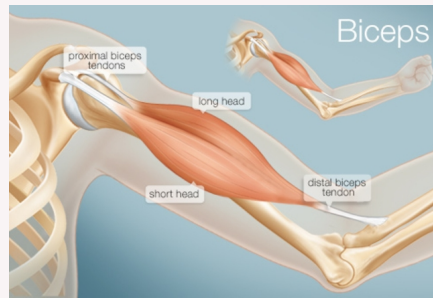


Bicep Anatomy



- Short head connects medial bicep muscle to coracoid process of the scapula (not susceptible to tendinopathy)
- Long head - connects to supraglenoid tubercle of the scapula and superior glenoid labrum - blood supply = anterior humeral circumflex artery.
- Inserts onto radial tuberosity
- Innervated by the Musculocutaneous nerve (C5-C6)

Bicipital Tendinitis

- Avascular parts of the long head of bicep tendon = deep undersurface of the tendon in the groove and proximal near insertion at the superior glenoid
- Avascularity makes the long head of bicep tendon prone to injury at the bicipital groove in the proximal humerus
- Can be acute inflammatory tendinitis to degenerative tendinopathy
- Can be Primary (microtrauma, insidious)/Secondary (Primary more common)
- **Secondary:**
 - Rotator cuff tendinitis/tendinopathy (especially subscapularis)
 - Subscapularis injuries
 - LHB tendon instability/dislocation
 - Direct/indirect trauma
 - Inflammatory conditions
 - Internal impingement of the shoulder (GIRD, superior labral lesions)
 - External impingement/subacromial impingement
 - GH OA

Pathology

- Early tenosynovitis and inflammation when repetitive traction, friction and shoulder rotation occurs
- Swelling occurs in the tendon due to inflammation tendon becomes mechanically irritated in the confined space
- Tendon exposed to pathologic shear forces due to increased pressure and traction
- Then the LHB sheath thickens as fibrosis and vascular compromise occurs
- LHB starts to degenerate - scarring, fibrosis and adhesions, anchoring the tendon onto the groove, shear forces and traction increases
- Tendon can rupture due to this anchoring

Demographics

- Common in young adults (18-35)
- Repetitive overhead activity (abduction and external rotation- peel back phenomenon, bicep muscle eccentrically contracts to decelerate elbow extension)
- Throwers, swimming, gymnastics, martial arts, racquet sports, contact sports
- Smokers
- Biomechanical risks: Repetitive overhead activity, repetitive shoulder activity, improper lifting, shoulder girdle muscle imbalances, poor posture, inflexibility, scapulothoracic or eccentric overload, trauma, osseous anatomical abnormalities (narrowing of bicipital groove - f#, OA and congenital disorders)

Classification

Grade 0:

- Tenocytes normal
- Myxoid degenerative material not present
- Collagen remains arranged in tight, cohesive bundles
- Blood vessels arranged inconspicuously between collagen bundles

Grade I:

- Tenocytes rounded
- Myxoid degenerative material present (small amounts)
- Collagen remains arranged in discrete bundles with slight separation
- Capillary clustering (<1 cluster/ten high power fields)

Grade II:

- Tenocytes rounded and enlarged
- Myxoid degenerative material evident (moderate-large amounts)
- Collagen bundles lose discrete organisation - separation between individual fibres and bundles increase
- Capillary clustering increased (1-2 clusters/ten high-power fields)

Grade III:

- Tenocytes rounded and enlarged with abundant cytoplasm and lacuna
- Myxoid degenerative material abundant
- Collagen disorganised - loss of microarchitecture
- Capillary clustering increased (>2 clusters/ten high-power fields)

Other changes: Tenosynovium: Synovial hypertrophy, hyperplasia and proliferation of the bicipital sheath/synovium

Presentation

- Deep Throbbing ache over anterior shoulder or bicipital groove
- May radiate to deltoid insertion/toward elbow/hand)
- Provoked by overhead activity, flexion of elbow and shoulder, forearm supination
- Can occur at night - sleeping on affected shoulder
- Relief from heat, ice, stretching and massage



Presentation (cont)

- Rule out tendon rupture (painful audible pop then relief, popeye muscle on observation)

Risks: Chronic tendinopathy

Concurrent rotator cuff tear

Contralateral bicep tendon rupture

Age >40

Poor conditioning

RA or other rheumatologic pathology

- Limited ROM - Active/resisted movements may provoke pain (forearm supination, elbow flexion, shoulder flexion) **Consider labral injury if popping, catching or locking during AROM occurs**

- Tenderness in rotator interval and bicipital groove

- +ve Yergasons, Speeds (most specific), Bear hug (most sensitive), Belly press (most specific), Upper cut (most sensitive), Backward Traction, Lippman test

- Assess for dysfunction in Cx and Tx spine, Scapula dyskinesis, Upper crossed, AC joint, labral tear

- Consider posterior capsule tightness

- Consider Cx/Shoulder exam

- Patient's occupational hx/current job/ hx of injury/trauma to the shoulder/neck, hand dominance, surgical hx

- AROM, PROM Cx, AROM, PROM, RROM Shoulder

- Strength of rotator cuff (strength tests and IR lag sign)

- Check for Impingement signs (may be +ve due to swelling of the tendon)

DDx

- Adhesive Capsulitis

- Biceps tendon rupture

- Cx radiculopathy

- Brachial neuritis

- AC joint pathology

- GH Arthritis/ instability

- Osteonecrosis of humeral head

- Subacromial impingement syndrome

- f#

- Neoplasm

- Rheumatologic disease

- SLAP

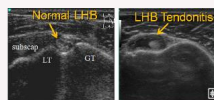
- GIRD



DDx (cont)

- Calcific tendonitis
- RC tears
- AVN
- Supracapular neuropathy
- TOS
- QSS
- Rupture of pecs, deltoid, lats)
- Scapulothoracic dyskinesia

Imaging



- Tendon thickening, hypertrophy of synovial sheath and fluid surrounding tendon
- Only if need to rule out osseous impingement/bony pathology (A-P, Y view)
- US- Gold standard
- MRI - if rupture/labral tears

Management

- Rest, ice, activity modification, functional retraining (limit motion that requires repetitive overhead activity, elbow flexion, forearm supination)
- 1st Phase: Pain relief and restoration of normal ROM, scapula stabilisation exercises (lower traps and serratus anterior), resisted internal and external rotation, low rows and concentric bicep strengthening
- STW: Transverse friction massage over biceps tendon
- Myofascial release and stretching exercises of biceps, cx, shoulder and periscapular musculature
- Pendulum circumduction, wall walking, cane/wand stretching in flexion and abduction, sleeper stretchers
- 2nd Phase: Strengthen from isometric to concentric then eccentric
- Advanced strengthening - Bear hug, reverse fly and resisted internal/external rotation at 90 degrees of abduction
- SMT for Cx and Tx, scapula dyskinesia (strengthen periscapula, mobilisation of scapula)
- NSAIDs
- Surgical referral is considered if no better with conservative care greater than 3 months, intra operative findings of inflamed tendon (lipstick lesion, significant fraying, tearing, hypertrophy, partial thickness tears, medial LHB subluxation and LHB subluxation with subcapularis tear/bicipital groove soft tissue compromise)



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Not published yet.
Last updated 14th November, 2021.
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Management (cont)

- Corticosteroids if symptoms persistent and no better with conservative care

Surgical complications

Tenotomy: Popeye deformity

Muscle spasm/cramping

Biceps pain

Biceps Tenodesis: Groove pain

Popeye deformity

Muscle spasm/cramping

Biceps pain

Humeral shaft fracture (spiral when humerus is stressed torsionally)

Post surgical Rehab

Tenotomy: Sling for 1-2 weeks

- AROM 2-4 weeks post op, sling discontinued
- Strengthening 4-6 weeks
- Light work 3-4 weeks post op
- Full return 1-3 months post op
- Unrestricted activities 3-4 months post op

Tenodesis: Sling 3-4 weeks

- PROM and grip strengthening
- Avoid active elbow flexion and forearm supination for 6 weeks
- Full AROM and PROM should be achieved by six weeks
- Light work 3-4 weeks post op
- Full duty 2-4 months post op
- Unrestricted activities 3-4 months post op



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