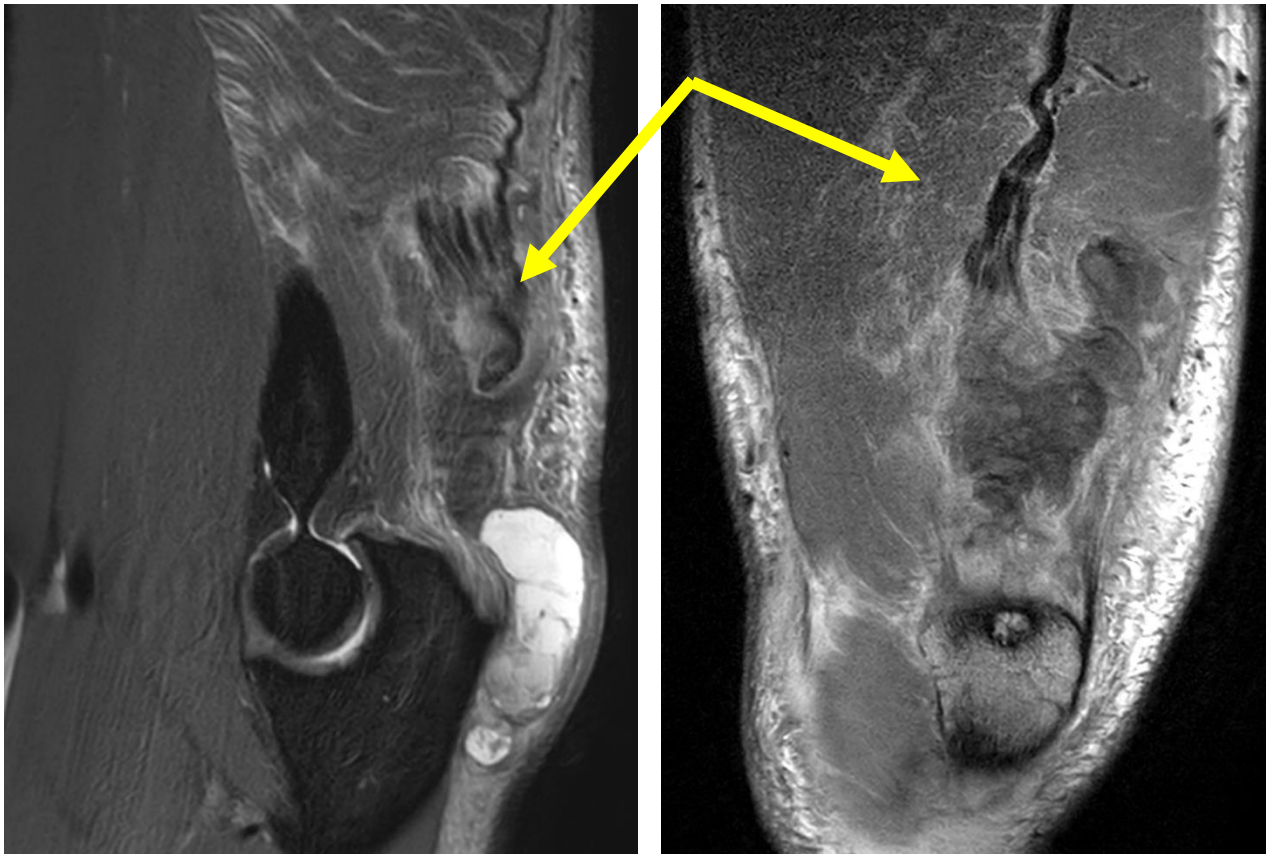
52 M powerlifter with recent triceps injury presents for assessment

MRI Findings:

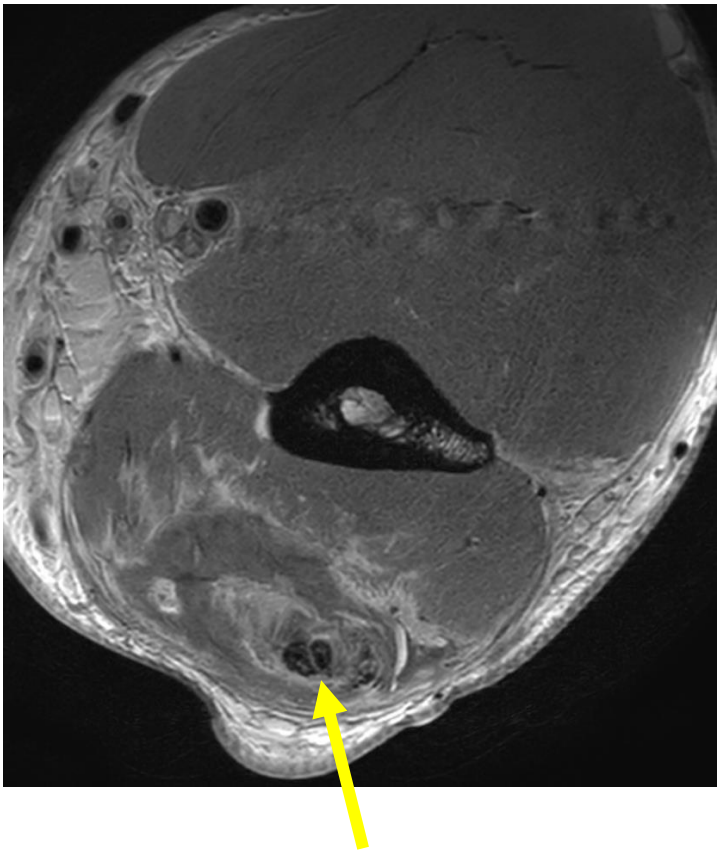
- Rupture distal triceps tendon from its attachment onto the olecranon process
- Tendon is retracted / recoiled in the order ~ 4cm, leaving a large fluid filled defect
- Disruption of tendon fibres that insert onto the fascia and oedema and blood fluid products track into the triceps muscle bellies (predominantly long and lateral heads)
- Moderate sized collection of blood filling olecranon bursal space

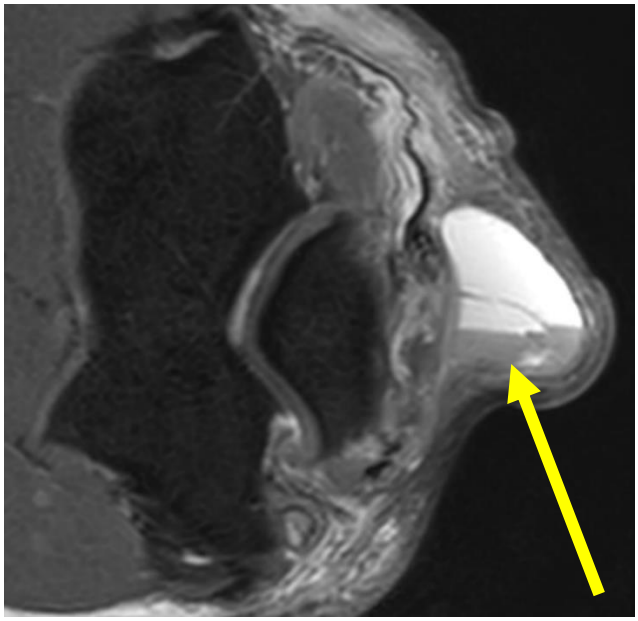


PD SPAIR sag and PD coronal – delineate frayed recoiled triceps tendon, haematoma/fluid in the defect and large olecranon bursal fluid collection (sagittal image)

Discussion

- Avulsion injury of the triceps tendon is an *uncommon* injury
- Present post trauma with regional pain, swelling and loss of extension strength
- Mechanism - usually occurs with eccentric contraction against forced flexion or a direct blow to the elbow
  - Athletes - repetitive loading during elbow extension susceptible (weightlifters, NFL linemen)
  - Non-athletes - falls on the outstretched hand, lifting injuries or blunt trauma
  - Increased risk – steroid exposure (systemic and local), tendinopathy





PD axial (L) – retracted tendon stump surrounded by fluid/blood products and tracking into muscle bellies mid-humeral level

PD SPAIR axial (R) – soft tissue oedema and layering (fluid-fluid levels) of blood/fluid products in an olecranon bursal collection

- Distal triceps tendon tears are nearly always avulsions at the tendon bone interface
- Often complete tear/avulsion of the posterior component of the triceps tendon (combined tendon of the lateral and long heads) and intact anterior component (medial head insertion)
- Although majority of injuries are avulsions, the distal triceps may partially tear at the myotendinous junction
- As the triceps is the only extensor at the elbow, surgery is indicated for virtually all complete tears in active persons and for incomplete tears when there is concomitant loss of strength
- Early primary repair best (within ~3/52) as delayed diagnosis may necessitate reconstruction
- Variant anatomy
    - Medial head accessory slip - inserts onto medial epicondyle -> can tear, scar and result in entrapment/impingement of ulnar nerve (cubital tunnel syndrome)
    - Anconeus epitrochlearis - anomalous muscle runs from medial olecranon -> medial epicondyle and must be considered in the setting of cubital tunnel syndrome (present in > 25% of cadavers)

Imaging

- XR
    - Soft tissue thickening along the posterior arm +/- avulsed olecranon bone fragment (or calcific tendinopathy)

- Ultrasound – dynamic assessment
    - Retracted tendon and tendon quality (changes of tendinopathy/enthesopathy), fluid gap/haematoma +/- avulsed bone fragment may be detected
- MRI
    - MRI is adept at demonstrating the spectrum of distal triceps injuries and associated pathologies
    - Illustrates variant anatomy

Further Reading:

Belentani C, et al: Triceps brachii tendon: anatomic-MR imaging study in cadavers with histologic correlation. Skeletal Radiol. 2009 Feb;38(2):171-5
Sollender et al: Triceps tendon rupture in weightlifters. J Shoulder Elbow Surg 7 (1998) 151-153
Madsen M, et al: Surgical anatomy of the triceps brachii tendon: anatomical study and clinical correlation. Am J Sports Med. 2006 Nov;34(11):1839-43
Bodor, D. Radsource MRI Web Clinic — Distal Triceps Injuries March 2010