RELETATIONSHIP OF MAXIMUM STRENGTH, STRENGTH ENDURANCE, POWER AND FLEXIBILITY TO RUNNING SPEED

*Santosh Kumar**

*Vijay Gurjar***

Strength is a conditional ability. It depends largely on the energy liberation process in the muscles. It is the most important motor ability in sports as it is a direct product of muscle contractions. All movements in sports are virtually seen by muscle contractions and therefore strength is a basic essence for all major abilities, technical skill and tactical actions of an athlete.

Maximum strength is the highest possible resistance which a sportsman can overcome through voluntary contractions of the muscles. Maximum strength can be isotonic or isometric (dynamic or static). Maximum strength is the highest possible tension which sportsman can develop through voluntary contraction.

Strength is a vital factor, on which the sports performance depends by which the magnitude and type of resistance are tackled in various sports. The sportsmen of different games need different levels and types of strength to achieve good performance.

Strength is an element in several other performance traits. It is a contributor to power because Power = Force x Velocity. Increased strength results in the ability to apply more force and thereby it contributes to power. Strength is also a factor in muscular endurance, which is the ability of the muscle to resist fatigue while doing work. Therefore, the present study has been planned to find out the relationship of maximum strength, strength endurance, power and flexibility to running speed.

Objective of the study

To find out the relationship of maximum strength, strength endurance, power and flexibility to running speed.

Hypothesis

Maximum strength, strength endurance, power and flexibility positively contribute in running speed.

Methodology

The data were collected on 20 male sprinters of Lakshmibai National Institute of Physical Education, Gwalior. In respect of maximum strength leg dynamometer

* Assistant Professor, Department of Physical Education, Mahatma Gandhi Kashi Vidyapith, Varanasi.

** Assistant Professor, G.H. Patel College of Engineering & Technology, Vallabh Vidyanagar, Gujrat.

was used, where as for strength endurance, power and flexibility half squat jump, vertical jump and sit and reach test was used respectively.

In order to achieve the objective statistical analysis was done. The findings thus obtained are presented in table 1 to 3.

Table - 1 Showing Mean and S. D. Of Maximum Strength, Strength Endurance, Power and Flexibility with Performance (50 Mts and 100 mts)

Variables	Mean	Standard Deviation
Maximum Strength	I 72.7500	12.1909
Strength Endurance	84.5000	9.9868
Power	49.8000	3.2703
Flexibility	19.3500	1.8432
50 Mts.	6.1350	.2978
100 Mts.	11.4000	.2956

The above table shows that means of maximum strength endurance, power and flexibility, 50 mts 100 mts run were 172.75 (S.D. + 12.19), 84.50 (S.D. +9.98), 49.80 (S.D. + 3.27), 19.35 (S.D. +1.84), 6.13 (S.D. + .29) and 11.40 (S.D. + .29) respectively.

The data pertaining to co-efficient of correlation among selected variable is presented in table no. 2.

Table - 2 Showing Coefficient of Correlation of Maximum Strength, Strength Endurance, Power and Flexibility with Performance (50 Mts and 100 Mts)

Variables	50 Mts.	100 Mts.
Maximum Strength	-0.477	-0.504*
Strength Endurance	-0.634	-0.446*
Power	-0.657	-0.495*
Flexibility	-0.743	-0.570*

*Significant at 0.05 level

Observation of above table depicts that the correlation between 50 mts. and maximum strength is -.477, 50 mts. and strength endurance is -.634, 50 mts. and power -.657, and 50 mts. and flexibility is -.743, while correlation between 100 mts. and maximum strength is -.504, 100 mts. and strength endurance is -.446, 100 mts. and power is -.495 and 100 mts. and flexibility and 100 mts. is -.570.

All the above components showed significant relationship with 100 mts. and 50 mts at .05 level of significance. Maximum strength had greater positive correlation

with 50 mts (-.477) in comparison to 100 mts. (-.504), whereas in strength endurance correlation was positively higher in 100 mts. (-.446) in comparison to 50 mts. (-.634). In relation to power and flexibility it was highly correlated positively with 100 mts (-.495) and (-.570) respectively in comparison to 50 mts. (-.657) and (-.743) respectively.

Conclusion

1. Maximum strength, Strength endurance, power and flexibility have positive relationship to running speed.
2. Maximum strength has greater positive relationship with 50mts. in comparison to 100 mts.
3. Strength endurance, power and flexibility have greater positive relationship with 100 mts in comparison to 50 mts.

Discussion of Findings

The result of this study indicates that there is a positive correlation between 50 mts and variables of maximum strength, strength endurance, power and flexibility. Similarly findings indicated positive correlation between 50 mts and the selected variables. The high correlation between dependent and independent variables in this case is quite understandable because all the four parameters indirectly contribute towards good performance in 50 mts and 100 mts. run. The results further indicate that correlation of 50 mts run was higher with maximum strength. This probably suggests that strength plays a dominants role in exerting force in creating forward momentum. In case of other 3 variables, strength endurance, power and flexibility, correlation was higher with 100 mts. performance. This may be mainly due to the fact that to continue the race over longer duration comparatively better endurance is required and power and flexibility indirectly assist in efficient movement.

References:

- Clarke, D. and Harrison. (1970). Research Process in Physical Education, Second Edition New Jersey: Prentice Hall Inc.
- Clarke, H. (1957). "Relationship of Strength and anthropometric Measures to Physical Performance Involving the Trunk and Legs, Research Quarterly.
- Dekok, D.B. (1968). "The Effect of a Specific Resistance Program and a Weight Training Program Upon the Strength Involved in and Speed of Specific Motor Movement of the Discus Throw." Completed Research in Health, Physical Education and Recreation.
- Frank, D. W. (1980). Sports Training Principles, Lepus Books, London.

- Hooks, G. (1963). Application of Weight Training to Athletics, Englewood Cliffs, N.J.: Prentice Hall Inc.
- Henson, P. (1994). Plyometric Training, "Track and Field Quarterly Review of Jumps.
- Reports of the Eighteenth Session of the International Olympic Academy at Olympic Athens: Hellenic Olympic Committee.
- Singh, H. (1984). Sports Training, General Theory and Technique Patiala: NSNIS Publication.
- Singh, T. (1994). "Competitive Study of Leg Strength, Arm Strength and Back Strength. Flexibility and Selected Anthropometric Measurements between Medium, Fast and Spin Bowlers" (Unpublished Master's Thesis, Jiwaji University).
- Tandon, D. K. (1992). "Plyometric Training in Sports", News Letter.