BICEPS RUPTURE, NOW WHAT?

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OBJECTIVES

- Upon completion of this lecture, participants should be able to:
  - *Understand the importance of physical exam and history in diagnosing a distal biceps rupture*
  - Explain the rationale for operative repair
  - List the most common complication associated with repair

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CASE 1 – WHAT WE ARE TRYING TO PREVENT

- 28 yr old RHD M
- 7/17/22: wrestling with friends and felt a pop in the elbow.
- 7/18/22: seen in urgent care and provided sling, Naproxen and muscle relaxer
  - Note indicates pt thinks there was a **pop**
  - Subjective decreased ROM
  - No physical exam documented
  - **XR negative**
  - Dx with biceps strain, instructed to f/u with ortho in 1 week if no better

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CASE 1

- 8/12/22 (3w5d): phone visit with PMD bc "not full usage" of arm
  - Given Medrol dose pack and Flexeril
  - f/u PRN
- 8/17/22: phone visit: MRI ordered, not completed
- 8/23/22: phone visit: ortho consult ordered
- 8/26/22 (4w5d): saw patient in clinic
  - + reverse popeye
  - Weak with resisted elbow flex/supination
  - Ordered MRI

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CASE 1 - MRI

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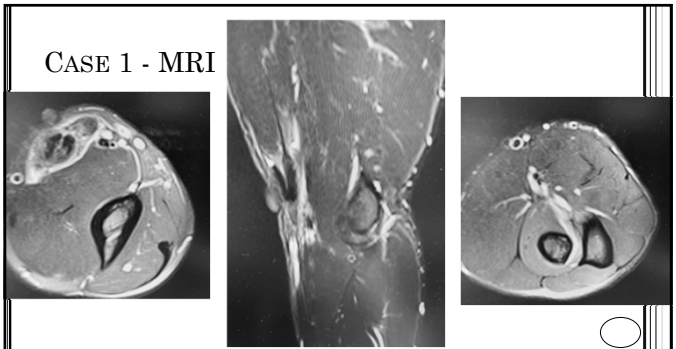
CASE 1 - MRI



- 8/31/22: distal biceps recon with Achilles

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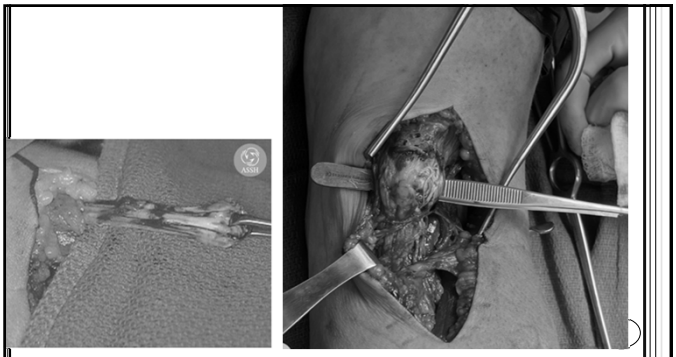

Acute tear Chronic Tear

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Distal Biceps Tendon Rupture

- Anatomy
- Incidence
- Etiology
- Physical Exam
- Imaging
- Classification
- Treatment
- Cases

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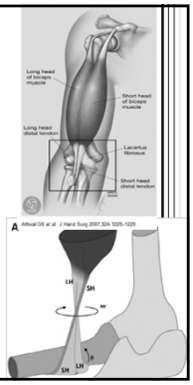
Anatomy

- Origin has two heads
  - Long head (LH) from glenoid rim
  - Short head (SH) from coracoid process
- Insertion
  - SH medial at musculotendinous junction and rotates 90 degrees to position it distal to the LH
    - More flexion
  - LH inserts proximal and posterior
    - More supination



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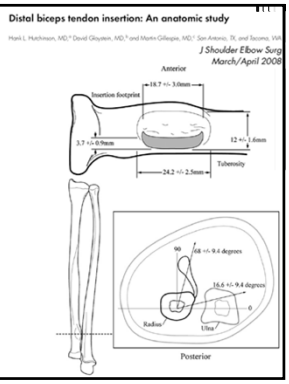
Anatomy

- The insertion footprint is on the posterior/ulnar aspect of the radial tuberosity
- Centered ~30 deg anterior to the coronal plane with the forearm fully supinated.



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Anatomy

- Lacertus Fibrosus aka bicipital aponeurosis
  - Begins at distal musculotendinous junction
  - 3 layers (sup, middle, deep) that merge and course distal and ulnarly
  - Attachments
    - Ulnar flexor muscles through fascial adhesions
    - Antebrachial fascia
    - Proximal ulna after enveloping the forearm flexor muscles

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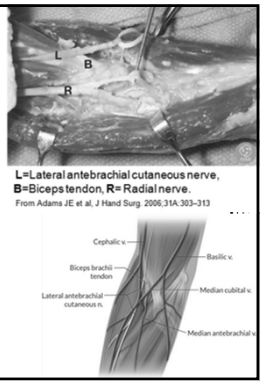
ANATOMY

- Neurovascular structures
  - Lateral antebrachial cutaneous nerve (LABCN)
    - Terminal branch of MCN
    - ***most commonly injured nerve with surgical repair distal biceps. **25% or more**



L=Lateral antebrachial cutaneous nerve, B=Biceps tendon, R= Radial nerve.
From Adams JE et al, J Hand Surg. 2006;31A:303–313

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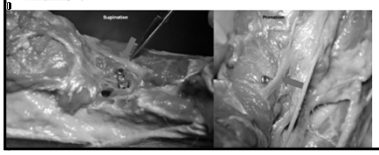
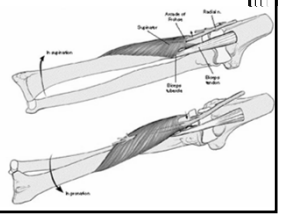
ANATOMY

- Posterior Interosseous Nerve (PIN)
  - passes lateral to radius and enters supinator
  - Location depends upon forearm rotation

Acute complete and partial distal biceps tendon ruptures: what have we learned? A review





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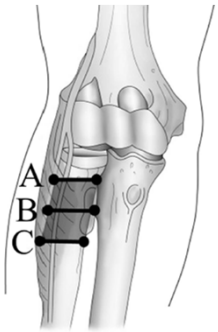
ANATOMY

- Typically, the PIN sits directly opposite the biceps tuberosity **(B)**, often directly on the cortex of the radius when the forearm is in full supination
- *Recommend a more proximal and ulnar drilling angle*



How to Avoid Posterior Interosseous Nerve Injury During Single-Incision Distal Biceps Repair Drilling

David Becker MBChB, BMLSc, Francisco Antonio Lopez-Marambio MD, Niels Hammer MD, Dr. habil, David Kaiser FRACS, FNZOA, MBChB, PhD

Clin Orthop Relat Res (2019) 477:424-431
DOI 10.1097/CORR.0000000000000534

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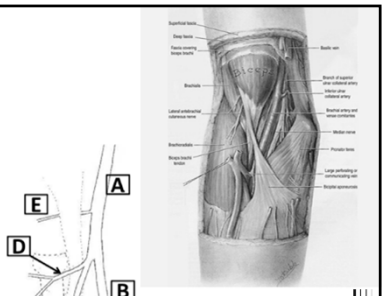
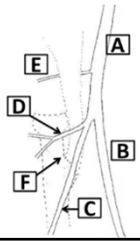
ANATOMY

- Lateral to Medial: Biceps, Brachial A/V, Median N
  - A: Brachial A
  - B: Ulnar A
  - C: Radial A
  - D: Rad Rec A
  - E dorsal rad rec A
  - F: prox most aspect of bicipital tuberosity





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DISTAL BICEPS TENDON RUPTURE

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Distal biceps tendon insertion: An anatomic study

J Shoulder Elbow Surg March/April 2008

INCIDENCE

- The typical injury occurs in the dominant arm of a male in his 40's to 50's
  - I am following a chronic tear in a 76 yr old active male
- Single forceful eccentric load is applied to the flexed elbow of the dominant extremity (80%).
- Increased incidence in weightlifters, smokers, anabolic steroid use

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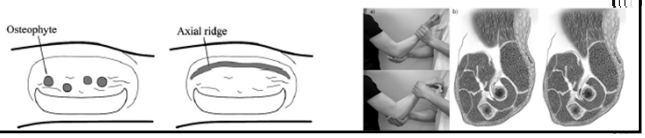
Etiology

- Watershed area of poor vascularity on tendon proximal to insertion into tuberosity
- 85% of radioulnar joint occupied by tendon in full pronation but 50% reduction from supination to pronation - Seiler J *JSES, 1995*
- Impingement may become sig in presence of axial ridge, osteophytes or hypertrophy of tendon



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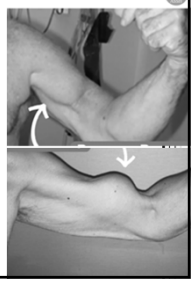
Physical Examination

- Complete rupture
  - Visible deformity (**reverse Popeye**)
  - Palpable defect
  - **Ecchymosis** (acute)
  - Weakness/Pain with supination/elbow flexion
  - Tenderness
- Partial rupture
  - Can be similar history and exam except biceps deformity absent
  - Vague antecubital pain
  - Weakness/pain with supination



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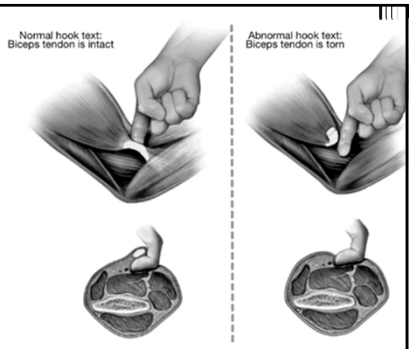
Hook Test

- Sensitivity:
  - Complete tears: 83%
  - Partial tears: 30%
  - Intact lacertus: 45%
- **Positive = Abnormal**



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