



ISSN: 2456-0057
IJPNE 2017; 2(1): 87-92
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www.journalofsports.com
Received: 16-11-2016
Accepted: 17-12-2016

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Positional-wise analysis on anthropometric and physical fitness parameters among male inter-collegiate volleyball players

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Abstract

The purpose of the study was to analyze the anthropometric and physical fitness Parameters among Position wise volleyball players. To achieve the purpose of the study 35 Attackers, 35 Blockers, 25 Setters and 12 Libero players those who represented for the inter-collegiate level tournament from affiliated colleges Bharathiar University, Coimbatore, Tamilnadu. The selected subjects were divided into four groups Group I consists of 35 Attackers, Group II consists of 35 Blockers, Group III consists of 25 Setters, and Group IV consists of 12 Libero players. Only male volleyball players were selected as participants subjects were tested on the selected Parameters. The data pertaining to the Parameters were examined by using analysis of variance (ANOVA) for each variables to determine the differences if any, among the means. Whenever 'F' ratio was found to be significant, the Scheffe's test was used as post-hoc test to determine the cell mean differences. The level of significance was fixed at.05 level of confidence for all the cases. The result of the study indicates that there is significant difference among Positional-Wise Male Volleyball Players namely Attackers, Blockers Setters and Liberos. However, Blockers are found to be better than Attackers, Setters and Liberos on Height, Arm Length, Leg Length, Calf Girth, and Explosive Power.

Keywords: Height, arm length, leg length, calf girth, explosive power

Introduction

Volleyball is an excellent all-round team-sport, and it has been widely accepted as a highly competitive and recreational game throughout the world. Since its inception in 1895, it has not only developed from a slow moving game into a fast one, but also has become a game of high interest and joy to the players and spectators alike. It is interesting to note that the speed of a powerfully spiked ball in the game of Volleyball is about 45 meters per second, which is much faster than the movement of the ball in most other games. Further, the game offers a wider opportunity for the development of strength, speed, endurance, agility, neuro-muscular skills and coordination of all parts of the body by the actions involved in the game, such as running, jumping, bending, stretching and other movements which call for balance and poise. The game situations demand coordinated teamwork thereby instilling in every player a sense of personal and group responsibility by his individual performance and his ability to combine with the rest of the team. Volleyball, when promoted under sound leadership, brings out and sharpens the qualities of honesty, fair play and sportsmanship in those who participate in it. Anthropometric measurement of body structure is the oldest type of body measurement known dating back to the beginning of recorded history. It was also an early type of testing in physical education. On the theory that exercise should be prescribed to affect muscle size, emphasis was placed upon muscle symmetry and proportion. In the year 1861 Hit Chock and sergeant produced profile charts to reveal how individuals compared with their standards. Sergeants chart continued 44 anthropometric measurements as well as number of strength tests. Fifty such tests were recommended by the American association for the advancement of physical education. Sue Gozansky, (1987) [5]

Methods

The purpose of the study was to analyze the anthropometric and physical fitness Parameters among Position-wise volleyball players.

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Statistical Technique

To compare the anthropometric and physical fitness variables among the attackers, blockers, setters and Liberos player. Static group comparison design was used as a experimental design. All the subjects were tested on selected criterion variables. The data pertaining to the variables were examined by using analysis of variance (ANOVA) for each variables to

determine the differences if any, among the means. Whenever ‘F’ ratio was found to be significant, the Scheffe’s post-hoc test is used to determine the cell mean differences. The level of significance was fixed at 0.05 level of confidence for all the cases.

Selection of Tests

Sl. No.	Criterion Parameters	Test Items	Unit of Measurement
1	Height	Stadiometer	In Centimeters
2	Arm Length	Measuring Tape	In Centimeters
3	Leg Length	Measuring Tape	In Centimeters
4	Calf Girth	Measuring Tape	In Centimeters
5	Explosive Power	vertical Jump	In Centimeters

Table I: Analysis of Variance on Height among Attacker, Blocker, Setter and Liberos.

Mean				Sources Of Variance	Sum of Square	df	Mean Squares	F-ratio
Attackers	Blockers	Setters	Liberos					
175.31	178.09	171.96	167.83	Between	1166.80	3	388.94	10.81*
				Within	3706.91	103	35.99	

Table shows that the mean values of four different groups like attackers, blockers, setters and Liberos are 175.31, 178.09, 171.96 and 167.83 respectively. The obtained f-ratio value is 10.81 which is greater than the table value 2.68 with df 3 and 103 required for significance at.05 level. Since the value of f-ratio is greater than the table value, it indicates that there is

significant difference exists among the means of four different groups on height.

Scheffe’s Test for the Differences between the Paired Means on Height among Different Groups

Mean values				Mean Differences	Confidential Interval
Attackers	Blockers	Setters	Liberos		
175.31			167.83	7.48*	5.65
175.31	178.09			1.78	4.17
	178.09	171.96		6.13*	4.51
		171.96	167.83	4.13	5.88

The table shows that the mean difference in between Attackers and Blockers and Setters and Liberos are 1.78 and 4.13 which are lesser than the confidence interval value of 4.17, 5.88 at.05 level of confidence. Mean Difference in Height between Attackers and Liberos and Blockers and Setters are 7.48, 6.13 which are greater than the Confidence

Interval Value of 4.51, 5.88 at.05 level of confidence. The result of the study indicates that there is significant difference between Attackers and Liberos, Blockers and Setters on Height. However, the mean values of Attackers are found to be higher than blockers, setters and Liberos.

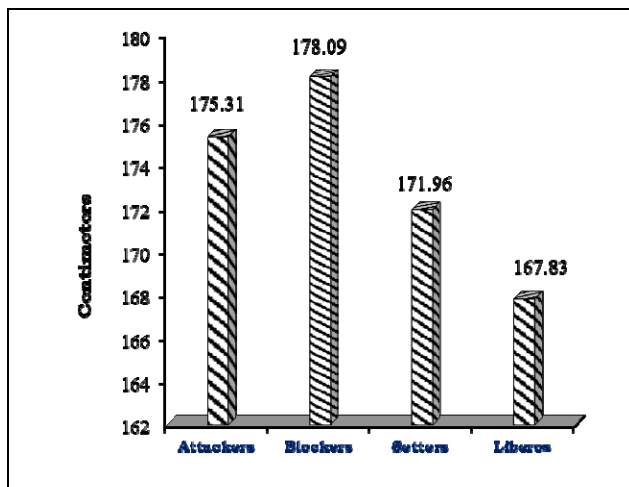


Table II: Analysis of Variance on Arm Length among Attackers, Blockers Setters and Liberos.

Mean				Sources of Variance	Sum of Square	df	Mean Squares	F-ratio
Attackers	Blockers	Setters	Liberos					
81.26	82.94	78.28	76.92	Between	504.59	3	168.17	8.16*
				Within	2122.53	103	20.61	

Table shows that the mean values of four different groups like Attackers, Blockers, Setters and Liberos are 81.26, 82.94, 78.28 and 76.92 respectively. The obtained F-ratio value is 8.16 which is greater than the table value 2.68 with df 3 and 103 required for significance at.05 level. Since the value of F-ratio is greater than the table value, it indicates that there is

significant difference exists among the means of four different groups on Arm length.

Scheffe’s Test for the Differences between the Paired Means on Arm Length among Different Groups.

Mean values				Mean Differences	Confidential Interval
Attackers	Blockers	Setters	Liberos		
81.26			76.92	4.34*	4.28
81.26	82.94			1.68	3.15
	82.94	78.28		4.66*	3.41
		78.28	76.92	1.36	4.46

The table shows that the mean difference in Arm length between Attackers and Blockers and Setters and Liberos are 1.68 and 1.36 which are lesser than the confidence interval value of 3.15, 4.46 at.05 level of confidence. Mean Difference in Arm length be between Attackers and Liberos and Blockers and Setters are 4.34, 4.66 which are greater than the

Confidence Interval Value of 4.28, 3.41 at.05 level of confidence. The result of the study indicates that there is significant difference between Attackers and Liberos, Blockers and Setters on Arm length. However, the mean value of Blockers was found to be higher than Attackers, Setters and Liberos on Arm length.

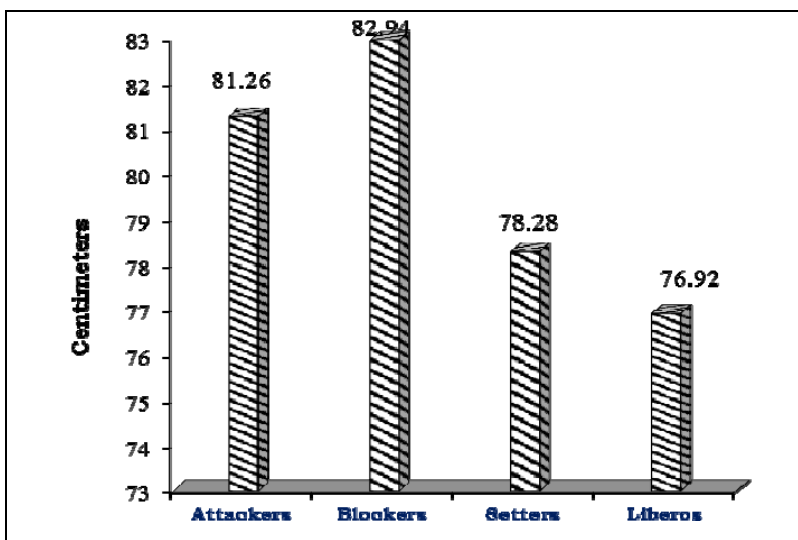


Table III: Analysis of Variance on Leg Length among Attackers, Blocker, Setter and Liberos.

Mean				Sources of Variance	Sum of Square	df	Mean Squares	F-ratio
Attackers	Blockers	Setters	Liberos					
105.49	107.46	103.20	100.75	Between	516.86	3	172.29	7.40*
				Within	2399.68	103	23.30	

Table shows that the mean values of four different groups like Attackers, Blockers, Setters and Liberos are 105.49, 107.46, 103.20 and 100.75 respectively. The obtained F-ratio value is 7.40 which is greater than the table value 2.68 with df 3 and 103 required for significance at.05 level. Since the value of F-ratio is greater than the table value, it indicates that there is

significant difference exists among the means of four different groups on Leg length.

Scheffe’s Test for the Differences between the Paired Means on Leg Length among Different Groups

Mean values				Mean Differences	Confidential Interval
Attackers	Blockers	Setters	Liberos		
105.49			100.75	4.74*	4.54
105.49	107.46			2.03	3.35
	107.46	103.20		4.26*	3.61
		103.20	100.75	2.45	4.74

The table shows that the mean difference in Leg length between Attackers and Blockers and Setters and Liberos are 2.03 and 2.45 which are lesser than the confidence interval value of 3.35, 4.74 at.05 level of confidence. Mean Difference in Leg length be between Attackers and Liberos and Blockers and Setters are 4.74, 4.26 which are greater than the

Confidence Interval Value of 4.54, 3.61 at.05 level of confidence. The result of the study indicates that there is significant difference between Attackers and Liberos, Blockers and Setters on Leg length. However, the mean value of Attackers was found to be higher than Blockers, Setters and Liberos on Leg length.

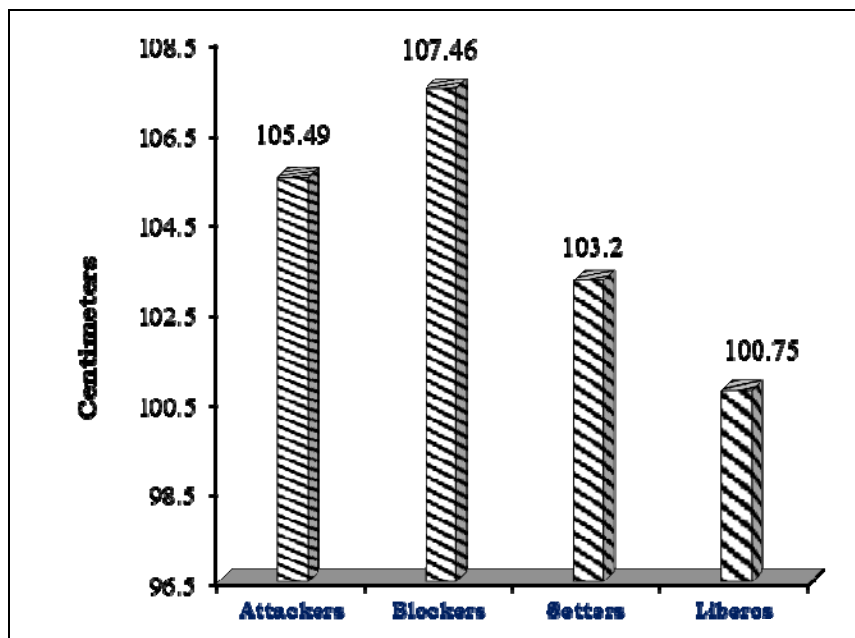


Table IV: Analysis of Variance on Calf Girth among Attackers, Blockers, Setter and Liberos

Mean				Sources of Variance	Sum of Square	df	Mean Squares	F-ratio
Attackers	Blockers	Setters	Liberos					
37.46	33.83	34.08	31.91	Between	6.461	3	2.154	2.70*
				Within	81.721	103	.793	

Table shows that the mean values of four different groups like Attackers, Blockers, Setters and Liberos are 37.46, 33.83, 34.08 and 31.91 respectively. The obtained F-ratio value is 2.70 which is greater than the table value 2.68 with df 3 and 103 required for significance at.05 level. Since the value of F-ratio is greater than the table value, it indicates that there is

significant difference exists among the means of four different groups on Calf girth.

Scheffe’s Test for the Differences between the Paired Means on Calf Girth among Different Groups

Mean values				Mean Differences	Confidential Interval
Attackers	Blockers	Setters	Liberos		
37.46			31.91	5.55*	2.56
37.46	33.83			3.63*	1.90
	33.83	34.08		0.25	2.04
		34.08	31.91	2.17	2.67

The table shows that the mean difference in between Blockers and Setters and Setters and Liberos, are 0.25, 2.17, which are lesser than the confidence interval value of 2.04, 2.67 at.05 level of confidence. Mean Difference in Calf Girth between Attackers and Liberos, Attackers and Blockers are 5.55 & 3.63 which are greater than the Confidence Interval Value of

2.56, 1.90 at.05 level of confidence. The result of the study indicates that there is significant difference between Attackers and Liberos, Blockers and setters on Calf Girth. However, the mean values of Attackers are found to be higher than blockers, setters and Liberos.

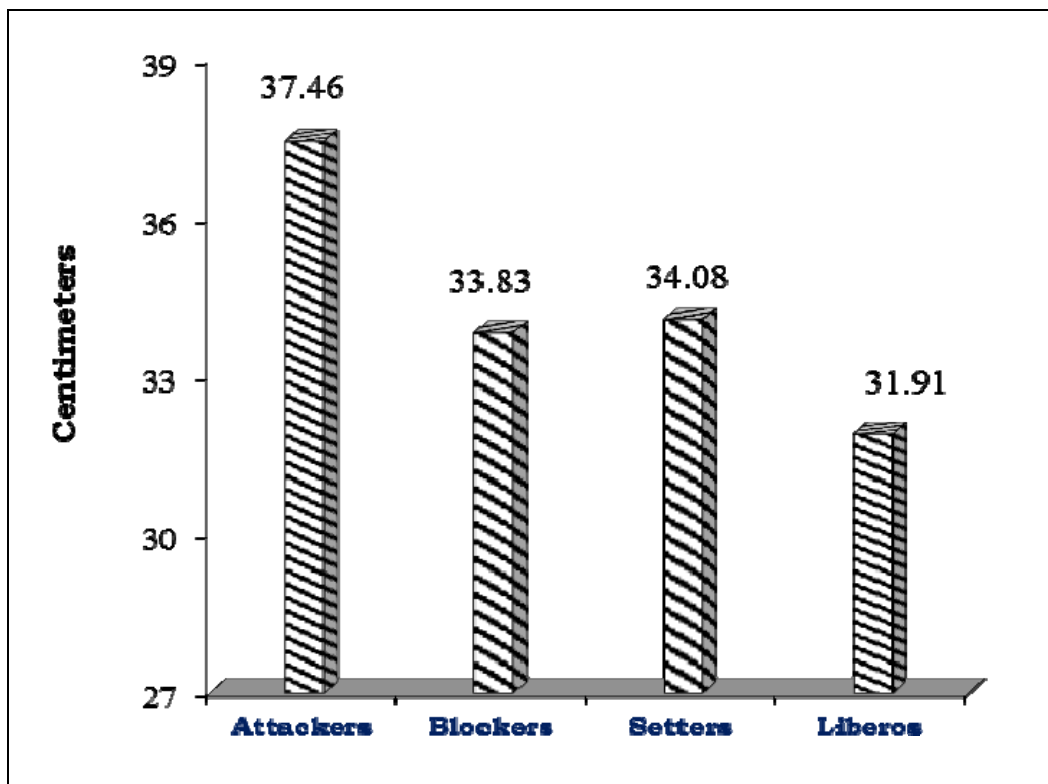


Table IV: Analysis of Variance on Explosive Power among Attackers, Blockers, Setters and Liberos.

Mean				Sources of Variance	Sum of Square	df	Mean Squares	F-ratio
Attackers	Blockers	Setters	Liberos					
57.17	55.03	56.10	49.75	Between	509.96	3	169.98	6.74*
				Within	2597.69	103	25.22	

Table shows that the mean values of four different groups like Attackers, Blockers, Setters and Liberos are 57.17, 55.03, 56.10 and 49.75 respectively. The obtained F-ratio value is 6.74 which is greater than the table value 2.68 with df 3 and 103 required for significance at.05 level. Since the value of F-ratio is greater than the table value, it indicates that there is

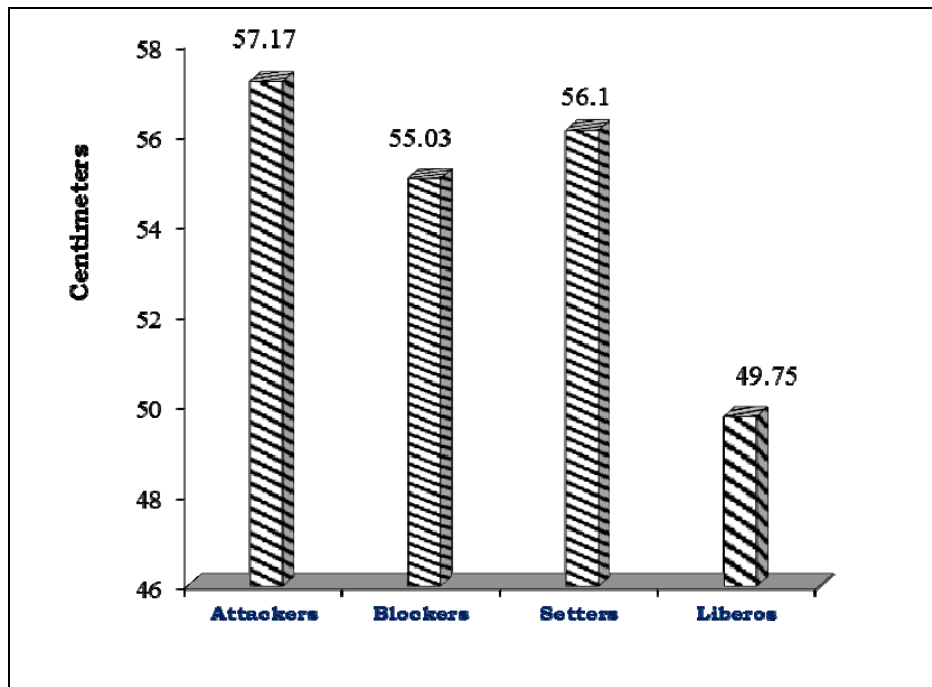
significant difference exists among the means of four different groups on explosive power.

Scheffe’s Test for the Differences between the Paired Means on Explosive Power among Different Groups

Mean values				Mean Differences	Confidential Interval
Attackers	Blockers	Setters	Liberos		
57.17			49.75	7.42*	4.71
57.17	55.03			2.14	3.49
	55.03	56.10		1.07	3.77
		56.10	49.75	6.35*	4.94

The table shows that the mean difference in between Attackers and Blockers and Blockers and Setters, are 2.14, 1.07, which are lesser than the confidence interval value of 3.49, 3.77 at.05 level of confidence. Mean Difference in Explosive power between Attackers and Liberos, setters and Liberos are 7.42 & 6.35 which are greater than the

Confidence Interval Value of 4.71, 4.94 at.05 level of confidence. The result of the study indicates that there is significant difference between Attackers and Liberos and Setters and Liberos on Explosive power. However, the mean values of Attackers are found to be higher than blockers, setters and Liberos.



Conclusions

There was significant difference among Attackers, Blockers, Setters and Liberos of inter-collegiate volleyball players on Height, Arm Length, Leg Length, and Calf Girth.

The result of the study indicates that there is significant difference among four different volleyball playing positions namely Attackers, Blockers Setters and Liberos. However, Blockers are found to be better than Attackers, Setters and Liberos on Arm Length, Leg Length.

The result of the study indicates that there is significant difference among four different volleyball playing positions namely Attackers, Blockers Setters and Liberos. However Attackers are found to be better than Blockers, Setters and Liberos on height, calf Girth and Explosive Power.

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