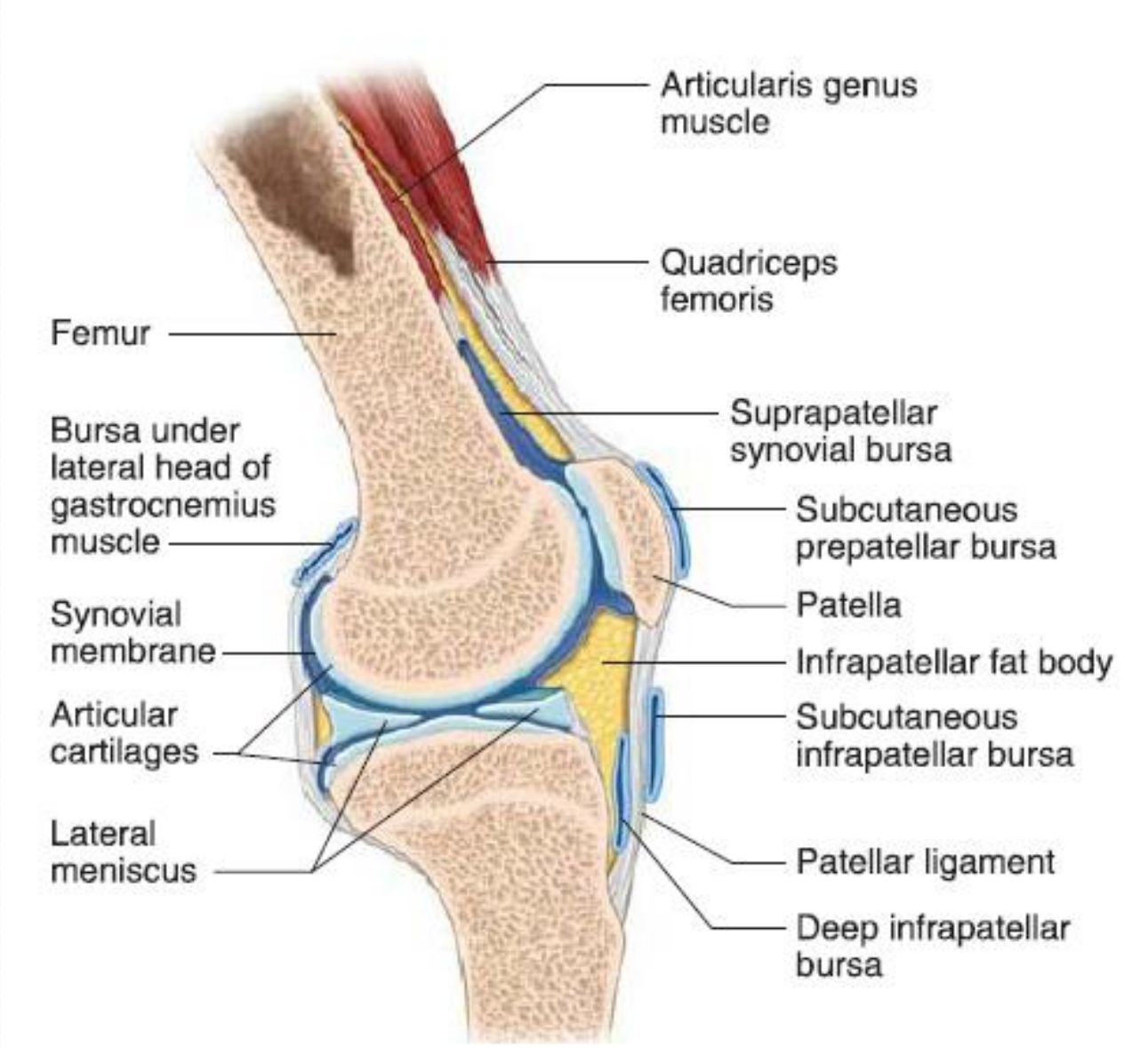
Musculoskeletal Ultrasound

Knee

Knee sono

- Ant
- Med
- Lat
- Pos



- Patient position:

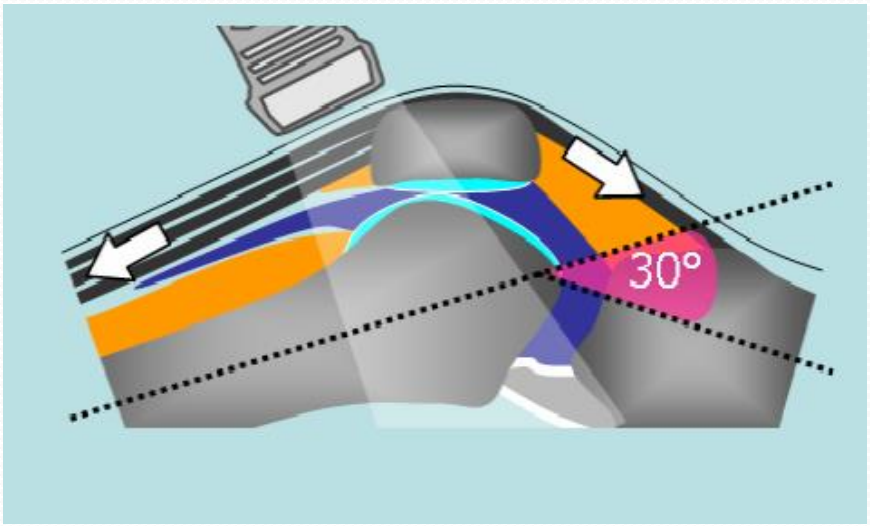
- Supine---- Ant, Med, Lat
- Prone ---- Post

Anterior of knee

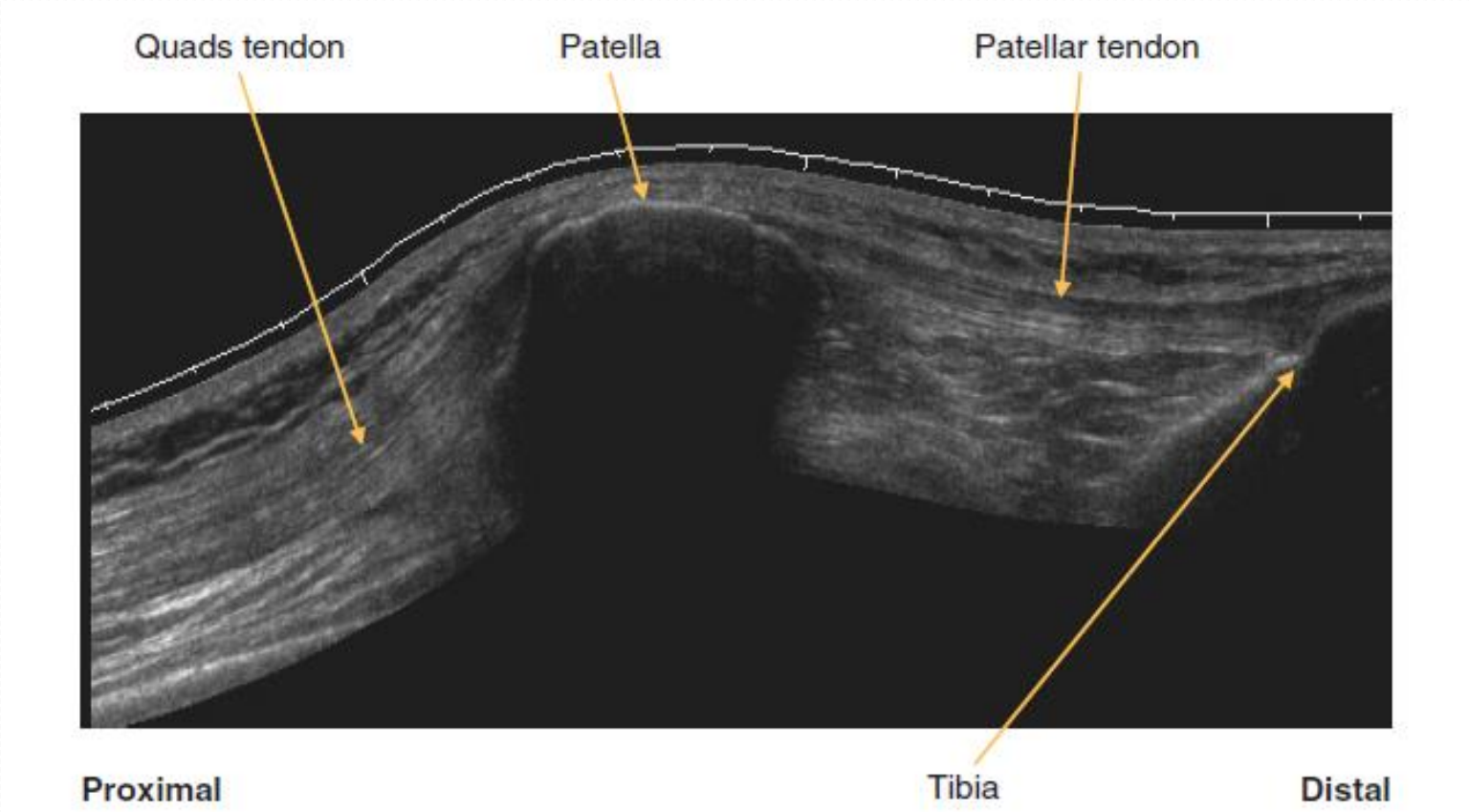
- Quadriceps tendon
- -four compartment of quadriceps
- -Patellofemoral ligaments and retropatellar surface
- Patellar tendon and hoffa fat pad

Anterior Knee

- Patient position: supine & knee flexion of approximately 20°-30° obtained by placing a small pillow beneath the popliteal space
  - ✓ stretches the extensor mechanism and avoids possible anisotropy related to the concave profile that the quadriceps and patellar tendons assume in full extension.



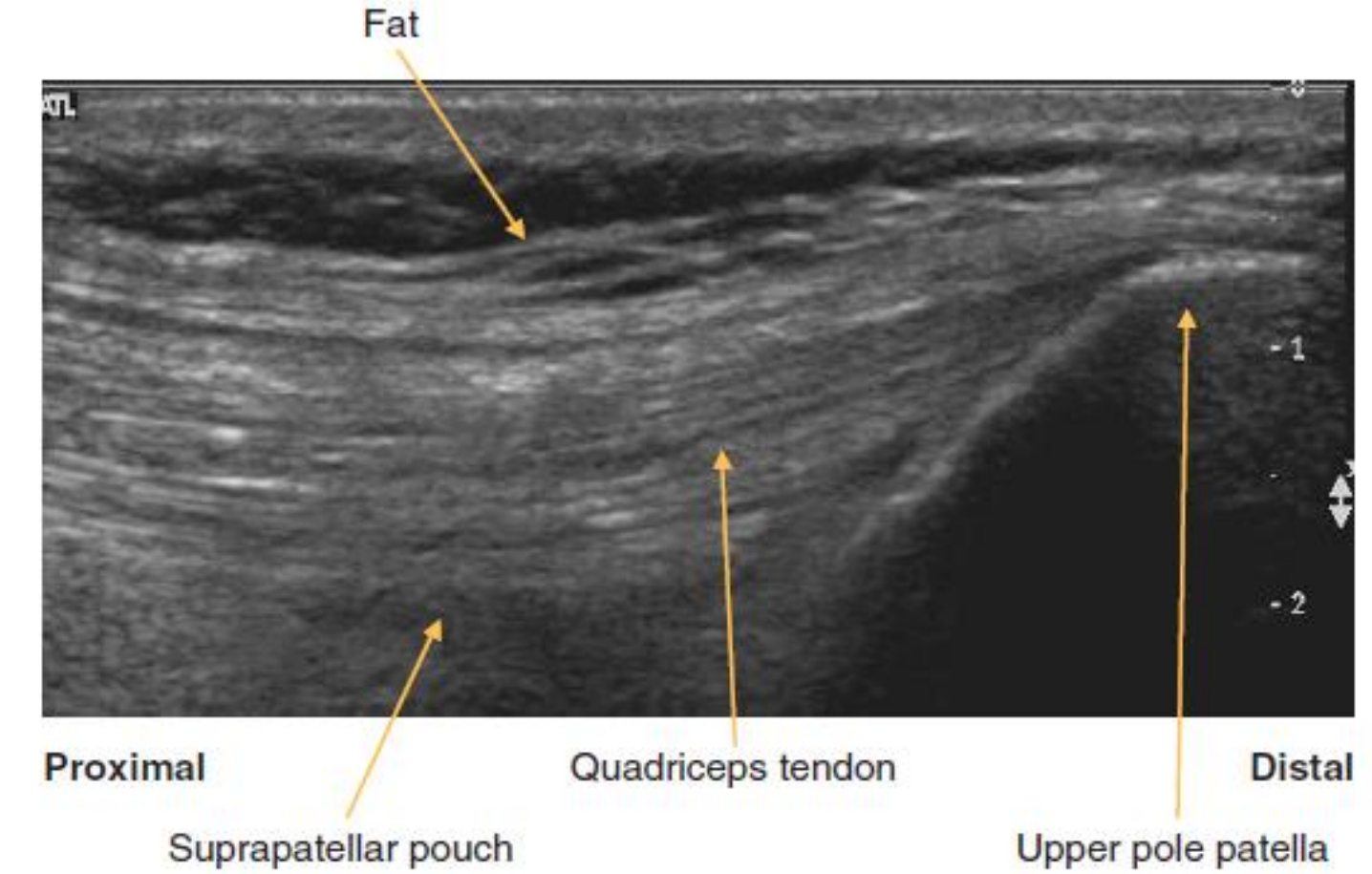
- 3 part (superior to inferior) :
  1. Suprapatellar structures of the quadriceps tendon, suprapatellar recess and the trochlea of the femur
  2. patella and retinacula (e.g. prepatellar)
  3. patella tendon and bursa (e.g., infrapatellar bursa)



- Long axis US images obtained in the midline while keeping the distal edge of the probe over the patella display the quadriceps tendon. (a)

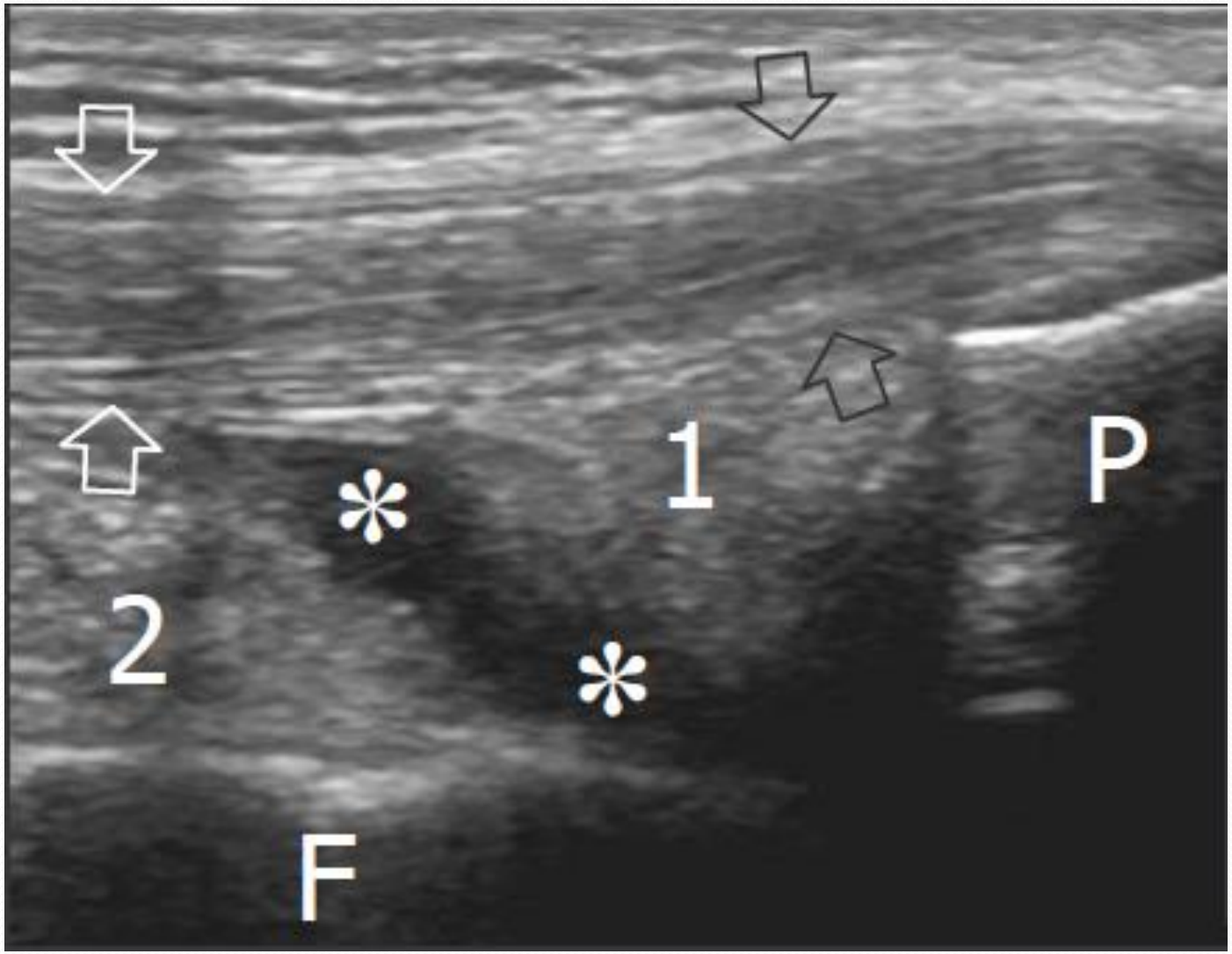
- multilayered appearance of quadriceps tendon : differentiation between full-thickness (three layers involved) and partial-thickness (one/two layers involved) tears.

- 1. Find patellar edge
- 2. Quadriceps tendon
- 3. suprapatellar pouch: between suprapatellar fat pad (quadriceps fat pad) & prefemoral fat pad

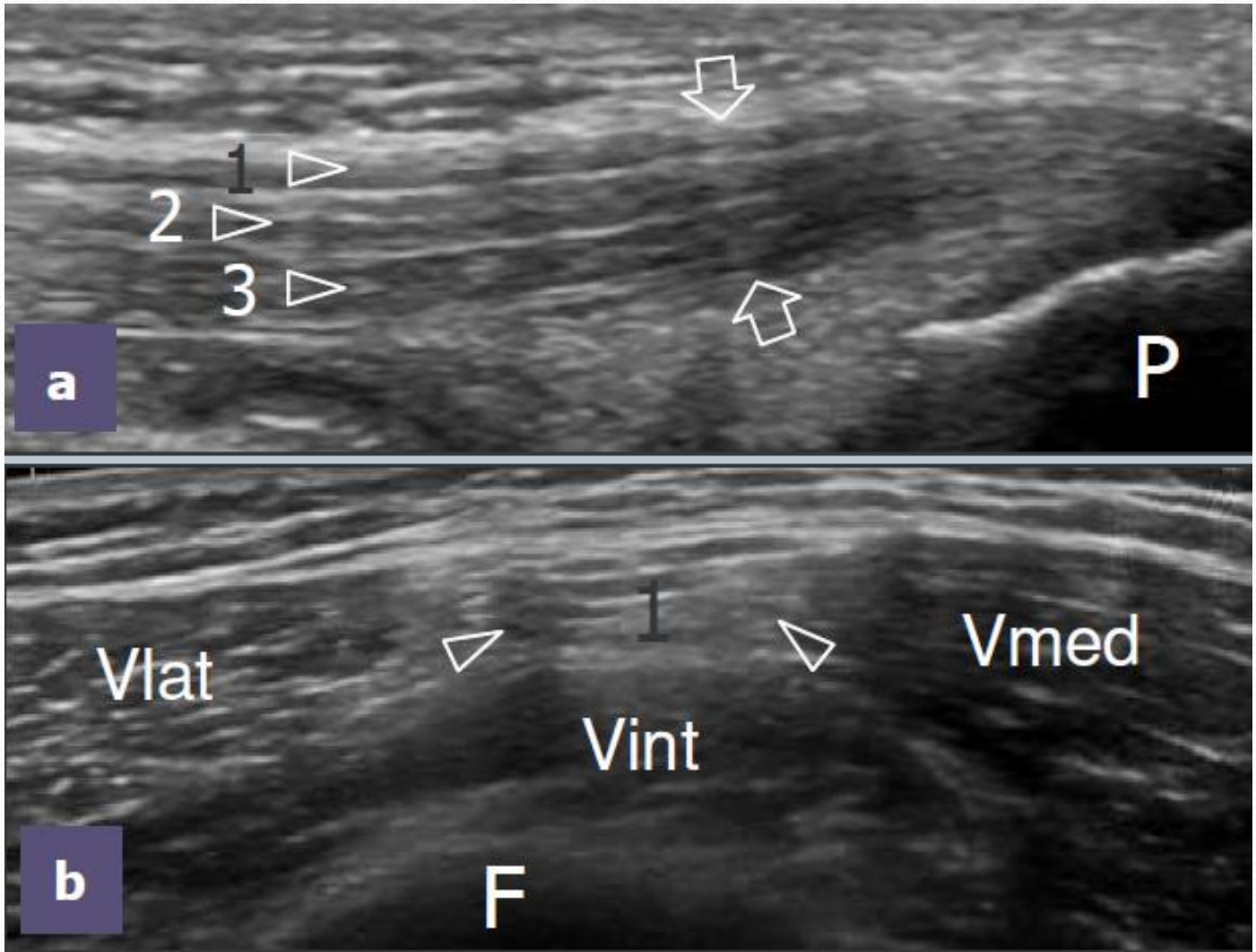


- suprapatellar pouch (recess)

Normal: thin hypoechoic S-shaped space



- 1: *rectus femoris*
- 2: *vastus lateralis and vastus medialis*
- 3: *vastus intermedius*



- to detect small effusions :
  - Dynamic scanning during isometric contraction of the quadriceps
  - or squeezing the parapatellar recesses with the non-examining hand
- Knee joint fluid is best detected by asking the patient to: !!
  - elevate the ankle with the knee extended.
  - Slight flexion of knee joint

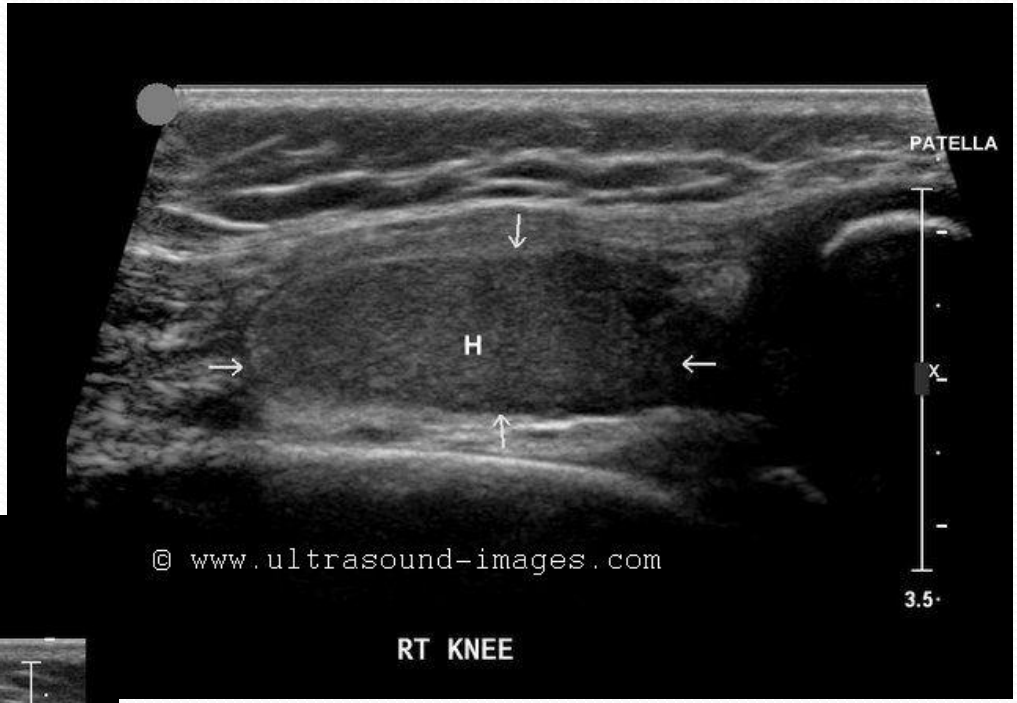
- differentiate effusion and synovial thickening:
  - compression with the probe
  - Power doppler

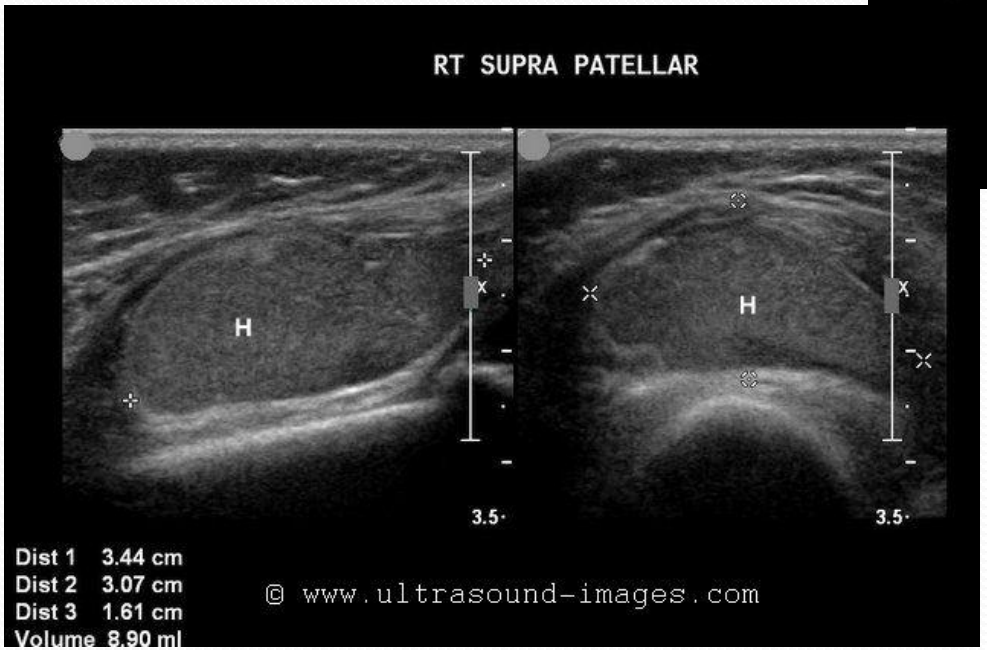
If you couldn’t see suprapatellar pouch

- Imaging should be extended over the lateral and medial sides of the quadriceps tendon because small synovial fluid tend to accumulate in the lateral and medial parts of the suprapatellar recess (gravity).

suprapatellar-hematoma

- Dx?

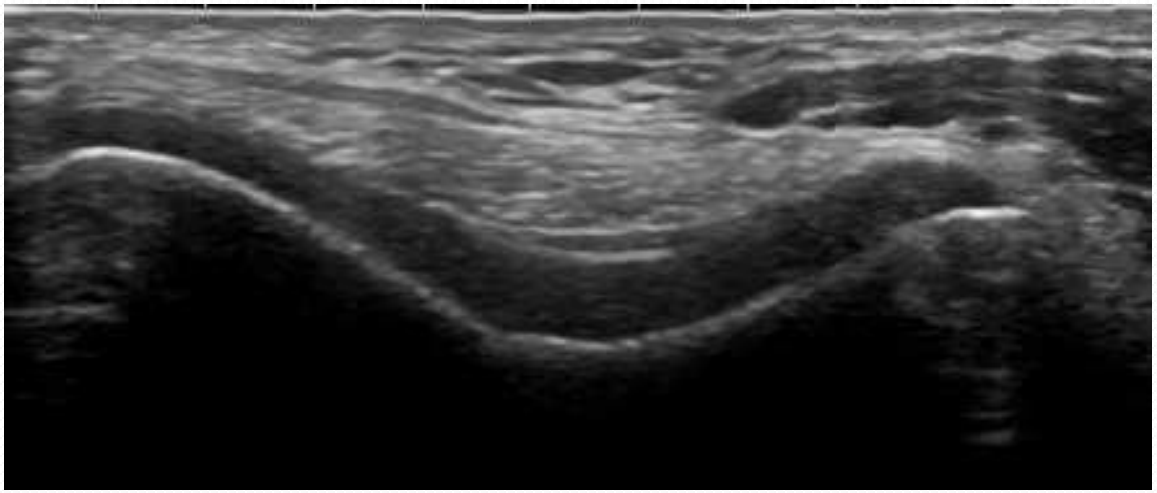


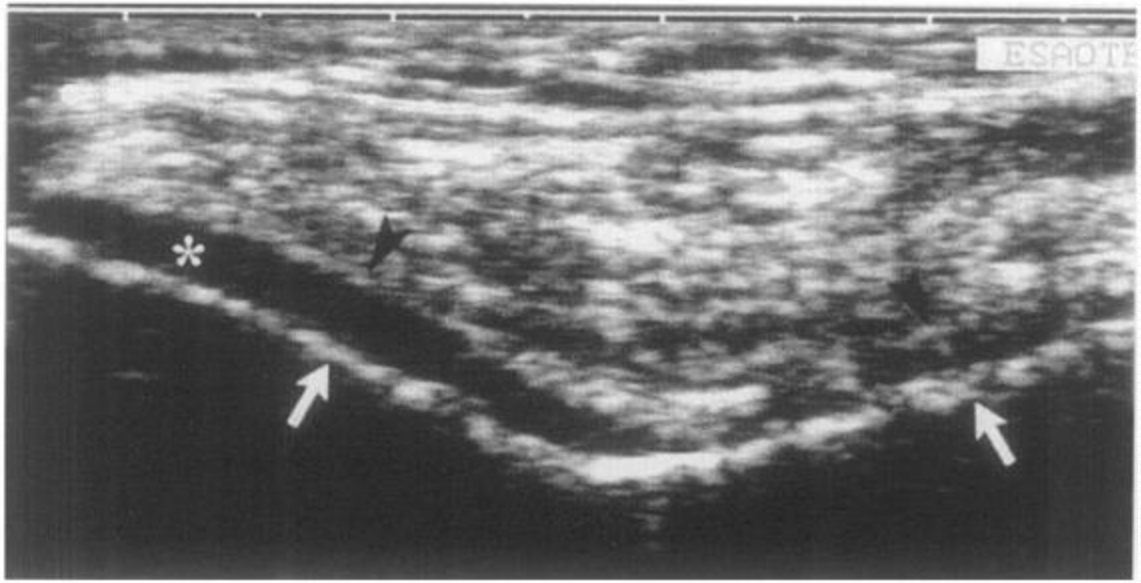


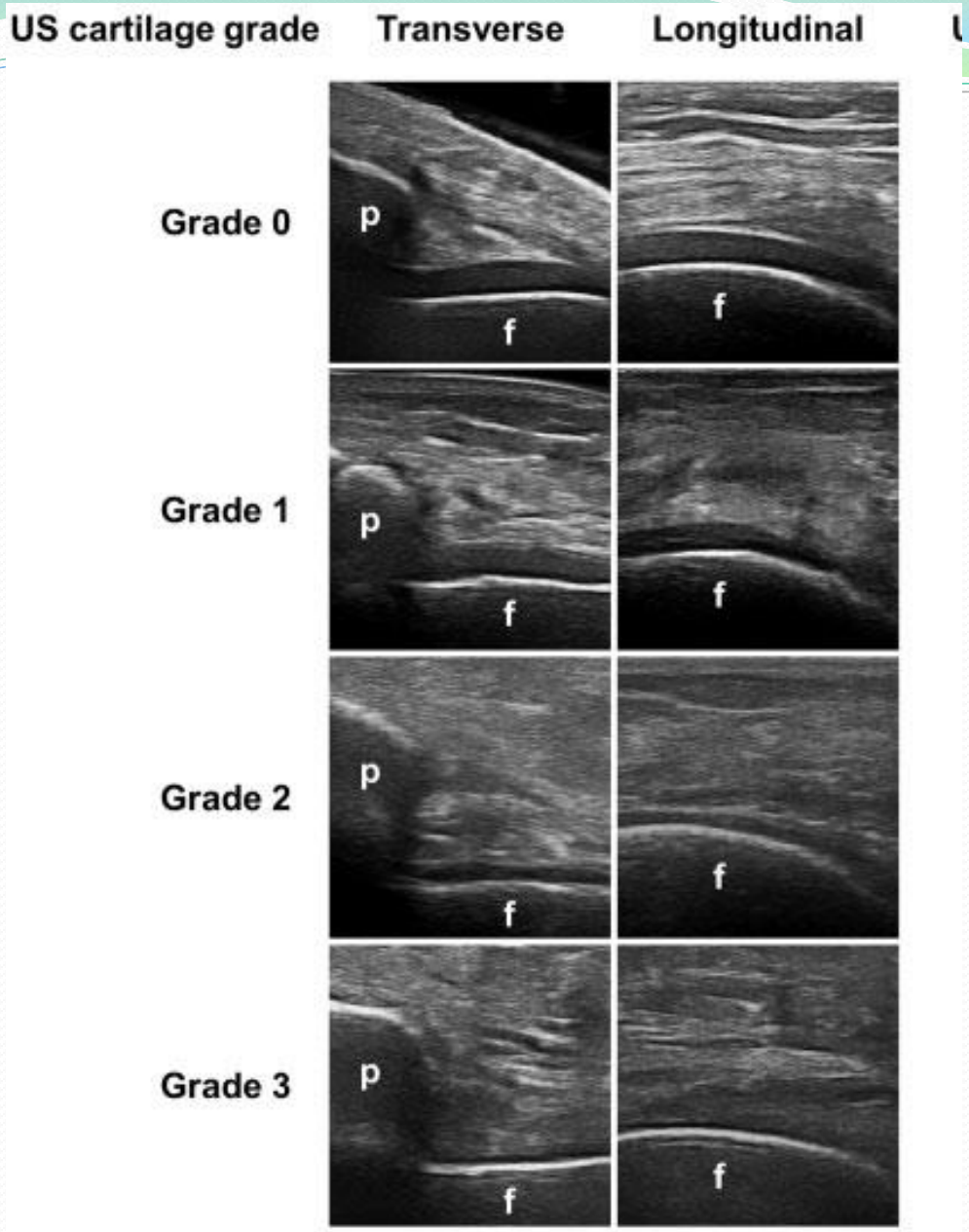
Quadriceps Muscle Rupture

- Disruption
- Hematoma

- With full knee flexion, the femoral V-shaped trochlea and the overlying articular cartilage are examined on axial planes.

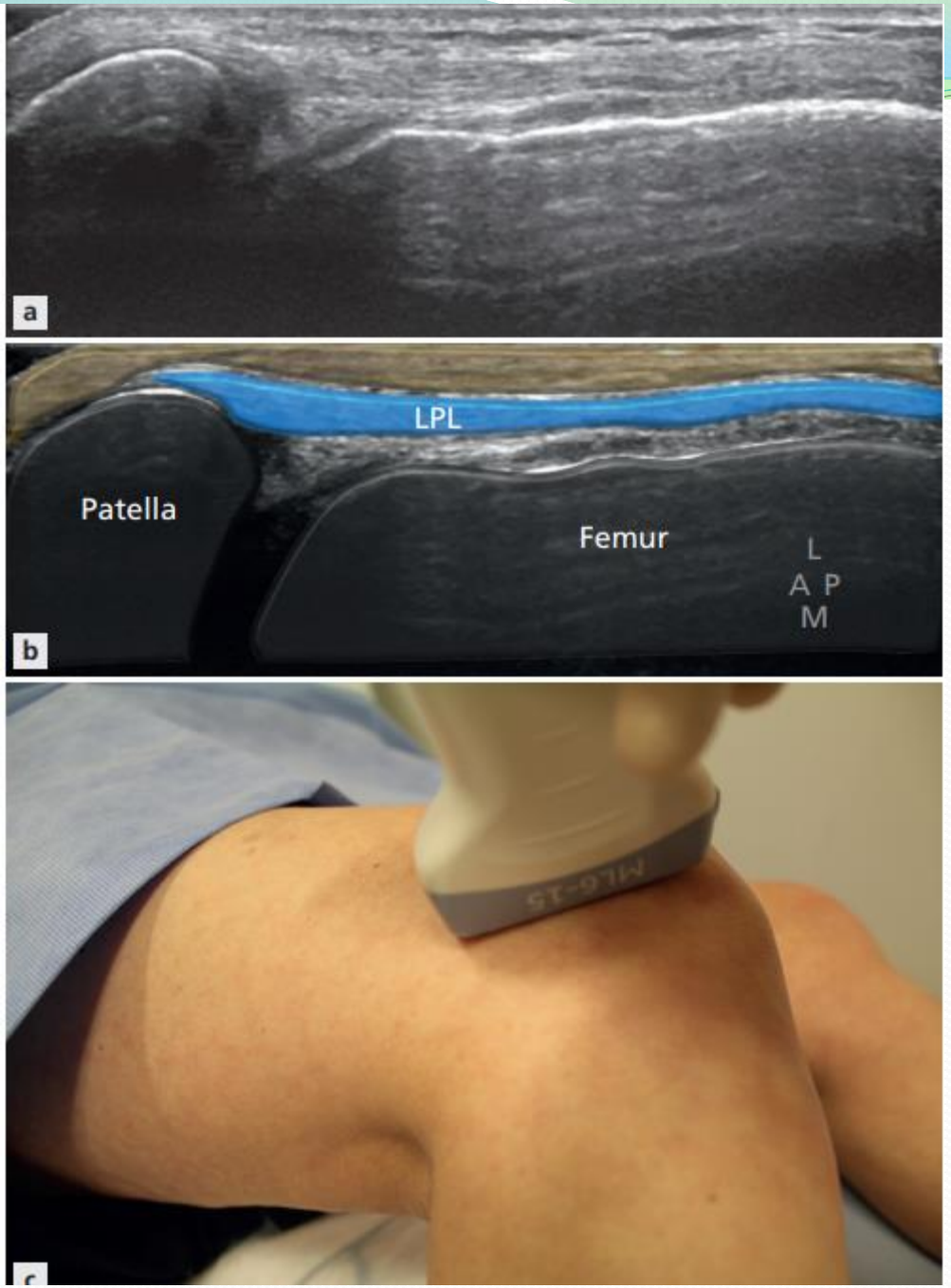


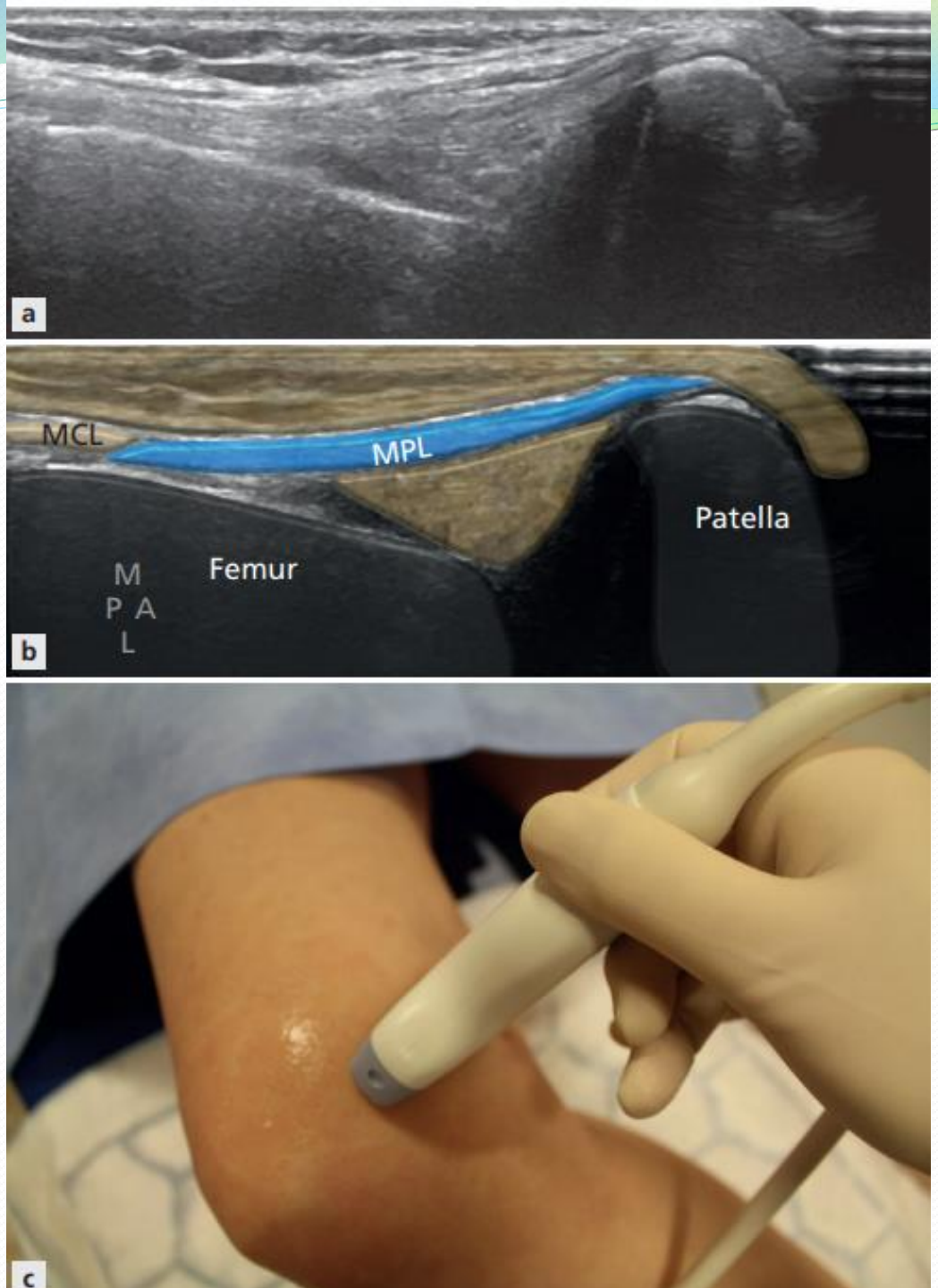



US cartilage grade
Transverse
Longitudinal
Grade 0
Grade 1
Grade 2
Grade 3
p
f

- Medial and Lateral patellar retinaculum:
- In full extension
- axial plane
- bilayer structures that cannot be discriminated from the underlying joint capsule

- Between patella and Medial or Lateral femoral condyle


a
LPL
Patella
Femur
L
A P
M
b
c


a
MCL
MPL
Patella
M
P A
L
Femur
b
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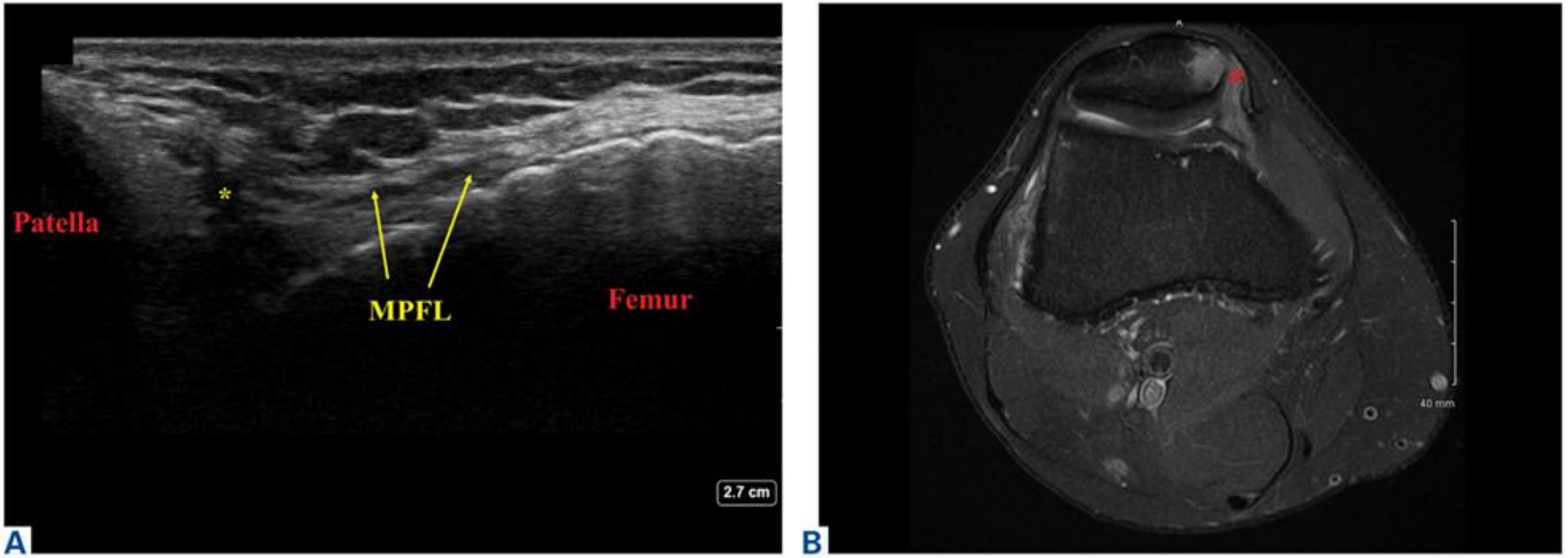
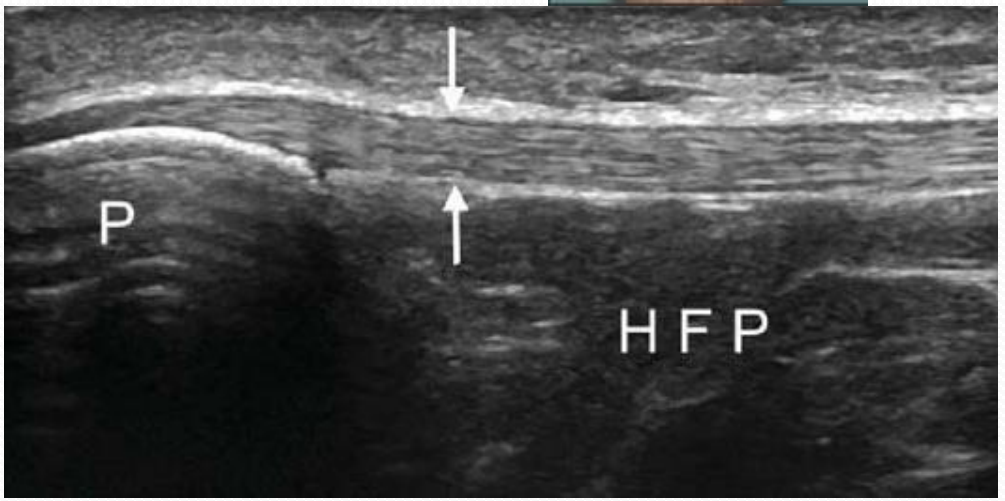


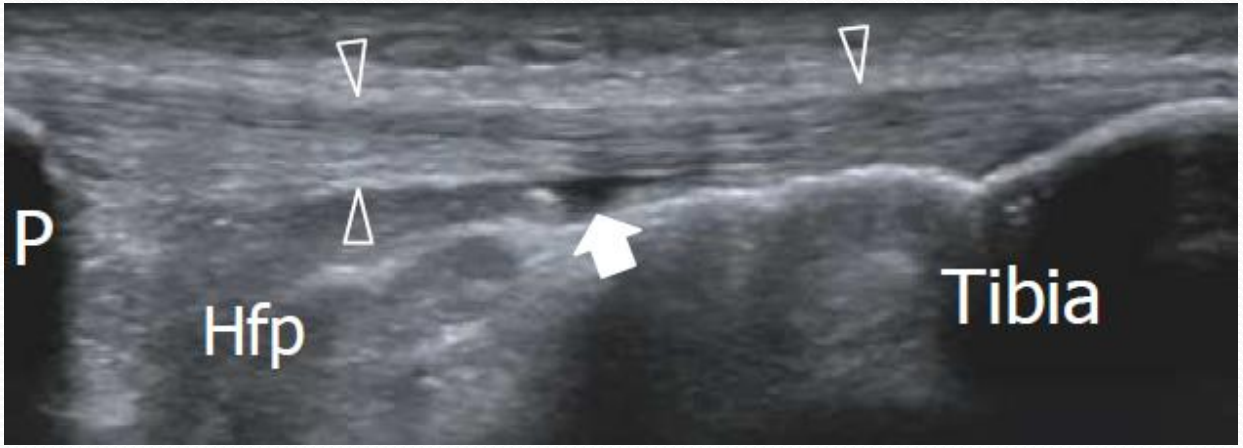
Figure 3. (A) Long-axis ultrasound of a medial patellofemoral ligament (MPFL) (yellow arrows) with a tear (*) at the patellar attachment. (B) Correlative proton density fat-saturated axial magnetic resonance imaging of left knee shows MPFL tear at the patellar attachment (*).

Patellar tendon

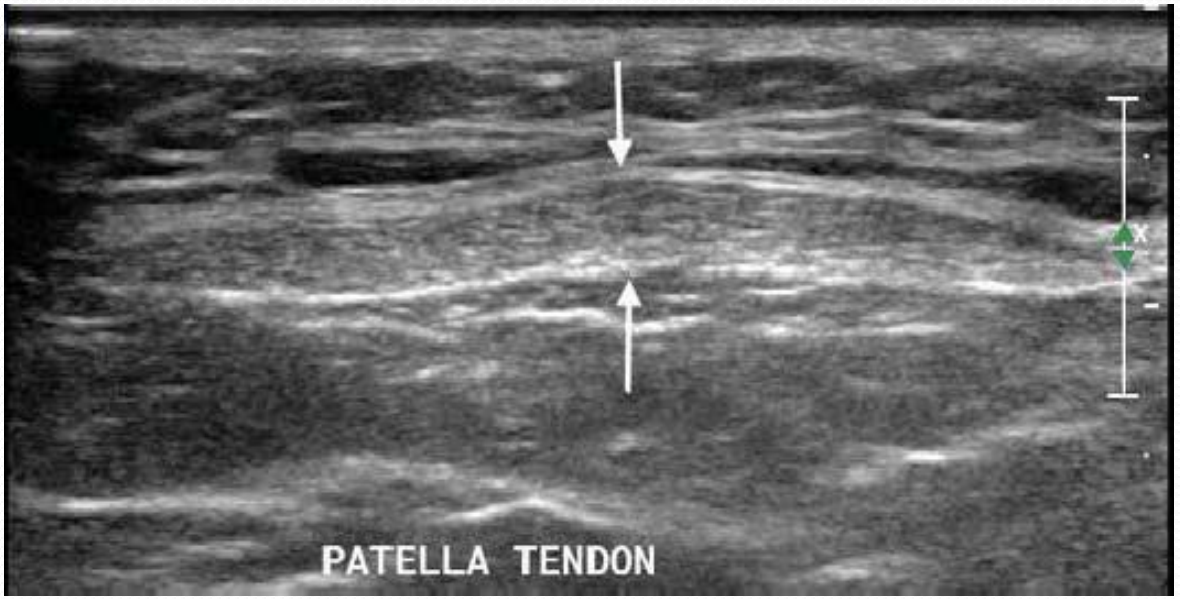
- knee flexion of approximately 20°-30°
- Long axis
  - Hoffa fat pad
  - Superficial infrapatellar bursa
  - deep infrapatellar bursa:
    - Mild distension is NL



- Long axis 5 cm
- 26*4 mm
- No tendon sheat
- Paratenon

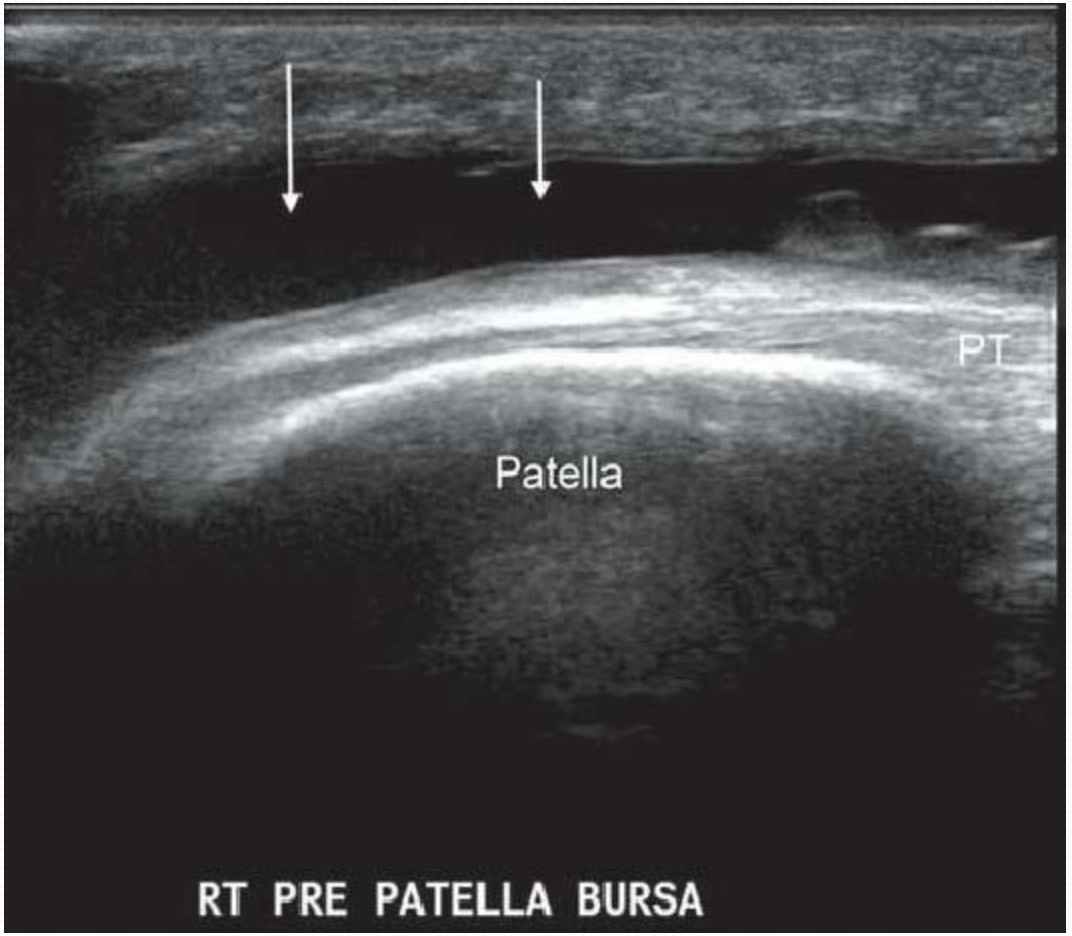


- Short axis



Prepatellar Bursitis *(housemaid's knee)*

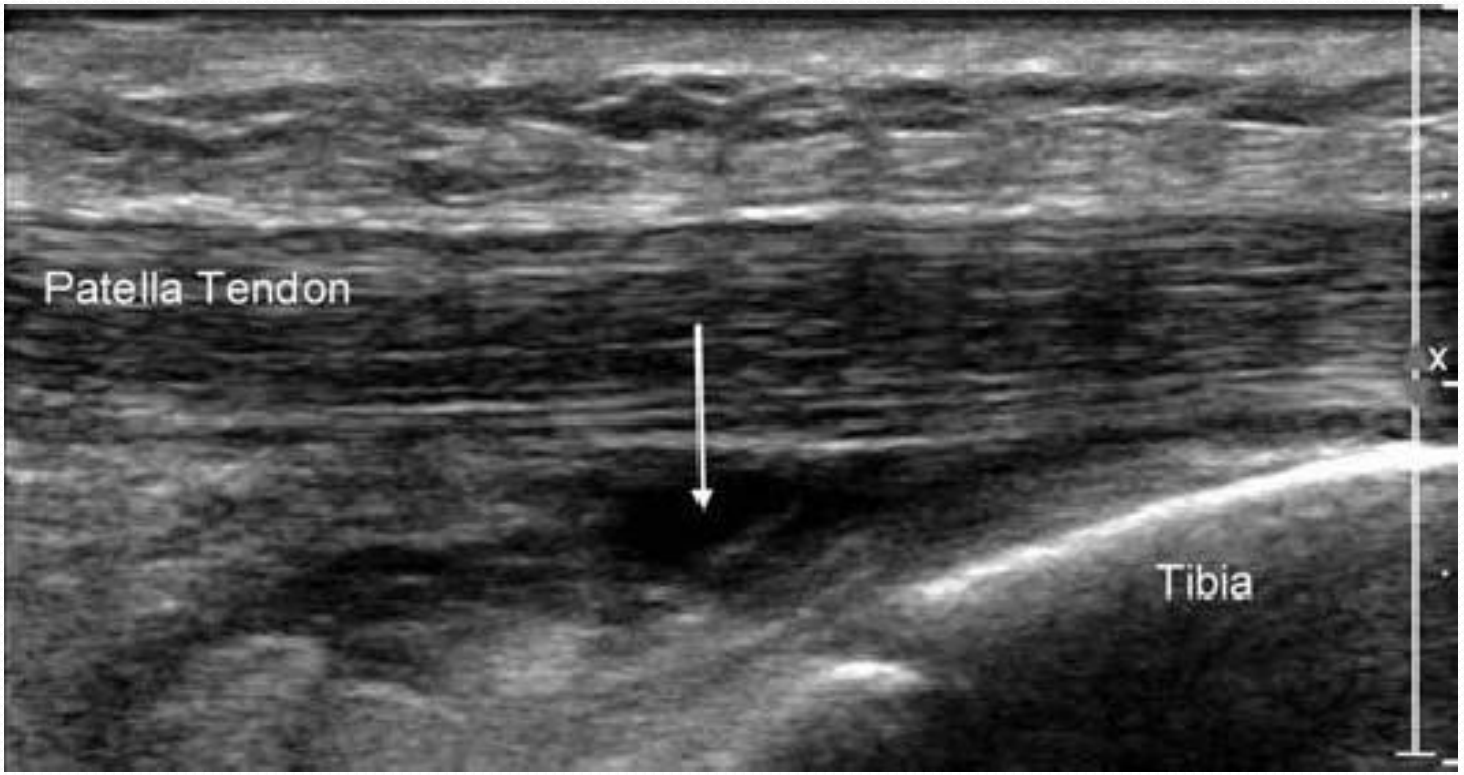
- Hematoma?



Patellar tendinopathy

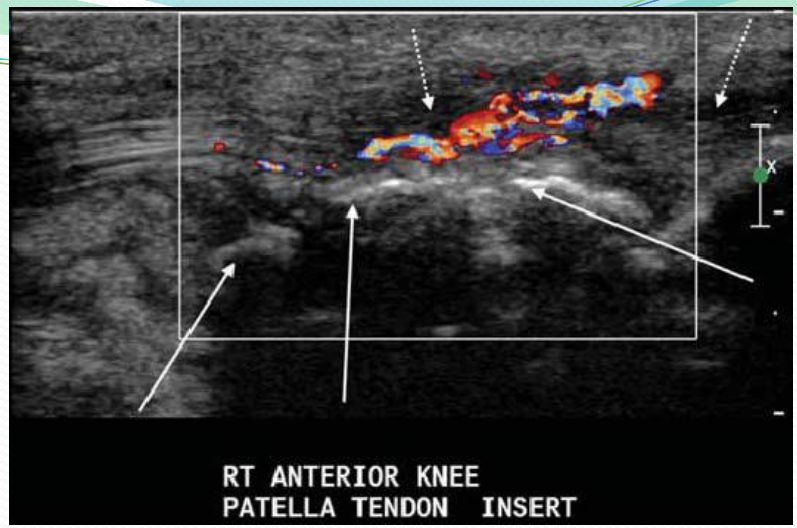
(fluid in the deep infrapatellar bursa)

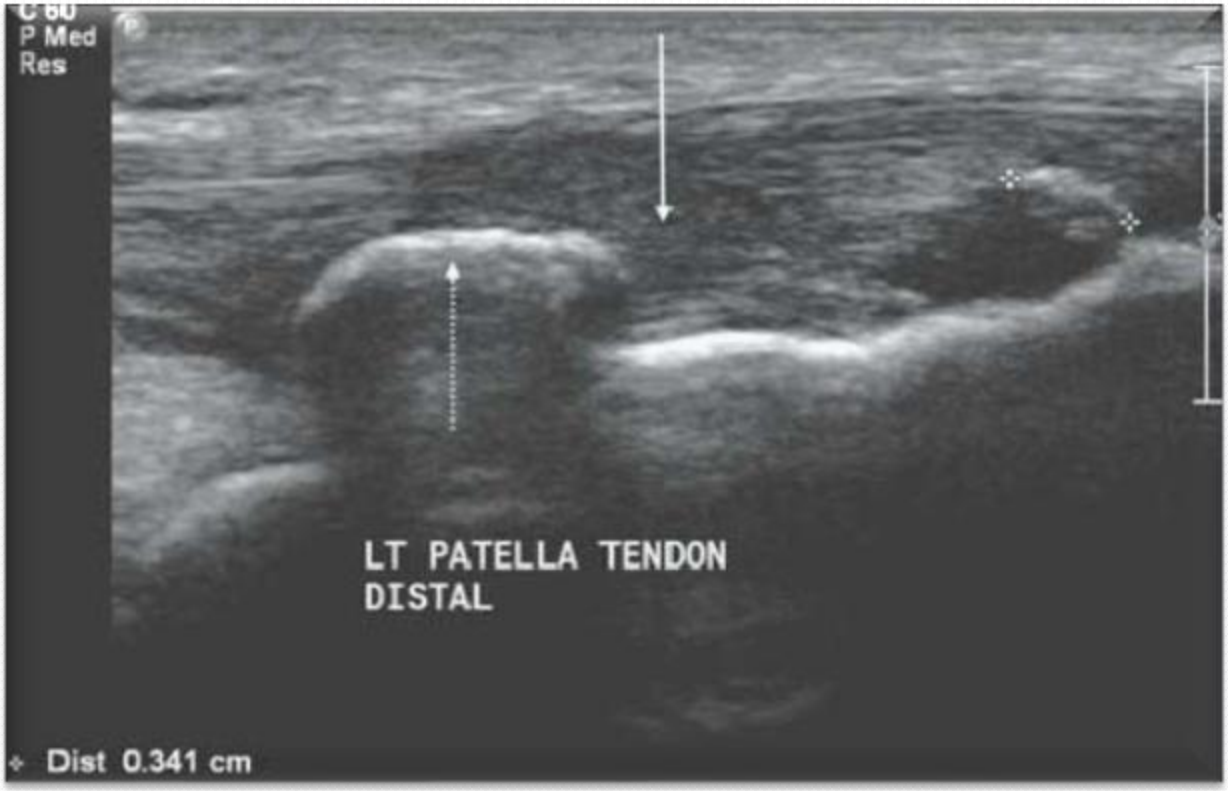
- ?



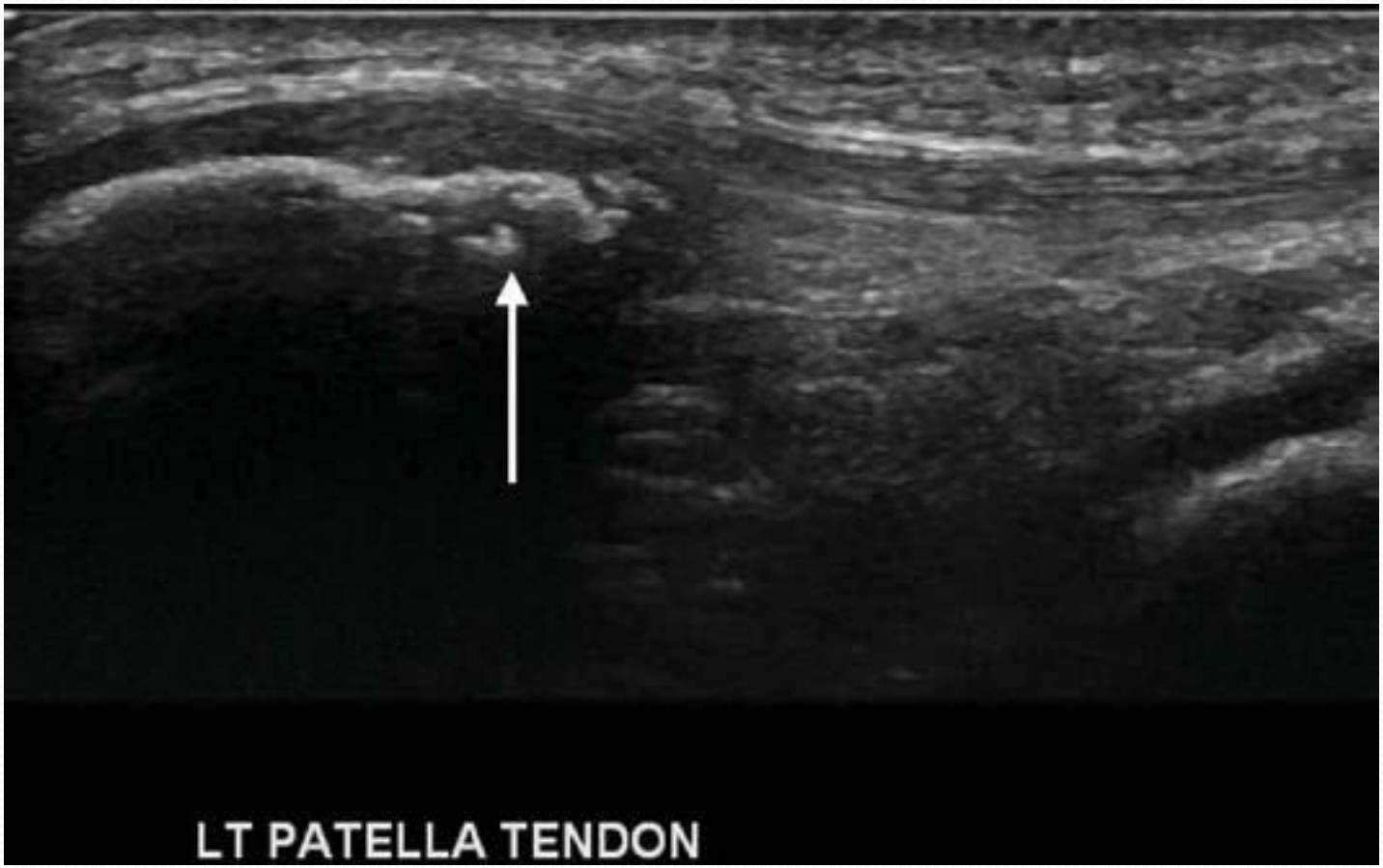
Osgood-Shlatter

- ?

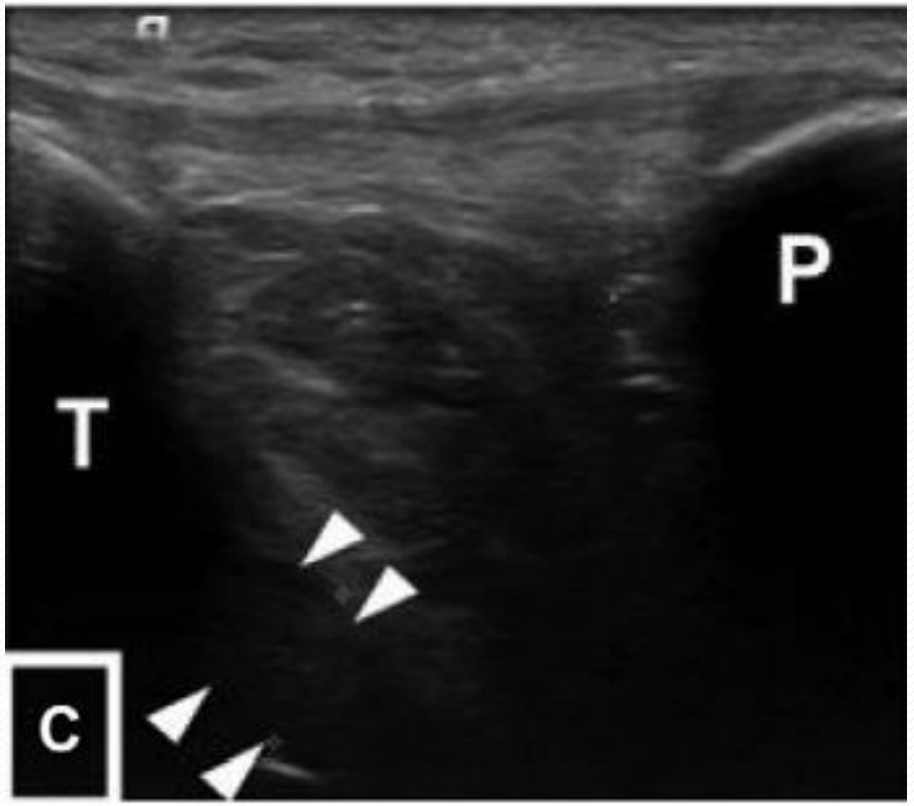




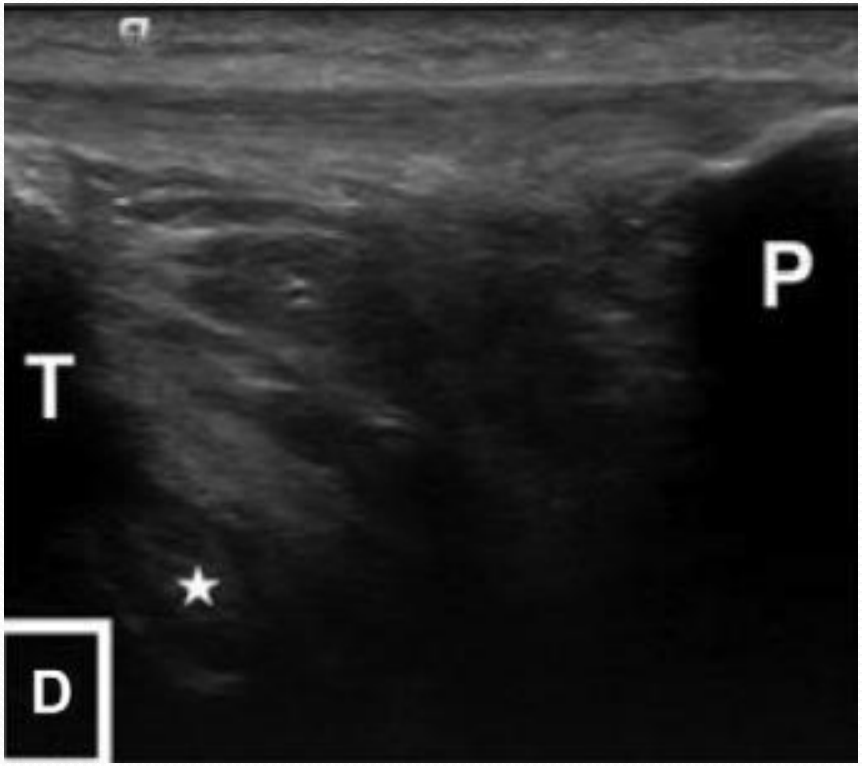
Sinding-Larsen-Johansson disease.



ACL from anterior view
thanks to Dr Izadseresht



Ruptured ACL with hematoma

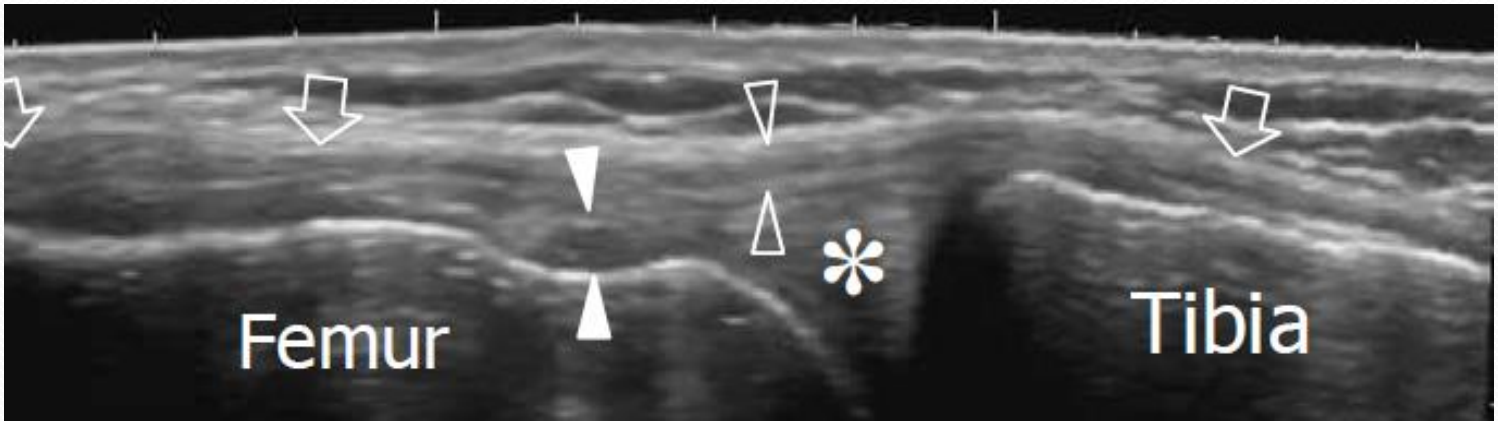


Medial Knee Assessment

- Position: Supine, external rotation

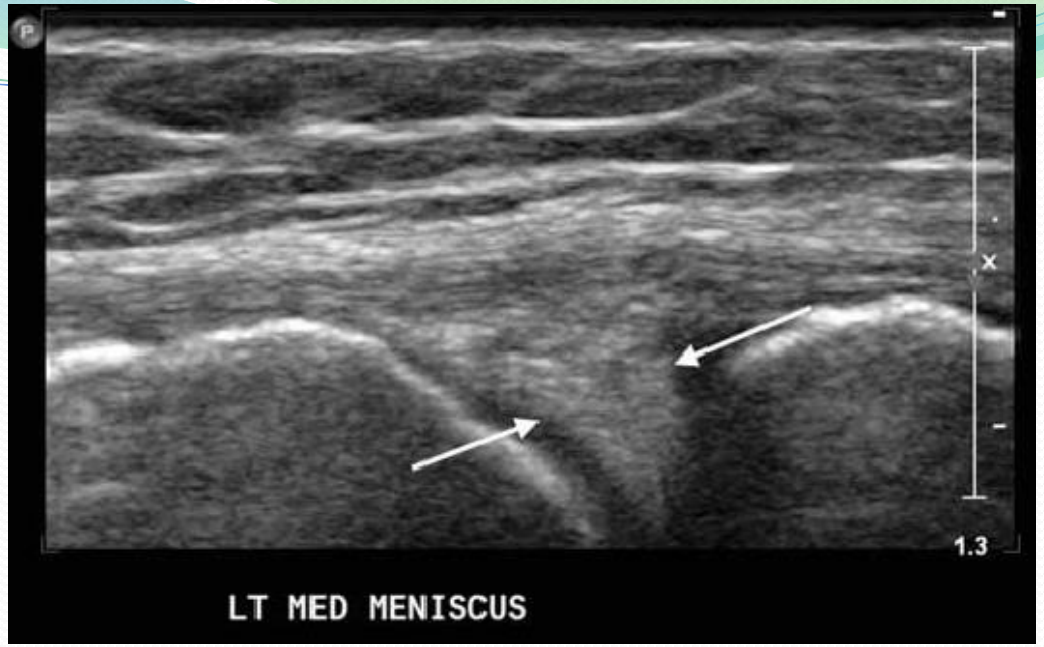
with the knee partly flexed.

- Place the transducer obliquely-oriented over the long-axis of the medial collateral ligament
- Dynamic scanning during valgus stress
- Check the soft-tissues immediately superficial to the base of the medial meniscus.



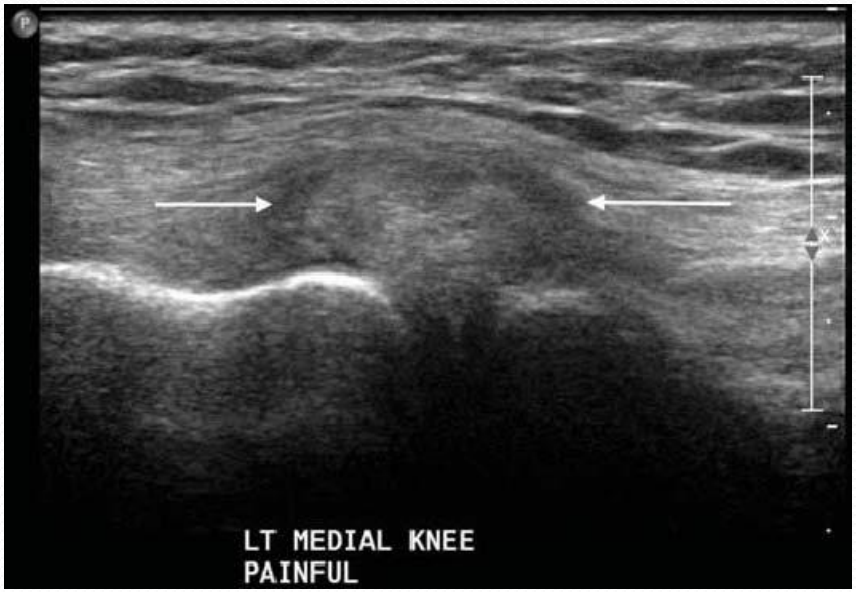
- Medial condyle to 5 cm below the joint
- Two layer
- The most common site of injury is proximal ,close to femoral origin
- Evaluaion in both plane

- Medial Meniscus

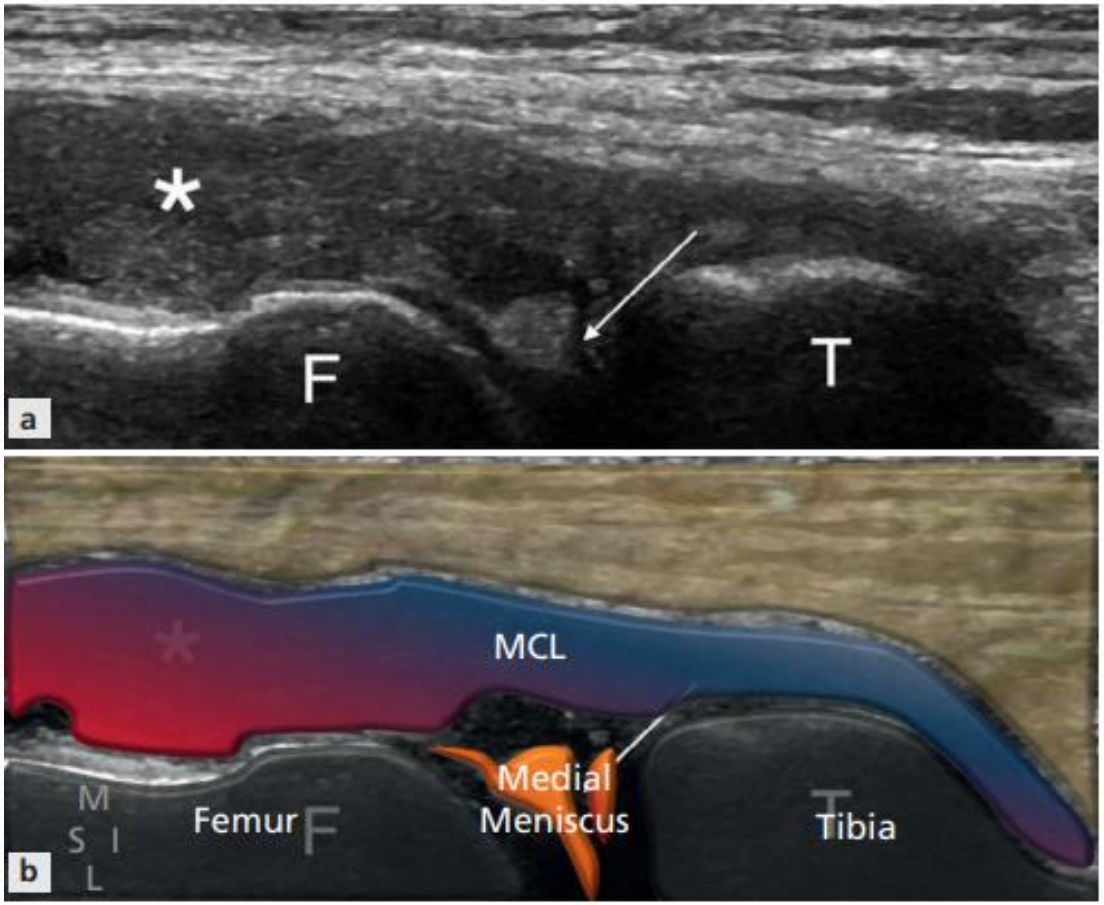


Scanning the peripheral margins of the menisci to look for cysts, degenerative changes, meniscal tears.

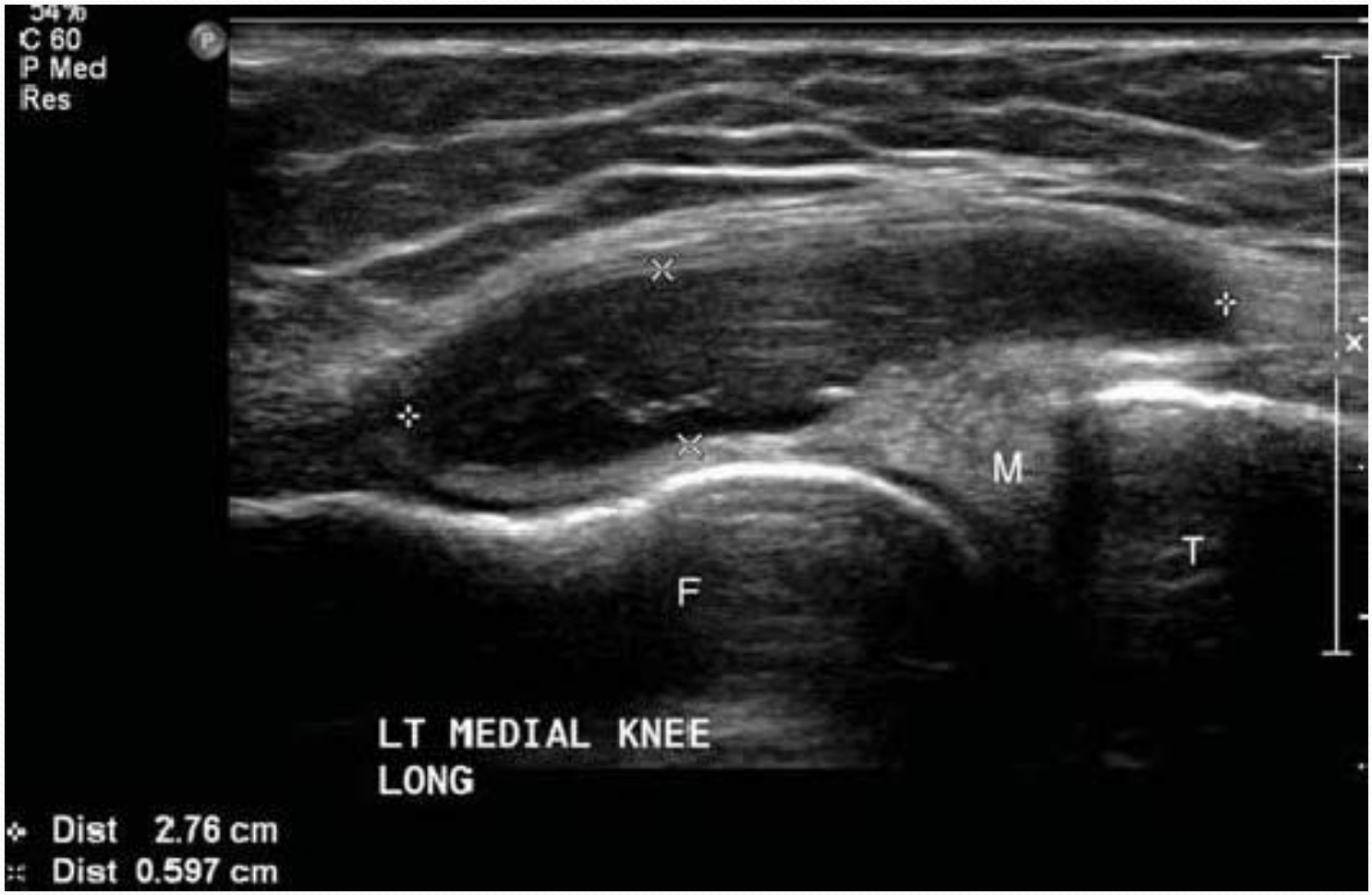
- bulging medial meniscus

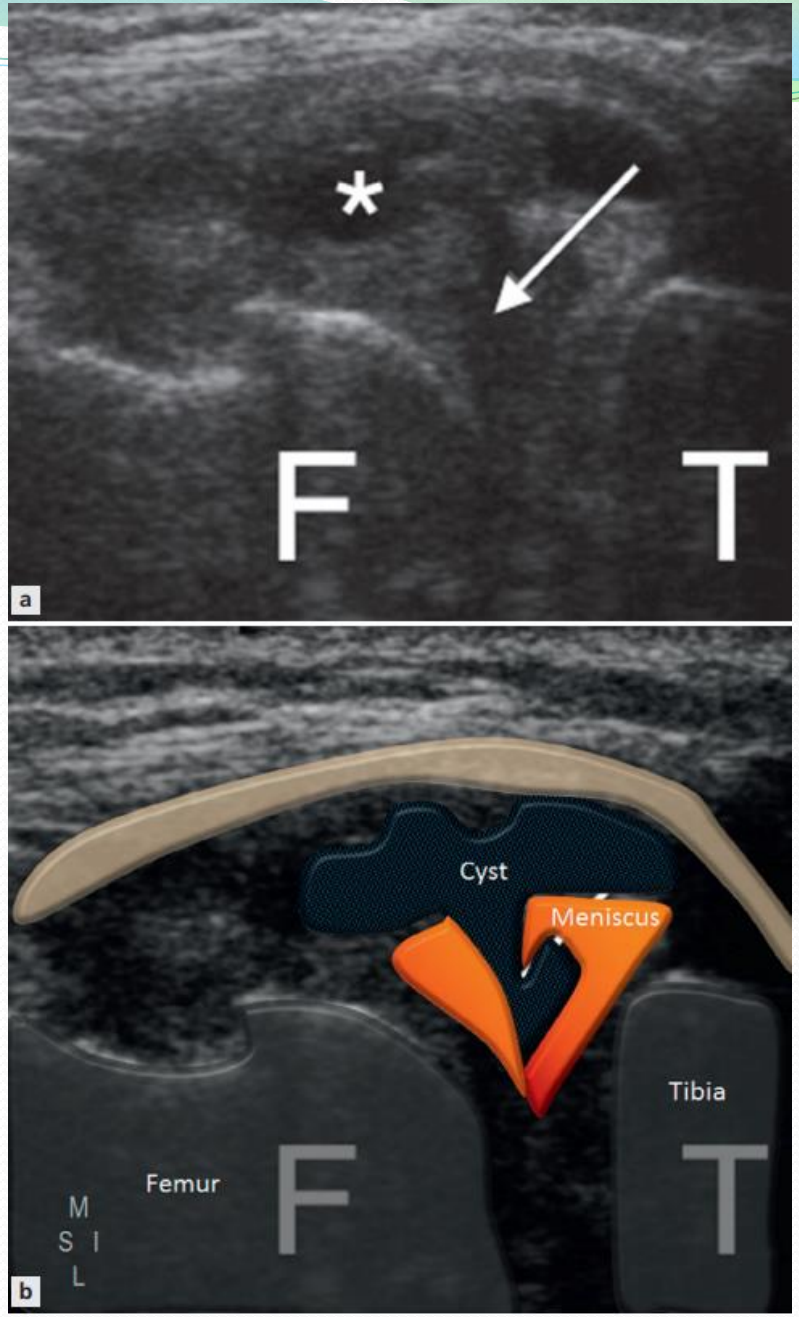


Meniscal Tear



- Medial knee sono ?
  - **meniscal cyst**




*
F
T
a
Cyst
Meniscus
Tibia
Femur
F
T
M
S
I
L
b

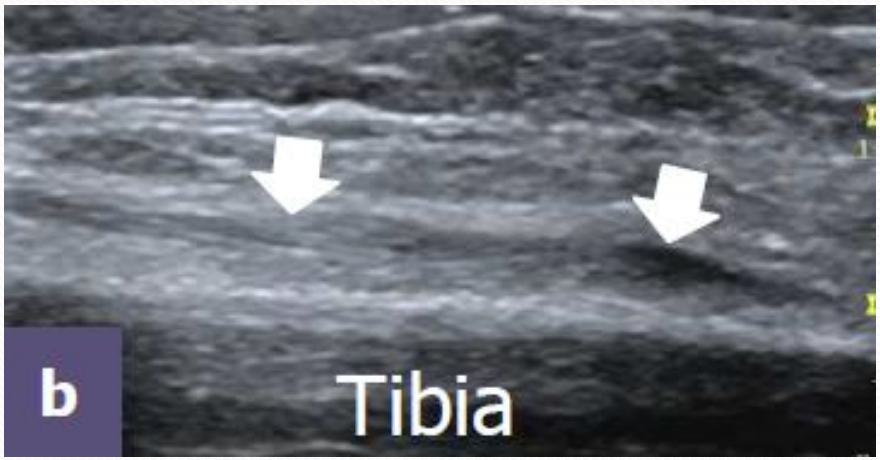

SA9900
07-04-2005-0001
SSEKAJA TOM
MULAGO HOSP
General
11.3
-11.3

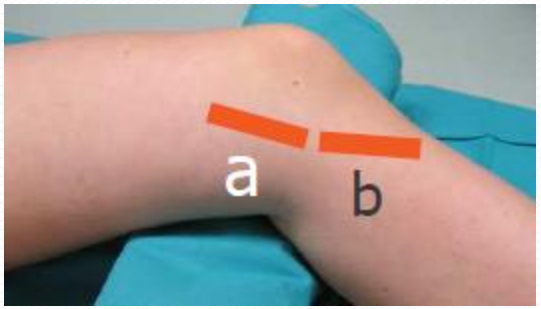

SA9900
27-04-2005-0009
NASIKOMBI MADINA
MULAGO HOSP
General

Key Point

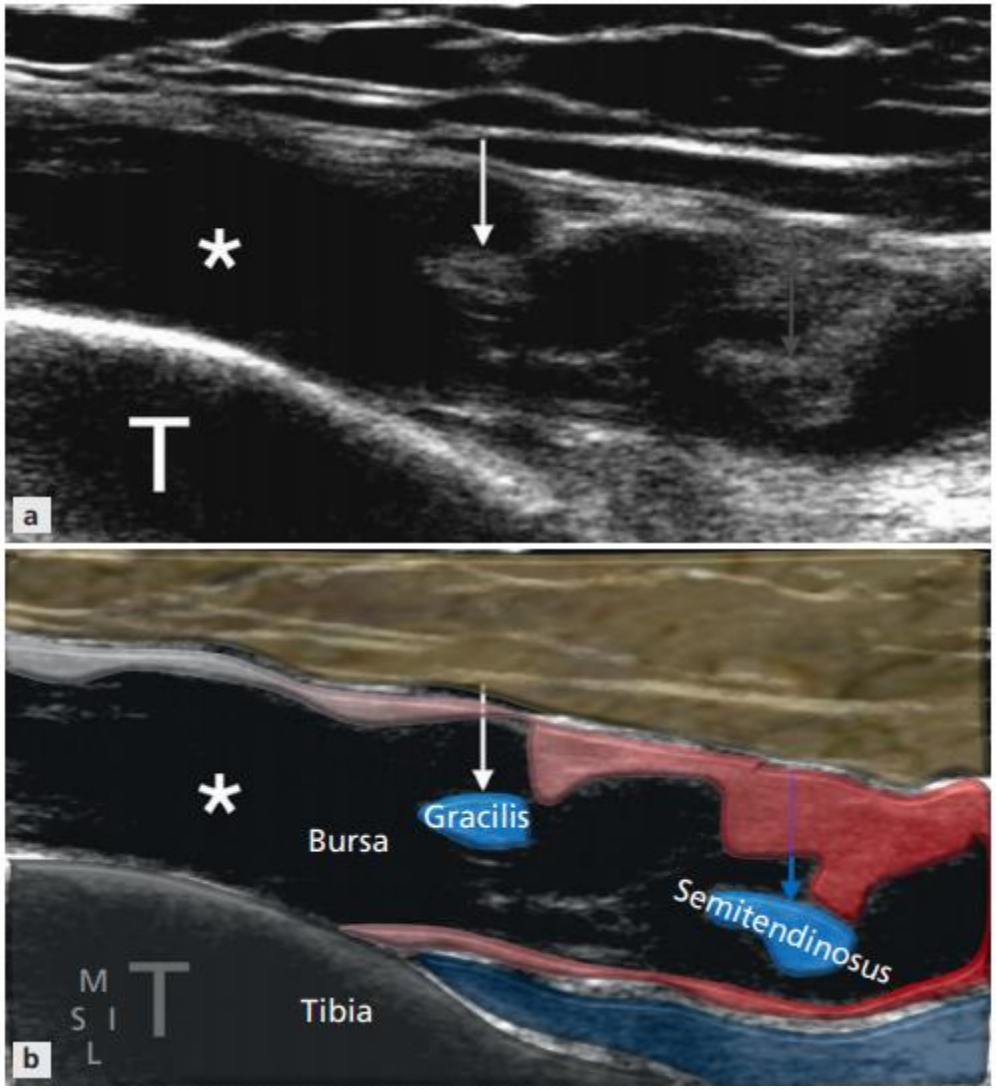
Although ultrasound carries a good positive predictive value if a tear is seen, the negative predictive value is poor and absence of a tear on ultrasound cannot be used as a reliable indicator of an intact meniscus.

- At distal end of MCL, rotate the transducer forward to image the tendons of the pes anserinus complex (b) (sartorius, gracilis and semitendinosus)





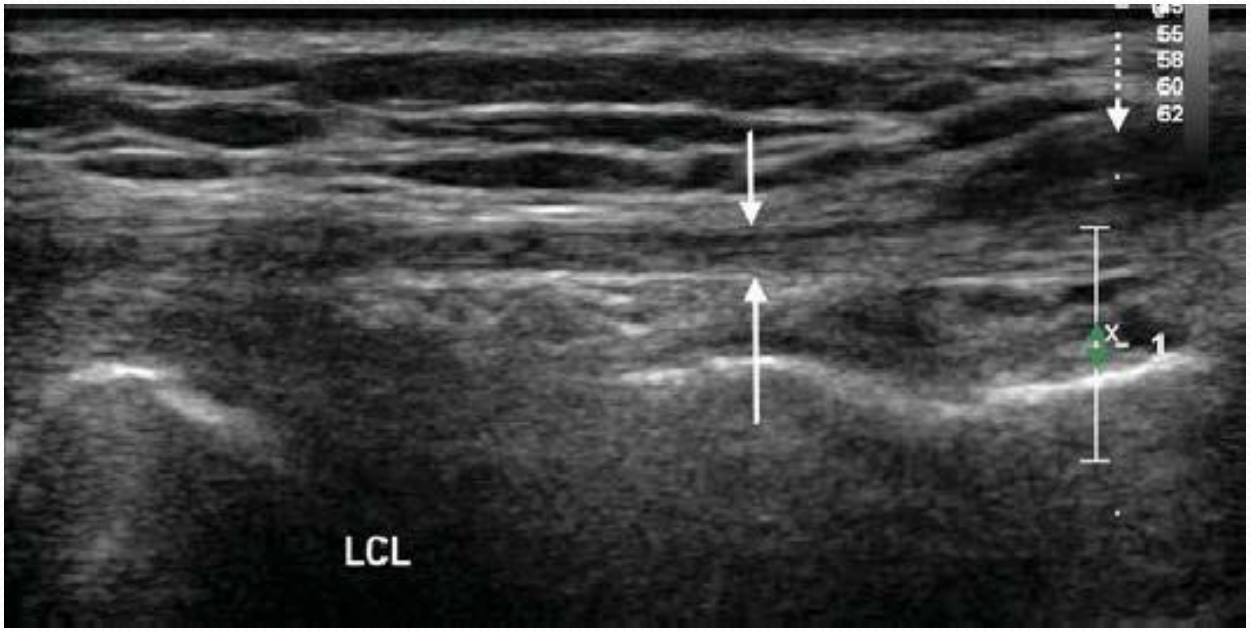
Pas anserine bursa



Lateral Knee Assessment

- Position: Supine, internal rotation with the knee mildly flexed

- LCL or FCL
- Check the ITB on its long-axis down to reach the Gerdy's tubercle.



ITB

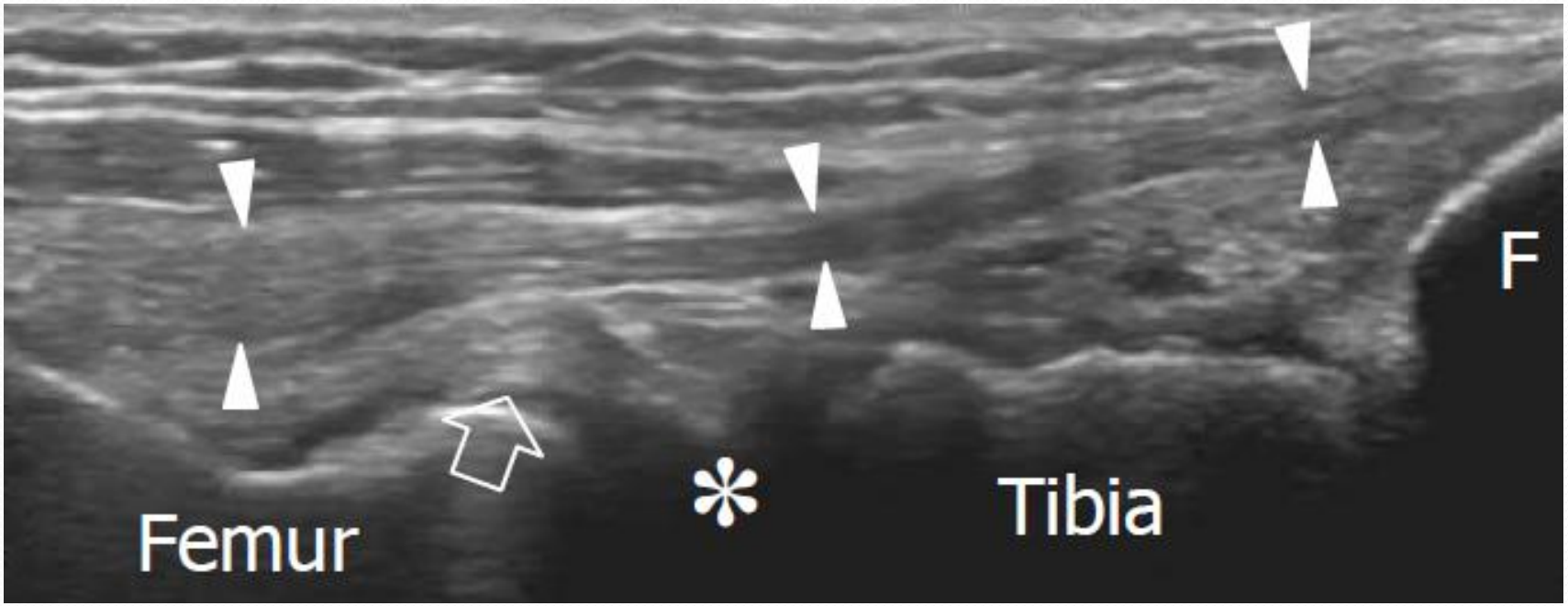
- From gerdys` tubercle
- thicker than surronding capsule and retinaculum

- ITB.....close to the lateral femoral condyle ....location of the greatest impingement

LCL or FCL

- Thicker and rounder than MCL
- It passes over the popliteus fossa and the lateral meniscus
- Larger space between the lateral meniscus and FCL
- In attachment site of FCL to fibula the tendon of biseps femoris comes into view

- Check the soft-tissues immediately superficial to the base of the lateral meniscus: when a meniscal cyst is suspected, examine the knee in forceful flexion to produce bulging of the cyst.
- Which structure the arrow show?

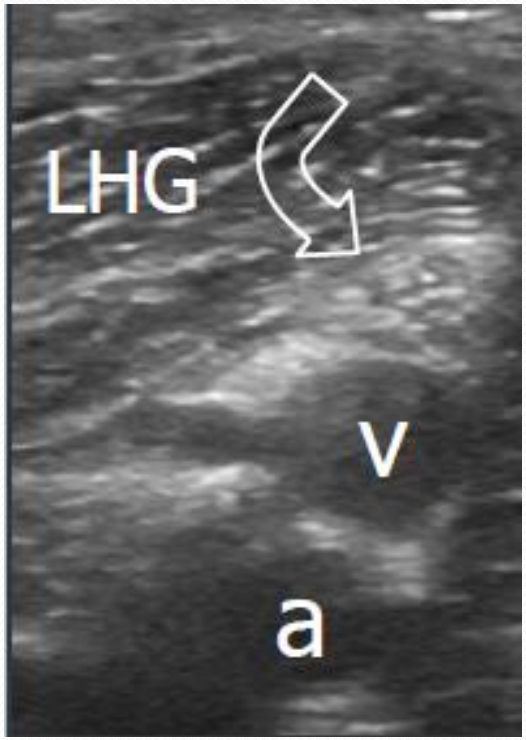


Posterior Knee

- Position: prone with the knee extended
- Central , medial , lateral
- CENTRAL

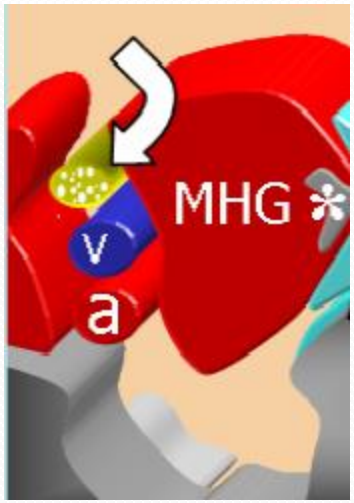
1-Superficial: popliteal artery and vein and nerves

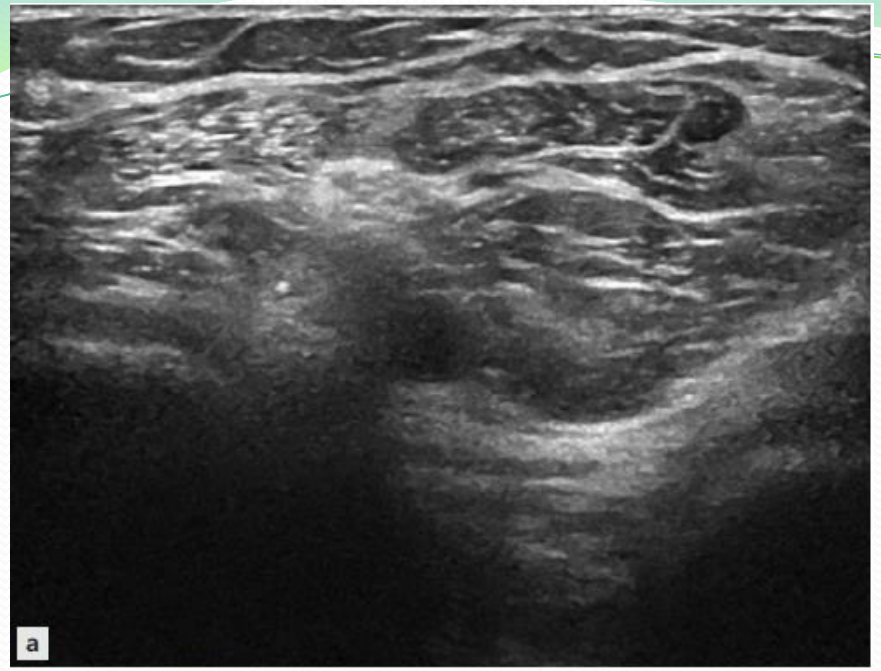
2-Deep: PCL insertion on the tibia, tendons

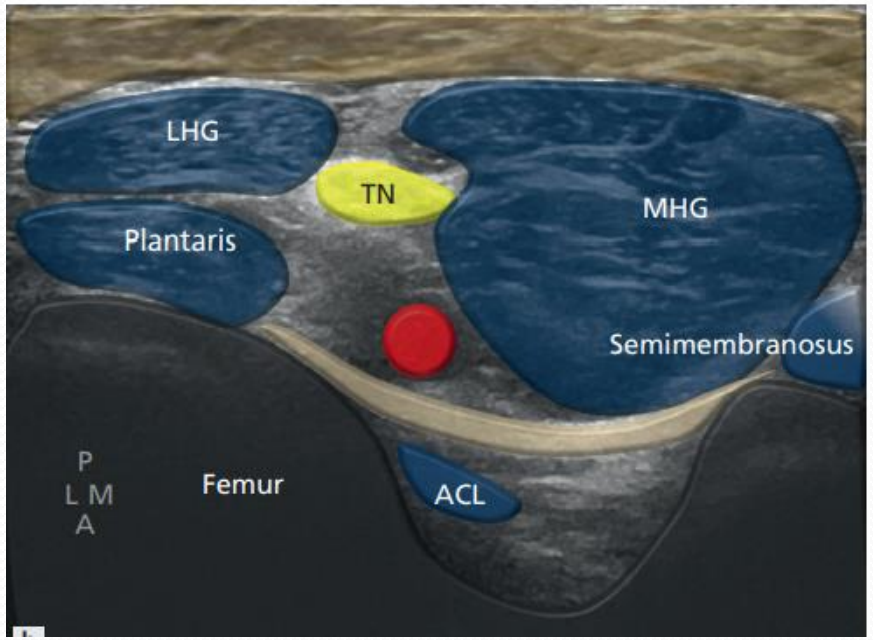


- Doppler Sono is so helpful

DDx: Baker Cyst from A or V

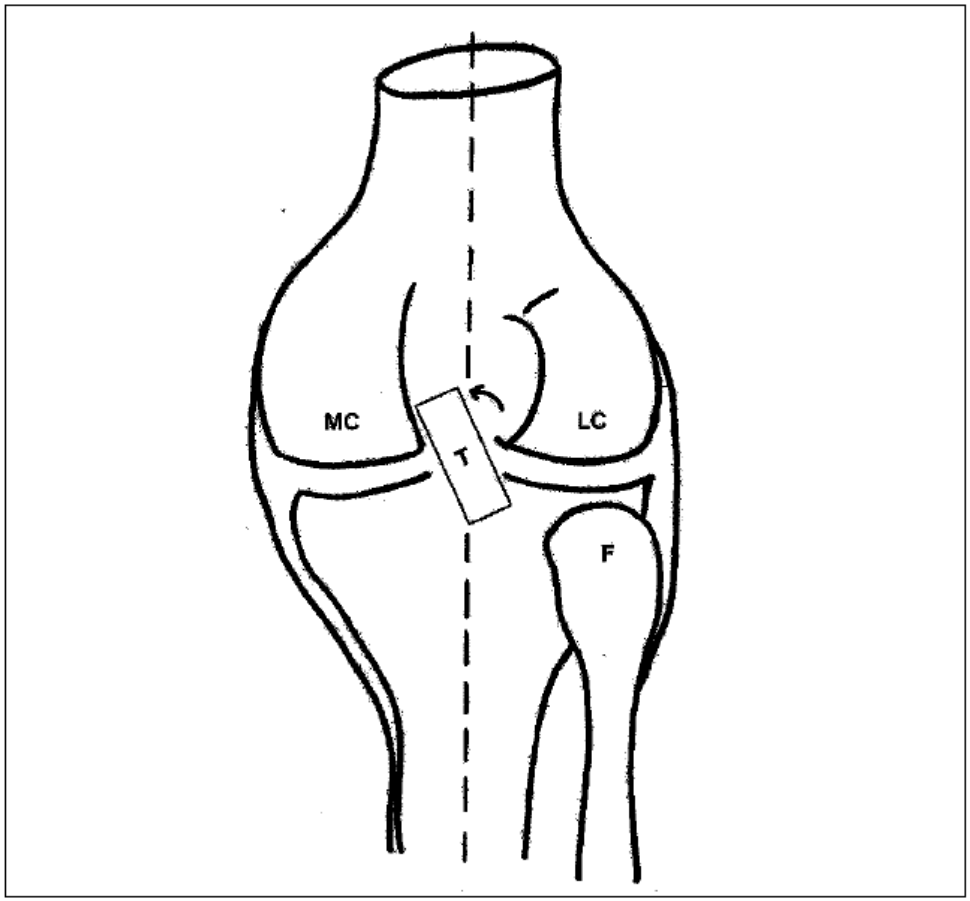



a

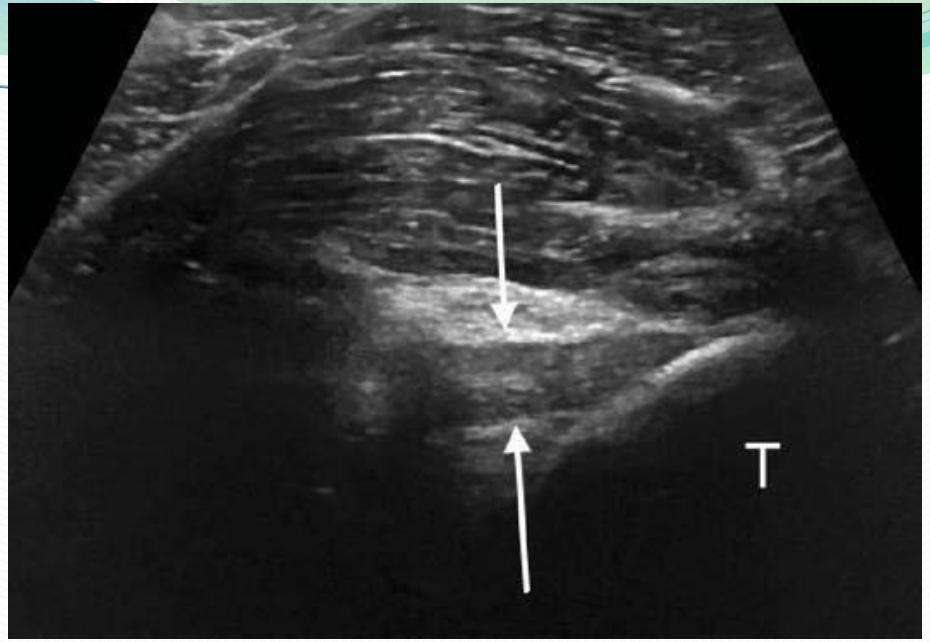

LHG
TN
MHG
Plantaris
Semimembranosus
P
L M
A
Femur
ACL


c

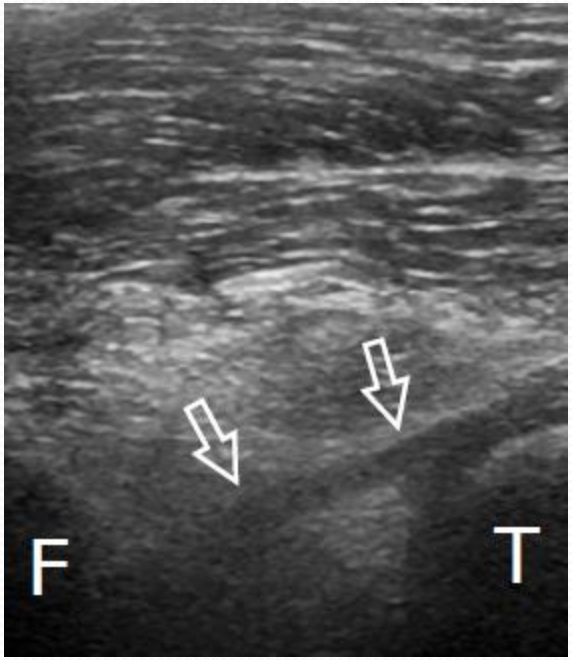
PCL probe place which probe?

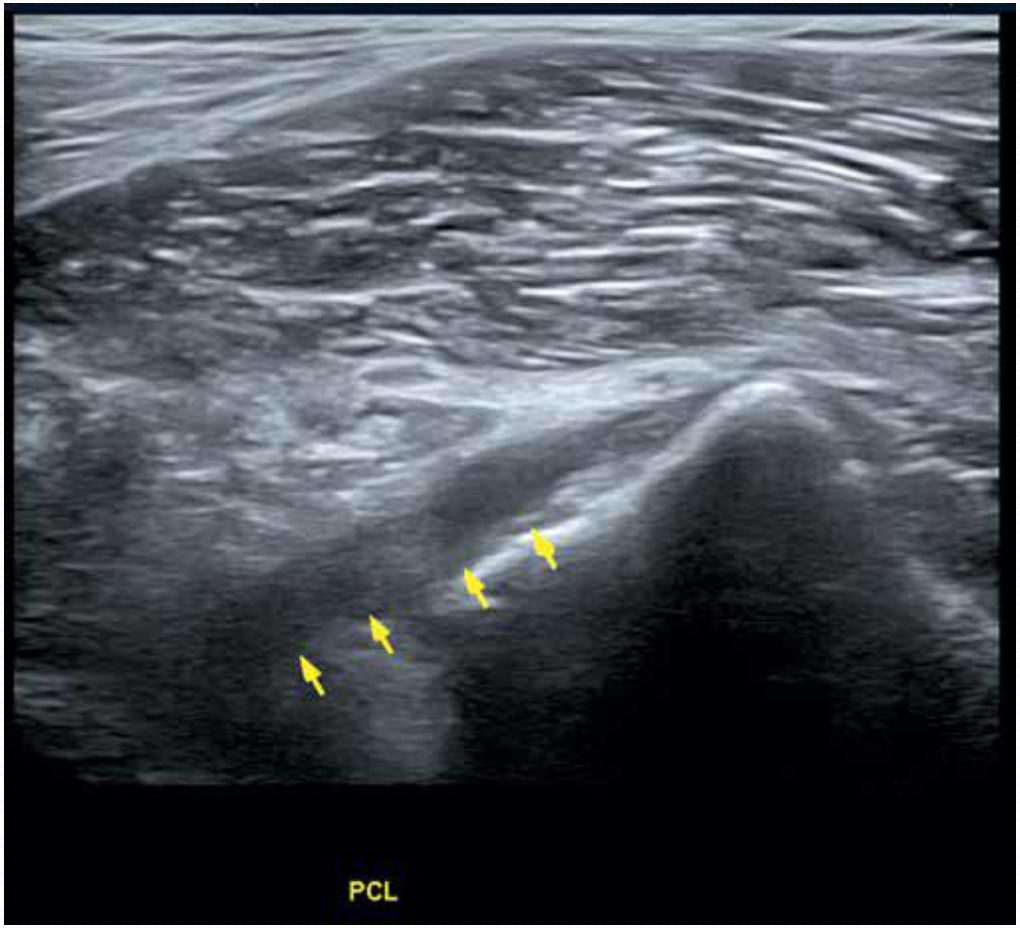


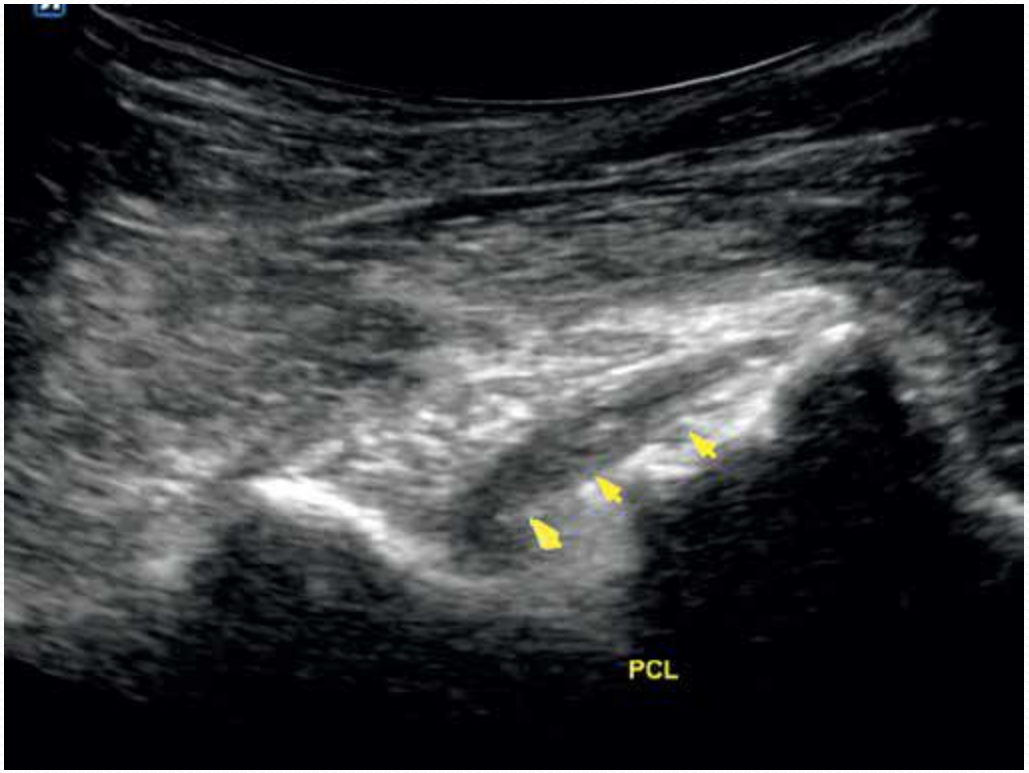
- PCL insertion on the tibia



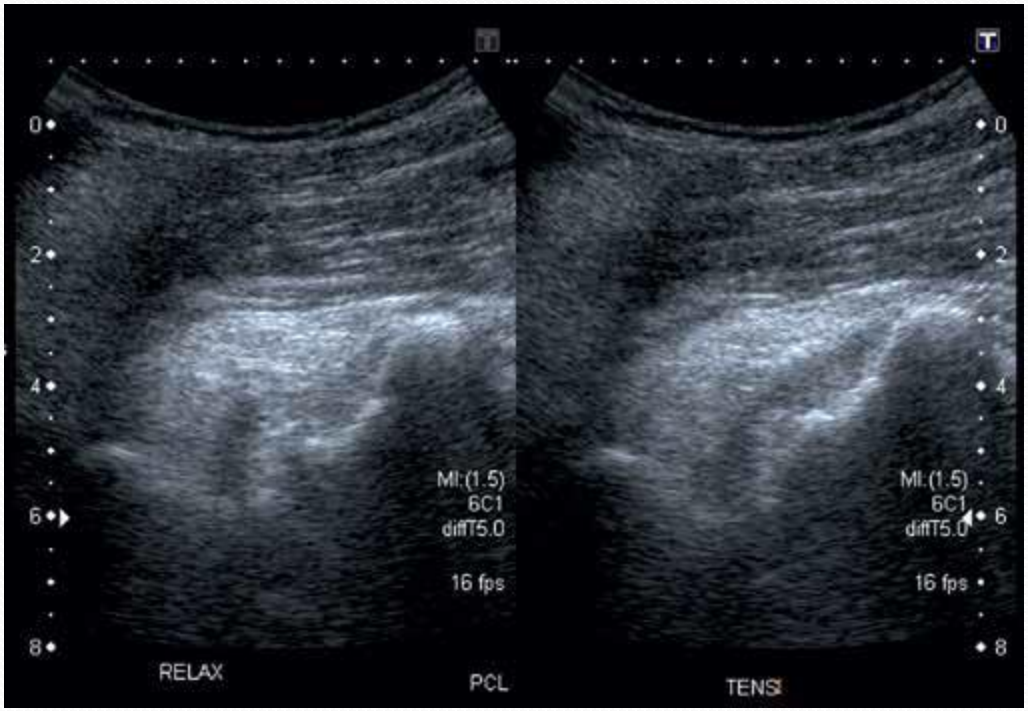
- PCL




PCL

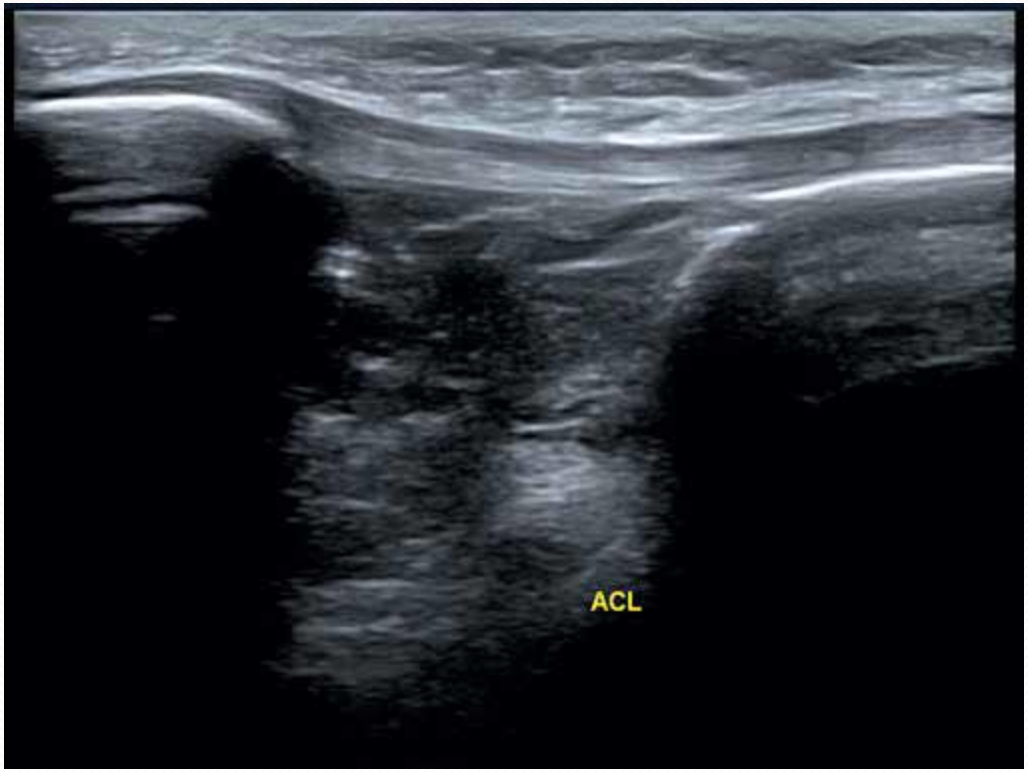

PCL

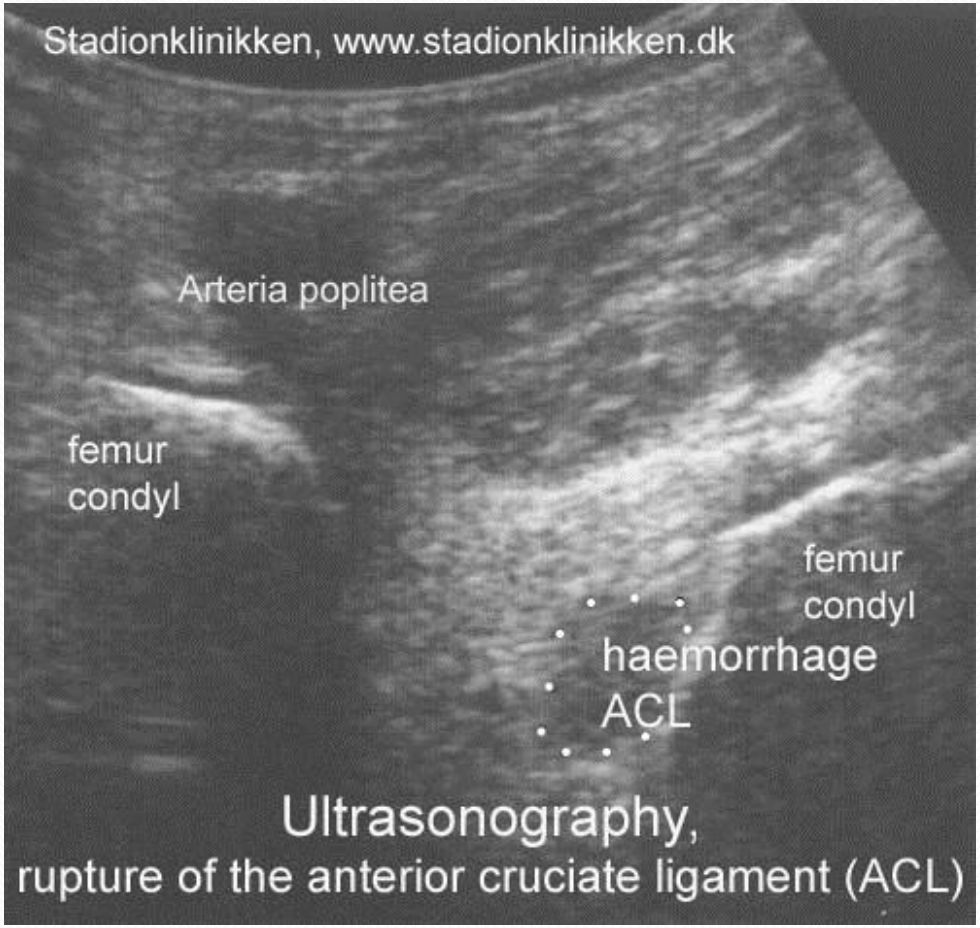
PCL dynamic exam



ACL

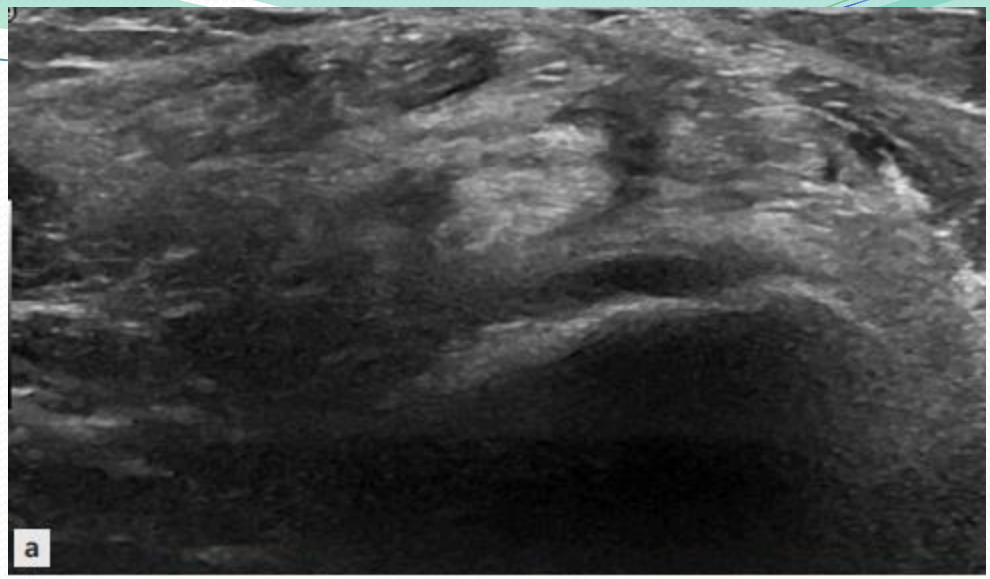
- Near to lateral condyle margin

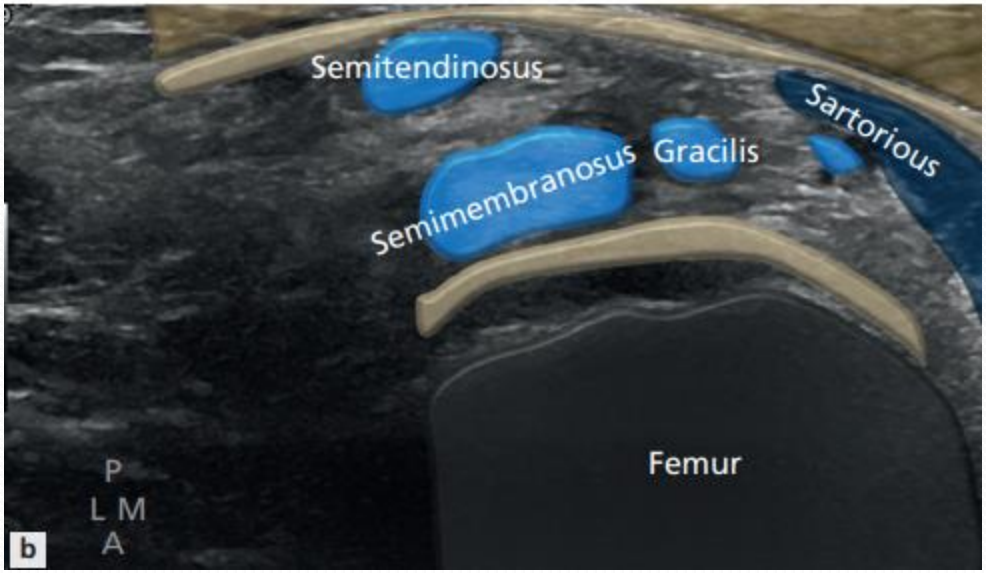



Stadionklinikken, www.stadionklinikken.dk
Arteria poplitea
femur
condyl
femur
condyl
haemorrhage
ACL
Ultrasonography,
rupture of the anterior cruciate ligament (ACL)

Medial

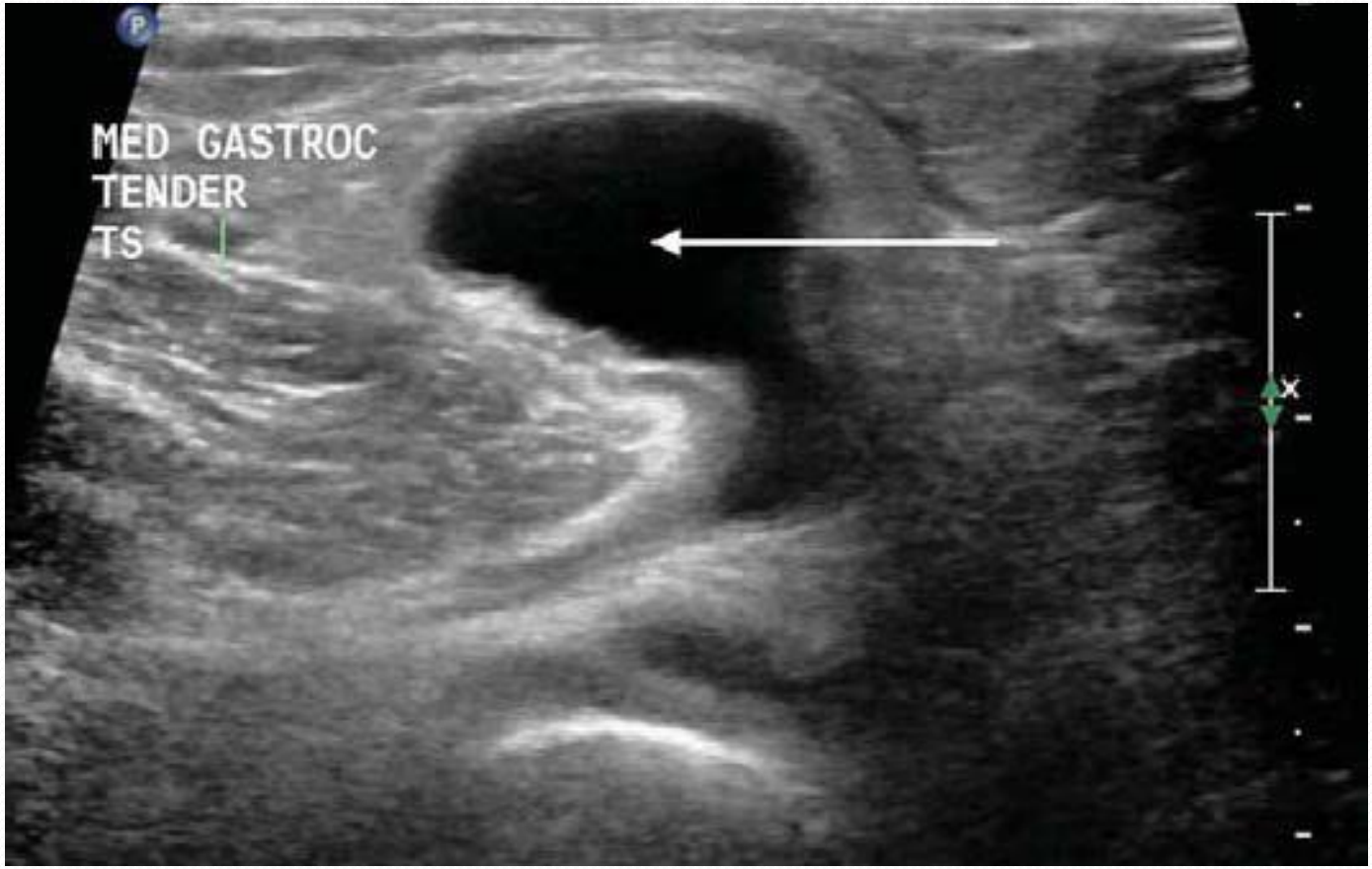

c


a


Semitendinosus
Sartorious
Semimembranosus
Gracilis
Femur
P
L M
A
b

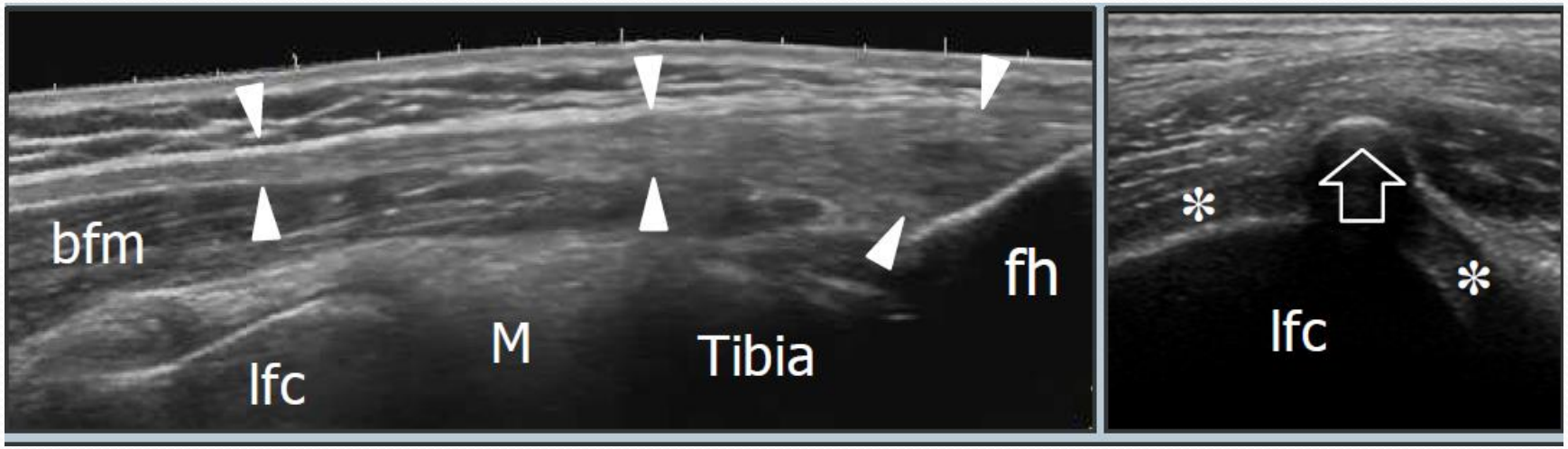
Baker cyst

- ?



- Baker cyst

Lateral



Peroneal nerve