Relationship of Selected Kinematic Variables with the Performance of Jump Shot Long In Hand Ball

Mr. Dhirendra Singh Chauhan[1], Mr. Arun Singh Rathore[2], Mr. Dharmendra Singh Narwaria[3]

[1]Assistant Professor, St. Joseph College Of Physical Education, Kerala, India

[2]PhD scholar, LNUPE, Gwalior, M.P, India

[3]PhD scholar, LNUPE, Gwalior, M.P, India

Abstract: The purpose of this study was to find out the relationship of selected kinematic variables with the performance of Jump shot long in hand ball. The study was conducted on eight (N=8) male handball players and the age ranged between 17 to 23 year of Lakshmibai National University of Physical Education. The study was delimited to the following selected linear and angular characteristics. A. Linear Kinematic variables were: a) Height of Center of Gravity of Handball players at the moment execution (shot). b) Height of center of gravity of ball at moment execution (shot). B. Angular Kinematic variables were: Ankle joints, Knee Joints, Hip Joints, Shoulder Joints, Elbow Joints, and Wrist Joints. Jump shot long performance as assessed through subjective judgment by panel of three experts out of 45 maximum points and Measuring angle in nearest degree at selected joints at the moment of execution of Jump shot were the criterion measures for the study. The video-graphy was used, as a technique for recording of jump shot in handball. A standard handy camera of Sony Company was used to obtain photo sequences of movement during the jump shot in sagittal plane by a professional videographer. Finally, the moment of execution of jump shot was the prime concern as per the purpose of this study. The Pearson's product moment correlation was used in order to find out the relationship between selected Kinematics variables with the performance of handball players in Jump shot long at the 0.05 level of significance.

Keyword: - Jump Shot Long, Kinematics, Segmentation Method.

———————————— ◆ ————————————

INTRODUCTION

Biomechanics is the study of both the structure and function of biological system using the methods of mechanics. In sports biomechanics, the interest focuses, clearly on the sports performance. However, interest also extends to the behavior inanimate structure that influence performance, such as sports implements, footwear, and surfaces.

The foundation of sports biomechanics, mechanics and anatomy of muscular-skeletal system Mechanics is closely related to calculus that underpin biomechanics is essential (Bartlett, 1997).

Handball is one of the most popular sports in the world - some say second only to soccer! It's played the world over - around 150 nations play the game. At least 15 million people from all walks of life get involved. And with good reason! There's something in it for everyone: it keeps you fit and healthy; it's fast and fun; and it promotes diverse strategies and tactics.

To identify a movement as an economic one, it is very essential to analyze the movement first sometimes it is very difficult for a human to analyze all the movement of various body segments and joint at the same time so, various instrument like still camera, video camera etc are used to analyze various body movements.

The best method to analyze or evaluate is called cinematography. This is a quantitative method which is very accurate at the same time costly and time consuming. The role of cinematography in biomechanical research involve from a simple form of recording motor movement to a sophisticated mean of complex analysis of motor efficiency. Over the years, new technique in filming, timing having been perfected to

aid the research in achieving accurate time measurement of both simple and complex locomotion patterns. (Ewton, 1971)

As we know that for improvement in techniques in any game and sport in techniques should be first mastered. For analyzing the technique, it is very important to know what are the variables of the techniques, which must be given due to attention for it improvement. This study was undertaken to analyze the technique of Jump shot, so that those variables which might have contributed to the effectiveness of the technique could be identified.

METHODOLOGY

Eight male handball players of Lakshmibai National University of Physical Education were purposely selected as subjects for the study. The ages of subjects were between 18 to 23 years. All eight subjects were participated in inter-university tournament. Further linear (center of gravity ball and players) and angular kinematics (angles of various joint: Ankles, Knee, Hip, Shoulder, Elbow, Wrist) at the moment of execution considered as independent variables. For collection data standard procedure were followed by investigator the video-graphy was used, as a technique for recording of jump shot in handball. A standard handy camera of Sony Company (D-100) was used to obtain photo sequences of movement during the jump shot in sagittal plane by a professional videographer. Finally, the moment of execution of jump shot was the prime concern as per the purpose of this study; the video camera was adjusted on a tripod at a height of 1.10 mts from the ground. The video camera was placed perpendicular to the execution line and parallel to horizontal plane at a distance of 12.14 mts from the midpoint of the execution line.

The jump shot long of different subjects were filmed at handball court of Lakshmibai National University of Physical Education, Gwalior. The video-graphy was taken under controlled conditions. The subjects performed the technique (Jump shot long) three times, best one taken for analysis.

The video-graphies as obtained by the use of video camera were analyzed by standard analysis method. Only one moment was analyzed simultaneously, angles were obtained through silicon coach pro -7 motion analysis free software. Three experts were asked to subjectively evaluate (criteria were provided by the investigator to the judges for marking) the movement (total) and award 45 points maximum, median score were taken into considered.

FINDINGS

The scores of each independent variables i.e. angular kinematics and linear kinematics were correlated with the dependent variable i.e. performance of subjects in handball jump shot long.

The relationship of selected linear kinematic variables selected moment with the performance of subjects in jump shot long have been given in table 1.

TABLE 1

RELATIONSHIP OF SELECTED LINEAR KINEMATIC VARIABLES TO THE PERFORMANCE OF JUMP SHOT LONG AT MOMENT OF EXECUTION

S.No	Variables	Coefficient Of Correlation (r)
1	Height Of Centre Of Gravity Of Subjects With The Performance In Jump Shot Long.	0.427
2	Height Of Centre Of Gravity Of The Ball From The Ground With The Performance In Jump Shot Long.	0.084

*significant at $r_{0.05}$ (6) =0.707

Table 2 reveals that the required value of coefficient correlation for 6 degree of freedom to the significant at 0.05 level is 0.707 and the obtained values were less than that, therefore, none of the selected linear

kinematic variables at selected moments have exhibited significant relationship with the performance of subjects in jump shot long.

The relationship of selected angular kinematic variables i.e. angle of selected joints at moment of execution with the performance of subjects in jump shot long have been presented in table 2.

TABLE 2

RELATIONSHIP OF SELECTED ANGULAR KINEMATIC VARIABLES WITH THE PERFORMANCE OF SUBJECTS IN JUMP SHOT LONG

S.No	Variables	Coefficient Of Correlation (r)
1	Ankle joint(left)	0.717*
2	Ankle joint(right)	0.676
3	Knee joint(left)	-0.034
4	Knee joint(right)	0.781*
5	Hip joint(left)	0.567
6	Hip joint(right)	0.462
7	Shoulder joint(left)	0.536
8	Shoulder joint(right)	-0.541
9	Elbow joint(left)	-0.260
10	Elbow joint(right)	-0.373
11	Wrist joint(left)	0.365
12	Wrist joint(right)	-0.227

*significant at $r_{0.05}$ (6) =0.707

Table 2 reveals that obtained significant values of correction (r= 0.717), (r=0.781) were for angle of left ankle and right knee joint to the performance of jump shot long of the subjects. It was greater than the required value of 0.707 at level of significance 0.05. However, the obtained value of coefficient of correlations in other variables were less than the required value of selected level of significance ,therefore, these selected angular kinematic variables at moment execution of jump shot long have shown significant relationship with the performance of jump shot long.

CONCLUSION

Based on the analysis and within the limitations of present study, it was concluded that:

- The greater extension of the left ankle and right knee (take-off leg and rear leg respectively) has positive effect on the performance of handball players in jump shot long.
- The other selected variables such as ankle joint(right) ,knee joint(left), hip joint(left and right),elbow joint(left and right), wrist joint(left and right), shoulder joint(left and right) do not have significant relationship with the performance of handball players in jump shot long.

REFERENCE

- Barrentine,steven w. “kinematic analysis of the wrist and forearm during baseball pitching” *journal of applied biomechanics*, vol. 14.1, (1998).
- Burdett, ray g. “biomechanics of snatch technique of highly skilled weightlifters” *research quartly for exercise and sports* 53:3 (1982):193-197.
- Harter r.a. and b.t. “kinetic and temporal characteristics of judo hip throws”, *biomechanics in sports* 2nd ed. (California:academic publisher,1985).p.150.
- Iderreta,julen. “A study of functional laterality in judo” abstact: 2nd international judo conference (munich, germany, 2001). www.ijf.org/research/post_presentation.
- Kerimov.f. “a kinetic analysis of ura-nage in judo” abstract; 2nd international judo conference (munich, germany, 2001). www.ijf.org/research/post_presentation.

- Kreighbaum,Ellen and barthels k.m. biomechanics: a qualitative approach for studing human movement 2nd edtion,new York; macmillan publishing company,1995.

- Motion analysis of overhand throwing: past, present, and future" shinji sakurai research center of health, physical fitness and sports nagoya university, nagoya, japan.

- Rod crossa "physics of overarm throwing"*university of sydney, sydney, nsw 2006, australia* received 22 april 2003; accepted 24 october 2003.

- Roland van den tillaar and gertjan ettema "a force-velocity relationship and coordination patterns in overarm throwing" journal of sports science and medicine (2004) 3, 211-219

- Rosemary dardine and N.G. martine "spatial ability and throwing accuracy" behavior genetic , vol – 13, 1983.