

Etiopathogenesis of Anterior Glenohumeral Dislocation in Professional Rugby Players

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ABSTRACT

INTRODUCTION: The glenohumeral joint is the most frequently dislocated joint in the body. There are various types of dislocations, but the most common is anterior glenohumeral joint dislocation (95%). The injury mechanism is often forced abduction accompanied by external rotation of the arm. There are a series of injuries that make the shoulder more predisposed to the occurrence of this type of injury.

OBJECTIVE: Review the existing literature on the etiopathogenesis of anterior glenohumeral luxation/dislocation and the mechanisms that cause such injuries in Professional Rugby.

MATERIAL AND METHODS: Retrieval and re-analysis of data was carried out performing a critical review of existing literature published over the last 5 years and available on PubMed using the following key-word search criteria: "anterior shoulder dislocation", "shoulder injuries in rugby" and "shoulder injuries".

DEVELOPMENT AND LITERATURE REVIEW: Shoulder injuries are common in rugby players, but the mechanisms of injury are less understood. Glenohumeral luxation represents 14% of all shoulder injuries and 62% of the disorders occur during blocking the ball. In the majority of cases (71%), injury is sustained during a tackle. Horsley *et al* defines the primary mechanism of injury as direct tackling (56%), followed by falling onto the arm (10%). Acromioclavicular joint injuries were the most common, with shoulder dislocations and instability accounting for the most severe injuries and greatest periods of absence from matches and scheduled training. James Crichton *et al* found that dislocations of the glenohumeral joint were the most common injury in 67% of rugby players. These dislocations were accompanied by associated injuries. Contact was responsible for 97% of injuries, with tackling or being tackled accounting for 65%. Longo *et al* describe three mechanisms: abduction and external rotation, flexion and internal rotation and landing heavily on a flexed elbow. Heady *et al* describe the "Try Scorer", "Tackler" and "Direct Impact" mechanisms.

CONCLUSIONS: (1) Repeated direct impact (blocking of the ball and the tackle) is the leading cause of most shoulder injuries; (2) There are discrepancies in the existing literature on the order and frequency shoulder dislocations occur in these athletes, but there is consensus that it is a common injury, a severe injury and can be the cause of great instability; (3) In some instances, glenohumeral dislocations can be accompanied by other injuries; (4) There is similarity in the mechanisms of injury, but all do not completely coincide.

Key words: Shoulder dislocations; Rugby; Glenohumeral

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INTRODUCTION

Glenohumeral joint dislocation can be defined as the separation of the humerus from the scapula at the glenohumeral joint, causing articular incongruity with functional disability and a high pain component.

The glenohumeral joint is the most frequently dislocated joint in the body, with an overall incidence of 17 per 100,000 people/year. Glenohumeral dislocation is classified in many ways, including duration (acute vs chronic), degree (dislocation vs. subluxation), the mechanism of injury (traumatic vs atraumatic) and direction (anterior, posterior)^[1].

There are various types of shoulder dislocations but anterior dislocation is the most common at approximately 95%. Usually affecting people aged between 18-30 years old and is related to high-energy sports activity^[2].

The injury mechanism is often forced abduction accompanied by external rotation of the arm. The humeral head is placed in front of the glenoid and the patient presents with the arm at their side holding it with the contralateral. Shoulder deformities may also occur.

The incidence of neurological damage, especially the axillary nerve, is 8-10% so one should explore the sensitivity of the lateral aspect of the arm.

It is important to perform AP shoulder X-rays to rule out the presence of accompanying fractures.

There are a series of injuries that predispose the shoulder to anterior dislocation, such as: Hill-Sachs, lesions of the glenoid labrum, changes in the orientation of the glenoid, constitutional hyperlaxity, muscle hypotonia or alteration of the shoulder stabilizing elements^[3].

OBJECTIVE

The aim of this paper is to review the pathogenesis of anterior glenohumeral dislocation and the mechanisms that cause these injuries in professional rugby players.

METHODS

Key words: anterior shoulder dislocation/shoulder injuries in rugby/shoulder injuries.

Ten results were obtained from papers published over the last 5 years, of which the most commonly used were:

Crichton J, Jones DR, Funk L. *Br J Sports Med.* 2012 Jun. With 119 related citations^[4].

Headey J, Brooks JH, Kemp SP. *Am J Sports Med.* 2007 Sep^[5].

Horsley IG, Fowler EM, Rolf CG. *J Orthop Surg Res.* 2013 Apr^[6].

Longo UG, Huijsmans PE, Maffulli N, Denaro V, De Beer JF. *J Orthop Sci.* 2011 Jul^[7].

Source: PubMed

LITERATURE REVIEW

Shoulder injuries in rugby players are common, but the mechanisms of injury are less well studied. By understanding the common mechanisms of injury and identifying injury patterns, better injury prevention programs can be implemented^[8-13].

Rugby is a physical game, characterized by multiple high energy impacts during the course of a game. In the study by Crichton J *et al* conducted on 24 elite players, shoulder dislocations were common and severe and led to a considerable amount of time out of training and matches. Dislocation represented 14% of all shoulder injuries and 62% occurred while blocking the ball. The right shoulder was injured more (63%) than the left at 37%. Most of the time injury occurred during a tackle (71%)^[4].

In recent years there has been an increase in the frequency and severity of shoulder injuries among rugby players. This may be because the game has become more aggressive and intense, and that over the years the game has become largely an amateur sport to one that is played at a professional level^[14].

The incidence of injury in Premiership rugby is 40.3 injuries per 1,000 hours played. During one season studied, the incidence of shoulder injuries was significantly lower during training (0.10 Player/1,000 hours played) compared with matches (8.9 players/1,000 hours played) and the number of days lost due to the dislocation or instability was 176 days for 1,000 hours played^[14].

This sport is unique in its rules and ways of tackling and one might expect a typical injury pattern to follow the repeated tackles in training and matches. A typical feature of professional rugby players is also a generally high pain threshold^[15].

In a retrospective study of 87 elite players by Horsley *et al*^[6] the main mechanism of injury was the direct tackle (56%), followed by a fall on the arm (10%). However, in 30% of cases injury mechanism could not be obtained because the players could not remember exactly how they were injured. The main surgical finding was that most patients had multiple shoulder pathologies: 75% of patients had two or more conditions. In all cases they presented pain with activity and movement, and in nine cases instability as a clinical complaint along with pain. A feeling of weakness was detected in certain positions of the shoulder in 45% of cases^[14].

Shoulder injuries occur in 17,000 hours of match play and 200,000 hours of training. First team players at the English Rugby Football Union were surveyed. The injuries reported were shoulder hematomas (12%), dislocation or instability (14%), injury to the acromioclavicular joint (32%), rotator cuff injuries or impingement (23%) and fractures (1%). Injuries to the acromioclavicular joint were therefore the most common along with shoulder dislocations and those that give greater instability, severity and longer duration of absence from training and scheduled games^[6].

James Crichton *et al*^[4] found that dislocations of the glenohumeral joint are the most common injury in 67% of rugby players. These dislocations were accompanied by associated injuries such as anterior or posterior labral tears or SLAP type and Hill-Sachs lesions. Acromioclavicular joint dislocations were observed in only 8% of the players in this study. Only injuries attended to by a specialist shoulder surgeon were included. This would explain the difference from the study by Headey *et al*, as it is likely that many of the ACJ injuries in rugby often settle and don't require an expert opinion.

Direct impact was responsible for 97% of injuries, 65% tackling or

being tackled making tackling the primary injury mechanism^[6].

Longo *et al*^[7] describe the first study of the mechanism of anterior dislocation of the shoulder in elite rugby players and recognize three mechanisms:

First and most common is when the arm is in abduction and external rotation.

Second, fall with the arm in flexion and internal rotation, with another player on top, prying the humerus out of the glenoid.

Third, player falls on the tip of the elbow flexed longitudinally loading the humerus and dislocation of the humeral head occurs.

The authors suggested that rugby players are also at risk of anterior dislocation by hyperflexion with internal rotation.

Subsequently, James Crichton *et al*^[4] also define three possible mechanisms of injury:

1. "Try Scorer": The mechanism involves the injured arm in flexion, specifically above 90°. A posterior force drives the arm backwards and exerts leverage on the glenohumeral joint with the arm either remaining in fixed flexion by contact with the ground, or forced into further flexion. This may be compounded by opposing players falling on top of the injured player, providing additional loading forcing the arm into greater flexion.

2. "Tackler": This occurs most commonly when the player tackles an opponent travelling towards them. The arm is held abducted to 90°. A posteriorly directed force, resulting from contact with the ball-carrying player, extends the abducted arm behind the player in the plane of abduction, again exerting a levering force on the glenohumeral joint. This mechanism is the least frequent (4/24 players).

3. "Direct Impact": This was seen in ball-carrying players sustaining direct impact from a tackling opponent directly on the shoulder and in tackled players falling onto the shoulder. The arm is held flexed below 90° (six players) or in neutral, with internal rotation, such as when carrying a ball by the side. A medially directed compressive force caused by direct impact to the shoulder results in injury. This is the second most common mechanism (8/24 players).

CONCLUSIONS

1. Repeated direct impact (blocking of the ball and the tackle) is the leading cause of most shoulder injuries.

2. There are discrepancies in the existing literature on the order and frequency shoulder dislocations occur in these athletes, but there is consensus that it is a common injury, a severe injury and can be the cause of great instability.

3. In some instances, glenohumeral dislocations can be accompanied by other injuries.

4. There is similarity in the mechanisms of injury, but all do not completely coincide.

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CONFLICT OF INTERESTS

There are no conflicts of interest with regard to the present study.

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