Sonography and podiatry

Sonographic artifacts

By : Brendan Goode – May 2021

Topics to be covered

- Sonographic artifacts
- What the sonographer/radiology department want on an ultrasound referral
- Image interpretation

Sonographic artifacts

Recognition of sonographic artifacts is critical to the interpretation of ultrasound images.

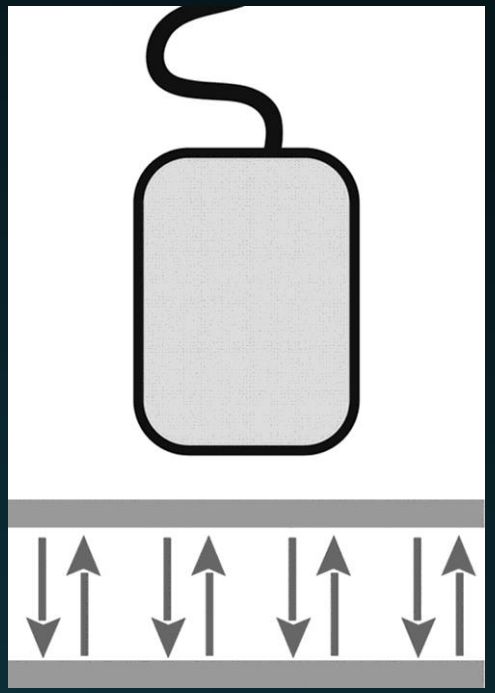
Sonographic artifacts provide clues to tissue composition thereby aiding in the understanding of pathology and increase diagnostic accuracy.

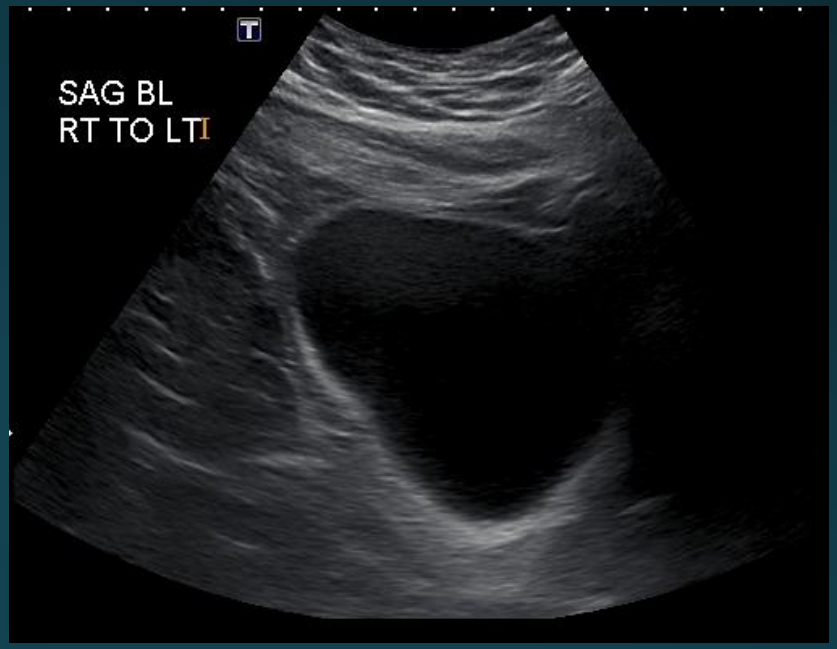
Being able to identify and potentially remedy sonographic artifacts aids quality control and assists us to provide optimal patient care.

- Reverberation
- Beam width artifact
- Posterior enhancement/shadowing
- Anisotropy
- Color flash
- Color bleeding
- Aliasing

Reverberation

- Adjust focal zone position
- Reduce probe pressure
- Increase probe frequency
- Ensure gain set appropriately

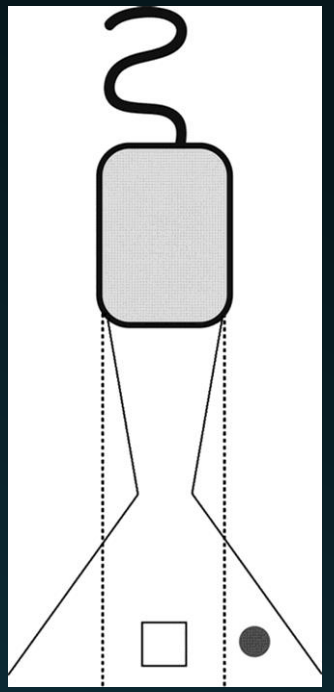


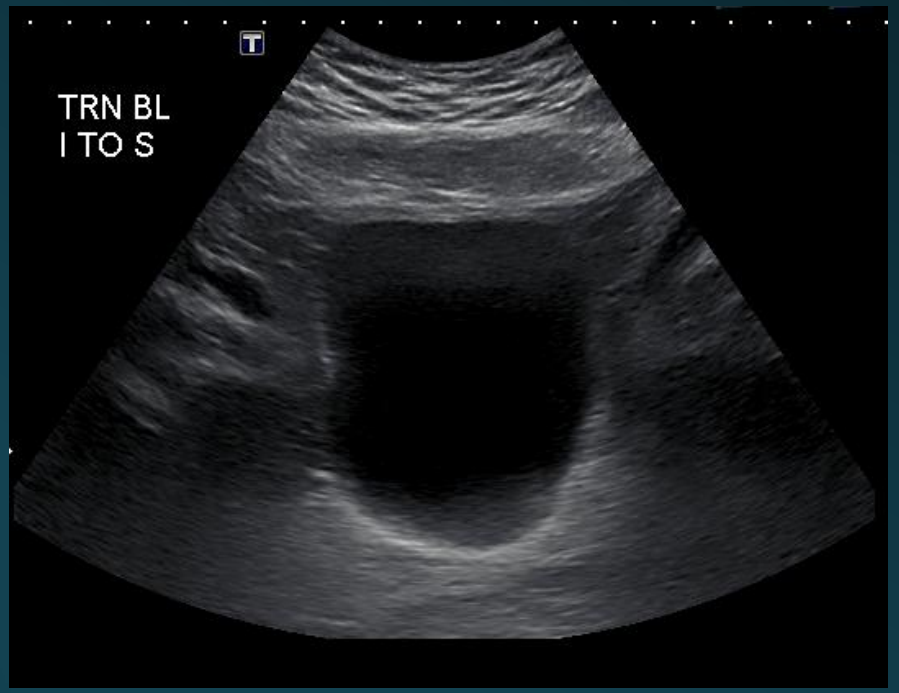


Feldman MK, Katyal S, Blackwood MS. US artifacts. Radiographics. 2009 Jul-Aug;29(4):1179-89. doi: 10.1148/rg.294085199. PMID: 19605664.

Beam width artifact

- Adjust focal zone position
- Place probe in middle of object
- Increase probe frequency
- Ensure gain set appropriately





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Posterior enhancement/shadowing

- Be aware of the potential
- Use the artifact to our advantage
- Optimize imaging gain settings especially TGC settings

Material	Attenuation Coefficient (dB/cm)
Water	0.0002
Soft tissue	0.3–0.8
Fat	0.5–1.8
Bone	13–26
Air	40

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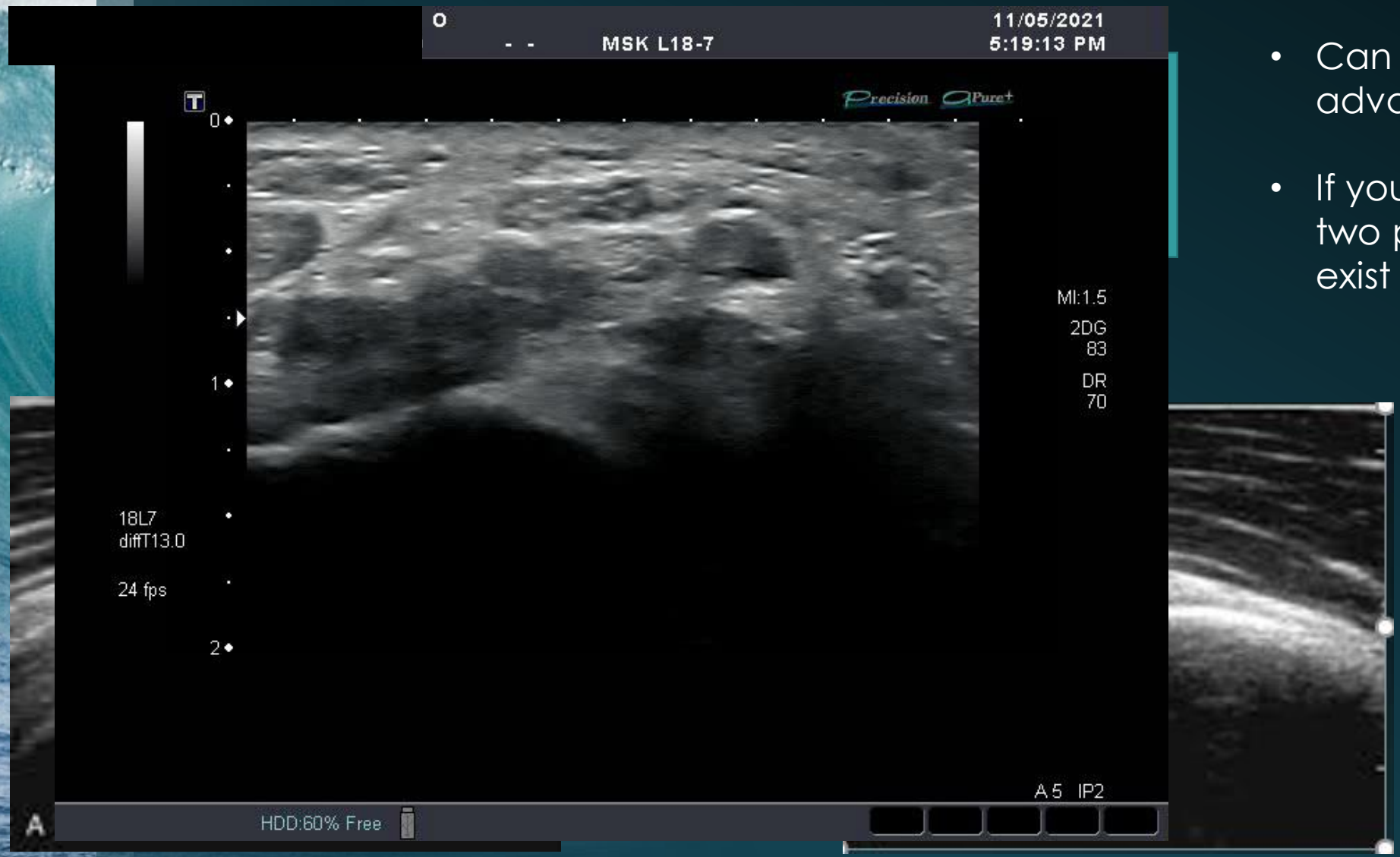
Anisotropy

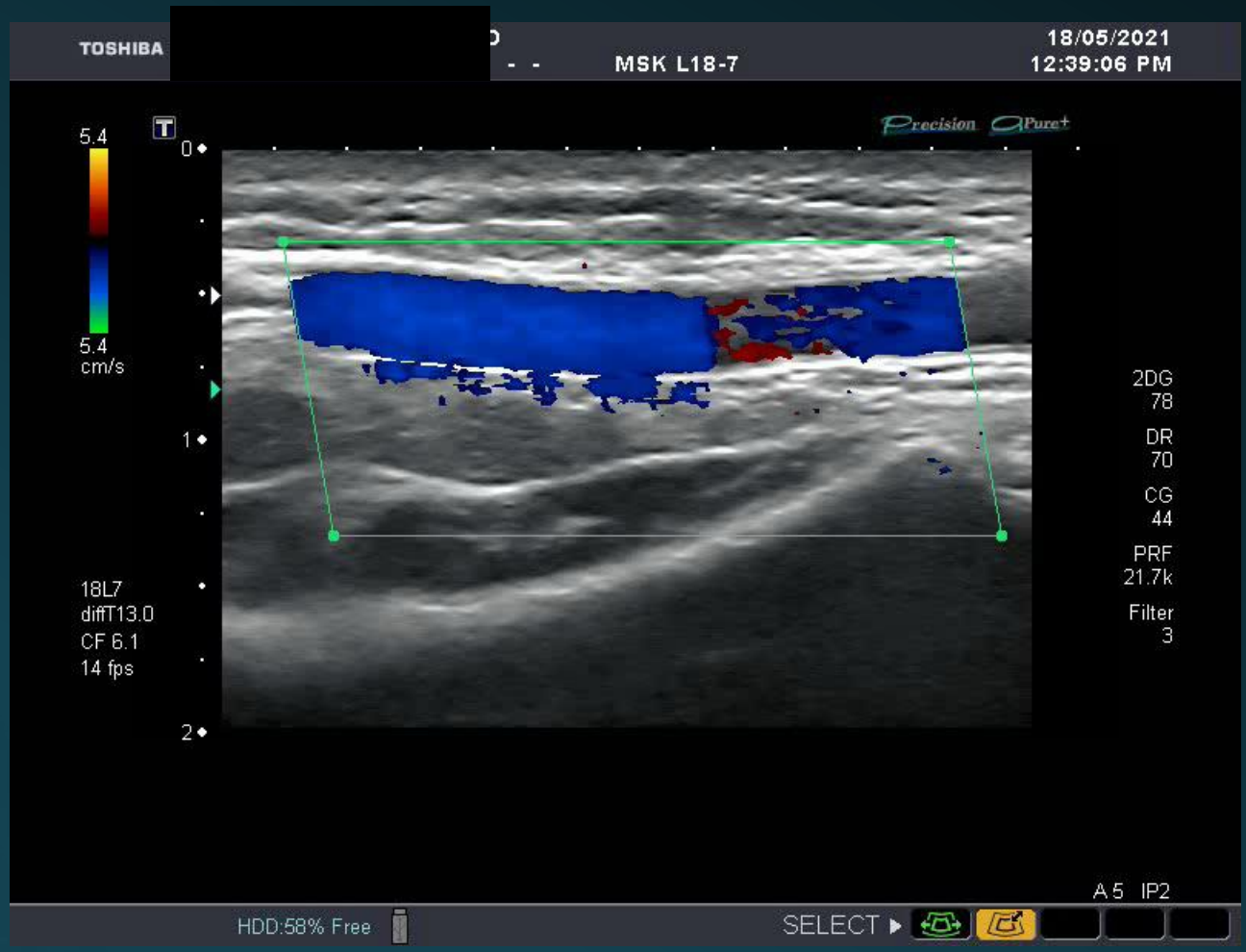


- Beware aware of the possibility
- Can be used to our advantage
- If you cannot see it in two planes it does not exist

Feldman MK, Katyal S, Blackwood MS. US artifacts. Radiographics. 2009 Jul-Aug;29(4):1179-89. doi: 10.1148/rg.294085199. PMID: 19605664

Color flash

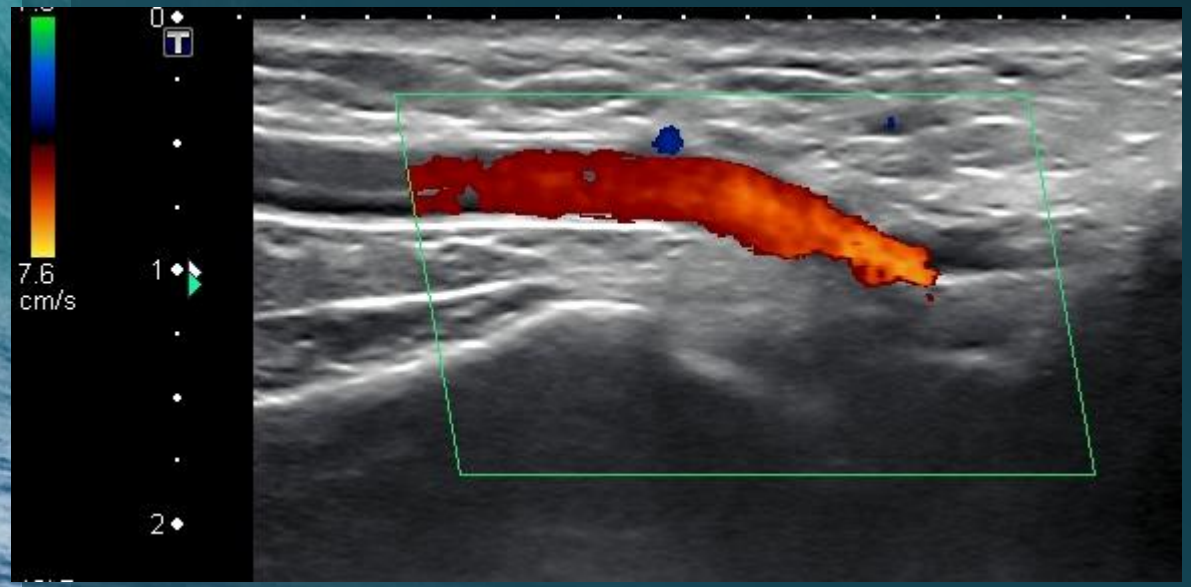
- Reduce all movement, patient and us
- Reduce color gain
- Increase color scale

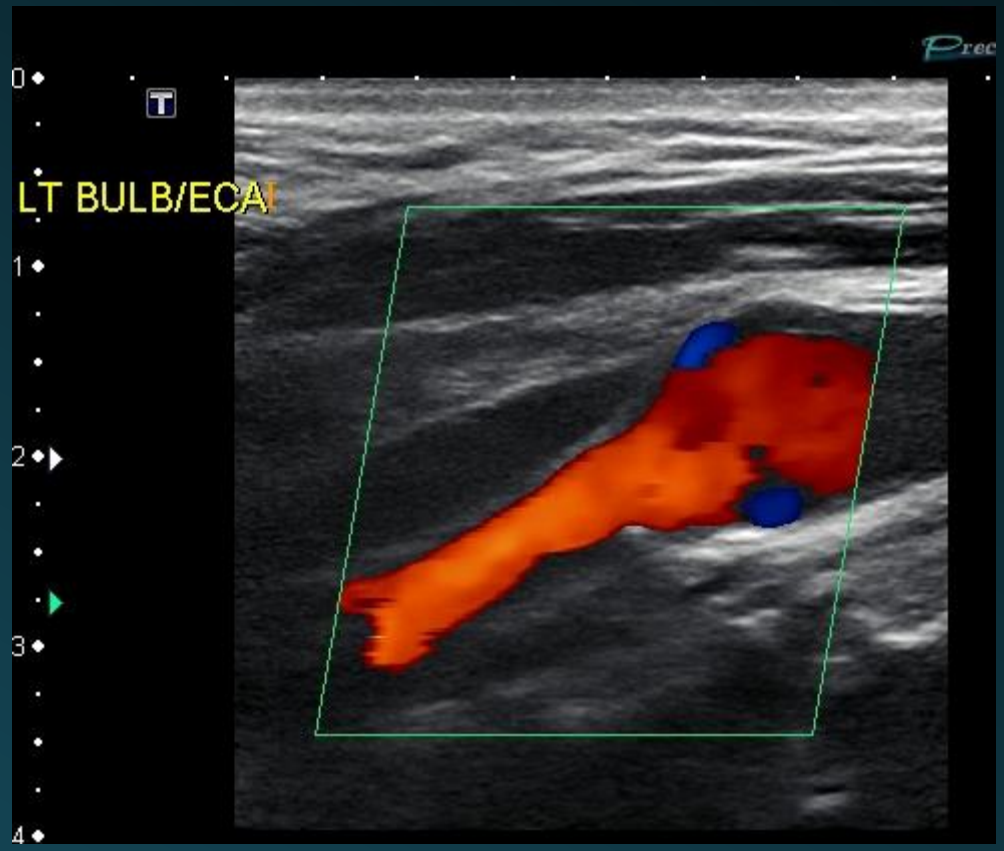


Feldman MK, Katyal S, Blackwood MS. US artifacts. Radiographics. 2009 Jul-Aug;29(4):1179-89. doi: 10.1148/rg.294085199. PMID: 19605664

Color bleeding

- Reduce color gain
- Increase color velocity scale

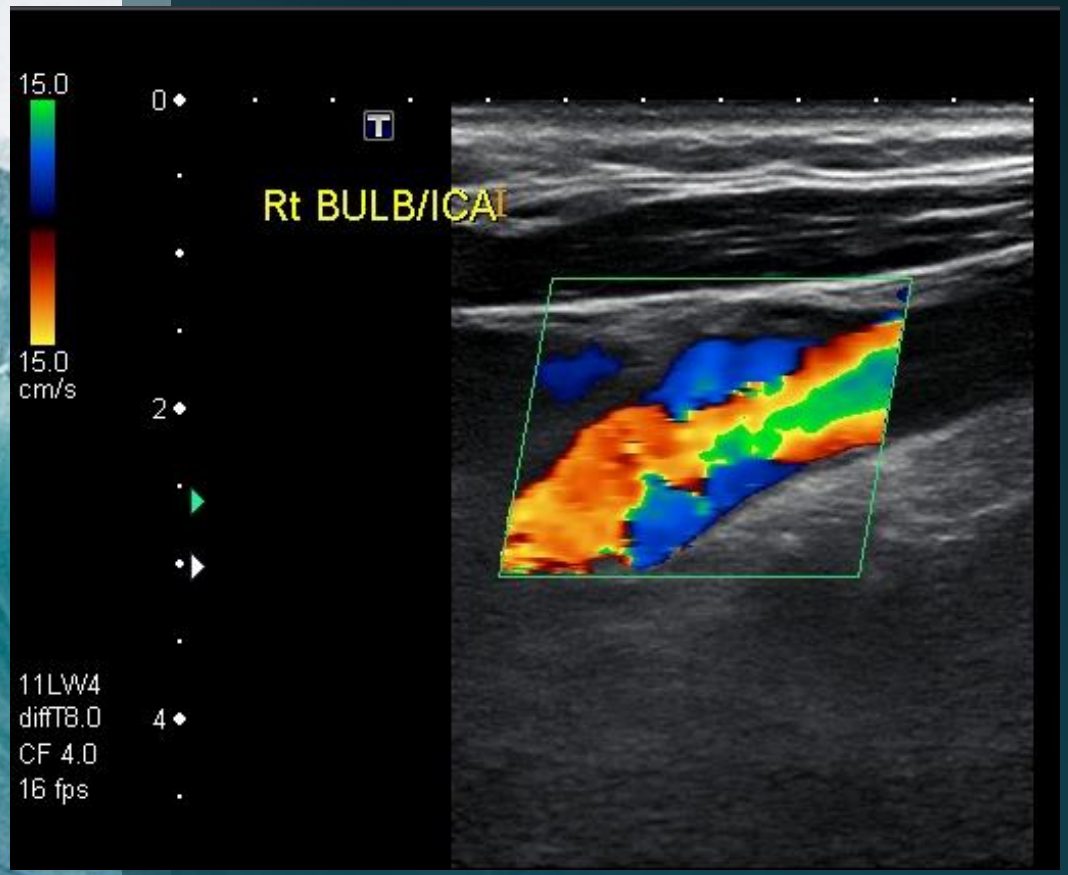




Feldman MK, Katyal S, Blackwood MS. US artifacts. Radiographics. 2009 Jul-Aug;29(4):1179-89. doi: 10.1148/rg.294085199. PMID: 19605664

Aliasing

- Increasing color velocity scale (alters probe pulse reptation frequency/more camera frames)
- Reducing probe frequency (creates a smaller doppler shift)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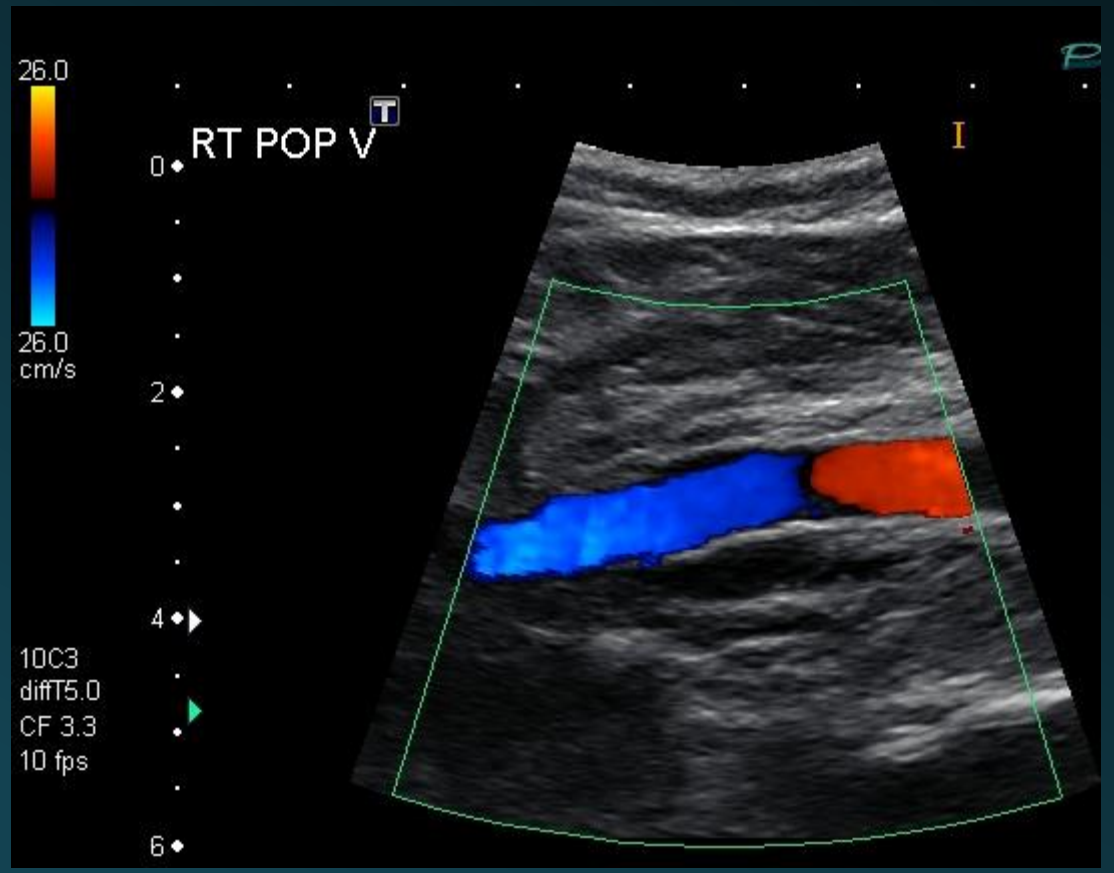
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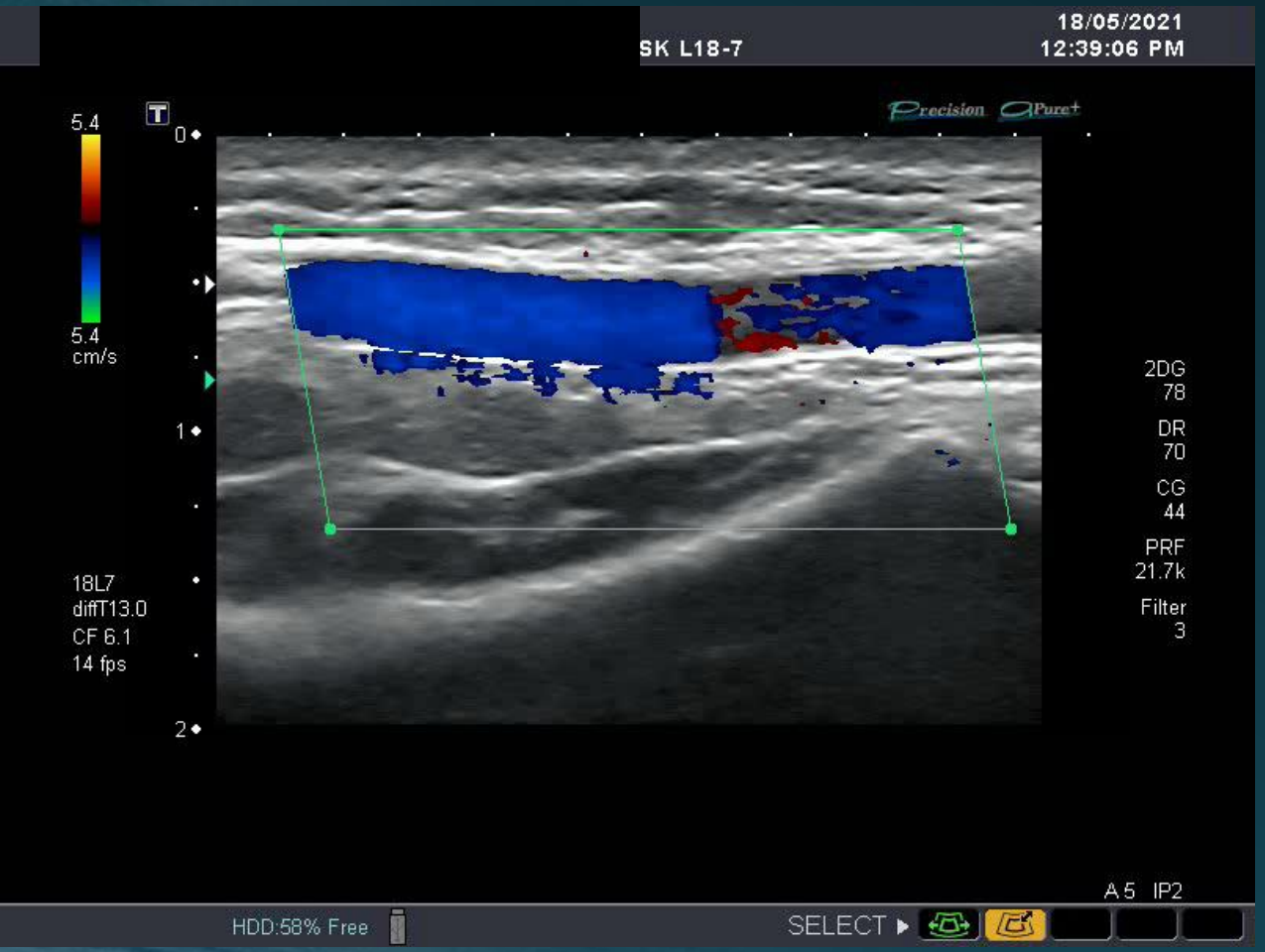
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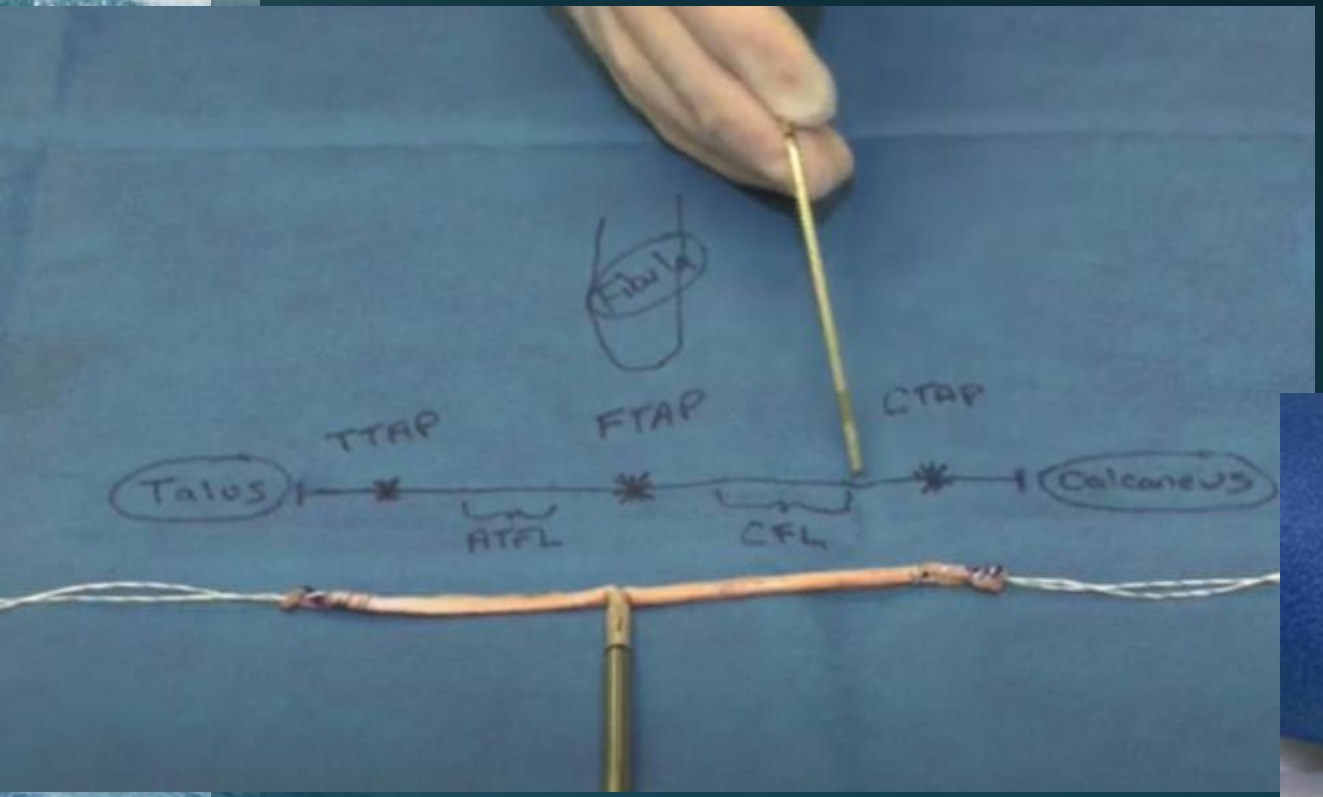
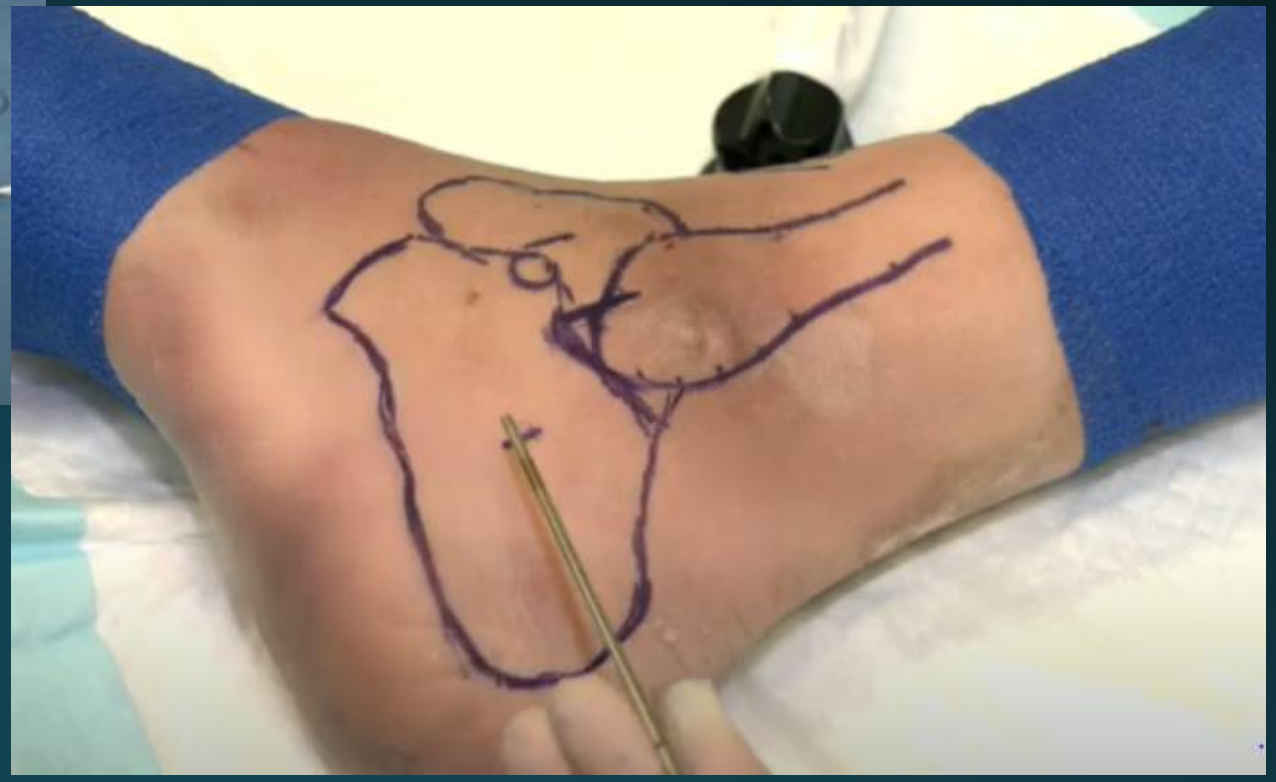
What to put on an ultrasound referral

- Make it very clear and succent what structures you are interested in
- Mechanism of injury
- How long problem has been there
- Any previous imaging results
- If you are unsure say so

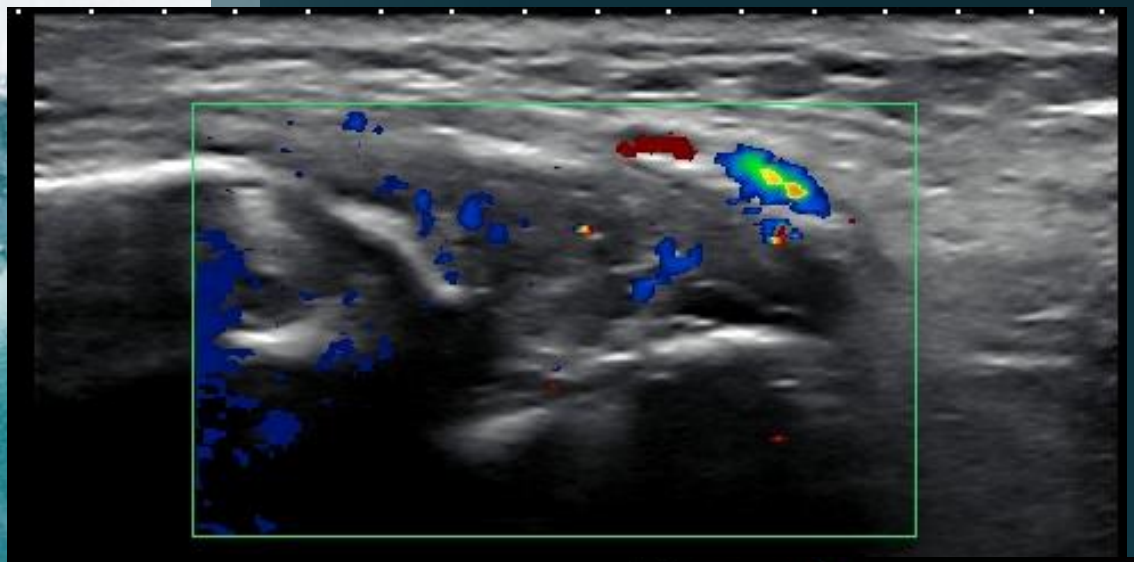
Anti-RoLL – Ankle Reconstruction of Lateral Ligaments

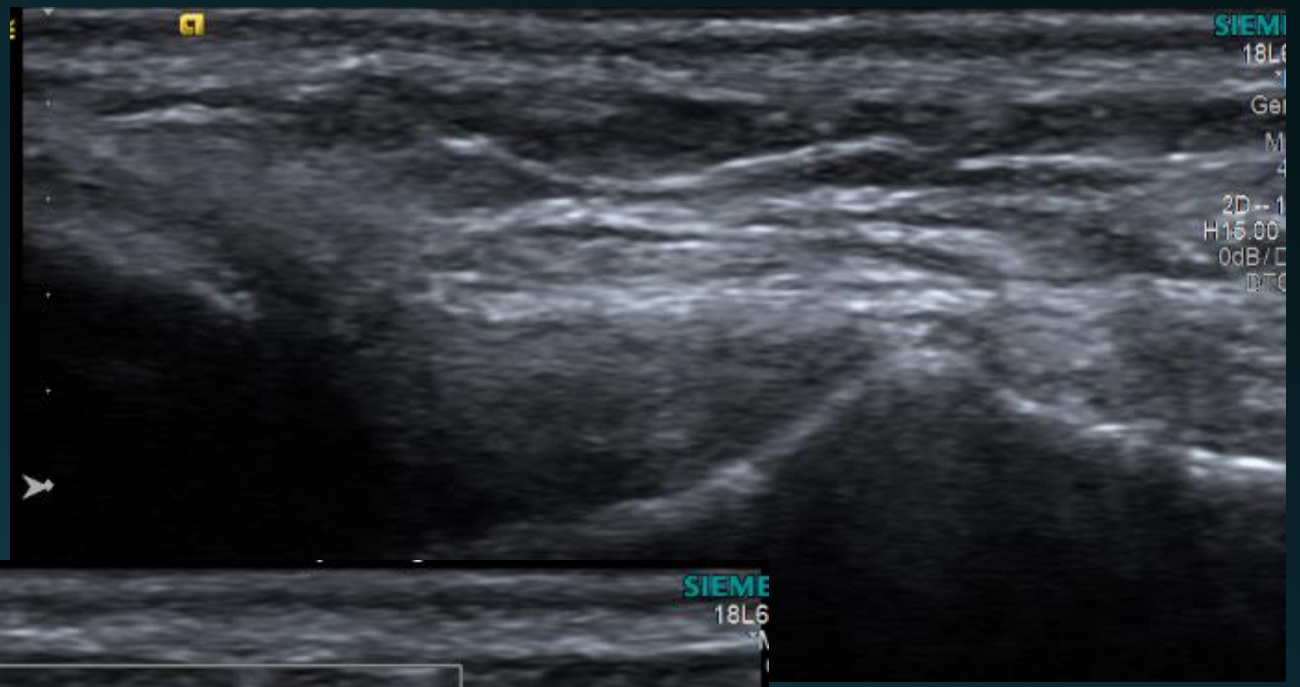
https://www.youtube.com/watch?v=PJmBatcTrl0

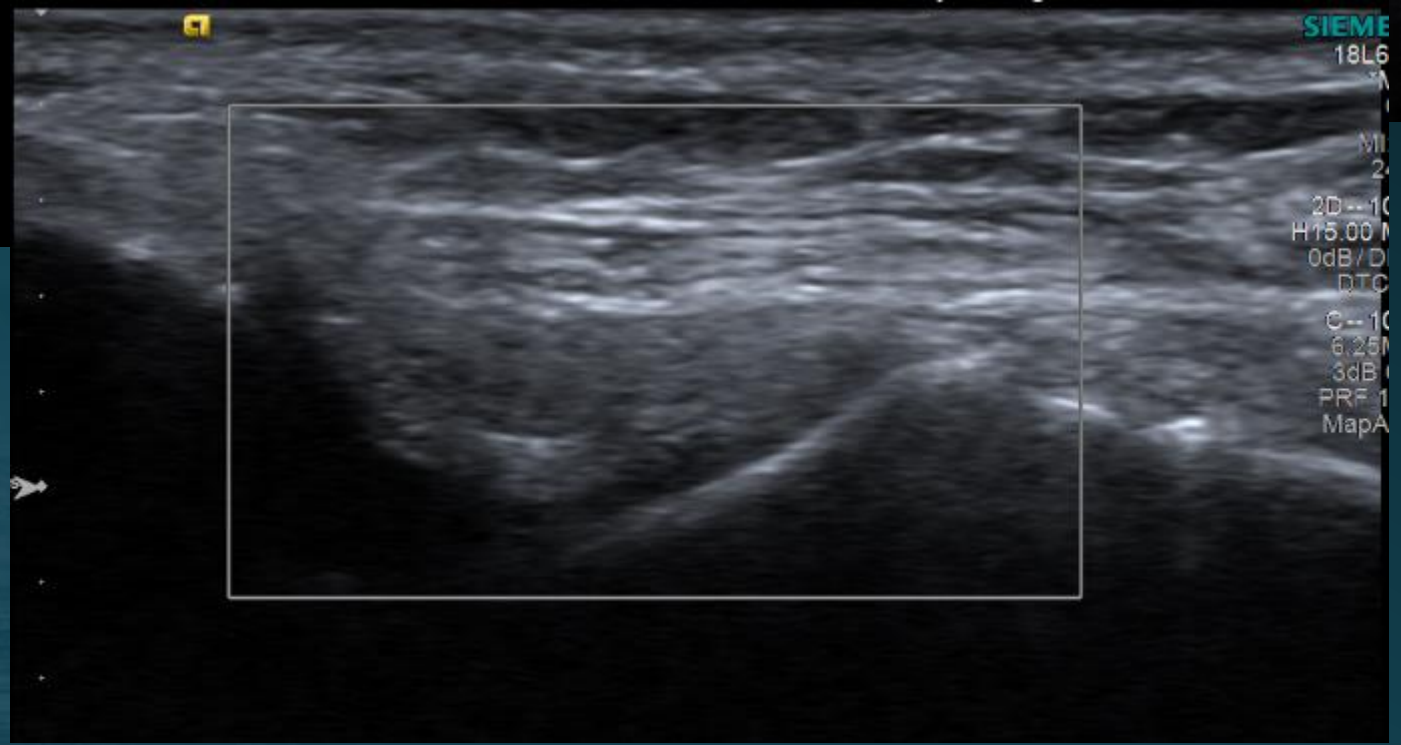




Case study 1







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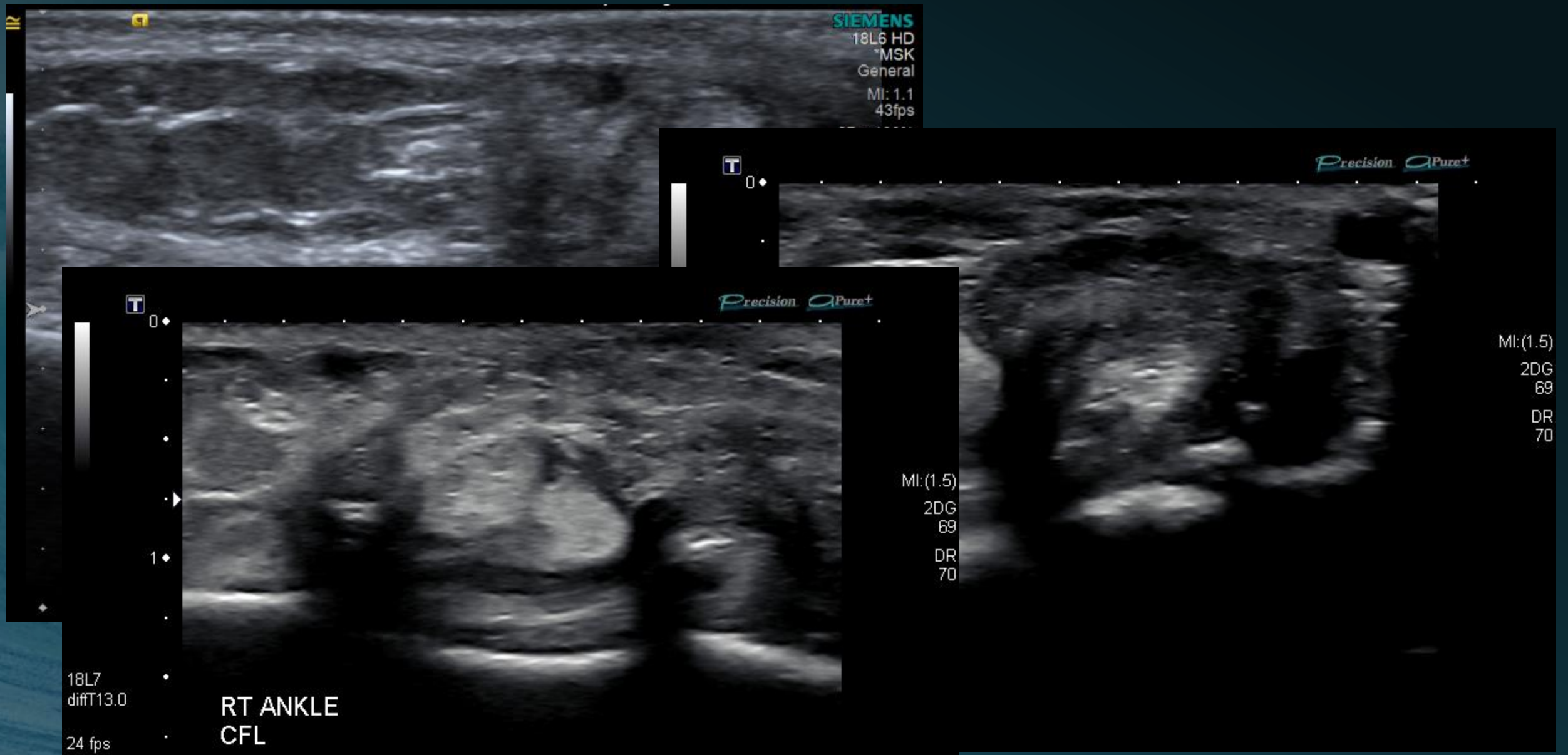
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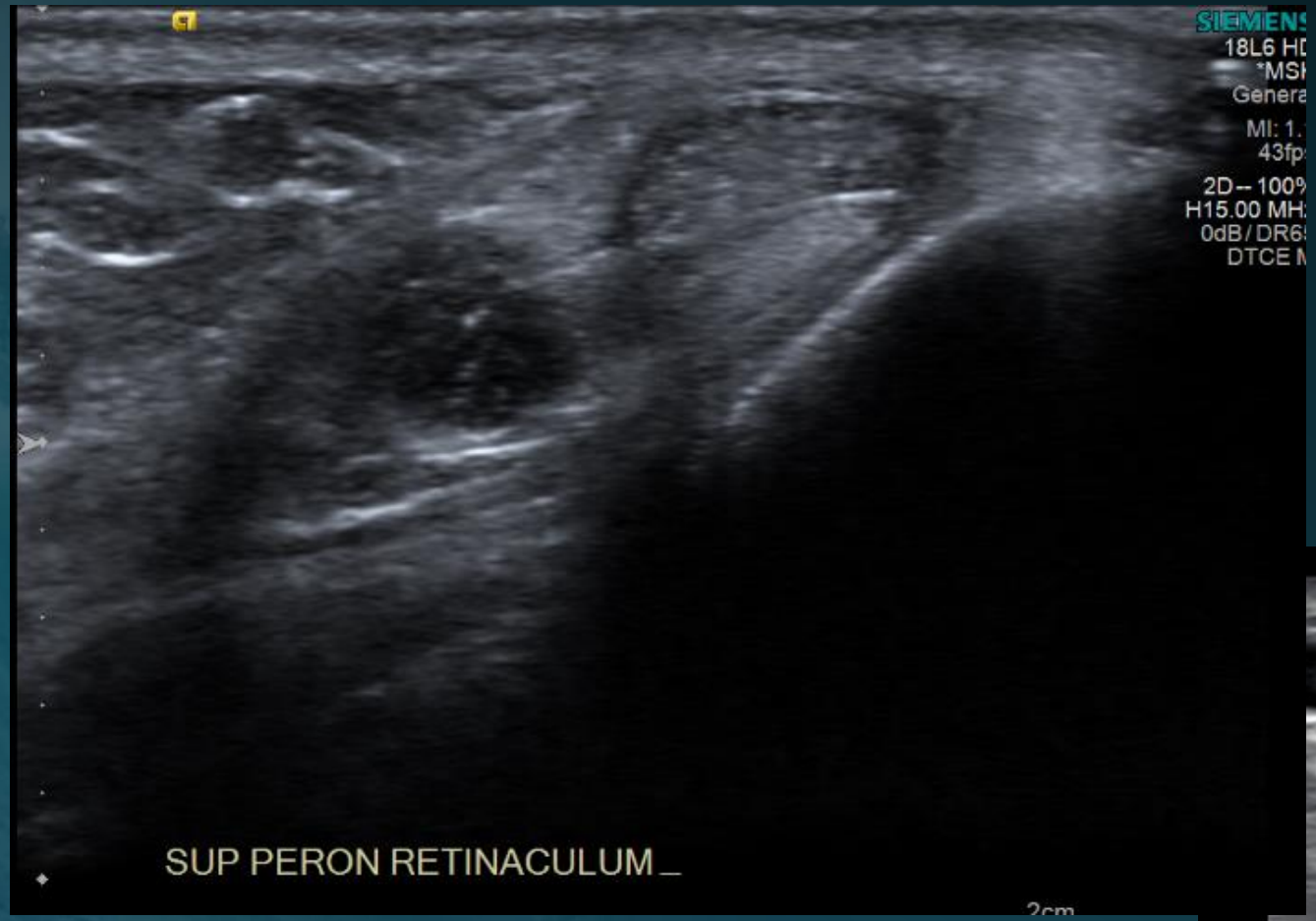
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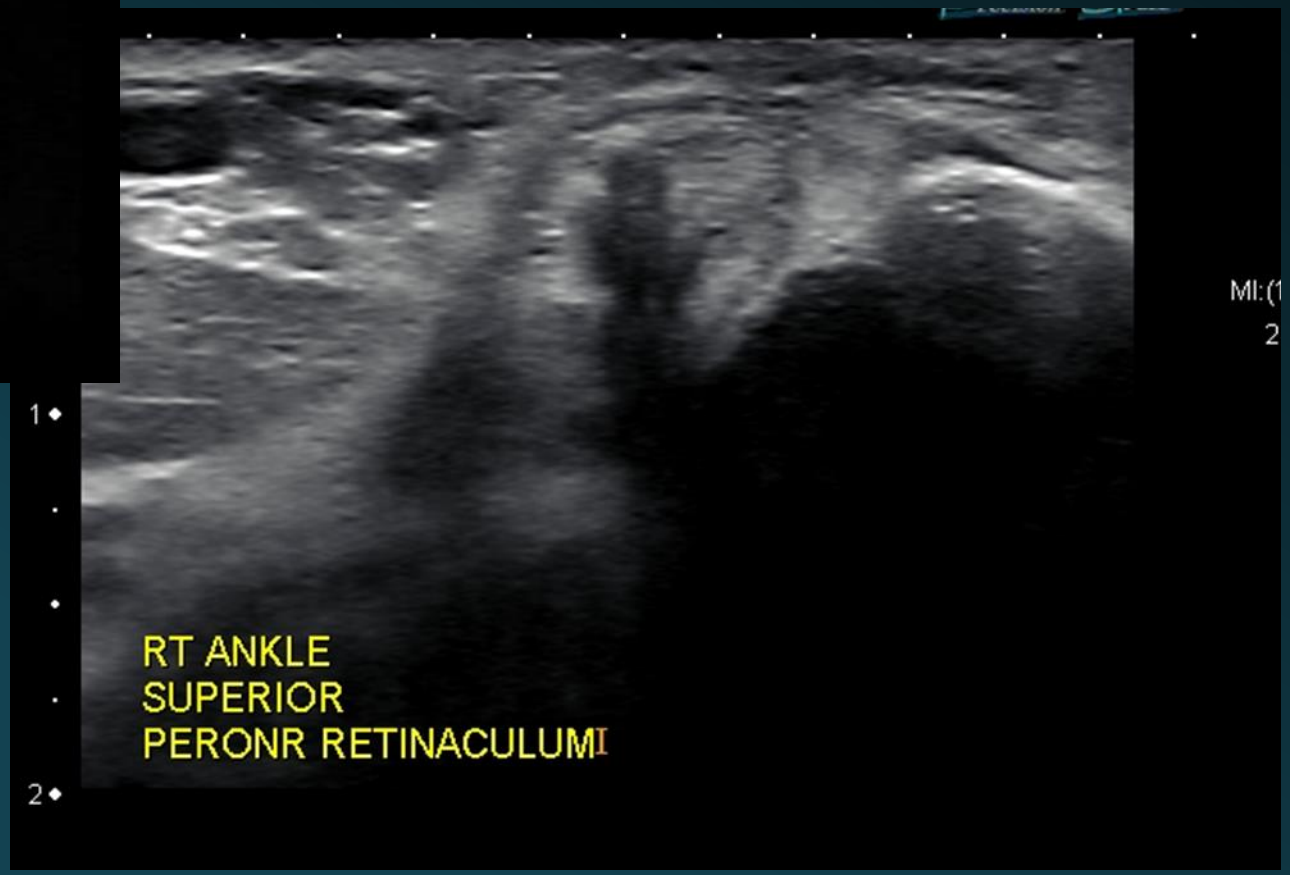
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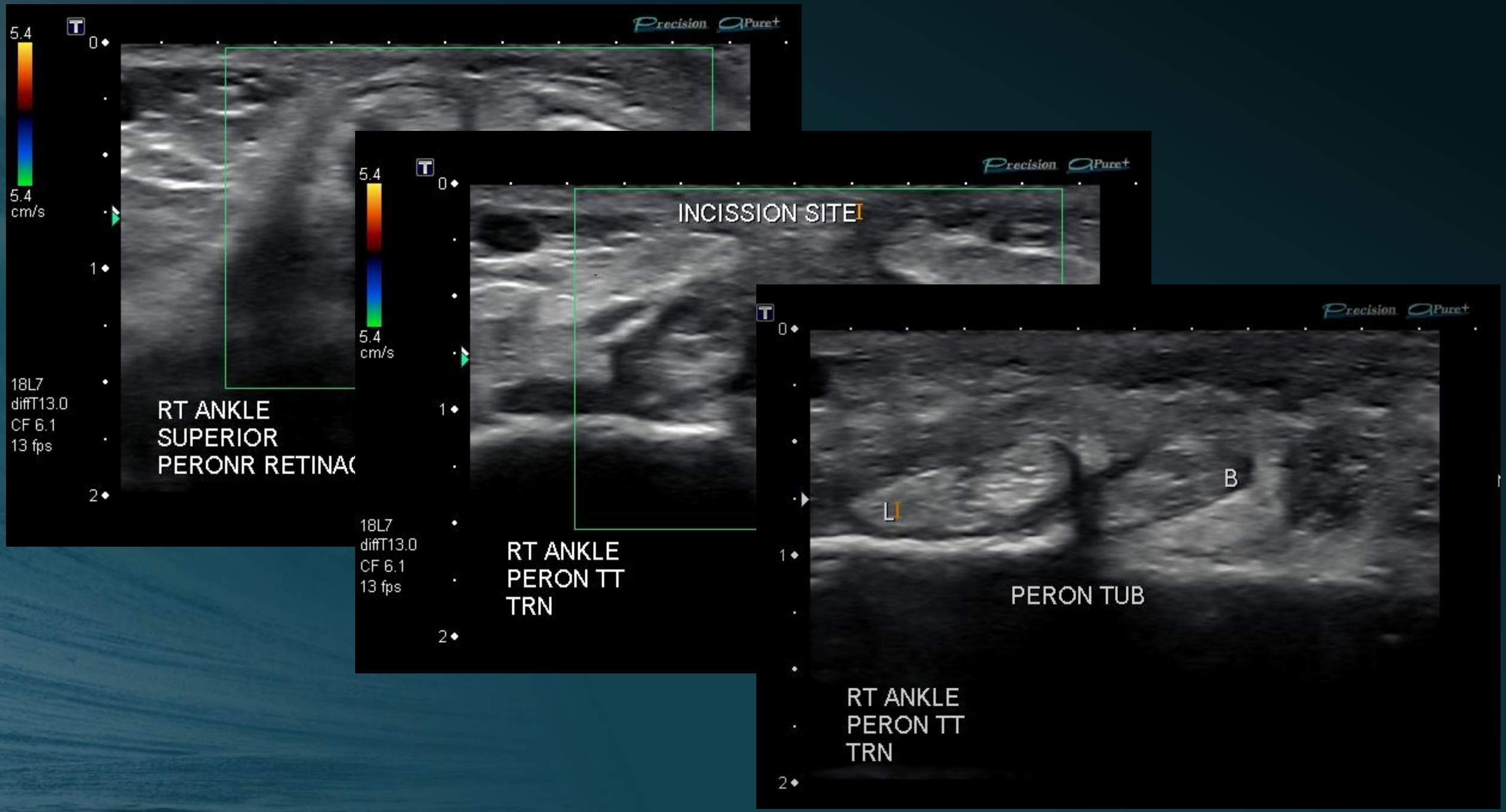
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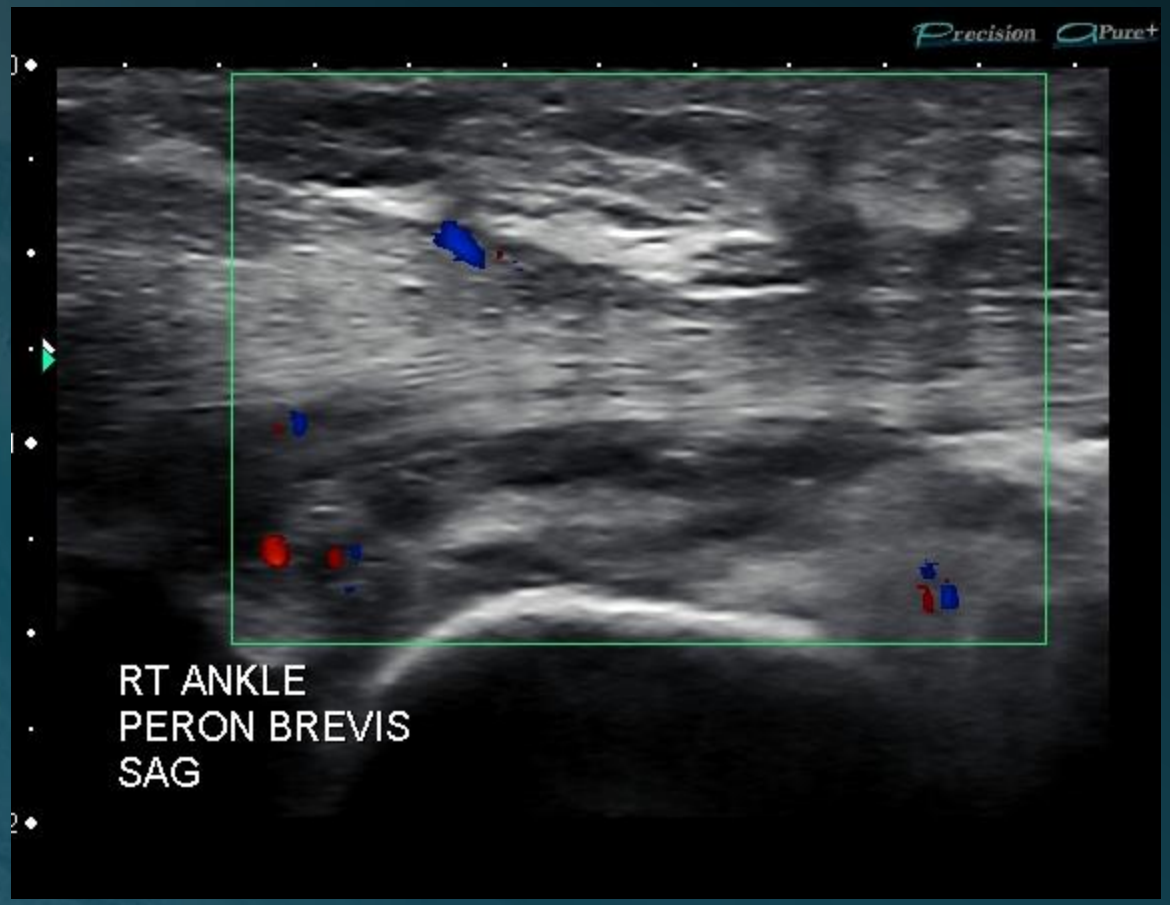
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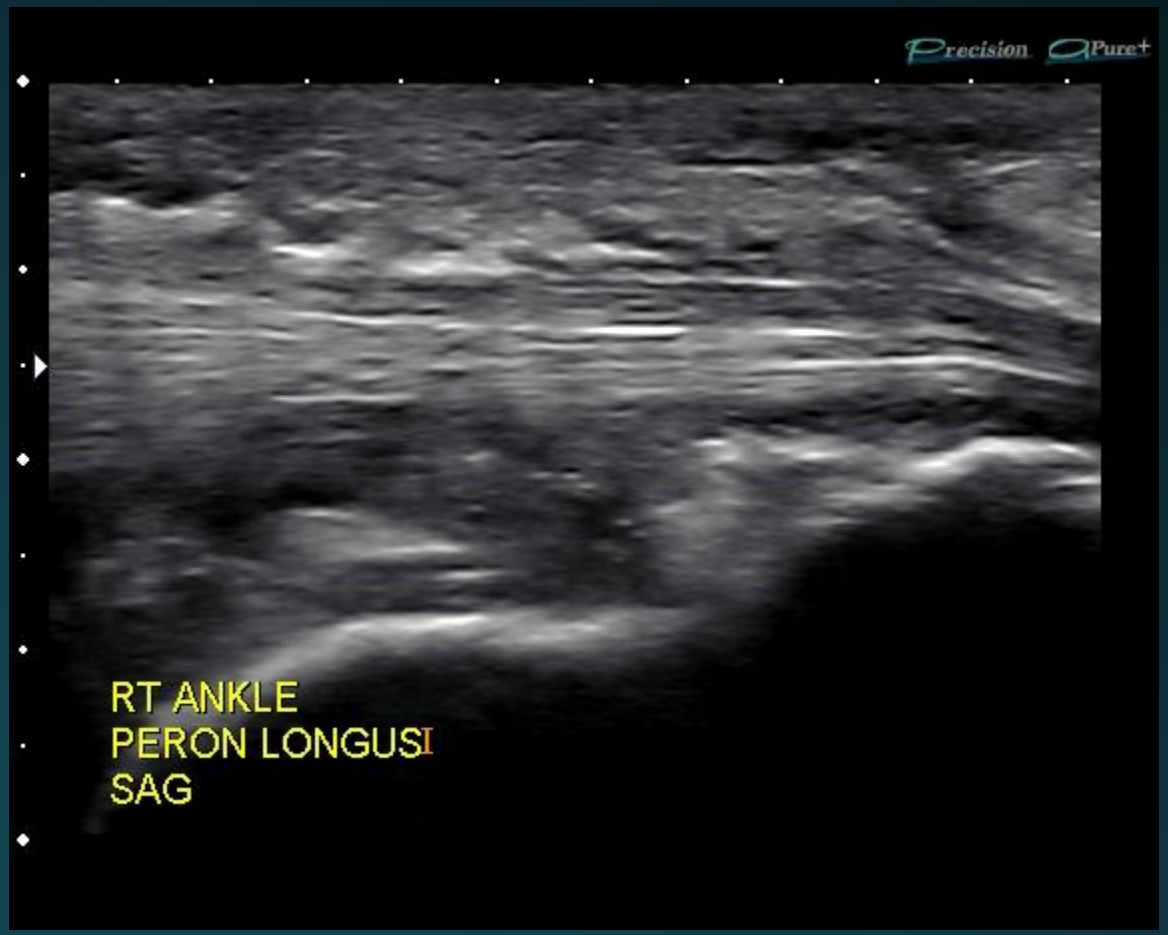
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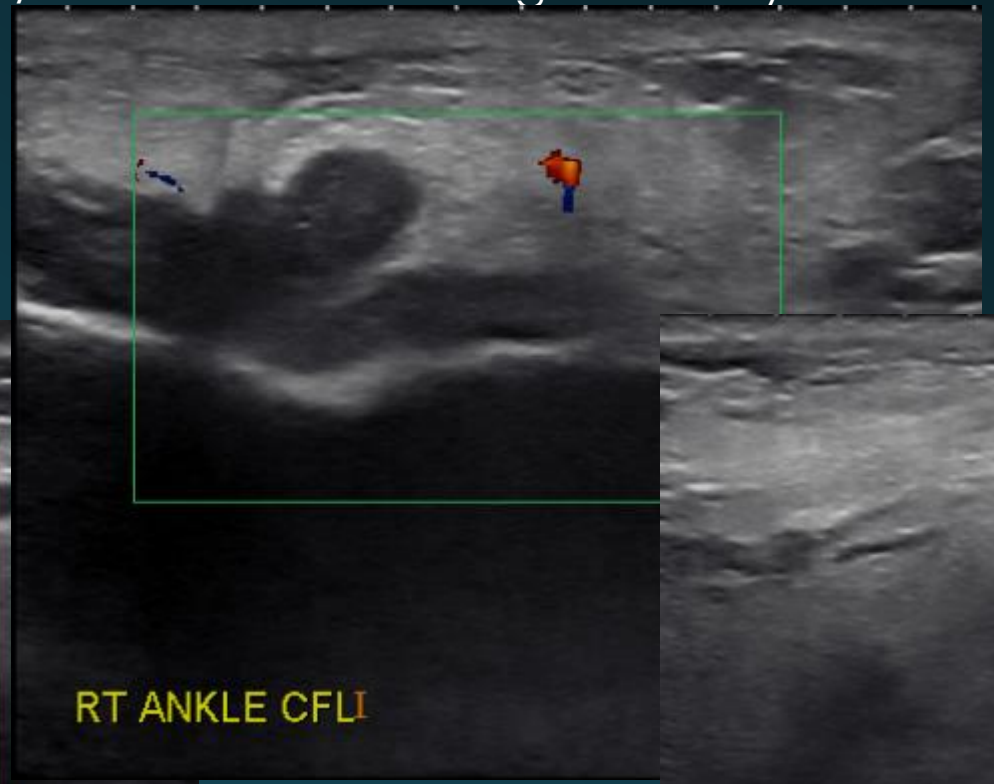
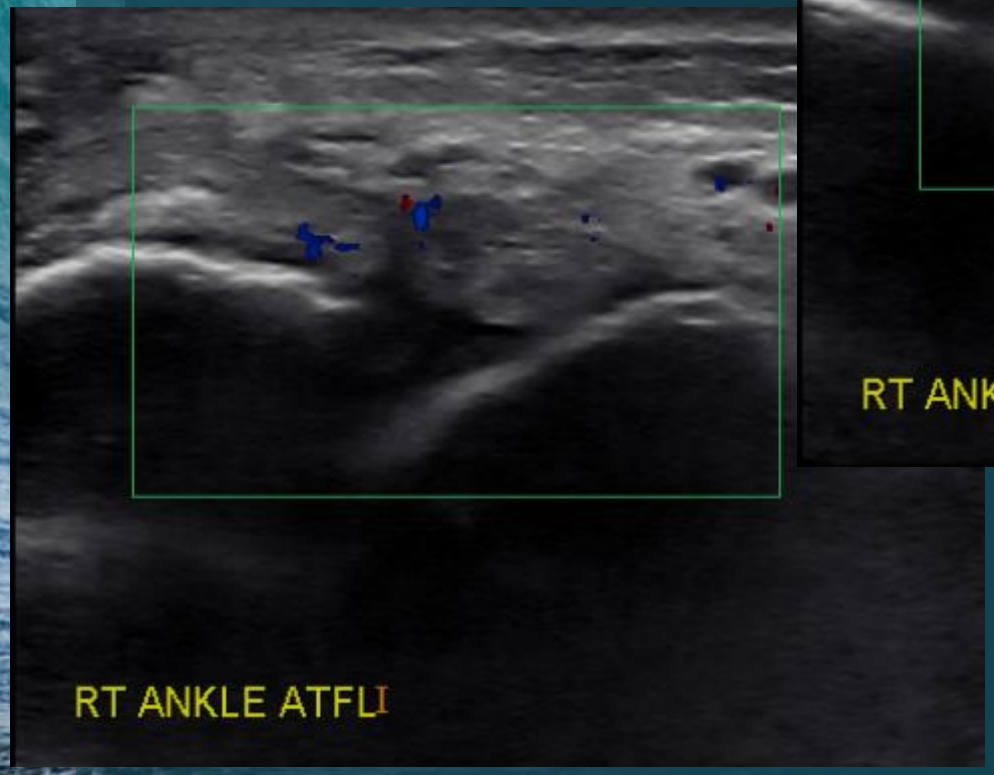
CINE REVIEW
ABC

Case study 2

- 57-year-old female with an inversion injury walking down steps seven days ago
- Pain and bruising anterior/lateral ankle reducing in severity but still quite tender to direct pressure



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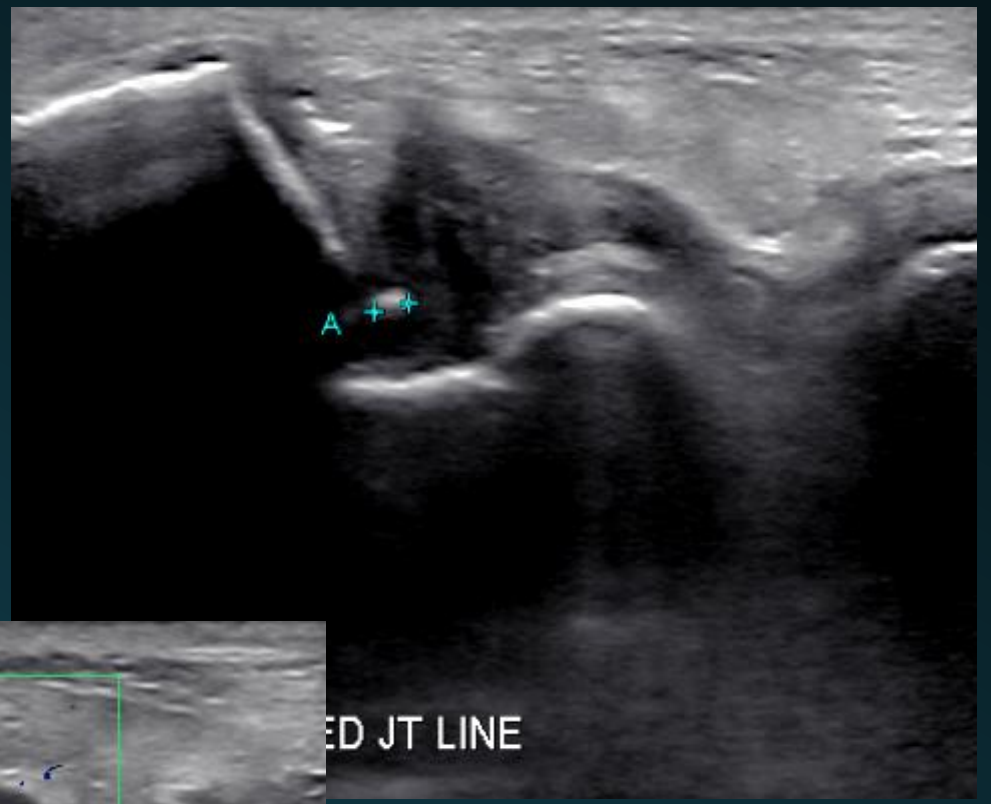
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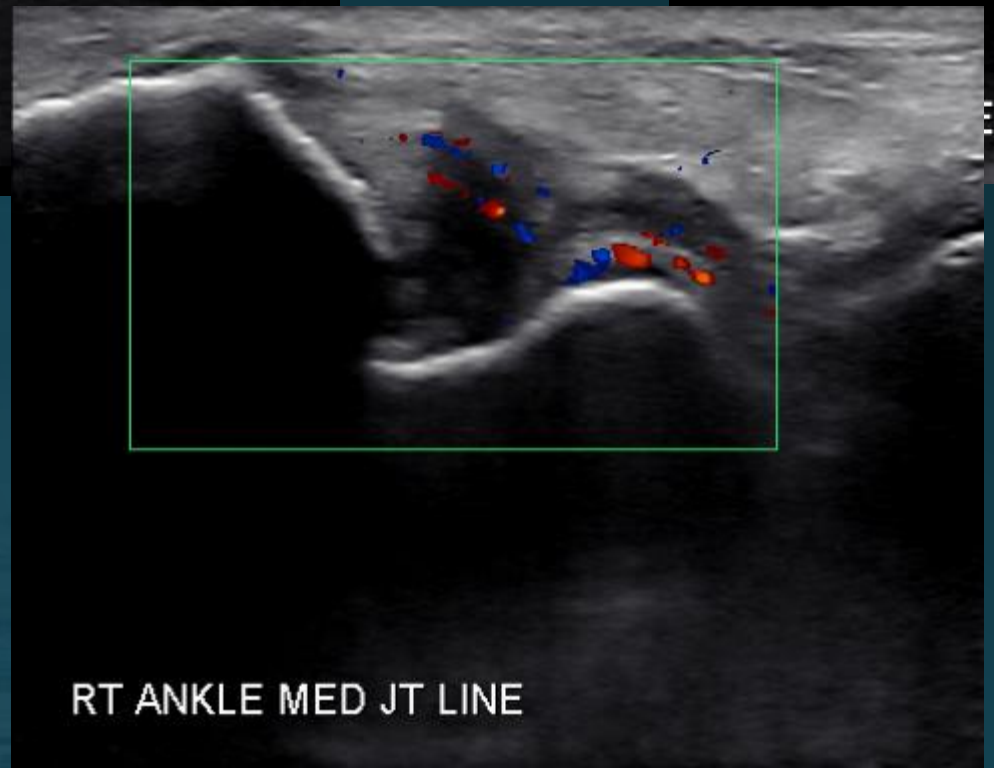
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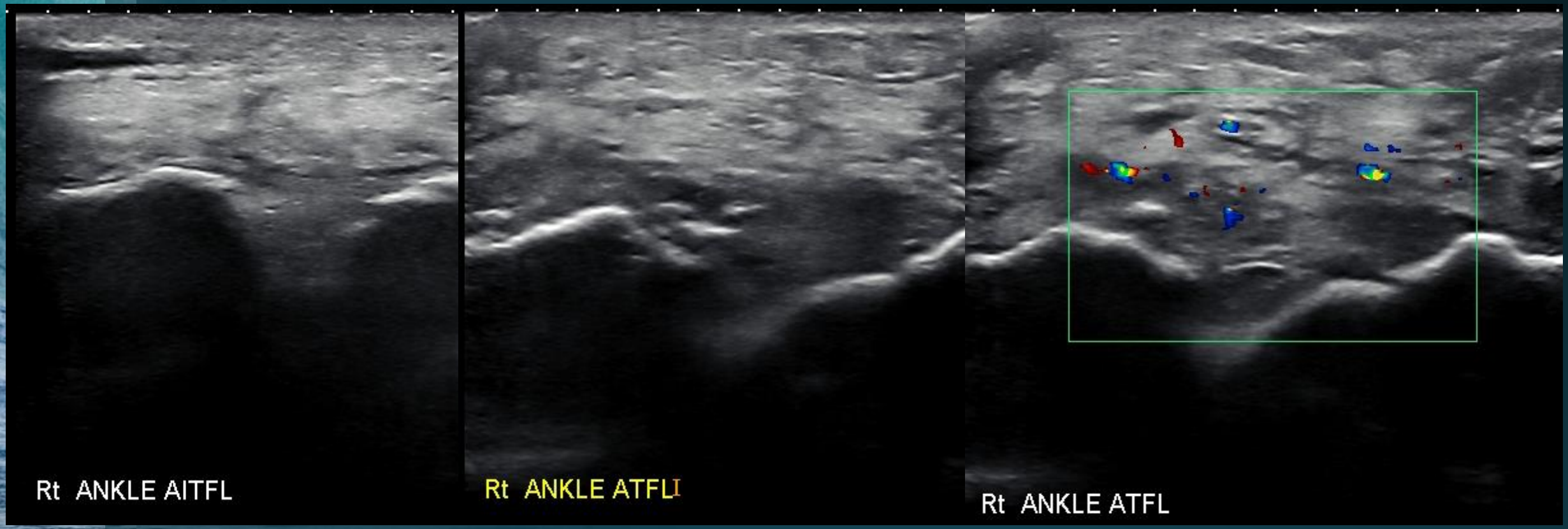
Case study 3

74-year-old female with an inversion/plantar flexion injury ten days ago.
Marked distal calf and dorsal foot bruising now reducing in severity.
Maximum symptoms relate to the anterior and lateral aspects of the ankle

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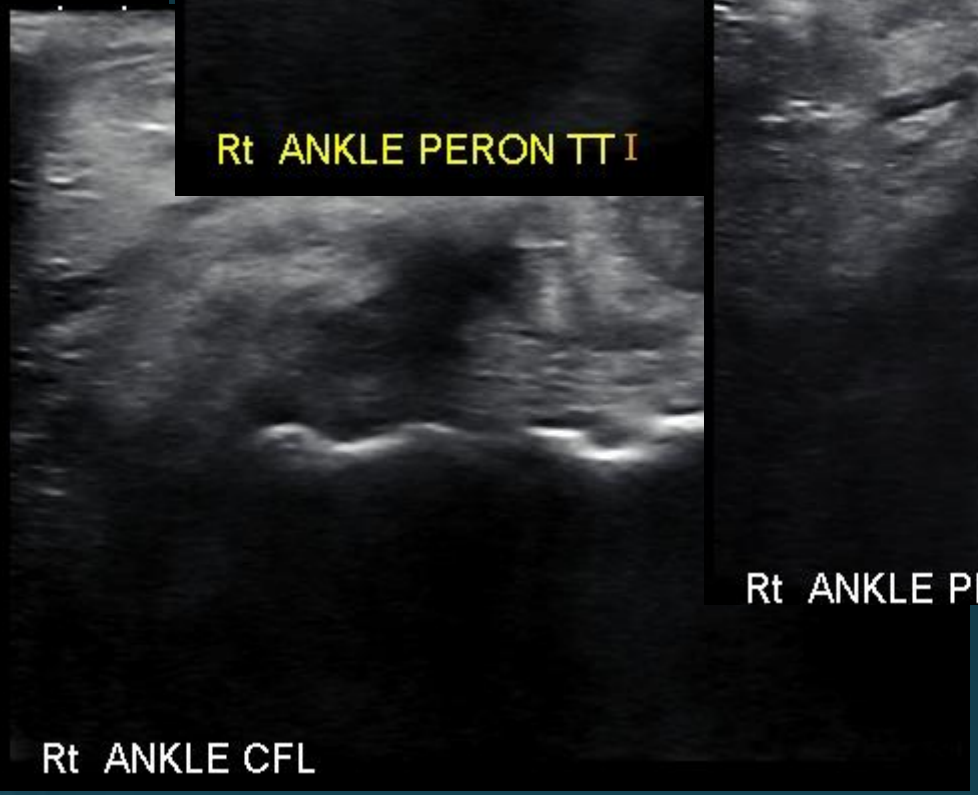
Rt ANKLE PERON TT


Rt ANKLE CFL


Rt ANKLE CFL

Something to try

- Play with the machine settings.
- Reducing dynamic range makes images blacker and whiter
- Narrowing field of view can increase resolution and reduce artifacts
- Layer of gel and /or water bath

Lastly – Don’t forget movement