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Biomechanical Analysis Of Penalty Shoot Drag Flick Of Male State And National Hockey Players: A Comparative Study

Hitesh Saini[1] , Sunil Singh[2]

[1]Master of Physical education Lovely Professional University Phagwara, Punjab

[2]Assistant Professor Lovely Professional University Phagwara, Punjab

Abstract

This study was aimed to find the differences of various kinematic angles during the penalty shoot drag flick between the state and national Hockey players. Total subjects volunteered for this study were 20 male hockey players in which 10 were state level and 10 were national level hockey players.The subjects included in this study were from Major Dhyan Chand National Stadium Academy and Delhi state players only. The joints selected to examine the kinematic angles during penalty shoot drag flick were shoulder joint, elbow joint and hip joint. The high definition cameras were used to record the performance of the players which was then used in kinovea software to calculate the various kinematic angles. Also t test statistics was used to find the difference of kinematic angles between the state and national level Hockey players. The results showed an insignificant difference for all the selected kinematic angles of various joints during the execution of a penalty shoot drag flick between national and state level hockey players.

Keywords: Biomechanics, kinematic, penalty shoot, drag flick

Introduction

In India, field hockey is one of the most popular sports. The origins of Indian hockey can be traced back to the magnificent era. It will be presented by the British in India (Hendricks, 1988). India has won various shrubs at international competitions. Until 1980, India had won eight gold, one silver, and two bronze medals at the Olympics. World Hockey is supported by India. Hockey is a sport in which players attempt to score goals by hitting, pushing, or flicking the ball into the opposing team's goal with hockey sticks (Miroy, 1986). The success of the Indian men's hockey team's penalty shoot metamorphosis has been crucial to the team's performance. Penalty shootouts are crucial, and in recent years, they have played a significant role in determining a match's outcome. There are as many types of drag flipping as there are groups that have perfected it. In 1992, Dutch International, Van lair Honert, would present the drag flick in the penalty shoot when penalty shoot regulations were changed to allow shots higher than 45cm. The drag flick is capable of delivering objectives that, if well executed by the assaulting squad, might be far more effective than a hit. In technical terms, it's a hybrid stroke that incorporates elements of both flick and scoop strokes. The purpose of this relatively new ability is to propel the ball into the net, passing past the goalkeeper's level and, in an ideal world, into the top shots of the goal. The drag flick is a very effective objective scoring weapon due to its combination of speed, precision, and assessment (McLaughlin, 1997; Yusoff et al. 2008).

There has been an increase in the number of set plays played during a game in modern hockey. In 1908, a penalty shoot will be provided for offences against protectors in the D circle, with the principles being corrected on a regular basis. The penalty shoot allows a team to take possession of the ball close to the goal and then execute a set play attack on the goal. In its most basic form, a player pushes the ball from the pattern to a player who remains at the circle's highest point and stops it. At that point, a third player standing behind the plug hits the goal (Glencross, 1985; McLaughlin, 1997).

Michael Nobbs, India's previous hockey coach, agrees that the speed and control of a drag flick are important qualities. He can flip too quickly and lose control, or he can flick too slowly and lose speed. There is a speed limit that must be adhered to. If there is a problem with the activity, we can use biomechanics to fix it. The importance of biomechanics stems from this motivation. Drag-flicking has resulted in a slew of goals, and we've scored at crucial moments. It's all about dedication when it comes to drag flicking. In the fraction of a second, you must choose where to hit the ball, said Raghunath, India's drag glint (Roy, 2012).

Objectives Of The Study

The following objectives had been summarized in this study:

1. To analyze the difference of kinematic angle at shoulder joint during penalty shoot drag flick execution between state and national Hockey players.
2. To find out the difference of kinematic angle at elbow joint during penalty shoot drag flick execution between state and national Hockey players.
3. To assess the difference of kinematic angle at hip joint during penalty shoot drag flick execution between state and national Hockey players.

Hypotheses

It was hypothesized that:

1. There exists a significant difference of kinematic angle at shoulder joint during penalty shoot drag flick execution between state and national Hockey players.
2. There exists a significant difference of kinematic angle at elbow joint during penalty shoot drag flick execution between state and national Hockey players.
3. There exists a significant difference of kinematic angle at hip joint during penalty shoot drag flick execution between state and national Hockey players.

Method & Procedure

Selection Of TheSubjects

Twenty (N=20) male right gave drag streaks were looked over Major Dhyan Chand National Stadium Academy and Delhi State players as the subjects for this assessment. The subjects were educated with regards to discipline shoot drag flick strategies. They addressed the different workplaces and Academies of Delhi States specifically, National Championship, State Championship Players. The age of the subjects went from 17 to 25 years. The assessments were recorded by using the standard equipment, which will be available reachable. The body weight of each subject will be recorded in kilogram (kg) by using measuring machine. Height of each subject will be recorded in meter by using stadiometer and age of each subject will be assessed in Chronological solicitation.

Selection of Variables:
For this study, the variable selected was kinematic angle of Hockey penalty shoot execution at different joints:

- ✓ Shoulder Joint
- ✓ Elbow Joint
- ✓ Hip Joint

Collection Of Data
The data was collected by using the various the cameras placed at different angles to capture the various joints of the subjects at Major Dhyan Chand National Stadium Academy. All the subjects were given three chances to play penalty shoot shot and the mean of the all three chances was taken as the final score of kinematic angle.

Tools
The entertainer of the subjects in the Hockey shooting convention and examination are depicted as under.

Measurement Of The Performance Of The Subjects
To see the impact of precise penalty shoot and punishment shoot out strategy of field Hockey on the scoring of the exhibition of each subject will be estimated by utilizing the standard strategies of (WAF). Three preliminaries will be given to each subject and the all endeavors will be thought of.

Filming Protocol And Analysis
The data acquired with the help of a 2D inspection. The computerised photographs were used to examine the kinematics of the punishment shoot drag flick. During the last draw push, second execution in sagittal plane of an expert picture taker, a standard engine driven camera such as the Nikon Coolpix P610 "16.0 megapixel with 60x optical zoom and 120 unique fine zooms covering a wide point of 24mm to 1440mm (35mm organisation same) was used to acquire photograph groupings of selected developments. Standard examination techniques were used to assess the photographs obtained through the use of advanced photography. The distance between the subjects and the camera was 5 metres, while the distance between the subjects and the target was 14 metres. The camera was 1.56 metres tall, and the CG box was 1 metre by 1 metre.At the time of the hockey snapshot, the player was in position and pointing to the goal territory, and then drags or hits the ball. The examinations were conducted in a controlled environment. The approach 3 endeavours were played out in this topic. The researcher used the joint point technique to draw a stick figure on the pictures from which they chose rakish kinematic elements. Using the division strategy, the focus point of gravity of each subject was located at a predetermined second for example execution.

Statistical Technique
To discover the connection between chosen kinematic factors of shoot drag flick investigation, SPSS was utilized to examine the gathered information's mean, standard deviation and t test was utilized to see whether any significantdifference exist among execution and kinematic factors. For testing the speculation the degree of significance was set at 0.05.

Results

Result and interpretation of kinematic angle at shoulder joint during the execution of penalty shoot drag flick

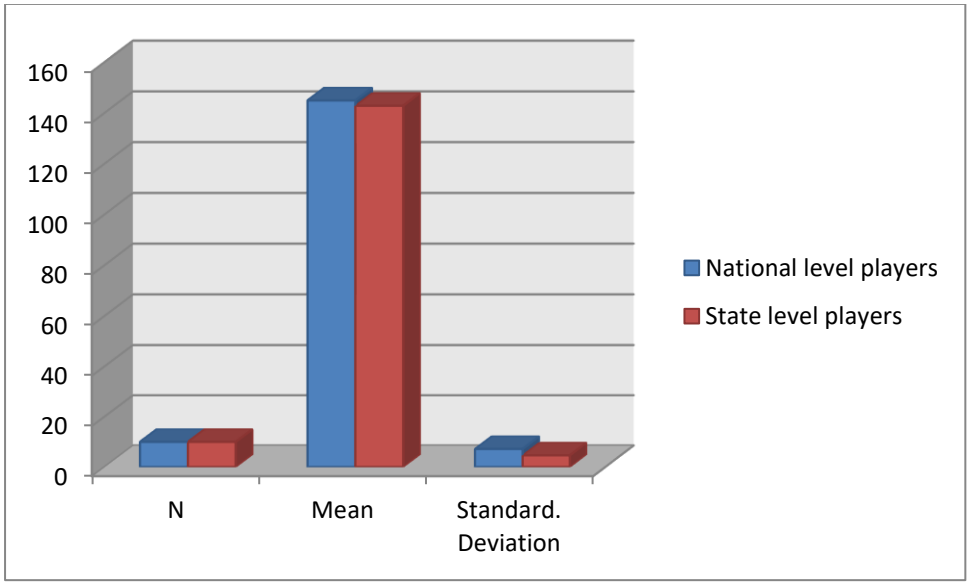
The collected data of kinematic angle at shoulder joint during the execution of penalty shoot drag flick was interpreted and the result was evaluated using t test.

Table no. 1 Difference of kinematic angle at shoulder joint during the execution of penalty shoot drag flick

Shoulder joint	N	Mean	Standard. Deviation	df	t value
National level players	10	88	5.46	9	0.08
State level players	10	88.2	5.62	9	

The difference in kinematic angle at the shoulder joint during drag flick penalty shoot execution between State and National level players was shown in table 1. The mean score of players at the state and national levels is 88 and 88.2, respectively, with a standard deviation of 5.46 and 5.62. The value of 't' was 0.08, indicated that the difference between State and National level hockey players was insignificant.

Graph no. 1 Graphical representation of difference of kinematic angle at shoulder joint during the execution of penalty shoot drag flick



Result and interpretation of kinematic angle at elbow joint during the execution of penalty shoot drag flick

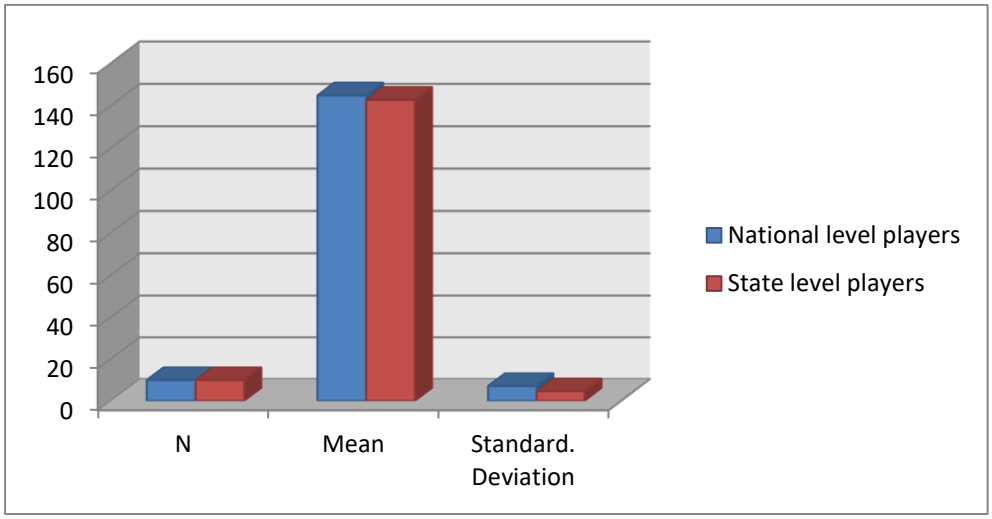
The collected data of kinematic angle at elbow joint during the execution of penalty shoot drag flick was interpreted and the result was evaluated using t test.

Table no. 2 Difference of kinematic angle at elbow joint during the execution of penalty shoot drag flick

Elbow joint	N	Mean	Standard. Deviation	Df	t value
National level players	10	137.3	10.32	9	0.06
State level players	10	137.6	12.1	9	

The difference in kinematic angle at the elbow joint during drag flick penalty shoot execution between State and National level players was shown in table 2. The mean score of players at the state and national levels is 137.3 and 137.6, respectively, with a standard deviation of 10.32 and 12.1. The value of t was 0.06, indicated that the difference between State and National level hockey players was insignificant.

Graph no. 2 Graphical representation of difference of kinematic angle at elbow joint during the execution of penalty shoot drag flick



Result and interpretation of kinematic angle at hip joint during the execution of penalty shoot drag flick

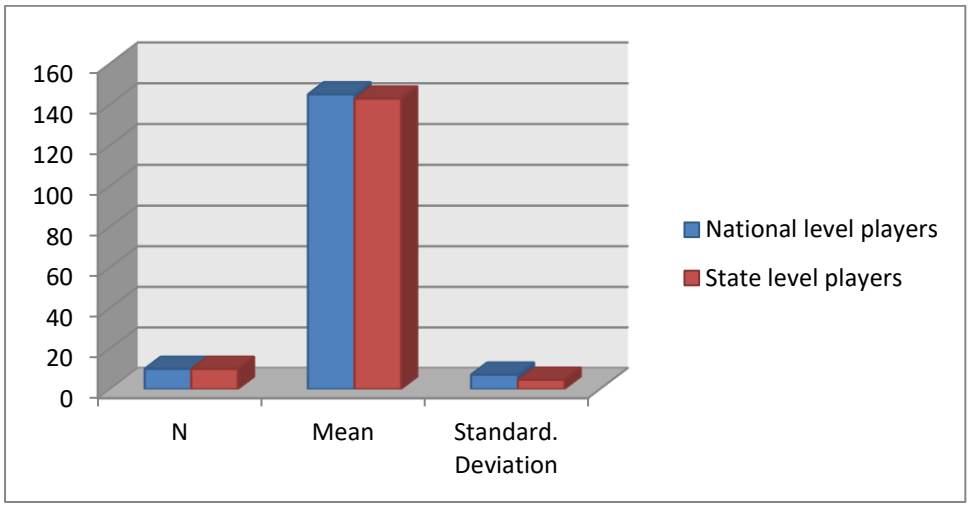
The collected data of kinematic angle at hip joint during the execution of penalty shoot drag flick was interpreted and the result was evaluated using t test.

Table no. 3 Difference of kinematic angle at hip joint during the execution of penalty shoot drag flick

Hip joint	N	Mean	Standard. Deviation	df	t value
National level players	10	145.9	6.53	9	0.16
State level players	10	146.4	6.77	9	

The difference in kinematic angle at the hip joint during drag flick penalty shoot execution between State and National level players was shown in table 3. The mean score of players at the state and national levels is 145.9 and 146.4, respectively, with a standard deviation of 6.53 and 6.77. The value of t was 0.16, indicated that the difference between State and National level hockey players was insignificant.

Graph no. 3 Graphical representation of difference of kinematic angle at hip joint during the execution of penalty shoot drag flick



Discussion and Conclusion

The results revealed no significant difference in kinematic angle at shoulder joint, elbow joint and hip joint during the execution of a penalty shoot drag flick between national and state level hockey players, implying that both levels of players had identical kinematic angles. Thus this study concluded that the kinematic angle at shoulder joint, elbow joint and hip joint did not make any difference in the performance of drag flick penalty shoot execution. This study also recommended to do further intensive study by taking different level of samples to validate the importance of kinematic angles in better performance of drag flick penalty shoot execution.

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