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**Lakhwinder Singh**

Assistant professor, Department of Physical Education, Punjabi University, Patiala, Punjab, India

**Dr. Gursharan Singh Gill**

Assistant Professor, Department of Physical Education, Khalsa College, Patiala, Punjab, India<sup>2</sup>

## Relationship of biomechanical analysis and performance of handball players

**Lakhwinder Singh and Dr. Gursharan Singh Gill**

### Abstract

The aim of the present research was to investigate the relationships between the biomechanical analysis and performance of Handball players. Total Three Handball players were select as a sample: national level male Handball players were selected as a sample on the basis of performance in preceding competition. The age of all the subjects was ranged above 18 years. The biomechanical variables were Hip flexion (lead leg), Hip extension (lead leg) and Knee flexion (follow leg) at the time of shoot and performance of Handball players. The biomechanical Analysis of Handball players Karl Pearson's product moment coefficient correlation was employed with the help of statistical package of SPSS. The level of significance was set at 0.05. The outcome of the study shows that significant relationship with performance (.59, .61 and .54) of Handball players in all variables.

**Keywords:** Biomechanical, hip flexion and hip extension.

### Introduction

Biomechanics is the study of the structure, function and motion of the mechanical aspects of biological systems, at any level from whole organisms to organs, cells and cell organelles, using the methods of mechanics (Wikipedia). Biomechanics of sports movements, as a science which studies human movements, discovers the laws that mechanically influence sports results. Kinematics, a branch of mechanics, is a science of movements and as such deals with the change of positions, velocity and acceleration in all sorts of movements without taking into consideration the forces affecting them. Accurately quantifiable in terms of space and time, a human body, can be subjected to various diagnostic procedures. At the same time, each human body movement, especially the sports one, has its optimum performance technique primarily characterized by maximum efficiency and minimum energy consumption. Therefore, a constructive change of one or a set of biomechanical parameters can affect the final result (sports success) On the basis of the results obtained by such a method it is possible to decide on the optimal movement structure for a given subject. (Markovic, S., 2016) [3]. Handball is a name that can refer to a long row of different games but this website is as mentioned above dedicated to European handball. European handball is a game where two teams, each comprised of seven players (six outfield players and a goalkeeper), meet on a handball court. The goal of the game is to score by throwing the ball into to the goal of the other team. The handball court is a rectangle divided into two halves. Each half has a goal at the end of it. In front of the goal there is a zone in which only the goalkeeper is allowed to step, but all outfield players are allowed to jump over it as long as they let go of the ball before they hit the ground. The zone stretches 6 meters from the goal and is marked by the 6 meter line. Outside the 6 meter line there is a 9 meter line. The 6 and 9 meter lines play important roles in the game as they form the basis for the formation of the teams. The winning team is whatever team has scored the most goals after 2 x 30 minutes. Handball is quick game with a lot of action. It is not unusual for a game to feature 50-60 goals which means that there is often a goal every minute or every other minute. A very large amount of the offensives results in goals. Handball used to be a very different game that what it is today. (Kumar, P. 2014) [2]

### Statement of the problem

The Problem entitled as "Relationship of biomechanical analysis and performance of Handball

**Correspondence**

**Lakhwinder Singh**

Assistant professor, Department of Physical Education, Punjabi University, Patiala, Punjab, India

players”.

### Method and procedure

Total Three Handball players were select as a sample: National level male Handball players were selected as a sample on the basis of performance in preceding competition. The age of all the subjects was ranged above 18 years.

### Selection of variables

- Hip flexion (lead leg)
- Hip extension (lead leg)
- Knee flexion (follow leg)

### Filming protocol

Motion capture technique was used in this study. To record the video of the handball players, while they performing the jump at the time of shoot digital video camera (50fps) was used by a professional photographer. After obtaining the recorded video, the video was analyzed through quintic coaching v-17 software approved by Human kinetics. First video was digitized through quintic coaching v-17 software. After the procedure of digitizing, the video was calibrated. The calibrated video gives us the results through makers, stroboscopic effect technique, stick figures, stopwatch programming, angle manual etc. with the help of “quintic coaching v-17 software.” Motion capture technique/Digital videography was used to analysis the kinematic variables of male Handball players. Digital video camera CASIO EX-FH 100 (50fps) was used for videography of Handball player’s performance. The performance of the subject was recorded with stroboscopic effect from approach to landing. Digital

Video camera was placed 6meter away at the side of ground of the Handball.

### Administration of the test

Three national level male Handball players were selected as a sample. All the selected subjects were asked to perform the Handball shoot with their full potential and accurate technique. The players were well directed, informed and prepared for the study. Five chances were given to every players. They were asked to perform the handball shoot skill in the natural way as they actually perform. It was ascertained that subjects possess reasonable level of technique. Players were video graphed with systematic filming method as required. Motion capture technique was used in this study. To recorded the video of the Handball players, while they performing the jump at the time of shoot, digital video camera (50fps) was used by a professional photographer. The performance of the subject was recorded with stroboscopic effect from approach to landing. Digital Video camera was placed 6meter away at the perpendicular to the plane of motion.

### Statistical procedure

With regard to purpose of the study Karl Pearson’s product moment coefficient correlation statistical technique was calculated between selected biomechanical variables with performance of male Handball players. In order to check the significance, level of significance was set at 0.05.

### Results

**Table 1:** Relationship between the biomechanical with performance of male Handball players

Variables	Pearson Correlation Coefficient (r)
Hip flexion (lead leg)	.59
Hip extension (lead leg)	.61
Knee flexion (follow leg)	.54

$\Gamma$  0.05 (13) = 0.514 \*Significant at 0.05 level

Table 1 depict the correlation coefficient (r) of the biomechanical parameters and with playing performance of male Handball players. The result of the study show that there was a significant and positive relationship of Hip flexion (lead leg) ( $r=.59$ ), Hip extension (lead leg), ( $r=.61$ ) and Knee flexion (follow leg) ( $r=.54$ ) with the performance of handball players at the time of shoot.

### Conclusions

On the base of above findings of present study, the following conclusions have been drawn.

It is concluded that on the bases of the results we say that, outcome display that significant Correlation of biomechanical variables with relation to their performance viz. Hip flexion (lead leg), Hip extension (lead leg) and Knee flexion (follow leg). Wagner, *et al.* (2011) <sup>[4]</sup> supported the present study.

### References

1. Fabrica GC, Gomez M, Farina RA. Angle and speed in female handball penalty throwing: Effects of fatigue and player position. *International Journal of Performance Analysis in Sport*. 2008; 8(1):56-67.
2. Kumar P. A Comparative Study of Agility among Handball and Basketball Male Player. *International Journal of Science and Research IJSR*. 2014; 3(2):256-257.

3. Markovic S. *Biomechanics of handball*, 2016. [https://www.researchgate.net/publication/317759484\\_Bio\\_mechanics\\_of\\_handball](https://www.researchgate.net/publication/317759484_Bio_mechanics_of_handball)
4. Wagner H, Pfusterschmied J, Duvillard SPV, Muller E. Performance and kinematics of various throwing techniques in team-handball. *Journal of Sports Science and Medicine*. 2011; 10:73-80. Wikipedia: <https://en.wikipedia.org/wiki/Biomechanics>