

The STL files of the arches derived from scans were analyzed using MeshLab software at three specific points: ID (pre-treatment), AC (post-treatment), defined as the result achieved after the first set of aligners without any refinement, and EC (digital planning). Perpendicular distances from the occlusal plane to the margin of the buccal cusp tip of each tooth from the second molar to the canine were measured. In all three groups, the differences between AC-ID and EC-AC were examined using the Wilcoxon test; successively, intergroup variations were compared also using the Kruskal-Wallis test.
RESULTS: The study revealed that aligners were only minimally effective at leveling the curve of Spee. The planned dental movements were not achieved, leading to a low predictability of the treatment. Across all groups, higher predictability values were found in canines and lower second molars. The highest mean accuracy was found in the Angel Aligner group (39%).
CONCLUSIONS: As described in literature, the clear aligner treatment for leveling the curve of Spee presents limits in terms of biomechanics of the device. The study shows that Angel Aligner devices are the most effective and predictable; however, no clinically and statistically significant differences emerged across the three systems used.

In conclusion, to achieve more predictable movements and successful treatment outcomes, especially for certain malocclusions, clinicians should consider hybrid treatment.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.273
SP231 3D-PRINTED PHANTOMS AS AN INNOVATIVE TEACHING AID IN DENTAL EDUCATION FOR CLEFT LIP AND PALATE

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AIMS: This study aimed to evaluate the educational impact of integrating 3D-printed phantoms as a teaching aid in dental education on cleft lip and palate (CLP), focusing on improving knowledge, spatial understanding, and student satisfaction compared to traditional teaching methods.
MATERIAL AND METHODS: This monocentric prospective intervention study involved 81 dental students in their 7th or 8th semester, divided into a control group (CTR, n=39) and an intervention group (INT, n=42). The CTR group attended a standard lecture using 2D slides, while the INT group participated in a hands-on seminar supplemented with 3D-printed phantom heads and feeding plates.

Six life-sized phantom heads with removable mandibles (three with unilateral and three with bilateral CLP) were designed using ZBrush software (Maxon Computer GmbH, Bad Homburg, Hessen, Germany), based on MRI images. Feeding plates matched to the cleft lip and palate of each phantom head were designed using OnyxCeph software (Image Instruments GmbH, Chemnitz, Germany). Both the phantom heads and their corresponding feeding plates were printed with the Asiga Pro 4K 3D printer (Asiga, Sydney, Australia).

Both groups completed the same multiple-choice test (MCT) and self-assessment questionnaires before and after the seminar to evaluate knowledge improvement and self-perception. Additionally, a course evaluation was conducted after the seminar. Statistical analyses were performed using the paired t-test or Wilcoxon signed-rank test for pre- and post-seminar comparisons, and the Wilcoxon-Mann-Whitney U test for group differences. The significance level was set at $p = 0.05$.
RESULTS: Both groups demonstrated significant knowledge improvements post-seminar ($p < 0.001$). However, the INT group showed significantly greater knowledge gains in understanding the anatomy of unilateral CLP and the use of feeding plates ($p < 0.05$). Student satisfaction was similarly high across both groups, with INT participants strongly agreeing that 3D-printed phantoms enhanced spatial understanding and comprehension of therapeutic principles.
CONCLUSIONS: The use of 3D-printed phantoms as a teaching aid significantly enhances learning outcomes in dental education on cleft lip and palate. These models provide students with a tangible, spatially accurate understanding of complex anatomical structures and treatment modalities, offering a cost-effective and impactful addition to conventional teaching methods.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.274
SP232 ‡‡‡ CORRELATION BETWEEN MID-PALATAL AND TRANSVERSE PALATINE SUTURE MATURATION STAGES ON CONE-BEAM COMPUTED TOMOGRAPHY IMAGES

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AIMS: The maturity of mid-palatal and transverse palatine suture has an important impact on maxillary expansion treatment outcome. Therefore, the aim of our study was to assess the correlation between maturation stages of the two sutures on cone-beam computed tomography (CBCT) images.
MATERIAL AND METHODS: A sample of 100 patients (56 females, 44 males, aged 33.91±22.67 years) with appropriate high-resolution CBCT maxillary images was screened. Firstly, assessment of the mid-palatal suture following the protocol described by Angelieri et al. was done. Patients were allocated into mid-palatal suture stages A, B, C, D and E (from least to most mature). Secondly, assessment of the transverse palatine suture was performed, however, previously selected central cross-sectional axial slice had to be readjusted to ensure better visibility of the transverse palatine suture. Patients were allocated into transverse palatine suture stages A, B, C, D and E, applying the qualitative characteristics as suggested for the mid-palatal suture by Angelieri et al. Patients with mid-palatal and transverse palatine suture maturational stage A were of limited number, therefore not included in further analyses. Lastly, Spearman's rho correlation coefficient was interpreted to assess the correlation between the mid-palatal and transverse palatine suture maturation stages.
RESULTS: A very strong positive significant correlation (Spear-man's rho = 0.839, $P < 0.001$) was seen between mid-palatal and transverse palatine suture maturation stages. Mid-palatal suture maturation stage C showed the most diverse distribution of the transverse palatine maturation stages compared to other mid-palatal suture stages. Additionally, concordance coefficient between mid-palatal and transverse palatine suture maturation stages was assessed using weighted Cohen's kappa and equalled 0.73, which indicates a strong agreement.
CONCLUSIONS: From a clinical perspective, CBCT assessment of the maturation stages of both sutures should be performed before maxillary expansion therapy. Greater distribution variability of the transverse palatine suture stages within patients with mid-palatal suture stage C might help explain why expansion treatment is sometimes successful and other times not within this group, however, further research is needed in this regard.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.275
SP233 SENSITIVITY OF MANUAL CONDYLE POSITION ASSESSMENT IN MANDIBULAR SURGERY

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AIM: Functional occlusion and facial aesthetic is provided by orthognathic surgery in the treatment of severe skeletal deformities when growth is completed. It is necessary to establish an occlusion compatible with the TMJ for stable results in orthodontic and surgical treatments. The position of the condyle is important in terms of skeletal and occlusion stability in mandibular surgery.

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The aim of this study was to investigate the results of manual determination of condyle position during mandibular sagittal split ramus osteotomy (SSRO). The null hypothesis of the study was that manual assessment of condyle position is a subjective method.
MATERIAL AND METHODS: The material of the study was consisted of the lateral cephalometric films of 14 adult individuals who applied for treatment at the department of orthodontics, Ankara University. Mandibular SSRO surgery was applied after orthodontic treatment. Condyle position was manualy assessed during mandibular surgery. Condylar position was evaluated on lateral cephalometric radiographs before orthodontic treatment (T0), immidiately after surgery (T1), and after orthognathic surgery (T2). Data in the T0, T1, and T2 periods was analysed with the SPSS 20 package program.
RESULTS: Dramatic results were obtained in the skeletal structure and facial profile in the T2 period. Statistically significant changes were found in the condyle position measurements. It was determined that the condyle was normal in the T0 period and supero-posteriorly positioned in the T1 period.
CONCLUSION: In mandibular surgeries, determining the condyle position and correcting it if necessary is important for stability. The sensitivity of the method of manually assessing the condyle position during SSRO surgery is an issue that needs to be reviewed.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.276
SP234 RPE COMBINED WITH FACE MASK VERSUS DOUBLE HINGED EXPANDER COMBINED WITH ALT-RAMEC?

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AIMS: Skeletal Class III malocclusions are characterized by maxillary retrognathia, mandibular prognathia, or a combination of both. Growth modification methods are applied for the treatment of skeletal anomalies in the early growth period. Class III anomalies with maxillary retrognathia in the early stages of skeletal growth are usually treated with a combination of maxillary expansion and face mask (FM). However, in recent years, alternate rapid maxillary expansions-constrictions (Alt-RAMEC) method has been applied in sagittal and transverse maxillary deficiencies. The null hypothesis of this study is that the application of double-hinged expander (DHE) combined with Alt-RAMEC during the appropriate skeletal growth period produces skeletal result similar to a FM effect. To test this hypothesis, the study aims to evaluate the position of the maxilla in three dimensions immediately after the application of the DHE combined with Alt-RAMEC protocol in Class III malocclusion associated with maxillary retrusion.
MATERIAL AND METHODS: A total of 18 individuals, 11 girls and 7 boys (mean chronological age 14.00 years and 13,85 years) with Class III malocclusion associated with maxillary retrusion, who presented to the Department of Orthodontics, Faculty of Dentistry, Ankara University, were treated with Alt-RAMEC and DHE. The DHE was opened four times a day, twice in the morning and twice in the evening in the first week for a daily activation of 1 mm; in the second week, it was closed with the same frequency; the repeated series was terminated with expansion at week 9th. The maxilla was evaluated sagitally, vertically and transversally on lateral cephalometric and posteroanterior radiographs at the beginning (T1) and 9th week (T2) of the treatment.
RESULTS: It was found that the maxilla advanced approximately 2.54 mm sagittally, expanded 1.01 mm in the premolar region and 0.89 mm in the molar region transversely, while the vertical movement wasn't statistically significant.
CONCLUSIONS: The hypothesis proposed in this study has been proved to be correct. During the appropriate skeletal growth period, the combination of DHE and Alt-RAMEC protocol provides maxillary sagittal growth similar to the FM effect reported in the literature.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.277
SP236 WASTE IN ORTHODONTICS – QUANTIFYING THE CHALLENGE OF SINGLE USE ITEMS IN ORTHODONTIC PRACTICE WITHIN THE UNITED KINGDOM

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AIMS: The synergistic relationship between plastic pollution and climate change has been described as one of the most pressing environmental challenges of the 21st century. Work has been undertaken to quantify single use plastic (SUP) waste produced within UK clinical dental settings during routine dental procedures. However, the contribution of orthodontics to SUP waste production has not yet been evaluated. Thus, our aim was to estimate the average number and mass of single use items (SUIs) used per patient episode in orthodontic practice within primary and secondary care.
MATERIAL AND METHODS: A multicentre, prospective service evaluation was undertaken using a sample of primary and secondary care orthodontic providers. This included private practices, mixed NHS and private practices, district general hospitals and dental hospitals within South Yorkshire (England, UK). Two dental undergraduate students from the University of Sheffield were trained and calibrated to act as 'observers' during routine orthodontic appointments at the different sites. The use of SUIs was then recorded using a piloted and standardised data collection tool, allowing the average number and weight of SUIs per patient episode to be calculated.
RESULTS: Across all 8 departments, 159 appointments were observed including orthodontic review and treatment appointments. On average, 9 items were used per review appointment, equating to approximately 39 grams of plastic. Approximately 14 items were used on average per treatment appointment, equating to 59 grams of plastic. Annualising the data for treatment appointments in a hospital setting seeing 100 patients a day and working 42 weeks per year would yield SUP use of 1,239 kilograms per year. The average mass of plastic used per appointment was also greater in secondary care compared to primary care settings.
CONCLUSIONS: This research provides a baseline understanding of the quantity and mass of SUPs in conventional orthodontic practice. With the worldwide production of plastics expected to triple by 2060, we must evaluate methods for reducing the use of SUPs within our profession and help to establish a circular plastic economy.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.278
SP237 EVALUATION OF HEAD POSTURE IN WHEELCHAIR-BOUND INDIVIDUALS AND ITS RELATION TO MALOCCLUSION

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AIMS: To evaluate head posture in wheelchair-bound individuals and to evaluate potential correlations with different malocclusions.
MATERIAL AND METHODS: Twenty wheelchair-bound participants, aged six to thirty years old, were categorized into three groups based on their head control (ability of an individual to maintain and adjust the position of their head independently) namely those with full control (Group 1), partial control (Group 2) and no control (Group 3). Head posture was measured on the three axes (Pitch: forward/backward head inclination, Roll: left/right head tilting, and Yaw: left/right head rotation) dynamically using an Inertial Measurement Unit for precise 3D tracking. Malocclusions, including molar and canine sagittal relationships, overjet, overbite, and crossbites were assessed through standardized clinical examinations. Medical history, posture habits, diet, and oral hygiene practices were recorded using questionnaires.
RESULTS: From the sample of 20 wheelchair-bound participants, 6 were in Group 1, 7 in Group 2, and 7 in Group 3. Statistically significant differences were found between the 3 groups regarding the Roll axis, with participants with full head control (Group 1) showing significantly less head-posture deviation compared to Group 2 (27° difference; p=0.019) and Group 3 (34° difference; p=0.004). Concerning associations between head posture and malocclusion, a significant correlation was found between the Pitch axis and the sagittal molar relationships (r=-0.6; p=0.005), whereby backward head posture was correlated with Class II molar relationships while forward head posture was correlated with Class III molar relationships.
CONCLUSIONS: This study identified significant differences in head posture between wheelchair-bound individuals with full head control and those with partial or no head control (using head rests). Moreover, correlations between head posture and malocclusion in wheelchair-bound individuals were observed with a significant correlation between head posture along the Pitch axis and sagittal molar relationships, with backward head posture being associated with Class II malocclusions and forward head posture with Class III malocclusions. These findings emphasize the critical role of head posture in influencing dentofacial growth and the potential development of malocclusions, underscoring the need for further attention being paid to the tailoring of headrest and wheelchair adjustments in these individuals.
Disclosure of interest: None declared

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Abstract citation ID: cjaf073.279
SP240 INCREASED OVERJET AS A POSITIVE PREDICTOR OF EARLY SKELETAL CLASS II MALOCCLUSION CORRECTION WITH THE HERBST MTH APPLIANCE: A RETROSPECTIVE STUDY

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AIMS: Class II Division 1 malocclusion is commonly associated with an increased overjet, which has generally been viewed as a negative predictor of treatment outcomes, aesthetic perception and long-term stability. This study investigated the potential link between the initial magnitude of overjet and the degree of skeletal correction, as assessed through changes in the ANB and WITS indices, in growing skeletal class II patients.
MATERIAL AND METHODS: This retrospective study analyzed 58 patients (mean age: 9.01 years) consecutively treated with the Acrylic-Splint MTH Herbst Appliance. Lateral cephalograms were taken at the onset of treatment (T0) and immediately after removing the Herbst appliance (T1). Cephalometric analysis was performed at both T0 and T1 to assess changes in skeletal and dental parameters. To examine different thresholds in the association between ANB or WITS and OJ, the sample was divided into four quartiles based on pre-treatment overjet values. Rank-Based Estimation regression models were constructed using the ANB and WITS difference (T1-T0) as the dependent variables and OJ at T0 as the main regressor.
RESULTS: A significant direct correlation was found between an initially increased overjet and improvement in the ANB angle ($p < 0.01$), with the correction primarily attributed to an increase in the SNB angle. A similar trend was observed for the correction of the WITS index ($p < 0.01$). Specifically, for every 1 mm increase in initial overjet, there was an average reduction of 0.65 mm in the WITS index and a decrease of 0.30 degrees in the ANB angle. This correlation became even more significant when the initial overjet exceeded 8.0 mm. The results were not influenced by the vertical dimension.
CONCLUSIONS: From this perspective it may be advisable to initiate treatment early, especially in cases of bullying or increased risk of trauma. In fact, the amount of mandibular advancement achievable in these cases appears to be comparable to that reported in the literature during the pubertal peak. In such instances, increased pre-treatment overjet could be considered a positive predictor of treatment success.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.280
SP241 GROWTH PREDICTION IN SUBJECTS WITH UNTREATED CLASS III MALOCCLUSION WITH ARTIFICIAL INTELLIGENCE IN THE LONG-TERM

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AIMS: Development of machine learning-based model to predict growth of Caucasian subjects with untreated Class III malocclusion in the long-term.
MATERIAL AND METHODS: 104 Caucasian subjects (47 males and 57 females) with untreated Class III malocclusion were selected. For each patient two lateral cephalograms were analyzed at T0 (first observation, mean age 9.4±3.2 yeas) and at T1 (last observation, mean age 14.0±3.5 years, T0-T1: 4.7±2.6 years). All observations available for each subject were used for developing the predictive model. Eighty-four subjects were selected for the training set (9.5 ±3.4 years at T0, 13.6±3.6 years at T1) and 20 patients for the test set (8.9 ±2.4 years at T0 and 15.7±2.4 years at T1). Sixteen cephalometric landmarks represented in a X Y Cartesian coordinate system were selected for each patient. The trained model was a Graph Neural Network. Descriptive statistics and a one sample t-test comparing the mean value to the value "0" (zero displacement) of the coordinates X and Y of the 16 cephalometric points of the test group, were performed.
RESULTS: On the X axis, points Condylion (CoX: 0.67mm, p=0.044), Articulare (ArX: 1.77mm, p<0.001), Menton (MeX: -2.56mm, p=0.039), A Point (AX: -1.15mm, p=0.036), and Sella (SX: 1.17mm, p<0.001) were statistically significant. On the Y axis, points CoY (-1.66mm, p<0.001), Gonion (GoY: 2.57mm, p=0.006), MeY (3.21mm, p=0.002), Gnathion (GnY: 2.55mm, p=0.012), Anterior Nasal Spine (ANSY: 1.28mm, p=0.024), Nasion (NY: -1.73mm, p=<0.001), Porion (PoY: 0.70mm, p=0.049), Orbitale (OrY: -1.31mm, p=<0.001) and Basion (BaY: 1.08mm, p=0.01) were statistically significant. On the X axis, Go, Me, Gn, and Pogonion (Pg) showed the highest error. On the Y axis, Go, Me, Gn, Pg, and B point showed the highest error. Mean Euclidean distance between predicted value and real value was increased for the cephalometric mandibular landmarks (Go, Me, Gn, Pg and B point).
CONCLUSIONS: The prediction model demonstrates that mandibular landmarks (Go, Me, Gn, Pg and B Point) showed an increase in the X and Y axis errors and in the Mean Euclidean distance between predicted and real values. This suggests that it is more difficult to predict the cephalometric mandibular landmarks in the long term.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.281
SP242 VOLUMETRIC EVALUATION OF ROOT RESORPTION AFTER UPPER FIRST MOLAR INTRUSION BY CLEAR ALIGNERS

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AIMS: To evaluate root volume change after upper first molar intrusion by clear aligner in an anterior open bite patient
MATERIALS AND METHODS: The study included ten anterior open bite patients treated by clear aligner (mean age of 22.80 ± 3.26 years), with open bite of 1.52 ± 0.42, and Skeletal Class I or mild Class II (ANB = 3.11 ± 1.90 degrees). Extrusion of 0.2 mm/aligner using 1-mm Duran thermoplastic sheets. Squeezing exercises were performed at least five times a day. After 6 months of intrusion cone-beam computed tomography (CBCT) at pretreatment (T0) and 6 months of treatment (T1), the upper first molars were segmented by Mimics Medical Software into an STL file, and the roots were separated by Geomegic Control X using a plane parallel to the cementoenamel junction and passing through the deepest point of the furcation between these roots. The amounts on the right and left sides were averaged and the difference between T0 and T1 was compared by paired samples t-test at a significance level of 0.05.
RESULTS: The mean amount of intrusion after 6 months was 0.84 ± 0.15 mm. All evaluated roots showed a significant decrease in root volume (P-value <0.001). The palatal root has decreased by 4.54 ± 1.80 mm^3, the mesiobuccal root decreased by 5.00 ± 1.56 mm^3, while the distobuccal root has decreased by 4.94 ± 2.09 mm^3
CONCLUSIONS: While all examined roots exhibited significant volumetric reduction, the extent of root resorption remained minimal.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.282
SP243 ‡‡‡ EFFECTS OF SKELETAL ANCHORAGE IN TREATMENT OF CLASS II MALOCCLUSION: A SYSTEMATIC REVIEW WITH META-ANALYSIS

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AIMS: Since the use of skeletal anchorage in treatment of class II malocclusion appears controversial, the aim of this review was to evaluate the effects on both, vertical dimension and incisors position, of combining TADs with different treatment protocols.
MATERIAL AND METHODS: Search without time restrictions was performed by two independent reviewers up to February 2024 in major electronic databases (Pubmed, Pubmed Central, Scopus and Medline) for randomized controlled trials, prospective and retrospective cohort studies, considering class II patients treated with and without skeletal anchorage. The RoB-2 was used to assess the methodological quality of the eligible studies. Common or random effects model was applied for all analyses according to heterogeneity. The meta-analysis was then performed using the Standardize Mean difference of the mean difference of the T1-T0 change in outcome between the different treatments evaluated as effect size.
RESULTS: 1217 documents were initially retrieved. According to PRISMA protocol, 18 studies comparing different skeletal anchorage protocols (upper/lower miniscrews and miniplates) combined with four appliances (Herbst, Forsus, Carriere Motion, Elastics) were included in the analysis. No significant difference in skeletal divergence was found between groups from an overall point of view (SMD: 0.19 (−0.48 to 0.83) according to the random-effects model). A

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statistically significant reduction in IMPAo was found in patients treated with temporary anchorage devices (TADs) (SMD of 5.58 (3.40 to 7.75)), except for the elastics group (SMD: 3.76 (−0.91 to 8.43)). The effect on the upper incisors' inclination appeared to be strictly dependent on the type of anchorage (TADs in one or both of the arches).
CONCLUSIONS: The vertical dimension seems not to be significantly affected by skeletal anchorage. In the lower arch labial flaring of mandibular incisors is generally reduced when TADs are used. In the upper arch skeletal anchorage might be useful if lingual tipping of the upper incisors is required; however, it is strictly influenced by the anchorage protocol.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.283
SP244 ‡‡‡ ANALYSIS OF STRESS DISTRIBUTION AND DISPLACEMENT BASED ON THE MINISCREW POSITIONS OF THE PALATALL SLOPE BONE-BORNE EXPANDER: A FINITE ELEMENT STUDY

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AIMS: This study aimed to investigate the stress distribution pattern of the palatal slope bone-borne expander on the maxillary area according to a different anteroposterior position of anchored miniscrews using finite element analysis.
MATERIALS AND METHOD: Nasomaxillary stereolithography files with three different anteroposterior anchored miniscrew positions of the palatal slope bone-borne expander were determined as model A, B, and C. Each model consists of four supported miniscrews. Model A: two anterior miniscrews were located between the maxillary canine and the first premolar, and two posteriors between the second premolar and the first molar. Model B: two anteriors were between the lateral incisor and the canine, and two posteriors were the same as in model A. Model C: two anteriors were the same as in model A, and two posteriors were distal to the first molar. One turn of expander screws was applied. Maximum principal stress, equivalent elastic strain, equivalent von Mises stress, and transverse displacement were evaluated.
RESULTS: The maximum principal stress was mostly found at the bone-miniscrew interface. Model A exhibited an intersecting area of stress between the supported miniscrews. The highest value of principal stress was in model B, while model C showed a uniform distribution pattern. The elastic strain pattern was similar to the principal stress in all models. The highest value of equivalent von Mises stress was located on the expander screw. The largest amount of transverse displacement of teeth was in model A, while model C exhibited a more consistent transverse displacement than other models. Vertical displacement of posterior teeth was also noticed.
CONCLUSIONS: Based on the result, it revealed that the various anteroposterior miniscrew placements of the palatal slope bone-borne expander had various patterns of stress distribution and resulted in various outcomes. It may be inferred that model A's miniscrew location was advantageous for obtaining expansion quantities, but model C's miniscrew position was advantageous for maintaining consistent biomechanics.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.284
SP245 THE EFFECTIVENESS OF THE MAXILLA DISTRACTION IN ADULTS USING SKELETALLY ANCHORED APPLIANCES

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AIMS: Skeletally anchored appliances for maxillary expansion are a less invasive alternative to surgery. The purpose of this study was to retrospectively evaluate the efficacy of the applied maxillary expansion procedure based on distractors supported by temporary orthodontic implants according to the gender in adults.
MATERIAL AND METHODS: The timing of the distraction process, in the form of the presence of a diastema between the upper incisors, was evaluated at follow-up visits: 1 week and 2 weeks after distractor application, as well as the timing of distraction completion. During the analysed period 26 patients were treated: 13 women and 13 men.
RESULTS: The presence of diastema at the first follow-up visit (1 week after the distraction started) was observed in 7 women and no men. At the second follow-up visit, no diastema was found in 1 woman, whereas in the male group, the presence of diastema was demonstrated in 3 patients.
CONCLUSIONS: The effectiveness of the distraction procedure has limited effectiveness in males.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.285
SP246 ASSESSMENT OF MAXILLARY DENTAL ARCH EXPANSION USING INVISALIGN? FIRST APPLIANCE - CROSS-SECTIONAL OBSERVATIONAL STUDY

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AIMS: Maxillary arch expansion is one of the primary goals during orthodontic treatment and it can be achieved in different ways. One of them is clear aligner treatment represented in this paper by Invisalign First appliance (Align Technology). The aim of this presentation is to assess predictability of maxillary dental arch expansion using Invisalign First Appliance.
MATERIALS AND METHODS: 40 patients were included in the analysis. Intermolar and intercanine widths were measured at the beginning and after the expansion period in ClinCheck software. The data were statistically analyzed in comparison with the amount of expansion predicted by the software. The level of significance was $p = 0.05$. The analysis was performed using Excel and the Jamovi statistical package.
RESULTS: The conducted statistical analysis shows that expansion achieved is statistically significant. Considering variable 'Molars' the strength of the observed effect turned out to be very high. In category results 'Final' ($M = 46.85$, $SD = 2.187$) turned out to be significantly higher compared to the category 'Initial' ($M = 44.91$, $SD = 2.178$). When variable 'Canines' was analyzed, the strength of the observed effect also turned out to be very high. In category results 'Final' ($M = 34.87$, $SD = 2.321$) turned out to be significantly higher compared to the category 'Initial' ($M = 31.79$, $SD = 2.041$).
CONCLUSIONS: The amount of expansion achieved on canines is significantly larger than that on molars - a greater expansion on canines is planned in the ClinCheck software, which is reflected in the expansion obtained. However there is no significant difference in the ratio of expansion for molars and canines, indicating that about half of the planned expansion is achieved in both cases. Practitioners can therefore plan for the same amount of overcorrection for both molars and canines during treatment planning.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.286
SP248 BUCCAL MAXILLARY CANINE IMPACTION IS NOT RELATED TO CRANIOFACIAL MOPRHOLOGY

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AIMS: The aim of the present study was to compare craniofacial morphology between individuals with buccally displaced maxillary canines (BDCs) and normal controls.
MATERIAL AND METHODS: The study population included 110 orthodontic patients (70 females and 40 males). The study group consisted of half of them (55 individuals) who all presented bilateral or unilateral buccal maxillary canine impaction. The other half constituted the control group (55 individuals) who all had normally erupted canines and did not present any other dental or craniofacial anomaly. The two groups were matched strictly for age and sex in order to minimize the confounding effect of growth and sex on craniofacial morphology.

Lateral cephalograms were retrieved for every individual of the sample. The shape of the craniofacial structures was outlined on calibrated cephalometric tracings using 15 curves and 127 landmarks (11 fixed and 116 semi-landmarks) using Viewbox software 4.1 (dHAL Software, Kifissia, Greece). Shape configurations were superimposed using Procrustes Superimposition and the resulting shape coordinates were reduced into Principal Components for all following analyses. Multivariate regression models were utilised to investigate the assocciation between buccal canine displacement and craniofacial shape. All analyses were performed assuming a type-1 error of 5%.

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RESULTS: The results of the multivariate regression model revealed an association between BDCs and shape of the cranial base (η^2= 0.271; P=0.011) and the maxilla (η^2= 0.319; P=0.008) in females. In males, the differences were not significant. Individuals with BDCs showed a wider premaxillary area compared to individuals with normally erupted canines. Differences in mandibular shape and the shape of the entire craniofacial configuration were minimal and not statistically significant.
CONCLUSIONS: The restuls of this investigation support the notion that buccal displacement of the maxillary canine is likely related to local factors, such as the lack of space in the maxillary arch, rather than a genetically driven development mechanism. The study results are limited by the small sample size, so further is granted on order to rech more robust conclusions.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.287
SP249 FACTORS THAT INFLUENCE ATTITUDE TOWARDS ORTHODONTIC TREATMENT

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AIMS: To study the factors that influence and are associated with attitudes towards orthodontic treatment.
MATERIAL AND METHODS: This study has a sample group of 150 participants, aged 18-60 years, who have a desire to undergo orthodontic treatment, have never had orthodontic treatment before, and have never consulted an orthodontist. The research instrument used is a questionnaire in paper format. The content validity was reviewed by experts, resulting in a content validity index (IOC) of greater than 0.5. The reliability of the questionnaire was assessed using Cronbach's alpha coefficient, which was greater than 0.7. Statistical analysis was performed using SPSS software (Statistical Package for the Social Sciences, version 26, IBM Corp., Armonk, NY, USA), with statistical significance set at $p < 0.05$. Descriptive statistics included frequency, percentage, mean, median, and standard deviation. Inferential statistical analysis involved the use of the Mann-Whitney U test, Kruskal-Wallis test to examine factors associated and multinomial logistic regression to analyze the relationship between factors affecting attitudes toward orthodontic treatment.
RESULTS: The majority being females (75.3%), which is three times more than males. Most of the participants were aged between 18-30 years (65.4%). It was found that the number of individuals with a bachelor's degree is slightly higher than under bachelor's degree, accounting for 52% and 44.7%, respectively. From the data analysis, it was found that the overall attitude toward orthodontic treatment had an average score of 4, indicating that the entire sample group had a positive attitude. It was found that the attitudes towards self-termination of treatment showed a statistically significant difference between males and females. Additionally, the attitudes towards wearing retainers after treatment showed a statistically significant difference among the three age groups.
CONCLUSIONS: Females are more aware that they should not stop orthodontic treatment on their own. They have a 1.4 times better attitude than males. Additionally, individuals in the 31-45 age group are 1.9 times more likely to be unaware that they need to wear a retainer after orthodontic treatment, compared to those in the 18-30 age group.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.288
SP250 EFFECT OF DIGITAL ORAL SELF-CARE GUIDANCE ON ORTHODONTIC PATIENTS' ORAL HYGIENE - A RANDOMIZED CONTROLLED TRIAL

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AIMS: The aim of this study was to evaluate the effect of digital oral self-care guidance on orthodontic patients' oral hygiene.
MATERIAL AND METHODS: The study was conducted in collaboration between University of Turku and The Wellbeing Services County of Southwest Finland, under ethical approval. Participants of the study were recruited by two orthodontic residents during 2024. The patients and their caregivers were informed of the study protocol, and those who returned the signed consent form were included in this study.

The participants were randomly divided into study-group and control-group. They both received oral self-care instruction: the study-group digitally through DentView appliance that has age- and treatment-targeted guidance videos and games, and the control-group from the orthodontic resident. All individuals received a toothbrush. The participants of the study-group also received a QR-code from where they could continue to have oral health-care instructions to their smartphones. Oral hygiene level was measured by two calibrated researchers before (T0) and 6-8 weeks after (T1) the intervention by modified Simplified Oral Hygiene Index (OHI-S) (Greene and Vermillion, *J Am Dent Assoc* 1964, Gil et al., *Acta Odontol Scand* 2022), where plaque and supragingival calculus are recorded in six index teeth (buccally in 16, 11, 26, and 31; lingually in 36 and 46) and scored 0-3 according to WHO plaque and calculus indexes. Data were analyzed with repeated measures ANOVA.
RESULTS: There were 61 participants (31 in study-group and 30 in control-group), aged 9 to 24 (mean 14.6) years in study-group and 7 to 34 (mean 14.8) years in control-group.

At T0, OHI-S was similar between the groups, 1.06 (SD 0.50) for the study-group and 1.03 (SD 0.41) for controls. At T1, it was 0.86 (SD 0.43) and 0.72 (SD 0.42), respectively. There was an improvement in OHI-S of 19.2% in the study-group and of 30.3% in the control-group. Difference between T0 and T1 was statistically significant for both groups ($p<0.001$) and there was no difference between groups (p=0.303).
CONCLUSIONS: Digital oral health guidance with DentView seems to be an efficient addition to improve oral health in orthodontic patients but does not outweigh chairside guidance.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.289
SP251 TWO METHODS COMPARED TO ASSESS THE ANCHORING CAPACITY OF DECIDUOUS SECOND MOLARS AS ANCHOR TEETH FOR ORTHOPAEDIC MAXILLARY EXPANSION: CBCT RECTROSPECTIVE STUDY

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AIMS: The aim of this study was to compare the predictability of the two methods with measurements performed on panorex reconstructed by cone beam CBCT.
MATERIAL AND METHODS: Sixty-eight patients were selected, including 31 males and 37 females between the ages of 6 and 10 years, who underwent palatal expansion with a semi-rapid protocol (two activations per day) with Haas appliance anchored to the E, then left in restraint for 12 months once the cycle of activations was over. All patients had CBCT cone beam examinations at the beginning and end of treatment to investigate possible dental problems. Two operators derived the panorex images from the 3D examinations by setting a section thickness of 9 mm to include all radiographic elements useful for the investigation. They then performed on the panorexes thus obtained both the measurements of the crown to root ratio of the E's and the position of the cusps of the second premolars in relation to the HPC line for each patient. To assess the reliability of the two methods, the inter-examiner agreement tested between the two examiners was calculated through Cohen's Kappa. In addition, the sensitivity and specificity, positive and negative predictive values, and the prevalence of both methods were evaluated to estimate the future exfoliation of the upper deciduous second molar during treatment with a maxillary expander.
RESULTS: the highest accuracy inpredicting deciduous molar exfoliation was observed for the evaluation of the position of the first premolar relative to the HPC line (89% and 92% respectively for the first and second operators), while the values were lowerfor evaluations of the crown-to-root length ratio (69% and 65% respectively).
CONCLUSIONS: The results obtained support that the HPC line method is more reliable in determining the exfoliation of deciduous second molars than the crown-root ratio.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.290
SP252 ‡‡‡ DIGITAL MODEL IN ORTHODONTIC TREATMENT PROCEDURES. A SYSTEMATIC REVIEW

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AIM: 3D-printing technology and digital modeling have dynamically evolved into potentially necessary elements of modern orthodontic practice. This systematic review focuses on the role of digital models in facilitating common orthodontic procedures.
MATERIAL AND METHODS: This systematic review was based on PRISMA guidelines. A comprehensive literature search was conducted across five electronic databases on 17 February 2024, yielding a total of 345 records. After excluding studies that did not meet the eligibility criteria, 82 studies remained for qualitative analysis. These studies were critically evaluated by three reviewers. The review focuses on specific orthodontic treatment areas where digital models can be applied: diagnosis, treatment procedures, retention and outcome evaluation in orthodontics.
RESULTS: The studies reviewed indicate that digital models enhance orthodontic diagnosis and treatment planning, despite certain limitations related to radiation exposure justification and the accuracy of 3D data integration methods. Digital models combining specific 3D data types (such as face scans, intraoral scans, and CBCT) proved beneficial for managing impacted canines, aligner therapy, mini-implant placement (where precise angle definition and orientation are critical) and care for cleft lip and palate cases. In orthognathic surgery, a comprehensive digital model integrating all 3D information available is recommended to ensure precise treatment planning and execution.
CONCLUSIONS: Digital procedures in orthodontics acquired by merging all or selected types of 3D data (face scan, intraoral scan, CBCT), enhance both diagnostic accuracy and treatment planning. However, limitations persist, including the need for justification of radiation exposure and the accuracy of 3D data integration methods.

Keywords: orthodontics; digital model; digital planning; imaging; three-dimensional
Disclosure of interest: None declared

Abstract citation ID: cjaf073.291
SP253 EVALUATION OF THE RELIABILITY OF THREE-DIMENSIONAL MID-SAGITTAL CEPHALOMETRIC PLANES IN DETECTING CHIN ASYMMETRY COMPARED WITH ANTHROPOMETRIC VALUES: AN OBSERVATIONAL STUDY

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AIMS: To identify among the mediosagittal cephalometric planes proposed in the literature those that are in agreement with the anthropometric data of the face in the detection of horizontal chin asymmetries
MATERIAL AND METHODS: This is an observational cross-sectional study. A stereophoto of the face and a CT-scan of the maxillo-facial complex were evaluated for each patient. On the stereophotos the amount of anthropometric chin asymmetry was measured by comparing the distance between cutaneous pogonion point and the sagittal line perpendicular to the bipupillary line passing through the glabella. On each CT-scan the osseous pogonion point was identified and the mediosagittal planes proposed in the literature were drawn. To assess the cephalometric chin asymmetry, the distance of each plane from the osseous pogonion point was measured. The anthropometric asymmetry measurements were then compared to the cephalometric asymmetry measurements to assess whether any cephalometric plan reliably reproduced the clinical observations. All digital analyses were carried out with the Simplant O&O software by an experienced orthodontic specialist. Both descriptive (mean, median, standard deviation) and analytic statistics (Pearson linear correlation coefficient and Lin's Concordance Correlation Coefficient (CCC) were performed using SPSS software.
RESULTS: The study included 52 Caucasian subjects (29 females, 24 males), aged 18-55 years (mean 46.5 F and 47 M). 37 mediosagittal planes were proposed in the literature by November 2024, of which 25 were included in this study. Pearson linear correlation coefficient was evaluated, showing values closest to the ideal value of 1 in the cases of planes 3, 10, and 25. The Lin's Concordance Correlation Coefficient (CCC) was ultimately considered, with plane 25 showing the highest value among all (CCC = 0.6025). This plane had a mean difference of -0.388 but a quite high standard deviation (SD = 2.708).
CONCLUSIONS: None of the analyzed plans presents a perfect concordance that makes it clinically reliable. Among those proposed in the literature, It is not yet possible to establish a plan that exactly describes a skeletal asymmetry corresponding to a skin asymmetry.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.292
SP254 CEPHALOMETRIC EVALUATION OF THE OCCLUSAL PLANE AS A PREDICTOR OF THE TWIN-BLOCK APPLIANCE SUCCESS IN PATIENTS WITH CLASS II MALOCCLUSION: A RETROSPECTIVE STUDY

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AIMS: Several studies in the literature have shown that the dental and skeletal changes induced by functional treatment with Twin-Block appliance do not always result in the correction of the initial malocclusion. The primary aim of the present retrospective study is to identify potential predictive parameters, capable of forecasting the Twin-Block appliance treatment success.
MATERIALS AND METHOD: The present research was conducted on patients diagnosed with class II malocclusion, treated with Twin-Block functional appliance during the mandibular growth peak phase. A total of 50 patients were selected, including 27 males and 23 females. The mean age of the patients was 11,62±1,76 years. Each patient underwent two lateral cephalometric radiograms, one taken before and one after the functional treatment. A cephalometric tracing was performed for each radiograph, resulting in a total of 100 tracings. The results of the cephalometric tracings performed before (T1) and after treatment (T2) were analysed to identify predictive factors of success. The success of the treatment, represented by the improvement in anteroposterior parameters, was assessed based on the T2-T1 changes in sagittal skeletal variables. Occlusal plane parameters at T1 were investigated as possible predictors of success. The statistical methods applied were descriptive statistics to summarize the data of the sample, and the multiple linear regression; results with p-values <0,05 were considered statistically significant. The statistical software R was used for the analysis.
RESULTS: The multiple linear regression identified as possible predictors three statistically significant parameters related to the occlusal plane: the Anterior Occlusal Plane of Sato (FH-OP) (R^2=0,2498 and p=0,00359), the Posterior Occlusal Plane of Sato (FH-OP) (R^2=0,2091 and p=0,0069) and GoGn^OP (R^2=0,1814 and p=0,0357).
CONCLUSION: Based on the results of the statistical analysis, greater mandibular growth can be expected in patients with a steep occlusal plane inclination before functional treatment. However, these findings should be interpreted with caution, since although the p-values obtained are below 0,05, the R^2 values are low. This indicates that while a correlation between the variables exists, it does not necessarily imply a predictive function.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.293
SP255 IMPACT OF ORTHODONTIC EXTRACTIONS ON FACIAL ATTRACTIVENESS: A RETROSPECTIVE 3D EVALUATION

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AIMS: Orthodontic treatments enhance smile aesthetics through dental alignment and can also influence facial profiles. A common critique of extraction-based therapy is its potential to cause profile changes, such as flattening or retrusion. This study aimed to determine, using three-dimensional facial scans (3D-FS), whether orthodontic treatments involving extractions affect facial attractiveness compared to non-extractive approaches.
MATERIAL AND METHODS: Thirty patients with dental crowding ≥ 4mm were divided into two groups: 15 underwent Extractive Therapy (ET) and 15 received Non-Extractive Therapy (NET). All participants underwent 3D facial scans at two time points: T0 (pre-treatment) and T1 (three months to one year post-treatment). The scans were evaluated by 11 general dentists, 10 licensed orthodontists, and 10 laypeople. Evaluators rated the scans on a scale of 0 (not attractive) to 10 (very attractive) and assessed the upper lip's sagittal position using a 3-point Likert scale (normal, protruded, or retruded).
RESULTS: Thirty patients with dental crowding ≥ 4mm were divided into two groups: 15 underwent Extractive Therapy (ET) and 15 received Non-Extractive Therapy (NET). All participants underwent 3D facial scans at two time points: T0 (pre-treatment) and T1 (three months to one year post-treatment). The scans

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were evaluated by 11 general dentists, 10 licensed orthodontists, and 10 laypeople. Evaluators rated the scans on a scale of 0 (not attractive) to 10 (very attractive) and assessed the upper lip's sagittal position using a 3-point Likert scale (normal, protruded, or retruded).
CONCLUSIONS: Managing borderline cases with non-extractive treatments can be challenging, as they may reduce facial attractiveness. In patients with normopositioned or protruded lower lips relative to the E-line, proclined incisors may create an excessive protrusion of lower lip that may appear less attractive.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.294
SP256 DISTRIBUTION OF TRANSVERSE PALATINE SUTURE MATURATION STAGES IN ADOLESCENT POPULATION

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AIMS: The aim of our study was to assess the distribution of the transverse palatine suture (TPS) maturation stages in adolescent population, which is the most interesting age group when deciding between different maxillary expansion treatment options.
MATERIAL AND METHODS: Firstly, we collected high-resolution cone-beam computed tomography (CBCT) maxillary images of 42 patients (22 females and 20 males), aged between 10 and 20 years. Assessment of TPS was performed on a selected cross-sectional axial slice and patients were allocated into maturation stages A, B, C, D and E. The qualitative characteristics as suggested for the mid-palatal suture by Angelieri et al. were applied. Briefly, stage A is described as straight, radiolucent and wide TPS; stage B as straight, radiolucent and narrow TPS; stage C as wavy and radiolucent TPS; stage D as very wavy TPS with almost no visible radiolucency between the two edges and stage E is presented as fused TPS without visible radiolucent line.
RESULTS: In a group of 42 patients, 2 (4.8%) were allocated into TPS stage A, 27 (64.3%) into stage B, 8 (19.0%) into stage C and 5 (11.9%) into stage D. The least mature TPS, stage A, was seen in one 15-year-old female and one 16-year-old male patient. Stage B was the most prevalent with 13 females and 14 males allocated into it. Females presenting stage B were 12 to 20 years old, similarly, the age of males ranged from 10 to 20 years. 4 females, aged 15 to 19 years and 4 males, aged 12 to 16 years, presented TPS stage C. A group of patients with stage D consisted of 4 females and only 1 male. The age ranged from 10 to 20 years, while the only male presenting stage D was 12 years old. The most mature sutural stage, stage E, was not detected within this group of patients.
CONCLUSIONS: It is evident that maturation of TPS varies significantly among adolescent individuals, therefore chronological age is not a reliable factor. However, CBCT assessment of TPS might offer additional information and support the decision regarding maxillary expansion treatment.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.295
SP258 IMPACT OF CLASS II MALOCCLUSION ON SPEECH PATTERNS AND ARTICULATION: A SYSTEMATIC REVIEW

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AIM: Class II malocclusion is a prevalent orthodontic condition often associated with functional impairments, including speech problems. This systematic review aims to analyze the specific impact of Class II malocclusion on speech articulation and patterns, focusing on how structural jaw discrepancies influence phoneme production and pronunciation.
MATERIAL AND METHODS: A thorough literature search was conducted in the databases MEDLINE, Scopus and Web of Science to identify relevant studies published within the last two decades. Inclusion criteria comprised clinical and observational studies focusing on the effects of Class II malocclusion on speech patterns. Studies without specific articulation analysis or lacking a clear association between Class II malocclusion and speech impairments were excluded. Predetermined and prepiloted data collection forms were used to record the necessary information.
RESULTS: 10 studies met the eligibility criteria for the present review. The review identified consistent correlations between Class II malocclusion and speech problems, with fricative (/s/, /z/) and affricate (/tʃ/, /dʒ/) sounds most affected. Severe overjet in Class II Division 1 malocclusion was found to alter tongue posture, leading to compensatory articulation mechanisms, while Class II Division 2 showed less pronounced speech distortions. Studies highlighted anatomical constraints, such as mandibular retrognathism and altered dental arch shapes, as primary factors contributing to impaired speech. Functional appliances, including twin-blocks, showed potential in improving articulation by addressing structural imbalances.
CONCLUSIONS: Class II malocclusion plays a significant role in speech articulation challenges, particularly through its impact on tongue placement and airflow during phoneme production. Early orthodontic intervention combined with speech therapy can alleviate these functional deficits and enhance orofacial performance. Further research with standardized assessments is needed to delineate the extent of these impairments and optimize multidisciplinary management strategies for affected individuals.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.296
SP259 ORTHODONTIC RELAPSE 2 YEARS AFTER BRACKET REMOVAL: A 3D SUPERIMPOSITIONAL ANALYSIS

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AIMS: To measure tooth movement relapse two years post-treatment and explore potential correlations with changes induced during orthodontic treatment.
MATERIAL AND METHODS: This prospective longitudinal follow-up study included 22 patients (9 males, 13 females). Digital dental casts were acquired at treatment onset (T0), at the end of treatment (T1), and two years post-treatment (T3). During the two-year post-treatment period the only retention appliance used on the upper dental arch was a Hawley device. The digital casts were superimposed on structures of the hard palate mucosa. Translation and rotation variables of the central incisors, canines and first molars were measured throughout the treatment and the two-years post-treatment period. Spearman's correlation coefficient was calculated to test potential correlations of tooth movements during the two time periods. Relapse was quantified for the significant relapse patterns, as percentage of orthodontic tooth movement.
RESULTS: Relapse was detected, and significant correlations were observed between the two time periods. For both first molars (#16, 26), negative correlation was found in mesiodistal tipping (r=-0.61, P=0.003; r=-0.57, P=0.006; relapse median 48.1% and 39.8% respectively). For the central incisors (#11, 21), negative correlations were in labiopalatal inclination (r=-0.43, P=0.048; r=-0.42, P=0.053; relapse median 11.1% and 11.8% respectively) and long axis rotation (r=-0.46, P=0.031; r=-0.50, P=0.017; relapse median 16.8% and 23.4% respectively). Only the left canine exhibited labiopalatal inclination towards the initial position (r=-0.63, P=0.009; relapse median 20.5%). Additionally, for the right first molar, negative correlation was recorded in long axis rotation (r=-0.61, P=0.003; relapse median 9.6%); for the left first molar, in the transverse position (r=-0.42, P=0.049; relapse median 44.4%) and labiopalatal inclination (r=-0.50, P=0.017; relapse median 53.6%), and for the right central incisor in mesiodistal tipping (r=-0.69, P<0.000; relapse median 22.3%).
CONCLUSIONS: Despite the use of a Hawley retention appliance, significant relapse could be observed two years post-treatment, which was considerably related to tooth movement during orthodontic treatment. These findings may help clinicians evaluate long-term relapse, and design individualized retention schemes based on the direction of tooth movement during treatment.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.297
SP261 OCCLUSAL CONTACT CHANGES AFTER ORTHODONTIC TREATMENT

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AIMS: Occlusion settling after orthodontic treatment remains unexplored although knowledge about this process can help to achieve optimal results. The

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goal of this preliminary study was to find the relation between changes of occlusion and the masseter muscle capacity.
MATERIAL AND METHODS: The sample consisted of 10 young adults with average age 22,1 years after orthodontic fixed appliance treatment ending with fixed wire retainers: 2-2 in the upper arch and 3-3 in the lower. Inclusion criteria was good general health, good periodontal status and lack of prosthetic restorations. The control group included untreated healthy individuals aged 23,8 years without orthodontic treatment meeting the same inclusion criteria. For all participants 3D digital scan of dentition was taken in the day of debonding (T0) and 3 months after (T1) and ultrasonographic recording of masseter muscle thickness was obtained. The occlusion contacts were evaluated with occlusion maps based on DDP digital 3D models DDP-Ortho (Polorto, Poland). Occlusal index was developed to quantify the occlusion value. Scores were given separate for the anterior teeth and for the right and left quadrant of maxillary dentition including molars, premolars and canine.
RESULTS: In this pilot study the changes in teeth occlusion contacts occurred during the 3 months after debonding did not reach statistical significance. Based on amount of contacts in posterior teeth two profiles of subjects were identified together in the sample and in the control: those with lower (below 4.5) and higher (above 4.5) occlusal contact index (0-6 ranging). In both groups correlation between masseter muscle capacity and occlusal contacts value was measured with adjustment by sex. Outcomes indicated significant relation ($\beta = 0.19$, $p<0.041$) between masseter muscle capacity and occlusal contacts value among patients with lower score in the occlusal index. Such relation was not confirmed among subjects with higher value of occlusal index.
CONCLUSIONS: The masseter muscle capacity is positively related with number of occlusal contacts in subjects with suboptimal occlusion contacts.

Due to minor changes occurring in the occlusion contacts after debonding the clinicians must be aware to achieve the best possible occlusion when finishing orthodontic treatment, especially in adults.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.298
SP262 TRANSFORMING SMILE DESIGN AND TREATMENT PLANNING WITH EXOCAD AND ALIGN TECHNOLOGY

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INTRODUCTION: Advances in digital technology have revolutionized dentistry, enabling precise treatment planning and enhancing patient satisfaction. Tools such as Smile Architect, Exocad, and Align Technology's Invisalign Smile Architect provide 3D smile design capabilities and simulate treatment outcomes, significantly improving precision and efficiency. These tools also foster better communication between dental professionals and patients, facilitating higher treatment acceptance.
AIM: This study evaluates the application of digital smile design tools in prosthetics, orthodontics, and aesthetic dentistry. It focuses on their impact on improving workflows, enhancing treatment planning, and increasing patient satisfaction.
MATERIALS AND METHODS: A systematic literature review was conducted using databases such as PubMed, ResearchGate, and Google Scholar. The analysis focused on peer-reviewed articles, with an emphasis on publications from the last decade (2012–2024), addressing the functionalities of Smile Architect, Exocad, and Invisalign Smile Architect.
RESULTS AND CONCLUSIONS: The findings demonstrate that digital tools such as Smile Architect and Exocad improve treatment precision through real-time 3D simulations, helping patients better understand proposed procedures and increasing acceptance rates. The integration of intraoral scanners and digital imaging systems has not only enhanced accuracy but also significantly reduced treatment planning time. Tools like Invisalign Smile Architect streamline orthodontic and restorative planning into a unified workflow, simplifying processes for dental professionals.

Moreover, the use of user-friendly interfaces is crucial for effective communication between dental teams and patients, especially for those who may be unfamiliar with dental procedures. Also, it increases collaboration between dentists and technicians, leading to a smoother workflow that benefits both patients and clinicians.

In conclusion, digital smile design tools represent a paradigm shift in dentistry, combining precision, efficiency, and enhanced patient involvement. Future research should explore their long-term cost-effectiveness, training requirements, and potential for broader integration into routine clinical practice. These innovations are setting new standards in dental care, shaping a future of more personalized and effective treatments.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.299
SP266 ‡‡‡ DOES CURRENT EVIDENCE SUPPORT THE DISCUSSION AROUND THE GUIDANCE THEORY? A SYSTEMATIC REVIEW AND META-ANALYSIS ON THE ASSOCIATION BETWEEN MAXILLARY LATERAL INCISOR AGENESIS AND DISPLACEMENT OF THE MAXILLARY CANINE?

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AIM: Palatal impaction of the maxillary canine is commonly considered as a genetic condition, while the lateral incisor root has been suggested to guide maxillary permanent canine eruption. This review assessed whether agenesis of the maxillary lateral incisor is associated with eruption disturbances of the maxillary canine (displacement or impaction).
MATERIALS AND METHODS: Unrestricted searches in six databases for observational case-control human studies until May 2024 assessing eruption disturbances of the permanent maxillary canine in conjunction with permanent maxillary lateral incisor agenesis. Study selection, data extraction, and risk-of-bias assessment with the Joanna Briggs Institute's tool were performed in duplicate. Random-effects meta-analyses of odds ratios (OR) with their 95% confidence intervals (CI) were performed, followed by meta-regressions and sensitivity analyses.
RESULTS: Seventeen reports pertaining to 17 case-control studies were included covering 10155 patients (11.6 year-old / 46% male on average). Maxillary lateral incisor agenesis was associated with eruption disturbance of the maxillary canine (17 studies; OR=3.88; 95% CI=2.05-7.34; P<0.001; I^2=58). Lateral incisor agenesis was more associated with canine displacement (7 studies; OR=7.56; 95% CI=2.10-27.18; P=0.008; I^2=57) and to a lesser degree with canine impaction (10 studies; OR=2.39; 95% CI=1.28-4.48; P=0.01). No significant effects of patient age or sex were seen, and the results were robust to study design and precision. The quality of evidence was low due to the inclusion of observational case-control studies with methodological issues and residual confounding.
CONCLUSIONS: Evidence indicates that permanent maxillary lateral incisor agenesis is associated with eruption disturbances of the permanent maxillary canine, including mainly displacement, but also impaction.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.300
SP269 REINFORCEMENT OF ORAL HYGIENE EDUCATION THROUGH VIDEO DURING FIXED ORTHODONTIC TREATMENT IN ADULTS - A RANDOMISED CLINICAL TRIAL

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AIMS: The study aimed to investigate the long-term effects of on-site and remote video-assisted oral hygiene reinforcement methods for patients undergoing fixed orthodontic treatment, comparing them to routine oral hygiene instruction and assessed the impacts after the video reinforcement was discontinued.
MATERIAL AND METHODS: This study was a three-arm parallel, prospective, single-centre randomized clinical trial involving 48 participants randomly divided into three groups: i) a control group that received only routine verbal oral hygiene instructions, ii) a group that received routine care along with on-site video-assisted oral hygiene education, and iii) a group that received routine care with remote video-assisted oral hygiene education, all in a 1:1:1 ratio. Participants underwent oral hygiene assessments every six to eight weeks over six follow-ups, coinciding with their orthodontic adjustments. The control group received solely verbal instructions, while the on-site and remote video groups received both verbal guidance and additional video assistance during the baseline (T0) and the first three follow-ups (T1, T2, T3). Video assistance was not provided during the last three follow-ups (T4, T5, T6). The outcome measures assessed were the Orthodontic Plaque Index (OPI) and the Full-Mouth Bleeding Score (FMBS).

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RESULTS: Before the intervention withdrawal, the control group showed no significant decrease in OPI scores, while both onsite and remote video groups saw significant decreases. FMBS scores significantly decreased across all groups. After withdrawal, only the remote group experienced a significant increase in OPI, with FMBS changes being insignificant for all groups. No significant differences in OPI or FMBS scores were found between groups. Video consumption frequency declined from 2.69 ± 1.01 at T0 to 1.60 ± 0.49 at T3, indicating reduced viewing habits. A moderate negative correlation was found between video consumption frequency and oral hygiene status, suggesting that higher video engagement led to better OPI improvements, though no correlation was noted with FMBS changes.
CONCLUSIONS: Routine verbal reinforcement of oral hygiene is important but not enough for sustained improvement. It should be combined with video-assisted interventions for greater effectiveness. Both on-site and remote methods are effective, but on-site delivery may offer better long-term sustainability due to supervision.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.301
SP270 EXAMINING THE SLOT DIMENSIONS OF A PASSIVE SELF-LIGATING BRACKET (TP ORTHODONTICS NU-EDGE SL MINI SERIES)

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AIMS: To measure the bracket slot dimensions of vertical slot height and wall parallelism, and examine surface irregularities, in a selection of 0.022-inch passive self-ligating brackets from the TP Orthodontic Nu-Edge SL Mini series.
MATERIAL AND METHODS: A total of 40 brackets for the upper central and lateral incisors were digitally imaged and measured using a light microscope for vertical bracket slot height, inbuilt torque angle and parallelism of slot walls. A randomly selected bracket was measured under scanning electron microscope to investigate surface irregularities and used to establish a baseline for calibration of the light microscope. All brackets were mounted and labelled on slides, digitally captured by a microscope camera attached to the light microscope, and images measured with a digital imaging software. Measurements were repeated one week later, and the mean measurement was taken to reduce error. Student t-test was used to calculate statistically significant ($p < 0.05$) differences between bracket slot measurements compared to manufacturer specifications.
RESULTS: All bracket slots examined were found to be significantly larger than the nominal value of 0.022-inches, ranging from 4.94 to 5.53 per cent oversized compared to manufacturer specifications. Discrepancies in the in-built torque angles of the brackets were found. The torque angles of the central incisor brackets ranged from 15 to 17 degrees and averaged 15.93 degrees compared to the published value of 17 degrees. Bracket walls were found to be either parallel or divergent. The measured angles ranged from -0.2 to 2.0 degrees. Microscopic surface irregularities were observed in the majority of brackets.
CONCLUSIONS: This study confirmed the findings of previous researchers, with brackets exhibiting discrepancies in all parameters analysed. As bracket deficiencies may result in loss of clinical torque thus inhibiting effective tooth movement, actual bracket measurements should be verified. It is recommended that manufacturers should publish bracket slot size tolerances as this may differ due to manufacturing methods and material composition.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.302
SP272 AESTHETIC ANALYSIS OF CAUCASIAN FACIAL PROFILES

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AIMS: To analyze the literature on the different esthetic analyses of the facial profile taking into account the variables of age, gender and race
MATERIAL AND METHODS: Different electronic databases were consulted between January and April 2024: Pubmed, Cochrane library, Web of science, Sciencedirect, SciELO, Scopus and Embase; as well as, journals of impact in the field of Orthodontics, such as the American Journal of Orthodontics, the European Journal of Orthodontics and the Journal of Esthetic and Restorative Dentristry. The search focused on observational analytical studies of the last ten years (June 2014-June 2024) analyzing photographs of male and female. These photographs should be positioned according to the natural posture of the head and analyzing photographs of Caucasian race. Studies that analyzed photographs in different position than the profile and studies, whose participants were other race than Caucasian, were not included
RESULTS: The total number of articles was 340. Repeated articles were discarded first, and then secondly based on title and abstract, so that 86 articles were selected. After analyzing the full text, 22 bibliographic references were selected, which met the requirements of being within the last 10 years, being full text and being in humans. Of these 22 articles, 5 were selected since the majority were discarded for analyzing profiles other than Caucasian race, 2 of them for analyzing frontal photographs instead of profile photographs, 1 for not performing soft tissue analysis and the last one for being a bibliographical review. Finally, 5 observational analytical studies were selected: according to Marchiori the H line to tip of the nose should be 10 mm; Volpato and Cassetta concluded that straight profiles are more attractive; Milutinovic added to the straight profile a protruding upper lip, a high tip of the nose and a short lower third; according to Hernández Alfaro, facial profiles with greater projection of the middle third were more highly valued.
CONCLUSIONS: In spite of the complexity of establishing an esthetic analysis that corresponds to the perception of facial esthetics of the current population, a profile with protruded middle third are considered esthetically pleasing among Caucasian population.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.303
SP273 LITERATURE REVIEW ON RETAINERS

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AIMS: To analyze the current evidence on the types of retainers used in orthodontics and the recommendations on their use, as well as to evaluate the failure rate of lingual and removable fixed retainers after orthodontic treatment, the degree of relapse by intercanine and intermolar width and the relationship of the different retainers with the periodontal health of the patients.
MATERIAL AND METHODS: After performing a comprehensive search in PubMed, Web of Science and Google Scholar databases between November 2023 and April 2024, a total of 18 articles from 2013 to 2024 were selected. Articles were included in Spanish and English during that period; children and adults with orthodontic treatment completed with clear aligners, conventional brackets or aesthetic brackets; any type of survey, retrospective studies, meta-analyses or literature reviews; and human and Caucasian clinical trials. Any articles that did not meet the above inclusion criteria were excluded.
RESULTS: The results have been classified into several categories. The first determined that the selection of the type of retention has to be individualized. The second found that there was no significant difference in intermolar or intercanine width. The third category concluded that the stability of fixed retainers seems to be better with those that are bonded to the six anterior teeth. And the last category determined that fixed retainers will increase the risk of gingival inflammation.
CONCLUSIONS: Currently, there is no consensus on retention protocol. Multi-strand retainers remain the gold standard and have a lower failure rate for those bonded to all six teeth. No differences were found in intercanine or intermolar width changes comparing two types of removable retainers, but there were differences in arch length and Little's Irregularity Index. Also, finally, fixed retainers will increase plaque index and gingival inflammation.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.304
SP274 DENTAL AND SKELETAL CHANGES WITH TOOTH-SUPPORTED AND HYBRID PALATAL EXPANDERS

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AIMS: To compare the dental and skeletal changes achieved with tooth-borne expanders (conventional) versus hybrid expanders (MARPE) in patients with maxillary deficiency.
MATERIAL AND METHODS: A literature review was conducted from January 2024 to June 2024 using PubMed, Cochrane, and Google Scholar databases.

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Inclusion criteria included English-language articles, studies published between 2020 and 2024, human studies, and high-impact journals. Studies comparing the effectiveness of conventional expanders and MARPE in patients aged 9–18 years of both sexes were analyzed, evaluating parameters such as dental inclination, skeletal changes, airway improvements, and periodontal effects using CBCT and other diagnostic tools.
RESULTS: Out of 345 articles initially identified, 6 articles were ultimately selected after screening. MARPE achieved greater skeletal expansion compared to conventional expanders, reducing undesirable effects such as buccal inclination and root resorption. Both types of expanders improved airway dimensions, with MARPE showing slightly superior impact. Long-term stability was comparable between the groups, with minimal relapse observed.
CONCLUSIONS: Both conventional and hybrid expanders are effective in treating transverse maxillary deficiency. MARPE provides better skeletal outcomes and reduces dental side effects, making it a suitable option for late adolescents and young adults.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.305
SP275 EVALUATING THE CLINICAL RELIABILITY OF PROPOSED HORIZONTAL REFERENCE PLANES IN 3D CEPHALOMETRY

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AIMS: Identify, in 3D cephalometry, the most reliable horizontal plane in assessing asymmetries of the maxillofacial complex, in comparison to indirect anthropometric analysis on stereophotogrammetry.
MATERIAL AND METHODS: In this cross-sectional observational study, a PubMed literature review was conducted to identify proposed horizontal planes in 3D cephalometry from January 2000 to November 2024.

Patients were selected as subjects aged 18 to 55 years who underwent CT scans of the facial complex. They also received facial stereophotogrammetry, with a tongue depressor between dental arches at the level of the second premolars. The stereophotos were examined with Viewbox 0.4 software (dHAL Software, Kifissia, Greece) to calculate the difference in the vertical distances between the right and left pupils with tongue depressors, measured at the level of the relative oral rims.

On each patient's CT scans, cephalometric planes were reproduced and the mesio-vestibular cusps of right and left maxillary first molars (or second premolars) were identified.

CT scans were analyzed with dedicated software (SimPlant O&O, Lueven, Belgium) to determine the difference in the distances of each plane from the right and left tooth points.

The cephalometric results obtained were compared to anthropometric ones to determine which cephalometric plane most agreed with the anthropometric one in identifying vertical facial symmetry.

Descriptive (mean, median, standard deviation) and analytical (Pearson's linear correlation coefficient and Lin's concordance correlation coefficient) statistics were performed using SPSS software.
RESULTS: 13 out of the 24 horizontal planes identified in the literature review have been selected as appropriate.

A total of 52 Caucasian patients were included in the study.

Pearson's linear correlation coefficient was evaluated, showing values closest to the ideal value of 1 in the case of planes 1, 2, 7, 11 and 13. Finally, Lin's Concordance Correlation Coefficient (CCC) was considered, with plane 11 showing the highest value of all (CCC = 0.553). This plane had a mean difference of 0.127 and standard deviation of 1.763.
CONCLUSIONS: Plane 11 exhibits the highest values; however, in a clinical context, Plan 11 alone is not sufficiently reliable, but still needs to be integrated with other data that form part of the diagnosis.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.306
SP276 RESIN-MODIFIED GLASS IONOMER VS COMPOSITE BONDING AGENTS FOR ORTHODONTIC BONDING: A RANDOMIZED CONTROLLED TRIAL

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AIMS: In this trial the aim was to compare the incidence of white spot lesions (WSL) and bond failures between groups of participants wearing fixed orthodontic appliances bonded with either light-cured resin-modified glass ionomer cement (GC Fuji Ortho™) or light-cured composite (3M Transbond™ Plus).
MATERIAL AND METHODS: Ninety consecutive patients, in the permanent dentition, requiring bimaxillary orthodontic treatment with fixed appliances were included in this RCT. A cross-mouth methodology was applied. In each patient, two diagonal quadrants (i.e. upper right and lower left, or vice versa) were randomly assigned to the Fuji Ortho group and the contralateral diagonal quadrants to the Transbond group, forward of the first molars. The incidence of the first-time brackets failure during the first 12 months of the treatment were registered. The presence of WSL was assessed before bonding and after debonding. The assessors were blinded to group allocation.
RESULTS: Of the ninety patients, eighty-four completed the trial. In the Fuji Ortho-group 64.3% of the participants had at least one bond failure compared to 17.9% with Transbond ($P<0.01$). The total amount of bracket failure in the Fuji Ortho group was 12.9% and 2.1% in the Transbond group. The difference in bond failure between the groups is significant ($P<0.01$) in favor of Transbond (RR 6.21 CI 95% 3.89-9.94). The incidence of WSL did not differ significantly.
CONCLUSIONS: Using resin-modified glass ionomer significantly increased the risk of bracket debonding compared to light-cured composite. The incidence of WSL was not affected by the bonding agent.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.307
SP277 COMPARISON OF TRANSVERSAL EXPANSION AND STABILITY IN LEFORT I AND SARPE PROCEDURES: A SYSTEMATIC REVIEW

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AIMS: The objective of the following systematic review was to compare the transversal changes and stability in patients who underwent Lefort I or SARPE orthodontic surgery
MATERIAL AND METHODS: An electronic search was undertaken in three different databases: Pubmed, Cochrane and WOS (Web of Science) by three authors by including studies in humans published from November 2014 to November 2024. The inclusion criteria included studies comparing patients aged 18 or older, who presented a skeletal transversal discrepancy who underwent either Lefort I osteotomy or SARPE procedure. Studies that included patients with syndromes, medical problems or were taking medicine were excluded from this systematic revision. The key words used for the search of data in the different databases were: Orthodontic surgery, SARPE/SARME, Le Fort I, stability, palatal expansion technique, transversal discrepancy.
RESULTS: A total of 3 articles were included in the systematic review after meeting the eligibility criteria for the research question posed.
CONCLUSIONS: A greater amount of total transversal expansion is obtained with SARPE (4.032cm) procedure rather than with Lefort I (3.650cm) osteotomy, although regarding skeletal expansion in the posterior maxillary region, Lefort may have a greater influence. After a 6 month retention period, both procedures seemed to have greater dental relapse than skeletal relapse; however, SARPE patients showed greater relapse overall (-3.63 +/- 3.70), making Lefort I osteotomy more stable after a 6 month postoperative period (1.17 +/- 0.80). Moreover, the increased expansion in SARPE may result in more alterations of the dental arch shape. Further studies are warranted to determine the stability in LeFort I and SARPE procedures.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.308
SP278 THREE-DIMENSIONAL EVALUATION OF UPPER AIRWAY IN PATIENTS WITH UNILATERAL CRANIOFACIAL MICROSOMIA: A PILOT STUDY

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AIMS: Unilateral craniofacial microsomia (UCM) presents with various degrees of unilateral deficiency of hard and soft tissues with underdevelopment of the

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temporomandibular joint, mandibular ramus, masticatory muscles, and the ear. Mandibular hypoplasia is a prevalent type of deformity in UCM and can be classified according to severity grades. The diminished size of the mandible and maxilla can reduce upper airway volume and potentially cause upper airway restriction. This dentofacial deformity in UCM has been linked to Sleep-disordered breathing.

The purpose of this study is to evaluate the three-dimensional morphology of the nasal cavity and pharyngeal airway in growing patients using innovative and validated evaluation methods on UCM patients.

MATERIAL AND METHODS: Settings and sample population: Cone beam computed tomography scans were retrospectively collected and divided into two groups: (a) UCM, 11 patients (mean age 12.7 ± 4.4 years); and (b) Control, 11 subjects, matched for age (mean age 12.1 ± 1.1 years). Two investigators performed the measurements.

The total and partial volumes of the nasal cavity and the pharyngeal airway were calculated. The pharyngeal airway centreline was determined to assess the minimal cross-sectional area and hydraulic diameter. The Paediatric Sleep Questionnaire was evaluated in the UCM group. Intraclass correlation coefficient was used to calculate intra-examiner and inter-examiner reliabilities. Measurement errors were assessed using Dahlberg's formula. An unpaired t-test was applied to compare the differences between groups.

RESULTS: Nasal cavity volume was significantly reduced in UCM patients (9714.9 ± 3.03 mm3) compared to controls (12773.9 ± 1.96 mm3) (P = 0.01). However, no significant differences were observed in pharyngeal airway volume measurements, minimal cross-sectional area, or hydraulic diameter between the UCM group and controls. The Pediatric Sleep Questionnaire results did not identify any UCM patients at high risk of Sleep-disordered breathing. Intra-class correlation coefficient values demonstrated excellent reliability, and the method showed minimal error.

CONCLUSIONS: This pilot study suggests that UCM patients might have reduced nasal cavity volume. The study found no increased risk of Sleep-disordered breathing in the small group examined. Further studies with larger samples are needed to explore this further.

Disclosure of interest: None declared

Abstract citation ID: cjaf073.309

SP281 IN VITRO EVALUATION OF CELL VIABILITY ON DIRECT CONTACT WITH ORTHODONTIC ALIGNERS IN IMMORTALIZED HUMAN FIBROBLAST STRAINS

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AIMS: The aim of this study was to evaluate fibroblast behavior (HGF-hTERT), cell viability and proliferation, on the surface of different *in-house* orthodontic aligner materials.

MATERIAL AND METHODS: 110mm diameter discs were digitally designed to thermoform the aligner plates. The STL files were 3D printed in orthodontic model resin (NextDent Model Ortho) and the aligner foils were thermoformed in a thermoforming unit with an automated process (Erkoform-3D motion). 8mm discs were prepared and randomly distributed among the study groups (n = 9 /study group): PET-G (Erkodur, Erkodent) (Group ERD); PET-G/TPU (Erkoloc-pro, Erkodent) (Group ERL). HGF1-hTERT were grown on these surfaces.

hTERT immortalized gingival fibroblasts – HGF- hTERT (ABMgood) were seeded on the disc samples surface for each study group and cultured as indicated by the supplier in a cell culture incubator at 37°C, 5% CO2 and 97% humidity. Cell viability was assessed at 1 and 7 days, using a resazurin-based method using a fluorescence plate reader and converted to % viability relative to negative control according to ISO 10-993. Cell morphology and adhesion were analyzed by fluorescence microscopy and scanning electron microscopy (FEG-SEM) at 1 and 7 days. The results were presented as mean ± standard deviation (or 95% confidence interval). Comparisons between groups were performed by unidirectional and repeated measures ANOVA (Tukey's *post-hoc* test) using statistical software (SPSS 28.0 for MacOS). Significance was defined as $p < 0.05$.

RESULTS: Cell viability increased over time in all groups, consistently exceeding 70% relative to the control threshold, indicating no cytotoxic effects. Repeated measures ANOVA with Tukey's *post hoc* analysis confirmed that the material had no statistically significant impact on cell viability from 1 to 7 days ($p = 0.911$). Additionally, no significant differences were observed between the ERL and ERD groups and the control ($p = 0.205$ and $p = 1.000$, respectively). Fluorescence microscopy and field-emission scanning electron microscopy (FEG-SEM) revealed progressive cell proliferation and adhesion over time, with cells displaying normal morphology and well-defined extensions on the surfaces of all discs.

CONCLUSIONS: Contact with PET-G and PETG/TPU surfaces showed no cytotoxic effects on fibroblast viability and proliferation compared to the negative controls.

Disclosure of interest: None declared

Abstract citation ID: cjaf073.310

SP282 EFFECTS OF MINIPLATE SKELETAL ANCHORAGE-BASED INTERMAXILLARY TRACTION IN CLEFT LIP AND PALATE

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INTRODUCTION: Maxillary retrusion is common in children with cleft lip and palate (CLP). Severe cases require surgical correction in adulthood, while orthodontic interventions, such as miniplate skeletal anchorage (MSA) with Class III elastics, are used during the growth period. Although MSA has shown promise in non-CLP patients, evidence on its effectiveness in CLP remains limited.

AIM: To evaluate the effect of MSA-based Class III elastics on maxillofacial morphology in children with CLP.

PATIENTS AND METHODS: This retrospective case-control study included 40 subjects with cleft lip and palate (CLP) who underwent one-stage cleft repair during their first year of life. The study group (MSA group, n=20, 60% male) had a mean age of 11.7 years (SD=0.9) at miniplate skeletal anchorage (MSA) placement (T1). The control group (Non-MSA, n=20, 65% male) had a mean age of 10.6 years (SD=0.6) at the start of observation (T1). The mean age at MSA removal (T2) was 15.6 years (SD=1.7), while the control group's observation period ended at 15.9 years (SD=1.3). Both groups were comparable in terms of surgical and orthodontic treatment methods. Cephalometric measurements, including SNA, SNB, ANB, maxillary length (MxL: Co-A), and mandibular length (MnL: Co-Pog), were recorded at T1 and T2. Descriptive statistics, t-tests, and regression analyses were performed to compare craniofacial changes between groups. Independent variables included MSA use, sex, age at T1, and length of observation.

RESULTS: The mean duration of MSA use was 3.6 years (SD=1.6, range 0.9-6.3). At T1, no significant differences were observed between groups in SNA (73.0° vs. 74.6°; p=0.108) and MxL (72 mm vs. 70.1 mm; p=0.254), though ANB (-3.8° vs. -1.3°; p=0.015) and MnL (103.8 mm vs. 98.3 mm; p=0.017) differed. Between T1 and T2, the MSA group showed significant SNA improvement (1.6° vs. -0.6°; p=0.002) but no significant differences in MxL (5.1 mm vs. 4.6 mm; p=0.729) or mandibular changes. Regression analysis confirmed MSA's effect on maxillary position (SNA change: p=0.002) and MxL (p=0.009), with age at T1 influencing mandibular growth.

CONCLUSIONS: MSA-based Class III elastics positively influence maxillary position in CLP patients but yield clinically limited results. Earlier treatment initiation may enhance outcomes.

Disclosure of interest: None declared

Abstract citation ID: cjaf073.311

SP283 ANTIBACTERIAL PROPERTIES OF MICRO- AND NANOSTRUCTURED TITANIUM SURFACES MODIFIED WITH TEFLON LIKE ICVD POLYMERS FOR ORTHODONTIC APPLICATIONS

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AIM: The aim of the study was to systematically investigate the bacterial affinity of oral pathogens on micro and nanostructured titanium surfaces in the context of orthodontic applications, as well as explore ways to reduce their rejection rate.

MATERIALS AND METHODS: Samples were fabricated from grade 5 Ti6Al4V alloy (Good Fellow, Huntingdon). A mechanically polished surface served as the control substrate, while two distinct types of micro and nanostructured surfaces were produced through acid etching and sandblasting techniques. All samples, including the control, were subsequently modified with a thin layer (20 nm) of a Teflon-like polymer via initiated chemical vapor deposition (iCVD). Following

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this modification, a comprehensive surface analysis was conducted using photoelectron spectroscopy (XPS), profilometry, and atomic force microscopy (AFM) to evaluate surface morphology and roughness. Additionally, scanning electron microscopy (SEM) was employed to visualize surface structures. The samples were then subjected to a standardized bacterial test to assess bacterial affinity with respect to *Escherichia coli*. Optical microscopy was utilized to quantify bacterial attachment and density on the surfaces, and samples were categorized based on the formation of bacterial colonies.
RESULTS: The polished control substrate exhibited minimal bacterial attachment, whereas the acid-etched and sandblasted surfaces demonstrated significant bacterial accumulation, attributable to their increased roughness. Conversely, the samples modified with the iCVD layer exhibited substantially reduced bacterial attachment, with efficacy observed in the double acid-etched surface, which showed markedly lower bacterial colonization.
CONCLUSIONS: The results indicate that titanium surfaces engineered with micro and nanostructures, in conjunction with a thin layer of Teflon-like polymers, can effectively serve as antibacterial surfaces and creates a robust superhydrophobic bulk material. This property is particularly critical for the functionality of orthodontic mini-implants. This approach holds promise for enhancing the durability of temporary anchorage devices by mitigating excessive bacterial accumulation, especially within the mandibular region.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.312
SP284 THE ACCURACY AND RELIABILITY OF AI IN 3D DENTOFACIAL ANALYSIS

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AIMS: The aim of this study is to determine the accuracy and reliability of 3D CBCT cephalometric tracing using artificial intelligence (AI)-based software. Previous research has indicated that AI-based cephalometric tracing software can achieve accuracy comparable to the computer-based digital tracing measuring key cephalometric landmarks and performing cephalometric analysis.
MATERIAL AND METHODS: A total of 85 CBCT scans were obtained from the archives of the Dental Hospital. CBCT scans were uploaded into AI based software Invivo 7.2 (Anatomage, Santa Clara, CA, USA). Fourteen parameters were selected. Scans with craniofacial anomalies or syndromes were excluded. All scans were standardized to the Midline plane and Frankfort plane before tracing. Fifteen scans were randomly selected to test the Intra-rater and Inter-rater reliability. Additional fifteen scans were selected to test the AI reliability twice. Kolmogorov Smirnov test Paired-t-test ($P < .05$) were used to compare the readings between the groups.
RESULTS: Intra- and Inter-rater reliability test showed high reliability for all measurements. No statistically significant differences were found between the AI tracing and computer-based digital tracing in SNA°, SNB°, U1 to NA°, L1 to NB°, L1 to NB mm, U1 to LI°, OP to SN°, GoGn to SN°, Y- axis angle, lower lip to E-plane and upper lip to E-plane mm. However, statistically significant differences were detected in ANB°, U1 to NA mm, and Pog to NB mm.
CONCLUSIONS: High reliability was found between the AI tracing the computer-based digital tracing in eleven measurements. Three measurements did not show good reliability. AI tracing can be considered as a valuable tool to perform 3D CBCT analysis tracing.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.313
SP285 ‡‡‡ WHAT IS THE IMPACT OF AUTOTRANSPLANTATION ON THE LONG-TERM STABILITY AND PATIENT SATISFACTION OF IMPACTED CANINES? A SYSTEMATIC REVIEW

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AIMS: To review the literature regarding the effects of autotransplantation on patient satisfaction, aesthetic out- comes, and the long-term stability of autotransplantation.
MATERIAL AND METHODS: This Systematic Review, registered with PROSPERO (CRD4202341), followed the PICO framework. Extensive searches were conducted in the Cochrane Library, PubMed, ScienceDirect, Scopus, VHL Regional Portal, and Web of Science, covering literature up to April 1, 2023.
RESULTS: The review analyzed 11 studies involving the autotransplantation of 395 canine teeth, including two mandibular canines. Findings indicate higher success rates in younger patients, with a higher prevalence of transplantation in females (164) than males (105). The survival rate of transplanted canines was up to 67.9 % after 21 years, with some surviving up to 27.8 years. Success factors included young age, female gender, minimal extraoral time, proper root canal treatment, and effective post-operative care. Negative factors included anky- losis, root resorption, root fractures, infections, and periodontal issues. Complications included tooth darkening and the need for crowning. Patient satisfaction was rarely reported, with only three studies mentioning it and none addressing quality-of-life directly.
CONCLUSIONS: Canine autotransplantation is viable for selected patients when other treatments are insufficient. Despite various influencing factors, consensus guidelines for procedural decisions still need to be improved, and reports on patient satisfaction and quality-of-life impacts should be more frequent.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.314
SP286 INTEGRATING CBCT WITH TREATMENT PLAN VISUALIZATION IN CLINCHECK SOFTWARE: A RETROSPECTIVE CLINICAL EVALUATION

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AIM: The ability to integrate CBCT images with planned tooth movements is a new feature in the ClinCheck software (Align Technology). This functionality allows for the assessment of risks such as bone dehiscence and fenestration due to planned transverse and sagittal expansion of the dental arches. Additionally, it aids in determining strategies for managing impacted teeth, dilacerated roots, periodontal diseases, and preparation for orthognathic surgery.

The aim of this study is to establish standards for 3D diagnostics to enhance control over the precision of orthodontic tooth movement in aligner treatment. This retrospective study analyses available treatment plans for patients qualified for Invisalign treatment between September 1, 2022, and October 31, 2024.
MATERIALS AND METHODS: This retrospective study included 76 patients, comprising 57 women and 19 men, aged 9 to 65 years, for whom the integration of the treatment plan in ClinCheck software (Align Technology) with CBCT was deemed appropriate.
RESULTS: In the adult patient group, consisting of 67 participants, CBCT-ClinCheck integration was performed due to the presence of gingival recessions (28 cases), periodontal disease (5 cases), and impacted teeth (1 case). Regarding treatment planning, 5 patients were qualified for orthognathic surgery, 31 for compensation of skeletal defects, 34 for transverse expansion, and 29 for proclination.

In the pediatric group, the indications for CBCT integration included impacted teeth (5 cases), root dilaceration (1 case), agenesis of permanent teeth (2 cases), and tooth loss due to trauma (1 case).
CONCLUSION: This study provides valuable insights and practical significance for systematizing knowledge among practicing orthodontists regarding the expanded indications for CBCT in modern digital orthodontics.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.315
SP287 QUANTITATIVE ANALYSIS OF BONE TISSUE SURROUNDING UPPER FIRST MOLARS IN VARIOUS AGE GROUPS – A CBCT STUDY

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AIM: In depth CBCT analysis in both qualitative and quantitative manner might prove vital in individualization of treatment planning. An attempt to determine the relation between the patient age and the amount of cancellous and cortical bone in the upper first molar area might be of particular importance, particularly in cases where maxillary constriction is observed.
MATERIAL AND METHOD: 103 CBCT maxillary scans of patients with normal occlusion and no history of orthodontic treatment were chosen from the database of our institution. Patients were divided into 3 age groups: I - <13 years; 30 pts.; mean age 8 +/-1,4; II – 13–17 years; 26 pts.; mean age 15,2 +/-2 and III - >17 years; 47 pts.; mean age 25,2 ± 4,2 and both the thickness of the cortical bone

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(vestibular and palatal) and width of the alveolar process at the level of the first upper molars root furcation was measured.
RESULTS: The youngest group of patients had significantly wider alveolar processes (I - 14,90 ±1,1 mm vs II - 12,95 ±1,24 mm and III - 12,31 ±2,04 mm) and thicker palatal cortical bone than patients older than 13 years (I - **0,58** ±0,15 mm vs II - **0,45** ±0,18 mm and III - **0,39** ±0,19 mm). 73,08% of mesial vestibular roots of upper first molars in group II and 95,74% in group III were either within the cortical bone or directly adjacent to it.
CONCLUSIONS: The decisive factor limiting the orthodontic movement in patients older than 12 years might be the decreasing distance between the palatal and vestibular cortical bone which restricts transverse tooth movement. Alveolar measurements performed on pre-treatment CBCT scan could affect the choice of treatment options aid in establishing accurate prognosis.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.316
SP288 ORAL HEALTH RELATED QUALITY OF LIFE IN PATIENTS WITH CLEFT LIP AND PALATE: A CROSS-SECTIONAL STUDY USING CHILD ORAL HEALTH IMPACT PROFILE

Jonathan Luyten[1], Naomi Seyad[1], Felix Degrijze[1], Guy De Pauw[1]; *[1]Ghent University, Ghent, Belgium*

AIM: The aim of this cross-sectional study was to compare the Oral Health Related Quality of Life (OHRQoL) among unilateral cleft lip and palate (CLP) patients from 10 to 18 years of age to control subjects at the Ghent University Hospital, using the COHIP-questionnaire.
MATERIALS AND METHODS: A total of 35 patients (aged 10 to 18 years) with unilateral cleft lip and palate (CLP) and, for comparison, 35 age- and gender-matched control subjects were included. OHRQoL was determined using the Child Oral Health Impact Profile (COHIP-34) questionnaires, which contains 34 questions on the five following domains: oral health well-being, functional well-being, social/emotional well-being, school environment and self-image.
RESULTS: Children with unilateral CLP scored significantly higher on the COHIP-questionnaires than the control subjects. They had significantly higher scores on the COHIP-subdomains 'functional well-being', 'oral health well-being' and 'school environment' respectively p=0.003, p=0.043, p=0.049. Additionally, the OHRQoL was compared within the patient groups for the age (divided into age-groups 10-14y and 15-18y). However, there were no significant differences in COHIP-scores between these age groups. The patients with cleft reported speech problems as the biggest issue. Additionally, snoring, dry mouth/dry lips and psychosocial burdens have been found as points for improvement.
CONCLUSION: In this study, children with unilateral CLP reported a significantly lower OHRQoL compared to controls. Further research is necessary to identify the causes and improve the OHRQoL in these children.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.317
SP289 VALIDATION OF THE NOVEL CLEFT LIP AND PALATE SMILE ESTHETIC INDEX

Jonathan Luyten[1] and Guy De Pauw[1]; *[1]Ghent University, Ghent, Belgium*

AIM: The aim of this research project is to investigate the validity of the novel cleft lip and palate smile aesthetic index (CLP-SEI) following its reliability testing.
MATERIALS AND METHODS: 33 patients born with cleft lip and/or palate were photographed in a standardized manner. An aged and gender matched control group was recruited and photographed. Photographs were randomized and blinded. A slideshow was presented to 5 general dentists and 5 orthodontists depicting the controls and patients. All raters were asked to complete the cleft lip and palate smile aesthetic index form.
RESULTS: Pearson correlation revealed a statistically significant ($p<0.05$) positive linear relationship between the mean scores for overall aesthetics of the smile and the mean scores for each of the 14 parameters. In the control group, no linear relationship with overall aesthetics of the smile could be found for 'nasolabial symmetry', 'upper lip vermillion', 'aesthetics of missing papillae/gingival excess' and 'aesthetics of tooth colour'. For the other parameters a significant linear relationship was found ($p<0.05$). In the cleft group, the inter-rater agreement was good to excellent for all parameters and for the overall smile aesthetics score (0.85-0.98). In the control group, the inter-rater agreement was good to excellent for all parameters and for the overall smile aesthetics score (0.77-0.96), except for 'the aesthetics of missing papillae/gingival excess' (0.69) and 'the aesthetics of buccal corridors' (0.73) for which an average agreement was found.
CONCLUSIONS: The CLP-SEI is a valid tool that can be used to assess smile esthetics in patients with Cleft lip and or palate in clinical and research settings.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.318
SP290 EFFECTS OF EARLY AND LATER TIMED CERVICAL HEADGEAR ON PERMANENT UPPER CANINES AND MOLARS FROM 7 TO 18 YEARS OF AGE: A FOLLOW-UP STUDY

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AIMS: To evaluate the effect of early versus later cervical headgear (CH) treatment to the eruption time and inclination of maxillary permanent canines and second molars, inclination of the first molars, and the overlapping between second and third molars.
MATERIAL AND METHODS: The material consisted of 67 seven-year-old children, with a Class II malocclusion, randomised into two equal-sized groups. In the early group (EG, n = 33), CH treatment was started at the age of 7.8 (T0) and in the later group (LG, n = 34) at the age of 9.5 (T1). Dental panoramic tomographs (DPTs) were taken at timepoints T0–T4. The comparisons between the groups in DPT measurements were made at different time points and by combining the results using a linear mixed model.
RESULTS: In the LG, the right canine erupted earlier in T1 and in T2 and both canines erupted earlier in the combined results, and the left canine was more vertically inclined in T2. The second molars in the EG were more distally tipped in T1 and in the combined results. The eruption stage of the second molars was earlier in the LG than in the EG. In the EG, more overlapping of the right and left third molars with the second molars was observed in T1. All P-values were <0.05.
CONCLUSIONS: A later treatment timing seems more beneficial, with earlier eruption and more vertically oriented canines, less distal tipping, and earlier eruption of second molars and less overlapping between second and third molars.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.319
SP292 AND THEN WHAT? - A RETROSPECTIVE STUDY OF SELECTED ASPECTS OF THE RETENTION PHASE OF ORTHODONTIC TREATMENT

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AIMS: The aim of study was to identify and investigate selected problems occurring during the retention phase.
MATERIAL AND METHODS: Obeying the scheduled visits, retainer types and the incidents of failures and iatropathologic effects, as well as malocclusion relapses occurrence were investigated in long-term follow-up study. The survival rate of a different retainers was determined and related to the other studied variables, using statistical analysis, namely: Chi^2, Fisher's, Shapiro-Wilk, Student's t, Mann-Whitney U, log rank and Kaplan-Meier plots, and logistic regression model.
RESULTS: The average observation time of 17 months with 3 follow-up visits were lower than recommended. Retainer failures occurred during 58.7% of 3045 visits. Kaplan-Meier function demonstrated that for two fixed retainers the probability of failure was greater than 50% after 4 months, and that only approximately 1/5 of the patients used both fixed retainers without any failures for 2 years. Removable retainers demonstrated better survival rates.

Iatropathologic effects occurred only in the cases of fixed retainers affecting 0.8% of the patients, after 5 years (on average). These complications significantly correlated with the increase of ML-NSL, ML-NL and Gn-tgo-Ar angles (insufficient test power) and with observation time (sufficient test power). There was no correlation between the occurrence of the fixed retainer failures and their iatropathologic effects.

The relapses were observed in 1.9% of the patients, on average after 4.5 years. *Post hoc* analysis revealed correlation between relapse and observation time and primary diagnosis of anterior open bite with an adequate test power.

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CONCLUSIONS: Recommendations for follow-up visits differ from their implementation in practice. The probability of a fixed retainer failure indicates that most patients will require its repair. Iatropathologic effects of fixed retainers are rare, but they occur several years after treatment, which substantiates the necessity to awake awareness among dentists from other specialties. The relationship between the relapse and the observation time indicates that long-term follow-up is needed, especially in patients treated due to an open bite.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.320
SP293 THE EFFECT OF INVISALIGN® ON ROOT RESORPTION IN THE TREATMENT OF ANTERIOR OPEN BITE MALOCCLUSION IN COMPARISON WITH FIXED APPLIANCES – A PILOT STUDY

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AIM: The aim of the present study was to examine the effect of Invisalign® on root resorption in the treatment of anterior open bite (AOB) malocclusion in comparison with fixed appliances (braces).
MATERIALS AND METHODS: This retrospective radiographic pilot study used linear measurements from panoramic radiographs (OPGs) to measure root resorption (RR) using 160 maxillary incisor roots from 40 participants (20 participants per group) following orthodontic treatment of AOB using either Invisalign® or fixed appliances from a private orthodontic clinic on the Gold Coast, Australia.
RESULTS: The Invisalign® group (61.3%) had almost two times more patients finishing with no RR in comparison to the fixed group (33.8%). For tooth 12, the odds are increased by approximately three times with the fixed treatment, relative to no RR. The odds of severe RR for tooth 22 increased by two times compared to a combined no/mild RR for the fixed treatment group. For tooth 11, the odds of severity increased by 2.5 times in the fixed treatment group for the severity of RR compared to a combined no/mild RR grade. The odds of being in a combined mild/severe RR group is increased by 2.7 times for the fixed treatment group relative to the no RR group. Finally, the odds of having a higher degree of RR severity if in the fixed treatment group is 4.4 times greater compared to a combined no/mild RR grade. Confounding variables such as age, sex, initial AOB and treatment duration were found to be statistically not significant between the groups, as such, these were removed from the analysis.
CONCLUSIONS: The frequency of degree of RR showed that fixed appliances exhibit more RR in comparison to Invisalign®, which had more cases displaying no RR in the treatment of AOB malocclusions – likely due to mechanical force application. However, there was no statistical significance when comparing severity of RR between fixed and Invisalign® appliances based on grading and the mean percentage change of RR. These findings suggest further investigation is required to elaborate on these findiings.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.321
SP294 SURGICAL TREATMENT OF 89 PATIENTS WITH CRANIOFACIAL MICROSOMIA IN FINLAND

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AIM: This retrospective study aimed to evaluate the surgical treatment interventions for patients with craniofacial microsomia (CFM) treated at a major craniofacial unit in Finland. Specifically, it assessed the types and frequencies of surgical procedures, the age at which these treatments occurred, and the distribution of CFM severity among the cohort.
PATIENTS AND METHODS: The study reviewed patient records from the Helsinki Cleft Palate and Craniofacial Centre between January 2010 and December 2020. Patients were identified using ICD-10-CM codes for microtia, congenital malformation syndromes, and facial asymmetry. After exclusions for incomplete documentation or diagnoses outside of CFM, 89 patients were included. The Pruzansky-Kaban classification was used for severity assessment. Surgical interventions, including ear reconstruction, soft tissue surgeries, and orthognathic surgery, were cataloged, and their timing and indications were analyzed. Descriptive statistics were used to characterize the cohort in terms of laterality, CFM severity, gender, and age at surgery.
RESULTS: Of the 89 patients, 49% were male, and 50% were female, with a median age of 15 years. The majority (39%) had Pruzansky type I CFM, followed by type IIa (18%) and type III (15%). Surgical treatment was received by 72% of patients, with the most common procedures being ear reconstruction (46%), followed by soft tissue corrections (34%) and (24%) cleft-related surgeries. Ear surgeries were primarily two-stage reconstructions, and the median age for these procedures was 11 years. Among Pruzansky III patients, 8 out of 13 underwent orthognathic surgery often near reaching of skeletal maturity.
CONCLUSIONS: This study underscores the variability in surgical treatment strategies for CFM, with a preference for delaying skeletal interventions until skeletal maturity is reached. Ear and soft tissue reconstructions were the most common procedures performed. The findings suggest that treatment plans are individualized, with a focus on minimizing early intervention to avoid disrupting mandibular growth. Further prospective studies are needed to establish clearer guidelines for the timing and indications for surgical interventions in CFM management.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.322
SP295 PLANNED GENIOPLASTY IN ORTHOGNATHIC SURGERY: IS IT ALWAYS NECESSARY?

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AIMS: The aim of this study was to evaluate the course and outcomes of planned genioplasties as part of orthognathic surgery treatments at the Department of Oral and Maxillofacial Diseases, Helsinki University Hospital (HUH), Finland, while investigating the impact of different osteotomy types on the necessity of genioplasty and identifying patient-related factors associated with changes in treatment plans. In HUH genioplasty operations are essentially performed in a separate operation post-osteotomy, if required by the patient.
MATERIAL AND METHODS: This retrospective study included 351 orthognathic surgery patients (141 males, 210 females) treated between 2016 and 2020. Data collected comprised planned and performed genioplasties, osteotomy types, patient demographics, and comorbidities. Cephalometric analyses of initial-, pre-, and post-operative lateral skull radiographs were conducted to evaluate esthetic and functional outcomes.

Paired Wilcoxon signed-rank test was used to compare initial-, pre-, and post-operative measurements. A logistic regression model was applied to identify factors predicting the necessity of genioplasty based on cephalometric measurements. Statistical analyses were conducted using R Studio 4.4.1.
RESULTS: Of 351 patients, 54 had genioplasty planned, but only 20% (11 patients) underwent the procedure post-osteotomy. Among patients who did not require genioplasty after osteotomy significant changes were observed in SNA and SNB values ($p < 0.05$), reflecting substantial skeletal corrections that made additional procedures unnecessary. In contrast, among patients who still required genioplasty after osteotomy no significant changes in SNA or SNB were observed, suggesting that primary treatment alone was insufficient to achieve esthetic goals. Logistic regression revealed that larger changes in SNB were significantly associated with requiring genioplasty ($p = 0.036$). Notably, none of the patients treated with Le Fort I alone required genioplasty
CONCLUSIONS: Genioplasty is not always necessary when osteotomy achieves adequate skeletal corrections, particularly in Le Fort I procedures. Patients undergoing bimaxillary surgery or BSSO may require genioplasty to optimize esthetic outcomes, especially when mandibular adjustments remain insufficient. Significant SNB changes are strong indicators for genioplasty. These findings suggest a need for refined presurgical planning to better predict the potential necessity of genioplasty.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.323
SP296 MECHANICAL PROPERTIES OF ORTHODONTIC ELASTICS UNDER DIFFERENT DECAY CONDITIONS

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AIMS: Intermaxillary elastics are widely used in Orthodontics. These elastics can be used to correct the antero-posterior relationship of the jaws, the midline, intercuspation and as aids for extra-oral devices. These devices offer enduring force, high flexibility, and low cost, while also being easy for patients to replace, helping them maintain good oral hygiene. Orthodontic elastics are valued for their ability to return to their original dimensions after deformation, but their force decreases over time due to creep, stress relaxation, and degradation accelerated by oral and storage conditions, affecting treatment effectiveness.

This study aims to assess the mechanical properties of intermaxillary elastics and measure the force exerted on teeth at various stretch levels.

MATERIAL AND METHODS: Latex elastics in 1/4, 3/16 and 1/8 sizes from the American Orthodontics and Ormco brands were used. Elastics of light, medium, and heavy force were randomly selected, based on the brand's classification. The mechanical characterisation of the elastics was assessed by their viscoelastic response. Each elastic was individually placed onto the universal testing machine's hook with a 5 kN load cell, and then they were stretched, and its force was measured minute by minute until rupture. All elastics were subjected to artificial saliva as an ageing medium at room temperature. Statistical analysis, with a significance level set at 5% ($p < 0.05$), was conducted to identify significant differences and trend.

RESULTS: Significant differences were found among the groups, with stretching protocols causing a rapid force reduction in all types of elastics. The control elastics demonstrated higher average forces at all testing times. This highlights the impact of stretching and environmental conditions on the mechanical performance of orthodontic elastics.

CONCLUSIONS: The elastics exhibited statistically significant variations in their mechanical properties depending on the different thicknesses and widths that characterise them. These results will contribute to the development of a clinical guide that enables the quick and accurate selection of the ideal elastic, optimizing orthodontic treatment efficiency.

Disclosure of interest: None declared

Abstract citation ID: cjaf073.324

SP297 IS THE SHEAR BOND STRENGTH OF NEW ORTHODONTIC BRACKETS SIMILAR TO RE-BONDED ONES?

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AIMS: The clinical success of fixed orthodontic appliances depends on the interface created between the bracket, the adhesive, and the enamel surface. Clinically acceptable bracket detachment should be below 10%, but studies report frequencies ranging from 3.5% to 23%. Enamel surface roughness influences bracket bond strength. This study aims to compare the shear bond strength of new orthodontic brackets with that of rebonded brackets, evaluating their performance and potential clinical applications

MATERIAL AND METHODS: 45 human premolar teeth extracted for orthodontic reasons in patients aged between 14 and 20 years were embedded in acrylic cubes (3x15mm) so that the buccal surface was oriented horizontally. The initial roughness was determined using a surface roughness evaluation machine, Mitutoyo Surftest SJ 500 (Mitutoyo Co., Kawasaki, Japan). Brackets (Roth prescription, 0.018-inch box, Dentaurum mini) were cemented according to the manufacturer's instructions. Group I was immersed in artificial saliva (n=15), group II in a demineralization solution for a period of 7 days (n=15), and group III in a demineralization solution of 7 days after being previously immersed in a fluoride-rich solution. After assessing the initial roughness of the enamel and bonding the brackets, the brackets were detached using a traction system and the maximum force required was recorded. The excess resin was then removed and new tests were conducted to assess the roughness of the dental surface. The brackets were then rebonded to each tooth followed by new debonding tests using the same initial traction system. The tooth surface was cleaned again to remove adhesive and cement residue, and roughness was reassessed.

RESULTS: The highest shear bond strength was observed in the initial bond in all three groups. There was a significant difference among the groups studied ($P < 0.005$). Statistically significant differences were found between the initial enamel surface roughness, after the second removal of the bracket and the cement, and in the final assessment.

CONCLUSIONS: Rebonding brackets achieves a bond strength similar to the initial bond. All groups showed significantly lower shear bond strength compared to the initial evaluation. A decrease in surface roughness was observed during multiple bracket rebonding procedures.

Disclosure of interest: None declared

Abstract citation ID: cjaf073.325

SP299 DETERMINATION OF ROOT ANATOMY AND LOCATION OF THE INDIVIDUAL CENTRE OF RESISTANCE OF HUMAN TEETH - A THREE-DIMENSIONAL IN-VITRO STUDY

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AIMS: The anatomy of teeth, in particular the root length, thickness, surface and its relationship to the dimensions of the associated tooth crown, as well as the level of alveolar bone, and thus the part of the tooth that is anchored in it, essentially determine the position of the center of resistance (CR), and is of great relevance during orthodontic tooth movement. As the root anatomy varies from person to person, **the aim of this study** was to three-dimensionally investigate the root anatomy of extracted human teeth of the same tooth groups and to determine the location of their individual CR.

MATERIAL AND METHODS: The study was previously approved by the Ethics Committee at the TU Dresden (**EK 223062016**). Human maxillary and mandibular teeth (n=42), which had been extracted as part of orthodontic treatment or periodontal disease and meet the inclusion criteria (intact tooth root/crown, completed root growth, no infection of the patient, informed consent to the study), were scanned using high-resolution micro-computed tomography (µCT; Skyscan 1174, Bruker, Massachusetts, USA), and converted into detailed 3D-models using Mimics Research 25.0 and 3-matic 17.0 (Materialise, Leuven, Belgien). Idealized periodontal ligament (PDL; constant thickness 0.2mm) and idealized bony alveolae (0.5mm) were generated. From each group of teeth n=3 individual teeth were scanned and formed a study group. Individual location of the CR was determined in a finite element (FE) analysis (MSC Marc/Mentat 2020, MSC.Software, California, USA) by 5, 10 and 15 Ncm buccal force application and evaluated for all teeth of each group. Statistics were conducted using two-way ANOVA ($\alpha \leq 0.05$).

RESULTS: Within all tooth groups a high variability in the location of the CR, which varied intra-individually due to anatomical variation, could be found. Especially for the molar teeth a statistically significant deviation from the classical assumption of the localization of the CR in the bifurcation of the roots was observed.

CONCLUSIONS: The results confirm the individual variation in the location of the CR and thus the possible effects of pre-fabricated orthodontic appliances during treatment, since these and standardized force application cannot optimally match individual conditions and consequently desired treatment outcomes.

Disclosure of interest: None declared

Abstract citation ID: cjaf073.326

SP300 LONG-TERM STABILITY OF DENTAL ARCH WIDTHS AFTER EXTRACTION AND NON-EXTRACTION ORTHODONTIC TREATMENT: A RETROSPECTIVE COHORT STUDY

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BACKGROUND/OBJECTIVES: Dental arch width is considered biologically determined and is associated with a balanced occlusion; however, it is often actively altered during orthodontic treatment and these modifications are associated with post-orthodontic relapse.

MATERIAL/METHODS: Young patients with malocclusion, who had been treated orthodontically with 0.018"-slot Edgewise fixed appliances, were included

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in this retrospective longitudinal study. The maxillary / mandibular intercanine, interpremolar, and intermolar widths were digitally measured before treatment (T1), at debond (T2), and an average of 7 years post-debond (T3). Data was analyzed statistically at 5% with regression modeling, while a subsample of borderline patients was analyzed to assess the effect of extractions on long-term stability.
RESULTS: A total of 104 patients were included (59.6% female; 11.5-year-old at T1), 39.4% of which were treated with tooth extractions. All dental arch widths were increased during fixed appliance treatment, with considerable differences between extraction and non-extraction cases ($P<0.05$ in all cases). On average 7 years post-debond, non-extraction cases showed significant relapse in intermolar width, while intercanine and interpremolar widths remained stable. After baseline matching of extraction / non-extraction cases, tooth extractions were not associated with post-treatment relapse ($P>0.05$). Treatment-related (T1-T2) increases in all three dental arch widths were associated with post-treatment (T2-T3) relapse for both jaws, with 0.20-0.34 mm T2-T3 relapse for each additional 1mm of width increase during T1-T2.
LIMITATIONS: This was a retrospective study.
CONCLUSIONS/IMPLICATIONS: Modest dental arch width increases during fixed appliance treatment showed satisfactory stability in the long term, while greater archwire expansion was associated with increased relapse.

Keywords: clinical study, cohort study, intercanine width, intermolar width, orthodontic treatment, treatment stability
Disclosure of interest: None declared

Abstract citation ID: cjaf073.327
SP301 HYOID BONE POSITION WITH BONE-BORNE OR TOOTH-BORNE SURGICALLY ASSISTED RAPID PALATAL EXPANSION: A RETROSPECTIVE COHORT STUDY

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AIMS: There is a lack of evidence whether hyoid bone position changes occur with surgically assisted rapid palatal expansion (SARPE), which could improve the airway. The aim of this study was to assess differences in hyoid bone position with bone-borne or tooth-borne SARPE.
MATERIAL AND METHODS: Eligible for inclusion in this retrospective cohort study were adult patients who underwent SARPE using bone-borne or tooth-borne expansion appliances. One group (n=33; female/male 15/18; mean age 25.0 ± 8.0 years) was treated with a bone-borne transpalatal distractor (TPD), the other group (n=32; female/male 20/12; mean age 26.0 ± 9.1 years) was treated with a tooth-borne hyrax appliance (HYA). The position of the hyoid bone was determined on lateral cephalograms before (T0) and after SARPE (T1) using eight measurements and five landmarks. The amount of maxillary expansion was calculated at dental landmarks and correlations between the expansion values and hyoid bone position were calculated. Wilcoxon signed-rank tests were used to assess intragroup differences, Mann-Whitney U tests were applied to evaluate intergroup differences with $\alpha = 5\%$. Pearson correlation coefficients were used to assess possible relations between expansion values and hyoid bone position.
RESULTS: There were no statistically significant differences in baseline characteristics between the two groups. In both of them, from T0 to T1, hyoid bone position generally remained stable after SARPE, where the hyoid bones' craniocervical inclination decreased slightly in the HYA group (mean difference 0.02°) while it increased in the TPD group (mean difference 1.25°), resulting in a significant intergroup difference ($p=0.036$). The vertical distance from the Hyoid point to the Menton point significantly decreased in the HYA group (mean difference -1.95 mm) while increasing in the TPD group (mean difference 0.75 mm) ($p=0.001$). Correlations between the expansion values and the position of the hyoid bone were inconclusive.
CONCLUSIONS: The results indicate that the hyoid position remains relatively stable after SARPE and is not dependent on the amount of expansion. However, the statistically significant differences observed must be considered to be clinically negligible.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.328
SP302 THE EFFECT OF THEOBROMINE ON THE BIOFILM FORMATION OF CANDIDA ALBICANS ON ORTHODONTIC ARCHWIRES

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AIMS: To evaluate the anti-biofilm activity of theobromine on Candida albicans on orthodontic archwires.
MATERIAL AND METHODS: The archwires used in this study were round and rectangular Nickel-Titanium and stainless-steel archwires; 0.016", 0.018", 0.017x0.025" and 0.019x0.025". Initially, 10mm length sterile archwires were placed in a well of a 6-well plate containing 2 mL of 200 mg/mL of theobromine of 50% concentration. The plate was incubated at room temperature for 1 min. Following that, the treated archwire was removed and placed in a 6-well plate containing 2 mL of Yeast Peptone Dextrose (YPD) broth. 2 mL of Candida albicans (ATCC MYA-4901), which was standardized to an OD620nm 0.5, was pipetted into the well. The plate was incubated at 37 °C for 24 h. Following incubation, the archwires were transferred into a 15 mL tube containing 5 mL of PBS and sonicated for 1 min. 100 µL of the suspension was collected, and the cell density (cells/mL) was enumerated using a hemocytometer. Similar protocols were repeated by replacing theobromine with 0.12% chlorhexidine gluconate and YPD broth, which serve as the positive and negative control, respectively. All experiments were conducted in triplicates.
RESULTS: Six out of the eight treated archwires tested showed a decrease in biofilm formation compared to the negative control. The highest reduction of biofilm was observed on 016 NiTi (72.7%), followed by 018 S.S (71.4%) and 17x25 NiTi (64.5%) Meanwhile, 19x25 NiTi exhibited the lowest by 37.8%. In contrast, archwires 17x25 S.S and 19x25 S.S showed an increase in C. albicans biofilm by 54.5% and 93.5%, respectively. However, all positive control (CHX) showed a significantly higher reduction of C. albicans biofilm formation than the theobromine-treated archwires ($P<0.05$).
CONCLUSIONS: The antibiofilm activity of theobromine on *C. albicans* biofilm is dependent on the materials and shape of the orthodontic archwires.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.329
SP303 ‡‡‡ PRIMARY HEADACHE RELIEF AFTER RAPID MAXILLARY EXPANSION: A PROSPECTIVE STUDY ON GROWING PATIENTS

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AIMS: Primary headaches (PH) can have a considerable impact on patients' quality of life and show high prevalence in growing population. Rhinogenic factors were observed to contribute to PH onset; rapid maxillary expansion (RME) was proved to induce modifications of nasal cavities and septum. Thus, this study aims to investigate the effects of RPE on PH episodes.
MATERIAL AND METHODS: 68 growing patients (30M-38F; 9.2±1.3 y.o.) were enrolled in the study according to the following inclusion criteria: ≥12 moderate or severe PH episodes in the previous year; transverse maxillary constriction to be treated by RME. Patients under PH treatment/medications, as well as syndromic patients and patients with history of facial trauma or surgery and orofacial congenital anomalies were excluded. The number of monthly PH episodes was recorded before starting orthopedic treatment (T0) and after the removal of the expander (T2). RME was performed using Hyrax device, activated twice a day until modest hypercorrection was achieved. Posterior-anterior cephalometric analysis was performed at T0, after the end of active expansion (T1) and at T2. Changes in PH episodes, as well as cephalometric changes between timepoints were investigated through paired *t*-tests.
RESULTS: A statistically significant ($p<0.001$) increase in the following measurements was recorded: nasal width changed from 27.82±3.04mm to 30.79 ±3.36mm, upper nasal septum length increased from 27.54±3.49 mm to 28.44 ±3.93mm, lower nasal septum length went up from 21.62±3.04mm to 23.27 ±2.74mm. A statistically significant reduction of the monthly PH episodes was observed ($p<0.001$), decreasing from a mean of 4.74 to a mean of 0.59 episodes/month.
CONCLUSIONS: RME induces significant modifications of maxillary and nasal width and of nasal length. It can be inferred that RME has beneficial effects on PH in growing population.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.330
SP305 MANAGING OBSTRUCTIVE SLEEP APNEA IN PATIENTS UNDERGOING ORTHODONTIC TREATMENT USING A HYBRID ALIGNER-MANDIBULAR ADVANCEMENT DEVICE (HAMAD) – A PROOF OF CONCEPT

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AIMS: This case series aimed to showcase the effective management of patients undergoing aligner therapy as part of pre-surgical preparation for Maxillomandibular Advancement (MMA) surgery using a modified Mandibular Advancement Device (MAD). This hybrid aligner MAD (HAMAD) was specifically designed to seamlessly integrate with aligner therapy while ensuring continued efficacy in managing Obstructive Sleep Apnea (OSA) symptoms.
MATERIAL AND METHODS: Four patients with moderate to severe OSA scheduled for MMA-surgery underwent perioperative aligner-based orthodontic treatment, which was integrated with the HAMAD. Traditional MAD's are incompatible with fixed appliances, creating a treatment dilemma when CPAP fails and MMA surgery is needed. This device was specifically designed to complement aligner therapy, featured posterior anchorage, lateral wings for mandibular advancement, and an adjustable expansion screw to accommodate ongoing orthodontic treatment. Unlike traditional MAD's, the anterior teeth were uncovered, enabling simultaneous orthodontic and airway management. Effectiveness was assessed based on patient-reported outcomes, achievement of orthodontic treatment objectives, and suitability for surgery.
RESULTS: As part of an interdisciplinary approach, all four patients received perioperative orthodontic treatment followed by MMA-surgery. Patients reported that the HAMAD provided comparable effectiveness to their previous MAD's in managing OSA symptoms. Orthodontic treatment goals were successfully achieved, and surgical objectives were fully met. The HAMAD's posterior anchorage ensured stability, while the lateral wings effectively advanced the mandible. Its integrated expansion screw facilitated seamless adjustments during orthodontic treatment, and the open-front design minimized interference with aligner therapy. Notably, no additional MADs were required throughout the treatment, underscoring the device's durability and adaptability.
CONCLUSIONS: This new designed HAMAD presents a promising approach for the management of OSA in patients undergoing orthodontic treatment with aligner therapy. By effectively mitigating OSA symptoms while facilitating the achievement of orthodontic treatment objectives, it provides a clinically viable option for patients with OSA and concurrent orthodontic requirements as part of presurgical treatment for MMA-surgery. Further studies with larger sample sizes are warranted to substantiate these preliminary findings.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.331
SP306 CORRELATION BETWEEN NASAL PARAMETERS AND CEPHALOMETRIC SOFT TISSUE PARAMETERS IN CLASS I, II AND III SKELETAL RELATIONSHIPS

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AIMS: This study aimed to investigate the correlation between nasal parameters and cephalometric soft tissue parameters across skeletal Class I, II and III.
MATERIAL AND METHODS: A total of 180 pre-treatment cephalograms of Malay subjects (90 males and 90 females, aged 20–30 years) representing skeletal Class I, II, and III were analyzed. Cephalograms were manually traced to measure 15 nasal parameters, including nasomental, nasofrontal, nasofacial, nasolabial, and nasal bone angles; soft-tissue facial convexity; dorsum axis; nasal length; nasal height; nasal hump; nasal depth 1 (pronasale to soft tissue nasion-subnasale line); nasal depth 2 (pronasale to alar curvature point); lower dorsum convexity; columella convexity; and nasal bone length. Additionally, 8 soft tissue parameters were assessed: E line-upper lip, E line-lower lip, S line-upper lip, S line-lower lip, H angle, Z angle, total facial convexity (including the nose), and facial convexity (excluding the nose). Pearson correlation tests were performed to examine the correlations.
RESULTS: In all skeletal classes, the nasomental angle exhibited a significant positive correlation with the Z angle (Cl I: r=+0.440; Cl II: r=+0.511; Cl III: r=+0.547; p<0.01, respectively), total facial convexity (r=+0.762, r=+0.824, r=+0.727, respectively), and facial convexity (r=+0.572, r=+0.585, r=+0.602, respectively). Conversely, the nasomental angle demonstrated a significant negative correlation with the H angle (r=-0.579, r=-0.668, r=-0.625, respectively). The nasofacial angle showed a significant positive correlation with the H angle across all classes (r=+0.365, r=+0.423, r=+0.395, respectively). In Class I and II, the nasofacial angle was negatively and significantly correlated with total facial convexity (r=-0.268, r=-0.423, respectively) while in Class III, it was positively correlated with E-line upper lip and E-line lower lip (r=+0.344, r=+0.288, respectively). Additionally, the nasofrontal angle in Class III showed a significant negative correlation with E-line lower lip and S-line lower lip (r=-0.310, r=-0.365, respectively). A significant negative correlation between the nasolabial angle and facial convexity was observed in both Class I and III patients (r=-0.348, r=-0.540, respectively).
CONCLUSIONS: Nasal morphology significantly impacts cephalometric soft tissue measurements and overall facial profile, with distinct correlations observed across different sagittal classifications.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.332
SP307 COMPARISONS OF TRANSVERSAL ANALYSIS BETWEEN DIRECT AND DIGITAL MEASUREMENTS IN THREE SEVERITIES OF MANDIBULAR TEETH CROWDING

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AIMS: To compare the transversal analysis between direct and digital measurements in three severities of mandibular teeth crowding.
MATERIAL AND METHODS: A total of thirty patients, prior to orthodontic treatment, were recruited for this study, with ten subjects in each group. The severity of mandibular teeth crowding was classified as mild, moderate, and severe. The transversal analysis included the intercanine (IC) and intermolar (IM) widths. Both IC and IM were measured using two methods: 1) direct measurements with a digital caliper on plaster models, and 2) digital measurements from scanned files (STL format) using the Geomagic Control X software. Statistical analysis was conducted with a significance level set at $p < 0.05$.
RESULTS: No statistically significant differences were found between direct and digital measurements for either IC or IM in any of the three groups of mandibular teeth crowding ($p > 0.05$). Additionally, no significant differences were observed in IC and IM measurements across the three severity groups ($p > 0.05$).
CONCLUSIONS: Transversal analysis between direct and digital methods revealed no significant differences. Furthermore, IC and IM measurements did not differ across the three severities of mandibular teeth crowding.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.333
SP308 CAPTURING SOCIAL HISTORY ON ORTHODONTIC ASSESSMENT CLINICS: ARE WE GETTING IT RIGHT?

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AIMS: To assess local orthodontic departmental compliance with current guidance on social history taking for children. Medical records should include the accompanying adult details, parental responsibility status, educational information and any additional patient needs.
MATERIAL AND METHODS: A retrospective record-keeping audit undertaken at a large dental teaching hospital. A customised clinical audit proforma was used to collect data from a sample of 50 children (aged under 16) who were seen on orthodontic new patient clinics over a one-month period in November 2024.

The gold standard was that 100% of clinical records should contain: name and relationship of the attending adult and parental responsibility status, school details, social care involvement, any other relevant educational or additional needs.
RESULTS: 50 records were analysed. 86% of records noted details of the accompanying adult, although no records documented name or contact details. No records documented living arrangements, social worker involvement and status. Regarding school details, 4% of records documented a name of a school, but no records

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documented the type of school or any assessment of identified educational/learning needs. Where it was established that an attending adult did not have parental responsibility, the appointment was modified and rescheduled accordingly.
CONCLUSIONS: Overall departmental compliance with current guidance on social history taking for children was below the optimal standard. Potential limitations identified were inconsistencies in existing proformas used and insufficient working knowledge of acceptable social history-taking. Departmental dissemination of findings, improved training on record-keeping at new patient clinics and subsequent re-audit is planned. It is important that all clinicians have a sound working knowledge of consent, parental responsibility, and social history to ensure compliance in all areas of practice.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.334
SP309 RELIABILITY OF ARTFICIAL INTELLIGENCE IN ORTHODONTICS: A COMPARISON WITH SPECIALIST OPINIONS

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AIMS: In the digital era, obtaining information by posing straightforward questions to artificial intelligence (AI) has become increasingly common. This study aimed to assess the level of agreement between the answers provided by four AI systems and those provided by orthodontic specialists to a series of clinical questions for which there is currently no established scientific evidence. The analysis focused on identifying potential similarities and differences.
MATERIAL AND METHODS: Ten dichotomous (yes/no) questions were posed to four AI chatbots (ChatGPT 4.0, Gemini, Microsoft Bing/Copilot, and Claude). The same questions were distributed to orthodontic specialists via an anonymous online survey, inviting them to respond based on their professional opinion and clinical experience. Topics included: the relationship between third molar eruption and tooth crowding, the functional consequences of malocclusions, the relationship between postural imbalances and malocclusions, the aetiology of temporomandibular disorders (TMDs), and indications for orthodontic treatment. Descriptive statistical methods were employed to compare the responses.
RESULTS: The survey gathered 207 responses. The AI systems demonstrated alignment with the majority of orthodontists regarding the absence of an association between lower third molar eruption and tooth crowding (156 out of 207), the consensus that orthodontic treatment is not a therapy for TMDs (165 out of 207) or postural issues (174 out of 207), and the association of malocclusions with reduced masticatory function (147 out of 207). However, while a slight majority of orthodontists did not support a link between malocclusions and posture (111 out of 207) or between malocclusions and TMDs (153 out of 207), the AI systems expressed the opposite view.
CONCLUSIONS: The AI systems tested exhibited concordance with orthodontic specialists on the majority of clinical topics lacking established scientific evidence. Notable exceptions were the associations between malocclusions and posture, as well as malocclusions and temporomandibular disorders. Among the AI chatbots, Claude showed the highest level of agreement with orthodontic specialists.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.335
SP310 THE IMPACT OF FUNCTIONAL CLASS II CORRECTORS ON FACIAL SOFT TISSUES: A PROSPECTIVE CLINICAL 3D STUDY

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AIMS: Treatment of Class II malocclusions poses challenges in achieving both dental alignment and favourable soft tissue changes. This prospective study explored 3D soft tissue effects of orthodontic functional therapy in Class II division 1 patients . The aim was to assess short-term changes during active treatment and potential relapse after retention.
MATERIAL AND METHODS: The sample included 31 patients with Angle Class II division 1 occlusion and an overjet ≥4 mm (19 males, 8.8–14.7 years; 12 females, 12.3–16.1 years). Active treatment durations ranged from 5 to 16 months. Soft tissue measurements were collected using Vectra® H1 3D imaging, capturing baseline (T0), 1 year post-treatment initiation (T1), and for 12 patients, 2 years post-treatment initiation (T2). Data analysis employed Python® scripts for image cleaning and landmarking and MATLAB® with Meshmonk® for creating structured surfaces, generating quasi-landmarks, and performing non-rigid mapping to compare facial meshes over time.
RESULTS: Short-term changes (T1-T0) showed retrognathic maxillary shifts (Subnasale: -0.6 to -1.5 mm), mandibular advancement (Pogonion: +0.9 to +2.1 mm), and Labiomental Fold flattening (+2.2 to +5.4 mm). Changes in the lips suggested a probable influence of changes in incisor inclination. Provisional retention phase data (T2-T1) revealed partial relapse in some regions, with Subnasale showing minimal retrogression (-0.2 to -0.8 mm), Point A experiencing further retraction (-0.2 to -1.7 mm), and Labiomental Fold changes varying (-2.8 to +2.3 mm). Mandibular soft tissues (Pogonion and Menton) showed minor variability (-0.7 to +1.8 mm), indicating relative stability of changes in the lower jaw.
CONCLUSIONS: This study demonstrated a significant short-term impact of functional therapy on facial soft tissues, including maxillary soft tissue distalization and mandibular soft tissue advancement. While partial relapse was observed in some regions during retention, mandibular changes showed relative stability. Further research will explore the long-term outcomes and implications for treatment planning.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.336
SP311 CLEAR ALIGNER CLINICAL EFFECTIVENESS : A RANDOMISED CONTROL TRIAL ON THE REFINEMENT SERIES

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AIMS: Clear aligners may be a great alternative for people looking for a more discrete orthodontic treatment. Refinements are often overlooked throughout the treatment planning process. This, in turn, leads in a lengthening of the total treatment duration as well as a significant increase in the total cost. This randomized clinical trial evaluated the effectiveness and the refinement need between Erkodur and Zendura FLX.
MATERIAL AND METHODS: 18 adult participants were randomized (14 females and 4 males, 29.73 (SD8.44) years old) into two groups. Medit Design software (version 2.1) was used to measure the efficacy of orthodontic tooth movement by performing superimposition of predicted and achieved outcome. The refinement series for each material was analysed by dissecting the refinement need involved in producing similar clinical outcome. Data related to demographics, tooth movement accuracy and the related costs were recorded.
RESULTS: The mean accuracy of tooth movement with Erkodur and Zendura FLX was comparable with no statistical differences in horizontal movement from T1 to T6 and vertical movement from T1 to T4 with $p < 0.05$. As the treatment advanced to T5 and T6, there was a statistically significant difference between Erkodur and Zendura FLX in vertical movement, with mean differences of 0.05mm in extrusion ($p = 0.036$).
CONCLUSIONS: Clear aligner therapy may require refinements more than half of the time, with Erkodur being twice as frequent than Zendura FLX.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.337
SP314 DEVELOPING AN ARTIFICIAL INTELLIGENCE-BASED MODEL TO ASSESS LOWER INCISOR-POGONION AS A CEPHALOMETRIC PARAMETER FOR THE ANTERIOR LIMIT OF DENTITION

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AIMS: The aim of this study was to develop an AI model that automates the prediction of the lower incisor position using lateral cephalometric radiographs, focusing on the Lower Incisor—Pg (LIP) parameter, which represent the distance from a line perpendicular to the Frankfurt plane, which intersects the incisal margin of the lower incisor (B1), to the Pogonion (Pg). This parameter is fundamental in determining the limits of movement of the lower incisors in orthodontic treatment, especially in cases of crowding and space management, as well as in conditioning the thickness of the cortical bone and the position of the lower lip. Furthermore, the study aimed to predict the potential movement of the lower incisor based on the LIP value previously determined by the AI model. This prediction is a valuable tool in clinical practice, allowing specialists to formulate accurate treatment planning.
MATERIAL AND METHODS: The study employed a dataset of 996 lateral cephalometric radiographs to identify the cephalometric landmarks and determine the LIP distance. The AI model, called PointIpg, employed convolutional neural networks (CNNs) to analyze the coordinates of cephalometric

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landmarks and predict the possible movement of the lower incisor, termed moveMax. The model was trained and validated using an 80/20 data split, and its performance was evaluated using Mean Absolute Error (MAE) with a 0.05 mm tolerance.

RESULTS: The results suggested that the AI model accurately identified the position of the lower incisor, with a Mean Absolute Error (MAE) of 0.03 mm, and predicted the potential movement limit of the incisor with 97.5% accuracy. Finally, the Recall value of 1.00 indicates that the model has successfully captured all predictions within the defined tolerance range.

CONCLUSIONS: This study suggests the potential of AI, specifically through a PointNet++ based model, in automating the prediction of lower incisor positioning using the LIP parameter. Furthermore, by accurately predicting the movement limits of the lower incisor with a high degree of accuracy (97.5%), the model provides a valuable tool for orthodontic treatment planning. This precision can help clinicians address issues like dental crowding and optimize treatment outcomes, ultimately improving aesthetic and functional results.

Disclosure of interest: None declared

Abstract citation ID: cjaf073.338

SP315 ORTHODONTIC APPROACHES FOR CORRECTING THE SPEE CURVE: A SYSTEMATIC REVIEW WITH META-ANALYSIS

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AIMS: The development of the curve of Spee is influenced by factors, namely skeletal morphology, orofacial growth, tooth eruption chronology, mandibular relationship, overbite, and neuromuscular development. Several orthodontic techniques have been described for correction, but their stability and effectiveness are still debated. Understanding the effectiveness of these methods is crucial due to the significant impact of the curve on occlusion and oral function.

To conduct a systematic review to compile and evaluate the current scientific evidence on the effectiveness of the orthodontic methods available for correcting the curve of Spee.

MATERIAL AND METHODS: The protocol for the systematic review was registered on the PROSPERO platform and conducted in accordance with Cochrane and PRISMA guidelines. A standardized search was carried out across various databases (PubMed via MEDLINE, Cochrane Library, Embase, and Web of Science), as well as gray literature. The risk of bias was assessed using Faggion Jr.'s guidelines on dental materials for *in vitro* and *in silico* studies, alongside the Cochrane risk-of-bias tool for clinical studies.

RESULTS: The initial search identified 693 studies, and after screening, a total of 40 studies were included. The main orthodontic methods used to correct the curve of Spee include nickel-titanium, stainless steel and beta-titanium orthodontic arches, applied using the continuous arch technique and the segmented arch technique, with or without the use of reverse curve arches, as well as invisible aligners and tooth extractions combined with multibracket fixed appliances. The quantitative analysis included 21 articles and compared the effectiveness of three methods: conventional braces, conventional braces with extractions and invisible aligners. Regarding the risk of bias, randomized studies presented either a high or low risk, most *in vitro* studies showed a high risk of bias, and most non-randomized studies exhibited a moderate to high risk of bias.

CONCLUSIONS: Despite the heterogeneity of the included studies, correction of the curve of Spee can be achieved using various methods, including conventional appliances, conventional appliances combined with extractions and aligners, and there is no ideal method, so the choice of method being adjusted to the treatment objectives.

Disclosure of interest: None declared

Abstract citation ID: cjaf073.339

SP316 THE IMPORTANCE OF THE ORTHODONTIST IN CENTRAL LONDON COMMUNITY HEALTHCARE TRUST: A SERVICE EVALUATION OF ORTHODONTIC WAIT TIMES FOLLOWING RFERRAL FROM SPECIALIST PAEDIATRIC SERVICES AND ASSOCIATED ADVERSE HEALTH OUTCOMES

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AIMS: This service evaluation of Central London Community Healthcare (CLCH) Trust aimed to understand how an orthodontist within the service may improve our patient experience and avoid adverse outcomes associated with UK orthodontic waiting times.

MATERIAL AND METHODS: CLCH offers specialist paediatric services including a monthly consultant clinic. From each consultant clinic of 2023, a paediatric patient which had been referred for orthodontic opinion was selected at random. The time waited for assessment within CLCH services and the time waited for orthodontic opinion were recorded for each patient, and an average found. Adverse outcomes associated with this wait and outcome of the orthodontic opinion were also recorded. It was determined whether treatment was possible within CLCH services.

RESULTS: 10 consultant clinics in 2023 were identified and assessed. Patients waited an average of 153 weeks for assessment within CLCH and a further 179.7 weeks for orthodontic opinion following onwards referral. Resulting adverse health outcomes were seen in 20% of patients, including further infra-occlusion of primary molars in one patient resulting in need for surgical treatment under general anaesthesia and progression of caries in a second patient, rendering their lower right second pre-molar unrestorable. Orthodontic planning identified treatment which could be completed within CLCH services in 60% of cases.

CONCLUSIONS: CLCH is a unique trust in London offering specialist dental services, including Tier 3 Care, in a community setting. This includes paediatric dental services with consultant input, as well as restorative, prosthetic, oral surgery and special care services. This allows for multi-disciplinary care nearer to the patient's home and reduces the pressures on London Hospitals. The service, however, does not offer orthodontic input. This service evaluation concludes that an orthodontic service running within the trust on a similar basis as a the monthly paediatric consultant clinic would reduce waiting times for an orthodontic opinion by approximately 175 weeks. Therefore helping to avoid adverse health outcomes and ensure orthodontic intervention is completed at the appropriate time. Only 40% of cases in this service evaluation required treatment within tertiary care, thus showing an orthodontic service within CLCH could greatly reduce burden to London Hospitals.

Disclosure of interest: None declared

Abstract citation ID: cjaf073.340

SP319 RETROSPECTIVE ASSESSMENT OF MAXILLARY MORPHOLOGY IN ADULTS WITH UNILATERAL CLEFT LIP AND PALATE AFTER ONE-STAGE REPAIR OF THE CLEFT – PRELIMINARY RESULTS

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INTRODUCTION: Unilateral cleft lip and palate (UCLP) can be repaired using various techniques, with no single approach proving universally superior across outcomes and age groups. One-stage UCLP repair offers a simplified approach by closing the entire cleft in a single surgery, avoiding scar tissue from prior operations. This method minimizes scar formation and reduces its inhibitory effect on maxillary growth. It may also be particularly beneficial in resource-limited settings where multiple surgeries can be unaffordable for families.

AIM: To evaluate the long-term maxillary growth outcomes following one-stage UCLP repair performed by the Warsaw Cleft Team and compare them with results from the Eurocleft study.

MATERIAL AND METHODS: This retrospective study included 76 non-syndromic patients with complete UCLP (48 males, 28 females) who underwent one-stage repair at a mean age of 9.4 months (SD=0.8; range: 6–16 months). Infant orthopedics was not used, and secondary alveolar bone grafting (SABG) was performed in patients over 6 years of age. Maxillary development was assessed via lateral cephalograms taken at a mean age of 18.4 years (SD=3.3; range: 14.8–22.0). Angular (SNA, ANB) and linear (Condylion–Point A distance, Co-A) cephalometric measurements were analyzed. Skeletal maturity was confirmed using the 5-stage cervical vertebral maturation (CVM) method.

RESULTS: The degree of maxillary growth inhibition was relatively low SNA: 78.1° (SD=4.68), ANB: -0.34° (SD=3.99), Co-A: 77.5 mm (SD=5.65). All patients were at CVM stages 4 or 5. Maxillary deficiency was observed in 22.4% of patients, and 6.6% required orthognathic surgery. The mean number of surgical interventions under general anesthesia was 3.0. Comparatively, the Eurocleft study reported SNA values ranging from 72.9° (team D) to 75.7° (team B) and ANB values from -2.4° (team F) to -0.1° (team A).

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CONCLUSIONS: One-stage UCLP repair results in favorable maxillary morphology, with relatively low growth inhibition. Further research is required to address the limitations of this study.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.341
SP320 IS THERE A CORRELATION BETWEEN CORROSION OF MULTIBRACKET APPLIANCES AND SENSITISATION? A PILOT STUDY

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AIMS: Although the release of metal ions due to the corrosion of orthodontic wires is well-documented and reported to remain below toxic thresholds, its potential immunological consequences are not yet fully understood. This study aimed to investigate the presence of corrosion in worn multibracket appliances (MBAs) and its potential association with sensitisations (type IV hypersensitivity), to inform material selection in orthodontics.
MATERIAL AND METHODS: Thirty young adults (aged 18–35 years) were allocated to three groups: G1 (debonding group), G2 (bonding group), and G3 (untreated control group). The study spanned 21 days, with assessments conducted at four intervals: baseline (T1), day 1 after orthodontic intervention (T2), 7 days post-intervention (T3), and 21 days later (T4).

In G1, the MBAs were removed at T1 and microscopically analysed using the Keyence microscope, scanning electron microscopy (SEM), and energy-dispersive X-ray spectroscopy (EDX). Saliva and blood samples were subjected to multielement analysis. Sensitisation was evaluated using the lymphocyte transformation test (LTT). The correlation between corrosion and sensitisation was statistically analysed.
RESULTS: Nine participants (30%) demonstrated sensitisation to nickel, a prominent component of MBA materials. In G1, corrosion was observed in over 50% of MBA components in all ten patients. However, only one patient exhibited positive sensitisation, while another showed borderline sensitisation to nickel. No significant correlation was found between the degree of corrosion and the LTT results. In G2, 50% of participants exhibited nickel sensitisation. Across all groups, saliva samples showed higher metal ion concentrations than blood, highlighting the localised nature of ion release.
CONCLUSIONS: Although corrosion and metal ion release were evident, a direct causative link to type IV hypersensitivity remains inconclusive. The positive sensitisation in G1 occurred only after appliance removal (T4), suggesting that chronic exposure to corroding MBAs may suppress immune responses. To mitigate potential adverse effects, the selection of orthodontic materials should prioritise biocompatibility, particularly for patients predisposed to immune dysregulation. Further studies are necessary to evaluate long-term systemic implications and refine material choices in orthodontics.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.342
SP321 TRANSLATION, CROSS-CULTURAL ADAPTATION, AND PSYCHOMETRIC PROPERTIES OF THE FINNISH VERSION OF THE MALOCCLUSION IMPACT QUESTIONNAIRE (MIQ)

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AIM: To translate and culturally adapt the Malocclusion Impact Questionnaire (MIQ) into Finnish and assess its psychometric properties in Finnish adolescents.
SUBJECTS AND METHODS: The Finnish version of MIQ (MIQ-Fi) was developed through translation, back-translation, and a pilot study (n=30 Finnish adolescents). A cross-sectional study was then conducted in 2022, using paper-and-pencil methods. Psychometric properties of MIQ-Fi were estimated considering the validity based on response processes, internal structure, and relations to another variable. Response process validity was evaluated using Item Response Theory (IRT) analyses, considering item fit statistics (infit and outfit). Internal structure validity was assessed through confirmatory factor analysis (CFA – fit indices: comparative fit index [CFI], Tucker-Lewis index [TLI], and standardized root mean square residual [SRMR]) and convergent validity (Average Variance Extracted [AVE]). Reliability was evaluated using ordinal alpha (α) and omega (ω). Validity based on another variable was assessed through correlational analysis (r) between MIQ-Fi and the Finnish version of the Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ-Fi).
RESULTS: 268 Finnish adolescents participated in the study (mean age=13.4 [SD=1.5] years, 48.5% girls). IRT analysis revealed that, on average, the sample exhibited a latent trait lower than the item difficulty (mean θ=-3.45, mean item difficulty=0). Item 19 ('bitting foods') had high item fit statistics (infit=1.67, outfit=3.77), which may compromise the measure. In the internal structure validity, items 15 ('being bullied'), 16 ('making friends'), and 17 ('fitting in with friends') lacked psychometric sensitivity (skewness$\geq$3.73; kurosis$\geq$14.41) and were excluded from the factorial model. CFA showed a low factor loading for item 19 (λ=0.29), consistent with IRT findings. Therefore, this item was also removed from the model. After these refinements, the MIQ-Fi model showed an adequate fit (CFA: CFI=0.96, TLI=0.95, SRMR=0.08, AVE=0.61, α and $\omega\geq$0.90). A strong correlation was observed between MIQ-Fi and PIDAQ-Fi factors, confirming validity based on another variable ($r\geq|0.71|$, $p<0.01$).
CONCLUSION: The data obtained using MIQ-Fi was valid and reliable after refining the factorial model. This scale may be useful for measuring the impact of malocclusion in Finnish adolescents within a clinical, research, and public health context.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.343
SP323 VALIDATION OF A DIGITAL, PARTLY AUTOMATED THREE-DIMENSIONAL CAST ANALYSIS FOR EVALUATION OF ORTHODONTIC TREATMENT ASSESSMENT

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AIMS: Plaster models have been considered the gold standard in traditional orthodontic model analysis. Modern imaging techniques and ever-advancing technologies have expanded the scope of digital diagnostic tools. These innovations allow the use of devices specifically designed for the diagnosis of 3D structures. The aim of this method comparison study was to determine the accuracy and efficiency of digital measurements compared to conventional manual measurements on plaster models.
MATERIAL AND METHODS: The study included 247 patient cases undergoing orthodontic treatment at the University Hospital of Aachen. Plaster models were digitised using a model scanner, and an experienced examiner performed various measurements on blinded plaster models using a calliper and on digital models using the specially developed 'Tooth width analysis Aachen' patch in the OnyxCeph3TM-3D software. Inter-rater reliability was determined by a second blinded examiner. Measurements included tooth width, crown height, arch width, arch length and arch circumference, as well as overjet and overbite. Differences between analogue and digital methods were calculated.
RESULTS: Differences of up to 0.3 mm were observed between manual and partially automated digital measurements for sagittal, transversal and vertical parameters. Teeth with close proximal contact to adjacent teeth and teeth in jaws with a negative space analysis result showed an increased difference between manual and partially automated digital measurements, although this was not clinically relevant. The time required to perform digital measurements was statistically significantly reduced.
CONCLUSIONS: Partially automated digital impression analysis offers an accurate, highly efficient and time-saving alternative to traditional manual impression analysis.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.344
SP324 TEACHERS' VIEWS ON THE DELIVERY AND CONTENT OF ORAL HEALTH EDUCATION IN SCHOOLS

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AIMS: Oral health education became a statutory component of the national curriculum for primary and secondary schools in England in 2020. However, there is limited research into how this curriculum is actually delivered within schools. This cross-sectional study aimed to explore primary and secondary school teachers' perceptions of oral health education.
MATERIAL AND METHODS: A mixed-method 12-question online survey using closed and open text responses was designed for this study and pre-tested by four educators. The survey focussed on teachers' views of oral health education. Teachers were recruited via posters with QR codes sent to 248 schools local to

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the lead investigator, and through targeted social media posts aimed at teacher groups. Data collection began in September 2024. Precise sample size and response rates were not calculable due to the online survey distribution format.
RESULTS: The participants were from a range of educational stages and were mainly from the North West of England. All respondents had over five years of teaching experience. No respondents reported a lack of confidence as a barrier to delivering oral health education. Preliminary analysis indicates that while teachers acknowledge oral health education as an important part of the curriculum, several challenges impact on its delivery. These include limited time, competing curriculum demands and inadequate practical resources. Teachers also reported differing views whose responsibility it was to promote children's oral health literacy, with some believing this belonged to parents and others reporting this should be addressed by dental professionals visiting schools.
CONCLUSIONS: Teachers play a crucial role in fostering oral health literacy among children, yet they face significant barriers in delivering this education. Addressing these challenges requires enhanced training, improved practical resources, and better collaboration between schools, parents, and dental professionals. This study highlights the need for systemic support to optimise the integration of oral health education, ensuring all children benefit from preventive measures within the school setting.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.345
SP325 CONVENTIONAL ORTHODONTIC VS CLEAR ALIGNER THERAPY: A RETROSPECTIVE STUDY FOR THE EVALUATION OF OCCLUSAL CONTACTS IN GROWING PATIENTS

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AIMS: Achieving adequate occlusal contacts is one of the principal objects of an orthodontic treatment as malocclusion can negatively affect chewing, the stress released by teeth during function and long-term treatment stability. This study aimed to assess occlusal contacts in growing patients treated with clear aligners treatment (CAT) or fixed appliance treatment (FAT).
MATERIAL AND METHODS: Twenty-four patients were selected: 12 treated with FAT and 12 with CAT. Occlusal contacts were calculated as the minimum distance between upper and lower scans through the creation of a color map. Different outcomes were used: "maximum contact point" (MCP) detected as the minimum distance point throughout the occlusal plane, "occlusal contact surface" (OCS) composed of all the points that are 50 μm from the MCP, "near occlusal contact surface" (NOCS) composed of all the points that are 350 μm from the MCP, "half mm" composed of all the points that are 0,5 mm distant from the MCP and "one mm" composed of all the points that are 1 mm from the MCP. The unpaired two-samples Wilcoxon test compared occlusal contacts between the two groups; p-value <0.05* or p-value <0,005** or p-value <0,001* were considered statistically significant. R version 4.4.1, Lucent Technologies, Murray Hill, New Jersey, USA was used for the statistical analysis.
RESULTS: FAT had significantly higher values of total occlusal contacts in OCS compared to CAT after the orthodontic treatment (P<0.05*). A statistically significant difference was found in antero-posterior ratio with FAT reporting minor anterior occlusal contacts in OCS, NOCS, half mm and one-mm (P<0.05*). No differences were found instead comparing groups based on occlusal contacts' asymmetry between left and right hemiarches and post-treatment single tooth contacts except for the second premolar that reported higher contacts in the FAT group (P<0.05*).
CONCLUSIONS: Fixed appliance treatment could be potentially more effective than clear aligners in growing patients for the achievement of adequate occlusal contacts when evaluating antero-posterior ratio, OCS in total occlusal contacts and the second premolar in single tooth contacts. Other studies are needed in order to confirm our results.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.346
SP328 THE PERSISTENCE OF THE MAXILLARY PRIMARY CANINES AS AN INDICATOR FOR PROGNOSIS OF IMPACTION OF THE MAXILLARY PERMANENT CANINES- A RETROSPECTIVE STUDY

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AIM: The aim of this study is to examine the relationship between the amount of root resorption of the maxillary primary canines and impaction of maxillary permanent canines.
MATERIALS AND METHODS: A retrospective longitudinal study was conducted using panoramic x-rays of 168 patients. The clinical group included 98 patients who had completed permanent dentition formation, with impacted maxillary canines with complete root development and no eruption of the wisdom teeth. The control group included 70 patients with fully erupted permanent teeth, also showing complete root development and no eruption of the wisdom teeth. The aim of the study was to evaluate the degree of resorption of the primary canines during different stages of tooth development in both the clinical and control groups.
RESULTS: In the clinical group, during the early mixed dentition stage, the analysis of root resorption of the maxillary canines revealed that 36.4% of the canines exhibited a low degree of initial resorption (up to one-third of the root length). In comparison, the control group showed a significantly higher percentage of 59.4%. In the late mixed dentition phase 1, a higher percentage of canines in the clinical group showed no initial resorption (7.7%) compared to the control group (2.8%). In late mixed dentition phase 2, the clinical group showed 5.9% of primary canines without resorption, while 38.2% had exfoliated. In the control group, 55% of primary canines had exfoliated, and none showed no initial resorption. The clinical group exhibited a delay in resorption, with a higher percentage of canines showing initial resorption (up to one-third of the root length) at 22.1%, compared to only 3.7% in the control group
CONCLUSION: The results of our study revealed a significant difference in the degree of resorption of the primary maxillary canines between the clinical and control groups. This highlights the importance of the persistence of temporary canines as a prognostic factor for the likelihood of impaction at an early age.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.347
SP330 UNILATERAL MESIALISATION USING MESIALSLIDER AND CLEAR ALIGNERS

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AIMS: The aim of this case report is to present an unilateral mesialisation of the posterior teeth with skeletal anchorage and subsequent finishing with clear aligners. In this case, it is a second treatment following orthodontic treatment in adolescence. As a result, the treatment should be as aesthetically pleasing as possible.
MATERIAL AND METHODS: A 23-year-old female patient presented with a deeply destroyed tooth 26. The plan was to extract tooth 26 with subsequent mesialisation of teeth 27 and 28 using a mesialslider and two paramedian- inserted TADs (Benefit 2x9 mm). For esthetic reasons, the patient wanted a finishing with clear aligners.
RESULTS: At the beginning of treatment, mesialisation was started immediately after extraction. Mesialisation was successfully completed after 19 months. This was followed by aesthetic finishing with aligners. The first set of aligners included 16 aligners per jaw , followed by a Refinement with 10 aligners. The total treatment time was 33 months. Throughout the treatment period, no intermaxillary elastics were used as anchorage.
CONCLUSIONS: The mesialslider is a reliable therapeutic tool for closing large spaces in the molar and anterior region, also in adult patients. The non-compliance device can also be easily integrated into the aligner workflow, overcoming the limitations of aligners and eliminating dental side effects.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.348
SP332 TYROSINE-PROTEIN KINASE AND NUCLEAR ENVELOPE SPECTRIN REPEAT PROTEINS AS NOVEL SALIVARY BIOMARKERS IN POST-ORTHODONTIC PATIENTS

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AIMS: To quantify the levels of salivary Tec and Nesprin-2 in the saliva of post-treatment orthodontic patients at the debond (T1), six months post-debond (T2), one-year post-debond (T3). Tyrosine-protein kinase (Tec protein) is known to activate calcium signalling, which is significant in bone remodelling. Nuclear envelope spectrin repeat (Nesprin) 2, an outer nuclear membrane protein, provides cells with mechanosensory functions, including osteocytes. Osteocytes, in turn, take role in promoting bone resorption.

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MATERIAL AND METHODS: A quasi-experimental study involving collection of 5 ml unstimulated whole saliva samples from each subject: 10 healthy individuals, who served as the control group, and 10 post-orthodontic patients at the debond stage. Protein concentrations were determined using commercially available ELISA kits. Little's Irregularity Index (LII) was measured at T1, T2 and T3. An independent-sample t-test was used to compare salivary protein concentrations between control and debond group. Repeated measures ANOVA (RMANOVA) was used to compare differences in salivary protein concentrations and LII across T1, T2 and T3. Pearson's correlation was used to assess the relationship between salivary protein concentrations and LII at T1, T2 and T3.
RESULTS: The mean salivary Tec protein level was significantly lower in the saliva of post-orthodontic subjects compared to the healthy control group ($p<0.05$). Nesprin-2 level were slightly lower at debond, but the difference was not statistically significant. The LII were significant across T1 and T3; however, no clinical relapse was observed, as measurements remained below 3 mm. No significant correlation was found between tooth movement and salivary protein levels.
CONCLUSIONS: Tec and Nesprin-2 exhibited declining trend at the debond stage (T1), through T2 and T3, although the correlations were not significant, the statistically significant tooth movement aligns with the upward trend of all the salivary proteins. At T3, both protein concentrations were close to those of control patients. While this may be clinically insignificant due to the minimal amount of relapse (less than 3mm), it can be suggested that Tec and Nesprin-2 have potential as biomarkers in monitoring outcomes and stability of completed orthodontic treatment.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.349
SP333 IMPACT OF ORTHODONTIC-SURGICAL TREATMENT ON TEMPOROMANDIBULAR DISORDERS - A RETROSPECTIVE STUDY

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AIMS: Patients with malocclusion and/or dentofacial deformities who require orthognathic surgery have a higher prevalence of temporomandibular disorders (TMD), often associated with psychosocial factors, functional deficiencies in the TMJ, muscles and occlusion, as well as behaviours such as teeth clenching or grinding. This study aims to evaluate the impact of orthodontic-surgical treatment on the temporomandibular disorders.
MATERIAL AND METHODS: 20 patients (12 females and 8 males) with dentofacial deformities who underwent orthodontic-surgical treatment at the Institute of Orthodontics of the Faculty of Medicine of the University of Coimbra between 2017 to 2023 were included. The Diagnostic Criteria for Temporomandibular Disorder (RDC/TMD) were used to diagnose temporomandibular disorder based on criteria from Axis I (diagnosis) groups I (Muscular disorders), II (Disc displacement) and III (Other joint conditions) and Axis II (Assessment of the degree of chronic pain). The questionnaires were carried out in two evaluation periods: T0- 1 month before the orthognathic surgery; T1- 1 year after the surgical procedure. The results were evaluated using a descriptive statistical analysis, with the following measures: mean, standard deviation and median.
RESULTS: Of the 13 patients with myofascial pain pre-surgical, 7 maintained their myofascial pain and 6 resolved it. Of the 6 patients with disc displacement in pre-surgical Group II, 5 resolved completely and only 1 maintained the disc displacement with reduction to the right TMJ. With regard to group III, there was a wide dispersion of results.

Regarding Axis II, of the 13 patients without TMD pain pre-surgery, 9 remained pain-free post-surgery and 4 developed TMD pain post-surgery. Of the 7 patients with TMD pain pre-surgery, 6 resolved completely and only 1 worsened the degree of TMD pain post-surgery.
CONCLUSIONS: This study found a greater tendency towards improvement in the disc displacement parameter and in the degree of chronic pain in patients undergoing orthodontic-surgical treatment.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.350
SP334 ‡‡‡ AN UPDATE ON E-CIGARETTES AND ORTHODONTICS. A COMPREHENSIVE REVIEW OF THE EFFECTS ON ORAL HEALTH AND ORTHODONTIC TREATMENT

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AIM: This review aims to explore the emerging evidence regarding the impact of e-cigarette use on orthodontic treatment outcomes, specifically in relation to tooth movement, demineralization, surgical healing, and staining.
MATERIALS AND METHOD: A narrative review was conducted, examining the current literature on the implications of e-cigarette use for orthodontic patients. Studies exploring orthodontic tooth movement, caries, surgical healing, and staining were analysed, with a focus on nicotine's effects and the potential risks associated with e-cigarettes in orthodontics.
RESULTS: E-cigarette use has been linked to several oral health concerns. While direct evidence on the effects of e-cigarettes on orthodontic tooth movement is lacking, animal studies suggest nicotine may accelerate tooth movement and influence root resorption. Furthermore, e-cigarette use has been associated with an increased risk of caries, with self-reported data indicating a higher likelihood of untreated caries in users. Laboratory studies suggest that e-cigarette aerosols promote plaque accumulation, with potential implications for orthodontic treatment outcomes. Additionally, the dry mouth reported by many e-cigarette users could exacerbate caries risk. While e-cigarettes lack many harmful substances found in tobacco, evidence suggests they may still negatively affect surgical healing, particularly in the context of orthognathic surgery.
CONCLUSIONS: The available evidence highlights a potential association between e-cigarette use and adverse orthodontic outcomes, including increased risk of caries and changes to tooth movement. However, more research, particularly clinical studies, is needed to fully understand the impact of e-cigarettes on orthodontic treatment. Given the rapid rise in youth e-cigarette use, this review underscores the importance of monitoring e-cigarette use in orthodontic patients and considering its implications in treatment planning.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.351
SP338 COMPARISON OF SKELETAL MAXILLARY TRANSVERSE DEFICIENCY TREATED BY MINI IMPLANT ASSISTED RAPID PALATAL EXPANSION AND TOOTH BORNE EXPANSION: A CBCT STUDY

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AIMS: This prospective randomized clinical study aimed to evaluate skeletal and dentoalveolar effects of tooth borne and mini-implant assisted rapid palatal expansion appliance (MARPE) in adolescent and young adult patients.
MATERIAL AND METHODS: The study consisted of 15 patients (7 males and 8 females) aged 13 to 15 years that were divided into 3 groups. MARPE and tooth-borne (Hyrax) appliances were randomly assigned to ten individuals with skeletal maxillary transverse deficiency (5 patients per group). For every patient, the activation procedure was the same: $2 \times 1/4$ turns (0.2 mm) every day for an average of around 15 days, or until the necessary sutural opening was achieved. In every patient in the sample, an interincisal diastema appeared. As a control group, five patients with impacted upper canines were included. Cone beam computed tomography scans were obtained before and after expansion, measuring angulation of the left and right upper first molar (MA), intermolar width (IMW), palatal height (PH), sutural opening (SO)- anterior and posterior, nasal base width (NBW), maxillary alveolar width (MAW). All the parameters were compared from pre- to post- treatment using the paired t-test for intergroup analysis, with statistical significance set to 0,05.
RESULTS: The patients in the control group, who received no expansion treatment, showed no significant changes in any of the skeletal and dental parameters. Upper first molar angulations in all groups remained relatively unchanged after maxillary expansion. Both groups of patients that were treated with MARPE and Hyrax type expander, showed statistically significant increase in IMW (p= 0,0003 and p= 0,0105 respectively), SO anterior (p= 0,0002 and p= 0,0078 respectively), SO posterior (p= 0,0007 and p= 0,0076 respectively) and in NBW (p= 0,0121 and p= 0,0137 respectively). Additionally, the group of patients treated with MARPE expander showed statistically significant increase in MAW.
CONCLUSIONS: Both tooth borne and mini-implant assisted rapid palatal expansion appliance could achieve significant skeletal effect. It was assessed that MARPE determines a more significant expansion and skeletal changes than the Hyrax expander.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.352
SP339 EVALUATION OF FORCES AND MOMENTS APPLIED BY THREE DIMENSIONAL PRINTED ALIGNERS DURING MOLAR BUCCAL MOVEMENT

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AIMS: To assess the forces and moments (F/M) generated by Direct Printed Aligners during a buccal bodily movement of a first maxillary molar (UL6) with varying thicknesses and materials.

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MATERIAL AND METHODS: F/M were measured using an AFT20-D15 multi-axis transducer (Aidin Robotics, South Korea) during a 0.50 mm buccal translation of the UL6 across 4 groups: G1 (0.50 mm, TC85 resin), G2 (0.7 mm, TC85 resin), G3 (0.5 mm, TA28 resin), and G4 (0.7 mm, TA28 resin), with 10 repetitions each.
RESULTS: Buccal forces for G1 and G2 were 0.32 N and 0.30N. TA28 generated higher buccal forces than TC85: 0.59 N (G3) and 0.62 N (G4). Significant differences in intrusive forces were seen between G3 (0.24 N) and G4 (0.02 N) and in buccal crown torque: 7.84 N·mm (G3) vs. 11.81 N·mm (G4).
CONCLUSIONS: Increasing TC85 thickness did not affect F/M during U6 buccal movement. TA28 produced higher buccal forces than TC85. Thicker TA28 controls better intrusive forces but increased buccal crown torque.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.353
SP340 OCCLUSAL INTERFERENCES – A POTENTIAL CONTRIBUTOR TO MUSCULOSKELETAL PATHOLOGY?

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AIMS: This study examines whether dental findings, especially occlusal interferences, correlate with pathological findings in manual medicine to identify potential effects of the stomatognathic system on the musculoskeletal system.
MATERIAL AND METHODS: After dental examination and verification of the contact situation using Shimstock foil in maximum intercuspation and centric occlusion in a physiological condylar position 82 patients were divided into two groups: Group A: Patients with harmonious occlusion (centric = maximum intercuspation): 31 patients (38.6 ± 17.7 years).

Group B: Patients with occlusal interferences (centric ≠ maximum intercuspation): 51 patients (41.1 ± 12.3 years).

Each patient underwent manual tests at two time points. The first test was performed in maximum intercuspation, and the second test was conducted after deprogramming using a cotton roll for 2 minutes. If a deviation of >20° was observed between the two measurements, the test was classified as pathological. The following manual tests were performed: head rotation, variable leg length discrepancy (variable LLD), trunk rotation, Leg Turn In Test, leg length discrepancy (LLD), and Prien Abduction Test.

The results were statistically analyzed to identify significant differences between the two groups.
RESULTS: Significant differences were observed in the number of pathological findings between the two groups. Patients in group B showed significantly more pathological findings in all manual tests. Significant differences were found for head rotation ($p = 0.006$), trunk rotation ($p = 0.006$), LLD ($p < 0.001$), and variable LLD ($p < 0.001$). The Leg Turn In Test ($p = 0.002$) and Prien Abduction Test ($p = 0.009$) also showed group B to be more affected.

Overall, 58.8% of patients in group B had more than two pathological findings, compared to only 6.5% in group A ($p < 0.001$).
CONCLUSIONS: The study shows that patients with occlusal interferences exhibit significantly more pathological findings in manual tests of the musculoskeletal system. Particularly pronounced differences were observed in leg length discrepancy, variable leg length discrepancy, and the Prien Abduction Test. These results suggest that occlusal interferences may have a considerable impact on the musculoskeletal system, and functionally adjusted occlusion could be beneficial for patients.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.354
SP341 REGULATORY VARIATION AT SEROTONIN RECEPTOR 1F (HTR1F) MODULATES AROUSALS AND RISK FOR SLEEP APNEA

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AIMS: Sleep apnea is a common sleep disorder affecting at least ten percent of the population. It is caused by lack of breathing during sleep, typically mediated by obstruction of airways or less frequently by misdirected central signals for breathing. The primary risk factor is a high body mass index (BMI), causing airway obstruction. However, understanding risk factors for sleep apnea in non-obese (BMI < 30) individuals requires further exploration. Our goal was to elucidate genetic risk factors for sleep apnea in non-obese individuals.
MATERIAL AND METHODS: We performed genome-wide association testing in individuals with BMI < 30 in FinnGen including 20,413 cases with sleep apnea diagnosis (ICD-10 G47.3 or ICD-9 3472) and 443,463 disease free controls. We replicated our analysis in Estonian Biobank.
RESULTS: We identified a significant association within the Serotonin receptor 1F (HTR1F) locus (rs1818163, beta = 0.059, se = 0.010, P < 1.58e-8), and replicated the association in Estonian Biobank (beta =0.042, se = 0.021, P = 0.046). The association signal co-localized with HTR1F expression across multiple tissues (posterior probability > 0.8), and single cell sequencing implicated HTR1F expression particularly in neurons. Analysis of eQTL data further supported a possible regulatory role in neurons (beta = -0.03, P = 1.2e-4). Finally, objectively measured sleep-activity data showed association with number awakenings during night (P = 5.6e-8).
CONCLUSIONS: The findings indicate association of HTR1F in sleep apnea particularly in the patient population within the non-obese BMI range and provide insight into the growing evidence of serotonin signaling as a factor modulating liability to sleep apnea.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.355
SP342 SURVIVAL RATE OF FIXED EIGHTFOLD BRAIDED RECTANGULAR RETAINER WIRE AND RECTANGULAR CHAIN RETEINER: A MULTICENTER RANDOMIZED SPLIT-MOUTH CLINICAL TRIAL

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AIM: To compare survival rates of two commonly used fixed orthodontic retainers: the eightfold braided rectangular stainless-steel wire (Bond-A-Braid) and the stainless-steel rectangular chain (Ortho FlexTech).
MATERIALS AND MERTHODS: This was a multi-centre randomized split-mouth clinical trial. In total, 81 patients were included in the trial, conducted in the Department of Orthodontics at Lithuanian University of Health Sciences and two private clinics in Lithuania. Two different fixed retainers were examined: the .027" x .011" eight-strand braided stainless steel Bond-A-Braid (Reliance Orthodontic Products, Itasca, IL, USA) retainer wire and the .010" x .028" stainless steel Ortho FlexTech (Reliance Orthodontic Products, Itasca, IL, USA) chain. The randomization process involved "flip-a-coin" method to determine which retainer was assigned to each arch. Patients meeting eligibility criteria provided informed consent and underwent reteiner bonding procedures. Follow-up appointments at 6, 12, 18, and 24-months post-treatment assessed retainer integrity and oral hygiene using the Visible Plaque Index. Statistical analysis was performed with IBM SPSS v20.
RESULTS: Analysis at patient level revealed a higher rate of failures in the Bond-A-Braid retainer wire group compared to the Ortho FlexTech group during four separate follow-up visits, although the difference was not statistically significant ($p>0.05$). However, over the entire 24-month trial period, significantly more survival failures were observed in the Bond-A-Braid group (35.8%) compared with Ortho FlexTech group (14.5%) ($p<0.05$). Events included: detachment, fractures or full debonding ($p<0.05$). Oral hygiene had significant impact on higher failure rate of Bond-A-Braid retainer wire compared to Ortho FlexTech chain at 6-month follow-up visit ($p<0.05$). Tooth-level analysis showed significantly higher failure rates for Bond-A-Braid wires at teeth 11 ($p<0.05$), 12 ($p<0.05$), 31 ($p<0.05$), and 43 ($p<0.05$), with detachment being the most frequent type of failure.
CONCLUSION: Although both retainers exhibited failures over time, the Ortho FlexTech chain showed superior survival rates at both the patient and tooth levels throughout the 24-month retention period compared to the Bond-A-Braid wire. These findings suggest that Ortho FlexTech chain may provide a more reliable option for fixed retention.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.356
SP343 ASSESSING THE CYTOTOXIC AND ESTROGENIC EFFECTS OF CLEAR ALIGNERS: AN UMBRELLA REVIEW

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AIMS: Clear aligners have gained popularity among patients looking for a more discreet and comfortable alternative to conventional braces. The market offers a wide variety of aligner brands, each with significantly different compositions, although all are ultimately derived from bisphenol A (BPA). BPA is an endocrine disruptor that can potentially cause teratogenic, mutagenic, and carcinogenic effects.

This umbrella review aims to compile and analyze the existing scientific evidence regarding the cytotoxicity and estrogenic effects of clear aligners.

MATERIAL AND METHODS: Following PRISMA guidelines, a systematic search was performed in September 2024 across five databases: PubMed via Medline, Web of Science, Cochrane Library, Embase, and Epistemonikos. All systematic reviews evaluating the cytotoxicity of clear aligners were included. The quality of the included studies was assessed using A Measurement Tool to Assess Systematic Reviews, and the overlap between reviews was analyzed with Corrected Covered Area .

RESULTS: The initial search yielded 332 articles, with no additional articles from Grey Literature. After screening titles and abstracts, 13 articles were selected for full review, meeting the eligibility criteria. Ultimately, 4 articles were included in the final qualitative analysis. Based on AMSTAR-2, all reviews were of low quality, and the CCA indicated a significant degree of overlap (21.3%). The included articles indicate that, in cases of BPA leaching, it occurs at concentrations well below toxic levels. However, these findings should be interpreted with caution due to the high risk of bias and significant overlap among the included studies, which limits their applicability to clinical practice.

CONCLUSIONS: It is currently not possible to definitively confirm or deny the presence of estrogenic or cytotoxic effects or the leaching of monomers such as BPA from orthodontic aligners. Future research should focus on more detailed and extended analyses of BPA leaching, alongside clinical studies to assess the safety and biocompatibility of orthodontic aligners.

Disclosure of interest: None declared

Abstract citation ID: cjaf073.357

SP344 A COMPARATIVE ANALYSIS OF THREE-DIMENSIONAL SCANNING SYSTEMS FOR THE ANALYSIS OF FACIAL ANTHROPOMETRY, WITH AN EVALUATION OF THE SYSTEMS' ACCURACY, PRECISION AND REPEATABILITY

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AIMS: The objective of this study is to evaluate the efficacy of various facial scanning methods, in comparison with the current gold standard, namely stereophotogrammetry. Accuracy, precision and intra/inter operator repeatability are assessed.

MATERIAL AND METHODS: The study was conducted in vitro using a dummy, on which the relevant anthropometric points of interest were marked.

Six different scanners were selected for use in the study: Facehunter (Zirkonzahn), Cyclops (Itaka Way med Srl), Rayface (Micerium), Carestream CS 9600 (Carestream Dental), Metascan-3D scanner (Abound Labs Inc.), Polishape 3D Maxiline (Polishape Srl).

For each scanner, 20 scans were conducted, with two different operators performing 10 scans for each.

At each shot, the dummy was repositioned and, when necessary, the scanner was recalibrated.

The images were analysed using Viewbox software (dHAL Software, Kifissia, Greece), which enabled the measurement of 14 linear distances for each shot.

The measurements obtained from the various shots of the different scanners were compared with those obtained by stereophotogrammetry.

The statistical analysis entailed the assessment of data normality with the Shapiro-Wilk test, the evaluation of accuracy with the Student t-test or Wilcoxon test, and the assessment of precision with the standard deviation. Intraoperator repeatability was gauged with the intraclass correlation coefficient (ICC) and the coefficient of variation (CV), while interoperator repeatability was evaluated with the intraclass coefficient (ICC).

RESULTS: All scanners demonstrated statistically significant discrepancies when compared to stereophotogrammetry. However, upon clinical interpretation of the data, Facehunter and Rayface exhibited discrepancies of less than 1mm (mean standard deviation Facehunter 0.4mm and mean standard deviation Rayface 0.5mm), which aligns with the cut-off values indicated in the existing literature.

The intraoperator repeatability was found to be high for all scanners (ICC: 0.9), while interoperator repeatability exhibited considerable heterogeneity.

CONCLUSIONS: None of the scanners analysed achieved the same results as stereophotogrammetry.

However, the Facehunter and Rayface devices did demonstrate a satisfactory level of performance when the results were interpreted in a clinical context.

Disclosure of interest: None declared

Abstract citation ID: cjaf073.358

SP345 TELE-ORTHODONTICS: PERCEPTIONS OF ORTHODONTISTS AND ORTHODONTIC POSTGRADUATE TRAINEES IN MALAYSIA

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AIMS: To assess the perceptions of orthodontists and orthodontic postgraduate trainees in Malaysia on the use of tele-orthodontics.

MATERIAL AND METHODS: This cross-sectional study involved a self-administered online questionnaire which was distributed through email and instant text messaging application among orthodontists through the Malaysian Association of Orthodontists (MAO) and orthodontic postgraduate trainees in Malaysia (n = 224). The questionnaire consisted of 44 items which were adapted from three previous studies. The data were analysed using SPSS to generate frequency tables and descriptive statistics. Tele-orthodontics is a method to provide orthodontic care to a patient using information communication technologies. It is claimed to enhance dental care for patients and improve efficiency in time management.

RESULTS: A total of 93 responses were received which represented a response rate of 41.5%. The findings show that 81.7% of the respondents were aware of tele-Orthodontics. However, only 47.3% of them have implemented it in their practice. The majority (>80%) agreed or strongly agreed that tele-orthodontics is capable of improving practice by making patient referrals more efficient, advising patients during emergencies, and enhancing clinical training and continuing education. However, only 15.2% of respondents agreed or strongly agreed that tele-orthodontics would provide an accurate diagnosis. The majority also felt that the use of tele-orthodontics would be advantageous for orthodontic practice and patients as it would help provide a safe atmosphere for practice by reducing the risk of infection such as during the COVID-19 pandemic (78.5%), help patients avoid unnecessary travel to the dental office (87.1%), and benefit patients in rural areas (79.6%). A significant number of respondents expressed their concerns regarding the potential of digital forgery, legislation, accessibility and technical issues. The majority were also found to be willing to practice tele-orthodontics in the future and would be supportive of the concept.

CONCLUSIONS: Malaysian orthodontists and orthodontic postgraduate trainees have positive perceptions of tele-orthodontics in terms of its capability to improve practice and its advantages for orthodontic practices and patients. Although there were high concerns regarding its use, they were willing to integrate technology into their practice in the future.

Disclosure of interest: None declared

Abstract citation ID: cjaf073.359

SP346 A 12-YEAR RETROSPECTIVE ANALYSIS OF NONSURGICAL CORRECTION OF CONGENITAL EAR DEFORMITIES BY A SINGLE CRANIOFACIAL ORTHODONTIST

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AIMS: Auricular deformation in newborns is a frequent phenomenon that can negatively impact psychological and social development. Nonsurgical correction by molding the cartilage of the ear in the neonatal period is corrective, with minimal discomfort and nominal cost. This study aims to evaluate the prevalence of auricular anomalies at a single center and compare the efficacy of different molding treatment modalities by a single trained craniofacial orthodontist.
MATERIAL AND METHODS: Retrospective chart review of 118 infants who received ear molding between 2010 and 2022. Patients were treated with either a custom Triad® dental acrylic device, Earwell prefabricated device (partial or full system), or both. Data on patient demographics, anomaly type, treatment method, treatment duration, familial history, comorbidities, resolution, compliance, complications, and subsequent pursuit of surgical correction following molding was compiled. Treatment result was assessed blindly by two craniofacial orthodontists and based on clinical photographs before and after treatment and rated subjectively as excellent, good, fair or poor. Statistical analysis was performed using STATA 17.0.
RESULTS: This study included 118 patients with 195 auricular deformities. 77 (65.25%) patients were treated bilaterally, 23 (19.49%) received unilateral right and 18 (15.25%) unilateral left auricular molding treatment. The majority of infants did not present with a parental or sibling history of congenital ear anomalies. Median age of initiation of treatment was 3.41 weeks. 25 (21.19%) patients were treated with Triad ® only, 50 (42.37%) Earwell ®, and 39 (33.05%) were treated with both. 4 patients received treatment with alternate treatment modalities and were excluded from statistical analysis. Mean treatment duration was 6.7 ± 2.8 for the custom device, 5.7±3.0 for the Earwell® system, and 8.5±4.1 for patients treated with both. 97 (49.74%) ears achieved excellent resolution, 61 good (31.28%), 31 fair (15.89%), and 12 (6.15%) poor. Treatment complications were skin irritation (6.8%) and sores (5.9%).
CONCLUSIONS: Nonsurgical ear molding is an effective option for treating auricular anomalies. Age of treatment initiation and the type of anomaly were predictors of successful resolution outcomes. Further studies are recommended to spread awareness and adoption of this treatment approach, aiming to facilitate early intervention and enhance treatment outcomes.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.360
SP347 STATISTICAL HETEROGENEITY IN ORAL HEALTH META-ANALYSES

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AIMS: Providing the summary effect size and its uncertainty, a prediction interval, and a measure of statistical heterogeneity constitute good reporting practices in meta-analyses. Popular statistical heterogeneity measures comprise the τ^2 and I^2 statistics. However, researchers often rely unduly on the I^2 statistic, using naive categorizations to gauge the extent of heterogeneity, leading to misuses of the meta-analysis models, deficiencies in reporting, and misleading conclusions. The present study aimed to provide empirical evidence on the reporting and interpreting of statistical heterogeneity in systematic reviews of oral health published between 2021 and 2023 in 21 leading specialty and general dental journals.
MATERIAL AND METHODS: Systematic reviews with at least one meta-analysis on binary or continuous outcomes with the most studies were identified. Characteristics were extracted at the systematic review, and meta-analysis levels.
RESULTS: In total, 313 systematic reviews with meta-analyses were analyzed. Within this cohort of meta-analyses, the random-effects model (89%, $n = 278$) was frequently applied. Almost all meta-analyses (98%, $n = 308$) reported the I^2 value and 51% ($n = 160$) reported the τ^2 value. For this sample, median I^2 was 76% (range: 0-100%), and median τ^2 was 0.29 (range: 0-2632), with 13% ($n = 20/160$) of these meta-analyses reporting zero τ^2. The majority of the meta-analyses (96%, $n = 299$) based the heterogeneity interpretation on I^2, and only 21 (7%) on τ^2. Although 49% ($n = 152$) of the meta-analyses chose the meta-analysis model a priori, only 41% ($n = 63/152$) justified this choice. Furthermore, 42% ($n = 131$) of the 313 meta-analyses chose the meta-analysis model based on the I^2.
CONCLUSIONS: Within oral health meta-analyses, there is evidence of overreliance on I^2 when reporting and interpreting statistical heterogeneity and selecting the meta-analysis model. The inappropriate use of I^2 in meta-analysis model selection and interpretation of statistical heterogeneity may have implications on the quality of conclusions delivered to the end-users of systematic reviews.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.361
SP348 DENTAL ANOMALIES ASSOCIATED WITH MANDIBULAR CANINE IMPACTION

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AIMS: The aim of this retrospective study was to investigate whether there exist any association between mandibular canine impaction and other dental anomalies, as previous studies confirmed there are some dental anomalies associated with maxillary canine impaction
MATERIAL AND METHODS: Initially, 4000 orthopantomograms from Department of Dentistry,2nd Faculty of Medicine, Charles University in Prague and one private practice between 2010-2024 were evaluated for presence of mandibular canine impaction. 120 patients with mandibular canine impaction were selected. Afterwards, 25 patients with odontoma, other tumours, fibrous dysplasia, craniofacial syndromes, cysts and trauma were removed from research, so final size of the study group was 95 patients with mandibular canine impaction. Control group consisted of 95 patients with physiologically erupted mandibular canine. On OPG, presence of 16 dental anomalies were evaluated: agenesis of maxillary lateral incisor, maxillary and mandibular second premolar, impaction of other tooth, multiple impaction, transposition, transmigration of other tooth, infraocclusion of deciduous molars, distoangulation of mandibular second premolars, taurodontism and rotation.
RESULTS: 95 patients with mandibular canine impaction were analysed (48 males, 47 females). No statistically significant difference was found for any dental anomaly ($p \geq 0,05$).
CONCLUSIONS: Unlike maxillary canine impaction, there exist no association between mandibular canine impaction and other dental anomalies
Disclosure of interest: None declared

Abstract citation ID: cjaf073.362
SP349 INCIDENCE OF WHITE-SPOT LESIONS DURING MULTIBRACKET APPLIANCE TREATMENT: DO 20 YEARS OF CLINICAL PROGRESS MAKE A DIFFERENCE?

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AIMS: White spot lesions (WSLs) are a common and undesirable side effect of multibracket appliance (MBA) treatment. A retrospective study from 2011 examined 400 patients treated between 1996 and 2006 at the Department of Orthodontics, University of Giessen, Germany. The analysis revealed that 60.9% of the patients developed new WSLs on maxillary front teeth during MBA treatment. Since then, efforts have been made at the department to improve prophylaxis, such as providing written oral hygiene instructions and applying a sealant at the start of treatment. The aim of the current study was to assess the incidence of WSLs in a patient cohort treated approximately 20 years later at the same institution still using the same bracket system.
MATERIAL AND METHODS: The same method as in the previous investigation was applied. Intraoral photos taken before and after MBA treatment of 400 consecutive patients (167 boys, 233 girls) treated between 2014 and 2024 were evaluated. The four maxillary front teeth were assessed using a modified version of the WSL index by Gorelick (1982). The inclusion criteria were as follows: no fillings or structural abnormalities, MBA treatment duration of ≥1 year, and a post-treatment observation period ≥1 year.
RESULTS: The patients' average age before treatment was 13.9±2.8 years, and the average MBA treatment duration was 2.0±0.7 years, which is similar to the previous investigation (mean age: 13.7±3.5 years; mean treatment duration: 1.9 ±3.6 years). For the current sample, the incidence of WSLs during MBA treatment was 32.3% on the patient level, significantly lower than in the previously studied cohort (60.9%). Most individuals affected by WSLs exhibited only mild lesions (62.8%), while 37.2% were severely affected, including 7% with cavitations. The severity of WSLs largely corresponds to that of the previously studied cohort (mild WSLs: 63.3%; severe WSLs: 26.8%; cavitations: 9.9%).

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CONCLUSIONS: The current study demonstrates a significant reduction in WSL incidence during MBA treatment compared to findings from a cohort treated nearly 20 years earlier. Nevertheless, despite enhanced prophylactic measures, approximately one third of the patients still developed WSLs during MBA treatment, emphasizing the need for further improvement.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.363
SP350 POSITIONAL CHANGES IN FIRST MAXILLARY AND MANDIBULAR MOLARS FOLLOWING RAPID PALATAL EXPANSION ANCHORED ON SECOND DECIDUOUS MOLARS: A RETROSPECTIVE STUDY

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AIMS: To evaluate, using pre- and post-treatment CBCT scans, whether the correction of transverse deficiency in growing patients, achieved through maxillary expansion anchored to the deciduous second molars, can influence the positional and angular changes of the upper and lower first molars.
MATERIAL AND METHODS: Thirty patients (12 females, 18 males; mean age = 7.96 ± 0.65 years) from the University of L'Aquila dental clinic were included. Inclusion criteria: transverse deficiency without mono- or bilateral cross-bite, pre- and post-treatment CBCT scans, and maxillary expansion using deciduous second molars as anchorage. Exclusion criteria: absence of CBCT scans or facial dysmorphisms. The ALARA principle was followed.

CBCT scans were oriented by two operators, and two coronal sections were selected for the evaluation of the upper and lower molars. Measurements in the maxilla included coronal expansion (CRs), nasal floor expansion (NF), and the TI angle (long axis of right/left the upper first molar to the NF plane). In the mandible, coronal expansion (CRi) and angles αDX/αSX (long axis of right/left lower first molars to the orbital plane) were recorded.

Descriptive statistics (mean ± standard deviation) were calculated. Normality was assessed with Shapiro-Wilk test. Paired T-tests ($p<0.05$) compared T0 and T1 data. Inter- and intra-operator reliability were evaluated with intraclass correlation coefficients (ICCs, 95%CI). Statistical analysis was performed using SPSS software.
RESULTS: ICC showed excellent reproducibility of results: $0.82<ICC<1$ in upper arch and $0.81< ICC<0.99$ in lower arch. In upper arch it was observed an increase in NF[Δ(T1-T0)=3.12 ±2.06] and in CRs [Δ(T1-T0)=3.10 ±2.27] both with a $p<0.001$, while TI^NF angles showed decreases [Δ(T1-T0)TI^NF dx= -2.74±5.09 and Δ(T1-T0)TI^NF sx= -1.12±7.16]. In the lower arch, a reduction in CR was observed [Δ(T1-T0)=-1.14±1.31] and an increase in α angles [Δ(T1-T0)αDx=4.57±5.83 and Δ(T1-T0)αSx=4.65±5.17]both with a $p<0.001$
CONCLUSIONS: ERP anchored to deciduous molars induces positional changes in the first permanent molars. In the upper molars, an improvement in buccopalatal inclination is observed, likely due to their indirect involvement in the expander's structure, allowing them to adapt to occlusal changes. In contrast, the lower molars exhibit an increased inclination angle as a direct consequence of occlusal readjustment.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.364
SP354 EVALUATION OF FACIAL APPEARANCE AND GROWTH IN ADOLESCENTS WITH ROBIN SEQUENCE: A HARMONIOUS MAXILLO-MANDIBULAR ANOMALY

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AIMS: The aims of the retrospective observational cohort study were to describe facial morphology and analyze facial growth in adolescents with isolated Robin sequence (RS) or Stickler syndrome.
MATERIAL AND METHODS: This retrospective photographic and cephalometric study involved 69 adolescents with RS who were 12 to 18 years old from the ADOROBIN study carried out at Necker University Hospital in Paris. A subjective profile analysis of photographs for all patients and an additional radiographic cephalometric analysis including soft-tissue and skeletal analysis for 37 (34 with RS and 3 with also Stickler syndrome) were performed. A subgroup analysis examined the effect of initial severity (anatomical and functional) underlying Stickler syndrome and type of cleft palate repair on facial parameters.
RESULTS: On subjective profile analysis, 84% of patients had a good or acceptable profile. When the subnasal profile was recorded, one third of patients had a straight profile, about 60% a retrognathic and only 7% a prognathic mandible. Cephalometric analyses revealed some noticeable differences from the norm such as a proportionate retrusion of both jaws but mostly associated with skeletal class I (62.2%), a tendency toward a vertical facial pattern, and downsized maxillary and mandibulary territories (analysis according to Delaire). During prepubertal growth spurt, SNB angle increased and ANB angle improved; the vertical facial pattern showed a tendency toward normalization. However, bimaxillary retrognathia was not associated with initial degree of neonatal retrognathia, functional impairment, or type of cleft palate surgery. Patients with Stickler syndrome presented a more vertical facial pattern and greater sagittal deficit of both jaws than RS patients.
CONCLUSIONS: Although RS patients presented a biretrognathic profile and a tendency toward a vertical growth pattern, maxillomandibulary growth was globally harmonious (normal ANB angle). Mandibular catch-up growth was observed during prepubertal growth spurt. Nevertheless, the mandible remained smaller than normal in all dimensions. Patients presented an esthetically adequate profile, and the sagittal maxillomandibulary discrepancy was not accentuated regardless of the initial degree of severity of the retrognathia and type of cleft palate repair.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.365
SP355 COMPARATIVE MICROSCOPIC ANALYSIS OF PLASTIC DISPERSION FROM 3D-PRINTED AND THERMOFORMED ORTHODONTIC ALIGNERS

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AIMS: To compare direct printed aligners (DPA) and thermoformed aligners (TFA) evaluating the potential release and dispersion of microsplastics (MPs) and nanoplastics (NPs) particles under simulated oral conditions.
MATERIAL AND METHODS: The experimental DPA samples comprised two parallelepiped foils of Graphy Tera Harz TC-85 DAC resin (Graphy Inc., Seoul, South Korea), each measuring 25x5x0.5mm. These samples were manufactured using a SprintRay PRO 95 3D printer (SprinRay Europe GmbH, Weiterstadt, Germany) following the manufacturer's protocol. A flat rectangular TFA sample measuring 5x25 mm, matching the official thickness (0.5mm) of Invisalign® aligners (Align Technology Inc., Tempe, AZ, USA), was also prepared for comparative analysis. DPA samples and TFA sample were subjected to rubs in ultrapure water bath. Post-friction, the liquid was collected and applied to different substrates for MPs and NPs detection analyses: optical microscopy (OM), transmission electron microscopy (TEM), and atomic force microscopy (AFM). Plastic residuals were quantified by weighing after drying withing laminar flow hood. Microscopic image analyses comprised the quantification of average size of MPs and NPs and their concentration by TEM and the roughness analysis by AFM to determine the gran size.
RESULTS: Each group consisted of 10 samples, and measurements were repeated five times per sample to ensure reproducibility. The mass of MPs and NPs separated after rubbing was 0.001g/200µl and 0.004g/200µl for TFA and DPA samples, respectively. TEM analysis confirmed that DPA samples had larger and more numerous particles (203.08±2651.65µm^2) compared to TFA (0.23 ±27.53µm^2), even it was not possible to distinguish the MPs and NPs due to clustering of the plastic residuals. AFM analysis indicated a bigger root mean square gran size for TFA (159.89±350.72nm) than DPA (5.48±1.88nm); similarly, the mean roughness was lesser in DPA sample (3.26±0.57nm) than TFA one (107.23±234.88nm).
CONCLUSIONS: DPA generated larger and more numerous plastic particles compared to TFA, though gran-size characterization was challenging due to

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particle aggregation. This suggests that the manufacturing process and materials used in DPA could impact the creation of MPs and NPs during simulated mastication, highlighting a potential area for process optimization.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.366
SP356 ASSOCIATION BETWEEN ANATOMY OF PERMANENT LATERAL INCISOR AND PALATALLY IMPACTED MAXILLARY CANINES

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AIMS: To investigate any association between altered anatomy of permanent lateral incisor and palatal maxillary canine impaction and if in bilateral palatal maxillary canine impaction lateral incisor have the same anatomy on the right and left side.
MATERIAL AND METHODS: Study group consisted of 102 patients (unilateral impaction) and 27 patients (bilateral impaction). All participants obtained proper CBCT scans, subsequently imported into imaging SW InViVo 6. These linear variables were measured: length of crown (Lc), maximal mesiodistal dimension of crown (MD), in cervical area (MDc), and incision (Incisal), buccolingual dimension of crown (BL), length of root (Lr), BL and MD dimensions of root at cementoenamel junction (MDr, BLr). From 3D variables, volume of crown (Vc), root (Vr) and teeth (Vt) were measured. Results were compared with contralateral and control group (170 patients). In bilateral impaction, statistically important differences between right and left lateral incisors were detected.
RESULTS: In unilateral impaction, there were confirmed statistically important differences among the study, contralateral and control group for all linear variables in mm: Lc (8,53 vs 8,8 vs 9), MD (6,25 vs.6,35 vs. 6,67), BL (5,7 vs.5,89 vs.6,23), MDc (4,64 vs.4,74 vs.4,86), Incisal (5,14 vs.5,51 vs.5,46), Lr(13,1 vs.13,67 vs.14,06), MDr (4,15 vs.4,35 vs.4,4), BLr (5,36 vs.5,58 vs.5,78). Statistically important differences were confirmed also for all 3D variables in mm^3: Vc (224,2 vs.226,8 vs.256,9), Vr (237,7 vs.264,1 vs.278,4) and Vt (461 vs.492,3 vs.535,3). In bilateral impaction, there was no statistically significant difference between anatomy of lateral incisor on the right and left side.
CONCLUSIONS: There exist strong association between altered anatomy of lateral incisor and palatal maxillary canine impaction, that holds both for linear and 3D measurements. In bilateral impaction, there was no statistically important difference between anatomy of right and left lateral incisors.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.367
SP357 PERCEPTION OF PATIENTS DURING TREATMENT WITH DIFFERENT DEVICES: BRACKETS, ALIGNERS, FIXED BRACKETLESS ORTHODONTICS

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AIMS: The aim of this study is to compare patients' perceptions of aesthetics, comfort, pain and quality of life during treatment with different orthodontic appliances: conventional brackets, aligners and fixed bracketless orthodontics (BFO).
MATERIAL AND METHODS: A 16-question questionnaire was administered to a sample of patients over the age of 14 years. The cohort was divided into 3 groups according to orthodontic appliances: conventional brackets group (CBG), aligners group (AG), BFO group (BFOG).

Responses were given on a scale from 0 to 4, except for the VAS scale used to assess pain intensity. The data obtained were processed using a Dwass- Steel-Critchlow-Fligner pairwise comparison and the independent sample t-test. The significance level was set at $P<0.05$.
RESULTS: The final sample comprised 270 patients (118 M, 152 F) with a mean age of 22.8±9.85. 130 were in the CBG, 90 in the AG, 50 in the BFOG.

From the Dwass-Steel-Critchlow-Fligner pairwise comparison, BFOG patients reported less difficulty in speaking compared to AG (p-value 0.012), patients reported less impairment of taste perception compared to CBG (p-value 0.027) and patients expressed better aesthetics (p-value <.001). AG patients reported less difficulty in chewing compared to CBG (p-value <.001) and less change in their eating habits compared to BFOG (p-value 0.024).

The independent sample T-test performed among participants in the AG reported that patients under 18 years of age lost their aligners more frequently (p-value 0.022) and wore them for fewer hours per week than participants over 18 years of age (p-value 0.018).

In the other variables studied (oral injuries, chair time, number of emergencies, oral pain, and VAS scale), no statistically significant differences were found between the groups.
CONCLUSIONS: Patients in the CBG have poorer taste perception, have more difficulty chewing and express worse aesthetics than patients treated with aligners or BFA. However, in young patients, treatment with conventional brackets should be preferred to treatment with aligners to solve the problems of poorer compliance and loss of the devices.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.368
SP358 COMPARISONS OF THE SHORT- AND LONG- TERM OUTCOMES BETWEEN CANCER SURVIVORS AND HEALTHY PATIENTS TREATED ORTHODONTICALLY

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AIMS: The aims of study were to compare the outcomes, the quality of life, the satisfaction, and the stability of orthodontic treatment between oncologic patients and control group of healthy subjects.
MATERIAL AND METHODS: The study included 74 cancer-survivors and patients in maintenance therapy treated orthodontically. Moreover, 74 healthy control subjects matched for age, gender, and malocclusion served as control group. The Peer Assessment Rating (PAR) Index, the Index of Complexity, Outcome and Need (ICON) were assessed before treatment, after the treatment and at the follow-up and compared with the Patient Reported Outcomes (the Oral Health Impact Profile (OHIP) and patient satisfaction score). The patients were followed for 36 months. A repeated ANOVA was used to test the statistical relation of the scores.
RESULTS: Ideal occlusion was achieved in all patients. The mean w-PAR and ICON values were significantly reduced in both groups after the end of the orthodontic treatment with no significant differences between the groups regarding the obtained results.

There were no significant differences regarding the OHIP-14 values between the examined groups at all stages of the examination. Both groups presented significant ($p<0.001$) improvement of the values of OHRQoL at the end of treatment comparing to the values achieved before its onset. However only the cancer survivors' group presented statistically significant ($P<0.001$) increase of the w-PAR and ICON values comparing to the values obtained at the end of the treatment, showing that previous cytotoxic drug treatment significantly decreases the stability of orthodontic treatment among the cancer survivors, particularly within first 12 months after the end of the treatment.
CONCLUSIONS: The results of properly conducted orthodontic treatment of patients with a history of oncological treatment do not differ significantly from the results of treatment of healthy individuals. Orthodontic treatment influenced the quality of life in both groups, with a significantly greater impact among men with oncologic history. Significant deterioration in the stability of treatment results was observed in patients with a history of cancer with no influence on patients' satisfaction.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.369
SP359 THE EFFECT OF CHIOS' MASTIC TOOTHPASTE ON HALITOSIS AND ORAL HYGIENE IN ORTHODONTIC PATIENTS: A RANDOMIZED CLINICAL TRIAL

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AIMS: The aim of this study was to investigate the effect of Mastic toothpaste on halitosis (Volatile Sulfur Compounds' levels, VSCs) as well as plaque and gingival indices in patients undergoing orthodontic treatment with fixed appliances

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MATERIAL AND METHODS: The study was a double-blinded, placebo-controlled, parallel group, randomized clinical trial. Thirty two patients with fixed orthodontic appliances were randomly allocated at a1:1 ratio, to either the mastic-toothpaste or the placebo-toothpaste group. Eligibility criteria included ages between 13 and 18, active orthodontic treatment with fixed appliances on both dental arches, good general health and total initial VSCs levels above the baseline level of 150ppb. The primary outcomes were: (a) their objective VSCs levels (hydrogen sulfide (H_2S), methyl-mercaptan(CH_3SH) and dimethyl sulfide {$(CH_3)_2S$} through the OralChroma^{TM}II device and (b) oral hygiene assessed with the use of the Modified Silness and Löe Plaque Index (PI-M) and the Silness and Löe Gingival Index (GI).Measurements were taken at baseline (T0) and after 2 weeks (T1).Stratified by gender randomization was implemented with two random sequences, one for each toothpaste, concealed sealed in opaque numbered envelopes. Blinding was applicable for outcome assessment. Mann-Whitney U test and Student's t test were used to analyze data with IBM SPSS Statistics 23.0.
RESULTS: H_2S median levels dropped from 158ppb(T0) to 26ppb(T1) for the mastic group and the difference between treatments was statistically significant and in favor of the mastic group (U=43.5, z=-3.185, p=0.001). The reduction in the levels of the other VSCs did not differ between treatment arms. The oral hygiene indices showed statistically significant differences for the mastic group. Specifically, PI-M index dropped from 1.2 (T0) to 0.8 (T1) with p<0.001 (95% CI: -0.5,-0.2) and GI index from 1.8(T0) to 1(T1) with p<0.001 (95% CI: -0.7,-0.4).
CONCLUSIONS: Mastic toothpaste could be an alternative treatment for adolescent patients suffering from halitosis during orthodontic treatment with fixed appliances. In addition, application of the mastic toothpaste led to a clinically meaningful and more pronounced reduction of plaque and gingival indices.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.370
SP360 THE ROLE OF GENETICS IN MALOCCLUSION: A SYSTEMATIC REVIEW OF HEREDITARY FACTORS AND GENE-ENVIRONMENT INTERACTIONS

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AIM: Orthodontic treatment typically focuses on addressing functional and aesthetic issues caused by malocclusion, yet there is limited emphasis on understanding the underlying genetic factors and environmental influences contributing to its development. This systematic review aims to explore the genetic and environmental factors influencing malocclusion, particularly Class II and Class III malocclusions. By investigating both hereditary and environmental aspects, this review seeks to provide a deeper understanding of their origins, which could ultimately yield effective treatment strategies for orthodontic patients.
MATERIALS AND METHOD: Literature search was conducted using databases such as MEDLINE/PubMed, Scopus, and Google Scholar to identify studies published in the last 20 years using as keywords orthodontics, genes, malocclusion, heredity, genetics, Class II malocclusion, Class III malocclusion, genetic predisposition, oral habits, environmental factors and genetic markers.
RESULTS: From 30 identified records, 12 studies were selected, where key malocclusion genes were reviewed. *MYO1H* was mentioned in 4 studies, highlighting its significant role in mandibular prognathism and Class III malocclusion. *ACTN3*, referenced in 3 studies, was associated with Class II malocclusion due to its impact on muscle fiber types influencing craniofacial development and jaw positioning. *FGFR2*, mentioned in 5 studies, was found to play a role in Class II malocclusion, via involvement in maxillary development. *MSX1* was referenced in 4 studies as a key factor in both Class II and Class III malocclusions, influencing both skeletal development and tooth positioning. *MATN1*, cited in 3 studies, was linked to mandibular retrognathism in Class II malocclusion, particularly through its extracellular matrix role. Other genes, including *PAX9*, *DUSP6*, *COL1A1*, *TGFB3*, and *HSPG2*, were also cited, indicating influence in both skeletal and dental malocclusion traits. Environmental factors, such as oral habits and postural influences during childhood, were recognized as contributors to the expression and severity of malocclusion in 6 studies, interacting with genetic predispositions to impact malocclusion.
CONCLUSIONS: Evidence suggests that while certain genes are strongly associated with specific malocclusion types, the overall inheritance pattern is multifactorial, involving multiple genes and environmental interactions. Further research is needed to deepen our understanding of genetic-environmental interactions and to develop more personalized, effective treatment strategies for malocclusion.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.371
SP362 IMPACT OF TOOTH INCLINATION ON CLEAR ALIGNER ATTACHMENT ACCURACY

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AIMS: To evaluate the effect of varying tooth inclinations on the accuracy of clear aligner attachments using three different adhesive materials.
MATERIAL AND METHODS: A phantom model was constructed using 24 (12 upper and 12 lower) extracted human teeth, including central incisors to first molars (six teeth per quadrant). Anterior teeth were normally inclined, right posterior teeth were palatally inclined, and left posterior teeth were buccally inclined. Digital scans of the jaws were captured using 3Shape TRIOS, and three sets of templates containing attachments (FAS Aligner System) were prepared.
Three composite materials with different viscosities were tested:

1. 3M™ Filtek™ Supreme Flowable Restorative Syringe
2. AO Bracepaste Medium Viscosity Adhesive
3. Tokuyama Dental Estelite Sigma Quick Supra-Nano Filled Universal Composite

Attachments were placed, and the jaws were rescanned. Pre- and post-application scans were superimposed using Geomagic Control X software to measure volumetric dimensional changes. Attachment size and excess adhesive were quantified and analyzed statistically, with significance levels set at $p<0.05$ and $p<0.01$.
RESULTS: No statistically significant difference in attachment sizes was observed between differently inclined teeth across all adhesive groups. However, all groups exhibited excess adhesive. Buccally and palatally inclined teeth showed greater excess adhesive for both low- and high-viscosity composites compared to normally inclined teeth.
CONCLUSIONS: Tooth inclination does not affect attachment size but contributes to excess adhesive during placement. Clinicians should exercise caution when working on abnormally inclined teeth to minimize excess adhesive.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.372
SP363 CAN MANDIBULAR ADVANCEMENT FUNCTIONAL APPLIANCES, SUCH AS THE HERBST OR MALU, ALLEVIATE SYMPTOMS OF SLEEP-DISORDERED BREATHING?

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AIMS: Despite significant public health implications, the craniofacial features associated with pediatric sleep-disordered breathing (SDB) remain understudied. SDB in children encompasses a range of conditions characterized by abnormal breathing patterns during sleep. These abnormalities disrupt the normal sleep architecture, leading to intermittent hypoxia, hypercapnia, and results in sleep fragmentation. Habitual snoring and obstructive sleep apnea(OSA) are frequently associated with craniofacial abnormalities, including mandibular retrognathia, malocclusion, glossoptosis, and ogival palate, all contributing to upper airway narrowing.

Orthodontic interventions using oral appliances offer a potential adjunctive or primary treatment for pediatric OSA. While under-researched, these appliances may improve upper airway patency by increasing airway volume and reducing collapsibility, potentially enhancing upper airway muscle tone. The aim of this study is to discuss the effects of the treatment including functional mandibular advancement appliance like Herbst or MALU on upper airway dimensions among children with Class II malocclusion and SDB symptomes and to compare it with our clinical observations.
MATERIAL AND METHODS: An English-language literature review was conducted encompassing articles published up to December 2024, utilizing PubMed, Google Scholar, and Medline databases. Keywords included: sleep-disordered breathing in children, pediatric obstructive sleep apnea, mandibular advancement, Herbst

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appliance. Lateral cephalometric data from Class II patients treated with a MALU appliance in our clinic for SDB and malocclusion correction were also analyzed.
RESULTS: Functional appliances, particularly those promoting mandibular advancement, are commonly employed in Class II skeletal malocclusions with mandibular retrognathia. These devices induce condylar remodeling and secondary growth through muscle stretching, improving upper airway patency by counteracting posterior glossoptosis. Three-dimensional cone-beam computed tomography (CBCT) analysis demonstrated significantly greater pharyngeal airway (PA) volume increase in Class II patients treated with a Herbst appliance compared to Class I patients treated with conventional edgewise mechanics.
CONCLUSIONS: Mandibular advancement appliances, such as the Herbst and MALU may offer a therapeutic approach for improving dentofacial relationships and upper airway dimensions in Class II patients with SDB. Increased PA volume resulting from this treatment may contribute to clinically significant improvements in SDB symptoms. Further research is warranted to fully elucidate the long-term effects of these treatments on respiratory function and craniofacial growth.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.373
SP364 THE SUCCESS OF MOLAR UPRIGHTING DEPENDS ON ATTACHMENT POSITION AT A 45-DEGREE ANGLE

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AIMS: The purpose of the study was to investigate the influence of attachment size, shape and angulation on the efficacy of mandibular molar uprighting.
MATERIAL AND METHODS: The research group consisted of 48 patients (27 females, 21 males) aged 21-54 years. Inclusion criteria encompassed the absence of prior orthodontic treatment, the need for space closure following an extraction performed at least 3 years prior and mandibular molar tipping of at least 15 degrees. The exclusion criterion was planned corticotomy. The treatment protocol for 37 patients included molar uprighting, distalization and subsequent implant placement, while for 11 patients, space closure was achieved with mesialization. All patients were treated exclusively with aligners without the use of temporary anchorage devices (TADs). The participants were randomly assigned to two even groups: group A - attachment with a large horizontal rectangular shape with sharp edges gingivally and oval edge occlusally rotated at an angle of 45 degrees; group B - attachment with a large horizontal rectangular shape with sharp edges gingivally and oval edge occlusally and parallel to the occlusal plane.
RESULTS: Successful uprighting of the mandibular molar was achieved in 31 patients (group A - 22 patients, group B - 9 patients). The mean number of aligners used in group A was 36 compared to 49 aligners in group B. In both groups, additional sets of aligners were required (group A - 19 patients, group B - 9 patients).
CONCLUSIONS: Positioning horizontal attachments at a 45-degree angle appears to be more effective in uprighting molars likely due to the generation of a greater force and enhanced retention of the aligner during treatment. This attachment configuration was associated with a higher success rate and a reduced number of aligners required, thereby improving treatment efficiency.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.374
SP365 THE ROLE OF MSX1, PAX9 AND AXIN2 GENES IN TOOTH IMPACTION. A SYSTEMATIC REVIEW

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AIMS: Comprehending the genetic basis of tooth impaction has significant clinical meaning. The purpose of this systematic review was to assess the best available research in an attempt to identify the genes and genetic polymorphisms linked to tooth impaction in humans.
MATERIAL AND METHODS: Ten electronic databases i.e. MEDLINE, Scopus, Science Direct, Cochrane Library, Google Scholar, Web of Knowledge, Ovid, ProQuest, CADTH, Clinical Trials Gov were systematically and unrestrictedly searched up to April 2024. Appropriate MeSH terms and related keywords were tailored for each database. The search strategy did not impose any restrictions on language, publication date, or publication status. The eligibility criteria included prospective or retrospective studies on patients presenting tooth impaction where genetic analysis was performed, with no restriction on age or sex. Article screening and data collection were performed independently by two reviewers. All procedures were performed in accordance with PICOS and PRISMA guidelines.
RESULTS: In total 10 studies met the criteria for inclusion. The Risk of Bias of the final studies was evaluated using the Cochrane Handbook for Systematic Reviews and Interventions tool. MSX1, PAX9, and AXIN2 genes were reported to have an association with impacted teeth. More specifically, tooth impaction risk was increased by mutations and polymorphisms in these genes i.e. MSX1 rs12532, PAX9 rs2073247, and AXIN2 rs2240308.
CONCLUSIONS: MSX1, PAX9, and AXIN2 polymorphisms seem to play an important role in tooth impaction. However, some contradictory results from the included studies make it difficult to draw firm conclusions. Finding the underlying genetic causes of tooth impaction demands more research with larger populations involving advanced methodologies.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.375
SP366 MANDIBULAR CORTICAL PLATE THICKNESS AND LOWER MOLAR INCLINATION IN SKELETAL CLASS III PATIENTS WITH AND WITHOUT CLEFT AS POSSIBLE INDICATORS FOR CORTICOTOMY

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AIMS: The aim of the study was to assess the thickness of the mandibular cortical plate and the inclination of the lower first permanent molars in the bone bases in patients with skeletal class III malocclusion and skeletal class III malocclusion in cleft patients prepared for orthognathic surgery.

MATERIAL AND METHODS: The study involved computed tomography (CT) of 20 patients with a class III skeletal defect and 20 patients with class III malocclusion with clefts. The control group consisted of 20 patients with skeletal class I. Measurements of cortical bone thickness were taken at the coronal cut of the CT. The coronal cut was conducted through the permanent lower first molars and the measurement was taken at the level of furcation. The Point of measurement is skeletal equivalent of the WALA ridge point. The Inclination of the Lower first molars was assessed by measuring the distance between the WALA ridge point and facial axis (FA) point.
RESULTS: The results of the study showed significant differences in the thickness of the cortical plate between patients with a class III defect and those with skeletal class I. In patients with class III malocclusion, a marked increase in the thickness of the cortical plate and lingual inclination of the lower molars was observed. The difference in measurements ranged at 0.3–1.0mm in between the groups.
CONCLUSIONS: The results suggest that the assessment of the thickness of the cortical plate and the inclination of the lower molars may be an important element in the decision to perform corticotomy during orthodontic preparation for orthognathic surgery in patients with class III skeletal defect. This procedure shortens the duration of orthodontic treatment and helps avoid complications of orthodontic therapy, which may improve the effectiveness of surgical treatment and increase the stability of results after orthognathic procedures.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.376
SP367 CORRELATION BETWEEN PERMANENT TEETH ERUPTION TIME AND MANDIBULAR GROWTH PEAKS IN LITHUANIAN CHILDREN

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AIMS: To estimate the correlation between permanent teeth eruption time and growth peaks of the mandible in Lithuanian children.
MATERIAL AND METHODS: In a cross-sectional study, 3596 children, 4 to 16 years of age were examined in randomly selected kindergartens and secondary schools of Vilnius city. All erupted permanent teeth were recorded. Head and face measurements were taken according to standardized anthropometric technique. The length and height of the mandible, as well as ramus height and the depth of the lower face were selected to find out the peaks in mandibular growth

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and their correlation with the eruption time of permanent teeth. Descriptive statistics in MiniTab15 and SPSS 17 statistical software was used.
RESULTS: Early peaks in the growth of mandibular length (go-gn) and ramus height (cdl-go) were estimated for boys at the age of 5 and at the age of 4 for girls. The first peak in growth of the depth of lower face height (t-gn) occurred at the age of 6 in both sexes. Second peak in growth occurred at age of ten for boys for all mandibular dimensions, except t-gn, and was correlated with the eruption of first premolars and canines. The biggest peak for t-gn was at the age of nine, just before eruption of first permanent canines and premolars, continued with the last peak at the age of 14. For girls second peak in growth occurred at 7 years of age for the height of the mandible, 1 year later for go-gn and at the age 9 to 10 for cdl-go. The third peak occurred at the age of 12 – with the eruption of upper second permanent molars. For both sexes the largest peak in growth for all measurements, except t-gn, happened 2 years after the eruption of second upper permanent molars at the age of 14 to 15.
CONCLUSIONS: The lower face depth increases the most just before the eruption of first premolars and canines while the largest peak in growth of the height, length of the mandible and ramus height occurs 2 years after the eruption of second permanent molars for both sexes.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.377
SP368 COMPARISON BETWEEN BONE-ANCHORED AND CONVENTIONAL MAXILLARY PROTRACTION IN GROWING CLASS III PATIENTS: A SYSTEMATIC REVIEW AND META-ANALYSIS

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AIMS: The aim of this systematic review was to evaluate the outcomes and the adverse effects of bone-anchored maxillary protraction in growing class III patients and compare them to conventional maxillary protraction methods.
MATERIAL AND METHODS: An electronic search of five databases (MEDLINE, Cochrane Library, Virtual Health Library, Web of Science, Google Scholar) and a manual hand search of the available literature were performed on December 5th, 2024. Prospective and retrospective clinical trials comparing a "skeletal anchorage treatment group" with a "conventional treatment group" were included. To control the confounding effect of pre-facemask maxillary expansion, studies were only included if they used maxillary expansion in all subjects or none. Two authors independently performed data extraction and risk of bias assessment. Any disagreements were resolved through discussion with the senior author. Risk of bias was assessed with the ROBINS-I tool for non-randomized studies. Due to low heterogeneity between the included studies, a meta-analysis was conducted, evaluating differences between the two methods in skeletal effects (WITS appraisal and SNA angle), anchorage loss and molar extrusion.
RESULTS: Five studies were considered eligible for the qualitative and quantitative analysis, with sample sizes ranging from 34 to 50 patients. Dental anchorage loss on the upper first molars was significantly lower in the skeletal anchorage groups compared to the conventional groups in the horizontal (-1.18 mm [95% CI: -1.77, -0.59]) and vertical (-0.74 mm [95% CI: -1.07, -0.40]) dimension. The SNA angle improved more in the skeletal anchorage group, with a mean difference of 0.66° (95% CI: 0.22, 1.10), while WITS appraisal values seemed to improve more in the conventional treatment groups (-1.18 mm [95% CI: -2.18, -0.18]). Differences were presented with forest plots and were found statistically significant in all cases.
CONCLUSIONS: Only short-term evidence is available on the efficacy of skeletally anchored maxillary protraction in growing class III patients. Within these limits, skeletal anchorage seemed to limit dental side effects including molar protraction and extrusion. Due to the low amount of available evidence, further high-quality clinical trials are needed in this research field.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.378
SP369 RESPONSE OF THE GINGIVAL MARGINS TO ORTHODONTIC TREATMENT OF PERIODONTALLY HEALTHY ADOLESCENT PATIENTS

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AIMS: Gingival margin discrepancies may have a profound impact on smile esthetics and are often seen in conjunction with tooth malpositions. Even though orthodontic treatment can effectively align the teeth within the dental arch, it remains unclear whether the gingival margins respond adequately to tooth movement. Aim of the present study was to assess the gingival margin position of mandibular anterior teeth before and after orthodontic treatment
MATERIALS AND METHODS: A total of 100 adolescent patients (40.4% male; mean age 11.5 years) in need of orthodontic treatment due to malocclusion were included in this study. Their dental cast models before and after orthodontic treatment with fixed appliances were scanned and analyzed digitally in terms of the labial gingival margins of the mandibular anterior teeth. Data was analyzed statistically with paired t-tests and McNemar's tests at the 5% level.
RESULTS: Compared to the canine's gingival margin as reference, the discrepancy of the incisors' gingival margin was 0.65 mm on average (95% Confidence Interval [CI] 0.34 to 0.96 mm) with 70.0% and 41.8% of the cases having discrepancy over 0.5 mm and 1.0 mm, respectively. After orthodontic treatment the corresponding gingival margin discrepancy was 0.35 mm (95% CI 0.17 to 0.54 mm) significant alignment (average improvement 0.30 mm; 95% CI 0.17 to 0.54 mm; $P<0.05$). Orthodontic treatment was associated with reduced odds of gingival margin discrepancy with either the 0.5 mm cut-off (Odds Ratio [OR] 0.42; 95% CI 0.18 to 0.90; $P<0.05$) or the 1.0 mm cut-off (OR 0.32; 95% CI 0.10 to 0.82; $P<0.05$).
CONCLUSIONS: The gingival margins of mandibular anterior teeth among periodontally healthy adolescent patients respond favourably to orthodontic alignment with fixed appliances. Orthodontic tooth alignment can be considered as a first approach to improve existing gingival margin discrepancies
Disclosure of interest: None declared

Abstract citation ID: cjaf073.379
SP370 LONG-TERM EFFECTS OF ORTHODONTIC TREATMENT, WITH OR WITHOUT SURGICAL INTERVENTIONS, FOR THE MANAGEMENT OF OBSTRUCTIVE SLEEP APNOEA. A SYSTEMATIC REVIEW

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AIMS: The aim of the current systematic review was to assess the available evidence on the long-term effect of orthodontic treatment alone or in conjunction to surgical procedures for the management of obstructive sleep apnoea (OSA) in children and adults.
MATERIAL AND METHODS: Multiple electronic databases (MEDLINE/PubMed, Ovid MEDLINE, Ovid Embase, LILACS, and Cochrane Library) were searched up to December 1st, 2024. Randomized controlled trials, non-randomized clinical trials, observational studies of prospective and retrospective designs, and cross-sectional studies reporting on long-term effects, i.e. evaluation in follow-up period of more than 24 months after orthodontic treatment alone or in conjunction to surgical procedures for the management of obstructive sleep apnoea, were considered eligible for inclusion. The quality of the included RCTs was assessed per the revised Cochrane risk of bias tool for randomized trials (RoB 2.0), whereas the risk of bias of the included cohort studies was assessed using the Risk Of Bias In Non-randomized Studies of Interventions tool (ROBINS-I).
RESULTS: Sixteen studies fulfilled the inclusion criteria. The risk of bias was deemed as unclear or high for most of the included studies. Orthodontic treatment with or without adjacent surgical intervention seems to provide stable results in the long-term. Orthodontic interventions mainly included palatal expansion and mandibular advancement with functional appliances. The results of the included studies comparing different treatment modalities were heterogeneous and qualitatively reported.
CONCLUSIONS: Although orthodontic treatment seems to be effective even in the long-term for the management of OSA, an inter-disciplinary approach is strongly recommended for the handling of OSA patients overall.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.380
SP373 WIDENING OF THE AIRWAYS AND IMPROVED SLEEP QUALITY AFTER TREATMENT WITH BIOBLOC 1 AND 2 DEVICES IN CHILDREN AGED 5-9 YEARS

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Adrianna Borczynska[1], Małgorzata Galczynska-Rusin[1], Agata Czajka-Jakubowska[1]; [1]*Poznan University of Medical Sciences, Poznan, Poland*

AIMS: Transverse maxillary deficiency is a frequently encountered dentoskeletal condition. It is associated with other orthodontic issues, such as crossbite or crowding. Breathing problems, including obstructive sleep apnea, are often seen and caused by the narrowing of the upper airways. Biobloc I and II treatment showed the ability to change the maxillary dimensions. This study aimed to evaluate the maxilla and airways dimensions and their influence on sleep quality in children before and after completing orthodontic treatment with Biobloc type 1 and 2 devices.
MATERIAL AND METHODS: Data was acquired prospectively in 27 children with an average age of 7,74 ± 1,02 years, 51.9% were female. Changes in maxillary dimensions were evaluated using 3D scans of the maxilla taken before and after the active treatment phase. Airway width was measured from cephalometric radiographs. The Pediatric Sleep Questionnaire (PSQ) was also analyzed before and after treatment. Statistical analyses were conducted using SPSS v23 software (IBM SPSS Statistics for Windows, Version 23.0. Armonk, NY, USA: IBM Corp). The local Bioethics Committee approved the study (KB-370-24).
RESULTS: The average duration of treatment was 385,74 ± 82,35 days. The initial average maxilla width before treatment was 30,17 ± 1,36 mm and increased significantly after treatment to 39,70 ± 0,99; p<0,05). All measured airway cephalometric indices increased statistically significant after treatment. The middle value of PSQ was 5,63 ± 5,60 before treatment. Nine of the children obtained PSQ ≥ 8. In children in whom PSQ was > 8 before treatment, statistically significant differences were found in the measurements of the airway sections between PNS and P1 (AWPP 9,23 ± 3,49 mm vs 5,89 ± 3,16 mm, p=0,023) and between AP1 and P2 (AWOP 9,37 ± 1,68 mm vs 7,07 ± 2,31 mm, p=0,020). The other measurements did not show statistically significant differences. After orthodontic treatment, no statistically significant differences in analyzed airway cephalometric indices were found. The middle value of PSQ after treatment was significantly lower (1,07 ± 1,07, p=0,000).
CONCLUSIONS: Biobloc 1 and 2 devices' treatment allowed for controlled maxillary expansion, statistically significant widening of the airways, and improved sleep quality.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.381
SP374 THE EFFECT OF RAPID MAXILLARY EXPANSION AND FUNCTIONAL ORTHODONTIC TREATMENT IN CHILDREN WITH SLEEP DISORDERED BREATHING: A SYSTEMATIC REVIEW

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AIMS: Sleep disordered breathing (SDB) in children, characterized by sleep apnea episodes or other episodic or persistent breathing disorders can be associated with the occurrence of malocclusions. Therefore, we conducted a systematic review of this topic, whose aim was to check whether orthodontic treatment effectively reduces SDB in children.
METHODS: The review was conducted in accordance with the Preferred Reporting Items for Systematic reviews and Meta-Analyses 2020 (PRISMA 2020). The study design was defined in the PICO format—Population (P): non-syndromic prepubertal and adolescent patients with SDB requiring orthodontic treatment; Intervention (I): Orthodontic treatment with rapid maxillary expansion and functional appliance; Comparison (C): children without any orthodontic treatment; Outcome (O): changes in Apnea Hypopnea Index (AHI) and SDB symptoms. The following variables were established for the selected articles: sample size, demographic characteristics, orthodontic treatment methods, type of study, AHI (Apnea-Hypopnea Index) parameter . The following scientific databases were searched: PubMed, Embase, Cochrane Central. The articles were analyzed for risk of bias and quality using the Risk Of Bias In Non-randomized Studies - of Interventions (ROBINS-I) protocol.
RESULTS: Five articles (n = 248 individuals, 163 girls and 124 boys) aged 8-12.5 years, mean age 10.6, were included in the review. In 124 patients with class II malocclusions or mandibular retrognathia, a modification of the anterior growth of the mandible was used using Twin-Block appliances and in 124 patients with bilateral crossbite the Rapid Maxillary Expansion (RME) method was used. Changes in AHI reduction and in SDB symptoms themselves varied.
CONCLUSIONS: The literature review suggests that orthodontic treatment may improve sleep quality, alleviate symptoms of SDB, and enhance sleep parameters however one article does not support this thesis. Consistent results were obtained in the articles with a functional appliance treatment. A close relationship between these phenomena has not yet been fully established. Registration CRD42024565669
Disclosure of interest: None declared

Abstract citation ID: cjaf073.382
SP375 FROM TRADITIONAL TO ALIGNER ORTHODONTIC TREATMENT - CHALLENGES FOR EVERYDAY PRACTICE AMONG SLOVENIAN ORTHODONTISTS

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AIM: To examine and evaluate how orthodontists, members of Slovenian Orthodontic Society (SOS) and teams tackled new conditions and strategies following orthodontic aligner therapy (OAT) changing orthodontic practices. Recent reports suggest that OAT now represents one third of an orthodontic practice caseload, and there are shifting demographics on patient preferences and awareness of OAT. Emergence of new conditions has posed many workflow challenges to orthodontic teams to cope with. Interest in specialization of ortodontics among graduates of dental medicine and changes in national public health system were also observed.
SUBJECTS AND METHODS: All active members of SOS, working either in public or private practices, were invited to participate in online survey by mailing list, they need to fill in questionnaires. Questions adressed workflow and treatment techniques changes, appointment schedule and lenght, digital procedures implementation: scanning, in-office printing, remote screening, teleorthodontics, dental monitoring and staff training. Data about interest in orthodontic specialization among dental graduates and changes in national public health system were collated. Data were analysed using SPSS programme.
RESULTS: In survey participated 49 active orthodontists, aged 30-75 years. Results confirmed that patient preferences and lifestyle needs have made AOT the primary choice when seeking care in private adult clients. Most important challenges followed by shift from traditional orthodontics to AOT were: accelerated transition to digitized procedures, remote consultations, monitoring and teleorthodontics. Interest for specialization among young graduates and exit of specialists from public services are extremely high.
CONCLUSIONS: The future of AOT brings challenging promises for clinicians. Many orthodontic practices have to re-invent their practices to meet patient needs and alter clinical workflows. Many OAT methods allow key treatment planning and the visualization of the patient end result. This Beginning with the End in Mind now allows clinicians to enhance their treatment plans and optimize smile aesthetics. Fundamentals of orthodontic examination and diagnosis, treatment planning, and biomechanics combined with clinical competency, experience and compliance remain the pillars of successful orthodontic treatment. A careful understanding of technology coupled with clinical-based evidence is very important. Appropriate measures to retain young orthodontic specialists in national public services should be prepared and adopted.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.383
SP378 TURNING TEETH AROUND: MULTIDISCIPLINARY MANAGEMENT OF A RETAINED DECIDUOUS CENTRAL INCISOR AND 180-DEGREE ROTATED PERMANENT CENTRAL INCISOR IN AN 8-YEAR OLD PATIENT

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AIMS: This case report aims to discuss the management of an 8-year-old boy referred to both the public dental service for symptomatic carious teeth management and the orthodontic department for a retained upper left deciduous central incisor (ULA). The goal is to highlight the multidisciplinary approach used to manage his complex case involving a Class 2 Division 1 malocclusion, a retained ULA, and an impacted and rotated upper left permanent central incisor (UL1) through the use of general anaesthesia, extractions, and orthodontic intervention.
MATERIAL AND METHODS: The patient, an 8-year-old male, was referred to the public dental service for multiple symptomatic carious teeth and to the orthodontic department at Glasgow Dental Hospital for a retained ULA. Clinical examination revealed a Class 2 Division 1 malocclusion with an increased overjet and overbite. A cone beam computed tomography (CBCT) scan was carried out to rule out the presence of a supernumerary tooth and to assess the eruption status and position of the UL1. The scan revealed that the UL1 was unerupted and rotated 180 degrees. Due to the patient's symptoms of pain, the patient was placed on an urgent extraction-only type general anaesthetic list and therefore the treatment plan involved the extraction of the carious teeth and the retained ULA under general anaesthesia to facilitate the eruption of the UL1.

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RESULTS: Under general anaesthesia, the patient successfully underwent the extraction of the carious teeth and the retained ULA. The CBCT scan revealed the unanticipated position of the UL1. The intervention has facilitated space for the UL1 to erupt, with orthodontic management planned to improve the rotation. It is likely that Paediatric/Restorative input will be required for restorative masking due to the severity of the rotation.
CONCLUSIONS: This case highlights the importance of early interdisciplinary intervention and coordination of care in complex dental and orthodontic cases involving retained teeth and eruption issues. The use of a CBCT scan was essential in diagnosing the rotated UL1 and planning the necessary extractions. The case underscores the benefits of a holistic, team-based approach to complex paediatric dental and orthodontic care.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.384
SP379 ETIOPATHOGENIC FACTORS IN MAXILLARY CANINE IMPACTION: A SCOPING REVIEW

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AIMS: The maxillary canine, the second most impacted tooth affecting 1–3% of the population, can cause complications such as dental arch reduction, migration of neighboring teeth, recurrent infections, follicular cysts, ankylosis, resorption of adjacent teeth, and pain, either individually or in combination. This scoping review aims to synthesize existing evidence on the aetiopathogenesis of maxillary canine impaction.
MATERIAL AND METHODS: Following the PRISMA-ScR guidelines, a comprehensive literature search was conducted in databases including Medline (PubMed), Web of Science, Embase, and Cochrane. Studies focusing on the etiopathogenesis of maxillary canine impaction were included. Meta-analyses were performed using the R 'metafor' package with a 5% significance level.
RESULTS: Out of 968 identified studies, 63 were included in the qualitative analysis and 22 in the quantitative analysis. Key aetiopathogenic factors identified were dental, skeletal, and genetic. Dental factors included agenesis or impaction of other teeth and variations in lateral incisors such as agenesis, microdontia, or peg-shaped morphology. Skeletal factors highlighted a reduced basal width and alveolar width near the first molar and premolar, with hyperdivergent patients being more prone to impaction.
CONCLUSIONS: Maxillary canine impaction is a multifactorial condition influenced by dental, skeletal, and genetic factors. Early identification of these characteristics is crucial for timely diagnosis and personalized treatment planning, as they may serve as early indicators of impaction risk.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.385
SP380 PREVALENCE OF TMJ DYSFUNCTIONS AND PATHOLOGIES IN ORTHOGNATHIC PATIENTS

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AIMS: To evaluate clinical signs of temporomandibular dysfunctions and to perform radiological assessment of the joint space and the incidence of TMJ pathologies in orthodontic patients with severe skeletal malocclusions.
MATERIAL AND METHODS: All orthodontic patients with severe Class II or Class III malocclusion scheduled for orthognathic surgery to the same maxillofacial surgeon between 2018-2019 were included. The exclusion criteria included pregnancy, severe medical conditions, previous TMJ treatment and analgesic and anti-inflammatory therapy. The control group included orthodontic patients with skeletal Class I malocclusion and absence of transversal and vertical problems. Clinical examination was performed using the RDC/TMD diagnostic questionnaire and recorded in the TMJ dysfunction protocol and individual charts. Radiological examination using cone-beam computed tomography (CBCT) of the TMJ structures was performed. Presence of degenerative lesions, osseous spurs, osteophytes, subcortical cysts and change of the shape and the outline of articular surfaces were assessed. Analysis of variance (ANOVA) was used to evaluate differences between the skeletal classes.
RESULTS: The clinical examination was performed in 77 orthodontic patients (mean age: 29 years 8 months). Twenty seven patients (21 females, 6 males) had severe Class II and 30 patients (21 females, 6 males) had severe Class III malocclusion; the control group included 20 patients (15 females, 5 males). Radiological examination was performed in 65 patients: 20, 21 and 24 with skeletal Class I, II and III, respectively. Acoustic sounds, TMJ arthralgia, clinical manifestations of pain in the TMJ and masseter area were more frequent in Class II and III malocclusions than in controls. Significant differences in the frequency of degenerative lesions within TMJ structures were present in patients with skeletal Class II, while surface flattening of the condyles was more frequent in Class II and III compared to patients with Class I. No significant differences were noted regarding the width of the articular space.
CONCLUSIONS: Patients with severe Class II or Class III malocclusions have increased prevalence of temporomandibular joint dysfunctions and pathologies, which should be diagnosed and treated before orthognathic surgery.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.386
SP381 FACE SCANNING AS A SCREENING TOOL IN BREATHING PROBLEMS

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Digitalization in orthodontics is progressing rapidly. CBCT and intraoral scanners are routine orthodontic diagnostics but do we know all the applications of face scanners? Mandibular retrognathism in class II patients is often connected with narrowed upper airways. An experienced orthodontist can identify which patient is at risk on the basis of facial features as constricted nose or retrognathic chin. Cephalometric analysis gives us measurements of the the upper airway width but it is a radiological examination and requires evaluation by an orthodontist.
AIM: To analyse if measurements performed by AI on a 3D head model can be a screening test for patients with breathing problems. To identify facial features in class I and II patients and to establish norms for the polish children.
MATERIALS AND METHOD: The study included 43 children aged 9 to 12 (mean age 10,5). The test group (T) consisted of 23 children with class II malocclusion while control group (C) consisted of 20 children with Class I. Facial measurements were obtained using a face scanner (Metismile, Shining 3D Dental). Among 31 parameters we analyzed 10 including: total facial height, lower facial height, bizygomatic width, face height, nasolabial angle, length of philtrum and colum, mentolabial sulcus depht, nose height and nose width. These measurements were recorded in two face positions: at rest and while smiling. Aditionally each patient was examined by an orthodontic specialist and the data for the survey were obtained from the patient's medical files.
RESULTS: We obtained following results: Total and lower facial height were higher in group C (respectively 0,98 mm and 2,08 mm). Bizygomatic width was also higher (0,31 mm) in group C. The biggest difference was in face height (3,27 mm higher in group C).

Nose height and width were also higher in group C (0,51 mm and 0,72 mm respectivelly).

Only nasolabial angle was higher i group T (1,80 mm).
CONCLUSIONS: Constricted upper airways increase the risk of sleep apnea and snoring. Identification of facial features for patients at risk can potentially accelerate the diagnosis making face scan analysis crucial not only for aesthetic purposes but also for medical intervention.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.387
SP382 IDENTIFICATION OF SALIVARY EXOSOME-DERIVED MIRNAS AS POTENTIAL BIOMARKERS OF BONE REMODELING DURING ORTHODONTIC TOOTH MOVEMENT

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AIMS: Orthodontic tooth movement (OTM) involves complex biological processes regulated by various molecular factors, including microRNAs (miRNAs). This study

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investigates the expression profiles of salivary exosome-derived miRNAs during OTM to identify potential biomarkers linked to bone remodeling.
MATERIAL AND METHODS: Fifteen Caucasian patients (aged 11-15) undergoing orthodontic treatment were enrolled and saliva samples collected at three time points: baseline (day 0), 7 days post-treatment (day 7), and 40 days post-treatment (day 40). Salivary exosomes were isolated, miRNAs extracted, and sequenced. Bioinformatics analyses, including differential expression analysis and Gene Ontology enrichment, were performed to identify miRNAs associated with osteoblast and osteoclast activity.
RESULTS: Out of 1405 detected miRNAs, 185 were retained for further analysis. The Gene Ontology enrichment analysis revealed several miRNAs involved in bone remodeling pathways. The statistically significant finding was the downregulation of hsa-miR-4634 after 40 days of treatment, which targets the VAV3 gene (influencing osteoclast activity). Other miRNAs showed varying expression patterns, although not statistically significant.
CONCLUSIONS: Salivary exosome-derived miRNAs, particularly hsa-miR-4634, hold promise as non-invasive biomarkers for monitoring bone remodeling during orthodontic treatment. The study enhances the understanding of miRNA regulation in orthodontics and suggests broader implications for skeletal disorders such as osteoporosis. Future research should focus on validating these biomarkers in larger cohorts and exploring their clinical utility in orthodontic practice.

Key words: miRNAs, Extracellular Vesicles, Biomarker, Orthodontic tooth movement, saliva.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.388
SP383 EFFECT OF ORTHODONTIC APPLIANCES ON THE SEVERITY OF SLEEP BRUXISM. A SYSTEMATIC REVIEW

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AIMS: The aim of the current systematic review was to assess the available evidence on the effect of orthodontic treatment for the management of sleep bruxism (SB) in children and adults.
MATERIAL AND METHODS: Multiple electronic databases (MEDLINE/PubMed, Ovid MEDLINE, Ovid Embase, LILACS, and Cochrane Library) were searched up to December 1st, 2024. Randomized controlled trials, non-randomized clinical trials, observational studies of prospective and retrospective designs, and cross-sectional studies reporting on the effect of all types of orthodontic appliances utilized for the management of SB, were considered eligible for inclusion. The quality of the included RCTs was assessed per the revised Cochrane risk of bias tool for randomized trials (RoB 2.0), whereas the risk of bias of the included cohort studies was assessed using the Risk Of Bias In Non-randomized Studies of Interventions tool (ROBINS-I tool).
RESULTS: Seven studies fulfilled the inclusion criteria. The risk of bias was deemed as unclear or high for most of the included studies. Orthodontic treatment seems to provide positive results for the alleviation or severity of sleep bruxism. Orthodontic interventions mainly included aligners, but studies also reported on fixed appliances, palatal expansion and mandibular advancement with functional appliances. The results of the included studies comparing different treatment modalities were heterogeneous and qualitatively reported.
CONCLUSIONS: Although orthodontic treatment seems to be effective for the management of sleep bruxism, an inter-disciplinary approach is strongly recommended for the handling of SB patients overall.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.389
SP384 TOOTH WEAR IS ASSOCIATED WITH CRANIOFACIAL SHAPE

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AIM: The study aimed to investigate the association between occlusal tooth wear and craniofacial morphology.
MATERIALS AND METHODS: The sample comprised 66 orthodontically treated individuals (49 females, 17 males; mean age: 14.8 ± 2.2 years) who were recalled approximately 13 years (mean follow-up: 12.7 ± 1.3 years; range: 9–16 years) after completing their treatment. No specific malocclusion or craniofacial morphology criteria were applied. Craniofacial morphology was captured using 127 landmarks (11 fixed and 116 semi-landmarks on 15 curves) identified on lateral cephalograms taken post-treatment. Shape configurations were analysed using Procrustes Superimposition, and the resulting shape coordinates were reduced into 18 principal components for subsequent analyses. Occlusal tooth wear was measured as the annual percentage of crown volume loss. The main outcomes were average wear across all teeth (up to first molars) and average canine wear per individual. Associations between tooth wear and craniofacial morphology were assessed using multivariate regression models, adjusted for age and sex. Method error, tested on 30 repeated tooth wear assessments and landmark identifications, was acceptable (no systematic error; random error of 4.6% and 3.7%, respectively).
RESULTS: After adjusting for age, sex, and tooth size, average annual tooth wear was significantly associated with craniofacial morphology (Pillai's Trace = 0.459, $F = 2.07$, $p = 0.025$), accounting for 46% of its variance. Similarly, average canine wear was significantly associated with craniofacial morphology (Pillai's Trace = 0.440, $F = 1.97$, $p = 0.034$), accounting for 44% of its variance. Individuals with greater overall and canine wear displayed distinct craniofacial traits, including shorter anterior facial height, increased sagittal dimensions, reduced facial plane divergence, and a more anteriorly positioned maxilla and upper face.
CONCLUSIONS: Occlusal tooth wear is significantly associated with craniofacial morphology and specific craniofacial features, such as reduced anterior facial height and increased sagittal dimensions. These findings suggest a potential interplay between craniofacial morphology and tooth wear patterns.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.390
SP385 REPRODUCIBILITY OF CT AND CBCT MACHINES IN REPEATED CRANIOFACIAL SCANS

Mohammed Ghamri[1], Mimmi Sunnard[1], Konstantinos Dritsas[1], Demetrios Halazonetis[2], Nikolaos Gkantidis[1]; *[1]University of Bern, Bern, Switzerland, [2]National and Kapodistrian University of Athens, Athens, Greece*

AIM: The present study aimed to evaluate the reproducibility of CT and CBCT radiographs.
MATERIALS AND METHODS: Under consistent settings, hydrated-dry skull specimens, with soft-tissue simulation using water, were scanned twice within seconds. Four skulls were scanned using a single CT machine, and eight skulls were scanned using two CBCT machines with different settings. An experienced operator independently segmented all facial skeletal surfaces using a visually estimated optimal threshold. The 3D models derived from the repeated scans were superimposed on three anatomical areas (forehead, zygomatic area, and maxilla) using a best-fit algorithm to compare their congruence. Distances between superimposed models in the predefined areas, along with the visualization of color-coded distance maps, were used for comparisons. Deviations between the models were attributed to either segmentation errors or inherent inaccuracies in the radiographic volume generation process. The two facial surfaces from each acquisition setting that exhibited the largest deviations were segmented again using the originally defined threshold value.
RESULTS: The repeatedly determined segmentation threshold values did not differ significantly from zero (p=0.266; median difference: -6.0, IQR: 39.5). Significant differences were found between CT and all CBCT machines, but not among CBCT machines. The overall median Mean Absolute Distance (MAD) for CBCT machines was 0.059 mm (IQR: 0.032), compared to 0.016 mm (IQR: 0.007) for CT. Color-coded distance maps confirmed these findings, indicating slightly higher consistency in models from the CT and Newtom machines, with comparable reproducibility achieved using the low-radiation Planmeca machine protocol. Repeated surface model segmentations using the same threshold indicated that differences were due to image generation parameters rather than threshold estimation.
CONCLUSIONS: While CT scans provide slightly more consistent models, CBCT machines, including low-radiation protocols, also offer high reproducibility.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.391
SP387 MIDPALATAL SUTURE DENSITY AS A PROGNOSTIC FACTOR IN RPE SUCCESS - A SCOPING REVIEW

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AIMS: The qualification of patients with skeletal transverse maxillary deficiency for rapid palatal expansion (RPE) based on chronological age is highly imprecise. In the age of advanced and accessible radiological diagnostics, there is a demand for specific and sensitive methods to evaluate the maturity of the palatine suture.

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Assessments such as midpalatal suture density ratio (MPSD) could serve as prognostic indicators for the success of RPE. This investigation aims to identify and validate these methodologies, ultimately improving patient outcomes in orthodontic treatment.

The objective of this study is to evaluate the usability of midpalatal suture density (MPSD) as a predictor of successful RPE procedures. This scoping review consolidates recent evidence according the MPSD assessed with CBCT, filling a gap in comprehensive and current analyses in this field.

MATERIAL AND METHODS: Using PRISMA guidelines, we performed a search of the literature published in 2014–2024 using Pubmed MEDLINE, Scopus, and Embase databases. This review focused on randomized controlled trials, case reports, and other reviews that evaluated midpalatal suture density in context with RPE procedure.

RESULTS: The analyzed articles suggest that the midpalatal suture density, assessed using CBCT, may serve as an effective prognostic indicator correlated with the maturity of the midpalatal suture. Consequently, it may represent a valuable prognostic factor for the success of rapid palatal expansion.

CONCLUSIONS: Despite the established effectiveness of assessing midpalatal suture density in relation to the success of RPE in the literature, the number of available studies on this topic remains limited. Further research with a larger patient population is necessary.

Disclosure of interest: None declared

Abstract citation ID: cjaf073.392

SP388 EXPLORING THE CORRELATION BETWEEN AIRWAY SPACE DIMENSIONS AND SAGITTAL SKELETAL MALOCCLUSIONS IN BRAZILIANS: A RETROSPECTIVE CROSS-SECTIONAL STUDY

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AIMS: To investigate the possible correlation between the airway space dimensions and sagittal skeletal malocclusions.

MATERIAL AND METHODS: This retrospective cross-sectional multicentric study evaluated a sample of orthodontic patients from two different areas of Brazil. Healthy patients of both sexes after growth spurts were included. Patients with former facial surgery or trauma, syndromes, diseases, and oral cleft were excluded from this study. Image J was used to measure the cephalograms' airway space dimensions such as the hypopharynx, oropharynx, nasopharynx, and hyoid-mandibular plane distance. The software OnyxCeph was used to calculate the ANB angle through which the patients were classified into class I (0° – 4°); class II (>4°); and class III (<0°). The cephalometric data was evaluated as categorical (skeletal class I, II and III), and linear and area measurements of the hypopharynx, oropharynx, nasopharynx, and hyoid-mandibular plane distance were evaluated as continuous data. The Shapiro-Wilk test was used to check if there was a statistically significant deviation from the normal distribution within the data. The Kruskal–Wallis test was used to evaluate the association between the variables. An alpha value of 5% was established for all analyses.

RESULTS: A total of 50 males and 81 females were included (ages ranging from 14 to 67). Fifty-nine patients had skeletal class I malocclusion, 58 patients had skeletal class II malocclusion, and 14 patients had skeletal class III malocclusion. Statistically significant results were found in patients with a skeletal class III malocclusion as they had larger measurements of the lower border of the hypopharynx (Pe-Ppe) (p=0.040). The area of the oropharynx was also larger in patients with a skeletal class III malocclusion (p=0.008). The lower border of the oropharynx (P-Pp) (p=0.064) and the area of the hypopharynx (p=0.054) were also borderline significant, in which skeletal class III patients had larger dimensions.

CONCLUSIONS: The results show that patients with skeletal class III malocclusion have larger airway space dimensions. A future study with a larger sample size should be conducted.

Disclosure of interest: None declared

Abstract citation ID: cjaf073.393

SP390 IMPROVING PATIENT SATISFACTION WITH ORTHODONTIC TREATMENT: A QUALITY IMPROVEMENT PROJECT

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AIMS: To assess patient satisfaction with orthodontic treatment and identify areas for improvement. The subsequent objective was to enhance patients understanding of orthodontic treatment including duration, risks and benefits and retention to ensure informed consent.

MATERIAL AND METHODS: This prospective, single-centre patient survey-based Quality Improvement Project (QIP) was conducted from November 2023 to May 2024 at the Orthodontic Department, Altnagelvin Area Hospital, Derry. Patient satisfaction questionnaires were given to post-treatment patients covering administration, staff interactions and treatment provision. Baseline data identified a need to improve the consent process, leading to the development of a Patient Information Leaflet (PIL) as part of PDSA 1. A further questionnaire was developed to assess patient understanding of the information provided. PDSA 2 assessed a pre-treatment patients' knowledge of adverse effects further through the use of an information video from the British Orthodontic Society's (BOS) website.

RESULTS: Baseline data revealed low knowledge regarding treatment duration and adverse effects, with average scores below 30%. Implementing the PIL during PDSA 1 resulted in a 45% increase in knowledge regarding duration and adverse effects. Following the introduction of the BOS video in PDSA Cycle 2, patient knowledge saw further improvement, with an additional 30% increase, bringing total knowledge gain to over 75% compared to baseline.

CONCLUSIONS: The QIP identified gaps in patients' understanding of treatment plans and adverse effects. The integrated use of the PIL and video significantly enhanced patients' understanding of treatment duration, associated risks, and retention. To further improve this, the BOS videos will be integrated early in the treatment journey. Education on all aspects of orthodontic treatment is essential to ensure patient satisfaction.

Disclosure of interest: None declared

Abstract citation ID: cjaf073.394

SP391 EFFECT OF THE PULP HARVESTING METHOD ON THE VIABILITY OF HUMAN DENTAL PULP STEM CELLS AND THEIR ODONTOGENIC DIFFERENTIATION POTENTIAL

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AIMS: Two methods for harvesting dental pulp stem cells (DPSCs) have been reported in the literature: removal of the dental pulp through the apical foramen after tooth extraction or by isolating the pulp tissue through the crown prior to tooth extraction.

The aim of this study was to investigate the effect of two dental pulp harvesting methods, the **apical** and **coronal** approach, on cell viability and differentiation capacity of DPSCs.

MATERIAL AND METHODS: A total of 148 healthy premolars from 46 patients were extracted for orthodontic treatment at Ghent University Hospital. The included premolars were randomly allocated to the apical or coronal prelevation method.

The comparison of the characteristics of the DPSCs was investigated using flow cytometric analysis and an MTT assay. Odontogenic differentiation was examined with specific odontoblast markers (immunocytochemical staining) and the deposition of calcium (Alizarin Red staining).

Statistical analyses were performed using SPSS Statistics 29. A Mann-Whitney U-test was used for flow cytometry data, and linear regression was applied to Alizarin Red staining results. Significance was set at p-value < 0.05.

RESULTS: Due to bacterial and fungal infections, only 37 (18 apical and 19 coronal) DPSC lines were obtained.

Flow cytometric analysis and MTT assays showed no statistical differences in **cell viability** between the two methods. No visual (immunocytochemical staining) or statistical (Alizarin Red Staining) differences were found between the apical and coronal **odontogenic differentiation capacity.**

CONCLUSIONS: The **coronal approach** to isolate dental pulp tissue is **equal** in terms of isolation efficiency, cell viability, and odontogenic differentiation potential **compared to the apical approach.**

Disclosure of interest: None declared

Abstract citation ID: cjaf073.395

SP392 EVALUATION OF ERUPTION PATTERNS AT AGE 11 FOLLOWING EARLY EXTRACTION OF THE FIRST PERMANENT MOLAR DUE TO MIH: A SPLIT-MOUTH RCT

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AIMS: This study aimed to investigate how the early extraction of the first permanent molar, due to Molar-Incisor Hypomineralisation (MIH), affects the eruption patterns of adjacent and opposing teeth in children at age 11.
MATERIAL AND METHODS: This split-mouth randomized controlled trial, included patients aged 6–9 with severe MIH of the FPM. Panoramic radiographs were taken pre-extraction (T0) and at age 11 (T1) to measure eruption length and angulation of SPMs and SPs using reference lines in the maxilla and mandible. Radiographs were analysed using Facad software, with measurement reliability assessed via ICC. Imaging errors were recorded for quality control. Paired t-tests were used to compare extraction and non-extraction sides.
RESULTS: This study included 46 patients (31 maxillary and 25 mandibular FPM extractions; mean age at extraction 8.1 years for maxilla and 8.2 years for mandible) with an average follow-up of 3.2 and 3.1 years, respectively. At T0, no differences in eruption length or angulation of SPM or SP were observed between extraction and non-extraction sides.

At T1, maxillary SPMs showed faster eruption on the extraction side (13.5 mm vs. 10.8 mm, $p<0.001$) and more upright angulation (72.9° vs. 62.1°, $p<0.001$). Maxillary SPs had increased mesial angulation on the extraction side (82.5° vs. 89.3°, $p<0.05$) but no differences in eruption length. In the mandible, no differences in eruption length or angulation of SPM or SP were found. No overeruption of antagonistic FPMs was observed.

Measurement reliability was excellent (ICC: 0.997–0.999), despite 75/94 radiographs showing imaging errors.
CONCLUSIONS: Evaluation at age 11 following early extraction of the first permanent molar (FPM) due to Molar-Incisor Hypomineralisation (MIH) revealed significant effects in the maxilla, including more perpendicular eruption of the second permanent molar (SPM) and second premolar (SP) and accelerated SPM eruption. In the mandible, no significant changes in eruption length or angulation were observed, and no overeruption of the opposing FPM was detected. These findings, based on panoramic radiograph measurements, provide insights into the eruption process at this developmental stage.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.396
SP394 THE IMPACT OF NINTEDANIB ON WOUND CONTRACTION AND SCAR FORMATION IN A RAT TAIL MODEL

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AIMS: Human fibrotic diseases are a major health problem worldwide. Scarring or fibrosis can occur in the skin, the muscles and other organs. It can lead to organ dysfunction, growth disturbances, functional and esthetical problems, and sometimes even death. Good examples are (severe) skin burns or the surgical reconstructions in patients with cleft lip and/or palate. Previous findings show that the antifibrotic drug nintedanib improves fibrosis in idiopathic pulmonary fibrosis. This study explores the effects of nintedanib on wound contraction and scar formation in a rat tail model.
MATERIAL AND METHODS: This in vivo study was carried out over a period of two months. The rats received a tail wound and were divided into five groups: one control group and four treatment groups receiving 25, 50, 75, and 100 mg/kg of nintedanib. Rats were sacrificed on day 3, 7, 28, and 56. Wound contraction was quantified on serial photographs using ImageJ software. Tissue sections were stained using hematoxylin-eosin (H&E), α-SMA (myofibroblasts) and AZAN staining (collagen).
RESULTS: There was no significant effect of nintedanib on wound contraction during the first seven days. However, at a concentration of 100 mg/kg, nintedanib significantly reduced the number of myofibroblasts in the wound tissue. The later time points are now being analyzed, but we expect that fibrosis will be reduced as myofibroblasts are the key cells in fibrosis.
CONCLUSIONS: The study shows that nintedanib significantly reduces myofibroblast numbers in rat tail wounds. These initial results indicate promising effects of nintedanib on fibrosis. This supports further research on nintedanib into antifibrotic treatments for patients.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.397
SP395 ‡‡‡ VOLUMETRIC PULPAL CHANGES IN PERMANENT FIRST MOLARS FOLLOWING ADVANSYNCTM AND TWIN BLOCK FUNCTIONAL APPLIANCE: A CONE BEAM COMPUTED TOMOGRAPHY STUDY

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INTRODUCTION: Dental pulp may respond differently to adverse orthodontic forces. Major physiological effects of optimum orthodontic force application on dental pulp are vascular pulpal changes, pulpal calcification, and fibrosis. Functional appliances taking anchorage from the dentition tend to exert reciprocal higher orthodontic forces. Therefore, the current research was planned to compare the effect of removable functional (Twin Block) and fixed functional (AdvanSync^{TM}) appliances on the 3D volume of the dental coronal pulp in maxillary and mandibular first permanent molars
AIM: To evaluate the 3D volumetric changes of the dental coronal pulp of maxillary and mandibular permanent first molars 6 months after AdvanSync^{TM} fixed functional and Twin Block removable functional appliance therapy and followed at 18 months of treatment (T2).
MATERIALS AND METHODS: This retrospective study was performed on CBCT records obtained from a previous prospective study (CTRI registration no. CTRI/2020/10/028734) comprising 32 patients [females: 17 (9.0–14.5 years), males: 15 (10.5–15.0 years)] who underwent functional mandibular advancement with either Twin Block (group 1) or AdvanSync^{TM} (group 2). Pretreatment (T0), 6 months (T1), and 18 months (T2) follow-up CBCT were assessed for dental pulp volume by using ITK-SNAP software version 3.2.
RESULTS: Intragroup volumetric pulpal changes showed a ***significant decrease*** in tooth 16, 26, and 36 (FDI two-digit notation) at time intervals T0–T1, T0–T2, and T1–T2 in groups 1 and 2. Intergroup comparison of pulpal volume showed no significant differences at T0 and T2 for 16, 26, and 36. Intergroup comparison of pulpal volume for 16 and 26 was statistically significant at T1 but was statistically non-significant for 36. There was statistically significant decrease in pulpal volume for 46 at time intervals T0–T1, T0–T2, and T1–T2 in groups 1 and 2. Intergroup comparison of pulpal volume for 46 was statistically non-significant at time intervals T0, T1, and T2
CONCLUSION: Functional appliance therapy with both Twin Block and AdvanSync^{TM} functional appliance tends to decrease the first molar pulpal volume.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.398
SP396 THE RELATIONSHIP BETWEEN MALOCCLUSION AND ORAL FRAILTY IN OLDER ADULTS

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AIMS: Since 2019, Ebina City, Kanagawa Prefecture, Japan has been conducting oral frailty health examinations for residents aged 55 and older, which include an assessment of malocclusion. This report examines the relationship between the number of remaining teeth and oral frailty among older adults with malocclusion based on 2020 data.
MATERIAL AND METHODS: This study included 501 citizens aged 55 and older in Ebina City who underwent oral frailty examinations and had a documented classification of malocclusion. Examination data were used to analyze participants' age, number of remaining teeth, and oral frailty status.
RESULTS: Of the participants, 413 had normal occlusion (average age 73.1 years), 36 had crowding occlusion (65.7 years), 11 had maxillary protrusion (72.9 years), 6 had mandibular protrusion (70.1 years), 7 had crossbite (69.0 years), 16 had an deep overbite (75.5 years), 7 had an open bite (67.7 years), and 5 had an edge-to-edge bite (68.8 years). The mean number of remaining teeth was 21.4 for normal bite, 25.9 for crowding, 23.9 for maxillary protrusion, 21.6 for mandibular protrusion, 24.7 for crossbite, 21.2 for deep overbite, 28.2 for open bite, and 23.2 for edge-to-edge bite. The overall rates of oral frailty and

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frailty risk were 32.9% for normal bite, 13% for crowding, 27% for maxillary protrusion, 50% for mandibular protrusion, 14.2% for crossbite, 43.5% for deep overbite, 14% for open bite, and 40% for edge-to-edge bite.
CONCLUSIONS: Contrary to expectations, individuals with crowding and open bite had more remaining teeth than those with normal occlusion. Among other malocclusions, mandibular prognathism and deep overbite were associated with fewer remaining teeth, though not significantly different from those with normal occlusion. Oral frailty was notably higher among individuals with mandibular prognathism, deep overbite, and edge-to-edge bite. These findings suggest that while malocclusion does not directly contribute to tooth loss in older adults, mandibular prognathism, deep overbite, and edge-to-edge bite may increase susceptibility to oral frailty as they affect oral function. Further analysis of oral function data for each malocclusion type in older adults is recommended.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.399
SP398 COMPARATIVE ANALYSIS OF VACUUM THERMOFORMING AND 3D PRINTING: EFFECTS OF AGING ON THE MECHANICAL PROPERTIES OF GRAPHY®. IN VITRO STUDY

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AIM: This study evaluates the innovative use of Graphy Inc material with shape-memory properties in 3D printing to determine if it can outperform traditional methods in the effectiveness and manufacturing of orthodontic aligners. Additionally, an *in vitro* experimental study investigates the impact of artificial saliva on the mechanical properties of the Tera Harz TC-85 material over time (day 0, day 7, and day 14), focusing on force delivery and deformation in direct-printed 3D aligners.
MATERIAL AND METHODS: A systematic review was conducted using PubMed, Google Scholar, and ScienceDirect, adhering to PRISMA guidelines, with registration in PROSPERO (CRD420245414). For the experimental study, 18 identical Class I DDA GRAPHY® aligners from Forestadent® (Pforzheim, Germany) were divided into three groups: D0 (unaged), D7, and D14. These aligners underwent aging in Fusayama/Mayer artificial saliva (Serlabo, France) at 37°C before mechanical testing on a traction bench. Deformation tests were performed at each time point (D0, D7, D14).
RESULTS: The systematic review identified 3718 articles, of which 14 met the inclusion criteria after screening. The experimental study revealed significant differences ($p<0.001$) in deformation between D0 and the aged aligners (D7 and D14) in incisors and molars.
CONCLUSION: 3D-printed aligners offer notable advantages, including superior geometric and dimensional precision and the ability to customize thickness and cleaning methods. The TC-85DAC resin provides shape-memory benefits, but biomechanical challenges remain. While directly printed aligners deliver consistent forces and improved strength, the shape memory of the Tera Harz TC-85 material becomes unstable as deformation occurs. This instability suggests aligners should be changed weekly, contrary to the manufacturer's 15-day recommendation. Furthermore, direct 3D printing does not reduce the total number of aligners required during treatment. Future research should address these challenges to enhance the reliability and adoption of 3D-printed aligners in orthodontic care.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.400
SP399 EVALUATION OF THE CORRELATION BETWEEN THE PROJECTION OF ZYGOMATIC BONE AND MALAR REGION SOFT TISSUE IN 3D PHOTOGRAPHIC AND TOMOGRAPHIC IMAGES

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AIM: The aim of this retrospective study is to determine the relationship between soft tissue thickness and zygomatic bone contour in the midface of patients planned to undergo orthognathic surgery. Representing inspection, the practicality of 3D facial scanning for this purpose and whether it can assist in estimating hard tissue thickness were investigated, to try and develop a method for measuring the soft and hard tissue of the zygomatic region using this software tool.
MATERIALS AND METHOD: 25 patients' preoperative lateral cephalometric films and CBCT data, as well as 3dMD data of 12 of the same patients constituted the study material. Data of obese and syndromic patients were not included in the study. Cephalometric measurements were undertaken with NemoCeph program, while 6 linear measurements of the hard and soft tissues of the zygomatic region were taken on the Axial Reference Plane selected from the CBCT data using the Materialize Mimics program, considering the head's right and left halves separately. Additionally, two linear topographic measurements were carried out on 3dMD data using the 3dMD Vultus program. Cephalometric measurements were analyzed along with CBCT and 3dMD measurements of hard and soft tissue CBCT data using Pearson correlation analysis.
RESULTS: Maxillary depth angle was negatively correlated with soft tissue thickness (r:0.3, p:0.035*). Weak negative correlations were observed with skeletal measurements ANB and Sn-GoMe (ANB: r:-0.4, p:0.004*-Sn-GoMe: r:-0.4, p:0.001*). No correlation was found between soft and hard tissue thickness (r:0.003, p:0.986). There was a moderate positive correlation between bone thickness and the Horizontal Topographic 3dMD measurement (r:0.4, p:0.039*), while no statistically significant relationship was found with the Vertical Topographic measurement (r:0.171, p:0.424).
CONCLUSIONS: It does not appear possible to obtain sufficient insights into bone projections solely through examination, photographs, or three-dimensional images. Fullness in the malar region indicates increased soft tissue thickness in that area, while fullness near the nasal ala suggests greater bone thickness in that specific area.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.401
SP401 BEST PRACTICES FOR IMPLEMENTING DIGITALIZATION IN ORTHODONTICS AT DENTAL OFFICES

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AIMS: Effective communication with patients is integral to digital orthodontic treatment, significantly influencing patient compliance and satisfaction.

This study aimed to enhance the communication skills of orthodontic staff, thereby improving patient compliance and the quality of health services provided.
MATERIAL AND METHODS: Data on the results of changes in compliance were measured using descriptive statistics embedded in JBI-PACES in the form of percentage changes from baseline. The study was conducted in three phases: an initial audit, the introduction of new procedures and education, and a follow-up audit. The inclusion criterion was patients enrolled in treatment with the Invisalign and Spark methods, specifically those attending their first visit when aligners and templates were delivered, attachments were fixed, and instructions on oral and aligner hygiene, cooperation rules, and aligner wear were provided.
RESULTS: Baseline audit documentation included records of 23 patients. Subsequently, 11 staff members were trained to deliver instructions verbally, via email, and in printed formats. Follow-up involved 34 patients who reported to the dental practice. The results demonstrated that implementing an educational program for the dental team and controlling the information provided through multiple routes significantly improved compliance with clinical guideline recommendations.
CONCLUSIONS: This study concludes that implementing best practice communication strategies in orthodontic settings can be an effective tool in enhancing daily digital orthodontic practice.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.402
SP402 ‡‡‡ EVALUATION OF INCISOR POSITION IN A SAMPLE OF ORTHODONTIC PATIENTS

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AIMS: To achieve a successful result, the orthodontist must use a systematic approach to plan the orthodontic treatment. Defining the correct position of the upper and lower incisors and evaluating their relationship with intermaxillary discrepancy and facial divergence have been recognized as the starting point for the diagnostic decision regarding extractions and anchorage requirements. The aim of our study was to analyze the relationship between intermaxillary discrepancy (ANPg^), mandibular inclination (SN^GoGn), lip incompetence, and the positioning of the upper and lower incisors (UIPs and LIPs) in a group of orthodontic patients.
MATERIAL AND METHODS: This retrospective study included 290 lateral cephalograms in 122 males (42.1%) and 168 females (57.9%) aged 8 to 53 years (median 14; interquartile range IQR 12–17). Data were analyzed by means of one-way Analysis of Variance (ANOVA) and linear regression analysis.
RESULTS: This study showed a statistically significant increase in LIP values in patients with lip incompetence ($p < 0.001$). Moreover, the distribution of LIPs in groups with various SN^GoGn and ANPg^ angles was significantly different ($p < 0.001$). The regression analysis also showed a positive association between the LIP and SN^GoGn and between the LIP and ANPg^.
CONCLUSIONS: The LIP presented a statistically significant difference in patients with and without lip incompetence, which varied significantly in subjects with different sagittal malocclusions and vertical face patterns.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.403
SP404 CORRELATION OF TONGUE POSTURE AND FUNCTION DURING THE TRANSITION FROM DECIDUOUS TO MIXED DENTITION

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AIMS: Given the importance that tongue posture and function might have in the aetiology of malocclusion, it is important to be aware of the physiological changes in tongue posture, its function and the correlation between them. The study therefore aimed to assess the correlation of tongue posture and its function during the transition from the deciduous to mixed dentition.
MATERIAL 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 were included in the study. Tongue posture and swallowing pattern were ultrasonographically assessed and a spontaneous act of swallowing was recorded. The swallowing pattern and tongue posture ultrasonograms were compared at the deciduous (DD), early mixed (EMD), and intermediate mixed (IMD) timepoints, to evaluate the possible effect of incisors' eruption.
RESULTS: A significant association was found between tongue posture and its function. In addition, it was found that tongue posture on the mouth floor results in higher occurrence of visceral swallowing pattern (OR=5.020), while lower prevalence of visceral swallowing (OR=0.071) corresponds with a prolonged early transport phase.
CONCLUSIONS: A significant correlation between swallowing pattern and tongue posture was detected in subjects with normal occlusion, regardless of the period of dentition.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.404
SP405 EVALUATING SELLA TURCICA MORPHOLOGICAL ANOMALIES IN DOWN SYNDROME: CLINICAL AND DEVELOPMENTAL PERSPECTIVES

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AIMS: To explore the distinctive morphological characteristics of the sella turcica (ST) in individuals with Down syndrome (Trisomy 21) and examine their clinical implications for craniofacial development and orthodontic care.
MATERIAL AND METHODS: A systematic review, registered with PROSPERO (CRD42024580071), was conducted following PRISMA guidelines. A thorough search of PubMed, Cochrane Library, Wiley, and Web of Science identified studies focusing on ST morphology assessed via lateral cephalograms, CBCT, and CT scans in Down syndrome populations. Six studies met the inclusion criteria. The risk of bias was evaluated using the ROBINS-I tool and the Newcastle-Ottawa Scale to ensure methodological rigor.
RESULTS: The review revealed that individuals with Down syndrome consistently exhibit enlarged ST dimensions, particularly in height, length, and diameter, compared to non-syndromic controls. Distinctive ST shapes, notably 'U'-shaped and 'J'-shaped configurations, were prevalent, suggesting disrupted ossification during embryonic development. Notably, gender differences emerged, with males often displaying larger ST dimensions. Age-related trends highlighted more pronounced morphological deviations in younger individuals. Despite some variability in classification methods, the findings underscore a pattern of ST anomalies that correlate with common craniofacial issues such as maxillary hypoplasia and malocclusions.
CONCLUSIONS: Sella turcica morphology offers a valuable window into the craniofacial anomalies associated with Down syndrome. Recognizing these distinctive features enhances diagnostic precision and informs personalized orthodontic interventions. By standardizing assessment protocols and conducting longitudinal research, clinicians can refine treatment strategies, ultimately improving outcomes for individuals with Down syndrome. These insights bridge the gap between craniofacial growth, genetics, and clinical practice, underscoring the critical role of ST analysis in comprehensive patient care.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.405
SP407 MORPHOLOGICAL VARIATIONS OF THE SELLA TURCICA IN CLEFT LIP AND PALATE: A COMPARATIVE STUDY ACROSS SUBTYPES

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AIM: This study investigates the morphological characteristics of the sella turcica (ST) in individuals affected by cleft lip and/or palate (CL/P), a common congenital craniofacial anomaly. By analyzing ST dimensions and shapes in patients with isolated cleft lip (CL), isolated cleft palate (CP), and combined cleft lip and palate (CLP), the research aims to uncover disruptions in cranial base development and their potential implications for growth and endocrine function.
MATERIAL AND METHOD: The research was conducted at an academic Department of Orthodontics, with ethical approval granted by the relevant Bioethical Committee. In this study, the dimensions of the sella turcica — specifically height, length, and diameter — were assessed using 151 lateral cephalometric radiographs of growing orthodontic patients presenting various cleft subtypes, along with a control group comprising of non-cleft individuals. Measurements were conducted according to the protocol established by Silverman and Kisling. Morphological categorization of the sella turcica followed Axelsson's criteria, which include classifications such as normal morphology, oblique anterior wall, double-contoured floor, irregular posterior segment, pyramidal shape, and sella bridging. Statistical comparisons were performed to analyze morphological distinctions between the different cleft lip and palate (CL/P) subtypes and the control group to identify any significant structural variations.
RESULTS: Significant morphological deviations were observed across the cleft subtypes. Patients with combined cleft lip and palate (CLP) exhibited the most pronounced anomalies, characterized by increased ST dimensions and a higher frequency of atypical shapes such as oblique anterior walls and bridging. In contrast, individuals with isolated cleft palate (CP) displayed moderate deviations, while those with isolated cleft lip (CL) exhibited the least variation. These results suggest that the complexity of cleft anomalies directly impacts cranial base development, with potential repercussions for pituitary function and overall growth regulation.
CONCLUSION: The study identifies a correlation between cleft subtypes and sella turcica morphology. The observed variations in CLP cases highlight the importance of incorporating sella turcica analysis into diagnostic protocols. This integration may enhance the management of craniofacial anomalies and associated endocrine dysfunctions. Further research is warranted to elucidate the developmental mechanisms underlying these associations.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.406
SP408 MAXILLARY EXPANSION USING CLEAR ALIGNERS VERSUS RAPID PALATAL EXPANDERS FOR MAXILLARY TRANSVERSE DISCREPANCY TRETMENT IN MIXED DENTITION

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The aim of this study is to compare maxillary dimensional changes in mixed dentition patients treated with clear aligners (CA) to those treated with rapid palatal expanders (RME).
MATERIALS AND METHOD: The systematic review was carried out following the PRISMA guidelines. The PICO question was: do rapid palatal expanders

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expand the maxilla better than clear aligners in mixed dentition patients? The search with keywords "clear aligner" AND "rapid palatal expander" AND "mixed dentition" was performed in six databases and registers: PubMed, Google Scholar, ScienceDirect, Web of Science, Cochrane Library and ClinicalTrials.gov. Inclusion criteria: full-text research articles published less than five years ago, written only in English, randomized controlled trials, and retrospective and prospective cohort studies.
RESULTS: The search resulted in a total of 992 research articles. After applying selection criteria, 8 full-text articles were found, 4 were included in this review for final analysis. A total of 242 patients participated in the conducted studies. Intraoral scans were taken before appliance placement and at the end of treatment, when the appliances were removed. Digital dental casts were then collected and analyzed. The results of Bruni et al showed that expansion was greater in the RME group; however, only the intermolar width at the gingival level was statistically significant (CA:1.58mm(SD1.53) to RME:3.87mm(SD1.67); p<0.001). Lombardo et al found that greater maxillary expansion was achieved with clear aligners in the intercanine width, both at the cusp and gingival levels (p<0.001). The study by Lu et al observed statistically significant differences in the intercanine (CA:1.89mm(SD1.56) to RME:4.18mm(SD2.01), intermolar (CA:2.43mm(SD1.42) to RME:5.32mm(SD1.13), and second interdeciduous molar (CA:1.93mm(SD1.75) to RME:5.52mm(SD1.31) widths (p<0.05), with more efficient expansion in the RME group. The findings of Torbaty et al also showed superior results in the RME group.
CONCLUSION: Rapid palatal expansion is the preferred method for achieving maxillary expansion in mixed dentition patients, whereas clear aligners are more suited for targeted expansion of the anterior maxillary arch.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.407
SP409 ORAL HEALTH IMPACTS OF MALOCCLUSION IN A POPULATION OF NIGERIAN ORTHODONTIC PATIENTS

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AIM: Malocclusion involves a spectrum of deviation from ideal or normal occlusion to various occlusal anomalies which often impact oral health and could cause difficulty with chewing, speaking, smiling, periodontal disease, facial and dental aesthetics concerns amongst other myriads of oral problems. The subjective perception of these problems with dentofacial complex and the impact on psychological well-being of individuals could influence the desire and uptake of orthodontic treatment. The aim of this study is to assess the impact of malocclusion on oral health-related quality of life and the influence of gender in a population of Nigerian orthodontic patients.
MATERIALS AND METHOD: The study sample comprised of 97 patients who presented for orthodontic treatment at the Orthodontic Clinic of the University of Benin Teaching Hospital, Benin City. The impacts of malocclusion on oral health-related quality of life were assessed with self-completed Oral Health Impact Profile (OHIP-14) questionnaire. The perception of the subjects for orthodontic treatment was also determined by the Aesthetic Component of the Index of Orthodontic Treatment Need (AC-IOTN). The prevalence of oral health impacts, mean total and sub-domain scores were determined and gender influences were evaluated with chi-square test with P<0.05 regarded as statistically significant.
RESULTS: The prevalence of oral impacts perceived fairly and very often was 45.4% and these orthodontic patients were self-conscious of their teeth while 28.9% felt tense and embarrassed because of their teeth respectively. The mean total OHIP score was 17.1 ± 10, the females mean score of 17.3 ± 10 was higher than that of male mean score of 16.8 ± 10 even though statistically insignificant. 36.4% of the patients perceived moderate to definite need for orthodontic treatment on dental aesthetics ground.
CONCLUSION: The prevalence of impact of malocclusion on oral health-related quality of life was high, with more impacts reported by females in this sample of Nigerian orthodontic patients. Also, more than a third of the subjects perceived the need for orthodontic treatment.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.408
SP411 AESTHETIC ANALYSIS OF THE INCISAL EDGE OF THE UPPER LATERAL INCISOR

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AIM AND INTRODUCTION: Dental aesthetics have gained attention in recent years due to technological advancements and the increasing demand for cosmetic treatments. The maxillary lateral incisor (MLI) plays a crucial role in smile aesthetics, affecting its appearance based on its shape, size, and position. The objective of this study is to analyze the different aesthetic perception that general dentists, orthodontists and laypersons have of the incisal edge of the MLI in different dental forms (square, ovoid and triangular) in male and female smiles.
MATERIAL AND METHODS: A cross-sectional descriptive observational study was conducted using a survey distributed to 180 participants, equally divided among general dentists, orthodontists, and individuals not related to dentistry. Digitally manipulated images of male and female smiles with variations in dental shape and the incisal edge height of the MLI relative to the central incisor (CI) were used. Aesthetic preferences were analyzed using Pearson's chi-square test and McNemar's test.
RESULTS: Aesthetic preferences showed significant variability among the evaluated groups. Laypersons preferred the MLI at 0 mm relative to the CI, except in female smiles with square teeth, where -0.5 mm was preferred. General dentists preferred -0.5 mm overall, except in female smiles with square teeth, where they preferred -1 mm. Orthodontists also preferred -0.5 mm, except in female smiles with square teeth (-1 mm) and male smiles with ovoid teeth (0 mm). Statistically significant differences were found in aesthetic perception between male and female smiles for the square shape across all groups, for the ovoid shape in laypersons and orthodontists, and for the triangular shape in general dentists and orthodontists.
CONCLUSION: There is significant variability in the aesthetic perception of the incisal edge of the MLI among professionals and the general population, as well as between genders. These findings highlight the importance of patient communication during orthodontic treatment planning to achieve an aesthetically pleasing and functional smile.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.409
SP413 ‡‡‡ DENTOSKELETAL EFFECTS OF MODERN HYBRID FIXED FUNCTIONAL APPLIANCES

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AIM: This study performs an in-depth analysis of the literature to evaluate the dentoalveolar and skeletal effects of modern hybrid fixed functional appliances (HFFAs).
METHODS: An extensive literature search spanning from January 2010 to November 2023 was executed across three databases: PubMed, Cochrane Library, and Google Scholar. Additionally, a manual search was done by employing the names of relevant authors and screening the references within the included articles. The assessment for eligibility was based on the PICO approach: (P)articipants: Any patients exhibiting Class II division 1 malocclusion up to the age of 18; (I)ntervention: Treatment with HFFAs; (C)omparison: Untreated individuals; (O)utcome measures: (a) Amount of overjet reduction; (b) Changes in upper and lower incisor proclination/protrusion; (c) Skeletal maxillary/mandibular alterations (ANB, SNA, SNB values); (d) Mandibular growth (changes in mandibular length); and (e) Treatment duration.
RESULTS: Nine clinical trials were included in this study, representing a total of 584 adolescents with Class II division 1 malocclusion. Cephalometric measurements indicate pronounced dentoalveolar effects, including lower incisor proclination and upper incisor retroclination, to correct overjet and overbite. Skeletal effects, such as modest maxillary restriction and improvement in the maxillary-mandibular anteroposterior relationship, were less prominent.
CONCLUSION: Although successful at Class II dental malocclusion correction, HFFAs induce unwanted side effects such as significant lower incisor proclination and clockwise rotation of the occlusal plane. Further research, particularly focusing on HFFAs coupled with skeletal anchorage, is necessary.
Disclosure of interest: None declared

Abstract citation ID: cjaf073.410
SP414 THE EFFECT OF ORTHODONTIC TREATMENT ON FACIAL AND SMILE ATTRACTIVENESS

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AIM: To evaluate the influence of orthodontic treatment on facial and smile attractiveness, as compared to untreated controls.

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MATERIALS AND METHOD: The study population comprised 37 young adults (aged between 21-35 years), 29 who received orthodontic treatment and 8 untreated controls who never sought orthodontic treatment. In total, 132 photographs, including full-face smiling and close-up smile images taken before (T0) and after treatment (T1) for treated individuals and at a single time point for controls, were rated. A group of 297 evaluators were recruited from the general population through an electronic invitation to rate the photographs. Facial and smile attractiveness were assessed using Visual Analog Scales (VAS) and scores were recorded with values between 0-10. The association between orthodontic treatment and attractiveness values was tested using univariate regression models while controlling for potential confounders (ANCOVA). Comparisons between study and control groups were performed using t-tests for independent samples. As secondary analyses, the effect of evaluators' demographic characteristics on attractiveness scores was tested using multivariate regression models and the association of the Aesthetic Component of the Index of Orthodontic Treatment Need (ACIOTN) with pre-treatment attractiveness scores was explored with Spearman correlation. For all statistical analyses, a type-1 error of 5% was accepted.

RESULTS: Orthodontic treatment had a significant effect on facial and smile attractiveness with VAS scores improving by 15.6% (P<0.001) and 24.3% (P<0.001), respectively. Post-treatment attractiveness ratings were also significantly higher than those of the untreated controls ($P_{face:}$ 0.029 / P_{smile}: 0.010), with no differences at pre-treatment ($P_{face:}$ 0.832 / P_{smile}: 0.997). Cases with high scores on the ACIOTN received lower T0 VAS scores from the evaluators (r=0.67; P<0.001). Subject age and treatment duration did not affect the study outcomes.

CONCLUSIONS: Orthodontic treatment significantly improves both facial and smile attractiveness, as perceived by laypeople. Treated individuals received markedly higher ratings than untreated controls, underscoring the aesthetic benefits of orthodontic care. These findings provide robust evidence for the positive impact of orthodontic treatment on facial and smile attractiveness. They significantly enhance patient communication and facilitate treatment planning and decision-making.

Disclosure of interest: None declared

Abstract citation ID: cjaf073.411

SP415 ‡‡‡ A PRECISE CLASSIFICATION OF ORTHODONTICS SKELETAL CLASS II AND III PATIENTS BASED ON MACHINE-LEARNING ALGORITHMS

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AIMS: Throughout the years, Orthodontists used many methods to classify the patients, and mainly used Lateral cephalogram parameters to correctly classify patients. Moreover, previous researchers established individualized parameters, such as the individualized ANB of Panagiotidis and Witt, and later on formulas, that taken into account specific population epidemiological data. However, these formulas are limited and the accuracy of such methods are not sufficient and vary between different populations. Therefore, the main aim of this study was to apply artificial intelligence methods, based on machine-learning models, to accurately classify patients as skeletal class II or III.

MATERIALS AND METHODS: This quantitative, observational study is based on the cephalometric parameter of 502 Arab orthodontic patients, from the Orthodontic Center, Jatt, Israel. All patients were diagnosed as skeletal class II or III, according to the individualized ANB of Panagiotidis and Witt. In the data analysis, we used multiple machine-learning models (Linear Discriminant Analysis (LDA), Support Vector Machine (SVM), K-Nearest Neighbor (KNN), Random Forest (RF), Classification and Regression Tree (CART), and Naïve Bayes (NB)) to accurately classify the patients as skeletal class II or III.

RESULTS: A very impressive results were revealed while using the machine-learning models. The stepwise forward machine-learning models results demonstrated that using only Wits appraisal and SNB angle, we can accurately classify the patients with 0.95 accuracy in the KNN, and SVM models (KNN- Accuracy=0.959, Kappa=0.919, SVM- Accuracy=0.951, Kappa=0.901). Besides, the addition of SN-Pg angle improved the accuracy of the two models to 0.96 (KNN- Accuracy=0.968, Kappa=0.937, SVM- Accuracy=0.962, Kappa=0.925). The results of these models, either with two predictors, or three predictors, were significantly higher than the accuracy that was gained in the research of Panagiotidis and Witt, that applied the traditional individualized ANB (R^2=0.8).

CONCLUSIONS: This research emphasizes the ability of machine-learning to better classify orthodontic patients, and to overcome limitations that orthodontists face while using typical methods. In conclusion, this research is a crucial step towards applying the use of artificial intelligence as a standard of care, for fast and precise diagnosis, and thereby enabling personalized orthodontic diagnosis.

Disclosure of interest: None declared

Abstract citation ID: cjaf073.412

SP416 A SURVEY OF ORTHODONTIC CLEAR ALIGNERS PRACTICES AMONG FRENCH SPECIALISTS : AN INTERNATIONAL COMPARISON

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AIMS: This study aimed to assess the use of clear aligners among French orthodontic specialists and compare the findings with a similar princeps study conducted in 2022 in Australia by Pr. Maurice Meade, and following similar surveys undertaken in the United Kingdom, the Republic of Ireland and Canada.

MATERIAL AND METHODS: An online survey was distributed through the SurveyMonkey® platform to 1,657 certified French orthodontic specialists. The survey included a total of 51 questions focusing on the general use of clear aligner therapies (CAT), preferences for specific aligner systems, digital treatment planning processes, case selection criteria, treatment protocols, and challenges encountered during aligner use.

RESULTS: 631 responses were collected from January to March 2023, representing a 38% response rate. Mean number of years in orthodontic practice is 15.6. Among the respondents, 89% report using aligners in their practice. This figure is to be compared with 95% in Canada, 93% in Australia, and 77% in Great Britain and the Republic of Ireland. In France CAT make up 12% of the annual orthodontic caseload, vs 30% in Canada, 24% in Australia and 10% in the UK. 36 % of French orthodontists favour in-house manufactured aligners (Australia, 22% - UK, 3 %). Notably, 50% of French orthodontists start between 11 and 50 aligner treatments annually. Adults are unsurprisingly the most frequently treated patients with aligners. Invisalign® emerges as the most frequently used French aligner system, preferred by 42% of the respondents, followed by Spark™ (36%). Regarding digital treatment plans, 66% of orthodontists report bringing one to three modifications to the initial set-up before accepting it. Two-week aligner changes are preferred in France and the most common check-up regimen is once every 8 weeks. Mean non-extraction treatment duration is 16.5 months.

CONCLUSIONS: Aligners are widely used across these five countries. France CAT prescription (12%) is however lagging behind Canada's (30%) and Australia's (24%), but remains in the same figure than the United Kingdom's (10%). A unique French trend is the major use of in-house manufactured aligners (36%). It is noteworthy that clear aligner therapies require in these five countries on average two refinements.

Disclosure of interest: None declared

Abstract citation ID: cjaf073.413

SP417 GINGIVAL CLEFT FORMATION FOLLOWING ORTHODONTIC SPACE CLOSURE : A CROSS-SECTIONAL STUDY

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AIMS: Gingival clefts are common periodontal defects that occur during space closure in extractions cases. According to current literature, incidence of these clefts ranges from 35 to 100% of treatments including extraction(s). These clefts

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present varying degrees of gingival folds, which may sometimes mask underlying bone defects. The aim of this cross-sectional study was to assess the prevalence of these clefts, evaluate their severity, and identify associated risk factors.

MATERIAL AND METHODS: A total of 23 patients who had completed their orthodontic treatment at least 3 months earlier were recruited from the Department of Dento-Facial Orthopedics of the University of Strasbourg. These patients represented 70 extraction sites. The presence or absence of gingival clefts and the periodontal characteristics of each site were recorded during a clinical examination using a periodontal probe. Cleft severity was assessed using the Reichert index. Data on the course and duration of the orthodontic treatment were retrospectively collected from patient records. These data were analyzed through multiple logistic regression tests to identify potential associations between these factors and the presence of clefts. Additionally, we explored whether these parameters had any influence on the severity of the clefts.

RESULTS: Prevalence of gingival clefts was 71.4%. The majority were complete penetration clefts, characterized by a periodontal probe passing from the buccal to the lingual side, representing relatively severe defects. This prevalence was significantly higher in the mandible (92%) compared to the maxilla (60%) ($p<0.005$). A probing depth greater than 3 mm was observed in the majority of sites with invaginations ($p<0.005$), suggesting a potential bone loss. No other parameter such as gingival phenotype, plaque index, BOP, attached gingival width, remaining diastema, retention type, space closure method or duration or initial spaces to be closed significantly influenced the presence of clefts ($p>0.005$).

CONCLUSIONS: A high rate of gingival clefts was put in evidence in this cross-sectional study. Moreover, clefts were significantly more prevalent in the mandibular arch and probing depth was significantly associated with cleft severity. Longitudinal studies might help to define the long term of these periodontal defects encountered on a routine basis in our extraction cases.

Disclosure of interest: None declared

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