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## A study of biomechanical and anthropometric variables of off spin bowler of Goa

**Chandu G Lamani**

**Abstract**

The purpose of the study was to analyze the relationship of selected anthropometric and Biomechanical variables with the performance of players in off spin bowling. The data for the present study was collected from Goa U-19 and U-23 Cricket players who were preparing for the BCCI U-19 Cooch Behar and Col.CK Nayudu trophy for the 2014-15 season, Five (05) Off Spin cricket players, age below 23 were selected as subjects for the study and were examined. All the players had competed at least at the state and national level. Since the results have shown significant relationship of few selected anthropometric variables to the performance of players in off spin bowling, the hypothesis was stated as there may not be significant relationship of selected anthropometric and biomechanical variables to the performance of players in off spin bowling in cricket was rejected through the results. However in case of other variables the hypothesis was accepted.

**Keywords:** Anthropometry, Cricket Players, Biomechanics, BCCI

**Introduction**

In the early years cricket was considered as a battle between bat and ball, to win the Test match you require a match winning Bowlers who can take 20 wickets for the team (Woolmer, Bob 2000). In cricket bowlers have different action like Front on, side on and some of them have mixed action, to find the errors and to rectify it and to make an Bowler a complete package a Coach required a Biomechanical help.

**Biomechanics and Cricket**

The role of biomechanics in attaining high performance cannot be overlooked, since it is the only science which helps to identify the faults in performing technique very precisely. There are basically two methods by which motor skill can be analyses. They are qualitative and quantitative. High speed movie film for exactness has been used extensively to examine in great details of the movements which occur too fast for the human eye to detect (Barlet, 1995). In many of the elite sport training and research institution around the world, force applied during high caliber sporting event, while the analysis test have done much to improve understanding of movement and the performance of elite athletes, the analysis task faced by the coach are predominantly qualitative in nature.

**Anthropometry and Cricket**

To predict superior performance in any sports, a number of studies have been done in which performances from various sports have been compared with regard to some of these factors. Malina 1984 speculates that morphological traits during early childhood provide early competitive advantages in certain sports, thus motivating the child to train and compete in a specific sport. Malina also states that knowledge of basic anthropometric parameters, including body proportion; make it possible to predict an individual's success. Therefore, if success in sports depends in part upon morphological characteristics, it is logical to expect that junior athletes should exhibit morphological characteristics that are similar to those of senior athletes.

**Purpose of the Study**

The purpose of the study was to analyze the relationship of selected anthropometric and Biomechanical variables with the performance of players in off spin bowling.

**Significance of the study**

It is hoped that the data generated and interpreted in this study will one day help the Goan cricket. The information collected can be used for monitoring the training programme as well as counseling; the author also assumes that this study will help the Goan cricket to improve the standard of cricket and quality of Spinner in the state.

**Hypothesis**

It was hypothesized that there may not be significant relationship of selected anthropometric and biomechanical variables to the performance of players in off spin bowling in cricket.

**Delimitation**

The study was delimited to 5 male cricketers of 18 to 23 years of age of State level player who presently played for the state of Goa in u-19 and u-23 matches organized by BCCI. The biomechanical variables, selected in the study were angles of wrist, elbow, shoulder, knee and ankle joint, and the height of centre of gravity of the body at moment release. The selected anthropometric variables were height, sitting height, arm length, leg length, body weight and height of release of ball

**Methodology**

**Subjects**

Five male cricket players who Represented Goa State team in u-19 and u-23 matches in Cooch Behar and Col. CK Nayudu Trophy were selected as subjects for this study. The data was collected when they were preparing for the Tournament. Entire Anthropometry test and Biomechanical test were conducted at BITS Pilani K.K.Birla Goa campus Gym and Cricket Ground. Necessary Permission was taken from Goa Cricket Association President, Secretary and Respective head coaches of the Team

**Criterion Measures**

The performance of off spin bowling of each selected subjects was taken as the criterion measure for the purpose of present study. The performance was recorded on the basis of twenty point scale. 5 point awarded in run up, 5 point awarded in placement of foot, 10 point awarded in Execution, 10 point awarded in Trajectory and 20 point awarded in line, length and spin. The performance of the subjects on off spin bowling was collected on the basis of three judge’s evaluation. The averages of three judges were considered as the final point obtained by each Bowler. Further, to make the calculation easier it was reduced out of 10 point.

**Tools and Apparatus**

To obtain reliable measurements, standard and calibrated equipments like, camera, stadiometer, weighing machine, steel tape etc were used in order to establish the reliability of the tester for anthropometric measurements, which were taken on two consecutive days, test retest method was used. The coefficient of correlation was calculated. The results had shown high degree of reliability. The camera used for biomechanical purpose was a standard Nikon EM (with motor drive).

**Collection of Data and Analysis of Film**

Sequential photographic technique was employed for the biomechanical analysis of bowling. The camera used for this purpose was a standard Nikon EM (with motor drive). For obtaining individual photographic sequence, the subjects were photographed in controlled conditions. The distance of the

camera from the subject was 11.05 meters, and was fixed on the tripod at 1.07 meters height. A hurdle was filmed prior to filming of subjects for reference of height and distance. The camera was operated by an expert professional photographer on the basis of the sequential photographs obtained the investigator developed the stick figures from which various biomechanical variables were taken.

**Statistical technique**

The relationship of selected anthropometric and biomechanical variables with the performance of cricket playing ability was calculated by using Pearson’s product moment correlation. For testing the hypothesis the level of significance was set at 0.05.

**Results**

As shown in Table-I that the obtained values of coefficient of correlation is case of height (r=.93), leg length (r=.88) and height of release (r=.90) were found significant at 0.05 level of significance. Since these values were higher than the tabulated value of .878 for 3 degree of freedom at the selected level of significance.

**Table I:** Relationship of Selected Anthropometric Variables with the Performance of Players in Off Spin Bowling

| Sr. No | Variables         | Coefficient of Correlation |
|--------|-------------------|----------------------------|
| 01     | Height            | 0.93*                      |
| 02     | Sitting Height    | 0.20                       |
| 03     | Arm length        | 0.35                       |
| 04     | Leg length        | 0.88*                      |
| 05     | Body weight       | 0.04                       |
| 06     | Height of Release | 0.90*                      |

\*Significant 0.05(3) =0.878

**Table II:** Relationship of Selected Biomechanical Variables with the Performance of Player in Off Spin Bowling

| Sr. No | Variables                         | Coefficient of Correlation | Mean  |
|--------|-----------------------------------|----------------------------|-------|
| 01     | Wrist                             | .62                        | 157.4 |
| 02     | Ankle joint left leg              | .74                        | 109   |
| 03     | Knee joint left leg               | .53                        | 165   |
| 04     | Elbow joint                       | .11                        | 175.4 |
| 05     | Shoulder Joint                    | .02                        | 162   |
| 06     | Ankle joint Right leg             | .02                        | 102.4 |
| 07     | Knee joint Right leg              | .07                        | 132.4 |
| 08     | Height of Centre of Gravity (Mts) | .80                        | 0.92  |

Relationship with the performance of the subjects in off spin bowling, Even though the value of coefficient of correlations in case of wrist joint (bowling arm) and Height of Centre of Gravity has exhibited quite high but were not found significant at the selected level of 0.05.

**Discussion**

- The obtained value of coefficient of correlation of selected anthropometric variables at the moment release Only the height and leg length have significant relationship with the performance of subjects in off spin bowling.
- In case of biomechanical variables none of the biomechanical variable has exhibited significant relationship with the performance of players in off spin bowling. It may be because of small size of the sample.
- It is a known fact that greater radius of rotation creates greater momentum but angle at elbow joint bowling arm did not exhibit significant relationship which may be due to other reasons.

- As a whole the variables which have shown high relationship with the performance must have contributed towards the performance of subject in off spin bowling. Along with these variables, other motor components also must have contributed to the performance.
- This does not mean that other variables might have not contributed to the performance. They do contribute to the performance.
- But the insignificant values of coefficient of correlation of such variables with the performance might have been due to the small size of the sample and non availability of sophisticated equipment.

### **Conclusion**

Since the results have shown significant relationship of few selected anthropometric variables to the performance of players in off spin bowling, the hypothesis which was stated earlier as there may not be significant relationship of selected anthropometric and biomechanical variables to the performance of players in off spin bowling in cricket was rejected. However in case of other variables the hypothesis was accepted.

### **Recommendation for Future Research work**

- In the present study sample size of young cricketers was very small. Therefore, it is recommended to replicate such an investigation with larger sample size.
- Therefore Investigation of such study is recommended on profiles of cricketers specializing in bowling, batting, and wicket keeping.
- The present investigation involved cricketers at state level. Therefore an investigation involving cricketers of national and international repute may be undertaken.

### **Recommendation for Coaches and Administrators**

- Therefore it is recommended that either training regime be made demanding or select players on Biomechanical criteria also.
- Based on the research findings involving young children in sports, identify talented cricketers at early age and coach them right.
- It is recommended that coaches based on their knowledge of Anthropometric and Biomechanical profile required for various departments of the game of cricket.

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