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Comparison of landing technique between male and female volleyball players

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Abstract

The present investigation was to find out the “comparison of landing technique between male and female volleyball players” with the help Biomechanical analysis of technical aspect of landing movement. The study was delimited to the volleyball players (5 female and 5 male) of L.N.I.P.E, Gwalior who are further delimited to Angle at different joints (right side view) Hip joint, Knee joint, Ankle joint, and Center of gravity. To determine the various angles of joints of the lower extremities and center of gravity of both the genders, Independent t-tests was employed and the significance was set at 0.05. Findings of the present study showed that there was no significant difference found among male and female in terms of centre of gravity, Thus this can be attributed to the fact that research scholar only confined to the relationship of height of centre of gravity at the moment of landing and another cause can be insufficient sample size and Other Findings of the present study showed that there were significant differences found among male and female in terms of angles of lower extremity specially at hip joint right, hip joint left, knee joint right, knee joint left and ankle joint right it maybe because of strength of the muscles of the lower extremities in male is more in comparison to the female subjects. On the other side in female, why these sub-factors are significant that dimension of the study lacks critical literature and need to be focus on future researches.

Keywords: Landing technique, volleyball, biomechanical analysis

Introduction

Volleyball is one of the truly global sports, played in sports halls and arenas (219 national federations are affiliated to the FIVB) and in parks, open spaces, and on beaches throughout the world. Since the average number of jumps performed during a five-set volleyball match by players is *96 (Fontani, Ciccarone, & Giulianini, 2000), and even more jumps are executed during practice sessions, it is unsurprising that a high percentage (63%) of injuries are due to jumping and landing (Gerberich, Luhman, Finke, Priest, & Beard, 1987). Watkins and Green (1992) reported that 15% of injuries occurred in the landing phase, while Cassel (2001) noted that 60% of acute injuries happened when landing after a block or attack with or without contact with another player. It was also reported that approximately 65% of knee injuries in American players were linked to inflammatory or overuse phenomena (Rice & Anderson, 1994; Schafle 1993). Other epidemiological studies have reported prevalences of patellar tendinopathies of 40–50% in high-level volleyball players (Ferretti, 1986; Ferretti, Ippolito, Mariani, & Puddu, 1983; Ferretti, Papandrea, & Conteduca 1990). Ferretti and colleagues (Ferretti, Papandrea, Conteduca, & Mariani, 1992) undertook an epidemiological study of knee injuries in a large sample of Italian volleyball players, and reported that the most severe and common knee problems requiring surgery were anterior cruciate ligament (ACL) injuries, with a higher prevalence in female players and in non-contact episodes as confirmed by Hewett *et al.* (2005).

Jumping and landing movements are fundamental features of many sporting activities and have received considerable research attention. Previous research on landing has concentrated on the implications of the impact and the resulting loads placed on the body as well as the injury potential of various landing situations. For example, Kovacs and colleagues, (1997) indicated that the landing technique used by the individual (forefoot vs. heel-toe landing) has significant implications regarding the forces transmitted to the body and the body's ability to dissipate these forces.

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Statement of the problem: Comparison of landing technique between male and female volleyball players.

Materials and Methods

Participants were 10 players (5-female and 5-male) LNIPE, Gwalior. Participants were at least All India University participated.

Design

A total of two groups were conducted with five participants per group and efforts made to ensure homogeneity in age and gender within groups.

5 male and 5 female subjects participated in the study. Subjects attempted landing technique (final position) after a spike jump. Successful attempts of the landing were compared among the two genders for the purpose of analysis.

The landing techniques of the players were recorded on the basis of execution of skill. Execution of skill was evaluated through subjective judgment by experts on the basis of observing the performance. The subjects landing techniques were recorded through film protocol (videography) and analysis were described. The angles at selected joints were recorded to the nearest degree. The center of gravity was measured nearest to the 1/10th of the centimeter. The video graphs were taken by a professional photographer. Videography was employed for the kinematic analysis of landing technique. CANON-70D with the frequency of 30 frames per second was placed on the sagittal plane (right side). The distance of the camera from the subject was 3.65 meters away and the height of the lens was 0.95 meters from the ground.



Fig 1



Fig 2

Procedure for location of center of gravity

After video recording, the CD was played with the help of computer and final position of each selected phase were obtain on the screen by trial and error method and kept in pause. Further the stick figures of each moment i.e. placement of feet and execution, were converted into photographs & recorded on transparency by the joint point method for all selected subjects. The center of gravity each body segment and the whole body was determined by segmentation method

as suggested by James G. Hay. The angle of various joints was measured by kinovea software from photograph.

Segmentation method

Probably the most versatile method for finding the center of gravity of human body is the segmentation method in this method the location of center of gravity of human body to the determined frame of a motion picture film from a photograph or as is more frequently the case.

Table 1: Descriptive statistics of C.G. and the angle of joints of the lower extremity

Variable Grp		N	Mean	Std. Deviation
center of gravity	male volleyballer	5	63.21	7.18
	female volleyballer	5	68.48	6.93
hip joint right	male volleyballer	5	100.80	25.95
	female volleyballer	5	137.00	23.03
hip joint left	male volleyballer	5	88.80	19.11
	female volleyballer	5	138.20	25.52
knee joint right	male volleyballer	5	103.60	12.75
	female volleyballer	5	113.20	6.57
knee joint left	male volleyballer	5	100.40	1050.
	female volleyballer	5	126.20	9.03
ankle joint right	male volleyballer	5	88.40	9.55
	female volleyballer	5	111.80	12.39
ankle joint left	male volleyballer	5	104.20	10.42
	female volleyballer	5	107.40	5.27

- **Graphical representation of mean values among male and female volleyball players and comparison of Centre of Gravity.**

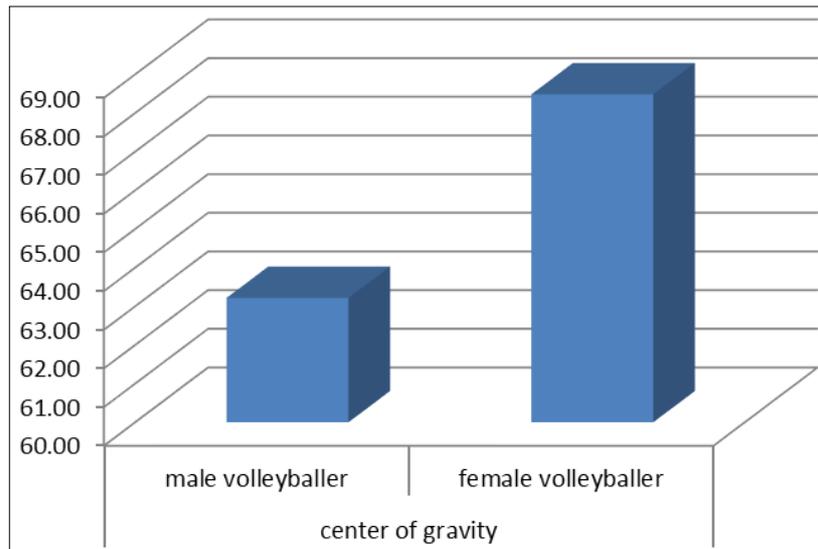


Fig 3:

- **Graphical representation of mean values among male and female in terms of hip joints left and right.**

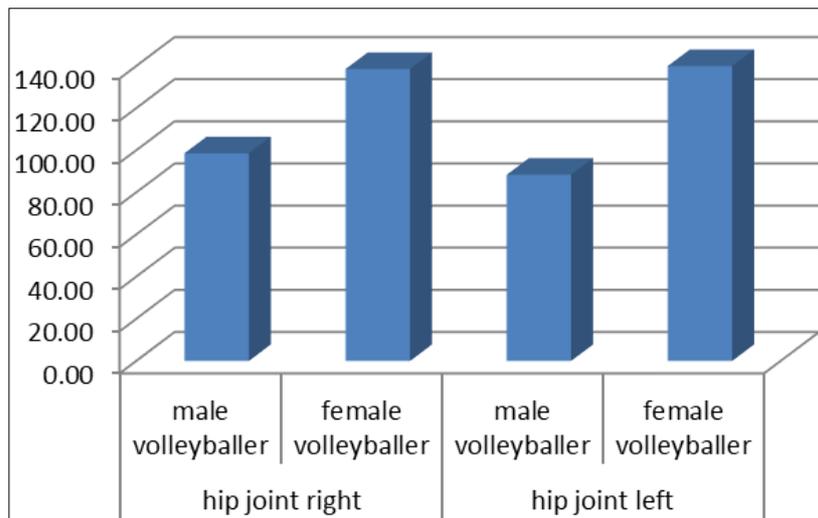


Fig 4: Graphical representation of hip joints among male and female.

- **Graphical representation of mean values among male and female in terms of Knee joints left and right.**

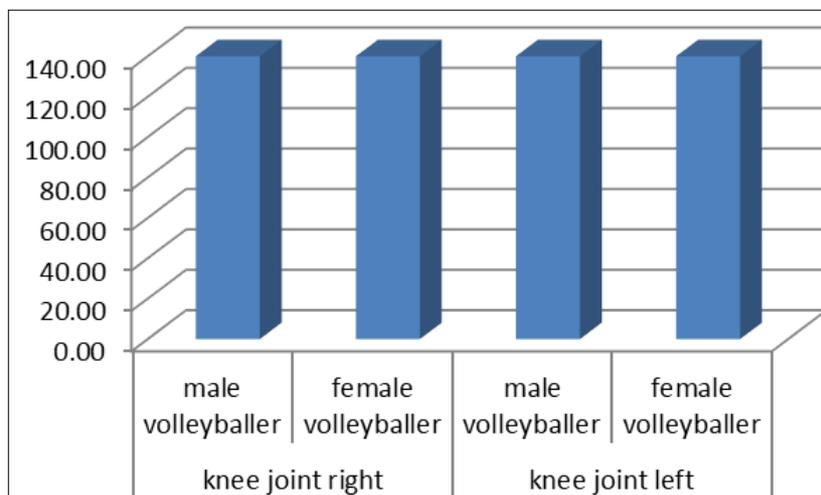


Fig 5: graphical representation of Knee joints among male and female.

• Graphical representation of mean values among male and female in terms of Ankle joints left and right.

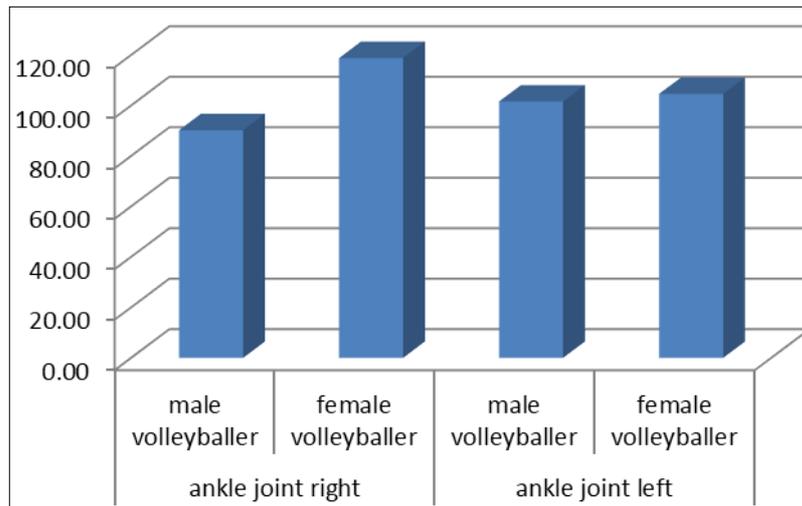


Fig 6: Graphical representation of ankle joints among and female.

Table 2: Independent t-test on C.G. and angle of joints among male and female

		t-test for Equality of Means				
		T	DF	Sig. (2-tailed)	Mean Difference	Std. Error Difference
center of gravity	Eqi varis. Asumd.	-1.17	8.00	.272	-5.26	4.46
	EqI varis. not asumd	-1.17	7.99	.272	-5.26	4.46
hip joint right	Eqi varis. Asumd.	-2.33	8.00	.048	-36.20	15.51
	EqI varis. not asumd.	-2.33	7.88	.048	-36.20	15.51
hip joint left	Eqi varis. Asumd.	-3.46	8.00	.009	-49.40	14.26
	EqI varis. not asumd.	-3.46	7.41	.010	-49.40	14.26
knee joint right	Eqi varis. Asumd.	-1.49	8.00	.173	-9.60	6.41
	EqI varis. not asumd.	-1.49	5.98	.186	-9.60	6.41
knee joint left	Eqi varis. Asumd.	-4.16	8.00	.003	-25.80	6.19
	EqI varis. not asumd	-4.16	7.82	.003	-25.80	6.19
ankle joint right	Eqi varis. Asumd.	-3.34	8.00	.010	-23.40	7.00
	EqI varis. not asumd	-3.34	7.51	.011	-23.40	7.00
ankle joint left	Eqi varis. Asumd.	-.61	8.00	.557	-3.20	5.22
	EqI varis. not asumd.	-.61	5.92	.563	-3.20	5.22

Discussion and Findings

Findings of the present study showed that there was no significant difference found among male and female in terms of center of gravity because in the study the research scholar was only confined to the relationship of height of center of gravity at the moment of landing of the subjects but significant relationship may be obtained by studying the path or displacement of center of gravity at selected moments. A significant result may also be obtained by increasing the sample size or by using the sophisticated equipment's.

Other Findings of the present study also showed that there were significant differences found among male and female in terms of angles of lower extremity specially at hip joint right, hip joint left, knee joint right, knee joint left and ankle joint right it maybe because of strength of the muscles of the lower extremities in male is more in comparison to the female subjects.

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