A BIOMECHANICAL ANALYSIS OF BADMINTON FOREHAND SERVICE

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ABSTRACT

Biomechanics is the study of the structure and function of the mechanical aspects of biological systems Sports biomechanics is the Quantitative based analysis of human movement. The main purpose of the research was to whether there is any difference in angle of wrist joint and center of gravity during delivering of the Forehand badminton service.For the purpose of the study total (N = 10) subjects were randomly selected from the Badminton match practice group of Lakshmibai national Institute of Physical Education, Gwalior (M.P).Specific tests were employed for the purpose of the study.French short service test was used to measure the short service ability. Poole's long service test was used to measure the long service ability. Scott and fox serve test for flick service test was used to measure flick service ability. Standard badminton court was used along with racket, shuttle, Inch tape, Go pro Hero Camera. Camera was mounted in certain height and placed in a position so that it can capture all the movement. Movement were Captured in sagittal plane. Video were analyzed through Kinovea 0.8.27. Than it was analyzed through SPSS software. For the study researcher used one way ANOVA. Researchers found Insignificance differences in center of gravity and wrist joint.

Keywords: *Badminton, Biomechanics, Short service, Flick Service, Long Service.*

Introduction

Badminton is the one of the fastest games of the world (Brahm, 2010).Badminton is the racket sports played by opponent to hit shuttle over the Net. Short service is played gently over the net to land at the opponent court. The long service is played powerfully upward, so that shuttle Cock travels very long distance which lands at back boundary line of the court. Long serve are frequently use in Singles game. Flick serve also executed in upward but much more lower than the long serve. In games and sports biomechanics plays vital role same way the biomechanics plays main role in badminton to gain success.Biomechanics is the study of the structure and function of the mechanical aspects of biological systems Sports biomechanics is the Quantitative based analysis of human movement. It can simply be described as the physics of sports. Out of many skills forehand services were taken into consideration. The main purpose of the research was to whether there is any difference in angle of wrist joint and center of gravity during delivering of the Forehand badmintonservice. Same kind of studies were carried out by various researchers i.e. Such as A Cinematographic analysis of upper extremity in badminton Strokes (Poole, 1970). Tsai, L. T., Shu, H, K., & Chang, S, S. (2005) Conducted study on "Biomechanical analysis of EMG activity between badminton smash and drop shots" (Tsai, Shu, & Chang, 2000). Ahmed, m & Ghai G, D._(2020) conducted study on "A comparative biomechanical analysis of three different badminton forehand overhead shot(Ahmed & Ghhai, 2020). Researchers hypothesized that there will be significant difference among badminton long service, short service and flick service.

Methods

For the purpose of the study total (N = 10) subjects were randomly selected from the Badminton match practice group of Lakshmibai national Institute of Physical Education, Gwalior (M.P). Players were at least participated in inter university competition. Specific tests were employed for the purpose of the study.French short service test was used to measure the short service ability. Poole's long service test was used to measure the long service ability. Scott and fox serve test for flick service test was used to measure flick service ability.

Materials

Standard badminton court was used along with racket, shuttle, Inch tape, Go pro Hero Camera. Camera was mounted in certain height and placed in a position so that it can capture all the movement. Movement were Captured in

sagittal plane. Video were analyzed through Kinovea 0.8.27. Than it was analyzed through SPSS software. For the study researcher used one way ANOVA. Researchers found Insignificance differences in center of gravity and wrist joint.

Result

Table 1 Descriptive Statistics for center of gravity and wrist joint

		N	Mean	Standard deviation
Center of gravity	Long service	10	94.46	6.50
	Flick service	10	93.88	4.21
	Short service	10	94.14	6.02
Wrist joint	Long service	10	145.50	16.47
	Flick service	10	136.20	19.86
	Short service	10	149.50	20.29

The table 1 gives different descriptive statistics of center of gravity and wrist joint. The mean and standard deviation of long service center of gravity 94.46 ± 6.50. The mean and standard deviation of flick service center of gravity 94.46 ± 6.50. The mean and standard deviation of short service of center gravity 94.14 ± 6.02. The mean and standard deviation of long service of wrist joint is 145.50 ± 16.47. The mean and standard deviation of flick service of wrist joint is 136.20 ± 19.86. The mean and standard deviation of long service of wrist joint is 143.73 ± 19.14.
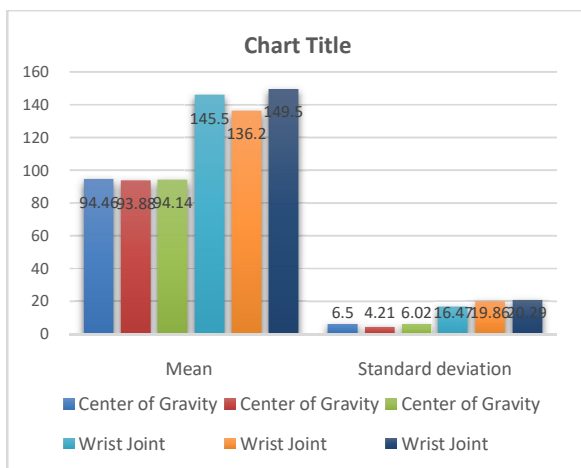

Figure 1 Mean Score of Badminton Forehand Serve

Table 2 ANOVA table of Center of gravity and wrist joint

		Sum of Squares	df	Mean Square	F	Sig.
Center of Gravity	Between Groups	1.70	2	.85	.027	0.97
	Within Groups	867.52	27	32.13		
	Total	869.23	29			
Wrist Joint	Between Groups	931.26	2	465.63	1.29	0.29
	Within Groups	9700.60	27	359.21		
	Total	10631.86	29			

The F-value in table 2 for center of gravity is not significant as its p-value is 0.97 which is more than 0.05.Thus the null hypothesis of no difference among the three skills, i.e. long service, flick service, short service may not be rejected at 0.05 level (Verma, 2019).

The F-value in table 2 for center of wrist joint is not significant as its p-value is 0.28 which is more than 0.05.Thus the null hypothesis of no difference among the three skills, i.e. long service, flick service, short service may not be rejected at 0.05 level (Verma J. , 2011).

Discussions and finding

Whereas one way ANOVA test was conducted research could not find any significance difference among Badminton forehand long service, flick service and short service. The p value of wrist joint was 0.29 which was greater than 0.05 that is why no further conclusion can be drawn. Same way in the variable wrist joint the result was found to be insignificance at the p value 0.29 was more than 0.05 where the researcher failed to reject the null hypothesis hence no further conclusion can be drawn among forehand long service, flick service, and short service. The reason of insignificance of the data may be due to technique of all the three service is more or less same study was carried out by Ahshan, M.(2018) where the researcher investigated on "An angular kinematic analysis of soccer instep and inside kick at impact phase of university soccer players" (Ahsan, 2018).he found that hip joint showed significant difference with ankle and knee joint angle whereas he failed to get significance difference between knee joint and

ankle joint at instep kick. It is recommended that to get better result one need high frequency camera where every steps of movement can be captured and it is also recommended that to use three dimensional analysis to get accurate results and findings.

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