

Kinematics Analysis Of Instep Kicking In Football Player

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ABSTRACT

The main purpose to conduct the study was to record the kinematics of lower limbs during before and after ball impact in instep kicking skill variables and the performance of Inter University Football Players. The range of age was 17-25 and the subjects were selected randomly from the concerned groups and ten players of Football were made to perform maximum number of instep kicks. Kinovea software version (0.8.25.) was used to measure the skill (Instep Kick) and in analysing different angles of the body during that time and the two-dimensional leg movements were captured at 1000 Hz. Four different processing approaches were used to determine the angular and linear velocities and accelerations. For comparing the kinematic variable and the performance the Pearson correlation moment technique was imported to collect the data. Also, it was noticed that when mean differences of footballers were compared it was found that there was some significant difference between the different kinematic variables and the performance. It was also found that few kinematic variables were not able to cause any significant difference during the time of instep kick among the football players.

Keywords: Lower limb and foot kinematics, Football instep kick.

1. INTRODUCTION

Various sorts of instep kicks are utilized in Football, for example, while passing the ball at medium and enormous partitions, while pursuing the objective, and when playing out extra shots (Kellis and Katis, 2007). Encounters dependent on lessons and information gathered based on mechanical model of required execution are fundamental for a guide to address execution among players (Smith et al., 2006). In soccer the kicking biomechanics is especially essential for administering and viewing the status strategy. Different examinations in the instep kicking biomechanics have zeroed in on various components in various people groups, at any rate all would like to create ideal factors, or factors that are regularly insightful of achievement, which is most normally depicted by the subsequent ball speed (Ismail et al., 2010). The instep Football place kick is one of the most isolated kicking practices in soccer (Dorge et al., 2002). Mulling over its impulse, application in the game, distinctive central focuses, and the craving for the best specific execution, the instep kick is the subject of much assessment that has joined all degrees of players, from youth competitors to experienced authorities (Ismail et al., 2010; Barfield et al., 2002; Shan and Wetproofs, 2005; Reilly, 2003; Kellis et al., 2004). Biomechanical techniques are essential contraptions for specific, sports disciplines, in any case, in soccer, they are extraordinarily valuable for depicting the qualities of aptitudes, improving mechanical adequacy in executing, and perceiving factors that influence profitable show.

2. MATERIAL AND METHODS

Present study was descriptive in nature and based on controlled observational method. Ten players of north zone inter university level were selected and age group of 17-25 years. To control the level of performance, only those students were ten who were representing their university continuously from last two years i.e. 2017 and 2018. Their certificate was and team list was verified from the office of sports, Lovely professional university Phagwara. To do the kinematic analyse of skill, researcher used Videography by digital Canon camera of model 70D was used. Students were asked to perform instep kick at the time of execution. After making video of each angles of skill, Kinovea software (0.8.25) was used for the detailed analysis of each movement Pearson product moment correlation was applied to find the results at the significance level of 0.05. The purposive random sampling was used for selecting the samples. The present study was conducted on male football players (subjects) of 17-25 years of age they are studying in various domain of Lovely Professional University, Phagwara, to ensure that selection of the subjects is as per the need of the topic, Certificate of participation were verified by the investigator. Out of 30 thirty players the 10 players have been chosen as subject (North Zone Inter University level) for the present investigation It was assumed that they possess good level of technique. The purpose of the research was explained to the subject and subjects was motivated for put in their best efforts, during each attempt. The instep kick was administrated in BH4 football ground, Lovely Professional University, Phagwara (Punjab). Before the administration of test all the helpers were briefed about the purpose of the study and important instructions for conducting the test were given to subjects so as they become familiar with the test and knew exactly what was to be done. To ensure testing conditions and obtaining reliable data the subjects were tested in the morning practice session of football camp of Inter University between 7:00AM to 10:00AM and also from researcher's own understanding of the problem and on the basis of discussion with experts, gleaned through the literature, the following kinematic variables (linear & angular) were selected:

Linear kinematic variable

Height of centre of gravity at the time of execution of the ball.

Angular kinematic variables

Ankle joint (right)

Knee joint (right)

Hip joint (right)

Shoulder joint(right)

Elbow joint(right)

Administration Tools

Measuring tape to measure the kicking area, the kicking box was marked clearly with white powder in the Penalty box area. One tripod and one DSLR (Canon- 70D) digital camera was used. Camera was placed to the right side of the player. The distance between the camera and the kicking box was 2 meters and height of the camera from the ground was 1.6 meter. And the horizontal distance of camera is 4.95 meter.

Filming Protocol and Analysis

The video was taken by a professional photographer, who was considered to be an expert in that area. The subject was filmed only in sagittal plane. The camera used for analysis was Canon- 70D. After taking the video, the photos were taken by pausing the video at the desired moment (instep kick) with the help of Kinovea software version 0.8.25. For calibration of the camera it has taken 2 meters area of spots. The vertical height of camera is 1.00 meter from ground level and horizontal distance of camera is 4.95 meter.

On the basis of Videography obtained the scholar developed the stick figures in which data pertaining to various kinematic variables was taken. The stick figures were developed by using joint point method with help of KINOVEA software.

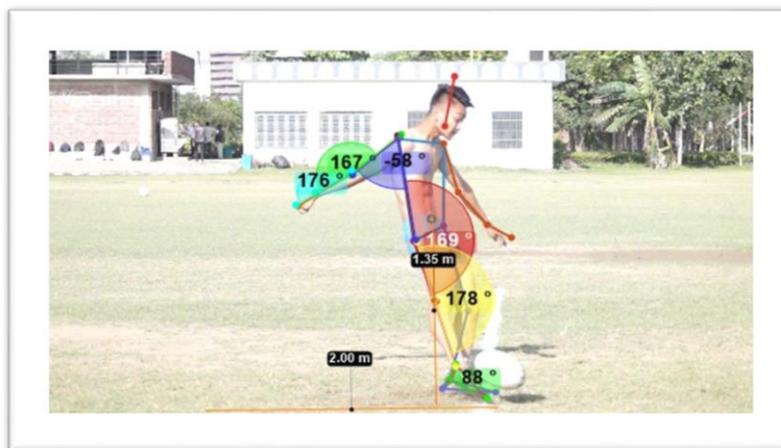
Criterion Measure

Three Trials were given to the performer and all performance was measured by the qualified officials, & recorded the distance (in meters). Measuring angle in nearest degree at selected joint at time of the execution of ball.

Procedure of Mechanical Analysis of the Film

Mechanics assumes an indispensable function in achieving high specialized execution it helps in recognizing issues in playing out the strategy definitely. There are two strategies by which an engine ability can be investigated i.e subjective and quantitative strategy. The quantitative strategy is more substantial if there should arise an occurrence of many determined aptitudes. The best way to assess the procedure quantitatively is through Videography and bringing those recordings into the movement examining programming. Programming having offices to break down the video speedy and preview mode. In the current investigation recordings were recorded and dissected through movement analyser programming (Kinovea 0.8.25)..

Statistical Technique



The data was analysed by applying descriptive statistics i.e mean. Standard deviation in order to determine the inter relationship between angular kinematic, centre of gravity and the performance average. Pearson product moment correlation (P.P.M.C) was applied. The results were tested at 0.05 level of significance. On the basis of findings, results were made.

3. ANALYSIS OF DATA AND RESULT OF THE STUDY

In this section the investigation of information, discoveries and consequence of the examination are introduced. The investigation was directed to discover the relationship of chose kinematic factors with execution of instep kick among between college football players. Pearson relationship item second technique was utilized so as to discover kinematic examinations of Instep kick in football. The reason for the investigation was to discover the relationship of chose kinematic factors with execution of instep kick among the football players. The measurable examination of the information was gathered on ten football players. The arbitrary testing method was utilized to achieve the targets of the investigation. All the subjects, after have been educated about the goals and convention of the examination, gave their agree and elected to partake in the investigation. to discover the connection of chose kinematic factors with execution of instep kick among football players. Pearson item second

coefficient connection factual strategy was utilized for finding the outcomes. So as to learn of direct kinematic and Angular kinematic factors in particular point at lower leg joint (right), edge at hip joint (right), edge at knee joint (right), and straight kinematic tallness of focus of gravity right now of execution in instep kick, Correlation was utilized for Analysis. For each picked factors, the outcome relating to critical contrast between chose bio mechanical factors with execution were estimated and they are given in following tables. Unmistakable investigation of the information was finished by processing the measurements like mean and standard deviation:

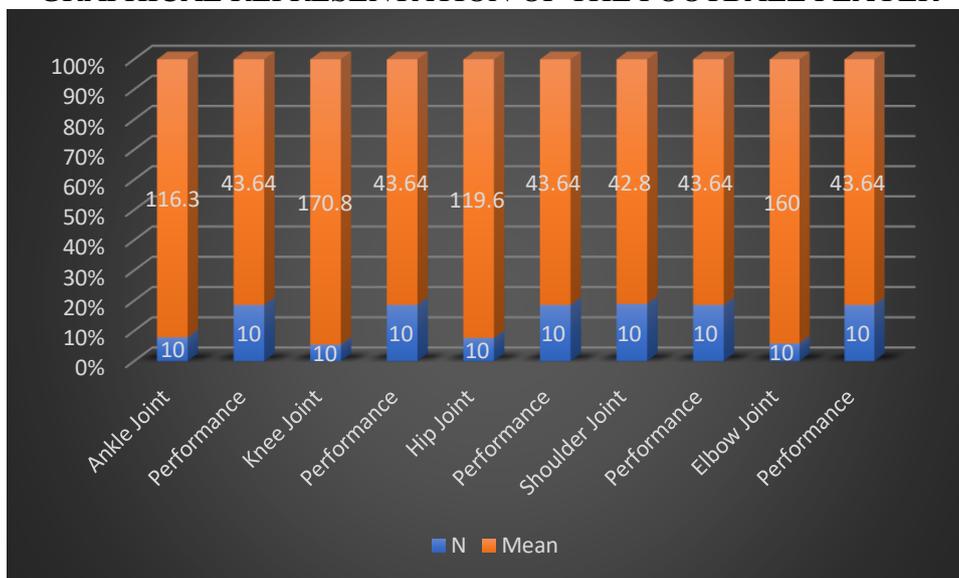
Table-1 DESCRIPTIVE STATISTICS FOR THE KINEMATICS MEAN STANDARD DEVIATION IN ORDER TO DETERMINE THE INTER RELATIONSHI BETWEEN ANGULAR KINEMATIC OF FOOTBALL PLAYER

Variables	N	Mean	Std. Deviation	DF	'r' Value
Ankle Joint	10	116.3	18.97	18	0.05
Performance	10	43.64	5.80		
Knee Joint	10	170.8	3.96	18	0.08
Performance	10	43.64	5.80		
Hip Joint	10	119.6	24.50	18	-0.298
Performance	10	43.64	5.80		
Shoulder Joint	10	42.8	19.21	18	0.546*
Performance	10	43.64	5.80		
Elbow Joint	10	160	19.92	18	0.045
Performance	10	43.64	5.80		

Tabulated value at DF 18 = 0.444 (significant at 0.05 level)

ILLUSTRATION 1

GRAPHICAL REPRESENTATION OF THE FOOTBALL PLAYER



The table 1 shows the relationship of effect of various joint angles on the performance of the Instep kick. The mean scores of the performance and the ankle at the time of execution, which was 116.3 and 43.64 respectively and the standard deviation was 18.97 and 5.80. The value of 'r' is 0.05 which shows positive very low correlation and statistically insignificant at 0.05 level of confidence. The above table shows that the 'r' value for performer and angle of instep kick whereas the table values for the same is found to be 0.444 at 0.05 level of confidence. The calculated values of 'r' being less than the table value, Hence the correlation between ankle joint and performance is insignificant. Thus, the stated hypothesis there exist significant relationship between ankle joint and performance of football players was rejected. It shows the correlation of effect of knee joint on the performance of the instep kick. The mean score of the performance and knee at the time of execution. Which was 170.8 and 43.64 respectively. And standard deviation was 3.96 and 5.80 respectively. This value of 'r' is 0.08 which shows positive very low correlation and statistically insignificant. The above table shows that the 'r' value for performer and angle of instep kick whereas the table values for the same is found to be 0.444 at 0.05 level of confidence. The calculated values of 'r' being less than the table value, Hence the correlation between knee joint and performance is insignificant. Thus, the stated hypothesis there exist significant relationship knee joint and performance of football players is rejected. It shows the correlation of effect of Hip joint on the performance of the instep kick. The mean score of the performance and Hip at the time of execution. Which was 119.6 and 43.64 respectively. And standard deviation was 24.5 and 5.80 respectively. This value of 'r' is -0.298 which shows the negative correlation and statistically insignificant. The above table shows that the 'r' value for performer and angle of instep kick whereas the table values for the same is found to be 0.444 at 0.05 level of confidence. The calculated values of 'r' being less than the table value, Hence the correlation between hip joint and performance is negatively insignificant. Thus, the stated hypothesis

there exist significant relationship hip joint and performance of football players is rejected it shows the correlation of effect of Shoulder joint on the performance of the instep kick. The mean score of the performance and shoulder at the time of execution. Which was 42.8 and 43.64 respectively. And standard deviation was 19.21 and 5.80 respectively. This value of 'r' is 0.546 which shows the positive average correlation and significant relationship between performance and shoulder during instep kick. The above table shows that the 'r' value for performer and angle of instep kick whereas the table values for the same is found to be 0.444 at 0.05 level of confidence. The calculated values of 'r' being less than the table value, Hence the correlation between shoulder joint and performance is significant. Thus, the stated hypothesis there exist significant relationship ankle joint and performance of football players is not rejected it shows the correlation of effect of Elbow joint on the performance of the instep kick. The mean score of the performance and elbow at the time of execution. Which was 160 and 43.64 respectively. And standard deviation was 19.92 and 5.80 respectively. This value of 'r' is 0.045 which shows the positive very low correlation and statistically insignificant.

The above table shows that the 'r' value for performer and angle of instep kick whereas the table values for the same is found to be 0.444 at 0.05 level of confidence. The calculated values of 'r' being less than the table value, Hence the correlation between elbow joint and performance is insignificant.

Thus, the stated hypothesis there exist significant relationship elbow joint and performance of football players is rejected.

4. DISCUSSION OF FINDINGS

The study was conducted to analyse the kinematic variables of Instep kick in football.

It was revealed from the kinematic variable that value of 'r' was 0.546 and the 0.444 was the tabulated value at 18 degree of freedom from the distinction of player in right shoulder joint. The level was great every time at the execution of Instep kick in football. The variables like ankle joint, knee joint, hip joint, elbow joint and the centre of gravity, does not showed any significant distinction to the lack of techniques patterns which the players follow during the instep kick while execution. The moment of leg in right knee & ankle joint were not flexed properly, also there was lack of force of back kick moment of leg while the execution of the movement (Instep kick).

It was seen that the 'r' esteem at hip joint was adversely irrelevance might be on the grounds that the hip locale was put sidelong and front to the skeletal muscle area (i.e., the butt cheek), underneath the bone peak, Suprajacent (overlying) the bigger outgrowth of the thighbone, or "thigh bone. In grown-ups, three of the bones in the pelvis are joined into the hip bone or attachment shaping an aspect of the hip area.

5. REFERENCES

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