Long Head of Biceps: More than a starting point?

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Aims

- Justification for topic choice
- Anatomy of the Long Head of Biceps
- Consideration of the physical examination
- Benefits of ultrasound
- Ultrasound technique
- Pathology encountered
- How useful is ultrasound?
- Limitations to the judgements in research?
- Implications for clinical practice
Why this topic?

- It’s the first thing we scan on the shoulder!
- Anterior shoulder pain is a commonly encountered complaint in ESP clinics
  - Shoulder pain is the 3rd most common MSK condition (Mitchell et al, 2005)
- Difficult to diagnose a specific pain source with shoulder pain (Park et al, 2005).
- Physical examination is unreliable in the diagnosis of LHB tendon pathology (Khazzam et al, 2012)
Long head of biceps

- LHB arises from glenoid labrum and supraglenoid tubercle
- Lies on medial aspect of bicipital groove
- LHB is intra-articular but extra-synovial
- 9cm long and 5-6mm in diameter (Ahrens & Boileau, 2007)
- Superior glenohumeral ligament and coracohumeral ligament act as a ‘biceps pulley’ mechanism. Subscapularis aponeurosis also provides stability (Brasseur, 2012)
- Function of LHB is controversial (Khazzam et al, 2012)...humeral head depressor and stabiliser of an unstable joint

Figure 1. Long head of Biceps Anatomy
Physical Examination:

- Physical examination is unreliable (Khazzam et al, 2012) and rarely dictates diagnosis.

- Individual tests have poor clinical quality in shoulder disorders (Kibler et al, 2009; Ditsios et al, 2012)

- Bicipital groove tenderness most common finding (Churgay, 2009)

- Yergasons/Speeds - Specificity 79%, 75% and sensitivity 43% and 32% (Holtby & Razmjou, 2004)

- Combination of tests is the best approach (Kibler et al, 2009)
Advantages of Ultrasound

- Real time
- No radiation
- Correlation with site of pain
- Relatively cheap
- Comparison with contra-lateral side
- Good patient tolerance
- Fewer contra-indications than MRI eg metal work, pace maker

(Smith and Finoff, 2009)
Transverse LHB

Figure 2: Normal Transverse LHB

Figure 3: Positioning for transverse view
Longitudinal LHB

Figure 4: Normal longitudinal LHB

Figure 5: Position for longitudinal image
Classification of LHB pathology

- Classification system proposed by Chen et al (2012)

  - Type 1: LHB tendinitis (tenosynovitis/tendinopathy)
  - Type 2: Subluxation of the LHB
  - Type 3: Dislocation of the LHB
    - Subluxation: Partial/ transient loss of contact between the tendon or groove (Ahrens & Boileau, 2007)
    - Dislocation: Complete and permanent loss of contact between the tendon and groove (Ahrens & Boileau, 2007)
  - Type 4: Partial LHB tendon tears
  - Type 5: Rupture LHB tendon
  - Type 6: SLAP lesions
LHB tendinopathy

- Increased cross-sectional area (Ahmad et al, 2007).
- ‘Hourglass biceps’ when hypertrophied and becomes entrapped blocking final 10 degrees of elevation (Ahrens and Boileau, 2007)
- Associated stenosis of the bicipital groove (Ahmad et al, 2007)
- Increase vascularity and effusion in the synovial sheath (Ahrens and Boileau, 2007)
Medial instability...

- Medial instability of the long head of biceps
  - Occurs in 20% of RC tears (Chen et al, 2012)
  - Angluation of the tendon predisposes it to medial subluxation (Brasseur, 2012)
  - Patient with large RC tears (>5cm) were more likely to have LHB pathology (Chen et al, 2012)
- Rupture of the coracohumeral ligament can lead to subluxation of the LHB on the anterior side of subscapularis tendon (Brasseur, 2012)
- Hypoechoic triangle – point of reference (Brasseur, 2012)
Lateral instability...and rupture

- Lateral instability of the long head of biceps
  - Associated with supraspinatus tear

- Spontaneous rupture –
  - Occurs in hypovascular zone 1.2cm-3cm from tendon origin
    (Cheng et al, 2010)
  - Popeye sign

Figure 10: Biceps rupture longitudinal view
(www.ultrasoundcases.info)
**Other considerations**

- Fluid in LHB sheath with 90% of RC tears and LHB pathology occurs in 82% of shoulders with RC tears (Chen et al, 2012)

- Also indicative of intra-articular, peritendinous effusion, however….also bicipital tendinopathy (but not always!)…potential for red herring!

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**Figure 11: Transverse LHB effusion**

**Figure 12: Longitudinal LHB effusion**
How useful is Ultrasound?

- Limited research in comparison to rotator cuff pathology (Skendzel et al, 2012)

- 90% concordance rate between arthroscopy and ultrasound for sonographically normal tendons (Skendzel et al, 2012)

- Ultrasound has poor sensitivity and specificity for detecting partial thickness tears (Armstrong et al, 2006)

- Ultrasound has a high sensitivity and specificity for biceps tendon rupture (Skendzel et al, 2012)

- High sensitivity and specificity for tendon dislocation (Armstrong et al, 2006)
Limitations to the judgements of research....?

- Comparison between arthroscopy and ultrasound for ‘non tear’ conditions is difficult...ultrasound can see within the tendon bulk whereas arthroscopy cannot..

- Ultrasound cannot visualise the anchor of the long head of biceps to the labrum..potentially missing pathology as it cannot be visualised..

- Difficult to conclude on the quality of imaging devices used, and the experience level of clinicians.
Clinical examination for long head of biceps pathology is not useful in isolation (Holtby and Razmjou, 2004)

Ultrasound can assist with diagnosing ruptures and dislocation. (Armstrong et al, 2006).

Ultrasound can assist in providing information on tendon thickness, neovascularisation, quality and effusion.

LHB effusion can indicate local tendinopathic changes but also other rotator cuff tears and joint pathology.

Merging clinical examination findings and ultrasound findings can enhance diagnosis of long head of biceps tendinopathy.
References


www.theultrasoundsite.org
Questions?