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## **A relationship of selected anthropometric measurement and general motor ability to performance in volleyball playing ability**

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### **Abstract**

The purpose of the study was to find out the relationship of selected anthropometric measurement and General Motor Ability to Volleyball playing ability. There would be significant relationship of selected Anthropometric measurement and Motor ability to the performance of Volleyball players. Twenty Female Volleyball players who represented in Inter State Volleyball competition held at Gandhinagar (Gujarat) were selected as subjects for this study. Tests were administered to the subjects immediately after the tournament was over. According to the eligibility records, their (ages ranged from 18 to 25 years. All the subjects involved in this study were physically fit for tests to be administered to them. This was a statistical study for the relationship of two variable, Anthropometric measurement and motor ability components to performance of Volleyball players, related to criterion measure. weight and calf girth of the players did not correlate with performance as the coefficient of correlation of weight and calf girth with playing ability performance was 0.174 and 0.021 respectively, whereas height, arm length, leg length, thigh length, foreleg length of an individual correlated quite satisfactorily with performance in Volleyball playing ability as their coefficient of correlation were 0.718, 0.638, 0.881, 0.683 and 0.787 respectively. Significant correlation with selected motor ability components i.e. speed (0.715; agility (0.597) and Eye-hand coordination (0.685). Within the limitations identified and on the basis of the results of the study, the following conclusions were drawn. The speed, agility, Eye-hand coordination, height, arm length, leg length, thigh length and foreleg length were significantly correlated with Volleyball playing ability performance. The anthropometric measurements i.e. weight and calf girth was not significantly related to Volleyball playing ability performance.

**Keywords:** Anthropometry, general motor ability, volleyball

### **1. Introduction**

Anthropometric measurement consists of objective measurements of structure and functions of the body. The measurement of the structure includes items such as weight, total height and width, the depth and the circumferences of the chest etc. The improvement in particular game and sport is mainly based upon the specialization of that concerned sports and game, so it is necessary to provide a very definite and scientific procedure for training technique in order to obtain the most efficient and effective performances. Measurement of body size includes such descriptive information such as height, weight, lengths width and circumferences of the various body segments. It has been found that top athletes in some sports tend to have those proportions that biomechanically aid the particular performance required. Anthropometric measurement consists of objective measurements of structure and functions of the body. The measurement of the structure includes items such as weight, total height and width, the depth and the circumferences of the chest etc. Several research studies indicated that speed was significantly related to power and that it was more important than strength in athletic performance. The game of Volleyball offers opportunities for the development of strength, endurance, speed, agility, and neuro-muscular 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. The objective assessment of the relationship that exists between selected anthropometric measures and body compositions to performance in sprint serve the coaches and physical education teachers to select the athlete for a particular event and to construct the training schedule accordingly because no study has been done on this topic.

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**2. Methodology**

**2.1 Objective of the study**

The purpose of the study was to find out the relationship of selected anthropometric measurement and General Motor Ability to Volleyball playing ability.

**2.2 Hypothesis**

It was hypothesized that there would be significant relationship of selected Anthropometric measurement and Motor ability to the performance of Volleyball players.

**2.3 Subjects**

Twenty Female Volleyball players who represented in Inter State Volleyball competition held at Gandhinagar (Gujarat) were selected as subjects for this study. Tests were administered to the subjects immediately after the tournament was over. According to the eligibility records, their ages ranged from 18 to 25 years. All the subjects involved in this study were physically fit for tests to be administered to them. This was a statistical study for the relationship of two groups, Anthropometric measurement and motor ability components to performance of Volleyball players, related to criterion measure.

**2.4 Variables**

The following Anthropometrics measurements and General Motor Ability were selected for the purpose of the study: -

**2.5 Anthropometrics measurements**

1. Weight
2. Height
3. Arm length
4. Leg length
5. Thigh length
6. Foreleg Length
7. Calf Girth

**2.6 General Motor Ability**

1. Speed
2. Agility
3. Eye-hand coordination

**3. Results**

The statistical analysis of data pertaining to weight, height, arm length, leg length, thigh length, foreleg length, calf girth and motor ability components i.e. speed, agility, Eye-hand coordination, and Volleyball playing ability collected from Inter State Volleyball competition held at Gandhinagar (Gujarat).

Relationship between Dependent Variable and Independent Variables

The relationship between the dependent variable that is Volleyball playing ability (performance) and independent variables-selected Anthropometric measurement and selected motor ability components was obtained. The coefficient of relationship was obtained by correlating the dependent variable to independent variables, presented in Table-1.

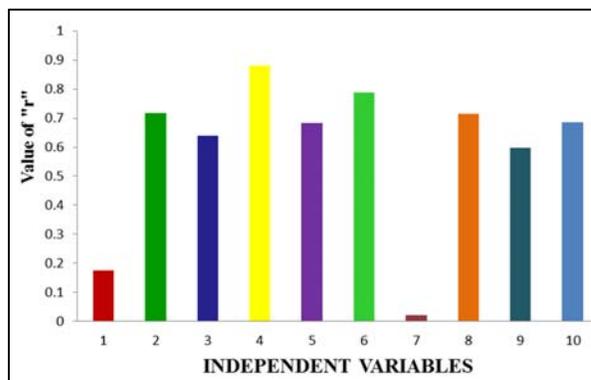
Table-1 revealed that weight and Calf Girth of the players did not correlate with performance as the coefficient of correlation of weight and Calf Girth with playing ability performance was 0.174 and 0.021 respectively, whereas height, arm length, leg length, thigh length, foreleg length of an individual correlated quite satisfactorily with

performance in Volleyball playing ability as their coefficient of correlation were 0.718, 0.638, 0.881, 0.683 and 0.787 respectively. Table-1 also shows significant correlation with selected motor ability components i.e. speed (0.715), agility (0.597) and Eye-hand coordination (0.685).

**Table 1:** Relationship of Dependent Variables to Independent Variables

S.NO.	Independent Variables	Coefficient of Correlation
1	Weight	0.174
2	Height	0.718*
3	Arm length	0.638*
4	Leg length	0.881*
5	Thigh length	0.683*
6	Foreleg Length	0.787*
7	Calf Girth	0.021
8	Speed	0.715*
9	Agility	0.597*
10	Eye-hand coordination	0.685*

N = 20 for df 18, r required to be significant at 0.05 level = 0.444  
\* Significant at 0.05 level



**Fig 1:** Relationship of Dependent Variables to Independent Variables

1. Weight
2. Height
3. Arm length
4. Leg length
5. Thigh length
6. Foreleg Length
7. Calf Girth
8. Speed
9. Agility
10. Eye-hand coordination

**4. Discussions**

The findings of the study indicated (Table-1) that speed of the Volleyball player correlated significantly with Volleyball playing ability (r = 0.715) at 0.05 level of significant. The significant positive relationship between speed and performance in Volleyball may be attributed to the fact that Volleyball is the game of speed where players has to frequently sprint to cover the ground. The findings show that the relationship between agility (r = 0.597) and performance in Volleyball playing ability was also significant at 0.05 level. This significant relationship may be due to the fact of nature of the game of Volleyball where always sudden fast movement and rapidly changing direction take place; so being a Volleyball player one has to be more agile in performing movement successfully.

The findings also show that the relationship between eye-hand coordination ( $r = 0.685$ ) and Volleyball playing ability performance was significant at .05 level. This significant relationship may be due to the fact that Volleyball players require more perception power to judge the movements of opponent, and vice versa and hand coordination to perform specific skill. The findings also reveal that the relationship between height ( $r = .718$ ) and performance in Volleyball was significant at .05 level. Moreover, the findings also revealed that the relationship between arm length, leg length, thigh length and foreleg length with the Volleyball playing ability, performance ( $r = 0.638$ ;  $r = 0.881$ ;  $r = 0.683$  and  $r = 0.787$ , respectively) were found significant at .05 level. These significant relationships may be due to the fact that well-coordinated movements of running, in case of weight and calf girth of anthropometric measurements.

The findings show that the relationship between anthropometric measurements i.e. weight and calf girth with performance in Volleyball playing ability ( $r = 0.174$ ,  $0.021$  respectively) were not significant at .05 level. These insignificant relationships may be due to the fact that heavy body weight hampers/motor ability components of Volleyball players and ultimately affect his performance in Volleyball. Therefore the hypothesis on the study has been accepted with respect to speed, agility, eye-hand coordination and selected anthropometric measurements i.e. height, arm length, leg length, thigh length and foreleg length, whereas rejected in case of weight and calf girth of anthropometric measurements.

## 5. Conclusions

Within the limitations identified and on the basis of the results of the study, the following conclusions were drawn.

1. The speed, agility, eye-hand coordination, height, arm length, leg length, thigh length and foreleg length were significantly correlated with Volleyball playing ability performance.
2. The anthropometric measurements i.e. weight and calf girth was not significantly related to Volleyball playing ability performance. Receiving, smashing and rapidly changing the direction in Volleyball depend upon arm length and well proportionate leg length (i.e. thigh leg length and foreleg length) of Volleyball players.

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