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## Relationship of selected anthropometric and biomechanical variable to the inter university athlete of track and field event

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### Abstract

The purpose of this study was to find out the relationship of selected anthropometric and biomechanical variables to the performance in race walking. The subjects were 5 male race walkers of All India Inter University level athletes with their age ranging between 18-25 years.

The sequential photography technique was employed to record the race walking technique. A motor drives Nikon Model EM camera was used. The subjects were photographed at the two phase i.e. single support and double support in sagittal plane. The anthropometric measurement of each subjects were taken by using an anthropometric kit selected anthropometric measurement and biomechanical variables were weight, height, sitting height, leg length and arm length, Ankle(R), Ankle (L), Knee (R), Knee (L), Hip (R), hip (L) Shoulder (R), Shoulder (L), Elbow (R), Elbow (L), Wrist (R), Wrist (L), Height of C.G. respectively.

Product moment correlation was calculated between the selected anthropometric and biomechanical variables with the performance of race walking at 0.05 level of significant.

**Keywords:** Race walking, anthropometric and biomechanical

### Introduction

Biomechanics is an 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 sports.

The role that sports biomechanics widely understood in the sports community and the demand for service increasing, researchers in sports biomechanics will have to consider carefully how much time they can devote to the provision of scientific services without impairing their performance as scholar researchers. To avoid the problems inherent in this situation, it may be necessary to develop programmes of study for the training of technicians in sports biomechanics; technicians who can provide Biomechanics offers track coaches information and mechanical factors which lead to successful performance careful study of great performances help to answer the question of why a given effort is superior to those of athletes who are equally well trained and who possess. Comparable strengths but do not perform as well what happens in the setting of a world record that makes the body be have more efficient and maximize the law of physics and other principles.

### Objective of the study

The purpose of the study was to investigate relationship of selected anthropometric and biomechanical variable to the All India Inter University athletes of selected track and field event.

### Subject of the study

Five male and five female Race Walking off track and field athlete of university level were selected. The age of the subjects were between 18-25 years. Purposive sampling were used for the collection of sample. Static group design were used for the study.

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**Variables**

**1. Anthropometric variables**

Sr. No.	Variables
1.	Weight
2.	Height
3.	Sitting height
4.	Leg length
5.	Arm length

**2. Biomechanical variables with the performance of race walking**

Sr. No.	Variables
1.	Ankle(R)
2.	Ankle (L)
3.	Knee (R)
4.	Knee (L)
5.	Hip (R)
6.	Hip (L)
7.	Shoulder (R)
8.	Shoulder (L)
9.	Elbow (R)
10.	Elbow (R)
11.	Wrist (R)
12.	Wrist (L)
13.	Height of C.G.

**Collection of Data**

The sequential photography was used as a technique of kinematics comparison of male and female sprinters. A standard motor driven camera i.e. Nikon Model EM, was used to obtain photo sequences of selected movements during the movement take-off.

The subjects were photographed between 40-55 meters in sagittal plane filming zone was 15 meters for obtaining individual photographic sequence the subjects were photographed in controlled condition. The distance of the concern from the subjects was 11.20 meters and fixed 1.20 meters high. The moment take-off was measured manually for each subject. The scholar-developed stick figure utilizes joint-point methods on which the body projections at the joints facing the camera were considered. The inclination of torso was measured by deviation of torso from the vertical axis.

The center of gravity of each subject at the moment take-off was located by using segmentation method as suggested by James g. Hay.

**Statistical Analysis**

The collected scores on each selected biomechanical and anthropometric variables and the performance of race walking were analyzed by product moment correlation method, the significance of the relationship was tested at 0.05 level of significance. Data were analyzed by using S.P.S.S. (Statically package of Social Science)

**Findings**

The values of selected anthropometric variables namely weight, height, sitting height, leg length and arm length with the performance of subjects in race walking parson’s product moment correlation was used. The result are presented in Table 1.

**Table 1:** Relationship of selected anthropometric variables with the performance in race walking

Sr. No.	Variables	Co-efficient of correlation
1.	Weight	0.537
2.	Height	-0.329
3.	Sitting height	-0.274
4.	Leg length	0.051
5.	Arm length	-0.308

Significant at 0.05 level with DF =4

Tab  $r_{.05} (4) = 0.811$

It is evident from table-1 that the correlation co-efficient for the selected anthropometric variables i.e. weight, height, sitting height, leg length and arm length is 0.537, -0.329,-0.274, 0.051 &-0.308 is not significant at 0.05 level of significance. It indicates that is no significant relationship between selected anthropometric variables and performance of race walking. It may be therefore said that the hypothesis stated earlier that there is no significant relationship of anthropometric variables with the performance of race walking is accepted.

Thus it may be concluded that there is no relationship exist between anthropometric variables and performance in race walking.

**Table 2:** Relationship of selected biomechanical variables with the performance of race walking

Sr. No.	Variables	Co-efficient of correlation (Single Support)	Co-efficient of correlation (Double Support)
1.	Ankle(R)	0.484	-0.194
2.	Ankle (L)	-0.705	0.452
3.	Knee (R)	-0.824*	0.000
4.	Knee (L)	-0.516	0.817*
5.	Hip (R)	0.406	-0.863*
6.	Hip (L)	0.90*	0.820*
7.	Shoulder (R)	-0.757	-0.330
8.	Shoulder (L)	-0.600	0.546
9.	Elbow (R)	-0.459	0.217
10.	Elbow (R)	0.141	0.000
11.	Wrist (R)	0.475	0.323
12.	Wrist (L)	-0.763	0.371
13.	Height of C.G.	-0.753	-0.555

It is evident from table-4 that co-efficient of correlation of selected biomechanical variables namely Ankle(R), Ankle (L), Knee (R), Knee (L), Hip (R), Shoulder (R), Shoulder (L), Elbow (R), Elbow (R), Wrist (R), Wrist (L), Height of C.G is not significant with the performance in race walking at single

and double support phase.

However, the co-efficient of correlation for Knee(R), Hip (L) with the performance in single support phase of race walking is 0.82 &0.90 respectively which is significant at 0.05 levels. Also the co-efficient of correlation for Knee (L), Hip (R) and

Hip (L) with the performance in double support phase is 0.82, 0.86 & 0.82 also significant at 0.05 level.

### Discussion of findings

In case of selected anthropometric measurement none of the anthropometric variables has exhibited significant relationship with the performance of race walking. It may be attributed to the fact that the sample size of the subjects were very small and also the greater radius of rotation provide greater momentum and stride length is depended on greater leg length but here the arm length and leg length has not shown significant relationship it may be because of other factors.

The obtained values of co-efficient of correlation of selected biomechanical variables at the two phases i.e. single support and double support to the performance of race walking has shown insignificant relationship. The statistical insignificance may be attributed to the fact that the selected biomechanical variables namely Ankle (R), Ankle (L), Knee (R), Knee (L), Hip (R), Shoulder (R), Shoulder (L), Elbow (R), Elbow (L), Wrist (R), Wrist (L), Height of C.G are not contributing very much to the performance as race walking a cyclic type of activity which requires smooth and easy execution of technique and basically hip joint and shoulder joint actions are playing more dominating role, might be the smaller sample size and level of participation of athletes must be the cause of statistical insignificance.

However the co-efficient of correlation for Knee(R), Hip (L) with the performance in single support phase of race walking is 0.82 & 0.90 respectively which is significant at 0.05 levels. Also the co-efficient of correlation for Knee (L), Hip (R) and Hip (L) with the performance in double support phase is 0.82, 0.86 & 0.82 also significant at 0.05 level.

The statistical insignificance pertaining to the selected anthropometric variables namely height, weight, sitting height, leg length, arm length and biomechanical variables i.e. angle of ankle joint, knee joint, hip joint, wrist joint, elbow joint and height of C.G. may be attributed to following factors:

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