Relationship between selected Kinematical variables and performance of Instep Kick

Deepak Kumar, Moradhvaj Singh and Brijesh Kumar Yadav

ABSTRACT

The purpose of the study to find out relationship of selected kinematic variables with the performance of In-step kick. Ten male soccer players (represented university level) from L.N.U.P.E. Gwalior selected as subject for the study. 2 D silicon pro software was used for kinematic analysis of different techniques of putting the shot. Casio Exilim Ex F1 a standard camera which frequency was 300 frame/second and which was placed at 5.67 meter distance perpendicular to the subject in horizontal plane at height of 1.50 meter. Selected kinematic variables were angle at hip joint (Right and Left), angle at knee joint (Right and Left), angle at ankle joint (Right and Left) at the moment of execution and horizontal distance covered by the ball. To find out relationship between selected kinematic variables with the performance of In-step kick, Product Moment Correlation Method and descriptive statistics was used at .05 level of significance. Results show that the calculated value of product moment correlation r is (.640), (.01), (.228), (.391), (.669*) and .342 in relation to linear kinematical variables i.e. Ankle joint(Right),Knee joint (Right),Hip joint(Right),Ankle joint (Left), Knee joint (Left) and Hip joint (Left) respectively. Angle of right knee were having greater mean (169.90±3.66) in comparison to right hip (132.80±9.76), left ankle (115.40±5.75), left knee(133.40±8.52), left hip(126.90±14.09) and angle of right ankle(107.10±4.25). Angle of right ankle was having greater mean in comparison to left ankle, knee angle (Right & left), Hip angle (Left &Right). Significant relationship was found between kinematic variables and performance of In-Step Kick in relation to angle of right ankle and angle of left knee. Insignificant relationship was found between kinematic variables and performance of Instep Kick in relation to angle of left ankle, knee angle (Right,) Hip angle (Left &Right).

Key Words: Kinematic, Horizontal distance, Soccer.
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Methodology:
For the collection of data 10 male national level soccer players of L.N.U.P.E, age ranging between 19 to 25 years, was selected for this study who had been participating regularly were selected as subjects, the subjects had been undergoing training for a considerable period. Therefore it was considered that they possess good level of skill. Casio Exilim Ex F1 a standard camera for videography was employed for conducting the kinematical analysis of putting the shot. The frequency of the camera was 300 frames/second. Silicon Pro 7 software was used for the analysis of kinematical variables at the moment of final stance. The subjects were photographed in sagittal plane in controlled conditions. The distance of the camera from the subject was 5.67 meters and was fixed 1.50 meter height. An object of known dimension was also filmed prior to the filming the subject for reference purpose. The scholar developed stick figures utilizing joint point method. The angles at various joints were measured by Silicon Pro 7 software. A kicking point was marked, the subjects performed inside of the in-step kick. The judges observed the first drop of the ball and measured the distance in meters. Each subject took five trials and best performance was used for analysis. The distance during kicking the ball was measured in meters. The purpose of the study would be explained to the subjects and requested to put in their best during each attempt. Following Variables were considered for the purpose of the study:-

Angular Kinematical Variables (Independent Variables)
- Angle at ankle joint (left and right)
- Angle at knee joint (left and right)
- Angle at hip joint (left and right)

Kinematical Variable (Dependent Variable)
- Performance of the subject (distance)

Results and Discussion:
The statistical analysis of data collected on ten male soccer players performing inside of the in-step kick have been presented in Table-I and in Table-II.

Table – I: Means and S.D. of Selected Kinematic Variables at the Moment of Execution

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>σ</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance (meter)</td>
<td>88.300</td>
<td>7.70353</td>
<td>10</td>
</tr>
<tr>
<td>Angle right knee (degree)</td>
<td>169.900</td>
<td>3.66515</td>
<td>10</td>
</tr>
<tr>
<td>Angle left ankle (degree)</td>
<td>132.800</td>
<td>9.76160</td>
<td>10</td>
</tr>
<tr>
<td>Angle left ankle (degree)</td>
<td>115.400</td>
<td>5.75809</td>
<td>10</td>
</tr>
<tr>
<td>Angle left knee (degree)</td>
<td>133.400</td>
<td>18.52446</td>
<td>10</td>
</tr>
<tr>
<td>Angle left hip (degree)</td>
<td>126.900</td>
<td>14.06690</td>
<td>10</td>
</tr>
<tr>
<td>Angle right ankle (deg)</td>
<td>107.1000</td>
<td>4.25441</td>
<td>10</td>
</tr>
</tbody>
</table>

Table-I revealed that Angle of right knee were having greater mean (169.90±3.66) in comparison to right hip (132.80±9.76), left ankle (115.40±5.75), left knee(133.40±8.52), left hip(126.90±14.09) and angle of right ankle(107.10±4.25).

Table-II: Relationship of selected angular kinematic variables at the moment of execution with performance

<table>
<thead>
<tr>
<th>S N</th>
<th>Variables</th>
<th>r</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Angle at ankle joint (Right)</td>
<td>.694*</td>
</tr>
<tr>
<td>2</td>
<td>Angle at knee joint (Right)</td>
<td>.01</td>
</tr>
<tr>
<td>3</td>
<td>Angle at hip joint (Right)</td>
<td>.228</td>
</tr>
<tr>
<td>4</td>
<td>Angle at ankle joint (Left)</td>
<td>.391</td>
</tr>
<tr>
<td>5</td>
<td>Angle at knee joint (Left)</td>
<td>.669*</td>
</tr>
<tr>
<td>6</td>
<td>Angle at hip joint (Left)</td>
<td>.342</td>
</tr>
</tbody>
</table>

Since the value of coefficient of correlation required to be significant for 8 degree of freedom is 0.632, the above table clearly shows that in case of angle at ankle joint (right) and angle of knee (left) at the moment of execution, obtained value is greater than tabulated value therefore it has shown significant relationship with performance of Instep kick in soccer. In case of left ankle joint, knee joint (right), hip joint (right and left) have shown insignificant relationships with the performance of subjects in Instep kick.

Graphical representation of relationship of selected angular kinematic variable to the performance in In-step kick.

Discussion of Findings:
In case of selected angular kinematic variables, right ankle joint and left knee have exhibited significant relationships with the performance at moment of execution and no other joint have shown significant relationship with the performance of subjects it means that if the angle of right ankle was more the release velocity will be more. On the basis of projectile principles range will be maximum at a constant velocity when the angle of release is 450 when the point of release and point of landing are same. Optimum velocity will be impart at the time of execution when the left knee will be flex. Remaining angle has shown
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ininsignificant difference with the performance may be due to small sample size and lack of standardized equipment.

Conclusions:

• Angle of right ankle was having greater mean in comparison to left ankle, knee angle (Right & left), Hip angle (Left &Right).

• Significant relationship was found between kinematic variables and performance of In-Step Kick in relation to angle of right ankle and angle of left knee.

• Insignificant relationship was found between kinematic variables and performance of In-Step Kick in relation to angle of left ankle, knee angle (Right, Hip angle (Left &Right).

References:


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