

Sonography of **Foot & Ankle**

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Lack of ionizing radiation
Non-invasiveness
Real-time, dynamic exam
Less expensive
Focused evaluation correlated with
the painful site of clinical concern
Guidance of aspiration or injection

Advantages of US

Anatomy, surface bony **landmark**
Adequate **positioning**
Patient
Transducer
Proper **setting** of the machine
Frequency, focus, intensity, gain, etc

To get a good image

Echogenicity: hyper-, hypo-, eu-, an-
Echotexture: homo- or hetero-
Thickness
Continuity (tendon, bony cortex)
Compressibility
Vascularity
Underlying bony involvement

Terminology

After this session, you should know...
Structures in routine examination
Positioning of patient and transducer
Normal and common abnormal US findings

Anterior

Anterior ankle pouch
AITFL

Lateral

ATFL
CFL
Peroneus tendons

Medial

Deltoid ligament
Tarsal tunnel
Navicular bone

Posterior

Achilles tendon
Plantar fascia

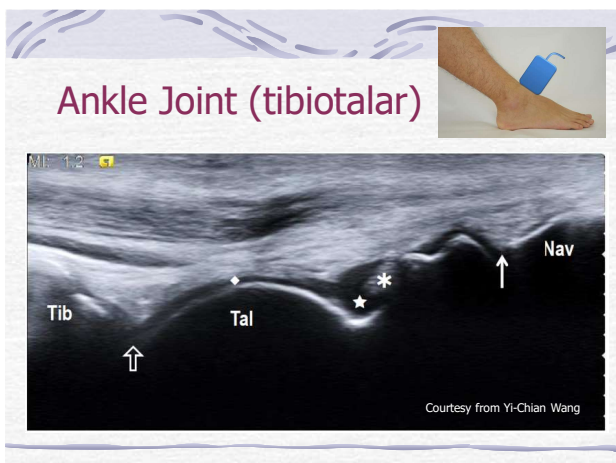
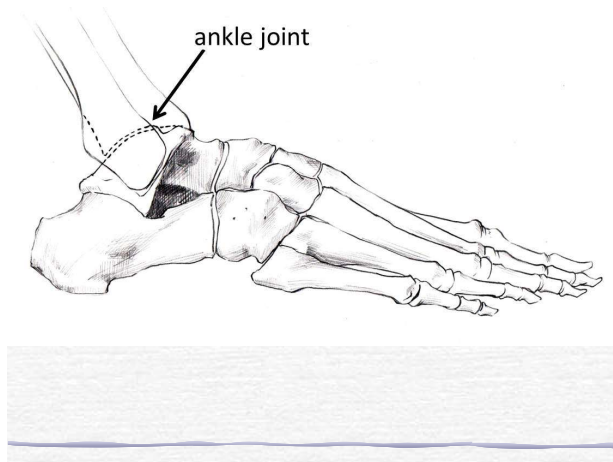
Common structures

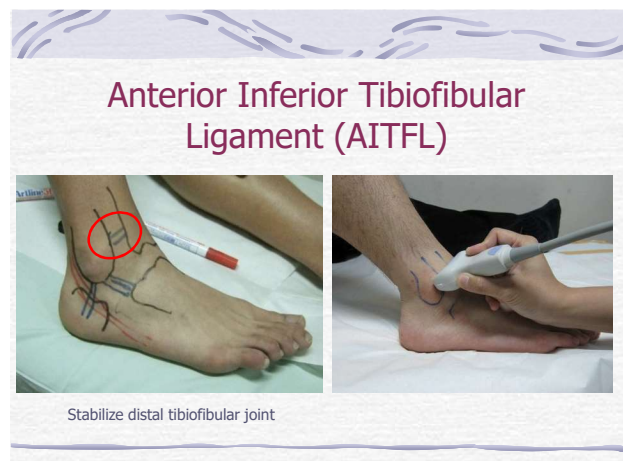
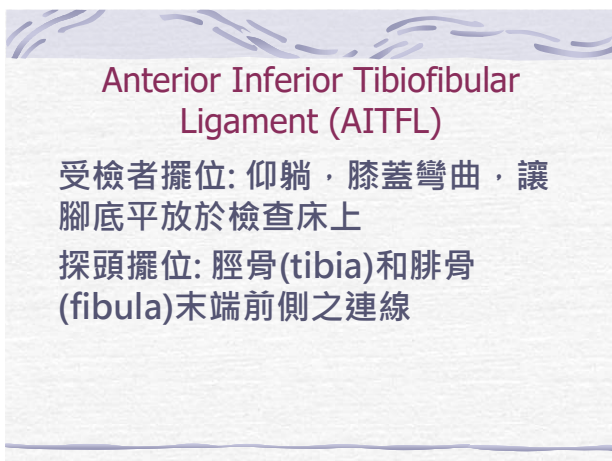
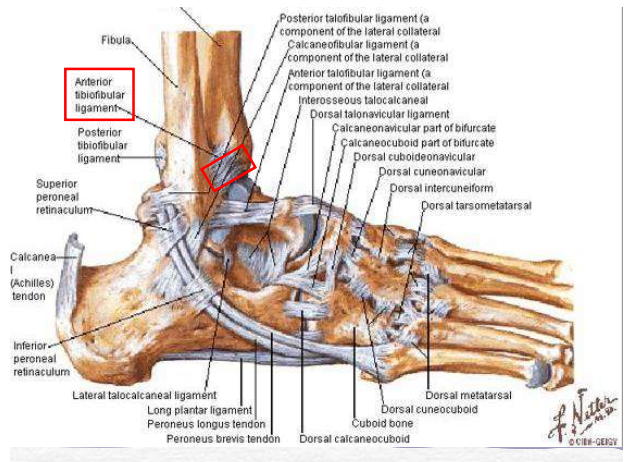
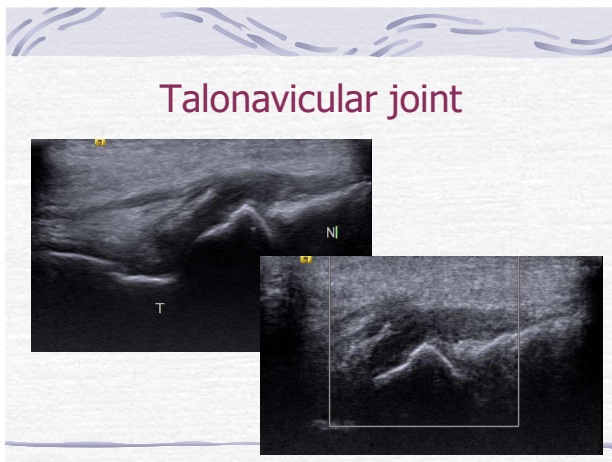
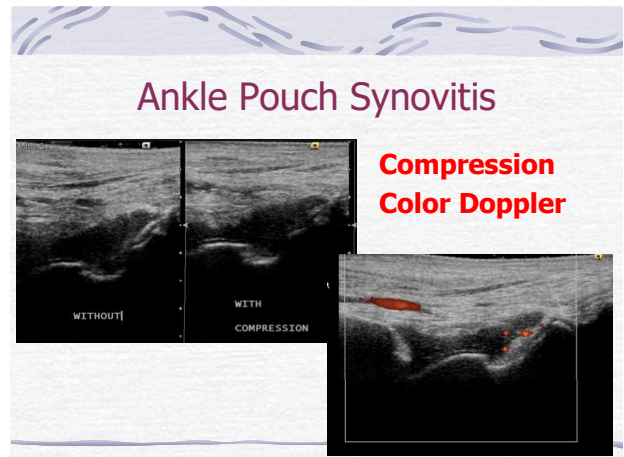
Anterior

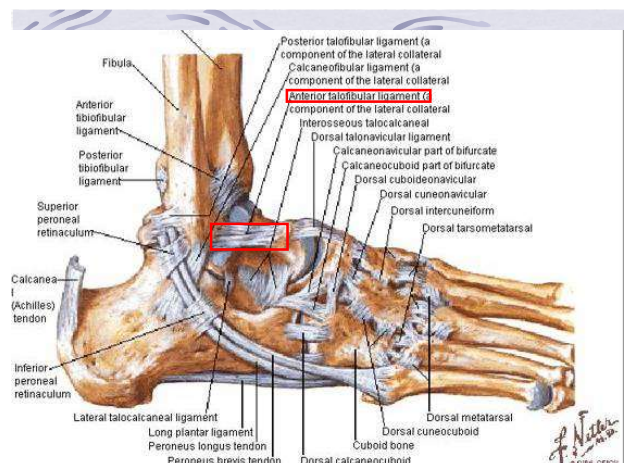
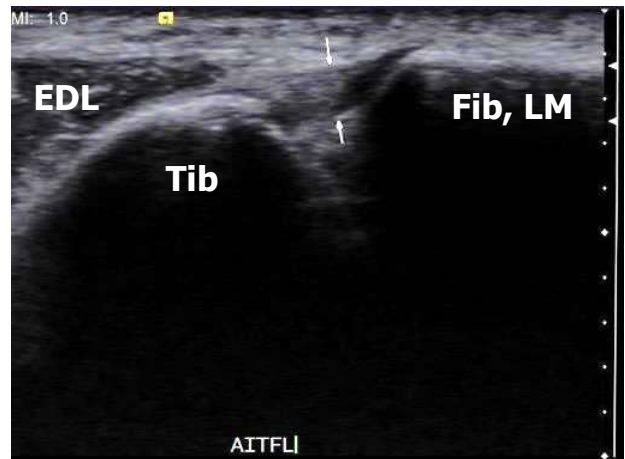
Anterior Ankle pouch

受檢者擺位: 仰躺, 膝蓋彎曲, 讓腳底平放於檢查床上, 踝關節盡可能蹠曲(plantar flexion)以完整檢查距骨

探頭擺位: 踝關節前方, 平行下肢的長軸。







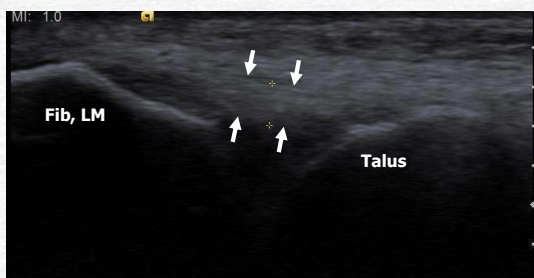
Anterior Talofibular Ligament (ATFL)

受檢者擺位: 側躺, 讓患腳在上, 以枕頭支撐踝部成稍微蹠屈(plantar flexion)及內翻(inversion)姿勢。
探頭擺位: 介於外踝(lateral malleolus)與距骨(talus)間, 平行足底方向。

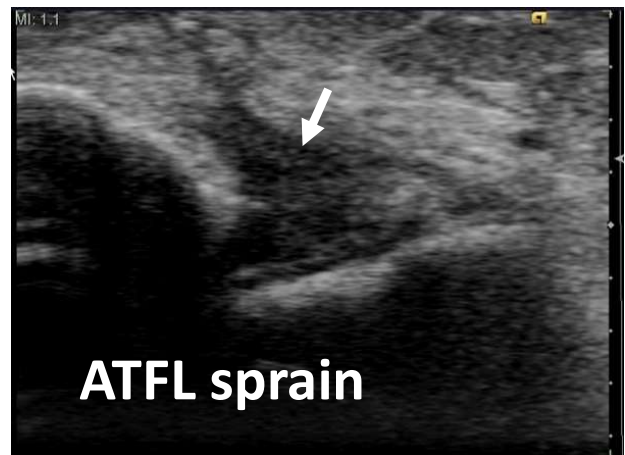
Anterior Talofibular Ligament (ATFL)



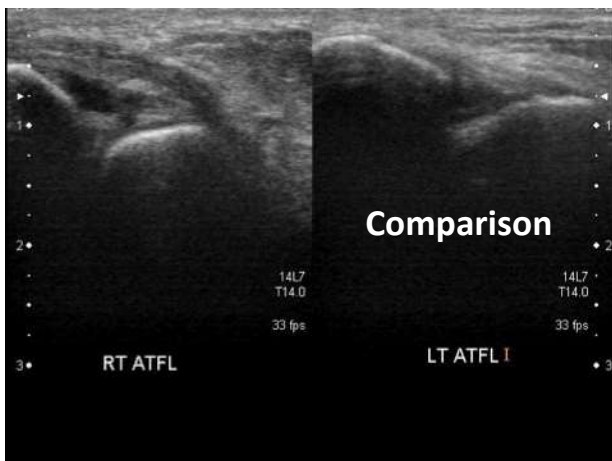
ATFL



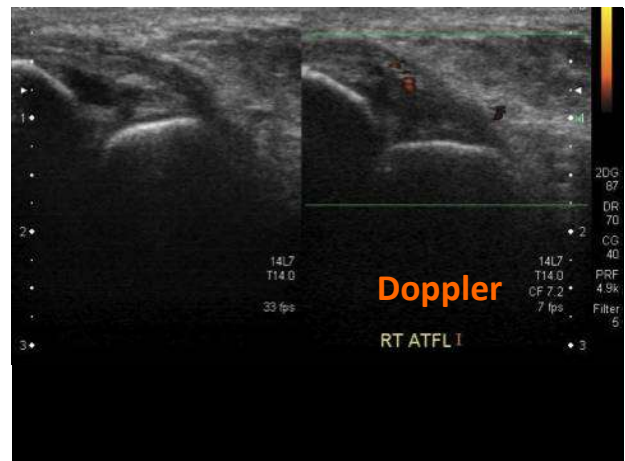
ATFL sprain

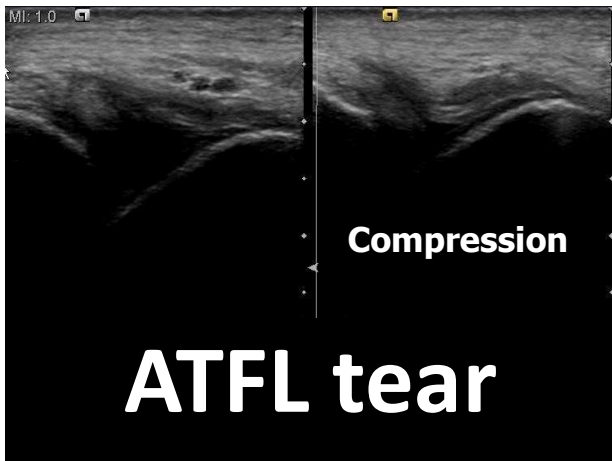


Comparison

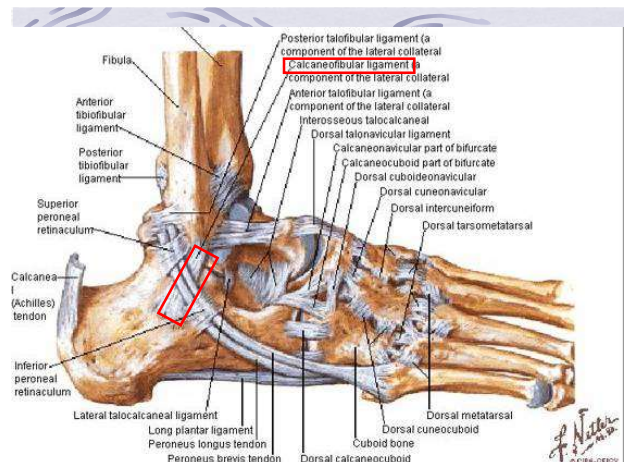
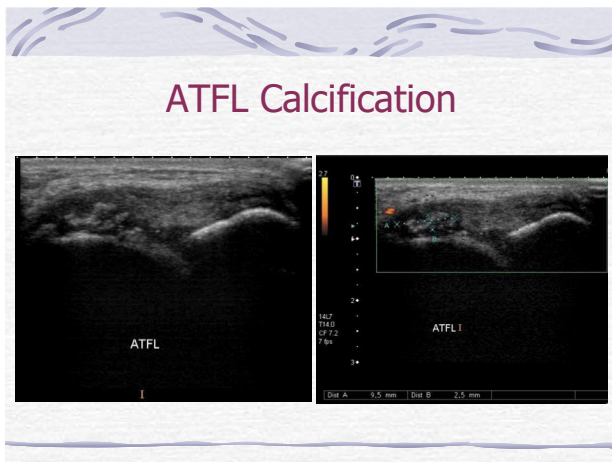


Doppler



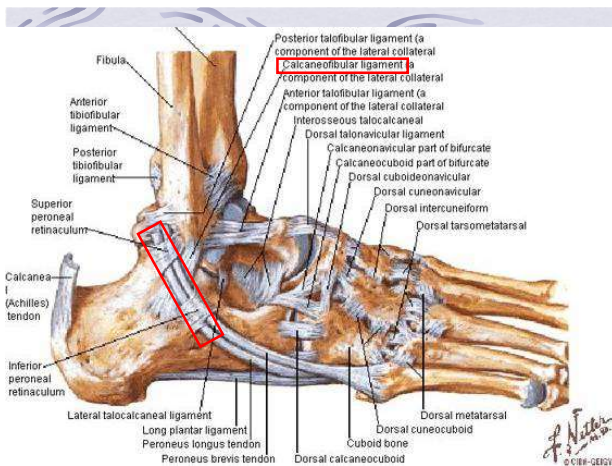
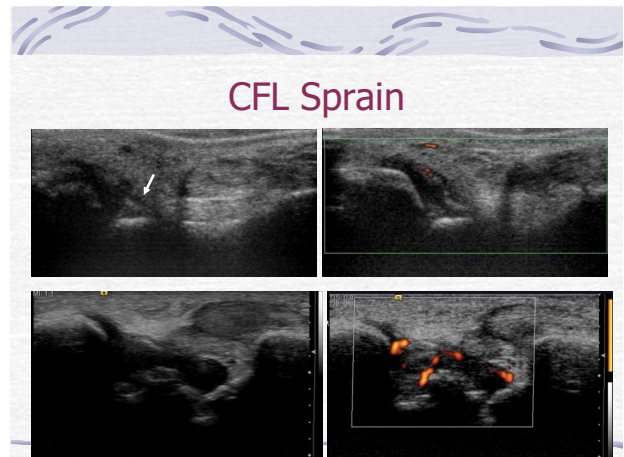
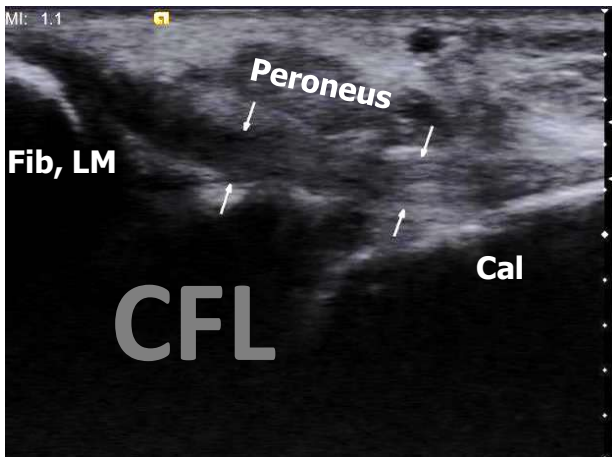


Normal
I: swelling, hypoechoic
II: partial tear
III: complete tear



Calcaneofibular Ligament (CFL)
 受檢者擺位：側躺，讓患腳在上，請患者將足背屈(dorsiflexion)，有時加一點內翻可使CFL被拉緊而較易呈像。
 探頭擺位：介於外踝與跟骨(calcaeus)間，垂直腳底方向，有時探頭遠端需稍向後傾。





Peroneus Longus/Brevis

受檢者擺位：側躺，讓患腳在上，請患者將足背屈。

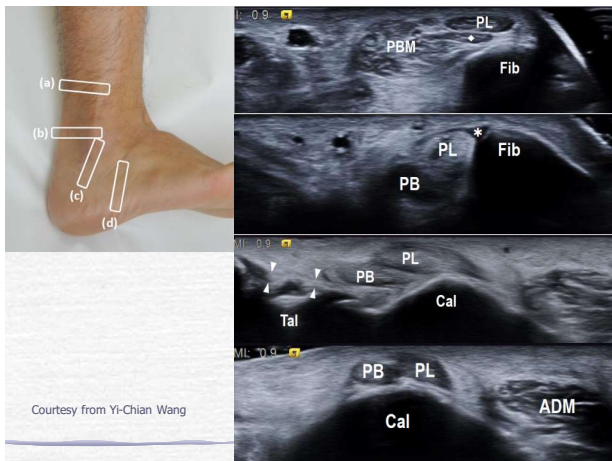
探頭擺位：介於外踝與跟骨間，垂直腳底方向，可檢查兩肌腱之橫切。若沿肌腱走向放置，則可檢查縱切。

Peroneus brevis (PB)
 → 5th metatarsal base
 Usually smaller

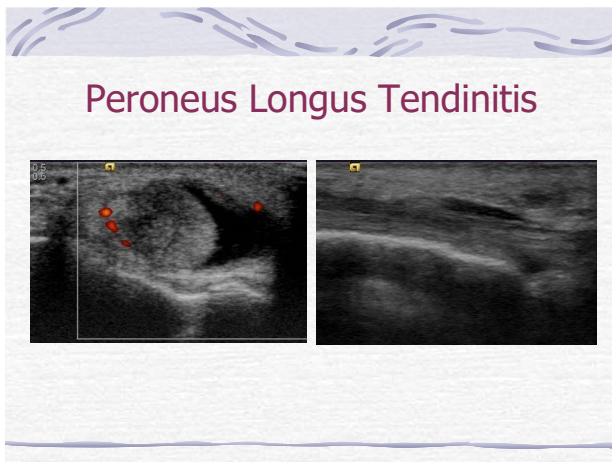
Peroneus longus (PL)
 → medial cuneiform, 1st metatarsal base

Share a common sheath at retro-malleolus level
 Separate sheath at infra-malleolus level

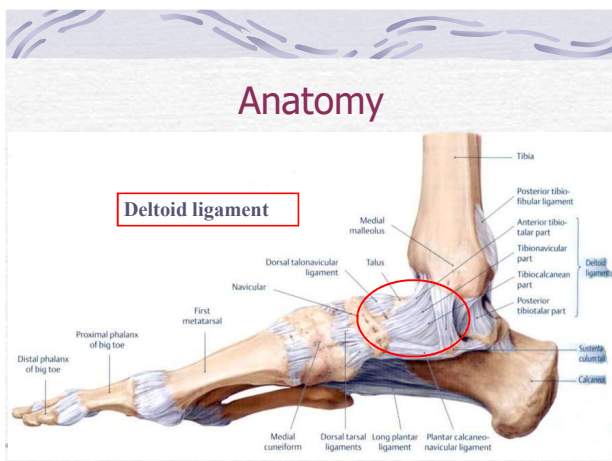
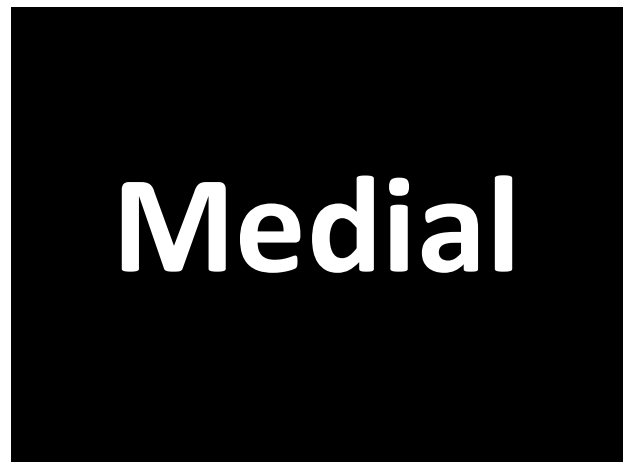
Peroneus Longus/Brevis



Courtesy from Yi-Chian Wang



Peroneus Longus Tendinitis



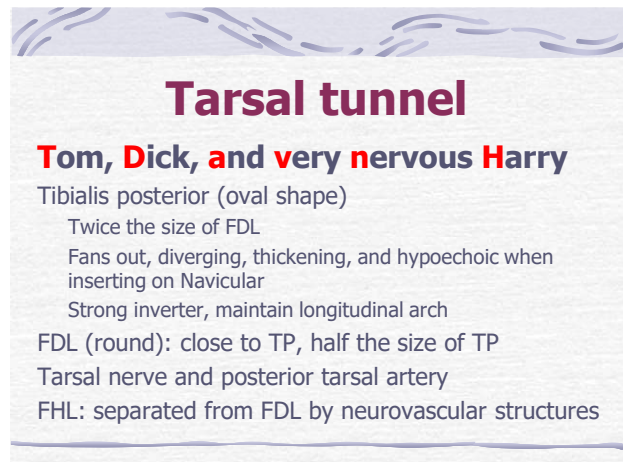
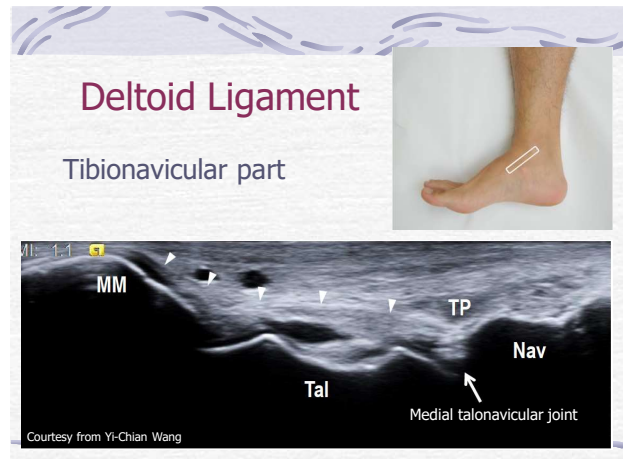
Anatomy

Deltoid ligament



Deltoid Ligament

受檢者擺位：側躺，讓患腳在下，內踝(medial malleolus)朝上。
 探頭擺位：介於內踝及跟骨或內踝及舟狀骨(navicular bone)之間，視檢查者欲檢查之部份。



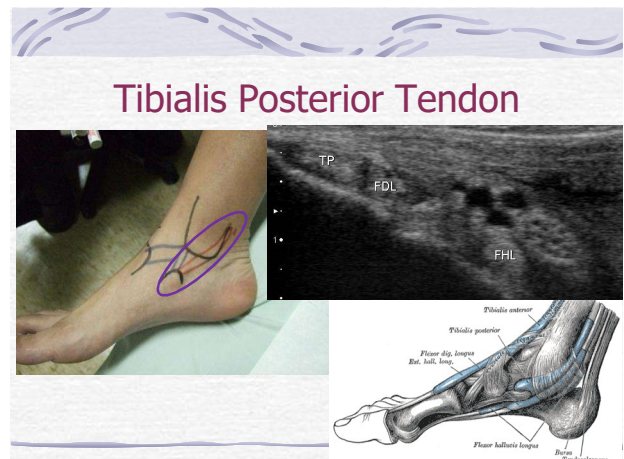
Tibialis Posterior Tendon

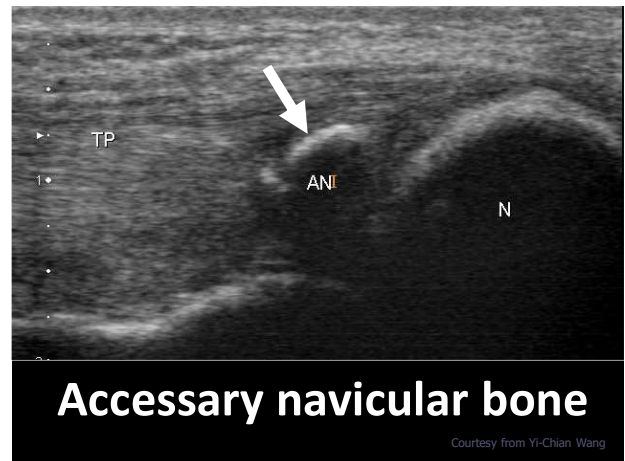
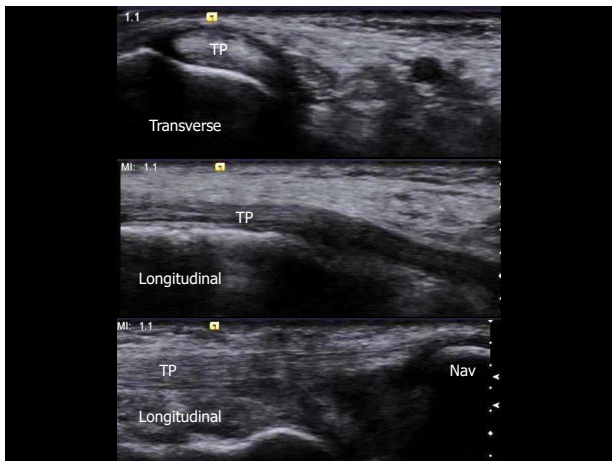
受檢者擺位：側躺，讓患腳在下，內踝朝上。

探頭擺位：內踝與阿基里斯腱之間，平行腳底方向，可檢查橫切。

旋轉九十度，沿內踝後緣，可以檢查肌腱近端之縱切。

將探頭移到內踝下方，介於內踝與舟狀骨之間，可檢查肌腱遠端之縱切。



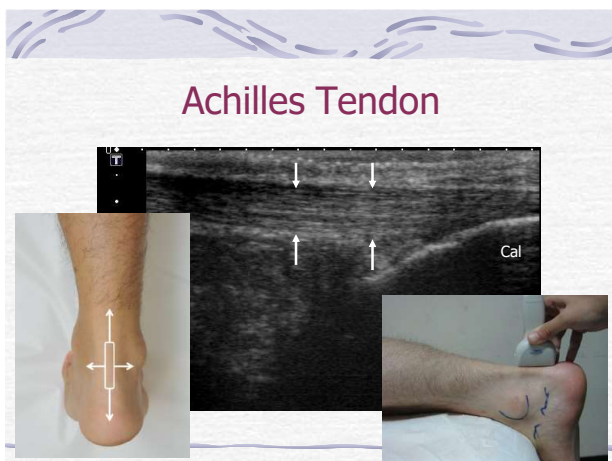


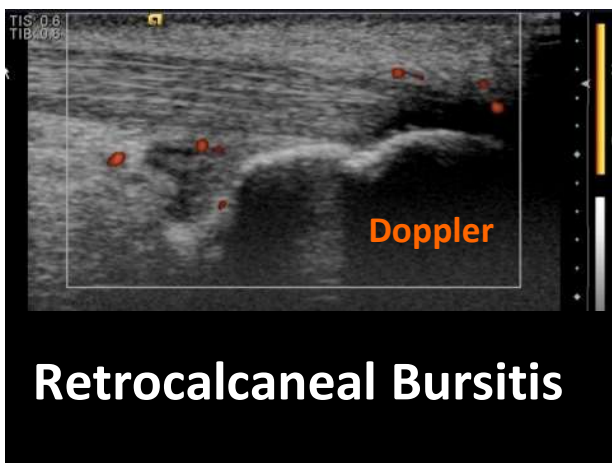
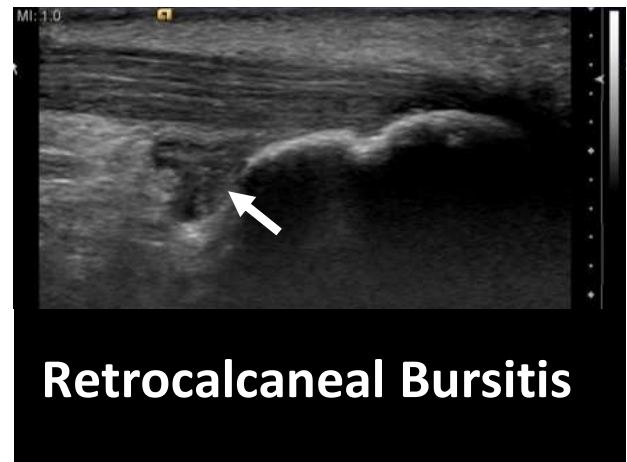
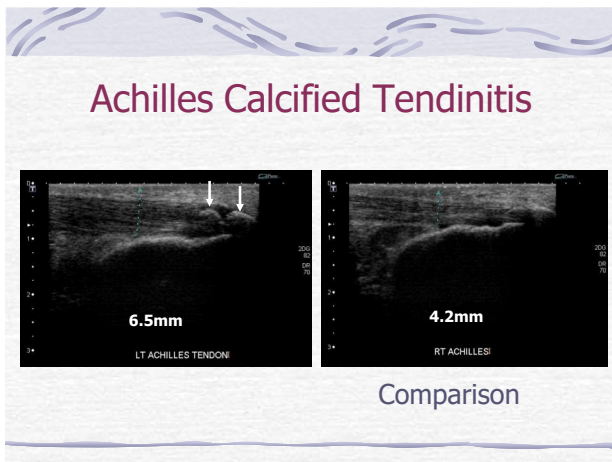
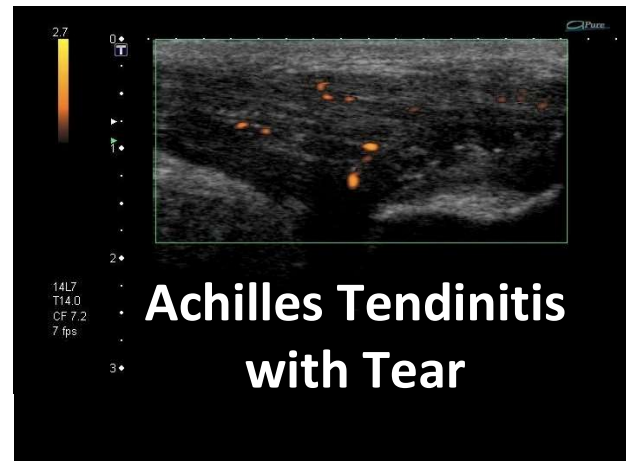
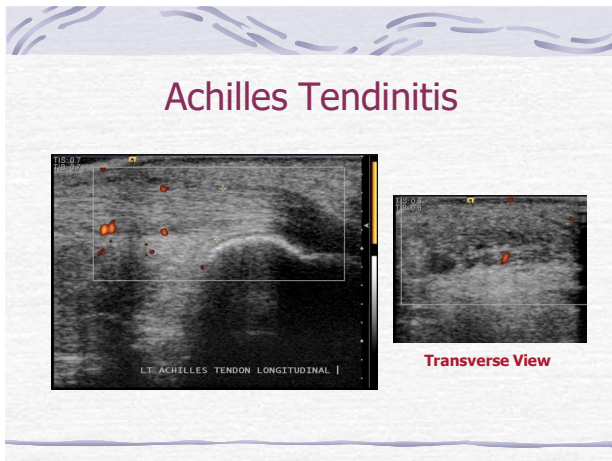
Posterior

Achilles Tendon

受檢者擺位：俯臥，將足踝垂出床緣，檢查者若為坐姿可用膝蓋頂住受檢者之腳尖以拉緊肌腱。

探頭擺位：直接置於肌腱上，平行肌腱走向，可以檢查縱切。旋轉九十度，垂直肌腱走向，可以檢查橫切，通常需使用較大量之傳導膠，使影像較清晰。

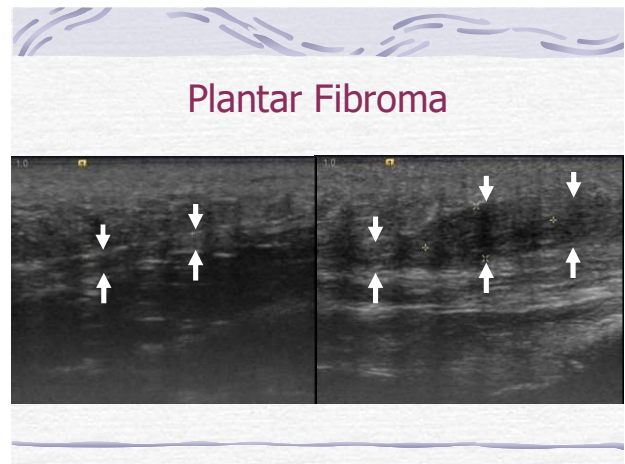
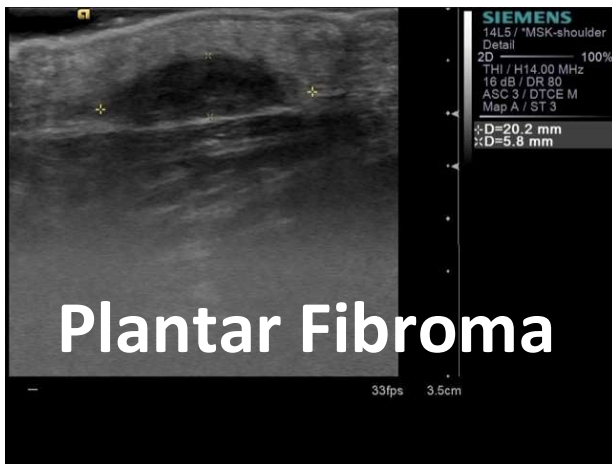
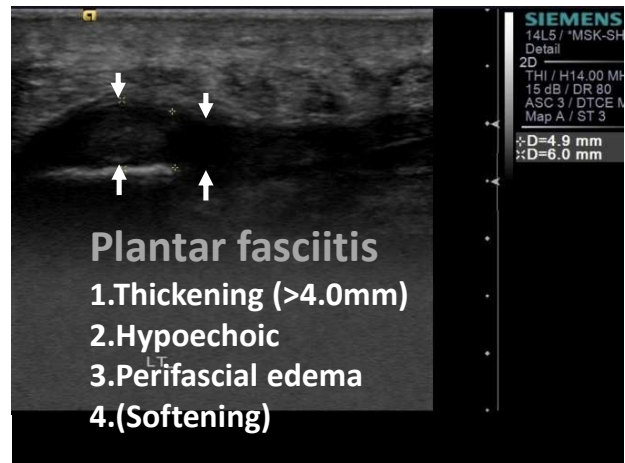
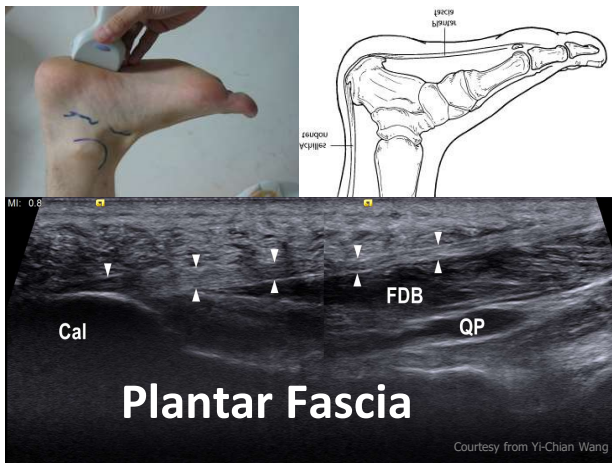




Plantar Fascia

受檢者擺位：俯臥，將膝彎曲九十度，足底朝上。

探頭擺位：摸到跟骨內側，沿足底筋膜走向，檢查縱切面。



Anatomy
Practice
Compression
Comparison
Color Doppler

3C

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