Morphological Characteristics, Somatotype, and Body Composition in Soccer Players in Relation to Playing Position: A Narrative Review

Características Morfológicas, Somatotipo y Composición Corporal en Jugadores de Fútbol en Relación con la Posición de Juego: Una Revisión Narrativa

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SUMMARY: Soccer is a sport where the physical attributes of players play a crucial role in defining their location on the field. Somatotype is determined by three components: endomorphy, which refers to the relative fatness of the body with a focus on the abdomen, high-square shoulders, and a short, fleshy neck; mesomorphy, which describes the musculoskeletal robustness characterized by large bones, a large chest, and a relatively slender waist; and ectomorphy, which pertains to the linearity or slenderness of the body with small bones, thin muscles, relatively long limbs, a short trunk, and a flat abdominal region. Body composition is a crucial aspect of fitness since having too much fat tissue adds extra weight that hinders performance in sports like running and jumping, where the body needs to oppose gravity. The aim of this article was to give a narrative review of the morphological characteristics, somatotype, and body composition of elite soccer players in relation to their playing positions.

KEY WORDS: Playing position; Mesomorph, body height; Levels of body composition.

INTRODUCTION

Soccer is a game in which morphological characteristics are an important factor in determining playing position. Morphological characteristics distinguish soccer players based on their competitive level and position in the game, making them an important factor in team sports player selection. Endogenous and exogenous factors heavily influence the anthropometric data that describe the body structure of players, defining the longitudinal and transversal dimensionality of the skeleton, mass, and volume of the body (Joksimovic *et al.*, 2019). On the other hand, aside from morphological characteristics, success in sports (soccer) is also associated with body composition and somatotype (Rogan *et al.*, 2011). Somatotype is defined by three components, as described by Carter *et al.* (2004): Endomorphy, which refers to relative fatness with a larger abdomen compared to the chest, high-square shoulders, and a short, fleshy neck; mesomorphy, which refers to musculoskeletal robustness with large bones, a big chest, and a relatively slim waist; and ectomorphy, which refers to linearity or slenderness with small bones, thin muscles, relatively long limbs, a short trunk, and a flat abdominal

region. Carter *et al.* (2004), developed 13 distinct somatotype groups based on the initial three fundamental components. The nomenclature of each category is chosen to accurately represent the interplay and hierarchy of the endomorphy, mesomorphy, and ectomorphy elements. For instance, the number 343 falls into the "central" category, meaning that each component of the number differs by no more than one unit from the other two components. The optimal somatotype for an athlete is contingent upon the specific requirements of the sport and the various positions within it. Rogan *et al.* (2011), assert that the prevailing somatotype observed in professional soccer players is a well-proportioned mesomorph (2.5-5-2.5) characterized by substantial muscularity (63 %) and a relatively low fat percentage (7-19 %). Monitoring the body composition (BC) of soccer players, which includes body fat, body mass, and fat-free mass, is crucial for assessing their competitive performance. Body composition (BC) is a crucial aspect of physical fitness since having too much adipose tissue adds unnecessary weight during activities like running and jumping, where the body needs to work against gravity. Scientists also

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comprehend that differences in body size and composition affect energy expenditure, power-to-weight ratio, and acceleration, thereby impacting the functional performance of soccer players. Furthermore, the impact of training on body composition (BC) makes it crucial for strength and conditioning coaches to closely monitor the equilibrium between energy intake and expenditure. During periods of inactivity, such as the off-season or due to injury, a decrease in physical activity can have a detrimental effect on body composition, as stated by (Carling & Orhant, 2010). The measurement of body composition (BC) in elite soccer players has garnered significant attention, specifically regarding their playing position and the documentation of changes over the course of the season. According to Carling & Orhant (2010), when analyzing competitive performance, it is recommended to customize training and body composition testing based on specific positional roles within a team (such as central and lateral midfielders) rather than categorizing players into attack, midfield, and defense lines. Curiously, scientific research on the body composition of great soccer players have not adhered to this suggestion. As a result, there is more and more systematic research and practical interest in the morphology of playing positions in elite soccer. The aim of this article was to give a narrative review of the morphological characteristics, somatotype, and body composition of elite soccer players in relation to their playing positions.

MATERIAL AND METHOD

In this comprehensive narrative review, a meticulous online search procedure was employed to gather relevant evidence. Databases such as PubMed, Google Scholar, and Google Advanced Search were systematically explored to analyze the existing literature. Both the full texts and the abstracts of the potentially eligible articles were carefully read. Because the investigations were constrained and compiled in a narrative fashion, meta-analysis was not feasible in the present study. Each paper that the current authors assessed was published on a platform that is recognized by scholars. Within the framework of the field of morphology, somatotype and body composition, every reference cited in this study was valid and reliable.

Morphological Characteristics

Morphological characteristics successfully determine soccer players based on both competitive level and playing position (Reilly *et al*.,2000). According to Andelic *et al*. (2021), it is known that sports performance largely depends on morphological characteristics and the level of motor abilities. Analyzing morphological characteristics within the sport of soccer leads to identifying suitable morphological characteristics specific to certain playing positions on a soccer team and attempts to create a morphological type (Trunic, 2007). Studying the morphological characteristics of elite athletes provides an idea of how athletes should look in certain playing positions (Carter *et al*., 2004). Parpa *et al*. (2022), report that there are differences in body height and weight in relation to playing position but no differences in body fat percentage (BF%). The authors state that younger players (18-24 years old) had lower body height, weight, and BF% compared to older players (30-35 years old), and that players in defense and attack positions are significantly taller and heavier than players in other positions (Table I).

Joksimovic *et al*. (2019), conducted a study on 29 players from the Serbian national football team and discovered that there were no variations in body mass index. However, goalkeepers and defenders exhibited the highest body height and mass in comparison to midfielders and forwards. As per the author's instructions, having the right body height and weight is essential for achieving optimal performance in elite football. This is because aerial duels, ball heading, and high ball catching, which are all important aspects of the game, greatly influence the successful execution of a match. Consequently, goalkeepers and defenders require a taller body height. As a result, goalkeepers and defenders need to have a greater body height, whereas midfielders and wingers often have a smaller body height and weight. This allows them to enhance their mobility, traverse greater distances on the playing field, and adeptly manipulate the ball to outmaneuver opponents. Rebelo *et al*. (2013), found that there was no notable disparity in morphological characteristics between elite and non-elite football players, regardless of their competition level or location on the field. Conversely, the authors highlight that elite goalkeepers and central defenders exhibited a greater height advantage over non-elite players in all positions. In contrast, elite midfielders showed only modest differences in bulk compared to their non-elite counterparts. In addition, the writers noted minor discrepancies in the height and weight of defenders and strikers. Rogan *et al*. (2011), observe that goalkeepers exhibited higher body height and mass in comparison to defenders, midfielders, and forwards. However, no variations in morphological parameters were found across the other playing positions. In addition, the writers did not document any variations in the morphological traits across the four teams in the Fifth Division. According to Lago-Penas *et al*. (2011), central defenders exhibited the greatest body height and mass in comparison to exterior defenders, central midfielders, external midfielders, and forwards. The authors assert that there is no statistically significant difference between goalkeepers and central defenders, but there is a statistically significant difference between outside backs and outside midfielders. In addition,

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Table I. Selected examples of key literature focusing on morphological characteristics.

Authors	Aims	Sample	Study design	Outcomes
Parpa *et al.* (2022)	Evaluating the influence of age and playing position on the physical measurements of male professional soccer players.	There were a total of 308 professional soccer players who took part in the first division in the Eastern Mediterranean region.	The athletes' stature was measured using a wall stadiometer, while their body weight and body fat percentage (BF%) were recorded utilizing a leg-to-leg bioelectrical impedance study.	The defenders and forwards possessed more height in comparison to the midfielders, full-backs, and wingers.
Joksimovic *et al.* (2019)	Analyze the variations in the anthropometric traits of professional football players based on their position and assess their significance in the game.	A group of twenty-nine male football players representing the national team of Serbia.	The morphological variables, including body height, weight, and BMI, were measured using the usual techniques of the ISAK.	The goalkeepers possessed the greatest height and weight, while the midfielders exhibited the lowest stature and weight.
Rebelo *et al.* (2013)	Examine the size, function, and skill of male U19 soccer players based on the level of competition and their playing position.	A total of 180 Portuguese U19 soccer players were chosen and categorized into two groups: an elite group (n = 95) participating in the top tier of the national U19 youth league, and a non-elite group (n = 85) competing in a regional division.	Height was determined using a stationary stadiometer, while body mass and percentage of body fat were assessed using a Tanita BC-418 MA body fat monitor.	Elite goalkeepers and central defenders typically exhibited greater height and weight compared to non-elite players in their corresponding positions. The body mass of elite midfielders exhibited slight variations. Minimal disparities in weight and height were noted between fullbacks and forwards.
Rogan *et al.* (2011)	Examine the physical features of amateur soccer players participating in the four Fifth Division soccer teams in Germany, with a focus on identifying specific bodily traits associated to playing positions and performance rankings.	A total of seventy-two male soccer players from the Fifth Division, belonging to four separate teams (A: n=17, B: n=19, C: n=17, and D: n=19), participated in this study as volunteers.	The morphological variables evaluations were performed in accordance with the recommendations of the International Society for the Advancement of Kinanthropometry (ISAK). The body fat percentage (BF%) of the individual was subsequently determined using Siri's equation.	Goalkeepers had greater body height and weight compared to field players. There was no discernible distinction among the field players, including the defender, midfielder, and striker.
Lago-Penas *et al.* (2011)	Analyze the morphological characteristics of young soccer players based on their playing position and assess their impact on their performance in competitive matches.	A total of 321 adolescent male soccer players took part in the study.	The morphological measurements were conducted in accordance with the guidelines specified by the International Society for the Advancement of Kinanthropometry (ISAK).	The Central Defenders were not only the tallest players, but they also had the most weight in comparison to External Defenders, Central Midfielders, External Midfielders, and Forwards. The Goalkeepers had a greater weight compared to the External Defenders and External Midfielders.
Hazir *et al.* (2010)	The objective of this study was to evaluate the morphological attributes of soccer players based on their playing level and position.	This study included a total of 305 male soccer players who were professionals in the Turkish Super League (SL) (n = 161) and Turkish First League (FL) (n = 144).	The height was measured with a portable stadiometer, rounded to the nearest 0.1 cm. Body weight was measured with an electronic balance scale (Tanita TBF 401A), rounded to the nearest 0.1 kg. The BMI was computed by dividing the weight by the square of the height.	There were no significant statistical variations in BMI among any of the playing positions. Goalkeepers were seen to possess greater height and weight compared to their teammates. Midfielders had a smaller height compared to other players, but they had a lower weight than forwards. There was no notable interaction impact detected for the physical features when considering both playing level and position.
Gil *et al.* (2007)	Conduct a study to evaluate the physical characteristics of young non-elite soccer players based on their playing position, and assess the significance of these characteristics in the player selection process.	A total of 241 male soccer players, who were affiliated with the Getxo Arenas Club in Bizkaia, took part in this study.	The morphological measurements were conducted in accordance with the rules established by the International Society for the Advancement of Kinanthropometry (ISAK) by an anthropometrist certified at level 3 by ISAK.	The findings of this study indicate that soccer players of various positions exhibit variations in their physical traits. The disparities are particularly pronounced within the goalie and forward cohorts.
Bloomfield *et al.* (2005)	The objective was to determine the league with the greatest caliber players among the English Premier League, Spanish La Liga Division, Italian Serie A, and German Bundesliga. Additionally, the study aimed to assess if there were variations in height, body mass, and BMI across different positions in these leagues.	Information was gathered for 2,085 professional soccer players participating in these four leagues during the 2001-2002 season.	The data presented in the article were sourced exclusively from the official FIFA website (*www.fifaworldcup.com, 2002*).	Significant variations were seen in the height, weight, and body mass index (BMI) across players in different positions and leagues.
Matkovic *et al.* (2003)	The objective of this study was to analyze the physical characteristics of elite Croatian soccer players based on their team position.	The measurements were conducted on a sample of 57 soccer players that are part of the First Croatian National League.	The International Biological Program was used to measure morphological traits.	Goalkeepers and defenders exhibited the greatest height among all players, with similar average mass values. However, in comparison to other players, goalkeepers possessed much greater levels of body mass. Statistically significant findings indicate that goalkeepers possess longer legs and arms, with the biggest biacromial diameter.

goalkeepers and central defenders had greater body mass index (BMI) levels in comparison to outside backs, outside midfielders, and forwards. Hazier *et al*. (2010), observed that players participating in the Turkish Super League had a greater weight than players participating in the Turkish First League. However, the height of players in both leagues is similar. Additionally, Super League players have higher body mass index values in comparison to First League players. The authors observe statistically significant disparities in height and weight across players, noting that goalkeepers exhibit greater height and weight compared to players in other positions. Weight players have a shorter stature in comparison to players in other positions, but they also have a lower body mass than forwards. The scientists observed that there was no significant impact of integration on the morphological characteristics across different levels and playing positions. In their study, Gil *et al*. (2007), found that goalkeepers had greater body height and mass in comparison to players in different positions. However, the researchers also observed that goalkeepers had higher body mass index values, although this difference was not statistically significant. According to the authors, the only players that displayed statistically significant differences in height and weight between the selected and non-selected defensive players were those in the middle position. Bloomfield *et al*. (2005), observed variations in the height, weight, and body mass index of players participating in four different leagues. The four leagues in discussion are the Premier League, La Liga, Serie A, and Bundesliga. Players participating in the Bundesliga exhibit higher body height and mass in comparison to players in other leagues. Players participating in the Premier League possess greater stature than those participating in La Liga, and a greater body mass than those participating in Serie A. Contrary to popular belief, players in the Premier League do not possess a higher average height compared to players in Serie A, nor do they have a greater average bulk compared to players in La Liga. Players participating in the Bundesliga and La Liga have exhibited higher body mass index (BMI) measurements in comparison to players participating in the Premier League and Serie A. Goalkeepers exhibited significantly higher body mass index (BMI) levels in comparison to players in other positions across all leagues, whilst midfielders displayed the lowest BMI values. According to the authors, defenders who use their heads to hit the ball, whether they are in the air or on the ground, have an advantage from their body height. This height is important in guiding players to specific positions or tactical responsibilities in the game. The height variation among midfielders and defenders is significantly extensive. However, although height does not necessarily determine success in football, it can significantly impact certain playing positions and scenarios, particularly when it comes to winning aerial duels with the head. According

to Reilly *et al*. (2000), assailants vary significantly in terms of their height. The range of measurements is between 1.67 and 1.90 centimeters. Players individually determine their tactical duties by considering this variability, opting for tall forwards to target high balls and shorter forwards to exploit gaps in the opponent's defense. From the given findings, it can be inferred that having tall defensive players is crucial in contemporary football for attaining ideal outcomes. Due to their tall stature, they are able to participate in aerial battles with opponents, particularly when there are frequent chances to receive long and high passes into the opposing team's defense. It is crucial to note that height alone does not ensure success in the game. However, in younger age groups, a specific height does influence player selection for different positions in the game, even before reaching the senior competition level. It also affects the training tailored to a particular position. According to this study, midfield players have the least physical stature across all the works evaluated. The advantages of such performances in comparison to taller players lie in the lower center of gravity and the ability of shorter athletes to swiftly change direction and accelerate. Additionally, players with lower heights, such as Messi who stands at 168 cm, are known for their exceptional ball control and technical capabilities. However, it is important to note that there are also tall players who possess excellent technical abilities. The height of Crouch is 201 cm. Taller players possess certain advantages over shorter players, particularly in duels and ball interceptions, due to their longer limbs and legs. From a physiological standpoint, the advantage stems from the fact that slimmer and taller players are more capable of efficiently dissipating heat from their bodies. (Tipton, 2005). Based on extensive research, goalkeepers are consistently found to be the tallest individuals in the sport of football. This height advantage provides them with a significant edge in effectively protecting the goal. Aside from the goalkeeper's physical height and other morphological traits, such as elongated legs and arms, these attributes enhance their ability to protect their own goal (Sutton *et al*., 2009).

SOMATOTYPE. Many scientists in the fields of exercise and sports (Can *et al*., 2004) have made somatotype a major field of interest. They apply somatotype measurements based on the external characteristics of body structure (Orhan *et al*., 2013) and accept them as the basic classification of physical characteristics and body type. According to Heath and Carter, the classical anthropometric method identifies three components: relative fatness (endomorphy), musculoskeletal component (mesomorphy), and linearity (ectomorphy). A typical soccer player's somatotype is characterized by muscular composition, which can be associated with outstanding muscle power, and its morphological configuration is similar to that of sprinters

(Casajús, 2001). However, the ideal somatotype for soccer players varies depending on the playing position (Hazir, 2010).

Orhan *et al*. (2013), examined the differences in somatotype relative to playing position in two professional clubs: Genclerbirligi Football Team (GB) and Genclerbirligi Oftas Football Team (GBO), which compete in the Turkish Football League (Table II). According to their study results, both clubs have averagely balanced membership. In terms of playing position, the authors state that GBO goalkeepers were ectomorphic-mesomorphic, whereas GB goalkeepers were slightly endomorphic-balanced mesomorphs. Both teams' defenders, GBO and GB, were balanced mesomorphs, whereas GBO midfielders were ectomorphic. Both teams' forwards were balanced morphs. According to the authors of this study, there is no difference in somatotype or playing position between the two clubs. Kaplanova *et al*. (2020), investigated the somatotype differences between Slovakian and Saudi Arabian soccer players in relation to playing position. For Slovakian players, the average somatotype values were balanced mesomorph, while for Saudi Arabian players, the average somatotype was mesomorphic-endomorph. In terms of playing position, balanced mesomorphs are dominant among Slovakian attackers and defenders, while the central type is dominant among Slovakian midfielders. Slovakian goalkeepers exhibited an endomorphic mesomorph. For Saudi Arabian soccer players, the goalkeepers, midfielders, and forwards showed a mesomorphic-endomorph, while among defenders, the predominant somatotype was endomorphic-mesomorph. We noted a difference in somatotype among Saudi Arabian players, with a higher proportion of the endomorphic component. Rogan *et al*. (2011), noted differences in somatotype between goalkeepers and other playing positions, revealing heterogeneity in mesomorphy between goalkeepers (6.1) and outfield players: defenders (5.0), midfielders (4.7), and forwards (5.3). According to the authors, goalkeepers' higher mesomorphic component aligns with their explosive movements. Hazir (2010), notes that the average somatotype values for soccer players competing in the Turkish Super League are 2.5-4.8-2.3, while for players in the Turkish First League, the somatotype values are 3.0-4.5-2.6. The Super League goalkeepers exhibited more mesomorphic, less endomorphic, and ectomorphic traits compared to their First League counterparts, with no statistically significant differences observed. Defenders in the Super League were significantly more mesomorphic and less endomorphic than

Table II. Selected examples of key literature focusing on somatotype

Authors	Team/League	Somatotype	Playing position			
			Goalkeepers	Defenders	Midfielders	Forwards
Orhan *et al*. (2013)	Turkish Club GB	Endomorphy	2.67±0.21	2.26±0.32	2.34±0.42	2.33±0.94
		Mezomorphy	3.90±0.66	4.26±0.77	4.64±1.17	4.13±0.66
		Ectomorphy	2.33±0.57	2.56±0.36	4.13±0.66	2.10±0.28
	Turkish Club GBO	Endomorphy	2.20±0.46	2.20±0.42	2.35±0.45	2.23±0.39
		Mezomorphy	3.77±1.37	4.42±0.76	4.33±1.12	5.05±1.08
		Ectomorphy	3.07±0.49	2.37±0.76	2.01±0.52	2.48±0.36
Kaplanova *et al*. (2020)	Slovakia	Endomorphy	3-6	2-7	3-7	2-7
		Mezomorphy	4-8	4-4	3-3	4-2
		Ectomorphy	2-1	2-6	2-6	2-5
	Saudi Arabia	Endomorphy	5-3	3-9	3-3	3-7
		Mezomorphy	5-7	4-7	3-5	4-2
		Ectomorphy	0-9	1-8	1-4	1-3
Rogan *et al*. (2011)	German Division	Endomorphy	3.2±1.6	3.2±1.0	3.1±1.2	3.2±0.7
		Mezomorphy	6.1±1.6	5.0±0.9	4.7±1.1	5.3±0.9
		Ectomorphy	1.9±1.2	2.3±0.9	2.6±1.1	2.1±0.9
Hazir, (2010)	Turkish Super League	Endomorphy	2.9±1.12	2.4±0.66	2.6±0.78	2.4±0.66
		Mezomorphy	4.6±0.80	4.8±0.89	4.9±0.92	5.0±1.10
		Ectomorphy	2.6±0.65	2.3±0.72	2.2±0.64	2.1±0.78
	Turkish First League	Endomorphy	3.4±1.01	3.0±0.90	2.9±0.77	3.1±1.01
		Mezomorphy	4.4±0.81	4.4±0.90	4.6±0.91	4.4±1.13
		Ectomorphy	3.0±0.83	2.6±0.80	2.4±0.79	2.6±0.83
Gil *et al*. (2007)	Spanish Getxo Arenas Club	Endomorphy	2.68±0.69	2.47±0.77	2.56±0.95	2.16±0.51
		Mezomorphy	4.37±0.93	4.44±0.98	4.39±0.98	4.49±0.99
		Ectomorphy	2.78±0.83	2.84±1.08	2.81±0.93	2.85±1.09
Perroni *et al*. (2015)	Italian soccer players	Endomorphy	6.1±0.0	2.2±0.9	2.5±1.0	2.4±0.5
		Mezomorphy	5.2±0.0	3.7±0.7	5.4±0.8	4.9±0.9
		Ectomorphy	0.8±0.0	3.1±0.7	2.0±0.8	2.0±1.0
Lago-Penas *et al*. (2011)	Spanish regional team	Endomorphy	2.91±0.7	2.72±0.77	2.51±0.64	2.38±0.64
		Mezomorphy	4.11±0.99	3.86±1.01	3.84±0.91	4.03±1.29
		Ectomorphy	2.58±0.98	2.81±0.84	2.81±1.01	2.90±0.90

players in the First League, while there was no difference in ectomorphy between defenders. Analyzing midfielders and forwards in both leagues, the mesomorphy components were similar, while players in the First League were significantly more endomorphic and ectomorphic (respectively) than players in the Super League. Gil *et al*. (2007), report that forwards had the highest mesomorphy values and the lowest endomorphy values compared to other playing positions. Perroni *et al*. (2015), state that goalkeepers recorded higher endomorphy values, while midfielders had higher mesomorphy values compared to defenders. According to Lago-Penas *et al*. (2011), endomorphy values were higher in defenders and goalkeepers compared to midfielders and forwards, while goalkeepers and forwards had higher values in ectomorphy and mesomorphy (respectively). Ectomorphic Mesomorph emerges as the dominant somatotype category across all playing positions, indicating a blend of lean muscle mass and slender body types. This finding aligns with the dynamic and endurance-focused nature of soccer, where players require a combination of agility and strength. Also, the fact that Endomorphic Mesomorph and Mesomorphic Ectomorph somatotypes are common suggests that players have a range of body types. Individual player characteristics and playing styles associated with different positions may account for this variety. Reilly *et al*. (2000), found that elite soccer players often exhibit characteristics associated with the mesomorphic and ectomorphic somatotypes, emphasizing the importance of a balance between muscle mass and agility in the sport. Furthermore, the higher endomorphy and mesomorphy values observed in strikers compared to midfielders and defenders are consistent with the notion that strikers may benefit from a more robust and muscular physique, providing an advantage in goal-scoring situations (Ostojic *et al*., 2014).

BODY COMPOSITION.

Body composition describes the various components that together make up body mass. Figure 1 groups these components into five levels based on their level of complexity. When it comes to sports (soccer), it is necessary to consider parameters such as fat mass, body water, adipose tissue, and muscle tissue (Holway *et al*., 2024). The comprehension of body mass composition encompasses five distinct stages. The initial tier examines the quantity of distinct atoms, encompassing hydrogen, carbon, oxygen, nitrogen, calcium, phosphorus, and several others. The second level of analysis examines the body mass in relation to its composition of various substances, such as lipids, water, proteins, carbohydrates, and minerals. The third level considers the many constituents of the body's cells, such as adipose tissue, aqueous solutions, and solid substances. The fourth level examines body mass in relation to several tissue

types, including adipose tissue, muscle, bone, and connective tissue. The fifth level of analysis dissects the body into different parts, such as the head, trunk, and limbs, in order to understand how mass is distributed throughout the body (Sebastiá-Rico *et al*., 2023).
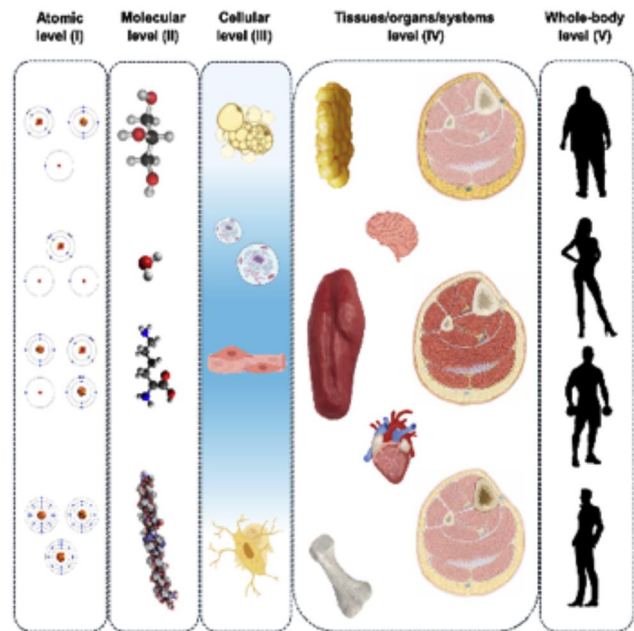

Fig. 1. The five levels of body composition. Data from: Holway *et al*. (2024).

In soccer, there are different playing positions with their own requirements and characteristics, which result in significant differences in body composition (Sebastiá-Rico *et al*., 2023). Most studies use a horizontal division of playing positions (goalkeeper, defender, midfielder, and forward). Additionally, it is necessary to use a vertical division (central defender, fullback, attacking midfielder, central midfielder, defensive midfielder, and winger) to further specify the body composition of each playing position (García-Rovés *et al*., 2014).

Sutton *et al*. (2009), in a sample of 64 professional soccer players from four different teams in the English Premier League divided by playing position (goalkeeper, defense, midfielder, and forward), recorded that goalkeepers had the highest percentage of fat mass (12.9±2.00 %). Cavia *et al*. (2019), conducted a similar study on a sample of 57 professional players competing in the Spanish league, divided by playing position (goalkeeper, defense, midfielder, and forward). The high goalkeepers recorded the highest percentage of fat mass (9.40±1.40 %), followed by defenders (8.00±1.60 %), forwards (7.70±1.40 %), and midfielders (7.40±1.30 %). Sebastiá-Rico *et al*. (2023), state that players in the goalkeeper position are considered to have the highest

fat mass (percentage and kilograms) compared to other playing positions. Conversely, the sum of six skinfolds, which correlates with fat mass, showed statistically significant differences, with goalkeepers having the highest sum of skinfolds (58.8 mm). The authors further emphasize that the fact that goalkeepers cover less distance during training and matches than other playing positions can justify these results. Additionally, goalkeepers have a large arm span to block shots from opposing players, which justifies the results of their study, the authors conclude. Defenders appear to have the highest muscle mass, together with goalkeepers. This makes sense because defenders play a very physical role in the game, where they must stop attackers by intercepting plays both on the ground and in the air, and they often initiate offensive plays. In terms of muscle mass and fat mass, midfielders have similar values to forwards. The purpose of this body composition is to enhance agility and speed during the game, particularly in counter-attacking plays, which are the primary roles of midfielders and forwards. However, these roles may change based on the team's strategic alignment and the coach's style of play, among other factors (Dolci *et al.*, 2020).

In soccer, it is essential to monitor body composition. Researchers have noted that players with lower fat mass have greater aerobic capacity, while those with higher fat mass are negatively associated with sprinting (Radziminski *et al.*, 2020). Body composition is certainly a significant factor in determining success in soccer, which is an aerobic-anaerobic sport with alternating phases of high intensity, such as sprints, quick changes of direction, jumps, deceleration, and duels. In all activities (training, matches), a player carries their own weight, moves it against gravity, and any excess fat tissue is

ballast that additionally burdens the energy systems and hinders the execution of full-body movements, especially jumps and sprints. Sebastiá-Rico *et al.* (2023) gave soccer players' morphological traits, somatotype, and body composition some rough reference values based on their playing position (Fig. 2). Porta *et al.* (2023) provided similar indicative reference values for Spanish soccer players.

All methods for assessing body composition have advantages and disadvantages that need to be considered. When conducted by a skilled or experienced researcher, anthropometry has high reliability and validity when working with athletes and is considered a useful tool for measuring fat mass. One of the issues with this method is that there are multiple formulas for estimating body composition—mainly fat mass. Only Kerr's formula directly assesses the validity of body composition, while indirect methods validate all other formulas. Kerr's equation allows for the estimation of subcutaneous adipose tissue, which includes other non-lipid components (such as water and proteins) that are part of adipocytes. Therefore, it is effective to use the sum of skinfolds, particularly in the clinical setting where factors like food intake, hydration levels, or daily physical activity can affect other methods that are difficult to control and standardize (Sebastiá-Rico *et al.*, 2023). The analyzed studies in this review, conducted with soccer players from various countries, highlight the fact that not all countries exhibit the same level of soccer, with certain countries ranking higher in the Federation Internationale de Football Association (FIFA) than others (www.fifa.com). It is important to note that not all professional soccer players exhibit the same level of professionalism regarding economic level, sports facilities, and physical demands. These differences affect many factors that directly impact body composition and soccer players' sports performance.

CONCLUSION

Football is a game in which morphological characteristics, somatotype, and body composition are important factors for specific player positions, where characteristics and abilities differ in relation to the competitive level and the position in the game. The results of this study can provide valuable information to coaches regarding player selection to maximize player performance at the highest level of competition in the senior age category.
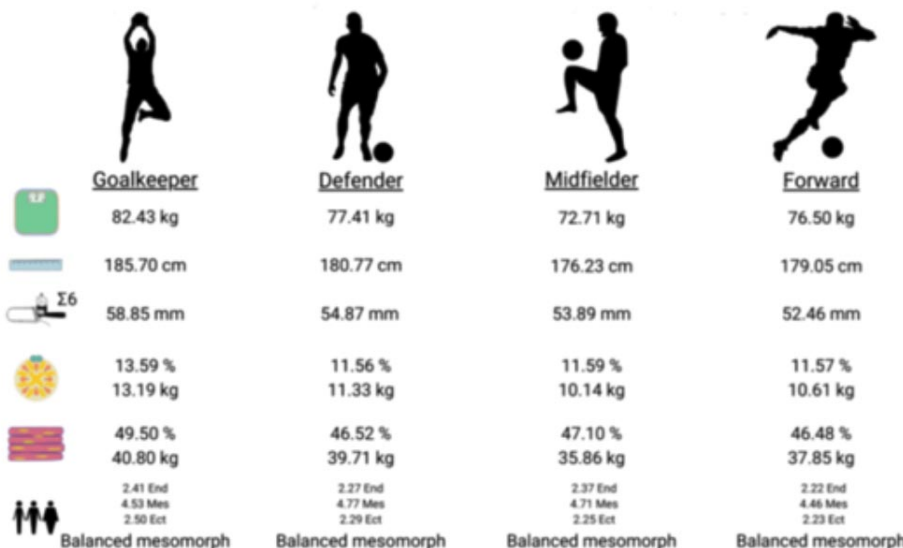

	Goalkeeper	Defender	Midfielder	Forward
	82.43 kg	77.41 kg	72.71 kg	76.50 kg
	185.70 cm	180.77 cm	176.23 cm	179.05 cm
Σ6	58.85 mm	54.87 mm	53.89 mm	52.46 mm
	13.59 %	11.56 %	11.59 %	11.57 %
	13.19 kg	11.33 kg	10.14 kg	10.61 kg
	49.50 %	46.52 %	47.10 %	46.48 %
	40.80 kg	39.71 kg	35.86 kg	37.85 kg
	2.41 End	2.27 End	2.37 End	2.22 End
	4.53 Mes	4.77 Mes	4.71 Mes	4.46 Mes
	2.50 Ect	2.29 Ect	2.25 Ect	2.23 Ect
	Balanced mesomorph	Balanced mesomorph	Balanced mesomorph	Balanced mesomorph

Fig. 2. Body composition according to the playing position. Data from: Sebastiá-Rico *et al.* (2023)

PETKOVIC, J.; NOKIC, A.; GORANOVIC, K.; JOKSIMOVIC, M. & MUNTEAN, R.I. Características morfológicas, somatotipo y composición corporal en jugadores de fútbol en relación con la posición de juego: Una revisión narrativa. *Int. J. Morphol., 43(1)*:148-155, 2025.

RESUMEN: El fútbol es un deporte en el que los atributos físicos de los jugadores juegan un papel crucial en la definición de su ubicación en el campo. El somatotipo está determinado por tres componentes: endomorfia, que se refiere a la grasa corporal relativa con un enfoque en el abdomen, hombros altos y cuadrados y un cuello corto y carnoso; mesomorfia, que describe la robustez musculoesquelética caracterizada por huesos grandes, pecho amplio y una cintura relativamente delgada; y ectomorfia, que se refiere a la linealidad o esbeltez del cuerpo con huesos pequeños, músculos delgados, miembros relativamente largos, tronco corto y región abdominal plana. La composición corporal es un aspecto crucial de la condición física, ya que tener demasiado tejido graso agrega peso adicional que dificulta el rendimiento en deportes como correr y saltar, donde el cuerpo necesita oponerse a la gravedad. El objetivo de este artículo fue brindar una revisión narrativa de los rasgos morfológicos, el somatotipo y la composición corporal de los jugadores de fútbol de élite en relación con sus posiciones de juego.

PALABRAS CLAVE: Posición de juego; Mesomorfo; Altura corporal; Niveles de composición corporal.

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