



Performance Analysis in Long Jump

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ABSTRACT

The aim of the study was to performance analysis in long jump. 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 best and lowest performance jump trails were considered as the test trails. The selected jumpers were tested with their approach run speed, length of the strides and long jump performance. The collected data were analyzed with simple correlation. The study was concluded that the performance of the long jump depended upon the approach run speed and length of the strides.

Keywords : Stride length, approach run speed, penultimate stride and jump Prformance.

Introduction

The Long Jump and Triple Jump are the two horizontal jumping events of track and field. They have in common 1) the primary goal of maximizing the horizontal distance jumped; 2) a sprint-like approach on a runway (often the same one) to a take-off marker; 3) an attempt to achieve a desired flight phase trajectory; and 4) similar training techniques used by the athletes (Ramey) Success in the long jump requires (a) a fast approach run; (b) an effective takeoff; and (c) a well-controlled landing. Despite its central importance to success in the event, the takeoff has been accorded little attention by sports biomechanists (Hay, 1992). The biomechanical analysis of long jump has been conducted with many different purposes. Ballreich and Brüggemann (1986), presented the principles of analysis and researched the best variables to explain the success of the athletes. Alexander (1990), identified the principles that govern optimum speed and leg angle for the take-off of long jumping and concluded that a faster run-up is desirable in long jumping to allow a great horizontal component of velocity at take-off. Bridgett and Linthorne (2006), analyzed an experienced male athlete using a single high speed camera and they concluded that the athletes should use a maximal run-up speed and place the take-off leg at about 61° to the horizontal with a minimum of knee flexion. Graham-Smith and Lees (2005), have performed a three-dimensional analysis of the touchdown to take-off phase in the long jump. They studied fourteen male high level long jumpers and found that performance in the long jump is dependent not only on speed but also on technique and strength. According to these authors, many three dimensional studies of long jump exist, but the only studies to have reported detailed data on the touch-down to takeoff phase were two-dimensional. This paper had an attempt to briefly summarize some performance analysis techniques that can be used to study the Long Jump. 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 of 18 to 25 year old college men. 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. To achieve the purpose of the study, long jumpers' best and a

lowest jump performance trail were considered as a test trail. 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. The jumpers best and lowest performance trails were tested in the following variables.

**TABLE I
SELECTED PARAMETERS**

Approach run distance	
Approach run speed in	First 5mts
	Middle 5mts
	Last 5mts
Length of the Strides in	First Three strides
	Last stride
	Penultimate Stride
Performance	Long Jump Performance

ANALYSIS

**TABLE II
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
Approach run distance (in mts)	Measuring tap	32.06	3.39	28	42

**Table III
selected parameters test and Descriptive statistics**

Variables	Tested in	Best perfor- mance		Lowest performance	
		Mean	SD	Mean	SD
Approach run speed (in sec)	First 5mts	1.49	0.25	1.49	0.23
	Second 5mts	1.34	0.19	1.39	0.25
	Last 5mts	1.41	0.21	1.43	0.21
Length of the stride (in mts)	First three strides	4.33	0.24	4.52	0.19
	Penultimate strides	2.15	0.16	1.90	0.20
	Last strides	2.19	0.17	2.25	0.21
Long jump performance (in mts)	Measuring tap	6.29	0.69	6.09	0.71

Table II
INTER CORRELATION MATRIX AMONG THE SELECTED VARIABLES AND LONG JUMP PERFORMANCE

Variables			Best performance	Lowest performance
Approach run distance		---	0.371*	0.352*
Speed	First 5mts	Lowest	---	-0.053
		Best	0.035	---
	Middle 5mts	Lowest	---	0.51*
		Best	-0.322*	---
	Last 5mts	Lowest	---	0.032
		Best	0.025	---
Length of the Stride	First 3 strides	Lowest	---	0.764*
		Best	0.634*	---
	Penultimate stride	Lowest	---	0.663*
		Best	0.700*	---
	Last stride	Lowest	---	0.082
		Best	0.093	---

*Significant $r_{0.05(58)} = 0.250$.

Results

Analysis of the data indicates that performance in long jump (best and lowest) was significantly correlated with the approach run distance. Middle 5mts speed significantly associated with the performance. At the same time first and last 5mts speed was not significantly correlated with the performance. First three stride and length of the penultimate stride was significantly correlated with performance. Besides, last stride length, first and last 5mts speed were some relation to the performance in long jump.

Discussion

Calculations showed that the performance of the long jump depended upon the approach run distance, penultimate stride and approach run middle 5mts speed. 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 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 first three strides and penultimate stride. At the same time length of last stride is more than the penultimate stride.

Conclusion

The present study was concluded that

1. Long jump performance was depends upon the middle 5mts speed
2. Strong association between the jump performance, first 3 strides length 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.

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