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Relationship of speed with foot length leg length and stride length of state level sprinters

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Abstract

Previous research has suggested that a degree of predictability exists in the relationship between self-selected running stride rates (SR) and stride lengths (SL) with measures of body size such as mass, height and limb lengths. The present study was undertaken to find the relationship of speed ability with foot length, leg length and stride length of state level sprinters. For this study 30 male state level sprinters, age range 18-24, of different athletics coaching Centre from west Midnapur and North 24 pgs in West Bengal were selected purposively. The subjects were tested speed by 50mt. dash and physical measures of foot length, leg length and stride length were also recorded. The product moment correlation was computed to find out the zero order correlation of the independent variables on the dependent variables. The statistical analysis of data in selected Anthropometric measurements (foot length and leg length) and Physical fitness (stride length) were computed by applying product moment correlation statistics for each variable separately. The level of significance was set at 0.05. Statistical calculation of the gathered data showed that stride length has a negative significant linier correlation with speed and foot length has a negative insignificant linier correlation with speed, leg length has positive insignificant linier correlation with speed of state level sprinters.

Keywords: Anthropometry, Sprint performance (Speed), Foot length, Leg length and Stride length etc

Introduction

It is the era of science. So without proper application of scientific principles there is no scope of the improvement in the sports. To develop the standard of the game, quality of the players, coaches, organizers should have the knowledge of the scientific principles of particular game and must follow them during practice. Along with the scientific principles, the coaches should have the knowledge of formulating an effective training schedule, time of training, equipment facilities etc.

“The race is not always to the swift nor the
Battle to the strong, but that’s the way to bet”- Runyon

Running, “the classical athletic sport,” can be considered simple and difficult; simple, because it is an instinctive, natural and basic fundamental skill performed by all. But difficult, because of its mechanical complexity as an athletic event.

Runyon’s quotation substantiated the mechanical complexity of running as competitive athletic event where neither the faster nor the stronger always win the fate but many a times the race (bet) is won by the athletes possessing mechanical efficiency which has its basis in technique, motor ability, morphometric measurements and mental play. Over the years records in running events have been shattered again and again and specifically in 100 mt. the speed barriers due to age, sex, physique, physiology etc. have been broken from time to time. Always new faces had been winning the short sprints in Olympics as well as in other international competitions. Therefore the present study was undertaken by researcher to find out the relationship of speed with foot length, leg length and stride length of state level sprinters.

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Methodology

The present study was undertaken to find the relationship of speed ability with foot length, leg length and stride length. For this study 30 male state level sprinters were purposively selected as subject, age range 18-24, from different athletics coaching Centre of West Midnapur and North 24 pgsdistricts of West Bengal. The variables undertaken for this study were 50mt. dash to measure speed in second, foot length and leg length were measured by anthropometer rod in centimeter and stride length were also recorded by standard measuring tape in meter. The test was conducted in different coaching camp of above mentioned districts. The various test and data was conducted and collected respectively by the researcher himself with the help of sports professionals.

To find out the existing relationship of Speed with Foot length, Leg length and Stride length of state level sprinters product moment correlation was used as a statistical

technique. The level of significance was set at 0.05.

Findings & discussion

Table 1: Mean and SD of variables (Speed, Foot length, Leg length and Stride length)

| Variable | Mean | SD |
|---------------|-------|------|
| Speed | 6.68 | .272 |
| Foot length | 24.67 | 1.08 |
| Leg length | 87.53 | 3.99 |
| Stride length | 2.18 | .23 |

From Table-1 on the basis of Mean and SD, it was observed that the subjects selected for this study were almost similar or slightly scattered but their performance in sprint were found more scattered.

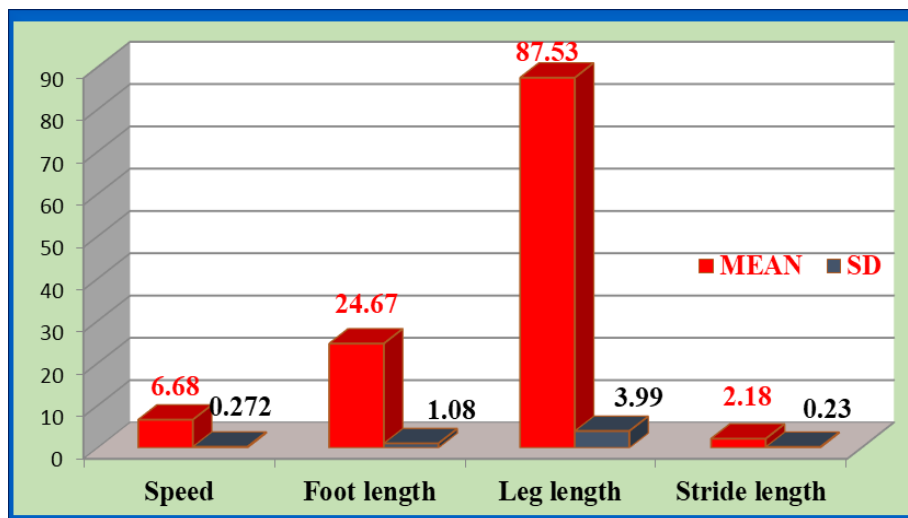


Fig 1: Mean and SD of variables (Speed, Foot length, Leg length and Stride length)

Table 2: Coefficient of Correlation of dependent variables to independent variables

| Sl. No. | Dependent variable | Independent Variables | 'r' |
|---------|-------------------------------|-----------------------|--------|
| 1. | Sprinting performance (Speed) | Foot length | -.20 |
| 2. | | Leg length | .05 |
| 3. | | Stride length | -.280* |

*Significant at .05, Tab $r_{0.05} (28) = .250$

Analysis of the result

From gathered data and its statistical computation it was found that mean of foot length 24.67 and SD was 1.08 and Sprint performance (speed) mean was 6.68 and SD was .272. Correlation of Sprint Performance (speed) with foot length was -.20 which was lower than the tabulated value. So, it was showed a negative insignificant correlation of speed with foot length of state level sprinters. According to result greater the foot length, speed will be less of an athlete. Probably longer foot length was provide a broader base of support that means the inertia of rest will be more that is why speed will be less. It was also found that Sprinting performance (speed) has a positive insignificant relationship with Leg length of state level sprinters. Leg length may play a role in determining the combination of step length and step rate used by an athlete; however, for an individual, the effects of leg length cannot be modified, at least to any great extent. This resulted in the faster sprinters having a longer step length (supposedly due to their greater horizontal velocity, relative to the treadmill belt). Our results suggested that a high vertical (and therefore, high vertical velocity of speed) had a positive effect on step length;

however, it also had a negative effect on step rate and basically no effect on sprint velocity (JOSEPH-2003). Leg length, it is presumed must have a telling effect on speed. In general, we know that longer leg length will create broader stride length and that is so helpful to increase speed. But in the present study it was found that the lower positive relationship. That might be due to the fact that the sample was probably not technically sound and ignorant of the movement structure.

On the basis of calculation on collected data; it was found that Sprint performance (speed) has a negative significant relationship with Stride length. Greater stride length covers maximum distance which is helpful for sprinting performance but decreased stride frequency. Speed basically depends upon frequency of steps not only the stride length and it reflects into present study. A wide step length and higher step rate combination is the base of high sprinting performance. This was partly due to a negative interaction that existed between step length and step rate; that is, those athletes who used a longer step length tended to have a lower step rate and vice versa. (JOSEPH-2003)

Conclusions

From the finding of the study it can be concluded that: -

- 1) Foot length was negative insignificant dependent measurement for sprinting ability. Sprinters possessing greater foot length sprinting time will be less, generally performance will be better. But the gain was not found significant.
- 2) Sprinting performance (speed) was a positive insignificant relationship with Leg length of state level sprinters.
- 3) Sprint performance (speed) has a negative significant relationship with Stride length. Sprinters possessing greater stride length gained significantly less time in sprinting events.

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