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Relationship of selected power test variables to performance in middle distance events in athletics

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Abstract
The purpose of the study was to ascertain the relationship of selected power variables to performance in middle distance events (800M AND 1500M). The subjects for the study were ten athletes in each of the selected events who were regularly training at the DDA Athletic Academy, Jawaharlal Nehru Stadium, New Delhi. The analysis of data employing Person's Product Moment Correlation Method revealed that performance in 800m was significantly related to standing broad jump and vertical jump. Performance in 1500m was significantly related to the scores in standing board jump and vertical jump.

Keywords: Middle distance events, power variables

Introduction

In middle distance running economy of energy is the most important consideration. All wasteful, hindering movements must be excluded by the use of rational technique. The way the foot lands on the ground varies according to the rate and length of strides. Middle distance runners make contact with the ground with the foot closed to the vertical projection of the body's centre of gravity. The longer the distance, the flatter the foot will be on impact. Middle distance runners will first make contact with the ground high up on the metatarsus. Shortly after the first contact, the body weight presses the whole of the foot for a shot moment down to the ground. The slight flexion in the knee joint during the leading support face is neutralized by the extension of the leg in the rear foot support face. During the run the upper body has only a slight or no forward lean (85^0 to 95^0). The arms assist the running movement rhythmically by an efficient angle at the elbow. It does not matter whether the arms move parallel to the body or slightly inwards in front of the body. Nor is it wrong if runners make some use of the shoulder girdle in the movement.

Top performances in middle distance runners mainly depend on the development level of various forms of endurance consistent with the race distance. Good performance in the competition depends on a high level of physical condition and of co-coordinative abilities such as speed, explosive strength, strength endurance, flexibility, agility, and capacity to relax. Finally anatomical and physiological and morphological factors such as functioning of physical development may favorably influence performance of middle runners.

Successful middle distance running primarily requires the development of aerobic as well as anaerobic endurance. Besides endurance; strength i.e. strength endurance and explosive strength also play a significant role. Speed endurance is another important factor which needs to be emphasized. Besides, skill efficiency has its own important role in ensuring that only required amount of energy is utilized in the performance.

Kanchana (2000) [3] conducted a study entitled predictive value of multivariate characteristics in determining distance running performance. The subjects for the study were 60 female middle and long distance runners who had participated in inter divisional athletic meet representing their respective colleges. The variables selected were anthropometric measurements, physical and physiological variables. Multiple Linear Regression Analysis was done in order to predict middle and long distance running performance on the basis of selected variables.

Michele (1978) [4] explored the possibility of developing a regression equation whereby football ability could be predicted from an analysis of selected anthropometric measures, strength tests, power measures, balance, standing height and body weight. Subjects were 56 scholarship football players at University of Arkansas. Six assistant football coaches, three offensive and three defensive, rated each offensive and defensive player, respectively. This rating on football ability was used as the criterion measure. Stepwise multiple regression and polynomial regression were utilized to form predictive equations. The equation by polynomial regression was: football ability - 787.65 + 7.33 bow legs - 143.22 (standing height) -2.60 (tibial torsion) – 33.40 (horse power) - 0.408 (body weight). R^2= .573 and percentage standard error of the estimate was 15.7 percent.

Battles (1980) [1] conducted this investigation to develop a prediction equation for selection of women intercollegiate basketball team members. Thirty three females from three colleges in Florida acted as subjects. Each subject completed a personal data form, the Athletic Motivational Inventory, the Knox Basketball Text, Sargent Jump Test, and the Field Goal Speed Test. Selected anthropometric measurements were also obtained from each subject. Each head coach and each assistant was asked to rank each member of the team in order of how each contributed to team success. Three different rankings such as head coach's rankings, the assistant coach's rankings and the average rankings of the head and assistant coaches were included in the statistical analysis.

Significant correlations (.05 level) were found to exist between the head coaches' rankings and the age and college basketball experience, and between the average of the head and assistant coaches' rankings and college basketball experience. Results of

stepwise multiple regression indicated that players ranked high by head coaches tended to score high on a combination of physical and psychological variables such as college basketball experience, height, vertical jump, mental toughness, and the AMI total score. Assistant coaches tended to select players with high scores on psychological variables which included trust, responsibility, mental toughness, and aggression. The average ranking of the head coach and the assistant (s) favored players with college basketball experience, responsibility, mental toughness, age and self confidence.

Datta (1984) [2] in his study on investigation of selected physical, physiological and psychological assessments as predictors of Hockey performance worked with 74 male combined university level Hockey players whose age ranged between 18 to 24 years. All the selected variables were tested employing standardized assessment procedures. The statistical analysis of data using zero order correlation, multiple correlation and regression analysis helped in developing prediction equations for assessing the playing ability in Hockey.

Methodology

The subjects for the study were 800m (N=10) and 1500m (N=10) runners who were regularly training at the DDA Athletic Academy, Jawaharlal Nehru Stadium, New Delhi and all of them had participated at least in the district level athletic meets. According to their performance they were termed as intermediate level athletes.

The power variables selected were standing board jump, vertical jump and soft ball throw. Performance of the subjects in each of the selected variable was tested adopting standardized procedures. The subjects were urged to put up their best performance in each of the tests.

Analysis of Data

The statistical analysis of data collected on 10 athletes each participating in 800m and 1500m was correlated to selected power variables using Person/s Product Moment Correlation Method. The level of significance to check the relationship obtained by Persons Product Moment Correlation Method was set at 0.05 level of confidence. The value of 0.632 was needed for significance at .05 level of confidence with 8 degrees of freedom.

Table 1: Relationship of selected power variables to performance in 800m

Variables correlated	Coefficient of Correlation
Standing board jump and performance in 800	-0.64*
Vertical jump and performance in 800m	-0.67*
Soft ball throw and performance in 800m	-0.20

N=10

*Significant at .05level of confidence

$r_{.05}$ (8) = 0.632

From the above table it is evidence that performance in 800m run is significantly related to Standing broad jump (r = -0.64) and Vertical jump (r = -0.67). The relationship of 800m performance to Soft ball throw was not found to be statically significant as the value of coefficient of correlation (-0.20) was less than the table value of 0.632 with 8 degrees of freedom.

Table 2: Relationship of selected power variables to performance in 1500m

Variables correlated	Coefficient of Correlation
Standing board jump and performance in 1500m	-0.75*
Vertical jump and performance in 1500m	- 0.81*
Soft ball throw and performance in 1500m	-0.47

N=10

*Significant at .05 level of confidence

$r_{.05}$ (8) = 0.632

Table 2 shows relationship of performance in 1500m to selected power variables namely standing broad jump, vertical jump and soft ball throw. It is seen from the table that performance in 1500m is significantly related at 0.05 level of confidence to standing broad jump (r = -0.75) and vertical jump (r = -0.81). Both these values are higher than the table value of 0.632 with 8 degrees of freedom. The table further shows 1500m performance is significantly not related to soft ball throw performance as the value of coefficient of correlation obtained is -0.47 which is less than table value 0.632 with 8 degrees of freedom.

Discussion of Findings

The performance in middle distance events selected in the study i.e. 800m and 1500m to a great extent is influenced by anaerobic endurance. Power is considered as one of the most important motor components in view of the fact that its development leads to indirect development of endurance and speed. Relationship of performance in 800m, 1500m to power variables show that performance in standing broad jump and vertical jump contributes to good performance in the two middle distance events. Both standing broad jump and vertical jump measure explosive leg strength of the legs. In the both middle distance events that is 800m and 1500m explosive strength of the legs plays an important role when the athlete takes a drive for the ground. In both the middle distance events the runners take long strides while participating in the events and for this explosive strength in the legs plays an important role.

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