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THE DETERMINATION OF ANTHROPOMETRIC CHARACTERISTICS OF TURKISH CHILDREN TENDS TO BE TABLE TENNIS PLAYERS

Abstract

As a result of the age of starting to do sports decreases day by day, the issue of determining the appropriate person models at early ages has emerged recently. It results from that all of the scientific efforts to develop the performance of the ones who were encouraged to participate in inappropriate fields prove to be insufficient.

The purpose of the study was to examine the anthropometric features of Turkish athletes who are candidates to become table-tennis players. In order to examine the anthropometric features of the research groups who are 8±1 years and 205 people; age, height, weight, thickness of 5 skin folds, 2 width and 2 circumference measurements were taken.

According to the consequence of the study, there emerges to be a significant discrepancy between the width of knees ($p<0.001$) and the width of ($p<0.05$) among genders.

***Key Words*:** *Somatotype, Anthropometry, Children*

INTRODUCTION

The Significant developments in all of the fields of sports are the products of the evaluation of athletes' general and specific anthropometric and kinesiology-related features.

Body measurements and physical body composition are important factors that affect physical performance.

In previous studies conducted about anthropometric features, suitable for certain fields were discussed and it was searched as to what extent they might have influence on the selection of talents for some sports.

The type of the body has a great role on the selection of suitable candidates for competitive sports.

Anthropometry is a systematic measurement technique which reflects the values of the body in terms of outer physical dimensions.

The purpose of the research conducted was to examine the anthropometric features of Turkish athletes who are candidates to become table-tennis players.

MATERIALS AND METHOD

This study was conducted in 2006 including 205 Turkish athletes who are candidates to become table-tennis players.

In line with the techniques that IBP (International Biological Programme) and ISAK (International Society for the Advancement of Kinanthropometry) stipulate, the athletes in the research group were measured in terms of 11 anthropometric features. The weight was measured by using a digital scale with a 100 gram precision. The height was measured with a Martin™ type anthropometer. The width of knees and elbows was measured with a small diameter compasses. Biceps and foot calf circumferences were measured with a strap meter, triceps, biceps, subscapular, suprailiac and the thickness of

calf skin fold (TSC) was measured with a Holtain skin fold and the values were recorded in millimeter.

A care was taken to minimize the operator error by carefully following procedures required.

RESULTS

Average values and standard deviation values of anthropometric features of 205 Turkish athletes who are candidates to become tennis players are given in Table 1 and Table 2.

Table 1. Anthropometric Values of Males

n=109	*M*	*SD*
Height	130,63	6,79
Weight	29,27	6,53
BMI	42,76	2,10
Triceps	11,02	3,44
Biceps	8,50	3,03
Subscapular	8,13	3,51
Suprailiac	7,65	3,85
Calf	15,43	5,03
Biceps Per.	19,40	2,22
Calf Per.	27,18	2,76
Width of Elbow	5,45	0,63
Width of Knee	8,19	0,58

Table 2. Anthropometric Values of Females

n=96	*M*	*SD*
Height	129,43	6,58
Weight	27,66	5,78
BMI	43,14	2,36
Triceps	11,03	3,30
Biceps	8,68	3,51
Subscapular	8,77	4,24
Suprailiac	8,01	3,67
Calf	15,59	5,00
Biceps Per.	19,04	2,06
Calf Per.	26,61	2,58
Width of Elbow	5,28	0,39
Width of Knee	7,82	0,57

In this study, average weight of females was found to be (n:96) 27,66 ± 5,78 kg and average weight of males was found as (n:109) 29,27 ± 6,53 kg (Table 1,2). In the computation of growing and progress, another one of the mostly used measurements along with the weight is the height. In this study, average height of females (n:96) was 129,43 ± 6,58 cm and average of males height (n:109) was 130,63 ± 6,76 cm (Table 1,2). Another anthropometric variable is the thickness of triceps skin fold. This was measured as 11,03 ± 3,30 mm for females (n:96) and as 11,02 ± 3,44 mm for males (n:109) (Table 1,2). One of the measurements used to determine the body fat is the thickness of biceps skin fold. It was found as 8,68 ± 3,51 mm for females (n:96) and as 8,50 ± 3,03 mm for males (n:109) (Table 1,2). Especially, the thickness of subscapular skin fold is significant in terms of giving the fat amount which is at the center of the body. In this study, the thickness of subscapular skin fold was calculated as 8,77 ± 4,24 mm for females (n:96) and as 8,13 ± 3,51 mm for males (n:109) (Table 1,2). Another variable that reflects the amount of fat which takes place at the center of the body is the thickness of suprailiac skin fold. It was defined as 8,01 ± 3,67 mm for females (n:96) and as 7,65 ± 3,85 mm for males (n:109) (Table 1,2). The thickness of calf skin fold was 15,59 ± 5,00 mm for female (n:96) and is15,43 ± 5,03 mm for males (n:109) (Table 1,2). In the measurement of biceps pentameter, it was found as 19,04 ± 2,06 cm for females (n:96) and as 19,40 ± 2,22 cm for males (n:109) (Table 1,2). As the other measurement of pentameter, that is calf pentameter, it was determined 26,61 ± 2,58 cm for females (n:96) where it was 27,18 ± 2,76 cm for males (n:109) (Table 1,2). In the width measurements which are the other anthropometric measurements in this study, the width of elbow was measured as 0,28 ± 0,396 cm for females (n:96) and as 5,45 ± 0,63 cm for males (n:109) (Table 1,2). Another width measurement is the width of knee, which was found as 7,82 ± 0,57 cm for females (n:96) and as 8,19 ± 0,58 cm for males (n:109) (Table 1,2).

According to the results of the "t Test", there seems to be a significant difference only between the width of knee ($p<0.001$) and the width of elbow ($p<0.05$) among genders.

Table 3. Correlations between Anthropometric Measures of Male and Female Players

		Height	Weight	Triceps TSC	Biceps TSC	Subscapular TSC	Iliac TSC	Calf TSC	Biceps PEN.	Calf PEN.	Width of Knee	Width of Elbow	BMI	
MALES	**Weigth**	**1,00**	**0,56**	**0,70****	**0,68**	**0,77****	**0,76****	**0,77****	**0,92****	**0,91****	**0,62**	**0,76****	**-0,67**	FEMALES
	Height	0,68	**1,00**	**0,13**	**0,16**	**0,12**	**0,21**	**0,19**	**0,40**	**0,42**	**0,60**	**0,53**	**0,22**	
	Triceps TSC	0,74**	0,34	**1,00**	**0,90****	**0,79****	**0,86****	**0,80****	**0,80****	**0,68**	**0,40**	**0,47**	**-0,70****	
	Biceps TSC	0,69	0,30	0,86**	**1,00**	**0,78****	**0,79****	**0,74****	**0,78****	**0,68**	**0,44**	**0,47**	**-0,63**	
	Subscapula TSC	0,81**	0,30	0,83**	0,75**	**1,00**	**0,86****	**0,78****	**0,81****	**0,74****	**0,36**	**0,50**	**-0,77****	
	Suprailiac TSC	0,75**	0,27	0,79**	0,75**	0,89**	**1,00**	**0,82****	**0,82**	**0,73****	**0,46**	**0,58**	**-0,71****	
	Calf TSC	0,79**	0,43	0,81**	0,77**	0,77**	0,76**	**1,00**	**0,78**	**0,76****	**0,42**	**0,62**	**-0,73****	
	Biceps PEN.	0,93**	0,53	0,85**	0,77**	0,84**	0,79**	0,85**	**1,00**	**0,88****	**0,61**	**0,68**	**-0,72****	
	Calf PEN.	0,92**	0,61	0,77**	0,70**	0,78**	0,73**	0,80**	0,92**	**1,00**	**0,55**	**0,73****	**-0,70****	
	Width of Knee	0,52	0,35	0,45	0,33	0,46	0,34	0,34	0,53	0,53	**1,00**	**0,56**	**-0,19**	
	Width of Elbow	0,82**	0,61	0,64	0,56	0,64	0,60	0,62	0,79**	0,81**	0,64	**1,00**	**-0,43**	
	BMI	-0,71**	0,01	-0,70**	-0,67	-0,80**	-0,75**	-0,67	-0,77**	-0,69	-0,40	-0,55	**1,00**	

The correlations between male and female players are shown in table 3. When anthropometric features were examined, one of the most important measurements used in the evaluation of development and body structure is the weight. There was a highly positive relationship between weight and triceps TSC (r = 0,70), between weight and subscapular TSC (r = 0,77), between weight and subrailiac TSC (r = 0,76), between weight and calf TSC (r = 0,77), between weight and biceps pentameter (r = 0,92) and between weight and calf pentameter of females. Especially, the thickness of subscapular skin fold is important in terms of indicating the amount of fat at the center of the body. Also, there was a highly positive relationship between subscapular TSC and triceps TSC (r = 0,79), subscapular TSC and biceps TSC (r = 0,78). Today, mostly BMI is used to determine the obesity. There seems to be a negative relationship between BMI and triceps TSC (r = -0,70), BMI and subscapular TSC (r = -0,77) of females. However, there was a highly positive relationship between weight and biceps pentameter (r = 0,93), between weight and calf pentameter (r = 0,92) of males. Also, there was a highly positive relationship between biceps pentameter and triceps TSC (r = 0,85), between biceps pentameter and calf TSC (r = 0,85), between biceps pentameter and subscapular TSC (r = 0,84). There was a highly positive relationship between calf pentameter and biceps TSC (r = 0,92), between calf pentameter and calf TSC (r = 0,80), and between calf pentameter and subscapular TSC (r = 0,78). There was a negative relationship between BMI and subscapular TSC (r = -0,80).

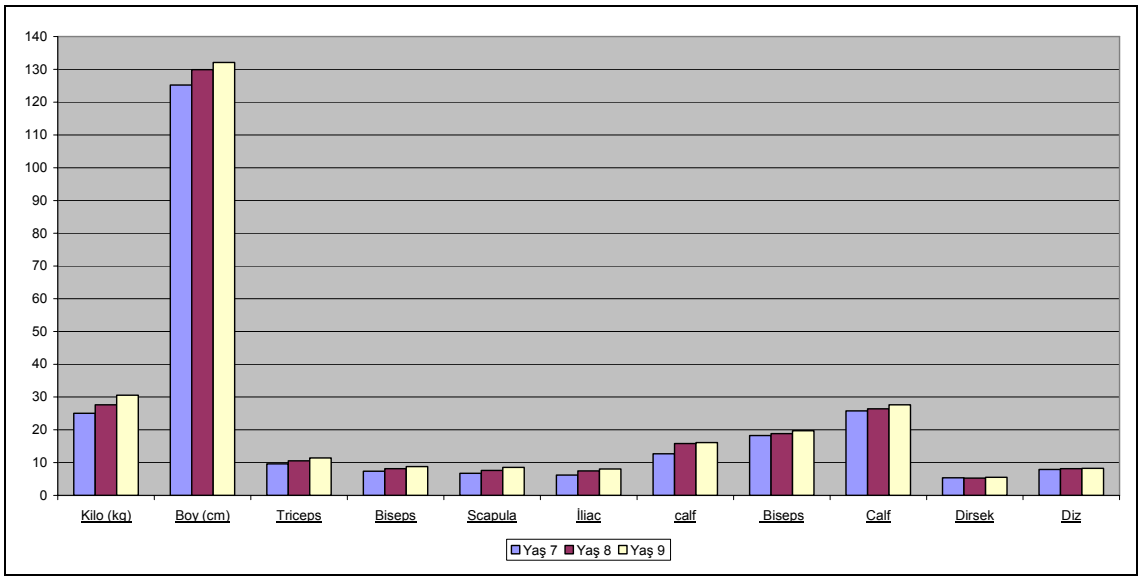

Figure 1. Male Students' Anthropometric Assessment Distribution Graph with Age)

In figure 1 the anthropometric assessment distribution of Turkish athletes who are candidates to become male table-tennis players was indicated along with their age levels.

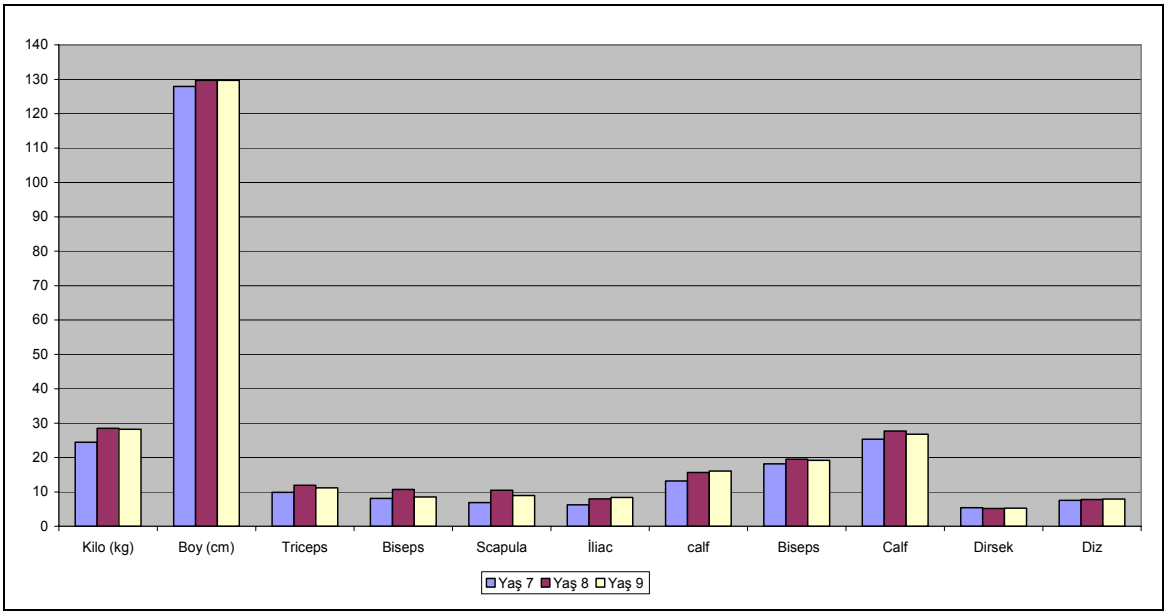

Figure 2. Male Students' Anthropometric Assessment Distribution Graph with Age)

In figure 2 the anthropometric assessment distribution of Turkish athletes who are nominees to become female table-tennis players was indicated along with their age levels.

DISCUSSION AND CONCLUSION

The adaptation skills to environmental conditions of human body which is shaped by mutual interactions between genetic and environmental factors are quite high. Trainings which are done according to the sport branch help body gain the intended shape, which increases the performance and makes the body shape mechanically more advantageous.

In all sports, the aim is to achieve success. In our country, increasing scientific researches affects the success in a positive way. Through the researches, it is seen that

body's anatomical features show differences between different sport branches and different subcategories of the same sport branches. The data collected through researches carry great importance in athletes' being directed to branches, athletes' education and elite athletes' trainings and their performances' being increased. That is why, it is pretty important to determine morphological and psychological characteristics of athletes.

That is why, anthropometric measurements (height, body weight, length measurements, etc.) which are taken at the early periods of starting the sport becomes helpful in the choice of skill. 11 anthropometric measurements of 205 Turkish athletes which are candidates to become table tennis players were taken during our survey that we conducted for that purpose.

Height is one of the anthropometric measurements and is generally used with weight to evaluate a person's growth and development. Length is important in the development period of the person especially for the chronic eating disorders. Changes in weight are much more dependent on the society's eating attitudes, and sometimes, decrease in body mass indicates the poor nutrition of society.

The average weight and average height of female athletes was found (n=96) 27,66±5,78 kg and 129,43±6,58 cm, respectively (Table 2) whereas in other studies which Balcı[22] and colleagues have conducted, the averages were found 31,8±8,1 kg and 133,1±8,1 cm. These averages are found higher than the averages in this study, the reason of which is that length is related much more with genetic factors than with environmental factors and that environmental factors have more influence on body weight than genetic factors.

In this study, the values for triceps TSF of females used to determine the body fat were found (n=96) 11,03±3,30 mm (Table 2), however they were found to be 12,4±5,1 mm in the study of Balcı[22] and colleagues (2004). The subscapula skin fold thickness is the most effective measure that shows the fat rate of the body's central area. [6,16,17] In this study, the subscapula TSF was found 8,77±4,24 mm (Table 2), but it was found 8,1±4,3 mm in the study of Balcı[22] and colleagues (2004). Another measure showing the fat rate of the body's central area is the suprailiac skin fold thickness. [5] While, in this study, the suprailiac TSF of females was found 8,01±3,67 mm (Table 2), it was stated as 8,4±5,4 mm in the study of Balcı[22] and colleagues (2004). The calf TSF gives an idea about the fat in the organs. [5] In this study, the calf TSF for female students was found 15,59±5,0 mm (Table 2); however, it is found 13,0±5,5 mm in the study of Balcı[22] and colleagues (2004). In the circumference measurement which is one of the anthropometric measurements, the circumference of biceps for girls was found 19,04±2,06 cm (Table 2) in our study whereas it was found 20,8±3,0 cm in the study of Balcı[22] and colleagues (2004). As another circumference measurement, the circumference of the calf for female students was found 26,61±2,58 cm (Table 2) in our study while it was found 27,9±3,5 cm in the study of Balcı[22] and colleagues (2004). In width measurement which is one of the anthropometric measurements used in our study, the elbow width of girls was found 5,28±0,39 cm (Table 2), but it was estimated at 5,2±0,5 cm in the study of Balcı[22] and colleagues (2004). The knee width for girls was found 7,82±0,57 cm (Table 2) in our study; however, it was found 8,0±1,0 cm in the study of Balcı[22] and colleagues (2004).

The difference in the skin fold thickness, the circumference measurements and the width measurements is thought to result from the cultural and socio-economic status differences and the life style of families, and connected with these issues, results from the differences in the growth, development and body shape of the person.

Based on the data that we obtained during our study, the average weight and the average height of male athletes' in our test subject group was found (n=109) 29,27±6,53 kg and 130,63±6,79 cm (Table 1) respectively. In the study of Özgün[14], the average weight and the average height of 9 year old males was estimated as 31,05±7,66 kg and 130,42±6,99 cm respectively. These values are higher than our values of average weight, but there is similarity between the values of average height. The reason of this, which is thought similar to the female test subject group, is that the length is dependent much more on the genetic factors than on the environmental factors and that the environmental factors are more effective on the body weight than the genetic factors.

The measures of triceps TSF which is used for determining the body fat for male students was found (n=109) 11,02±3,44 mm (Table 1), but it was estimated at 8,96±3,05 mm in the study of Özbar, N[21] and colleagues (2004). The subscapula skin fold thickness is the best anthropometric measurement that gives the amount of the fat in the central area of the body. [6,16,17] In this study, the subscapula TSF of male students (n=109) was found 8,13±3,51 mm (Table 1), but it was estimated at 9,35±3,30 mm in the study of Özbar, N[21] and colleagues (2004). Another measure which exists in the central area of the body and gives the amount of fat in the center is the suprailiac skin fold thickness. [5] in our study, the suprailiac TSF for males was found 7,65±3,85 mm (Table 1); however, it was estimated at 7,58±3,86 mm in the study of Özbar, N[21] and colleagues (2004). The calf TSF gives an idea about the fat in the organs. [5] In this study, the calf TSF for males (n=109) was found 15,43±5,03 mm (Table 1) while it was estimated at 18,85±4,34 mm in the study of Özbar, N[21] and colleagues (2004). In the circumference measurement, which is examined in the category of anthropometric measurements in our study, the biceps circumference of male students was found 19,40±2,22 cm (Table 1) whereas it was found 28,71±2,67 cm in the study of Özbar, N[21] and colleagues (2004). As another circumference measurement, the calf circumference of male students (n=109) was found 27,18±2,76 cm in our study (Table 1) while it was estimated at 35,46±2,58 cm in the study of Özbar, N[21] and colleagues (2004). In the width measurements of our study's anthropometric measurements, the elbow width was found 5,45±0,63 cm (Table 1), but it was found 7,35±1,13 cm in the study of Özbar, N[21] and colleagues (2004). While the knee width of male students was found 8,19±0,58 cm in our study, it was estimated at 10,34±1,23 cm in the study of Özbar, N[21] and colleagues (2004).

The difference in the skin fold thickness, the circumference measurements and the width measurements for males is thought to result from the cultural and socio-economic status differences and the life style of families, and connected with these issues, results from the differences in the growth, development and body shape of the person.

It is thought that the differences between the findings of our study and the findings of other studies result from not only nutrition factors but also those measurements' being collected from different cities and regions and in different dates. Also, it is thought that these differences result from the fact that the average age of the students in our test subject group are younger than the average age of other studies' test subject groups.

To sum up, children who are chosen by the skill choice model of candidate Turkish athletes of table tennis player were measured during this study. This study is the first measurement that is conducted on this group, and the measures which will be gained after a lot of measurements in the future will be quite helpful in forming the normative values of choosing Turkish table tennis players. For these comparisons and conclusions, the norms that are determined by longitudinal studies are required in terms of putting forward the athletes' features of body types which are peculiar to the branches and their distinctive body shape. These norms being created carry great importance on the choice of skills.

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