



Original article

Anterior internal impingement of the shoulder in rugby players and other overhead athletes

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Abstract

Background/Objective: Impingement syndromes are a common cause of shoulder pain in overhead athletes. Anterior internal impingement is a recently suggested mechanism for activity-related pain of the shoulder. Impingement syndromes were initially described to occur due to repetitive or excessive contact between the rotator cuff and other structures in the shoulder.

Methods: This is a retrospective, clinical case study reporting 54 consecutive cases of anterior internal impingement in overhead athletes, of which 28 (51.2%) cases were of rugby players. All had undergone physiotherapy without relief of the symptoms. Of 54, there were 45 male and 9 female patients with an average age of 27 years (range, 17–51). The mean duration from injury to surgery was 40.7 weeks (range, 5–364). Of the 54 patients, 29 (53.7%) were full-time professional and 25 (46.3%) were semiprofessional or recreational athletes. The players associated the onset of pain occurred following an injury in 29/54 cases (53.4%), whereas in the remaining 25 cases (46.2%), a gradual onset of symptoms was described. All 54 patients could demonstrate a “functional impingement sign” in positioning their arm and provoke pain.

Result: On examination, the examiner could reproduce the same pain in 38/54 (70.3%) patients only. Of the 54 patients, “SLAP tests” including O’Brien’s test, Palm up test, and compression rotation test were positive in shoulders of 39 (72.2%) patients, Jobe’s test in 27 (50%), Gerber’s lift off test in 6 (11%), and Hawkins’s test in 6 (11%) patients. During arthroscopic assessment, impinging flap tears were found in 44 (81.4%) patients from the SLAP, whereas undersurface rotator cuff flap tears were found in 24 (44.4%), flap tears from the anterior or inferior labrum were found in 16 (29.6%), and distal subscapularis flap tears were found in 10 (18.5%) patients. Only in 12/54 patients (22.2%) was an isolated pathology found, in all cases SLAP tears. Treatment included vaporisation and excision of the impinging flaps. In 15/54 (27.7%) patients, repair of an unstable SLAP tear was undertaken using absorbable suture anchors and fibre wires. All athletes returned to their previous activity level within 17.2 weeks (range, 6–36) from surgery and were discharged when they claimed that they were symptom free.

Conclusion: This series of anterior internal impingement, which we believe is the largest in the literature to date, demonstrates the value of an to assess and successfully treat overhead athletes with anterior impingement syndrome.

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Keywords: anterior shoulder impingement; posterior shoulder impingement; rugby shoulder pain; shoulder arthroscopy; SLAP tear

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Introduction

Impingement syndromes are a common cause of shoulder pain^{1–4} in overhead athletes. They were initially described to occur due to repetitive or excessive contact between the rotator cuff and other structures in the shoulder.⁵ In 1972, Neer⁶ introduced the external impingement syndrome. He reported that mechanical impingement of the rotator cuff tendon occurs beneath the anteroinferior portion of the acromion, especially when the shoulder is in a forward-flexed and internally rotated position. Consequently, this syndrome was labelled external or subacromial impingement.^{7–9} First described in 1992 by Walch et al,¹⁰ posterior internal impingement was defined as excessive contact between the undersurface of the supraspinatus and infraspinatus tendons with the posterior superior glenoid rim or labrum.^{10–13} Although this contact between the undersurface rotator cuff and posterior superior glenoid is physiological,^{7,10,12,14,15} it is supported in the literature that posterior internal impingement can be a mechanism of injury.^{2,11,12,14–17} The biomechanics of an overhead throwing motion is believed to intensify the contact between the structures, resulting in a tissue injury.^{10,12–16,18} Lesions on the articular posterior aspect of the supraspinatus tendon and/or portion of the infraspinatus tendon as well as Type I or II SLAP lesions have also been identified using arthroscopy in overhead athletes.^{10,12,13} Paley et al¹⁶ reported undersurface cuff fraying in 93% of overhead athletes with posterior internal impingement, and posterior-superior labral fraying was found in 88%.

More recently, a type of internal impingement separate to posterior internal impingement has been described.^{3,4,19} Anterior internal impingement was first introduced to by Gerber and Sebesta⁴ as a different form of intra-articular impingement responsible for pain of the shoulder. They showed that impingement of the undersurface of the pulley and the subscapularis tendon occurs against the anterosuperior glenoid rim in a position of flexion and internal rotation of the arm. This contact has also been shown in cadaveric studies.^{20,21} It has been suggested that such contact is physiological.³ However, in cases of partial rotator cuff tears and flaps, the contact may become pathological as the fragmented tissue is sheared and compressed between the superior humeral head and glenoid. One study found that when lesions of the pulley or the subscapularis tendon were present, they could be shown to contact corresponding lesions of the anterosuperior glenoid labrum in the flexed internal arm position.⁴ Similar to posterior internal impingement, this may contribute to lesion formation.^{4,19} Gerber and Sebesta⁴ claimed that because of repetitive, forceful internal rotation manoeuvres above the horizontal plane, friction damage results from impingement between the pulley system and subscapularis on one hand and the anterior superior glenoid rim on the other, leading to the aforementioned pathological lesions. Such movement is typical in overhead sports, such as tennis, but also occurs as a repetitive movement during overhead work, such as brick laying.⁴ Struhl³ claimed that the presentation of patients with anterior internal impingement is

often identical to that of patients with subacromial impingement, making preoperative identification impossible. However, the mean age of patients in their review was 37 years, well below the usual age for patients with subacromial impingement. Hence, although these patients had signs and symptoms similar to those with subacromial impingement, their relatively young age lowered the index of suspicion for that diagnosis. As a relatively new site of impingement, clinical reports on anterior internal impingement in the literature remain limited.^{3,4,19}

This study reports 54 consecutive cases of anterior internal impingement in overhead athletes. The series, which we believe is the largest in the literature to date, describes the clinical presentation, introduces a concept of a “functional impingement sign” correlated to intra-operative pathology and consequential treatment, highlighting the importance of a sport-specific approach to the management.

Materials and methods

This is a retrospective, clinical case study. All players signed a written consent for treatment and surgery. All the surgeries and clinics occurred at Sheffield Centre of Sports Medicine, Sheffield, UK. It was at the time fully owned by the University of Sheffield, but it ceased to exist in 2009. The University Clinic received a general ethical approval from the University Ethical Committee to conduct audition and research of which the patients were informed and agreed to when entering the clinic, but no specific ethical approval was applied for this particular study of the records of anonymised patients. In total, 54 consecutive athletes were referred due to overhead activity-related pain and underwent clinical assessment and arthroscopic surgery by a senior orthopaedic surgeon at a Sports Medicine Centre. All had undergone physiotherapy without relief of the symptoms. These 54 cases accounted for 14.7 % of the 365 arthroscopic shoulder procedures performed in athletes at our centre over this time. All complained of activity-related pain on overhead activities as the main symptom, in some cases associated with stiffness or weakness. Cases treated for instability, fractures, external impingement, posterior impingement, complete rotator cuff tears, frozen shoulder, and post-traumatic stiffness were excluded. The clinical assessment incorporated documenting the patients’ age, sex, activity level, sport, side of injury, mechanism of injury, duration of symptoms, and previous treatment interventions. All patients were examined by the same senior surgeon. Range of motion, Sulcus sign, Wilcoxon’s criteria for general joint laxity, apprehension test, Hawkins impingement test, Neer’s internal impingement test, O’Brien’s test, Gerber’s lift off test, across body test, compression and rotation test, Palm up test, and Jobe’s test were undertaken comparing both sides. A “functional impingement test” was undertaken guided by the athlete’s presentation. This functional test was performed by the examiner guided by the athlete’s demonstration of pain provoking movement in order to try to reproduce the symptoms.

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