Bicipital Tendinopathy

**Synonym:** biceps tendonitis

Bicipital tendinopathy occurs in the long head of the biceps tendon as it runs on the anterior aspect of the humerus between the attachments of the supraspinatus (greater tuberosity) and subscapularis (lesser tuberosity). The function of the biceps brachii muscle is supination and flexion of the forearm. Problems with the biceps tendon can result from impingement or from inflammation. Bicipital tendinopathy can also occur secondary to compensation for other shoulder disorders, particularly rotator cuff disorders, labral tears and intra-articular pathology[1].

The diagnosis can be difficult not just because there are many other causes of shoulder pain but also because it is common for several different problems to exist in the same shoulder and contribute to a sometimes confusing clinical picture. Injuries appear to occur more often among patients who engage in frequent pulling, lifting, reaching or throwing (work or recreation). It occurs typically with repetitive overhead activity.

Complications are more common in older patients, particularly damage and rupture of the tendon. Clinical series have described biceps tendon ruptures in rock climbers and weightlifters.

**Pathophysiology**

Historically, all disorders of the biceps tendon were described as biceps tendonitis. However, degenerative changes occur in the tendon without inflammation. An inflammatory pathology may explain the pain experienced in the biceps tendon. The different terms used to describe the pathophysiology more accurately are defined below:

- **Tendonitis** describes inflammation of the tendon and the paratenon (fatty or synovial tissue between a tendon and its sheath). Chronic overload is thought to cause microscopic tears in the tendon which trigger an inflammatory response.
- **Peritendinitis** describes inflammation of the paratenon or tendon sheath. This usually results from a direct injury or irritation caused by impingement of the tendon against a bony prominence. This is also described as a tenosynovitis.
- **Tendinosis** is an histological definition and describes degenerative changes in the tendon:
  - Macroscopically there is a degenerative tendon with disorganised tissue (mucoid degeneration).
  - Microscopically there are degenerative changes to the collagen with fibrosis. Inflammatory mediators are not usually present in tendinosis. Older injuries (more than three months) have less inflammation and more degenerative change.

- The term tendinopathy refers to the clinical presentation of a symptomatic tendon rather than the underlying pathology (degenerative or inflammatory). Three aetiological theories for tendinopathy are described:
  - A mechanical theory where repetitive loading of the tendon causes microscopic degeneration. Fibroplasia occurs within the tendon, resulting in scar tissue.
  - A vascular theory describing tendon degeneration with secondary areas of focal vascular disruption.
  - Neural modulation. This is a new theory proposing that tendinopathy arises from neurally mediated mast cell degranulation and release of substance P.
Epidemiology

- The incidence of biceps tendon injury in sport and different occupations is unknown.
- Bicipital tendinopathy occurs in a variety of sports including weightlifting, tennis, wheelchair athletics (and general wheelchair use), cricket, baseball, kayaking and other sports where overhead activity is involved.[2]
- Degenerative tendinosis and biceps tendon rupture are usually seen in older patients.
- Isolated tendinopathy often presents in young or middle-aged patients but the exact incidence is unknown.

Presentation

History
It is important to consider some basic points in the history, as these have an important bearing on the management, including use of injections and whether or not prompt referral is appropriate.

General factors

- How old is the patient? Older patients are more prone to impingement, tendinosis and tendon rupture.
- Are there significant comorbidities? Rheumatoid arthritis is more often associated with tendon rupture and significant joint pathology.
- What is the patient's occupation?
- What are their hobbies?

The site and nature of the pain

- Typically, it is a vague anterior shoulder pain which has an aching quality.
- It is aggravated by lifting (and especially pulling and pushing overhead) and relieved by rest.
- Is the pain acute or chronic? If the pain has been going on for longer than two months it is likely that there are degenerative changes in the tendon. Referral is more appropriate. Tendon rupture is more likely.

Previous tendon rupture and the mechanism of any injury involved

- Usually there is no history of injury but, if there is such a history, beware of possible tendon rupture.
- With rupture of the long head of the biceps tendon, patients may report a sudden and painful popping sensation with appearance of the 'Popeye' deformity in the anterior upper arm (bulging retracted muscle).
- When there has been a traumatic injury, the biceps tendon rupture is often preceded by a history of shoulder pain that resolves following a painful and audible snap.

Whether overuse has been a factor
Bicipital tendinopathy frequently occurs from overuse syndromes of the shoulder and so tends to occur with repetitive overhead activity which may be sporting, recreational or occupational. These are common in athletes where, again, repetitive overhead activity is involved. Examples of such sports include cricket, swimming, racquet sports, weightlifting, rowing and kayaking.

Other associated symptoms

- Shoulder instability and subluxation can be associated with degeneration of the biceps associated with chronic tendinitis.
- Instability and subluxation also occur with labral tears, often with additional locking or catching symptoms.
Examination

- Diagnosis requires a thorough shoulder examination. Essentially the assessment should locate the site of tenderness and demonstrate which movements aggravate the pain.
- Use special tests to confirm the diagnosis. Several have been described. Detailed description is beyond the scope of this article but it is worth being aware of their significance, as they may be described in reports and letters. These are:
  - Biceps tests, including Speed's tests (1 and 2 to confirm bicipital tendinopathy), Yergason's test (not considered universally useful), Gilchrist's test (use of weights to confirm bicipital tendinopathy) and the Lippman test (test for tenosynovitis with instability of the biceps tendon).
  - Other tests looking for rotator cuff, labral and acromioclavicular joint pathology. These include the Hawkins-Kennedy test and the Neer test (acromioclavicular joint) and O'Brien's test, anterior slide and clunk test (labral tests).

Investigation

This is a clinical diagnosis and investigation is not routinely required. However, investigations may occasionally be useful - for example, when pain is severe, the diagnosis is in doubt or functional limitation is marked.

- Ultrasound is the examination of choice. Soft tissue ultrasound may help to improve localisation prior to local steroid injection.
- Plain X-ray may be used when there is a suspicion of neoplasm. The demonstration of spurs, calcification or changes of osteoarthritis is unlikely to help management.
- MRI scan can demonstrate the whole course of the biceps tendon (including the intra-articular tendon and related intra-articular pathology). However, it is not appropriate or cost-effective for routine use. It is indicated after unsuccessful rehabilitation or where there is suspected rotator cuff or labral tear injury.

Differential diagnosis

Injury

- Glenoid labrum tear (anterior).
- Fractures (greater or lesser tuberosity).
- Glenohumeral instability (humeral subluxation).
- Subscapularis strain or tear.

Inflammation

- Synovitis.
- Capsulitis (frozen shoulder).
- Inflammatory arthropathy.

Others

- Neoplasm.
- Peripheral nerve entrapment.

Management

The appropriate management will depend on the patient and the length of history. Treatment should incorporate:

- Rest from lifting, stretching and overhead use of the affected arm.
- Ice applied for 10-15 minutes three to four times per day for the first two days.
- Non-steroidal anti-inflammatory drugs taken regularly for pain over the first few weeks.
- Other modalities of treatment which may be employed by physiotherapists, including ultrasound, transcutaneous electrical nerve stimulation and gentle stretching exercises.
Local anaesthetic and steroid injection. This procedure is typically recommended 3-6 weeks after the acute injury (see 'Injection', below).

Orthopaedic referral. This should be considered if, after two months, the patient's symptoms persist. If biceps tendon rupture is suspected then early referral is appropriate, especially in patients under the age of 40 years.

Injection

Many people use methylprednisolone or triamcinolone that are available already mixed with local anaesthetic. Although this is convenient, these strong steroids can cause fat atrophy and depigmentation in the skin over the injection site and so it is often argued that hydrocortisone with lidocaine should be used in preference and the stronger steroids saved for deeper injections.[7]

With the patient sitting or lying, the biceps tendon is identified in the groove, and the point of insertion noted. To inject into the area of the long head of the biceps tendon, the needle is inserted directly into the most tender area over the bicipital groove. The needle should enter the skin at 30° and be directed parallel to the groove. The objective is to infiltrate the area in and around the groove and not into the tendon, as this may result in rupture. Increased resistance to the injection suggests that the needle is in the tendon and it should be withdrawn a little.

The risk of tendon rupture is increased with repeated injections and also in patients over 40 years of age.

As with the other injections, shortly after performing it, repeat the physical examination, and pain and restriction of movement should have disappeared.

Advice after injection

The patient may be impressed by the instant cure but warn that:

- The initial benefit is from the local anaesthetic and its presence assures that the injection was put in the right place. However, it will wear off over the following two or three hours.
- The benefit of the injection takes two or three days.
- Sometimes, before it gets better than it was, the pain becomes worse.
- Rarely, crystals of steroid precipitate and cause extreme pain. This may still precede cure.
- The patient should not forget what caused the lesion initially and should return slowly to full activity. Restrict lifting and overhead activities by the patient for 30 days after the injection.

Surgery

Surgical intervention is rarely indicated. It may be appropriate for partial rupture of tendons and is usually performed early (under six weeks). If there is slow and gradual improvement, surgical intervention is not recommended for bicipital tendinopathy but may occasionally be indicated if a trial of conservative care for six months is unsuccessful. Acromioplasty with anterior acromionectomy is the standard surgical treatment for bicipital tendinopathy, although arthroscopic decompression is also performed.

Prevention

Bicipital tendinopathy tends to occur with repetitive overhead activity. Modification of activities may be appropriate with certain occupations with guidance from a physiotherapist. In addition to physiotherapy, advice from a sports physician may be sought where this type of tendinopathy may relate to technique which may be modified with suitable coaching advice.

Further reading & references

- Churgay CA; Diagnosis and treatment of biceps tendinitis and tendinosis. Am Fam Physician. 2009 Sep 1;80(5):470-6.

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