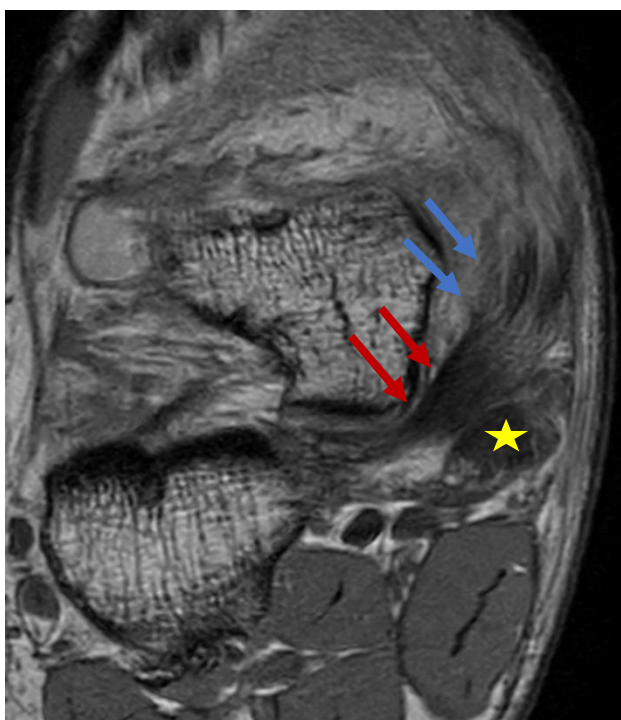
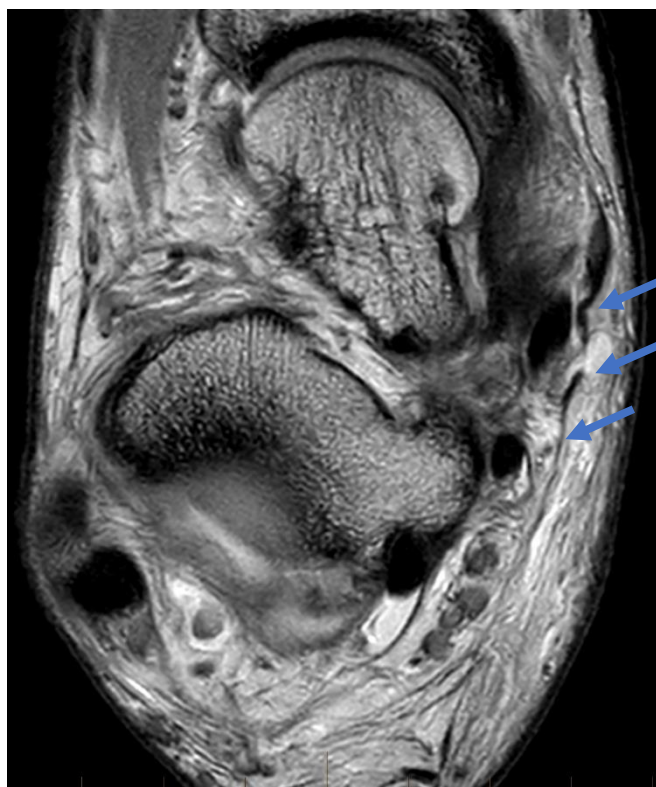
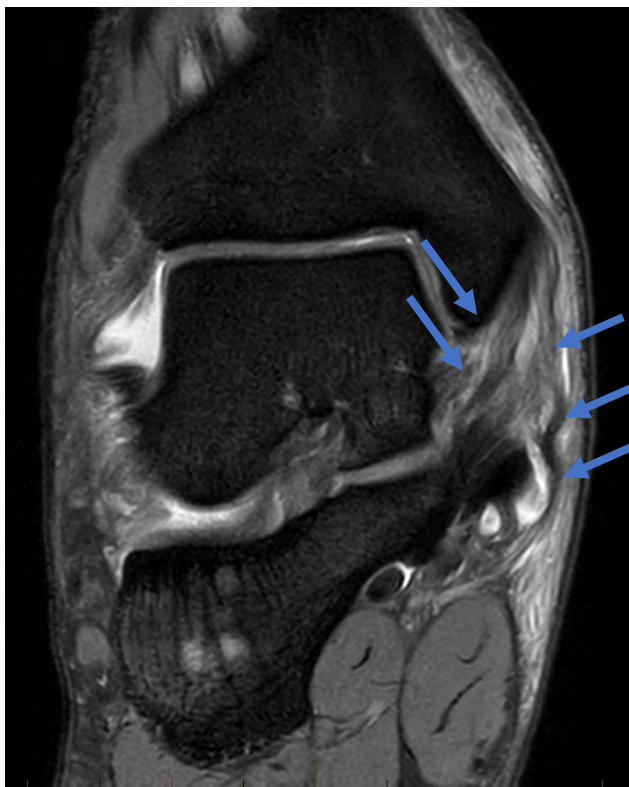


22yo M athlete with persistent pain and instability after an inversion injury

MRI Findings:

- Extensive tearing and de-tensioning of the superficial fibres of the deltoid ligamentous complex
- Tearing extends anteriorly into the tibiospring portion of the deltoid ligament, extending into the superomedial spring ligament. The spring ligament itself is partially torn and detensioned (see next page)
- Surrounding oedema through the torn fibres, and blood/fluid products tracking around the medial ankle



TOP LEFT: Coronal T2 shows the interstitial tearing/contusion through the deep deltoid fibres, while the more lateral arrows indicate the injury to the flexor retinaculum

TOP RIGHT: Axial PD shows the tearing along the flexor retinaculum in another plane

LEFT: Coronal PD shows more anterior slices, which shows injury to the tibiotalar components. Here, we see the tibiospring portion of the superficial band of the deltoid ligament complex (blue arrows) become continuous with the superomedial/plantar spring ligament (red arrows) – the 'glide zone' between the superomedial spring ligament and the tibialis posterior tendon (yellow star) is where the high-grade injury to this deltoid ligament appears to extend.

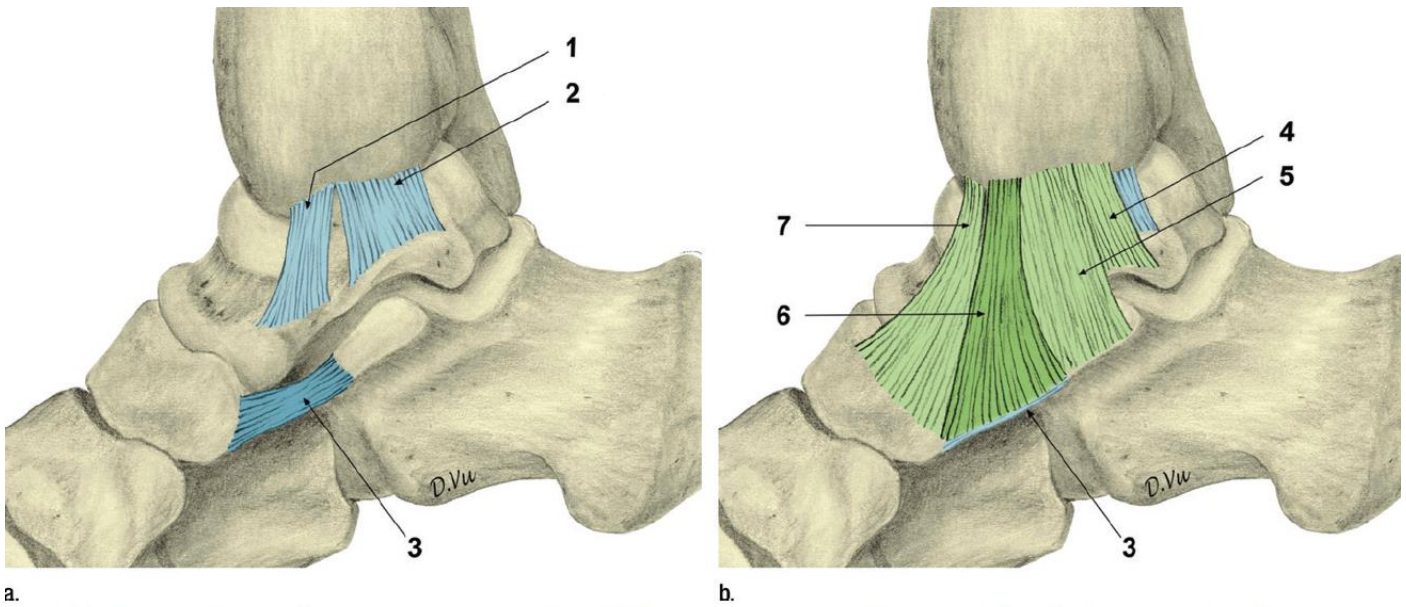
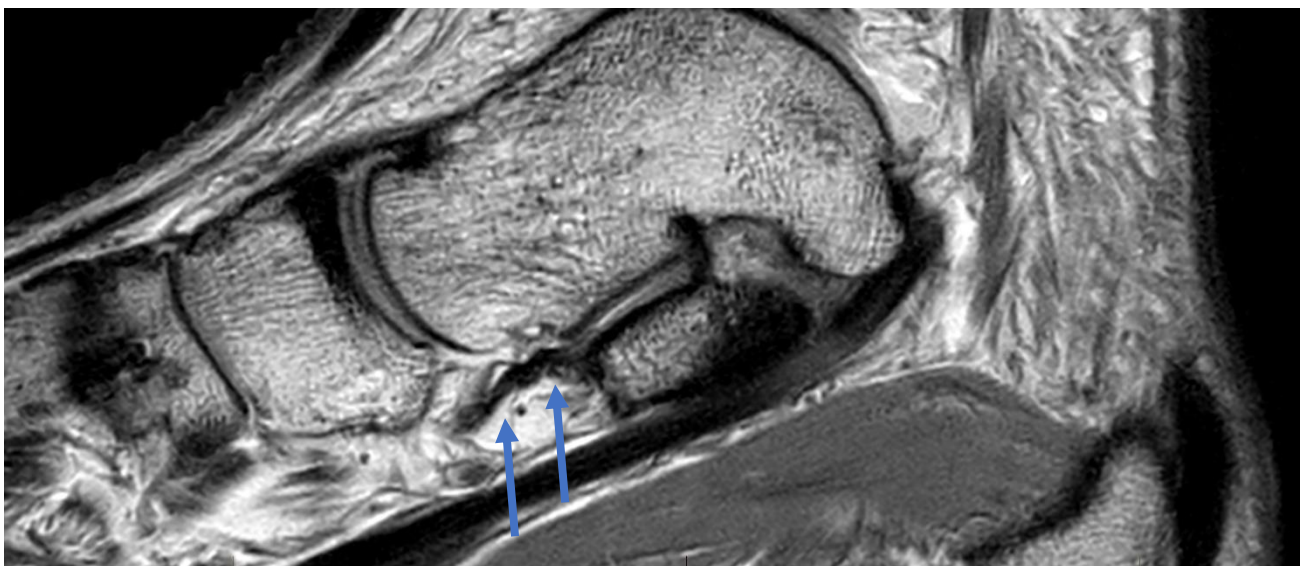


Figure 13: Diagram of the deltoid ligament anatomy. (a) The deep deltoid comprises anterior (1) and posterior (2) fibers. (b) The superficial deltoid consists of tibiotalar (4) (variably present), tibioalcaneal (5), tibiospring (6), and tibionavicular (7) portions. Also illustrated is the superomedial spring (3) ligament.

Graphic above: Taken from an excellent article by Linklater et al, the diagram above is a brilliant illustration of the deltoid complex. Note especially that the spring ligament (3) blends with the tibiospring component (6) on the right picture. (Reference: Linklater et al, *Imaging of Acute capsuloligamentous sports injuries in the ankle and foot: sports imaging series*, Radiology, Vol 283:3, 2017)



Sagittal PD: The blue arrow indicates an injured spring ligament complex. When paired with the diagram above which shows a 'simplified' appearance of the deltoid complex, it can be seen how the (deep) anterior tibiotalar, tibionavicular, tibiospring and true spring ligament all 'blend' together somewhat. The blue arrows represent the spring ligament.

Key Considerations:

- Routine/stress radiographs used in acute setting to evaluate stability
- MR represents best test to precisely evaluate injury to ligaments, chondral surface
- Deltoid injuries often associated with injuries to lateral ligamentous complex, flexor retinaculum, spring ligament, bone marrow contusions of the talus and medial malleolus
 - An injury to one should prompt a search for others!
- Overall, the deltoid complex itself has usually good healing potential – long-term valgus instability post deltoid trauma is a rare phenomenon

Further Reading:

Linklater et al, *Imaging of Acute capsuloligamentous sports injuries in the ankle and foot: sports imaging series*, Radiology, Vol 283:3, 2017
 Stadnick ME, Deltoid ligament injuries, RadSource MRI Web Clinic, Acc 16 Jul 2019, DOI <http://radsources.us/deltoid-ligament-injuries/>
 Crim JR, Deltoid Ligament Injury, STATdx (MSK syllabus), Acc 15 Jul 2019, DOI: <https://my.statdx.com/document/deltoid-ligament-injury/b77a5591-8668-4ae3-abca-c76264ae1f5c?searchTerm=spring%20ligament%20injury>
 Stadnick ME., Spring ligament tears, RadSource MRI Web Clinic, Acc 16 Jul 2019, DOI: <http://radsources.us/spring-ligament-tear/>