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Research Paper

Effect of Approach Length on Take Off Velocity for Spiking in Volleyball

Physical Education

KEYWORDS : Volleyball Spiking, Motion Analysis, approach length, take off velocity

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ABSTRACT

Introduction: Purpose of the present study was to analyze the short set and high set volleyball spiking action and understand the relation between approach length and take off velocity.

Methods: The action of short and high set ball spiking of eight male intervarsity volleyball players (1.78±0.05m, 65.09±6.83kg, and 22.5±2.0 yrs) was recorded by a digital video camera of East Zone Intervarsity Volleyball Tournament. The approach length was calculated by using steel tape. The take off velocity for spiking was calculated by using appropriate motion analysis software. Mean, standard deviation and Coefficient of correlation were computed to analyze the data.

Results and Discussion: Length of approach and take off velocity were found to be negatively correlated with the value of co-efficient of correlation of -0.59 for short set ball and -0.25 for high set ball. The result of the present study indicated that the approach length may have an indirect with the take off velocity.

Conclusion: From this study it is found that there was a negative relationship in between approach length and take off velocity for front row spiking in volleyball and the players with greater than the optimum approach length may not be able to produce greater take off velocity for spiking the ball.

INTRODUCTION:

Volleyball has been played around the world for over one hundred years. It involves many participants worldwide making it the most popular participant sport in the world. The volleyball spike is one of the most important offensive weapons in the competition and the most frequently used technique to obtain a point. The athlete is expected to jump and hit a ball with maximum force and accuracy at the approximate peak of the jump. Based on the variety of movements, the analysis of the volleyball spike is a complex approach. The previous researchers (Coleman et al., 1993; Davila et al. 1994) have investigated front spike techniques of ordinary players. Coleman et al. (1993) indicated that the volleyball jump spike can be divided into the following six phases: approach; plant; takeoff; flight; the hitting action; and landing and recovery. The approach for spiking in volleyball involves two or three controlled running strides, a transitional last step to prepare for the transfer of horizontal momentum into vertical momentum and two foot vertical jump. Ideally, the spiker uses the approach to achieve a high jump with minimal horizontal motion (Prasala, 1982). The approach and take off velocity are the most important factors for a successful volleyball spiking. So the purpose of the present study was to analyze the 'short set' and 'high set' volleyball spiking action and understand the relation between approach length and take off velocity.

METHODS:

The subjects of the present study were eight male intervarsity (East Zone Interuniversity Volleyball Tournament) volleyball players, having height, weight and age as 1.78±0.05m, 65.09±6.83kg, and 22.5±2.0 yrs respectively from Visva-Bharati University and University of kalyani. The action of the front row spike for short and high set ball of the eight spikers was recorded by a digital video camera (24fps). Following a brief warm up and stretching period, an assistant passed the ball to the setter, who set the ball for each subject to perform five front row spikes for both short and high set ball. Only the successful spiking action was analyzed to measure the selected kinematic parameters using freeze frame technique. After projecting a particular frame the stickman configuration was drawn from the each frame. Distance and time information were obtained from the 'kinegram' and the camera frequency respectively. Velocity of movement was calculated as the first derivative time of (Distance-time) information. The approach length was defined as the total distance covered in approach. The take off velocity was identified as the velocity with which the spiker took-off from the ground for spiking the ball. A Pearson Product Moment Correlation was used to examine the relationship between approach length and take off velocity for front row spiking. Fig 1 represents the filming environment for collecting the data for this study.

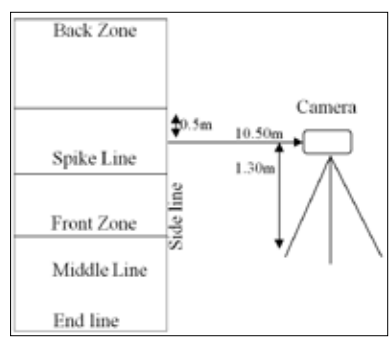

Fig 1 Filming environment

RESULTS AND DISCUSSION:

Table 1 presents Pearson correlation between the selected kinematic parameters for front row spiking on 8 players.

Table 1 Pearson correlation between selected front row spiking variables

SHORT SET BALL SPIKING			
	Approach Length (m)	Take Off Velocity (m/s)	Coefficient of Correlation "r"
Mn	3.32	3.33	-0.593
SD	±0.27	±0.86	
	HIGH SET BALL SPIKING		
	Approach Length (m)	Take Off Velocity (m/s)	Coefficient of Correlation "r"
Mn	3.87	3.66	-0.251
SD	±0.38	±1.14	

The high set ball spiking have greater values than the short set ball spiking on approach length as well as the take off velocity. Coleman et al. (1991) reported that the mean vertical velocity at take off for spiking was 3.59m/s which was greater than the value of the present study. The result of the Pearson Product Moment Correlation showed that the approach length and take off velocity were negatively correlated with the value of co-efficient of correlation of -0.59 for short set ball and -0.25 for high set ball. The result of the present study indicated that the approach length may have an indirect relation with the take off velocity.

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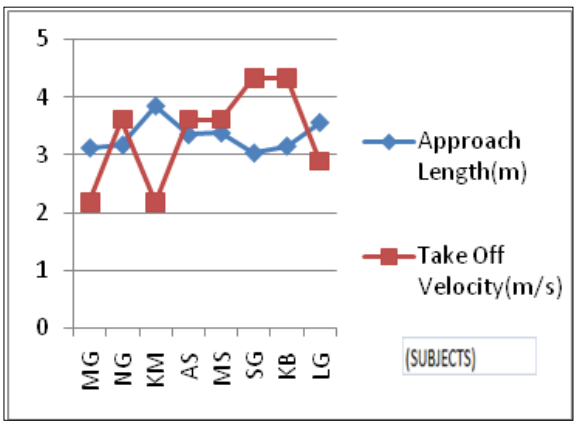

Figure 2 Approach Length and Take Off Velocity for Short Set Front Row Spike

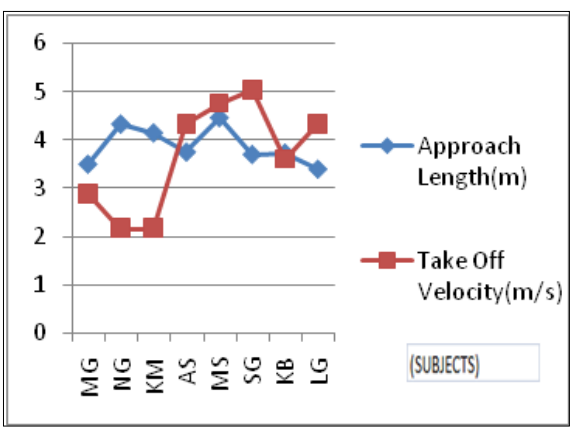

Figure 3 Approach Length and Take Off Velocity for High Set Front Row Spike

CONCLUSION:

This study describes the kinematic characteristics of the male 'short set' and 'high set' ball front row spike. It was noted that high set front row spike had a greater approach length and take off velocity than that of the short set front row spike. From the result of the study it may be concluded that there was a negative relationship in between approach length and take off velocity for front row spiking in volleyball and the players with greater than the optimum approach length may not be able to produce greater take off velocity for spiking the ball.

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