

Relationship of Height of Release and Angle of Release with Free Throw in Basketball

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Abstract

The purpose of the study was to find out the relationship between free throw and angle of release and height of release. For this purpose ten men basketball players were selected at random for the purpose of the study. The age of the subjects was between 18 to 25 years. The subjects were randomly selected from reputed universities and colleges in Chennai. The selected players were in their top form and no one was having injuries or recovering from the injury. All the selected players were right hand shooters. The investigator used the video capturing technique. Videos captured in Sony digital video camera (Model: HDR-XR550E). The camera was placed perpendicular to the plane of free throw at a distance of 8.05 meters to capture the free throw. The camera was fixed perpendicular to the plane of motion by setting the axis of the camera at 90 ° angle through a plumb line test. The camera focus and optical settings were fixed after a number of attempts to ensure the optimum image was captured in the camera. All the necessary steps were taken carefully to avoid the perspective error. The camera was fixed on a stationary tripod at a height of 1.40 meters a careful attention was taken to avoid panning. The calibration frame of 1m x1m was placed nearer to the plane of action in front of camera. The angle of release and height of release variables were measured from the video captured in camera. The captured videos were analyzed by frame by frame to measure the angle of release and height of release through the KINOVEA software version 0.8.15. Pearson's product moment correlation coefficient will used to determine the significant relationship between free throw and the angle of release and height of release. Partial Correlation will used to find out the relationship of each independent variable. The study concluded that there was a significant positive relationship between free throw and height of release. There was no significant relationship between free throw and angle of release.

Key words: free throw, height of release, angle of release and biomechanics

Introduction

Modern basketball players are also found to perform the movement skills such as quick starting, sudden stopping, change of pace, change of direction, sudden acceleration of speed, quick jumping and shuffling of feet with and without ball. It is accepted by experts like the main ball skills essential in modern basketball are "over head passes, chest passes, speed dribble, zigzag dribble, lay-up shooting, jump shooting and rebounding" (Subramanian, 1981).

Fontanella (2007) describes how the laws of physics influence the movement of a basketball, focusing mainly on shooting. It is observed that

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the apex of the balls trajectory must be kept at maximum height for that distance from the position of the player and the hoop for maximum conversion of the shoot.

Miller (1996) studied with three-dimensional cinematography (100 Hz) which was used to establish the relationship between distance and the kinematics of shooting with respect to playing position in basketball. From this study it is observed that an increase in distance between the player and the basket, the release angle decreases and the release speed increases which compromises accuracy of scoring a shot.

Mullineaux (2010) investigated the joint kinematics and coordination-variability between missed and successful (swishes) free throw attempts. The study brings about the details of release speed and release angle influenced by the coordination of the wrist, elbow and shoulders.

Southard et al. (1989) studied the nature and effect of certain highly patterned behaviors utilized prior to free-throw shooting in basketball. Free throw successful attempts are observed based on speed, height and angle of release of the ball.

Tran (2008) studied to determine the optimum release conditions for the free throw in men's basketball. The research provides an insight on the choice of variables such as speed of release, angle of release, relative height of release, and apex of trajectory and their importance in the study of basketball shooting.

Methodology

The purpose of the study was to find out the relationship between free throw, angle of release and height of release. For this purpose ten men basketball players were selected at random. The age of the subjects was between 18 to 25 years. The subjects were randomly selected from reputed universities and colleges in Chennai. The selected players were in their top form and no one was having injuries or recovering from the injury. All the selected players were right hand shooters. The investigator used the video capturing technique. Videos captured in Sony digital video camera (Model: HDR-XR550E). The camera was placed perpendicular to the plane of free throw at a distance of 8.05 meters to capture the free throw. The camera was fixed perpendicular to the plane of motion by setting the axis of the camera at 90 ° angle through a plumb line test. The camera focus and optical settings were fixed after a number of attempts to ensure the optimum image was captured in the camera. All the necessary steps were taken carefully to avoid the perspective error. The camera was fixed on a stationary tripod at a height of 1.40 meters a careful attention was taken to avoid panning. The calibration frame of 1mx1m was placed nearer to the plane of action in front of camera. The angle of release and height of release variables were measured from the video captured in camera. The captured videos were analyzed by frame by frame to measure the angle of release and

height of release through the KINOVEA software version 0.8.15. Pearson's product moment correlation coefficient will be used to determine the significant relationship between free throw and the angle of release and height of release. Partial Correlation will be used to find out the relationship of each independent variable.

Results

Descriptive Analysis

The minimum, maximum, mean and standard deviation of selected variables of basketball players are presented in the table - I

Table - I
Descriptive Statistics of the Selected Variables

S. No	Variables	N	Min.	Max	Mean	SD (\pm)
1.	Height of R	10	1.07	1.34	1.17	0.09
2.	Angle of R		67.67	88.20	76.85	6.69
3.	Free throw		6	10	8	1.15

(Note: R- denote Release)

Table-I shows that the descriptive analysis of free throw, height and angle of release. For the present study, the minimum and maximum free throw was 6 and 10 respectively. The mean and standard deviation of free throw of the selected subjects of the study were 8 and 1.15 respectively.

The minimum and maximum values of height of release were 1.07 meters and 1.34 meters respectively. The mean and standard deviation of height of release of the selected subjects of the study were 1.17 and ± 0.09 respectively.

The minimum and maximum values of angle of release were 67.67°s and 88.20°s respectively. The mean and standard deviation of angle of release of the selected subjects of the study were 76.85 and ± 6.69 respectively.

Table - II
Inter-Correlation of Selected Independent Variables and Free Throw

Variable	Height of R	Angle of R
Free throw	0.662*	0.197
Height of R	****	0.233

Table value with df 8 at 0.05 level of significance was 0.549.

It was evident from the Table-II that the height of release was positively correlated with free throw (0.662*).

It was evident from the Table-II that the angle of release did not correlate with free throw.

This result was relation with the studies of Tran (2008) research provides an insight on the choice of variables such as speed of release, angle of release, relative height of release, and apex of trajectory and their importance in the study of basketball shooting. Fontanella (2007) observed that the apex of the balls trajectory must be kept at maximum height for that distance from the position of the player and the hoop for maximum conversion of the shoot. Southard et al. (1989) conveyed that free throw successful attempts are observed based on speed, height and angle of release of the ball.

Conclusion

There was a significant positive relationship between free throw and height of release. There was no significant relationship between free throw and angle of release.

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