The biceps tendon : treatment and controversies

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I - Anatomy - Physiology

- *Anatomy* : origin from the supra glenoid tubercule and superior labrum, courses laterally and inferiorly, then vertically in the groove (constrained osteoligamentous canal), ends at the inferior part of the pectoralis major.
- *Function* : the bicipital groove glides around the tendon during elevation and rotations : the long head of biceps acts as flexor and supinator of the elbow. EMG studies show that the biceps is nearly silent during shoulder motion.
- *Stabilizing mechanism* : ligamentous pulley which is the common insertion of the coraco humeral and superior gleno-humeral ligament at the supero lateral border of the lesser tuberosity.

II - Patho-Anatomy

- At the insertion : S.L.A.P. lesions (not discussed here).
- With intact rotator cuff :
  * rupture : rare
  * tendinopathy nearly always associated with other intra articular pathology: e.g. gleno humeral osteoarthritis, rheumatoid arthritis, osteochondromatosis...
  * medial displacement (subluxation, dislocation) : always observed with rotator cuff lesion or fracture of the lesser tuberosity.
- With rotator cuff lesion : 41% of the 959 rotator cuff tears operated on between 1988 and 1996 had a biceps lesion.
  * Rupture (8% of the cases). Located at the entrance of the groove.
  * Tendinopathies (17% of the cases). Are related to subacromial impingement with or without medial displacement ; should not be considered as "compensatory mechanism" to depress the humeral head. (Inflammation, hyperemia of the sheath are common and should not be considered as tendinopathy)
  * Medial displacement (16% of the cases). Are always fixed, no possibility of spontaneous relocation ; feeling of "instability" are related to the rubbing mechanism on the lesser tuberosity not to recurrent subluxation. Hidden in 90% of the cases by an intact fascia which must be divided to see the lesion
    - *Subluxation* : partial loss of contact between the tendon and the groove ; the ligamentous pulley is distended or torn and there is partial desinsertion of the supero-lateral part of the subscapularis tendon.
    - *Dislocation* : Complete loss of contact between the tendon and the groove. Three types :
      - Over the lesser tuberosity : within the substance of the subscapularis tendon which is partially torn and delaminated.
      - Intra articular : complete tear of ligamentous pulley, subscapularis and middle gleno humeral ligament.
      - Over an intact subscapularis : rare, associated with complete tear of supra spinatus and ligamentous pulley.

III – Clinical presentation

- Bump in mid-arm in case of rupture (this deformity of the muscle is not always visible over 60 year old).
- Main symptom is PAIN during ADL, at night (++++), but not specific.
- No specific testing manoeuver for tendinopathy or medial displacement but some signs are evocative of biceps pathology
  - anterior pain of the arm
  - recognized pain during bicipital groove palpation
  - painful palm-up test

IV – Imaging study

- Arthro CT, arthro MRI or ultrasound
- MRI without intra-articular contrast maybe misleading

V - Treatment

- *Conservative* : anti inflammatory drugs, physiotherapy, corticoid injections.
- *Relocation* : tubularization of the tendon, deepening of the groove, repair of the subscapularis
- *Tenodesis* : attachment to the humerus (transosseous suture, key hole, interference screw) or to the pectoralis major ; avoid attachment to the coracoid process (secondary impingement).
- *Tenotomy* : arthroscopic release at the supra glenoid tubercule

VI - Controversies

- *Function* : active or passive depressor of the humeral head ?
  anterior stabilization of the shoulder ?
  exclusively elbow function ?
- *Treatment of tendinopathy*: conservative or sacrifice of the tendon (tenodesis, arthroscopic release)?
- *Treatment of medial displacement*: relocation or sacrifice of the tendon (tenodesis, tenotomy)?

VII – My opinion

- LHB has no function for the shoulder.
- Very often involved in shoulder pain (impingement, painful gliding mechanism in the groove)

Tendinopathy :

  - If the cuff is repairable : cuff repair and tenodesis with interference screw.
  - If the cuff is not repairable (too large, older patients, non motivated patients) : arthroscopic release + subacromial decompression if the head is still centered ; isolated arthroscopic release if the head is migrated superiorly.

- Subluxation, Dislocation over the tuberosity, Dislocation over the subscapularis tendon :
  - If the cuff is repairable : cuff repair and tenodesis (relocation is discontinued because of very painful rehabilitation and secondary rupture) ;
  - If the cuff is not repairable : arthroscopic release.
- Intra articular Dislocation: severe lesion, bad prognosis. Biceps tendon usually not responsible for pain and arthroscopic release usually inefficient. Problem is subscapularis complete tear ; consider rotator cuff repair if possible.

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