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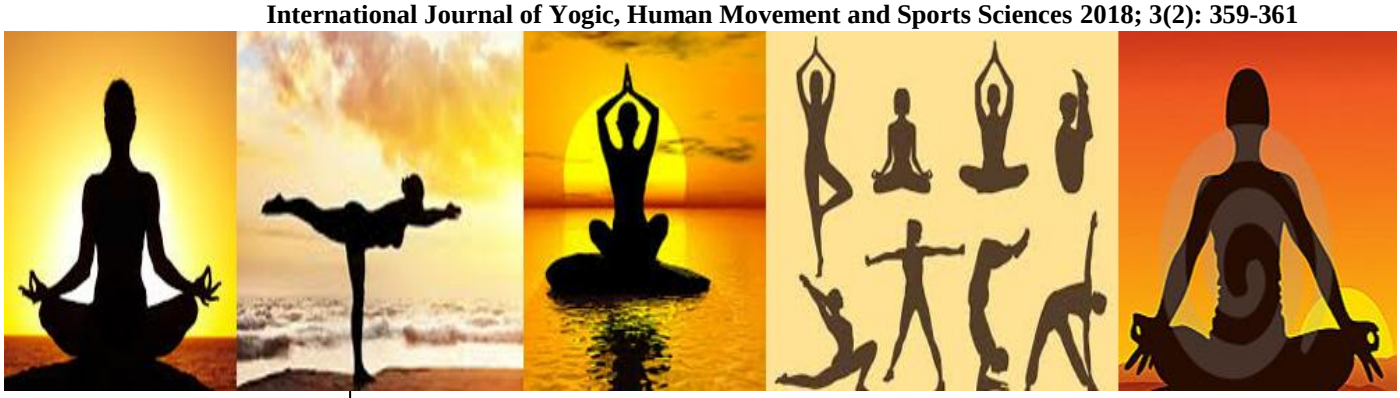

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Relationship between jump and reach test and standing broad jump as a measure of explosive power

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Abstract
Introduction: Jumping ability in sports requires a special type of muscular contraction is based on the exhaustion of muscular force like varied types of contraction. Strength, exhausted by the human body's part is highly mechanical in nature. So, it may be static or dynamic. It may be isotonic, isokinetic, isometric. Strength is a product so the conjoint action of muscular or other connective tissues in reference to joint.
Methods: 30 boys (15 athlete boys, 15 Non- athlete boys),age ranged between 16-18 yeas, who regular participant of different sports activities and another category who were non-participants in any sports activities, Subjects were collected from Nadia, West Bengal, India. The subject was randomly selected for conducting this research work, volunteered to serve as subjects of the study. Standing broad jump and Jump and reach was the selected variables of the study. The coefficient correlation was used to examine the significant difference; the level of confidence was set at .05.
Findings: The r -value between standing broad jump and jump and reach of Athlete boys [**.**91(<0.05)], and non-athlete boys [**.**61(<0.05].
Result: The values indicated that there was a positive relation between standing broad jump and Jump and Reach performance of athlete boys as well as Non-Athlete boys between standing broad jump and jump and reach performance.

Keywords: Standing broad jump; jump and reach; athlete boys; non- athlete boys

Introduction

Jumping ability in sports requires a special type of muscular contraction is based on the exhaustion of muscular force like varied types of contraction. Strength, exhausted by the human body's part is highly mechanical in nature. So, it may be static or dynamic. It may be isotonic, isokinetic, isometric. Strength is a product so the conjoint action of muscular or other connective tissues in reference to joint.

The term “explosive” denotes the intensity of contraction. Intensity is related to the time and distance.

Muscle power, the ability to release force as fast as possible, is displayed in the shot-put, sprint start, jumping events, and in any movement which involves a maximum or near maximum muscular contraction against resistance in a minimum time.

Most ‘explosive” movements are mechanically complex and do not easily lend themselves to accurate measurement. However, it is possible to measure the power exerted during this type of movement by permitting the body to work against some external load. Then the power developed by the body. In this case, the human body operated as the work input or effort source of this machine system. Basic to this approach is that the human body puts into the machine all the force that it develops and that all individuals have the same opportunity and are not handicapped or limited in any way in this force development.

A test is a method that measures the degree of quality of certain things. Quantifying the quality is one of the principle objectives of testing is to measure that state of the matter.

The measurement of muscle power in physical education has depended on largely upon skill tests such as the standing broad jump, vertical jump, and putting the shot expressed in terms of the distance jumped or thrown. However, if the ‘muscle power’ is also used to imply the ability of the body to generate the power in the mechanical sense, that is, the rate of doing

work, then the common tests of muscle power are of questionable validity.

Measuring strength through dynamometer is a very common practice. But there are some tests where the dynamic components are measured. Measurement of explosive strength may be properly measured through jump and reach test. In many cases, conduction of such field tests does not become feasible, and for measuring the same component an alternative test is always suited.

Since leg explosive power is an essential physical component for high-level performance in sports, the improvement of such component has to be assessed from time to time. Therefore, the component of leg explosive power may also be assessed by an alternative test-standing broad jump'. Both the test sum to be identical but the relationships between these two tests are to established. Therefore, this study has been undertaken to find out relationship, if any, between these two tests; so that one test can be replaced by another for measuring the same component.

There is a large variety of muscle power, having their bases in the physiological, physical and mechanical procedure. Those different approaches, the mechanical methods when accurately applied offer a valuable technique and lead to the measurement of muscle power developed by the human body.

Sargent (1924) [14] regarded the original Sargent jump as a measure of power rather than of just work, for the velocity of the body and the rate of doing work were important aspects of performance. Schwegler and Englehardt (1924) [15] appreciated the importance of the time factor in muscle power and modified the Sargent jump according to be more nearly a measure of driving power by application of the formula:

Sum of jumps in 15 sec.* weight/ height

One of the most comprehensive attempts to measure the power developed in a standing vertical jump was by Garrish (1934) [8] His calculation were based on directly on the mechanical principle of power. The force, distance, and time were recorded by means of motion photography. Gray *et al* (1962) [7] developed the vertical power jump, a modified Sargent jump, in which the arm and back movements are eliminated. Power is calculated directly by knowing the rate of change of the position of the center of gravity of the individual during the jump.

The procedures reported, however, have limited application. There is a need for a measure of muscle power directly in terms of the mechanical principle of power, power = force * distance/time which can be applied to numerous movements of the body and be more generally applicable the measuring procedures reported above.

Purpose of the study

The purpose of the present study was –

1. To find out the relationship between 'jump and reach' and 'standing broad jump' abilities.
2. To determine the acceptability of one 'jump and reach' test instead of other 'standing broad jump' test.

Methodology

Selection of the subject

30 boys (15 athlete boys, 15 Non- athlete boys), age ranged between 16-18 yeas, who regular participant of different sports activities and another category who were non-participants in any sports activities, Subjects were collected from Nadia, West Bengal, India. The subject was randomly selected for conducting this research work.

Each subject has had medical check-up so that any muscular injury in the leg of the subject is identified in order to eliminate injured subjects.

Each subject was given three successive trials for 'standing broad jump' and 'jump and reach' with the interval of the 2-3 minute. The distance and height were recorded and the best performance was considered.

Similarly, subjects each group took three 'jump and reach; successively with a considerable interval.

Criterion measures

In the present study, the investigator has considered the following things such as-

Table 1

S. No	Variables	Units	Criterion measures
1.	Standing Broad Jump	Meters	Leg Explosive Power
2.	Jump and Reach	Centimeters	Leg Explosive Power

Statistical procedure

For statistical analysis, the mean, standard deviation and correlation coefficient were estimated. Product moment method was used for computation of coefficient of correlation.

Results and discussion

Table 2: Mean and Standard Deviation of Standing Broad Jump and Jump and Reach of Athlete and Non- athlete boys

Variables	Groups	Number	Mean	Standard Deviation
Standing broad jump	Athlete boys	15	2.37	.47
	Non-Athlete	15	2.13	.26
Jump and Reach	Athlete boys	15	.50	.41
	Non-Athlete	15	.45	.43

The data collected by following specific tests as mentioned in table-1 were computed with an aim of deriving the results through the application of the suitable statistical measure. The results, obtained by computing the data have been considered for analysis and discussion.

Table-2 shows the means of the performance in 'standing broad jump' and 'jump and reach' performance. The results show that the means of performance in 'standing broad jump' of athlete boys and non-athlete are 2.37±.47, 2.13±.26 respectively. The means of performance of 'jump and reach' are athlete boys, non-athlete boys' .50±.41, and .45±.43, respectively.

In reference to the objective of this study, the relationship between 'standing broad jump' and 'jump and reach' performance have been computed following product moment method.

Table 3: The coefficient correlation (r) among 'standing broad jump' and 'jump and reach' of athlete boys and Now- athlete boys

Group	Athlete boys	Non- athlete boys
Athlete boys	0.91*	
Non- athlete boys		0.61*

Level of significance 0.05 df (28) = .361 * significant at 0.05 level

Table-3 shows the relationship between standing broad jump and jump and reach the performance of athlete boys, non-athlete boys group.

From the above table, it appears that there is a positive correlation between standing broad jump and jump and reach. The highly significant coefficient of correlations was obtained in the case of athlete boys. In the case of non-athlete boys, it shows a positive correlation is obtained. Therefore, above two relationships, clearly show a positive relation between 'standing broad jump' and 'jump and reach'.

Standing broad jump requires the ability of a reasonable speed of contraction of the leg muscles especially the quadriceps along with synchronized arm action involving the deltoid group of muscles. It is an action that carries the CG in a horizontal direction, whereas the jump and reaches action requires a modified ability for lifting one's CG in a vertical direction. The analogy of these two jumps involves shifting or displacing the body.

From the table, it is found that leg explosive power ability remains unaltered irrespective of sex and training. The results indicate that the objectives of standing broad jump and jump and reach do not contradict with each other.

According to Harre (1982) [9], the level of power affects the cyclic movement is measured for height and distance. Jump test is a popular test to measure jumping strength. Long jump capacity can be assessed, for example, by a triple hop or by other variation. Inertial dynamograph can be used in scientific investigations analyzing power. In this way, the relation of applied force and resulting velocity can seem precise.

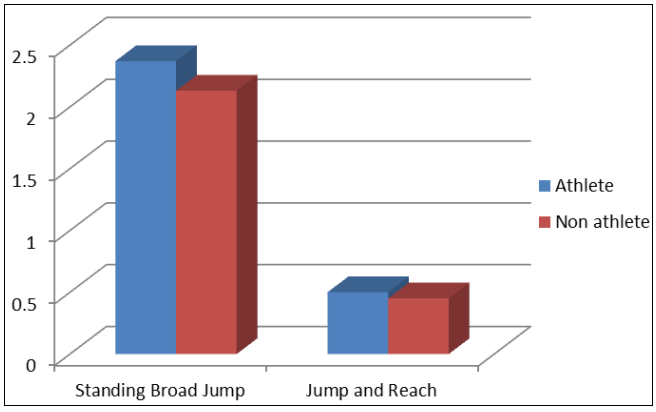

Fig 1: Graphical representation of different components of the subject

Conclusion

i. The leg explosive strength can be measured by both standing broad jump and jump and reach.
ii. The criteria of explosive power are invariable irrespective of sex and training.
iii. There is a positive correlation between jump and reach test and standing broad jump test among athlete boys and non-athlete boys groups.

References

1. Artero EG *et al*. Criterion-related validity of field- based muscular fitness tests in youth. Journal of Sports Medicine and Physical Fitness. 2012; 52:263-272.
2. Barrow Hold M, Mc. Gee R. A practical approach to measurement in physical education (3rd edition), Philadelphia, Lea Febiger, 1979.
3. Castro-Pinero J *et al*. Assessing muscular strength in youth: Usefulness of standing long jump as a general index of muscular fitness. Journal of Strength & Conditioning Research. 2010: 24:1810-1817. doi:10.1519/JSC.0b013e3181ddb03d
4. Glencross DJ. The muscle power: An instrument for measuring muscle power, Research quarterly. 1966; 37:202-10.
5. Dumith SC *et al*. Physical fitness measures among children and adolescents: Are they all necessary? Journal of Sports Medicine and Physical Fitness. 2012; 52:181-189.
6. Garret Henry E. Statistic in psychology and education, Vikhils, Ferrer & Simons Ltd, 1981.
7. Garry RK, Start KB, Glen cross DJ. Test of leg power. Research Quarterly. 1962; 33:44-50.
8. Garrish PH. A dynamic analysis of the standing vertical jump, New York, Colombia University, 1934.
9. Harre Edtt D. Principles of sports training, Sports Verlag, Berlin, 1982.
10. Hands B. Fitness and motor skill levels of Western Australian primary school children. University of Western Australia, Perth, 2000.
11. Haga M. The relationship between physical fit- ness and motor competence in children. Child Care Health and Development. 2008; 34:329-334.
12. Jenson Clyne R, Cyntha C. Measurement in physical education and athletics, New Work, Mc Millan, Publishing Co Inc.
13. Pyke JE. Australian health and fitness survey 1985: The fitness, health and physical performance of Australian school students aged 7-15 years. The Australian Council for Health, Physical Education and Recreation, Parkside, 1987.
14. Sargent LW. Some Observation in the Sargent test neuromuscular efficiency, American Physical Education, 1924, 29.
15. Schwegler RA, Englehardt JL. Test op Physical Efficiency, American Physical Education, 1924, 29.