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Comparative Effect of Varied Foot Spacing in Crouch Start on Acceleration Speed of Sprinters

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INTRODUCTION

Athletics, also called track- and -field sports or Track & Field, a variety of competitions in running, walking, jumping, throwing events and combined events. Although these contests are called Track and Field (or simply track), they are generally designated as athletics elsewhere. Track -and -field athletics is the oldest forms of organized sport having developed out of the most basic human activities - running, jumping and throwing. Athletics is one of the most popular international sports, in which a large number of countries in the world used to participate in the International level. Athletics Association of various counties sends their athletes to the Olympic Games and to the official world championships of Track and Field.

All track events begin with the firing of a gun. In races of one lap or less the runners remain in their marked lanes for the entire distance. In longer events the runners may ignore the lane markers and run as close to the inside edge of the track as is prudent. The runner whose torso reaches the winning line first is the winner.

In the 2007 World Championships in Track and Field held in Osaka, Japan, the difference in time between first place and sixth place in the women's 100 meter dash was less than .1 seconds. With such a miniscule amount of time separating a gold medal from no medal at all, there is no room for error. An important piece of the 100 meter dash is the initiation of movement, or the start. The importance of the sprint start does not merely end when the sprinter leaves the blocks. The force, velocity and positioning of the body from the start have an effect on the acceleration phase of the sprint, and eventually the outcome of the race.

Different aspects of the start, such as angles of the hip, knee and ankle angle of the pedals and longitudinal spacing of the feet have all been studied. One of the most common variables researched is the variance in the spacing from the starting line to the feet. The three common types of longitudinal spacing are the bunch, medium and elongated starts.

In the modern scientific age athletic use being trained by highly sophisticated means for better achievement in their concerned sports and they are being exposed to the exercise and training methods which have proved beneficial for achieving higher standards. Since the days of Grecian foot races, many important innovation and consequent developments have been made concerning the shorter sprint races. Two of these the introduction of the crouch start and the universal acceptance of starting block were instrumental in providing a basis for improved techniques and resultant lower elapsed times.

In all sprint events "starts" play an important role, winning an event largely depends upon the type of start taken by an athlete. For sprinters, the start means half the race. The winning margin of most sprint races rarely exceeds a few centimeters. If a sprinter can gain even slight edge at the start, he has a great advantage over his opponents in sprinters. Since a good start is important, it can be developed by constantly practicing the proper method until it is mastered and by keeping in mind that a good start is not only speed from the block but that will carry the sprinter to full sprinting stride in the Fastest Fashion.

The coaches and physical education teachers should realize the importance of acceleration in sprint events therefore, the research scholar have made an attempt to find out influences of synthetic surface on acceleration by using bunch, medium and elongated crouch start. Once the appropriate starting position is determined the physical education teachers and coaches will be able to employ the synthetic running surface and effective position for better acceleration and improvement on sprinting performance.

PURPOSE OF THE STUDY

The purpose of the study was to compare the effect of varied foot spacing in crouch start on acceleration speed of sprinters on synthetic surface.

METHODOLOGY

For the purpose of the study a total of 10 male Sprinters age ranged from 18-25 years, belongs to

Lakshmibai National Institute of Physical Education, Gwalior who had represented the University at the All India Inter University level were selected as subjects. For measuring acceleration, the distance was delimited to 30 meters only. Thirty meters run was employed to measure acceleration speed of the subjects in the bunch, medium and elongated crouch start on synthetic surface.

CRITERION MEASURES

The criterion measures adopted for this study was acceleration performance of each subject on synthetic surface by using bunch, medium and elongated crouch starts recorded in terms of time taken over a distance of 30 meters to the nearest one hundred of a second.

STATISTICAL ANALYSIS

The data was analyzed by applying one way analysis of variance (ANOVA). The level of significance was set at 0.05.

FINDINGS

For the chosen distances of 30m acceleration by different foot spacing in crouch start, the data were subjected to Descriptive, Levene statistics and one way Analysis of Variance (ANOVA).

The data was subjected to Descriptive statistics to find out the mean difference on 30 meters acceleration by different foot spacing in crouch start (Bunch, Medium and Elongated). The Descriptive statistics are shown in Table No.1. The mean time for Bunch start was 4.30 sec, for medium start the mean time was 4.20 sec and for elongated start the mean time was 4.26 sec. Bunch start has the least variance. The level of significance was at .05.

Table – 1

A Descriptive Statistics of the Different Foot Spacing In Crouch Start over the Distance of 30 Meters Acceleration

Foot Spacing	N	Mean	Std. Deviation
Bunch	10	4.3070	.06447
Medium	10	4.2090	.10300
Elongated	10	4.2680	.12081
Total	30	4.2613	.10388

The data was subjected to Levene statistics to test the assumption of homogeneity of variances. The P-value was found .179 which is greater than .05 which means the Null hypothesis of equality of variance was accepted. Hence the assumption is fulfilled. The Levene statistics are shown in Table No.2.

Table – 2

The Levene Statistics Test of Homogeneity of Variances

Levene Statistics	df1	df2	Sig.
1.834	2	27	.179

The P-value for ANOVA was found .102 which is greater than the level of significance .05. There was no significant difference was found between the varied foot spacing in crouch start on acceleration speed of sprinters on synthetic surface. The data on one way Analysis of Variance of the different foot spacing in crouch start over the distance of 30 meters acceleration is shown in Table No. 3.

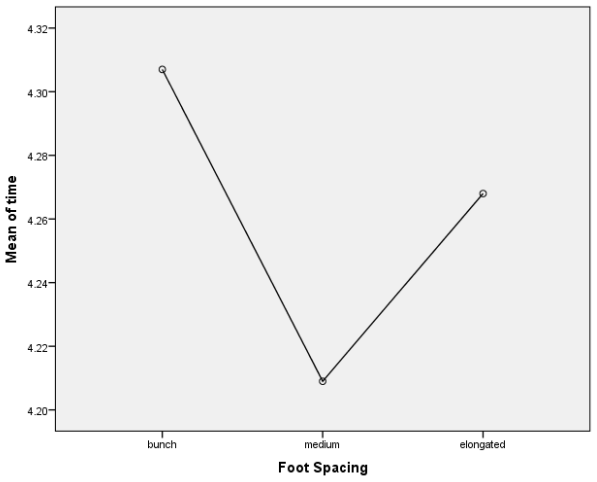
Table – 3

Analysis of Variance of the Different Foot Spacing in Crouch Start over the Distance of 30 Meters Acceleration

Variance	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	.049	2	.024	2.487	.102
Within Groups	.264	27	.010		
Total	.313	29			

* Level of Significance at .05.

Mean Plot



The mean time (in seconds) for Bunch foot spacing was 4.3070, for Medium foot spacing was 4.2090 and for Elongated it was 4.2680. Hence Medium foot

spacing was better when compared to Bunch and Elongated foot spacing.

CONCLUSION

The study examined the effect of varied foot spacing in crouch start on acceleration speed of sprinters on synthetic surface.The findings of the study revealed that Medium foot spacing is superior to other two foot spacing (bunch and Elongated) for acceleration up to a distance of 30 meters. Every athlete had sprinted in less time from the medium starting position than from either the bunch or the elongated foot spacing. There was no significant difference in the time taken to accelerate the 30 meters distances from the bunch and the elongated foot spacing in crouch start positions, this may be because of small sample size, level of the athletes, different reaction ability of the athletes, different anthropometric variables of the athletes etc. When the individual trials were studied, the largest number of fastest acceleration were made from the medium foot spacing crouch start, the next largest number from the bunch foot spacing crouch start and the smallest number from the elongated foot spacing crouch start.

REFERENCES

A. D. Dickson (1934). "The Effect of Foot Spacing on the Starting Time and Speed in Sprinting and Relation of Physical Measurements to Foot Spacing", Research Quarterly 5:1: p. 12.

Albert W. Biancani (1973). "The Effect of Foot Width Placement on Sprint Starting", Dissertation Abstracts International 33: p. 4911-A.

Bill Lynn Nulter (1973). "A Comparison of the Modified Standing and the Traditional Crouch Start for Running Speed", Dissertation Abstracts International 34: p. 2278.

G. Luke (1956). Coaching High School Track and Field (Londan: Nicholus Kaye Ltd.), p. 26.

J. W. Kistler (1934). "A Study of the Distribution of the Force Exerted Upon the Blocks in Starting the Sprint from Various Starting Position", Research Quarterly 5:1: p. 27.

Malcolm Stock (1934). "Influence of various Track Starting Position on Speed", Research Quarterly 5: 1: p. 12.

Nathalie, Jacques and Karl Hainaut, "Low Starting Block Angle is more effective", U.S. Track Coaches Review 95:3 (Nov. 1995): 10.

P.N. Heidenstron (1971). "Acceleration Key to Sprinting", Track and Field News: p. 22.

Paul Earl Ward, "An Analysis of Kinetic and Kinematic Factors of the Stand up and the Preferred Crouch Starting Techniques with Respect to Sprint Performance". Dissertation Abstracts International 34 (January 1974):3973-A.

Peter O, Sigerseth and Vernon F. Grinaker (1962). "The Effect of Foot Spacing on Velocity in Sprints", Research Quarterly 33:4: p. 606.

Ronald C. Henley and Robert A. Rosemier (1968). "Effectiveness of Four Starting Position on Acceleration," Research Quarterly 39:1: p. 161.

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