Ultrasound of Biceps and Triceps Brachii

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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)

From: Basli M., et.al. Surg Radiol Anat 2014; 36:17
Biceps Brachii: terminal bifurcation

Ultrasound Examination:
- Anterior: sagittal plane
- Medial: oblique coronal plane
- Lateral: elbow flexed
- Dorsal: flexed pronated view

Biceps Brachii Tendon: distal

Biceps Brachii Tendon: technique

Tendon Abnormalities:
- Tendinosis: hypoechoic, swollen
- Partial-thickness tear: anechoic focus, no retraction
- Full-thickness tear: discontinuity
  - Dynamic imaging: retraction
Biceps Brachii Tendon: tendinosis

Medical Approach

Dorsal Flexion Pronation Position

Biceps Brachii Tendon: complete tear

Long Axis

Distal biceps stump

Normal

Biceps Brachii Tendon: complete tear non-retracted

Longitudinal: dynamic imaging

Kalume Brigido M. Eur Radiol 2009 ; 19:1817

Biceps Brachii Tendon: non-retracted tear

Lateral

Biceps Tear

Transverse

Intact Bicipital Aponeurosis or Lacertus Fibrosus (white arrows)

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

da Gama Lobo et al., Am J Roentgenol 2013; 200:158
Biceps Brachii Tendon: partial tear (short head)

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

Biceps Brachii: short head tear

- Yellow arrows = tearing of short head
- White arrows = intact long head
Biceps Brachii: short head tear

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

Biceps Brachii Tendon: repaired

Anterior

Lateral

Bicipital Aponeurosis Injury

Biceps: long axis

Biceps: short axis

Bicipitoradial Bursa:

- Surrounds distal biceps
  - Does not communicate to elbow joint
  - No distal biceps tendon sheath
- If distended:
  - Mechanical, inflammatory
  - 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

Short Axis to Biceps

Axial T2w
**Triceps Tear:**
- Muscle injury: contusion
  - Mixed echogenicity hemorrhage
- Distal tendon injury
  - Usually partial-thickness tear
  - Superficial aspect of tendon
  - Avulsion fracture of olecranon

**Anatomy of the Distal Triceps Tendon**
- 3 heads: long, lateral, medial
- Inserts as common tendon on olecranon

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

**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

*From Resnick, Skeletal Radiol 2009; 38:171*

**Triceps Tendon: partial tear + avulsion**

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

*Olecranon Bone Fragment*  
*Intact Medial Head*

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**Ankylosing Spondylitis**

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**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


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**DOMS: delayed onset muscle soreness**

*Triceps Brachii: medial head*  
*Deltoid*
Take-home Points:

- **Biceps brachii:**
  - Anatomy explains partial-thickness tears
  - Multiple scanning techniques
  - Dynamic imaging

- **Triceps brachii:**
  - Anatomy explains partial-thickness tears
  - Avulsed enthesisophyte pitfall

Syllabus on line and other educational material: [www.jacobsonmuskus.com](http://www.jacobsonmuskus.com)

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