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Physical performance according to body fat percentage and fat-free mass in Chilean young amateur soccer players

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ABSTRACT

Objective: This study compared physical performance according to body fat percentage and fat-free mass in young amateur soccer players. Secondly, to analyze whether there is a correlation between body fat percentage and fat-free mass with physical performance.

Methods: This is a cross-sectional study in which 65 youth amateur soccer players with a mean age of 16.8±5.14 years, distributed between below mean and above mean body fat percentage and fat-free mass, were analyzed.

Results: The main results indicate the lower ball kicking speed dominant foot in players with above average body fat percentage (p=0.01; d=3.90; effect very large) and 20 m sprint ball (p=0.02; d=1.40 effect very large). While in fat-free mass above the mean in squat jump (p=0.00; d=1.70; effect very large), drop jump (p=0.00; d=1.91, very large effect), 10 m sprint ball (p=0.00; d=1.20; very large effect), 20 m sprint (p=0.00; d=0.83; very large effect), 20 m sprint ball (p=0.00; d=1.40; very large effect), foot dominant ball kicking speed (p=0.00; d=3.90; very large effect) and non-dominant ball foot kicking speed (p=0.00; d=2.80; very large effect).

Conclusion: An above-average fat-free mass and below body fat percentage in young amateur soccer players leads to better jump performance, sprint speed, and ball-kicking speed.

KEYWORDS

Body Composition, Nutritional evaluation, Sports nutrition, Anthropometric monitoring, Youth Sports.

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INTRODUCTION

Soccer is one of the most played sports due to its high adaptability to space and multiple players[1], simplicity of rules, and low cost of participation, where millions of children and young people play it worldwide[1]. On the field of play in official matches, high-intensity actions are executed intermittently with short recovery periods, aiming to score a goal[2,3]. Most of the movements within the field of play are preceded by linear speed (45%) as vertical jumps (16%)[4-6], associated with high levels of muscle strength, power, and sprint speed, determinant factors for successful participation in youth and adult soccer players[4-6]. While physical performance in the previously mentioned actions is vital in soccer, body composition (body fat percentage and fat-free mass) is crucial to reach an optimal physical level, which can be translated into a good performance of play[7]. Physical performance and body composition may vary at different ages, sexes, and competition levels (amateur, semi-professional, professional and/or elite)[8-10].

In the study conducted by Matsumoto, Ishizaka[11] on youth amateur soccer players in Japan, significant differences are reported in a lower body fat percentage (BFP, $p < 0.05$) for U-15 players compared to U-19, with a higher fat-free mass (FFM, $p < 0.01$) for U-19 concerning U-15. In the study of Márquez, Gómez-Álvarez[12] on Chilean players from Chillan, there is a significantly higher vertical jump height in favor of professional soccer players in countermovement jump (CMJ, $p = 0.0001$) and squat jump (SJ, $p = 0.0001$) in comparison with university soccer players. In a study conducted by Zanini, Kuipers[13] on U-12 and U-13 semi-professional male soccer players from Chapecoense, Brazil, it was reported that a lower BFP was related to better aerobic capacity (r = -0.41; $p = 0.006$), and lower limb muscle strength (r = -040; $p = 0.003$). Similarly, Hilgemberg, Hilgemberg[14] in adult professional soccer players showed negative and significant correlations between BFP with CMJ (r = -.0. 73; $p = 0.011$), SJ (r = -0.87; $p = 0.0001$), and CMJ-Arms r = -0.70; $p = 0.03$), while in FFM with CMJ (r = 0.74; $p = 0.001$), SJ (r = 0.82; $p = 0.001$), and Abalakov (r =0.70; $p = 0.03$). However, in a study conducted by Akdoğan, Heper[15] in Turkish amateur male soccer players, there was no significant correlation between BFP with SJ (r = -0.426; $p = 0.100$) and CMJ (r = -0.432; $p = 0.095$) as well as FFM with SJ (r = -363; $p = 0.14$) and CMJ (r = -.313; $p = 0.238$). In the Stanković, Čaprić[16] study of elite female soccer players, only significant correlations were found between BFP and SJ (r = -0.53; $p = 0.02$), with no significant correlations with CMJ (r = -0.39; $p = 0.09$). No significant correlations were found between FFM with SJ (r = 0.21; $p = 0.38$) and CMJ (r = -0.01; $p = 0.97$).

While there is evidence of the relationship between body composition and physical performance at different competition levels in amateur, semi-professional, professional, and elite soccer players of different ages and sexes, these results are unclear[13-16]. Considering that body composition and physical performance may vary according to the competitive level as well as the country of origin of the soccer player[7,17]. This study compared physical performance according to BFP and FFM in youth amateur soccer players. Secondly, to analyze whether there is a correlation between BFP and FFM with physical performance. It is hat above-average FFM leads to better physical performance in jump performance, running sprint speed, and ball-kicking speed assessments in young amateur soccer players[11,14].

METHODS

Study design

This study presents a cross-sectional, descriptive, and comparative correlational design by convenience sampling. Soccer players from the amateur soccer league of Osorno, Chile, were invited to participate in this research. Measurements of BFP, FFM, SJ, CMJ, drop jump (DJ), 10 m sprint speed, 20 m sprint speed with and without the ball, and ball kicking speed with both feet were performed. Body composition measurements were performed in the laboratory fasting in the morning under controlled conditions with a temperature between 21 °C and 24 °C, using 8-point touch bioimpedance (InBody 570®, Seoul, South Korea). While physical performance measurements were performed in the afternoon at the same place. For all physical performance tests, a familiarization session was carried out at a submaximal level and on the days that the physical performance tests were taken, they were performed at maximum intensities prior to a standardized warm-up for each test. These were carried out during the Osorno Amateur Soccer League's inaugural season, 2024 Chile; this is presented in Figure 1.

Participants

The sample size calculation indicates that the ideal number of participants is 61 young male amateur soccer players[18]. An alpha level (α) of 0.05 was considered, with a power of 85% (β) and a large effect size (d = 0.80). The G*Power software (version 3.1.9.6, Franz Faul, Universiät Kiel, Kiel, Germany) was used to calculate statistical power. 65 soccer players (16.8 ± 5.14 years) distributed according to BFP and FFM (below average and above average) were selected. Those who did not play soccer as a career and/or were members of lower divisions of professional teams were regarded as amateur football players. The following were the requirements for inclusion: (i) playing soccer at an amateur level, (ii) having played soccer for at least two years, and (iii) not receiving medical attention for an injury. The following were the criteria for exclusion: (i) playing soccer professionally or at an elite level, (ii) participating in any other sport, (iii) playing for multiple soccer clubs, (iv) receiving any medication that may impact physical performance or change body composition, and (v) using any sports supplements that may enhance physical performance. The sample selection procedure is depicted in Figure 2.

By signing an informed consent form or an assent form, all participants' proxies accepted the conditions of data handling and use, allowing their use for scientific research. The Scientific Ethics Committee of the Universidad Autónoma de Chile reviewed and approved the study protocol (approval number: 126/18). The protocol was developed under the recommendations of the Declaration of Helsinki for research involving human subjects.

Anthropometric and body composition

Bipedal height was measured using a stadiometer (Seca model 220, SECA, Hamburg, Germany; accuracy to 0.1 cm), and body weight was calculated using a mechanical scale (Scale-tronix, Chicago, IL, USA; accuracy to 0.1 kg) while wearing the barest minimum of clothing. The BFP and FFM were calculated using tetrapolar bioimpedance (InBody 570®, Seoul, South Korea) with eight tactile point electrodes. The

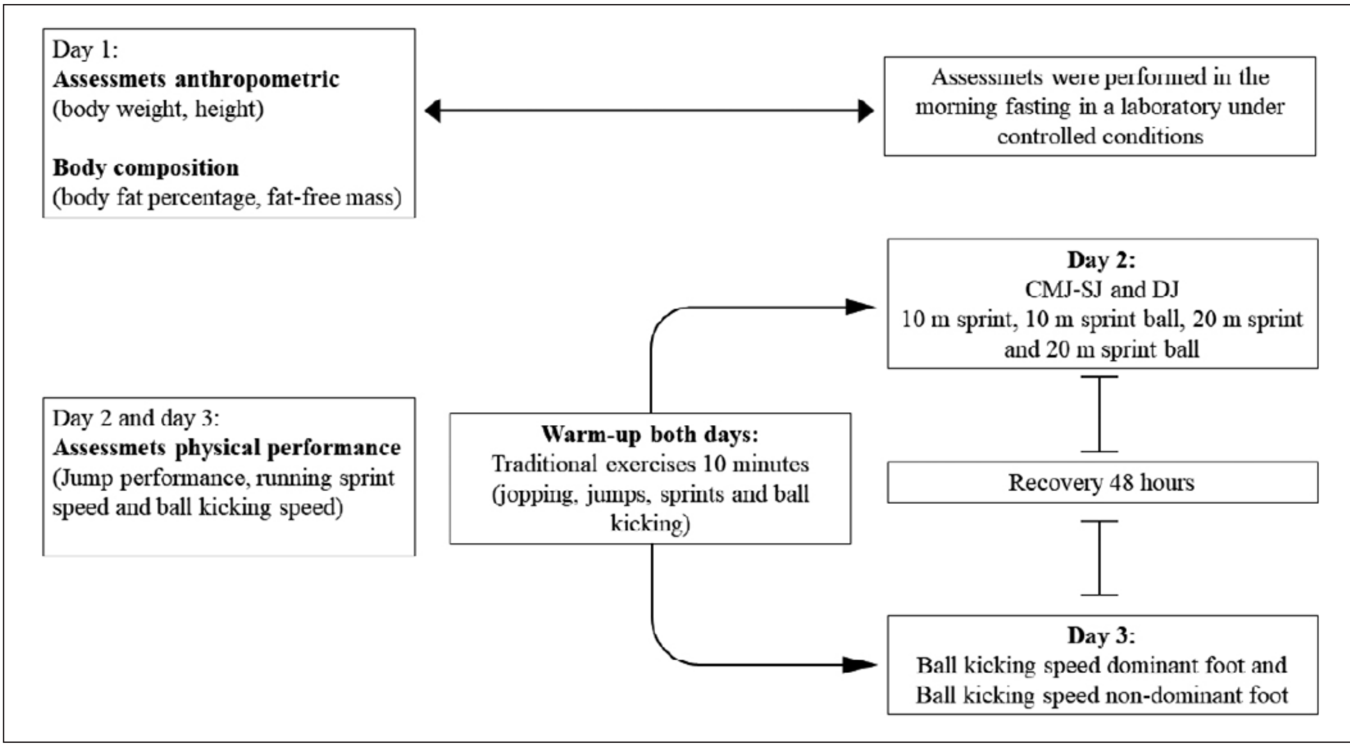


Figure 1. Procedure for measuring body composition and physical performance in youth male amateur soccer players

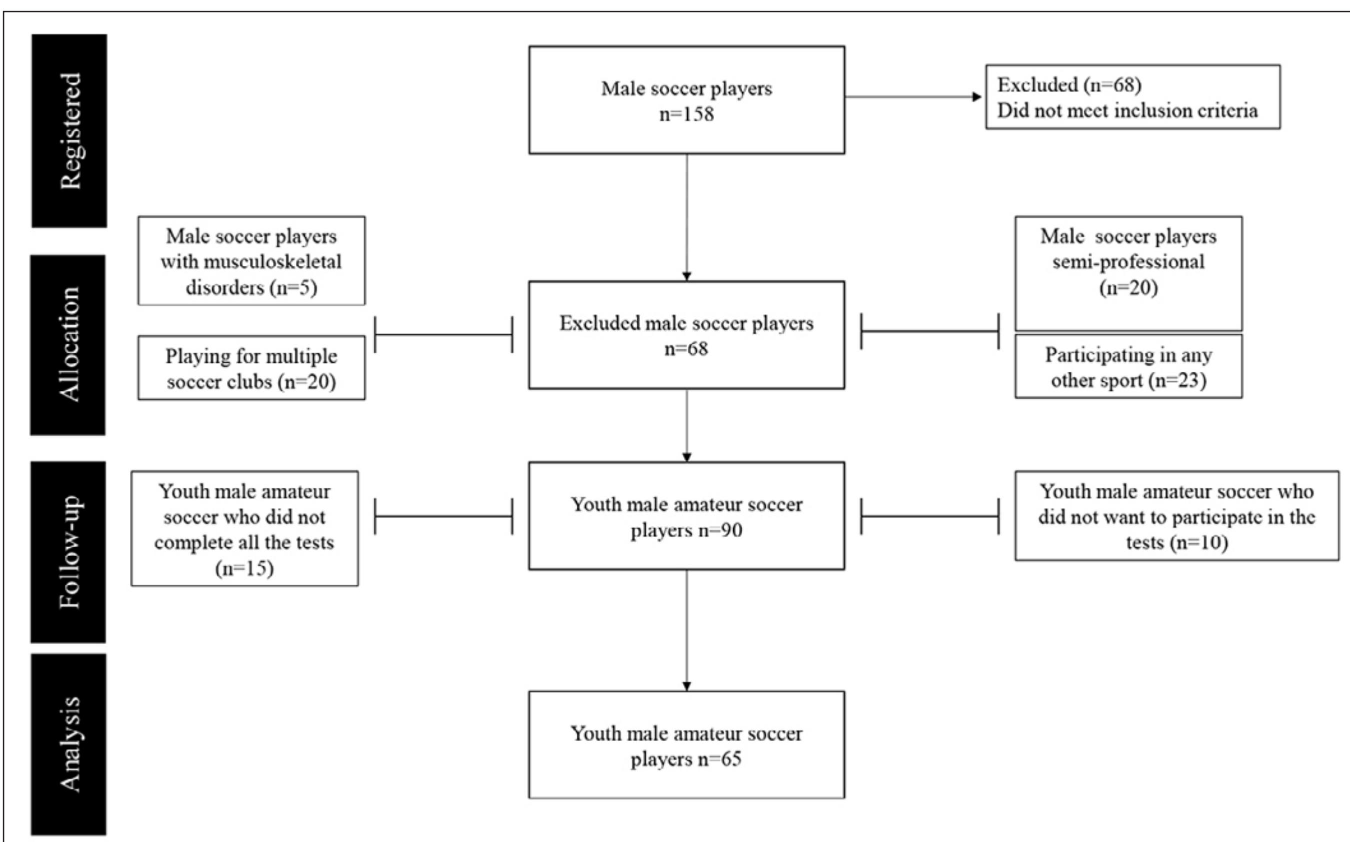


Figure 2. Flowchart of the recruitment process

International Society for the Advances in Kinanthropometry (ISAK) recommendations were followed for each measurement[19-20]. The evaluators were certified by ISAK at level 1.

Jump performance

All jumping tests were performed according to previous recommendations (21). For the CMJ, soccer players executed maximal effort jumps on an Ergojump® Globus mobile contact platform (ErgoTest, Codogne, Italy) with arms over the iliac crests. Take-off and landing were standardized at the exact location, and players executed full knee and ankle extensions during the flight phase. For the SJ, the players stepped on the contact platform with arms over the iliac crest and a semi-flexed knee position at a 90° angle and the "stop" signal; the player maintained this posterior position, performing the maximum jump. The take-off and landing were standardized at the exact location, and the players executed total knee and ankle extensions during the flight phase. In the DJ test, participants were instructed to minimize ground contact time (<250 ms) after descending from a 20-cm box[22]. The best of three jumps (with a 1-minute rest between each attempt) was recorded in CMJ, SJ, and DJ. The data obtained for SJ, CMJ, and DJ were determined to have a high reliability of 0.95.

Running sprint speed

Sprint speed time was assessed to an accuracy of 0.01 s using Brower® Timing System (Salt Lake City, Utah, USA) single beam timing gates. Soccer players started by placing the preferred toe behind the starting line. The running sprint speed started when the player initiated the test, automatically triggering the timing. Timing gates were placed at the start (0.3 m in front of the athlete) and at the 10 m and 20 m sprints. They were positioned ~0.7 m above the ground (approximately hip height). This system allows capturing the movement of the trunk and not a false triggering of a limb. Three sprints were performed, recording the best of the three with a 1-minute rest between each attempt, both with and without a ball[23]. This test was carried out with the shoes used in soccer matches and, on the field, played on synthetic grass using soccer (Molten Vantaggio 5000®, FIFA PRO certified, Hiroshima, Japan). The data obtained for the maximum speed at 10 m and 20 m sprint speed was determined to have a high reliability of 0.96.

Ball kicking speed

Participants performed a maximal instep ball strike with their dominant and non-dominant foot after a two-stride run using a size five soccer ball (Molten Vantaggio 5000®, FIFA PRO certified, Hiroshima, Japan). Maximum speed was measured with a Radar Gun Speed SR3600 (Sports Radar®, Homosassa, Florida, United States of America). Three attempts were carried out, recording the best of the three attempts with a 1-minute rest between each attempt[18]. The data obtained for ball kicking speed was determined to have a high reliability of 0.96.

Statistical analysis

Mean and standard deviation (SD; ±) were used to present descriptive statistics. The Shapiro-Wilk test was used to determine the normality of the data, while the Levene's test was used to determine the homogeneity of variance. A normal distribution was observed in the data; with homogeneity of distinct variances. Therefore, to compare the below mean and above mean BFP and FFM of youth amateur soccer players with physical performance, Student's t-test for independent samples was used. To determine the correlation between BFP and FFM with physical performance, Pearson's r for bivariate samples was used, considering the correlation as minimal (0.00-0.20), low (0.20-0.40), moderate (0.40-0.60), large (0.60-0.80) and very large (0.80-1.00)[24]. Effect size (ES) was calculated using Cohen's d[25], considering a small (≥0.2), moderate (≥0.5), or large (≥0.8) effect. The α level was set at $p < 0.05$ for statistical significance. Data were analyzed using SPSS 25.0 statistical software (SPSS 25.0 for Windows, SPSS Inc., Chicago, IL, USA).

RESULTS

Body composition was adjusted according to the average of young amateur soccer players to compare physical performance in jumping, speed and kicking tests. These results are presented in Table 1.

By adjusting the BFP 60% below the mean and 40% above the mean, which was 16.8% BFP, those below the mean showed better performance in running sprint speed and ball kicking speed. Among the main results we observed a lower ball kicking speed with the dominant foot in favor of players with above-average BFP (d = 0.98; large effect), these differences being significant ($p < 0.05$) and 20 m sprint ball (d = 0.60; large effect). However, there were no significant differences ($p > 0.05$) between the groups in BFP with CMJ (d = 0.05; very low effect), SJ (d = 0.13; very low effect), DJ (d = 0.32; low effect), 10 m sprint speed (d = 0.39; low effect), 10 m sprint ball (d = 0.12; very low effect), and 20 m sprint speed (d = 0.37; low effect); this is presented in Figure 3.

Adjusting for FFM was 65% above average and 35% below average which was 27.9 kg. Those with higher FFM showed better physical performance in jump performance, running sprint speed and ball kicking speed. While in FFM above average, there was significantly ($p < 0.01$) better physical performance in SJ (d = 1.70; very large effect), DJ (d = 1.91; very large effect), 10 m sprint ball (d = 1.20; very large effect), 20 m sprint speed (d = 0.83; very large effect), 20 m sprint ball (d = 1.40;

Table 1. Body composition and physical performance of youth amateur soccer players

	BFP below average (n= 39)	BFP above average (n = 26)	FFM below average (n = 42)	FFM above average (n = 23)
Age (years)	14.8±4.99	18.1±5.08	14.7±0.44	18.1±2.91
Weight (kg)	54.9±12.5	64.1±13.9	50.5±8.82	73.8±4.43
Height (cm)	1.61±0.11	1.68±0.10	1.58±0.09	1.73±0.05
Body mass index (kg/m²)	21.2±2.32	22.7±4.31	20.2±3.45	24.7±5.12
Body composition	12.9±4.38	20.1±3.66	23.4±4.50	34.0±2.44
CMJ (cm)	29.3±4.86	29.7±4.20	32.4±3.2	32.7±3.2
SJ (cm)	29.1±12.1	29.4±3.46	27.3±3.0	32.1±2.5
DJ (cm)	28.4±2.32	29.3±3.44	27.1±2.2	31.4±2.3
10 m sprint (s)	2.04±0.25	2.17±0.39	2.22±0.38	2.07±0.33
10 m sprint ball (s)	2.41±0.34	2.37±0.29	2.55±0.33	2.21±0.2
20 m sprint (s)	3.41±0.27	3.51±0.27	3.6±0.41	3.34±0.16
20 m sprint ball (s)	3.88±0.24	4.16±0.53	4.28±0.42	3.74±0.33
Ball kicking speed dominant foot (km/h)	73.3±9.26	86.9±17.1	68.8±6.69	98.2±7.97
Ball kicking speed non-dominant foot (km/h)	64.8±10.2	69.6±17.1	57.5±9.03	81.8±7.7

CMJ: countermovement jump; SJ: squat jump; DJ: drop jump; m: meters; cm: centimeters; s: seconds; km/h: kilometers per hour; BFP: body fat percentage; FFM: fat-free mass.

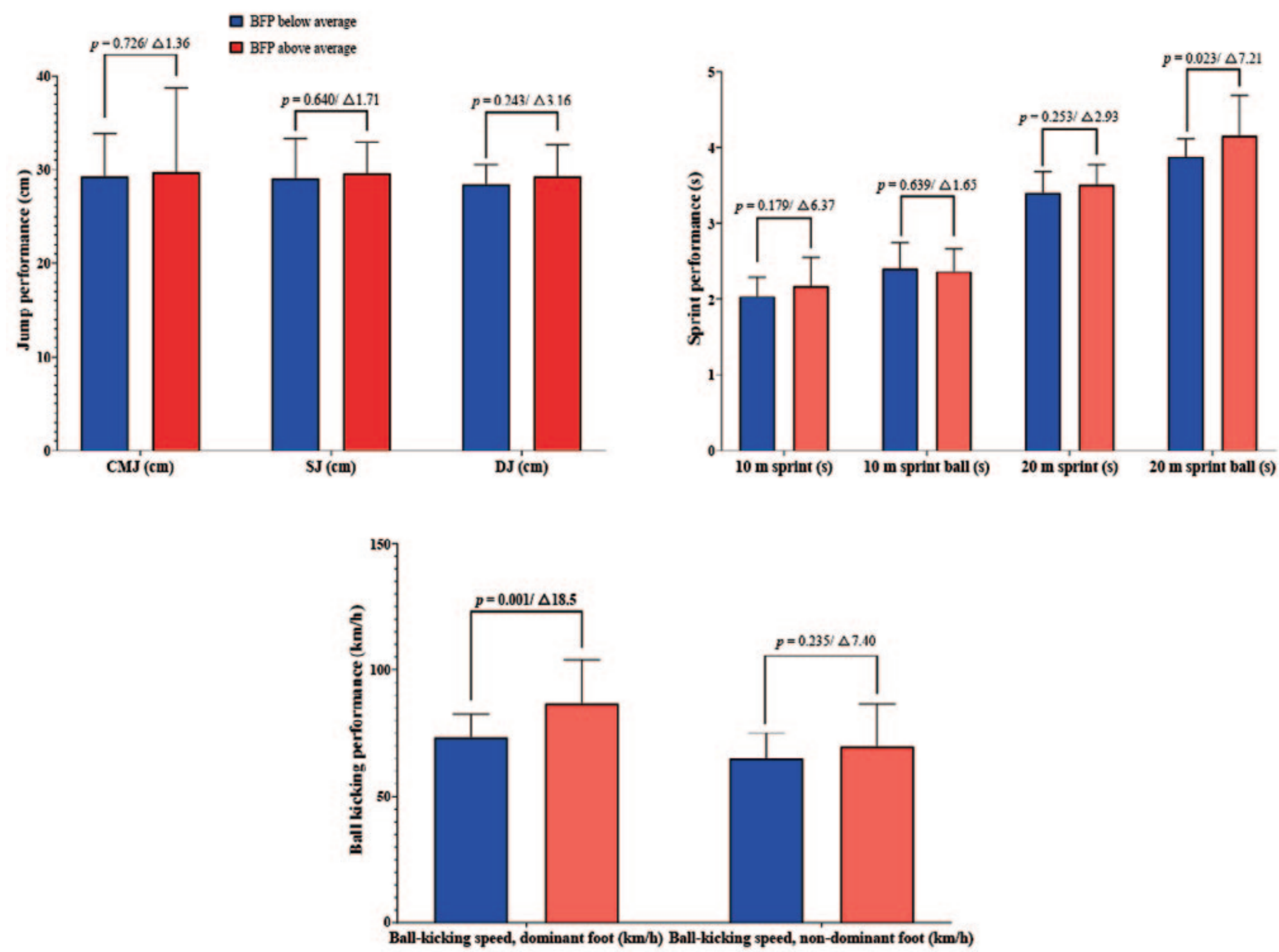
very large effect), ball kicking speed dominant (d = 3.90; very large effect) and non-dominant (d = 2.80; very large effect) foods. However, no significant differences ($p > 0.05$) in CMJ were reported (d = 0.09; very small effect) and 10 m sprint speed (d = 0.42; moderate effect), there are no significant differences between groups according to FFM; these results are presented in Figure 4.

Table 2 shows positive and significant correlation between BFP with 10 m sprint speed (r = 0.404; p = 0.002), 20 m sprint speed (r = 0.408; p = 0.002), 20 m sprint speed with

Table 2. Correlation between body composition and physical performance in youth amateur soccer players

Physical performance	Body fat percentage (%)		Fat-free mass (kg)	
CMJ (cm)	r = − 0.078	p = 0.577	r = 0.072	p = 0.607
SJ (cm)	r = −0.111	p =0.425	**r = 0.800**	**p = 0.000**
DJ (cm)	r = −0.237	p =0.085	**r = 0.777**	**p = 0.000**
10 m sprint (s)	**r = 0.404**	**p = 0.002**	**r = −0.273**	**p = 0.046**
10 m sprint ball (s)	r = 0.142	p = 0.307	**r = −0.537**	**p = 0.000**
20 m sprint (s)	**r = 0.408**	**p = 0.002**	**r = − 0.553**	**p = 0.000**
20 m sprint ball (s)	**r = 0.416**	**p = 0.002**	**r = − 0.707**	**p = 0.000**
Ball kicking speed dominant foot (km/h)	**r = 0.243**	**p = 0.002**	**r = 0.839**	**p = 0.000**
Non-dominant ball foot-kicking speed (km/h)	r = − 0.005	p = 0.970	**r = 0.783**	**p = 0.000**

CMJ: countermovement jumps; SJ: squat jump; DJ: drop jump; m: meters; cm: centimeters; s: seconds; km/h: kilometers per hour; r: Pearson's correlation index.



BFP: body fat percentage; CMJ: countermovement jump; SJ: squat jump; DJ: drop jump; m: meters; cm: centimeters; s: seconds; km/h: kilometers per hour; Δ: percentage magnitude of change.

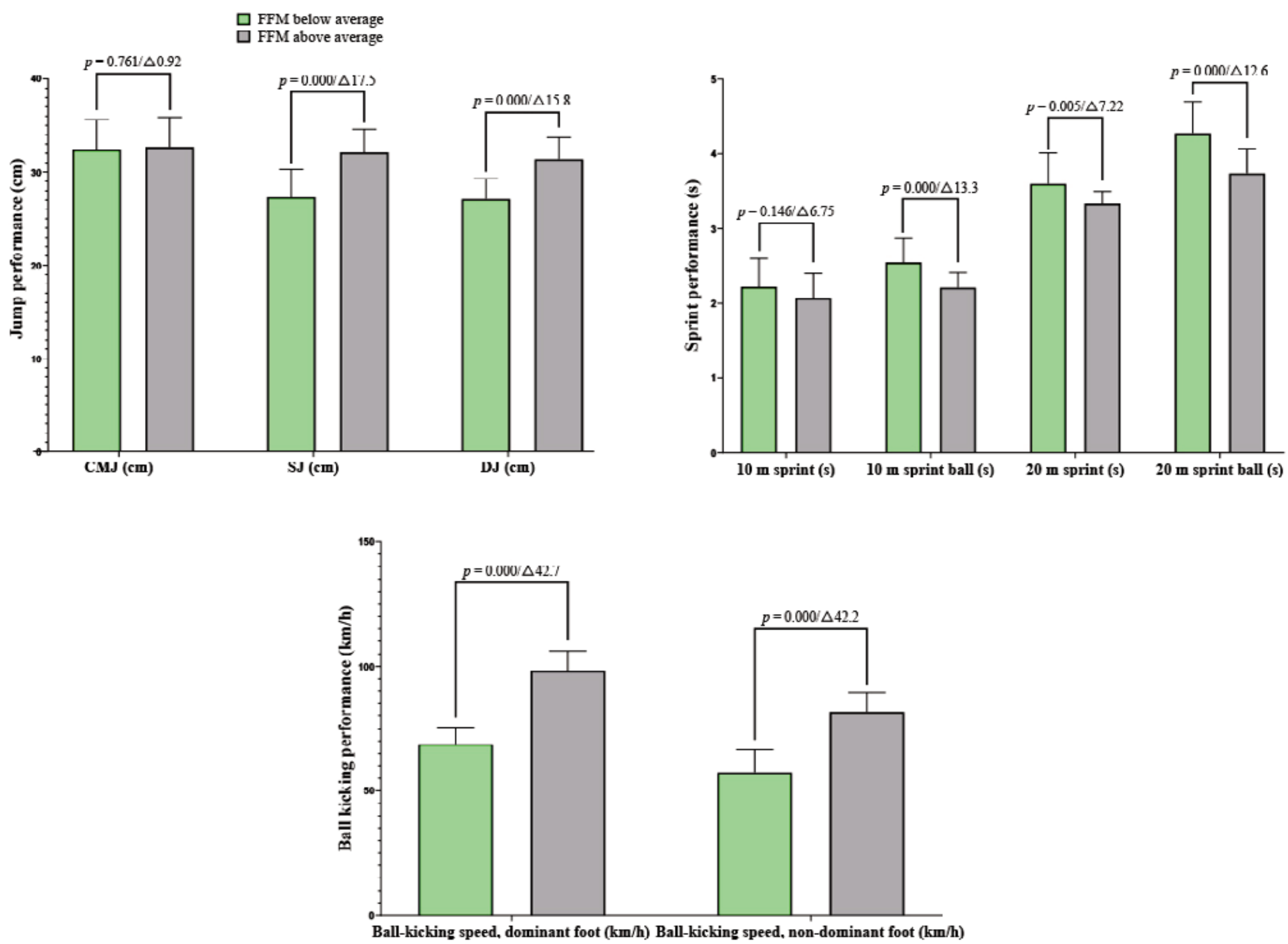
Figure 3. Physical performance is below average and above average in body fat percentage

ball (r = 0.416; p = 0.002) and ball kicking speed with the dominant foot (r = 0.243; p = 0.002). However, no significant correlations were found between BFP with CMJ (r = -0.078; p = 0.577), SJ (r = -0.111; p = 0.425), DJ (r = -0.237; p = 0.085), 10 m sprint ball (r = 0.142; p = 0.307) and non-dominant foot of ball kicking speed (r = -0.005; p = 0.970).

In contrast, FFM presented positive and significant correlations with SJ (r = 0.800; p = 0.000), DJ (r = 0.777; p = 0.000), ball kicking speed dominant (r = 0.839; p = 0.000) and non-dominant (r = 0.783; p = 0.000) foots, and negative and significant correlations with 10 m sprint (r = −0.273; p = 0.046), 10 m sprint ball (r = −0.537; p = 0.000), 20 m sprint (r = −0.553; p = 0.000), and 20 m sprint ball (r = −0.707; p = 0.000), without finding significant correlations between FFM and CMJ (r = 0.072; p = 0.607).

DISCUSSION

This study compared physical performance according to BFP and FFM in youth amateur soccer players. Secondly, to analyze whether there is a correlation between BFP and FFM with physical performance. Among the main results, it is reported that having a FFM above average leads to better performance in vertical jump tests (SJ, DJ), in running sprint speed performance (10 m sprint ball, 20 m sprint ball, and 20 m sprint ball), and ball kicking speed dominant and non-dominant feet. In FFM, a positive and significant correlation was reported with SJ, DJ, ball kicking speed with the dominant foot and ball kicking speed with the non-dominant foot, while the BFP, negative and significant correlation with 10 m sprint, 10 m sprint ball, 20 m sprint, and 20 m sprint ball the hypothesis that having a higher than average FFM correlation leads to better performance in physical tests in amateur soccer players is accepted.



FFM: Fat-free mass; CMJ: countermovement jump; SJ: squat jump; DJ: drop jump; m: meters; cm: centimeters; s: seconds; km/h: kilometers per hour; Δ: percentage magnitude of change.

Figure 4. Physical performance is below average and above average in fat-free mass

Jump performance

In jump performance for the CMJ, SJ, and DJ tests, there were no significant differences according to BFP in the present study. Similar results to those reported by Akdoğan, Heper[15] in Turkish amateur male soccer players, there was no significant correlation between BFP with SJ (r = -0.426; p = 0.100) and CMJ (r = -0.432; p = 0.095). However, a study by Hilgemberg, Hilgemberg[14] in adult professional soccer players showed positive and significant correlations between lower BFP with higher height CMJ (r = -0.73; p = 0.011), SJ (r = -0.87; p = 0.0001). In contrast, in the present study, a higher FFM led to a higher vertical jump height in SJ and DJ. Similar to that reported by Akdoğan, Heper[15], male professional soccer players reporting higher FFM was related to greater jump height in SJ (r = 0.82; p = 0.001). In contrast, in elite female soccer players Stanković, Čaprić[16], there was no significant correlation between FFM with SJ (r = 0.21; p = 0.38) and CMJ (r = -0.01; p = 0.97). Regarding our findings, it is essential to consider that the assessments were conducted during the inaugural season of the second semester of the amateur soccer league. A study has reported that short periods of detraining can affect body composition in soccer players, including reduced aerobic performance, anaerobic power, and sprint capacity[26]. Therefore, we can assume that there are certain variations in body composition and physical performance from the beginning to the end of the competition season. In this regard, our study did not report significant differences according to the BFP for the CMJ, SJ and DJ tests, however we identified that a greater FFM led to a greater vertical jump height in SJ and DJ, this can be attributed to the fact that a greater FFM in an athlete can allow for a greater application of force and power in the lower extremities to propel themselves during the jump due to the greater muscle volume developed by strength training and sports practice[27]. In this regard, it has been reported that the level of maximum force and the rate of force development are important variables that affect both jump height and sprint performance[28]. Regarding CMJ, it has been reported that jump height alone may not be sensitive enough to analyze an athlete's neuromuscular characteristics compared to other metrics related to time and deceleration[29]. Therefore, the analysis of deceleration phase-specific variables might be required for a better understanding of the neuromuscular characteristics of soccer players based on body composition[30].

Running sprint speed

Regarding running sprint speed performance, there was a worse performance in the 20 m sprint for the above average BFP cut-off and a negative correlation between BFP with the 10 m sprint and 20 m sprint with and without the ball. These results are similar to those reported by Ishida, Travis[31] in collegiate male soccer players, presenting a negative and significant correlation between BFP with 10 m sprint (r = 0.44; p = 0.03) and 20 m sprint (r = 0.50; p = 0.02). However, in the study of Kahraman and Arslan[32] semi-professional youth soccer players, there were no significant correlations between BFP and 10 m sprint speed (r = 0.14; p = 0.55) and 20 m sprint speed (r = 0.30; p = 0.18). However, in the present study, there was a better performance in the 10 m sprint with the ball and 20 m sprint with and without the ball in soccer players with above average FFM and a negative and significant correlation in the 10 m sprint and 20 m sprint with and without the ball. In contrast, in the study conducted by Kahraman and Arslan[32], there was no significant correlation between higher FFM with 10 m sprint (r = -0.35; p = 0.12) and 20 m sprint (r = -0.37; p = 0.10). The study of body composition is critical in sports, where athletes must mobilize their body weight to move quickly on the playing field[33]. In this sense, based on current evidence and the results of our study, soccer players with optimal body composition, with a relatively low BFP and a relatively high FFM, may benefit from their performance in 10 m and 20 m sprints with and without the ball[34,35]. Also, higher body mass has been reported to be associated with slower sprint performance, specifically due to increased body mass via non-functional tissues[36]. Conversely, FFM may positively affect sprint performance by improving power output and force application per unit of time in soccer players[28]. In this regard, it is vital to consider the strength levels of the players, given that there is strong evidence of the importance of muscle strength in sprint performance[28]. Although strength and power production can be improved without body mass gains, proper prescription of the training load is important to avoid excessive muscle mass gains that may be detrimental to the physical demands of soccer[27]. Therefore, constant monitoring of body composition and muscle strength is essential for the performance of soccer players.

Ball kicking speed

Regarding ball kicking speed in BFP, being below average led to higher ball kicking speed foot dominant, while having a FFM above average led to higher ball kicking speed dominant and non-dominant feet, along with a positive correlation between these variables. These results are similar to those presented by Hart, Nimphius[37] in Australian professional soccer players, reporting that lower BFP (r = -0.570; p < 0.01) and higher FFM (r = 0.631; p < 0.01) led to higher ball kicking speed. Kicking the ball is one of the most crucial soccer skills[38]. Foot speed is a kinematic variable during kicking, and lean mass is a stable and modifiable component of the lower extremities[37]. Considering this, it has been reported that increasing FFM and reducing BFP can improve kicking speed[37]. Furthermore, Hart, Nimphius[37] reported that more accurate kickers had higher relative lean mass values and significantly lower amounts of relative BFP in their legs, attributing this to a better ability to mediate and control foot speed production; this could give soccer players a greater opportunity to strike the ball in the right place and direction[39].

Limitations and strengths

The limitations of the study are the following: (i) not analyzing according to playing position; (ii) not comparing body composition variables with other levels of competition (semi-professional, professional, or elite); (iii) not analyzing these results in amateur female soccer players; (iv) not including a dietary control or dietary regime for players, which may affect body composition; (v) not analyzing physiological variables that may influence physical performance. Among the strengths are the following: (i) to carry out an analysis according to body composition in youth amateur soccer players where the largest number of youth people who practice this sport are found, being the previous level to go on to semi-professional level and to be able to become a professional soccer player later; (ii) to carry out an analysis above and below average in body composition variables such as the BFP and FFM which influences the physical performance of soccer players which helps coaches to make decisions on the training program to be carried out.

Practical applications

We can suggest some recommendations for coaches and trainers based on our results. For example, coaches need to monitor and regulate their soccer players' nutrition through a nutritionist. As we reported in our study, a lower BFP and a higher FFM can lead to a higher vertical jump height in SJ and DJ, sprint performance, and improvements in ball-kicking speed. In this sense, food consumption should be controlled through a nutritional plan, especially in the off weeks after the season. On the other hand, we suggest that soccer players with a higher BFP undergo additional training (i.e., high-intensity interval training sessions) in conjunction with a specific diet to reduce BFP and improve physical performance[40].

CONCLUSION

An above-average FFM in young amateur soccer players leads to better performance in vertical jump height in SJ and DJ, 10 m and 20 m sprint, 20 m sprint ball speed tests, and better performance in ball-kicking speed dominant and non-dominant feet. There is a positive and significant correlation between FFM with SJ, DJ, dominant and non-dominant ball kicking speed, and a negative correlation between BFP with 10 m sprint, 10 m sprint ball, 20 m sprint, and 20 m sprint ball. These results will help to make decisions about the importance of having an adequate FFM and BFP in soccer players at this competitive level to maximize physical performance in young players.

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