

KINEMATICAL ANALYSIS: LONG RANGE SHOOTING IN GIRLS BASKETBALL PLAYERS

¹Nazia Khan ²Rachna Vishwakarma

¹Assistant Professor, Department of Physical Education, Aligarh Muslim University, Aligarh, U.P., India

²Physical Education Teacher (Gymnastic Coach), Mayo College Girls School, Ajmer, Rajasthan, India

ABSTRACT

The study was conducted to analyse long range shooting of girls basketball players. Ten female basketball players, who represent C.S.J.M. University Kanpur, 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 sagittal plane of Set shot. Siliconcoach Pro 7 Software was used in order to obtain the values of selected angular kinematics variables Ankle Joint(right), Knee Joint(right), Hip Joint(right) Shoulder joint(right), Elbow joint (right) and Wrist joint (right) from develop stick figures feature And linear kinematic variable such as Height of ball release, Velocity of ball release, Angle of ball release and standing height of players. The data was analyzed by use of Descriptive statistics. The results have at long range shooting subject gained maximum ankle that is 130.10 degree in execution position with knee 175.20, hip 175, shoulder 102.30, elbow 150.40 and wrist 149.70. At long range shooting subject gained maximum height of ball release is 2.12 mts. at kinematic variable with angle of release is 75.3 degree, velocity 75.03^{ms⁻¹} and 1.62mt. of standing height of players.

Keywords: Kinematics, Analysis and Players.

INTRODUCTION:

Biomechanics is the application of mechanical principles to biological systems, such as humans, animals, plants, organs, and cells. Perhaps one of the best definitions was provided by Herbert Hatze in 1974: "Biomechanics is the study of the structure and function of biological systems by means of the methods of mechanics". 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 modeling 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 The simple descriptive approach which was characteristic of early work has been superseded by attempts to explain the mechanisms underlying movement.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, orthopedic surgery, physical rehabilitation, and sport¹.

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 defense develops great teams. The spectator realizes this subconsciously but in many cases cannot recognize it. Shooting which is an evaluation of passing will follow 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.²

OBJECTIVE-: The purpose of this study was to the analysis of selected kinematical variable in long range shooting.

METHODOLOGY : The study was delimited to female basketball players of C.S.J.M. University, Kanpur. The study was further delimited to the 10 subject belonging to the age group 17 to 25 years. The subjects were right and left handed shooters.

The scores of the subjects in 3Point Shot were used as the criterion variable in the study. Siliconcoach pro 7 software was used for biomechanical analysis of 3 Point Shot in basketball. A Casio Exilim F-1 High Speed Camera, which was positioned at 7.90m from the subject at a height of 1.50m. from the subject on an extension of 3 point line in centre. Camera was also set for capturing 300 fps. The subjects were made to take two Shots only. The angular 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) by siliconcoach pro 7 software. Only one selected frame was analyzed. Selected variables were as under Ankle joint, Knee joint, Hip joint, Shoulder joint, Elbow joint, Wrist joint, Height of release, Angle of release, Velocity of Ball and standing height of players. The data was analyzed by use of Descriptive statistics.

¹ James .G. Hay, “ **The Biomechanics of Sports Techniques**” Practice Hall Englewood Cliffs, New Jersey, p-13

² W.J.D Berry, “**Basketball for Schools**” (London: Pelham Books, 1970), p 15.

RESULTS :

TABLE NO. 1

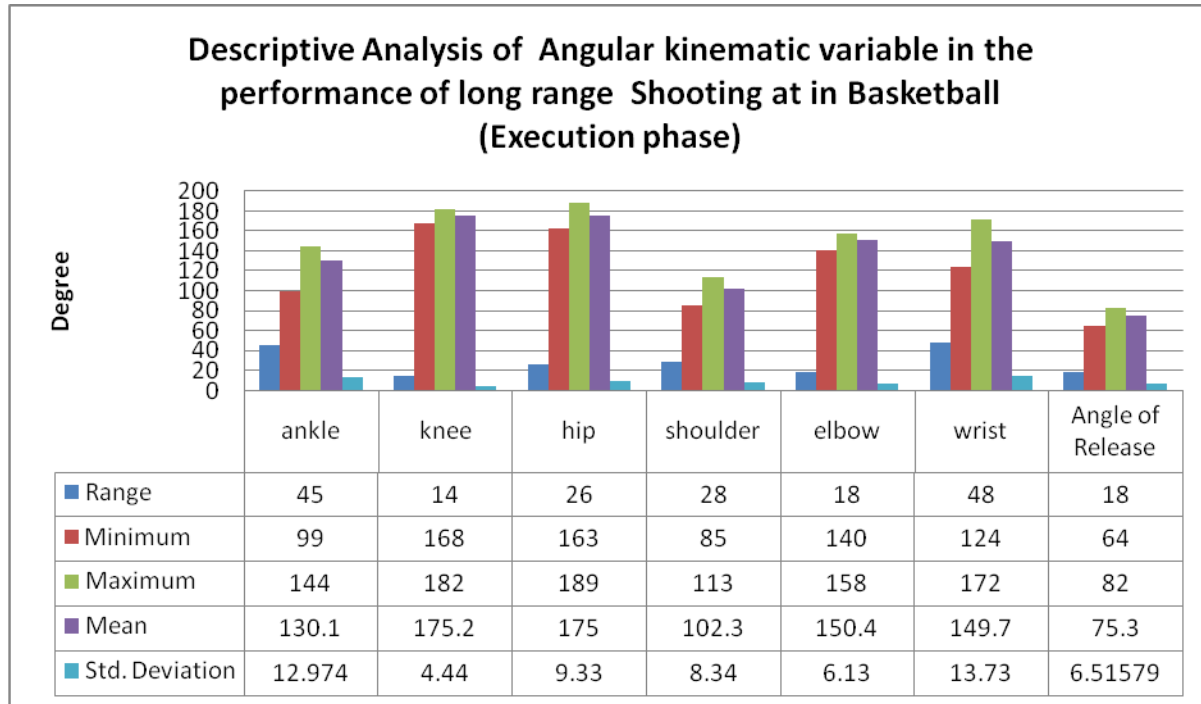


Table-1 reveals the descriptive analysis of 3 point shot in basketball. In this the angle of ankle joint shows value of mean and standard deviation (130.10 ± 12.97) respectively. The maximum value is 144 and minimum value is 99 of ankle joint. The angle of knee joint shows value of mean and standard deviation (175 ± 4.44) respectively. The maximum value is 182 and minimum value is 168 of knee joint. The angle of hip joint shows value of mean and standard deviation (175 ± 9.33) respectively. The maximum value is 189 and minimum value is 163 of hip joint. The angle of shoulder joint shows value of mean and standard deviation (102.30 ± 8.34) respectively. The maximum value is 113 and minimum value is 85 of shoulder joint. The angle

of elbow joint shows value of mean and standard deviation (150.40 ± 6.13) respectively. The maximum value is 158 and minimum value is 140 of elbow joint. The angle of wrist joint shows value of mean and standard deviation (149.70 ± 13.73) respectively. The maximum value is 172 and minimum value is 124 of wrist joint. The angle of ball release shows value of mean and standard deviation (75.30 ± 6.51) respectively. The maximum value is 82 and minimum value is 64 of angle of ball release.

TABLE NO. 2

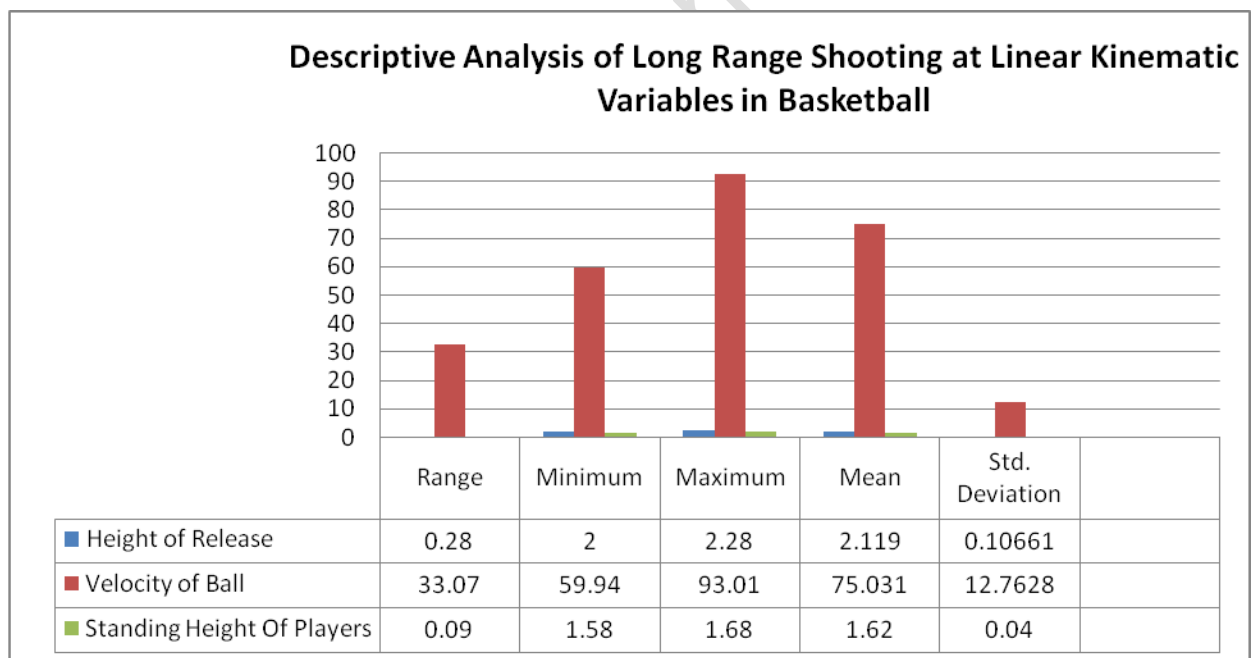


Table-2 reveals the descriptive analysis of 3 point shot in basketball. In this the height of ball release shows value of mean and standard deviation ($2.12 \pm .107$) respectively. The maximum value is 2.28 and minimum value is 2 of height of ball release. The velocity of ball release shows

value of mean and standard deviation (75.03 ± 12.76) respectively. The maximum value is 93.01 and minimum value is 59.94 of velocity of ball release. The standing height of players shows value of mean and standard deviation ($1.62 \pm .04$) respectively. The maximum value is 1.68 and minimum value is 1.58 of standing height of players.

CONCLUSION:

On the basis of the finding of the study it is concluded that :-

At long range shooting subject gained maximum ankle that is 130.10 degree in execution position with knee 175.20, hip 175, shoulder 102.30, elbow 150.40 and wrist 149.70.

At long range shooting subject gained maximum height of ball release is 2.12 mts. at kinematic variable with angle of release is 75.3 degree, velocity 75.03 ms^{-1} and 1.62mt. of standing height of players.

On the basis of above mentioned conclusion is evident that $1.62 \pm .15$ standing height of players, height of ball release is $2.12 \pm .14$ mts. With angle of release 75.3 ± 9 degree and velocity of ball is 75.03 ± 16.5 .

Girls 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

References

Books

John W. Bunn, "Scientific Principles of Coaching" (Englewood Cliff, N.J: Practice Hall Inc, 1989): pp 26

W.J.D Berry, "Basketball for Schools" (London: Pelham Books, 1970), pp 15.

David H. Clarke and H. Harrison Clarke, "Research Process in Physical Education" Second Edition (New Jersey: Prentice Hall, Inc., 1970), pp. 1-2.



Hall Susan J., “Basic Biomechanics”(California state university Northridge California)1995

Hay James G., “The Biomechanics of Sports Techniques” Practice Hall Englewood Cliffs, New Jersey.

Wickstorm Ralph L., “Fundamental Motor Pattern”, 2nd Edition (Philadelphia: Lea & Febiger, 1977).

www.ijems.net