Two Dimensional Analyses of Badminton Overhead Strokes

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Abstract

The purpose of the study to investigate the angular kinematics of Hip joint during the execution of Smash and Drop Shot in Badminton. Total [N=10] no of subjects were selected from the Lakshmibai National Institute of Physical Education who at least participated in Inter university tournament. Subjects were selected for the study in each shot (Drop and smash). Only right handed Badminton player were taken for the study whose age level was (19±6) and the mean height (169.9 cm), mean weight (67.7 kg).only angle of hip is selected as the variable. GO- pro hero camera was used for capturing of movement while executing the Drop and Smash. The frame rate of the camera was 119 frame/second. The distance of the camera from the performing area was 10 mts away and height was 120 mts. Subjects were asked for complete warm up before the execution of stroke. The comparison of selected kinematic variables, i.e. hip angle had shown the significant difference between Smash and Drop in Badminton players. This significant difference may due to the pattern of technique of all players have their different performing technique but executing the smash and Drop more or less similar.

KEYWORDS: Kinematics, Hip Joint, Drop Shot, Smash, Badminton, GO-pro

Introduction

In today's world Biomechanics has been playing significance role in by means of recording and analyzing the Quantitative and qualitative movement. With the development of photography it become possible to captures the movement with respect to sequence of images. Even it can capture such a movement which are not possible to capture with the naked eyes. The improving pattern of Badminton is due the execution of stroke gracefully with minimum input to get the maximum output. Biomechanics is an applied mechanics which investigate those mechanics which helps the player to get maximum output. So people who are directly or indirectly associated with the biomechanics should know about the major groups Muscles, how body moves, about the degree of difficulty in joint movement. "Over an years timing and filming have been perfected to aid in research in Achieving accurate time measurement of both complex and simple locomotion patterns"(John and Dee, 1971). " The approach can providing understanding of the natures of any skill, Their economic way of Execution, and heir dependent variables, can build into an Awareness of larger scheme of economic movement" (Cloude, Barry and Mopherson, 1992).

Badminton is a game which is played over net. The game badminton demand high level of fitness where once requires economical movement to sustain on the court. Mechanical factors plays important role to win the game it has various kinds of strokes.

Forehand smash is the offending shot where player wants to finish the rally in one stroke but the clear shot may be offending or defending where the offender push the shuttle to back boundary lines for double with certain flight.The Badminton smash is a one of the most essential factor of player's repertoire and significance stroke in gaining success as it is the most valuable winning shots (Tsai and Chang, 1998; Tong and Hong, 2000; Rambely et al., 2005).

Methodology

Selection of Subjects

Total [N=10] no of subjects were selected from the Lakshmibai National Institute of Physical Education who at least participated in Inter university tournament. Subjects were selected for the study in each shot (Drop and smash). Only right handed Badminton player were taken for the study whose age level was (19±6) and the mean height (169.9 cm), mean weight (67.7 kg).only angle of hip is selected as the variable.

Collection of Data

Data were collected by the using of Go- pro Hero camera in the skill Drop and Smash in badminton.

Filming procedure

GO- pro hero camera was used for capturing of movement while executing the Drop and Smash. The frame rate of the camera was 119 frame/second. The distance of the camera from the performing area was 10 mts away and height was 120 mts. Subjects were asked for complete warm up before the execution of stroke.

Data Analysis

Biomechanical Data was analysis through kinovea-0.8.27. To infer any endeavor there is a requirement of an appropriate statistical test for the study a t- test was used to infer the difference between smash and Drop.

FIGURE-1

ANALYSIS OF SUBJECT PERFORMING THE STROKE

TABLE-1

t-TABLE OF THE HIP JOINT WITH F VALUE FOR LEVENE'S TEST

Hip angle	Means	Std. Deviation	Mean Difference	Std. Error of mean difference	t value	p value	F value	p value
Smash	135.80	22.86	-36.00	10.76	-3.34	0.021*	1.51	0.25
Drop	171.80	7.49	-36.00					

***Significant level 0.05**

Interpretation of result

The following Interpretation can be done on the basis of result shown in figure

- In the above table Standard deviation, mean, and standard error of the mean for the hip angle on smash and Drop. The mean angle of Smash is more than of Drop however difference is whether significance or not cannot be revealed only through t-value and its Associates p-value.
- One of the Assumption for using two sample Ratio-test for unrelated groups are that variance of two group must be equal. To test the equality of variance Levene's test was used. In above table F-value 1.51>0.05. thus , null hypothesis of equality of variance may be accepted, and it can be concluded that variances of two groups are equal

- It can be seen in the above table the value of t-statistics is -3.34. This t-value is significant as its p value is 0.021 which is less than 0.05. Hence the null hypothesis of equality of the population means is rejected, it may be concluded the average Hip angle of smash and Drop is Difference. Average Hip angle of smash is less than Drop which may be concluded that to Drop the Shuttle one should execute more angle than the smash as the power of execution of drop shot is less than the smash and flight of the shuttle is difference vice versa in case of Smash.

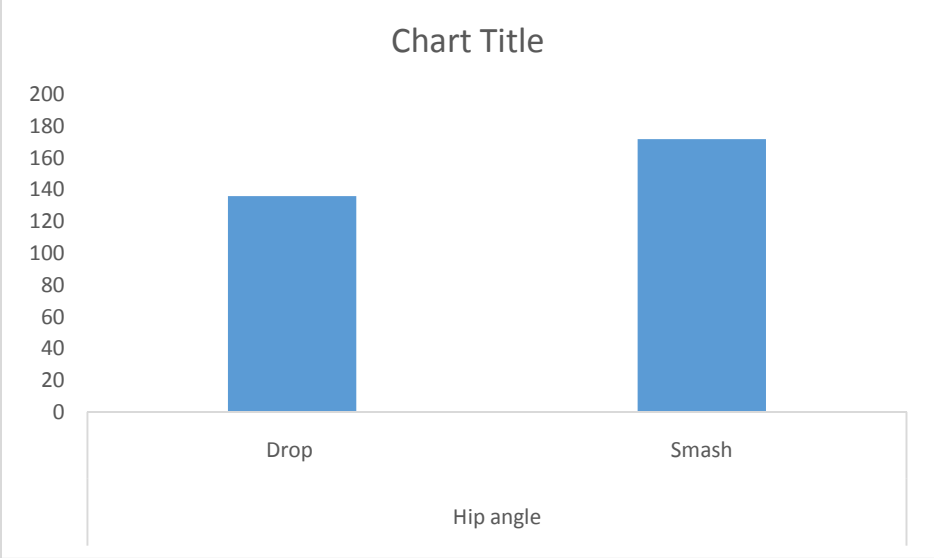

FIGURE-2
MEAN OF HIP ANGLE BETWEEN SMASH AND DROP

Discussion of Finding

To investigate the study independent t- test was used. The comparison of selected kinematic variables, i.e. hip angle had shown the significant difference at 0.05 level of significance between Smash and Drop in Badminton players. This significant difference may due to the pattern of technique of all players have their different performing technique but executing the smash and Drop more or less similar. The Hip Angle of smash is more may be to get the more height so that the player can execute the shot from the more height. With this data it is not possible to investigate all the mechanism of smash and drop of Badminton. One need to go through the more depth study with proper gadgets.

Conclusion:

The selected independent Biomechanical Variables namely Hip angle of Drop and Smash had a significant difference. The Hip Angle of smash is more may be to get the more height so that the player can execute the shot from the more height. With this data it is not possible to investigate all the mechanism of smash and drop of Badminton. One need to go through the more depth study with proper gadgets.

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