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A Comparative Study of Explosive Strength and Selective Anthropometric Variables between the Basketball and Volleyball Players

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Abstract:
The purpose of the study is to compare the explosive strength and selective anthropometric variables between Basketball and Volleyball players. Thirty district level Volleyball (N=30) & thirty district level Basketball (N=30), male players were taken as the subjects for the Study respectively from 'Youth Town Club' (YTC) 'Bolpur Town Club' (BTC) and Visva-Bharati university from Bolpur, Birbhum district, West Bengal, India. The age group of the subjects was ranged from (18-24) years. To measure the explosive strength in leg muscles and shoulder muscles between the basketball and volleyball players 'Standing broad jump test' and 'Medicine ball throws' were conducted on the subjects for present study and for anthropometric characteristics 'Standing height', 'Weight', 'Leg Length', 'Arm Length' also were measured. The collecting data were calculated by using descriptive statistic and student "t" test and level of significance was set at 0.05 levels. There was no significant difference exists on Height, Weight, Leg Length between Basketball and Volleyball players, as because Cal "t" value (1.32, 0.270 & 1.60) are lower than Tab "t" 0.05(58) value (2.000). But in case of Arm Length, Standing broad jump and Medicine ball throws between Basketball and Volleyball players significant difference were exist, as because Cal "t" value (2.07, 3.166 & 2.179) are higher than Tab "t" 0.05(58) value (2.000).

Keywords: *Basketball, volleyball, explosive strength, anthropometric variables, standing broad jump, medicine ball throws*

1. Introduction

Volleyball and Basketball have become a major part of all physical education programs, these are one of the leading intramural sports in school programs; and these are played on a highly competitive basis by high school, college, amateur, and professional teams throughout the country.

Volleyball and Basketball are very fast game and players need a special quality of jumping ability. For performance excellence in Volleyball and Basketball as well as other so many activity or games explosive jumping ability, explosive strength and anthropometrical status are very important factors besides physical fitness. Volleyball and basketball are among the world's popular sports, successful participation in these sports requires from each player a high level of technical and tactical skills and suitable anthropometric characteristics.

Anthropometry is a branch of anthropology concerned with comparative measurements of the human body and its parts as well as the variables which impact these measurements. Anthropometry is an important aspect of sports medicine. Anthropometric dimension and morphological characteristics play an important role in determining the success of a sportspersons.

The anthropometrical characteristics and body composition of athletic populations has been an interest of trainers, exercise scientists and sport medicine professionals for years and many of them assumed the practicing athletes might be expected to exhibited structural and functional characteristics that are specifically favorable for the sport (Singh et al. 2010). Since each sport have specific demands, every athlete should have specific anthropometrical characteristics and body composition for his own sports discipline.

Explosive strength is defined as the combination of strength and speed. In any sport explosive movement is critical for improving performance. In sports like volleyball and basketball explosive jump, sprinting from one side of the court or field to another is an important part of winning.

In all court games, including Volleyball and Basketball, a special type of anthropometrical status and having explosive strength in all parts of body, are the basic to good performance. In volleyball, performance of skill during jump e.g. spiking, smashing, blocking, jump-pass, demands a high level of explosive strength in all parts of body specially in leg and solder. In basketball also during jump ball, rebound, dunk-shot, hook pass, baseball pass, explosive strength of solder and leg is play a vital role in performance of these skill.

So, both the game of Volleyball and Basketball required a special type of anthropometrical status, explosive jumping ability and explosive strength in solder joint which is influence the performance of the game. That is why I want to compare of explosive strength

and anthropometrical measurement between Volleyball and Basketball players. I think basket ball players and volleyball players both have the different anthropometrical status and also difference in their explosive strength. That was my question and my interest is to find out the true and that is why I have chosen the study. It was understood that the results of the research work would be useful for future research in the field of physical education and sports.

2. Methodology

In order to compare the Explosive strength and Anthropometric characteristics between Volleyball and Basketball players, thirty district level Volleyball (N=30) & thirty district level Basketball (N=30), male players were taken as the subjects for the Study respectively from 'Youth Town Club' (YTC) 'Bolpur Town Club' (BTC) and Visva-Bharati university from Bolpur, Birbhum district, West Bengal, India. Thus total number of subjects were (N=60) sixty only. The age group of the subjects was ranged from (18-24) years. To measure the explosive strength in leg muscles and shoulder muscles between the basketball and volleyball players 'Standing broad jump test' and 'Medicine ball throws' were conducted on the subjects for present study and for anthropometric characteristics 'Standing height', 'Weight', 'Leg Length', 'Arm Length' also were measured. The collecting data were calculated by using descriptive statistic and student "t" test and level of significance was set at 0.05 levels, after that the conclusion drawn in the basis of the findings.

3. Analysis of Data

To find out Anthropometric characteristics and Explosive strength between Volleyball and Basketball players 'Standing height', 'Weight', 'Leg Length', 'Arm Length' and 'Standing broad jump test', 'Medicine ball throws' were conducted on the subjects represented, Volleyball & Basketball respectively. For the analysis of the present study, data were collected on anthropometric variables and explosive strength between Volleyball and Basketball players; student "t" test was applied. The mean and standard deviation of obtained data belonging to Anthropometric characteristics as measured by 'Standing height', 'Weight', 'Leg Length', 'Arm Length' of Volleyball and Basketball players have been presented following table-1.

Variable	Mean		Std- Deviation		T-Ratio
	Basketball Players	Volleyball Players	Basketball Players	Volleyball Players	
Hight	167.36	170.43	7.962	9.54	1.32 NS
Weight	60.7	61.26	8.47	7.27	.270 NS
Leg Length	98.86	101.60	5.66	7.20	1.60 NS
Arm Length	76.06	78.63	4.41	4.90	2.07*

Table 1: Mean, Standard deviation and "t" test in Height, Body Weight, Leg Length, Arm Length between Basketball player and Volleyball player

*Table value- $t_{0.05}(58) = 2.000$, *= Significant, NS=Not- Significant*

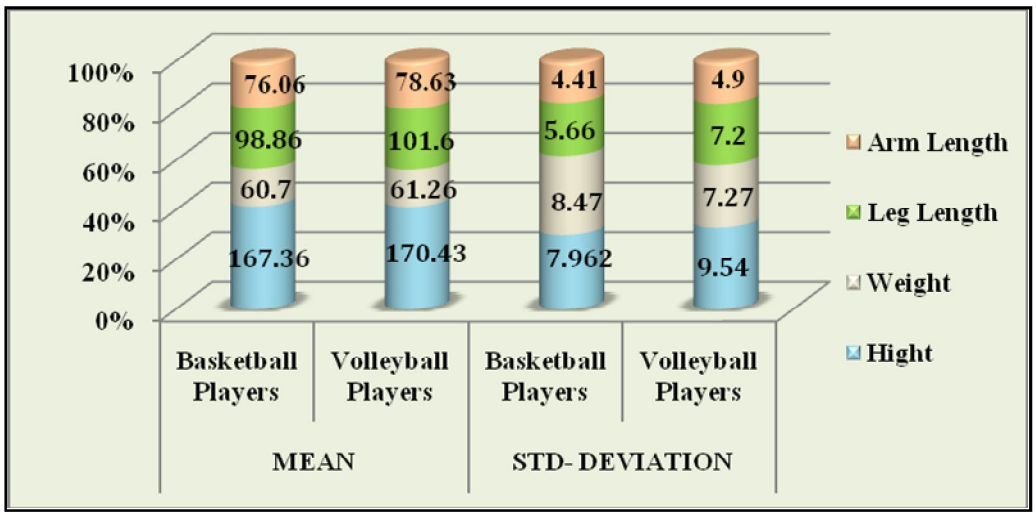

Figure 1: Mean and Standard deviation of Height, Body Weight, Leg Length, Arm Length between Basketball player and Volleyball player

3.1. Findings

From this findings clearly reveled that, no significant difference exist on Height, Weight, Leg Length between Basketball and Volleyball players, as because Cal "t" value (1.32, 0.270, 1.60) are lower than Tab "t" $_{0.05}(58)$ value (2.000). But in case of Arm Length significant difference exist as because Cal "t" value (2.07) is higher than Tab "t" $_{0.05}(58)$ value (2.000).

It is evident from Figure-1 shows that the mean and standard deviation of district level Basketball and Volleyball players on Height, Weight, Leg Length and Arm Length has been found 167.36±7.962 and 170.43±9.54 (Height), 60.7±8.47 and 61.26±7.27 (Weight), 98.86±5.66 and 101.6±7.20 (Leg Length), and 76.06±4.41 and 78.63±4.90 (Arm Length).
The mean and standard deviation of obtained data belonging to explosive strength as measured by 'Standing broad jump test' and 'Medicine ball throws' of Volleyball and Basketball players have been presented following table-2.

Variable	Mean		Std- Deviation		T-Ratio
	Basketball Players	Volleyball Players	Basketball Players	Volleyball Players	
Standing Broad Jump	1.97	2.16	0.22	0.204	3.166*
Medicine Ball Throw	8.67	9.52	1.66	1.28	2.179*

Table 2: Mean, Standard deviation and "t" test of Standing Broad Jump & Medicine Ball Throw between Basketball player and Volleyball player
*Table value- $t_{0.05}(58) = 2.000$, *= Significant, NS=Not- Significant*

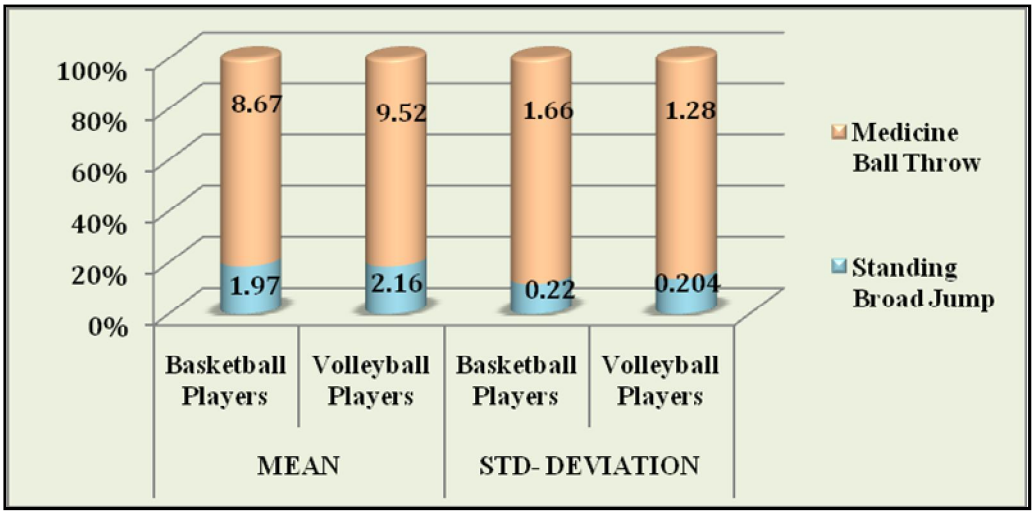

Figure 2: Mean and Standard deviation of Medicine Ball Throw and Standing Broad Jump between Basketball player and Volleyball player

3.2. Findings
From this findings clearly reveled that, significant difference exist on Standing broad jump and Medicine ball throws between Basketball and Volleyball players, as because Cal "t" value (3.166, 2.179) are higher than Tab "t" $_{0.05}$(58) value (2.000).
It is evident from Figure-2 shows that the mean and standard deviation of district level Basketball and Volleyball players on and Standing Broad Jump and Medicine Ball Throw has been found 1.97±0.22 and 2.16±0.204 (Standing Broad Jump) and 8.67±1.66 and 9.52±1.28 (Medicine Ball Throw).

4. Findings, Conclusion and Recommendations

4.1. Findings
The result as obtained while conducting the study and after analyzing the gathered data by using "t" test statistic on Height, Weight, Led Length, Arm Length, Standing Broad Jump and Medicine Ball Throw between Basketball players and Volleyball players, the discussion of the findings can expressed by the following ways.
In the present study though we have made a position hypothesis on Height, Weight, Led Length, Arm Length, Standing Broad Jump and Medicine Ball Throw between District level Basketball players and District level Volleyball players, but after calculation it is observed that no significant difference is exit in Height, Weight, Leg Length [Cal "t" value (1.32, 0.27 and 1.60) is lower than Tab "t"$_{0.05}$ (58) value (2.000)], but on the other hand there is a significant exit in Arm Length, Standing Broad Jump and Medicine Ball Throw [Cal "t" value (2.07, 3.166 and 2.179) is higher than Tab "t"$_{0.05}$ (58) value (2.000)] between Basketball players and Volleyball players. In these all cases mean scores of Volleyball players were better in comparison than Basketball players.
The scholar is greatly satisfied to mention that the findings have accomplished the purpose for which the study was initially conceptualized. The study done by Aouadi R, Jlid MC, Khalifa R, Hermassi S, Chelly MS, Van Den Tillaar R, Gabbett T.(J Sports Med Phys Fitness. 2012 Feb;52(1):11-7.) showed that The players with longer lower limbs have the better vertical jump performances and their anaerobic power is higher. These results could be of importance for trained athletes in sports relying on jumping performance, such as basketball, handball or volleyball. Thus, the measurement of anthropometric characteristics, such as stature and lower limb length may assist coaches in the early phases of talent identification in volleyball and basketball.

The study done by Vishaw Gaurav, Mandeep Singh and Sukhdev Singh (Journal of Physical Education and Sports Management Vol. 1(3), pp. 28-32, December 2010) showed that there were significant differences in most of the anthropometric characteristics between the basketball players and volleyball players.

The study done by Soumendra Nath Ghosh & Arijit Putatunda (International Educational E-Journal, ISSN 2277-2456, Volume-II, July-Aug-Sept 2013)showed that In Volleyball and Basketball jumping ability also a most important movement for attacking as well as defensive players so that they need a explosive strength in their leg.

In a study Aruna Rani, Rohit Chauhan and Dr. Satpal Kaur Kalsi (Received on: 12 Jan 2013, Reviewed on: 16 Feb 2013 and Accepted on: 19 March 2013) reported that the Volleyball players as well as the Basketball players both need to have Arm Strength variable similarly.

4.2. Conclusion

For performance excellence in Basketball and Volleyball games explosive jumping ability, explosive strength and anthropometrical status are very important factors besides physical fitness, technical and tactical efficiency, intellectual development and also type of body measurement for these games. The level and types of explosive strength in Basketball and Volleyball games is different but sometimes, there may have an even anthropometrical status of a player in basketball and Volleyball games also is not same as to that of all games but sometimes, it also may have. In case of volleyball and Basketball some time a special kind of anthropometrical status, movement with explosive jump and perform of explosive solder strength with different movement are there.

Within the limitation of the present study the following conclusions were drawn on the basis of obtaining results. In this study there were no significant difference exist on Height, Weight, Leg Length between Basketball and Volleyball players but in case of Arm Length, Standing broad jump and Medicine ball throws there were significant difference exist. In comparison of mean score in both players, Volleyball players were found better in Height, Weight, Leg Length and Arm Length than Basketball players. That means the Volleyball players get more advantages from Anthropometrical status than Basketball players. In comparison of mean score in both players, Volleyball players were found better in Standing Broad Jump ability and Medicine Ball Throw ability than Basketball players. That means the Volleyball players has more explosive strength in their solder and legs muscles than the Basketball players, and for that the Volleyball players also get more advantages during game situation than Basketball players.

4.3. Recommendations

On the basis of the findings of the present study, the following recommendations are made: a) Similar study may be conducted with female subjects of different age and level of participation with large populations. b) Further study can be taken up by using other measuring methods on above mentioning certain physical and physiological variables. c) Similar study may be conducted on psychological and sociological parameters. d) Similar study may be conducted on larger subjects with same variables.

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