A STUDY OF ANALYSIS OF PACE IN SPRINTERS

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INTRODUCTION

All the sports techniques that have been subjected to biomechanical analysis , few have been examined thoroughly examined than the sprint start . scientific research on sprint starting dates back as far as 1927 when Bresnahan investigated the difference between starting from holes dug in the ground and starting from blocks. The important thing in sprint is to reach top speed as quickly and smoothly as possible and this can only be done if the rhythm of the stride begins actually in the starting blocks. In staring the emphasis is upon the getting away from the mark as quickly as possible, and then into a favorable to developing the desired pace in the shortest distance. World class male sprinters stride approximately forty three times for a100 meter race. If a mechanical error cost one-one thousandth of a second per stride, the total cost is 0.43 second by the finish. The pace in sprinters (200mts) may be viewed as dominating factor. In order to design optimal skill development and conditioning for the sprinters in track and field. It is first necessary to gain a clear understanding of the pace in 200mts run at a distance of each 50mts. To understand all about this complex area the present study had undertaken.

MATERIALS AND METHODS

Participants

The present study is based on randomly selected 8 male sprinters of track and field studying in Lakshmibai National University of Physical Education Gwalior, who had participated in All India Inter University, aged (18 to 25 years). The data were collected under natural environmental conditions in their practice session.

Methodology

Digital photography was employed for conducting the analysis of pace in 200mts sprint. The video camera used for this purpose was a standard Nikon model EM. This video camera was used to record the data in sagittal plane from the moment

of sprint start till the finish of 200 meter performance. The camera was mounted on a tripod at a height of 1.46 mt from the ground and parallel to horizontal plane at a distance of 17.30mt from the midpoint of straight of the track. For the measurement of performance in each 50 mt during 200 meter run three judge were deputed and the timing were recorded in 100^{th} of second .Purposive sampling and static group design were used for this study.

STATISTICAL TECHNIQUE

Descriptive Analysis and Analysis of variance was applied to compare the pace and stride of sprinters in each 50 meter during 200 meter run. Further the significant F-ratio was analyzed with the LSD Post Hoc test. The level of significance was set at 0.05.

RESULTS

In order to analysis of the pace of sprinters the collected data were analysed by the descriptive analysis and Analysis of variance . The result of the statistical technique used on data were presented in given tables.

TABLE 1

Descriptive Statistics of Sprinters in Each 50meter During 200meter Run

Phases	Distance	Range	Mean	Std. Deviation
1^{st}	00-50 mtrs	0.86	7.06	0.28
2^{nd}	51-100 mtrs	0.96	5.99	0.30
3^{rd}	101 – 150 mtrs	0.85	6.10	0.27
4^{th}	151 – 200 mtrs	2.52	6.80	0.83

Table -1 showed the descriptive statistics of each 50mts during 200mts run. Mean and standard deviation of each 50mts pace were described in the above table. The mean and standard deviation of first 50mts (7.06±0.28) , second 50mts(5.99±0.30), third 50mts (6.10±0.27) and fourth 50mts (6.80±0.83) respectively. Graphical representation of above table is made in fig. no. 1.

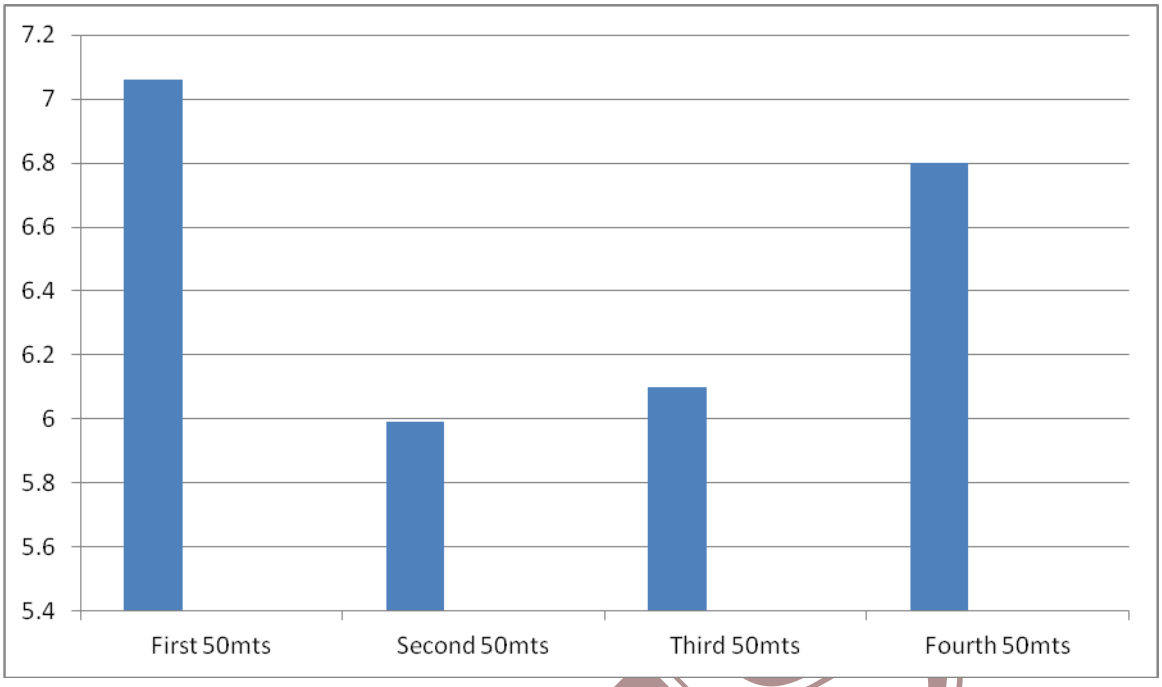

Fig. No.1: Mean Values of Sprinters in each 50 mtrs during 200 mtrs run.

TABLE 2

One Analysis of Variance of Sprinters in Each 50 meter during 200meter Run

Source of Variation	d.f	SS	MSS	'F' Ratio
Treatment	**3**	**6.64**	**2.21**	**9.355***
Error	**28**	**6.63**	**0.237**	

*significant at 0.05 level of significance $F_{(3, 28)(0.05)} = 2.95$

Table-2 clearly revealed one way analysis of variance of pace of sprinters which showed the significant difference in each 50 meter while running 200 meter because the calculated F ratio (9.355) was higher than the tabulated F value (2.95) at 0.05 level of significance. Hence, to find out the significant difference the post hoc LSD test was applied at 0.05 level of significance were presented in table -3

TABLE-3

Post-Hoc Mean Comparison of Pace of Sprinters in Each 50 meter During 200 meter Run

1st 50mts	2nd 50mts	3rd 50mts	4th 50mts	M.D	C.D
7.06	5.99			1.07*	0.49
7.06		6.10		0.96*	0.49
7.06			6.80	0.26	0.49
	5.99	6.10		0.11	0.49
	5.99		6.80	0.81*	0.49
		6.10	6.80	0.70*	0.49

*Significant at 0.05 level of significance.

Table-3 reveals post hoc mean comparison of pace of sprinters between each 50 meter during 200 meter run. There is significant difference between 1st 50 mts(7.06) and 2nd 50 mts (5.99), 1st 50mts (7.06) and 3rd 50mts (6.10), 2nd 50mts (5.99) and 4th 50mts (6.80), 3rd 50mts(6.10) and 4th 50mts (6.80) because the mean difference is more than the critical difference.

Discussion

There were significant difference between each phase of 50 meter during 200 meter run except two phases they were first 50 meter and fourth 50 meter, and second fifty meter and fourth 50 meter. There was significant difference between first 50mts and second 50mts because in first 50 meter athletes have to start from his initial position by breaking his inertia and also take time to achieve the momentum to get acceleration. It may also because the athletes have to run in curve of the track that produces coupling effect which reduces the performances . in second 50 meter athletes reaches to his maximum speed and come in flying phase because athlete have to run in a straight line due to this the forces developed

by athletes to run forward applies in a straight line without deviating and also not to counteract any other resistive forces. There is also significant difference between first 50mts and third 50mts. It may be the reason that after getting the maximum speed it is easier for athlete to maintain pace for the next 50mts. As the data is taken in 200mts track athlete have to run third 50mts in the curve of the track due to which centrifugal forces may affect the performance. There were significant difference between second 50 meter and fourth 50mts, and third 50mts and fourth 50mts due to the fatigue factor as well as lack of speed endurance in the pace of fourth 50mts where as the maximum pace of run is in second 50mts and third 50mts.

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