
2-D Biomechanical Analysis of Spiking Skill in Volleyball

¹Dr. Harpreetsingh

¹Assistant Professor, (University College Chunnikalan, Fatehgarh sahib)

Email: harpreetphyedu@gmail.com

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Abstract

The purpose of the study was to do biomechanical analysis of spiking skill in volleyball, ten Inter-University level male volleyball players were randomly selected from north zone as subjects for the study. The selected biomechanical variables such as the angle of wrist joint at time of spiking, angle of elbow joint at time of spiking, the angle of shoulder joint at time of spiking, The result of the study revealed that there was insignificant relationship between angle of wrist joint, angle of elbow joint, angle of shoulder joint. of counter spiker in volleyball players with performance.

Keywords: *Biomechanics, Analysis, Spiking and Volley.*

Introduction:

The sport of volleyball originated in the United States, and is now just beginning to achieve the type of popularity in the U.S. that it has received on a global basis, where it ranks behind only soccer among participation sports. In 1895, William G. Morgan, an instructor at the Young Men's Christian Association (YMCA) in Holyoke, Mass., decided to blend elements of basketball, baseball, tennis, and handball to create a game for his classes of businessmen which would demand less physical contact than basketball. He created the game of Volleyball (at that time called mintonette). During a demonstration game, someone remarked to Morgan that the players seemed to be volleying the ball back and forth over the net, and perhaps "volleyball" would be a more descriptive name for the sport. Play is started by a player on one side serving the ball over the net into the opponents' field or court. The opponents then, without letting the ball strike the floor, return it, and it is in this way kept going back and forth until one side fails to return the ball or the ball hits the floor. The side serving the ball earns points when the opposite side either fails to return the ball or allows the ball to hit the floor. (Wikipedia; The Free Encyclopedia, 2017) After reaching Japan and Asia through the

YMCA network by 1896, a specially designed ball came in 1900, and over the next 20 years, rules were set into place. The Philippines created the "set" and "spike" in 1916 and six-a-side play was the standard two years later. By 1920, the rules mandating three hits per side and back-row attacks were instituted. France recognized the sport nationally as well. The International Olympic Committee (IOC) made the game a non-Olympic sport in 1949 and the first World Championships for men were held in that same year. The women's first world-level competition came three years later.

Methodology and Procedure:

Ten Inter-University levels, volleyball players were randomly selected from north zone as subjects for the study. The separate data will collected as for all counter spikers. The subjects went through traning for a considerable period. Therefore it was ascertained that subjects possess reasonable level of technique. The subjects were explained about the objective of the study.

The selected variables are as follows:-

- a) The angle of wrist joint at time of spiking
- b) The angle of elbow joint at time of spiking.
- c) The angle of shoulder joint at time of spiking.

Analysis of Data:

To find out the relationship of selected kinematical variable with performance of counter spiker in volleyball players a Karl Pearson product moment coefficient correlation statistical technique test was used with the help of SPSS software. To test the hypothesis the significance level was set at 0.05 percent.

Findings:

For each of the chosen variable, the results pertaining to significant relationship, if any, between selected Volleyball players with performance were assessed and are presented in following tables.

Table No.-4.1: Relationship between Angle of Wrist Joint with Performance of Counter Spiker in Volleyball

Trials	Variables	Mean	Standard deviation	Correlation(r) value
10	Angle of wrist joint	170.37	0.95	-0.775
10	Performance	7.10	1.19	

“r”_{0.05(18)} = 0.468

Table & figure no. 4.1 represents that the mean value of angle of wrist joint of counter spiker in volleyball players was 170.37, whereas the standard deviation (SD) of angle of wrist joint of counter spiker in volleyball players was 0.95 respectively. At the time of calculation of relationship between Angle of wrist joint with performance of counter spiker in volleyball players the r value was -0.775. The data does suggest that there is significant relationship between angles of wrist joint of counter spiker in volleyball players with performance.

Figure 4.1: Mean and Standard Deviation Values of Counter Spiker in Volleyball Players
Angle of Wrist Joint and Performance

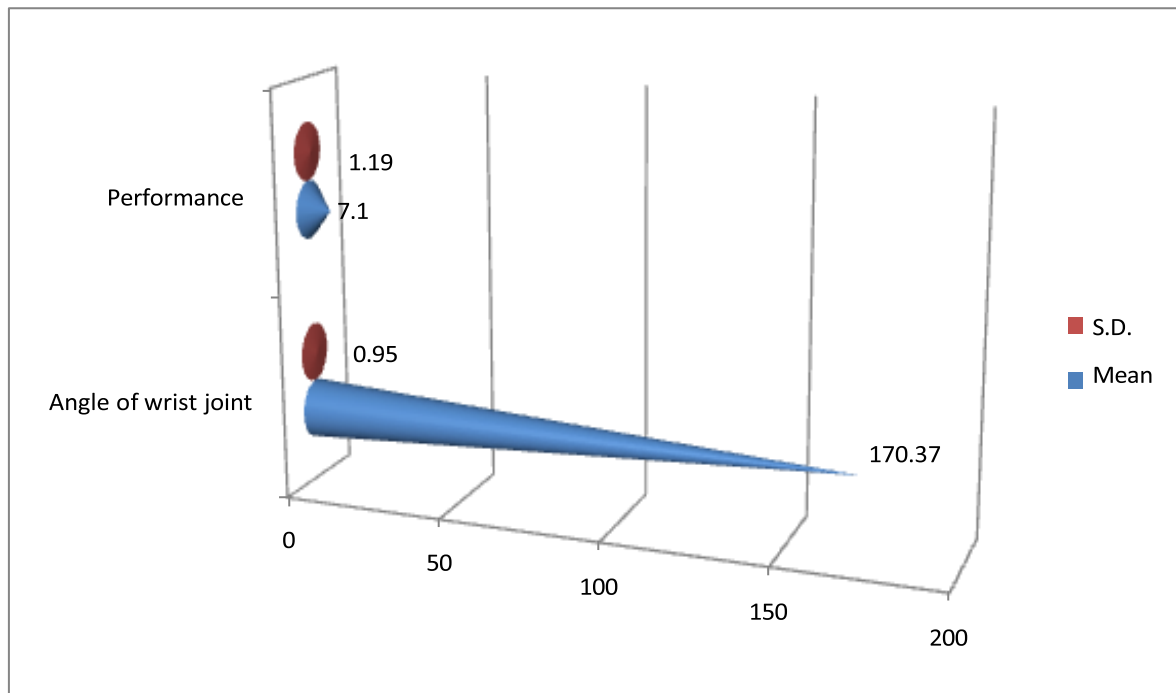


Table No.-4.2: Relationship between Angle of Elbow Joint with Performance of Counter Spiker in Volleyball

Trials	Variables	Mean	Standard deviation	Correlation(r) value
10	Angle of elbow joint	174.46	0.91	-0.850
10	Performance	7.10	1.19	

“r”_{0.05(18)} = 0.468

Table & figure no. 4.2 represents that the mean value of angle of elbow joint of counter spiker in volleyball players was 174.46, whereas the standard deviation (SD) of angle of elbow joint of counter spiker in volleyball players was 0.91 respectively. At the time of calculation of relationship between Angle of elbow joint with performance of counter spiker in volleyball players the r value was -0.850. The data does suggest that there is significant relationship between angles of elbow joint of counter spiker in volleyball players with performance.

Figure 4.2: Mean and Standard Deviation Values of Counter Spiker in Volleyball Players Angle of Elbow Joint and Performance

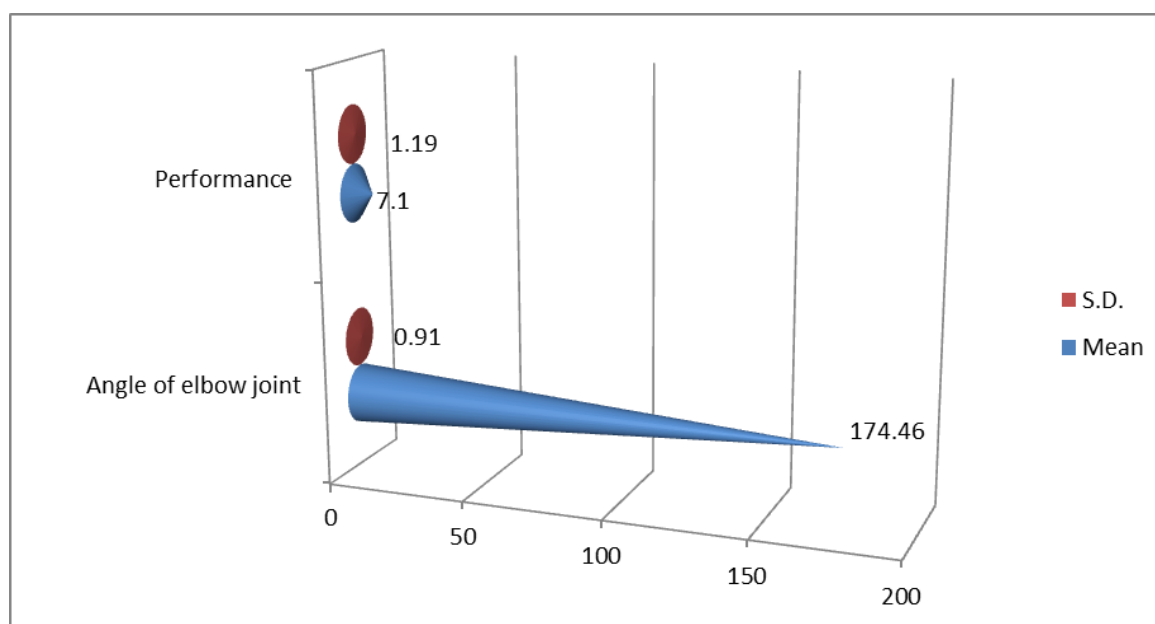


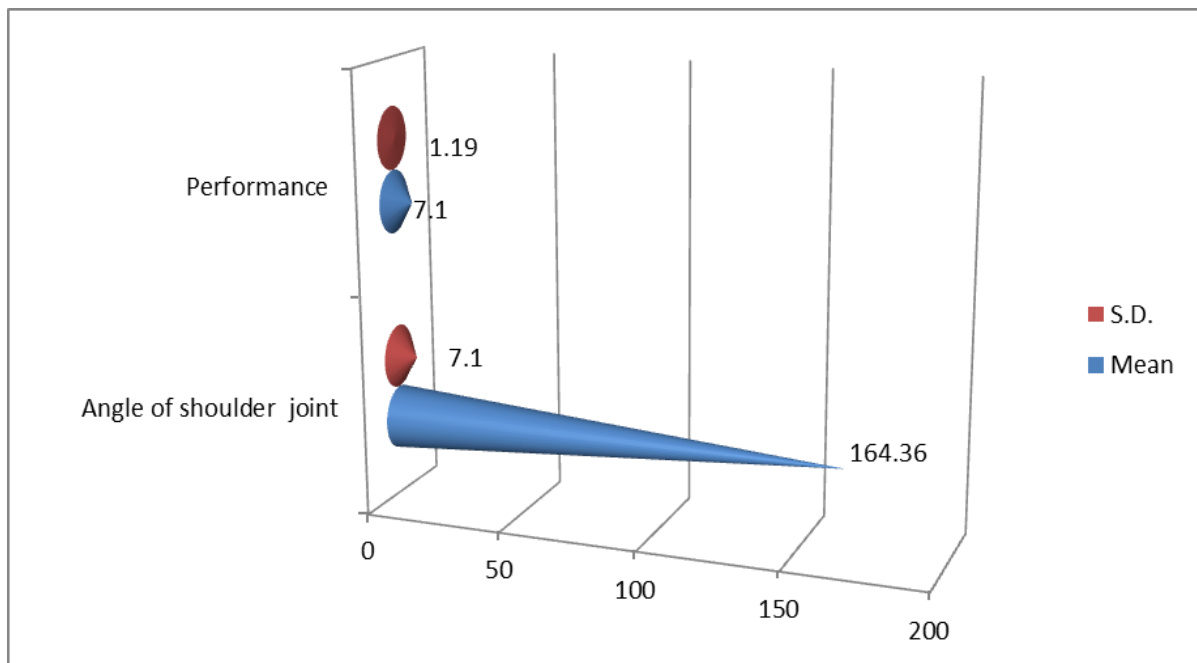
Table No.-4.3: Relationship between Angle of Shoulder Joint with Performance of Counter Spiker in Volleyball

Trials	Variables	Mean	Standard deviation	Correlation(r) value
10	Angle of shoulder joint	164.36	7.10	-0.737
10	Performance	7.10	1.19	

“t”_{0.05(18)} = 0.468

Table & figure no. 4.3 represents that the mean value of angle of shoulder joint of counter spiker in volleyball players was 164.36, whereas the standard deviation (SD) of angle of shoulder joint of counter spiker in volleyball players was 7.10 respectively. At the time of calculation of relationship between Angle of shoulder joint with performance of counter spiker in volleyball players the r value was -0.737. The data does suggest that there is significant relationship between angles of shoulder joint of counter spiker in volleyball players with performance.

Figure 4.3: Mean and Standard Deviation Values of Counter Spiker in Volleyball Players Angle of Shoulder Joint and Performance



Summary:

The selected biomechanical variables such as The angle of wrist joint at time of spiking, angle of elbow joint at time of spiking, The angle of shoulder joint at time of spiking, Total ten attempts were given to each subject and the successful shots marked as score out of ten as criterion measure of performance in the study.

Digital video camera **CASIO EX-FH 100** (50 fps) was used in order to register the technique of counter spiking while attempting the shot. The films were analyzed by using standard motion analyzer. With regard to purpose of the study **Karl Pearson's product moment coefficient correlation** statistical technique was calculated between selected kinematical variables with performance of male counter spiker in volleyball. In order to check the significance, level of significance was set at 0.05.

Conclusion:

The result of the study revealed that there was significant relationship between angle of wrist joint, angle of elbow joint and angle of shoulder joint of counter spiker in volleyball players with their performance.

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