

Research Paper

RELATIONSHIP BETWEEN LINEAR AND ANGULAR KINAMATICS WITH JUMP SERVE IN VOLLEYBALL

Arvind Bahadur Singh
Assistant Professor,
Department of Physical Education, G.G..University,,
(A Central University), Bilaspur, (C.G.)

Dr. Vishan Singh Rathore
Head/ Director,
Department of Physical Education&Sports,
G.G.University,,
(A Central University), Bilaspur, (C.G.)

ABSTRACT

The purpose of the study was to determined the relationship of selected linear and angular kinematics variable with the performance of jump serve in volleyball. The subject for this study five female national volleyball players of Chhattisgarh, the age varied from 19-23 year old. The performance of jump serve was measured by Russel-lunge volleyball serve test. Each subject was given ten service and whole movement in saggital plane filming and recorded by video-graphy technique. The high speed camera (Sony Model 3CCD, HDDR FX1) was used in video-graphy. Segmentation method was employed to determined height of center of gravity.

The data was used by using Pearson's product movement correlation to ascertain the relationship between the selected angular and linear kinematics variable with jump serve performance in volleyball. The level of significance was set at 0.05 level. There was positive relationship between wrist joint and elbow joints angle during hitting the ball. Another selected angular and linear kinematics variables does not show the significant relationship with the performance of jump serve in volleyball. This does not mean that these variables might have not influence the performance in jump serve.

INTRODUCTION

During the early 1970, the international community adopted the term "Biomechanics", to describe the science involving the study of biological system from a mechanical perspective. Biomechanist used tools of mechanics which is the branch of physics involving the action of forces, to study the anatomical and functional aspect of living organism. Biomechanical researcher rely heavily on quantitative technique in attempting to answer related to sports events .it has scientific perspective in performance improvement through design of innovative equipments and also directed effort at improving mechanical aspect, techniques, and components of athletics performance.

Human movement performance can be enhanced many ways. Effective movement involves anatomical factors, neuromuscular skills, physiological capacities, and psychological and Cognitive abilities. Most kinesiology professionals prescribe technique changes and give instructions that allow a person to improve performance. Biomechanics is most useful in improving performance in sports or activities where technique is the dominant factor rather than physical structure or physiological capacity.

Biomechanics is an applied form of mechanics and consequently the method used to investigate. It must be derived from those of mechanics. Biomechanics aim to explain the mechanics of life and living from molecules and tools organized everything must obey the law of mechanics clarification of the mechanics many things (Person, 1990) Sports biomechanics have also generated others efforts at improving athletics performance in the different games and sports it is helpful to, minimize sports injury through both identify dangerous practice and designing safer equipment and apparel. Biomechanics recognized that the ground or playing surface the shoes and the human body compose and interactive system.(Hall, 1991) Performance in tennis is greatly affected by the technique a player uses and sports biomechanics play an important role in stroke performance. And the knowledge and the principle of sports biomechanics play a key role to teach and trained the accurate skill to the player. The jump serve is a commonly performed athletics skill and have received some attention in the scientific biomechanical literature serve kinematics, electromyography, and ball speed have all being observed. It appears that during the tennis serve, the fastest forces and movements are applied at the shoulder joint. Also, the lower extremities are important to the successful performance to jump serve in volleyball.

The game of volleyball required a high level proficiency in executing its skills. The main skills frequently used are serving volleying, setting, spiking, blocking etc. Serve is an important technique in volleyball. It is not only an act of merely putting the ball into play, but a well developed serving technique puts the opponents team on the defensive

As we know that for improvements in technique of games and sports, the technique should be first mastered .it is observed that the server takes change in kinematics' variables and make reception difficult. Photo instrument encompasses a wide range optical recording devices, many of which have been applied to the human motion on either a qualitative or quantitative level, the filming of basketball and football has been common practice for several year and increasing us a now

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been made a photography in a spot such a aquatics, gymnastics track and field and golf the subjective analysis of such films as greatly assisted coaches in evaluating the performances of their athletics.(Bouchard, 1992

In order to determine this objective problem stated as "Relationship of linear and angular kinematics' variables with the performance of jump service in volleyball.

METHODOLOGY

The subject for this study was six national volleyball women players, participated in national volleyball tournament at Raipur, (C.G.) in 2011-12 and studying in M.P.Ed. Guru Ghasidas Vishwavidyalaya, Bilaspur, (C.G.). The age ranged from 18 -23 years old. This players are right hander. The performance of jump serve was recorded by the score obtain by Russel-lunge volleyball service test (1940). The performance was recorded by video-graphy technique. Each subject was given teen service and best service was used to criterion measure for the study. The filming done only saggital plane of the players. The subject was performed the jump serve and the recorded by the high speed camera (Sony Model 3CCD, HDDR FX1) fixed on the tripod which was position at height of 1.22 M and 9.16 M away from the court. The photograph to be obtained by the use of digital photography and stick figure developed after developing stick figure segmentation method was applied to determined height of center of gravity. The angle between various joints was measured by protector.

Selection of variable:

This study was selected the following kinematic variables.

(A). Angular kinematics variables:

(i) Right Shoulder joints angle.

(ii) Right hip joints angle.

(iii) Right knee joints angle.

(iv) Ankle joints angle.

(v) Right Wrist joints angle.

(vi) Angle at the toss

(vii) Angle at the time of hitting the ball

(B). linear kinematics variables:

(i) Height of centre of the gravity at the time of toss the ball.

(ii) Height of the centre of the gravity at the time of hitting movement of the ball.

Statistical Tool

In order to determined relationship of selected kinematic variables with the performance of jump serve in volleyball was obtained by employing the Pearson's Product Moment Correlation method. The level of significance at 0.05 level of confidence.

RESULT:

Table - 1

Relationship of angular kinematics variables with the performance of the jump serve in volleyball.

SL.No.	Variables	Toss the ball	Hitting the Ball
1.	Right shoulder joint angle with jump server	.668	.684
2.	Right elbow joint angle with jump serve	.275	.940*
3.	Right wrist joint angle with jump serve	.493	1.076*
4.	Right hip joint angle with jump serve	.653	.769
5.	Right knee joint angle with jump serve	.285	.337

Significant, $r_{.05}(3) = .878$

The finding of the table- 1 showed that significant relationship in wrist joint and allow joint during hitting the ball. Others selected kinematics variables are not significant relationship at .05 level of significance.

Table - 2

Relationship of Liner Kinematics Variables with the Performance of the Subject in Jump Serve.

Variables Correlated	Coefficient Correlation
Height of Center of gravity at the time of Toss the ball	.868
Height of center of gravity at the time of hitting the ball	.768

Significant, $r_{.05}(3) = 0.878$

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The finding of tables 2 showed that selected linear kinematics variables does not show any significant relationship because the obtain value is less than the required value to significant value at 0.05 level of significance.

DISCUSSION AND CONCLUSION:

As shown by the table no l significant relationships in wrist joint and elbow joint because during hitting of the ball wrist joint and elbow was require different variation in the angle. It was equal of mostly players. Another selected angular and linear kinematics variables does not show the significant relationship with the performance of jump serve in volleyball. This does not mean that these variables might have not influence the performance in jump serve.

Based on the analysis and within the limitations of present study, it was concluded that only wrist joint and elbow joint was the significant relationship and others selected kinematics variables were insignificant relationship with the performance of subject in jump serve in volleyball. It may be due to the different quality technique adopted by the player weak point as well as to complete the movement by hook and cook. It may be due to the small size of the sample or other reasons.

IMPLICATIONS FOR COACHING

Results indicated necessity of linear and angular kinematic variable must be include during training sessions and consistent control over its performance from youth categories. It is advised to focus on other kinematics variable with the tactical and technique training

For future of assessment of Kinematics variable with other skills in volleyball it is essential to examine next factors affecting player's performance and performance of game skills. One of possible ways is a triangulation of scientific methods as kinematic analysis and assessment methods from area of rehabilitation and physical medicine.

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