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Kinematical Analysis of Set Shot in Basketball

KEYWORDS: Kinematical analysis, Ball release, set shot

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ABSTRACT *Aim: The study was concluded in order to the kinematical analysis of set shot in basketball players. Material and Methods. Ten randomly selected female students aged 17-28 years and who have participated in North Zone Inter University Basketball Championship were selected as subjected for the study. With the help of Casio High Speed Camera (300 F/s) was used to film the subjects is sagital plane of set shot. Point joint method was used in order to obtain the values of selected linear and angular kinematics variables Ankle Joint(right), Knee Joint(right), Hip Joint(right) Shoulder joint(right), Elbow joint(right), Wrist joint(right), height of ball release and angle of ball release, from develop stick figures feature. Three point scale was used in the study. The data was analyzed by use of Descriptive statistics. The level of significance was set at 0.05.Results The results have at long range shooting subject gained maximum ankle that is 135 degree in execution position with knee 186, hip183, shoulder 129, elbow 160, wrist 172 and angle of ball release 68, height of ball release 2.1*

Introduction
Biomechanics may be defined as the science, which investigates the internal and external forces acting on a human body and the effects produced by these forces. In the last several decades, biomechanics has demonstrated considerable growth evolving from an exercise in the filming of human movement to an applied science with a powerful array of measurement and modelling techniques. The simple descriptive approach which was characteristic of early work has been superseded by attempts to explain the mechanisms underlying movement. Consequently, biomechanics has emerged as an important area of scientific investigation in a variety of disciplines. Included among these are automobile safety, biomedical engineering, ergonomics, exercise science, orthopaedic surgery, physical rehabilitation, and sport.

Cinematography is the technique most frequently used in sport biomechanics research for obtaining a record of human movement. These film records are quantitatively analysed to obtain linear and angular displacement time data for total body or segmental movements. Typically, the basic displacement time functions of a motion do not provide sufficient information to describe fully the activity thus; these data are further treated mathematically to determine the respective velocity and acceleration functions.

The role of cinematography in biomechanical research involved from a simple form of recording motion to a sophisticated means of computer analysis of motor efficiency. Over the years, new techniques in filming and timing having been perfected to aid the research in achieving accurate time measurements of both simple and complex locomotion patterns .

Basketball is a game of intricate movement combined with great speed and accuracy. The meshing of fundamentally sound players weaving clever patterns of attack and defence develops great teams. The spectator realizes this subconsciously but in many cases cannot recognize it. Shooting which is an evaluation of passing will folhigh and give the greatest satisfaction in execution. It makes little difference how well a team defends, dribbles, and passes to work the ball into a scoring position if the player cannot shoot.

Objective-:
The purpose of this study was to do the kinematical analysis of set shot in basketball.

Methodology:
The study was delimited to the female basketball players of C.S.J.M. University who have participated in North Zone Inter University Basketball Championship were selected as subjected for the study. With the help of Casio High Speed Camera (300 F/s) was used to film the subjects in sagital plane of set shot. The study was further delimited to the 10 subject belonging to the age group 17 to 28 years. The subjects were right and left handed shooters.

The scores of the subjects in set shot were used as the criterion variable in the study. The performance of the subject were assessed by the three judges however element related to the accuracy of shooting were also added. Used in three point scale .three point awarded in correct action and basket scored. Two points awarded in correct action but not scored. One point awarded in touches the ring or board.

Photograph-1 Set Shot at the moment execution

A Casio Exilim F-1 High Speed Camera, which was positioned at 7.90m from the subject at a height of 1.50mts. from the subject on an extension of free throw line. Camera was also set for capturing 300 fps. The subject was made 2 take three shorts only. The selected kinematical variables of the body were calculated at moment execution.

The videos as obtained by the use of digital videography were analyzed (the best trial). Only one selected frame was

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analyzed. Selected variables were as under Ankle joint right, Knee joint right, Hip joint right, Shoulder joint right, Elbow joint right, Wrist joint right, Height of ball release and angle of ball release. The data was analyzed by use of Descriptive statistics. The level of significance chosen to test the hypothesis was 0.05.

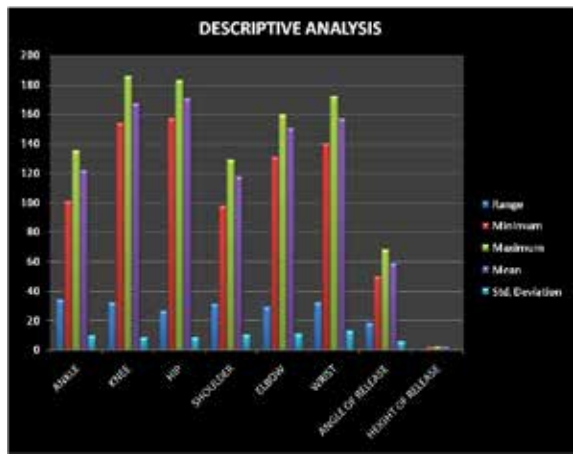
RESULTS

TABLE NO. 1

Descriptive Analysis of Set Shot at Execution phase in Basketball

variable	N	Range	Minimum	Maximum	Mean	Std. Deviation
ANKLE	20	34	101	135	121.9	9.7
KNEE	20	32	154	186	167.1	8.63
HIP	20	26	157	183	170.6	8.6
SHOULDER	20	31	98	129	117.5	10.23
ELBOW	20	29	131	160	150.4	10.85
WRIST	20	32	140	172	157	13.17
ANGLE OF RELEASE	20	18	50	68	58.4	5.75
HEIGHT OF RELEASE	20	0.25	1.85	2.1	1.975	0.079

Table-18 reveals the descriptive analysis of set shot in basketball. In this the angle of right ankle joint shows value of mean and standard deviation (121.9 ± 9.7) respectively with the range of (34). The maximum value is 135 and minimum value is 101 of ankle joint. The angle of right knee joint shows value of mean and standard deviation (167.1 ± 8.63) respectively with the range of (32). The maximum value is 186 and minimum value is 154 of knee joint. The angle of right hip joint shows value of mean and standard deviation (170.6 ± 8.6) respectively with the range of (26). The maximum value is 183 and minimum value is 157 of hip joint. The angle of right shoulder joint shows value of mean and standard deviation (117.5 ± 10.23) respectively with the range of (31). The maximum value is 129 and minimum value is 98 of shoulder joint. The angle of right elbow joint shows value of mean and standard deviation (150.4 ± 10.85) respectively with the range of (29). The maximum value is 160 and minimum value is 131 of elbow joint. The angle of right wrist joint shows value of mean and standard deviation (157 ± 13.17) respectively with the range of (32). The maximum value is 172 and minimum value is 140 of wrist joint. The angle of ball release shows value of mean and standard deviation (58.4 ± 5.75) respectively with the range of (34). The maximum value is 1.57 and minimum value is 1.26 of ankle joint. The height of ball release shows the value of mean and standard deviation (1.975 ± 0.079).



Conclusion:

1. The mean of angle of ankle in Set Shot was. 121.9 degree and the range was between 101 to135.
2. The mean of angle of knee in Set Shot was 167.1 degree and the range was between 154 to 186 degrees.
3. The mean of angle of hip in Set Shot was 170.6 degree and the range was between 157 to 183 degrees.
4. The mean of angle of shoulder in Set Shot was 117.5 degree and the range was between 98 to 129 degrees.
5. The mean of angle of elbow in Set Shot was 150.4 degree and the range was between 131 to 160 degrees.
6. The mean of angle of wrist in Set Shot was 157 degree and the range was between 140 to 172 degrees.
7. The mean of angle of ball release in Set Shot was 58.4 degree and the range was between 50 to 68 degrees.
8. The mean of height of ball release in Set Shot was 1.975 mts and the range was between 1.85 to 2.1 mts.

The Basketball players there have own specific skill and style for long range shooting skill but above mention findings recommended that coaches with trainees their finds of this study shell provide much orientation.

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