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Validity and reliability of the My Jump 2 application for measuring the vertical jump height in young, male basketball players.

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ABSTRACT

This study aimed to analyze the validity and reliability of the My Jump 2 application for measuring the most frequent tested vertical jumps against Optojump in young, male basketball players. Twenty-seven young, male basketball players (height: 167.26±10.33 cm; weight: 61.99±3.97 Kg; BMI: 22±3.97 Kg/m2) were voluntarily agreed to participate in this study. Participants were asked to perform 3 countermovement jumps (CMJ), 3 squat jumps (SJ) and 3 countermovement jump with arm swing (CMJSA) following a 10-min standardized warm-up. Vertical jump heights assessed by Optojump and My Jump2 application, simultaneously. Jump height in centimetres (cm) and flight time (FT) in seconds (s) were tested. Statistical analysis indicated an almost perfect correlation between two instruments for CMJ, SJ and CMJSA jump heights. FT of CMJ and SJ and CMJSA were also shown almost perfect correlation. Reliability of the measurements (ICC) was perfect for CMJ, SJ and CMJSA jump heights, as well as for SJ and CMJSA FT, and very large for CMJ FT. The results of this study suggest that "My Jump 2" app is a reliable and valid tool for measuring the vertical jump height in young, male basketball athletes.

Keywords: Basketball; Vertical jump; My Jump 2

Introduction

Basketball is one of the most popular team sports worldwide, with about 500 million recreational and elite players who are currently playing the game in 250 countries all over the world (Ziv & Lidor, 2009). It is a fact that the season 2013-2014 basketball was the second most popular team sport in the United States (*Team Sports in the US by Number of Participants 2017*, n.d.) and Australia (*2014-Basketball-ACT-Annual-Report.Pdf*, n.d.) with various participants coming from all ages and genders (Spiteri et al., 2019). What characterizes basketball is that mainly high-intensity activities are

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required, such as sprints and explosive change of directions (Cormery et al., 2008; Galleja-Gonzales et al., 2016). However, vertical jump constitutes the most prevalent action among basketball players, even though it is not considered a high-intensity activity (Ziv & Lidor, 2010). A big number of vertical jumps are repeated during a basketball game both in offence (shooting and passing), as well as in defense (rebounding, stealing and blocking) (Abdelkrim et al., 2007). Nonetheless, athletes are not only required to jump high many times in one single game but also jumping higher than any other of their opponents (Ziv & Lidor, 2010). Thus, coaches and strength and condition coaches aim to improve their players' lower extremities strength and power. However, in order to evaluate the jump height performance, coaches utilize three different types of jumps, which are the most commonly assessed among basketball. The countermovement jump (CMJ), the squat jump (SJ) and the countermovement jump with arms swing (SMJSA) (Haynes et al., 2019).

There are several tools and devises that have been made to measure the vertical jump height and flight time (FT) such as force platforms, contact mats, high speed-cameras and photoelectric cell systems (Haynes et al., 2019). By this time, the laboratory force platforms are considered the "gold standard" for assessing the vertical jump (Vanrenterghem et al., 2001). However, their high price and the fact that the only way for someone to evaluate their jump performance is to visit a laboratory environment, make access to athletes and their trainers almost impossible. Nevertheless, a photoelectric cell system (Optojump photocell system; Microgate, Bolzano, Italy) was created for estimating the vertical jump height and its strong concurrent validity when compared to a force platform has been approved (Attia et al., 2017; Glatthorn et al., 2011). Furthermore, Optojump has been demonstrated as a reliable tool for field-based vertical jump tests comparing to data derived from the force plate. But a slightly lower reliability has been indicated in CMJ (Balsalobre-Fernández et al., 2014). However, despite the high degree of portability and accessibility that it possesses, its high cost still constitutes an inhibitory factor for a basketball team, coaches or players.

Recently, an application named "My Jump 2" released by Apple Inc. (USA) on app store promising that can provide accurate and reliable data for assessing vertical jump height (Coswig et al., 2019). Moreover, it assures that the data can be obtained immediately after the jump performance, allowing basketball coaches monitoring their players in any environment (Carlos-Vivas et al., 2018).

"My Jump 2" app provides valid and reliable jump height results by using the high-speed recording capabilities of the iPhone cells (Apple Inc., USA). The validity and reliability of "My Jump 2" have been demonstrated on primary school children (Bogataj, Pajek, Hadžić, et al., 2020), recreationally active adolescents (Bogataj, Pajek, Andrašić, et al., 2020), cerebral palsy football players (Coswig et al., 2019), trained athletes (Gallardo-Fuentes et al., 2016), sport science students (Carlos-Vivas et al., 2018; Haynes et al., 2019), young recreational athletes (Balsalobre-Fernández et al., 2014; Driller et al., 2017) and elderly people (Cruvinel-Cabral et al., 2018).

Besides, a high reproducibility and reliability of the app's vertical jumps compared to high-speed cameras and force platforms have been previously demonstrated (Balsalobre-Fernández et al., 2014; Cruvinel-Cabral et al., 2018; Gallardo-Fuentes et al., 2016). However, considering the importance of assessing these three different vertical jump heights in basketball and according to the authors' knowledge, no previous studies have assessed the validity and reliability of vertical jump height and flight time derived from "My Jump 2". Therefore, the aim of the present study was to evaluate the reliability and validity of the "My jump 2" application with iPhone XS Max for assessing the CMJ, SJ and CMJSA in young, male basketball players compared to Optojump photoelectric (Glatthorn et al., 2011).

We hypothesized that "My Jump 2" app would indicate high reliability and concurrent validity for measuring vertical jump height when compared to the Optojump system.

Methods

Participants

A total of twenty-seven healthy, young Greek basketball players (167.26 ± 10.33 cm; 61.99 ± 17.63 Kg; 22 ± 3.97 Kg/m2) who play basketball in local basketball teams in Thessaloniki, Greece, volunteered to participate in this research. In addition, all participants had at least one year of jumping training experience, and none of them had a pathological or traumatic history of the lower extremities within 6 months prior to the study. All participants were vocally informed about the research procedure, and they advised for their right to withdraw from the study at any time. Finally, all participants were asked to refrain from high-intensity exercise and resistance training focusing on lower limbs 24h before the testing and during the assessing day.

Assessment tools

Optojump system. The Optojump photoelectric cells system consists of two separate parallel bars placed at the basketball court. Two bars were positioned parallel and horizontal one to another at a distance of 1 meter. In order to quantify the data, Optojump was connected to a personal computer, and the Microgate software (Optojump software, version 3.01.0001) was utilized. Height in centimetres (cm) and Flight time (FT) in seconds (s) were calculated. Finally, Optojump has been indicated as a valid and reliable tool for measuring vertical jump height and has been proposed as an appropriate tool for field-based jump tests (Bogataj, Pajek, Andrašić, et al., 2020; Bogataj, Pajek, Hadžić, et al., 2020).

My Jump 2 application. The application "My Jump 2" for iPhone XS Max was used to calculate the jump height through the high-velocity camera of 240 Hz. The tester manually selected the take-off and landing frame of the video. According to Bosco et al. (Carmelo Bosco, 2010) application calculates the jump height using the following equation eq (1): $h = t2 \times 1.22625$ where h stands for the jump height (in meters) and t for flight time (in seconds). The iPhone was placed 1.5 m in front of the participant according to the manufacturer instructions (Bogataj, Pajek, Andrašić, et al., 2020), on a flexible tripod for mobile phones. All videos were recorded by the same evaluator having no previous experience in professional video analysis.

Stadiometer. Body height was measured with the Seca 213 (Seca 213, SECA, Birmingham, United Kingdom) stadiometer.

Scale. Body mass was measured with the electronic Mi smart scale 2 (Mi smart scale 2, Xiaomi, Beijing, China).

iPhone XS Max. The iPhone XS max was utilized for the installation of My Jump 2 application.

Procedure

All participants have been familiarized with the CMJ, SJ and CMJFA techniques priori assessment procedure. Basketball coaches have trained their athletes of the appropriate technique two weeks before testing by explaining and demonstrating the proper way to perform the jumps. Assessment procedure took place in the same basketball court where players have been familiarized. All athletes carried out a standardized 10 min warm-up consisted of skipping, jogging, vertical jumps and lower body dynamic stretches similar to warm-up protocols applied in previous studies (Balsalobre-Fernández et al., 2014; Bogataj, Pajek, Andrašić, et al., 2020; Brooks et al., 2018). Then, each participant was asked to perform three CMJs, SJS and CMJSAs as high as they could with a 90-sec passive rest between jump repetitions and a 5-min passive rest between jump trials (Attia et al., 2017). Each trial simultaneously recorded with the Optojump devise and with My Jump 2 app installed on an iPhone XS Max.

Countermovement jump performance. Athletes were asked to stand in an upright position in the center of the infrared timing system with their feet approximately shoulder-width apart and their hands on the hips for avoiding arm swings. After that, they should lower themselves to a self-selected depth, and jump for maximal height as possible, with no pause between eccentric and concentric movements, landing on their both legs.

Squat jump performance. Participants were advised to initiate in an isometric squat, with approximately 90o knee angle position from the center of the infrared timing system with feet to shoulder-width apart and hands placed on hips for avoiding arm swings. Then, players performed a concentric only action jumping vertically, landing on their both legs.

Countermovement jump with arm swing performance. Athletes were asked to stand in an upright position in the center of the infrared timing system with their feet approximately shoulder-width apart, and their hand was positioning free close to the body. They were then asked to lower themselves to a self-selected depth and jump for maximal height as height as possible with arm swing, and with no pause between eccentric and concentric movements. Finally, they landed on both legs.

Statistical analysis

Several statistical analyses were conducted to determine the reliability and validity of My Jump 2 app. Descriptive statistics with means and standard deviations were used to describe the sample characteristics. Moreover, the Shapiro-Wilk test was conducted to assess the normality of the data. To test the validity of the app, Lin's concordance correlation coefficient was applied on normally distributed data. The strength of association between the instruments was assessed according to the following criteria: ≤0.1 trivial, 0.1–0.3 small, 0.3–0.5 moderate, 0.5–0.7 large, 0.7–0.9 very large, and ≥0.9 almost perfect (Buchheit et al., 2010; Hopkins et al., 2001; O'Donnell et al., 2018; Rago et al., 2018). In addition, the Blond-Altman plots were conducted to test the level of agreement between the two devices (Bland & Altman, 2010).

To analyze the reliability of My Jump 2 app for evaluating the jump height compared to Optojump system, the two-way random intraclass-correlation coefficient (ICC) with absolute agreement was used (Martín Acero et al., 2011). ICC was interpreted as ≤0.1 trivial, 0.1–0.3 small, 0.3–0.5 moderate, 0.5–0.7 large, 0.7–0.9 very large, and ≥0.9 almost perfect (Buchheit et al., 2010; O'Donnell et al., 2018; Rago et al., 2018). To analyze the stability of the app when assessing the 3 jumps in 3 different

jump types of each participant, Cronbach's α and the coefficient variation (CV) was utilized. All analyses were performed using SPSS 25 for Mac OS (IBM, Armonk, NY, USA). The level of statistical significance Alpha was set at $p < 0.05$.

Results

Validity

All data were considered normally distributed ($p > 0.05$). Perfect correlation was indicated between two instruments for CMJ (r = 0.99; $p < 0.01$), SJ (r = 0.99; $p < 0.01$) and CMJSA (r = 0.90; $p < 0.01$). Furthermore, almost perfect correlation was presented for flight time between two tools for CMJ (r = 0.99; $p < 0.01$), SJ (r = 0.99; $p < 0.01$) and CMJSA (r = 0.99; $p < 0.01$). All data are indicated in Table 1 and Table 2 (Tab. 1, Tab. 2).

Table 1. Descriptive statistics and validity analysis regarding jump height (cm)

	Mean Optojump	My Jump 2	rc	Rating
CMJ	18.52 ± 5.63	18.53 ± 5.65	0.99*	Perfect
SJ	19.24 ± 5.41	19.27 ± 5.32	0.99*	Perfect
CMJSA	23.67 ± 5.43	23.78 ± 6.22	0.90*	Perfect

*$p < .05$

Table 2. Descriptive statistics and validity analysis regarding flight time (s).

	Mean Optojump	My Jump 2	rc	Rating
CMJ	0.384 ± 0.06	0.384 ± 0.06	0.99*	Perfect
SJ	0.392 ± 0.06	0.392 ± 0.05	0.99*	Perfect
CMJSA	0.435 ± 0.05	0.439 ± 0.06	0.99*	Perfect

*$p < .05$

Reliability

Almost perfect levels of agreement were shown between two random selected jump repetitions of each trial assessed using "My Jump 2" for CMJ (ICC = 0.91; 95%CI = 0.79 – 0.96; $p < 0.01$), SJ (ICC = 0.95; 95%CI = 0.89 – 0.98; $p < 0.01$) and CMJSA (ICC = 0.97; 95%CI = 0.94 – 0.99; $p < 0.01$). Moreover, near perfect agreement was indicated in flight times of SJ (ICC = 0.96; 95%CI = 0.91 – 0.98; $p < 0.01$) and CMJSA (ICC = 0.98; 95%CI = 0.95 – 0.99; $p < 0.01$) while CMJ presented a very

large agreement between jump repetitions (ICC = 0.88; 95%CI = 0.75 – 0.95; $p < 0.01$) (Tab. 3, Tab. 4).

My Jump 2 application presented good intra-session reliability of the jump height of CMJ (α = 0.911q; CV = 12%), SJ (α = 0.974; CV = 12%) and CMJSA (α = 0.972; CV = 10%). Good intra-session reliability indicated also of flight time of SJ (α = 0.971; CV = 6%) and of CMJSA (α = 0.974; CV = 8%), whereas CMJ showed a good (α = 0.903; CV = 7%) intrasession reliability (Tab. 3, Tab. 4). However, the CV value for FT of CMJ was bordering on unacceptable, whereas FT of SJ and CMJSA was considered unacceptable according to previous studies suggested that for biomechanical variables a CV of ≤ 10 of is reliable (Cormack, Newton, McGulgan, & Doyle, 2008).

Table 3. Reliability analysis regarding jump height (cm).

	ICC	α	CV%
CMJ	0.91 (0.79 – 0.96)	0.911	12%
SJ	0.95 (0.89 - 0.98)	0.974	12%
CMJSA	0.97 (0.94 - 0.99)	0.972	10%

Table 4. Reliability analysis regarding flight time (s).

	ICC	α	CV%
CMJ	0.88 (0.75 - 0.95)	0.903	6%
SJ	0.94 (0.87 - 0.98)	0.971	8%
CMJSA	0.98 (0.95 - 0.99	0.974	7%

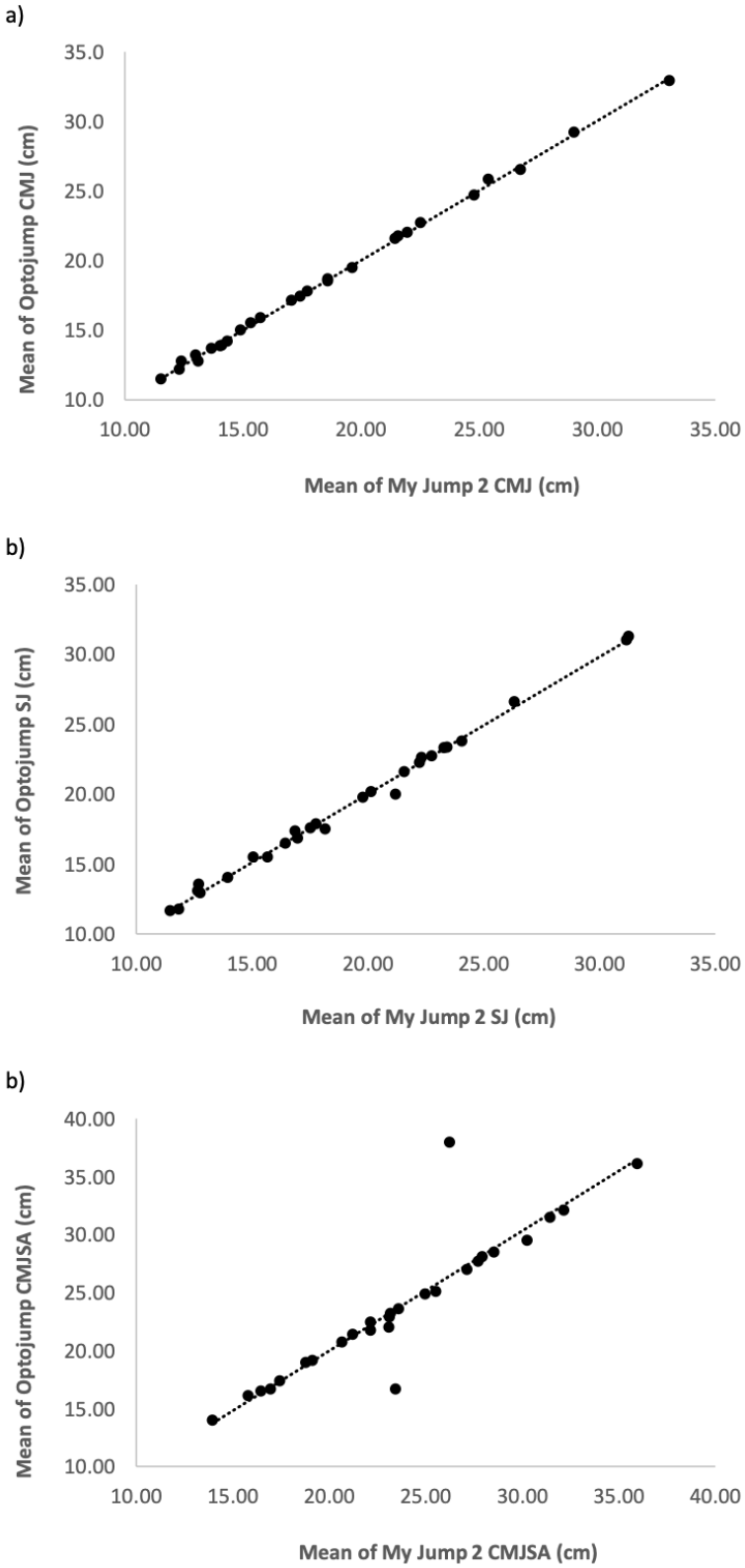

Figure 1. Lin's concordance correlation coefficient for jump height derived from Optojump and My Jump 2 application. a) countermovement jump, b) squat jump, c) countermovement jump with swing arms.

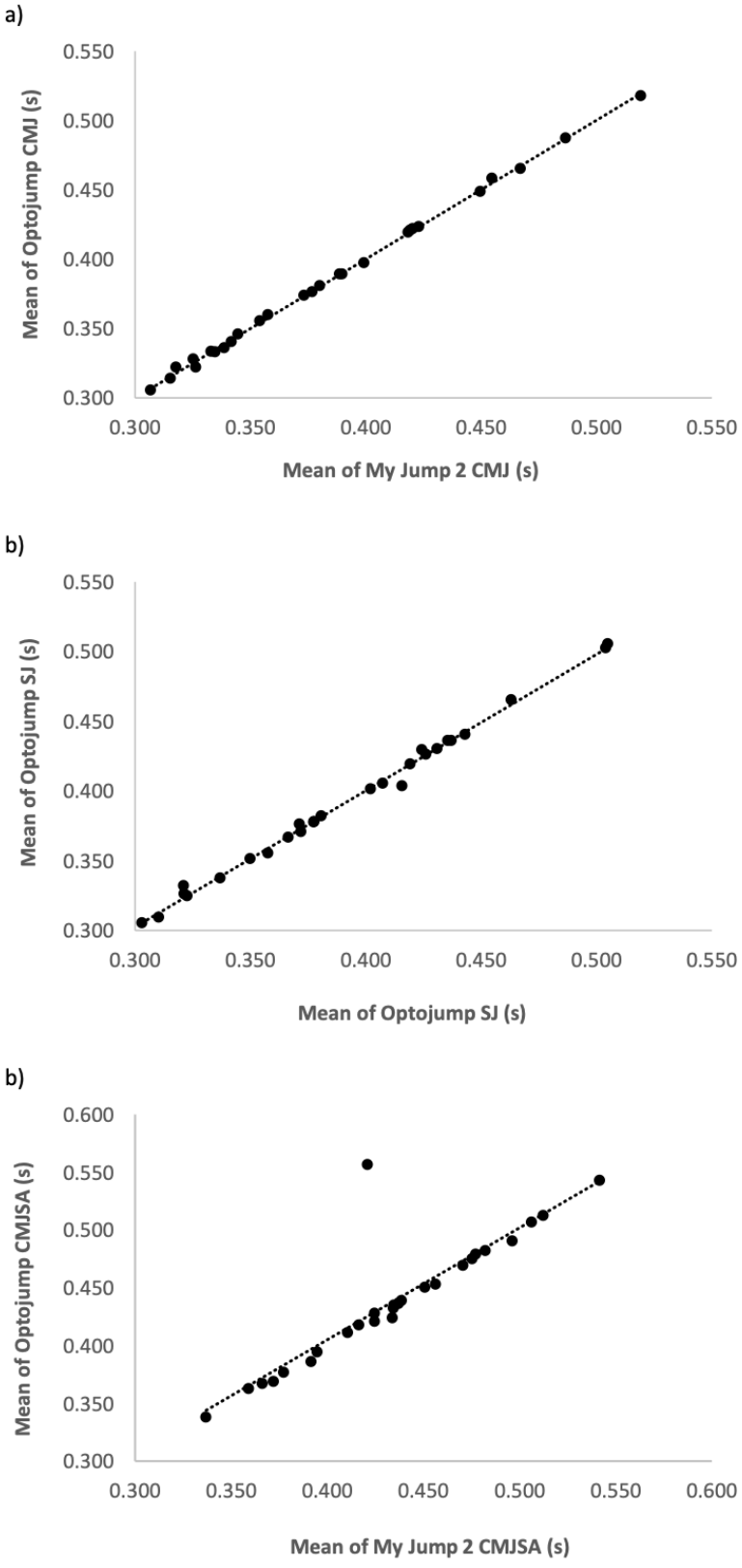

Figure 2. Lin's concordance correlation coefficient for flight time derived from Optojump and My Jump 2 application. a) countermovement jump, b) squat jump, c) countermovement jump with swing arms.

Discussion

The primary purpose of this study was to examine the validity and reliability of "My Jump 2" application for assessing the jump height of three different vertical jumps such as CMJ, SJ and CMJSA on young, male basketball players compared to a valid and reliable instrument, called Optojump (Optojump photocell system; Microgate, Bolzano, Italy). The major findings of this study were that My Jump 2 app constitutes a valid and reliable tool for measuring the vertical jump height in young, male basketball players similar to the photoelectric cell system.

The almost perfect agreement shown between My Jump 2 app and the Optojump in CMJ, SJ and CMJSA, both in JH and FT, all suggested the validity and reliability of the app for measuring the jump height. Moreover, Lin's concordance correlation coefficient plots (Fig. 1, Fig. 2) also reinforced that suggestion by portraying that strong agreement. Intraclass-correlation was measured for each method in order to check the reliability of the different types of measures and between the two methods to verify the validity of My Jump 2 when it was compared with the Optojump system. The main findings seen was the almost perfect correlation between two instruments for measuring the vertical JH and FT of CMJ, SJ and CMJSA**.** These findings support that although the take-off and landing frames are manually selected, My Jump 2 accurately measures the jump height and flight time.

Our results are in agreement with 2 other studies that supported investigated the reliability and validity of My Jump 2 application in vertical jumps (Bogataj, Pajek, Hadžić, et al., 2020; Coswig et al., 2019). Bogataj et al. (2020) tested the validity and reliability of "my Jump 2" app compared with Optojump. Forty-eight primary school children were recruited to perform three CMJs, SJs and CMJSAs. High reliability (ICC > 0.89) and very large correlation for CMJ (r = 0.97; p = 0.001), SJ (r = 0.97; p = 0.001), and CMJSA (r = 0.99; p = 0.001) were observed (Bogataj, Pajek, Hadžić, et al., 2020). Thus, the authors suggested that vertical jump height could be easily assessed and it was reproducible and reliable through the app.

Furthermore, Coswig et al., (2019) (Coswig et al., 2019) tested 2 different types of vertical jumps, the CMJ and SJ, in a sample constituted by 40 professionals cerebral palsy football players. In this study, authors compared the My Jump 2 app with contact mat observing a strong correlation between two methods for JH of CMJ (r = 0.95) (Coswig et al., 2019). Similarly, our results showed an almost perfect correlation between My Jump2 and Optojump for CMJ JH (r = 0.99).

My Jump2 application also indicated consistent measures between the three types of a vertical jump performed. From the jump assessed, excellent Cronbach's α scores were observed in both JH and FT, supported high internal consistency between jumps. The CV between JH for CMJ, SJ and CMJSA measured was high, while for FT of CMJ, SJ and CMSA measured as low. The slightly larger variation in FT measurements could be due to the players' varying chronological and biological ages resulting in their jump performance.

This study has several limitations to be acknowledged. One possible limitation is that SJ is not a part of a basketball training session and does not constitute a vertical jump performed in basketball. Therefore, the correct performance by athletes cannot be assured. Furthermore, despite the iPhone XS MAX's improvement frame rate at 240 fps, it is still possible that few milliseconds from landing and take-off frames could be lost. Moreover, the players' biological age was not taken into consideration affecting probably the JH outcome. Finally, one of the most important limitations is the human factor. Most of the evaluators are not experienced with video analysis; therefore, the height of each jump is possible to be changed despite the fact that the video remains the same.

Practical applications

According to the findings of this study "My Jump 2" applications is a reliable and valid instrument for assessing the jump height of young, basketball players. Moreover, it is very simple to manage and transfer the mobile phone on a basketball court, thus allowing basketball coaches and practitioners to enhance their athletes' performance and get more reliable measures.

Conclusion

To conclude, "My Jump 2" application showed high reliability and validity to assess the CMJ, SJ and CMJSA height and flight time in young, male basketball players. Furthermore, we consider that this study could encourage people engaged in basketball to utilize My Jump 2 app to monitor the jump performance and have a better view of players' condition and training procedure.

References

2014-Basketball-ACT-Annual-Report.pdf. (n.d.). Retrieved January 1, 2021, from http://www.basketballact.com.au/wp-content/uploads/2015/07/2014-Basketball-ACT-Annual-Report.pdf

Abdelkrim, N. B., El Fazaa, S., & El Ati, J. (2007). Time-motion analysis and physiological data of elite under-19-year-old basketball players during competition. *British Journal of Sports Medicine*, *41*(2), 69–75.

Attia, A., Dhahbi, W., Chaouachi, A., Padulo, J., Wong, D. P., & Chamari, K. (2017). Measurement errors when estimating the vertical jump height with flight time using photocell devices: The example of Optojump. *Biology of Sport*, *34*(1), 63–70.

Balsalobre-Fernández, C., Tejero-González, C. M., del Campo-Vecino, J., & Bavaresco, N. (2014). The Concurrent Validity and Reliability of a Low-Cost, High-Speed Camera-Based Method for Measuring the Flight Time of Vertical Jumps: *Journal of Strength and Conditioning Research*, *28*(2), 528–533.

Bland, J. M., & Altman, D. G. (2010). Statistical methods for assessing agreement between two methods of clinical measurement. *International Journal of Nursing Studies*, 6.

Bogataj, Š., Pajek, M., Andrašić, S., & Trajković, N. (2020). Concurrent validity and reliability of my jump 2 app for measuring vertical jump height in recreationally active adults. *Applied Sciences (Switzerland)*, *10*(11).

Bogataj, Š., Pajek, M., Hadžić, V., Andrašić, S., Padulo, J., & Trajković, N. (2020). Validity, Reliability, and Usefulness of My Jump 2 App for Measuring Vertical Jump in Primary School Children. *International Journal of Environmental Research and Public Health*, *17*(10), 3708.

Brooks, E. R., Benson, A. C., & Bruce, L. M. (2018). Novel Technologies Found to be Valid and Reliable for the Measurement of Vertical Jump Height With Jump-and-Reach Testing: *Journal of Strength and Conditioning Research*, *32*(10), 2838–2845.

Buchheit, M., Spencer, M., & Ahmaidi, S. (2010). Reliability, Usefulness, and Validity of a Repeated Sprint and Jump Ability Test. *International Journal of Sports Physiology and Performance*, *5*(1), 3–17.

Carlos-Vivas, J., Martin-Martinez, J. P., Hernandez-Mocholi, M. A., & Perez-Gomez, J. (2018). Validation of the iphone app using the force platform to estimate vertical jump height. *Journal of Sports Medicine and Physical Fitness*, *58*(3), 227–232.

Carmelo Bosco, P. L. and P. V. K. (2010). How to construct an artificial stomach. *American Biology Teacher*, *72*(7), 444–446.

Cormery, B., Marcil, M., & Bouvard, M. (2008). Rule change incidence on physiological characteristics of elite basketball players: A 10-year-period investigation. *British Journal of Sports Medicine*, *42*(1), 25–30.

Coswig, V., Silva, A. D. A. C. E., Barbalho, M., Faria, F. R. D., Nogueira, C. D., Borges, M., Buratti, J. R., Vieira, I. B., Román, F. J. L., Gorla, J. I., & Gorla, J. I. (2019). Assessing the Validity of the MyJump2 App for Measuring Different Jumps in Professional Cerebral Palsy Football Players: An Experimental Study. *JMIR MHealth and UHealth*, *7*(1), e11099.

Cruvinel-Cabral, R. M., Oliveira-Silva, I., Medeiros, A. R., Claudino, J. G., Jiménez-Reyes, P., & Boullosa, D. A. (2018). The validity and reliability of the "my Jump App" for measuring jump height of the elderly. *PeerJ*, *2018*(10), 1–13.

Driller, M., Tavares, F., McMaster, D., & O'Donnell, S. (2017). Assessing a smartphone application to measure counter-movement jumps in recreational athletes. *International Journal of Sports Science & Coaching*, *12*(5), 661–664.

Gallardo-Fuentes, F., Gallardo-Fuentes, J., Ramírez-Campillo, R., Balsalobre-Fernández, C., Martínez, C., Caniuqueo, A., Cañas, R., Banzer, W., Loturco, I., Nakamura, F. Y., & Izquierdo, M. (2016). Intersession and Intrasession Reliability and Validity of the My Jump App for Measuring Different Jump Actions in Trained Male and Female Athletes: *Journal of Strength and Conditioning Research*, *30*(7), 2049–2056.

Galleja-Gonzales, J., Terrados, N., Mielgo-Ayuso, J., Delextrat, A., Jukic, I., Vaquera, A., Torres, L., Schelling, X., Stojanovic, M., & Ostojic, S. M. (2016). Evidence-based post-exercise recovery strategies in basketball. *Physician and Sportsmedicine*, *44*(1), 74–78.

Glatthorn, J. F., Gouge, S., Nussbaumer, S., Stauffacher, S., Impellizzeri, F. M., & Maffiuletti, N. A. (2011). Validity and Reliability of Optojump Photoelectric Cells for Estimating Vertical Jump Height: *Journal of Strength and Conditioning Research*, *25*(2), 556–560.

Haynes, T., Bishop, C., Antrobus, M., & Brazier, J. (2019). The validity and reliability of the My Jump 2 app for measuring the reactive strength index and drop jump performance. *Journal of Sports Medicine and Physical Fitness*, 253–258.

Hopkins, W. G., Schabort, E. J., & Hawley, J. A. (2001). Reliability of power in physical performance tests. *Sports Medicine*, *31*(3), 211–234.

Martín Acero, R., Fernández-del Olmo, M., Andrés Sánchez, J., Luis Otero, X., Aguado, X., & Rodríguez, F. A. (2011). Reliability of squat and countermovement jump tests in children 6 to 8 years of age. *Pediatric Exercise Science*, *23*(1), 151–160.

O'Donnell, S., Tavares, F., McMaster, D., Chambers, S., & Driller, M. (2018). The validity and reliability of the GymAware linear position transducer for measuring counter-movement jump performance in female athletes. *Measurement in Physical Education and Exercise Science*, *22*(1), 101–107.

Rago, V., Brito, J., Figueiredo, P., Carvalho, T., Fernandes, T., Fonseca, P., & Rebelo, A. (2018). Countermovement Jump Analysis Using Different Portable Devices: Implications for Field Testing. *Sports*, *6*(3), 91.

Spiteri, T., Binetti, M., Scanlan, A. T., Dalbo, V. J., Dolci, F., & Specos, C. (2019). Physical Determinants of Division 1 Collegiate Basketball, Women's National Basketball League, and

Women's National Basketball Association Athletes: With Reference to Lower-Body Sidedness. *Journal of Strength and Conditioning Research*, *33*(1), 159–166.

Team sports in the US by number of participants 2017. (n.d.). Statista. Retrieved January 1, 2021, from https://www.statista.com/statistics/190273/number-of-participants-in-team-sports-in-the-us-in-2009/

Vanrenterghem, J., De Clercq, D., & Cleven, P. V. (2001). Necessary precautions in measuring correct vertical jumping height by means of force plate measurements. *Ergonomics*, *44*(8), 814–818.

Ziv, G., & Lidor, R. (2009). Physical attributes, physiological characteristics, on-court performances and nutritional strategies of female and male basketball players. *Sports Medicine*, *39*(7), 547–568.

Ziv, G., & Lidor, R. (2010). Vertical jump in female and male basketball players-A review of observational and experimental studies. *Journal of Science and Medicine in Sport*, *13*(3), 332–339.

ΑΘΛΗΣΗ & ΚΟΙΝΩΝΙΑ
ΠΕΡΙΟΔΙΚΟ ΑΘΛΗΤΙΚΗΣ ΕΠΙΣΤΗΜΗΣ

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Η αξιοπιστία και εγκυρότητα της εφαρμογής My Jump2 σε σύγκριση με το Optojump για την μέτρηση του κατακόρυφου άλματος σε νεαρούς, έφηβους καλαθοσφαιριστές

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[5]SportsClinic

Περίληψη

Σκοπός της παρούσας μελέτης ήταν να εξετάσει την εγκυρότητα και την αξιοπιστία της εφαρμογής My Jump 2, σε σύγκριση με το Optojump, για την αξιολόγηση τριών ειδών κατακόρυφου άλματος σε νεαρούς, έφηβους καλαθοσφαιριστές. 27 νέοι, έφηβοι καλαθοσφαιριστές (ύψος: 167.26±10.33 cm, Βάρος: 61.99±3.97 kg, ΔΜΣ: 22±3.97 Kg/m2) τοπικών ομάδων της Θεσσαλονίκης, δέχθηκαν να συμμετάσχουν εθελοντικά. Οι αθλητές εκτέλεσαν 3 κατακόρυφα άλματα με τα χέρια στην μεσολαβή (CMJ), 3 κατακόρυφα άλματα χωρίς την φάση της προ-ενεργοποίησης των μυών των κάτω άκρων (SJ) και 3 κατακόρυφα άλματα με τα χέρια ελεύθερα (CMJSA), έπειτα από 10-λεπτη προθέρμανση. Μεταξύ των επαναλήψεων υπήρχε παθητική αποκατάσταση 90 δευτερολέπτων και μεταξύ των σετ 5 λεπτη αποκατάσταση. Τα άλματα μετρήθηκαν με τα δύο συστήματα ταυτόχρονα. Το ύψος του άλματος (JH) και ο χρόνος πτήσης (FT) αξιολογήθηκαν. Η στατιστική ανάλυση παρουσίασε σχεδόν τέλεια συσχέτιση μεταξύ των δύο συσκευών για το JH σε όλα τα άλματα. Επίσης, φάνηκε σχεδόν τέλεια συσχέτιση μεταξύ των δύο συσκευών για το FT στο CMJ, SJ και CMJSA. Σχεδόν τέλειος βαθμός συμφωνίας παρατηρήθηκε στο JH και FT μεταξύ των μετρήσεων στις επαναλήψεις των αλμάτων, εκτός από το FT του CMJ που ήταν πολύ μεγάλος. Επομένως, η εφαρμογή My Jump 2 είναι ένα αξιόπιστο και έγκυρο εργαλείο για την αξιολόγηση του κατακόρυφου άλματος.

Λέξεις κλειδιά: Καλαθοσφαίριση, κατακόρυφο άλμα, My Jump 2.

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