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ORIGINAL ARTICLE

RELATIONSHIP OF SELECTED ANTHROPOMETRIC MEASUREMENTS TO SPRINT PERFORMANCE

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Abstract:

The purpose of the study was to find out the relationship of selected anthropometric measurements to sprint performance. Fifteen male sprinters of LNIPE Gwalior specialzing in track and field were selected as subject as subject and their age were between 17-25 years. Selected anthropometric measurements were height, sitting height, leg length, lower leg length, upper leg length, arm length and weight. Different inter block spacings were bunch, medium start and elongated start. The subject runs 100m race and they were timed at different check points they are 10m, 20m, 30m and 100m marks. In order to find out the reliability of data test retest method was used. Coefficients of correlation were calculated by using Pearson's product moment correlations. From the findings we can say that lower leg length and 10m sprinting performance with bunch start, leg length and 20m sprinting performance in case of bunch start and elongated start, upper leg length and 20m performance in case of bunch start, arm length and 20m sprinting performance in case of bunch start these all were found to have a positive correlation except weight and 100m sprinting performance in case of elongated start the values were found negative. That's why all values were found insignificant. The values which were found insignificant were height, sitting height, leg length, upper leg length, arm length and weight at 10m, 20m, 30m and 100m mark in case of crouch start.

KEYWORDS:

Anthropometric measurements, Sprint, Starting blocks.

INTRODUCTION

The various starts which a sprinter normally takes are medium start, bunch start and elongated start. The form of individual sprinters may vary in minor details, but the basic fundamentals are the same. The stronger foot is placed on the front block. The athlete's problem at start may be as where to place his feet so as to promote the maximum amount of work off his front foot combined with steadiness and control over the initial strides. This in effect will mean, he must bring his foot as forward as possible without upsetting his initial strides. Furthermore the nearer he comes to the line the more weight he will have over and in front of the line and though his drive, off the front foot will built up more slowly and from a point nearer to the finish than an athlete who places his front foot further back. Not only the front block but also the back foot until you find the power points on the blocks. These are the points where the sprinters feel he has maximum power to drive with both of his legs.

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Speed plays a vital role for sprinters. For a sprinter, to give good performance, he must possess acceleration speed, sprinting speed, speed of movement and reaction time. There is no doubt regarding the contribution of acceleration speed, sprinting speed and speed of movement to bring about better performance on the part of sprinters. A thorough analysis show that result in most of the sports events are achieved by quickly accelerating the body which means the speed per unit time is increased as far as possible. Acceleration is concerned with the attainment of maximum speed in the shortest possible time.

PROCEDURE OR METHODOLOGY:-

Fifteen male athletes studying in the three years B.P.E and two years M.P.E of LNIPE Gwalior were selected as subjects for this study. The age varied between 17-25 years. The all athletes have represented the All India Inter-varsity athletic meet. The following anthropometric measurements were take on each subjects by using standard techniques. Stature, sitting height, leg length, upper leg length, lower leg length, arm length and body weight. The selection of the above mentioned anthropometric variables was based on the facts that these were mainly referred in literature and they may relate to the performance of sprinters. Proper commands of sprints were used to give the start to the subjects. The distance of 10m, 20m, 30m and 100m were marked. The timings of each subject were taken by two time keepers using digital manual times to the nearest 1/100th of seconds. The pearson's product moment correlate was used to test the level of significance at 0.05 level.

RESULT OF THE STUDY:-

In order to ascertain the relationship selected anthropometric measurements i.e height, sitting height, leg length, upper leg length, lower leg length, arm length and weight with the performance of subject at 10m, 20m, 30m and 100m mark while using different block spacings i.e bunch start, medium start and elongated start are given in table 1, 2, 3 and 4.

Table-1
Relationship of selected anthropometric measurements to 10m sprinting performance by using bunch, medium and elongated start.

S.No	Anthropometric measurements	Bunch start	Medium start	Elongated start
1.	Height	0.18	0.30	0.01
2.	Sitting height	0.06	0.19	-0.03
3.	Leg length	0.43	0.46	0.14
4.	Upper leg length	-0.02	0.22	0.15
5.	Lower leg length	0.53*	0.33	0.02
6.	Arm length	0.20	0.46	0.25
7.	Weight	0.17	0.10	-0.04

*Significant at 0.05 level (13) = 0.514

Table-2
Relationship of selected anthropometric measurements to 20m sprinting performance by using bunch, medium and elongated start.

S.No	Anthropometric measurements	Bunch start	Medium start	Elongated start
1.	Height	0.34	0.45	0.32
2.	Sitting height	0.19	0.44	0.19
3.	Leg length	0.60*	0.41	0.57*
4.	Upper leg length	0.57*	0.38	0.27
5.	Lower leg length	0.14	0.09	0.42
6.	Arm length	0.25	0.56*	0.27
7.	Weight	0.31	0.12	0.24

*Significant at 0.05 level (13) = 0.514

Table-3
Relationship of selected anthropometric measurements to 30m sprinting performance by using bunch, medium and elongated start.

S.No	Anthropometric measurements	Bunch start	Medium start	Elongated start
1.	Height	0.30	0.33	0.31
2.	Sitting height	0.27	0.27	0.26
3.	Leg length	0.40	0.46	0.34
4.	Upper leg length	0.58*	0.45	0.33
5.	Lower leg length	-0.12	0.09	0.07
6.	Arm length	0.18	0.28	0.38
7.	Weight	-0.07	0.14	0.15

*Significant at 0.05 level (13) = 0.514

Table-4
Relationship of selected anthropometric measurements to 100m sprinting performance by using bunch, medium and elongated start.

S.No	Anthropometric measurements	Bunch start	Medium start	Elongated start
1.	Height	0.02	0.02	-0.32
2.	Sitting height	0.06	0.01	-0.30
3.	Leg length	0.002	0.13	-0.23
4.	Upper leg length	0.03	0.07	-0.12
5.	Lower leg length	-0.03	0.09	-0.16
6.	Arm length	0.07	0.12	-0.29
7.	Weight	-0.35	-0.27	-0.63*

*Significant at 0.05 level (13) = 0.514

DISCUSSION OF FINDINGS:-

As revealed in Table-1 that significant relationship between the lower leg length of the subject with their performance of 10m mark when the subject have used bunch start. This is contrary to the popular belief that shorter lower leg length favours the better performance. In case of all other variables of coefficient of correlation have shown insignificant relationship in different type of inter block spacings.

As exhibited in Table-2 that the leg length of the subjects has shown the significant relationship with the performance of 20m mark when the subject used bunch and elongated start. The result favours the inverse relationship of leg length and performance of the subject at selected marks. This is due to the fact that greater leg length may result in lesser frequency at strides to cover a lesser distance. The other reason may be that frequency of strides play a comparatively dominant roe than length of strides. The reason behind it maybe that greater arm length adds friction while running a fixed distance. That's why positive relationship was obtained. In case of all other variables of coefficient of correlation have shown insignificant relationship in different type of inter block spacings.

As revealed in Table-3 that the upper leg length of the subject has shown significant relationship with performance of 30m mark when the subject used bunch start. Generally it is seen especially in All India Inter-varsity level the shorter athlete had to perform better in sprint than taller athlete. The reason may be the frequency of strides play a dominant role than length of strides. In case of all other variables of coefficient of correlation have shown insignificant relationship in different type of inter block spacings.

The results of Table-4 have shown significant relationship between the body weight of the subject and the performance of 100m mark when the subject used elongated start. The reason behind negative significant relationship of weight and 100m performance may be due to the fact that greater body weight assists in applying more thrust than lesser body weight as the sample chosen in the study were all well trained athletes. In case of all other variables of coefficient of correlation have shown insignificant relationship in different type of inter block spacings.

CONCLUSIONS:-

1). The selected anthropometric variables in the study have any significant relationship with performance.
2). Different inter block spacings had an effect on the performance.
3). Different inter block spacings had some effect in different anthropometric variables at different check points.

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