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Incidence of alteration of scapula position in bowlers

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Abstract

Background: The shoulder is an important joint connecting upper limb to the trunk. Shoulder is the most commonly used joint during batting and bowling, hence, it is more prone to injuries during bowling. Melbourne Instability Shoulder Score (MISS) questionnaire was used to check the amount of instability at shoulder joint.

Objectives: To evaluate the alteration of scapular positions using MISS questionnaire and measuring tape using Lennie test.

Methods: Total number of 50 cricket players between the age of 18-25 years both male and female players with more than one year of experience were selected by simple random sampling. Outcome measures were Lennie's test and Melbourne Instability Shoulder Score (MISS) Questionnaire.

Results: The study shows that there is no functional disability in fast bowlers according to Melbourne Instability Shoulder Score (MISS) questionnaire, but there is alteration of scapula position in the same which suggests that bowlers can carry out their daily activities without any pain or disability with alteration of scapula position.

Conclusion: There is incidence of alteration of scapula position in bowlers without any functional disability at the shoulder joint.

Keywords: Bowlers, scapula position, MISS questionnaire, Lennie test

1. Introduction

A study of English cricket country suggested that about 23% of the bowlers may experience shoulder injuries^[3] where as the Indian cricket country include injuries to the upper limb for about 25-32%^[2]. The most commonly used joint in bowling and batting is the shoulder joint. The injuries are seen in bowlers, batsmen and fielders namely. But bowling has been found to be a major cause of cricket injuries^[4]. Common injuries in bowlers include backache, muscle tear, dislocation of shoulder joint and stretch. Stretch includes bowling too fast, captain over-bowling the bowler, bowler bowling continuously without subsequent rest between the previous and the current over, inadequate warm up before bowling, return to game too soon after an injury^[2]. Shoulder joint is a ball and socket joint^[5]. It is a major joint connecting the upper limb to the trunk. It is made up of four joints namely Glenohumeral joint, Acromioclavicular joint, Sternoclavicular joint and Scapulothoracic joint. In the shoulder joint, the ligaments play a key role in stabilising the bony structures. Movements at the shoulder joint are flexion, extension, abduction, adduction, internal rotation and external rotation^[5].

1.1 The pitching motion consists of 5 phases as follows

- 1. Wind up:** It begins with initial movement of contra lateral lower extremity, and it culminates with elevation of lead leg to its highest point and with separation of the throwing hand from the glove^[7].
- 2. Cocking phase:** It lasts for 1500ms^[6]. This phase prepares the arm to throw the ball. In late cocking, the scapula is brought into a position of retraction, the elbow flexes and the humerus undergoes abduction and external rotation^[7].
- 3. Acceleration phase:** In this the throwing arm moves forward to throw the ball to the target. The scapula protracts and the internal rotators move the arm from extreme external rotation to internal rotation
- 4. Deceleration phase:** The deceleration phase occurs between ball release and maximum humeral internal rotation and elbow extension^[7]. When is ball is released, the scapula

protracts and the arm is in maximum internal rotation.

5. **Follow-Through:** In this phase the body continues to move forward with the arm until motion is ceased [7]. It slows down all the body motions and stops the forward movement of the body.

Shoulder injuries are common among cricketers more particularly during throwing and bowling than fielding and batting [9]. Throwing is an overhead activity which causes a ballistic motion of the body [7]. Common injuries in cricket bowlers: Shoulder impingement, Scapular dyskinesis, SICK scapula, GIRD and Rotator cuff syndrome [11, 12]. Throwing motion occurs at above 90 degrees of abduction. The deltoid elevates the humerus and the rotator cuff adjusts the humeral head in the glenoid cavity [7]. The pitching motion generates and transfers energy from the body to the arm to the hand and then the ball. Each part starts moving once the adjacent joint as reached the top speed with the top speed of the most distal segment. The scapula plays an important role in transferring this energy distally to the hand [7].

2. Material and Methodology

2.1 Methodology: The study design was Cross Sectional Design. Study setting was in sports clubs in and around Pune. Total number of 50 cricket players between the age of 18-25 years both male and female players with more than one year of experience were selected by simple random sampling. Outcome measures were Lennie's test and Melbourne Instability Shoulder Score (MISS) Questionnaire.

2.2 Exclusion Criteria

- History of any injury to the shoulder joint or upper back

Batsmen

2.3 Outcome Measure

- Lennie's test
- Melbourne Instability Shoulder Score (MISS) Questionnaire.

2.4 Procedure

Participants were selected on the basis of inclusion criteria. The aim and method of the study was explained and their consent on the consent form was taken. Melbourne Instability Shoulder Score questionnaire was filled by the participants to check for shoulder instability. This questionnaire was used to check the instability of the shoulder joint. It was divided under four sub headings namely: Pain, Instability, Function and Occupation and Sporting Demands. The score of the questionnaire was expressed in the following range of 0-100 with 100 being the best score. MISS questionnaire is also described as Poor <50, Fair 50-69, Good 70-79, Very good 80-89 and Excellent 90-100 [9].

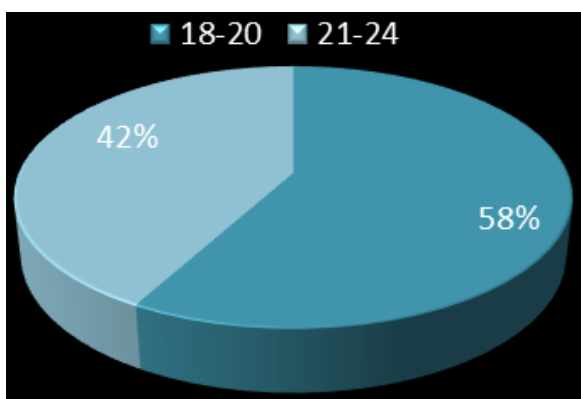
Lennie test: In this test, the scapula position of the participants was measured using a measuring tape. The spinous processes are measured horizontally to two scapular positions at the medial aspect of the superior point that is superior angle and inferior point that is inferior angle [13].

3. Results and Discussion

3.1 Results Tables and Figures

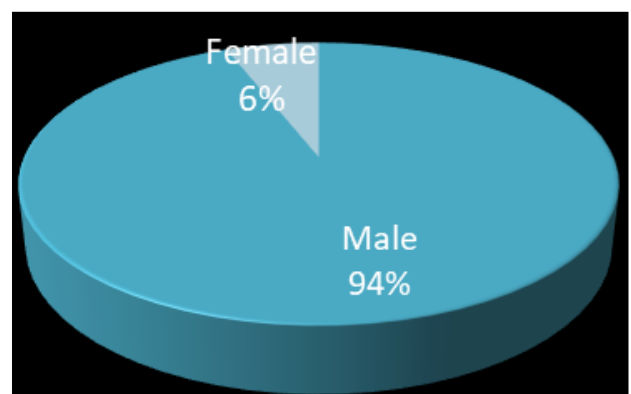
Table 1: Represents Age, Gender, Years of experience and score of MISS questionnaire

Outcome Measure	Samples	Percentage
Age	18-20 years	58
	21-24 years	42
Gender	Male= 47	94
	Female= 3	6
Years of Experience	1-5 years	48
	6-10 years	50
	11-15 years	2
MISS questionnaire		
Poor	3	6
Fair	8	16
Good	9	18
Very Good	8	16
Excellent	22	44



Graph 1: Age wise distribution of samples

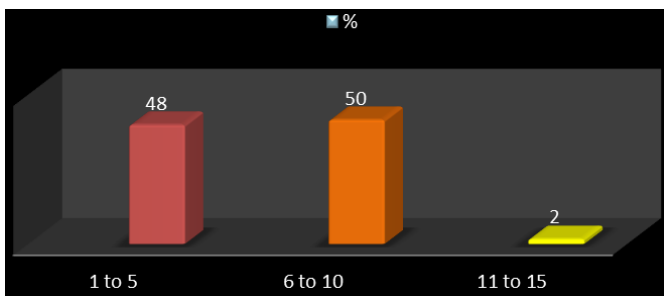
The statistical analysis for this was 29 (58%) bowlers in the age group of 18-20 years and 21 (42%) in the age group of



Graph 2: Gender wise distribution of samples

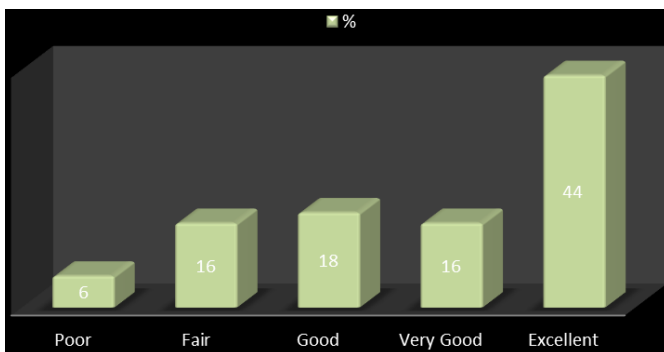
Interpretation: In Graph 1 of results, the participants were classified into various age groups like 18-20 and 21-25 years.

Interpretation: In Graph 2, the participants were classified further on the basis of gender. The statistical analysis of which were 47 (94%) participants were males and 3 (6%) were females.



Graph 3: Graphical representation of years of experience of samples

Interpretation: In Graph 3, classification of participants on the basis of their years of experience of playing which was classified into 3 categories like 1-5 years, 6-10 years and 11-15 years out of which maximum percentage of participants were in the group of 6-10 years that is 50%, and 48% were in the group of 1-5 years and 2% in the age group of 11-15 years.



Graph 4: Graphical representation of MISS questionnaire

Interpretation: Table number 4 of results shows classification of participants based on Melbourne Instability Shoulder Score (MISS) questionnaire^[9] which depicted least percentage of injury to the shoulder of almost all the participants with a statistical analysis of 6% for Poor, 16% for Fair, 18% for Good, 16% for Very Good and 44% for Excellent.

3.2 Discussion

The study was aimed to find out the incidence of alteration of scapula position in bowlers between age group of 18-25 years. A survey based study was performed among 50 participants using outcome measures namely Melbourne Instability Shoulder Score (MISS) questionnaire and Lennie's test irrespective of any pain at the shoulder joint. Melbourne Instability Shoulder Score questionnaire was used to check the amount of instability at the shoulder and how it hampers the daily activities of the participants^[9]. Lennie's test was performed to check the alteration of scapula position of the dominant (bowling) side as compared to the non-dominant (non-bowling) side^[13]. The study was carried out at Nehru stadium, Shinde ground, Katariya high school and Phoenix club. In this study the available bowlers were taken. A total of 50 participants were examined based on the inclusion criteria. The test was explained to all the participants and also all the components of the questionnaire were explained. Their consent on the consent forms was taken. The data was

collected, analyzed and statistical analysis was done. In the previous article Rodney A. Green *et al.* (2012) underwent a study on altered scapula position in elite young cricketers with shoulder problems^[9] which shows was performed on players between age group 15-19 years. Hence the current study was carried out on participants with age between 18-25 years. In the previous article Rodney A. Green *et al.* (2012) underwent a study on altered scapula position in elite young cricketers with shoulder problems^[9] which included only male participants. In the present study both males as well as females were included, but the number of female participants was less as compared to the number of male participants. In the previous article Rodney A. Green *et al.* (2012) underwent a study on altered scapula position in elite young cricketers with shoulder problems using Melbourne Instability Shoulder Score (MISS) questionnaire the mean result was 72.1 that is characterized as Good according to the questionnaire^[9] but in the present study the mean result was 95.27 which was characterized as Excellent. In the previous article Apurv P. Shimpi *et al.* underwent a study on scapula resting position and gleno-humeral movement dysfunction in asymptomatic racquet players^[8] using Lennie's test^[13] which concluded that there is difference in the distance between the spine of scapula on the dominant side compared to non-dominant side but in the present study by using Lennie's it shows that there is alteration of scapula position at both the points that is the spine of scapula and inferior angle in all the 50 participants on the dominant side as compared to the non-dominant side. This was due to regular bowling session and the throwing motion of the dominant hand repeatedly. Abnormal training practices were found in these participants. Abnormal stretching, warm up and cool down sessions led to pain in the shoulder and also muscle imbalance. If normal training sessions were carried out each day before and after practice then it reduces the risk of shoulder pain and other injuries. Although the sample size in this study was small, it was sufficient enough to check the alteration of scapula position between groups^[9]. The repetitive nature of throwing motion at the shoulder joint may cause fatigue in the posterior group of muscles thus causing weakness and stress leading to instability of the muscles to hold the scapula in the correct position. This repetitive motion in future may lead to trauma, muscle tear and an increased risk for SLAP lesions, GIRD and rotator cuff tears in bowlers^[11, 12]. According to the results, from the present study it is proved that there is no functional disability in fast bowlers according to Melbourne Instability Shoulder Score (MISS) questionnaire, but there is alteration in the scapular position in the same which suggests that bowlers can carry out their normal activities without any pain or disability with alteration in scapular position.

4. Conclusion

From the above study we can conclude that, there is incidence of alteration of scapula position in bowlers without any functional disability at the shoulder joint.

5. Limitations and Future scope of study

It was not a funded study. Sample collection was within a limited area. Study duration was also less. Only a particular group of players were included. Comparison of scapula position alteration can be done with different sports. Comparison of dominant versus non dominant side can be done. Applying for funding to All India Cricket Association for better access to the equipment and to carry out a larger study.

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