

COMPARISON OF SOME ANTHROPOMETRIC CHARACTERISTICS OF ELITE BADMINTON AND TENNIS PLAYERS

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ABSTRACT

The purpose of this study was to investigate the comparison of anthropometric parameters of elite badminton and tennis players. The sample of this study is consisting from 30 elite tennis and badminton players who participate the study voluntarily.

As a result of this study, a significant statistical difference between badminton and tennis players is observed only in terms of calf variable which is one of the circumference width variables. In terms of length measures, a significant difference is not observed between the mean values of badminton and tennis players at the significance level of 0.05. However, a significant difference is observed in terms of bust and forearm lengths at the level of 0.10. A statistically significant difference is found between the mean values of the players in terms of biacromial, bitrochanteric and femoral epicondular diameters which are diameter measure variables. It also observed that tennis players have larger mean values in biacromial and femoral epicondular diameter and badminton players have larger mean values in bitrochanteric diameter measures. As a result, it can be said that the wider hip and calf breadths of badminton players results from the excess of jumping movements in badminton game and the continual movements of badminton players by toe tips in a close area. The wider biacromial diameter and longer whole arm length in tennis players can be associated with reaching actions in tennis game due to the wide court. We may also claim that, due to frequent forearm activities in badminton, the players have shorter forearm lengths than tennis players and this gives an advantage of better working lever for the amount of strengt spent.

KEYWORDS: Anthropometry, Badminton, Tennis.

INTRODUCTION

Badminton is a sports branch which can be played easily and savorily by all people from several ages, which does not drives the player to violence, which also can be used for a recreation and fitness purposes (R. C. Memedov and R. Kale, 1994). On the other hand tennis is not only a sports branch which is so popular but also has new point of views. On one hand it is a kind of sport which is a popular spare time activity and many people can exercise and this sport also became a remarkable revenue source provider (P. Unierzyski, 1995).

When the countries and teams which have reached an upper level in sports branches, studies which is being carried out in the light of programs prepared more scientifically and by more informed people (C. Açıkada and E. Ergen, 1986). In most countries the science people not only try to show sportsmen profiles of their countries by studies but also they provide data which may dominate other countries' studies (S. Muratlı, 1997). The performances and physical characteristics of elite sportsmen which perform in different sports branches may vary and as well anthropometric and basic motoric differences may be distinctive for branches in talent identification (Australian Sports Commission, 1998). The studies which seek for how the structural features affect the performance in the selected sports branch are limited (B. Durmaz et al.,

1995; A. Farkas et al., 1989; J. A. Mazza et al., 1992).

The purpose of this study is to identify the physical profiles of the elite badminton and tennis players which are similar sports in visuality and play characteristics; and to introduce some anthropometric differences between these sports branches.

MATERIAL AND METHOD PARTICIPANTS

The research group is consisted of 30 elite badminton and tennis players who grant to get involved in the study. The measures of the involved player's variables were made while they were not wearing t-shirts, shorts and shoes.

DATA COLLECTION METHOD

The measures of the 30 player who were involved into the study were made by an expert anthropologist of Gazi University School of Physical Education and Sport physiology laboratory. In order to provide the measure reliability, each measure was repeated for two times and the mean values were used in the study. The characteristics measured values and demographic information of the subjects were recorded in the data form which was prepared formerly.

DATA ANALYSIS

SPSS 17.0 package program was used in the study to analyze the data. Firstly, descriptive statistical values were calculated according to the profiles and measure variables of the subjects. Kolmogorov-Smirnov normality tests were used for the selection of the parametric and nonparametric test which will be used for significance of the difference between mean values. At the end of these tests it was observed that chest circumference, waist circumference, bust length, humerus epiconduler diameter, femoral epiconduler diameter variables have not the normal

distribution. Thus, nonparametric Mann-Whitney U test was used for variables and parametric t test was used for other variables. Before the t test, equality of the group variances was calculated by F test and it was observed that the hypothesis on equality of group variances was supported except for bitrochanteric diameter variable. The t test was carried out under these assumptions.

RESULTS

In this part, results of the statistical analysis concerning the findings of the subjects are given.

Table 1. Kolmogorov-Smirnov Normality Tests

Badminton				Tennis			
Variables	Statistic	n	p	Variables	Statistic	n	p
Body Weight	0.134	15	0.200	Body Weight	0.192	15	0.140
Biceps Cir.	0.202	15	0.102	Biceps Cir	0.149	15	0.200
Waist Cir.	0.147	15	0.200	Waist Cir.	0.170	15	0.200
Chest Cir.	0.225	15	0.390	Chest Cir.	0.142	15	0.200
Hip Cir.	0.178	15	0.200	Hip Cir	0.266	15	0.005
Calf Cir.	0.183	15	0.188	Calf Cir	0.168	15	0.200
Lower Body Length.	0.120	15	0.200	Lower body Length.	0.174	15	0.200
Bust Length.	0.131	15	0.200	Bust Length.	0.234	15	0.027
Arm Length.	0.253	15	0.098	Arm Length.	0.156	15	0.200
Forearm Lenght.	0.164	15	0.200	Forearm Lenght.	0.170	15	0.200
Biacro. Cir.	0.149	15	0.200	Biacro. Cir.	0.171	15	0.200
Hum. E. Cir.	0.178	15	0.200	Hum. E. Cir.	0.230	15	0.032
Bitroc. Cir.	0.141	15	0.200	Bitroc. Cir.	0.191	15	0.145
F. Ep. Cir.	0.152	15	0.200	F. Ep. Cir.	0.222	15	0.044

Table 2. Levene Test For Equality of Group Variances

Variables	F	P
Body Weight	0.556	0.462
Length	0.849	0.365
Waist Circumference	1.689	0.204
Chest Circumference	0.010	0.920
Biacromial Diameter	1.572	0.220
Bitroc. Diameter	17.635	0.000

Table 3. Descriptive Characteristics of Subjects

Variables	Branch	n	\bar{x}	ss
Age (year)	Badminton	15	21.67	3.52
	Tennis	15	21.07	3.53
Body Weight (kg)	Badminton	15	71.97	6.03
	Tennis	15	74.58	3.48
Spors Age (year)	Badminton	15	10.00	3.21
	Tennis	15	12.80	3.96
Training Frequency (w/day)	Badminton	15	5.20	0.78
	Tennis	15	5.93	0.46
Daily Exercise Duration (hour)	Badminton	15	2.13	0.35
	Tennis	15	2.28	0.45

Information concerning the players who are involved in the study are given in the Table 3.

Table 4. Descriptive Statistics and Statistical Tests for Circumference Widths of Elite Badminton and Tennis Players

Variables	Branch	n	\bar{x}	ss	t	p
Biceps Circumference (cm)	Badminton	15	29.23	2.92	-1.776	0.091
	Tennis	15	30.71	1.37		
Waist Circumference (cm)	Badminton	15	79.07	2.21	0.592	0.559
	Tennis	15	78.63	1.83		
Calf Circumference (cm)	Badminton	15	36.68	1.48	3.397	0.001
	Tennis	15	34.40	1.68		

			Mean Rank	Mann-Whitney U	P
Chest Circumference (cm)	Badminton	15	13.77	86.500	0.285
	Tennis	15	17.23		
Hip Circumference (cm)	Badminton	15	17.40	84.000	0.250
	Tennis	15	13.60		

Descriptive statistics and statistical test results are given in the Table 4. When the measures of the circumference width are examined, a significant difference is found only in the measures of the calf circumference between the two branches ($p < 0.05$). It

is observed that the calf circumferences of the badminton players are larger than the tennis players. Additionally, the differences between the mean values of hip circumference are found significant at the level of 0.10.

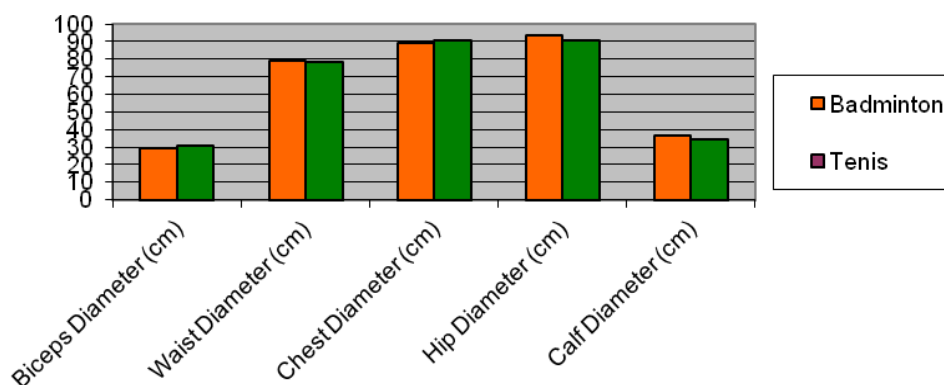


Figure 1. The Mean Values of Circumference Width of The Tennis and Badminton Players

Table 5. Length Measures of Badminton and Tennis Players - Descriptive Statistics and Statistical Test

Variables	Branch	n	\bar{x}	ss	t	p
Length (cm)	Badminton	15	177.43	5.51	0.148	0.342
	Tennis	15	179.50	6.20		
Lower body Length (cm)	Badminton	15	107.25	3.66	-0.154	0.884
	Tennis	15	107.06	3.38		
Arm Length (cm)	Badminton	15	76.77	2.58	-1.87	0.878
	Tennis	15	76.92	2.74		
Forearm Length (cm)	Badminton	15	45.82	1.64	0.967	0.072
	Tennis	15	47.10	2.06		
			Mean Rank		Mann-Whitney U	P
Bust Length (cm)	Badminton	15	12.53		68.000	0.067
	Tenis	15	18.47			

Descriptive statistics and statistical test results concerning length measures of the players are given in the Table 5. When the data obtained from each group is compared, a statistically significant

difference is not seen. However, the mean values of forearm lengths are different at the significance level of 0.10.

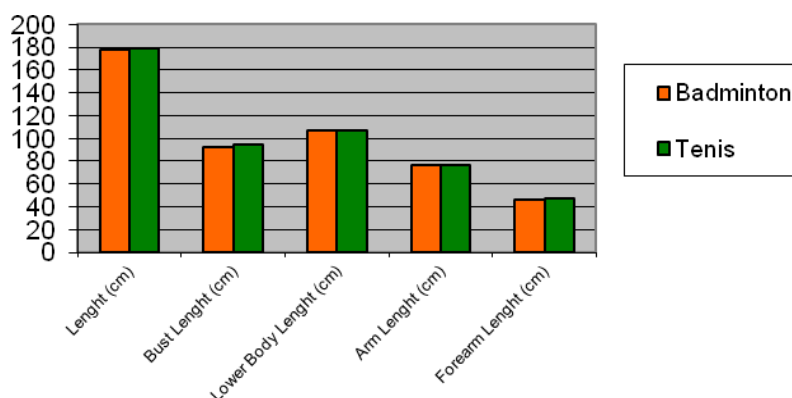


Figure 2. The Mean Values of Length Variable of Badminton and Tennis Players

Table 6. Descriptive Statistics and Statistical Tests for Circumference Measures of Elite Badminton and Tennis Players

Variables	Branch	n	\bar{x}	ss	t	p
Biacromial Diameter (cm)	Badminton	15	38.85	1.18	-4.349	0.000
	Tennis	15	41.52	2.05		
Bitrochantheric Diameter (cm)	Badminton	15	32.16	1.11	6.710	0.000
	Tennis	15	27.59	2.36		
			Mean Rank		Mann-Whitney U	P
Humerus Epiconduler Diameter (cm)	Badminton	15	14.80		102.000	0.683
	Tennis	15	16.20			
Femoral Epiconduler Diameter (cm)	Badminton	15	19.43		53.00	0.013
	Tennis	15	11.57			

When the Table 6 is examined, it can be said that there is a statistically significant difference between the biacromial and bitrochanteric diameters. While

badminton players have larger bitrochanteric diameters and tennis players have larger biacromial diameters.

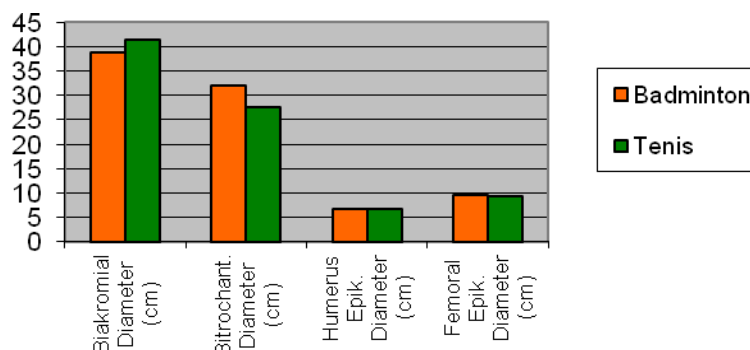


Figure 3. The Mean Values of Diameter Measures of Badminton and Tennis Players.

Discussion

Looking at the mean values of age, length and body weight of elite badminton players who are involved in this study, it is seen that the mean age is 21.67 ± 3.52 , the mean length is 177.43cm, the mean body weight is 72.04 ± 5.57 kg and the mean sports age is 10.00 ± 3.21 years. In the study of which Arslanoğlu and friends have analyzed the badminton matches in the 2008 Beijing Olympics, they have observed that the mean age is $27,12 \pm 4,02$, the mean length is 178.98cm and the mean body weight is 73.47 ± 7.59 kg (Arslanoğlu & et al, 2008). For the tennis players who are involved in this study, it seen that the mean age is 21.07 ± 3.53 , the mean length is 179cm, the mean body weight is 74.58 ± 3.48 kg and the mean sports age is 12.80 ± 3.96 years. In the study made by Gelen and his friends, again for the tennis players, it is seen that the mean age is 18.30 ± 3.02 , the mean length is 183.40cm and the mean body weight is 73.20 ± 7.16 kg (E. Gelen et al., 2006).

When the measures of the circumference widths of the subjects are examined; there is a significant difference only in the measures of calf circumference between the two branches ($p < 0.05$). The calf circumferences of the badminton players are 36.68 ± 1.48 cm. The calf circumference of the tennis players is 34.40 ± 1.68 cm; thus it can be said that the calf circumferences of the badminton players are larger than the tennis players. When a study on the literature is carried out; in the study of Gelen and Friends, it was observed that the calf circumference of the tennis players is 37.00 ± 3.85 cm (E. Gelen et al., 2006). As the thickness of calf skin curl is smaller in badminton players and as the calf circumference width is larger, it can be concluded that the muscle density of badminton players is larger on this part of the body than the tennis players. The cause of this

circumstance is interpreted to be the jumping action in badminton play and continuous movement on the tiptoes of the badminton player in a smaller place.

When the length measures of the players were examined, a significant difference was not observed statistically between the two branches. It is observed that the length, bust and lower body lengths of the badminton players are respectively: 177.43 ± 5.51 cm, 92.69 ± 2.93 cm and 107.25 ± 3.66 cm. Arm and forearm lengths are respectively: 76.77 ± 2.58 cm and 45.42 ± 1.64 cm. For the tennis players; respectively: 179.50 ± 6.20 cm, 94.52 ± 2.81 cm, 107.06 ± 3.38 cm and the arm and forearm lengths are: 76.92 ± 2.74 cm and 47.10 ± 2.06 cm.

According to the diameter measures of the subject; significant differences between the two branches is found in biacromial diameter, bitrochanteric diameter and femoral epicondular diameter ($p < 0.05$). For the badminton players; the biacromial diameter is 38.85 ± 1.18 cm, bitrochanteric diameter is 32.16 ± 1.11 cm, and femoral epicondular diameter is 9.56 ± 0.27 cm. For the tennis players; it is observed that the biacromial diameter is 41.52 ± 2.05 cm, bitrochanteric diameter is 27.59 ± 2.36 cm, and femoral epicondular diameter is 9.28 ± 0.30 cm.

Conclusions

In conclusion, significant statistical differences in measures of calf diameters between two branches exist and calf circumferences of the badminton players are greater than the tennis players. According to the diameter measures; it is observed that tennis players have larger shoulders and thinner waists and there is a significant difference in biacromial, bitrochanteric and femoral epicondular diameter measures between the two sports branches.

Bibliography

- AÇIKADA, C., ERGEN E., 1986,** *Yüksek Performansta Bir Başka Nokta;* Bedensel Yapı. Bilim ve Teknik Dergisi; 2: 39.
- ARSLANOĞLU, E., ARSLAN Y., ŞENEL Ö., 2009,** *2008 Pekin Olimpiyat Oyunları Badminton Müsabakalarının analizi ve 2004 Olimpiyatlarıyla Karşılaştırılması,* Spormetre Beden Eğitimi ve Spor Bilimleri Dergisi, 7 (2): 77-84.
- AUSTRALIAN SPORTS COMMISSION, 1998,** *The National Talent Identification and Development Program,* Talent Search, Phase 2, Testin Manu.
- DURMAZ, B., ÖZÇALDIRAN, B., DOĞAN, B., VAROL R., 1995,** *The Anthropometric Characteristics of Preadolescent Boy Swimmers and Their Relationship with Performance,* Journal of Ege Physical Medicine of Rehabilitation, 1 (3): 151-154.
- FARKAS, A., MOHACSI, J., MESZAROS, J., 1989,** *Four Styles of Swimming Performance and Anthropometry of Child Swimmers,* In: Oseid S. editors: Children and Exercise XIII. Illinois, Human Kinetics Books: 129-134.
- GELEN, E., VE ARK. 2006,** *1. ve 2. Ligdeki Tenisçilerin Fiziksel Uygunluk Özelliklerinin Karşılaştırılması,* Fırat Üniversitesi Sağlık Bilimleri Dergisi, 20 (2): 119-127.
- MAZZA, J. A., COSOLITO, P. Y., ALARCON, ET AL., 1992,** *Somatotype Profile of South American Swimmers.* In: Mc Claren D, Reilly T, Lees A. Biomechanics and Medicine in Swimming, E&FN Spon; London: 371-378.
- MEMEDOV, R. C., KALE R., 1994,** *Uçan Tüytöp Badminton.* İstanbul: Başak Ofset.
- MURATLI, S., 1997,** *Çocuk ve Spor,* Bağırğan Yayınevi, Ankara.
- UNIERZYSKI P., 1995,** *Influence of Physical Fitness Specific to the Game of Tennis, Morphological and Psychological Factors on Performance Level in Tennis in Different Age Groups.* Science and Racket Sports, E&FN Spon, London: 61-68.