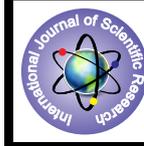


## "Comparison of Selected Kinematic Variables of Jump Spike Serve Between National and University Volleyball Players"



### Physical Education

**KEYWORDS :** Jump Spikes Serve, Linear kinematics, Angular kinematics

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### ABSTRACT

*The purpose of this study was to compare the selected kinematic variables of Jump Spike Service between National and University level volleyball players. Ten (5 from each group) male volleyball players who represented National and University were selected as the subject from LNUPE, Gwalior. The age of the subjects was ranged from 19 to 25 and all subjects were right-handed volleyball players. The players were filmed from their right side and for that purpose the Digital photography (Nikon D-100) was employed in the sagittal plane to register the technique of Jump Spike Service at moment execution. The selected linear and angular kinematic variables were height of center of gravity of player and ankle joint, knee joint, hip joint, shoulder joint, elbow joint and wrist joint. By joint point method, stick figures were prepared from the photographs to measure the angles and by segmentation method the center of gravity of players were calculated at selected moments. For statistical analysis of the data t-test was employed. The finding of the study revealed the no significant difference between National and University level male Volleyball players in the Jump Spike Service.*

### INTRODUCTION

Biomechanics is an applied form of mechanics and consequently the methods used to investigate it must be derived from those of mechanics. However, bio-mechanics have not developed in the wake of mechanics, but as a bordering science in other scientific disciplines such as anatomy, physiology and the technique of sports. The role that sports biomechanics widely understood in the sports community and the demand for service increasing, researchers in sports biomechanics will have to consider carefully how much time they can devote to the provision of scientific services without impairing their performance as scholar researchers. To avoid the problems inherent in this situation, it may be necessary to develop program of study for the training of technicians in sports biomechanics; technicians who can provide the kind of services sought by sporting bodies. The center of gravity in the human body is located in the middle of the trunk and at about hip level when standing in the normal erects position, with the arm hanging at the side. Any movement of the body part will alter or shift the center of gravity in the direction of movement. For example, if the arms are lifted above the head while in the normal standing position, the center of gravity will be raised upwards. This change in position of the center of gravity with movement of a body part is instantaneous. External weight added to the body will increase the total body weight and effect the location of the center of gravity of the body and the added weight. The role of biomechanics in attaining high performance cannot be over looked. There are basically two methods by which motor skills can be analyzed. They are the qualitative and quantitative methods, high speed movie film, for exactness has been used intensively to examine in great details of the movements of the body which occurs too fast for the human eye to detect. In many of the elite sport training and research institute around the world, force applied during high caliber sporting events, while the analysis tests have done much to improve our understanding of movement and the performance of elite athletes, the analysis tasks faced by the coach are predominantly qualitative in nature.

The purpose of the study was to compare the selected kinematic variables of Jump Spike Service between National and University level volleyball players. The study was delimited to National and University level Volleyball players and further delimited to selected kinematic variables.

On the basis of available literature and the scholars own understanding of the problem it was hypothesized that there would be significance difference on selected kinematic variables of Jump Spike Service between National and University level Volleyball players.

### METHODOLOGY

The principal aim at finding the differences in selected Kinematic variables was to gain information of Jump Spike Serve between National and University volleyball players. Ten male Volleyball

players who have participated National and University Volleyball Competition were selected as a subjects for the study. The age of subjects was between 19 to 25 years. The subjects were good players and have been practicing the technique for quite a considerable time. The subjects were explained about the filming procedure. All the measurements pertaining to the biomechanical variables were taken by the research scholar under the expert guidance so the data collected for the present study were considered reliable. For Biomechanical analysis of Jump Spike Serve in Volleyball, the digital photography was used. A standard motor driven camera, i.e. Nikon D-100 was used to obtain sequential photo of selected movements during the Jump Spike Serve and moment execution in sagittal plane was recorded by a professional photographer. The camera was mounted on a tripod at a height of 1.39 mts from the ground and the camera was placed perpendicular to the initial line and parallel to horizontal plane at a distance of 8.25 mts from the midpoint of initial line. An object of known dimension was filmed before the trails of the subjects. The Jump Spike Serve of different subjects was filmed at volleyball Court of Lakshmbai National University of Physical Education, Gwalior. Three trails were given to each subject to perform the skill and the best trail was used for analysis purpose. Only one moment execution was analyzed. The scholar developed stick figure on the photographs, from which selected angular kinematic variables were calculated by using joint point method and the center of gravity of each subjects at selected moment i.e. execution was determine by using segmentation method. The selected kinematic variables were obtained by the help of protector from the stick figures. In order to determine the significance of difference on selected kinematic variables of Jump Spike Service between National and University level volleyball players, the t-test was employed, the level of the significance was set to 0.05.

### RESULTS

**Table 1**  
**SIGNIFICANCE OF DIFFERENCE AMONG NATIONAL AND UNIVERSITY VOLLEYBALL PALYERS ON SELECTED KINEMATIC VARIABLES**

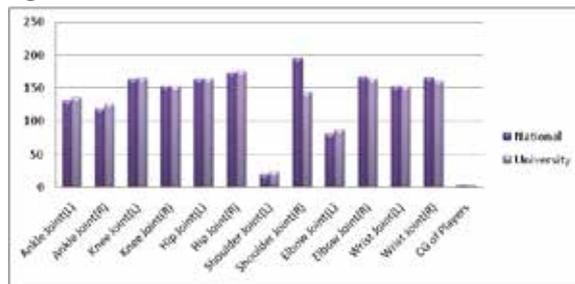
Kinematic Variables	National		University		Cal. t
	Mean	S D	Mean	S D	
Ankle Joint(L)	130.40	10.64	135.60	15.27	.910
Ankle Joint(R)	118.40	4.93	126.40	8.29	1.50
Knee Joint(L)	163	19.63	165.80	13.85	.283
Knee Joint(R)	152.80	27.11	153	23.47	.010
Hip Joint(L)	162.80	22.47	164.60	20.31	.108
Hip Joint(R)	172	7.04	174.60	8.02	.428
Shoulder Joint(L)	18.80	12.38	23.40	10.43	.632
Shoulder Joint(R)	194.60	13.13	142.40	12.22	.966
Elbow Joint(L)	80	27.61	87.60	25.67	.505
Elbow Joint(R)	167	10.95	163.80	10.69	.439

Wrist Joint(L)	152	23.79	152.80	24.32	.041
Wrist Joint(R)	165.40	14.26	160.20	14.82	.933
CG of Players	1.70	.079	1.70	.063	.038

\*Significant at 0.05 level Tab. t = 2.23

The data presented in table 1 revealed that the National and University level Volleyball players had no significance difference in relation to selected kinematic variables i.e. ankle joint, knee joint, hip joint, shoulder joint, elbow joint and wrist joint and height of center of gravity of player. Since the obtained value of ankle joint left (.910), ankle joint right (1.50), knee joint left (.283), knee joint right (.010), hip joint left (.108), hip joint right (.428), shoulder joint left (.632), shoulder joint right (.966), elbow joint left (.505), elbow joint right (.439), wrist joint left (.041), wrist joint right (.933) and height of center of gravity of player (.038) were less than tabulated value 2.31.

Figure 1



### Mean of selected kinematic variables of National and University Volleyball players

The graphical representation of figure 1 revealed the status of mean of selected kinematic variables among National and University Volleyball players.

### DISCUSSION

The aim of this was to compare the selected kinematic variables of Jump Spike Service between National and University level volleyball players. The finding of the study shows that the National and University Volleyball players do not differ significantly in relation to selected kinematic variables i.e. ankle joint, knee joint, hip joint, shoulder joint, elbow joint and wrist joint and height of center of gravity of player.

These findings may be attributed to the fact that, segment angle and centre of gravity of player of selected subjects were more or less same for National and University players. It may be due to level of participation were same for National and University players and they were participating in higher level of competitions, both groups were highly trained athletes and the level of participation, training age, number of training years and experience, maturity were almost same at this age and level.

### CONCLUSION

Based on the analysis and within the limitations of the present study, it was concluded that there was no significant difference in linear kinematic variable (height of centre of gravity) among National and University Volleyball players. And there was no significant difference among angular kinematic variables (ankle joint, knee joint, hip joint, shoulder joint, elbow joint and wrist joint).

## REFERENCE

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