

ASSOCIATION OF SELECTED KINEMATIC VARIABLES WITH SPEED OF BASKETBALL PLAYERS

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ABSTRACT

The aim of this study was to find out the association of selected kinematic variables on speed of the basketball players. The investigator selected 15 basketball players who represented Annamalai University in the inter University competition were randomly selected as subjects. They were in the age group of 19 to 23 years. The results proved that speed of the basketball players were significantly associated with kinematic variables such as right foot to left foot step length time (0.72), left foot to right foot step length (0.86), left foot to right foot step length time (0.65), stride length (0.97) and stride length time (0.93). It was proved that speed of the basketball players were not significantly associated with kinematic variables of right foot ground contact time (0.11), right foot flight time (0.24), right foot to left foot step length (0.40), and angle of lead leg knee joint (0.03). The multiple correlation results showed that the obtained 'R' value is 0.626 and the 'R' square is 0.392. This proved that the selected kinematic variables contributed for speed performance of basketball players only 39%, which is less than the required level fixed for this study. It was proved that the selected kinematic variables do not significantly contribute for speed performance of basketball players. It was concluded that the effect of any specific coaching on speed of basketball players cannot be assessed in relation with the selected kinematic variables to improve the speed performance of the players.

Key Words: speed, kinematics, 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, stride length time and angle of lead leg knee joint.

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). The basketball players are not reached maximum speed. High speed starting and accelerating should receive the major emphasis. A high level of speed and quickness as a player makes repeated short sprints throughout the game (Foran, 2001). The basketball players must be able to run the court efficiently, have a quick first step read and react to game situation, move in any direction at any time, and jump high and quickly, move in any direction at any time, and jump high and quickly in rapid succession. To accomplish this, basketball players need a speed base, strength base and a condition base. The player who is will conditioned will obtain the best results from sport specific functional training (Dintiman, ward and George, 1998). Speed plays a vital role in passing, dribbling, scoring and winning game of basketball. It was the interest of the investigator to find out the association of selected kinematic variables with speed of basketball players.

METHODOLOGY

The purpose of this study was to find out the association of selected kinematic determinants with speed of basketball players. To facilitate the study, 15 basketball 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, step length time and angle of lead leg knee joint 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 arrive meaningful conclusion mean and standard deviation for dependent and independent variables were calculated separately. Simple correlation was computed to analyze the association of each kinematic determinant selected with speed. Multiple correlations were computed to find out the overall association of selected kinematic determinants on speed. In all cases 0.05 level was fixed as significant level.

RESULTS

The simple association between selected kinematic determinants and speed of the basketball

players were analyzed by using correlation coefficient and the results are presented in table-I.

Table- I: Relationship between kinematic determinants and speed of the basketball players.

S.No	Relationship between speed and kinematic determinants	N	Obtained 'r'	Required 'r'
1	Right foot ground contact time (sec)	15	0.11	0.497
2	Right foot flight time (sec)	15	0.24	
3	Right foot to left foot step length (meters)	15	0.40	
4	Right foot to left foot step length time (meters)	15	0.72*	
5	Left foot to right foot step length (meters)	15	0.86*	
6	Left foot to right foot step length time (sec)	15	0.65*	
7	Stride length (meters)	15	0.97*	
8	Stride length timing (sec)	15	0.93*	
9	Angle of lead leg knee joint (degrees)	15	0.03	

* Significant at 0.05 level

The overall relationship between the selected kinematic determinants and the speed of the basketball players was determined by using multiple correlation coefficient and the results are presented in tables-II and III.

Table- II: Multiple correlations between speed performance and selected kinematic determinants of basketball players

Model	R	R square	Adjusted R square	Std. error of the estimate
1	0.626	0.392	-0.217	0.3661

Table- III: ANOVA Results showing significance between regression and residual variables of basketball players

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	0.604	7	0.086	0.644	0.712
Residual	0.938	7	0.134		
Total	1.542	14			

DISCUSSIONS

The results proved that speed of the basketball players were significantly associated with kinematic variables such as right foot to left foot step length time (0.72), left foot to right foot step length (0.86), left foot to right foot step length time (0.65), stride length (0.97) and stride length time (0.93). It was proved that speed of the basketball players were not significantly associated with kinematic variables of right foot ground contact time (0.11), right foot flight time (0.24), right foot to left foot step length (0.40), and angle of lead leg knee joint (0.03). The multiple correlation results showed that the obtained R value is 0.626 and the R square is 0.392. This proved that the selected kinematic variables contributed for speed performance of basketball players only 39%, which is less than the required level fixed for this study. It was proved that the selected kinematic variables do not significantly contribute for speed performance of basketball players. Foran, (2001) recommended that the basketball players are not reached maximum speed. High speed starting and accelerating should receive the major emphasis. A high level of speed and quickness as a player makes repeated short sprints throughout the game. Tilp and others (2008) concluded that because of the compliance of the sand surface, the participants slowed down their movements, especially during the phase of transition from knee flexion to extension and during the extension phase. Furthermore, the

participants demonstrated changes in foot position to reach the greatest height possible. 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 effect of any specific coaching on speed of the basketball players cannot be assessed in relation with the selected kinematic variables to improve the performance of the players.

REFERENCES

- [1] Dick.W.Frank (1997). "Sports Training Principles" Third edition A & C Black, London. pp. 243-245.
- [2] Dintiman, B.George, Ward.D.Robert and Tellez Tom (1998). *Sports Speed*, Second edition, Human Kinetics. pp. 43-44.
- [3] Foran Bill (2001), "High performance Sports conditioning." Human kinetics. Pp. 222.
- [4] Murphy AJ, Lockie RG, Coutts AJ (2003), "Kinematic determinants of early acceleration in field sport athletes." Journal of Sports Science and medicine. 2: 144-150.
- [5] Tilp Markus , Wagner Herbert and Müller Erich (2008)." Differences in 3D kinematics between volleyball and beach volleyball spike movements." Sports Biomechanics 7 (3): 386-399.

