

Partial Cuff Tear

The average thickness of the normal tendon of the rotator cuff is 10 to 12 mm.

3 subtypes

- 1) a bursal-side tear (BT)
- 2) an intratendinous tear (IT)
- 3) a joint-side tear (JT)

JT is 3 times common than bursal side. IT is less common

Ellman

Depth as measured arthroscopically by a probe with a 3 mm bent arm.

Grade-I tears had a depth of less than 3 mm,

Grade II of 3 to 6 mm and

Grade III, > 50%

Some JTs, which develop in young throwers and other overhead athletes secondary to internal impingement.

Pathogenesis

The pathogenesis of a tear of the rotator cuff involves two main mechanisms: outlet impingement and an intrinsic degenerative process. Although differentiating between tendinosis and a partial tear with MRI is difficult, it is a noninvasive technique with the ability to define reliably pathologic changes that are associated with chronic impingement, such as tendinitis or degeneration of the tendon.

Our findings imply that articular side tears are mainly associated with intrinsic pathologic changes of the rotator cuff. On the other hand, at least some of the shoulder discomfort in patients with articular side tears comes from secondary subacromial attrition due to a persistent dysfunction of the rotator cuff. [Int J Shoulder Surg. 2012 Jan-Mar; 6(1): 15–18.]

Current data show persistent pathologic changes on the acromioclavicular joint side of the acromion in all patients with bursal side tears. This indicates that the acromial insertion of the coracoacromial ligament is the area where impingement of the cuffs.

During the aging process or repeated injuries, the rotator cuff becomes degenerative, and articular side tears occur due to degeneration and hypovascularity. The repeated attrition leads to reactive and degenerative osseous changes, such as osteophytic traction spurring of the coracoacromial ligament.

In young patients, there may be no pathologic changes of the rotator cuff in the presence of acromial pathology—a clinical impingement. A bursal-side defect in the rotator cuff may then be caused by direct attrition between the rotator cuff and the acromial degenerative traction spur.

PABST [partial anterior bursal side tear] lesions are usually located in the far anterolateral insertional part of the supraspinatus tendon at the bursal side. PABST lesions usually occur in relatively young patients, and trauma is frequently associated. Thus, the pathogenesis of tears of the rotator cuff is now considered to be multifactorial, and there is interplay of age-related tissue degeneration, trauma, repetitive microtrauma, internal impingement, hypovascularity, enthesopathy, and subacromial impingement.

Thrower's shoulder [internal impingement]

Internal impingement of the shoulder is a pathologic condition characterized by excessive or repetitive contact of the greater tuberosity of the humeral head with the posterosuperior aspect of the glenoid when the arm is abducted and externally rotated. This arm positioning leads to rotator cuff and glenoid labrum impingement by the bony structures of the glenohumeral joint. Internal impingement as a disease state that affects overhead athletes and is characterized by the development of articular-sided rotator cuff tears and postero-superior labral lesions. The precise cause of these impingement lesions remains unclear. However, it is believed that varying degrees of glenohumeral instability, posterior capsular contracture, and scapular dyskinesis may play a role in the development of symptomatic internal impingement.

It seems clear that the thrower's shoulder is particularly at risk for the development of internal impingement due to the repetitive and forceful nature of the overhead throw and its requirement that the arm be in the abducted and externally rotated position. Articular-sided, partial-thickness lesions at the musculotendinous junction of

the infraspinatus tendon or at the distal insertion of the supraspinatus tendon, posterosuperior labral tears, and a loss of glenohumeral internal rotation are the hallmark findings of this condition.

While physical examination findings alone seldom establish the diagnosis, posterior joint line tenderness, the posterior impingement sign, and the relocation sign should raise one's index of suspicion for internal impingement.

There are several commonly identified radiographic and MRI findings in patients with internal impingement, but the high frequency of similar abnormal findings in asymptomatic throwers makes correlation of such findings with clinical symptoms essential.



Bursal Tear



C/F

Night pain: is the most irritating symptom.

BTs were found to be the most painful of the three subtypes and therefore surgery should be carried out.

The physical signs are non-specific.

Signs: Painful arc, an impingement sign, a positive procaine test.

Investigations

1. Shoulder arthrography: Arthrography of the shoulder allows evaluation of the integrity of the undersurface of the rotator cuff.

2. Ultrasonography: Accurate for the diagnosis of full-thickness but not of partial-thickness tears. The appearances in the latter may be subtle and present difficulty in

diagnosis. Fluid within the tendon of the rotator cuff produces a focal hypoechoic area. It is difficult, however, to distinguish partial-thickness tears from scarring within the tendon or a small full-thickness lesion. Small defects in the cuff can be missed. The investigation is dependent on the skill and experience of the operator in both performance and interpretation.

3. MRI. The use of adjunctive contrast or of fat-suppression techniques may improve accuracy in detection, but consistency has not been demonstrated.

4. Diagnosis at surgery

The use of arthroscopy has allowed visualisation of partial thickness tears on the joint and bursal side, if adhesions are adequately controlled. Diagnosis of the intratendinous tear still remains elusive.

Incising the tendon along its fibres for direct visualisation of the substance or undersurface of the tendon is also a helpful diagnostic maneuver.

Natural Course

Yamanaka undertook an arthrographic follow-up over two years on 40 JTs, which had not been treated by operation, and found that 10% decreased in size and 10% disappeared, but that the remaining 80% enlarged or progressed to full-thickness lesions.

Treatment

1. Spontaneous healing of a partial-thickness tear is unlikely in most cases.
2. Treatment of most symptomatic partial tears should be directed towards a primary diagnosis such as an impingement syndrome or instability, with treatment of the partial tear itself being considered secondarily.
3. **Conservative.** Most surgeons agree with the principle that treatment of disease of the rotator cuff varies according to the pathology and that initially conservative treatment should be used. The latter is primarily indicated for tendon and bursal inflammation.
4. The judicious use of no more than three injections of steroid into the subacromial space or around the biceps tendon can also be helpful in the early phase.
5. Physiotherapy is increased as inflammation diminishes and pain subsides. Posterior capsular contracture is addressed by progressive stretching in

adduction and internal rotation. Horizontal adduction or cross-body adduction exercises are recommended to release the posterior capsule. As pain decreases and the range of movement increases, strengthening exercises for the rotator cuff and periscapular musculature are prescribed to restore the normal mechanics of the shoulder girdle. Most BTs respond poorly to conservative treatment.

6. Fukuda recommended early surgical intervention when the severe clinical manifestations and positive imaging suggest such a diagnosis.

Operative. The indications for the surgical treatment of partial-thickness tears have not been clearly delineated. Surgical treatment, however, is generally considered for those patients with symptoms of sufficient intensity and long duration, and in whom imaging suggests the presence of partial or small full-thickness lesions. The timing of surgical intervention after failed conservative treatment ranges from a few months to 1.5 years.

Operation may involve debridement of the partial tear, acromioplasty alone, acromioplasty and debridement or repair of the cuff in addition to acromioplasty. Most clinicians agree that tears involving more than 50% of the thickness require repair.

BTs are easily identified but synovial proliferation may mask. In order to detect both intratendinous and joint-side lesions, the critical portion of the tendon of supraspinatus and the adjacent area should be carefully palpated for thinning or softening. Indigo Carmine or Methylene Blue (3 ml mixed with 17 ml of normal saline) is injected into the glenohumeral joint and the shoulder is put through a range of movement. Torn cuff tissue is easily stained by the dye.

Results of treatment

There is no reliable report on the conservative treatment of partial tears.

1. Wright and Cofield: reported overall satisfactory (excellent and good) results in 50% to 94% of patients.
2. Budoff reported that arthroscopic debridement of the rotator cuff without subacromial decompression yielded satisfactory results in 87%.
3. Fukuda reported on acromioplasty and open repair on 66 patients with partial-

thickness tears of the rotator cuff. Satisfactory results were obtained in 62 patients (94%) with an average follow-up of 32 months.

1. Pathogenesis: (*J Shoulder Elbow Surg* 2006;15:271-278.)
2. Fakuda. VOL. 85-B, No. 1, JANUARY 2003
3. Internal impingement. *Am J Sports Med* 2009 37: 1024