

A COMPARATIVE STUDY OF ANTHROPOMETRIC PARAMETERS OF INDIAN ELITE MALEATHLETES OF DIFFERENT THROWING EVENTS

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ABSTRACT

The purpose of the study was to compare the anthropometric parameter of Indian elite male athletes of different throwing events. For this purpose, 25 elite male throwers for each event i.e. Javelin, Shot put, Discus and Hammer throws were selected from various States taken admission for regular diploma course, SAI hostel of Patiala and India camp held at SAI, NSNIS, Patiala. Purposive sampling was used to extract the sample. data in the from of criterion measure of study described above were collected through the anthropometrical tools during 2004-2005. The level of significance of study 0.05. Results of the study indicated that there was no significant difference in the means of sitting height of hammer, shot put, discus and javelin throwers.

Key words: Anthropometric parameter, Sitting height, Arm length, and Leg length.

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INTRODUCTION

The throws (shot put, discus, javelin, and hammer) are field events in athletics. They are measure for explosive strength (power) in a human being from ancient time to modern time. The throwers of shot put, Discus, Javelin and hammer differed greatly in physique from the other athletes. As a group, they are taller and heavier, with longer arms in relation to their legs. They had broader shoulders and broader hips even for their trunk size, and are somewhat fatter than the track athletes. Their proportions of leg to the trunk is similar to those of middle distance In ancient time throws were used in hunting and warfare. In modern time throws are used for achieving awards or medals in National and International level competitions.

The greater size of the throwers in all dimensions contributes to increase the proportionally body weight of these athletes. The stresses of weight bearing in the case of throwers may be responsible for broadening their knee. The better development of the lean body mass will help them to provide the great strength required in the throwing events runners.

The purpose of the study was to assess and compare the arm length , leg length and sitting stature of the Indian elite male athletes of different throwing events.

METHODOLOGY

Selection of Subjects

For the purpose of this study, Twenty Five (25) elite male athletes of Javelin, Shot put, Discus and Hammer events were selected from NIS trainees during 2004-05, SAI hostel of Patiala and Indian athletic camp held at SAI NSNIS Patiala (PB.) from 27.1.2005 to 26-2-2005.

Selection of Variable

Three anthropometric parameters were selected to measure the sitting height, total arm length and total leg length.

Criterion Measure

All the subjects were tested on sitting stature, total arm length and total leg length. and scoring of data for Sitting height is recorded in centimeters; Total arm length is measured in to nearest centimeters and total leg length is also recorded in to nearest centimeters.

Administration of Tests

The subject of four throwing events were explained about the purpose of study in the presence of their coaches to elicit active cooperation from them..

1. Sitting Stature

Purpose: To measure the sitting height of the athletes of different events.
Equipments: Anthropometric rode, Sitting table, Measuring scale Procedure: The subject

was made to sit on the stool with his legs hanging down freely. The subject was asked to stretch his back as far as possible and to hold his head upright so that Frankfort planes becomes horizontal. Gentle upward pressure was applied to the mastoid processes. The muscles of the thigh and buttock were contracted in order to stretch him full. The horizontal bar of the anthropometric rod was brought down so that it touched the highest point on the head. The distance between anthropometric rod and the highest point of the stool was measured. Scoring: Sitting height in Cm.

2. Total Arm Length

Purpose: To measure the sitting height of the athletes of different events. Equipments: Anthropometric rode, Sitting table, Measuring scale, Procedure: The subject was made to stand with arms hanging down normally. Acromion and Dactylion were marked on the right hand. The distance between two points was measured with the help of measuring tape. Scoring: Sitting height in Cm.

3. Total Leg Length

Purpose: To measure the sitting height of the athletes of different events. Equipments: Anthropometric rode, Sitting table, Measuring scale Procedure: The subject was made to stand erect with body weight equally distributed on the legs. The distance between trochanterion to pternion or ground was measured with the help of measuring tape. Scoring: Sitting height in Cm.

RESULTS AND DISCUSSION

In order to find out the significance of differences among male elite athletes of different throwing events, means, standard deviations, and F-ratio were computed for obtained data. As the F-ratio was found to be significant, L.S.D. test of post-hoc comparison was applied to study the significance of differences among elite male athletes of different throwing events. The level of significance was set at .05 level and data pertaining to this have been presented in Table 1 to 5 .

TABLE I
ANALYSIS OF VARIANCE OF SITTING HEIGHT OF ELITE MALE INDIAN
ATHLETES OF DIFFERENT THROWING EVENTS

Anthropometric Variable	Source of variance	df	Sum of Square	Mean Squares	F-value
Sitting height	Between Groups	3	65.63	21.88	1.96
	Within Groups	96	1072.00	11.17	

Significant at .05 level, $F_{.05}(3,96) = 2.70$

It is clear evident from Table 1 that the statistically insignificant difference existed among elite male athletes of different throwing events, as the obtained F- value of 1.96 was lesser than the required value $F_{.05}(3,96) = 2.70$

TABLE 2
ANALYSIS OF VARIANCE OF TOTAL ARM LENGTH OF ELITE MALE INDIAN
ATHLETES OF DIFFERENT THROWING EVENTS

Anthropometric Variable	Source of variance	df	Sum of Square	Mean Squares	F-value
Total Arm Length	Between Groups	3	125.55	41.85	4.18*
	Within Groups	96	961.84	10.02	

Significant at .05 level, $F_{.05}(3,96) = 2.70$

It is clear evident from Table 2 that the statistically significant difference existed in total arm length among elite male athletes of different throwing events, as the obtained F-value of 4.18 was higher than the required value $F_{.05}(3,96) = 2.70$

As the F-ratio was found to be significant, L.S.D. test of post-hoc comparison was applied to study the significance of differences in total arm length of elite male athletes of different throwing events i. e. Shot put, Discus, Javelin and Hammer throws and the data pertaining to this have been presented in Table 3.

TABLE 3
SIGNIFICANCE OF DIFFERENCES AMONG ELITE MALE ATHLETES OF
DIFFERENT THROWING EVENTS BETWEEN ORDERED PAIRED
MEANS ON TOTAL ARM LENGTH

Mean Scores of Throwing Groups					
Javelin	Discus	Shot put	Hammer	Paired Mean difference	C.I
80.36	80.12	-	-	0.24	0.354
80.36	-	78.68	-	1.68*	
80.36	-	-	77.6	2.76*	
-	80.12	78.68	-	1.44*	
-	80.12	-	77.6	2.52*	
-	-	78.68	77.6	1.08*	

*Significant at .05 level

It is quite obvious from the table 3, that the significant differences in total arm length were found between elite male athletes of Javelin throw-Shot put followed by Hammer throw; between Discus throw- Shot put followed by Hammer throw and between Shot put – Hammer throw, as the obtained paired mean differences of 1.68, 2.76, 1.44, 2.52 and 1.08 respectively were higher than the confidence interval of 0.354.

TABLE 4
ANALYSIS OF VARIANCE OF TOTAL LEG LENGTH OF ELITE MALE INDIAN
OF DIFFERENT THROWING EVENTS

Anthropometric Variable	Source of variance	df	Sum of Square	Mean Squares	F-value
Total Arm Length	Between Groups	3	790.27	263.42	7.91*
	Within Groups	96	3196.48	33.29	

Significant at .05 level, $F_{.05}(3,96) = 2.70$

It is clear evident from Table 4 that the statistically significant difference existed in total leg length among elite male athletes of different throwing events, as the obtained F-value of 7.91 was higher than the required value $F_{.05}(3,96) = 2.70$

As the F-ratio was found to be significant, L.S.D. test of post-hoc comparison was applied to study the significance of differences in total leg length of elite male athletes of different throwing events i. e. Shot put, Discus, Javelin and Hammer throws and the data pertaining to this have been presented in Table 5.

TABLE 5
SIGNIFICANCE OF DIFFERENCES AMONG ELITE MALE ATHLETES OF
DIFFERENT THROWING EVENTS BETWEEN ORDERED PAIRED
MEANS ON TOTAL LEG LENGTH

Mean Scores of Throwing Groups					
Javelin	Discus	Shot put	Hammer	Paired Mean difference	C.I.
104.08	110.6	-	-	6.52*	0.646
104.08	-	103.4	-	0.68*	
104.08	-	-	106.12	2.04*	
-	110.6	103.4	-	7.2*	
-	110.6	-	106.12	4.48*	
-	-	103.4	106.12	2.72*	

Significant at .05 level

It is quite obvious from the table 5, that the significant differences in total arm length were found between elite male athletes of Javelin throw- Discus throw followed by Shot put, and Hammer throw; between Discus throw- Shot put followed by Hammer throw and between Shot put – Hammer throw, as the obtained paired mean differences of 6.52, 0.68, 2.04, 7.20, 4.48 and 2.72 respectively were higher than the confidence interval of 0.646.

DISCUSSION

Sitting height

Results of the study indicated that there was no significant difference in the means of sitting height of hammer, shot put, discus and javelin throwers.

Total arm length

By comparing the paired mean difference, It was concluded that mean of total arm length of javelin throwers was significantly greater than mean of total arm length of discus, shot put and Hammer throwers. Further mean of total arm length of discus thrower was also significantly greater than mean of total arm length of shot putter and hammer throwers and mean of total arm length of hammer thrower was significantly the least from all the three groups.

The Javelin throwers needs greater long arm length for throwing the javelin to maximum distance. The greater arm length provides greater bone lever and arm jerk during the throwing of the Javelin.

Discus throwers needs longer arm length for taking greater radius during rotation in the circle. Javelin throwers are using linear application of force to throwing the javelin where as Discus throwers are using centrifugal force. Therefore the requirement of greater arm length for javelin throwers is greater than discus throwers.

Shot putters requires maximum strength during the putting of shot. Therefore the requirement of arm length for shot putter was lesser than javelin throwers and discus thrower.

Total leg length

By comparing the paired mean difference, It was concluded that mean of total leg length of discus throwers was significantly greater than mean of total leg length of, hammer, javelin throwers and shot putter. Further mean of total leg length of Hammer thrower was also significantly greater than the mean of total leg length of Javelin throwers and Shot putter, mean of total leg length of shot putter was significantly the least from all the three groups.

Lesser Total leg length means greater upper segmental length. Lesser leg length of shot putter helps in stability during stance and foot placement with easiness in diameter coverage of the circle. Greater leg length also helps in the development of greater distance course of force application.

Lesser leg length of Javelin thrower helps in taking effective strides. Lesser leg length of Hammer throwers also helps in effective step turning and foot placement, which also increases the course of force application for hammer throwers. Discus thrower had least upper segmental length, which gives them more stability during turning movement and foot placement. This increase the speed of their turning, thus centrifugal force is enhanced which takes the Discus to maximum distance.

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