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Relationship of Selected Kinematic Variables with the Speed of Volleyball Players

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Abstract – The purpose of this study was to find out the relationship of selected kinematic variables with the speed of volleyball players. To facilitate the study, 15 volleyball players, who represented the Annamalai University in inter university competition were selected randomly as subjects. They were in the age group of 19 to 23 years. Speed (50 meters run – total time in seconds) was selected as a dependent variable and the kinematic variables such as right foot ground contact time, right foot flight time, right foot to left foot step length, right foot to left foot step length time, left foot to right foot step length, left foot to right foot step length time, step length and step length time were selected as independent variables. The running speed of the subjects was measured through "50 meters run test" and the kinematic variables were measured through video graphical analysis and the measures determined through computer based software "Silicon Coach". To ascertain the degree of relationship Pearson product moment correlation was selected and the level of confidence was fixed at 0.05. The results of the study indicated that there was a statistically insignificant relationship between selected kinematic variables and speed of the volleyball players. Further, the volleyball players are significantly related within the kinematic variables.

Keywords: Volleyball, Speed, Right Foot Ground Contact Time, Right Foot Flight Time, Right Foot to Left Foot Step Length, Right Foot to Left Foot Step Length Time, Left Foot to Right Foot Step Length, Left Foot to Right Foot Step Length Time, Stride Length and Stride Length Time.

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INTRODUCTION

Speed is the determining factor in the explosive sports (e.g. *sprints, jumps and most field sports*), while in the endurance events its role as a determining factor appears to reduce with increased distance. Speed of whole body movement or of individual joint actions, is a decisive factor of successful performance in many sports. Coaches are frequently to praise certain players or an entire team for their quickness (Dick, 1997). Running speed is an essential component of most of the major sports. Often, it is the determining factor in the outcome of a sporting event (Luhtanen, 1978). Volleyball is an exciting and challenging sport that has developed into a premier interscholastic and professional spectator event. Understanding the rules, technical skills, and strategies, of competitive volleyball is an essential for its full appreciation. The game requires the highest levels of speed, agility, power, concentration and teamwork (Dunphy, 2001). Successful competitive volleyball demands the highest levels of individual technical skill and coordinated team play. This game focuses on two challenging aspects, the offensive spike and team defense. The spike is the most difficult and important shot in volleyball and it requires great speed, quickness, flexibility, jumping ability, and timing to be executed properly (Dintiman, ward and George, 1998). Speed plays a vital role in passing, scoring and winning game of volleyball. It was the interest of the investigator to find out the association of selected kinematic variables with speed of volleyball players

METHODOLOGY

The purpose of this study was to find out the relationship of selected kinematic variables with the speed of volleyball players. To facilitate the study, 15 volleyball players, who represented the Annamalai University in inter university competition were selected randomly as subjects. They were in the age group of 19 to 23 years. Speed (50 meters run – total time in seconds) was selected as a dependent variable and the kinematic variables such as right foot ground contact time, right foot flight time, right foot to left foot step length, right foot to left foot step length time, left foot to right foot step length, left foot to right foot step length time, step length and step length time were selected as independent variables. The running speed of the subjects was measured through "50 meters run test" and the kinematic

variables were measured through video graphical analysis and the measures determined through computer based software "Silicon Coach". To ascertain the degree of relationship Pearson product moment correlation was selected and the level of confidence was fixed at 0.05.

RESULTS

Table - I

Inter Correlation Matrix among Speed and Kinematic Variables of the Volleyball Players

	1	2	3	4	5	6	7	8	9
1	1.0000								
2	0.4620	1.0000							
3	0.0350	0.0210	1.0000						
4	-0.2460	0.2380	0.3780	1.0000					
5	0.3170	0.6440*	0.7780*	0.4390	1.0000				
6	-0.2580	-0.0280	-0.0840	0.7820*	-0.0820	1.0000			
7	0.1480	0.4060	0.7590*	0.4010	0.8360*	0.0210	1.0000		
8	-0.2670	0.1030	0.1420	0.9370*	0.1740	0.9500*	0.2130	1.0000	
9	0.2630	0.5760*	0.8020*	0.4420	0.9760*	-0.0440	0.9360*	0.1960	1.0000

** Significant 0.05 level*

(Table value required is 0.514 for 13 degrees of freedom)

Here, 1- speed, 2- right foot ground contact time, 3- right foot flight time, 4- right foot to left foot step length, 5- right foot to left foot step length time, 6- left foot to right foot step length, 7- left foot to right foot step length time, 8- stride length and 9- stride length time.

Table – I revealed that the obtained correlation coefficient values between the kinematic variables and speed of volleyball players. The obtained correlation coefficient of right foot ground contact time, right foot flight time, right foot to left foot step length, right foot to left foot step length time, left foot to right foot step length, left foot to right foot step length time, stride length and stride length time with speed of football players are 0.4620, 0.0350, -0.2460, 0.3170, -0.2580, 0.1480, -0.2670 and 0.2630 respectively. The correlation coefficient between speed and the kinematic variables such as right foot flight time, right foot to left foot step length, left foot to right foot step length and stride length are insignificant at 0.05 level. Because the obtain values (0.4620, 0.0350, -0.2460, 0.3170, -0.2580, 0.1480, -0.2670 and 0.2630) are lesser than the required value of 0.514 for 13 degrees of freedom.

Further, the table - I shows that the correlation coefficients between the kinematic variables are followed: The right foot ground contact time is significantly related with right foot to left foot step length time and stride length time. The right foot flight time is significantly related with right foot to left foot step length time, left foot to right foot step length time and stride length time. The right foot to left foot step length is significantly related with left foot to right foot step length and stride length. The right foot to left foot step length time is significantly related with left foot to right foot step length time and stride length time. The left foot to right foot step length is significantly related with stride length. The left foot to right foot step length time is significantly related with stride length time.

DISCUSSIONS

The results of this study proved that the speed of volleyball players are insignificantly related with kinematic variables. Further, the volleyball players are significantly related within the kinematic variables. Hunter and others (2004) concluded that a wide range of step length and step rate combinations was evident, even for subgroups of athletes with similar sprint velocities. This was partly due to a negative interaction that existed between step length and step rate. Further, they concluded leg length, height of takeoff, and vertical velocity of takeoff are all possible sources of a negative interaction between step length and step rate. Murphy and others (2003) were concluded that those subjects who are relatively fast in early acceleration achieve this through reduced ground contact times resulting in an improved stride frequency.

CONCLUSION

The findings of the study indicated that there was a statistically insignificant relationship between kinematic variables such as right foot ground contact time, right foot flight time, right foot to left foot step length, right foot to left foot step length time, left foot to right foot step length, left foot to right foot step length time, stride length and stride length time and the speed of volleyball players. Further, the volleyball players are significantly related within the kinematic variables.

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