



A comparative study on selected anthropometric characteristics in national male volleyball players

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Abstract

Aim: The purpose of the study was to compare the selected Anthropometric characteristics in National Volleyball Players.

Methods: The study was conducted on sixty male volleyball players from various states which participated in National Volleyball Championship. Twenty subjects from each team (i.e. Spiker, Setter and Libro) were selected for the present study. The age of the subjects ranged from 18 to 25 years. The following.

Anthropometric Characteristics: Were selected for the purpose of this study: Standing Height, Body Weight, Leg Length, Arm Length, Forearm Length, Trunk Length, Upper Arm Girth, Hand Length, Thigh Length, Thigh girth, Calf Girth.

Statistics: To compare the Volleyball players among spiker, setter and Libro in relation to anthropometrical variables, analysis of variance was used at 0.05 level of significance.

Conclusions: Spiker were having larger trunk length, upper arm girth, Hand length. Leg length, Thigh girth, Calf girth and Thigh length in comparison to other players.

Keywords: spiker, setter and libro

Introduction

Today the preparation of an athlete for top notch achievement is a completely dynamic state characterized by a high level of physical and physiological efficiency and degree of perfection of the necessary skills and knowledge, technique and tactical preparation. An athlete arrives at this stage only as a result of appropriate training. Thus, athletes training today are a multisided process of expedient use of aggregate factor so as to influence the development of an athlete and ensure the necessary level of participation.

The success or failure of an individual athlete depends on the blending of physical ability, conditioning, training mental preparation and the ability to perform well under pressure. It is not uncommon to hear coaches and athlete express disbelief on how poorly their team performed against a certain opponent or how they field in the crucial situation.

Athletes for superior performance in any sports are selected on the basis of his physical structure and body size, which has proved to be appropriate for high performance in the given sports.

The game of Volleyball offers opportunities for the development of strength, endurance, speed, agility, and neuromuscular skills and immediate action along with many precise educational outcomes. The game of volleyball requires a conditioning programme, which develops flexibility, muscular strength, power and agility all of which must be integrated to achieve the optimum skill performance from each player.

For competitive sports or for selection of a particular sport, one has to consider the measures of human body and the physical fitness, which play a dominant role at higher level of sports competition.

Anthropometric measurements matter of concerns of the first phase of the scientific area of measurement which began in

1960's. Current interest in anthropometric measurements focuses on three areas – growth patterns and prediction of success in motor activities, as well as, assessments of obesity. Body composition was concerned in past with the obesity of the individual. In measuring the aspects, the total body weight and fat weight, fat weight and lean body weight which includes muscles, bones and vital organs. The higher percentage of fat body weight, the higher the percentage of obesity. The physical fitness anthropometric measurement variables and body compositions are very important factors for achieving the high level of performance in standard competitions.

Objective of the study

The purpose of the study was to compare the selected Anthropometric characteristics of National Volleyball Players. The study was conducted on sixty volleyball players from various states which participated in National Volleyball Championship. Twenty subjects from each team (i.e. Spiker, Setter and Libro) were selected for the present study. The age of the subjects ranged from 18 to 25 years. Based on literary evidence and scholar's own understanding the following Anthropometric Characteristics were selected for the purpose of this study: Standing Height, Body Weight, Leg Length, Arm Length, Forearm Length, Trunk Length, Upper Arm Girth, Hand Length, Thigh Length, Thigh girth, Calf Girth.

It was hypothesized that there will be no significant difference among different playing positions (i.e. Spiker, Set-upper and Libero) in National Volleyball Players.

At the beginning, the investigator gathered all the subjects of volleyball (spiker, set-upper and libero) of and explained the purpose of the present study to them. The required data in different components was collected during the course of three

days in the volleyball field of (Raipur, Senior National 2007). The coaches and subjects were consulted personality and their sincere co-operation was solicited. Respondents were called to a common place when they were not busy and had enough time to spare for testing. Necessary instructions were given to the subjects before the administration of each test.

The criterion measures chosen were: Height, Arm Length, Forearm Length, Trunk Length, Upper Arm girth, Hand Length, Leg length, Thigh Girth, Calf Girth, Standing height, Body weight and Thigh length was measured with the help of flexible steel tape and score was recorded nearest to half centimeter.

To find the characteristics of selected anthropometrical variables of Spikers, Setuppers and Libero, to compare the selected anthropometrical among spikers, setuppers and libero, ANOVA (One way Analysis of Variance) has been applied.

The above statistical technique was performed by using SPSS version 11.5.

Table 1: Mean Comparison of Spiker, Set-upper and Libero in Relation to Standing Height of National Volleyball Players

Source of Variation	SS	df	MS	Cal. 'F'	Tab. 'F'
Between Groups	2284.275	2	1142.138	196.3116*	3.158843
Within Groups	331.625	57	5.817982		
Total	2615.9	59			

*Significant at 0.05 level of Significance

It appears from the Table - 1 that the computed value of F (196.3116) among Spiker, Set-upper and Libero of National level volleyball players in relation to Standing Height was greater than the tabulated (3.158843), F at .05 level as shown in table - 1, therefore null hypothesis among Spiker, Set-upper and Libero of National level volleyball players in relation to Standing Height was not accepted at 0.05 level.

Table 2: Post Hoc Comparison of Spiker, Set-upper and Libero in Relation to Standing Height (cm.) of National Volleyball Players

Spiker	Set-upper	Libero	Mean Difference	C.D.
189.4	180.78		8.62*	1.5255
189.4		174.18	15.22*	
	180.78	174.18	6.6*	

* Significant at 0.05 level.

Table – 2 revealed that significant difference exists in case of spikers and set-upper, spiker and Libero, and Set-upper and Libero as the Mean difference was greater than the Critical Difference.

Table 3: Mean Comparison of Spiker, Set-upper and Libero in Relation to Body Weight of National Volleyball Players

Source of Variation	SS	df	MS	Cal. 'F'	Tab. 'F'
Between Groups	2073.658	2	1036.829	52.43538*	3.158843
Within Groups	1127.088	57	19.77346		
Total	3200.746	59			

*Significant at 0.05 level of significance

It appears from the Table -3 that the computed value of F (52.43538) among Spiker, Set-upper and Libero of National level volleyball players in relation to Body weight was greater

than the tabulated (3.158843), F at .05 level as shown in table – 3, therefore null hypothesis among Spiker, Set-upper and Libero of National level volleyball players in relation to Body weight was not accepted at 0.05 level.

Table 4: Post Hoc Comparison of Spiker, Set-upper and Libero in Relation to Body Weight (kg.) of National Volleyball Players

Spiker	Set-upper	Libero	Mean Difference	C.D.
82.24	74.25		7.99*	2.8124
82.24		67.8	14.44*	
	74.25	67.8	6.45*	

* Significant at 0.05 level.

Table – 4 revealed that significant difference exists in case of spikers and set-upper, spiker and Libero, and Set-upper and Libero as the Mean difference was greater than the Critical Difference.

Table 5: Mean Comparison of Spiker, Set-upper and Libero in Relation to Arm Length of National Volleyball Players

Source of Variation	SS	df	MS	Cal. 'F'	Tab. 'F'
Between Groups	689.0333	2	344.5167	63.34406*	3.158843
Within Groups	310.0125	57	5.438816		
Total	999.0458	59			

*Significant at 0.05 level of significance

It appears from the Table- 5 that the computed value of F (63.34406) among Spiker, Set-upper and Libero of National level volleyball players in relation to Arm length was greater than the tabulated (3.158843), F at .05 level as shown in table - 5, therefore null hypothesis among Spiker, Set-upper and Libero of National level volleyball players in relation to Arm length was not accepted at 0.05 level.

Table 6: Post Hoc Comparison of Spiker, Set-upper and Libero in Relation to Arm Length (cm.) of National Volleyball Players

Spiker	Set-upper	Libero	Mean Difference	C.D.
80.8	74.23		6.57*	1.475
80.8		72.93	7.87*	
	74.23	72.93	1.3	

* Significant at 0.05 level.

Table – 6 revealed that significant difference exists in case of spikers and set-upper, spiker and Libero as the Mean difference was greater than the Critical Difference.

Table 7: Mean Comparison of Spiker, Set-upper and Libero in Relation to Forearm Length of National Volleyball Players

Source of Variation	SS	df	MS	Cal. 'F'	Tab. 'F'
Between Groups	137.1	2	68.55	20.51102*	3.158843
Within Groups	190.5	57	3.342105		
Total	327.6	59			

*Significant at 0.05 level of significance

It appears from the Table- 7 that the computed value of F (20.51102) among Spiker, Set-upper and Libero of National level volleyball players in relation to forearm length was greater than the tabulated (3.158843), F at .05 level as shown in table - 7, therefore null hypothesis among Spiker, Set-upper and Libero of National level volleyball players in relation to

forearm length was not accepted at 0.05 level.

Table 8: Post Hoc Comparison of Spiker, set-upper and Libero in relation to Fore Arm Length (cm) of National Volleyball players

Spiker	Set-upper	Libero	Mean Difference	C.D.
32.8	36.35		-3.55*	1.1562
32.8		35.3	-2.5*	
	36.35	35.3	1.05	

* Significant at 0.05 level.

Table – 8 revealed that significant difference exists in case of spikers & set-upper and spiker & Libero as the Mean difference was greater than the Critical Difference.

Table 9: Mean Comparison of Spiker, Set-upper and Libero in Relation to Trunk Length of National Volleyball Players

Source of Variation	SS	df	MS	Cal. 'F'	Tab. 'F'
Between Groups	303.2583	2	151.6292	43.7641*	3.158843
Within Groups	197.4875	57	3.464693		
Total	500.7458	59			

*Significant at 0.05 level of significance

It appears from the Table - 9 that the computed value of F (43.7641) among Spiker, Set-upper and Libero of National level volleyball players in relation to trunk length was greater than the tabulated (3.158843), F at .05 level as shown in table - 9, therefore null hypothesis among Spiker, Set-upper and Libero of National level volleyball players in relation to trunk length was not accepted at 0.05 level.

Table 10: Post Hoc Comparison of Spiker, Set-upper and Libero in Relation to Trunk Length (cm) of National Volleyball Players

Spiker	Set-upper	Libero	Mean Difference	C.D.
78.16	74.9		3.26*	1.1772
78.16		72.68	5.48*	
	74.9	72.68	2.22*	

* Significant at 0.05 level

Table – 10 revealed that significant difference exists in case of spikers & set-upper, spiker & Libero and Set-upper & Libero as the Mean difference was greater than the Critical Difference.

Table 11: Mean Comparison of Spiker, Set-upper and Libero in Relation to Upper Arm Girth of National Volleyball Players

Source of Variation	SS	df	MS	Cal. 'F'	Tab. 'F'
Between Groups	1248.908	2	624.4542	95.16446*	3.158843
Within Groups	374.025	57	6.561842		
Total	1622.933	59			

*Significant at 0.05 level of significance

It appears from the Table- 11 that the computed value of F (95.16446) among Spiker, Set-upper and Libero of National level volleyball players in relation to upper arm girth was greater than the tabulated (3.158843), F at .05 level as shown in table - 11, therefore null hypothesis among Spiker, Set-upper and Libero of National level volleyball players in

relation to upper arm girth was not accepted at 0.05 level.

Table 12: Post Hoc Comparison of Spiker, Set-upper and Libero in Relation to Upper Arm Girth (cm) of National Volleyball Players

Spiker	Set-upper	Libero	Mean Difference	C.D.
29.6	24.03		5.57*	1.6201
29.6		18.35	11.25*	
	24.03	18.35	5.68*	

* Significant at 0.05 level.

Table – 12 revealed that significant difference exists in case of spikers & set-upper, spiker & Libero and Set-upper & Libero as the Mean difference was greater than the Critical Difference.

Table 13: Mean Comparison of Spiker, Set-upper and Libero in Relation to Hand Length of National Volleyball Players

Source of Variation	SS	df	MS	Cal. 'F'	Tab. 'F'
Between Groups	47.23333	2	23.61667	8.533439*	3.158843
Within Groups	157.75	57	2.767544		
Total	204.9833	59			

*Significant at 0.05 level of significance

It appears from the Table- 13 that the computed value of F (8.533439) among Spiker, Set-upper and Libero of National level volleyball players in relation to hand length was greater than the tabulated (3.158843), F at .05 level as shown in table - 13, therefore null hypothesis among Spiker, Set-upper and Libero of National level volleyball players in relation to hand length was not accepted at 0.05 level.

Table 14: Post Hoc Comparison of Spiker, Set-upper and Libero in Relation to Hand Length (cm.) of National Volleyball Players

Spiker	Set-upper	Libero	Mean Difference	C.D.
23.2	21.8		1.4*	1.0521
23.2		21	2.2*	
	21.8	21	0.8	

* Significant at 0.05 level

Table – 14 revealed that significant difference exists in case of spikers & set-upper and spiker & Libero as the Mean difference was greater than the Critical Difference.

Table 15: Mean Comparison of Spiker, Set-upper and Libero in Relation to Leg Length of National Volleyball Players

Source of Variation	SS	df	MS	Cal. 'F'	Tab. 'F'
Between Groups	917.2333	2	458.6167	73.64742*	3.158843
Within Groups	354.95	57	6.227193		
Total	1272.183	59			

*Significant at 0.05 level of significance

It appears from the Table- 15 that the computed value of F (73.64742) among Spiker, Set-upper and Libero of National level volleyball players in relation to leg length was greater than the tabulated (3.158843), F at .05 level as shown in table - 15, therefore null hypothesis among Spiker, Set-upper and Libero of National level volleyball players in relation to leg

length was not accepted at 0.05 level.

Table 16: Post Hoc Comparison of Spiker, Set-upper and Libero in Relation to Leg Length (cm.) of National Volleyball Players

Spiker	Set-upper	Libero	Mean Difference	C.D.
111.4	105.8		5.6*	1.5783
111.4		101.65	9.75*	
	105.8	101.65	4.15*	

* Significant at 0.05 level

Table – 16 revealed that significant difference exists in case of spikers & set-upper, spiker & Libero and Set-upper & Libero as the Mean difference was greater than the Critical Difference.

Table 17: Mean Comparison of Spiker, Set-upper and Libero in Relation to Thigh Girth of National Volleyball Players

Source of Variation	SS	df	MS	Cal. 'F'	Tab. 'F'
Between Groups	911.2333	2	455.6167	25.00737*	3.158843
Within Groups	1038.5	57	18.2193		
Total	1949.733	59			

*Significant at 0.05 level of significance

It appears from the Table- 17 that the computed value of F (25.00737) among Spiker, Set-upper and Libero of National level volleyball players in relation to thigh girth was greater than the tabulated (3.158843), F at. 05 level as shown in table - 17, therefore null hypothesis among Spiker, Set-upper and Libero of National level volleyball players in relation to thigh girth was not accepted at 0.05 level.

Table 18: Post Hoc Comparison of Spiker, Set-upper and Libero in Relation to Thigh Girth (cm.) of National Volleyball Players

Spiker	Set-upper	Libero	Mean Difference	C.D.
58.7	51.35		7.35*	2.6996
58.7		49.75	8.95*	
	51.35	49.75	1.6	

* Significant at 0.05 level.

Table – 18 revealed that significant difference exists in case of spikers & set-upper and spiker & Libero as the Mean difference was greater than the Critical Difference.

Table 19: Mean Comparison of Spiker, Set-upper and Libero in Relation to Calf Girth of National Volleyball Players

Source of Variation	SS	df	MS	Cal. 'F'	Tab. 'F'
Between Groups	502.2333	2	251.1167	15.52541*	3.158843
Within Groups	921.95	57	16.17456		
Total	1424.183	59			

*Significant at 0.05 level of significance

It appears from the Table - 19 that the computed value of F (15.52541) among Spiker, Set-upper and Libero of National level volleyball players in relation to calf girth was greater than the tabulated (3.158843), F at. 05 level as shown in table - 19, therefore null hypothesis among Spiker, Set-upper and Libero of National level volleyball players in relation to calf girth was not accepted at 0.05 level.

Table 20: Post Hoc Comparison of Spiker, Set-upper and Libero in Relation to Calf Girth (cm.) of National Volleyball Players

Spiker	Set-upper	Libero	Mean Difference	C.D.
42.8	37.95		4.85*	2.5436
42.8		35.9	6.9*	
	37.95	35.9	2.05	

* Significant at 0.05 level.

Table – 20 revealed that significant difference exists in case of spikers & set-upper and spiker & Libero as the Mean difference was greater than the Critical Difference.

Table 21: Mean Comparison of Spiker, Set-upper and Libero in Relation to Thigh Length of National Volleyball Players

Source of Variation	SS	df	MS	Cal. 'F'	Tab. 'F'
Between Groups	212.4333	2	106.2167	7.10146*	3.158843
Within Groups	852.55	57	14.95702		
Total	1064.983	59			

*Significant at 0.05 level of significance

It appears from the Table - 21 that the computed value of F (7.10146) among Spiker, Set-upper and Libero of National level volleyball players in relation to thigh length was greater than the tabulated (3.158843), F at. 05 level as shown in table - 21, therefore null hypothesis among Spiker, Set-upper and Libero of National level volleyball players in relation to thigh length was not accepted at 0.05 level.

Table 22: Post Hoc Comparison of Spiker, Set-upper and Libero in Relation to Thigh Length (cm.) of National Volleyball Players

Spiker	Set-upper	Libero	Mean Difference	C.D.
60.2	57.85		2.35	2.446
60.2		55.8	4.4*	
	57.85	55.8	2.05	

* Significant at 0.05 level

Table – 22 revealed that significant difference exists in case of spiker & Libero as the Mean difference was greater than the Critical Difference.

Discussion of Findings

The present study reveals that significant difference was found in the mean of selected Anthropometrical variables and the playing position (i.e Spiker, Set-upper and Libero. The difference in anthropometrical variables can be attributed to the fact that in every game a specialized player is required for a specific task. For example the libero which act as best defender in volleyball, set-upper acts as a pivot and finally spiker which acts as a attacker. Thus we can assume that spiker needs to be taller in order to get the advantage in spiking. Whereas Libero can smaller because smaller Libero can maintain better C.G. Thus there are difference in the anthropometrical variables.

Testing of Hypothesis

It was hypothesized that there will be no significant difference between different playing positions was accepted.

Conclusions

1. Spikers were taller than set-upper and Libero whereas Libero are most shortest player in a team
2. Spikers are heavier in comparison to other players.
3. Arm length is greater in spiker in relation to other players.
4. Set-upper were having larger forearm length in comparison to other players
5. Spiker were having larger trunk length, upper arm girth, Hand length. Leg length, Thigh girth, Calf girth and Thigh length in comparison to other players.

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