

Biceps tendon – To Divide or
Not to Divide

Anatomy of the Biceps Tendon

Proposed Functions of the Biceps

- Weak humeral head depressor role that increases in relative importance in the presence of rotator cuff tears.
- Stabilizing function, esp in abduction and external rotation.
- Proprioceptive roles for the biceps tendon remain to be studied.

Do We Really Know?

- Other studies have suggested that the long head of the biceps functions solely in relation to the elbow, with very little coordinated biceps activity occurring specific to the shoulder joint.
- Yamaguchi et al. in a study of 44 shoulders, showed no significant shoulder-related activity of the biceps muscle when elbow function was controlled with the use of a brace. No significant increase was seen in patients with rotator cuff tears.
- Levy et al. in a study of 10 shoulders, also found no significant electrical activity in the long head of the biceps tendon in response to isolated shoulder motion when elbow and forearm position were controlled

What We do Know However....

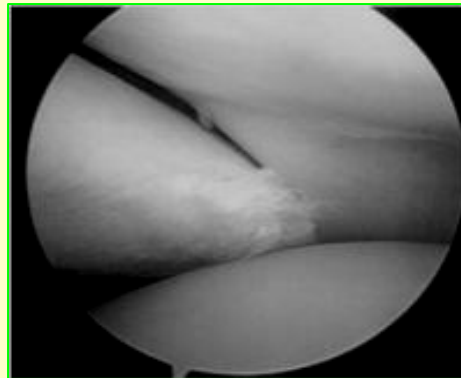
- The biceps can be an important source of shoulder pain.
- Retention of a severely symptomatic long head of the biceps tendon is likely to have more negative functional consequences than loss of the tendon itself.

Pathology Affecting the Biceps Tendon

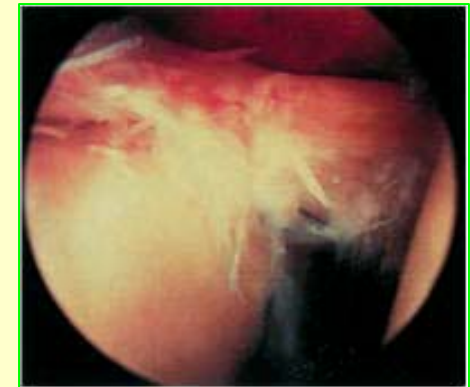
- Inflammation i.e. Tendinitis
- Instability : primary or secondary to shoulder pathology.

- Rupture

<25%



>25%

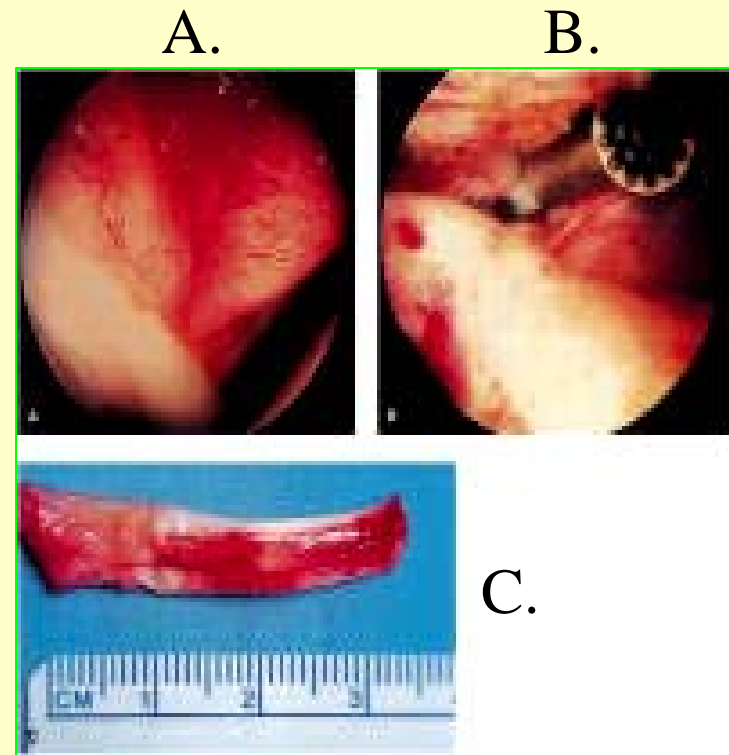


Inflammation i.e. Tendinitis

With RC Tendinitis

Arthroscopic view showing the marked synovitis that can be seen on the undersurface of the rotator cuff with rotator cuff tendinitis.

- **A. Synovitis is seen encircling the biceps tendon during its intra-articular course.**
- **B. Synovitis involvement of the biceps origin.**
- **C. Removed tendon obtained from a patient who had undergone a previous unsuccessful decompression for chronic rotator cuff tendinitis**

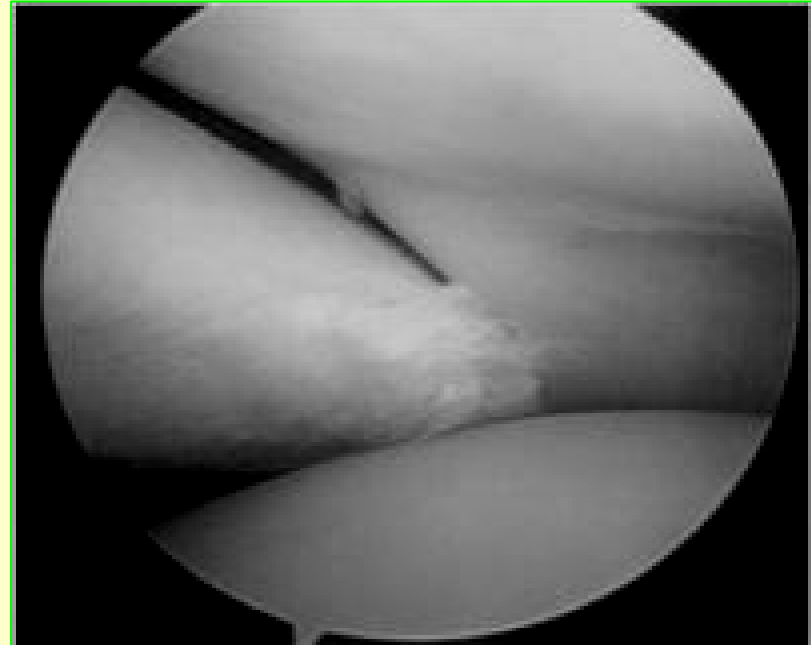


Decision for surgery

- Routine biceps tenotomy or tenodesis should not be performed.
- Avoidance is employed whenever the inflammatory changes to the biceps tendon are considered reversible.
- Tenotomy or tenodesis is indicated when irreversible structural changes are present.

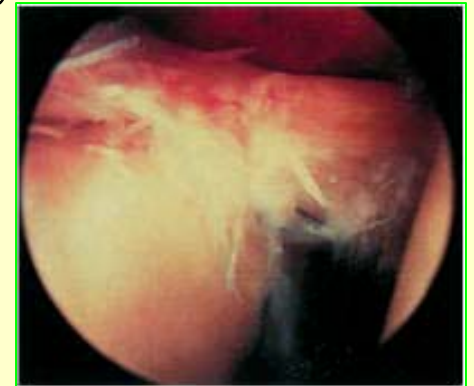
Debridement of Biceps

- Good results if $< 25\%$ fraying of tendon.



Indications for Tenotomy/Tenodesis

- Partial thickness tearing or fraying of the tendon of more than 25%,
- Any luxation of the tendon from the bicipital groove,
- Any disruption of the bony or ligamentous anatomy of the bicipital groove that would make autotenodesis likely.



Indications for Tenotomy/Tenodesis

- Any significant reduction in the size of the tendon that is more than 25% of the tendon's normal width.
- An additional relative indication for biceps tenotomy or tenodesis includes any biceps pathology in the context of a failed previous acromioplasty.

Tenodesis or Tenotomy of the Biceps Tendon: Why and When to Do It: Yamaguchi et al *Techniques in Shoulder Surgery* Volume 2(3) September 01 pp 140-152

TENODESIS

- for all younger patients (less than 55 years).
- For the occasional older patient unwilling to accept the possibility of a cosmetic deformity.

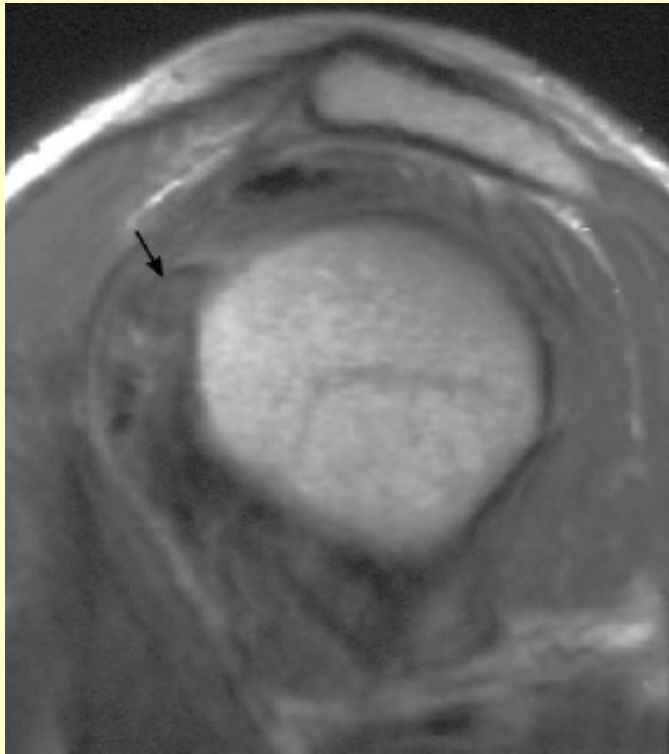
TENOTOMY

- For the older less active patient. is preferred, accepting the possible deformity that can occur if the long head retracts into the arm., tenodesis can be performed.
- Tenotomy can also be considered in rare instances in younger patients who are not concerned about the deformity and who wish a quicker recovery

Primary Bicipital Tendinosis

- 43% of cases.
- No other identifiable cuff pathology/impingement.
- Prolonged trial of conservative treatment recommended.
- If fails, Bicipital tenodesis + Subacromial decompression (no way to diff. Betn. primary /secondary tendonitis)

Bicipital tendinosis.
Oblique sagittal T2-weighted image demonstrating thickening and increased signal intensity of the intrascapular portion of the long bicipital tendon (arrow).



Long Head Instability

- Most commonly secondary to loss of the soft tissue restraints with degenerative rotator cuff tears.
- Full-thickness tears of the supraspinatus tendon and rupture of the coracohumeral ligament.

Treatment of Instability

Burkhead et al. (The biceps tendon. In: Rockwood CA, Matson III,

FA eds. The shoulder. 2nd ed. Philadelphia: WB Saunders, 00;1009–63.)

recommend

- early open reduction of the tendon with
- reconstruction of the fibrous roof
- and repair of the rotator cuff,
- combined with an acromioplasty.

Levigne C, et al. Tears of the supraspinatus tendon associated with “hidden” lesions of the rotator interval. J Shoulder Elbow Surg 1994; 3:353–60.

- In a series of 14 shoulders with subluxated biceps tendons, an attempt at reinsertion of the tendon and repair of torn structures resulted in secondary rupture of the tendon in 25% of cases.
- Even when rupture is not seen, there is still the concern of autotenodesis with this operative strategy.

Tenodesis or Tenotomy of the Biceps Tendon: Why and When to Do It: Yamaguchi et al *Techniques in Shoulder Surgery Volume 2(3) September 01 pp 140-152*

- Arthroscopy with special emphasis on discovering associated rotator cuff and coracohumeral ligament tears.
- Any luxation of the biceps tendon from the bicipital groove is an indication for tenodesis, with tenotomy reserved for older patients.
- Arthroscopic subacromial decompression and surgical management of any associated pathology.

Traumatic Rupture of the Long Head of the Biceps Tendon

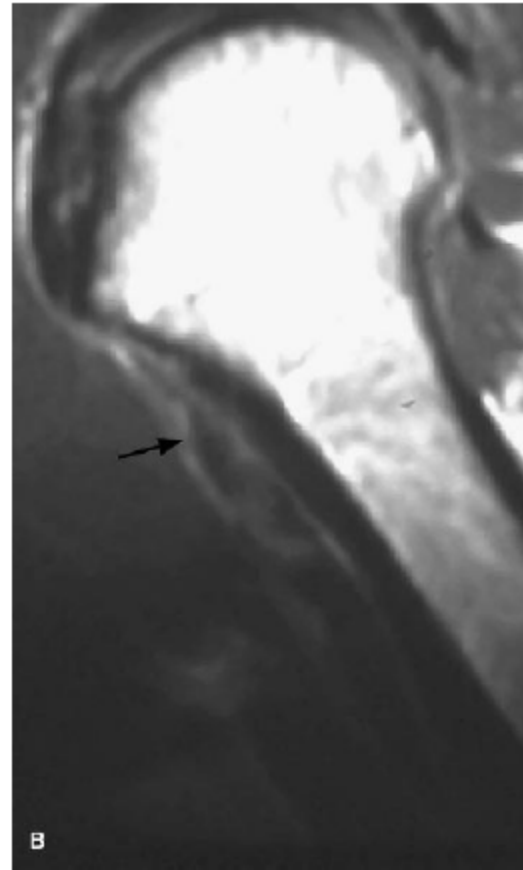
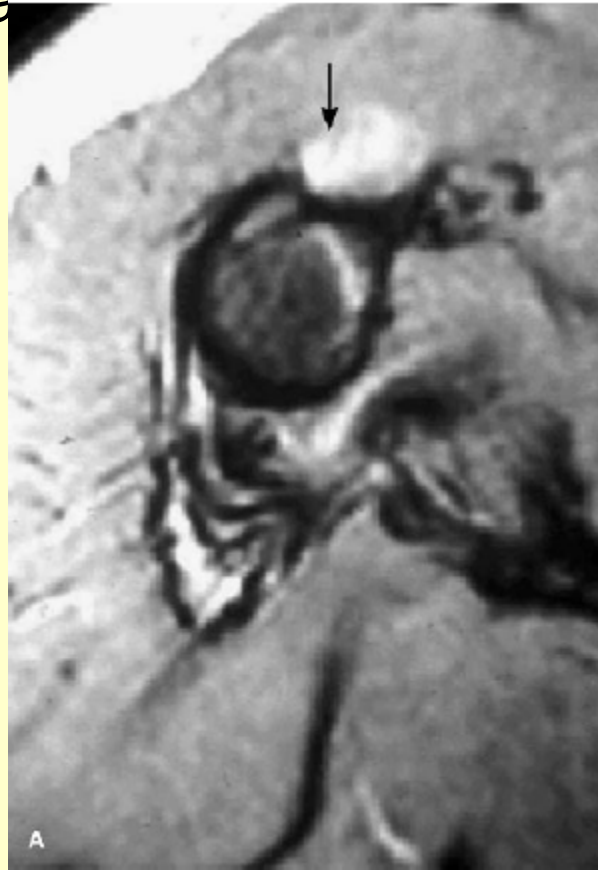
- Extremely uncommon.
- Usually seen in the significant trauma, involving either a powerful supination force or a fall on the outstretched arm.

Tear of the long bicipital tendon at the level of the bicipital groove, with distal retraction.

A: Axial gradient-echo image demonstrating an empty

distal bicipital groove occupied only by fluid (arrow).

B: Oblique sagittal image demonstrating the distal retraction of the long bicipital tendon (arrow).



Treatment of Ruptures

- Full-thickness traumatic ruptures of the biceps tendon are generally less symptomatic (Habermeyer P, Walch G. The biceps tendon and rotator cuff disease. In: Burkhead Jr, WZ ed. Rotator cuff disorders. Baltimore: Williams & Wilkins, 1996;142–59)
- Spontaneous or traumatic ruptures of the long head of the biceps generally do not require surgical intervention (Carroll RE, Hamilton LR. Rupture of biceps brachii. A conservative method of treatment. J Bone Joint Surg [Am] 1967; 49:1016)

Results of biceps tenotomy for treatment of pathology of the long head of the biceps brachii

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May/June 2001

- N= 30
- Arthroscopic release of the intra-articular portion of the long head of the biceps brachii tendon.
- The mean age was 50 years (range, 16 to 75 years).
- Mixed pathology

Results of Tenotomy

Average F/u 19 mths (12 to 69 mths)

Return to work	Return to sport	ASES	Complicn.
96.7%	90%	81.8	13.3%

Results of Tenodesis

- DePalma and Callery found 80% excellent or good results but had an average follow-up of only 27 months.
- Crenshaw and Kilgore reviewed 89 patients with a minimum follow-up of 1 year. Maximum improvement was reached at 12 months after surgery, with excellent and good results obtained in 87%.

Results of Tenodesis Without Decompression – long term F/U

Becker DA, Cofield RH. Tenodesis of the long head of the biceps brachii for chronic bicipital tendinitis. J Bone Joint Surg [Am] 1989; 71:376–81

- Varied results when not performed in conjunction with decompression.
- 54 shoulders; average f/u - 13 years after surgical tenodesis of the long head of the biceps. Acromioplasty was not performed.
- 22 shoulders had mild or no pain,
- 22 continued to be moderately or severely painful.
- 29 patients needed additional treatment in the form of steroid injections or surgical procedures (rotator cuff repair, anterior acromioplasty, or excision of the distal clavicle)

TO BE CONTINUED.....