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## RELATIONSHIP OF SELECTED ANTHROPOMETRIC AND BIOMECHANICAL VARIABLES TO PERFORMANCE IN LONG JUMP

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### ABSTRACT

The purpose of the study was to find out the relationship of selected anthropometric and bio mechanical variables in long jump 5 University level long jumpers from the Coimbatore District of 18 to 24 years were selected for this study. The selected bio mechanical variables recorded at the moment of take off were Angle at ankle, Angle at knee, Inclination of torso, Height of C.G. The selected anthropometric variables were Height, Weight, Leg Length, Lower leg length. The criterion measures chosen for the study were the horizontal distance jumped by the subject using running long jump and recorded in mts. Angle at knee, Angle at ankle, Angle of inclination of torso at the time of take off and recorded in degrees. Height of the C.G at the moment of take off was recorded in cms. Height (stadiometer) was



recorded in cms. Weight (weighing machine) was recorded in kgs. Leg length and lower leg length measured with the help of flexible steel tape and recorded in cms. Standard Nikon model EM with motor drive camera Sequential photography was employed for filming the subjects. The frequency of the camera was 4 frames /second. The relationship of selected anthropometric and bio mechanical variables with the performance of long jump was calculated by using Pearson's Product Moment Correlation. The level of significance chosen was .05 Based on the analysis, and within the limitations of the

present study it has been found that the height and weight of the person have a positive influence on performance in long jump. Leg Length and lower leg length are not found to be significant contributors to long jump performance The bio mechanical variables namely angle at ankle, angle at knee, inclination of torso, height of C.G at the moment of takeoff have not been found to be significantly related to performance in long jump.

**KEYWORDS:** Relationship Of Selected Anthropometric, Lower leg length, Biomechanical Variables.

### INTRODUCTION:

Modern long jump technique can be effectively broken down into five aspects- the approach run, preparation for takeoff, flight and landing. One of the areas of modern sports science is biomechanics and it is applied form of mechanics, and consequently the methods used to investigate it must be derived from those of mechanics. However, bio mechanics have not developed in the wake of mechanics, but as a bordering science in other scientific disciplines such as anatomy, physiology and the technique of sport. The role that bio mechanics can play is becoming more widely understood in sports community and the demand for service increasing, researchers in sports bio mechanics will have to consider carefully how much time they can devote to a provision of scientific

services without impairing their performance as scholar researchers. The anthropometric measurements focuses on three areas; growth measure, body type and body composition which helps for classification, prediction of growth patterns and prediction of success in motor activities as well as assessment of obesity. The centre of gravity in the human body is located in the middle of the trunk and at about hip level, when standing in normal erect position, with the arm hanging at the side. Any movement of the body part will alter or shift the centre of gravity in the direction of movement.. Bio mechanics offers information and mechanical factors which lead to successful performance. It helps the body to be more efficient and maximize the law of physics and other principles. It has been found that top athletes in some sports tend to have those proportions that bio mechanically aid the particular performance. The jumping events like long jump require a great amount of leg power. The long jumper's size and structure of the body and bio mechanical variables may play an important role in their success in the event. So it is feasible to have some sort of invention, which may contribute in selecting right kind of athlete for that event as well as help to isolate the factors that may contribute to the development of the jumping events

### **Aim**

The purpose of the study was to find out the relationship of selected anthropometric and bio mechanical variables to performance in long jump

### **METHODOLOGY**

Five male inter varsity long jumpers of 18 to 24 years were selected for this study. They had undergone training for a considerable period in order to acquire good level of technique of long jump. The selected bio mechanical variables recorded at the moment of take off were Angle at ankle, Angle at knee, Inclination of torso, Height of C.G. The selected anthropometric variables chosen were Height, Weight, Leg Length, Lower leg length. Due to non availability of sophisticated instruments for cinematography, the sequential photographic technique has been used which may be treated as the limitation of the study.

### **CRITERION MEASURES**

The criterion measures chosen for the study were the horizontal distance jumped by the subject using running long jump and recorded in mts. Angle at knee, Angle at ankle, Angle of inclination of torso at the time of take off was recorded in degrees. Height of the C.G at the moment of take off was recorded in cms. Height of the subject was taken with the help of the stadiometer and recorded to the nearest half cms. Weight of the subject measured using a weighing machine and recorded in the nearest half kilogram. Leg length and lower leg length measured with the help of flexible steel tape and recorded in to the nearest half cms. Camera was used for filming the subjects. The performance of each subject was measured by using standard procedures where the subject ran from a certain distance with optimum speed and took take off with one leg on the board and landed in the pit, which was observed by three persons and measured with the help of steel tape in meters.

### **FILMING PROTOCOL AND ANALYSIS**

Standard Nikon model EM with motor drive camera Sequential photography was employed for filming the subjects. The frequency of the camera was 4 frames /second. But only three photographs at the time of take off were selected for analysis. The camera was placed 7 mts away from the subject. On the basis of sequence photographs, stick figures were developed from which various bio mechanical variables were calculated. The stick figures were developed by using joint point method. The centre of gravity of each subject was located by using segmentation method, as suggested by Hay

**Table 1**  
**RELATIONSHIP OF SELECTED ANTHROPOMETRIC VARIABLES TO PERFORMANCE IN LONG JUMP**

S.No	Variables	Coefficient of correlation
1.	Height	0.91
2.	Weight	0.96
3.	Leg length	0.70
4.	Lower leg length	0.67

It is evident from table 1 that the correlation for the selected anthropometric variables the height and weight of the person have a positive influence on performance in long jump. Leg Length and lower leg length are not found to be significant contributors to long jump performance at .05 level of significance.

**Table 2**  
**RELATIONSHIP OF SELECTED BIOMECHANICAL VARIABLES TO PERFORMANCE IN LONG JUMP**

S.No	Variables	Coefficient of correlation
1.	Angle at ankle	-0.58
2.	Angle at knee	-0.26
3.	Inclination of Torso	0.10
4.	Height of the C.G	0.15

It is evident from table 2 that the correlation for the selected biomechanical variables namely Angle at ankle, Angle at knee, Inclination of torso, Height of C.G at the moment of take off have not been found to be significantly related to performance in long jump at .05 level of significance. The relationship of selected anthropometric and bio mechanical variables with the performance of long jump was calculated by using Pearson's Product Moment Correlation. The level of significance chosen was .05

## CONCLUSION

Based on the analysis, and within the limitations of the present study it has been found that the height and weight of the person have a positive influence on performance in long jump. Leg Length and lower leg length are not found to be significant contributors to long jump performance The bio mechanical variables namely angle at ankle, angle at knee, inclination of torso, height of C.G at the moment of takeoff have not been found to be significantly related to performance in long jump.

## RECOMMENDATIONS

The results may be used by the teachers of physical education in selection of long jumpers of intervarsity level. The variables such as height, weight may be kept in mind as these factors contribute to performance in long jump. The results of the study may be helpful to evaluate the performance of their players. The results of the study may be helpful to prepare a technique model for university level long jumpers and can make self assessment with the results of the study. Similar studies may be conducted by using sophisticated equipments and subjects of higher level and also in other events in athletics and other games and sports.

## REFERENCE

- 1.Carter,J.E.L and Diego San , 'Physical structure of Olympic athletes'. Bases Wernor Brucl A.G,1984
- 2.Hay.James A, The Bio Mechanics of Athletic Movement. Berlin:Sortverlog, 1984
- 3.Comparison of Anthropometric Measurements, Physical Fitness and General Motor Ability of Elementary Boys and Girls, VYAYAM VIDNYAN, hvpm. Amaravati, Vol.19,May- August 1986.
- 4.Relationship of Selected Biomechanical variables with the performance of female swimmers using different types of starts, VYAYAM VIDNYAN, hvpm Amravati, Publication Maharashtra, Vol. 30: 3-4, August - November 1997.
- 5.Bartlett, R.M. and Best, R.J. 1988. The biomechanics of the javelin throw: A review. Journal of Sports Sciences,

6: 1–38.

6. Franks, B.D. and Huck, S.W. 1986. Why does everyone use the 0.05 significance level? *Research Quarterly*, 57: 245–249.

7. Hay, J.G. 1988. 'Approach strategies in the long jump'. *International Journal of Sport Biomechanics*, 4: 114–129.

8. Hay, J.G. and Miller, J.A. 1985. Techniques used in the transition from approach to takeoff in the long jump. *International Journal of Sport Biomechanics*, 1: 174–184.

9. Komi, P.V. and Mero, A. , 1985. 'Biomechanical analysis of Olympic javelin throwers'. *International Journal of Sport Biomechanics*, 1: 139–150.

10. Bunn John W., 'Scientific principles of coaching' (Englewood Cliff N.J.: Prentice Hall 1978

11. Chaudhari K. et al, "Bio mechanical Analysis of Long jump," Abstracts: National Conference of Bio Mechanics (December 1988):34

12. Hay, J.G. 1987. "Biomechanics of the long jump - and some wider implications" in *bio mechanics X-B*, Edited by: Johnson, B. 1193–1203. Champaign, IL: Human Kinetics.

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