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BMUS MSK Travelling Ambassador 2024

INTRODUCTION TO ANKLE ULTRASOUND

Learning objectives

- To understand basic anatomy.
 - Tendons
 - Ligaments
- To understand basic ultrasound technique.
(demonstration)
- To understand basic pathology.
- Report writing.

Ankle tendon anatomy - Anterior

Tibialis Anterior (TA)

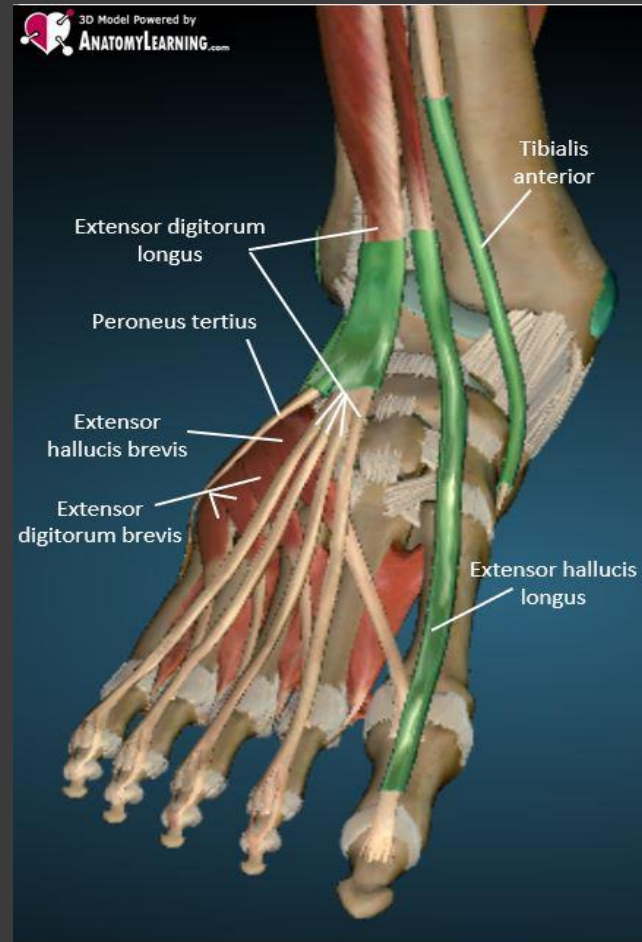
- Insertion – Medial cuneiform and 1st MT

Extensor Hallucis Longus (EHL)

- Insertion – base of 1st distal phalanx

Extensor Digitorum Longus (EDLs)

- Insertion – middle and distal phalanges of 2nd to 5th toes.



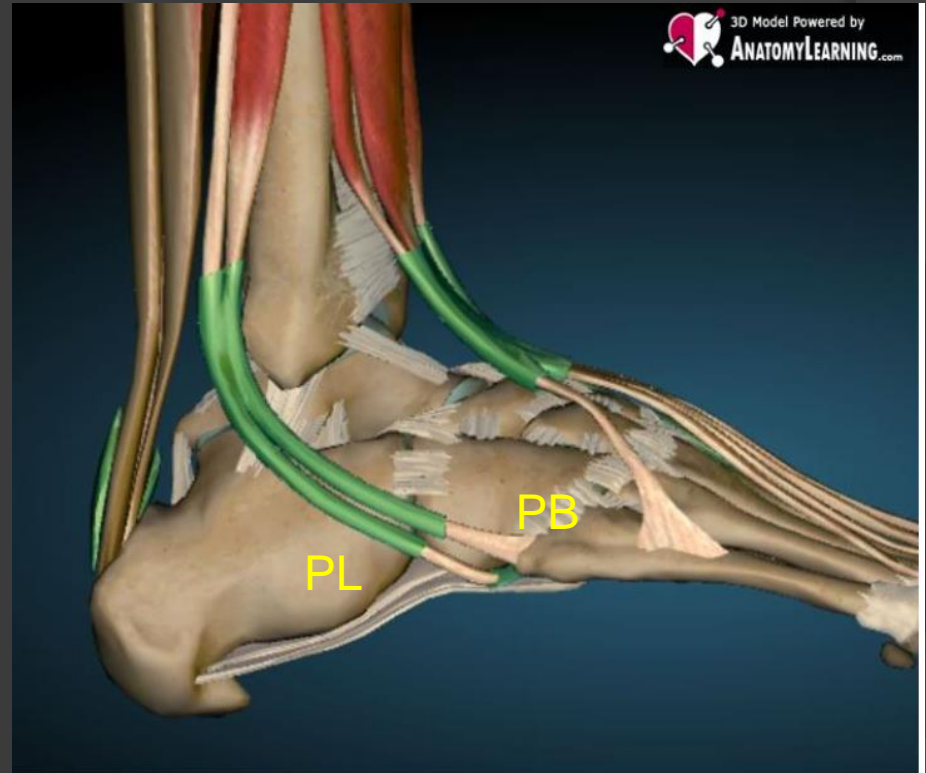
Ankle tendon anatomy -Lateral

Peroneal Longus (PL)

- Insertion – 1st MT, medial cuneiform

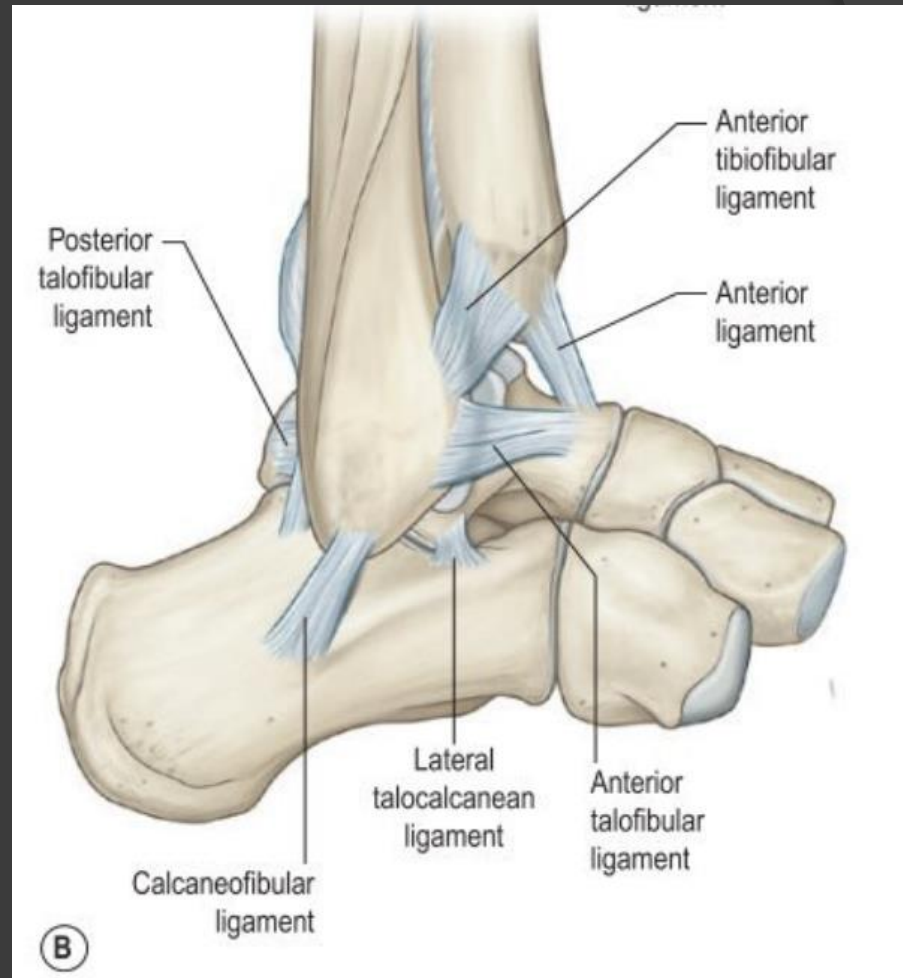
Peroneal Brevis (PB)

- Insertion – 5th MT.



Ankle ligament anatomy – Antero-lateral

- ⦿ ATFL - Anterior Talo-Fibular ligament
- ⦿ AITFL - Anterior Tibia-Fibular ligamen
- ⦿ CFL – Calcaneal Fibular ligament



Ankle tendon anatomy - Medial

Tibialis Posterior (TP)

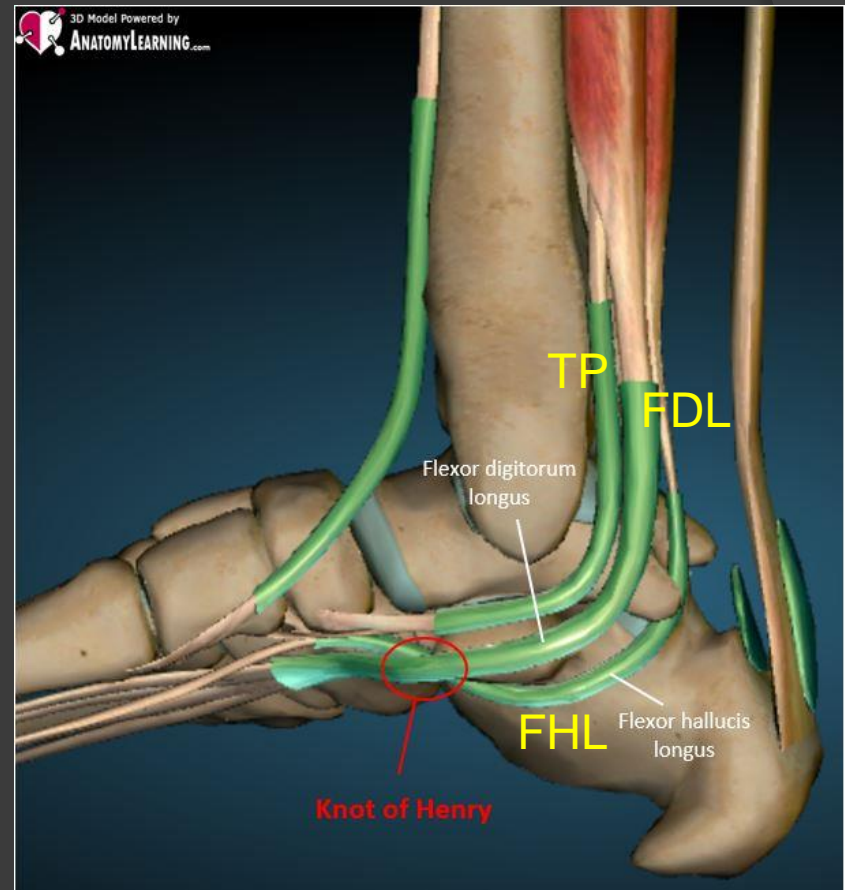
- Insertion – Navicular / medial cuneiform

Flexor Digitorum Longus (FDL)

- Insertion – base of distal phalanges of 2nd to 5th toes

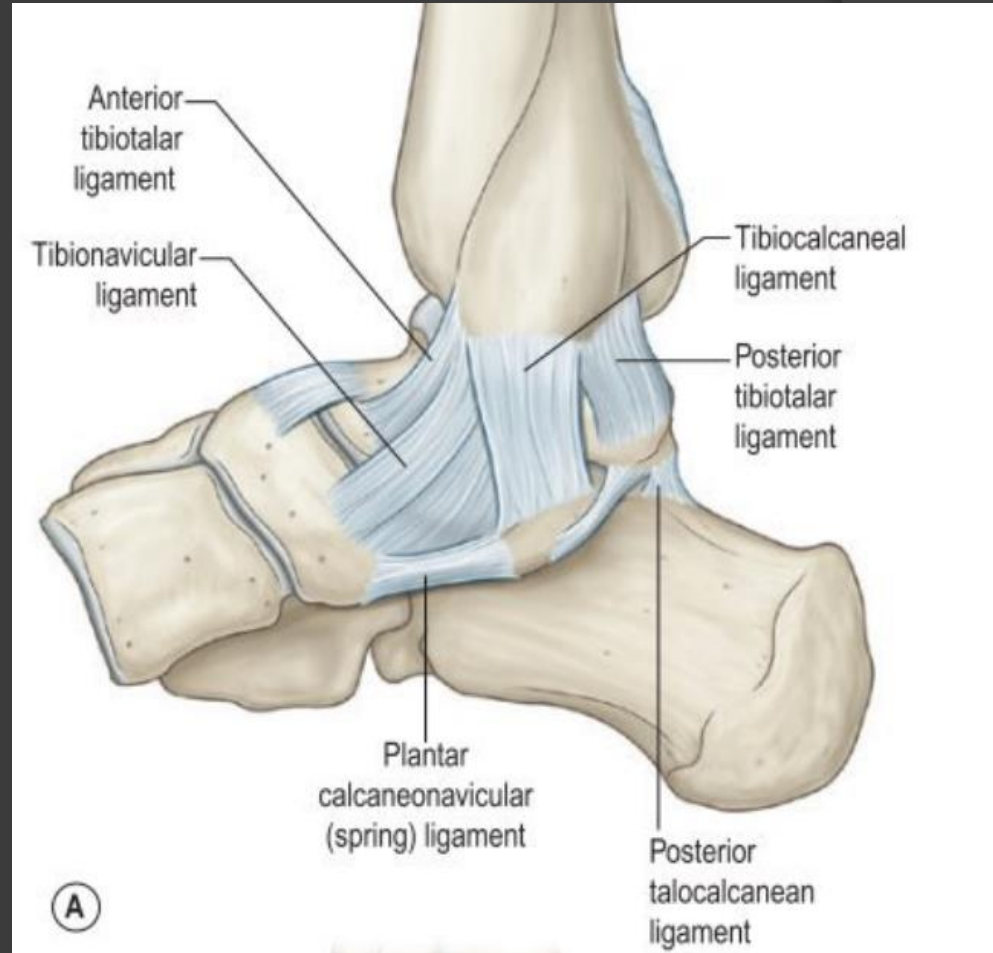
Flexor Hallucis Longus (FHL)

- Insertion – base of distal phalanx of the big toe



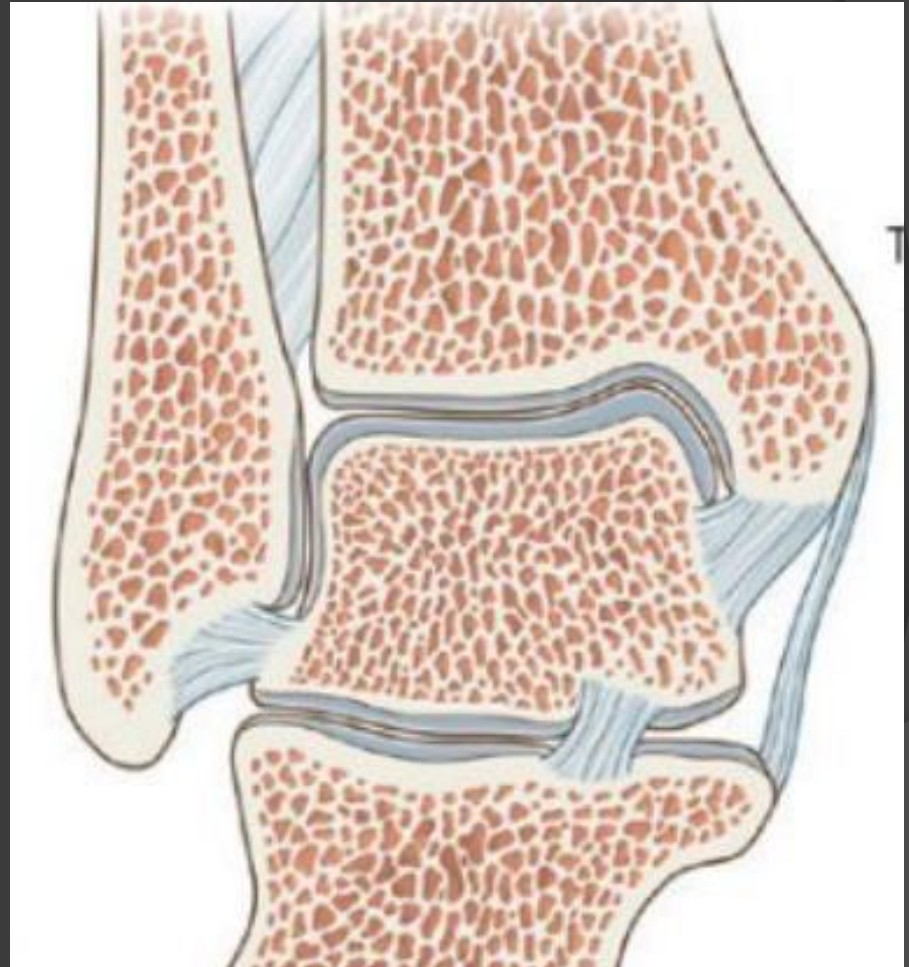
Ankle ligament anatomy – Medial Deltoid Ligament

- Complex ligamentous components – difficult imaging on ultrasound
- 4 components
 - Anterior tibiotalar
 - Tibionavicular
 - Tibiocalcaneal
 - Posterior tibiotalar



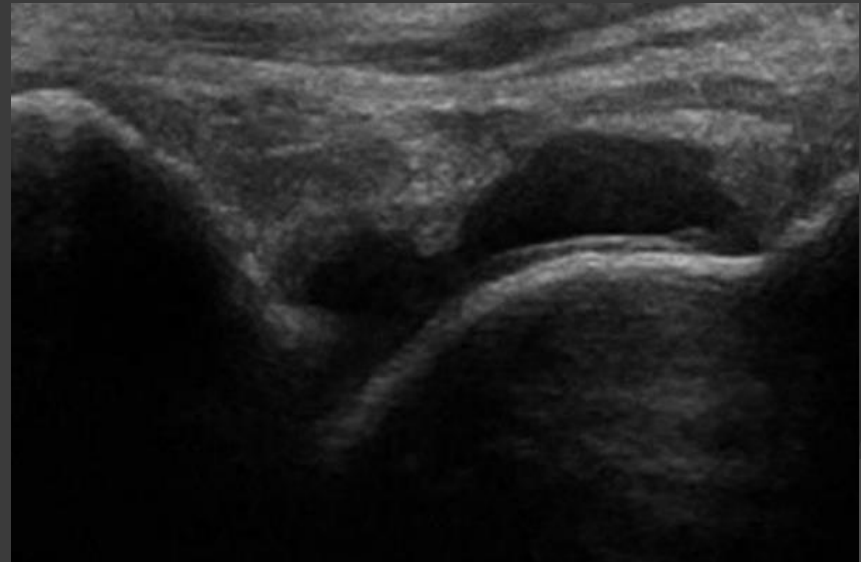
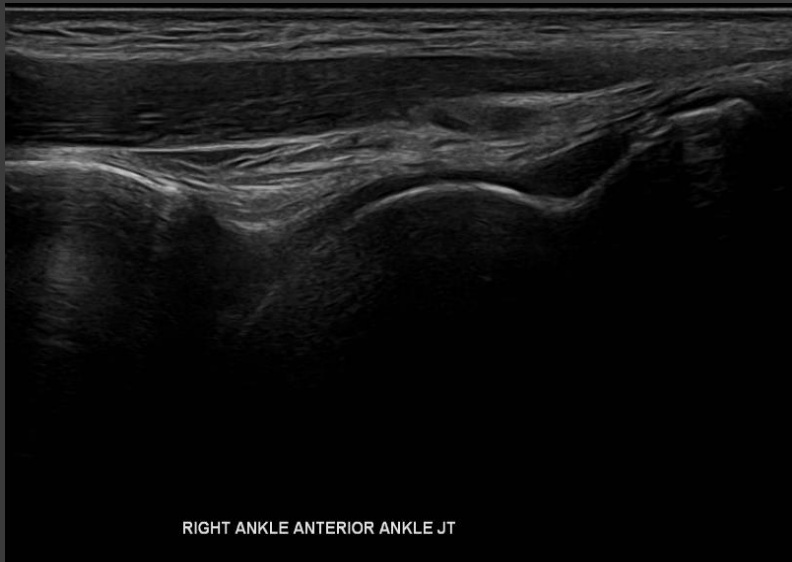
Anterior ankle joint

- Hinge joint which allows dorsi-flexion and plantar-flexion of the foot. However, it also allows inversion, eversion and rotation and therefore could be considered a complex joint.
- It is a synovial joint.
- A high load bearing joint but is also a stable joint due to it's complex ligamentous structure.
- Common joint for post traumatic OA to occur.



Anterior ankle joint

- Check anterior joint (tibiotalar joint) for effusion.
- Can result from trauma, inflammation or infection, comparison to the asymptomatic side is helpful.

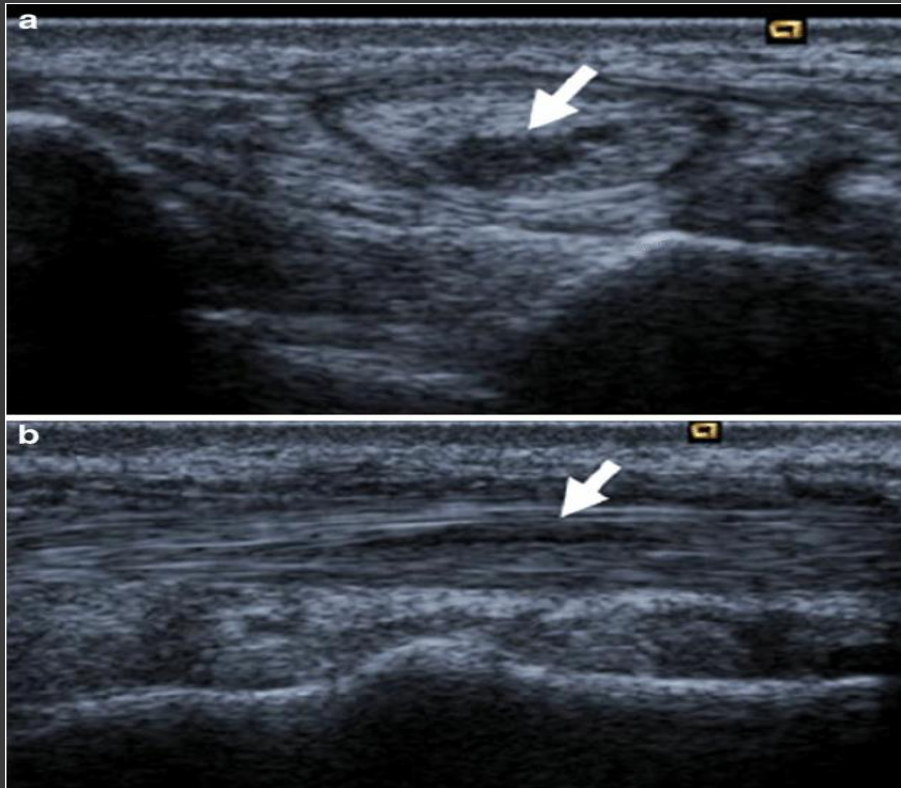


How to identify disease/injury

- ⦿ Are the tendons intact?
- ⦿ Are the tendons normal in fibrillar pattern?
- ⦿ Do the tendons appear to be thickened? If so, compare to the asymptomatic side.
- ⦿ Is there any free fluid within the tendon sheaths?
- ⦿ Do the tendons move freely on dynamic evaluation?
- ⦿ Is there any neo-vascularisation within the tendon or hyperaemia of the tendon sheath?

Pathologies

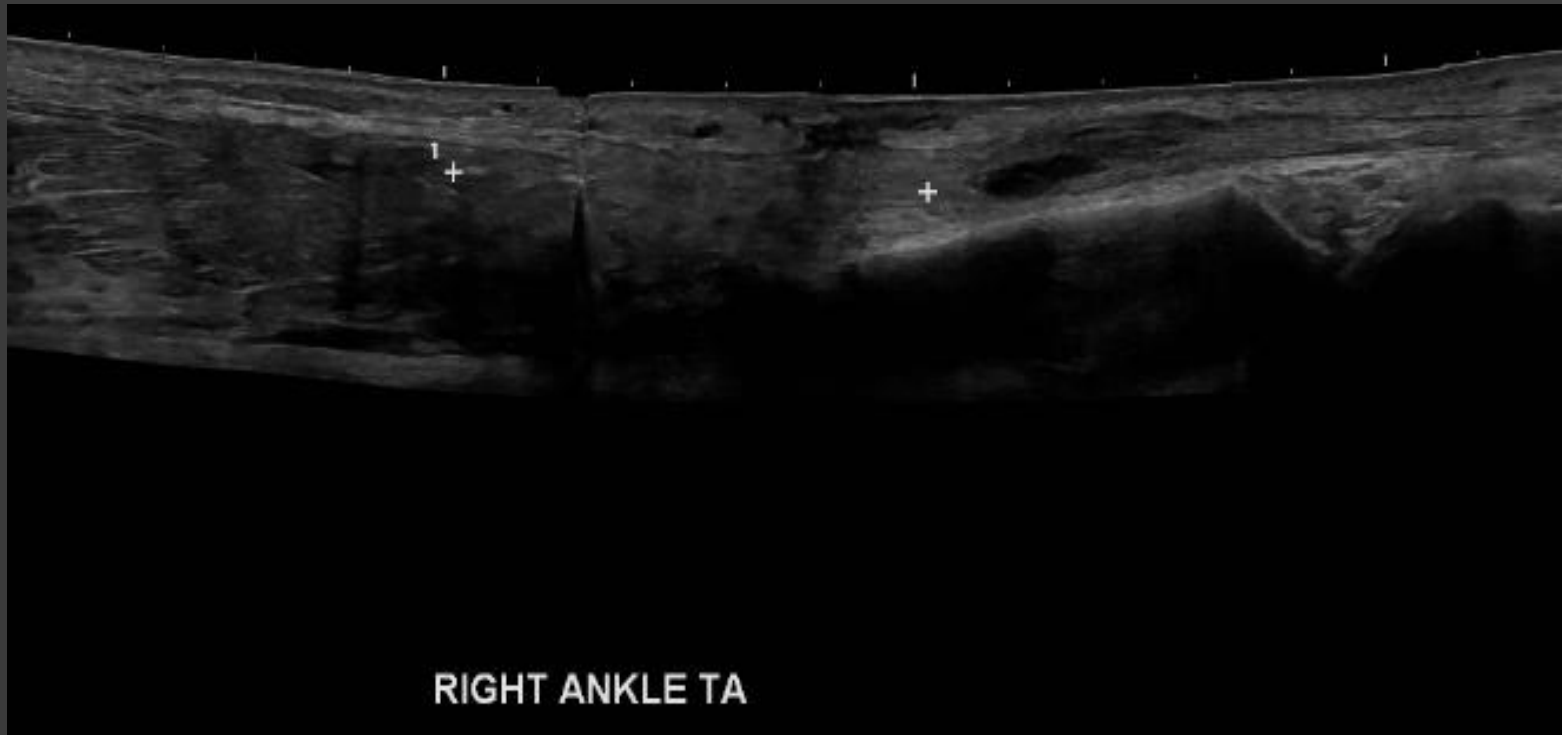
- ◎ Tendon tears - partial or intra-substance
 - hypoechoic defects – can be linear



Mansour, Ramy & Jibri, Zaid & Kamath, Sridhar & Mukherjee, Kausik & Ostlere, Simon. (2011). Persistent ankle pain following a sprain: A review of imaging. *Emergency radiology*. 18. 211-25. 10.1007/s10140-011-0945-8.

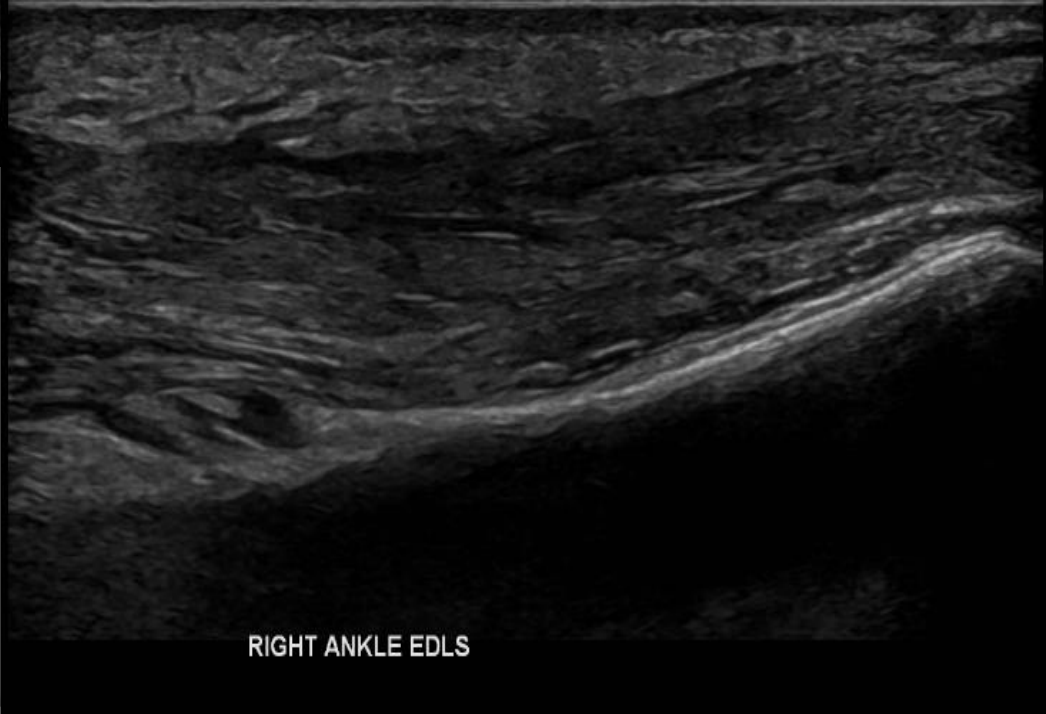
Tibialis Anterior rupture

- Full thickness tendon tear





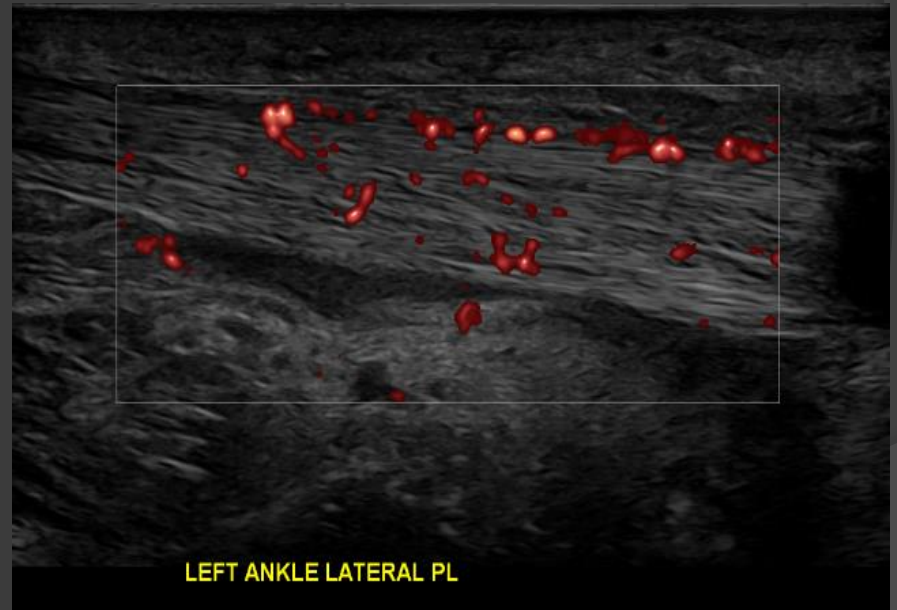
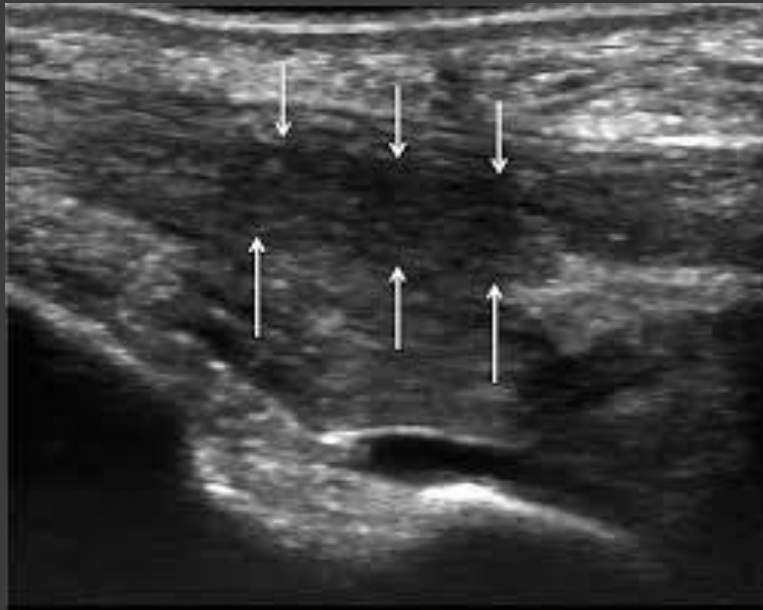
RIGHT ANKLE EHL DIST TO PROX



RIGHT ANKLE EDLS

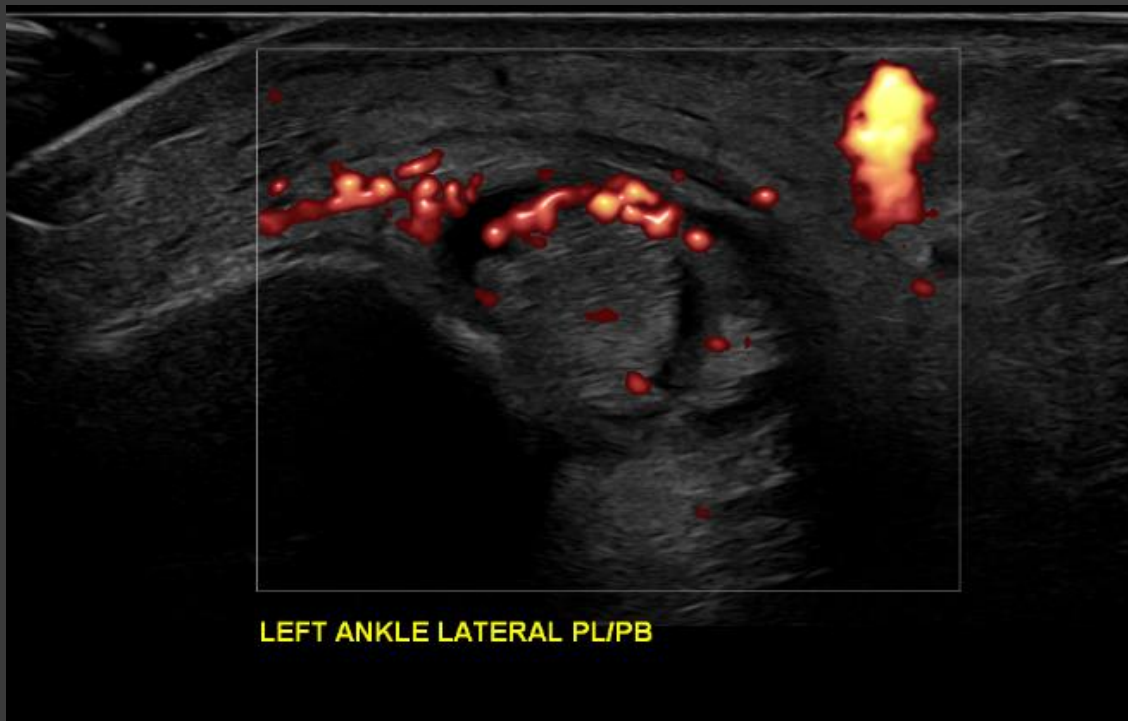
Tendinopathy

- Tendon becomes hypoechoic and thickened, with loss of normal fibrillar pattern. Neo-vascularity may or may not be seen.



Tenosynovitis

- ⦿ Inflammation of the tendon sheath – thickened synovial sheath showing hyperaemia on Doppler, can be with or without effusion.



Reporting

- A report should answer the clinical question.
- Be worded so that it prompts appropriate action for the patient.
- Should provide a diagnosis or in some cases a tentative or differential diagnosis, including a degree of confidence in that diagnosis

Reporting

- Usual clear, concise reporting techniques required.
- An example report for tear:

There is an intra-substance tear of the mid tibialis posterior tendon, just posterior to the medial malleolus. It measures approximately 15mm in length. Neo-vascularity is identified. The remainder of the tendon is intact but appears tendinopathic in nature.

The FDL and FHL tendons are intact and normal in appearance. No tenosynovitis. No evidence of anterior joint effusion seen.

Reporting

- An example report for Tendinopathy:

There is a thickening of the mid peroneal longus tendon, just posterior to the lateral malleolus. The tendon is hypoechoic with loss of normal fibrillar pattern. Neovascularity is identified. No tears seen. Appearances are in keeping with tendinopathy.

The peroneal brevis tendon is intact and normal in appearance. No anterior joint effusion.

- An example report for Tenosynovitis:

There is thickening of the tendon sheath around the tibialis anterior tendon. Free fluid and debris are noted within. Hyperemia is seen and appearances are in keeping with tenosynovitis. No anterior joint effusion.

Thank you

- This is an overview of ultrasound of the ankle.
- Any questions?

