

INCIDENCE OF SHOULDER INJURIES AMONGST FAST BOWLERS

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ABSTRACT: Fast bowling is the high intensity activity which involves various dynamic postures. Repetitive bowling mechanics can put stress on shoulder joint and repetitious practice for long duration can lead to deterioration in shoulder joint. The goal of the study was to find out the Incidence of shoulder injuries using Constant-Murley Score and to assess shoulder disability in fast bowlers using Shoulder Pain and Disability index. Total 100 fast bowlers playing at state and district level were approached according to inclusion and exclusion criteria. This study concluded that there is significant incidence of shoulder injuries amongst fast bowlers.

Key Words: : Fast bowlers, shoulder injuries, Constant-Murley score, SPADI

INTRODUCTION:

Cricket is a national sport of Australia and it is the most popular game in India and is gaining importance in all over world. A bat-and-ball game with complex rules, cricket involves physical fitness, skill and strategy. Its expansion over the past decades has placed greater demands on cricketers due to increased playing hours and performance expectations^{1,2}.

The shoulder complex is combination of five joints glenohumeral, sternoclavicular, acromioclavicular and subacromial joint. The shoulder complex is primarily designed for mobility, allowing the hand to move through wide range of motion³.

Bowling is the high intensity activity that consists of various dynamic postures. Bowling involves repetitive twisting, extension and rotation in short period and the hours of repetitious practice produce a gradual deterioration in functional capacity of the body⁴.

Shoulder biomechanics play important role in fast bowling action⁵. Phases of bowling includes run up phase, pre-delivery stride, delivery stride and follow through⁶.

Phases of throwing which mostly uses shoulder joint in bowling action includes preparation/ wind up phase, cocking, acceleration, and deceleration⁷.

Preparation/ Wind-up phase establishes the rhythm of the pitch or throw. The major forces arise in the lower half of the body in pitching, hip flexion of the lead leg raises the center of gravity. During this phase, shoulder muscles are relatively inactive⁷.

In Cocking phase, all segments of body are activated for ball release. The shoulder goes into abduction following horizontal extension and then into maximal external rotation. The internal rotators are in stretched position. At the end of cocking phase static anterior stabilizers are under strain. Due to repetitive nature of throwing, these structures can become weak and lead to instability⁷.

Acceleration phase is extremely explosive. It consists of forceful internal rotation and elastic force due to tight fibrous capsule, which generates excessive force at glenohumeral joint, to keep humeral head fixed in glenoid rotator cuff muscles were activated. The acceleration phase concludes with the ball release⁷.

Deceleration/ follow through, in this phase very high forces pull forward on the glenohumeral joint following ball release, which places large stresses on the posterior shoulder structures⁷.

Common shoulder injuries seen in throwing sports include micro instability, superior labrum anterior posterior, (SLAP) tear, impingement, glenohumeral internal rotation deficit, scapular dyskinesia, Rotator cuff tear⁸.

The throwing motion involves coordinated motion progressing from toes to fingertips. Both bowlers and fielders are prone to shoulder injuries arising due to large amount of forces generated and repetitive nature of throwing⁸.

Hence to find out the incidence of shoulder injuries in fast bowlers is necessary.

METHODS:

Study design: Survey based

Population: Male fast bowlers of 18 to 35 years

Sampling Technique:Convenient sampling

Sample size: 100

Eligibility criteria:

Inclusion criteria

1. Fast male bowlers
2. Participants between age group 18-35 years
3. Bowlers must be in sports since 2 years
4. Level of cricket : State/District level players

Exclusion criteria

1. Individuals involved in any other sports
2. Bowlers with any recent surgery
3. Individuals not willing to participate

Materials:

Constant- Murley score questionnaire, Dumbbell, SPADI sheet

Outcome measures:

1. Constant-Murley score⁹
2. Shoulder pain and disability Index (SPADI)¹⁰

Procedure:

Permission was taken from institutional ethical committee. The purpose of study was explained and informed consent was taken from the subjects. Total 100 Subjects were evaluated according to constant Murley score questionnaire and disability of subjects was evaluated using SPADI index. Data was collected and subjected to statistical analysis.

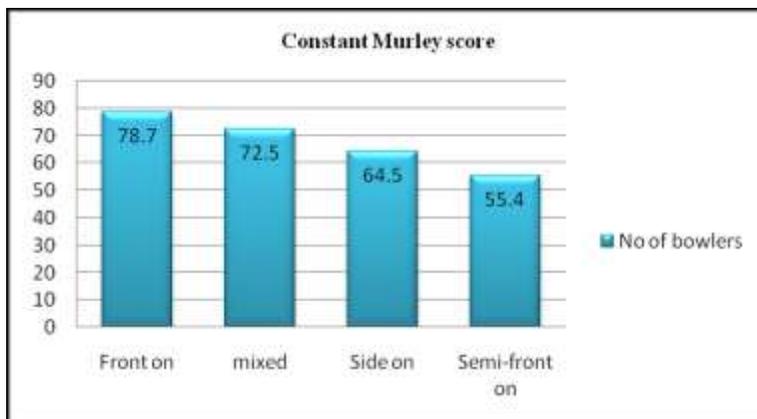
RESULTS:

Table 1:SPADI index with level of players and years of experience

Age Group of Bowlers	Level of Play		Years of Experience (Mean ± SD)	SPADI index (Mean ± SD) (0%- best and 100%-worst)	
	State	District		State	District
18-25	46	49	3.88 ±1.61	44.65 ±4.21	35.22 ±6.35
25-30	5	8	3.37 ±1.06	33.58 ±10.	38.12 ±6.1
30-35	0	1	8 ±0.0	0	38.75 ±0.0

Table 2: The Constant Murley score in different bowling actions

Type of action	Front-on (Mean ± SD)	Side-on	Semi-front on	Mixed
Constant Murley score (%)	78.7 ±2.5	72.5 ±2.5	64.5 ±2.3	55.4 ±0.8



Graph 1: The Constant Murley score in different bowling actions

DISCUSSION:

This study was done to investigate the incidence of shoulder injuries in fast bowler. The mean age of the participants included in the study was 22.31 and $SD \pm 2.45$ years, only male fast cricket bowlers were included in the study. In this study 100 fast bowlers were approached according to inclusion and exclusion criteria fast bowlers were selected.

In this study Constant-Murley score questionnaire is used to assess shoulder joint, which is 100 point scale composed of subjective as well as objective findings. Subjective findings (severity of pain, activities of daily living and working in different positions) have 35 points while objective findings (activity of daily living, movement and strength) have remaining 65 points. Using this questionnaire the incidence of shoulder injuries at state level between age group 18-25 was 44.65 ± 4.21 , 25-30 was 33.58 ± 10 and 30-35 was 0 and at District level between age group 18-25 was 35.22 ± 6.35 , 25-30 was 38.12 ± 6.1 and 30-35 was 38.75 ± 0.0 .

Our study concurred with Dennis et al suggested that there were two distinct pathways of how these bowling overuse injuries occurred; Continuous excessive exposure to a pattern of loading caused tissue to weaken to the point of injury or an otherwise normal load causes failure of the tissue that has been weakened because of an existing injury¹³.

The major cause of bowling injuries was not a single factor but rather combination of factors. These include one or more of the following: inadequate physical or physiological attributes, postural defects, poor bowling technique or high physical demands on young fast bowlers^{12,14,15}.

The system of these injuries can be explained on the basis of close biomechanical study of the joint including the functioning of the joint, muscles and ligaments and subject to the amount of stress they have placed on. Biomechanically fast bowling can be analysed as an action where internal shoulder rotator muscles continuously contract during the speeding up phase of the delivery (wind up, cockup, acceleration, deceleration and follow through)¹⁶.

In this study we found that bowling biomechanics affects the shoulder joint. This is supported by literature Sports and medicine and exercise science by G. C. Sathpathy et al, literature states that during throwing action there are repetitive micro traumatic stresses placed on athlete's shoulder joint which challenge physiologic limits surrounding tissues. Alteration in throwing mechanics may lead to tissue breakdown and injury. These injuries mostly involve glenohumeral capsule, glenoid labrum and rotator cuff musculature¹⁷.

The major risk indicators for injury were; bowling action, speed at which the bowler bowls; bowlers who had bowled a large number of days. The specific bowling technique of fast bowler is normally of concern to skill coaches, these actions and the way they place stress on body will significantly influence the amount and type of conditioning work that is undertaken with those bowlers¹⁸.

As the cricket is popular global sport gaining so much importance, success and financial status players are willing for becoming player at elite level. This has ultimately increased physical and emotional status in cricket, increased training and practice session has exposed them to risk of injuries. As there is higher injury risk at higher level of cricket due to increase in physical demand and increased training in the present study out of 30 participants 18 were state level fast bowlers while 12 were district level fast bowlers. In the present study to assess shoulder function we used Shoulder pain and disability index (SPADI).

The Shoulder Pain and Disability Index (SPADI) is a self-administered questionnaire that consists of two dimensions, one for pain and the other for functional activities pain dimension has 5 questions and for disability functional activities are assessed with 8 questions designed to measure degree of difficulty an individual has with daily activities that require upper extremity use. It showed that out of bowlers 30, 12 bowlers at District level were with disability 39.67 ± 8.71 and 18 bowlers at State level were with disability 42.22 ± 6.05 . The results shows that due shoulder injuries fast bowlers may suffer from shoulder disability.

Mandeep S Dhillon et al. in his study, the incidence of upper limb injuries in the professional and semi-professional cricket players a prospective observation summarized that incidence of upper limb injuries in the professional and semi-professional cricket players is significant, causing them to miss matches or practice for a significant number of days. This was the first study of Indian cricketers which showed high incidence of upper limb injuries. This study was done in all cricket players (Batsman, bowler- fast and slow, wicketkeeper, all-rounders) while our study only focuses on fast bowlers⁽¹⁾.

K D Aginsky et al. underwent a study on Shoulder injuries in provincial male fast bowlers; Predisposing factors stated that shoulder injuries were more common in fast bowlers with front-on action than the bowlers with side on or semi-front on, this study support our findings, In the present study it shows that incidence of Shoulder injuries was more in fast bowlers with front on(78 ±4.4)) action than side-on(64.5 ±2.3) or semi-front on(55.4 ±0.8) or mixed(72.5 ±2.5) type of action. The possible reason for this may be imbalance in the rotator cuff muscles combined with front on bowling action may be predisposing factor for shoulder impingement syndrome in fast bowlers ⁽¹¹⁾.

The result of our study concludes that there is incidence of shoulder injuries in fast bowlers and the injured bowlers suffer from shoulder disability. Modern cricket requires proficient players and proper biomechanics of whole body while bowling to avoid unnecessary injuries to any part of the body and thus fulfilling their potential in sports and practice further. In addition, further studies can be done on Study can be done to find out effect of shoulder injuries on functional performance in fast bowlers and comparative studies can be done to find out incidence of shoulder injuries in females and males.

CONCLUSION:

The study concluded that there is significant incidence of shoulder injuries in fast bowlers.

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Conflict of interest: None

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