



ISSN: 2456-4419

Impact Factor: (RJIF): 5.18

Yoga 2019; 4(1): 76-78

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www.theyogicjournal.com

Received: 26-05-2018

Accepted: 28-06-2018

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Investigation of selected anthropometric variables as predictors of pole vault performance

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Abstract

The objective of the study is to find out the effect of selected anthropometric variables on pole vault performance. For the purpose of the study thirty male pole vaulters representing different universities who participated in all India inter university athletics championships were selected as subjects. The dependent variable was pole vault performance and independent variable was selected anthropometric variables. pole vault performance was determined by taking actual height cleared at the time of competition. Anthropometric variables included - calf girth, thigh girth, chest girth, upper arm girth, ponderal index and crural ratio. The following conclusions were drawn. Among anthropometric variables ponderal index was related to pole vault performance. Anthropometric variables namely calf girth, thigh girth, chest girth, upper arm girth and crural ratio were not found to be significantly related to pole vault performance.

Keywords: Pole vault, calf girth, thigh girth, chest girth, upper arm girth, ponderal index, crural ratio.

Introduction

The pole vault, like the running broad jump can be treated to the days of primitive man. No doubt, it was employed by early man as a means for gaining distance in jumping obstacles of horizontal distance in the beginning and later evolved in to an event for height clearance. Pole vaulting is frequently described and discussed as the track and field sport which more than other, calls for the complete athletic. Identification of talent in sports is of great importance. the selection criterion used during the past lacked scientific approach, as a consequence the performance of various athletes in different sport events suffered. Kin anthropometry or sports anthropometry, which emerged as a scientific discipline, is highly applicable in identification of individuals, at a relatively younger age. anthropometry measurements consist of objective measurements of structures and functions of the body. the measurements of structures include such items of weight, total height, and the width, the depth and the girth.

In his study, Cureton has concluded that all round athletic ability is characterized by wide shoulders compared to hip width. It is also stated that Davenport's crural Index is a valuable guide for the selection of individuals body limit in an agility pattern of bony leverage. In their study (Degarry, Levine and Carter) stated that the top level performance in a particular event demands particular type of body size and shape.

Purpose of the study

The purpose of the study was to investigate selected anthropometric variable as predictors in pole vault performance.

Significance of the study

1. The findings of the study may provide criteria for selecting talented players who are likely to benefit from coaching in order to achieve competitive success
2. The results of the study may educate pole vault athletes in general about the contributions of anthropometric variables to achieve better performance in pole vault.
3. The study may also help physical education teachers and coaches so as to enlighten them about the specific anthropometric qualities required by pole vaulter.

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Methodology

To execute the study thirty male pole vaulters representing different universities, participated in All India Inter-university Athletics championship were selected as subjects. The dependent variable was pole vault performance and independent variable were selected anthropometric variables. Pole vault performance was determined by taking actual height cleared at the time of competition. Anthropometric variables included - Calf girth, Thigh girth, Chest girth, Upper arm girth, Ponderal Index, and crural ratio. To measure these variables steel tape was used for girth measurements, Nomo graph was used to assess value on ponderal Index and specified formulas were used to calculate Index and ratio as

$$\text{Ponderal index} = \frac{\text{Standing Height}}{\sqrt[3]{\text{Weight}}}$$

The score of the height of a subject is in inches corrected to 1/4 of an inch and the score of weight is in kilogram corrected to 1/4 of a kilogram.

$$\text{Crural ratio} = \frac{\text{Fore Leg Length}}{\text{Thigh Length}}$$

This ratio was computed by dividing the score of fore leg length by the corresponding score of thigh length and the obtained value was recorded correct to four decimal places.

Analysis of data

The data were analysed by using the Pearson Product Moment

Correlation(r) for assessing the relationship of the pole vault performance to each of the anthropometric variables; Partial correlation was performed to assess the effect of each anthropometric variables to pole vault performance. Multiple correlation (Wherry-Dolittle Method) for assessing combined contribution of the anthropometric variables to pole vault performance; Regression equation for predicting the pole vault performance from anthropometric variables. Level of significance for testing the hypothesis was set at .05.

Results of the study

Table 1: Relationship of anthropometric variables to pole vault performance

Variables Correlated	Correlation Co-Efficient (r)
Calf Girth	0.181
Thigh Girth	0.071
Chest Girth	0.265
Upper Arm Girth	0.154
Ponderal Index	-0.53*
Crural Ratio	-0.034

N = 30, r .05(28) = 0.361, * Significant at 0.05 level.

Table 1 indicated that pole vault performance is significantly related to the Ponderal index, where as no significant relationship was obtained between Calf Girth, Thigh Girth, Chest Girth, Upper Arm Girth, Crural ratio and pole vault performance as shown in figures 1, 2, 3, 4 and 6. Therefore it was evident that Ponderal index contributed to performance in pole vault as shown in figure 5.

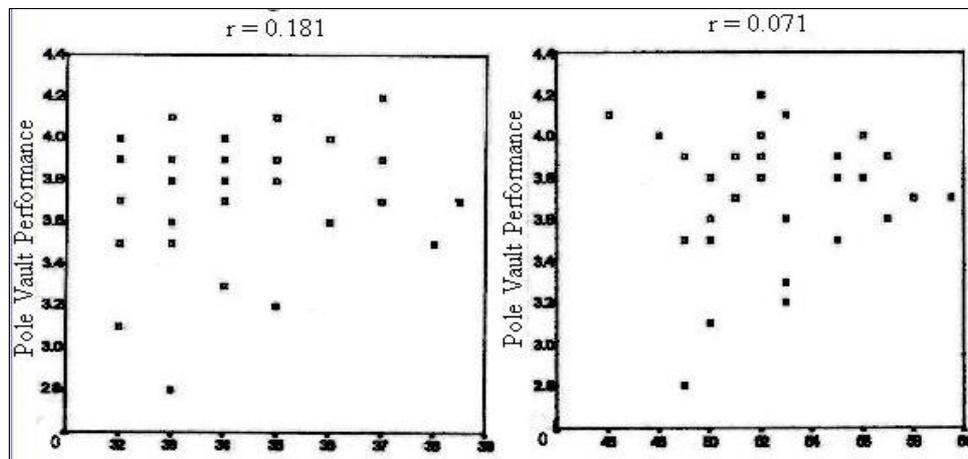


Fig 1: calf girth

Fig 2: thigh girth

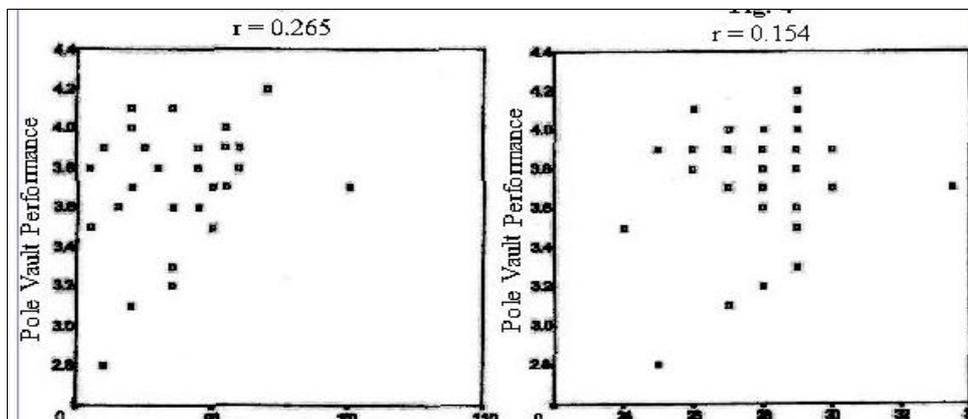


Fig 1: chest girth

Fig 2: upper arm girth

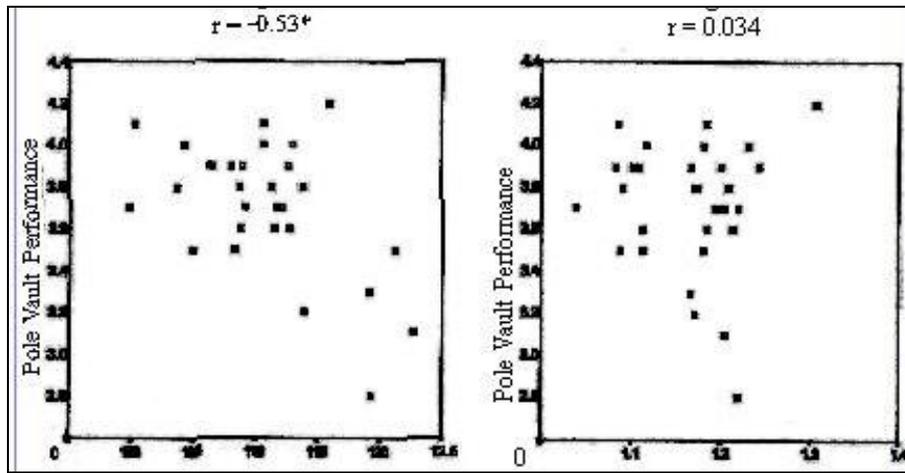


Fig 5: ponderal index

Fig 6: crural ratio

Table 2: Combined contribution of Anthropometric variables to pole vault performance

Criterion Variable	Independent Variable	Multiple Correlation	Co-efficient of Multiple Correlation
Performance (C)	Calf Girth(A) Thigh Girth (B) Chest Girth (C) Upper Arm Girth (D) Ponderal Index (E) Crural Ratio (F)	RcABCDEF	0.934*

N = 30, R0.05 (23) = 0.604, *Significant at 0.05 level

The table 2 revealed that combined contribution of all anthropometric variables to pole vault performance was significant at .05 level as the computed value(.934) (Rc ABCDEF) for Multiple correlation (Wherry Doolittle Method) was more than the tabulated value (.604) required for the Multiple correlation co-efficient to be significant at .05 level with 23 degree of freedom. From the obtained value of multiple correlation it was evident that anthropometric variables taken together contributed to Pole Vault performance.

Conclusion

Within the limitations of this study the following conclusions appeared justified as per the results obtained.

1. Among anthropometric variables, Ponderal index was related to pole vault performance.
2. Anthropometric variables namely Calf girth, Thigh girth, Chest girth, Upper arm girth and Crural ratio were not found to be significantly related to pole vault performance.

Recommendations

In the light of the results of this study the following recommendations are made.

1. It is recommended that height and weight relativity may be considered while selecting athletes for pole vault event.
2. The results of this study may be used by physical education teachers, scientists and coaches as an aid in screening and selecting athletes for pole vault.
3. A similar study may be conducted with women pole vaulters as subjects.

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