Research Paper Physical Education

Analysis of Long Jump Performance

* T.Christopher Nallarasu ** Dr.V.Mahadevan

* Director of Physical Education, Margregorios College, Chennai

** Director of Physical Education i/c, University of Madras, Chennai

ABSTRACT

The aim of the study was to analysis long jump performances. To achieve this purpose, 60 male long jumpers who had participated in the inter-collegiate track and field meet during the year 2011-12 were selected randomly from affiliated colleges of University of Madras, Chennai. The selected jumpers were tested with their height, weight, leg length, leg strength, hip flexibility, explosive power and approach run distance. The best and lowest long jump performances, approach run speed, length of the penultimate stride were also measured. The collected data were analyzed with simple correlation. The study was concluded that the performance of the long jump depends upon the all criterion variables.

Keywords : Stride length, speed, power and jump performance

Introduction

In all the jumping events in track and field, there is a strong relation between the execution of the approach run and take-off for a good performance of a jump. The more consistent and more technically correct the approach run and take-off, the better the jump performance. Most world-record performance in the jumping events in track and field has resulted from a successful approach run and take-off. When a long jumper breaks contact with the ground, the center of gravity forms a parabolic curve in the air and there is nothing that can be done to change this predetermined flight path. There force, the majority of coaching time in the long jump should be spent developing a technically sound approach run and take-off. The long jump can be broken down into four components namely approach run, last two strides, take off, action in the air and landing. Consistent approach run that allow for gradual acceleration, beginning with the first stride and ending with maximum controlled speed at the take-off.

The length of the approach run should be between 12 and 19 strides. The approach run should be as long as possible depending on the jumper's experience, sprinting technique and conditioning level. The length of the approach run will determine the amount of speed that is developed. The longer the approach run, the more difficult is to develop a consistent stride pattern. Thus, experience jumpers should begin by using a shorter approach run of 12 strides. Jumpers must feel the lowering or "gathering" of the body during the penultimate stride. The penultimate stride is different than a normal running stride; so jumpers should not just "run" through the penultimate. It is imperative that they prepare the body during the penultimate. The last stride is shorter than the penultimate stride because of the raising of the jumper's center of gravity. As the take off foot makes contact with the ground, the foot is placed flat and in front of the jumper's body. For an effective landing, the jumpers extend and sweep the arms down forward the ground. This action of the arms raises the leg up forward the torso and closer to the jumper's center of gravity. Thus, the action of the arms causes an equal and opposite reaction with the legs. As the jumper makes contact with sand, the knees bend and flex to cushion the impact. In addition, the arms are brought forward to assist the jumper forward momentum and avoid falling back. The long jumper, who can control the highest horizontal velocity and is able to convert that speed at take-off with a high vertical velocity of the centre of gravity, should in most causes jump the furthest. One key area which can only assist the good vertical lift-off, is the speed over the last 3-5 strides (Rogers, 2000).

Based on the above points the researcher has designed to findout the relationship between the long jump performance and the selected variables.

Methods

The purpose of the present study was to find out the relationship between the long jump performance and the selected variables. Sixty male long jumpers who have participated in the inter-collegiate Athletic meet 2011-12 were selected randomly from affiliated colleges of University of Madras, Chennai. The age was fixed from 18 to 25. To achieve the purpose of the study, long jumpers' best and a lowest jump performance trail were considered as a test trail. The selected jumpers were tested with their height, weight, leg length, leg strength, hip flexibility, explosive power and approach run distance. The best and lowest performances of the long jump, approach run speed, length of the penultimate stride were also measured. Simple correlation was used as statistical technique to find out the significant association among the selected variables and level of significance was fixed at 0.05.

ANALYSIS

Table I

selected parameters test and Descriptive statistics

Variables	Test	Mean	SD	Minimum	Maximum
Height (in cms)	Stadio meter	169.4	6.34	158	186
Weight (in Kgs)	Weighing machine	63.47	5.21	54	80

Hip flexibility (in cms)	Sit & reach	31.11	1.12	39	34
Leg length (in cms)	Measuring tap	40.08	1.47	37	43
Leg strength (in Kgs)	Led dynamometer	31.12	1.12	99.93	6.52
Explosive power (in cms)	Sargent vertical jump	2.78	0.22	2.39	3.2
Approach run distance (in mts)	Measuring tap	32.06	3.39	28	42

Table I
selected parameters test and Descriptive statistics

Variables	Test	Best performance		Lowest performance	
		Mean	SD	Mean	SD
Approach run speed (in sec)	Approach run distance/ time taken	4.22	0.65	4.31	0.64
Length of the penultimate stride (in mts)	Measuring tap	2.15	0.16	1.90	0.20
Long jump performance (in mts)	Measuring tap	6.29	0.69	6.09	0.71

Data analysis
Table II
INTER CORRELATION MATRIX AMONG THE SELECTED VARIABLES AND LONG JUMP (BEST) PERFORMANCE

Variables	Best Performance	Lowest performance
Flexibility	0.538*	0.507*
Leg length	0.545*	0.533*
Leg strength	0.831*	0.863*
Explosive power	0.881*	0.853*
Approach run distance	0.37*	0.351*
Penultimate Stride length (Best performance trail)	0.7*	--
Penultimate Stride length (Lowest performance trail)	--	0.663*
Speed (Best performance)	0.025	--
Speed (Lowest performance)	--	0.038

*Significant r0.05 (58) = 0.250.

Results
Analysis of the data indicates that performance in long jump (best and lowest) was significantly correlated with the flexibility, leg length, leg strength, explosive power, penultimate stride and approach run distance. There was no significant association between the approach run speed and performance of the long jump.

Discussion
Calculations showed that the performance of the long jump (Best and Lowest) depended upon the leg length, leg strength, flexibility, explosive power, approach run distance and penultimate stride. The results of the study may depend upon the following factors related to long jump performance: **Jones, (2012), stated that** "The 'Jump formula' for Powell might be summarized as follows: shortened second-to-last stride, vertical lead leg landing stiff landing of the takeoff leg with a large offset, incorporation of the pelvis in the locomotion due to powerful trunk, energetic swing. The lowest center of mass position is reached in the beginning of the last surface interaction. Considerable loss in the horizontal velocity is compensated by a large gain in the vertical component. "The 'Jump Formula' for Lewis: significant elongation of the second-to-last stride, early lowering the center of entering a very short last stride with zero vertical velocity, very short last stride and takeoff with fast inward hip motion. A world class jumper Powell (9.85mts jump in1991) and Lewis's (9.81mts jump in1991) length of last stride is less than the penultimate stride. In the same way the Beamon's (1968 jump) length of last stride is more than the penultimate stride. As for as our study is concern the performance of the long jump depend upon the penultimate stride. At the same time length of last stride is more than the penultimate stride. The above findings of the present study are in agreement with the studies conducted by (Koyama,et al.,(2005), and kale (2009).

Conclusion
The present study was concluded that

1. Performance of the long jump was depends upon the flexibility, leg length, leg strength and explosive power.
2. High correlation between the jump performance and length of the penultimate stride.
3. Best performance trail's length of the first three strides and last stride were less than the lowest performance trail.
4. Best performance trail's penultimate stride was more than the lowest performance trail.
5. There was some association between the approach run speed and performance of the long jump.

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