Practical POCUS: Enhancing Your Diagnostic Edge in Primary Care

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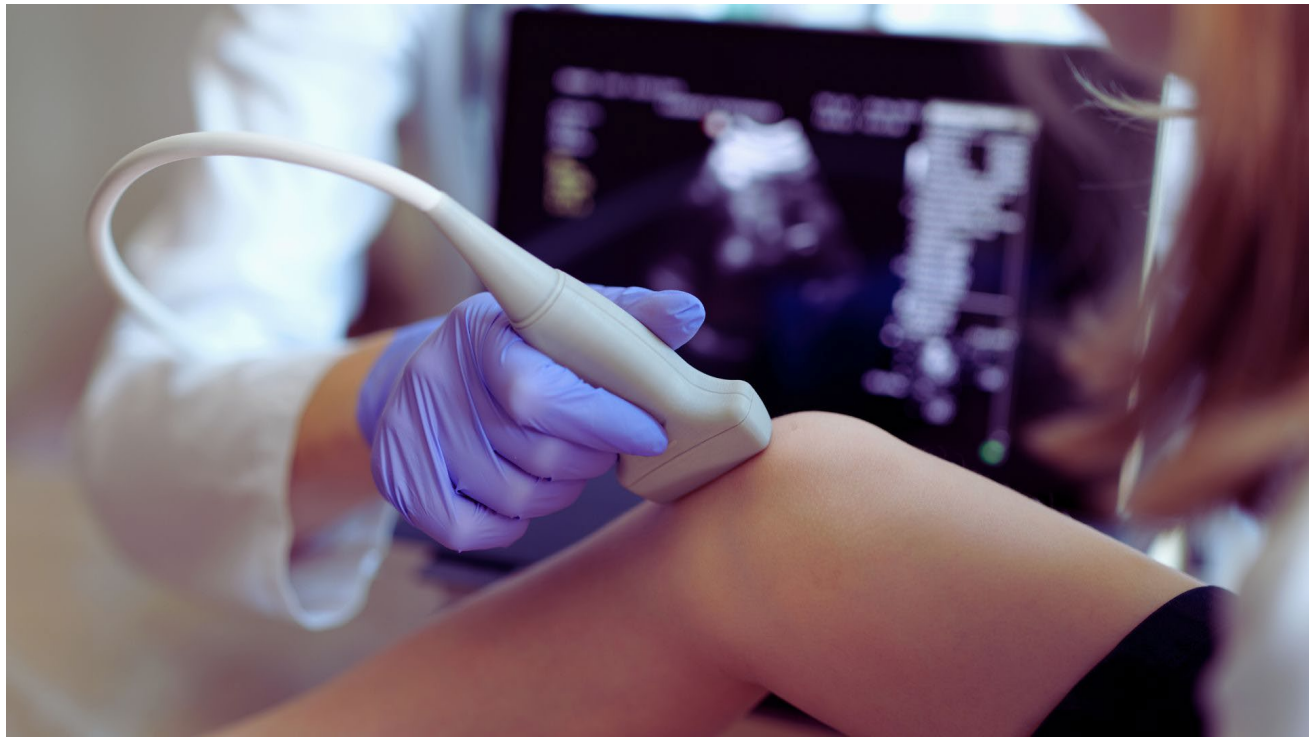
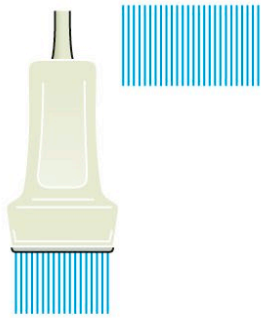
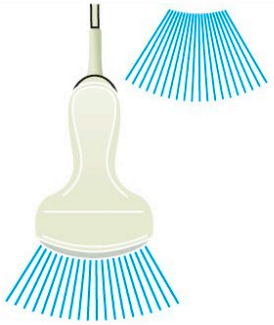
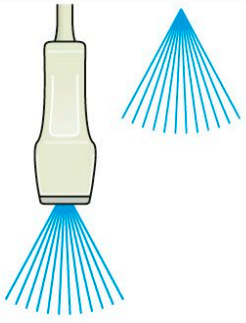
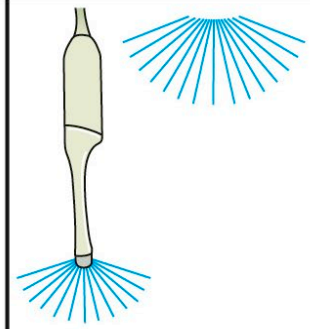
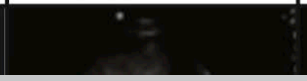
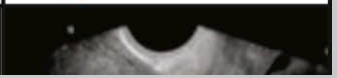
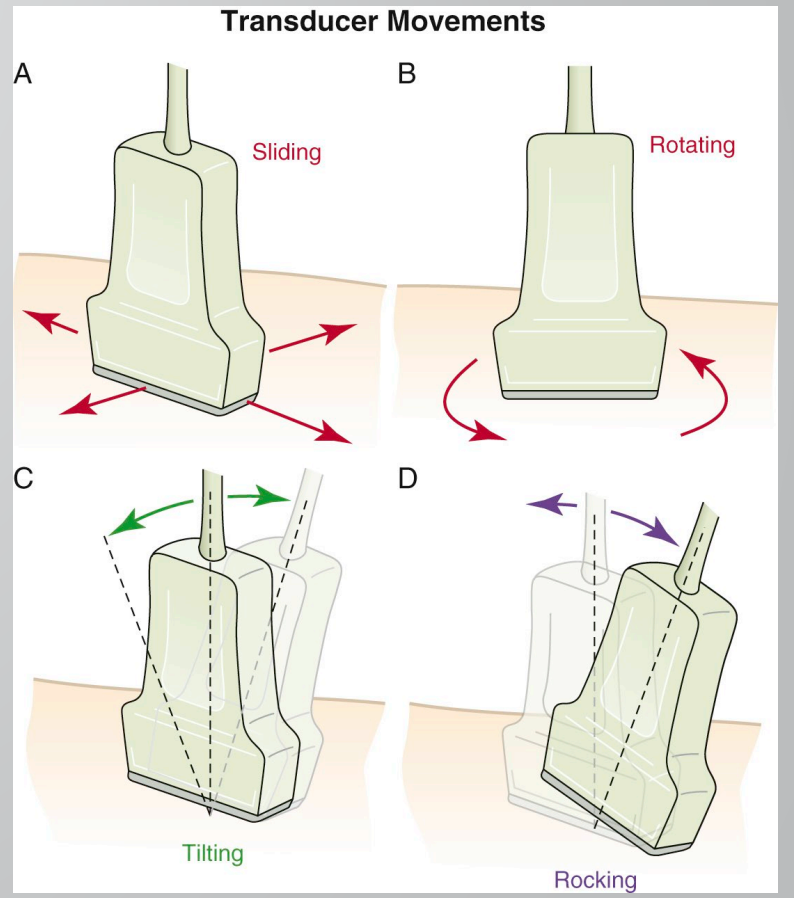


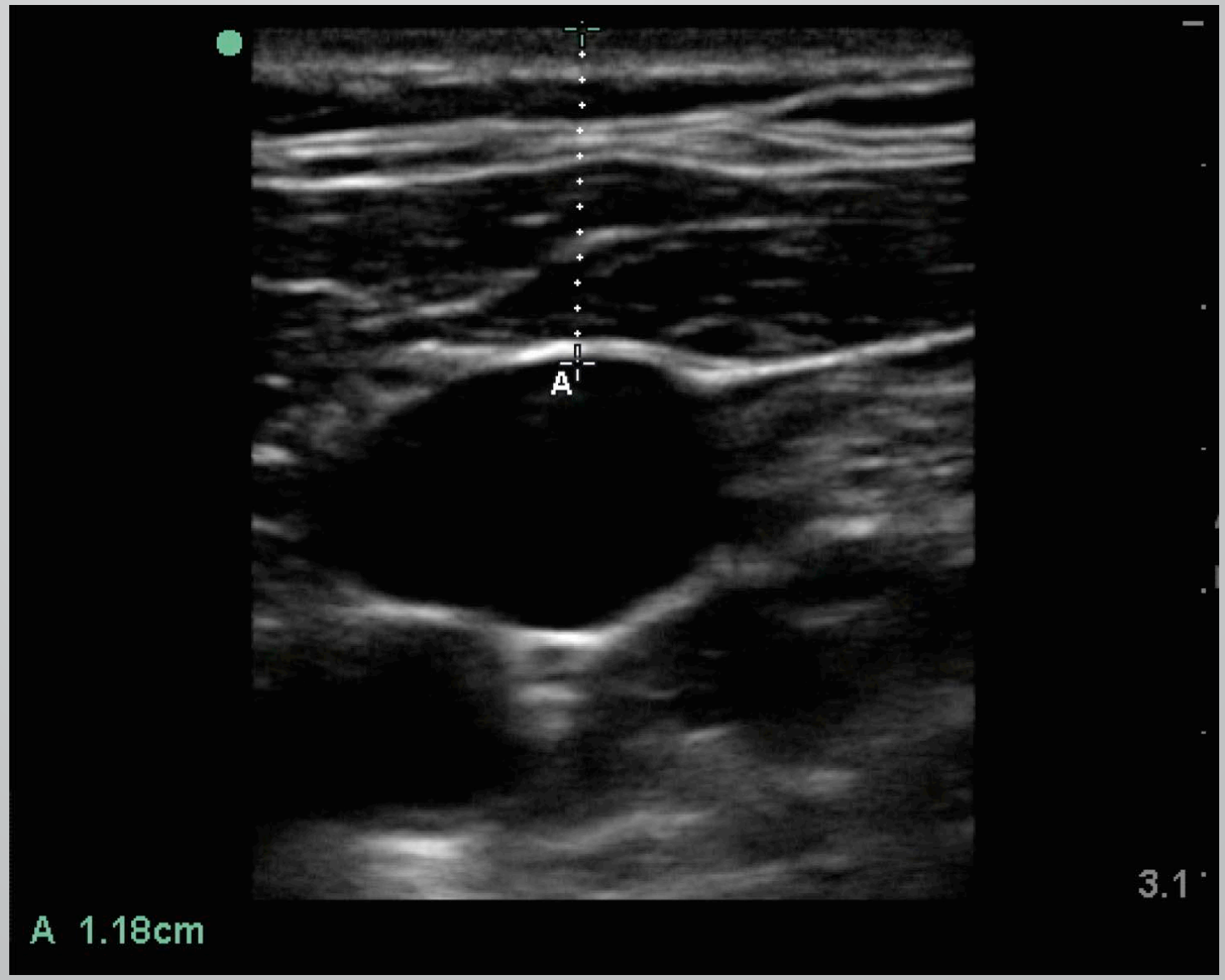
Introduction: Your Stethoscope for the 21st Century

Probe Selection

Transducer type	Linear	Curvilinear	Phased array	Intracavitary
				
Frequency range	5–15 MHz	2–5 MHz	1–5 MHz	5–8 MHz
Imaging depth	9 cm	30 cm	35 cm	13 cm
Footprint				
Image				

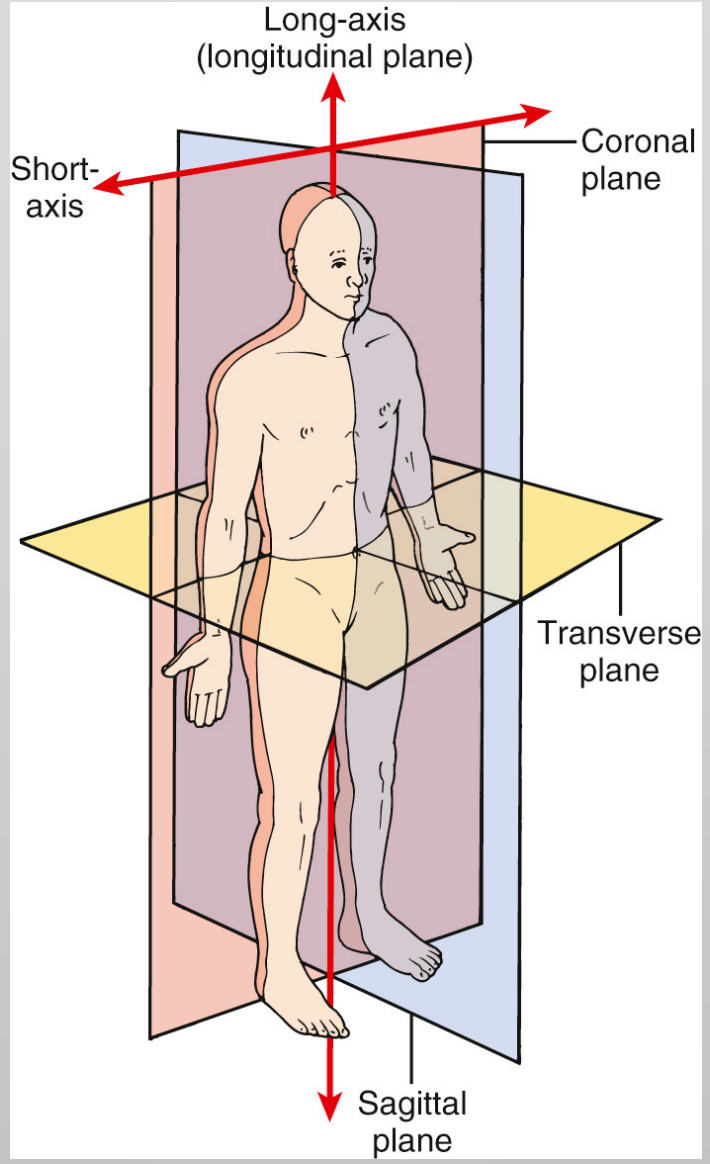


Linear Probe View

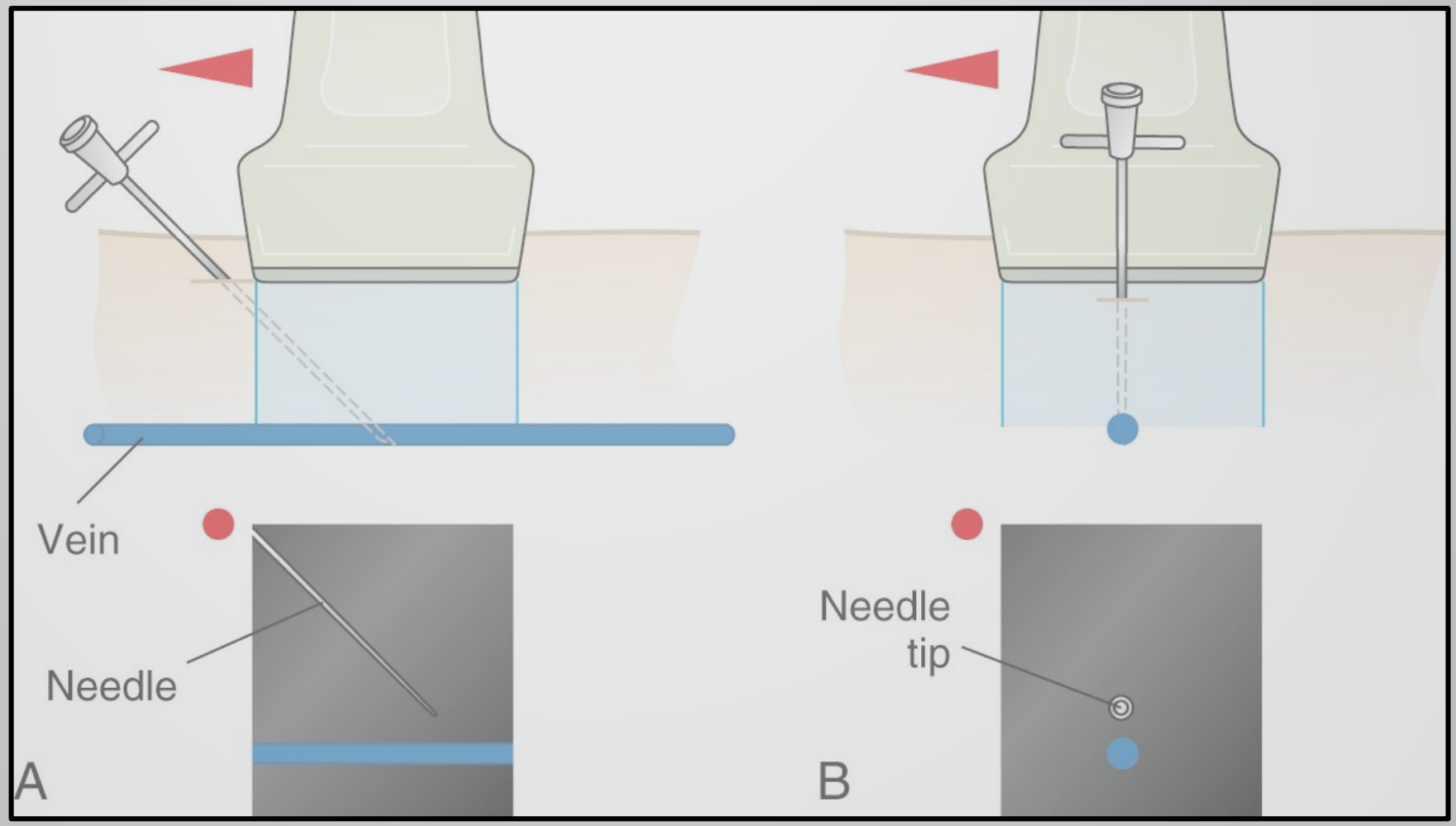


Curvilinear Probe View

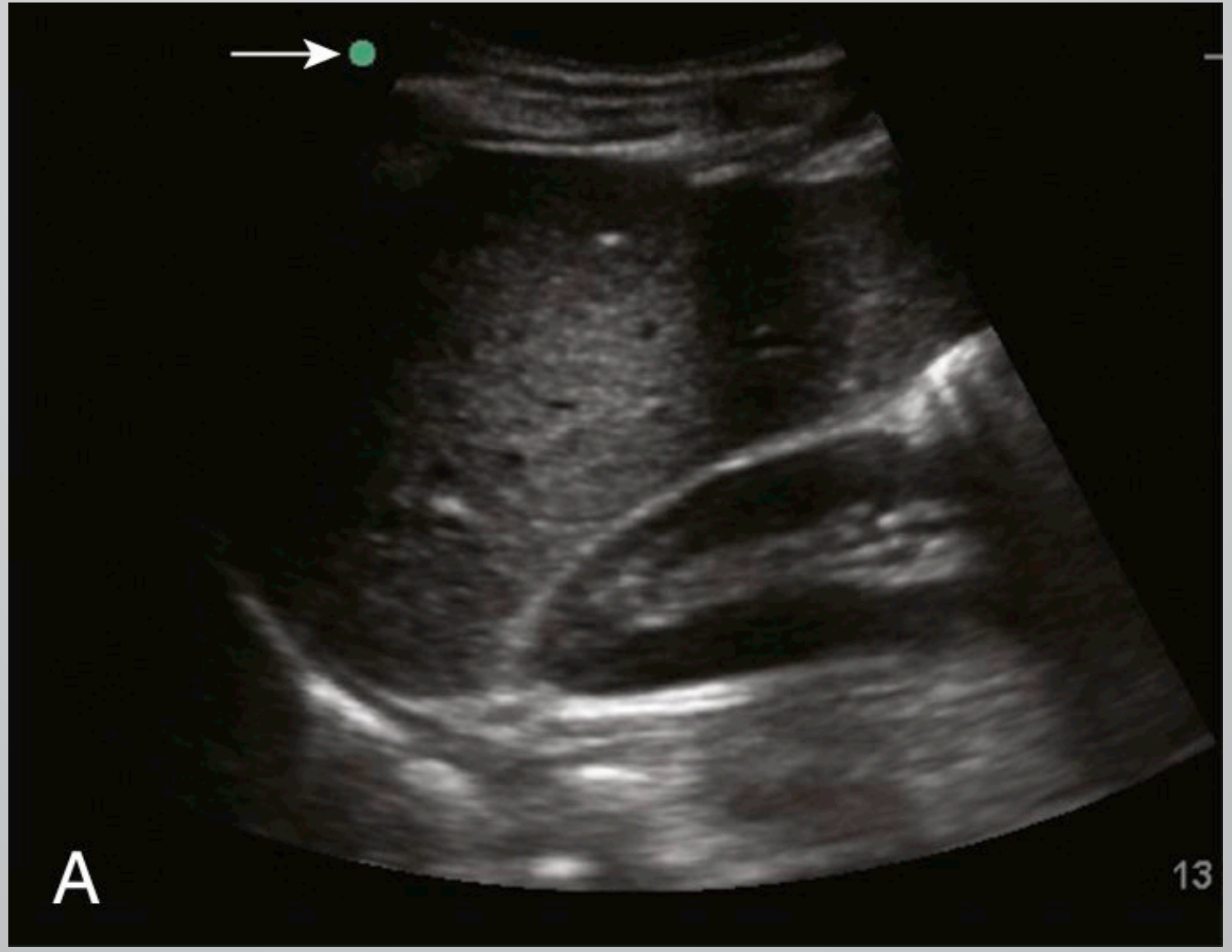
Imaging Planes



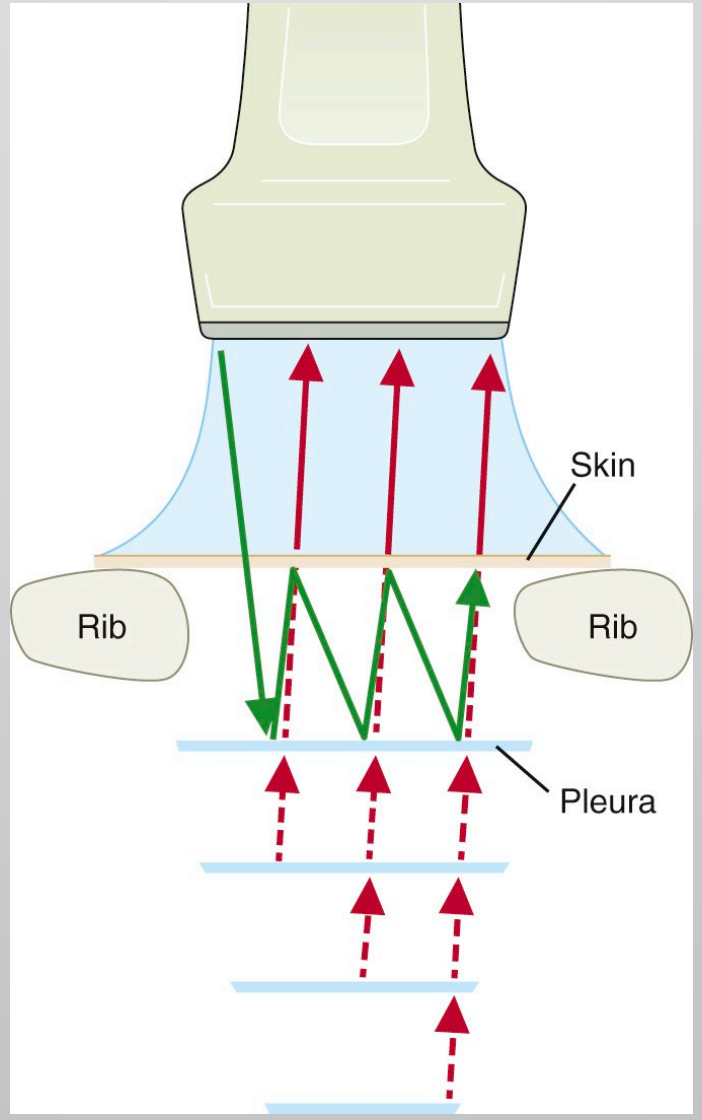
Needle Orientation



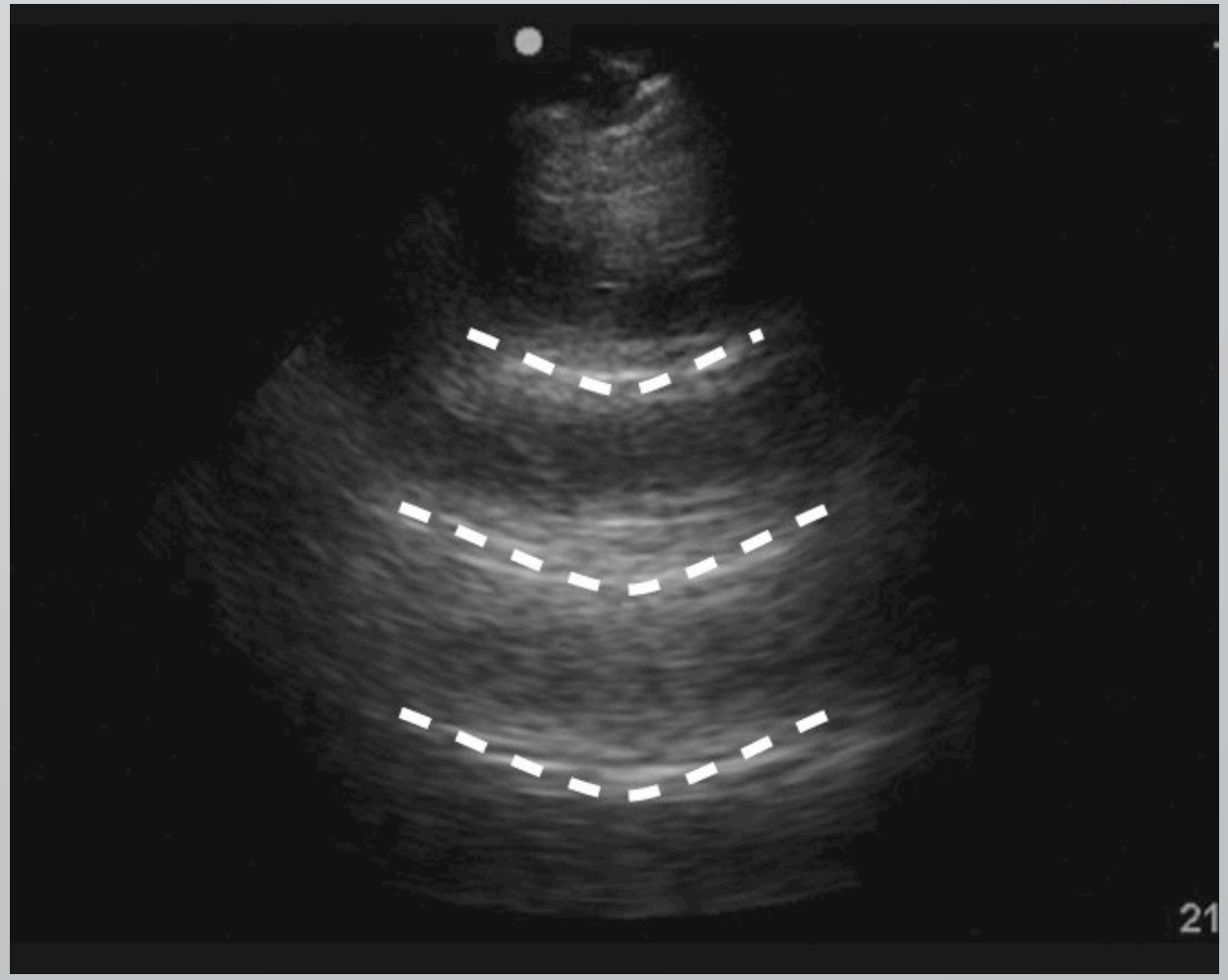
Screen Orientation



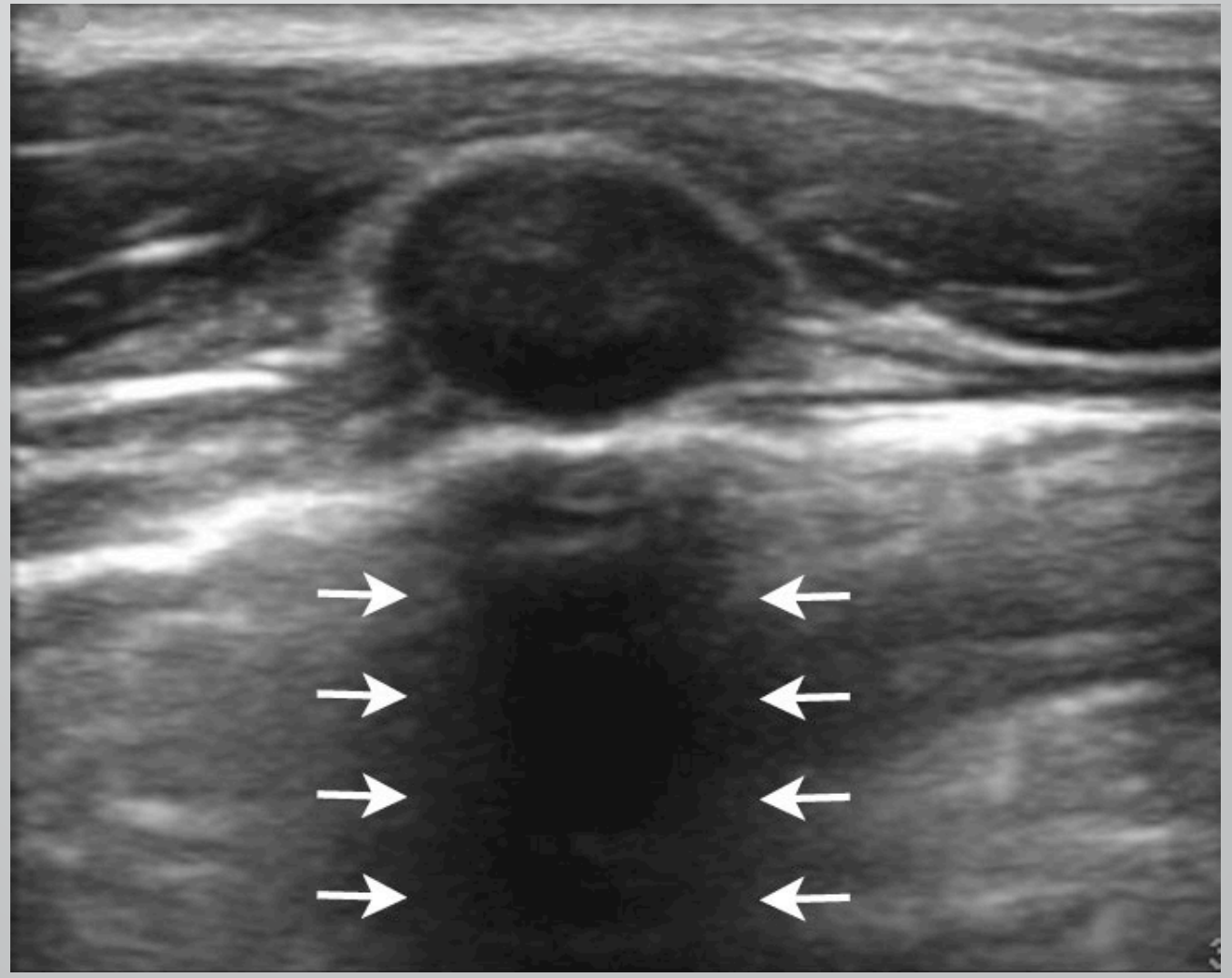
Reverberation Artifact



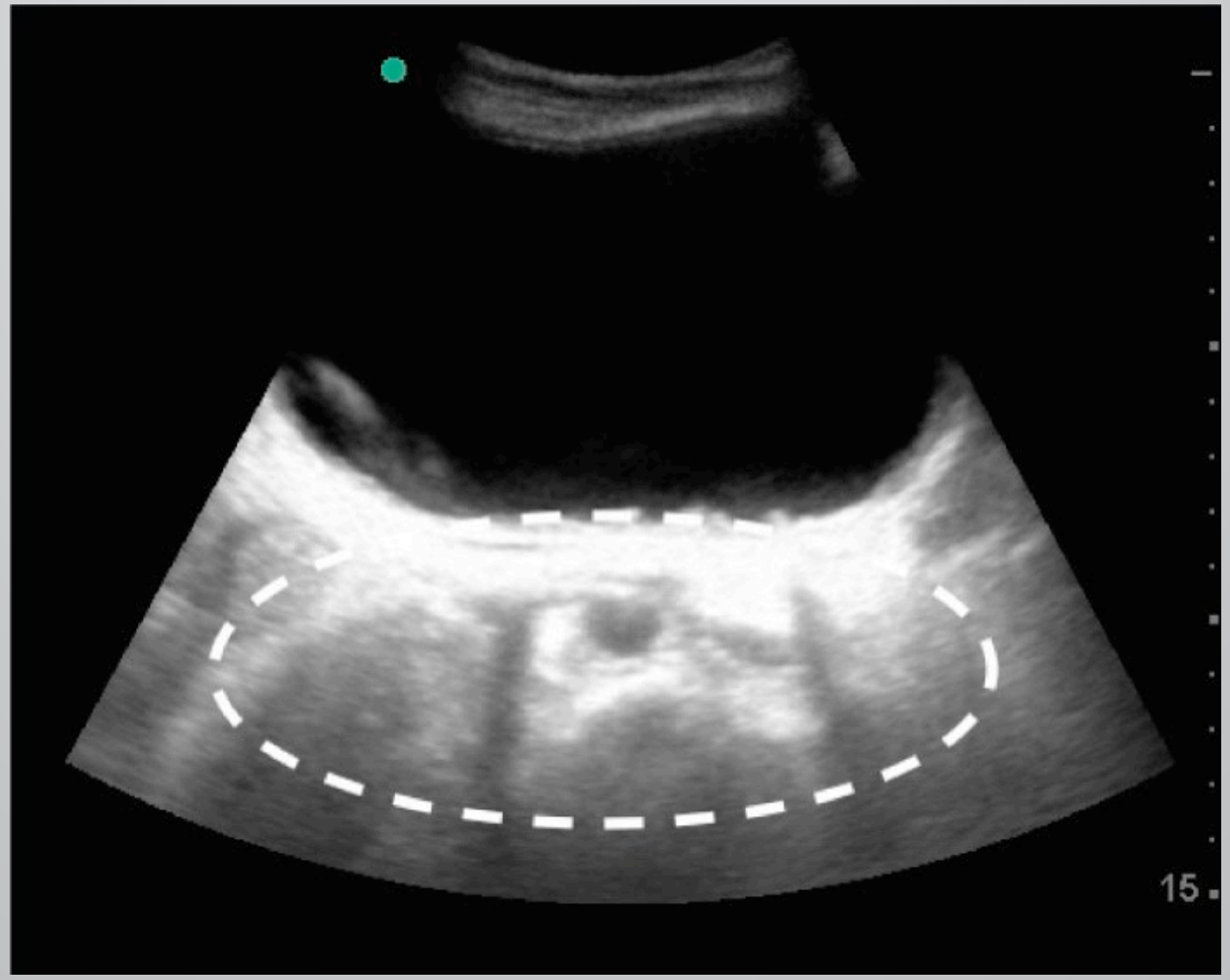
Example of Lung Reverberation called “A” Lines



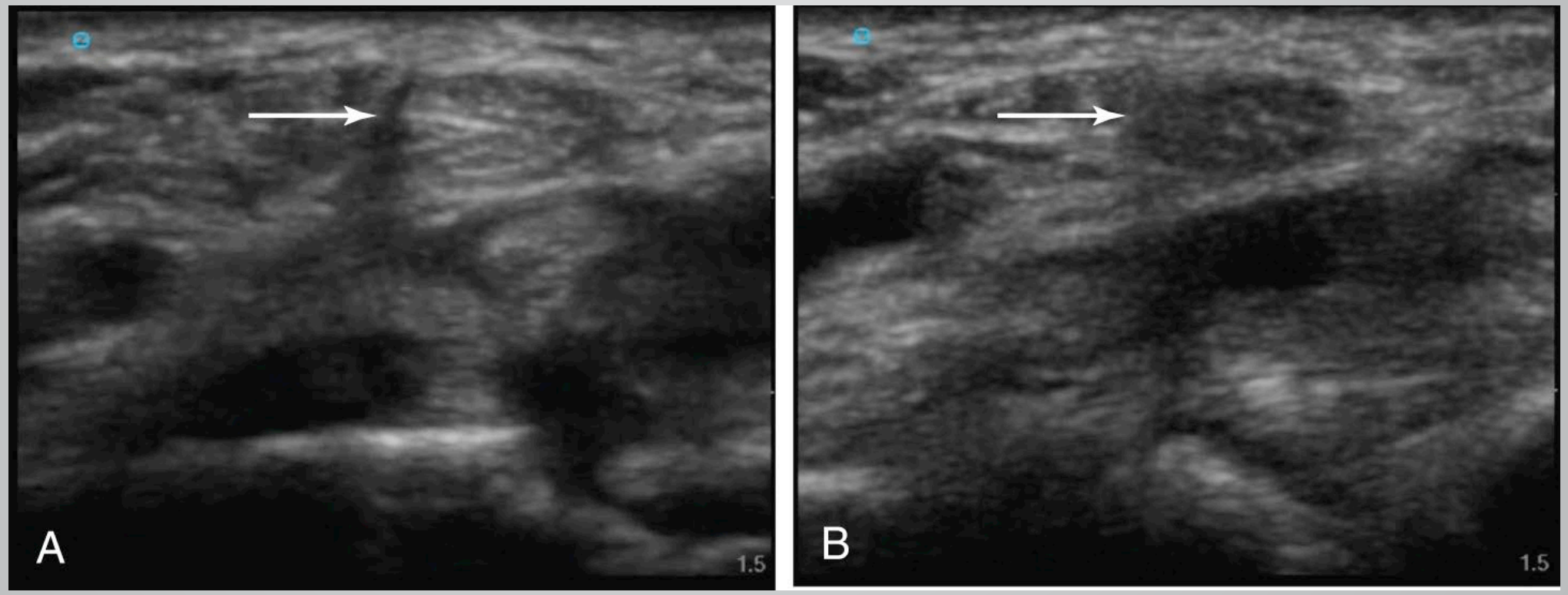
Acoustic Shadowing



Acoustic Enhancement

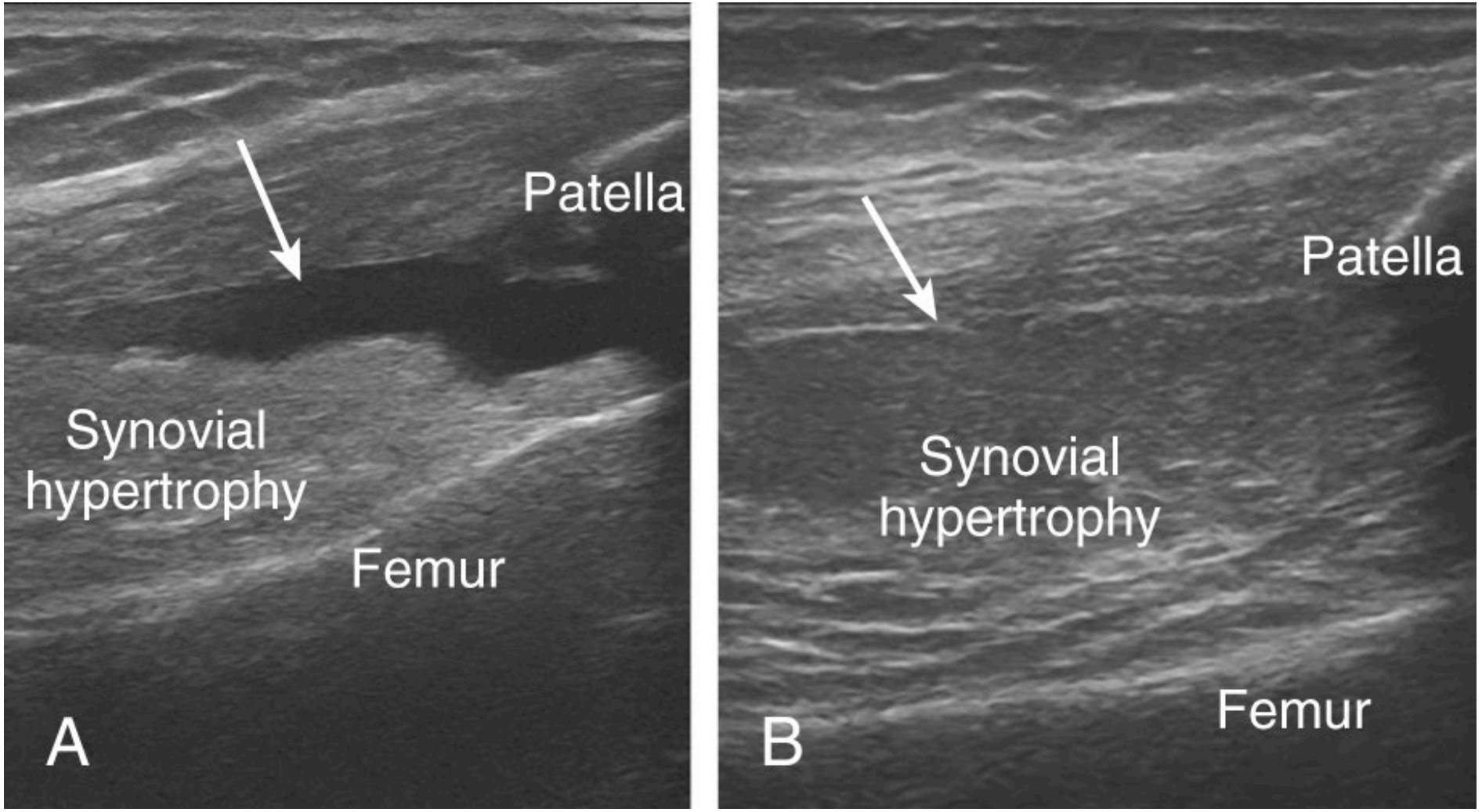


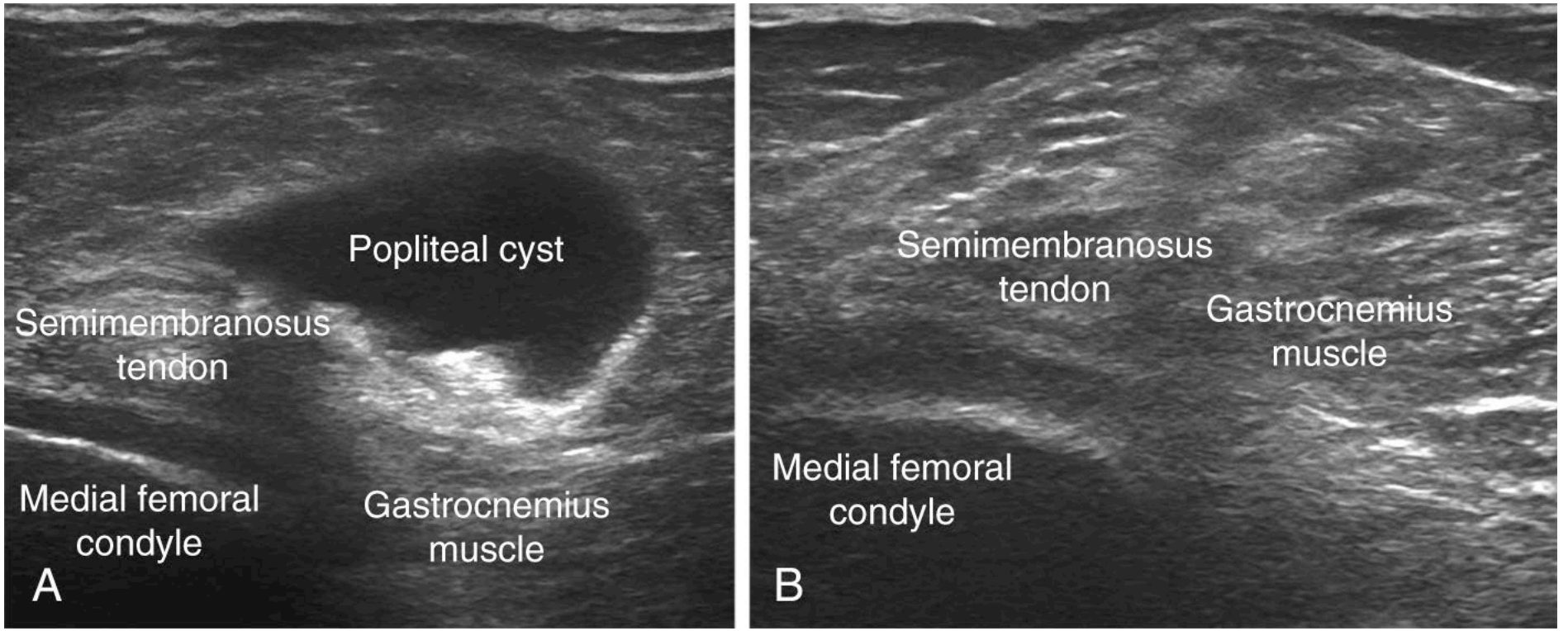
Anisotropy



Patient Presentation

"Mrs. Smith, a 68-year-old active woman, presents after a mechanical fall directly onto her left knee. She reports immediate and significant swelling, severe pain, and states she is 'unable to bend her knee at all' due to the pain. She also mentions a feeling of fullness and discomfort in the back of her knee. On exam, you note a globally swollen knee joint with significant tenderness over the patella and quadriceps tendon. Posterior knee exam is limited by pain but reveals diffuse fullness


Patella
Synovial
hypertrophy
Femur
A
Patella
Synovial
hypertrophy
Femur
B


Popliteal cyst
Semimembranosus tendon
Medial femoral condyle
Gastrocnemius muscle
A
Semimembranosus tendon
Gastrocnemius muscle
Medial femoral condyle
B

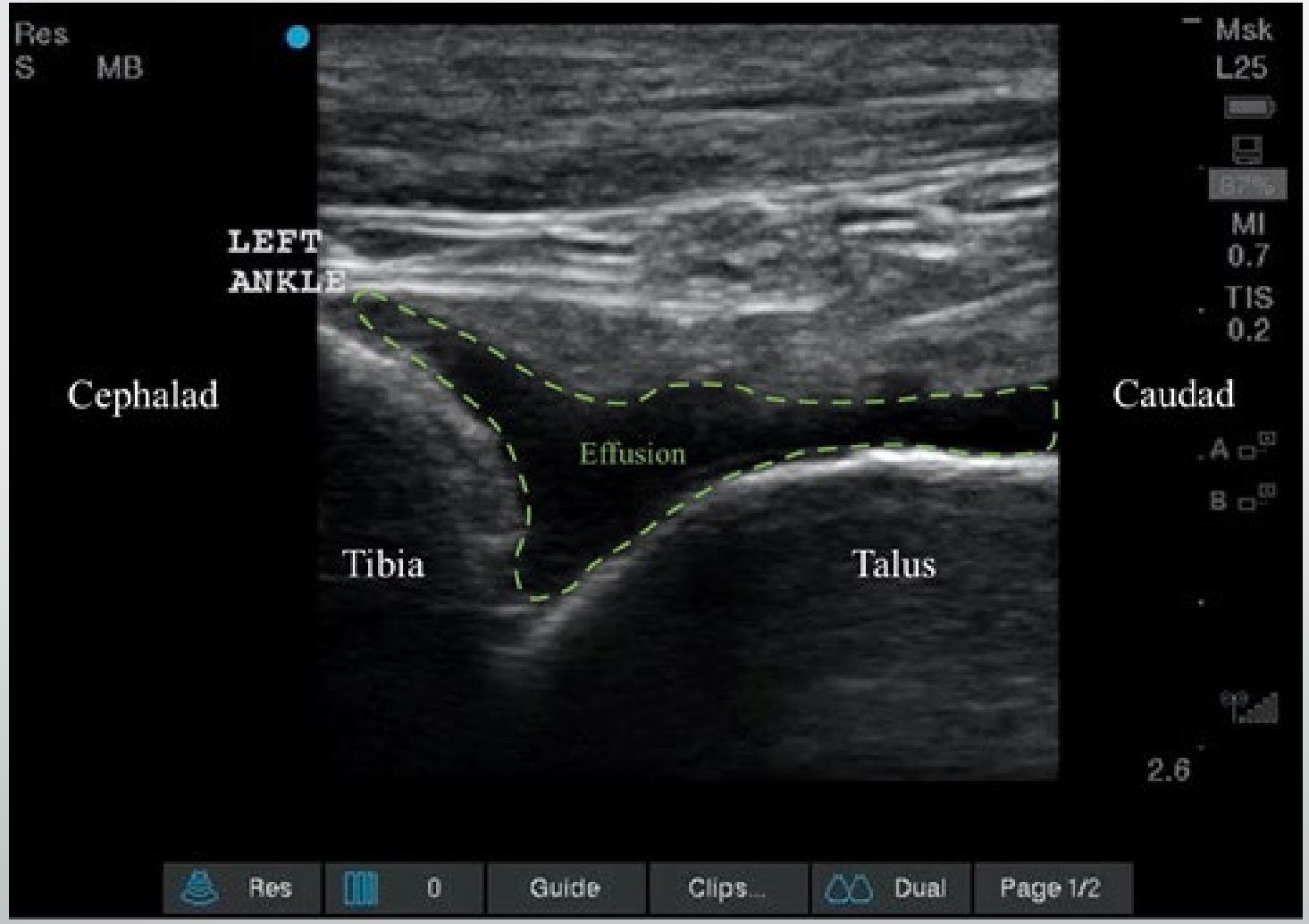
Patient Presentation

"Mr. Jones, a 45-year-old male, presents with several days of worsening left ankle pain and swelling. He denies any acute injury, fall, or twisting event. He notes the ankle feels 'puffy' and is painful to walk on. His history is significant for multiple lateral ankle sprains (last one was ~2 years ago) and a history of gout (last flare was ~1 year ago in his great toe).“

The Clinical Dilemma:

Is this an acute-on-chronic ligament issue from his old sprains, or is this an intra-articular process, like synovitis or an acute gout flare?

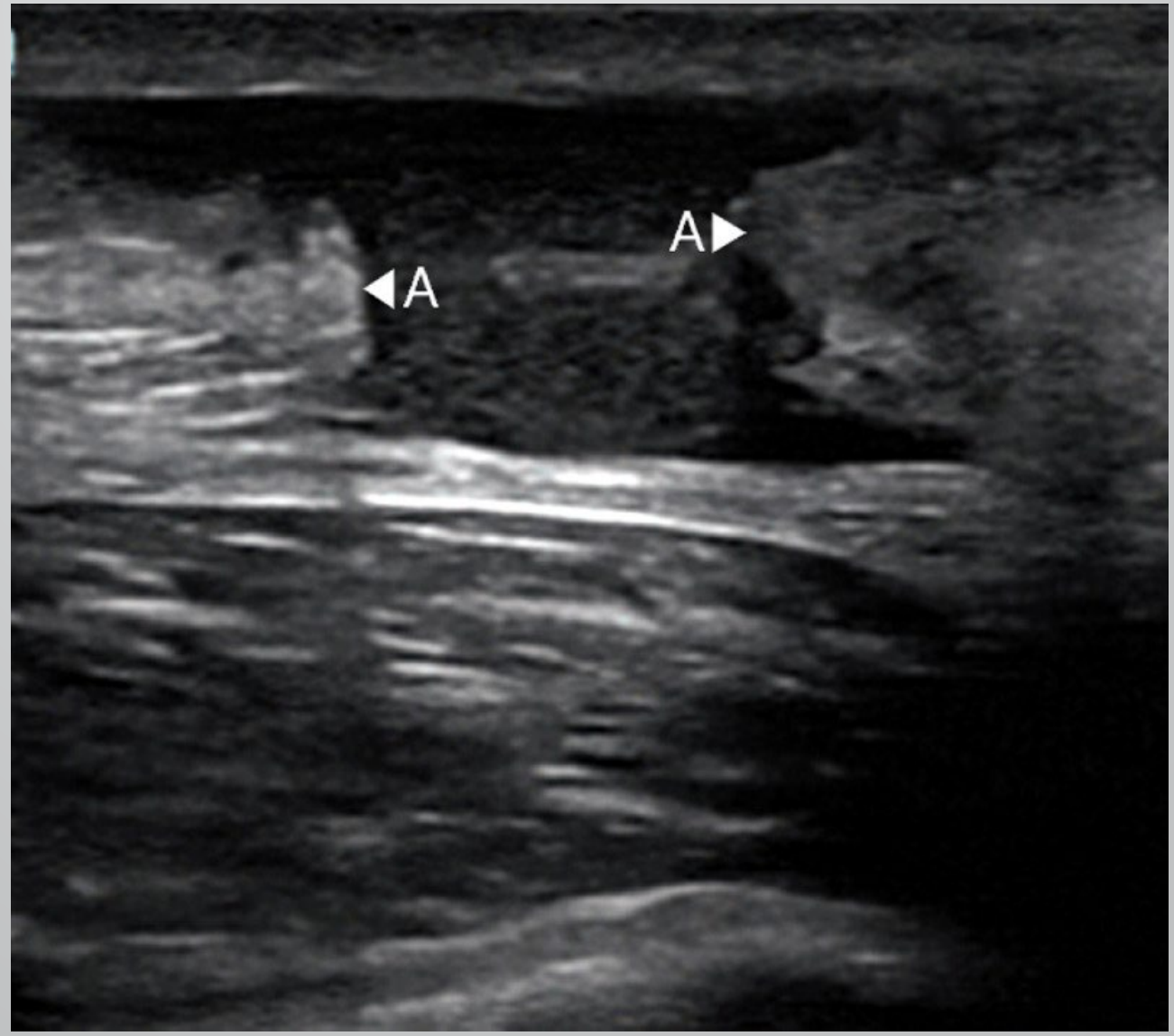
Ankle joint effusion



Patient Presentation

A 42-year-old male recreational runner presents to your clinic. He states he was running downhill when he felt a sudden, sharp 'pull' in his left lower leg, as if he'd been kicked. He had immediate pain and is now **unable to bear weight**. On your physical exam, there is palpable swelling 4-5 cm proximal to the calcaneus. However, the **Thompson test is equivocal** (unclear) due to patient guarding and significant swelling.

Achillies tendon tear



Plantar fascia tear

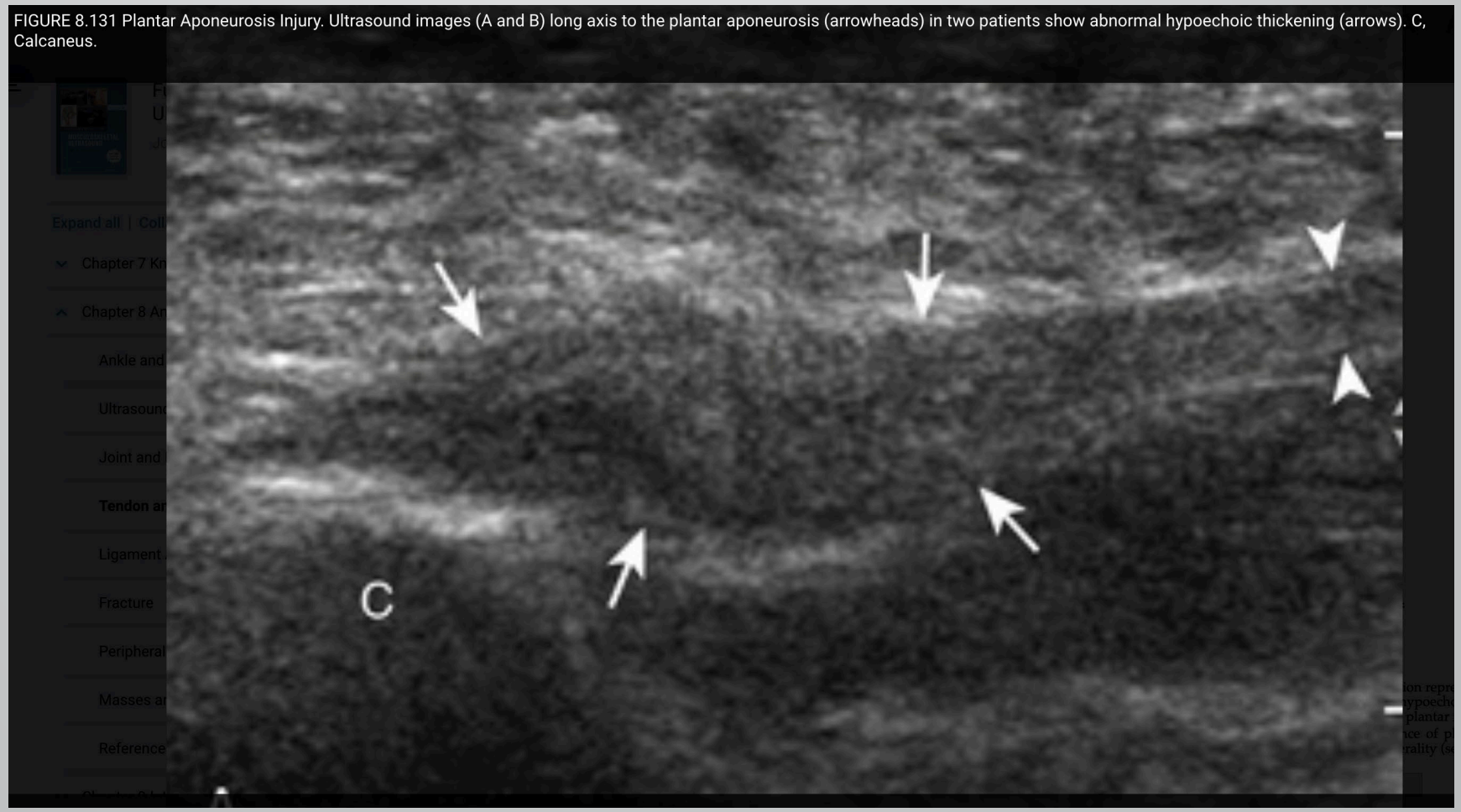
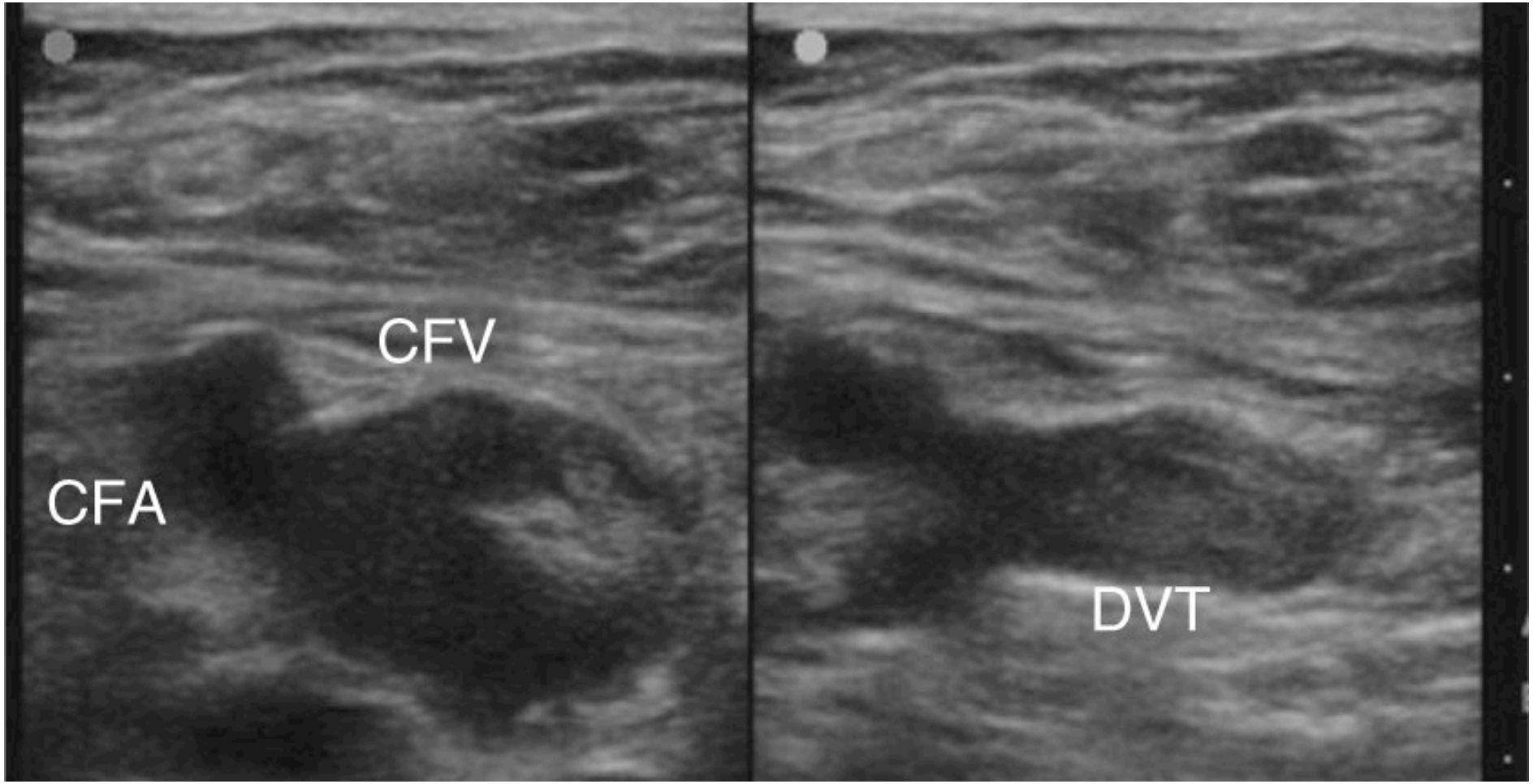


FIGURE 8.131 Plantar Aponeurosis Injury. Ultrasound images (A and B) long axis to the plantar aponeurosis (arrowheads) in two patients show abnormal hypoechoic thickening (arrows). C, Calcaneus.

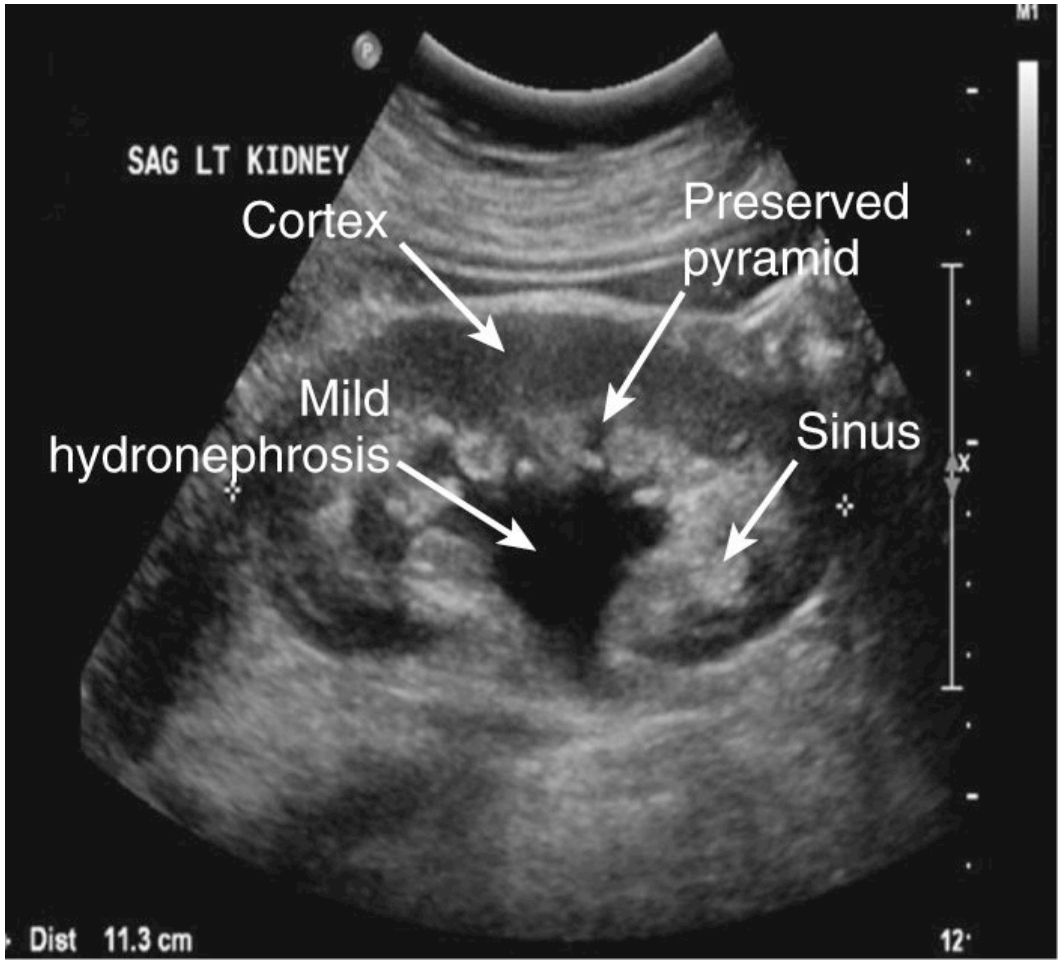
Patient Presentation

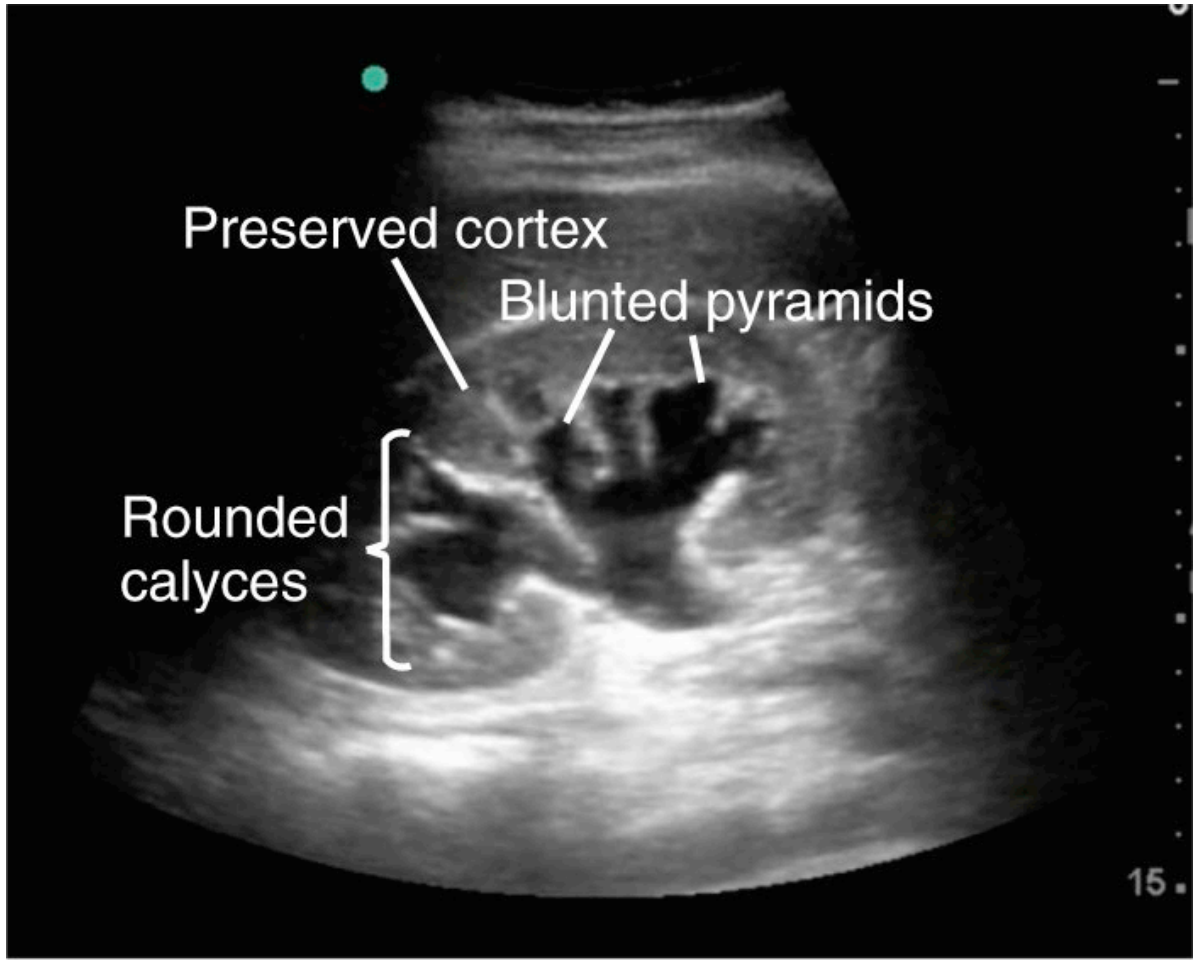
A 34-year-old female bodybuilder presents with a 3-day history of right calf pain and a feeling of 'slight swelling.' She denies a specific injury but notes her last intense leg training session was one week ago. Her medical history is significant for being on **estrogen supplements**, and she just returned from a 6-hour flight 4 days ago. She also notes she is **currently on her period**


CFV
CFA
DVT

Patient Presentation

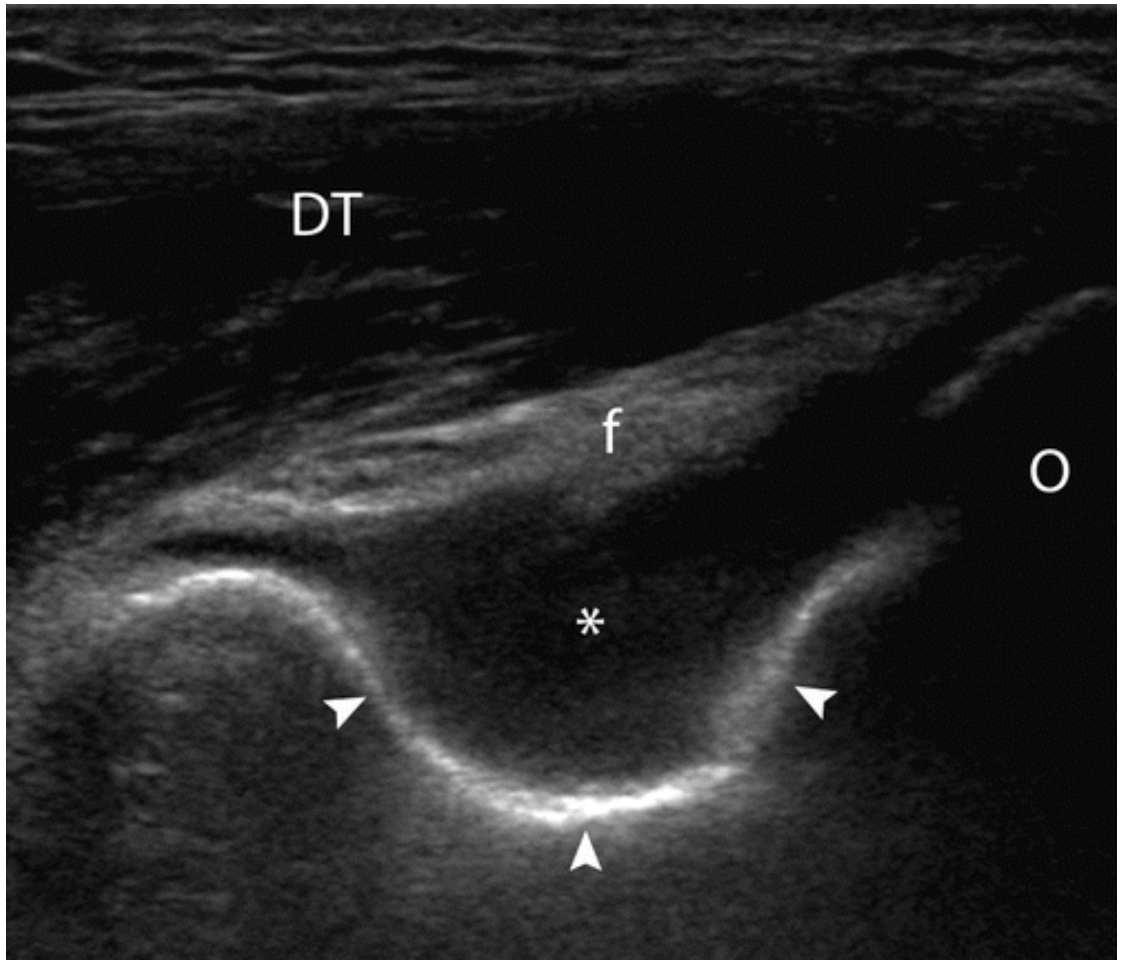
A 38-year-old male with a known **history of kidney stones** (which he 'usually passes on his own') presents with 6 hours of sharp, colicky left flank pain. He is uncomfortable but non-toxic (no fever, vitals stable). It's 4:30 PM on a Friday. He **adamantly does not want to go to the ER** and asks if he can just 'drink a lot of water and wait it out' over the weekend."


SAG LT KIDNEY
Cortex
Preserved pyramid
Mild hydronephrosis
Sinus
Dist 11.3 cm


Preserved cortex
Blunted pyramids
Rounded calyces
15

Patient Presentation

A 30-year-old male presents after falling directly onto his elbow. He was evaluated at an urgent care, where an **X-ray was negative for fracture**. His primary complaint is that he is **unable to fully straighten his elbow**. He reports a 'stuck' or 'locked' sensation at his end range of motion, which is very painful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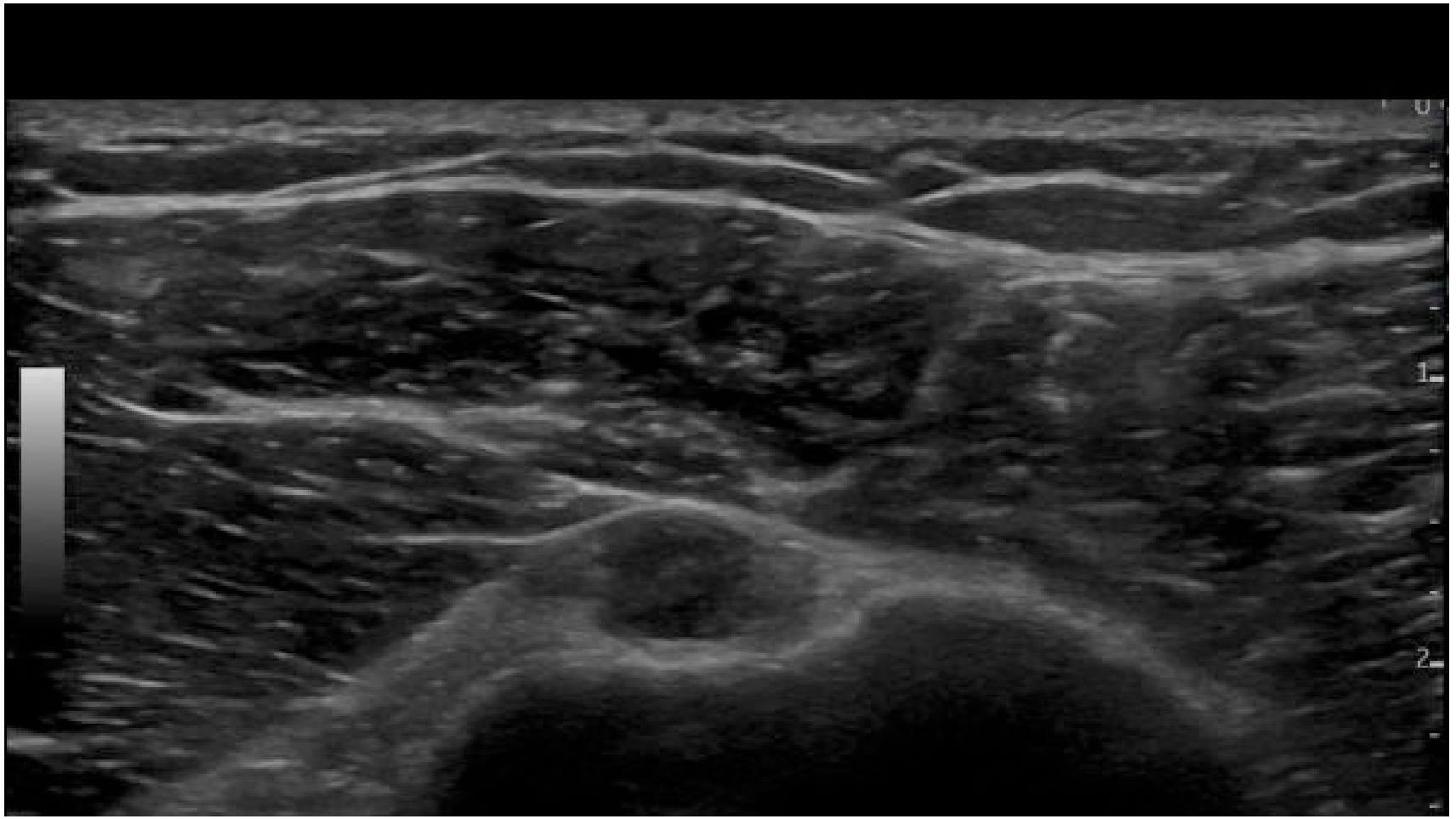
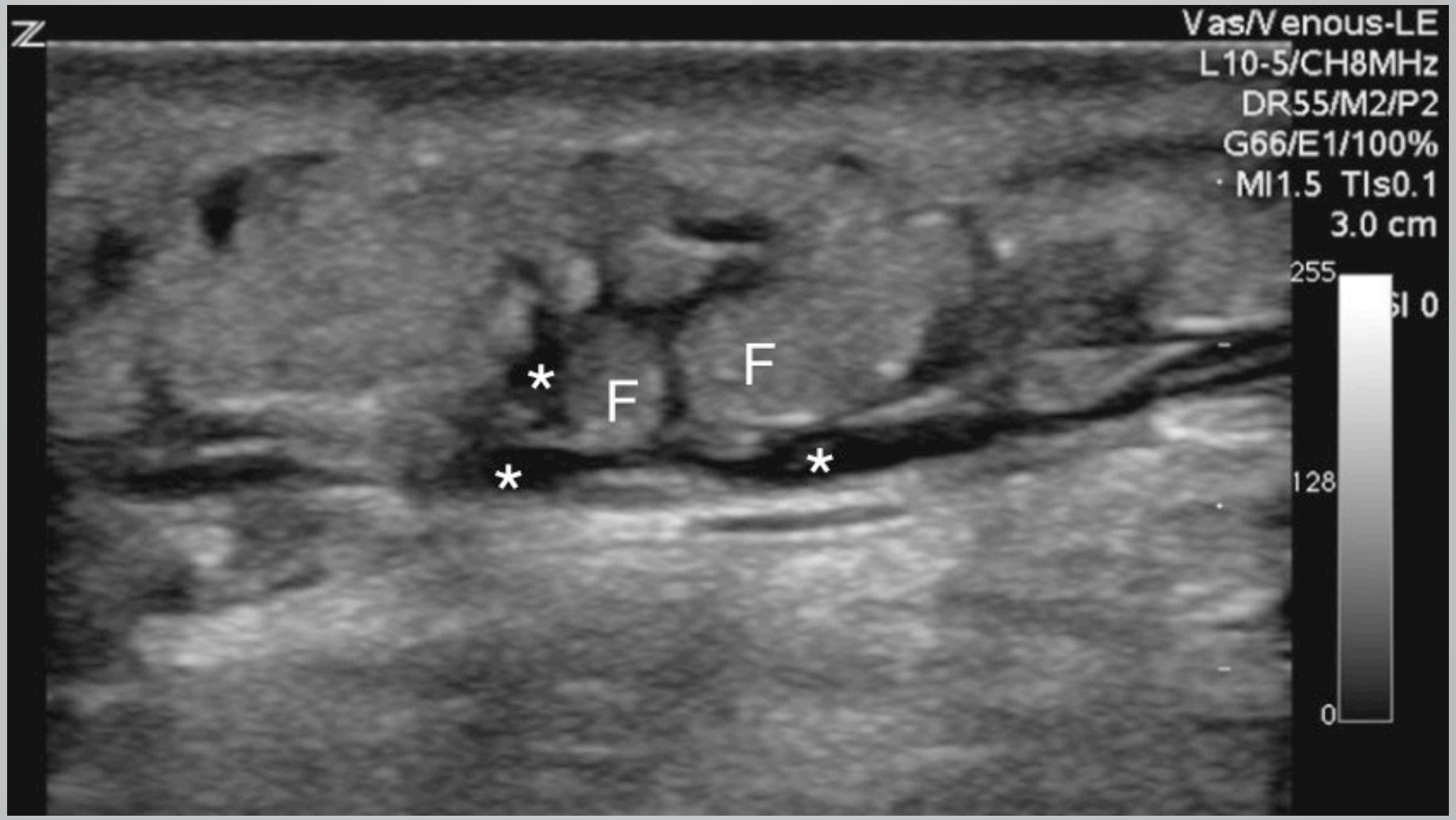
Patient Presentation

A 45-year-old male presents with acute anterior shoulder pain. He was 'lifting heavy' (e.g., deadlift or bicep curl) yesterday when he felt a sudden **'pop'** in his shoulder, followed by immediate pain. Today, he notices bruising traveling down his arm and a visible 'bulge' in his upper arm when he tries to flex his elbow—a classic **'Popeye' sign**.



Patient Presentation

A 72-year-old male presents with **swelling and redness in his right lower leg**. He denies any pain, fever, or chills. His history is significant for **heart failure with reduced EF (HFrEF)**. When asked, he notes he has **'similar swelling, but less redness' on the other (left) side**.


Vas/Venous-LE
L10-5/CH8MHz
DR55/M2/P2
G66/E1/100%
MI1.5 TIs0.1
3.0 cm
255
128
0
F
F
*
*
*

Conclusion

- **Remember Your "Why":** Why did we learn this?
- **To Be a Better Clinician:** To move from "I think" to "I see." It's the most powerful extension of your physical exam.
- **To Improve Patient Care:** Get faster answers, build patient trust by showing them their pathology, and guide treatment with more confidence.
- **To Reduce Waste:** Save your patients and the system the cost and time of unnecessary MRIs and referrals.