



RESEARCH ARTICLE

ASSOCIATION SHIP OF SELECTED KINEMATIC VARIABLES WITH THE PERFORMANCE OF IN-STEP KICK IN FOOTBALL OF INDIAN FOOTBALL SCHOOL TEAM

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ABSTRACT

Sixteen female footballer (n=16) who represented India in ISF World School Championship held at Prague, The capital of Czech Republic from 21st May to 29th May 2017 were selected as the subject for the present study and there range of mean age, mean height and mean weight was $17.5 \pm .84$ years, 152.8 ± 4.60 cm and 49.7 ± 6.45 kg respectively. Videography technique was employed in order to register the performance of the subjects in In – Step Kick for the study. Selected kinematics variables (table 2 and table 3) and four selected phases (Figure 1) of whole skill i.e. of Initial phase, Hip extension phase, Knee extension and ball touch phase and Follow through phase were analysed. The selected phases and the stick figures of the selected movements and the centre of gravity of different phases were located by Kinovea software. The selected angular kinematic variables were obtained at Initial phase, Hip extension phase, Knee extension and ball touch phase and Follow through phase. Angles of selected joints were measured by the help of Kinovea software at the nearest of degrees. The performance of each subject of In – Step kick was collected on the basis of three judge’s evaluation. The average of three judges was considered as the final point obtained by each footballer. Further, to easy calculation it was reduced out of ten points. The finding showed, the linear and angular kinematic variables showed significant relationship in Shoulder joint (Knee extension and ball touch phase - .954, Follow through phase - .614), Hip joint (Hip extension phase - .578) and Knee Joint (Hip extension phase - .644) found more than the tabulated value other than that all the variables in remaining phases were less than the tabulated value. The findings of table 3 also showed significant relationship in Center of gravity at Hip extension phase (.918), Center of gravity at Knee extension and ball touch phase (.511) and Total time of execution of the skill (.941) and other remaining variables were found insignificant with the performance.

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INTRODUCTION

Biomechanics research and sports techniques sometimes tend to lack behind the changes that are naturally occurring in sports. Athletes and coaches experiment with new techniques all the times. Students of biomechanics may be surprised to find that there are often limited biomechanical studies on many techniques in many popular sports. The vast number of techniques, their variation and their high rates of changes and innovation tends to out distance biomechanics research resources. The single most important kicking skill in soccer is the instep drive, also known as the instep kick or the “laces” kick. The instep drive uses the quadriceps muscles of the thigh to provide the most powerful kick available in the game, forcing the top of the foot (instep) to propel (drive) the soccer ball forward. Further, mastery of the instep drive forms the basis for any number of other kicks, including shooting, goal

kicks, corner kicks, chips, long passes, clearances, volleys, half-volleys and more. Accordingly, the basic concepts of the instep drive must be well understood by coaches and taught properly to beginning players. Soccer players do not “toe” the ball for this main kick of soccer, but use the top part of the foot covered by the shoelaces. This part of the foot is called the “instep.” As the soccer ball is struck at the instep, the foot becomes an extension of the leg, pulled down by the calf muscle, causing the ankle to be “locked.” At the same time, the toes are curled under. Power is derived for the kick from the flexion and then the rapid extension of the upper leg at the hip and the lower leg at the knee. Proper balance, a solid base to the non-kicking foot, and follow-through are essential.

Objective

- To see the relationship of selected kinematic variables with the performance of in-step kick in football of Indian football school team

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Figure 1. Photographic sequence of In-Step Kick

Delimitations

- The study was further delimited to the Sixteen female footballer (n=16) who represented India in ISF World School Championship held at Prague, The capital of Czech Republic from 21st May to 29th May 2017 from Kendriya Vidhyalaya, Barwani, Madhya Pradesh.
- The study was delimited on the Pearson Product moment correlation statistical technique.

Limitations

- Lack of Cinematography was the major limitation of the study.
- Lack of proper sophisticated instruments was also considered as the limitations of the study.

Hypotheses

It is hypothesized that there is no significant difference of the selected kinematic variables with the performance of in-step kick in football of Indian football school team

Sample: For the present study the purposive sampling (Non probability sampling) technique was employed to footballer (n=16) who represented India in ISF World School Championship held at Prague, The capital of Czech Republic from 21st May to 29th May 2017 from Kendriya Vidhyalaya, Barwani, Madhya Pradesh.

Tool: Pearson Product moment correlation statistical technique was employed to find the relationship among the kinematic variables with the performance and level of significance was 0.05.

MATERIALS AND METHODS

Sixteen female footballer (n=16) who represented India in ISF World School Championship held at Prague, The capital of Czech Republic from 21st May to 29th May 2017 from Kendriya Vidhyalaya Barwani, (Madhya Pradesh) were selected as the subject for the present study and there range of mean age, mean height and mean weight was $17.5 \pm .84$ years, 152.8 ± 4.60 cm and 49.7 ± 6.45 kg respectively. Videography was employed for the biomechanical kinematics analysis of In – Step Kick. The camera that was used for this study was a standard Nikon – D 5200 camera was used.

The video camera was mounted on the tripod stand at the height of 1.40 mts. from the ground. The video camera was placed perpendicularly at center in the line of Penalty spot to the sagittal plane at a distance of 9.42 mts. The frequency of the camera was 50 frames/second. The subjects performed the skill three times and the best trail was used for the analysis. Videography technique was employed in order to register the performance of the subjects in In – Step Kick for the study. Selected kinematics variables (table 2 and table 3) and four selected phases (Figure 1) of whole skill i.e. of Initial phase, Hip extension phase, Knee extension and ball touch phase and Follow through phase were analysed.

The selected phases and the stick figures of the selected movements and the centre of gravity of different phases were located by Kinovea software. The selected angular kinematic variables were obtained at Initial phase, Hip extension phase, Knee extension and ball touch phase and Follow through phase. Angles of selected joints were measured by the help of Kinovea software at the nearest of degrees. The performance of each subject of In – Step kick was collected on the basis of three judge's evaluation. The average of three judges was considered as the final point obtained by each footballer. Further, to easy calculation it was reduced out of ten points. The evaluating criteria are mentioned in Table 1. Association ship of selected kinematic variables with the performance of in-step kick in football of Indian football school team were obtained by employing the Pearson's product moment correlation technique by using SPSS (20.0) and for testing the hypothesis the level of significance was set at 0.05.

RESULTS AND DISSCUSSION

The findings of table 2 clearly revealed that only Shoulder joint (Knee extension and ball touch phase - .954, Follow through phase - .614), Hip joint (Hip extension phase - .578) and Knee Joint (Hip extension phase - .644) found more than the tabulated value other than that all the variables in remaining phases were less than the tabulated value ($r=.878$) at 0.05 level of significance. The result of product moment correlation which were obtained in order to ascertain the relationship of the selected linear kinematics variables i.e., height of center of gravity at of Initial phase, Hip extension phase, Knee extension and ball touch phase and Follow through phase and time taken during complete movement with the performance of In-Step kick has been presented in table 3 mentioned below:

Table 1. Evaluating criteria of In-Step kick

S.No.	Components	Points
1.	Body position during initial phase	10
2.	Body position during hip extension phase	10
3.	Body position during knee extension and ball touch phase	10
4.	Body position during follow through phase	10
5.	Overall Execution of whole movement	10
	Total	50

Table 2. Relationships of selected angular kinematic variables with the In-Step kick performance

S.No.	Variables	Phase	Correlation
1.	Shoulder Joint	Initial phase	.270
		Hip extension phase	.001
		Knee extension and ball touch phase	.954*
		Follow through phase	.617*
2.	Hip Joint	Initial phase	.133
		Hip extension phase	.578*
		Knee extension and ball touch phase	.017
		Follow through phase	.429
3.	Knee Joint	Initial phase	.158
		Hip extension phase	.644*
		Knee extension and ball touch phase	.114
		Follow through phase	.282

*Significant at $r 0.05(14) = .4973$

Table 3. Relationships of selected linear kinematic variables with the In-Step kick performance

S. No.	Phase	Correlation
1.	Center of gravity at Initial phase	.274
2.	Center of gravity at Hip extension phase	.918*
3.	Center of gravity at Knee extension and ball touch phase	.511*
4.	Center of gravity at Follow through phase	.435
5.	Total time of execution of the skill	.941*

*Significant at $r 0.05(14) = .4973$

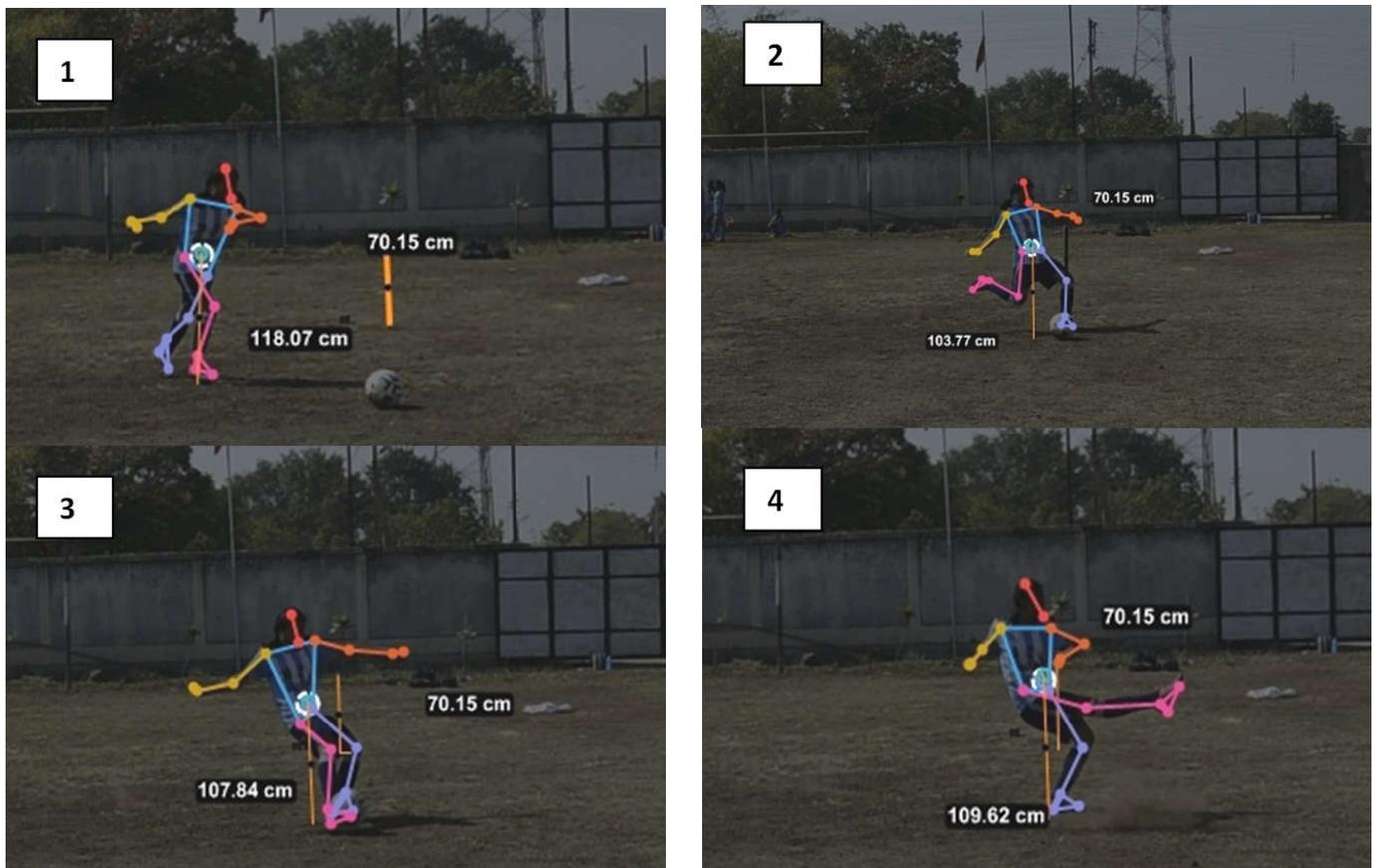


Figure 2. Initial phase – 1, Hip extension phase – 2, Knee extension and ball touch phase – 3, Follow through phase – 4.

The findings of table 3 also showed significant relationship in Center of gravity at Hip extension phase (.918), Center of gravity at Knee extension and ball touch phase (.511) and Total time of execution of the skill (.941) and other remaining variables were found insignificant with the performance. The finding showed, the linear and angular kinematic variables showed significant relationship in Shoulder joint Knee extension and ball touch phase (.954), in Center of gravity at Hip extension phase (.918) and Total time of execution of the skill (.941) and other remaining variables were found insignificant with the performance. The main reason of insignificant results in their sports was that the performance of any games and sports depending upon the multidimensional factors such as physical factors, physiological factors, psychological factors and so many other factors. Only due to the slight association in the selected kinematics variables, the performance of the athlete cannot vary directly. Because in football, these linear and angular kinematic variables are associated with the techniques but the whole performance regarding the skills and techniques consist of the variety of dominating factors that influence the performance.

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