

Ultrasound Guided Regional Anesthesia

Overview of Lower Extremity Nerve Blocks

Milica Markovic, MD

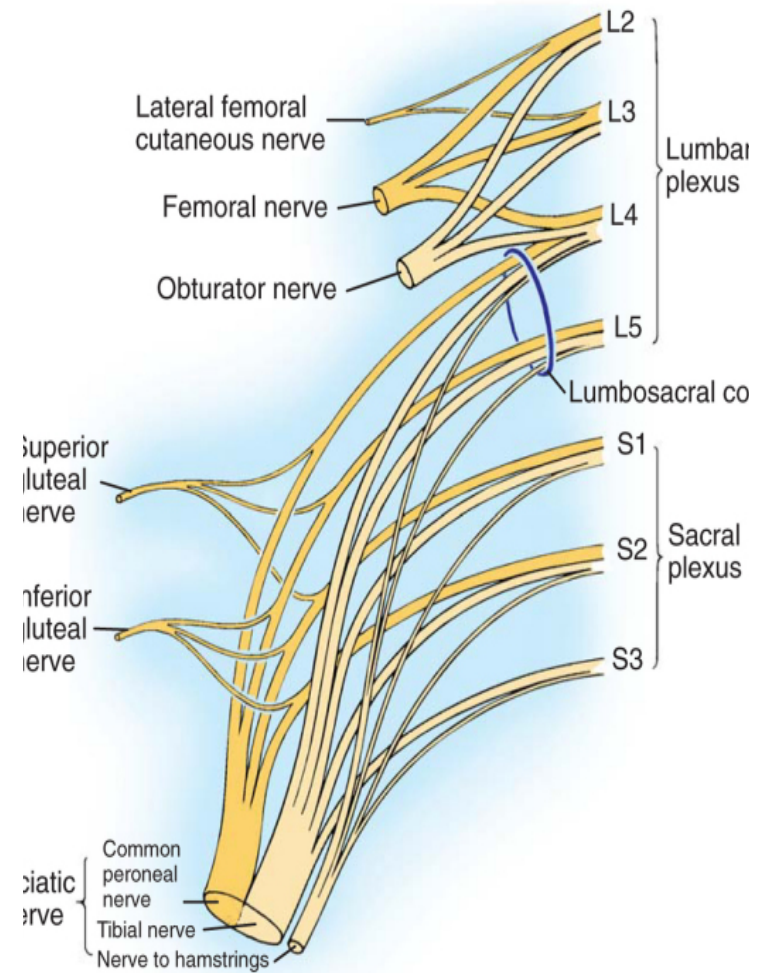
Assistant Professor of Anesthesiology

Weill Cornell Medical Center

New York Presbyterian Hospital

Features of the Lower Extremity

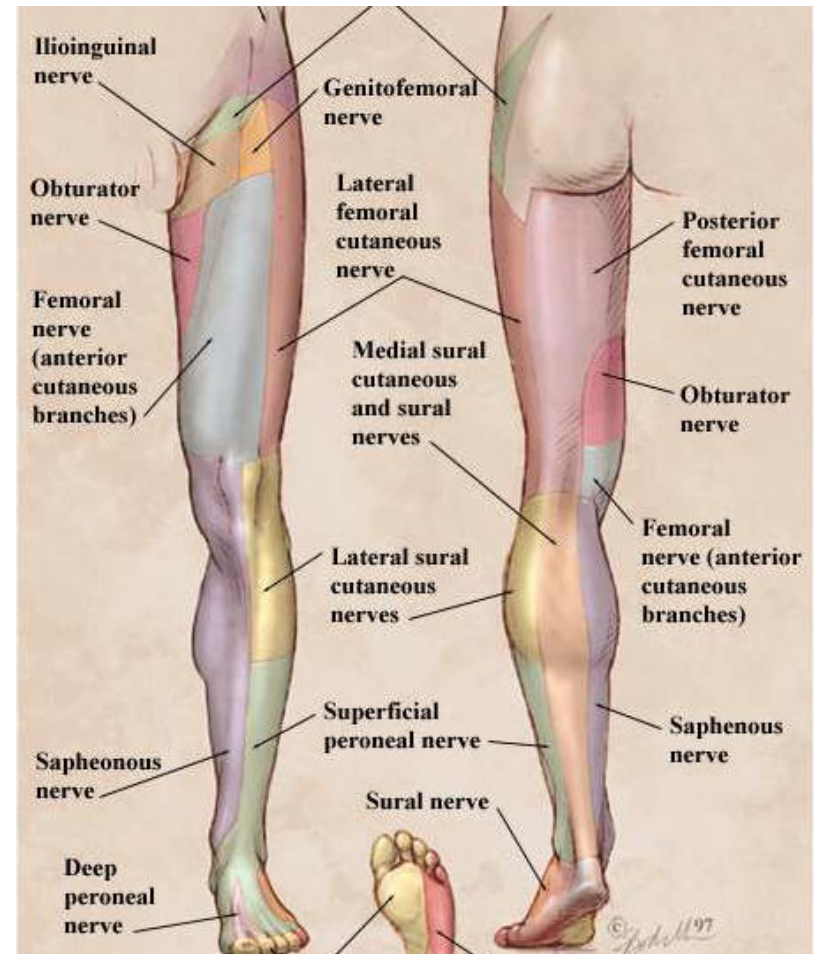
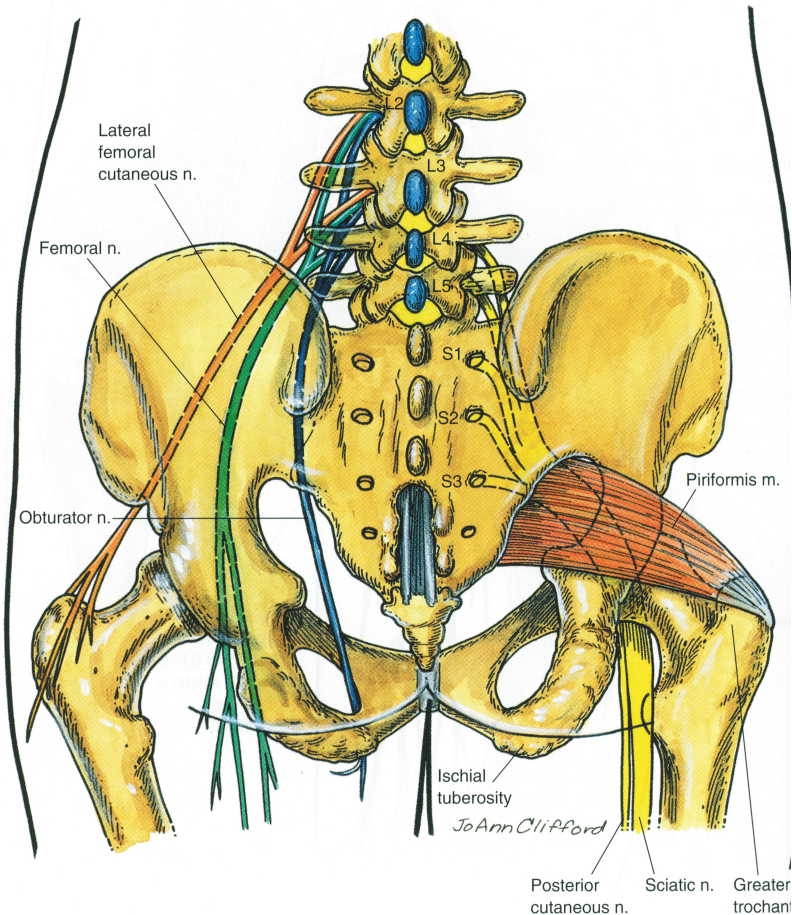
- 2 plexuses instead of one
 - Lumbar plexus (L2-L4)
 - Sacral plexus (L4-S4)
- Alternative = neuraxial
 - Therefore, blocks of the LE are less widely used than UE blocks



Utility of Lower Extremity PNB

- Surgical anesthesia for hip, femur, knee, ankle, foot
- Postop analgesia single shot block, catheter
- Avoid neuraxis if prior surgery, coagulopathy, elderly

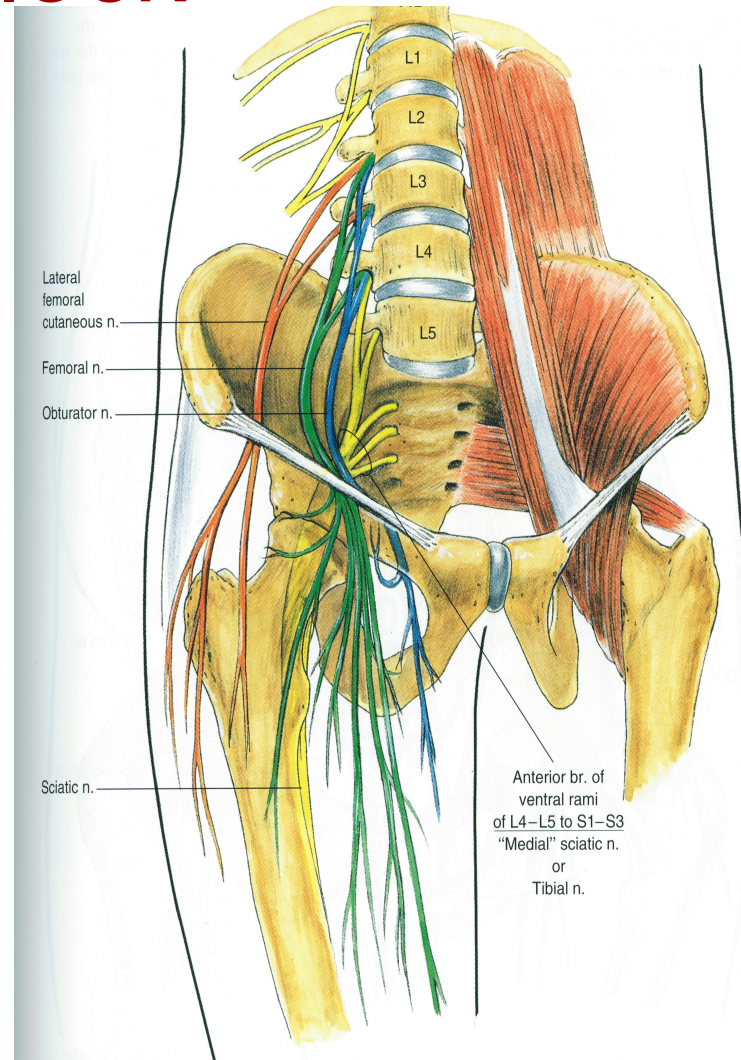
Plexuses of the Lower Extremity



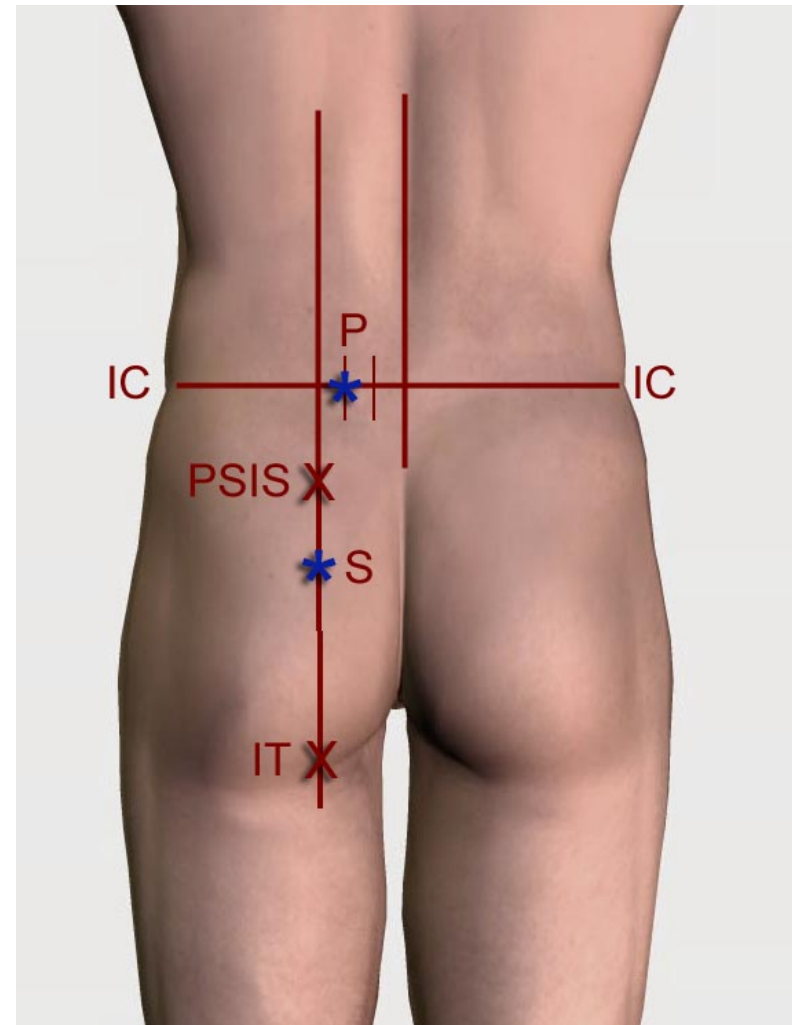
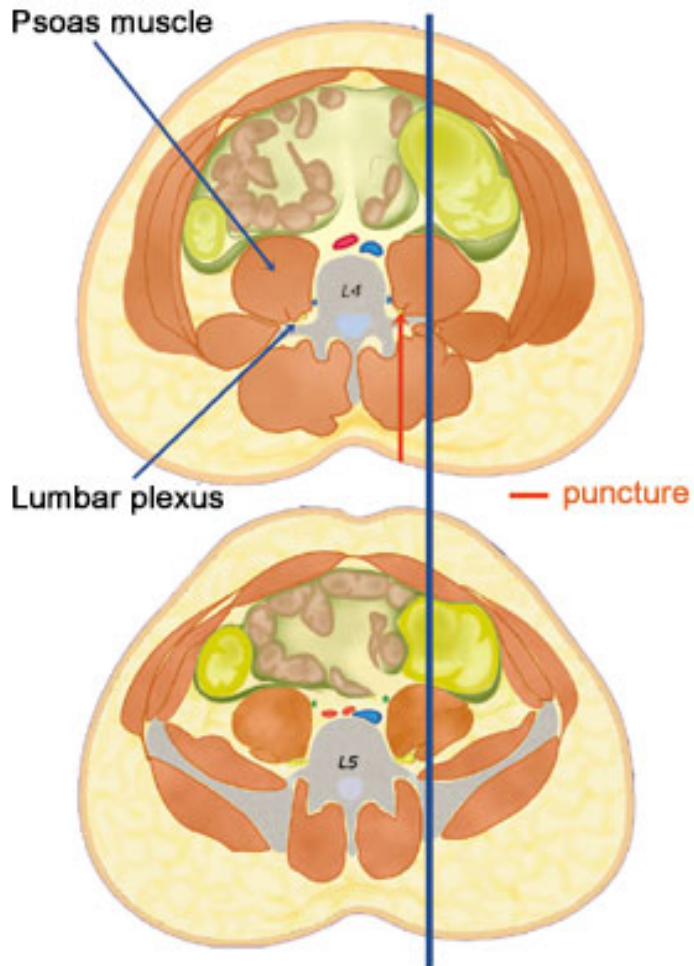
LUMBAR PLEXUS BLOCK

Lumbar Plexus Block

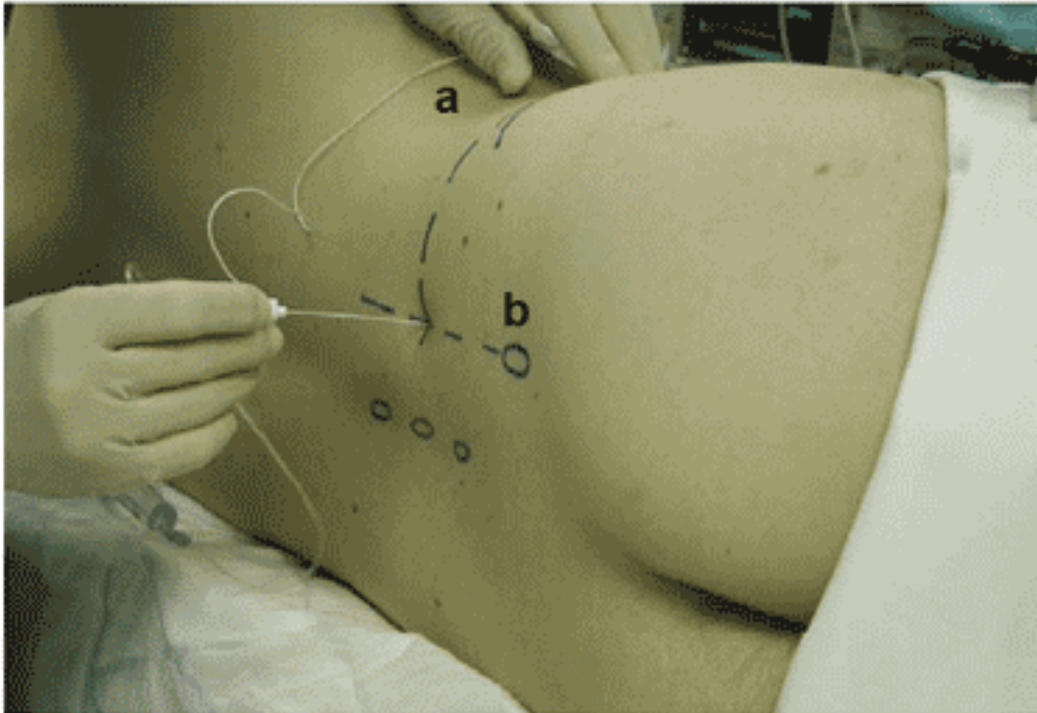
- Reliable block of 3 main branches (Femoral, Obturator, Lateral Femoral Cutaneous)
- Indications: hip, femur knee surgery



Lumbar Plexus Block



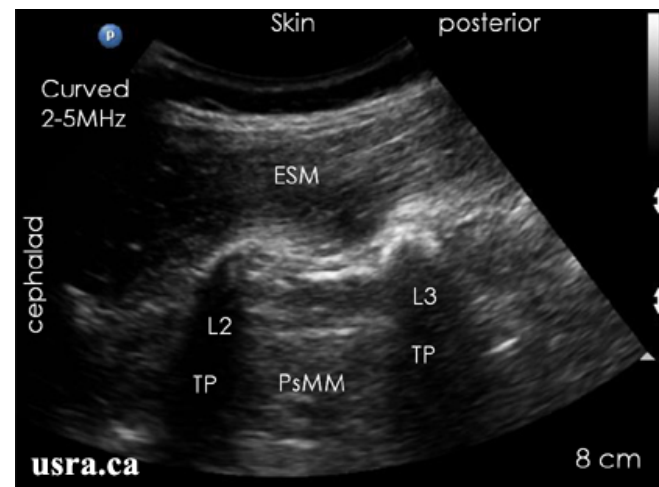
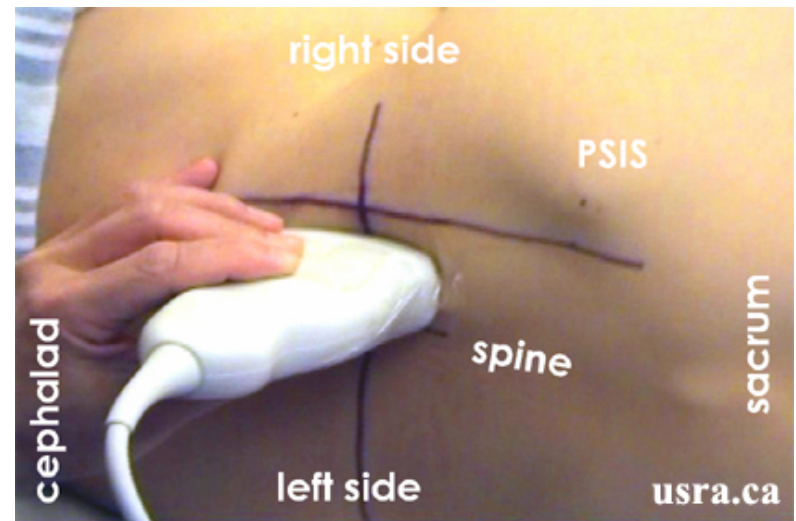
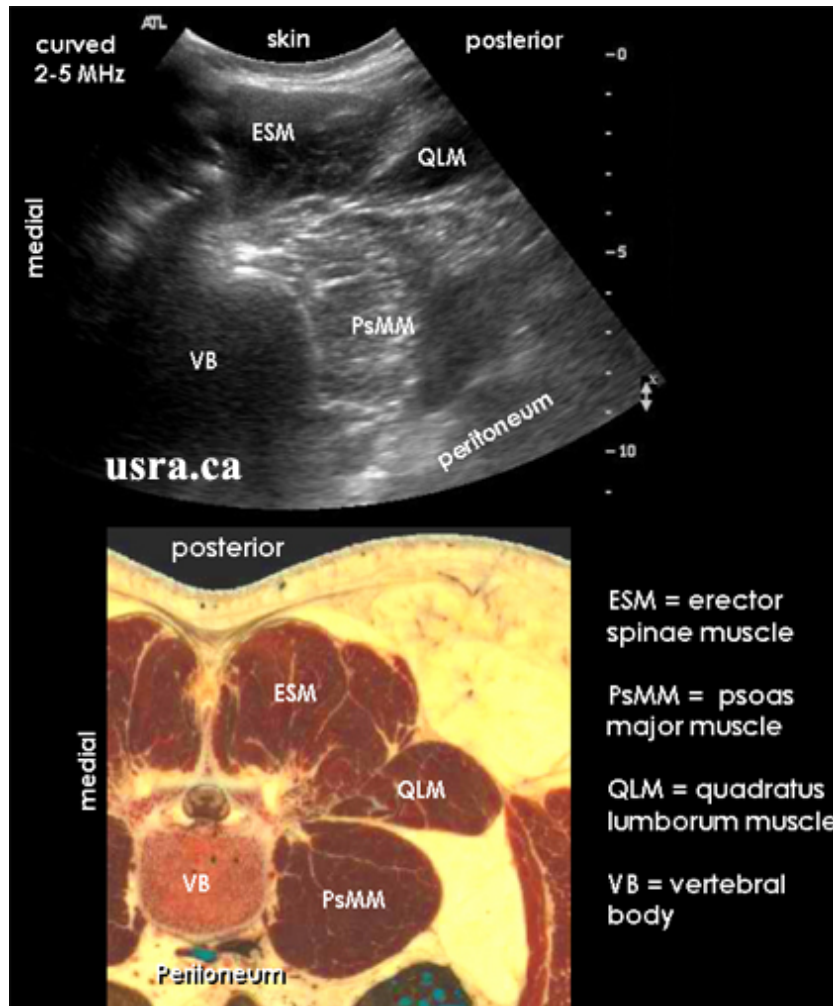
Lumbar Plexus Block NS



3 Lumbar plexus block. a Tuffier's line, b posterior superior iliac spine. The distance from the midline is 4–6 cm.

- Nerve stimulator
- Lateral decubitus
- Landmarks: Spinous processes L3-4, PSIS, Iliac Crest
- Stimulate quadriceps
- Lose twitch at higher stimulation current to avoid epidural spread

Lumbar Plexus Block US



Lumbar Plexus Block

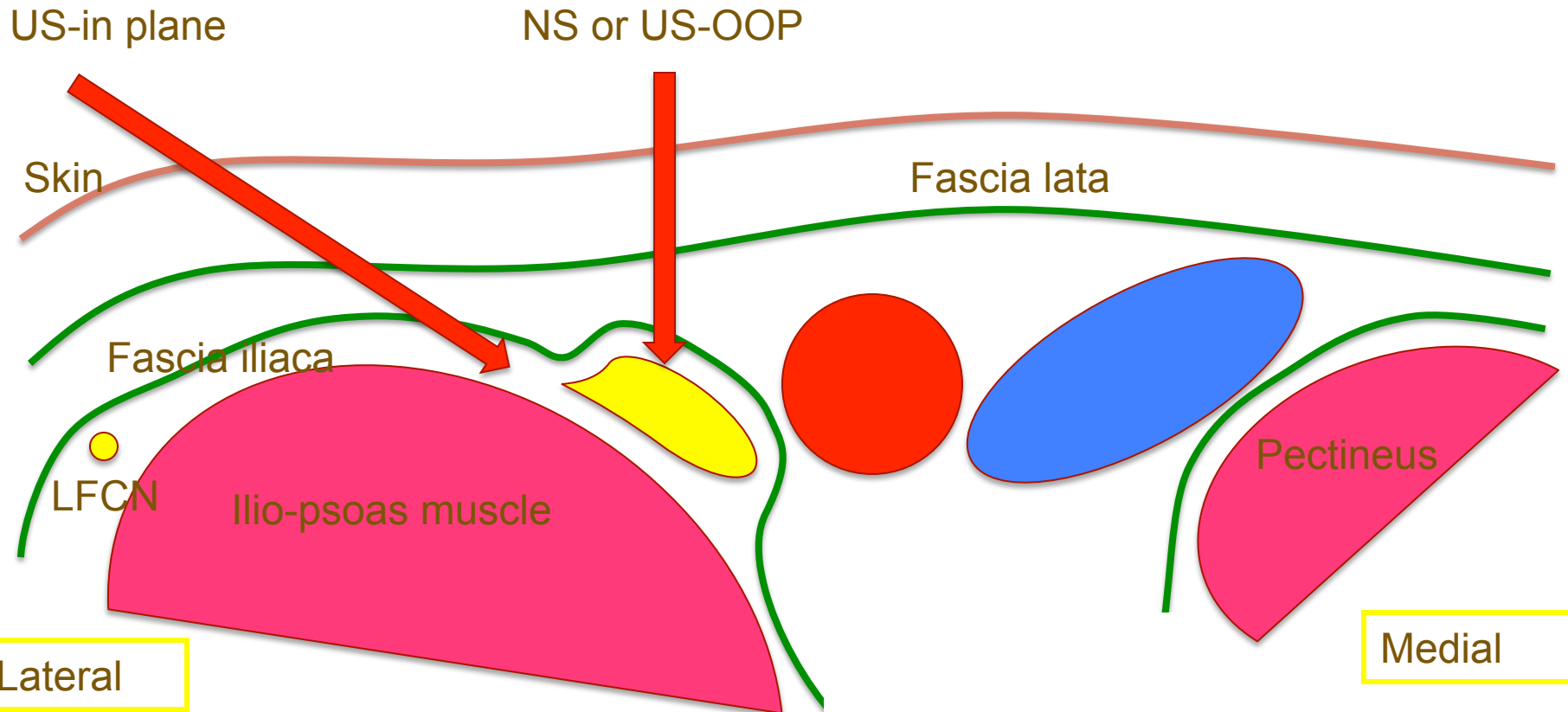
- Complications:
 - Renal injury
 - Hematoma
 - Peritoneal entry
 - Epidural/intrathecal injection
- Contraindications:
 - Coagulopathy
 - Major spine deformity

FEMORAL NERVE BLOCK

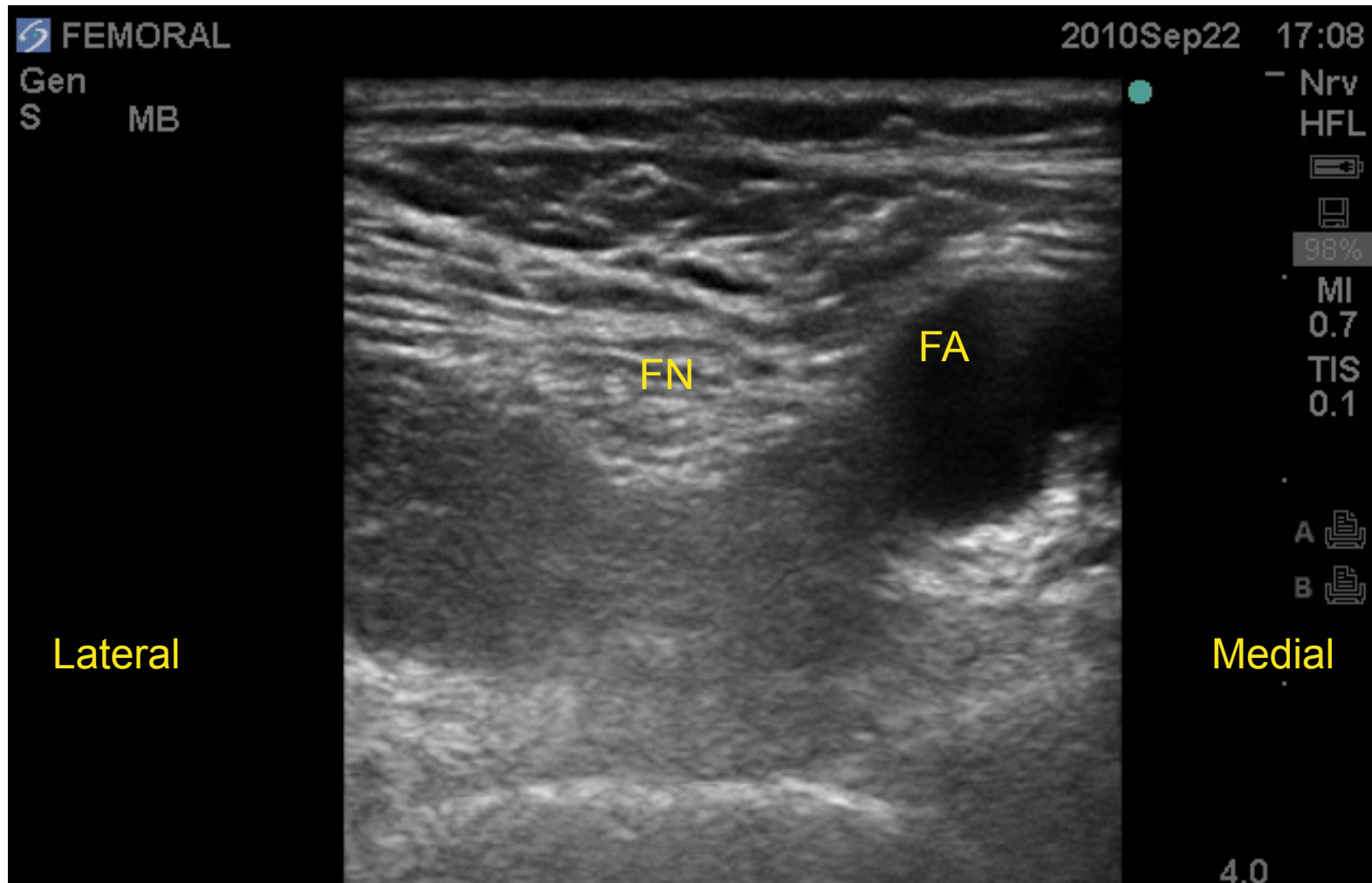
Femoral Nerve Block

- Indications: Surgery of anterolateral or anteromedial thigh, knee, medial leg
- Easy, superficial, low complication
- Technique Easy, superficial, low complication:
 - Nerve Stimulation
 - Ultrasound

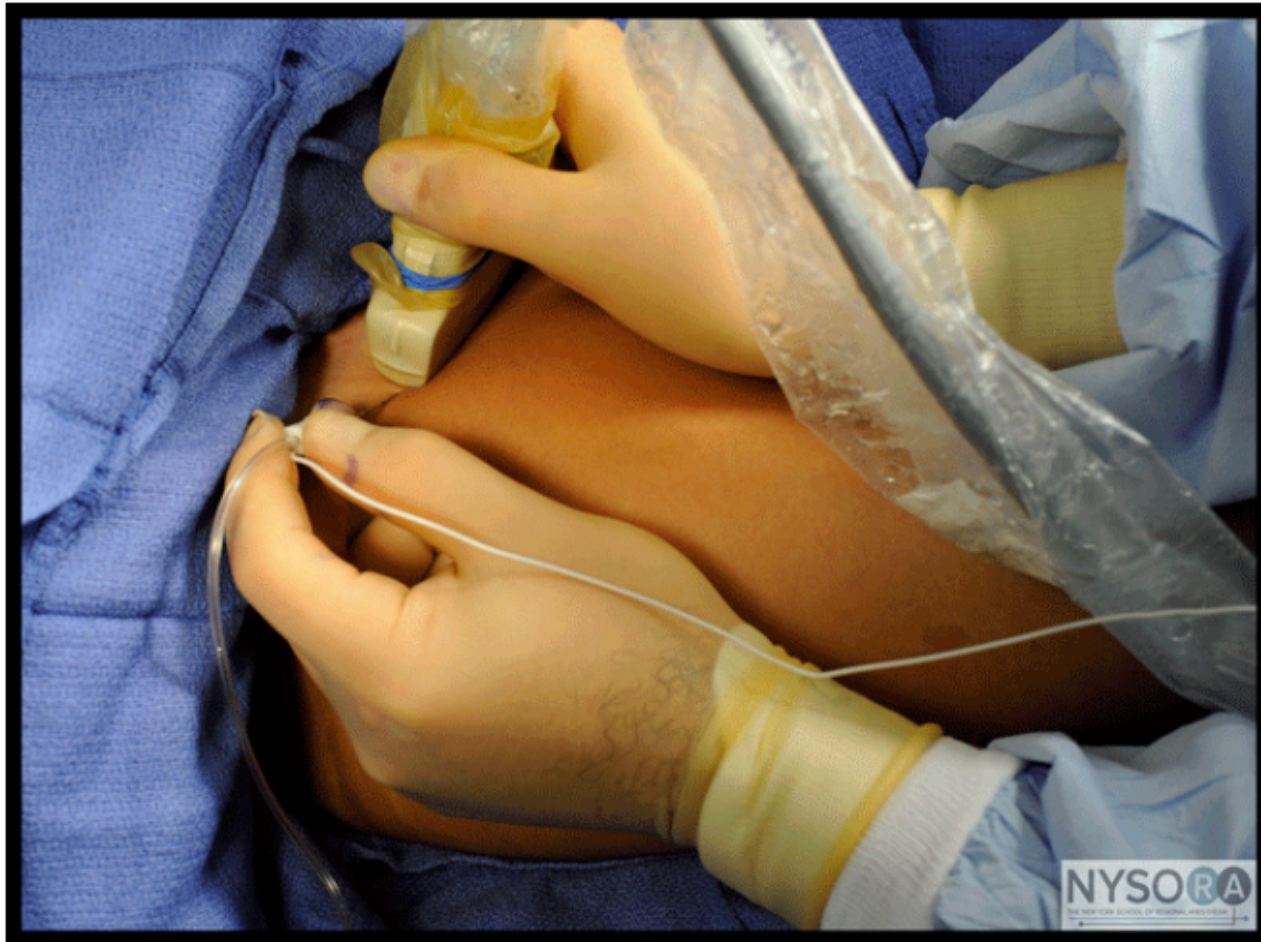
Femoral Nerve Block



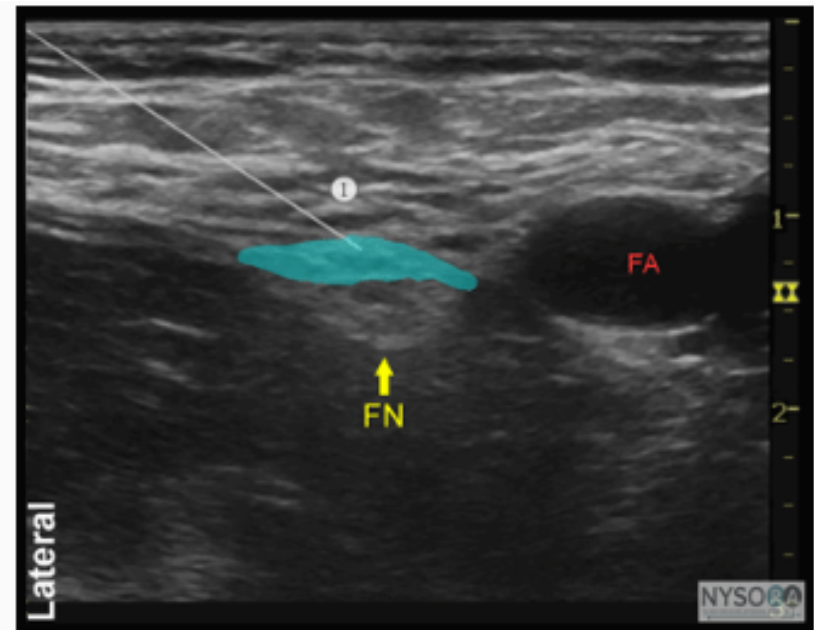
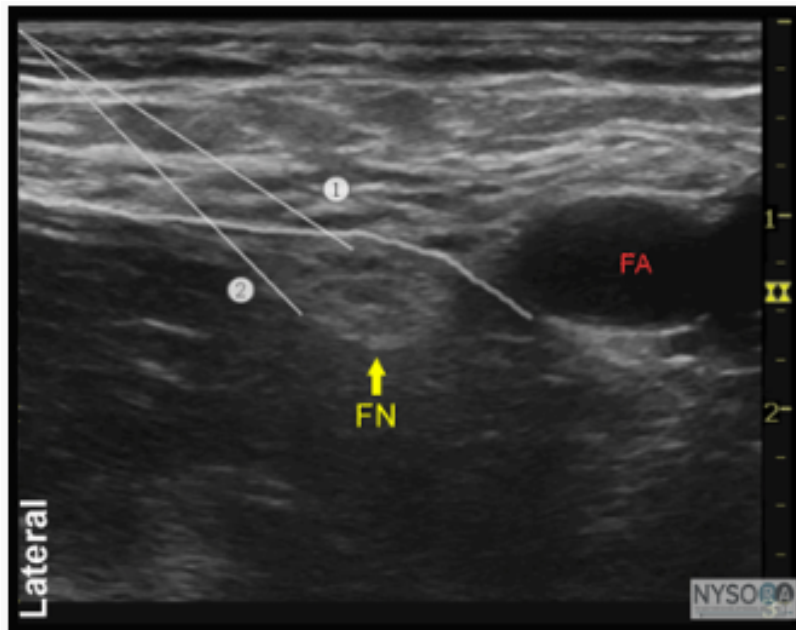
Femoral Nerve Block (US)



Femoral Nerve Block (US)



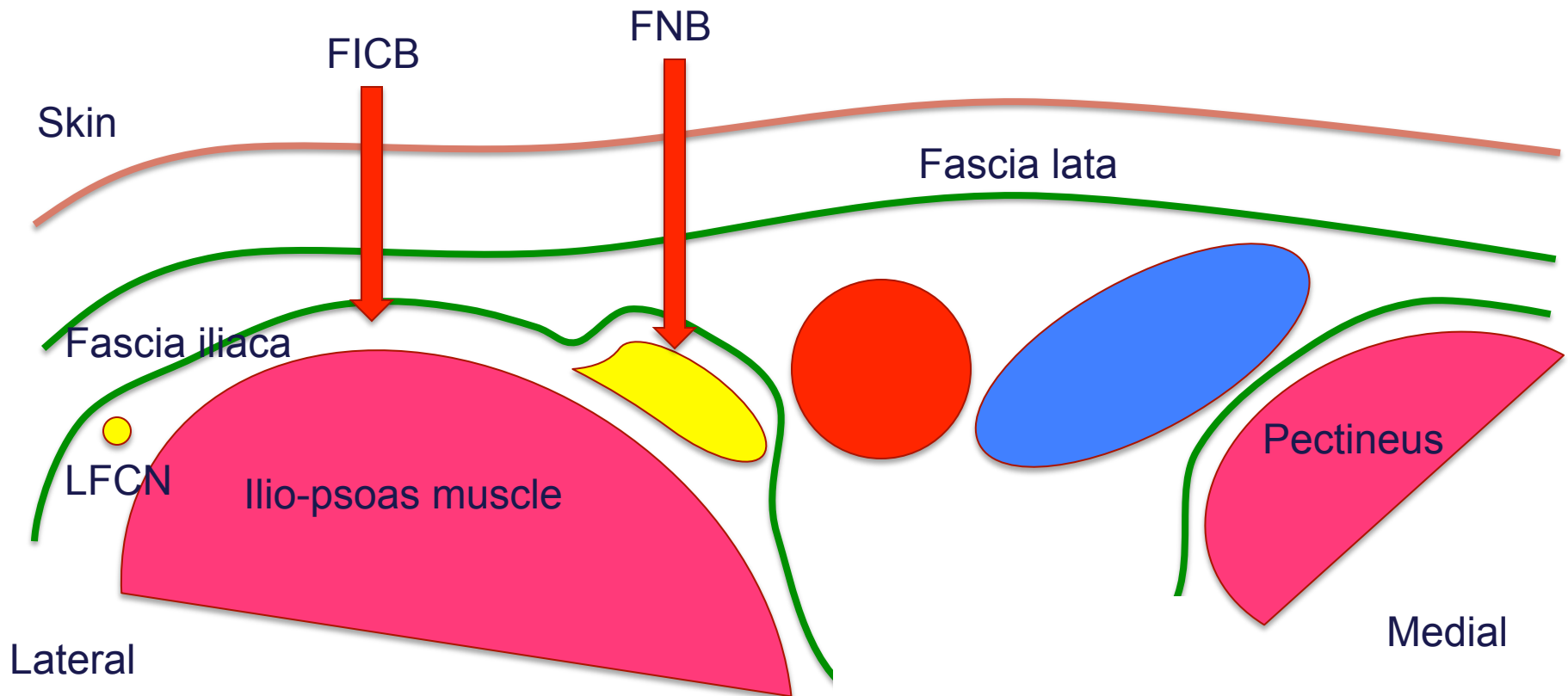
Femoral Nerve Block (US)



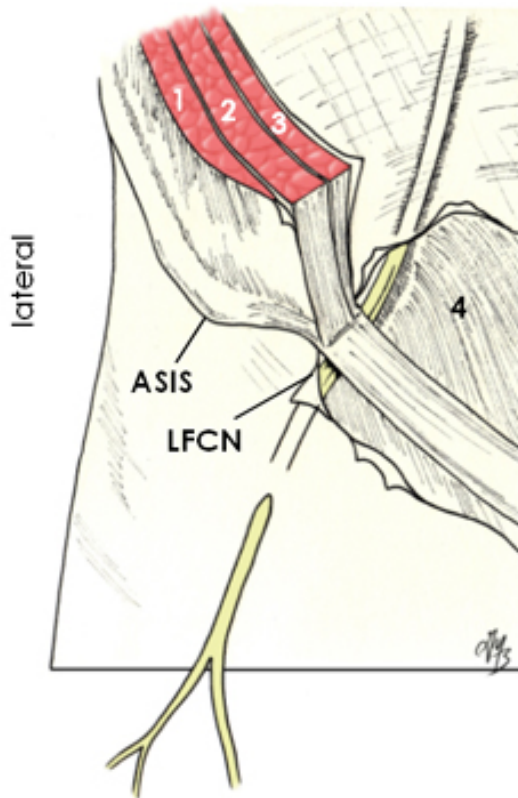
Femoral Block

- Limitations:
 - Rarely adequate as a sole anesthetic
 - Quadriceps muscle weakness will interfere with ambulation and increase the risk of falls.
 - Contraindicated in patients where a dense sensory block can mask the presence a compartment syndrome
- Complications
 - Hematoma formation from inadvertent femoral artery puncture.
 - nerve injury from needle puncture, intraneural injection of local anesthetics
 - local anesthetic toxicity.

Fascia Iliaca Compartment Block



Lateral Femoral Cutaneous Nerve Block



1 = external oblique muscle

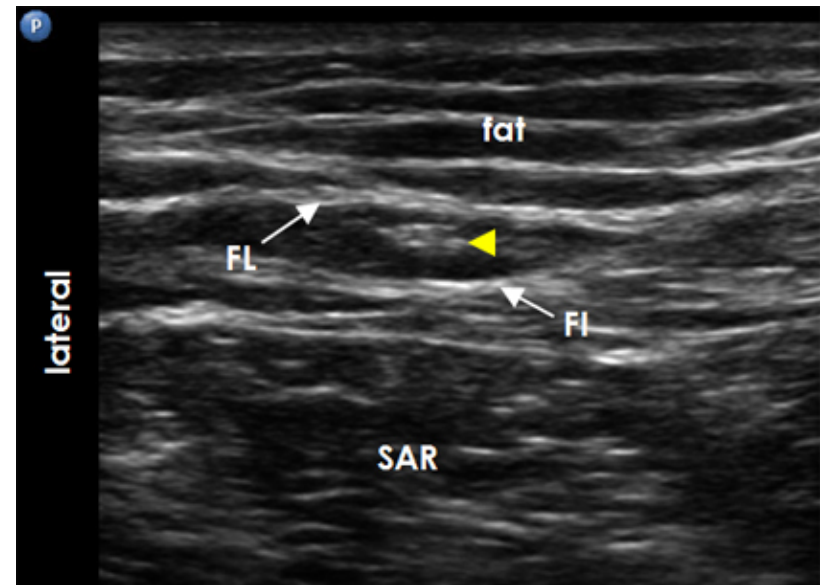
2 = internal oblique muscle

3 = transverse abdominis muscle

4 = iliacus muscle

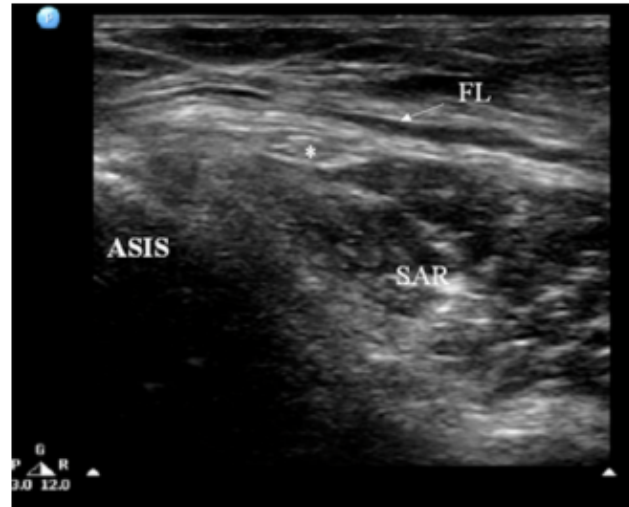
ASIS = anterior superior iliac spine

LFCN = lateral femoral cutaneous nerve



USRA.CA

Lateral Femoral Cutaneous Nerve Block

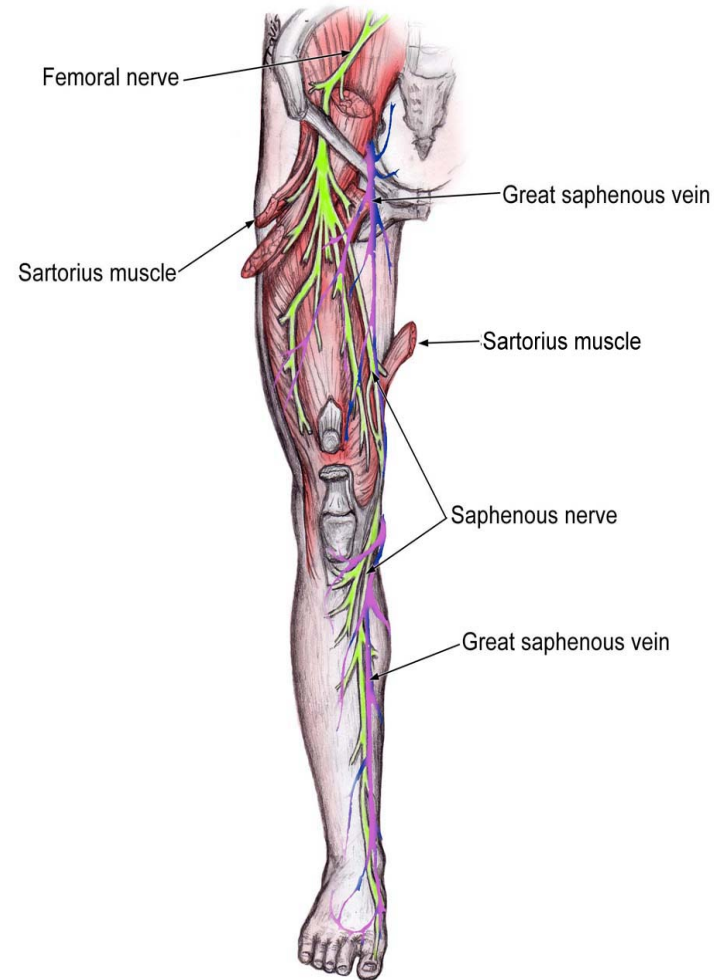


SAPHENOUS NERVE (ADDUCTOR CANAL) BLOCK



Saphenous (Adductor Canal) Block

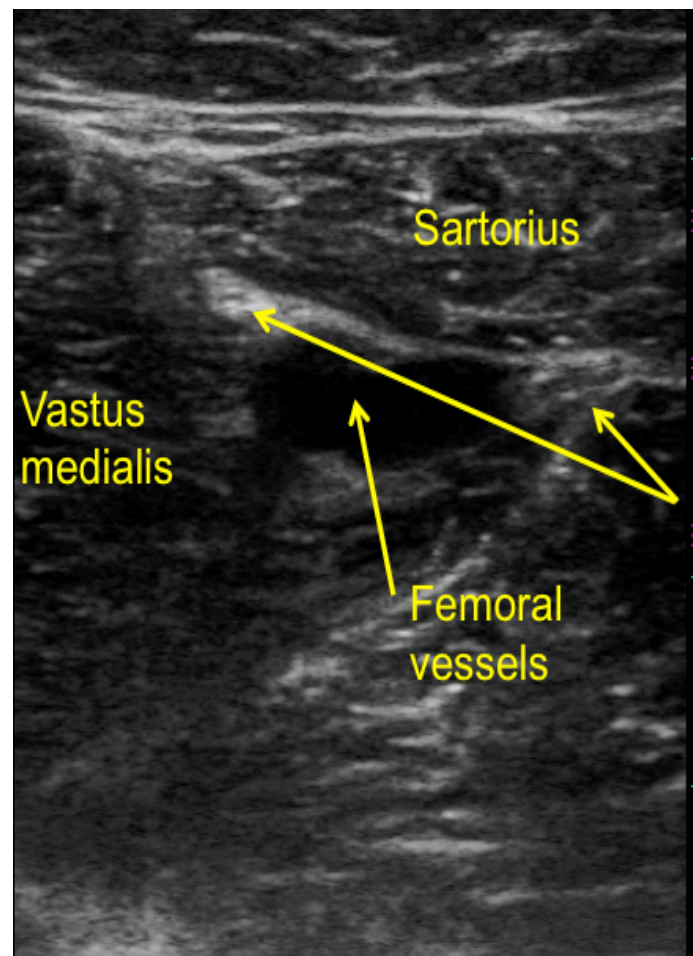
- Pure sensory branch off femoral nerve
- Gives off branches to medial thigh, articular branches to the knee joint, skin of anteromedial aspect of lower leg
- Pearl: only nerve in foot not blocked by sciatic



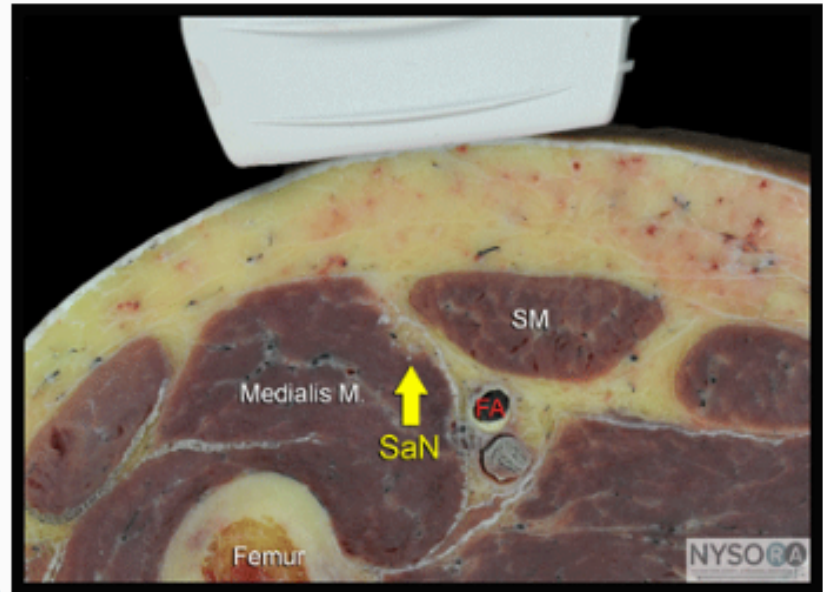
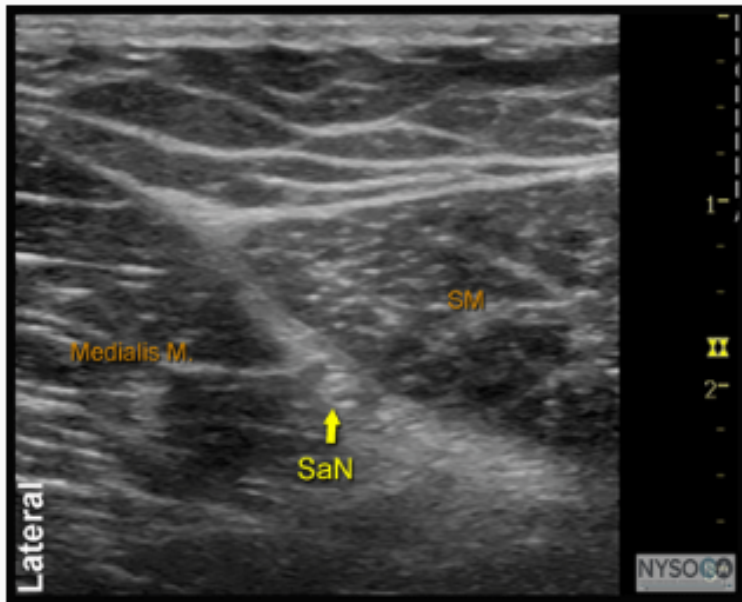
Saphenous (Adductor Canal) Block

- Indications:
anesthesia/analgesia
to the medial aspect of
the knee, lower leg or
ankle
- Pure sensory, motor
sparing, no quadriceps
weakness
- Ultrasound in medial
thigh's adductor canal,
or field block medial
knee cap/ankle
- Complications &
Contraindications
 - None specific

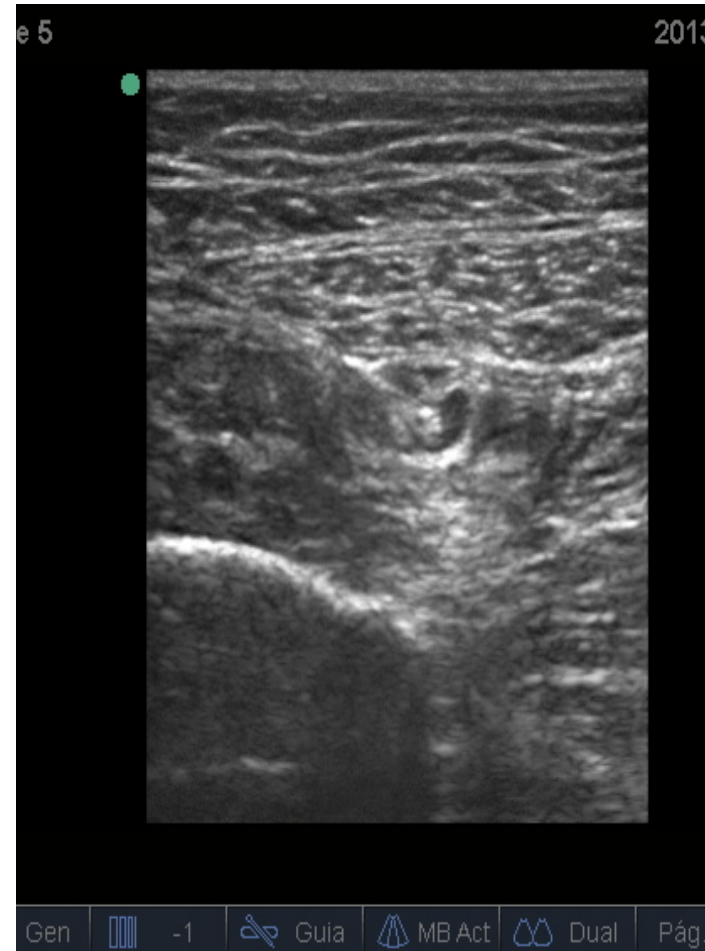
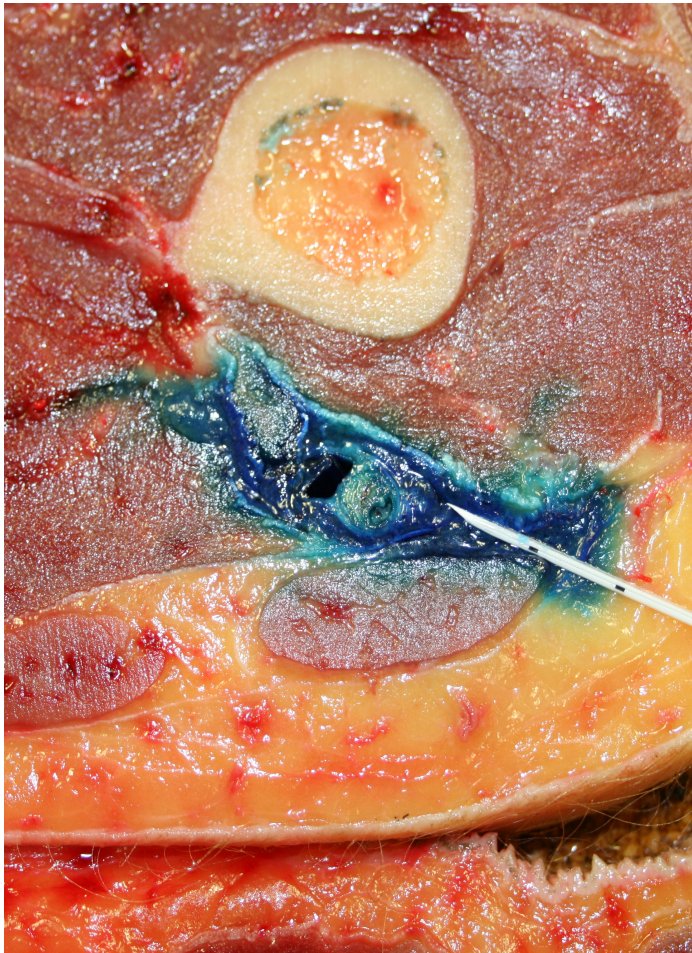
Saphenous (Adductor Canal) Block



Saphenous (Adductor Canal) Block

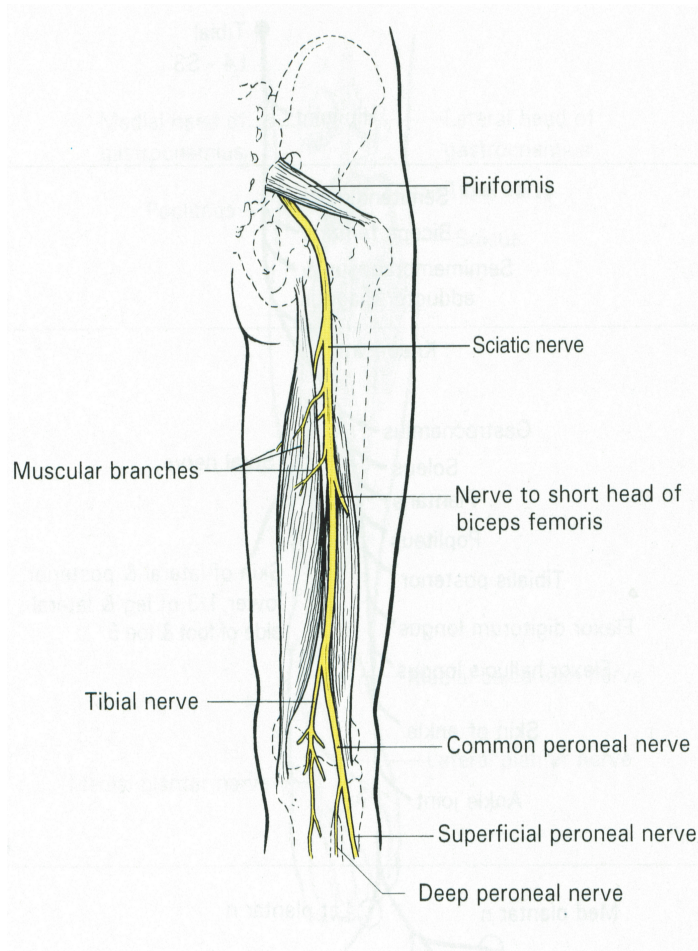


Saphenous (Adductor Canal) Block



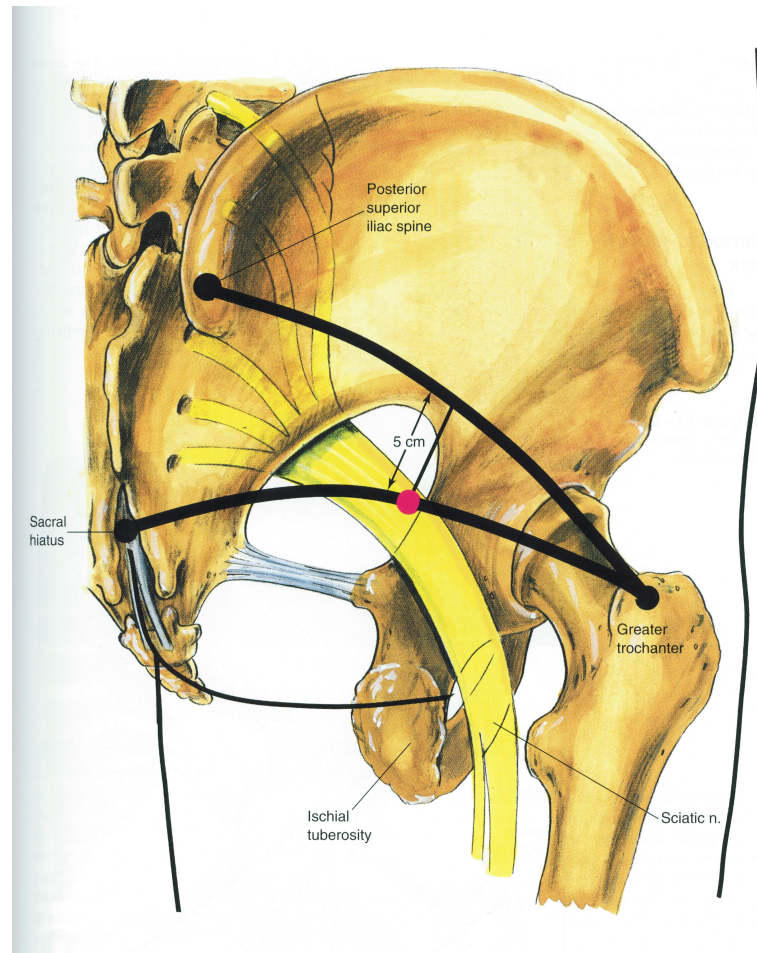
SCIATIC NERVE BLOCK

Sciatic Nerve Block



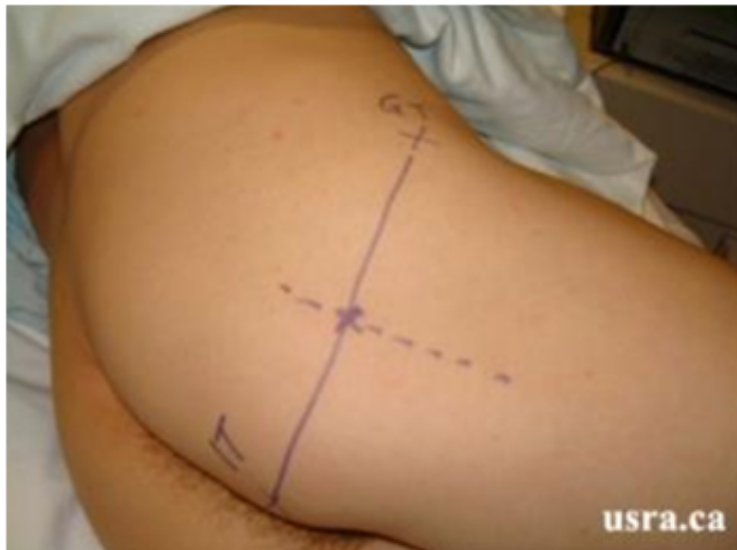
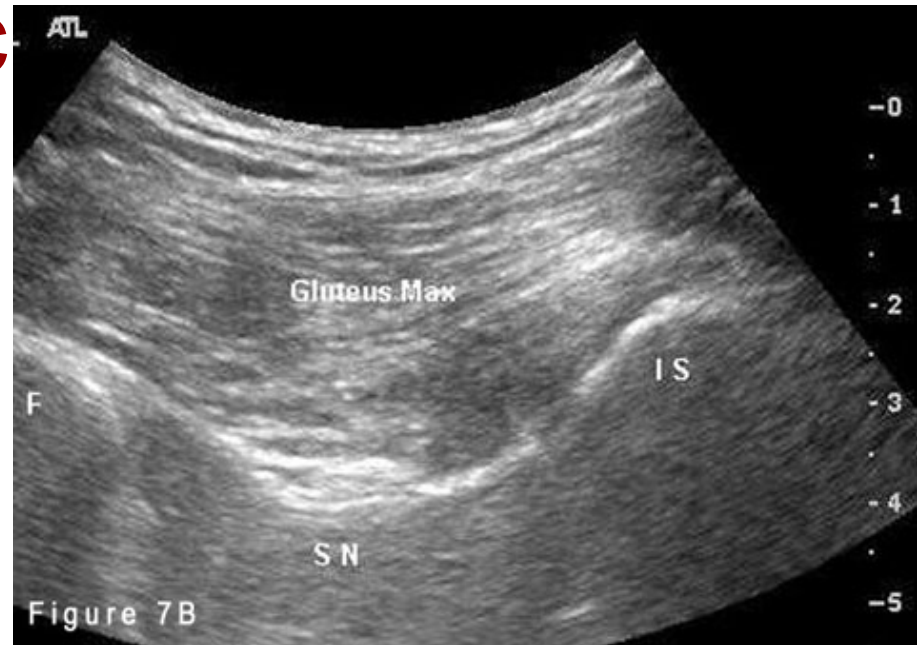
- Deep block
- Nerve stimulator vs. ultrasound
- Low complication rate
- Lateral decubitus or prone

Sciatic Nerve Block

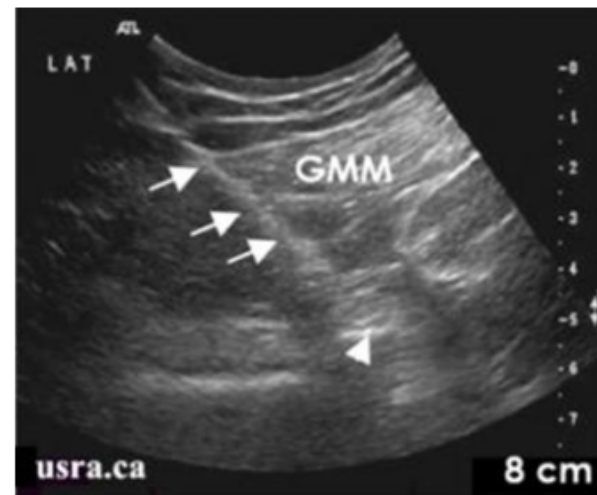
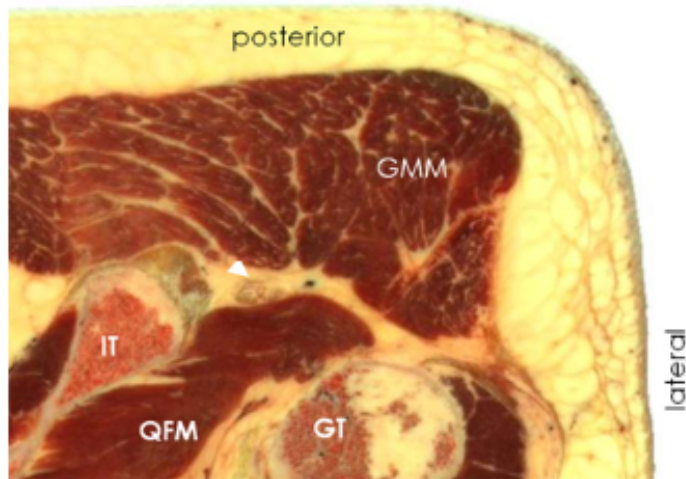
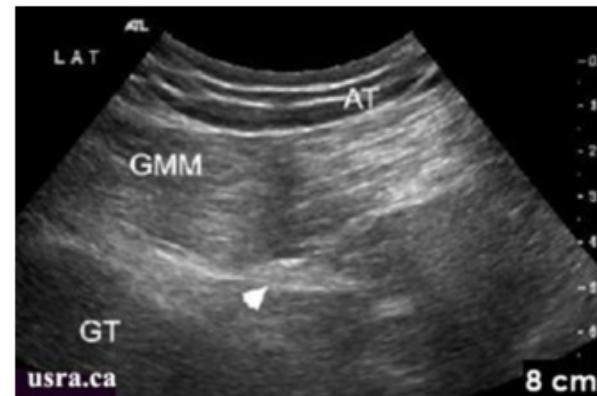
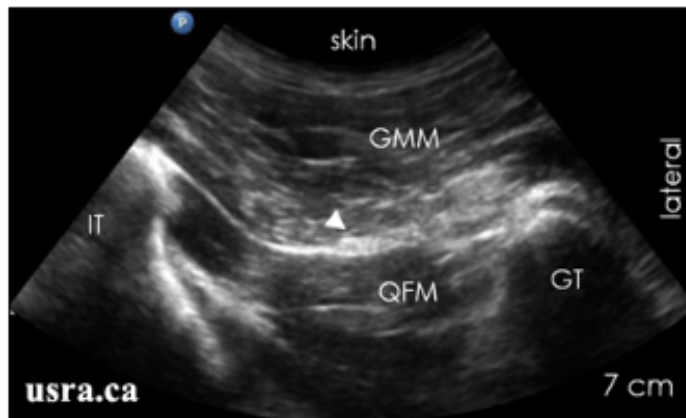


Subgluteal Sciatic Block

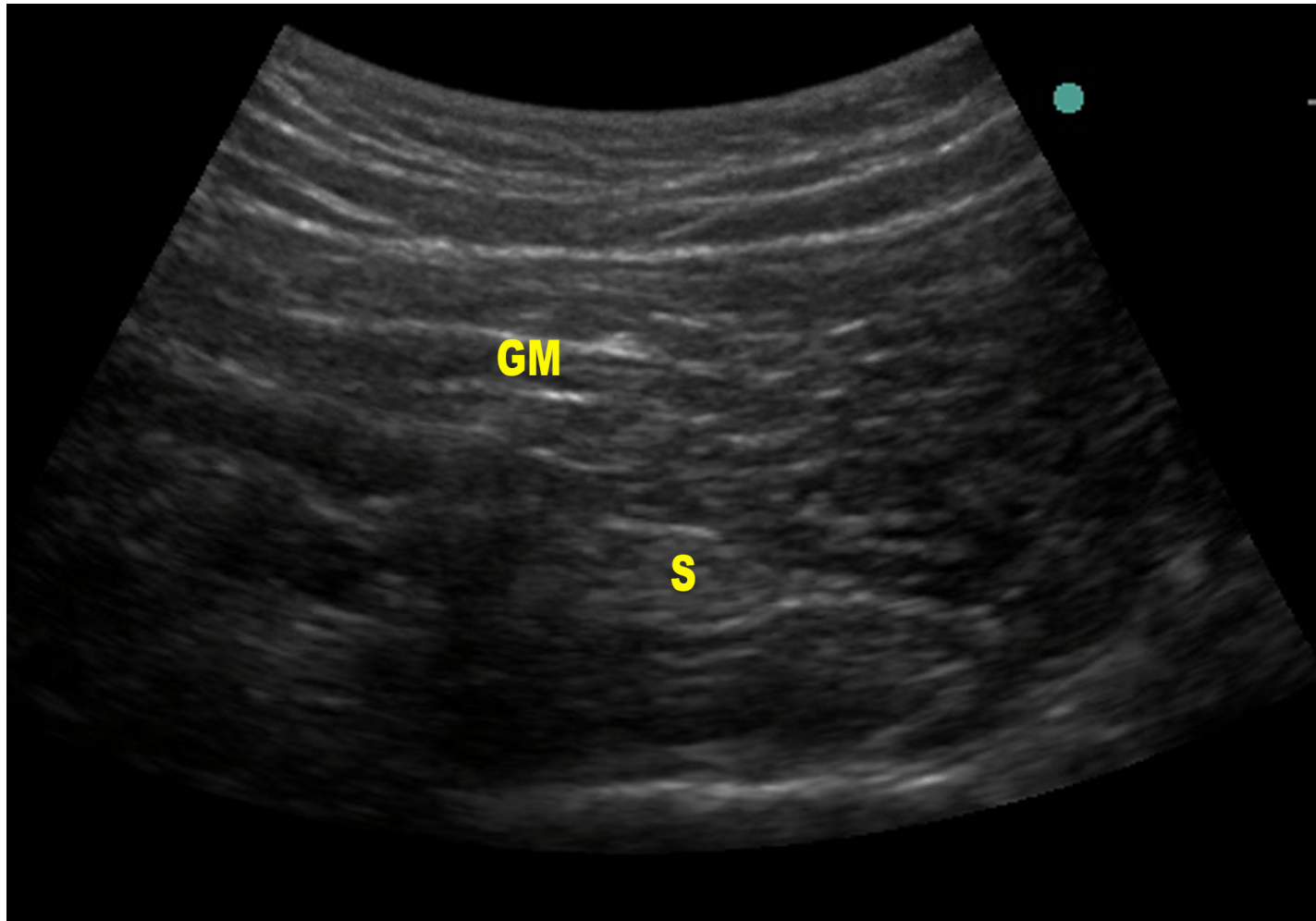
- Landmarks:
Ischial Tuberosity
and Greater
Trochanter



Subgluteal Sciatic Block



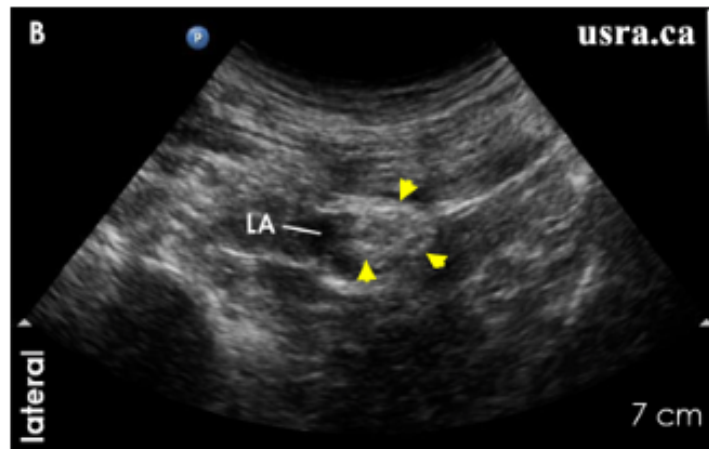
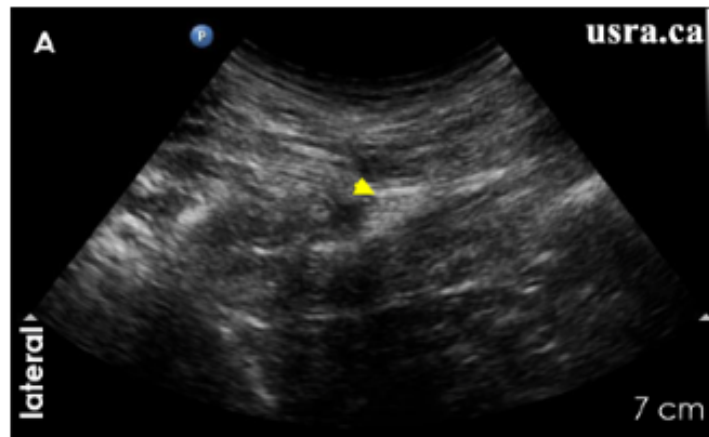
Subgluteal Sciatic Block (US)



Subgluteal Sciatic Block - Tips

- The sciatic nerve may be difficult to visualize in this region because of the required depth of beam penetration and the use of a lower frequency transducer
 - Use nerve stimulator to confirm
- Aim to see circumferential spread of hypoechoic local anesthetic solution around the nerve.
- Two separate needle insertion sites may be necessary to place the needle on both sides of the nerve.
- Scan along the nerve proximally and distally to check the extent of longitudinal local anesthetic spread.

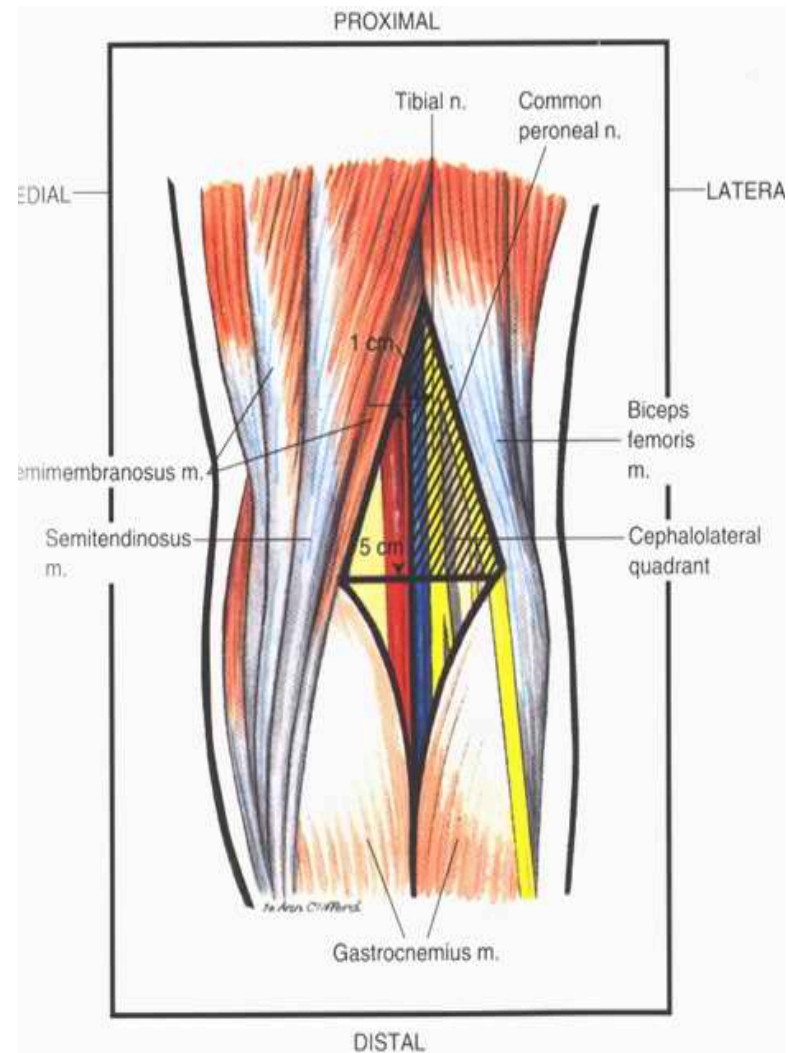
Subgluteal Sciatic Block (US)



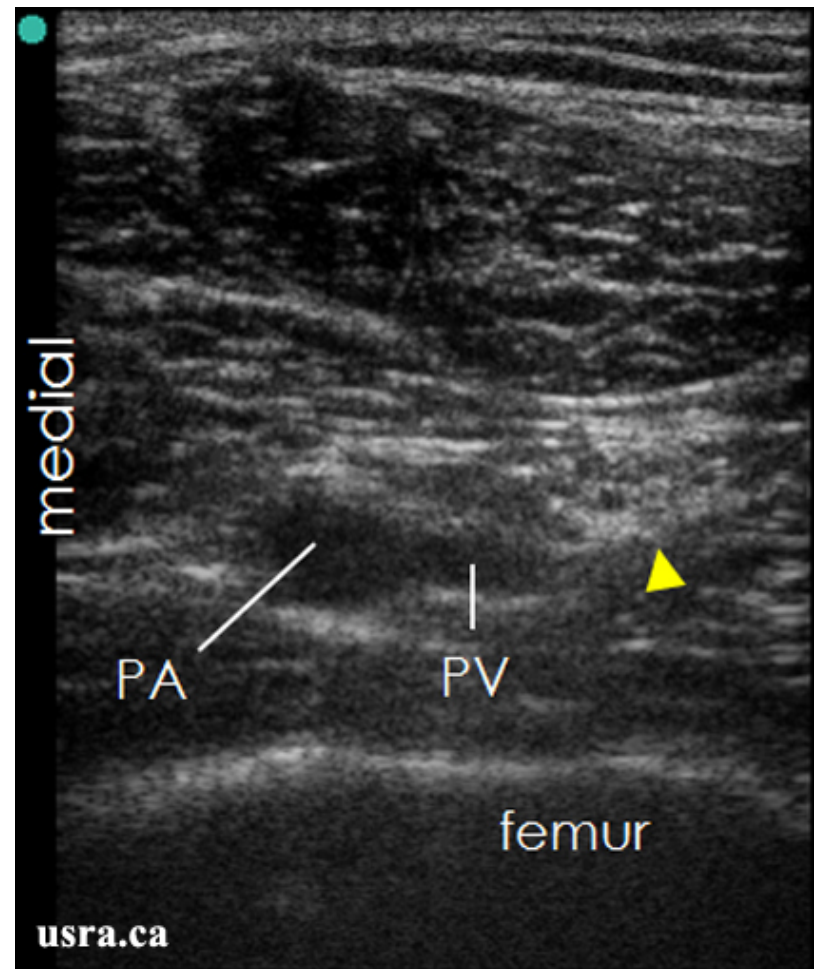
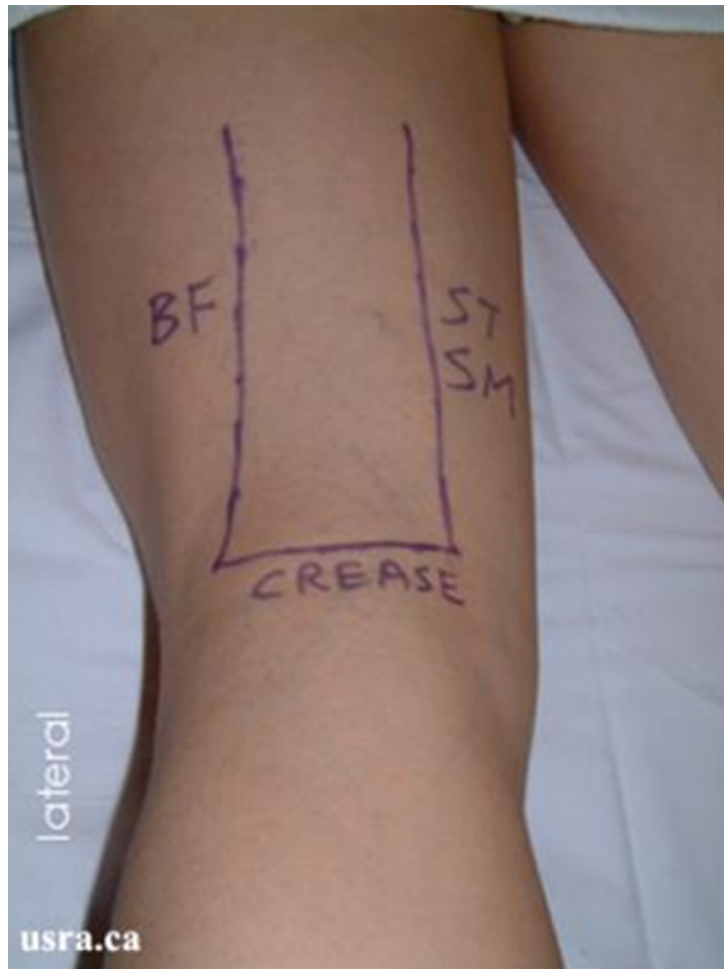
POPLITEAL BLOCK

Popliteal Block

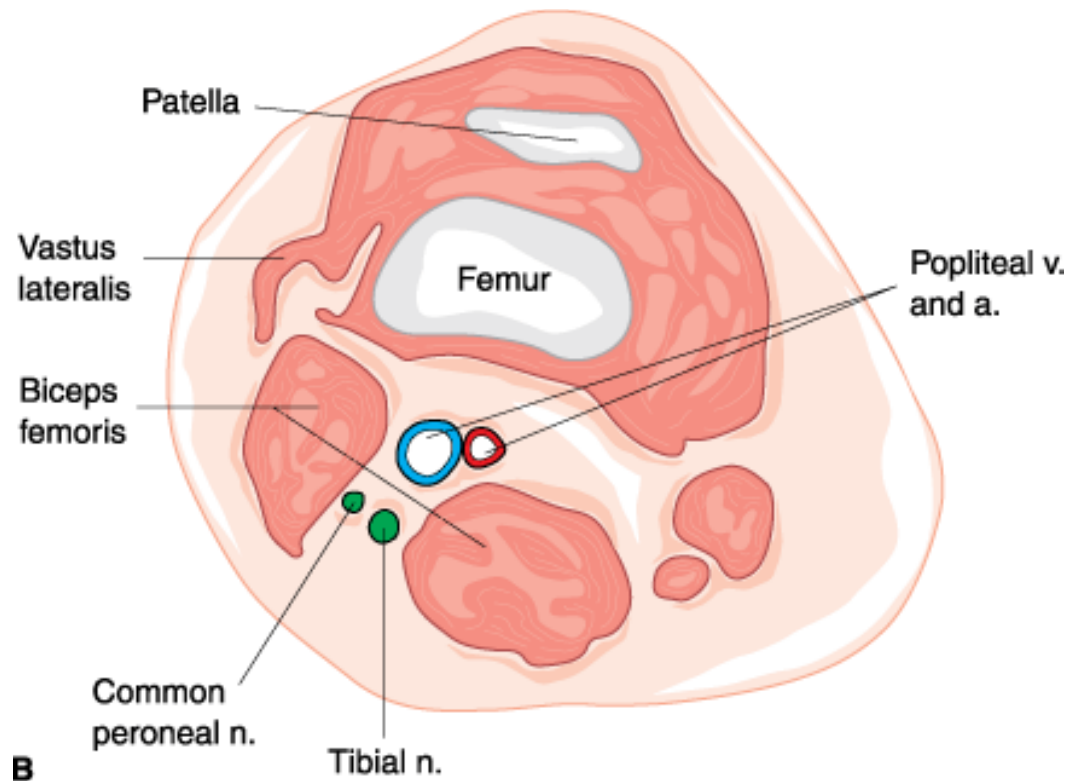
- A.k.a. Sciatic Nerve in the popliteal fossa
- For foot and ankle surgery
- Lateral Decubitis, supine, prone
- Landmarks: Popliteal crease, semimembranosus/ tendinosus tendons & biceps femoris



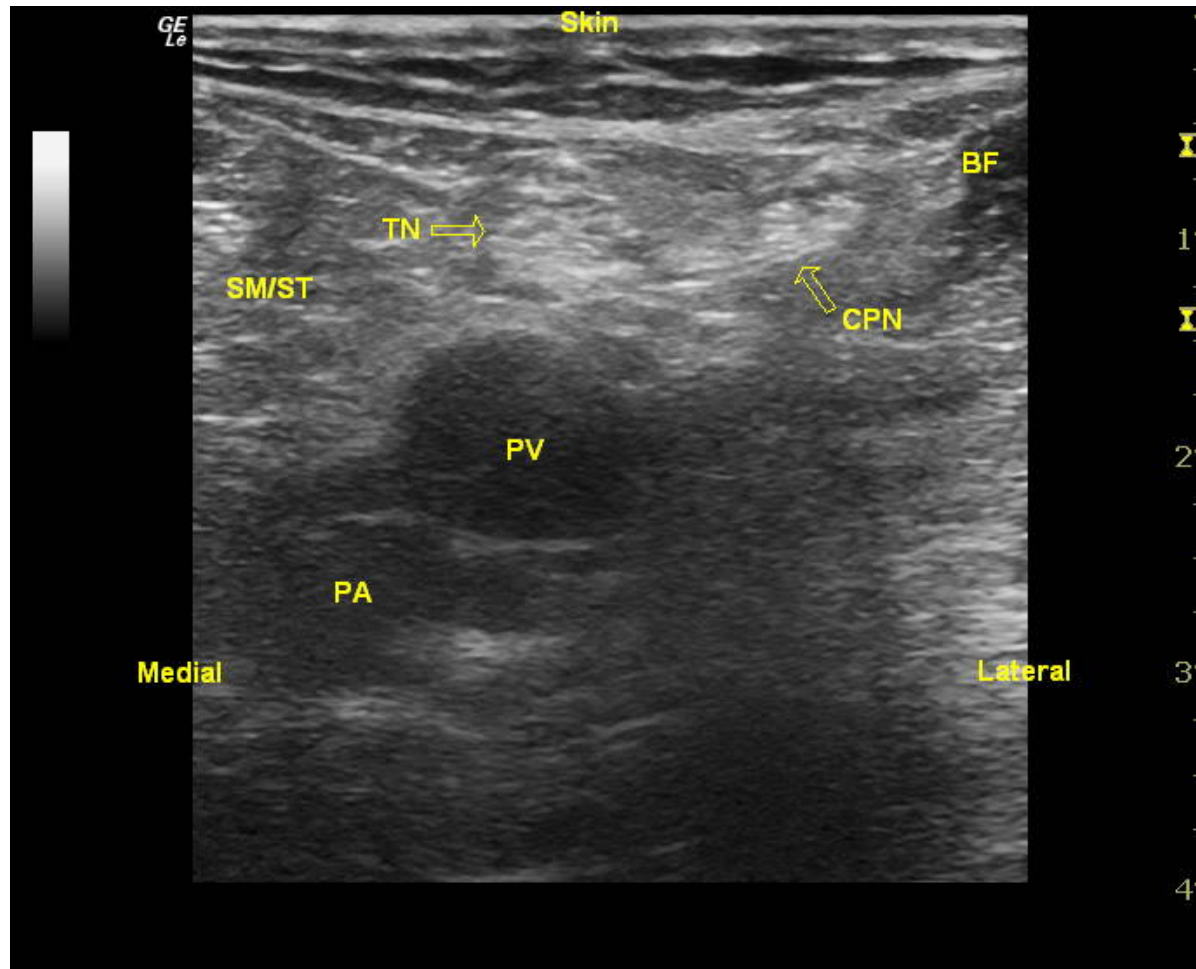
Popliteal Block (US)



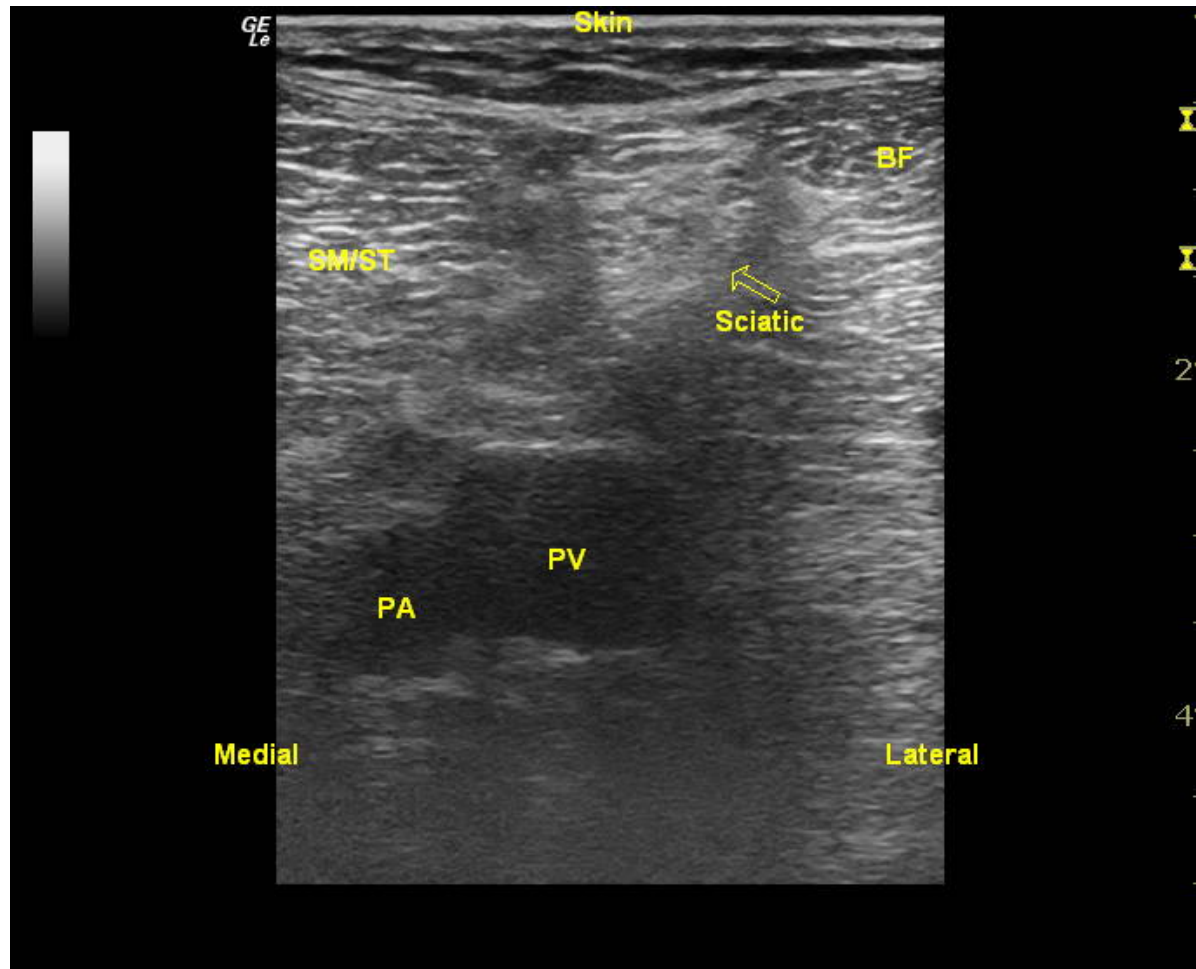
Popliteal Block



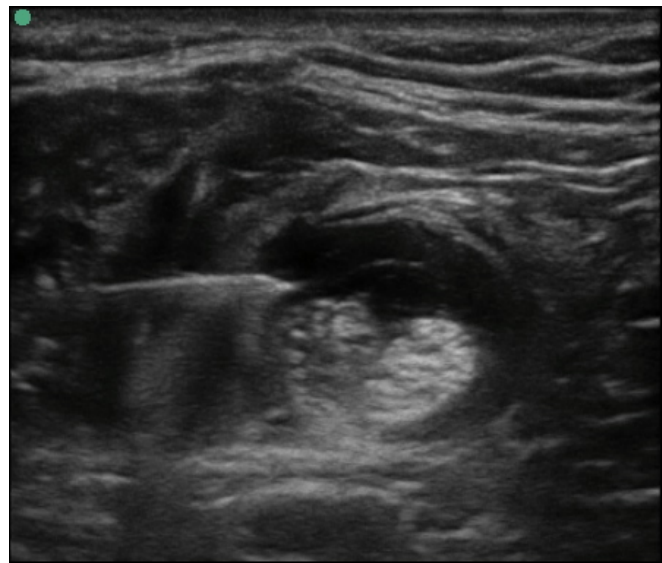
Popliteal Block (US)



Popliteal Block (US)



Popliteal Block



Popliteal Block

- LIMITATIONS

- Dense sensory block can mask the presence of compartment syndrome
- Foot drop in ambulatory patients

- COMPLICATIONS

- Hematoma formation from inadvertent popliteal artery puncture.
- Nerve injury from needle trauma or intraneural injection
- Local anesthetic toxicity.

THANK YOU!