

In the Name of God

Title:

**A Comparative Study of the Anthropometric Features and Physical Fitness of
Professional Soccer and Futsal Players**

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Abstract

This study aims at a comparative study of the anthropometric features and physical fitness of professional soccer and futsal players. For this purpose, we selected 16 soccer players with an average age of 27 years and 16 futsal players with an average age of 24 years who played in Iran's Division 1. The measured anthropometric features included height, sitting height, weight, arm span, waist-to-hip ratio (WHO), and BMI, and physical fitness indicators included Sargent jump, 45-meter sprint, and 4×9 run. The results suggest that all the players participating in this study had an appropriate weight and height. According to our findings, there is a significant difference between soccer and futsal players in their height, sitting height, arm span, and BMI. There is also a significant difference between soccer and futsal players in their explosive strength and agility. No significant difference was observed in the other parameters measured in this study.

Keywords: anthropometric, physical fitness, soccer, futsal, WHO, BMI, Sargent jump.

Introduction

Today, soccer is undoubtedly the most popular sport and futsal is also experiencing a rapid growth in popularity [23]. Soccer enjoys a huge number of spectators around the globe and is transforming from a simple hobby to a large industry. The variety of types and levels of playing soccer has resulted in the creation of several other sports such as futsal and beach soccer which are similarly appealing to their audience [1].

Soccer and futsal share many of their characteristics [18]. Both are played under intensive conditions and engage both aerobic and anaerobic systems [11].

Professional sport is increasingly conceived as an activity that requires scientific approaches if high performance is desired [1]. Scientific findings in the field of sport science and physical education could greatly contribute to success in professional sport. Coaches attempt to select athletes not based on random criteria, personal desires, and kinship but based on scientific methods that aim at measurement of objective indicators. This could maximize athletic performance in addition to preventing waste of time [2].

The process of discovering talented athletes is among the central issues of contemporary professional sport [1]. Thus, sport scientists and talent identification coaches seek out specific indicators to find talented persons including anthropometric, body-composition, and biomechanic norms [3].

Soccer and futsal, too, are not exceptions and require certain physical abilities. Optimum performance of sport skills is a result of interaction between anthropometric and physiological factors. Recognition of anthropometric and physiological features is crucial for selection of athletes in any sport [25].

Through these features, experts could develop more efficient exercise plans [1]. Also, these plans could be developed according to individual conditions, the capacity of each participant, and requirements of a specific competition [8].

Anthropometric and physiological requirements vary from one sport to another and understanding them can act as a reliable guide for improving the performance of athletes, including futsal players [7].

In spite of its growing popularity, studies of futsal, particularly those that address the assessment of players in terms of anthropometric factors and body composition, are relatively limited. Moreover, little is known about the physical and physiological reactions of futsal players [19].

It should be noted that both futsal and soccer have experienced progress in recent years in Iran, albeit with a slower trend than in East Asian countries. More research is needed to accelerate this progress [5]. In Iran, however, no study has so far dealt with the comparison of soccer and futsal players in terms of their anthropometric features.

Research Method

The population of this study consists of futsal and soccer players who are currently playing in Iran's Division 1 League. Purposeful sampling (convenient sampling technique) was used to select 16 soccer players (average age of 27) and 16 futsal players (average age of 24) from this population. The players had been informed about our protocols beforehand and participated voluntarily in the study.

Data Collection

Stadiometer was used to measure height and sitting height, medical scale to measure weight, and tape meter to measure arm span and waist-to-hip ratio (WHO). Explosive strength was measured through Sargent jump, speed through 45-meter sprint test, and agility through 4×9m run test.

Statistical Methods

Tables of the descriptive statistic measures of the data were prepared. Normal distribution of the data was confirmed with Kolmogorov-Smirnov test and the equality of variances of the two groups (soccer and futsal) was measured through Levene's test. The main statistical analysis was independent t-test. The above analyses were all performed in SPSS v20.

Data Analysis

The results suggest that there is no significant difference between the two groups in weight, 45-meter sprint results, and WHO ($p \leq 0.05$). In contrast, there is a significant difference in height, sitting height, arm span, BMI, 4×9m run results, and Sargent jump ($p \leq 0.05$).

Anthropometric features and physical fitness indicators

Variables	Soccer	Futsal	P
Age	27±2.2	24±6.8	0.089
Weight	73.31±4.7	73.87±7.4	0.802
Height	182.75±2.8	176±3.7	0.000*
Sitting height	89.87±2.1	86.68±3.4	0.004*
Arm span	181.31±2.6	174.06±7.6	0.001*
4×9 run	9.37±0.4	7.58±0.4	0.00*
45-meter sprint	6.93±0.5	6.96±0.4	0.971
BMI	21.86±0.9	23.85±2.4	0.005*
Sargent jump	60.43±1.9	57.56±3.2	0.000*
Waist-to-hip ratio	0.69±0.01	0.67±0.04	0.126

Discussion and Conclusion

The present study sought to compare the anthropometric features and physical fitness of soccer and futsal players.

According to the findings, the weight and height of the soccer players in this study were appropriate and conformed to the data in the literature [22].

This was also true for the futsal players and their height and weight were within the normal range [12, 24]. Although there are insufficient data on the body composition and anthropometric

features of futsal players, observations of successful national teams in the world suggest that, in general, futsal players have normal body size, a height of 170-180 cm, an average weight of 70 kg, and a fat percentage of 8 to 12 percent [14].

The average height of soccer players was 182.75 cm whereas futsal players had an average height of 176 cm [16, 21]. This is in line with the physical requirements of soccer and the fact that soccer players like goalkeeper and defender have usually great heights, which has been confirmed in previous studies [17].

On the other hand, futsal players move at higher speeds and require lower heights so that their center of gravity would become closer to the ground. In general, higher speeds and agility could be more easily achieved with medium height.

The mean sitting height of soccer players was 89.87 and that of futsal players was 86.68, meaning that the sitting height of soccer players is greater. This is quite natural given the ratio of sitting height to standing height. Of course it should be noted that this ratio is 0.48 in both groups, which is again indicative of the appropriateness of anthropometric features in both groups. As indicated in the literature, the ratio of sitting height to standing height in athletes is around 0.5, which has also been proved by our results [6].

The average arm span of soccer players was 181.31 and that of futsal players was 174.06. It is an anthropometric fact that the arm span of normal individuals is almost equal to their height, and the participants of this study are not exceptions. As the average height of soccer players is greater than the average height of futsal players, their average arm span is also greater [6].

The mean BMI of soccer players in our study was 21.86 and that of futsal players was 23.85. BMI is the result of the division of weight in kilograms by the square of height in meters [6]. The mean weights of both groups were very close but their difference in height led to the difference in the mean BMI.

The agility of futsal players (7.58) in the 4×9 run test was higher than soccer players (9.37) [16]. This finding is explained by the nature of futsal where a player needs quick movements with or without ball in a small pitch in contrast to soccer in which the pitch is much larger and the agility of players needs not be as high as in futsal.

According to Alvurdu (2013), futsal players must control the ball and move between the defenders at high speeds in order to impose their status and advantage [10]. Therefore, agility is more crucial in futsal than in soccer [18].

The vertical jump of soccer players was higher than futsal players. In the table, the mean value of Sargent jump is 60.43 for soccer players while it is 57.56 for futsal players. Cuadrado et al. have also confirmed the fact that there is a significant difference in Sargent jump between professional soccer players and futsal players [13].

This difference is explained by the requirements of both types of sport [9, 20]. In soccer, delivering high passes and heads are important ways of scoring goals. This is rarely the case in futsal and, for this reason, soccer players need higher vertical jumps.

Overall, through this study and a review of the literature we found out that there are many similarities between the anthropometric features and physical fitness indicators of soccer and futsal players [15]. The significant difference in some of these factors could be explained by the different physical requirements of these two types of sport. But in general, the majority of anthropometric features of both groups of athletes are the same due to the similarities in the techniques of these games.

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