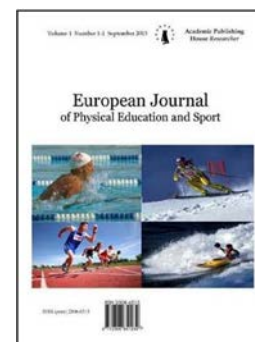


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## Comparison the Anthropometric and Physical Fitness Characteristics of Rasht City Semiprofessional Soccer and Futsal Players

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### Abstract

The purpose of this study was to comparison anthropometric and physical fitness characteristics of semiprofessional Rasht city soccer and futsal players. The research was conducted on a sample of 102 subjects divided in two groups: 47 futsal players ( $65.60 \pm 11.43$  kg,  $169.91 \pm 5.70$  cm) and 55 soccer players ( $67.84 \pm 8.39$  kg,  $175.91 \pm 6.02$  cm). Anthropometric indices including: height, weight, lean body mass (LBM), body fat percent (BF %), body mass index (BMI), hip Thigh, leg and waist circumferences, sitting height and lower limb length, were measured. Physical fitness including: aerobic power, explosive power, speed, agility and flexibility were measured. The result showed that there were significant differences between soccer and futsal players in stature, sitting height, LBM, Thigh and leg circumferences, aerobic and explosive power, 10 and 30 meters speed and agility ( $P \leq 0.05$ ). In conclusion, Anthropometric differences may be effect on technical, tactical and roles of players in special situation. It is important for coaches and trainers to concentrate on the variables those are specific for improvement the performance and success in soccer and futsal.

**Keywords:** soccer, futsal, physical fitness, anthropometric characteristics.

### Introduction

Despite the fact that soccer is one of the most popular sports today, interest in futsal slowly starts to grow and therefore its popularity too. Futsal techniques are very similar to soccer's. Nevertheless, focus of the researchers to object of scientific differences is curious. Up to date much more studies have been conducted in soccer than in futsal. It is particularly interesting that only a few studies exist which deals with the comparison of players in soccer and futsal despite the fact that they are very related (Milanovic et al. 2011). Soccer and futsal are sports modalities with their own characteristics, in which there is a complex variety of factors that can influence the performance of a team. Sport science has contributed in a significant and decisive way, related to each sport, evaluating its characteristics, physical and motor requirements, athletes' profiles improving and developing more efficient training methods, which aim at achieving better performance and results (Matos et al. 2008). Futsal is a high intensity, intermittent sport which acceleration and short sprints (usually with duration of 1 to 4 seconds) are performed at maximal or almost maximal intensity, interspersed by brief recovery periods (activities of low intensity or

pauses). The game may last a relatively long period of time (75 - 80 minutes) (Berdejo-del-Fresno et al. 2012). What the soccer and futsal have in common is that they represent an intermittent high - intensity activity which is based on not only anaerobic but also aerobic capacity of players (Milanovic et al. 2011). The intensity of physical activity during the futsal competition is almost 90% of the maximum heart rate (Barbero-Alvarez et al. 2008) and it is higher to compare with match intensity in soccer that is lower and ranged from 80 to 90 % of maximum heart rate (Reilly 1994). Milanovich et al (2011) reported that futsal and soccer players differ in the intensity exertion during the game but there were no differences in the motor activities such as agility. Matos et al (2008) showed in their study that 10m speed test results were different between the two groups, with better results for the futsal athletes. High intensity starts are happened more frequently in futsal to compare with soccer.

The anthropometric and body compositions of athletes have been the subject of many investigations as many researches have hypothesized that trained athletes might be expected to exhibit structural and functional characteristics that are specifically favorable for their specific sport (Popovic et al. 2013). Such information is useful to determine possible differences or similarities, and perfect planning for coaches, managers and players. Thus, the purpose of this study was to comparison anthropometric and physical fitness characteristics of Rasht city semiprofessional soccer and futsal players.

### Methods

The research was conducted on a sample of 102 subjects divided in two groups: 55 soccer players ( $17.35 \pm 0.799$  years,  $67.84 \pm 8.39$  kg,  $175.91 \pm 6.02$  cm) and 47 futsal players ( $16.4 \pm 1.056$  years,  $65.60 \pm 1.43$  kg,  $169.91 \pm 5.70$ ). The players were in the soccer and futsal teams in Rasht city who regularly have participated in provincial and national composition in 2014. They were selected in simple random method from 200 players. Stature, Thigh, leg, hip and waist circumference, sitting height, and lower limb length were measured using a tape meter. Body weight (using a Camerie Scale), BF% and LBM (using Saehan caliper) were measured in a same time.

Physical fitness factors including: aerobic power (1 mile test), explosive power (vertical jump test), speed (sprints 10 and 30 meters tests), agility (Illinois test) and flexibility (sit and reach test) were measured in two groups. Statistical analyses were performed using SPSS. The level of significance established in this study was in  $p \leq 0.05$ . Differences in the characteristics between the soccer and futsal players were analyzed using independent sample t tests.

Table 1: Anthropometric measurement methods

index	Method Measure	instrument
Stature	Measurement the maximum distance from the floor to the highest point on the head	Tape meter
Sitting height	This dimension is pertinent to the establishment of proper overhead clearances for seated persons	Tape meter
Thigh circumference	Point tape mid thigh girth	Tape meter
Waist circumference	Point 3cm to the right of and 1cm below the midpoint of the umbilicus	Tape meter
Hip circumference	At maximum protrusion of gluteal muscles	Tape meter
Leg circumference	Place tape at widest section of calf	Tape meter

Lower limb length  
BF%

Point anterior superior iliac spine than malleolus bone  
Chest, abdomen, and thigh skinfold (Jackson Polak nomogram)

Tape meter  
caliper

**Results**

The finding showed that in the indices of waist and hip circumference, lower limb length, weight, BF % and BMI there were no significant differences between two groups ( $p \geq 0.05$ ). Also, the results indicated that there were significant differences in stature, sitting height, LBM, leg and thigh circumference between soccer and futsal players ( $p \leq 0.05$ ) (Table 2).

The finding showed that in the indices of aerobic and anaerobic power, sprint 10 and 30 meters and agility, there were significant differences between two groups ( $p \leq 0.05$ ). There was no significant difference in flexibility between groups ( $p \geq 0.05$ ) (Table 3).

Table 2: Anthropometric characteristics of subjects

Variable	Soccer Mean $\pm$ SD	Futsal Mean $\pm$ SD	P
Stature (cm)	175.91 $\pm$ 6.02	169.91 $\pm$ 5.70	0.000*
Sitting height (cm)	89.87 $\pm$ 4.53	87.79 $\pm$ 5.25	0.034*
Weight(kg)	67.84 $\pm$ 8.39	65.60 $\pm$ 11.43	0.258
Waist girth (cm)	74.29 $\pm$ 11.59	73.30 $\pm$ 8.33	0.626
Hip girth (cm)	90.53 $\pm$ 4.37	100.21 $\pm$ 89.97	0.427
Leg girth (cm)	37.04 $\pm$ 2.35	35.87 $\pm$ 3.19	0.037*
Thigh girth (cm)	52.31 $\pm$ 4.06	50.38 $\pm$ 4.66	0.028*
Lower limb length (cm)	90.98 $\pm$ 6.64	91 $\pm$ 3.89	0.987
BF%	4.95 $\pm$ 1.93	5.68 $\pm$ 3.50	0.185
LBM (kg)	64.37 $\pm$ 7.57	60.28 $\pm$ 8.44	0.011*

\*significant differences

Table 3: Physical fitness characteristics of subjects

variable	Soccer Mean $\pm$ SD	Futsal Mean $\pm$ SD	P
Aerobic power (ml/k/min)	57.42 $\pm$ 4.35	52.77 $\pm$ 3.95	0.000*
Explosive power (cm)	39.4 $\pm$ 5.45	43.36 $\pm$ 4.35	0.001*
Agility (s)	19 $\pm$ 0.76	17.21 $\pm$ 0.97	0.000*
30m speed (s)	4.40 $\pm$ 0.19	4.98 $\pm$ 0.18	0.000*
10m speed(s)	2.26 $\pm$ 0.26	2.13 $\pm$ 0.17	0.003*
Flexibility(cm)	37.69 $\pm$ 5.05	37 $\pm$ 5.63	0.515

\*significant differences

**Discussion**

The purpose of this study was to compare anthropometric and physical fitness characteristics of Rasht city semiprofessional soccer and futsal players. Findings showed that there was a significant differences in height between soccer (175.91  $\pm$  6.02) and futsal (169.91  $\pm$  5.70 cm) players (P= 0.000). Findings showed that there was a significant difference in sitting height between soccer and futsal players (P=0.034). In fact soccer players were taller than futsal players. We did not find any significant differences in low limb length between soccer and futsal players. Reilly et al (2000) reported that the mean height of Soccer players posts. The mean heights were including: goalkeepers=184  $\pm$  2, defenders =177  $\pm$  1, midfield = 173  $\pm$  1 and forward 172  $\pm$  2 cm and the goalkeepers and defenders were significantly higher than midfields and forwards (P= 0.001).

It seems, in soccer, the tall players might be used as a target player for high balls, whereas the short players may prefer to run for balls deep into the opponent's defense. It is necessary to have tall goalkeepers and defenders to perform successfully in the air battles during the game whereas height is not a determining factor for the wingers. In fact, since these players try to advance the ball with a high speed, their shorter height can be advantageous to defeat the center - backs. Since a short height keeps the center of gravity closer to the ground and futsal player should perform their tasks with high speed and agility, so it seems intermediate height is better for them.

The present study showed that there were significant differences between soccer and futsal in leg and thigh circumference. Leg muscle strength is related to muscle size. It seems, during a soccer and futsal game, every player performs several dynamic movements (headers, cuttings, tackling, sprint, kicks), which require a very high level of muscle strength.

The weight of soccer players was higher than the futsal players but it was not significant ( $P= 0.258$ ). Results showed that there was no significant difference in BF% between groups. In the present study mean BMI of soccer and futsal players were  $22.47 \pm 2.21$  kg/m<sup>2</sup> and  $22.43 \pm 3.18$  kg/m<sup>2</sup> respectively.  $P= 0.937$ ). LBM was significantly higher in soccer players to compare with futsal players ( $P= 0.011$ ).

One of the main aspects of physiological fitness in soccer is body composition. This point is important in the terms of game particularly for the players who have excess fat (Reilly 2005). Furthermore, the amount of body fat increases with age. Other cases that have an impact on body fat are diet, race and physical activity (Wilmore & Costil 2004). The differences between various soccer and futsal players are probably due to differences in the age, nutrition and the type of activity.

Findings showed that there was a significance difference between aerobic power of soccer and futsal players. Aerobic power in soccer players was significantly higher in soccer than futsal players ( $P= 0.000$ ). The aerobic system is the main source of energy provision during soccer match or training and the average values of  $vo_2max$  for top - level soccer players tend to be high. While  $vo_2max$  values may be influenced by differences in standards of play, training regimes and the phase of season. A team with superior aerobic fitness would have the advantage, being able to play the game at a faster pace throughout (Ostojic, 2000). Aerobic power of the soccer and futsal players of this study was lower than the aerobic power of the elite players from other countries. Reilly et al (2000) stated that although  $vo_2max$  alone in soccer is not a success factor, but approximately, 60 ml  $o_2$  per kg per minute is necessary for soccer. When  $vo_2max$  of soccer players are less than this value, their performance will likely fluctuate.

Futsal players have significant higher jump than soccer players. It seems, jumping to catch the ball in the air is an important skill in soccer players irrespective of playing position and allow for more powerful jumps, kicks, tackles, and sprints among other factors. Explosive power is essential to perform sprints, high intensity runs, and duel plays, all of which may contribute to the final result.

Findings showed that there is a not significance differences between flexibility in soccer and futsal players. The flexibility decreases with the age. During the adolescence, in result of the fast pubertal growth, considerable loss of this characteristic occurs. It is known, also, that athletes of soccer and futsal as result of the programs of force aiming the gesture of the kick tend to have considerable shortening of posterior thigh muscles, that promotes a loss of income and it incline the athletes to the muscular injuries (Bertolla et al 2007).

Our findings showed significance differences in sprint 10 meters and sprint 30 meters between soccer and futsal players. In fact futsal player were faster in 10 meters test and soccer players were faster in 30 meters test. Matos et al. (2008) describe in their research results that the mean sprint 10 meters of the in Minas Geris futsal player was  $1.53 \pm 0.23$  s and Cruzeiro Esporte club was  $1.79 \pm 0.07$  s. These findings are in agreement with the findings of the present study. Speed in the soccer depends on prediction of game, reaction, reaction time choice and movements and etc. (Stolen et al. 2005). This problem has caused most of the coaches to do fast activities at the end of training, and to do various exercises with his players. The findings showed that there was significance difference in agility between soccer and futsal players. The results of research showed that mean agility (Illinois test) of soccer players was  $(19.0 \pm 0.76)$  and futsal players  $17.21 \pm 0.97$ s.  $P= 0.000$ ).

Other study results showed that the mean agility Iranian elite soccer players were included: goalkeeper=  $15.77 \pm 0.48$ , fullback=  $15.41 \pm 0.82$ , midfielder=  $15.18 \pm 0.73$ , attackers=  $15.37 \pm 0.48$  s. (Chaleh Chaleh et al. 2012). Milanovic et al. (2011) evaluate that the futsal and soccer players differ in the intensity exertion during the game but not in the motor activities such as agility. These findings are in disagreement with the findings of the present research. Agility is a very important component of both, futsal and soccer and it represents a common characteristic. Such reduced pitch dimensions and the frequent turnovers during futsal match requires from players fast decision - making and high sprint capabilities under pressure during attacking and defending phases of the game. Moreover, encouragement and competition between players during the test contributed to this finding. Soccer and futsal is a very complex sport, and ideal physique and physiology are not sufficient for excellence in soccer and futsal. It seems that players vary widely in body size. Thus, these parameters are not essential factors for success in soccer and futsal. Moreover, they might determine the playing positional role. Other components such as technique, tactics, and strategy of the coach play a key role in the final results. Profiling may be useful in a player's selection and development and for specific training programs. The coach may use this scientific information to avoid errors and to maximize the chance of preparing the team will. A scientific approach toward preparation for play when taking into consideration the players' physical fitness and anthropometric characteristics can nevertheless enhance the enjoyment of both players and spectators.

### Conclusion

In conclusion, there were significant differences in the anthropometric and physical fitness measures between soccer and futsal team players in Rasht. Anthropometric differences may be effect on technical, tactical and roles of players in special situation. From a practical standpoint, this information is important for coaches and trainers to adjust training regimes and concentrate on the variables that are specific to improve performance and achieve success in soccer and futsal.

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