



Relationship of The Selected Biomechanical Variables With The Performance of Volleyball Female Players in Topspin Serve

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ABSTRACT

The purpose of this study was to find out the relationship of the selected angular kinematic biomechanical variables with the performance of volleyball female players in topspin serve. For the purpose of this study ten female volleyball players from the Department of Physical Education University of Allahabad were selected as subjects who had participated in inter university. The subjects were ranging from 18 to 22 years of age. To measure the performance of volleyball players in topspin serve Russell – Lange test of Volleyball serve test were used. The product moment correlation (Pearson) was used in order to find out the relationship between selected angular kinematic variables with the performance of volleyball female player's in topspin serve. The level of significance was set at 0.05. The results of study have shown that only in case of left knee joint and right shoulder joint of subjects had shown a significant relationship with the performance of topspin serve while other selected angular kinematic variables have shown the insignificant relationship with the performance of female subjects in topspin serve.

KEYWORDS

Volleyball, Biomechanical Variables, Angular kinematic variables, Topspin serve, Russell-Lange test

Introduction:

Volleyball is an excellent all-round team sport and has been widely accepted as a highly competitive game. It has not only developed from a slow moving game into a fast one, but has also become a game of high interest and joy to the players and spectators alike. It is interesting to note that the speed of a powerfully spiked ball in the game of volleyball is about 45 meters per second this is much faster than the movement of the ball in most other games. The game offers a wider opportunity for the development of strength, speed, endurance, agility, neuro-muscular skills and co-ordination of all parts of the body by the action involved in the game, such as running, jumping, bending, stretching and other movements. The game situations demand co-ordinate team-work, thereby instilling in every player a sense of personal and group responsibility by his individual performance and his ability to combine with the rest of the team. As a sport, volleyball has immense recreational and carry-over values and thus, it meets all the requirements of an excellent form of physical activity. The increasing development of a scientific approach to the analysis of human movements has been believed by this very problem. At one time the term kinesiology (literally, the science of movement) was used to describe that body of knowledge concerned with the structure and function of the muscular-skeletal system of the human body. Later the study of the mechanical principles applicable to human movement became widely accepted as an integral part of kinesiology. Later still the term was used much more literally to encompass aspects of all the sciences that impinged in any way on human movement. At this point it became clear that kinesiology had quite lost its usefulness to describe specifically that part of the science of movement concerned with either the muscular-skeletal or the mechanical principles applicable to human movement. Several new terms were suggested as substitutes, and anthrop mechanics, anthrop kinetics, bio-dynamics, bio-kinetics and kinanthropology all had their proponents. From all this there ultimately emerged one term that gained wider acceptance than any other-biomechanics. Analysis usually perform a quantitative film or video analysis with computer-linked equipment that enables the calculation of estimates of kinematic quantities of interest for each picture, the tradition procedure for analyzing a film or video picture

involves a process called digitizing. This involves the activation of a hand-held pen, cursor or mouse over subject joint centers or other point of interest, with the X, Y coordinates of each point subsequently stored in a computer data film. Some system enables automated tracking and digitizing of high contrast markers on the film or video by computer software. The service is considered the first attack action in Volleyball games, most types of services can be recognized through the athlete's posture before he hits the ball. Frequently this information is not enough to prepare on adequate reception. Erratic behavior seems to appear along the trajectory hindering the reception. This work focuses on the characterization of the service ball's trajectories the topspin serve has spin. The fairly low risk involved in serving the topspin and its high effectiveness. Have made topspin serves the most popular among the men's and women's teams. To produce a topspin serve, the force of the impact must pass through the ball's center of gravity in the direction of the desired flight.

METHODOLOGY:

Ten female volleyball players from the Department of Physical Education University of Allahabad were selected as subjects who had participated in inter university. The subjects were ranging from 18 to 22 years of age. The selected angular kinematic variables such as angle at ankle joint, knee joint, hip joint, shoulder joint, elbow joint, wrist joint measuring was degree with the help of protector from the stick figures at the time of execution of topspin by the female volleyball players. The criterion measure for this study was the performance of the female subjects on topspin serve as assessed by Russell – Lange test of Volleyball serve. A court with special marking according to Russell – Lange service test of Volleyball was prepared. All female subjects serve topspin ten times in a legal manner in to a target on the court across the net. Let serve are repeated and each topspin serve was scored according to the value of the target area in which the ball landed. A ball landed on a side or the end lie scores the value of the area. The lines are included means if ball dropped on the lines points were given. The subjects were given two trials of ten topspin serves and sum of scores in both the trials best one was considered. More points were scored by the female player's means better the topspin serving ability. Points range was

between 0 to 50. Trials which float serve fault occurred scored zero. The product moment correlation (Pearson) was used in order to find out the relationship between selected Biomechanical variables with the performance of volleyball female player's in topspin serve. The level of significance was set at 0.05.

RESULTS & DISCUSSION:

Table-1

Relationships of selected angular kinematic variables with the performance of female subjects in topspin serve

S. NO	VARIABLES CORRELATED	MEAN DEGRESS	COEFFICIENT OF CORRELATION (r)
1	Left ankle joint and F.S. performance	116.8	0.304
2	Right ankle joint and F.S. performance	114.8	0.645
3	Left knee joint and F.S. performance	178	0.765
4	Right knee joint and F.S. performance	164.8	-0.254
5	Left side hip joint and F.S. performance	167.1	0.408
6	Right side hip joint and F.S. performance	167.8	0.326
7	Left shoulder joint and F.S. performance	20.3	-0.164
8	Right shoulder joint and F.S. performance	171	0.736
9	Left elbow joint and F.S. performance	86.6	-0.152
10	Right elbow joint and F.S. performance	153.6	0.557
11	Left wrist joint and F.S. performance	169	0.108
12	Right wrist joint and F.S. performance	168.2	0.327

*significant, $r_{0.05}(06) = 0.707$

As shown in table-1 the obtained value of correlation ($r=0.707$) for 6 df any angle of left knee joint and right shoulder joint of the subjects was greater than the required value of 0.707 at 0.05 level of significance. however, the obtained value of coefficient of correlation in other variables were less than the required value at selected level of significance, There for, These selected angular kinematic variables at selected moment have shown insignificant relationship with the performance of subjects.

Conclusion:

The analysis of the data revealed that the only two variable i.e. the angle at left knee joint and right shoulder joint of female subjects which happen to be the supporting leg (calf) in the topspin serve this means that while doing topspin serve leg is extended maximally and great stability of leg to increase the performance it happen to all body extension and body reach maximum range and right shoulder joint stretch maximum while performing topspin serve have exhibited significant relationship at the selected level of 0.05.. However, other angular kinematic variables left ankle joint, right ankle joint, left knee joint, left side hip joint, right side hip joint, left shoulder joint, left elbow joint, right elbow joint, left wrist joint, right wrist joint did not show significant relationship.

References:

1. Kansal, Devinder K. "Textbook of applied Measurement Evaluation and Sports Selection" New Delhi: Sports and Spiritual Science Publication, 2008.
2. Clark and Clark "Application of Measurement to Physical Education (Prentice Hall Inc. Englewood Cliffs, New Jersey, U.S.A.1987).
3. Clarke H. David and H.Clarke Harrison, "Research Process in Physical Educa-

- tion" (Englewood Cliffs New Jersey: Prentice Hall Inc. 1984).
4. Hall J. Susan, "Basic Biomechanics" Third Edition International Editions Copyright ©1999 by the Englewood Cliffs N.J. 073639).
5. Hay James G., "The Biomechanics of Sports Techniques" Second Edition © 1978 by Prentice Hall Inc.
6. Kumar Ashok, "DPH Sports Series Volleyball" (Discovery Publishing House New Delhi 1999).
7. Scates Allen E. "Winning Volleyball" (Boston: Allen and Bacon Inc. 1976).
8. Selinger's Arie, "Power volleyball" (St. Martin's Press New York Aric Selinger Laguna: N Nigel California September 1985).