

## Case Report

## Pan-labral tear of the shoulder joint in a non-athlete patient with six years history of recurrent shoulder subluxations and intraoperative findings of osteoarthritic changes: A case report

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## ABSTRACT

The hypermobility of the glenohumeral joint accounts for its anatomic predisposition for instability and dislocation. The stability of the shoulder joint is dependent on static and dynamic soft tissue structures, among which is the labrum. Circumferential labral tears are a rare pathological entity of shoulder instability that have not been commonly reported in the literature. A detailed history and physical examination are crucial for accurate diagnosis since MRIs have a poor sensitivity. A 40-year-old male patient with a history of atraumatic recurrent left shoulder subluxations for 6 years. On physical examination, there was no evidence of motor or sensory deficit. MR images were suggestive of Hills-Sachs lesion with intact rotator cuffs. Pan-labral tear repair via arthroscopy presents a unique challenge, even for the skilled orthopedic surgeon. Hence, the repair demands accessory portals and percutaneous techniques for the adequate placement of anchors. The purpose of this case is the rare presentation of a pan-labral tear repaired arthroscopically.

## Introduction

When compared to other joints, the glenohumeral joint has a greater range of motion which explains its anatomic predisposition for instability and dislocations since the glenoid is significantly shallower than the acetabulum when compared to the hip joint for example. Henceforth, the stability of the glenohumeral joint is dependent on soft tissue structures, both static and dynamic. In addition to the rotator cuff muscle group which acts as humeral head depressor, the labrum provides further stability to the glenohumeral joint by adding certain depth to the glenoid [1–4]. The superior half of the glenoid labrum is, to a certain extent, loose and mobile; thus, respecting the hypermobile status of the glenohumeral joint. The inferior half of the glenoid labrum is relatively more tightly attached to the glenoid; thus, providing further stability to the glenohumeral joint [5]. The most common anatomical locations for glenoid labral tears are the anteroinferior and the superior labra. Andrews et al. described Superior Labral tear from Anterior to Posterior (SLAP) lesions which are posterosuperior labral tears extending anteriorly [6,7]. Snyder et al. categorized SLAP lesions into four categories [8] with SLAP type II lesion being the most common [6]. In SLAP II lesion, there is detachment of both the superior labrum and the tendon of the biceps brachii muscle from the superior glenoid rim [6]. Maffet et al. added three more types of SLAP lesions to the initial Snyder's classification [9]. Powell et al. further introduced two new variants of SLAP lesions to the classification which are type VIII and type IX, with the latter being a circumferential tear or a pan-labral tear which is the combination of several lesions involves the anterior, posterior, superior, and inferior aspects of the labrum [10]. In their study conducted in 2008, Owens

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et al. found that among the patients undergoing surgery for labral tear, 28.8% had labral lesions in more than one functional area such as a SLAP lesion with an associated Bankart lesion. Moreover, 6.5% of the patients had lesions in the anterior, posterior, and superior labrum (triple lesion) [11]. One of the largest studies involving pan-labral tears was conducted by Tokish et al. which involved 41 shoulders in 39 patients in a military population. The initial presentation of 26 of these shoulders was anterior instability while nine of these shoulders presented with posterior instability. For the rest of these shoulders, the direction of the instability could not be established. Moreover, 39 of the 41 shoulders had a positive apprehension test on physical examination. These lesions were managed arthroscopically, and a 15% failure was reported [12].

Circumferential glenoid labral tears represent a rare and small, but significant, entity of labral injuries. However, such combined lesions of the glenoid labrum have not been commonly reported in the literature [13]. Moreover, Ricchetti et al. reported that circumferential glenoid labral tears were frequently missed on preoperative MRI, showing poor sensitivity of preoperative MRI for detecting combined labral lesions. Hence, detailed history and physical examination are fundamental in establishing the diagnosis and for performing the adequate treatment at the time of surgery. Subsequently, orthopedic surgeons should be prepared at the time of surgery for the possibility that the labral lesion is more extensive than what is seen on imaging modalities [13].

The literature contains conflicting results regarding the relationship between the extent of the labral lesion and the number of shoulder dislocations [14–16].

Herein, we report a case of a non-athlete patient with 6 years history of recurrent atraumatic shoulder subluxations presenting with pan-labral tear of the left shoulder.

### Case presentation

A 40-year-old right-hand dominant boxer male patient, with a 6-year history of recurrent left shoulder subluxations, around 8 episodes per year, involuntary and painless that eventually became voluntary and painful, initially caused by indirect trauma due to overhead lifting of heavy object, treated conservatively and a positive past surgical history for right shoulder arthroscopy for anterior dislocation of the right glenohumeral joint, presented to our hospital with a chief complaint of left shoulder instability. The patient denies any hereditary musculoskeletal disorders, or any traumatic events sustained to his left shoulder. Upon initial presentation, the patient reported left shoulder pain and limited range of motion but denies any neurological deficits in his left upper extremity. On physical examination of his left shoulder, the patient was found to have no deformity, some muscle atrophy, pain with active range of motion in all direction, slight pain with passive range of motion. We used the modified Hawkin's classification as modified by Edward McFarland; A defined as can reach the rim of glenoid, B defined as can subluxate over the rim. The laxity test shows subluxation in all direction, anterior drawer test b with pain, posterior drawer test b with pain, Jobe test positive, O'Brien test positive, Apprehension test positive, Neer test positive, Sulcus sign positive, relocation test negative, Hawkin's test negative.

Upon examination of the right shoulder, findings were normal and signs of any shoulder instability or ligamentous instability were absent. The neurological exam was normal with preserved strength and sensation in all nerve distributions of the upper extremities bilaterally, including the axillary nerve distribution.

Shoulder X-ray was chosen as an initial imaging modality for the assessment of the left shoulder. On anteroposterior and lateral views, the patient was found to have posterolateral humeral head defect of the left shoulder. Magnetic resonance imaging without contrast was subsequently performed for further evaluation of the patient. On the axial (Fig. 1), coronal (Fig. 2) and sagittal (Fig. 3) view of a fat-suppressed T2-weighted image without contrast showed increased signal in the anterior, inferior, and posteroinferior labrum, which is suggestive of a pan labral tear. No rotator cuff tear detected. (See Table 1.)

Subsequently, the patient was scheduled for left shoulder arthroscopy. Under general and loco-regional (nerve block) anesthesia, the patient was put in the beach chair position with the head rest and traction. Subsequently, the patient was secured and strapped.

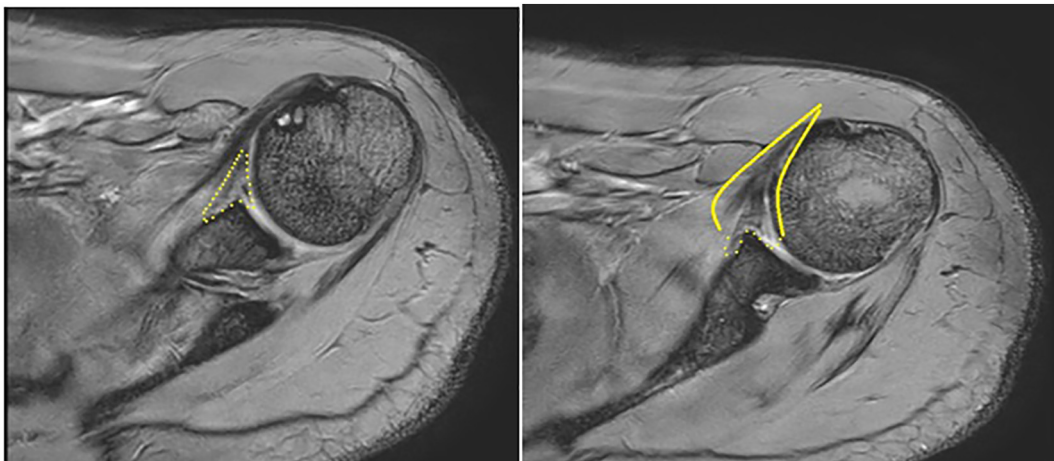


Fig. 1. Axial T2 MRI of the left shoulder showing panlabral tear with osteoarthritis.

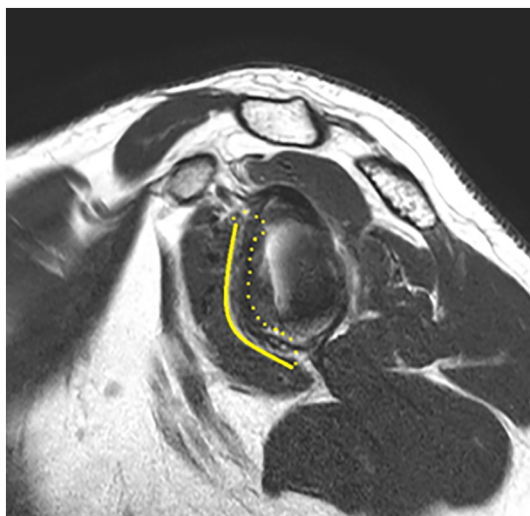


Fig. 2. Coronal T2 MRI of the left shoulder showing panlabral tear.

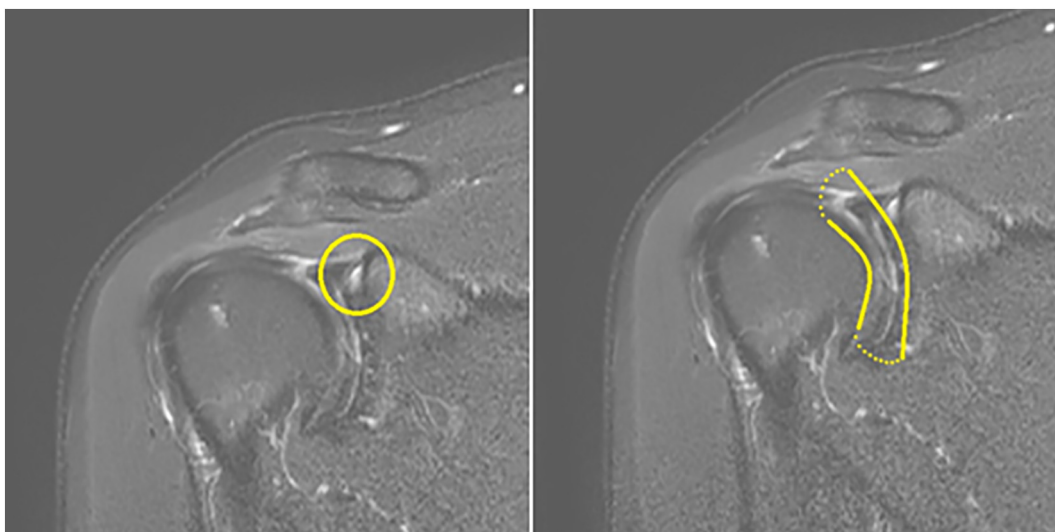


Fig. 3. Sagittal T2 MRI of the left shoulder showing panlabral tear.

**Table 1**

Classification of SLAP lesions [8–10].

SLAP type	Description
Type I	Fraying of the superior labrum with intact biceps anchor
Type II	Detachment of biceps anchor (biceps instability)
Type III	Bucket-handle tear, biceps anchor intact
Type IV	Bucket handle tear, biceps anchor detached
Type V	SLAP lesion with anterior-inferior extension (Bankart) (i.e. Bankart + SLAP)
Type VI	Superior flap tear
Type VII	SLAP lesion with capsular lesion (SLAP with extension into the middle glenohumeral ligament)
Type VIII	SLAP lesion with posterior labral extension
Type IX	Circumferential tear (pan-labral)
Type X	SLAP lesion with associated posterior-inferior labral lesion (reverse Bankart) (rotator interval extension)

The left shoulder was scrubbed and draped in a standard fashion.

First, a posterior viewing portal was established. Then, an anterior rotator interval portal through an outside-in spinal needle technique.

Arthroscopic evaluation of the left glenohumeral joint through a posterior portal was performed with additional examination of the biceps, the rotator cuffs with the rotator interval capsule, the anterior glenohumeral ligaments, anteroinferior and posteroinferior capsular recesses, and entire labral rim and attachment to the glenoid articular cartilage. At arthroscopic inspection, a 360° labral tear was confirmed with additional findings of articular cartilage degeneration.

Starting with supero-anterior labrum and biceps anchor tear, an accessory anterior-superior lateral portal is established at a position one cm anterolateral to the anterolateral acromion border. This portal is localized by an outside-in spinal needle technique. An accessory posterolateral portal was required and used in this case.

Supraglenoid tubercle was prepared with a burr. 8 mm cannulas are used for suture shuttling. The 10 and 12 o'clock labral areas are predrilled. One suture anchor is placed at 11 o'clock and biceps anchor-labral complex was reattached.

Next, the posterior-inferior labral tear is addressed. The 9 to 6 o'clock area of the glenoid rim is debrided with a burr, lasso suture is used to bring the labrum into place. Then an anchor, placed at 7 o'clock, was used to fix the tissue ensuring adequate capsule tension.

Lastly, the anteroinferior labral tear will be repaired. Preparation cortical rim with a burr is done from two to six o'clock position. Then, two suture anchors were placed at 3 o'clock and 5 o'clock and with the help of the Lasso(arthrex) they fixed the labral defect adequately.

The exploration of the subacromial space revealed an inflamed bursa. Subsequently, subacromial bursectomy was performed.

Closure with 3-0 nylon suture done, dressing and shoulder immobilizer was placed.

The patient had an uneventful postoperative course with no pain or neurological complaints, and he was discharged day one postoperatively.

## Discussion

Combined lesions of the glenoid labrum are when the labrum sustains lesions in more than one quadrant. These lesions are being increasingly recognized as a unique glenohumeral pathological entity [11,17,18]. Ever since they were described by Powell et al. and their classification as type IX SLAP lesions [10], pan-labral tears of the glenoid have not been commonly reported in the literature [18]. This subset of combined glenoid labral tears involves the full detachment of the labrum from the glenoid rim anteriorly, posteriorly, superiorly, and inferiorly [10,18]. It has been hypothesized that recurrent episodes of shoulder instability may explain the pathological biomechanism of a pan-labral tear. However, the literature contains conflicting results regarding a relationship between the frequency of shoulder dislocations and the extent of labral tears as previous reports described a positive correlation [14,15,18] while others have reported the absence of such relationship [16]. Tokish et al. conducted one of the largest prospective studies involving circumferential glenoid labral tears among the military population. The authors found that 78% of these patients had evidence of anterior shoulder dislocation while 22% of these patients had evidence of posterior shoulder dislocation.

The circle concept of instability proposed the pathologic biomechanism of the development of a circumferential glenoid labral tear. This concept states that shoulder instability in one direction should be accompanied by lesion on the opposite site. For example, anterior shoulder instability should be accompanied by a posterior lesion [18].

MRIs have showed poor sensitivity for preoperative identification of circumferential labral tears. Hence, the surgeon should expect intraoperative findings of a more extensive labral lesion. Subsequently, the acquisition of preoperative information through medical history and physical examination in addition to imaging modality are more beneficial in establishing a diagnosis.

Most pan-labral tear cases found in the literature involve patients who sustained a traumatic event, athletic patients, or patients of military background. Herein, we presented the case of a boxer, non-military personnel patient with a negative history for a direct trauma to his shoulder. Our patient has a six year history of recurrent subluxation events who did not initially seek medical attention that became painful starting one year before presentation. It is important to highlight the special features found in our patient including the chronic history of subluxations over six year due to neglect, the involuntary subluxation that developed into voluntary subluxation. Initially it was painless, but eventually it became painful, with a frequency of one episode per month on average.

Therefore, recurrent anterior shoulder involuntary subluxations should not be neglected even if it is pain free because it may become voluntary and painful due to osteoarthritis.

## Conclusion

Circumferential tears of the glenoid labrum have been poorly reported in the literature since they were first described by Powell et al. pan-labral tears are more commonly associated with shoulder dislocations which can be recurrent dislocations or first episode of dislocation. Moreover, newer research denies the relationship between the frequency of shoulder dislocations and the extent of the labral tear. History, physical exam, MRI, and arthroscopic inspection are essential to paint the clinical picture of a pan-labral tear. Arthroscopic repair of circumferential labral tears has showed good outcome.

## Declaration of competing interest

No funds were received in support of this study.

The authors declare no conflict of interest regarding the publication of this article.

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