



Somatotype of Iranian Soccer Premier League Players

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Abstract

Aim: The aim of the present study was to examine the somatotype of elite soccer players based on positions. A total of 232 elite male soccer players (24.14 ± 5.15) participated in this study. **Methods.** All anthropometric measurements (10 variables) were performed by a criterion anthropometrists according to the standards of the International Society for Advancement of Kinanthropometry (ISAK). Heath-Carter Somatotyping method was used to calculate endomorphy, mesomorphy and ectomorphy components. **Results.** The mean body mass and height were 76.29 ± 7.96 kg and 180.42 ± 6.82 cm, while the mean somatotype values were 1.89 ± 0.60 - 4.91 ± 0.80 - 2.65 ± 0.77 . Somatotype, height and body mass of the goalkeepers showed a significant difference with the other positions. **Conclusion.** The findings of this study provide a valuable reference data to support soccer talent identification programs and development of more specific preparatory strategies for soccer.

Keywords: Anthropometry, Soccer, Somatotype, Talent Identification

Resumen

Objetivo: El objetivo del presente estudio fue examinar el somatotipo de jugadores de fútbol de élite en función de las posiciones. Un total de 232 jugadores de fútbol masculino de élite ($24,14 \pm 5,15$) participaron en este estudio. **Métodos.** Todas las mediciones antropométricas (10 variables) fueron realizadas por antropometristas de criterio de acuerdo con los estándares de la Sociedad Internacional para el Avance de la Cineantropometría (ISAK). Se utilizó el método de Heath-Carter Somatotyping para calcular los componentes de endomorfía, mesomorfía y ectomorfía. **Resultados.** La masa corporal y la altura medias fueron $76,29 \pm 7,96$ kg y $180,42 \pm 6,82$ cm, mientras que los valores medios del somatotipo fueron $1,89 \pm 0,60$ - $4,91 \pm 0,80$ - $2,65 \pm 0,77$. El somatotipo, la altura y la masa corporal de los porteros mostraron una diferencia significativa con el resto de posiciones. **Conclusión.** Los hallazgos de este estudio proporcionan datos de referencia valiosos para respaldar los programas de identificación de talentos del fútbol y el desarrollo de estrategias preparatorias más específicas para el fútbol.

Palabras Clave: Antropometría. Fútbol. Somatotipo. Identificación de talentos

Introducción

Soccer is the most popular sport discipline in the world. Iran is a top-ranking country in the Asian Football Confederation (AFC) and has a professional league (Persian Gulf League). There are numerous physical indicators for soccer performance. Anthropometric characteristics are important indicators and have the potential to influence soccer players' success (Norton and Olds 1996). A review of literature has shown that height, body mass, body fat percent and somatotype are some of the important anthropometric characteristics related to performance (Norton and Olds 1996).

Somatotype is a very important characteristic that can be used as an indicator of elite athletic suitability. This parameter, combined with body composition and proportionality indices, could be used in the talent identification programs. There is a large amount of data in the literature about the suitability of different somatotype patterns not only for sport disciplines, but also for intra-sport positions, events and weight categories. Although,

some of these data need to be refreshed and updated due to secular trends, modification of the sport rules, greater availability of elite athlete as subjects and emerging new training methods.

Body composition and shape in different groups of humans, including athletes, determines Somatotype which can be classified in three categories of endomorphy (related to fatness), mesomorphy (related to muscle mass) and ectomorphy (related to linearity and slenderness).

The aims of this study therefore were to: (1) determine somatotype of elite soccer players playing in Persian Gulf League (Iranian Premier League); and (2) compare somatotype of the players based on their position. It was hypothesised that the somatotype of elite soccer players would vary in different playing positions.

Material and Methods

A total of 232 male soccer players from Iranian Professional premier league (Persian Gulf League) voluntarily participated in the study. All players were regularly involved in competitive training and matches. Mean age of the subjects was 23.54 ± 4.86 years old. All subjects were professional players with at least two years of playing experience in the league. The distribution across various positions was goalkeeper (n=26), defender (n=66), midfielder (n=81), and striker (n=59).

This research was performed in compliance with the 1964 Helsinki Declaration. All experimental procedures were in accordance with the rules of the Ethical Committee of the Centre for Strategic Studies, Iranian Sport and Youth Ministry. All subjects signed informed-consent forms. The inclusion criteria was to be a member of one of the Iranian Premier League soccer clubs and the main exclusion criterion was injuries that prevented training and competition.

Data were collected in the clubs' training facilities during first weeks of the season and positions were recorded based on the validated data.

Measured anthropometric variables were height, body mass, two bony breadth (bicipital, humerus and femur), two girths (arm girth tensed and flexed, maximal calf girth), and four skinfolds (Triceps, Subscapular, Supraspinale, and Medial Calf). All measurements were done by an ISAK criterion anthropometrist following the protocols from the International Society for the advancement of Kinanthropometry (ISAK) (2011). Somatotype was determined according to Heath-Carter somatotyping method (Carter et al. 1990). Somatotype Attitudinal Distance and Somatotype Attitudinal Mean (SAM) were also determined (Carter et al. 1990).

The body mass was measured by a weighing scale (Seca 707) to the nearest 0.1 kg. Stature was measured by a stadiometer (Seca 206). Skinfolds thicknesses were taken using the Harpenden Skinfold Caliper (British Indicators Ltd, Luton) to the nearest 0.1 mm, and girth measurements were done with a flexible metallic tape (Lufkin w606PM, Mexico), with a precision of 1 mm. Bi-epicondylar Bone breadth were also measured with a Tommy 2 bone caliper (Rosscraft).

Results

The mean body mass and height were 76.29 ± 7.96 kg and 180.42 ± 6.82 cm, while the mean somatotype values were 1.89 ± 0.60 - 4.91 ± 0.80 - 2.65 ± 0.77 .

Table 1 Descriptive basic data and somatotype of male elite soccer players based on positions (Mean \pm SD)

	Goalkeeper (n=26)	Defender (n=66)	Midfielder (n=81)	Striker (n=59)	P value
Age (years)	24.14 ± 5.15	26.71 ± 4.28	25.15 ± 4.95	24.59 ± 4.99	Ns
Body Mass (kg)	$84.28^* \pm 6.23$	77.10 ± 6.70	73.73 ± 5.93	74.71 ± 9.71	0.0000
Height (Cm)	$188.05^{**} \pm 3.53$	182.12 ± 5.80	177.92 ± 5.16	178.59 ± 8.01	0.0000
Endomorphy	$2.36^{***} \pm 0.65$	1.79 ± 0.53	1.83 ± 0.59	1.88 ± 0.58	0.0002
Mesomorphy	4.78 ± 0.58	4.78 ± 0.74	4.94 ± 0.79	5.05 ± 0.94	0.307
Ectomorphy	2.89 ± 0.61	2.74 ± 0.71	2.55 ± 0.76	2.59 ± 0.90	0.1729

* Significantly different ($P < 0.05$) from defenders, midfielders, and strikers.

** Significantly different ($P < 0.05$) from defenders, midfielders, and strikers.

values of all players were balanced mesomorph (Ramadan et al.1987). Also Pelin et al (2009) found that average somatotype values of football players were balanced mesomorph.

Ramadan and Byrd (1987) concluded that goalkeepers had significantly higher values for endomorphy (3.0) and mesomorphy (5.5) when comparisons were made by position (Ramadan et al. 1987) . Silvestre et al. (2006) reported that goalkeepers had more body mass than the rest of the team. The findings of Rienzi and his colleagues (2000) showed that goalkeepers had different somatotype characteristics compared to other positions (Rienzi et al. 2000). However, Orhan and his colleagues (2013) indicated that there was is no specific relationship between somatotype and playing position (Orhan et al. 2013).

Table 2 Somatotype of Soccer players (data are presented as mean \pm SD)

Subjects (n)	Somatotype Mean \pm SD			References
	Endomorphy	Mesomorphy	Ectomorphy	
Turkish Players - Two club (48)	2.31 \pm 0.42	4.37 \pm 0.99	2.30 \pm 0.62	Orhan et al. 2013
Italian professional Team (19)	2.2 \pm 0.5	3.6 \pm 1.3	3.2 \pm 0.8	Campa et al. 2018
Italian youth player (112)	2.85 \pm 1.25	3.88 \pm 1.15	2.98 \pm 1.13	Perroni et al. 2015
South American international players (11)	2.2 \pm 0.7	5.4 \pm 1	2.2 \pm 0.6	Rienzi et al. 2000
Copa America Championships (110)	2.0 \pm 0.5	5.3 \pm 0.8	2.2 \pm 0.6	Rienzi et al. 1998
Spanish Professional player La Liga (15)	2.6 \pm 0.54	4.9 \pm 0.85	2.3 \pm 0.72	Casajús 2001
Indonesian professionals and amateurs player (96)	2.70	4.94	2.95	Rahmawati et al. 2007
Spanish National Team World Cup 1990 (16)	2.1 \pm 0.52	5.1 \pm 0.76	1.9 \pm 0.51	Casajús 1991
English International youth player (16)	2.1 \pm 0.5	4.0 \pm 0.9	2.9 \pm 0.9	Reilly et al. 2000

Table 3 Somatotype of Soccer players according to their playing positions

Subjects (n)	Somatotype												References
	Goalkeeper			Defender			Midfielder			Striker			
	Endo	Meso	Ecto										
Spanish regional teams (321)	2.91 \pm 0.7	4.11 \pm 0.99	2.58 \pm 0.98	2.72 \pm 0.77	3.86 \pm 1.01	2.81 \pm 0.84	2.51 \pm 0.64	3.84 \pm 0.91	2.81 \pm 1.01	2.38 \pm 0.64	4.03 \pm 1.29	2.90 \pm 0.90	Lago-Peñas et al. 2011
Italian youth player (112)	4.3 \pm 1.3	4.2 \pm 0.6	2.0 \pm 0.8	2.9 \pm 1.3	3.7 \pm 1.1	3.1 \pm 1.1	2.62 \pm 0.9	3.8 \pm 1.1	3.2 \pm 1.0	2.7 \pm 1.3	4.1 \pm 1.4	2.92 \pm 1.3	Perroni et al. 2015
Spanish Getxo Arenas Club (241)	2.68 \pm 0.69	4.37 \pm 0.93	2.78 \pm 0.83	2.47 \pm 0.77	4.44 \pm 0.98	2.84 \pm 1.08	2.53 \pm 0.95	4.39 \pm 0.98	2.81 \pm 0.93	2.11 \pm 0.51	4.49 \pm 0.99	2.85 \pm 0.98	Gil et al. 2007
Turkish Super League (161)	2.9	4.6	2.6	2.4	4.8	2.3	2.6	4.9	2.2	2.4	5.0	2.1	Hazir 2010
Turkish First League (144)	3.4	4.4	3	3	4.4	2.6	2.9	4.6	2.4	3.1	4.4	2.6	
Brazilian Youth player (67)	3.1	4.1	2.9	2.7	4.2	3.0	2.3	4.1	2.9	2.5	4.7	2.6	Fidelix et al. 2014

The research done by Martirasov and his colleagues (1987) on national junior team players of 10 different countries revealed that the somatotype values of the players were balanced mesomorph and ectomorph-mesomorph in average (Martirasov et al. 1987). Rienzi et al. (1998) found that the somatotype values of South American football players were balanced mesomorph. Vivani et al. (1993) analyzed 19 football players and reported similar somatotypes of were 2.1 (endomorph), 5.2 (mesomorph) and 2.4 (ectomorph).

Conclusion

In conclusion, mean somatotype of male soccer players of the present study ectomorphic mesomorph. This is a constant pattern for all positions, except for goalkeepers. The Goalkeepers were balanced mesomorphs on average with greater adiposity than other positions. This findings are nearly close to somatotype patterns of Turkish super League (Hazir 2010), but there are differences with other studies especially those have been conducted with different age groups (Lago-Penas et al 2011, Gil et al 2007) or Sub-elite level subjects (Perroni et al 2015, Fidelix et al 2014).

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Conflict of interest

The authors do not have any conflicts of interest to declare.

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