



BIOMECHANICAL ANALYSIS OF SET SHOT IN BASKETBALL

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ABSTRACT :

The aim of this study was to analyse the selected biomechanical factors of set shot in basketball. Men (n=21) Basketball players represented university were purposively selected from Tamil Nadu state, India for this study, the age of the subjects ranged from 18 to 28 years. The subjects had past playing experience of at least four years in basketball. Written informed consent was obtained from players. The high definition camera (Sony 10) was used to record the performances that were approximately transverse to the trajectory of the plane of motion. Video footage was digitized using Kinovea software for data analysis of speed of release, relative height, angle of release, apex of the ball and accuracy. The collected data was statistically analysed by using descriptive statistics and Pearson's correlation coefficients. The finding reveals that the accuracy has significant relationship with speed of release, relative height and angle of release. Among the selected variables accuracy and speed of release having highest relationship.

KEYWORDS: Biomechanics, Kinovea, Basketball, set shot

INTRODUCTION

Basketball is one of the most popular and widely viewed sports in the world. Points are scored by throwing (shooting) the ball through the basket from above, the team with more points at the end of the game wins. The ball can be advanced on the court by bouncing it (dribbling) or passing it between teammates. Disruptive physical contact (foul) is penalized and there are restrictions on how the ball can be handled (violations). Through time, basketball has developed to involve common techniques of shooting, passing and dribbling, as well as player's positions and offensive and defensive structures. Typically, the tallest members of a team will play center or one of two forward positions, while shorter players or those who possess the best ball handling skills and speed, play the guard positions. While competitive basketball is carefully regulated, numerous variations of basketball have developed for casual play. In some countries, basketball is also a popular spectator sport. Shooting is the act of attempting to score points by throwing

the ball through the basket. While methods can vary with players and situations, the most common technique is outlined as follows: The player faces the basket with feet about shoulder-width apart, knees slightly bent, and back straight. The player allows the ball to rest on the fingertips of the dominant hand (the shooting arm) slightly above the head, with the other hand supporting the side of the ball. To aim the ball, the player's elbow should be aligned vertically, with the forearm facing in the direction of the basket. The ball is shot by extending the bended knees and straightening the shooting arm; the ball rolls off the finger tips while the wrist completes a full downward flex motion. The shooting arm, fully extended with the wrist fully bent, and the fingers pointing downward, is held stationary for a moment following the release of the ball, this is known as a follow-through, which when properly done, enhances the accuracy of the shot. Generally, the non-shooting arm is used only to guide the shot, not to power it. Players often try to put a steady backspin on the ball to

deaden its impact with the rim. The ideal trajectory of the shot is somewhat arguable, but generally coaches recommend a proper arch. Players may shoot directly into the basket or may use the backboard to redirect the ball into the basket.

The two most common shots that use the above described set up are the set shot and the jump shot. The set shot is taken from a standing position, with neither foot leaving the floor, typically used for free throws. The jump shot is taken while in mid-air, when the ball is released near the top of the jump. This provides much greater power and range, and it also allows the player to elevate over the defender. Failure to release the ball before the feet return to the ground is considered a traveling violation. The purpose of the study was to analyse the biomechanical factors of set shot in basketball.

METHODS

Twenty one men Basketball players represented university were purposively selected from Tamil Nadu state, India for this study, the age of the subjects ranged from 18 to 28 years. The subjects had past playing experience of at least four years in basketball. Written informed consent was obtained from players. To acquire biomechanical data the high definition camera (Sony 10) was used to record the performances that were

approximately transverse to the trajectory of the plane of motion. The camcorder mounted at the height of 1.5 meter, placed 6 meters away perpendicular to the trajectory of the plane of motion. A cage with the dimensions of 1.0x1.0m at 4 control points was used to calibrate the space, in which the set shot was performed. After a 15-minute standard warm-up session, participants perform the set shot; 10 trials were randomly captured from the subjects. If the subjects did not introduce the ball into the basket, the trial was rejected. speed of release, relative height, angle of release, apex of the ball and accuracy were taken as variable and the successful trial was analysed through the kinovea software.

Statistical technique

Descriptive statistics and pearson's correlation coefficients were applied to establish the relationships among the variables measured. Data were analyzed using SPSS (Statistical Package for Social Science) version 15.0. The level of significance was fixed at 0.05.

RESULTS AND DISCUSSION

The descriptive statistics for biomechanical characteristics for all players are presented in the table below

TABLE 1
DESCRIPTIVE STATISTICS OF BIOMECHANICAL CHARACTERISTICS OF SET SHOT IN BASKETBALL

Variables	N	Minimum	Maximum	Mean	SD (\pm)
Accuracy	21	4.00	9.00	6.95	1.56
Speed of release	21	3.50	6.50	4.66	0.94
Relative height	21	1.93	2.38	2.22	0.13
Angle of release	21	76.00	103	86.14	7.66
Apex of the ball	21	3.36	3.74	3.55	0.12

The table 1 explains the mean and standard deviation of biomechanical characteristics of set shot in basketball.

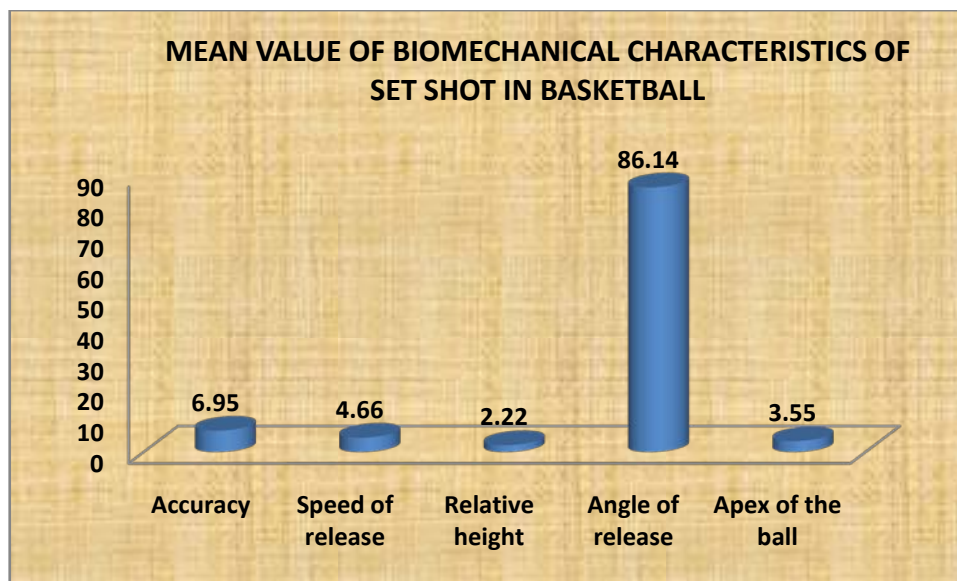


FIGURE: I
MEAN VALUES OF BIOMECHANICAL CHARACTERISTICS OF SET SHOT IN BASKETBALL

TABLE II
INTER-RELATIONSHIP OF SELECTED BIOMECHANICAL VARIABLES OF SET SHOT IN BASKETBALL

Variables	accuracy	speed of release	relative height	angle of release	apex of the ball
Accuracy	1	.502*	-.459*	-.479*	.231
Speed of release		1	-.610**	-.364	.329
Relative height			1	.440*	-.177
Angle of release				1	.080
Apex of the ball					1

*Significant at 0.05 level ** significant at the 0.01 level

It was evident from the above table – II relationship exists among the basketball players, the result of the study reveals that the university basketball players, the speed of release has significant relationship with accuracy. Among the selected variables speed of release having high relationship followed by angle of release and relative height. In Previous research on the kinematic analysis of Basketball three point shoot after high intensity program (Chi-Yang, 2006) found that Improvement in the power for the shot exhibited to be dependent on knee and ankle joint to much extent. It was analyzed that 7% of contribution in the performance of set shot was caused by time

to perform the course but when we consider players of different heights, time period among different height players may not be different in performing the skill of set shot. (Hay, 1978), found that 29% of variation in the performance was being caused by angle of release of the ball. At the time of execution angle of release of the ball also depends on the related wrist action.

CONCLUSIONS

From the present study it is concluded that, the speed of release has significant relationship with accuracy. Among the selected variables speed of release having high relationship followed by

angle of release and relative height.

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