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The Validity and Reliability of the Output Sport System vs VALD ForceDecks in Countermovement and Squat Jump Performances of Elite Basketball Players

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Abstract: The aim of this study was to examine the concurrent reliability validity and of the Output Sport system compared with the VALD ForceDecks system during countermovement jump (CMJ) and squat jump (SJ) in elite basketball players; Twelve elite male basketball players (age: 20.3 ± 1.2 years; body height: 201.8 ± 2.7 cm; body mass: 87.4 ± 3.9 kg; BMI: 21.4 ± 0.7 kg/m²) from a top-division club participated in the study. The jump height, flight time, and take-off velocity were recorded during CMJ and SJ simultaneously using the Output Sport system and the VALD ForceDecks system. Concurrent validity between two systems was assessed using Pearson's correlation (r) with 95% confidence intervals, while reliability was evaluated using Cronbach's α coefficients; The Output Sport system showed excellent validity relative to the VALD ForceDecks system for CMJ (jump height, flight time, and take-off velocity) with correlation coefficient ranging from r = 0.961–0.976 and $p < 0.001$. Additionally, Output Sport system showed hight validity compared to the VALD ForceDecks system for SJ (jump height, flight time, and take-off velocity) with cor-relation coefficient ranging from r = 0.803–0.918 and $p < 0.001$. Both systems demonstrat-ed comparable and acceptable-to-good reliability for CMJ (jump height, flight time, and take-off velocity) (Cronbach's α = 0.759–0.837) and SJ (Cronbach's α = 0.761–0.837), indi-cating similar internal consistency across devices. The Output Sport system provides ex-cellent valid and good reliable measurements of CMJ and SJ performances compared to the laboratory-standard VALD ForceDecks system. Its portability and ease of use make it an efficient and practical tool for monitoring neuromuscular and explosive performances in elite basketball players under field conditions..

Keywords: Vertical jump performance, Inertial measurement unit, Performance monitoring, Sports technology validation, Field-based assessment

1. Introduction

Basketball is an intermittent high-intensity team sport that involves transitions between offense and defense [1]. During transitions players engaged in intermittent motor activities such as sprinting, jumping, changes of direction, and shooting elements [2]. These neuromuscular performances represent important elements for success in basketball [3]. Specifically, jumping ability is essential for the outcome of the game, since it is key for successful rebounds, blocks, and fast breaks. The basketball

player typically makes 50 jumps during basketball games [4]. A recent study [5] confirms previous results, indicating that basketball player performs up to 50 jumps (vertical jumps and shooting elements) within a 40-min game period, which accounts for 48.7% of actions. These findings further emphasize the importance of good jumping performance that basketball players need to possess in order to achieve the desired game outcome.

Considering the importance of jump performances in basketball, the vertical jump is often used as non-invasive indicator to assess lower body neuromuscular capability [6]. Edwards et al., [7] reported that two of the most used vertical jump performance in research and practice are the countermovement jump (CMJ) and squat jump (SJ) The CMJ indicates the ability to produce force rapidly using the slow stretch–shortening cycle, whereas the SJ measures force production during concentric movement only. In these jumps, jump height is generally used as the key performance metric in basketball players [6]. A more recent study [8] analyzed flight time during CMJ in male basketball players, while take off velocity in this case is not investigated. A variety of systems are used to measure jump variables, including force platforms, contact mats, optoelectronic devices, accelerometers, linear position transducers, wearable sensors, and video cameras [9]. Despite their widespread use, evidence on the validity and reliability of these systems specifically in basketball players remains limited. The best of our knowledge, only 2 previous studies [6,10] have analyzed reliability and validity CMJ an SJ in basketball players measured force platforms. De Pedro-Múñez et al., [6] reported high reliability (ICC > 0.96) for both CMJ and SJ measurements using the Chronojump BoscoSystem contact platform in professional basketball players. Additionally, [10] found that CMJ show high reliability (ICC = 0.969–0.995) and good validity in basketball players measured infrared timing system (Optojump System). However, studies have been found that have analysed the validity and reliability of different variant systems in CMJ and SJ in other populations [11,12]. Collings et al., [11] demonstrated that the VALD ForceDecks system is a valid and reliable alternative to laboratory force plates for healthy adults (male and female, mean age 25.9 ± 2.9 years), provided that strict standardized testing and data analysis procedures are followed. Comyns et al., [12] investigated the validity and reliability Output Sport System during CMJ (jump height) in field-based sports athletes, reporting excellent agreement with force plate measurements (r = 0.98; ICC = 0.98).

In line with the aforementioned findings, previous studies have demonstrated high validity and reliability of various systems (Chronojump Bosco System, Optojump System, VALD ForceDecks system, and Output Sports System) used to measure vertical jump performance basketball players and other athletes. However, despite the growing use of portable inertial systems in applied sport settings, no study has directly compared the Output Sport system with the VALD ForceDecks system across both CMJ and SJ assessments and multiple key performance variables (jump height, flight time, and take-off velocity) in elite basketball players. This represents a clear research gap, particularly given the need for sport-specific validation in high-performance populations. Therefore, the aim of the present study was to determine the concurrent validity and reliability of the Output Sport system compared with the VALD ForceDecks system during CMJ and SJ assessments in elite basketball players.

2. Materials and Methods

Experimental approach to the problem

In this cross-sectional study, professional male basketball players performed a CMJ and an SJ to assess jump height, flight time, and take-off velocity. Each athlete completed three repetitions of both jump tests, and the best trial—defined as the jump with the greatest height measured by the force plates—was selected for subse-

quent analyses. All trials were simultaneously recorded using the Output Sports system (Output Sports, Dublin, Ireland), attached to the participants' right shoe, and a dual force plate system (ForceDecks, VALD Performance, Brisbane, Australia). Participants stood with both feet positioned on the ForceDecks platforms, while the Output Sports sensor was firmly secured to the right foot to enable synchronized data acquisition across both systems. All athletes were familiar with the testing procedures, as jump assessments are routinely implemented in their performance monitoring program. Data collection took place in the morning during the pre-season period in a controlled indoor training facility.

Subjects

A total of 12 elite basketball players (age: 20.3 ± 1.2 years; height: 201.8 ± 2.7 cm; body mass: 87.4 ± 3.9 kg) participated in this study, who were engaged in a high-performance training schedule consisting of 6 to 8 training sessions and one official game per week. To be included in the study, athletes were required to: i) be aged between 18 years and 25 years; ii) be a professional basketball player competing in a top-division club; iii) have regularly participated in team training sessions and official competitions during the previous competitive season; and iv) be free from current lower-body injuries, pain, neurological conditions, or any musculoskeletal injury within the preceding six months. Exclusion criteria included injuries or illnesses that could negatively impact the results. All participants were fully informed and familiarized with the experimental procedures prior to participation before providing written consent. The study was conducted under the principles of Declaration of Helsinki and approved by the Ethics Committee of the Faculty of Sport and Physical Education, University of Novi Sad (No.51-11-09/2025-2). This study was preregistered and is publicly available on the Open Science Framework (OSF), where all collected data can be accessed (link: https://osf.io/arxqw). The registration DOI is: 10.17605/OSF.IO/TZM93.

Procedures

The subjects performed tests (CMJ and SJ) in gym prior to the athletes' regular team training session. The air temperature was between 18 and 22°C, with relative humidity ranging from 40 to 60%, in accordance with Fédération Internationale de Basketball (FIBA) and sport performance testing recommendations. All participants were fully informed and familiarized with the experimental procedures prior to participation before providing written consent. Participants were also instructed to avoid intense exercise 24 h before the assessment session. At the beginning of testing, participants body height was measured to the nearest 0.1 cm using a Martin anthropometer (GPM in Switzerland), while body mass was obtained to the nearest 0.1 kg using a calibrated balance beam (Avery Ltd, Model 3306 ABV). After that, all athletes completed a standardized 10-minute warm-up protocol consisting of dynamic stretching exercises (e.g., walking lunges, squat-to-heel rise, A-skips, high knees, butt kicks) [13] and submaximal jumps [14], administered by their respective strength and conditioning coaching staff. All athletes performed the CMJ first, followed by the SJ. Two different devices (i.e., Output Sport System and VALD ForceDecks) were used simultaneously to measure jump height (cm), flight time (s), and take-off velocity (m/s) (Figure 1). A 30-second rest period was provided between trials to ensure adequate recovery [14]. If an athlete failed to execute a proper take-off or landing, the trial was repeated. Strong verbal encouragement was provided throughout the testing procedures by research assistants, instructing the athletes to focus on pushing against the ground as hard and forcefully as possible [15].



Figure 1. Measurements from the Output Sport and VALD ForceDecks systems.

CMJ and SJ assessment

The CMJ and SJ are widely used assessments of lower-limb neuromuscular and explosive performance in athletes. The CMJ involves a rapid eccentric–concentric sequence that utilizes the stretch–shortening cycle, beginning from an upright stance with hands on the hips, followed by a self-selected downward movement (approximately 60°–90° knee flexion) and an immediate maximal vertical jump without pause between phases. In contrast, the SJ isolates concentric force production by eliminating the countermovement; athletes start from a static semi-squat position (~90° knee angle), hold briefly to avoid elastic preloading, and then perform a maximal jump. During both jumps, arms remain on the hips to reduce variability, and athletes are instructed to jump as high as possible while maintaining proper landing mechanics—landing on the toes with extended lower limbs [16]. Standardized protocols recommend consistent footwear, stance width, rest intervals (30–60 s), and validated measurement devices to ensure test–retest reliability [14]. When properly standardized, both tests demonstrate high reliability (ICC > 0.85) and are considered valid tools for monitoring performance and fatigue in athletic populations [13,14].

Output Sport System

The Output Sports measurement device was securely attached to the participants' right shoe to minimize any potential movement during each trial. Prior to every jump attempt, the device was manually adjusted in accordance with the manufacturer's instructions. The applied synchronization procedure ensured that data from both the ForceDecks and the Output Sports device were recorded simultaneously for each jump [17].

VALD ForceDecks system

A portable dual force platform system (2A6SF-FD, Vald Performance, Brisbane, Australia) sampling at 1000 Hz was used to record the vertical ground reaction forces. Jump height was computed using the manufacturer's software (Jump Application v2.2.6 (#153), Vald Performance, Brisbane, Australia) based on the flight-time approach, consistent with previously established methods [18,19]. In brief, the centre of mass velocity was obtained by dividing the cumulative impulse by body mass, and the velocity at take-off was then used to estimate jump height [20]. Each jump trial was visually checked, and any trial with an incorrectly identified movement onset was excluded from analysis.

Statistical analysis

Data are presented as Mean±SD. The Shapiro-Wilk test was used to ensure a normal distribution of the data. Statistical data analysis was conducted using the JASP software package (version 0.18.1), while the power analysis was performed with G*Power 3.1.9.4 [21]. The sample of 12 professional basketball players was evaluated in G*Power (two-tailed, $\alpha = 0.05$), which indicated that the sample size provided adequate statistical power to detect strong correlations ($r \geq 0.8$), while the sensitivity for detecting moderate effects ($r \approx 0.5$) was moderate. To evaluate the validity of measurements between the two devices, a linear association analysis was applied using Pearson's correlation and a regression matrix, with reporting of the correlation coefficient (r), the associated p-value, and 95% confidence intervals. The strength of the correlations was interpreted as follows: r=0.00-0.10 was considered trivial, r=0.11–0.30 was considered small, r=0.31-0.50 was considered moderate, r=0.51-0.70 was considered large, r=0.71-0.90 was considered very large, and r=0.91-1.0 was considered nearly perfect [22]. This method represents a standard procedure for assessing instrument validity in sports science research, as it enables the examination of both the interrelationship among variables and the criterion validity of measurement devices [22-24]. The reliability of the measurements was assessed using Cronbach's α coefficient and inter-item correlations to determine the internal consistency and homogeneity of the measurement outcomes [25-27]. Cronbach's α values were interpreted according to the following thresholds: unacceptable (<0.50), poor (0.50–0.60), questionable (0.60–0.70), acceptable (0.70–0.80), good (0.80–0.90), and excellent (>0.90). The selected statistical approaches are fully consistent with methodological recommendations for research in sports sciences, where instrument validity and reliability are regarded as key indicators of the objectivity of measurement methods [28,29]. It is important to clarify that the present study did not employ a test–retest design across separate sessions. Therefore, intraclass correlation coefficients (ICC) for temporal stability were not calculated. Cronbach's α was used to evaluate the internal consistency and homogeneity of measurement outputs within the same testing session, rather than to assess longitudinal reliability [25-27]. Confidence intervals were calculated using the t-distribution (n−1 degrees of freedom), which is appropriate for small sample sizes [22].

3. Results

Table 1 presents the descriptive statistics for the CMJ and SJ variables measured using the Output Sport System. The mean values and low CV (0.066–0.138) indicate a high level of homogeneity among participants and consistent performance across trials. The 95% CI are relatively narrow, suggesting stable and reliable measurement estimates. Furthermore, the results of the Shapiro–Wilk test ($p > 0.05$ for all variables) confirm that the data are normally distributed.

Table 1. Descriptive statistics for Output Sport System - CMJ and SJ.

CMJ					
Variables	**Mean±SD**	**CV**	**Shapiro-Wilk**	**95% CI**	
				Upper	**Lower**
Jump height (cm)	36.76±5.07	.138	.830	39.98	33.54
Flight time (s)	.546±.038	.069	.894	.570	.522
Take-off velocity (m/s)	2.67±.18	.070	.864	2.79	2.56
SJ					
Jump height (cm)	35.67±4.75	.133	.352	38.69	32.65
Flight time (s)	.538±.036	.067	.386	.561	.515
Take-off velocity (m/s)	2.63±.17	.066	.383	2.74	2.527

Note: CV – Coefficient of variation; SD – Standard Deviation; 95 CI% – Confidence Interval Mean; CMJ – Countermovement jump; SJ – Squat jump.

Table 2 presents the descriptive statistics for the CMJ and SJ variables measured with the VALD ForceDecks system. The mean values and low CV (0.069–0.148) indicate a good level of homogeneity among participants and consistent performance across trials. The 95% CI are relatively narrow, suggesting stable and reliable measurement outcomes. The results of the Shapiro–Wilk test ($p > 0.05$ for all variables) confirm that the data are normally distributed.

Table 2. Descriptive statistics for VALD ForceDecks – CMJ and SJ.

CMJ					
Variables	Mean±SD	CV	Shapiro-Wilk	95% CI	
				Upper	Lower
Jump height (cm)	36.42±5.37	.148	.342	39.83	33.01
Flight time (s)	.544±.040	.074	.348	.569	.518
Take-off velocity (m/s)	2.64±.23	.087	.519	2.78	2.49
SJ					
Jump height (cm)	35.30±4.80	.136	.850	38.36	32.25
Flight time (s)	.536±.037	.069	.831	.559	.512
Take-off velocity (m/s)	2.59±.19	.074	.206	2.71	2.46

Note: CV – Coefficient of variation; SD – Standard Deviation; 95 CI% – Confidence Interval Mean; CMJ – Countermovement jump; SJ – Squat jump.

Table 3 shows that the Output Sport System produced comparable results, with Cronbach's α values between 0.759 and 0.837 and item–rest correlations ranging from 0.965 to 0.980, indicating consistently strong internal reliability across all measured variables. Perfect correlations observed between paired variables (e.g., CMJ Flight Time and CMJ Take-Off Velocity; SJ Flight Time and SJ Take-Off Velocity) highlight excellent measurement coherence within the system.

Table 3. Reliability statistics for Output Sport system: CMJ and SJ.

CMJ			
Variables	**Mean±SD**	**Cronbach's α**	**r**
Jump height (cm)	36.76±5.07	.759	.980
Flight time (s)	.546±.038	.837	.990
Take-off velocity (m/s)	2.67±.18	.833	.990
SJ			
Jump height (cm)	35.67±4.75	.761	.965
Flight time (s)	.538±.036	.837	.978
Take-off velocity (m/s)	2.63±.17	.833	.976

Note: SD – Standard Deviation; r – Item-rest correlations; CMJ – Countermovement jump; SJ – Squat jump.

The overall Cronbach's α coefficient for all variables combined was 0.831 (95% CI [0.835, 0.854]), reflecting robust internal consistency across the full dataset. Table 4 presents the reliability statistics for CMJ and SJ variables obtained from the VALD ForceDecks system. Cronbach's α values ranged from 0.761 to 0.837, accompanied by high item–rest correlations (0.877–0.990), which demonstrate similarly stable and consistent measurement performance within the VALD system. Taken together, these findings confirm that both the Output Sport and VALD ForceDecks systems deliver highly reliable, stable, and repeatable measurements for jump performance assessments.

Table 4. Reliability statistics for VALD ForceDecks: CMJ and SJ.

CMJ			
Variables	**Mean±SD**	**Cronbach's α**	**r**
Jump height (cm)	36.42±5.37	.761	.977
Flight time (s)	.544±.040	.837	.987
Take-off velocity (m/s)	2.64±.23	.832	.974
SJ			
Jump height (cm)	35.30±4.80	.764	.946
Flight time (s)	.536±.037	.837	.965
Take-off velocity (m/s)	2.59±.19	.833	.877

Note: SD – Standard Deviation; r – Item-rest correlations; CMJ – Countermovement jump, SJ – Squat jump.

The results presented in Table 5 indicate a high level of validity of the Output Sport System compared to the VALD system in assessing jump parameters. For the CMJ, very strong and statistically significant correlations were observed for jump height ($r = .971$, $p < .001$), flight time ($r = .975$, $p < .001$), and take-off velocity ($r = .976$, $p < .001$), with narrow confidence intervals further confirming the stability of the measurements. Similarly, for the SJ, high correlations were found between systems for jump height ($r = .918$, $p < .001$), flight time ($r = .917$, $p < .001$), and take-off velocity ($r = .916$, $p < .001$), although the values were slightly lower compared to the CMJ test. Overall, all parameters demonstrated statistically significant and strong associations between the Output and VALD systems, indicating high measurement validity of the Output device, particularly in the assessment of CMJ performance.

Table 5. Validity statistics for Output Sport and VALD ForceDecks system: CMJ and SJ.

		VALD - CMJ		
		Jump height (cm)	**Flight Time (s)**	**Take off velocity (m/s)**
Output - CMJ	**Jump Height (cm)**	.971*** (.992-.898)	.970*** (.992-.894)	.961*** (.989-.862)
	Flight Time (s)	.975*** (.939-.910)	.974*** (.993-.908)	.959*** (.989-.856)
	Take-off velocity (m/s)	.976*** (.993-.913)	.975*** (.993-.911)	.961*** (.989-.862)
		VALD - SJ		
Output - SJ	**Jump Height (cm)**	.918*** (.977-.728)	.914*** (.976-.716)	.807** (.944-.433)
	Flight Time (s)	.917*** (.977-.724)	.913*** (.976-.713)	.807** (.944-.435)
	Take-off velocity (m/s)	.916*** (.976-.70)	.912*** (.975-.709)	.803** (.943-.425)

Note: CMJ – Countermovement jump; SJ – Squat jump; *** - p <.001; ** p <.01.

4. Discussion

The aim of this study was to examine the validity and reliability of the Output Sport System in comparison with the criterion VALD ForceDecks system during the execution of CMJ and SJ in male elite basketball players. The main findings of this study indicate that the Output Sport System demonstrates a high level of validity and reliability when compared with the VALD ForceDecks system for assessing vertical

jump (CMJ and SJ) performances (jump height, flight time and take-off velocity) in male elite basketball players. The descriptive indicators obtained in this study (low coefficient of variation and narrow 95% CI) suggested measurement stability and sample homogeneity, further supporting the robustness of the collected data. These findings are particularly relevant in the context of sports such as basketball, where regular and rapid assessment of explosive power is essential for monitoring players' neuromuscular status and training readiness [13,15]. Moreover, the results demonstrated very high correlations between the two devices across all analyzed variables (jump height, flight time, and take-off velocity) ($r = 0.91–0.98$, $p < 0.001$), indicating a very strong linear association and high concurrent validity between the two systems [24]. The magnitude of these correlations ($r \geq 0.90$) is considered nearly perfect according to established interpretation guidelines, providing strong empirical evidence of concurrent validity when compared with a laboratory-grade force plate system. Therefore, the consistently high and statistically significant associations across both CMJ and SJ variables confirm that the Output Sport system produces measurements that are closely aligned with those obtained from the criterion VALD ForceDecks system. It should be acknowledged that Pearson correlation quantifies the strength of linear association but does not directly assess absolute agreement between measurement systems [24]. Therefore, the present findings should be interpreted in terms of concurrent validity and relative consistency in ranking performance, rather than full device interchangeability at the individual level. These results are consistent with previous research confirming that portable inertial measurement units (IMUs) can represent a valid alternative to force plate systems for assessing explosive movements athletes [14,17,20]. The findings also revealed that the validity of the Output Sport System was highest for the CMJ test, which aligns with the results reported by Ruf et al., [14], who observed stronger correlations between portable sensors and force plate measurements in movements involving the stretch–shortening cycle (SSC) compared to isolated concentric actions during the SJ test. A similar trend was identified by Montoro-Bombú et al., [22], who noted that dynamic tests with greater ranges of motion and velocity allow for more accurate detection of temporal and kinematic variables. The slightly lower validity observed in SJ compared with CMJ may be explained by biomechanical and signal-processing factors. The SJ is characterized by a purely concentric action without a SSC, resulting in lower peak acceleration and reduced impulse magnitude. Inertial sensors estimate velocity and displacement through numerical integration of acceleration signals; therefore, movements with smaller acceleration amplitudes may be more sensitive to sensor noise and integration drift [18-20]. In contrast, CMJ generates higher acceleration peaks and clearer take-off detection, enhancing signal-to-noise ratio and measurement precision. High Cronbach's α coefficients (0.759–0.837) confirmed the strong internal consistency of both systems, consistent with the reliability thresholds proposed by Atkinson and Nevill [28] and Hopkins [29]. Comparable α values were reported by Čabarkapa et al., [13], who examined the test–retest reliability of vertical jump performance in professional basketball players. From a statistical inference perspective, the framework proposed by Batterham and Hopkins [30] is particularly valuable, emphasizing that beyond statistical correlation, practical significance and magnitude-based inference should also be considered when interpreting results. Following this reasoning, the findings of the present study indicate that the Output Sport System not only provides consistent within-test performance measures but also generates replicable outcomes comparable to those obtained from laboratory-grade systems. Furthermore, the present results contribute to the growing body of literature supporting the validity and reliability of portable systems for assessing jump performance [20,21]. Collectively, these findings confirm that the Output Sport System represents a robust and practical alternative for use in applied sports settings. Its portability, ease of use, and capability for in-field data collection make it particularly suitable for continuous performance monitoring with minimal disruption to the regular training process.

Although the sample size was determined through an a priori power analysis targeting large correlation coefficients [21], the relatively small number of participants (n = 12) inevitably limits external validity and generalizability. Studies involving elite athletes frequently rely on smaller samples due to restricted population availability; however, caution is warranted when extrapolating findings beyond similar high-performance contexts [22]. Second, only basic jump parameters—jump height, flight time, and take-off velocity—were analyzed. Including force-time characteristics such as peak force, rate of force development, and impulse could provide a more comprehensive understanding of the system's measurement validity. Finally, data collection was conducted under controlled indoor pre-season conditions; therefore, future studies should examine the system's reliability and validity across different environments, phases of the competitive season, and sport-specific contexts. Expanding the sample and incorporating a broader set of biomechanical variables would enhance understanding of the Output Sport system's performance capabilities and limitations in applied athletic testing. Importantly, this study provides the first direct comparison between the Output Sport system and the VALD ForceDecks system across both CMJ and SJ assessments and multiple key performance variables (jump height, flight time, and take-off velocity) in elite basketball players. While previous studies have examined individual systems or isolated jump metrics, no prior investigation has simultaneously evaluated these two specific systems across both jump modalities within a high-performance basketball cohort. This strengthens the sport-specific and applied relevance of the present findings.

5. Conclusions

The results of this study demonstrated that the Output Sport System possesses a high degree of validity and reliability when compared with the VALD ForceDecks system in measuring vertical jump performance among male elite basketball players. The nearly perfect correlations observed across CMJ and SJ variables provide strong evidence of concurrent validity, while the comparable Cronbach's α coefficients confirm similar internal consistency between systems. Both systems exhibited high internal consistency, and correlations between devices were nearly perfect across all analyzed parameters — jump height (cm), flight time (s), and take-off velocity (m/s). These findings confirm that the Output Sport System can serve as a credible, efficient, and cost-effective alternative to laboratory-based force platforms for assessing lower-limb explosive power in athletic populations. Notably, this investigation provides the first direct comparison of the Output Sport and VALD ForceDecks systems across both CMJ and SJ tests and multiple key performance variables in elite basketball players, thereby contributing novel evidence to the field of sports technology validation and applied performance monitoring.

Practical Application

The findings of this study hold meaningful practical implications for strength and conditioning practice and applied sports science. The Output Sport System enables coaches, strength and conditioning professionals, and sport scientists to rapidly and accurately evaluate athletes' explosive power without requiring access to laboratory-grade force platforms. Due to its portability, user-friendly interface, and short setup time, the device can be easily integrated into daily training and competition environments. This allows practitioners to monitor training adaptations, detect neuromuscular fatigue, and track recovery status, thereby facilitating evidence-based optimization of training load and performance management. Additionally, the availability of quantitative data on jump height (cm) and take-off velocity (m/s) provides valuable feedback for individualized programming and real-time performance diagnostics. Such an approach is particularly beneficial in team sports, where frequent, non-invasive, and time-efficient assessments are essential for maintaining peak athletic readiness.

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Conflicts of Interest: The authors declare no conflicts of interest.

Abbreviations

The following abbreviations are used in this manuscript:

CMJ	Countermovement jump
SJ	Squat jump

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