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## An association of leg strength with selected anthropometric variables in volleyball players

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### Abstract

The purpose of the study was to find out the relationship of leg strength with different anthropometric parameters. A total of 50 volleyball players from different colleges of Amravati district, Maharashtra were selected randomly as subject for the present study. The age of the subjects was from 18 to 20 years. Explosive leg strength was measured by standing broad jump. Body weight, body height, Leg length, ankle diameter, thigh circumference and calf circumference were measured by steel tape. Mean and Standard Deviation were used as descriptive statistics for each variables. For the purpose of investigation of the relationship between explosive leg strength with selected anthropometric variables, Coefficient of Correlation (r-value) was calculated using Pearson's Product Correlation Method. The level of Significance was considered for the study was only 0.05 level. Result: Significant relationships were found between leg strength in Volleyball players with body height, leg length, ankle diameter, thigh circumference and calf circumference it was the component of anthropometric and it was positively statistically significant.

**Keywords:** Flexibility, anthropometric, volleyball players

### Introduction

Muscular strength is the maximal one-effort force that can be exerted against a resistance, the maximum amount of force that one can generate in an isolated movement of a single muscle group. The stronger the individual, the greater the amount of force that can be generated. Lifting heavy weights maximally once or twice, or exerting maximal force when gripping a hand dynamometer provide measurements of muscular strength.

A review of literature reveals that anthropometry was the first technique of measurement used in physical education. Anthropometry was first introduced in physical education by a physician, Dr. Edward Hitchcock who occupied the first chair of physical education created in USA in 1861 at Amherst College, Ohio. Thus, the history of measurement in physical education is less than, 150 years old. Dr Edward Hitchcock measured height, weight, girths, breadths, vital capacity and some strength variables of physical and some strength variables of physical education students to evaluate progress and gain in health. [1]

Anthropometric measurements consist of objective measurements of structures and function of the body. The measurement of structure includes items such as weight, height, length of the limbs, depth and width and the circumference of the different parts of the body.

The structure of an individual plays an important role on his motor performance. Hence, the teacher of physical education and the coaches while selecting their teams for participation in tournaments give due consideration to the skill possessed by the players and at the same time they provide due weight age to various anthropometric measurements.

### Methodology

A total of 50 volleyball players from different colleges of Amravati district, Maharashtra were selected randomly as subject for the present study. The age of the subjects was from 18 to 20 years. Explosive leg strength was measured by standing broad jump. Body weight, body height, Leg length, ankle diameter, thigh circumference and calf circumference were measured by steel tape. Mean and Standard Deviation were used as descriptive statistics for each variables.

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**Statistical Analysis**

For the purpose of investigation of the relationship between explosive leg strength with selected anthropometric variables, Coefficient of Correlation (r-value) was calculated using Pearson’s Product Correlation Method. The level of Significance was considered for the study was only 0.05 level.

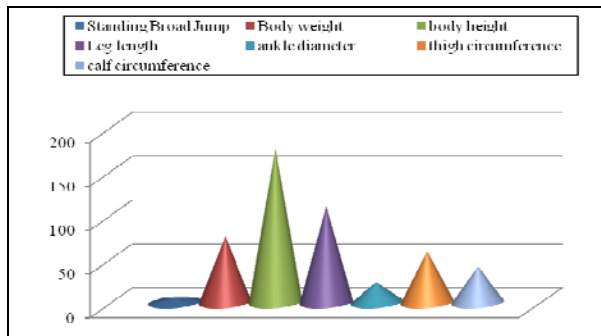
**Findings**

The Mean value and the Standard Deviation of explosive leg strength and other selected anthropometric variables have presented in Table No. 1.

**Table-1:** Mean and Standard Deviation of explosive leg strength and other selected anthropometric variables

Variables	Mean	SD
Leg Strength	6.90	0.53
Body Weight	75.46	5.08
Body Height	175.80	8.96
Leg Length	109.96	5.67
Ankle Diameter	23.48	1.23
Thigh Circumference	58.52	4.37
Calf Circumference	41.20	5.34

The table-1 showed that the Mean + Standard Deviation values on leg strength, body weight, body height, leg length, ankle diameter, thigh circumference and calf circumference for volleyball players. Leg strength is  $6.90 \pm 0.53$ , body weight  $75.46 \pm 5.08$ , body height  $175.80 \pm 8.96$ , leg length  $109.96 \pm 5.67$ , ankle diameter  $23.48 \pm 1.23$ , thigh circumference  $58.52 \pm 4.37$  and calf circumference  $41.20 \pm 5.34$  respectively.



The mean values of leg strength, body weight, body height, leg length, ankle diameter, thigh circumference and calf circumference for volleyball players

**Table 2:** Coefficient of correlation of different anthropometric variables with leg strength in volleyball players

Variables	Coefficient of correlation ‘r’
Body weight	0.197
body height	0.401*
Leg length	0.405*
Ankle diameter	0.412*
Thigh circumference	0.497*
Calf circumference	0.508*

N=50 \*Significant at .05 level. R 0.05 (48) = .273

An analysis as shown in table-2 indicates that the relationship of leg strength in Volleyball players with anthropometric variables. Body weight is the component of anthropometric and its relationship with leg strength ( $r = 0.197$ ) it was statistically insignificant as the value obtained were less than the tabulated value (.273) required, to be significant at 0.05

level with 48 degree of freedom.

The component of anthropometric variable is body height which is correlated with leg strength ( $r = 0.401$ ) it was statistically significant as the value obtained were much higher than the tabulated value (.273) required, to be significant at 0.05 level with 48 degree of freedom.

Leg length is the component of anthropometric and its relationship with leg strength ( $r = 0.405$ ) it was statistically significant as the value obtained were much higher than the tabulated value (.273) required, to be significant at 0.05 level with 48 degree of freedom.

The component of anthropometric variable is ankle diameter which is correlated with leg strength ( $r = 0.405$ ) it was statistically significant as the value obtained were much higher than the tabulated value (.273) required, to be significant at 0.05 level with 48 degree of freedom.

Thigh circumference is the component of anthropometric and its relationship with leg strength ( $r = 0.412$ ) it was statistically significant as the value obtained were much higher than the tabulated value (.273) required, to be significant at 0.05 level with 48 degree of freedom.

The component of anthropometric variable is calf circumference which is correlated with leg strength ( $r = 0.508$ ) it was statistically significant as the value obtained were much higher than the tabulated value (.273) required, to be significant at 0.05 level with 48 degree of freedom.

**Conclusion**

After the statistical analysis of the data the following conclusions were elucidated:

Significant relationships were found between leg strength in Volleyball players with body height, leg length, ankle diameter, thigh circumference and calf circumference it was the component of anthropometric and it was positively statistically significant. By the light of the results of our study the anthropometric variables contribute highly significantly to leg strength. Form this study its saw that anthropometric variables was good for everyone it was very important to improve players performance. It may be cleared that the leg strength of Volleyball players was stronger in all respect of anthropometric components because the main skill of Volleyball is smashing and blocking for this they have been doing more jumping practices. Therefore the leg strength of Volleyball players was significant.

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