International Journal of Research
Available at https://edupediapublications.org/journals
p-ISSN: 2348-6848
e-ISSN: 2348-795X
Volume 04 Issue 06
May 2017

Position-Wise Analysis On Anthropometric Characteristics Of State Level Junior Elite Basketball Players

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Abstract

The purpose of the study was to analysis the position-wise anthropometric characteristics of state level Basketball players. To achieve the purpose of the study, 96 basketball players were selected as subjects from the 64th Junior National Championship, 2013. the selected players were classified into three groups namely Gurad (G), Forward (F) and Centers (C); each classification consists of 32 basketball players. All the anthropometric assessment, were measured by standardized test protocols. To analysis the significant mean difference among their playing position's anthropometric characteristics, Analysis of Variance (ANOVA) was computed. The result revealed that the center players were possessing maximum value in all anthropometric characteristics followed by forward and then the guard players.

Key Words: Guard, Forward and Center Junior Basketball players,

Introduction

Basketball is a team based sport that has evolved greatly since its inception over couple of centuries ago. India has both men's and women's national teams in basketball. Affiliated into FIBA since 1936, India has one of Asia's longest basketball traditions. Now a day more and more young players are turning on to participate in international events. This is very good sign for India. To compete with world number one teams, India yet to be adopt more scientific methodology to enhance the performance in all spheres. The modern game of basketball is played at very faster speed that consists of activities of short duration but high intensity during the game. The changing nature of the game both on offensive and defensive system of play and advent of professionalism has led to greater morphological, physiological and psychological demands on players. Playing position in basketball is necessary to optimize the organization

of offense and defense and thus increase their efficiency (Bishop and Wright, 2006).

Further, basketball is the game where size, shape and body composition play an important role in providing distinct advantage for specific playing positions. For optimal performance during play at an elite level, a variety of areas must be addressed (Viswanathan and Chandrasekaran, 2011). These include the high skill level, psychosomatic level and importantly the specific use of anthropometric measurements namely length measurements (arm span, leg length, arm length, palm length), breadth measurements (shoulder breadth, humerus & femur breadth), girth measurements (arm girth, thigh girth, hip – waist ratio, chest girth) and skinfold measurements (biceps, subscapula, triceps, supraspinale, abdominal, iliac crest, front thigh, medial calf) which play a vital role in the game basketball. There is profound positive relationship between performance in sports and the anthropometric aspects of an athlete's body (Abdelkrim, et al., 2007). It has been scientifically proved that different sports or different events in a same sport require the demand of different bodily characteristics. In some games, where players have to play at different positions, there too, it has been found that the requirement of anthropometric characteristics is different. The purpose of the study was to make an attempt to profiling of anthropometrical characteristics of state level junior elite basketball players and then assess the relative importance of these characteristics by comparing with their playing position.

Methodology

To achieve the purpose of the study, 96 basketball players those who were participated in the 64th Junior National Basketball Championship, 2013 held at Cuttack, Odisha, India, were selected as subjects for this study. The age of the subjects were ranged from 16 to 18 years. All the selected subjects were played the championship in Level – I classification matches. The independent variables namely, height, weight, skinfold measures (biceps, subscapula, triceps, supraspinale, abdominal, iliac crest, front thigh and medial calf); girth measures (arm girth relaxed, arm girth tensed, waist, gluteus and calf) and breadth measures (humerus & femur breadth) were selected. Further, the selected players

were classified into three groups namely Gurad (G), Forward (F) and Centers (C); each classification consists of 32 basketball players. All the anthropometric assessment, were measured by the investigator who was a certified ISAK level – I and level – II Anthropometrist, by **I**nternational **S**ociety for the **A**dvancement of **K**inanthropometry (ISAK). The Statistical techniques included descriptive statistics for all the anthropometric characteristics of selected subjects with special reference to their playing positions. To analysis the significant mean difference among their playing position's anthropometric characteristics, Analysis of Variance (ANOVA) was computed. If any significant mean differences exist, to identify which pair of means have greater among the groups, Scheffe's Post hoc test was applied. The level of significance was set at 0.05 for all the cases.

Result and Discussions

The descriptive statistics of mean, standard deviation, minimum, maximum and range of the criterion anthropometric measures were computed and presented in the Table – I.

Table – I
Descriptive statistics of Anthropometric Characteristics of State level Junior Elite Basketball Players

Variable	Position	Range	Minimum	Maximum	Mean	SD (±)
Biceps SK	Guard	8.20	3.00	11.20	6.19	2.38
	Forward	14.60	3.50	18.10	6.11	3.23
	Center	8.80	3.50	12.30	6.24	2.36
Triceps SK	Guard	21.60	1.40	23.00	10.91	4.68
	Forward	20.00	5.00	25.00	11.84	4.84
	Center	79.00	6.00	85.00	14.20	13.53
Subscupular SK	Guard	16.50	7.50	24.00	12.75	4.54
	Forward	17.30	8.00	25.30	14.39	4.22
	Center	14.80	7.30	22.10	13.51	3.79
Iliac crest SK	Guard	32.50	1.50	34.00	15.23	6.74
	Forward	42.10	2.90	45.00	17.55	9.20
	Center	29.50	5.50	35.00	19.90	7.26
Sapraspinate SK	Guard	19.00	4.00	23.00	7.99	4.38
	Forward	18.00	4.00	22.00	8.71	4.37
	Center	11.00	5.00	16.00	8.75	2.69
Abdominal SK	Guard	39.80	6.20	46.00	16.59	10.04
	Forward	35.89	2.11	38.00	16.51	8.55
	Center	27.50	6.00	33.50	18.32	7.28
Front thigh SK	Guard	25.70	4.30	30.00	16.41	5.55
	Forward	30.00	6.00	36.00	17.19	7.77
	Center	19.50	7.00	26.50	18.13	5.20

Medial calf SK	Guard	17.50	5.00	22.50	10.09	4.23
	Forward	26.10	4.20	30.30	12.42	6.20
	Center	22.50	5.00	27.50	12.18	5.98
Arm girth relaxed	Guard	9.70	22.30	32.00	25.78	2.02
	Forward	9.50	22.00	31.50	26.67	2.10
	Center	11.00	23.00	34.00	27.57	2.16
Arm girth tensed	Guard	11.60	25.40	37.00	28.83	2.28
	Forward	13.00	25.00	38.00	29.91	2.46
	Center	14.00	25.00	39.00	30.51	2.43
Waist Girth	Guard	45.70	28.80	74.50	68.83	7.75
	Forward	35.40	48.00	83.40	71.53	5.67
	Center	27.40	69.00	96.40	75.81	6.27
Gluteus Girth	Guard	23.00	77.00	100.00	86.73	4.39
	Forward	46.00	55.00	101.00	87.61	9.63
	Center	29.30	82.00	111.30	92.07	6.11
Calf Girth	Guard	8.00	29.00	37.00	33.27	2.16
	Forward	26.00	30.00	56.00	36.06	5.44
	Center	21.50	25.50	47.00	35.53	3.35
Humerus Breadth	Guard	1.50	6.00	7.50	6.57	0.42
	Forward	1.50	6.00	7.50	6.74	0.42
	Center	3.80	6.20	10.00	7.16	0.67
Femur Breadth	Guard	79.50	8.50	88.00	11.82	13.91
	Forward	1.50	9.00	10.50	9.63	0.42
	Center	4.00	9.00	13.00	9.98	0.81
Height	Guard	11.00	167.00	178.00	173.53	3.64
	Forward	7.00	178.00	185.00	180.59	1.49
	Center	23.50	186.00	209.50	191.56	6.05
Weight	Guard	29.00	51.00	80.00	62.91	6.74
	Forward	32.00	52.00	84.00	70.03	7.25
	Center	73.00	64.00	137.00	78.34	12.66

Table – II
Analysis of Variance on Skinfold Measures of State level Elite Basketball Players

Variables	Source of Variance	Sum of Squares	df	Mean Square	F
Biceps SF	Between Groups	.271	2	0.136	0.019
	Within Groups	670.961	93	7.215	
Triceps SF	Between Groups	184.034	2	92.017	1.209
	Within Groups	7076.946	93	76.096	
Subscupular SF	Between Groups	42.986	2	21.493	1.222
	Within Groups	1636.174	93	17.593	
Iliac crest SF	Between Groups	349.227	2	174.613	2.866
	Within Groups	5666.005	93	60.925	
Sapraspinate SF	Between Groups	11.877	2	5.938	0.391
	Within Groups	1410.910	93	15.171	
Abdominal SF	Between Groups	67.054	2	33.527	0.443
	Within Groups	7034.117	93	75.636	
Front thigh SF	Between Groups	47.262	2	23.631	0.599

	Within Groups	3666.745	93	39.427	
Medial calf SF	Between Groups	104.914	2	52.457	1.708
	Within Groups	2856.591	93	30.716	

* significance at 0.05 level (table value F(0.05,2,93) = 3.09)

From the table – II, the obtained F value for all the Skin fold measures of state level Elite Basketball Players were less than the table value of 3.09 at 0.05 level of significance with degree of freedom 2, 93. The result revealed that there was no significant mean difference exists among the skin fold measures of state level junior elite basketball players with reference to their playing positions.

Table – III
Analysis of Variance on Girth Measures of State level Elite Basketball Players

Variables	Source of Variance	Sum of Squares	df	Mean Square	F
Arm girth relaxed	Between Groups	50.944	2	25.472	5.814*
	Within Groups	407.446	93	4.381	
Arm girth tensed	Between Groups	46.309	2	23.154	4.043*
	Within Groups	532.631	93	5.727	
Waist Girth	Between Groups	791.101	2	395.550	9.023*
	Within Groups	4076.816	93	43.837	
Gluteus Girth	Between Groups	523.157	2	261.579	5.258*
	Within Groups	4626.192	93	49.744	
Calf Girth	Between Groups	139.856	2	69.928	4.609*
	Within Groups	1410.923	93	15.171	

* significance at 0.05 level (table value F(0.05,2,93) = 3.09)

From the table – III, the obtained F Value of girth measures are greater than the table value of 3.09 at 0.05 level of significance with 2, 93 degree of freedom. The result revealed that all the girth parameters with reference to the playing positions, there was a significant mean difference exists. Since the differences were account significantly, scheffe's post hoc test

was computed. The post hoc test emphasized that the all the girth parameters, the guard-center pair of mean difference was significantly differed.

From the table – IV, the obtained F Value (10.76) of Humerus breadth is greater than the table value of 3.09 at 0.05 level of significance with 2, 93 degree of freedom. But femur breadth, the obtained F value was less than the table value of 3.09 ($p < 0.05$). The result revealed that the Humerus breadth with reference to the playing positions, there was a significant mean difference exists. Since the differences were account significantly on humerus breadth, scheffe's post hoc test was computed. The post hoc test emphasized that the humerus breadth, the guard-center pair of mean differences was significantly differed.

Table – IV
Analysis of Variance on Breadth Measures of State level Elite Basketball Players

Variables	Source of Variance	Sum of Squares	df	Mean Square	F
Humerus Breadth	Between Groups	5.817	2	2.908	10.763*
	Within Groups	24.861	92	.270	
Femur Breadth	Between Groups	88.057	2	44.028	0.673
	Within Groups	6020.302	92	65.438	

* significance at 0.05 level (table value F(0.05,2,93) = 3.09)

Table – V
Analysis of Variance on Height and Weight of State level Elite Basketball Players

Variables	Source of Variance	Sum of Squares	df	Mean Square	F
Height	Between Groups	5286.742	2	2643.371	152.31*
	Within Groups	1614.014	93	17.355	
Weight	Between Groups	3820.583	2	1910.292	22.19*
	Within Groups	8006.906	93	86.096	

* significance at 0.05 level (table value F(0.05,2,93) = 3.09)

From the table – V, the obtained F Value of height and weight are greater than the table value of 3.09 at 0.05 level of significance with 2, 93 degree of freedom. The result revealed that the height and weight of junior

basketball players with reference to the playing positions, there was a significant mean difference exists. Since the differences were account significantly, scheffe's post hoc test was computed. The post hoc test emphasized that the both height and weight parameters, the guard-center pair of mean differences was significantly differed.

Conclusions

1) The anthropometric characteristics of the basketball players were differed with respect to their playing positions, namely Guard, Forward and Center.
2) Among all the three playing positions, center players possessing maximum anthropometric values, followed by Forwards and then Guards at junior classifications.
3) Among the skin fold measures, there was no differences were accounted as far as their playing positions.

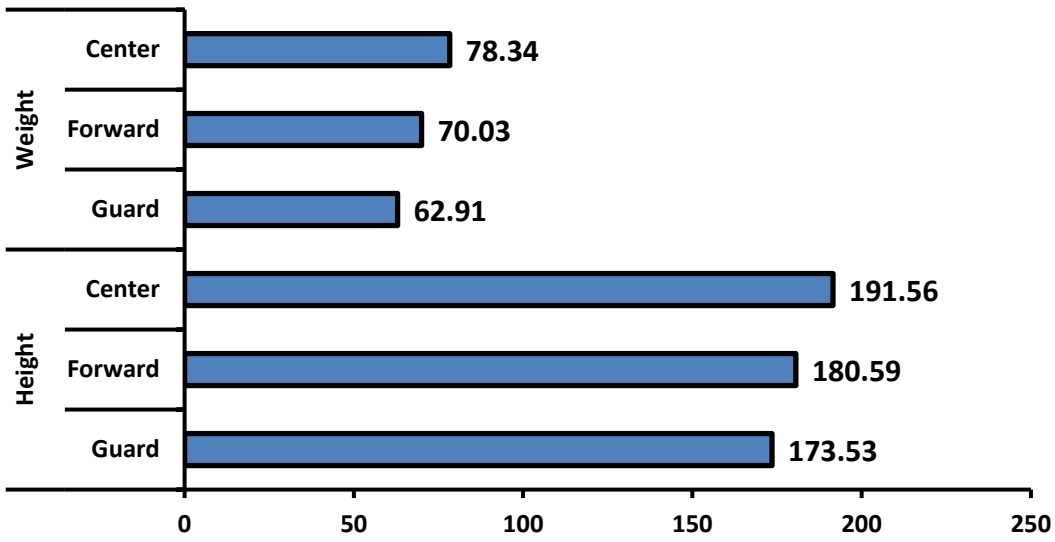

Fig – I : Bar Diagram Showing the Mean Values of Height and Weight of the State Level Junior Elite Basketball Players

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