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KINEMATIC COMPARISON OF DIFFERENT HEIGHTED BASKETBALL PLAYERS DURING JUMP SHOT

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ABSTRACT

The purpose of the present study was to compare the selected Kinematic variables between short height and medium height basketball players. Ten (N=10) Basketball player of Basketball academy from NBA Academy Indore are purposively selected, Further they were divided into two different heighted groups of five (N=5), subjects each. All the subject ranged between age 15 to 21 years. Videography method was used to biomechanically analysis the selected moments i.e. execution of Jump shot in Basketball. The selected angular kinematic variables such as shoulder joint, elbow joint and wrist joint were selected for the present study. Kinovea software was used in order to obtain the values of selected angular kinematic from developed stick figure. For the purpose of this study independent 't' test was used. The level of significance was set at 0.05. The result revealed significant difference in Shoulder and Wrist joint but the researcher failed to get the significant result in elbow joint.

Keywords: Kinematic, Basketball, Videography, Shoulder joint, Elbow Joint, Wrist Joint.

INTRODUCTION

Basketball is one of the most popular sports in the world. Participants of all ages have discovered basketball to be to be fun, competitive, educational, recreational, and fitness oriented. Individual skills, such as shooting passing dribbling, and rebounding, along with offensive and defensive teamwork, are prerequisites for successful participation in sport. A jump-shot is a strong, controlled two footed stop that may help an offensive player establish a pivot foot, avoid traveling, or maintain good balance. As you approach the basket, simultaneously stop dribbling and bring both feet forward to a stopping point on the court. While the feet are moving toward the stopping point, position the ball between both hands. When your feet touch the ground they should be parallel to each other, and the body weight should be balanced between both feet. Kinematics is the accurate description of motion and is essential to understanding the biomechanics of human motion. Kinematics can range from anatomical descriptions of joint rotations to precise mathematical measurements of musculoskeletal motions. Kinematics is subdivided according to the kinds of measurements used, either linear or angular. Whatever the form of measurement, biomechanical studies of the kinematics of skilled performers provide valuable information on desirable movement technique. Biomechanics has a long history of kinematic measurements of human. Accurate kinematic measurements are sometimes used for the calculation of more complex, kinetic variables.

Kinematic variables in documenting both linear and angular human motions. The principles of biomechanics that apply kinematics to improving human movement are Optimal Projection and the Coordination Continuum.

METHODOLOGY

Ten (N=10) basketball player from NBA Academy Indore were purposively selected for present study. Further divided into two different height groups of five (N=5) subjects each, the first group was heighted from 155 to 165 cm and the second group was heighted from 166 to 175 cm respectively. The entire subject ranged between the age 15 to 21 years and were right handed basketball shooter. The research scholar familiarized subjects with the testing equipment and procedures and following Angular kinematic variables were represented by the angles at selected joints- Wrist joint (right hand), Elbow joint (right hand), Shoulder joint (right hand). For the purpose of present study, the angles at selected joints were recorded to the nearest degree. Videography method was used to biomechanically analysis the selected moments i.e. execution of jump shot in basketball. Canon EOS 6D mark II camera with the frequency of 60 frames per second was placed on the sagital plane. The height of the video camera was set at 1.4 meters from the ground and the distance between video camera and the subjects performing area was 6.33 meters. Kinovea software was used to measure the angles at different joints. To compare the selected Kinematic variables between short heighted and medium heighted basketball players independent 't' test was used.

RESULTS

TABLE 1
T-TABLE OF THE VARIABLE WITH F VALUE
FOR LEVENE'S TEST

Groups	Means	S. D.	M. D.	SE	t Value	P Value	F Value	P Value
Shoulder angle	112.40 131.60	12.66 7.30	-19.20	6.53	-2.938	0.019	0.316	0.589
Wrist angle	105.40 127.00	10.01 8.63	-21.60	5.91	-3.653	0.006	0.497	0.501
Elbow angle	158.20 154.40	15.64 9.52	3.80	8.19	0.464	0.65	2.78	0.134

*significant at 0.05 level

In the above table mean, Standard deviation and standard error of the mean for the Shoulder angle, Wrist angle, and Elbow Angle on Short Heighted and Medium Heighted Basketball players are shown. The mean angle of Shoulder off medium Heighted is more than the Short heighted, In Wrist Joint the mean Angle of Short heighted players is more than the medium heighted players in same way in case of elbow joint the mean angle of medium heighted players are less than the Short heighted. The mean angle of Medium heighted is more than Short heighted players except the elbow joint however difference is whether significance or not cannot be revealed only through t-value and its Associates p-value. One of the assumption for using two sample test for unrelated groups are that variance of two group must be equal. To test the equality of variance Levine's test was used. In above table F-value for shoulder joint is 0.316>0.05, F- value for wrist joint is 0.497>0.05, F-value for Elbow joint is 2.78>0.05 thus, null hypothesis of equality of variance may be accepted, and it can be concluded that variances of two groups are equal. It can be seen in the above table the value of t-statistics of Shoulder joint-2.93 (Verma, 2013). This t-value is significant as its p value is 0.019 which is less than 0.05 and t-statistics of Wrist joint is 0-3.65. This t-value is significant as its p value is 0.006 which is less than 0.05 and for the t-statistics angle elbow joint is 0.46 This t-value is insignificant as its p value is 0.65 which is more than 0.05 (Verma, 2013) . so the null hypotheses of population is failed to accept wrist and shoulder joint but the null hypothesis is accepted in case of elbow joint it may be conclude that average of Shoulder and wrist angle of short heighted players is less then medium heighted players which may be concluded that Short heighted players are more agile so he can throw the ball from minimum range motion in Shoulder angle. Average of elbow angle of Short heighted player is more than medium heighted players. Short heighted players extend their elbow to get more height.

CONCLUSION

The present study conclude that there is a significant difference in Shoulder and Wrist joint but the researcher failed to get the significant result in elbow joint. The finding of the study suggest that different kind of angle should be taken by different heighted player during execution of shot as basketball playing ability directly depends on height of the players.

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