

## THE COMPARISON OF BALANCE AND BODY FAT PERCENTAGE OF ELITE FUTSAL PLAYERS AND SEDENTARY PEOPLE

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### ABSTRACT

This study, which was applied to determine the balance and body fat percentage of elite futsal players and to compare them with the sedentary people, consisted of totally 49 people; 12 elite futsal players from Gazi University, 12 elite futsal players from Middle East Technical University and 13 sedentary people from Police Academy. The age, height, weight, balance and body fat percentage data of subjects were measured. The data obtained from the study were analyzed in SPSS 19 by using Kruskal Wallis and Pearson correlation tests and the significance level was accepted as  $p < 0.05$ . There was no significant difference between the balance values of athletes and sedentary people. The body fat percentage levels of athletes were lower than the levels of sedentary people and besides, there was a positive correlation between the weight and height values of athletes and the weight and body fat percentage of sedentary people. It was thought that, effective factor that determines the weight in sedentary group is body fat and in athlete group is height. In this study, some structural differences of athlete and sedentary groups may be the cause of indifference of balance ability between groups.

**Key Words:** Futsal, Static Balance, Body Composition.

### ÖZET

Elit futsal oyuncularının denge ve vücut yağ yüzdelerinin belirlenmesi ve sedanterler ile karşılaştırılması amacıyla yapılan bu araştırmaya Gazi Üniversitesi, Ortadoğu Teknik Üniversitesi ve Polis Akademisinden 12'er elit futsal oyuncusu ile 13 sedanter olmak üzere toplam 49 kişi katılmıştır. Araştırmaya katılan deneklere özgü yaş, boy, vücut ağırlığı, denge, vücut yağ yüzdesi (skinfold) verileri alınmıştır. Araştırmadan elde edilen veriler SPSS 19 paket programında, Kruskal Wallis H ve Pearson korelasyon testleri kullanılarak  $p < 0,05$  anlamlılık seviyesinde analiz edilmiştir. Sporcuların vücut yağ yüzdesi sedanterlere göre oldukça düşükken sporcu ve sedanterlerin denge değerleri arasında anlamlı bir fark bulunamamıştır. Ayrıca sporcuların vücut ağırlığı ile boy, sedanterlerin vücut ağırlığı ile vücut yağ yüzdesi arasında pozitif yönlü bir ilişki bulunmuştur. Sporcularda vücut ağırlığı belirleyen etkin faktörün boy, sedanterlerde ise vücut yağ yüzdesi olduğu görülmektedir. Bu çalışmada, sporcu ve sedanter grupları arasındaki bazı yapısal farklılıkların denge değeri yönünden gruplar arası farkın ortadan kalkmasına etken olduğu düşünülmektedir.

**Anahtar Kelimeler:** Futsal, Denge, Vücut Kompozisyonu.

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## INTRODUCTION

The physical structure, body shape and body functions are accepted as very important factors to reach the high level sportive performance<sup>4</sup>. The genetic capacity and development level of motoric features bring along the proper technique application for sportive performance<sup>1-2</sup>. Among motoric features, the balance is seen as an important factor for the recovery in a short time and the continuation of activity. The balance defined as the cancellation out strengths affecting the trunk<sup>3</sup> which is divided into two parts: static and dynamic balance<sup>16</sup>. While static balance is ability to equilibrate the body in a place or a position, dynamic balance is ability to equilibrate in motion<sup>17</sup>. It is known that the elite athletes show the progressive balance control related to their branches<sup>18</sup>. Factors that influence balance include sensory information obtained from the somatosensory, visual, and vestibular systems and motor responses that affect coordination, joint range of motion, and strength.<sup>19</sup> Although experts may not agree on the mechanism of balance and postural control, research suggests that changes in both sensory and motor systems with motor responses and trainings experiments influence balance performance.<sup>20</sup>

In a sport like soccer, players must necessarily perform motor skills and control their posture during the game. In futsal (indoor soccer), players mostly perform lower extremity passing, shooting, dribbling skills and controlling the balance and postural stability which effect the success of movements, passes, shoots. Also, soccer

requires a unipedal posture to perform these different technical movements. The stability of the supporting foot turns out to be critical to shoot as accurately as possible.<sup>21</sup> It seems that proprioception and balance training can lead amateur soccer players to higher levels of technical ability.<sup>22</sup> Therefore, soccer players' postural control should be evaluated considering the specific conditions of soccer.

In this study, the static balance and body fat percentage of elite futsal players and sedentary people have been compared and the correlations of some anthropometric variables with balance are analyzed.

## MATERIAL and METHOD

**Participants:** 36 male futsal players from Police Academy, Middle East Technical University (Metu), Gazi University; and 13 sedentary, totally 49 volunteer participated in this study. Participants' mean age is  $21.9 \pm 2.25$ , height is  $177.1 \pm 7.12$  and weight is  $71.08 \pm 7$ .

**Measurements:** Participants' heights measured with "Holtain" brand stadiometer, body weight; measured with Tanita brand weighing and skin thickness measured with "Holtain" brand skinfold kaliper from subscapula and thigh sites. Static balance measurement was done twice for each participant with Lafayette 16020 IRF/E stabilometer after explaining the device usage. The calculation of body density was done with Sloan and Weir formula and body fat calculated with the formula below.

*SF = Skinfold,*

*Body Density (gm/ml) = 1.1043 - 0.00133 x (Thigh SF) - 0.00131 x (Subscapula SF)*

*Body fat % = ((4.57/Density) - 4.142) x 10).<sup>23</sup>*

**Statistics:** SPSS package program version 19 used for statistical analysis. Kruskal Wallis H comparison and

Pearson's correlation tests were applied among the groups and variables,  $p < 0.05$  accepted as significance level.

## FINDINGS

**Table 1. The Comparison of age, height, weight, body fat percentage and balance values.**

Groups	Age	Height (cm)	Weight(kg)	Body Fat Ratio (%)	Balance (Sec)	
Gazi University (n=12)	Mean	24.92	177.50	73.42	9.82	12.69
	Std. Deviation	2.50	6.35	6.47	1.62	2.85
Metu (n=12)	Mean	21.92	181.00	74.75	12.05	10.51
	Std. Deviation	1.88	8.42	6.17	2.10	1.59
Police Academy (n=12)	Mean	20.58	178.67	68.33	11.16	13.25
	Std. Deviation	1.83	5.45	6.75	2.05	2.92
Sedentary (n=12)	Mean		20.46	171.00	68.08	15.97
	Std. Deviation		0.97	5.05	6.69	5.86
	Chi-Square		21.60	11.32	8.38	15.37
	p		<b>0.00*</b>	<b>0.01*</b>	<b>0.04*</b>	<b>0.00*</b>

\* $p < 0,05$

In Table 1, there were significant differences in the age, height, weight and

body fat percentage values, but no significant difference in balance values among groups.

**Table 2. The comparison of age, height, weight, body fat percentage and balance values of subjects.**

Groups	Age	Height (cm)	Weight(kg)	Body Fat Ratio (%)	Balance (sec)	
Athlete	Mean	22.47	179.05	72.17	11.00	12.14
	Std. Deviation	2.741	6.81	6.876	2.09	2.73
Sedentary	Mean	20.46	171.76	68.08	15.96	11.41
	Std. Deviation	0.967	5.05	6.689	5.85	3.20
	z	-2.603	-3.177	-1.587	-3.170	-1.178
	p	<b>0.01*</b>	<b>0.00*</b>	0.11	<b>0.00*</b>	0.23

\* $p < 0,05$

In Table 2, it was seen that the age and height values of athletes were higher than the values of sedentary people besides the body fat percentages of sedentary

people were higher than the athletes. There was no significant difference between the balance values of athletes and sedentary people.



**Tablo 3. The correlation of age, height, weight, body fat percentage and balance values of athletes and sedentary subjects.**

Groups Variables	Age	Height (cm)	Weight(kg)	Body Fat Ratio (%)	Balance (sec)
Athlete	Age	1	-0.090	0.123	-0.243
	Height(cm)		1	0.715*	0.217
	Weight(kg)			1	0.312
	Body Fat Ratio(%)				1
Sedentary	Age	1	0.126	0.445	0.289
	Height(cm)		1	0.240	-0.112
	Weight(kg)			1	0.795*
	Body Fat Ratio(%)				1

\*p<0,05

In Table 3, it could be seen that there were positive relationships between the height

and weight of athletes, between the weight and body fat percentage of sedentary people.

**Table 4. The correlation of age, height, weight, body fat percentage and balance values of groups.**

Groups	Age	Height (cm)	Weight(kg)	Body Fat Ratio (%)	Balance (sec)
Gazi University	Age	1	-0.020	-0.149	-0.530
	Height(cm)		1	<b>0.875**</b>	0.155
	Weight(kg)			1	0.187
	Body Fat Ratio(%)				1
Metu	Age	1	0.207	0.194	0.392
	Height(cm)		1	<b>0.840**</b>	0.003
	Weight(kg)			1	0.184
	Body Fat Ratio(%)				1
Police Academy	Age	1	-0.379	-0.172	0.068
	Height(cm)		1	<b>0.602*</b>	0.362
	Weight(kg)			1	<b>0.668*</b>
	Body Fat Ratio(%)				1
Sedentary	Age(yıl)	1	0.126	0.445	0.289
	Height(cm)		1	0.240	-0.112
	Weight(kg)			1	<b>0.795**</b>
	Body Fat Ratio(%)				1

\*p<0,05

The correlation of age, height, weight, body fat percentage and balance variables of the subjects was investigated. Although there were significant differences in

balance and weight variables of Gazi and Metu futsal teams, this relationship was contrary to each other.

## DISCUSSION

In this study, a meaningful difference among the values of body fat percentage of elite futsal players and sedentaries was found, which was lower in athletes (Table 2). In similar studies; Kyle et al. has found the body fat ratio as  $18.9 \pm 5.2$  at the study carried on 3549 sedentary men.<sup>7</sup> Daud et al. has found the body fat ratio respectively  $13.8 \pm 4.5$  and  $16.5 \pm 3.4$ <sup>5</sup> in elite athletes and sedentaries from seven countries.<sup>5</sup> In a different study on elite athletes, people making moderate exercise and making no exercise groups the body fat percentage and body mass index were lower in elite athletes group than other two<sup>6</sup>.

While there is a negative relation between elite sportsmen's body weight and static balance ( $r = -0.431$ ;  $p < 0.05$ ), no relation found in sedentaries' values ( $r = -1.31$ ;  $p > 0.05$ ) (Table 3). Hue et al. bring up in their study that body weight's influence on balance is 52% and when age and length factors are added, this rate rises to 63%.<sup>9</sup> Deforche et al. found that there is a negative relation between weight and balance of fat and extreme fat people.<sup>10</sup> Suveren, found a negative relation between weight and balance in the study on elite, male handball and volleyball players.<sup>11</sup> Andrea et al. didn't find a relation between weight and balance in his study on 119 sedentaries<sup>12</sup>.

In studies on active football players; it was found that football training has a meaningful effect on balance ability<sup>8-13-14-15</sup> and it is thought that the physiological system which provides balance is improved more in football players. But on the contrary of the thoughts, in this study there was no difference between footballers and sedentaries on the ability of balance (Table 2). The lack of number of participants or the difference in other variables (height, weight;

which were more in futsal groups than sedentary) in groups are thought to be the reason of this result.

## CONCLUSION

As a result, within these parameters, the main variable found which makes difference between athletes and sedentaries was body fat percentage. Interestingly, in study, it cannot be said that futsal players' ability of balance was more improved than sedentary subjects. A significant difference was not found between athletes and sedentary on balance ability. When correlation analyzes made in various variables in athletes and non-athletes; between athletes' height and body weight and in sedentaries' body weight and body fat percentage showed the positive significant correlation. It was thought that, effective factor that determines the weight in sedentary group is body fat percentage and in athlete group is height. The structural difference of athlete and sedentary groups may be the cause of body fat's ineffectiveness on balance and indifference of balance ability.



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