Relationship of Selected Motor Abilities and Anthropometric Parameters with Long Jump Performance of National Level Jumpers

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ABSTRACT

The purpose of the study was to know the relationship of selected motor abilities and anthropometric parameters of national level long jumpers with their performance. Twentytwo male long jumpers were taken as subjects, for the present study. Speed test (30 m), jumping ability tests (Hop standing from both legs),strength test (standing broad jump) and anthropometric procedures were administered to collect the data. Trials were conducted to assess the long jump performance.

The results indicate that there is lower relationship of 30 m fly (0.214) with performance. The r value of standing broad jump (0.384) is having significant relationship with competition performance, at 0.05 level. Strength parameter has shown significant correlation with performance. three hop standing with right leg (0.316) and left leg (0.618) and five hop right leg (0.85I) left leg (0.809) is highly significant with long jump performance.

INTRODUCTION

The long jump was one of the events of the pentathlon of the original Olympics in ancient Greece. Long Jump was the only known jumping event in these ancient Olympic Games. The long jump has been part of modern Olympic competition since the inception of the Games, in 1896.

There are four main components of the long jump, the approach run, the last two strides, take off and action in the air, and landing. Speed in the run-up or approach and a high leap off the board are the fundamentals of success. Because speed is such an important factor of the approach, it is not surprising that many long jumpers also compete successfully in sprints. A classic example of this long jump / sprint doubling is performances by Carl Lewis.

The long jump is a track and field event in which athletes combine speed, strength and agility in an attempt to leap as far from the take-off point as possible.

Pearson (1963) stated that, in long jumping, the athlete should be capable of varying type of moments to the limit of the joints. In a 'Hitch Kick movement', a full range of movement is necessary to affect maximum contrary turning, on the upper part of the body.

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Short hamstring muscles may cause the jumper to drop his leg down earlier than required for a good landing.

According to Bosen (1972) , a successful long jumper requires speed to cover the sufficient distance with controlled speed.

Bosen (1972) reported that this event requires a run up of sufficient length to develop maximum controllable speed, combined with effective sprinting at the take off. Wilt Fred (1972) stated that approach speed the long jumping is important; but, he has also stated that the I00 m sprint time is not comparable with the result of long jumping; because, the long jumper speed requirement is decisive at a distance between 40 m to 50 m. Further, he noted that the higher speed of approach run, which jumper can maintain at the take off without great loss in the momentum, the better will be the resultant conversion of the approach speed at the take off. According to Baursfield and Schroter (1979) the performance in all jump events in track and field is based on explosive strength which is known as jumping strength for the jumpers and is related to reactive strength ability. Doherty (1984) is of the belief that the practice organization for long jump should consider at least five factors, i.e., speed, power, skill, tendon and tissue toughness and speed endurance. Victor Lopez (1989) stated that a potential horizontal jumper must possess "speed" and explosive power, which includes elastic components such as "flexibility" and good co-ordination. Dan Plaff (1996) pointed out that the tests for elastic strength, such as timed hopping over the barriers alternate bounding, provide valid prediction.

According to Bianco (1996), speed is one of the most important physical qualities required for performance in the jumps, especially in the long jumpers.

METHODOLOGY

Twentytwo male long jumpers were taken as subjects for the present study. Out of 22 long jumpers, eleven were national position holders in various national competitions at senior and junior levels and the rest had only participated in the various India competitions. The long jumpers selected for the study were from northern region.

The following test procedures were used for the assessment of anthropometric and fitness variables in the present study.

Anthropometric Measurements

- Height(cm)
- Weight(kg)
- Sitting Height(cm)

Fitness tests

30 m Run from Standing start (seconds)
- Speed

Standing broad jump (meters)
-Explosive strength

3 Hop standing right leg (meters)
-Explosive strength

3 Hop standing left leg (meters)
-Explosive strength

5 Hop standing right leg (meters)
-Explosive strength

5 Hop standing left leg (meters)
-Explosive strength

Forward Bend and reach (cms)
-Trunk Flexibility

In addition the long jump performance was also recorded.

Mean, SD and correlation of coefficient was calculated to interpret the data.

RESULT& DISCUSSION

The main objective of the present study was to determine the relationship between selected anthropometrical and fitness variables with long jump competition performance. The mean score, standard deviation and correlation (r) values of selected variables and competitive performance are presented in Table 1 to 7.

Table-1 : Mean and SD values of selected variables (n=22)

S. No.	Test	Mean	SD
1	30 M flying (sec)	3.48	0.26
2	Standing broad jump(mts)	3.18	0.25
3	3 Hop standing right leg (mts)	8.36	1.64
4	3Hop standing left leg (mts)	8.78	0.87
5	5 Hop standing right leg (mts)	14.63	1.28
6	5 Hop standing Left leg (mts)	14.46	1.23
7	Flexibility (cm)	21.25	3.47
8	Ht. (cm)	179.9	5.38
9	Body wt. (kg)	74.81	8.84
10	Leg length (cm)	98.80	5.32
11	Performance (mts)	6.866	0.543

The Table 1 is presenting the Mean and SD Values of all selected variables.

The correlation value of height, body weight and leg length presented in Table 2 are 0.148., 0.111 and 0.095, respectively.

The height is a dominating factor to achieve higher competitive performance in long jump (Sodhi, 1981). But, the results of the present study indicate that height, weight and leg length has no relationship with long jump performance. According to Ranawat and Kang (2010), jumpers were found tallest among all athlete groups.

Table-2: Relationship between physical characteristics and long jump Performance (n=22)

Tests	Correction (r)
Ht(cm)	0.148
Body wt (kg)	0.111
Leg lenght(cm)	0.095

From the result presented in Table 3, it has been found that the correlation value of 0.214 is not significant at 0.05 level. Locatelli (1987) stressed that 30m fast runs are a must for all levels of long jumpers. Speed is the most important physical ability, among the other abilities required for jumpers (Schmolinsky, 1983)

Table-3: Relationship between physical characteristics and long jump Performance (n=22)

Tests	Correction
30m flying	-.2144

Significant at 0.05 level (required value = .360)

Table-4: Relationship between physical characteristics and long jump Performance (n=22)

Tests	Correction
Standing broad jump	0.384

Significant at 0.05 level (required value = .360)

The correlation values (r) mentioned in the Table 4 for standing broad jump is 0.384, which shows significant relationship with competitive performance.

The correlation values, presented in Table 5, show that there is a significant relationship between 3 hop standing left leg and competition performance with a value of 0.618 and a non-significant relationship of 3 op standing right leg with competition performance (0.316) . The reason behind left leg hop showing significant relationship may be that the majority of the subjects were left leg dominating jumpers. The mean value of left leg hop is higher than the right leg hop. Straznski (1987) states that the jumping ability plays a major role for performance, a faster, effective take off action.

The correlation values (r) 0.85132 and 0.80968, mentioned in Table 6, show that 5 hop standing right leg and 5 hop standing left is significantly correlated with performance at 0.05 levels, Larkins

Table-5: Relationship between physical characteristics and long jump Performance (n=22)

Tests	Correction
3 Hop standing right leg	0.316
3 Hop standing left leg	0.618

Significant at 0.05 level (required value = .360)

Table-6: Relationship between physical characteristics and long jump Performance (n=22)

Tests	Correction
5 Hop standing right leg	0.85132
5 Hop standing left leg	0.80968

Significant at 0.05 level (required value = .360)

Table-7: Relationship between flexibility characteristics and long jump Performance (n=22)

Tests	Correction
Flexibility	-0.377

Significant at 0.05 level (required value = .360)

(1990) stated that hopping drills, that emphasize horizontal projection, rather than vertical projection, are related to long jump performance.

The reason may be that hop jumps measure the explosiveness of the muscles in horizontal direction, which is considered to be a dominating factor in long jump and pole vault.

The r values of 0.377 presented in Table 7 shows that there is a statistically significant relationship between long jump performance and flexibility in national level jumpers.

The result of trunk flexibility test indicating significant relationship between long jump performance confirms the view of Payne, H. (1981) that flexibility is one of the other motor ability for improving range of moment of joints; thus, improving running or jumping performance in long jump.

CONCLUSION

The following conclusions are warranted from the results of this study.

wing conclusions are warranted from the results of this study.

Old trainees having lower height (1.70-1.75) have shown maximum jumping performance (7.77 mts), while new trainees having maximum height (1.88 – 1.89) has lower jumping performance. So, these results had shown no co-relation between jumping performance in relation to height, leg length.

The variation may be due to having small sample size.

1. There is significant relationship between speed and jumping performance.
2. There is significant relationship between standing jump performance.
3. 3 standing hops on left leg show higher and significant relationship with long jump performance in comparison to right leg hops.
4. 5 hop jumps performance is significantly correlated to the long jumper's performance.

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