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Golden Research Thoughts

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**ABSTRACT:-**

The aim of this study was to find out the relationship between leg power and reaction time with long jump performance. To achieve the purpose of the study, the investigator randomly selected 30 long jumpers who participated at inter collegiate level athletic meet, representing different colleges. The selected subjects were measured of their leg power through standing broad jump test and reaction time through reaction time tester and long jump performance following the standard procedure. The collected data on leg power, reaction time were correlated with long jump performance to find out the relationship. The obtained data were further subjected to statistical analysis using Pearson Correlation Coefficient analysis to find out whether leg power and reaction time were significantly related to long jump performance of these athletes. The Correlation co-efficient results proved that there was significant relationship ($P<0.05$) between leg power and long jump performance while there was no significant relationship between reaction time and long jump performance. It was concluded that leg power has significant relationship with long jump performance and more researches are required to establish relationship with long jump and reaction time.

**KEYWORDS:**

Leg Power, Reaction Time, Standing Broad Jump, Reaction Time Tester, Long Jump Performance.

# RELATIONSHIP BETWEEN LEG POWER, REACTION TIME AND LONG JUMP PERFORMANCE

## INTRODUCTION

Leg strength plays a vital role in the daily activities of man. It is an essential factor for indulging in almost all games and sports. There is an old adage that an athlete will go on only as long as his leg could carry him. Vertical jump is used to measure the explosive power and strength of legs. Jumping ability depends on strength muscles and tendons and flexibility of ankles, knee and hip joints. (Larsen, 1971) In vertical jumping exercise, the forces are directed upward and projection takes place with the center of gravity directly over the base of support. Power is a composite of a number of different factors operating together to produce an explosive effort to get away to a first start, to accelerate the shot, to get maximum life when jumping all these require the explosive power.

A jump is a motion which carries the body through the air from the take-off. In a jump the propulsive force may be exerted either by foot or by both feet. In long jump, the run preceding the jump gives the forward movements and vertical determined by the strength which are involved in these movements. Long jump requires lot of speed, strength and agility. So one can attain success in these events of jumping with proper training which are suitable to develop those qualities. A good technique is very essential in the field of athletics especially for long jumpers. But the first and foremost quality for a long jumper is leg strength and muscular power so that the jumper can develop so much of speed and go up in the air with maximum effort to gain distance.

Human Psychomotor skills are organised patterns of muscular activities guided by changing signals from the environment. The genetic factors, growth and development considerations and prior environmental experiences provide learners to come to a learning situation with dissimilar probabilities for success. In researches concerning psychomotor skills particular attention is given to the learning to co-ordinated activity of the arms, hands, fingers and feet. If we assume the uniqueness of the skill to be learned and a relative homogentiy of the would be learners in relevant variables.( Oxendline, J.B. (1975)

Reaction time is one of the factors of great significance in competition. Different forms of reaction time may dominate one's ability to perform according to situation demanding quick response and immediate action. Reaction time is considered as the time that elapses from the occurrence of the stimulus till we set act or the time from the occurrence of the stimulus to the completion of a simple muscular contraction.( John,D.Lawther. (1960) Reaction time improves upto the age of 25-30 after that it gradually declines. Men generally respond and react slightly faster than women. Studies have recalled that gymnasts and wrestlers react more slowly than the team game athletes" (Lawther, 1960).

Coward SR and Halsey LG (2014) analysed video recorded data on horizontal jumping and found the calf muscle is likely used more, and the thigh muscles less, to take-off from a firm springboard during 1.8 m jumps, which may result in the power required to take-off being produced less efficiently. And the angle of take-off is closer to the optimal for energetic efficiency, possible due to the impulse provided by the surface as it returns stored energy during the final stages of the take-off. López-Segovia M et al. (2014) examined the relationship between lower body power and repeated as well as single sprint performance in soccer players and found repeated and single sprints are associated with relatively lower body power in soccer players. Lockie RG et al. (2014) examined lower-body focused tests, hurdle step, in-line lunge that could assist in identifying movement deficiencies affecting multidirectional sprinting and jumping, which are important qualities for team sports and found functional movement screen (FMS) have minimal capabilities for identifying movement deficiencies that could affect multidirectional speed and jumping in male team sport athletes. Theodorou A et al. (2013) investigated the occurrence of stride regulation at the approach phase of thelong jump in athletes with normal vision and visually deprived and found reduced vision does not prevent athletes from applying a regulatory mechanism similar to that observed in sighted athletes. Panteli FN et al. (2014) examined the presence of visually regulated control in young, novice long jumpers as they approach the takeoff board and found that young, novice participants adjust the length of the final steps of their approach run, suggesting the presence of visual control. Chatzopoulos D et al. (2014) compared the acute effects of three different stretching protocols on balance, agility, reaction time and movement time of the upper limbs and revealed significant main effects for all variables except reaction time. Ricotti L et al. (2013) found visual and acoustic reaction times do not discriminate among players or control subjects (non-athletes). Nuri L et al. (2013) investigated whether a difference exists in sensory-cognitive skills between two different sport domains (volleyball players and sprinters) and found athletes have greater sensory-cognitive skills related to their specific sport domain either open or closed. The theoretical foundations laid proved that there were some attempts made to identifying variables for long jump performances and some other researches were attempted to find out the influence of reaction time among different athletes. These findings proved that there is further scope for research to find out the relationship between leg power and reaction time on long jump performances among collegiate level long jumpers.

## METHDOLOGY

To achieve the purpose of the study, the investigator randomly selected 30 long jumpers who participated at inter collegiate level athletic meets, representing different colleges. The selected subjects were measured of their leg power through standing broad jump test, simple reaction time using reaction timer and long jump performance following the standard procedure. The collected data on leg power and reaction time were correlated with long jump performance to find out the relationship between leg power

and reaction tome with long jump performance. Statistical tool Pearson Coefficient of Correlation was used to find out the relationship between criterion variable, long jump ability and independent variables, leg power and reaction time. In all cases 0.05 level was fixed to test the significance of the study.

## RESULTS

**Tab 1: Showing Descriptive Statistics, Number of Subjects, Means and Standard Deviation on Leg Power, Reaction Time and Long Jump Performance of the Subjects**

| S.No | Variables | No. of Subjects | Mean | Standard Deviation | Range | |
|---|---|---|---|---|---|---|
| | | | | | Min | Max |
| 1 | Leg Power | 30 | 2.04 | 0.14 | 1.74 | 2.28 |
| 2 | Reaction time | 30 | 0.467 | 0.051 | 0.374 | 0.558 |
| 3 | Long Jump Performance | 30 | 5.42 | 0.363 | 4.87 | 6.05 |

The descriptive statistics showed that the average leg power of the subjects were 2.04 meters to standing broad jump run with standard deviation of + 0.14. The average reaction time scores of the subjects were 0.467 seconds with standard deviation of + 0.051. The long jump performance average score was 5.42 Meters with standard deviation of 0.363. The obtained data were statistically analysed to find out whether leg power and reaction time have any significant relationship with long jump performance.

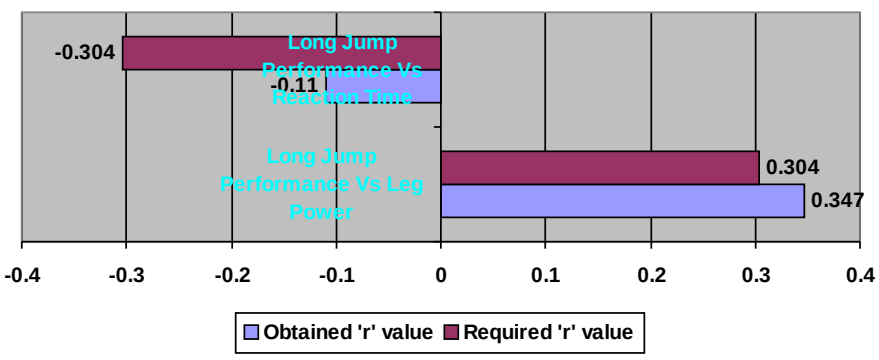
**Tab 2: Showing Pearson Coefficient Correlation Between Criterion and Independent Variables**

| S.No | Variables LONG JUMP PERFORMANCE Vs | No. of Subjects | Obtained 'r' | Required 'r' |
|---|---|---|---|---|
| 1 | Leg Power | 30 | 0.347* | 0.304 |
| 2 | Reaction time | 30 | -0.110 | 0.304 |

* Significant at 0.05 level.

The results proved that there was significant relationship between leg power of the subjects and their long jump performance ($P<0.05$) and there was no significant relationship between reaction time and long jump performance of the subjects.

**Fig 1: The obtained & Required 'r' values.**




## DISCUSSION ON RESULTS

The results presented in Table 2 proved that there was significant relationship between leg power and long jump performance of the subjects. The reaction time of the subjects were not significantly related to long jump performance as the obtained 'r' value of -0.11 was less than the required 'r' value of 0.304 to be significant at 0.05 level. Coward SR and Halsey LG (2014) found the calf muscle is likely used more, and the thigh muscles less, to take-off from a firm springboard during 1.8 m jumps, which may result in the power required to take-off being produced less efficiently. López-Segovia M et al. (2014) examined the relationship between lower body power as well as single sprint performance in soccer players and found repeated and single sprints are associated with relatively lower body power in soccer players. These findings revealed that long jump performance are associated with leg power and the findings of this study are in agreement with these previous researches. Chatzopoulos D et al. (2014) compared the acute effects

of three different stretching protocols on balance, agility, reaction time and movement time of the upper limbs and revealed significant main effects for all variables except reaction time. The findings of this study proved that there was insignificant relationship between reaction time and different protocols including long jump and the findings of this study that there is no significant relationship between long jump and reaction time was in agreement with this previous study.

## CONCLUSION

It was concluded that leg power has significant relationship with long jump performance and more researches are required to establish relationship with long jump and reaction time.

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