

Relationship of Selected Motor Abilities and Phase Ratios with Performance of Male Triple Jumpers

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ABSTRACT

The aim of the present study was to know the relationship of selected motor abilities and Phase Ratios with Triple Jump performance. Sixteen male triple jumpers of national level were selected as subjects for this study. Speed tests (30 m and 50 m sprint), Jumping ability tests (Standing triple jump and Two hops-Two steps and Jump) and strength tests (Snatch, Bench press and overhead backward throw) were administered to collect the data. Trials were conducted to assess the Triple Jump performance.

The result indicates that there is no relationship of 30 meter run (-.382) and 50 meter run (-.138) test performances with Triple Jump performance.

The 'r' values of 0.643 and 0.687 for Standing Triple Jump and 2 Hop-2 Step Jump, respectively, with triple jump performance are highly significant, at 0.01 levels. Strength parameters have shown significant relationship with Triple Jump performance. A highly significant relationship between Snatch and triple jump performance (0.759 at $p < 0.01$ level) indicates that Snatch is an important exercise to improve Triple Jump performance. The mean value of Phase Ratio of Indian Triple Jumper is 36.82%:29.57%:33.61% which indicates that Indians are Hop dominating jumpers.

INTRODUCTION

Triple Jump is one of the four jumping events in Track and Field. Conolly (U.S.A.) was the first Olympic winner in 1896, at Athens, with a leap of 13.71 m. According to the literature, first jumper to use the present form of triple jumping was Edwin Bloss (U.S.A.) who, in Chicago, on

September 16 1883, officially jumped 14.78 m (Bullard and Knuth, 1977). At present, the world record stands at 18.29 m in the name Jonathan Edwards of Britain, finally surpassing the 10 years old world record of William Augustus Banks of U.S.A.

Triple Jump is considered to be the most

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Challenging event and demands a well co-ordinated technique with speed, strength and flexibility. However, the reactive strength is one of the vital parameters in Triple Jump.

The ratio of hop, step and jump, in relation to Triple Jump performance, is called Phase Ratio. The phase ratio of world champion with a record of 18.29 meters is found to be 33, 29, 38 in hop, step and jump, respectively. Bruggemann et al (1999) and Dyson (1977) suggested a phase ratio of 36, 28, and 34 for the beginners.

Such events demand a long time of systematic training for developing technical level of the skill, to put it all together in a unified four phased jump.

METHODOLOGY

Sixteen male triple jumpers of national level were selected as subjects for this study. The data was collected in three days. The sequences of the tests, for collection of data, are given below.

'r' value was computed to find out the relationship of selected motor abilities and phase ratios with Triple Jump performance.

Name of the test	Measuring unit	Aim
30 m sprint	Seconds	Running Speed
50 m sprint	Seconds	Running Speed
Standing triple jump	Meters	Explosive, Leg strength
Two hop, two step and jump	Meters	Rebound strength
Snatch	Kg	Whole body strength
Bench press	Kg	Arms strength
Overhead backward throw (4kg)	Meters	Upper body / arm strength

RESULTS & DISCUSSION

The main objective of the present study was to determine the relationship of the selected motor ability tests and Phase Ratio with Triple Jump performance.

The raw data and the performance of the selected motor abilities are presented hereafter. The mean, S.D. of height, weight and age is presented in Table 1.

Table-1 : Mean, SD, values of age, height, and weight of the Triple Jumpers.

Tests	Mean	sd.
Height	180.43	±5.644
Weight	75.75	±6.757
Age	23.19	±3.69

Table-2 : Correlation values of speed variable with Triple Jump performance.

TESTS	Mean	sd.	'r' values
30 m standing start	3.7	0.173	-.382
50 m standing start	5.57	0.234	-.138

From the results of Table 2, it has been found that 30 m and 50 m do not show significant relationship with performance. The achieved values are less than the required table value .482, at $p < 0.05$ level and .606 at $p < 0.01$ level. Correlation between 30 m and Triple Jump performance indicates that there is difference between control speed during approach run and pure speed. The 30 m shows

better relationship with performance (.382) in comparison to 50 m run (.138).

Locatelli (1987) stressed that 30 m fast runs, from standing start, are a must for all levels of long, triple and high jumpers. Schmolinsky (1983) points out that speed is the most important physical ability among the other abilities required for jumpers.

Table-3: Correlation of jumping ability with performance in Triple jump.

Test	Mean	s.d	correlation(r)
Standing triple jump	9.58	0.445	0.643
2 Hop-2 Step jump	17.00	1.638	0.687

**correlation is significant at the $p < 0.01$ level (N-16)*

The results presented in Table 3 show positive correlation of jumping ability with performance. The found values of 0.643 and 0.687 for Standing Triple Jump and 2 Hop-2 Step Jump with performance, respectively, are highly significant at 0.01 levels.

The suggestions made by some of the authors also support the results of the present study. Straznski (1987) states that the jumping ability plays a major role for performance, a faster, effective take-off action, and continues forward momentum until the step and jump are completed. He was also of the opinion, that Standing Triple

Jump and 2 hop-2 step jumps are some of the common tests for sprints and jumping events, to monitor the development of explosive power of an athlete.

The take-off is repeated three times and hence rebound strength is vital factor so that the jumper can lose less speed at the consecutive jumps. This is a prerequisite for a good triple jumper (Hay, 1988).

Larkins (1990) stated that hopping drills that emphasize horizontal projection, rather than vertical projection, will help them to learn an effective hop technique. This will enable them to

rebound more easily from hop landing and therefore attain greater step distance. Their weak

step could also be improved by additional step drills such as hop-step rhythm drills.

Table-4 : The Mean, SD, and correlation among strength parameters with Triple jump performance.

Test	Mean	Sd	correlation(r)
Snatch	68.75	8.139	0.759**
Bench press	75.625	6.708	0.538*
Overhead backward (4kg) shot throw	19.47	1.906	0.546*

*Correlation is significant at the $p < 0.05$ level.

**Correlation is significant at the $p < 0.01$ level.

The result reveals that the relationship between Snatch and Triple Jump performance is highly significant with an 'r' value of 0.759, at $p < 0.01$ level. In bench press and overhead backward shot throw the found value of 0.538 and 0.546, respectively, are higher than the required table value. Dick (1980) suggested that power can be developed by improving maximum

strength.

Over head throw is a test directed towards the power and coordination of the legs, back and arms. All the three parameters are significantly important for Triple Jump performance.

The different motor abilities tests are an excellent tool for measuring the progress in training for Triple Jump at all levels.

Table-5 : Mean, sd, and correlation(r) values of ratios with performance.

Test	Mean	sd	'r' value
Hop	36.82	± 0.217	0.152
Step	29.57	± 0.389	0.298
Jump	33.61	± 0.507	-0.294

The correlation values of Hop, Step, and Jump with Triple Jump performance do not show significant relationship. As per the found mean values, the Phase Ratio of Indian triple jumpers is 36.82% : 29.57% : 33.61% for hop step and jump, respectively. The mean values also indicate that

the achieved ratios are similar to the pattern suggested by Dyson (1977) for the beginners (36% : 28% : 34%). It indicates that Indian jumpers are Hop dominating; whereas, the world champion with a performance of 18.29 m is a jump dominating triple jumper (Bruggemann et al, 1999).

Therefore, the control ratio training may be given weightage according to the fitness and performance level of the male Triple jumpers.

CONCLUSION

The result of this study shows that :

1. The Standing Triple Jump and 2 Hop 2 Step Jump have shown significant correlation with Triple Jump performance.
2. The 30 m and 50 m are not showing significant correlation with jump performance.
3. It is found that Snatch shows highly significant correlation with Triple Jump performance.
4. Bench Press and over head backward shot throw show significant correlation to the Triple Jump performance.
5. There is no significant relationship between Triple Jump performance and HOP, STEP and JUMP ratio.
6. The result proves that Indian Male triple jumpers fall in the Hop dominating ratio.

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