

Exploring the Efficacy of Basketball Shooting: A Comprehensive Analysis of Success Rates

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ABSTRACT— The present study evaluated success rate of basketball shooting for different skill levels. A total of 10 subjects (5 skilled and 5 unskilled) participated in this study. The main goal of the study was to provide the preliminary data for further studies in finding mechanisms of improving shooting success rate during basketball games. This larger constraint is thought to require performers to change their motion control strategy to maintain accuracy and create a tremendous urge to push the ball the moment it is released. Still, many players have difficulty adapting to longer distance shooting. The results suggested that there were main effects of group and distance, but, no interaction effect was found. In conclusion, shooting success rate were affected by distance regardless of skill levels in basketball shooting.

KEYWORDS- Basketball Shooting, Release Time, Field Goal

I. INTRODUCTION

Basketball requires accurate ball shooting, proper handling of ball, and fast and accurate dribbling. This makes a player to attack the ring within a short period of time. However, only way to score is by shooting which make it the most vital skill in the basketball game [1-3]. Basketball game is very competitive and wining or losing will depend on field goal percentage. A player who can shoot from a variety of distances has an advantage in the game, especially the 3-point shot. Jump shots with different distances can expand offensive space and facilitate the implementation of various offensive tactics [4].

A basketball shot is a very complex action. A successful basketball shot is created by the interplay of three factors: the individual, the task and environment [5]. For example, each basketball shot is created differently by the position of the defender and the position, ability and strategy of the offense. Changes of release speed of a basketball affect correct throwing tasks [6]. A study of basketball shooting kinematics found that release speed of basketball continued to increase as the basketball shooting distance increased [7].

Lower basketball release speeds were found to result in higher field goal percentages [8]. Good basketball players

had a habit of shooting from angles that were easier to obtain minimum release velocity [9]. Lower ball release speeds could minimize the variation of movements in all parts of the body by providing more time to adjust the movements via visual and proprioceptive feedbacks, and this would result in an increase the stability of the movement [10]. Changes in release speed of a basketball has the greatest effect on the arrival location of a throwing task [11]. This larger constraint is thought to require performers to change their motion control strategy to maintain accuracy and create a tremendous urge to push the ball the moment it is released. This greater constraint forces the performer to change their motion control strategy to maintain accuracy of field goal and is thought to create greater impulse/urge to push the ball at the moment of release [12]. Still, many players have difficulty adapting to longer distance shooting, especially amateur players [13]. This could be explained by shooting success rate of basketball throwing. Therefore, the present study aimed to evaluate the variations in field goal percentage during basketball shootings among players with different levels of basketball skills when shooting distances increased.

II. METHOD

A. Participants

This study selected 5 skilled shooters and 5 unskilled shooters as the research objects. They were fit and used to shooting right-handed. In addition, the subjects were fully informed of the purpose and necessity of the study procedure before the experiment. For accurate study results, subjects were advised to avoid excessive exercise or physical activity and to get plenty of rest before the experiment. They had no history of musculoskeletal injuries in the previous 6 months prior to the examinations. Their characteristics are followed (table 1).

Table 1. Physical Characteristics and PF(%)

	Unskilled(n=5)	Skilled(n=5)
Age	20.3±0.6	20.3±1.2
Height	180.4±2.3	186.5±3.5

Weight	77.5±5.6	76.3±2.5
Years	2	10
FP(%) at 5m	50.3±12.6	87.3±10.2
FP(%) at 6.8m	22.3±8.4	65.7±6.8

FP: field goal percentage,

B. Procedure

A size 7 basketball was used for all shooting for different distances (5 and 6.8m). Each subject shot 5 times for each distance (5m and 6.8m) in random orders. Success rates were calculated as # of successful shooting/total shooting. The participants wore their own basketball shoes.

III. RESULTS

Two-way mixed factor ANOVA results suggested that there were significant main effects, but, no significant interaction effect in shooting success rate (FP) (Table 2).

Table 2. Shooting success rate (FP) at different distances for unskilled and skilled shooters (mean ± SD, %)

Variables	<i>P</i>
Distance	<0.001
Group	<0.001
Interaction	0.69

There was a significant difference in shooting success rate in terms of distance (table 2). Post hoc multiple comparisons showed significant differences in success rates in the skilled group at 5m and 6.8m shots and the unskilled group at 5m and 6.8m shots. The results suggested that, generally, success rate of basketball shooting decreased significantly as distance increased. However, unskilled group showed a greater decrease, decreasing by nearly 30% with a low success rate. There was a significant difference in the group main effect of shooting success rate, and post hoc comparisons revealed significant differences in the two groups at 5m distance (P=0.001) and at 6.8m distance (P<0.001), with the skilled group having a higher success rate at both distances.

IV. DISCUSSION

The present study evaluated shooting success rate for skilled and unskilled basketball players. The main purpose of the present study was to provide preliminary data for future studies in evaluating mechanisms affecting shooting success rate.

Results from the present study demonstrated that the shot success rate would fall lower for both groups as the

shooting distances increased This may have been because the horizontal virtual target decreased as shooting distance increased. Therefore, the further the shooting distance, the greater the spatial accuracy constraint that the shooter must master [14]. Results from the present study suggested that as the shooting distance increased, unskilled group’s success rate decreased more than skilled group.

V. CONCLUSION

In conclusion, shooting distance influence success shooting rate regardless the skill levels of shooters. However, shooting success rate would increase as skill levels increased.

VI. RESEARCH QUESTION

1. What will be main factors influencing successful basketball shooting performance?
2. What will happen to shooting success rate if shooters are induced fatigue?
3. Will muscle activity sequence and energy transfer mechanism change between skilled and unskilled players

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