Relationship of Selected Kinematic Variables With The Performance of Pull Shot Performance in Cricket

Physical Education

Dr. Suhel Raza   Asst. Prof. Dept. of Physical Education & Sports P.P.N College, Kanpur

ABSTRACT   *Aim: The study was concluded in order to determine the relationship between selected biomechanical variables with the performance of Pull shot performance in cricket. Material and Methods: Twenty male cricket players who had participated in the Inter-University Cricket tournament or any National level tournament were selected as subjects for this study were selected as subjected for the study. The help of digital photography was used to film the subjects is sagital & frontal plane of Pull shot performance. Joint point method was used in order to obtain the values of selected angular kinematics variables from develop stick figures. The performance in Pull shot performance was recorded on the basis of the three judge's evaluation the technique of the subjects on selected batting skills were collected. Ten points scale was used. For each batsman's the average of three judges was considered as the final score. It is hypothesized that there would be no significant relationship between linear & angular kinematic variables and the performance in Batting skills. Analysis of data: To determine the degree of relationship between selected biomechanical variables with the performance in Pull shot performance Pearson's product Moment Correlation Method, Multiple correlation & regression equation was used. Results: A significant relationship between (Pull shot performance at moment execution) and ankle joint(right),knee joint (right) & shoulder joint(left) as the correlation coefficient values were found higher than the tabulated value. at .05 level of significance. A significant relationship between (Pull shot performance at moment execution) and shoulder joint(right),shoulder joint(left) & elbow joint(left) as the correlation coefficient values were found higher than the tabulated value. at .05 level of significance. Since the researcher has calculated the relationship individually. This may be attributed to the fact that the angles at different joints mentioned in this study such as Knee joint, Ankle joint, Hip joint, Shoulder joint, Elbow joint, Wrist joint. Change from one individual to another according to his Anthropometric measurement. i.e. his height, leg length, arm length*

Introduction

Objectives

The purpose of this study was find out the relationship between selected biomechanical variables with the performance of *Pull shot performance* in cricket**.**

Methods

Twenty male cricket players who had participated in the Inter-University Cricket tournament or any National level tournament were selected as subjects for this study. Since the players had been trained for a considerable period of time, they were considered skilled and their technique was treated as stabilized. All the subjects were explained the purpose of the study and were requested to put in their best during each attempt.

The performance of *Pull shot performance* of each selected subject was taken as the criterion measure for the purpose of the present study. The skills performance of subjects was evaluated by subjective judgment by a panel of three judges. On the basis of the three judge's evaluation the technique of the subjects on selected batting skills were collected. Ten points scale was used. For each batsman's the average of three judges was considered as the final score. Judges are B.C.C.I. certified level "1" coach and giving their services to U.P.C.A. The performance of the subjects on selected batting skills were evaluated separately

For the biomechanical analysis of selected batting skills in cricket High speed videography technique was employed. The two Casio Exilim EX-F1 high speed camera used for this purpose. Performance of subjects was recorded in control and favourable conditions. The data were recorded from both planes i.e. Sagittal plane and frontal plane. Camera-1was placed perpendicular from the subject at a distance of 8.00 meters and was mount at 1.30 meters height. Camera -2 was placed perpendicular to camera-1 and in front of subject performing the skill at the distance or 24.00meters and mount at 2.00 meters. The frequency of camera was set 300 frames/second.

The subjects had given three trials for each selected variables of batting to perform the skill and the best trial was used for analysis.

On the basis of the video recording, the scholar mark various angular measurements, and distance measurements with the help of siliconcoach pro-7 motion analysis software. All the marking done over selected frame and stick figures were developed. Selected angular kinematic variables were; angle at ankle joints (Left and Right), Knee joints (Left and Right), Hip joints (Left and Right), shoulder joints(Left and Right), elbow joints (Left and Right) and wrist joints (Left and Right).

Angles drawn at moment stance with the help of measuring tool of siliconcoach pro 7 motion analysis software. Joint the all marked points and the angle at selected joint was recorded in nearest degree. Calculating the height of C.G. by segmentation method.

Analysis of data

To find out the relationships of linear and angular kinematics variables and performance in selected batting skill were employed Pearson's .Product moment correlation, Multiple correlation and regression equation for testing the hypothesis the level of significance was set at 0.05 level of significance.

Findings
Table-1

Correlation between Dependent Variable (*Pull shot performance***) and Independent Variables (selected kinematic variables at moment stance)**

Independent Variables	Correlation coefficient
Ankle Joint (right)	.456(*)
Knee joint (right)	.449(*)
Hip joint (right)	-.318
Shoulder joint (right)	-.157
Elbow joint (right)	-.306
Wrist joint (right)	.277
Ankle joint (left)	.157
Knee joint (left)	-.178
Hip joint (left)	-.096
Shoulder joint (left)	.493(*)
Elbow joint (left)	-.080
Wrist joint (left)	.288

* Significant at .05 level
r.05 (18) = .444

Table - 1 clearly indicates that there exists a significant relationship between(**Pull shot performance at moment execution)** *and ankle joint(right),knee joint (right) & shoulder joint(left)* as the correlation coefficient values were found higher than the tabulated value. at .05 level of significance.

On the other hand, there exists an insignificant relationship between **Pull shot performance** *and hip joint(right), shoulder joint(right),elbow joint(right), ankle (left), knee joint(left),hip joint(left),elbow joint(left) & wrist joint(left)* as the correlation coefficient values were found lower than the tabulated value. at .05 level of significance.

Table – 1(A)

Joint contribution Independent Variables (selected angular kinematic variables) in predicting Dependent Variable (Pull shot performance)

Criterion Variable	Independent Variables	Coefficient of Multiple Correlation
Pull shot performance	Ankle Joint (right)	.662*
	Knee joint (right)	
	Shoulder joint (left)	

* Significant at .05 level.
r.05 (17) = .456

Table- 1(A) indicates that significant relationship was found between criterion variable (**Pull shot performance**) and independent variables *ankle joint(right),knee joint (right) & shoulder joint(left)* as coefficient of multiple correlations was found significant which is higher than the tabulated value.

Multiple Regression Analysis

$Y = -.690 + .057X_{1} + .042X2 + .214X3$

Where,

Y = Estimation of **Pull shot** *performance* at moment stance
$X_1 =$ *Ankle joint (right)*
X2= Knee joint (right)
X3= Shoulder joint (left)

Table- 2

Correlation between Dependent Variable (Pull shot performance) and Independent Variable (selected linear kinematic variable) at moment

Stance

Independent Variable	Correlation coefficient
Height of Centre of Gravity	.406

* Significant at .05 level
r.05 (18) = .444

Table – 2 clearly indicates that there exists an insignificant relationship between Pull shot performance and height of centre of gravity as the correlation coefficient values were found lower than the tabulated value at 0.05 level of significance.

Since no significance relationship was found between *Pull shot* performance and linear kinematic variables at moment stance and there multiple correlation and regression aggression were not formulated.

Table- 3

Correlation between Dependent Variable (*Pull shot performance***) and Independent Variables (selected kinematic variables at moment execution)**

Independent Variables	Correlation coefficient
Ankle Joint (right)	.282
Knee joint (right)	.273
Hip joint (right)	-.155
Shoulder joint (right)	.598(*)
Elbow joint (right)	.266.
Wrist joint (right)	.131
Ankle joint (left)	.034
Knee joint (left)	.071
Hip joint (left)	.260
Shoulder joint (left)	.445(*)
Elbow joint (left)	.531(*)
Wrist joint (left)	.268

* Significant at .05 level
r.05 (18) = .444

Table - 3 clearly indicates that there exists a significant relationship between **(Pull shot performance at moment execution)** *and shoulder joint(right),shoulder joint(left) & elbow joint(left)* as the correlation coefficient values were found higher than the tabulated value. at .05 level of significance.

On the other hand, there exists an insignificant relationship between **Pull shot performance** *and ankle joint(right), knee (right), Hip joint(right),elbow joint(right),wrist joint(right), ankle (left), knee joint(left),hip joint(left) & wrist joint(left)* as the correlation coefficient values were found lower than the tabulated value. at .05 level of significance.

Table – 3(A)

Joint contribution Independent Variables (selected angular kinematic variables) in predicting Dependent Variable (Pull shot performance)

Criterion Variable	Independent Variables	Coefficient of Multiple Correlation
Pull shot performance	Shoulder joint (right)	.745*
	Shoulder joint (left)	
	Elbow joint(left)	

* Significant at .05 level.
r.05 (17) = .456

Table-3(A) indicates that significant relationship was found between criterion variable (**Pull shot performance**) and independent variables shoulder joint (right) & shoulder joint(left) as coefficient of multiple correlations was found significant which is higher than the tabulated value.

Multiple Regression Analysis

$Y = 4.285 + .100X_{1} + .027X2 + .054X3$

Where,

Y = Estimation of **Pull shot** *performance* at moment execution
X_1 = Shoulder joint (right)
X2= Shoulder joint (left)
X3=Elbow joint(left)

Table- 4

Correlation between Dependent Variable (Pull shot performance) and Independent Variable (selected linear kinematic variable) at moment

Execution

Independent Variable	Correlation coefficient
Height of Centre of Gravity	.102

* Significant at .05 level
r.05 (18) = .444

Table – 4 clearly indicates that there exists an insignificant relationship between Pull shot performance and height of centre of gravity as the correlation coefficient values were found lower than the tabulated value at .05 level of significance.

Since no significance relationship was found between *Pull shot* performance and linear kinematic variables at moment execution and there multiple correlation and regression aggression were not formulated.

Conclusion
Ankle joint (Right), Knee joint (Left), Shoulder joint (Right), have positive contribution on the performance of in-swing bowling at gather phase.

The other selected kinematic variables such as Ankle joint (Left), Knee joint (Right), Hip Joint (Left & Right) & Elbow Joint (Left & Right), Wrist joint (Right), Shoulder joint (Left), Wrist joint (Left & right) & Body Inclination and height of C.G. do not have significant relationship with the performance of pull shot performance at moment stance.

Shoulder joint (Right & left) & Elbow joint (Right) has positive effect on the performance of pull shot performance at moment execution.

The other selected kinematic variables such as Ankle joint (Right), The *Knee joint (Right), Hip Joint (Right),* Wrist joint (Right), Ankle Joint (Left), Knee joint (Left), Hip joint (Left), Elbow joint (Left) &Wrist joint (Left), Body Inclination and height of C.G. do not have significant relationship with the performance of pull shot performance at moment execution.

Reference

1.   Eric, Carlson Roy, "Analysis of the Forward Pass." **Completed Research in Health, Physical Education and Recreation** 5 (1963):85.

2.   Finch, Alfored E. "Relationship of Segmental to Total Body Momentum in the Standing Long Jump." **Completed Research in Health, Physical Education and Recreation** 79 (1978):258.

3.   Garman, Lorraine K. "A Conematographical and Mechanical Analysis of the Push Pass in Field Hockey." **Completed Research in Health, Physical Education and Recreation** 79 (1978):172.

4.   Miller, Doris I. and Nelson, Richard C. **Biomechanics of Sports.** Philadelphia: Lea and Febiger, 1973.

5.   Rash, Philip J. and Burke, Roger K. **Kinesiology and Applied Anatomy**. Philadelphia: Lea and Febiger, 1978.

6.   Seaton, Doneash et al., **Basic Book of Sports.** Englewood Cliffs, N.J.: Prentice Hall Inc., 1958.

7.   Sharma, S.R. and Gautam, G.P. **Sports Policy of India**. Delhi: Friends Publication, 2000.

8.   Singh, Hardayal. **Science of Sports Training.** New Delhi: D.V.S. Publication, 1997.

9.   Snyder, Eldon E. and Sprlitzer, Elmer. **Social Aspects of Sports.**