

RELATIONSHIP OF SELECTED KINEMATIC VARIABLES TO THE  
PHASES OF PREDELIVERY AND DELIVERY STRIDE  
DURING CRICKET FAST BOWLING□ Miss. Firdaus Tabassum\*  
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## ABSTRACT

**Aim:** To find out the relationship among ankle joint angle, shoulder alignment, pelvic alignment, shoulder counter rotation and pelvic shoulder separation angle at back foot contact and delivery stride of pace bowling in cricket.

**Methodology:** Five University level pace bowlers (aged  $23.09 \pm 2.8$ ; height  $1.64 \pm 6.4$  mts) of Visva Bharati University were filmed in an outdoor field in a full length (20.12m) cricket pitch with a full length runway by (2-D) motion analysis system. Sunco video camera in a field setting operated at a frame rate of 50 Hz and 120 fps was in the transverse plane at a height of 12 meters and parallel to the longitudinal Axis and an another camera was positioned perpendicular to the sagittal plane and parallel to the bi-lateral axis. Kinovea – 8.24 was used to analyze the collected kinematical data. To find out the relationship among the selected variables Pearson Product Moment Method was used by using IBM-SPSS 20. The level of significance was set at 0.05 level.

**Results:** Ankle Joint Angle positively correlated with Minimum Shoulder Alignment (most side-on) and Pelvic Shoulder Separation Angle at Back Foot Contact.

**Conclusion:** Bowlers experiences greater Ankle Joint Angle which tends to indirectly increase the Minimum Shoulder Alignment (most side-on) and Pelvic Shoulder Separation Angle at Back Foot Contact. In spite of Minimum Shoulder Alignment (most side-on) and Pelvic Shoulder Separation Angle, none of the above kinematic variables correlated with Ankle Joint Angle may be due to the greater acceleration of their upper body.

**Keyword:** Separation angle, Shoulder Alignment, Delivery Stride, Pace Bowling

## Introduction:

The main intention of fast bowlers is to get more wickets with the help of their pace. And due to that fact they just forget to maintain the proper alignment of their body. Previous work of Ranson et al, 2008 has clearly shown the importance and injuries of lower back due to wrong alignment of the body. Very less amount of studies concentrating on the correlation of their lower limb movements with various kinematic variables. So purpose of this study was to establish the correlation of kinematic variables like Shoulder Alignment (S.A),

Pelvic Alignment (P.A) at Back Foot Contact & Front Foot Contact, Shoulder Alignment (most side-on action), Shoulder Counter Rotation (SCR) and Pelvic Shoulder Separation Angle (PSSA) with the Ankle Joint Angle (AJA) of Pace Bowlers in Cricket.

## Methodology:

## Subjects

Five University level pace bowlers (aged  $23.09 \pm 2.8$ ; height  $1.64 \pm 6.4$  mts) of Visva Bharati University were filmed in an outdoor field in a full length (20.12m) cricket pitch with a full length runway.

## Collection of data

14 markers were attached to all pace bowlers for calculating various kinematic variables. Kinematic data were acquired by the Sunco

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video camera in a field setting operated at a frame rate of 50 Hz and 120 fps. The positioning of first camera was in the transverse plane at a height of 12 meters and parallel to the longitudinal Axis. And another camera was positioned perpendicular to the sagittal plane and parallel to the bi-lateral axis.

For the acquisition of kinematical data, subjects Shoulder Alignment, Pelvic Alignment & ankle joint angle was analyzed in Kinovea – 8.24.

## Data Reduction

Each bowler was given three trials and instructed to pitch the ball on the good length area and the highly scored on the accuracy target were selected for analysis.

## Measurement of Shoulder Alignment (S.A)

Shoulder Alignment was measured by using the 2D analysis from the horizontal plane by aligning the left and right shoulder joint

## Measurement of Shoulder Counter Rotation

Shoulder Counter Rotation is the transformation in the alignment of the shoulder at back foot contact to the most side on Alignment of the shoulder during the delivery stride (minimum shoulder angle). (Glazier et al., 2000).

SCR = Minimum (most side on) Shoulder Alignment – Shoulder Alignment at Back Foot Contact.

## Statistical Analysis

Descriptive Statistics (Mean, SD) and Pearson Product Moment Method was used by using IBM-SPSS 20. The level of significance was set at 0.05 levels.

## Results and Discussion of

The mean value of Ankle Joint Angle, Shoulder Alignment, Pelvic Alignment, Back Foot Contact (BFC), Minimum Shoulder Alignment (most side-on), Shoulder Alignment,