



## Research Article

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# Relationship of Physical Variables, Physiological Variables and Body Compositions to the Sprint-Starts

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## Abstract

The purpose of the study was to determine the relationship of physical variables (i.e. standing broad jump, flexibility) physiological variables (anaerobic capacity, resting pulse rate, vital capacity) and body compositions (lean body mass, total body weight, height, biceps, triceps, sub scapula and supra iliac skin fold) to the sprint starts. Twenty male students of under graduate and post – graduate classes of L.N.I.P.E., Gwalior, were selected as subjects. For measuring these physical, physiological variables and body compositions following tests were employed: sprint starts were measured up to 50 m from starting line and the performance was recorded in seconds; explosive strength was measured by the standing broad jump, and the performance was recorded in centimeters; flexibility was measured with the help of seat and reach test and the performance were recorded in inches; anaerobic capacity was measured by the help of Margarita Calamine power test in the unit of kg. m/sec; resting pulse rate was measured by the help of stop watch and recorded in number of beats per minute; vital capacity was measured by the help of wet-spirometer in the unit of liters; lean body mass was calculated by subtracting the fat weight from the total body weight; total body weight was measured by the help of weighing machine in the unit of kilograms; height was measured with the help of height stadiometer in centimeters; body fat was estimated by the help of skin fold caliper (bicep, triceps, sub scapula and supra iliac) and the fat weight was measured by calculating percentage of the body fat with the help of skin fold caliper, taken namely biceps, triceps, sub scapula and supra iliac in millimeters and then weight of the fat was calculated on the basis of the total body weight of the individuals subjects. Product movement correlation was used to compute correlation between sprint starts (50m run) and each of the selected independent variables i.e. explosive strength, flexibility, anaerobic capacity, resting pulse rate, vital capacity, lean body mass, body weight, and height. For testing the hypothesis, the level of significant was set at 0.05 level. The finding of the study indicated that standing broad jump (Explosive leg strength) had significant relation to the sprint starts and co-efficient of correlation was 0.611. Further the co-efficient of correlation between sprint starts and flexibility, anaerobic capacity, resting pulse rate, vital capacity, lean body mass, body weight and height were 0.260, 0.413, 0.275, 0.229, 0.308, 0.181 and 0.260 respectively, these values indicated insignificant relationship.

**Key words:** Standing broad jump, flexibility, anaerobic capacity, resting pulse rate, vital capacity, lean body mass, total body weight

## Introduction

Sports is a medium which can provide a sense of purpose, a sense of continuous challenge as well as a range of emotions which is sometimes different to experience elsewhere. There are

numerous opportunities for personal growth and for stretching for the limits of human potential both physical and physiological. The desire to do the personal best, to excel to attain the highest standards of performance, to be super in one's chosen field is a worthy human ambition which has

left and can continue to lead to increased standards and personal growth. High levels of achievement and excellence in any area do not come early. The trail is hard and steep. There are numerous abstracts to overcome and barriers to push forth. Becoming a highly skilled person in any field demands commitment and sacrifice. He is saying now being modified sprinter is born with some inherent speed but he can also be trained and shaped into a still better sprinter with the guarantee speed plays a vital role in all games and sports, but it plays a very dominant role for sprinters. For a sprinter, to quite good performance he must passes acceleration, speed, sprinting speed, speed of movement and reaction time. Even though these four components of speed affected the performance of a sprinter yet the contribution is made reaction to enhance speed performance is still not very certain there is no doubt regarding the contribution of acceleration, speed, sprinting speed and speed of movement to bring about better performance on the parts of sprinters therefore to attain optimum performance in activities where speed is the main factor acceleration speed, sprinting speed, speed of movements and reaction time should be woven together.

There is more understanding of the physiological need for acclimatization, there is better medical control over chance injection and above all there is greater attention paid to the development of the psychological attitudes necessary to successful competition. But mostly the improvement is due to the athletes themselves. In the sprints, jumps and the throwing events at least, it is hard to resist the conclusion that the modern athlete is actually better endowed physically better suited to his particular task. In events such as the sprints put there has been advances in technique too. Clearly the search for better men has been successful. Speed items (sprinting starts) have been on the programmed of the modern Olympic Games from the every beginning. Earlier athletes did not adopt any sophisticated training means for the development of speed. In the competitions the athlete exhibited whatever he gained through daily physical work and whatever speed characteristics he inherited from his parents. The saying "sprinters are never made they are born" used to carry weight in ancient days.

## Experimental

### Subjects

For the purpose of the study 20 male students belonging to age group 18 to 25 years from

B.P.E. and M.P.E. classes of L.N.I.P.E., Gwalior were selected randomly.

### Measures-

- Sprint speed was measured by the 50 m. dash.
- Explosive strength was measured by the standing broad jump.
- Flexibility was measured with the help of seat and reach test.
- Anaerobic capacity was measured by the help of Margarita Calamine power test.
- Resting pulse rate was measured by the help of stop watch.
- Vital capacity was measured by the help of wet-spirometer.
- Lean body mass was calculated by subtracting the fat weight from the total body weight.
- The height was measured with the help of height stadiometer.

### Scoring of data

The performance of sprinting starts standing broad jump, flexibility, anaerobic capacity, resting pulse rate, vital capacity, lean body mass, body weight, height were recorded for the purpose to find statistical relationship between physical variables (standing broad jump, flexibility), physiological variables (anaerobic capacity resting pulse rate, vital capacity), and body composition (lean body mass, body weight, and height) to the performance in sprinting starts.

### Statistical analyses

To find out correlation between independent variables and dependent variable, Product Movement Method of correlation was used. The level of significance was fixed at 0.05.

## Results and Discussions

The Table -1 shows that the explosive strength (standing broad jump) only has significant relationship to the sprint start performance with the value of 0.611. The flexibility shows insignificant relationship to the performance, in sprint start with value of 0.260. The relationship regarding physiological variables and sprint starts is presented in the Table 2.

The Table-2 shows that the physiological variables such as anaerobic capacity (0.413), resting pulse rate (0.229) and vital capacity (0.275) has insignificant relationship to the sprints start.

The Table-3 shows that the composition such as lean body mass (0.308), body weight (0.181), and height (0.260) has insignificant relationship to sprint starts. The findings of the study shows that the only explosive strength (standing broad jump) has significant correlation to the sprint start with the value of 0.611. The performance of the standing broad jump has showed high correlation to performance in sprint starts because while leaving from the block or for quick start the athlete may need tremendous amount of leg extension and power<sup>1</sup>. The insignificant relationship of other physical, physiological variables and body composition, such as flexibility (0.260), anaerobic capacity (0.229), vital capacity (0.275), resting pulse rate (0.229), lean body mass (0.308), body weight (0.181) height (0.260) may be due to fact find that technique is most important rather than flexibility, resting pulse rate, vital capacity, lean body mass, body weight and height<sup>2</sup>. Anaerobic capacity has shown in significant relationship to the performance to sprint start, but value of anaerobic capacity (0.413) is close to significant sprint event which shows that sprint event is anaerobic type of activity to perform it should not be ignored, but it have shown insignificant relationship due to some other

factors. The relation of vital capacity and performance in sprint start has shown insignificant because endurance athletes have a better vital capacity as compared to sprint athlete, endurance athlete perform sufficient amount of oxygen, while sprint athletes perform the activity in the presence of insufficient amount of oxygen, therefore in the sprint event vital capacity is less required<sup>3</sup>.

## References

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**Table 1** Co-efficient of correlation between physical variables and sprint start (50 m run)

Dependent variables	Independent variables	Co-efficient of correlation
50m run	Standing broad jump	0.611*
	Flexibility	0.260

\*Significant at 0.05 level

**Table 2** Co-efficient of correlation between physiological variables and sprint starts (50 m run)

Dependent variables	Independent variables	Co-efficient of correlation
50m run	Anaerobic capacity	0.413
	Resting pulse rate	0.229
	Vital capacity	0.275

**Table -3** Co-efficient of correlation between body compositions and sprint starts (50 m run)

Dependent variables	Independent variables	Co-efficient of correlation
50m run	Lean body mass	0.308
	Body weight	0.181
	Height	0.260