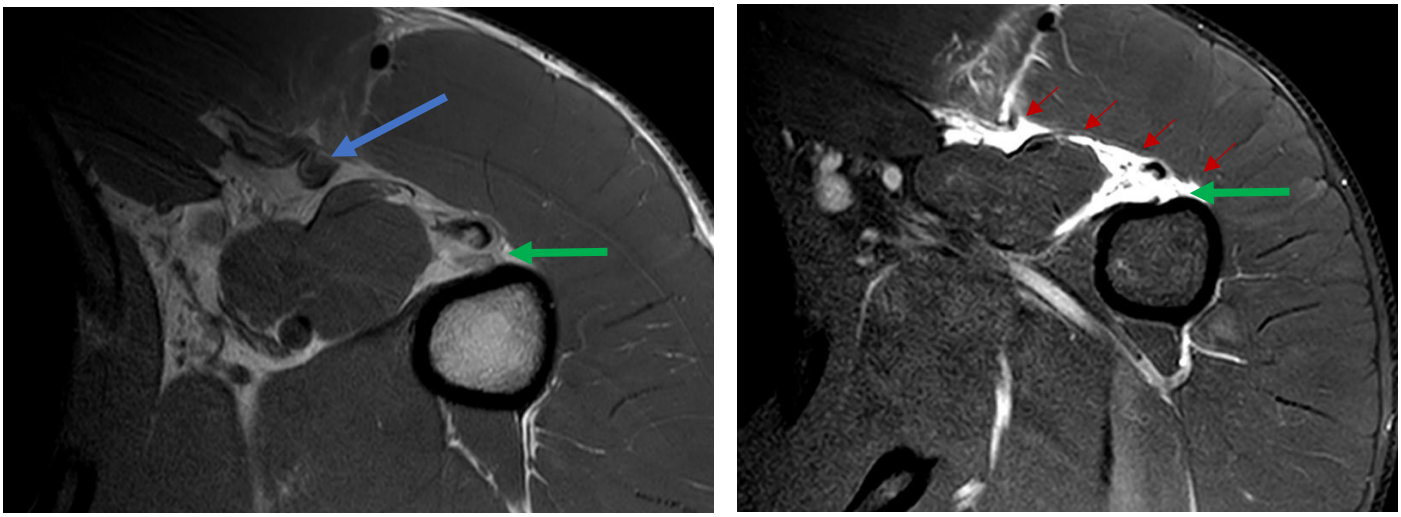
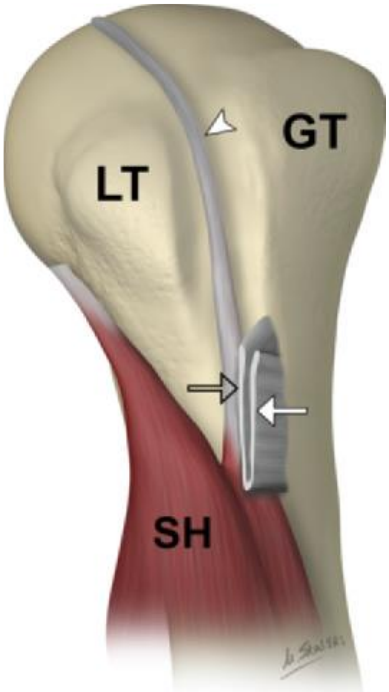
21 year old male with acute lateral chest pain and bruising, suspected pectoralis major injury

MRI Findings:

- Pectoralis major tendon complete tear near its insertion into the proximal humerus
- Tendon is de-tension and retracted
- Fluid/bleeding surrounding the injured tendon and humerus
- Biceps tendon is intact but anteriorly displaced



PD and T2 Axial - The blue arrow on the left shows the torn and retracted pectoralis major tendon, while the red arrows on the right show the oedema. Note the green arrows on both images which show a complete absence of tendon at the insertion of the pectoralis major into the clavicle.



T2 saggital – The blue arrow shows a fluid gap in place of the pectoralis insertion into the humerus. Note that the biceps tendon adjacent is slightly anteriorly displaced. The image on the **right**, taken from Radiographics, shows the normal anatomic insertion of the pectoralis tendon – the U-shaped pectoralis tendon (arrows) courses anterior to the long head of biceps tendon (arrowhead), immeidately adjacent to the short head of biceps (reference: Lee et al*, US and MR Imaging of pectoralis major injuries*, Radiographics, 2017, 37: 176-189)

Discussion

- Pectoralis major threatened by overload to an extended humerus or excessive tension on maximally contracted muscle
  - Bench-press of weightlifting is classic culprit, but also common in contact sport
- Patient presents with sudden severe arm/pain shoulder, painful range of motion, weakness
- Tears are usually lateral in location, either at tendon/bone enthesis of humerus, or myotendinous junction
- Proximal and small myotendinous partial tears normally heal, complete tears cause weakness and chest deformity
- MR gold standard for injury evaluation
  - Evaluates tendon, associated injuries in high-impact injuries (rugby/AFL etc)
  - Can ascertain associated haematoma, proximal intramuscular tear/injury
  - Assess for 'nonsurgical' injuries at the pectoralis origin and muscle belly (usually traumatic in origin) as well as surgical injuries of musculotendinous junction, tendon proper, and enthesis

XR / CT

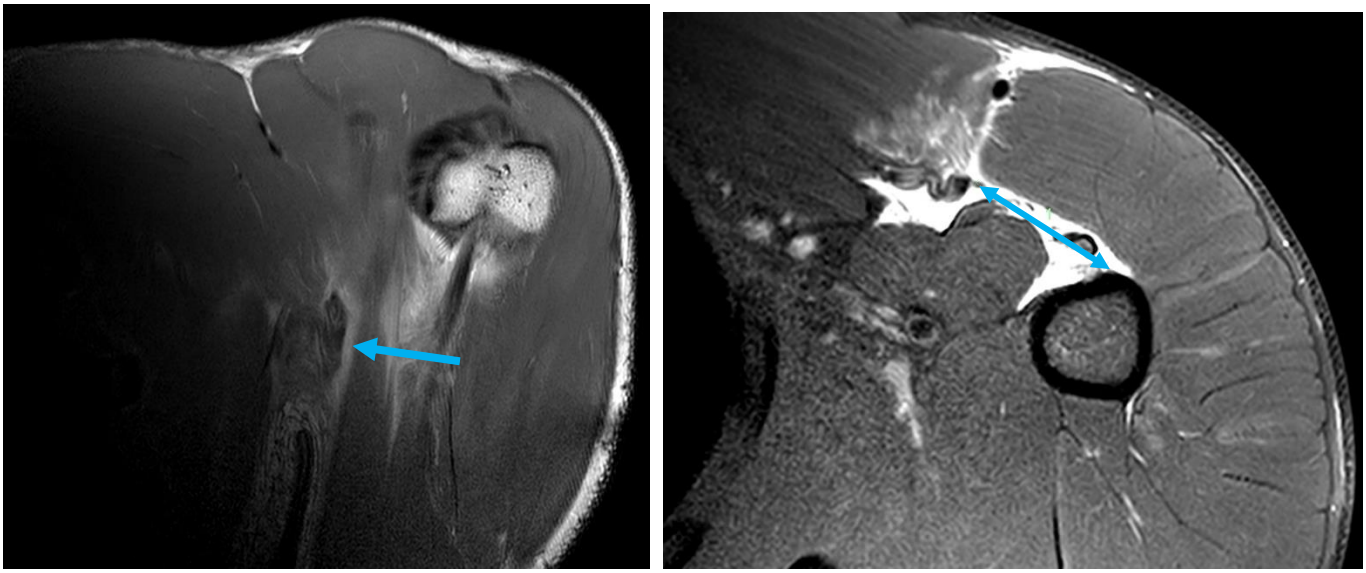
- Usually negative – may see asymmetry of pectoral shadow on CXR (unhelpful clinically)
- CT may show bony avulsion with distal enthesis injury

US

- Operator dependent, but in experienced hands can nicely show pectoralis major tendon injury

MR

- T1/PD used to identify gap in pectoralis tendon
- T2 sequences for oedema, haemorrhage, partial tendon tear



Coronal PD and Axial T2 – the blue arrow on the **left** coronal image shows the deformed and retracted lateral margin of the pectoralis muscle belly. The image on the **right** shows the distance of tendinous retraction, and surrounding oedema.

Further Reading:
Connell DA, Potter HG, Sherman MF, Wickiewicz, *Injuries of the pectoralis major muscle: evaluation with MR imaging*, Radiology, 199, Vol 210, No 3
Lee et al*, US and MR Imaging of pectoralis major injuries*, Radiographics, 2017, 37: 176-189
Hasegawa K, Schofer JM, *Rupture of the pectoralis major: a case report and review*, J Emerg Med, 2010 Feb; 38(2): 196-200
Lee et al, *MR imaging assessment of the pectoralis major myotendinous unit and MR imaging – anatomic correlative study with surgical correlation,* American Journal of Roentgenology, 200, Vol 174:5