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Videographical Analysis of Short Service in Badminton

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The present empirical research work has been undertaken under UGC, SAP (DRS-I) Programme, running in the Department of Physical Health and Sports Education, Aligarh Muslim University, Aligarh, India.

Abstract

The purpose of this study is to analyze the kinematic variables (shuttle velocity and racket angle) and segmental variables. For the purpose of the study eight male intervarsity badminton players were selected as the subjects. The mean age, height and body weight of the subjects were reported as 18.8 ± 0.9 years, 174.8 ± 3.5 cm & 66.9 ± 4.5 kg respectively. Canon Legria HF S10 Camcorder operating at 60 Hz used to record the movement. The identified clips were analyzed with the help of Silicon Coach Pro7 motion analysis software. The result of study revealed that there is significant difference existed between forehand short service and backhand short service at racket angle and shoulder angle. Whereas there was negative relationship exists between shoulder angle and shuttle velocity.

Keywords: Videographical, badminton, forehand, backhand, short service.

1. Introduction

The service is known as core of badminton sports because the game starts with the service and to some extend determines the control of the game. There is two type of service in practice in competitive badminton i.e. long service and short service. The short service skill conceals the body movement and unobservant shuttle placement as compared to high service. The shuttle travels at a very flat trajectory just over the net and reaches the service box. The short serve is mostly used when the player is under pressure from an opponent. It is a useful skill for both during single and the doubles. Both either forehand or backhand are used to perform the short service. In both the forehand and backhand short service the wrist is kept in firm position. This service provides more opportunities for slicing and without back swing. If it is delivered accurately at the top of the net, the opponent has to play a close net return or lift the shuttle. In both cases, the server gets an advantage either to the drop or smash.

Researchers on the badminton skills and action have been done from variety of perspective examining the upper extremity movement of world class players (Poole, 1970), analysis of strokes (Adrian & Enberg, 1971), analysis of power strokes (Gowitzke & Waddel, 1977), analysis of badminton strokes (Sakurai et al., 1989), studied of overhead power strokes (Gowitzke & Waddell, 1991), comparison of movement times involving wrist and forehand actions (Johnson & Hortung, 1974), analysis of forehand smash (Tang, 1995), analysis of different badminton forehand overhead strokes (Tsai et al, 1997), analysis of badminton forehand strokes (Gowitzke & Waddel, 1991; Tang et al., 1995) analysis of backhand strokes (Kuei-S.H.; Chenfu et al 2002) and also on forehand and backhand strokes (Chien-Lu et al., 2004). However, a few attempts have been made to study on service. Thus the present study was structured to analyze the short service in badminton.

2. Methodology

2.1 Selection of Subject

The subject selected for the present study was eight male Badminton players from North Zone Intervarsity Badminton Tournament held at Aligarh Muslim University, Aligarh in 2010. The mean age, height and body weight of the subjects were reported as 18.8 ± 0.9 years, 174.8 ± 3.5 cm and 66.9 ± 4.5 kg respectively. All subjects in the study were right handed badminton players. They were healthy and don't had any injury reported within the last year.

2.2. Tools and Equipments

One camcorder (Canon Legria HF S10) with tripod, measuring tape, motion analysis software (Silicon Coach Pro7) and computer system etc. were used.

2.3. Procedure for Data Collection

The data is obtained during competition situation. Each video clip of short service started 4 seconds before shuttle contact and terminated as soon as shuttle crossed the net. A Cannon Legria HF S10 Camcorder, operating at 1/2000 shutter speed at 60 Hz, was used to collect the video clips. The camcorder was mounted on the firm tripod at the height of 4 feet fixed at the distance of 8 meters from the service position on frontal axis perpendicular to sagittal plane. After collecting the data, the video clips were downloaded in the personal computer. The coordinated clippings of forehand and backhand short service were digitized with the help of Silicon Coach Pro7 motion analysis software. The biomechanical variables and segmental angle were identified as the shuttle velocity (SV), racket angle (RA), wrist angle (WA), elbow angle (EA), shoulder angle (SA) and ankle angle (AA) for analysis.

2.4. Statistical Analysis

The mean and standard deviation were computed for different variables of both forehand and backhand short serves. The t test was used to determine the difference between the selected variables of forehand and backhand short serves, further the level of significance was set at 0.05 significant. Pearson product moment correlation was used to test the relationship between shuttle velocity (SV) and significant variables of forehand and backhand of short service.

3. Result

The results highlight the differences in movement pattern between the forehand and backhand short services. There were significant differences exist between forehand and backhand short service in relation to shoulder and racket angle at 0.05 level of significance. The shoulder angle of backhand short service has higher mean value than forehand short service. The mean value of racket angle of backhand short service is also higher than forehand short service.

Table 1: Mean, Standard Deviation and calculated t of Kinematic variables of Forehand and Backhand Short Serve.

Variables	Groups	Mean	SD (±)	Mean Difference	Calculated t
WA (°)	FHSS	122.50	8.74	8.0	-0.80
	BHSS	114.50	17.86		
EA (°)	FHSS	130.75	4.65	2.0	-0.18
	BHSS	132.75	22.05		
SA (°)	FHSS	38.75	8.77	59.25	-3.61*
	BHSS	98.00	31.60		
AA (°)	FHSS	12.90	7.53	73.85	2.20
	BHSS	86.75	37.69		
RA (°)	FHSS	11.80	9.97	84.20	2.86*
	BHSS	96.00	11.69		
SV (m/s)	FHSS	10.31	3.47	1.23	-0.40
	BHSS	11.54	5.20		

Abbreviations: FHSS, Forehand Short Serve; BHSS, Backhand Short Serve; WA, Wrist angle; EA, Elbow angle; SA, Shoulder angle; AA, Ankle angle; RA, Racket angle; SV, Shuttle velocity.

On the other side, it was found that there were insignificant differences between forehand and backhand short service in respect to wrist angle, elbow angle, ankle angle and shuttle velocity. The mean difference of racket angle of backhand and forehand short service was very high i.e. 84.20. However, the mean difference of remaining variables- wrist angle, elbow angle, and shuttle velocity of forehand and backhand short service were low. The table also revealed that all variables of backhand short service have more variation than forehand short service.

Table 2: Relationship between shuttle velocity and significant variables of forehand and backhand of Short service.

Variables	N	Calculated r	Tabulated Value
SVF & SA	4	-0.920*	0.707
SVF & RA	4	-0.675	
SVB & SA	4	-0.347	
SVB & RA	4	0.687	

*significant difference level at (0.05)

Abbreviations: SVA, Shuttle Velocity of Forehand; SVB, Shuttle Velocity of Backhand

As shown in Table 2 there was significant (negative) relationship existed between shoulder angle and shuttle velocity of forehand and insignificant correlation between racket angle with shuttle velocity forehand and shuttle velocity and racket angle with shuttle velocity of backhand of short service at 0.05 level of significance.

4. Discussion

The intention of present study was to determine the videographically analyze the short service in respect to wrist, elbow, shoulder, ankle angles and with the kinematics variables i.e. racket angle and shuttle velocity during the execution of forehand and backhand short service in Badminton. The result showed that there was significant difference existed between forehand and backhand short serve in respect to shoulder angle and racket angle. This difference reflects a meaningful improvement in forehand short service and backhand short service through increase and decreases the shoulder and racket angle. The findings this study in a line with previous study of Kuei et al., (2002) who analyze the performance of three backhand overhead strokes smash, clear and drop. The selected kinematics variables were shuttle velocity, flying angle, contact height and racket angle along with various segmental angle and angular velocities. They reported that there was significant difference among the clear and smash stokes in relation to racket angle and shoulder angle. Yates & Holt (1982) in their study reported that the shooters have greater shoulder angle at ball release. In contrast, no significant difference were evident in wrist angle, elbow angle, ankle angle and shuttle velocity variables in both groups. The findings this study also supported with the study of Tsai, et al (1998 & 2001).

The results from the Pearson product moment correlation indicated that there is significant negative correlation between shuttle velocity forehand and shoulder angle. This difference reflects that improvement in shuttle velocity of forehand by decreasing the shoulder angle. This may be due to coordination of scapula and humeral movement, arm elevated in abduction, flexion and rotation of scapula, enables greater range of motion of shoulder angle. In contrast, no significant correlation between racket angle with shuttle velocity forehand and shoulder angle and racket angle with shuttle velocity of backhand.

5. Conclusion

On the basis of result obtained from this empirical study, it may be concluded that there were significant differences existed between forehand and backhand short service in relation to shoulder and racket angle. It is further concluded that decreasing shoulder angle increase the shuttle velocity.

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