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Research Article

THE RELATIONSHIP OF ANTHROPOMETRIC FEATURES AND BODY COMPOSITION WITH THE PERFORMANCE OF TEHRAN ADOLESCENT SOCCER PLAYERS

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ABSTRACT
The aim of current study was to determine the relationship of anthropometric features and body composition of Tehran adolescent soccer players with their performance. 50 Tehran adolescent players in range of 15-17 years old were selected purposely as the statistical samples. Some anthropometric features and body composition were measured. For anthropometric features; height, weight, BMI, height of waist round to round of hips ratio, the ratio of length of foreleg to height, and foreleg length to leg length ratio. For body composition; body fat percentage, body fat weight and body fatless weight. The performance of adolescent players included training with ball, running with ball and dribbling that were measured through standard test of England soccer federation. It is observed, by decreasing body fat percentage, body fat weight and body fatless weight, the performance of adolescent players increases ($P<0.05$). Also dribbling and training with ball increase when weight increases ($P<0.05$). Moreover, by increasing the ratio of leg length to height, the performance of running with ball increases ($P<0.05$). On the other hand, no significant relationship was observed among BMI, WHR, and ration of foreleg length to leg length in these players ($P>0.05$). Probably by increasing body fat percentage, fat mass percentage, body fatless percentage, and body weight, the performance of adolescent soccer players increases. Also by increasing the ratio of leg length to height, speed of running with ball increases.

Keywords: *Soccer, Anthropometric, Body Composition, Sport Performance, Dribble*

INTRODUCTION
Soccer is the most favorite and high spectator sport in the world, and in most of countries, it is their national sport. According to FIFA statistics, one from six persons plays soccer and one from three like soccer (Dadkan, 2005).
Soccer has different features which performance of athletes depends on them, such as physiological, technique, tactic and mental factors. Although the complexities of soccer, it is difficult to determine and separate the role of each of these variables. According to its effects on society and wide spreading effects and economical sides, more people pay attention to this sport. Hence, people try to learn soccer and physical skills without paying extra money and involve themselves into its economics and social discussions. Cooperative physiological, body, psychological and dynamic existence factors end up to success in different sport competitions. These factors are used in most existence models for performing analysis in different sports. Having body abilities such as body features, dynamic existence and standard energy existence are the necessary conditions for sport achievements (Mirhashemi *et al.*, 2013).
Getting familiar with body and physiological features in any sport fields is one of the determining factors in performance of athletes (Mirhashemi *et al.*, 2013). Evaluating body and physiological features are in coaches scheme to evaluate athletic teams for years (Mirzaei, 2006). In number of sport fields, some features are important than the others, an also they may be significant in one field but not in the others, and they may be in relationship with success in that sport field (Agha *et al.*, 2007). For example, it is proved that, long arms and high height have significant relationship for getting succeeded in basketball (Ghare *et al.*, 1998).
Hence some of the experience coaches who follow athletic talented players, find them through knowing these relationships and their physiological and body dimensions, and guide them to championship path. So, according to importance of soccer for adolescents, it is important to watch and consider player's

talents to discover who are best. No doubt if sport talented, especially in soccer in which costs more money, being predicted and considered from adolescence, it can prevent heavy costs and would spend this money for talented adolescents.

The aim of the current study was to determine the relationship of anthropometric features and body composition with skill performance of adolescent soccer players of Tehran.

MATERIALS AND METHODS

50 Tehran adolescent and in touch players in range of 15-17 years old were selected purposely. They had played in first class of Tehran soccer league 3 years ago. Meanwhile, they have passed adolescence age.

Participants attended in exam session, and their height, weight, BMI, waist round to hips round ratio, leg length to whole body ratio, foreleg length to leg length ratio, body fat percentage, body fat weight and body fatless weight were measured.

Then the participated in skill performance session after 48 hours and their running skill, training with ball, running speed and dribbling were measured. Then, to study the relationship between skills performance with anthropometric features and body composition, all their relationship were studied. We notice that the nutrition recommendations the day, night before the test and exam day were given to participants (for two test sessions).

Each of 4 technique standardized tests by England football federation including running with ball, turning with ball, running speed and dribbling is illustrated below. Running with ball: objects begin running behind the start line in a 1.84*27.60 meter band and their time will be recorded when they cross the end line. The aim of this test is to run as fast as they can from the start line to the end line. Turning with ball: in this test, there are 2 lines. A and B that placed 4.6 m from each other and two 4.6 m areas are provided on these lines. The objects start running with ball behind line A, then make a U turn behind line B and coming to line A, then make another U turn behind line A and again go to line B and make the last U turn and running to line A to finish their test. Then one stops the time and records their times. The aim of this test is to turning with ball as fast as they can. Running speed: the objects start running behind the line in a spiral direction with width of 9.20 m and obstacles that have been put every 9.20 m, and then cross obstacles spirally. Their time will be recorded when they pass the last obstacle that is 23 m of starting line.

The aim of this test is to run as fast as they can and passing from the obstacles spirally to finish the test. Dribbling: the required area for this test is as the same as the speed test with the only difference that the objects start behind the line and change their direction before the ball hits the obstacle, toward to another obstacle, then after crossing from the last obstacle, their time will be recorded. The aim of this test is to dribble the defenders as fast as they can from the start to the end. Running with ball, running speed and dribbling are performed once, and if there be any errors, tests would be replayed again for the objects and the times will be recorded.

About training with ball, the objects perform it twice to register their best records. No restrictions are for the style of running (Rosoukhi, 1998).

Height was measured with high meter made of Satrap Company with 0.01 millimeter accuracy, weight with digital scale made in Germany with 0.5 kg accuracy, BMI by dividing weight into this form: Kg/height^2 (m). Waist round to hips round ratio (WHR) can obtain after measuring waist and hips with a band meter and dividing waste to hips. Leg length and foreleg length can be measured by height meter. We can also use Caliper Skin Fold RH15 9LB Hard Pender to measure body composition including body fat percentage and muscular mass.

To study the relationship among studied variables, one used Pierson correlation factor in a significant level ($P \leq 0.05$). Also SPSS V.16 software is used for statistical calculations.

RESULTS AND DISCUSSION

Studied variables average and scale deviation are presented in table 1. The results of Pierson correlation factor are presented in table 2.

Table 1: Studied Variables Average And Scale Deviation

Variable	Average scale deviation
Age(year)	16.40 ± 0.70
Height (centimeter)	175.36 ± 4.55
Wright (kilogram)	70.36 ± 4.60
BMI (kg / m^2)	22.87 ± 0.33
WHR	0.80 ± 0.018
Fat percentage	11.41 ± 1.32
Fat mass (kg)	7.77 ± 1.52
Fatless mass (kg)	62.57 ± 4.24
Leg length to height ratio	0.55 ± 0.02
Foreleg length to leg length	0.44 ± 0.016
Turning with ball (second)	11.36 ± 1.55
Running with ball (second)	7.48 ± 1.004
Dribbling (second)	12.22 ± 3.66

It is indicated by decreasing body fat percentage, body fat weight, and body fatless weight, the performance of adolescent soccer players increases (P<0.05). Moreover it is indicated by increasing leg length to height ratio, running with ball performance increases (P<0.05). In contrast, no significant relationship was among BMI, WHR and foreleg length to leg length ratio (P>0.05).

Table 2: The Results of Pierson Correlation Factor to Study the Relationships Among Variables

Body features	Skills features	R	P
	Turning with ball	-0.038	0.85
Height	Running with ball	0.40	*0.04
	Dribbling	0.93	*0.001
	Turning with ball	-0.47	*0.016
Weight	Running with ball	0.29	0.15
	Dribbling	-0.48	*0.016
	Turning with ball	0.32	0.11
BMI	Running with ball	-0.01	0.94
	Dribbling	0.33	0.10
	Turning with ball	-0.02	0.92
WHR	Running with ball	-0.05	0.81
	Dribbling	-0.04	0.84
	Turning with ball	-0.75	*0.001
Fat percentage	Running with ball	-0.80	*0.001
	Dribbling	-0.78	*0.001
	Turning with ball	-0.58	*0.002
Fat mass	Running with ball	-0.56	*0.003
	Dribbling	-0.060	*0.002
	Turning with ball	-0.41	*0.042
Fatless mass	Running with ball	-0.62	*0.001
	Dribbling	-0.55	*0.004
	Turning with ball	0.26	0.20
Leg length to height ratio	Running with ball	0.43	*0.032
	Dribbling	0.28	0.19
	Turning with ball	0.30	0.13
Foreleg length to leg length ratio	Running with ball	-0.26	0.20
	Dribbling	0.33	0.11

Significant in level of P≤ 0.05

Discussion

According to recent studies, there was a significant negative relationship among body fat percentage, body fat weight and body fatless weight with the performance of adolescent soccer players. In fact, by increasing body fat percentage, body fat weight and body fatless weight, the performance of adolescent player's increases. Also, it is indicated there was significant negative correlation among weight, performance of training with ball and dribbling. In another words, the performance of training with ball and dribbling increases, when weight decreases. Moreover it is indicated there is significant positive relationship between leg lengths to height ratio with running speed.

In fact, when leg length to height ratio increased, the performance of running with ball has increased in adolescent soccer players. In contrast, no significant relationship was observed among height, BMI, WHR, foreleg length to height ratio with the performance of adolescent soccer players in Tehran. In order to achieve success and getting to high levels of championship, it is necessary to make effective moves and profoundly study the differences of personal anatomic and features that mostly have genetic aspects (Rosoukhi, 1998).

Most recent studies indicated that, personal performance level in different sports depends on height, and this factor mostly can affect personal performances (Youtie, 1998). About physical action and its relationship with height and weight of 9-16 years old boys, Winburg perceived that most correlation factors exist among height, weight and physical action (Ghorbanzadeh, 1993). There was a survey that has studied the effects of height and weight on athletic activities in 11 years old kids in Tehran schools. The correlation factor between height and Lacha test results was 0.51, and between weight and Lacha test results was 0.61 (Haji, 1980). There was another survey on 15-17 years old objects, indicated that, the 15 years old objects have the least average of height, weight and BMI. This age class got the best average time in speed and agility tests, while 17 years old objects were faster, agiler and higher height and weight in compare with other objects (Garazhyan, 2001).

A survey that 993studied the effects of age, bravery and body dimensions on selecting under 17 years old Algerian soccer players, indicated that selected samples had entered or passed their growth pace peak. They also were higher, heavier and had more BMI and thigh perimeter in compare with other selected national players (Chibane *et al.*, 2007). Malina's survey titled as "dependent changes to adolescence in sport specialty skills of 13-15 years old young soccer players" has concluded that age, experience, body size and maturity level have less effects on performing foursome tests, including dribbling with pass, ball control with head, ball control with body and shot accuracy, than 6 soccer specialty skills tests in 13-15 years old soccer players (Malina & Cumming, 2005).

Also Thomas Riley has studied England sky bet league and announced that, 23% of total differences among player readiness is because of having different body sizes (Zahedi, 1999). Reilly and Bangsboj (2000) have done a survey titled as "body readiness and physiological of genius soccer players" concluded that, physiological and body scale rulers playing a part role of regular cares about discovering genius soccer players (Reilly & Bangsboj, 2000). Vivianif and Toniutto (1993) have studied body type before maturity on adolescent soccer players with average age of 13. They indicated that, there was a significant relationship between skilled and amateur players from point of weight and height (Vivianif & Toniutto, 1993).

Vanderford and Meyers (2004) survey titled as "physiological response and sport specialty skills of Olympic young soccer players with average age of 14.6 years old" has indicated that elder athletes have more potential height and weight and final work potential in compare with young athletes (Vanderford & Meyers, 2004). Mayelikohan (2006) has studied some of anthropometric, physical fitness and dynamic features of Iran soccer genius players. Their ultimate results indicated that quick forward players have more agility, reaction, flexibility and less jump height and were shorter in compare with other players that seem have no harmony with their dynamic features. Middle players with less fat percentage and most consuming oxygen and also defenders with more weight, more fatless weight, taller and high jump, were more significant than the other players, also it seems genetic and environmental factors would be effective (Mayelikohan, 2006).

Physiological responses to exercise have a tight relationship with anthropometric and body composition of experienced and skilled athletes. Cavanac and Redger (1989) have studied the step length of stamina competition runners and its relationship with acceleration and body dimensions. The objects were all male and in range of 18-40 years old. The results have shown a positive correlation among step length to running acceleration and step length to its anthropometric sizes (Yadavar, 1997). Smith and Smith and Thomas (1991) have shown that successful performance in international competitions requires a combination of technique and tactic abilities and mostly body fitness and body requirements in relationship with special sport (Smith & Thomas, 1991). Reilly (1995) has studied the relationship of genius female athletes with their success rate in one of the orientation competition. The participants were divided into 2 groups: the successful group (12 people) and the unsuccessful group (11 people). The measured variables included fat percentage, two width, 3 lengths and three physical fitness tests (hand strength, leg strength and flexibility). The results have shown that, there was no difference between the successful and the unsuccessful groups in anthropometric features, and the only difference was in their body types (Reilly, 1995).

Totally, there are limited and inconsistent findings in association with the relationship of anthropometric and body composition with performance in soccer. These differences may have some reasons such as type of sport, the performance measurement tests that were used and etc. In the current study, the performance measurement test is a kind of test that requires speed. So because of low fat and low weight, it increases the performance, nevertheless, the relationship between BMI and WHR with the performance was not significant. Probably the speed of running with ball will increase when the leg length to height ratio increases. Obviously, we need more surveys.

Conclusion

According to current studies, we can conclude; probably when body fat percentage decreases, body fat and fatless mass and body weight increases in adolescent soccer players of Tehran. Also, probably when leg length to height increases, the speed of running with ball increases too. Nevertheless BMI, waist round to hips round ratio and also foreleg length to leg length have no relationship with the performance of adolescent soccer players. But, for an accurate conclusion, we need more surveys with controlling other soccer skills.

By confirming these findings through doing supplementary surveys, we can recommend that it is better to consider the body low fat during designing exercises for adolescent soccer players, to get better results on their skill performance. Also, it is better to consider leg length to height ratio for whom needs fast talented players, like side players.

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