

Association of Shoulder Injuries in Fast Bowling Cricket Players: A Systematic Review

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Abstract

Cricket is a safe sport with a relatively low overall player injury rate but, due to the extreme stress of repetitive vigorous shoulder loading, fast bowlers are highly prone to injuries, with bowlers accounting for 45%-60% of all injuries suffered by cricketers. Shoulder joint injuries are especially common, accounting for one-fifth to one-third of all injuries sustained by cricketers. Aim of the study is to evaluate the association of shoulder joint injuries in fast bowling cricket players. The objective of the study is to systematically review the literature on the association of shoulder joint injuries in fast bowling cricket players. Studies were collected from databases such as pubmed central, google scholar, rehab data, research gate, and SAGE journals. Studies such as clinical trials, randomized controlled trial were included, excluding reviews and case report (36 articles were reviewed through keywords, 22 were excluded, 8 were included and 6 were extracted finally for analysis). The study emphasizes the association of shoulder joint injuries in fast bowling cricket players. These studies investigated the prevalence of shoulder injuries in fast bowling cricket players.

Keywords: Cricket players; Shoulder injuries; Injuries in cricket; Sports physiotherapy

Introduction

Cricket is a national sport of Australia and it is the most popular game in India and is gaining importance in world wide. 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]. 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 motion. Bowling is the high intensity activity that consists of various dynamic postures [2,3]. 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 body. Shoulder biomechanics play important role in fast bowling

action. Phases of bowling includes run up phase, pre-delivery stride, delivery stride and follow through. Phases of throwing which mostly uses shoulder joint in bowling action includes preparation/wind up phase, cocking, acceleration, and deceleration. 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 tear [4]. 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 throwing. Hence to find out the incidence of shoulder injuries in fast bowlers is necessary. The upper extremities account for 25% of injuries in cricket players, respectively [5]. However, fast bowlers have a high incidence of shoulder injuries, with fast bowlers sustaining 42% of the upper extremity injuries to cricketers. Injuries in fast bowlers may be caused by a number of factors, such as postural defects, poor bowling technique, inadequate physical or physiological attributes, as well as high physical demands [6]. Further, during a match many bowlers are placed to field in the outfield and thus have a tendency to develop 'thrower's arm' and other injuries. Fast bowlers with a front-on bowling action are more susceptible to an injury of the shoulder. The presence of an imbalance between the agonist and antagonist groups is one of the major risk factors for developing shoulder injuries such as dislocation and impingement. Thus, the aim of the study was to investigate the relationship between shoulder flexibility and isokinetic strength as possible factors predisposing a male provincial fast bowler to shoulder injuries [7,8]. The findings would assist in a better understanding of the risk factors for shoulder injury in an elite fast bowler, thus suggesting methods for reducing the incidence of injury and contributing to a prolonged career with fewer shoulder problems. These shoulder injuries are more common in spin bowlers than fast bowlers. A decreased internal rotational difference and increased external rotational difference exist when comparing the dominant shoulder with non-dominant shoulder between overarm cricketers and non-throwing wicket keepers [9-11].

Study Design

This study is a systematic study based on PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-analysis) guidelines.

Selection of studies

The databases used for searching articles were: Cochrane library

Trial, Pub Med Central Research gate PEDro Database

After referring all the 36 articles, I got 6 articles which have fulfilled our eligibility criteria according to our inclusion criteria and risk of bias.

Inclusion and exclusion criteria

- Articles only available with English.
- Articles included subjects of fast bowling cricketers.
- All articles included young subjects between the age group of 15 to 30.
- Only recent articles were included from the year 2000 to take review on recent studies. Articles including subjects with previous shoulder injuries were excluded. Articles available only with abstracts excluded

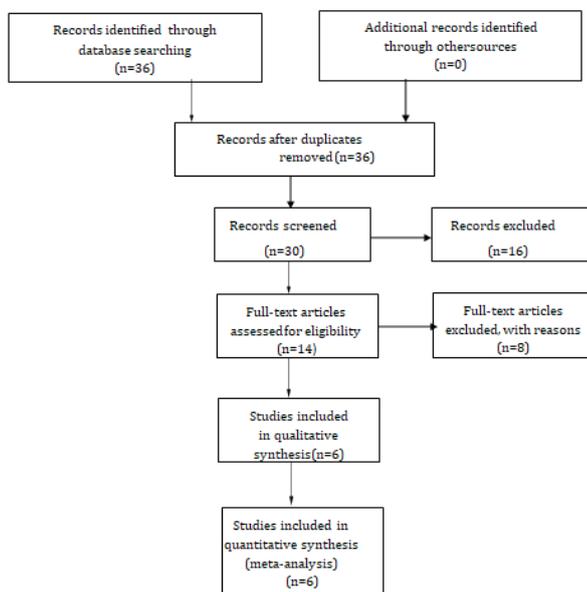


Figure 1: Study selection strategy.

Statistical Method

Assessment of study characteristics and risk of bias

Papers were critically analyzed for their methodological quality. Risk of bias was assessed using cochrane risk of bias tool. It evaluated seven sources of bias, including randomization, allocation concealment, blinding of participants and personnel, blinding of outcome assessment, completeness of outcome data, selective outcome reporting, and other potential bias and evaluated as being low risk, high risk, or unclear risk (Figure 2).

Data extraction and analysis

The author independently read full text of including articles and extracted all obtainable characteristics for each study, including design and blinding, sample size, control groups and final results. Data were extracted based on characteristics and observed effects. Descriptive analysis was used to compare the study characteristics: study design, type of falls, demographic data, number of participants and outcome measures.

Study	Risk of bias domains							Overall
	D1	D2	D3	D4	D5	D6	D7	
P.Sathya et al.,	⊖	⊕	⊖	⊖	⊕	⊖	⊗	⊖
D.Foster et al.,	⊕	⊕	⊕	⊖	⊕	⊖	⊕	⊕
Roxanne Davies et al.,	⊖	⊕	⊖	⊖	⊕	⊕	⊗	⊗
RA Stretch et al.,	⊕	⊕	⊗	⊖	⊖	⊕	⊖	⊕

Domains:
D1: Bias due to confounding.
D2: Bias due to selection of participants.
D3: Bias in classification of interventions.
D4: Bias due to deviations from intended interventions.
D5: Bias due to missing data.
D6: Bias in measurement of outcomes.
D7: Bias in selection of the reported result.

Judgement
⊖ Critical
⊗ Serious
⊖ Moderate
⊕ Low

Figure 2: Cochrane risk of bias tool.

Study Flow

Out of the 36 articles identified, 6 were selected as being related to reliability based on information in the abstract and title. Excluded studies, primarily for having inadequate detail about the method or insufficient data to include in this review. The final list of studies was selected after exclusion.

Quality of studies and risk of bias, for item random sequence generation all six studies showed a low risk of bias, for item blinding of participants and personnel, blinding of outcome assessment, bias was unclear in all six studies and outcome data measures, all six studies were considered low risk. The study emphasizes the association of shoulder injuries in fast bowling cricket players. These studies investigated the prevalence of shoulder injuries in fast bowling cricket players. However, fast bowlers have a high incidence of shoulder injuries, with fast bowlers sustaining 42% of the upper extremity injuries to cricketers.

Discussion

Only a few RCTs have investigated the association of shoulder injuries in fast bowling cricket bowlers; often with varying methodology qualities and have not been able to provide evidence regarding its usefulness. This systematic review could not provide a sufficient level of evidence, to highly recommend, as only a small number of studies were available based on search criteria. Still, the review provides some sort of evidence that there is prevalence of shoulder injuries in fast bowlers, based on the RCT studies evaluated. During detailed study selection, some articles were excluded, as few studies were not focused on a specific outcome. In the study, the incidence of upper limb injuries in the professional and semi-professional cricket players a prospective observation summarized the 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 [11,12]. This study was done in all cricket players (Batsman, bowler-fast and slow, wicketkeeper, all-rounder's) while our study only focuses on fast bowlers. In 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. In a study to compile an injury profile of 46 fast bowlers aged 11-18 years, and to identify the associated risk factors for injury during one academy cricket season. The fast bowlers selected were tested and observed for one academy cricket season. The results indicated that inadequate fitness, high bowling workload and bowling technique all have a multi factorial role in predisposing a bowler to increased risk of injury. In this study 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. Our study concurred with 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 injury. The aim of their study is to review the sources that describe biomechanical perspective of shoulder injuries and various preventive or counter measures in fast bowling. From this review it is evident that there is a need to continue with injury surveillance, identifying preventive strategies as well as a need for future research to be done to evaluate the efficacy of intervention strategies in order to reduce the risk of shoulder injuries in fast bowlers. Outcome measures have been highly varied between studies. In addition, studies failed to include the long-term follow up, to assess any change in outcome. Due to large number of limitations and less number of relevant articles, strong conclusion was not possible. Future studies should be taken to address these limitations and can also concentrate on prevention of shoulder injuries [13,14].

Conclusion

The evidence is of very low quality. There is low or very low-quality evidence to suggest that there is association of shoulder injuries in fast bowling cricket players based on short-term, clinically significant improvements in pain and functions. Shoulder was the most affected area in bowlers as well followed by knees, ankles/feet and hip. The study also concludes that on the basis of type of injury strain and sprain are the most

common types of injuries faced by the cricket players. Any further research of shoulder injuries to fast bowlers in cricket should be definitive, blinded, and of high quality.

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