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COMPARATIVE STUDY ON SELECTED KINEMATIC ARAMETERS OF IFFERENT TYPES OF FLOAT SERVES IN VOLLEYBALL

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Standing Float Serve, Walking Float Serve

ABSTRACT

The present research work compared the selected kinematic variables of two different types of float serve in volleyball. To accomplish the purpose of the study 11 national level senior female volleyball players, having a minimum training experience of 8 years were selected as subjects. The serve trials of selected subjects were recorded using high definition cameras and analysed using Kinovea Motion analysis software. The data of Height of CG at ball contact, ball contact angle at shoulder, ball contact angle at elbow, ball contact angle at wrist and velocity of the serve were measured for float serve executed in two different styles, namely standing float serve and walking float serve. The selected variables were compared using dependent t test on different types float serve and the results revealed that there is significant difference in height of CG at ball contact ($t = 5.84$, $p < 0.05$) and ball contact angle at wrist ($t = 8.07$, $p < 0.05$) between two different types of float serve among national senior female volleyball players.

The technical and tactical developments in volleyball game have its chronological progression throughout the years and also this is being considered as one of the major reason to which the standard of the game is modified to the present status. Definitely volleyball is a power game, but at the same time the techniques used in volleyball and the related tactical implications will make account of the success of a team. In volleyball serve is being considered as important factor in determining the chances of winning a rally for a team as an effective serve can side line a strong attack form the opponents so far a

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serving team is concerned. This is the reason why modern volleyball demands effect serve strategies which focus on the techniques used and how perfectly it is being executed related to game situations. In comparison with the jump serve- the most powerful serve used now a days- float serve make its peculiarity though its trajectory after hit. Even though it is not powerful as jump serve, the difficulty in predict the path of the serve makes it difficult for the receiving team, and there by creates chance of a poor return by the opponents. The technique float serve requires lots of mechanical elements while its execution, especially during making the impact with ball. The recent trend shows the use float serve as important type of serve and being used in various forms. The players execute a float serve at a standstill position, execute it along with walking through the ground, and also execute with walk in combination with a jump. These are technically terms as standing float serve, walking float serve and jump float serve respectively. All the three types requires its mechanical perfection, irrespective of the difference in execution. There are a number of mechanical factors that can affect a successful and effective float serve. There for the researchers made an attempt to compare two different types of float serve – standing float serve and walking float serve - in relation to selected kinematic parameters that are important during the execution phase of the techniques.

METHODOLOGY

11 national level female volleyball players, with a minimum training experience of 8 years were randomly selected as the subjects for the study. The selected female volleyball players either represented Kerala state in senior level national championship or represented the senior Indian women national volleyball team at international level tournament. The age of the subjects ranged between 21 to 27 years. The objective was to conduct a video analysis of standing and walking float serve using video recorded performance and Kinovea motion analysis software. Video was captured in two dimensional set up, covering a frame with of 11 meters. Two cameras were positioned in the sagital plane of motion ensuring the complete capture of the movement of the players as well as the ball from the service zone to the net. The cameras (Sony A7 S2, 120 fps) were placed at a height of 1.50 meters and the calibrating measurements were used in the video recording. The subjects were oriented to perform at their best as in a game situation. The trials were recorded after a general and specific warm up session. Each subject was given five attempts for both type of serve and the serve with maximal velocity in each category for a player was selected for obtaining data. With the help of calibrating measurements and time frame available in the software, the data were obtained for height of CG at ball contact, ball contact angle at shoulder, ball contact angle at elbow, ball contact angle at wrist and velocity of the serve. The data were analysed using descriptive statistics and paired t test was calculated to find the significant difference in selected biomechanical parameters in relation to type of float serve. The level of significance was set 0.05.

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RESULTS OF THE STUDY

Table 1

Descriptive statistics on selected kinematic variables in different types of float serves

Variable	Type of Serve	N	Mean	Std. Deviation	Std. Error Mean
Height of CG at Ball Contact (m)	Standing Float Serve	11.00	1.08	0.08	0.02
	Walking Float Serve	11.00	1.22	0.08	0.02
Ball Contact Angle at Shoulder (Degree)	Standing Float Serve	11.00	166.64	8.24	2.48
	Walking Float Serve	11.00	170.36	5.78	1.74
Ball Contact Angle at Elbow (Degree)	Standing Float Serve	11.00	131.27	10.66	3.21
	Walking Float Serve	11.00	137.00	6.88	2.08
Ball Contact Angle at Wrist (Degree)	Standing Float Serve	11.00	166.27	4.47	1.35
	Walking Float Serve	11.00	177.18	4.47	1.35
Velocity of the Serve (m/s)	Standing Float Serve	11.00	17.02	0.78	0.24
	Walking Float Serve	11.00	17.34	1.11	0.33

The height of the centre of gravity at the time of ball contact was found more in walking float serve in comparison with standing float serve. In the case of angle at shoulder, elbow and wrist at the time of hit, the angles were found comparatively higher in walking float serve than standing float serve. The velocity of walking float serve was found higher than that of standing float serve.

Table 2

Paired Sample t Test between type of serve

Variable	Paired Differences					t	df	Sig. (2-tailed)
	Mean	S.D	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Height of CG at Ball Contact	-.14	.08	.02	-.20	-.09	-5.84	10	.000
Ball Contact Angle at Shoulder	-3.73	11.11	3.35	-11.19	3.74	-1.11	10	.292
Ball Contact Angle at Elbow	-5.73	8.95	2.70	-11.74	.28	-2.12	10	.060
Ball Contact Angle at Wrist	-10.91	4.48	1.35	-13.92	-7.90	-8.07	10	.000
Velocity of the Serve	-.31	1.27	.38	-1.17	.54	-.82	10	.431

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Table 2 revealed that the height of CG at ball contact ($t = 5.84$, $p < 0.05$) and ball contact angle at wrist differ significantly ($t = 8.07$, $p < 0.05$) between the standing and walking float serves of national level senior women volleyball player. There was no significant difference in all other variables such as ball contact angle at shoulder, ball contact angle at elbow and velocity of the serve ($p > 0.05$).

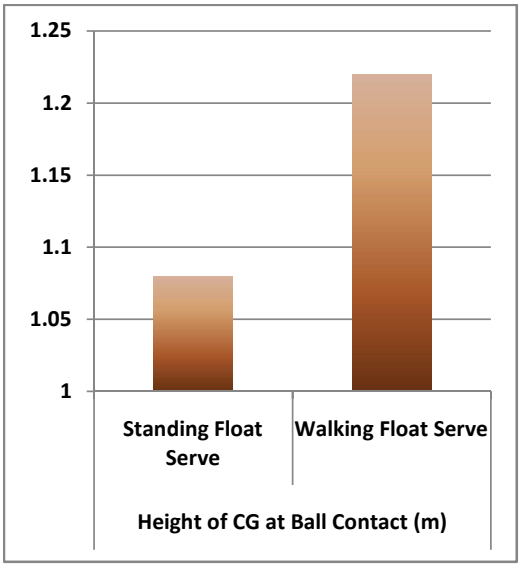

Figure 1. Mean Height of CG at Ball Contact.

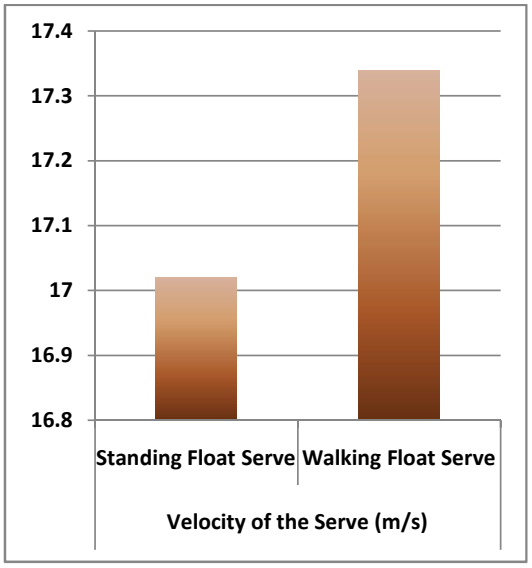

Figure 2. Mean Velocity of the serve

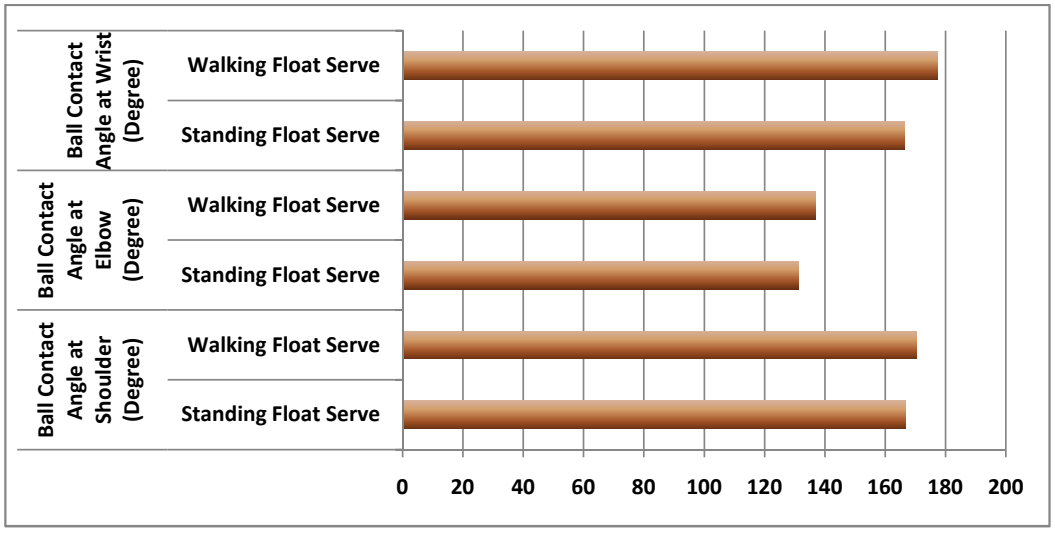

Figure 3. Mean Ball Contact angle at Shoulder, Elbow and Wrist.

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CONCLUSIONS

1. The height of CG at ball contact, ball contact angle at shoulder, elbow and wrist and the velocity of the serve were found higher in walking float serve.

2. There was significant difference in the height of CG at ball contact and ball contact angle at wrist between the standing float serve and walking float serve among national level senior women handball players.

3. There was no significant difference in ball contact angle at shoulder, ball contact angle at elbow and velocity of the serve between the standing float serve and walking float serve among national level senior women handball players.

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