Biceps and Triceps Pathology

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Fundamentals of Musculoskeletal Ultrasound are copyrighted by Elsevier Inc.

Anatomy: biceps brachii

From: University of Minnesota WebAnatomy

Biceps Brachii:
• Insertion: radial tuberosity
  – Short head: superficial, distal
  – Long head; deep, proximal
• No synovial sheath
• Bicipitoradial bursa


Biceps Brachii: long (1), short (2) heads

Note: long head (1) courses lateral to medial, deep to short head (2)


Biceps Brachii: Terminal Bifurcation

Note: endotenon septum (asterisk and arrows)

Biceps Brachii: terminal bifurcation

Note: toggling the transducer, which creates anisotropy allows visualization of two tendon heads

Courtesy of M. Chiavaras, Hamilton, Ontario

Ultrasound Examination:
- Anterior: sagittal plane
- Medial: oblique coronal plane
- Lateral: elbow flexed
- Dorsal: flexion pronation

Biceps Brachii Tendon: distal

1 = long head
2 = short head

Long Axis

Biceps Tendon
- Medial approach
- “Pronator window”
- Transducer:
  - Distal aspect over medial epicondyle
  - Parallel to humerus
  - Slide transducer anterior


Biceps Brachii Tendon: lateral approach

Long Axis: dynamic imaging
Kalume Brigido M. Eur Radiol 2009; 19:1817

Biceps Tendon
- Flexion, pronation view
- Transverse: between radius and ulna
- Radial tuberosity rotated into view
- Limited diagnostic value
- Ideal biceps tendon injection

Ulna
Radial Tuberosity
Supination
Pronation
Tendon Abnormalities:

- Tendinosis: hypoechoic, swollen
- Partial-thickness tear: anechoic focus, no retraction
- Full-thickness tear:
  - Discontinuity: within 1-2 cm from tuberosity
  - Variable retraction
  - Dynamic imaging: retraction

Belli, J Ultrasound Med 2001; 20:587
Biceps Brachii Tendon: complete tear

Biceps Brachii Tendon: complete tear non-retracted

Lacertus Fibrosus: normal

Biceps Brachii Tendon: non-retracted tear

Biceps Brachii Tears:

- Diagnosis of full-thickness tear versus partial-thickness tear:
  - 95% sensitivity
  - 71% specificity
  - 91% accuracy
- Shadowing: important indirect sign of tendon retraction

Biceps Brachii Tendon: partial tear (short head)
Biceps Tendon Tears: dynamic imaging

Partial Tear

Complete Tear

Biceps Brachii: short head tear

Yellow arrows = short head
White arrows = fluid around long head

Biceps Brachii: short head tear

Yellow arrows = tear of short head
White arrows = intact long head

Pitfall: retracted short head tear is not in view from medial approach when viewing long head (white arrows)
Bicipitoradial Bursa

- Surrounds distal biceps
  - Does not communicate to elbow joint
  - No distal biceps tendon sheath
- If distended:
  - Mechanical, inflammatory
  - Characteristic “U” shape
  - Average: 1.8 – 2.5 cm in size
  - May displace deep branch of radial nerve

Skaf AY, Radiology 1999; 212:111

Bicipitoradial Bursitis

- Long Axis to Biceps
- Sagittal T2w
Bicipitoradial Bursitis: Radial Nerve Compression

Triceps Tear:
- Muscle injury: contusion
  - Mixed echogenicity hemorrhage
- Distal tendon injury
  - Usually partial-thickness tear
  - Superficial aspect of tendon
  - Avulsion fracture of olecranon

Triceps Tear: partial thickness tear
- Superficial layer torn
  - Long and lateral heads
- Intact deep layer (medial head)
- Associated enthesophyte bone fragment
  - 1 – 2 cm in size
  - 2.5 – 4 cm retraction
  - No donor site

Triceps Tendon: partial tear + avulsion

Triceps: long head tear

Anatomy of the Distal Triceps Brachii
- Superficial (blue arrow): long + lateral heads
- Deep (black arrow): medial head
  - Primarily muscular insertion

*From Resnick, Skeletal Radiol 2009; 38:171

J Ultrasound Med 2011; 30:1351
**Triceps Tendon: partial tear + avulsion**

- Olecranon bone fragment
- Intact medial head

**Ankylosing Spondylitis**

**Muscle Injury: DOMS**

- Delayed onset muscle soreness
- Type 1 muscle strain
- Pain after intense physical activity:
  - Microtrauma: inflammation and edema
  - Onset: day 1, peak day 2-3, resolves day 7
  - Possible increased creatine kinase
- Upper extremity: triceps, biceps, brachialis
- Muscle enlargement with increased echogenicity


**DOMS: delayed onset muscle soreness**

- Triceps Brachii: medial head
- Deltoid

**Injury: Pronator Teres**

- Short Axis
- Long Axis
- Contralateral
Take-home Points:

- **Biceps brachii:**
  - 4 different scanning techniques
  - Anatomy explains partial tears
  - Dynamic: partial versus full-thickness tear
- **Triceps brachii:**
  - Anatomy explains partial-thickness tears
  - Don’t forget about medial head attachment

Syllabus on line and other educational material: www.jacobsonmskus.com
Twitter handle: @jacobsonmusr