

COMPARISON OF ANTHROPOMETRIC MEASUREMENTS OF DOMINANT HANDS BETWEEN ADULT ELITE VOLLEYBALL PLAYERS AND SEDENTARIES

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ABSTRACT

Objective: The aim of the study is to compare the dominant hand anthropometric rational differences between adult elite volleyball players and sedentaries.

METHOD: In this study, totally 100 subjects (mean age 23.9±3) participated and, they are separated as 25 male volleyball players, 25 female volleyball players, 25 male sedentaries and 25 female sedentaries, respectively. The objects of volleyball levels (elite or non elite) are evaluated by an individual questionnaire data form. Length, weight, hand length, hand width, metacarpal width, hand finger length, hand wrist circumference and hand wrist width are measured by anthropometer, stick, tape measure (international standards, millimetric) and the data are analyzed statistically with t-Test and Two-Way ANOVA.

RESULT: With the measurements stated above meaningful differentials are found between volleyball players and sedentary related to length, weight, hand length, hand width, metacarpal width, hand finger length, hand wrist circumference and hand wrist width.

CONCLUSION: Theoretically, it is assumed that elite sportsman and woman represents the most appropriate physical structure related to the sport branch performed. In this context, anthropometric measurements of sportsmen and women are at higher degree than sedentary. In this study, anthropometric hand measurements of volleyball players and sedentaries (related to gender variable) are found different. As a result, it is found that the meaningful difference related to anthropometric measurements of dominant hand result from the performed sport branch.

KEYWORDS: Sport, Anthropometric Hand Measurements, Volleyball Player, Sedentary

PURPOSE

Volleyball is very common in all countries nowadays and, is a team game that people play at almost every age.

The questions and worries about 'how to obtain success in sport', 'how to reach the summit' and 'how to stay on top' are important in the selection of branch-specific players and determining the applicable training. Therefore, researchers' interests are increased in studies which targets putting forward the performance and physical qualifications with scientific data. At the present time, athletes in all branches want to be faster, to be more efficient and have superior anthropometric and physiological capacities in quality. When we look at the countries that had reached highest levels in the sports industry, their teams are more aware of people and perform in the light of more scientifically prepared programs.

As a part of overall body structure, hand consists of 27 bones such as carpal, metacarpal, phalanges and three functional sections. The genes and genetic structure of an individual play a role in the development and differentiation of hands. And also, in the process of development, external and occupational factors affect hand structure. It is thought that in different branches of sport, suitable training for purpose is contribute to forming of hand by modification in the structure.

Previously many conducted studies showed that in terms of anthropometric, dominant hand gives higher measurement values than others. On the other hand, many studies have revealed that mainly used extremities develop. For example, the study conducted

in Vienna has revealed that there is a significant relationship between business using hand and hand size (D.F. Roberts, 1995).

As volleyball, handball, basketball branches is required mainly the use of hand it is considered that hands of professional athletes in these branches are to be more developed than sedentary'.

For this reason, the aim of the study is to compare the dominant hand anthropometric rational differences between adult elite volleyball players and sedentary.

METHOD

Male volleyball players with a mean age of 23,1 years; male sedentary with a mean age of 23,7 years; female volleyball players with a mean age of 24,7 years and female sedentary with a mean age of 24,8 years voluntarily participated in the study. Subjects who are playing in the first volleyball league are elite level athletes.

To determine anthropometric measurements of subjects, in accordance with international standards, the height with anthropometer, body weight with 100 gr-sensitive electronic weigher, wrist circumference with measuring tape and hand length, finger length, hand width and metacarpal length by using compass are measured (T.J. Lohman et al., 1998; J.S.Weiner and J.A. Lourie, 1988). The obtained results were analyzed statistically by using SPSS software; frequency distribution, cross tabulation (comparison of differences between socio-demographic groups) and t-test are used to test research hypotheses.

RESULTS

The findings of this study were evaluated by a quantitative analysis. A total of 100 subjects (mean age 23.9±3) participated in the study, as 25 male volleyball players, 25 female volleyball players, 25 male sedentary and 25 female sedentary, respectively.

It is determined that male volleyball players' and sedentary' with the mean age of 23,4 years and 23,1 years average anthropometric measurements are as

follows (Table 1) height of 1938,23 mm, 1736,33 mm; weight of 858,97 gr, 726,80 gr; hand length of 223,36 mm, 202,04 mm; finger length of 115.56 mm, 105.84 mm; hand width of 116.08 mm, 103.88 mm; metacarpal width of 91.80 mm, 84.56 mm; wrist width of 62.72 mm, 57.60 mm; wrist circumference of 188.76 mm, 175.80 mm, respectively.

Table 1. Antropometric Data of Male Volleyball Players and Sedentaries

	Volleyball Player (n=25)		Sedentary (n=25)		MEAN	F
	M	DS	M	DS		
	DİF.					
Length (mm)	1938.2	50.79	1736.3	69.88	180.510	0.81
	3		3			
Weight (gr)	858.97	64.79	726.80	136.55	143.570	0.00
Hand Length (mm)	223.36	9.48	202.04	7.78	21.320	2.15
Hand Width (mm)	116.08	5.36	103.88	4.62	12.200	1.94
Hand Finger Length (mm)	115.56	5.10	105.84	6.27	9.270	1.63
Metacarpal Width (mm)	91.80	4.13	84.56	4.85	7.240	1.343
Hand Wrist Circumference (mm)	188.76	6.54	175.80	8.704	12.960	0.535
Hand Wrist Width (mm)	62.72	2.475	57.60	3.162	5.120	0.058

p ≥ 0.001 significancy level

It is determined that with the mean age of 24.7 years, female volleyball players' and sedentary' average anthropometric measurements are as follows (Table 2) height of 1767.97 mm, 1595.97 mm; weight of 699.90 gr, 576.80 gr; hand length of 203.96 mm,

182.12 mm; finger length of 105.84 mm, 95.96 mm; hand width of 98.84 mm, 92.92 mm; metacarpal width of 82.56 mm, 77.04 mm; wrist width of 57.28 mm, 52.40 mm; wrist circumference of 176.12 mm, 160.36 mm.

Table 2. Antropometric Data of Female Volleyball Players and Sedentaries

	Volleyball Player (n=25)		Sedentary (n=25)		MEAN	F
	M	DS	M	DS		
	DİF.					
Length (mm)	1767.9	74.43	1595.9	64.57	179.460	0.870
	7		7			
Weight (gr)	699.90	98.10	576.80	87.94	136.480	0.023
Hand Length (mm)	203.96	10.85	182.12	10.69	21.840	0.018
Hand Width (mm)	98.84	5.10	92.92	4.94	5.920	0.092
Hand Finger Length (mm)	105.84	5.914	95.96	6.14	9.880	0.004
Metacarpal Width (mm)	82.56	3.513	77.04	3.680	5.520	0.141

Hand Wrist Circumference (mm)	176.12	20.50	160.36	7.24	15.760	1.078
Hand Wrist Width (mm)	57.28	3.49	52.40	2.36	4.880	1.862

$p \geq 0.001$ significancy level

DISCUSSION AND CONCLUSION

In Chuang and his friend's study, between 16 and 20 years of age 120 male subjects were analyzed. The average of subjects' hand length was found as 18.4 ± 0.9 cm (M.C. Chuang et al., 1997).

As a result of the study conducted by B. Buchholz and T.J. Armstrong, (1991) on ages ranged from 10-31 years 15 male and 15 female subjects; male participants' hand width value of 87.0 ± 5.0 mm, female participants' hand width value of 75.2 ± 2.8 mm was found. Male participants' hand length value and female participants' hand length value were found to be 187.0 ± 9.9 mm and 167.2 ± 4.6 mm, respectively (B. Buchholz and T. Armstrong, 1991). It was observed that the results of measurements are close to sedentary value, are lower than volleyball players' value.

In L.L. Lloyd and T.M.C. John's, (1967) research on mean age of 20.44 ± 3.89 years 117 male subjects; right hand length was measured at 19.21 ± 0.98 cm, left hand length was measured at 19.20 ± 0.97 cm (L.L. Lloyd and T.M. C. John, 1967).

O. Okunribido, (2000), in his study on ages ranged from 9-60 years (mean age of 33.51 ± 15.35 year) 37 female Nigerian subjects, found right hand width as 75.75 ± 5.17 mm, right hand length as 175.05 ± 11.07 mm (O. Okunribido, 2000).

In the study conducted by G. Kulaksiz, (2001), it was found that group consisted of male and female college students ranged from 17 to 25 years old have right hand width of $81,1325 \pm 6,0447$ mm (G. Kulaksiz, 2001).

J.E. Fernandez and K.G. Uppugonduri, (1992), found that 128 south Indian male workers' with mean age of 25.2 ± 4.1 years dominant hand width as 83 ± 4 mm (J.E. Fernandez and K.G. Uppugonduri, 1992).

L.W. Means and R.E. Walters, (1982), measured hand length in their research on the group consisted of 77 male and 79 female subjects. As a result of the measurements, it was found that among male whose right hand are dominant, their right hand lengths are longer than left, in the same way among male whose left hand is dominant, their left hand lengths are longer than right.

In female, they found that dominant right hand's length value is lower than their left hands'; dominant left hand's length value is lower than their right hand's (L.W. Means and R.E. Walters, 1982).

In branches in which the using the hand is important, anthropometric measurements of the hands are thought to be essential in directing of athlete. In terms of anthropometric measurements of the hands, significant differences were found between elite-level

volleyball players and sedentary groups, and it was concluded that athlete's branch could be resulted from.

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