

Trunk & Lower extremity Blocks

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Intercostal Nerve Block

Indications

- **Analgesia** after
 - upper abdominal and thoracic surgery.
 - Rib fracture
 - PHN
- **Anaesthesia**
 - Minor chest wall procedures
 - ICD insertion
- Any patient is ok but obesity ??

Anatomy

- intercostal nerves are the ventral rami of T₁ to T₁₁
- T₁₂ is subcostal nerve
- Ilio inguinal
- T₁ – prefixed
- T₂ and T₃ – intercostobrachial

Branches and course

2 - sympathetic

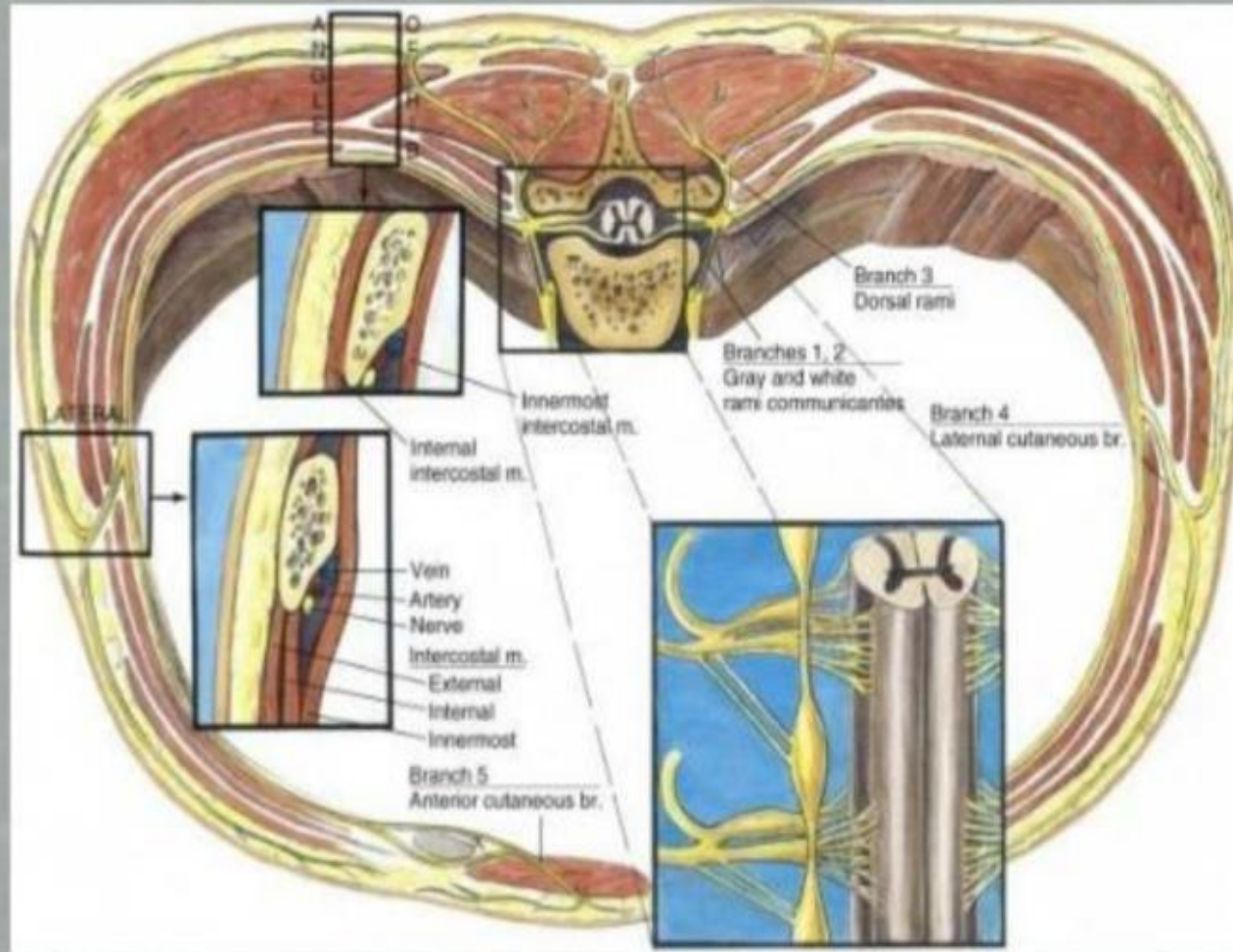
Dorsal

Lateral – midaxillary line

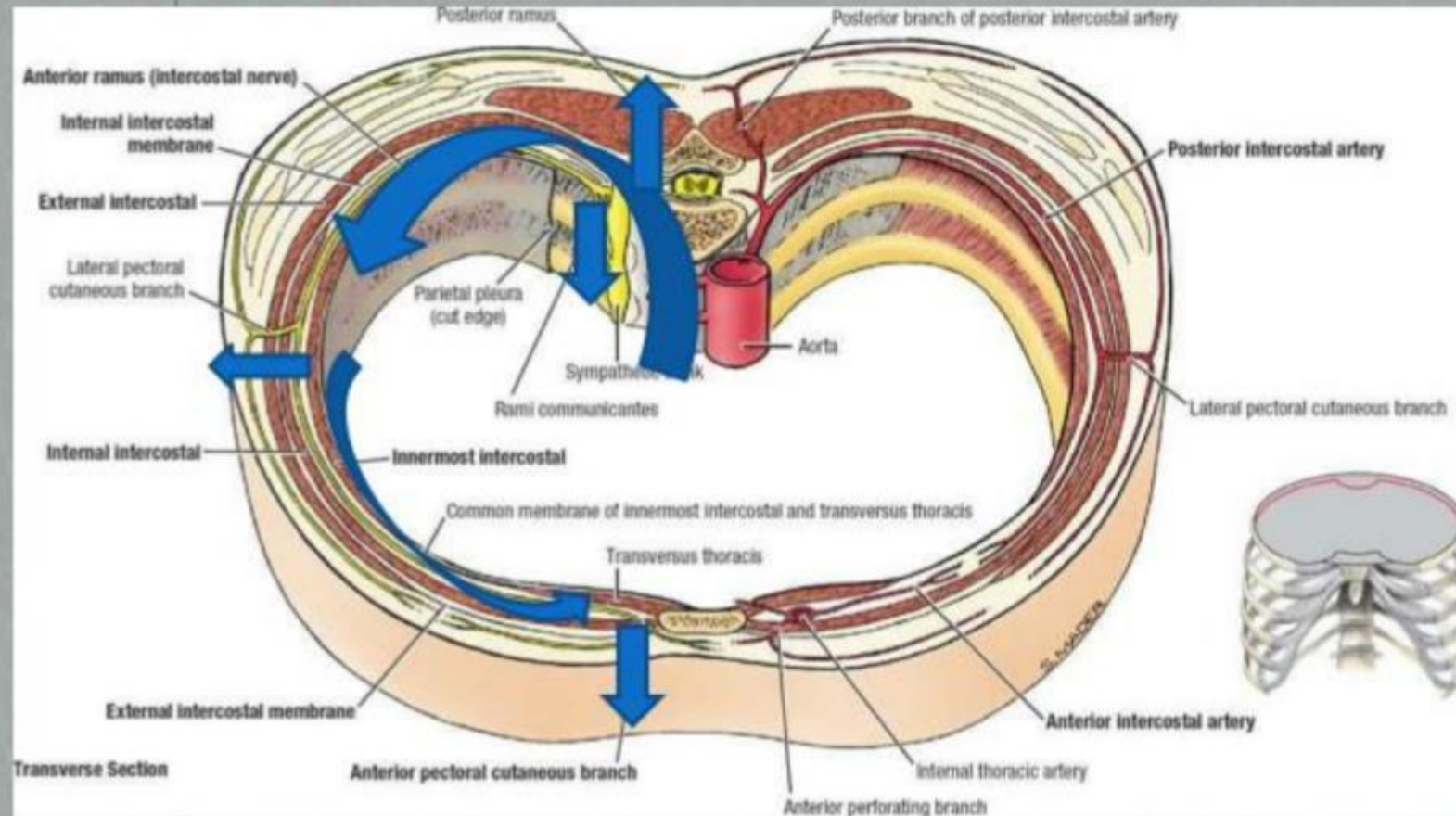
Anterior cutaneous

- At the rib's posterior angle, the area most commonly used during intercostal nerve block, the nerve lies between the internal intercostal muscles and the intercostalis intimus muscle. Throughout the intercostal nerve's course, it traverses the intercostal spaces inferior to the intercostal artery and vein of the same space.

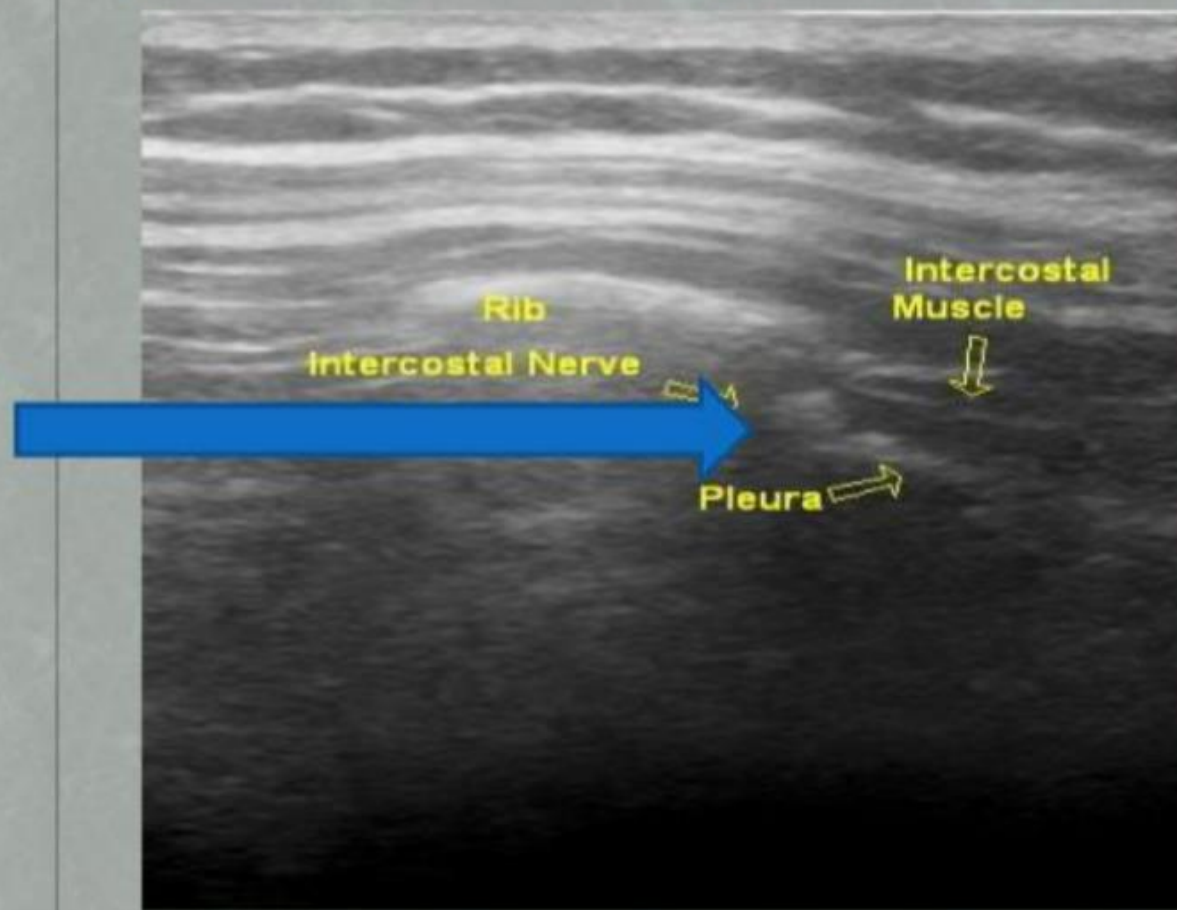
Branches



Course



USG picture of intercostal nerve



Complications

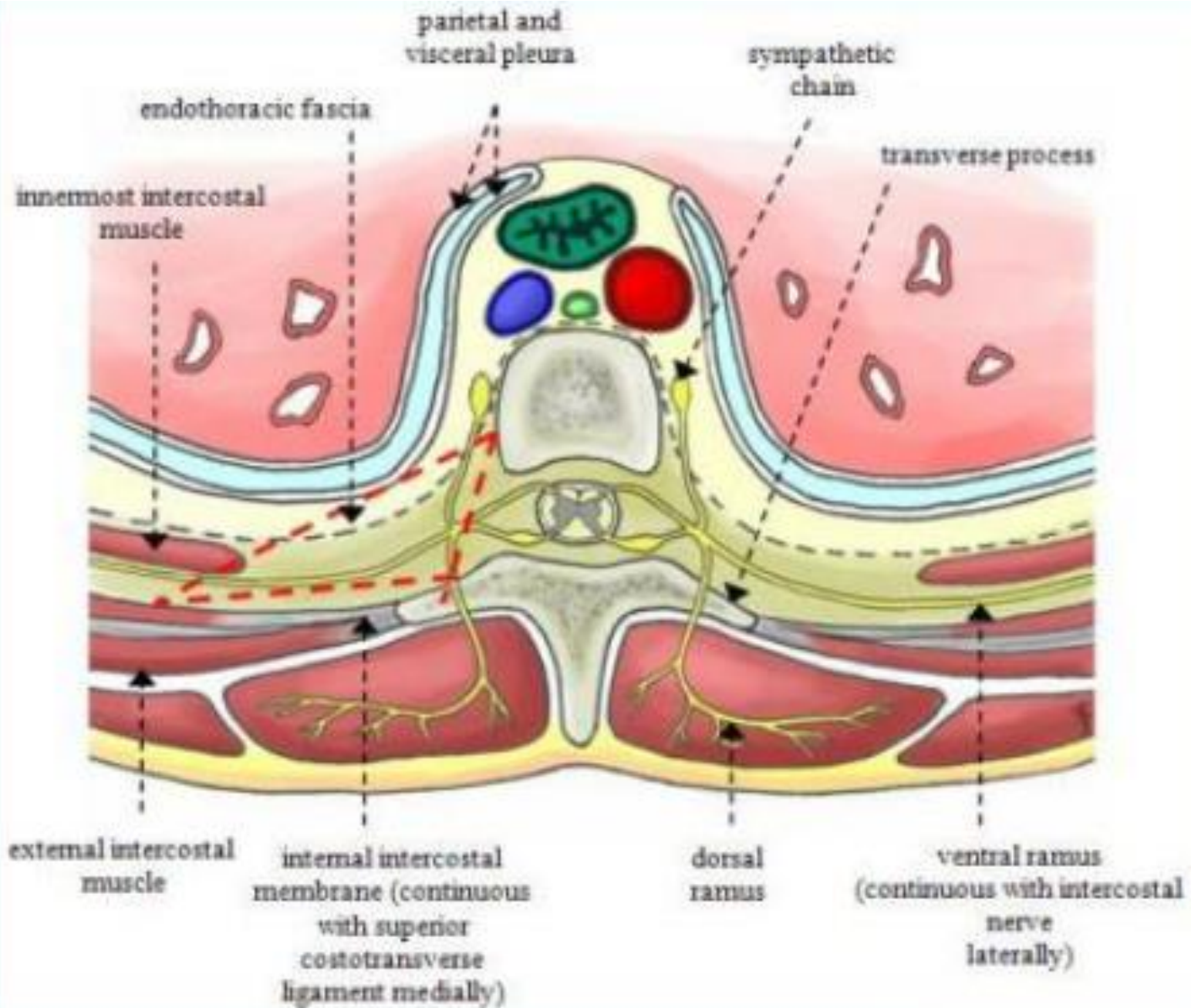
- **vascularity of the intercostal space**, blood levels of local anesthetic are higher for multiple-level intercostal block.
- peak blood levels may be delayed for 15 to 20 minutes,
- patients should be closely monitored after the completion of a block for at least that interval.
- Hemorrhage
- Pneumothorax (0.1 %)
- More imaginary

Paravertebral Thoracic Nerve Block

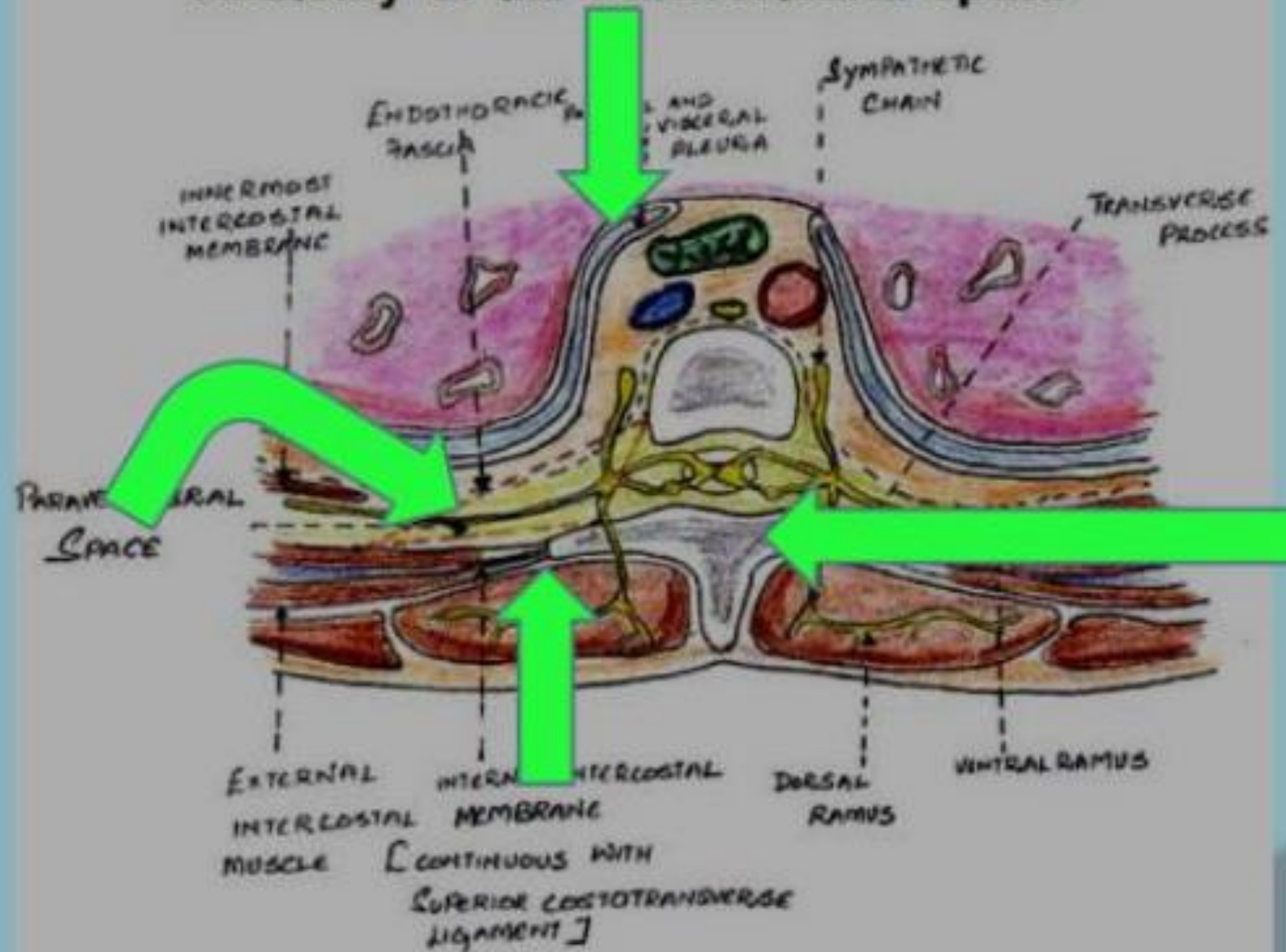
Indications anaesthesia – analgesia

- Thoracic surgery
- Liver surgery
- Inguinal hernia
- Ambulatory surgery
- open cholecystectomy
- Rib fracture
- Breast surgery
- High risk patients





Anatomy of the Paravertebral space



Anatomy

- ⦿ the spinal root emerges from the intervertebral foramen and divides into dorsal and ventral rami.
- ⦿ The sympathetic chain lies in the same fascial plane.
- ⦿ Hence, PVB produces unilateral sensory, motor and sympathetic blockade

Drugs –single and catheter

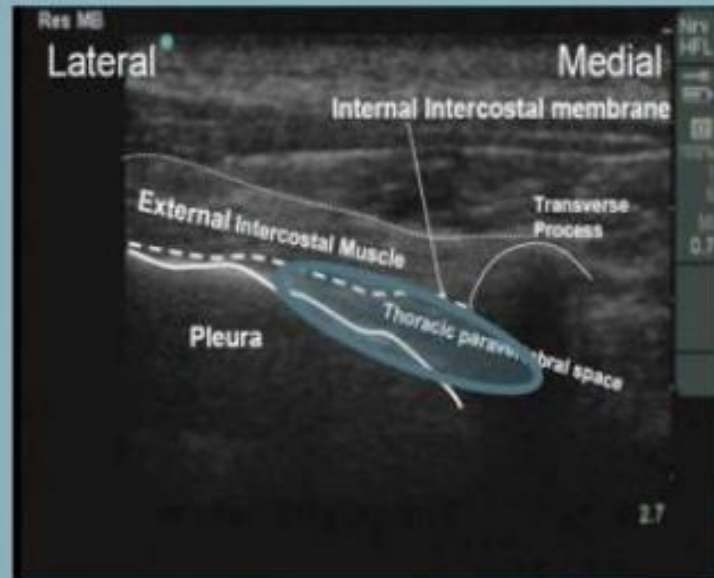
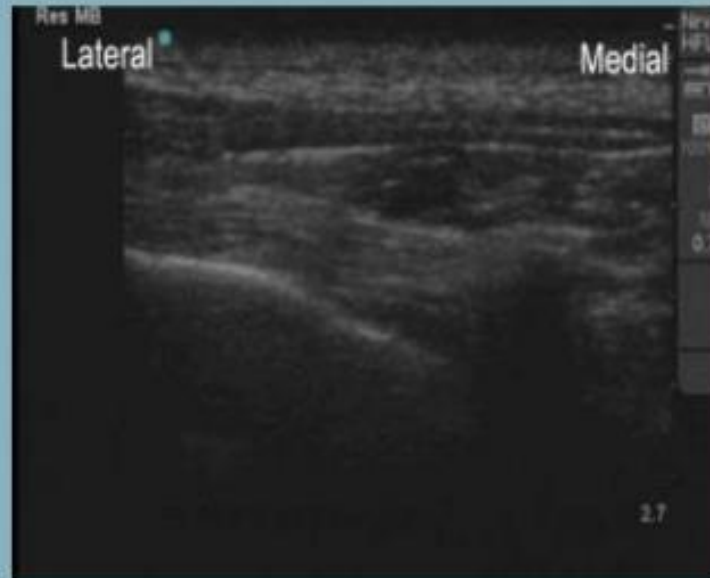
- ⊙ Each level injected with the single-injection technique requires 5 mL
- ⊙ total volumes 30 mL with unilateral injections
- ⊙ to 60 mL with bilateral injections.
- ⊙ A continuous infusion of a lower concentration of the same drug at 5 to 15 mL/hr is commonly used for continuous analgesia

Complications

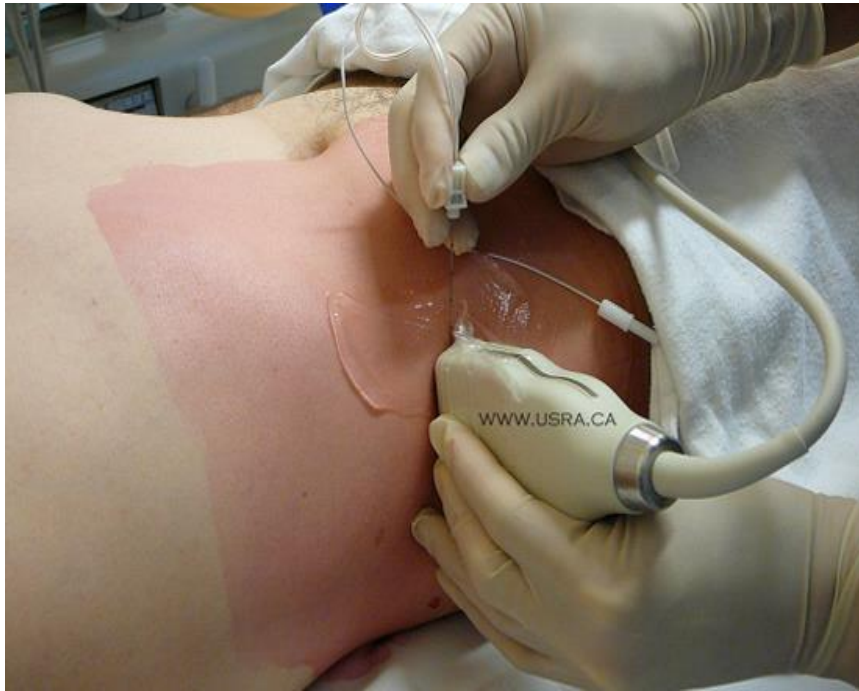
- ⦿ failure rate of 6.1%
- ⦿ Inadvertent vascular puncture (6.8%), hypotension (4%),
- ⦿ epidural or intrathecal spread (1%), pleural puncture (0.8%)
- ⦿ Pneumothorax (0.5%)
- ⦿ Horner's reported
- ⦿ More with bilateral blocks



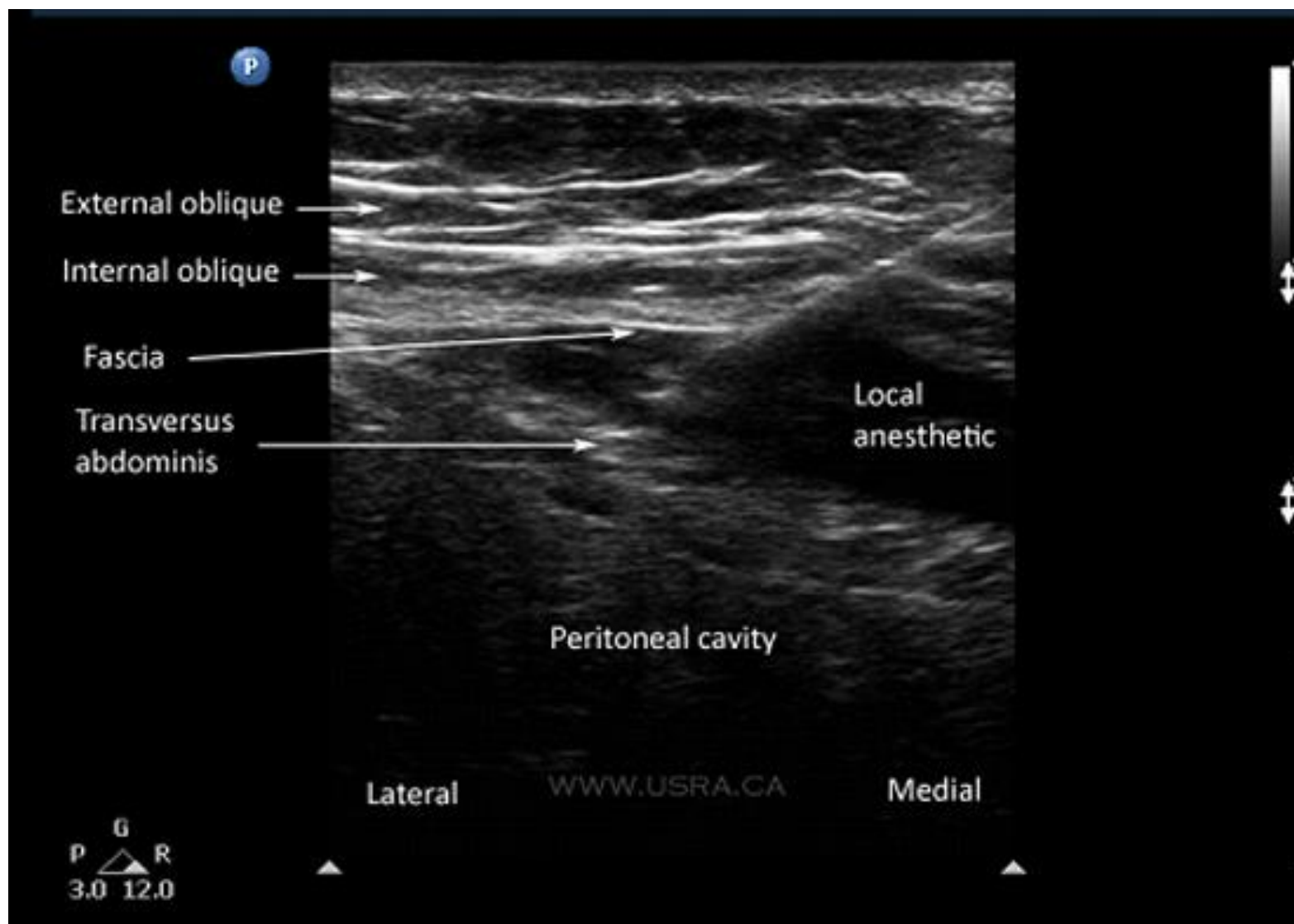
USG reports



Transversus Abdominis Plane (TAP) Block



- Triangle of Petit: bounded by the latissimus dorsi posteriorly, the external oblique anteriorly and the iliac crest inferiorly.
- Needle is inserted perpendicular to all planes looking for the tactile sensation of 2 pops. First indicates penetration of the external oblique fascia into the plane between external and oblique muscles. Second pop signifies entry into the plane between internal oblique and transversus abdominis muscles.



Ilioinguinal Nerve Block

- The ilioinguinal/iliohypogastric nerve (II/IH) is one of the lumbar plexus branches from Th12, L1.
- It runs through the psoas major muscle on the outside into the fascia between oblique and transversus abdominis muscle and then travels medially and downward.

This block provides analgesia of perception of the lower abdomen and groin skin.

- Indication :
- Entrapment syndrome of II/IH, postoperative analgesia for inguinal hernia repair [1], pain on iliac bone harvesting, etc.

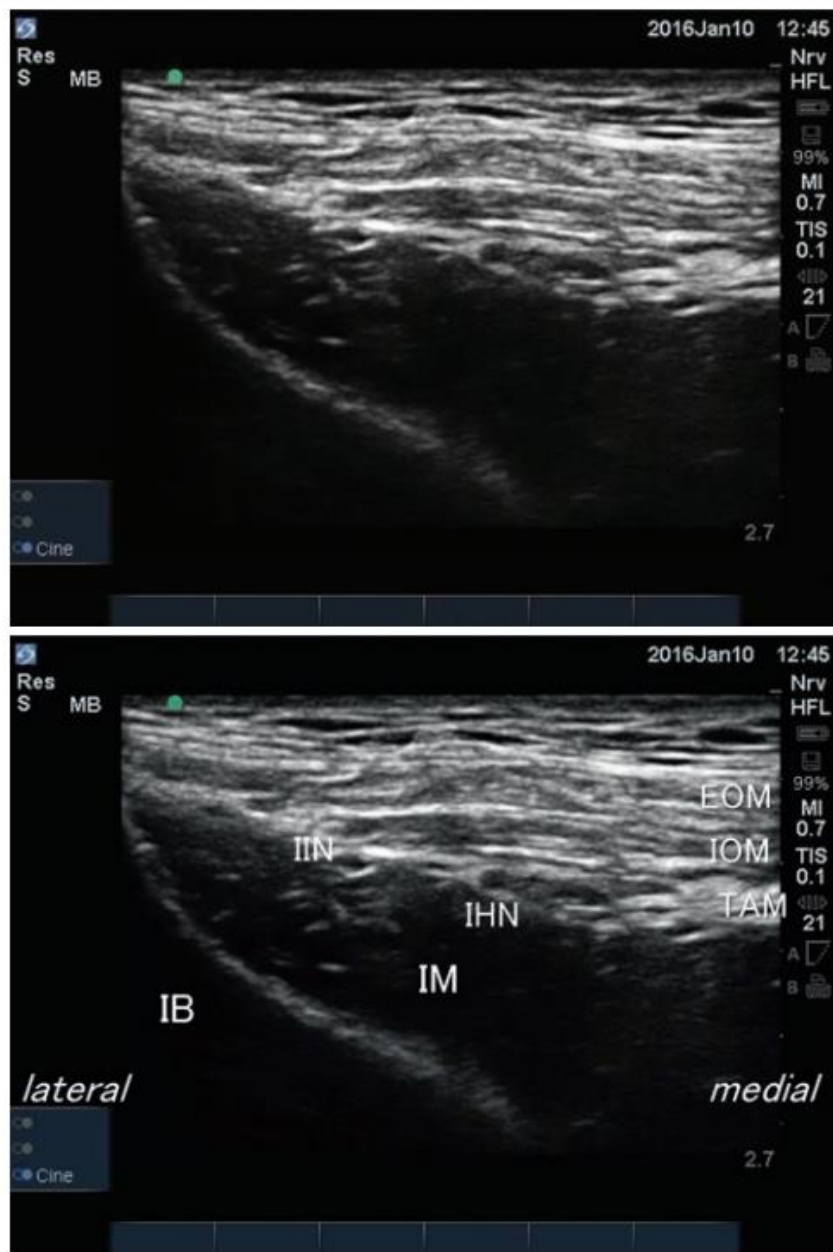


Fig. 42.4 Typical sonographic images for ilioinguinal/ iliohypogastric nerve block

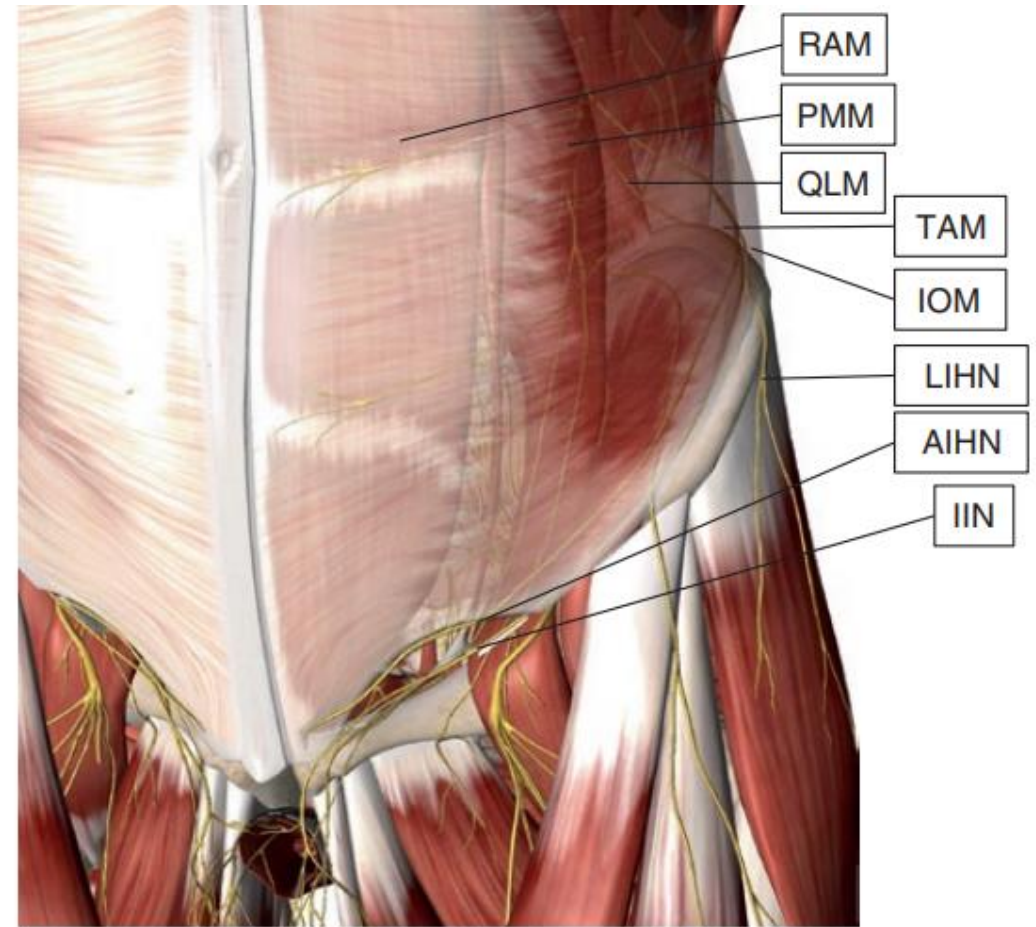


Fig. 42.1 Anatomy of ilioinguinal/iliohypogastric nerve. *AIHN* anterior cutaneous branch of iliohypogastric nerve, *IIN* ilioinguinal nerve, *IOM* internal oblique muscle, *LIHN* lateral cutaneous branch of iliohypogastric nerve, *PMM* psoas major muscle, *QLM* quadratus lumborum muscle, *RAM* rectus abdominis muscle, *TAM* transversus abdominis muscle. Image is from 3D4Medical's Essential Anatomy 5 application

Lumbar Plexus Block

Introduction

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- The lumbar plexus block is *an advanced nerve block technique*.
- The block has *significant clinical applicability* and because of this, it is used commonly in our practice.
- However, this block has a relatively higher potential for *complications* and should be practiced only after appropriate *training*

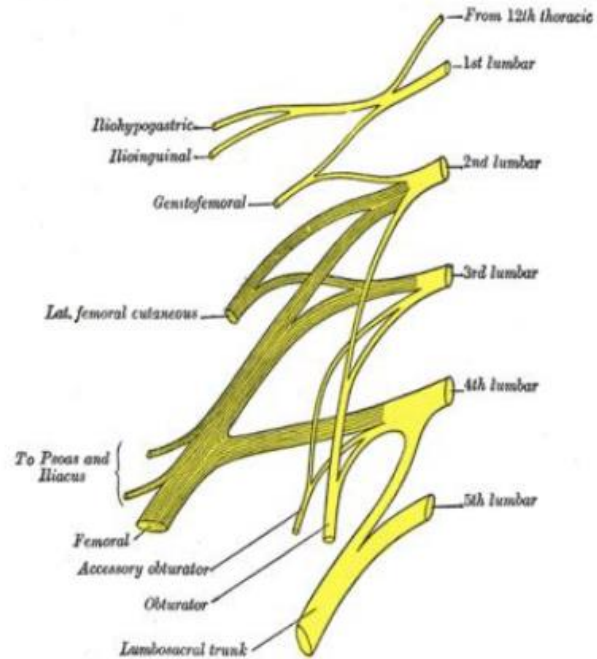
Indications

- Anterior, medial, and lateral procedures of the thigh including harvest of skin grafts, malignant hyperthermia (MH)-biopsy procedure.
- Knee replacement,
- Total hip replacement ,hip fractures.
- Anterior and posterior cruciate ligament reconstruction.

Anatomy of Lumbar Plexus

- The lumbar plexus is formed by the anterior rami of the **first four lumbar nerves**; it frequently includes a branch from T12 and occasionally from L5.

- The plexus lies between the psoas major and quadratus lumborum muscles in the so-called **psoas compartment**.

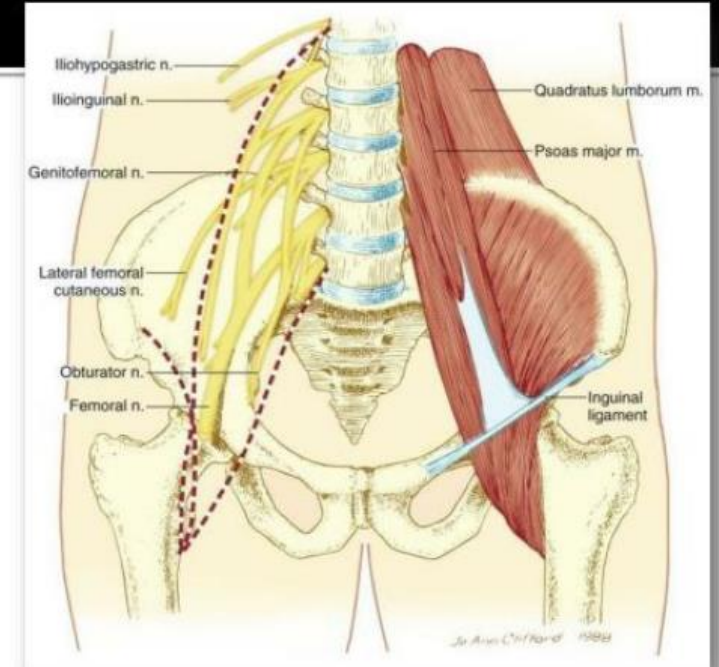


Plan of lumbar plexus.

Anatomy of Lumbar Plexus

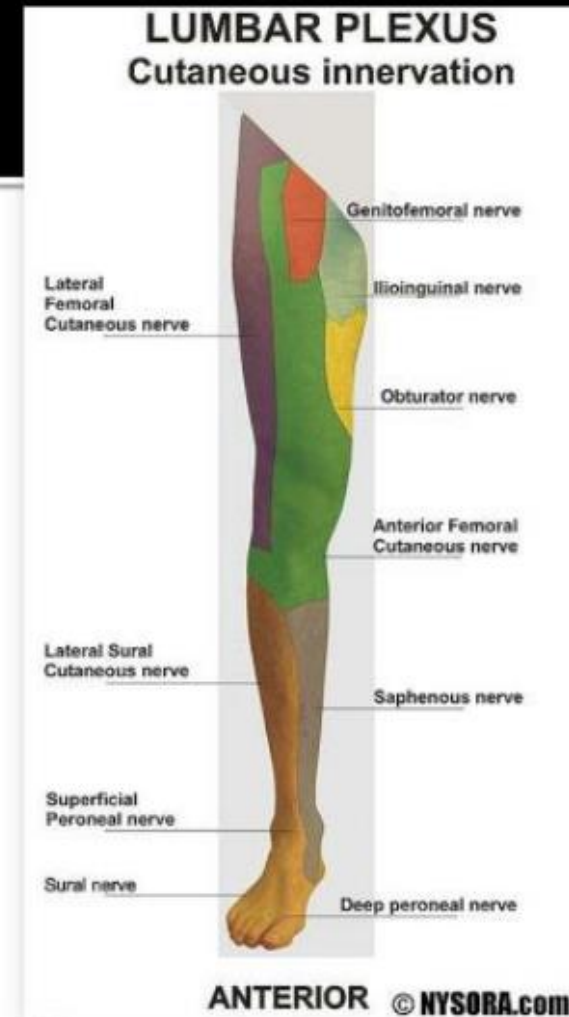
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Distribution of Anesthesia

- The femoral nerve supplies motor fibers to the quadriceps muscle (knee extension), skin of the anteromedial thigh, and the medial aspect of the leg below the knee and foot.
- The obturator nerve sends motor branches to the adductors of the hip and a highly variable cutaneous area on the medial thigh or knee joint.
- The lateral femoral cutaneous and genitofemoral nerves are purely cutaneous nerves



Complications

- Infection
- Hematoma (should not be performed in anticoagulated pts)
- Nerve injury
- Vascular puncture
- Local Anesthetic Toxicity
- Hemodynamic consequence (Spread of the local anesthetic to the epidural space may result in significant hypotension and occurs in as many as 15% of the patients)

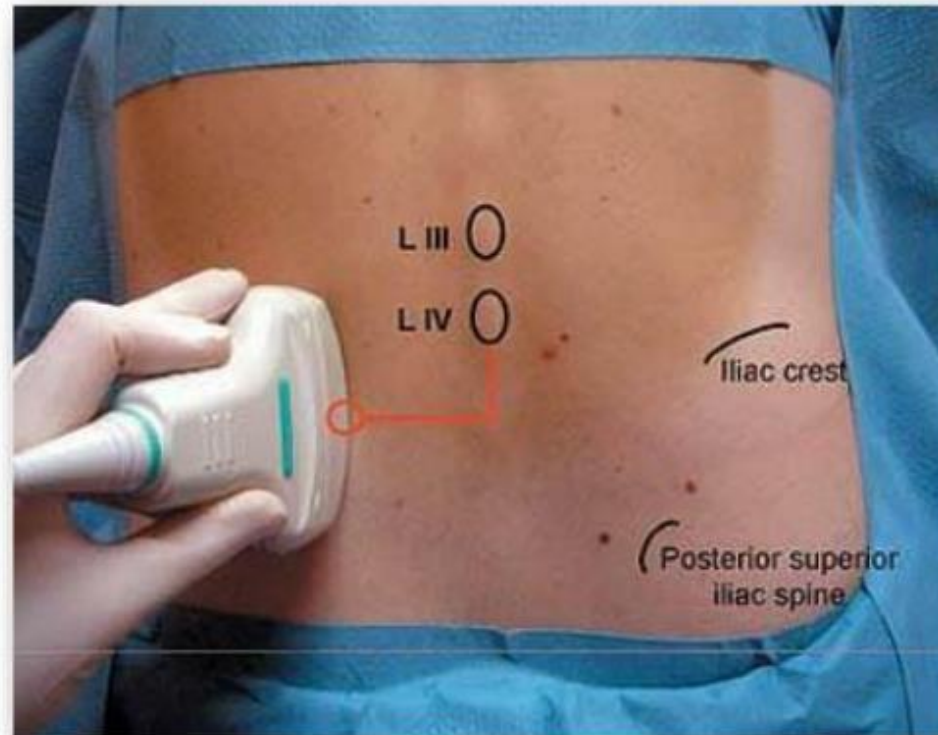
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Ultrasound Landmarks:
The transverse processes of the third and fourth lumbar vertebrae and the psoas muscle.

Transducer Type:
Linear or curved array, 3 to 7 MHz

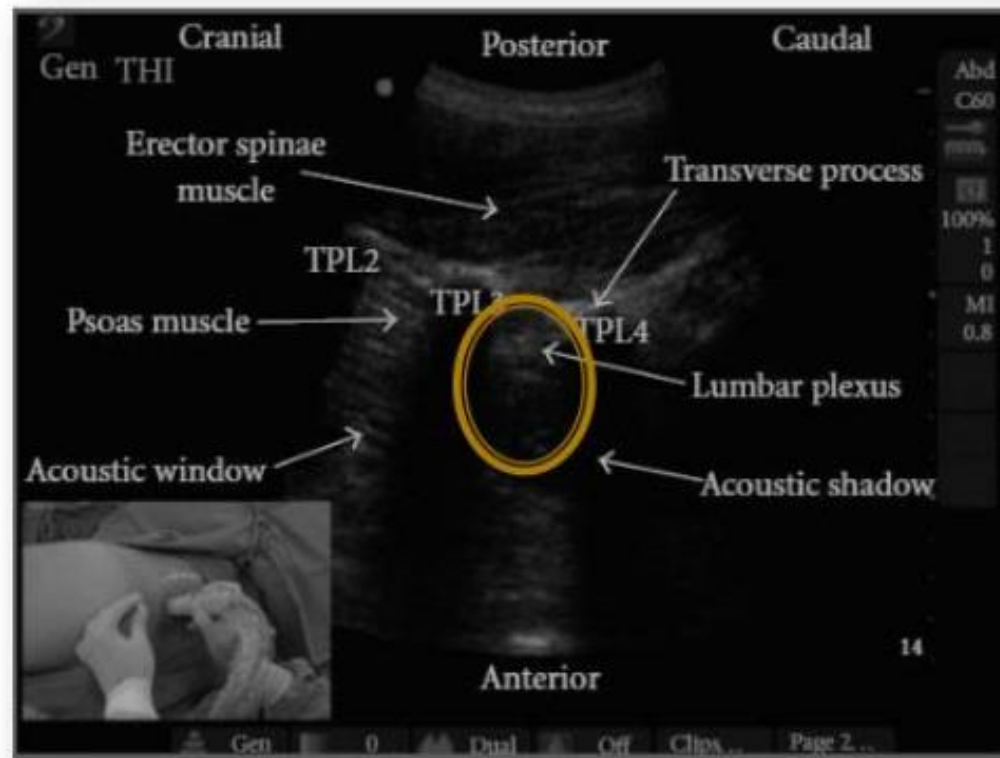
Transducer Position:
Sagittal plane, 4 to 5 cm lateral to the posterior spinous process of the fourth lumbar vertebra



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Longitudinal sonogram of the lumbar paravertebral region showing an optimal scan for lumbar plexus block **the 'trident sign'**.



Femoral Nerve Block

- Introduction
- Anatomy
- Distribution of anesthesia
- Patient positioning
- Equipment
- Nerve stimulator guided technique
- US guided technique
- Complications

Introduction

- Femoral nerve block is a *basic nerve block* technique that is easy to master.
- It carries a *low risk* of complications, and has a significant clinical applicability for surgical anesthesia and post-operative pain management.

Indications

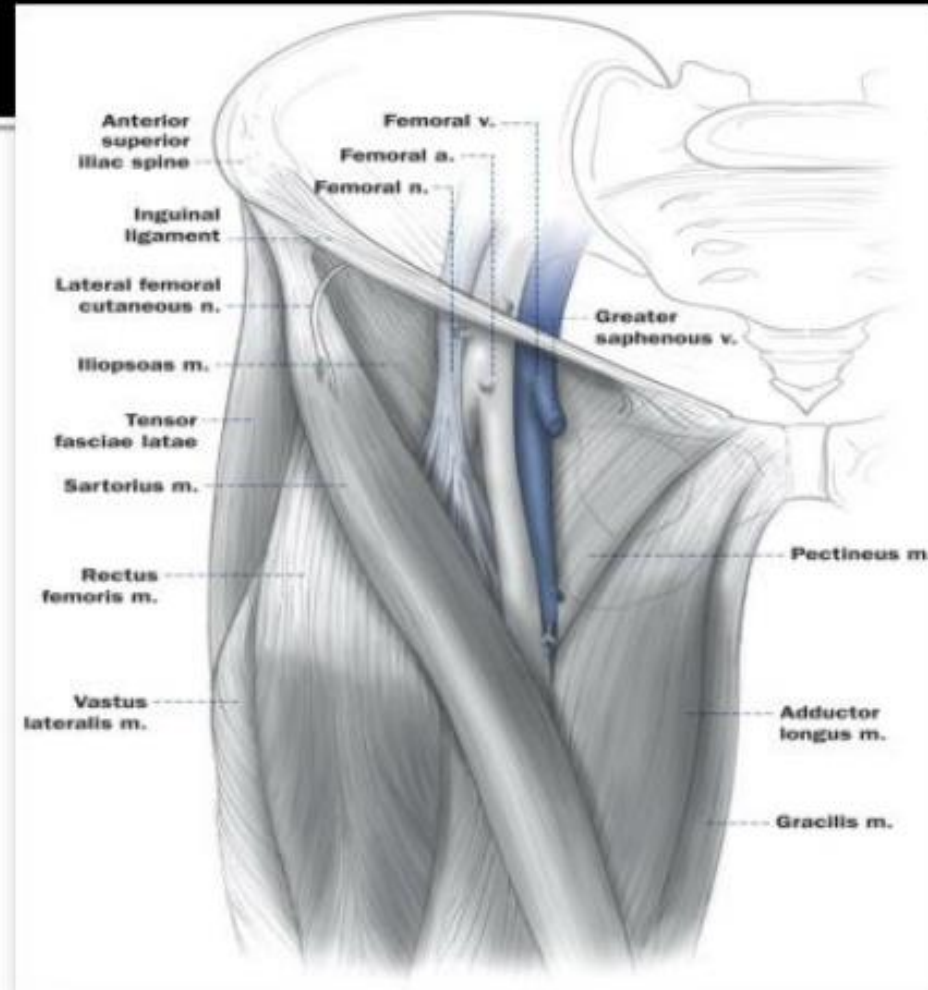
- Anterior thigh surgery
- ACL repair
- Knee arthroscopy (+ intra-articular local)
- Femur surgery
- Knee arthroplasty (pain management only)

Anatomy



Download

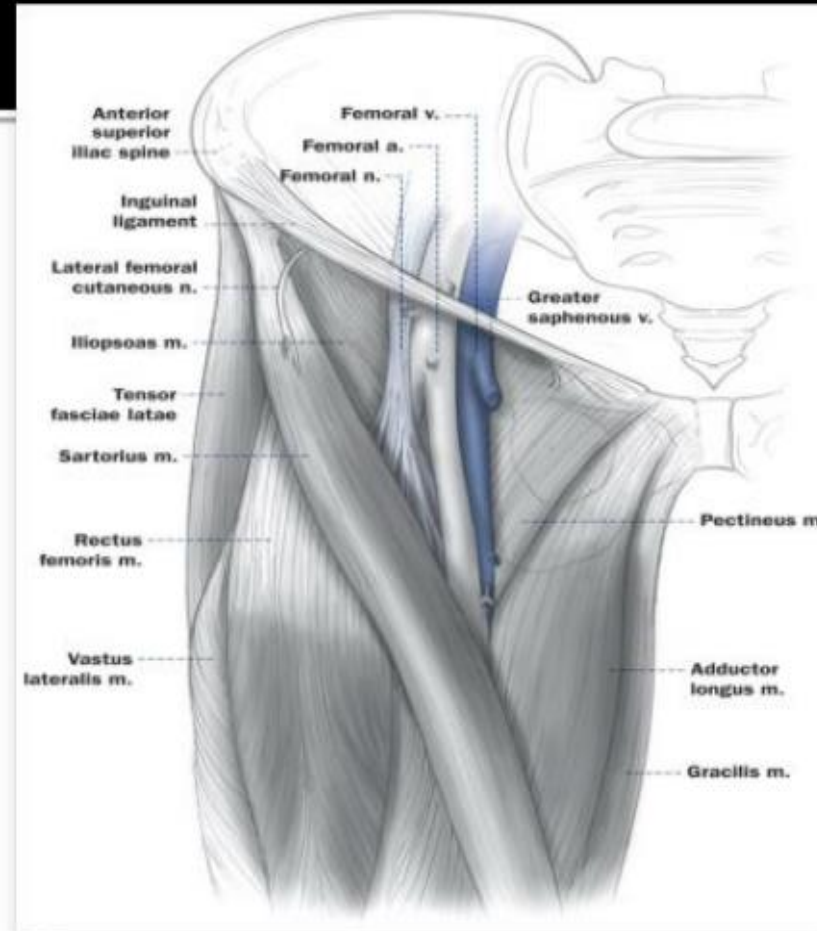
- The femoral nerve, formed by the dorsal divisions of the anterior rami of L2–L4, is the largest terminal branch of the lumbar plexus.



Anatomy



- The **femoral nerve** passes underneath the inguinal ligament into the thigh.
- As the **femoral nerve** passes underneath the inguinal ligament, it is positioned immediately lateral and slightly deeper than the femoral artery

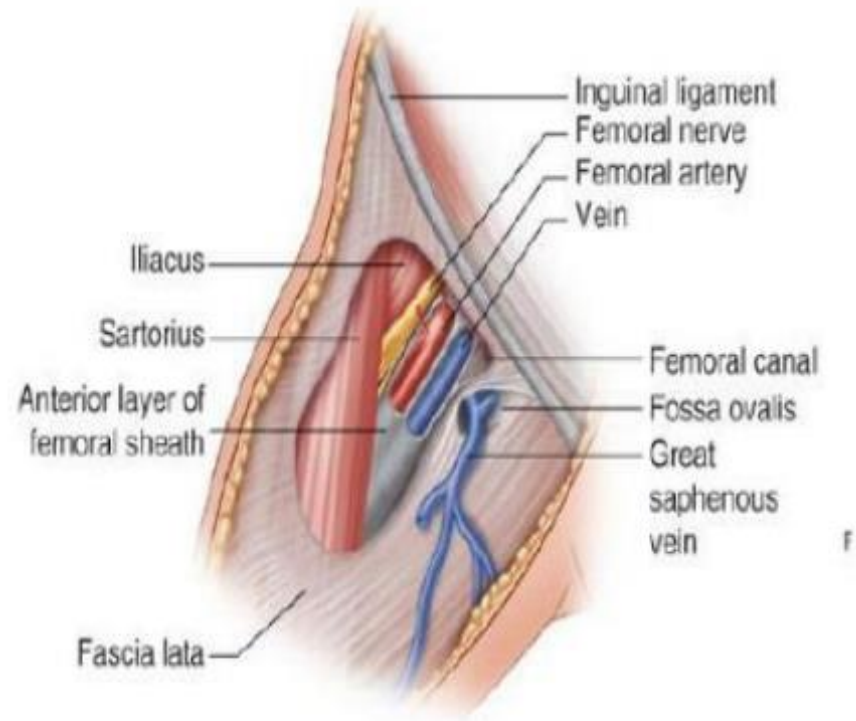


Anatomy



• At the femoral crease, the nerve is covered by the **fascia iliaca** and separated from the femoral artery and vein by a portion of the psoas muscle and the ligamentum ileopectineum.

• This physical separation of the femoral nerve from the vascular fascia explains the lack of the spread of a **"blind paravascular" injection** of local anesthetics toward the femoral nerve.



Anatomy



- After emerging from the ligament, the femoral nerve divides into an **anterior and posterior branch**. At this level it is located lateral and posterior to the femoral artery

anterior branch

Motor

Sartorius and pectineus ms

Sensory

skin of the anterior and
medial thigh

posterior branch

Motor

quadriceps muscles

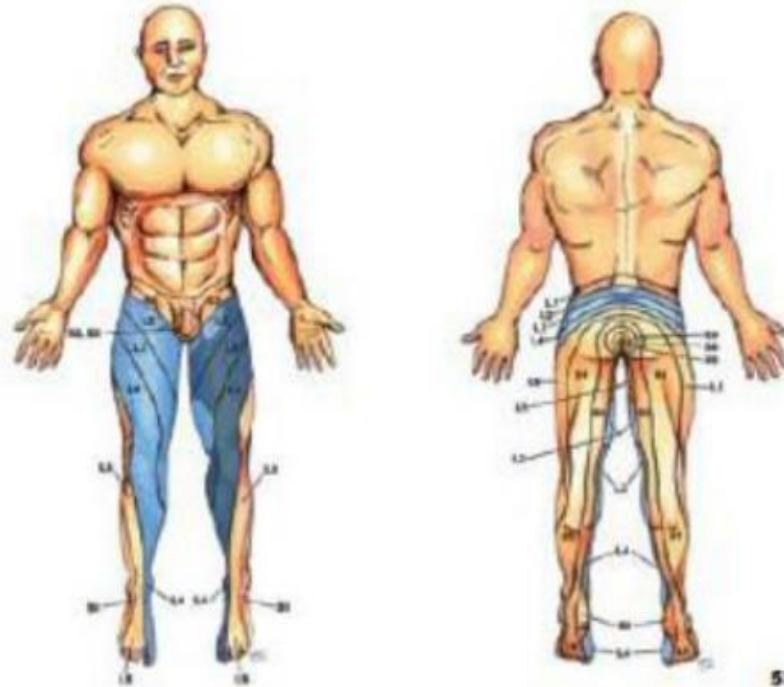
Sensory

medial aspect of the
lower leg via the
saphenous nerve

Distribution of Anesthesia



- A femoral block results in anesthesia of the entire anterior thigh and most of the femur and knee joint.
- The block also confers anesthesia of the skin on the medial aspect of the leg below the knee joint (saphenous nerve - a superficial terminal extension of the femoral nerve).



Complications



- Infection
- Hematoma
- Nerve injury
- Vascular puncture
- Others (falls)

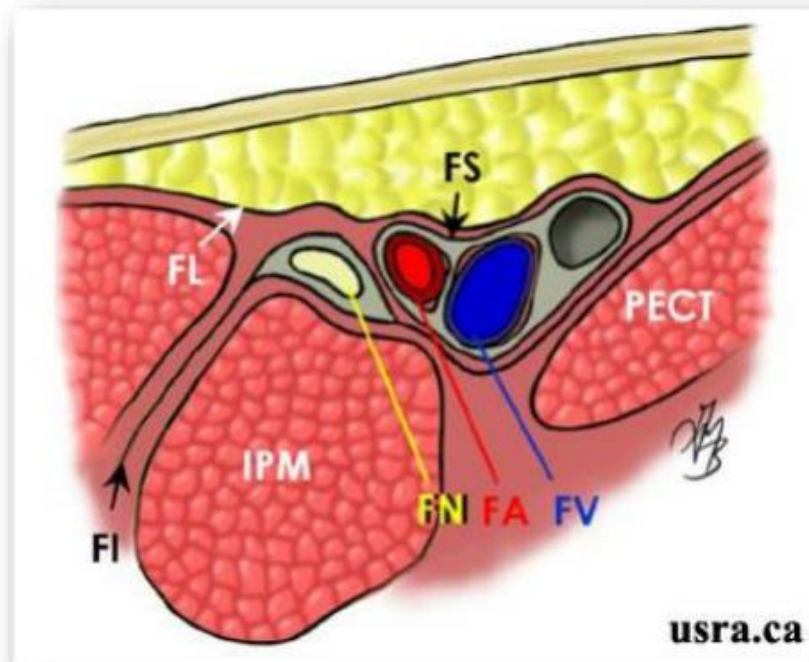
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Ultrasound

Landmarks:

The femoral artery and the femoral nerve. The nerve lies lateral or occasionally deep to the artery.



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- **Transducer Type:**
10 to 15 MHz linear array

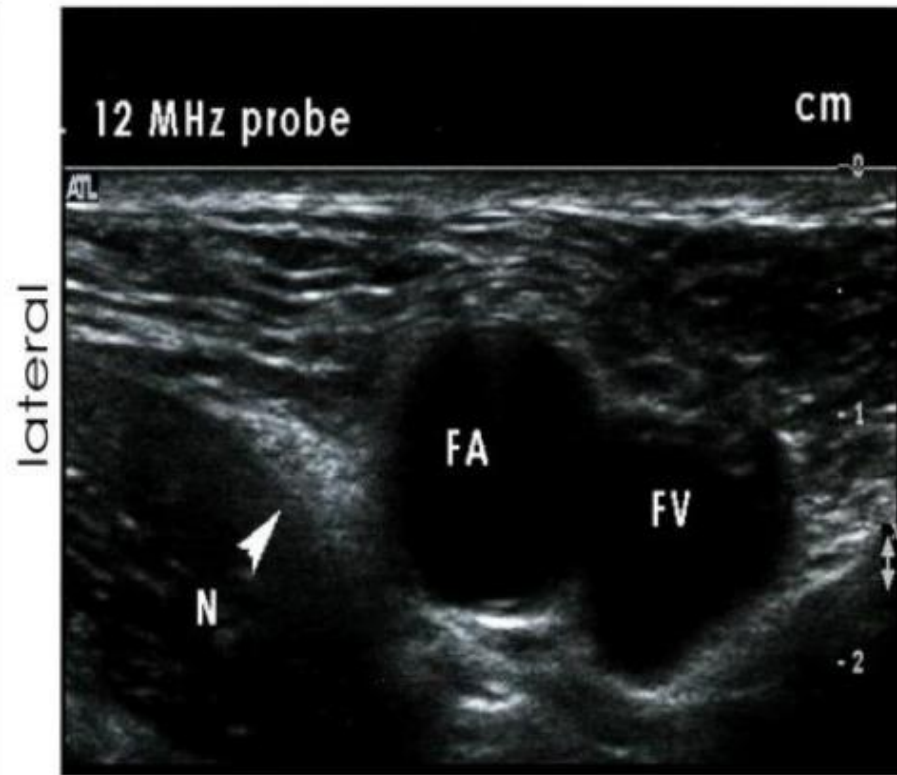
- **Transducer Position:**
The probe is located in the axial plane along the inguinal crease



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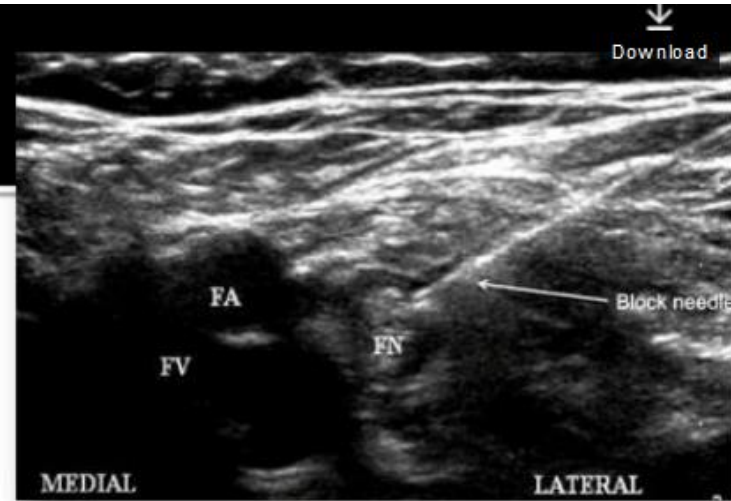
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- The femoral nerve appears as a *hyperechoic flattened oval structure* lateral to the femoral artery.



US Guided

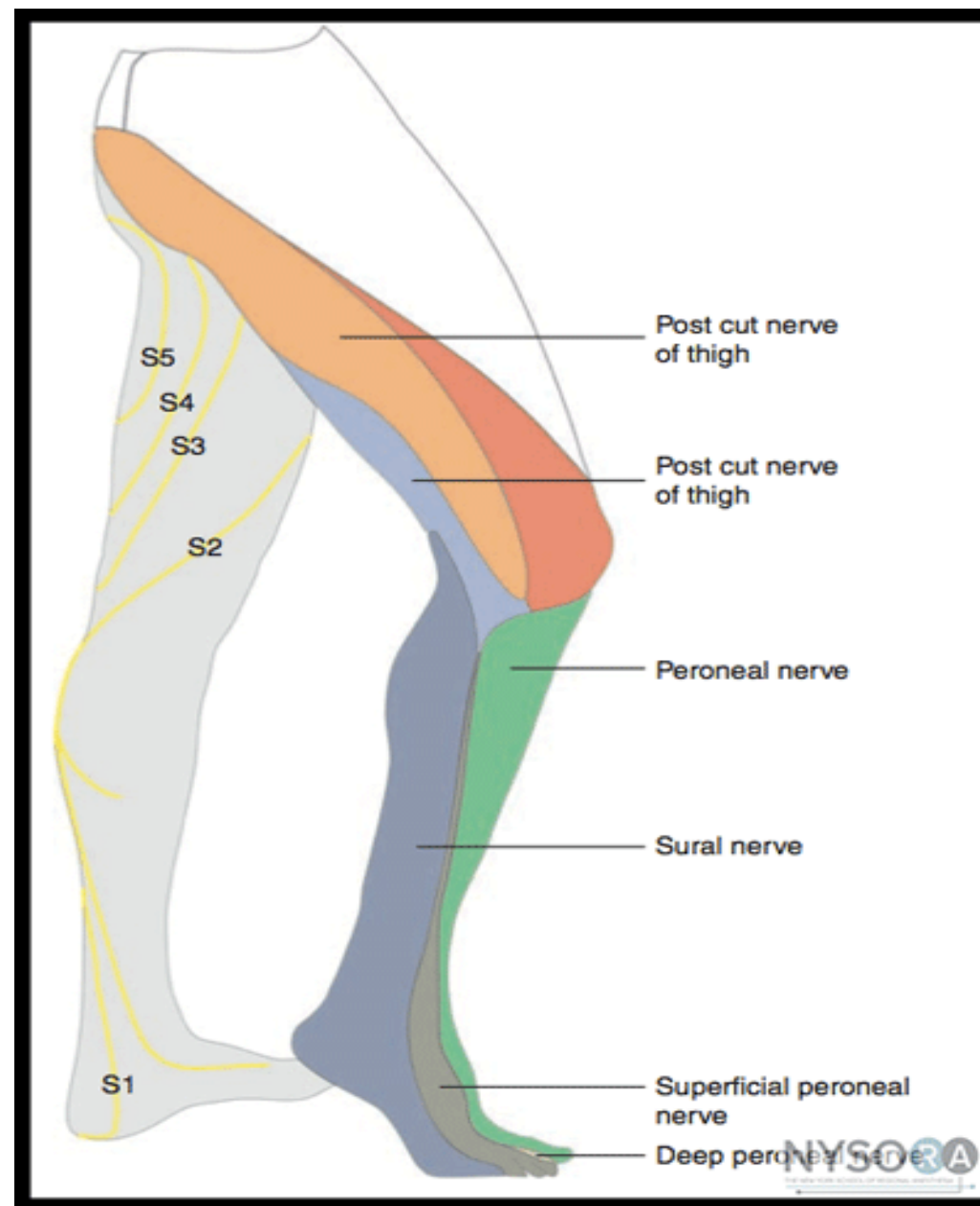
- The spread of the local anesthetic can be visualized in real time as hypoechoic solution surrounding the femoral nerve, and the needle tip is repositioned if required to ensure appropriate spread.



Sciatic Block

- The sacral plexus provides motor and sensory innervation to the entire lower extremity including hip, ankle and knee. Important components are the sciatic and posterior cutaneous nerves
- Landmarks are the greater trochanter, the posterior superior iliac spine, and the sacral hiatus.
- Twitch monitors may be used with the goal of visible or palpable twitches of the hamstrings, calf muscles, foot or toes.
- The patient needs adequate sedation; commonly painful. Onset of block usually occurs in 10-25 minutes.
- It provides for complete anesthesia of the leg except for the medial strip of skin innervated by the saphenous nerve. Combined with a femoral block, complete anesthesia of the leg may be achieved.
- More discreet posterior blocks are generally used

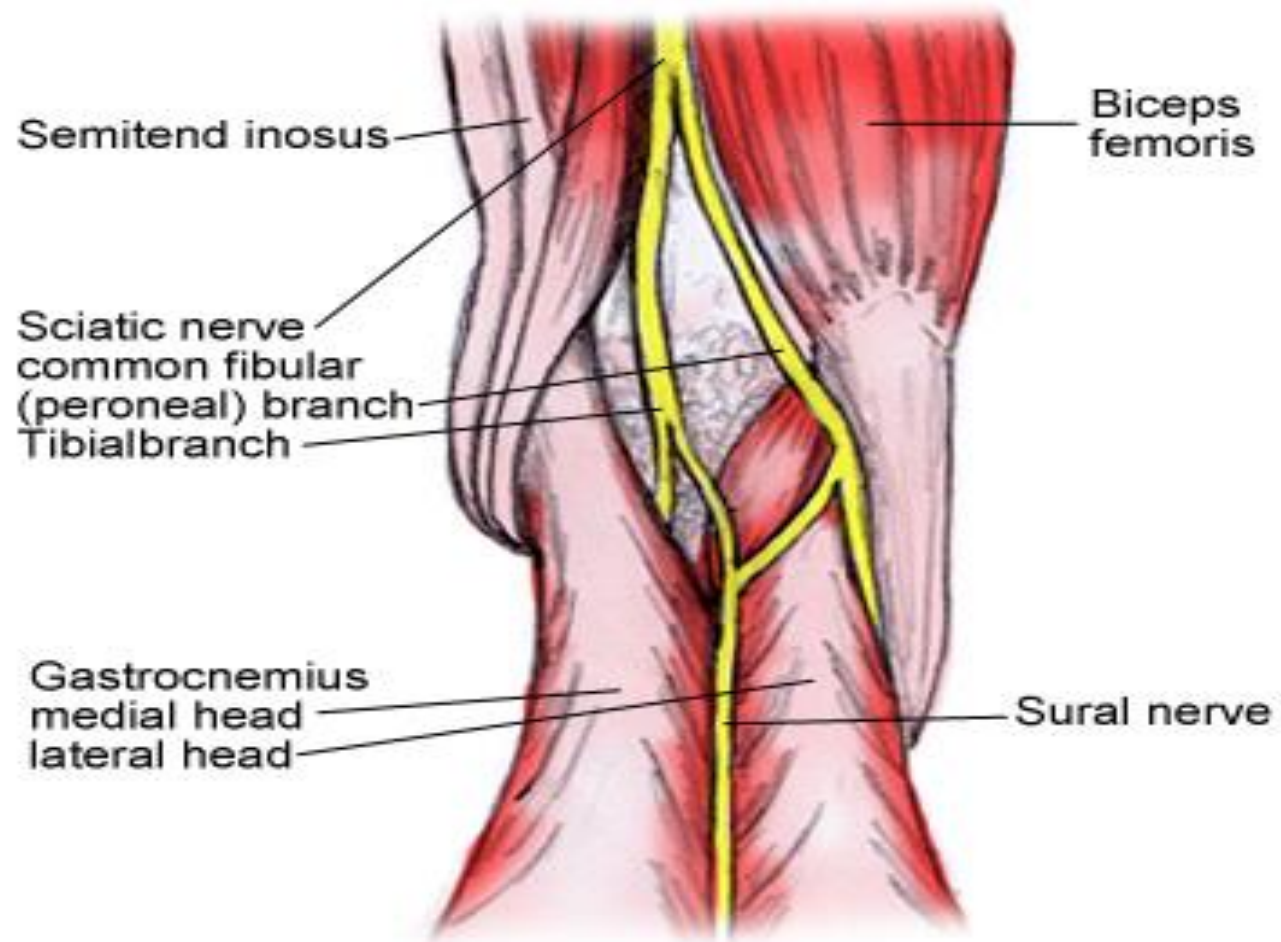
Sciatic Nerve Block

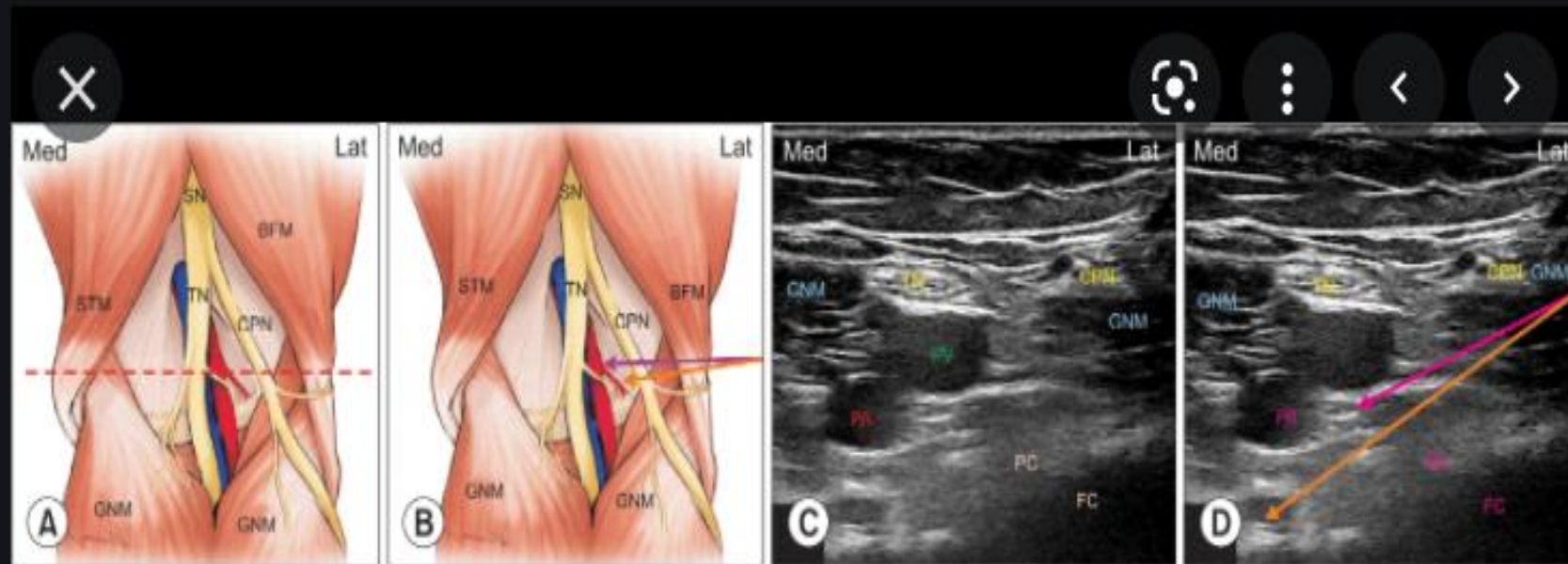


Popliteal Sciatic Block

- Anesthetizes the entire leg below the tibial plateau except the skin of the medial aspect of the calf and foot (saphenous nerve distribution)
- The popliteal block is performed on the sciatic nerve proximal to this bifurcation; about 10 cm from the popliteal crease.
- Landmarks include the popliteal crease, tendons of the biceps femoris and the semitendinosus muscles
- Used for minor surgeries of the distal lower leg, foot or ankle

Popliteal fossa





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Popliteal Sciatic Block

- Pt. is positioned in the prone position or in a modified exaggerated lateral position with the leg to be blocked uppermost and flexed at the knee touching the bed and the underlying leg straight.
- Advantages are improved calf tourniquet tolerance and an immobile foot.
- Complications may be persistent foot drop with potential pressure necrosis

Popliteal-sciatic block: two approaches

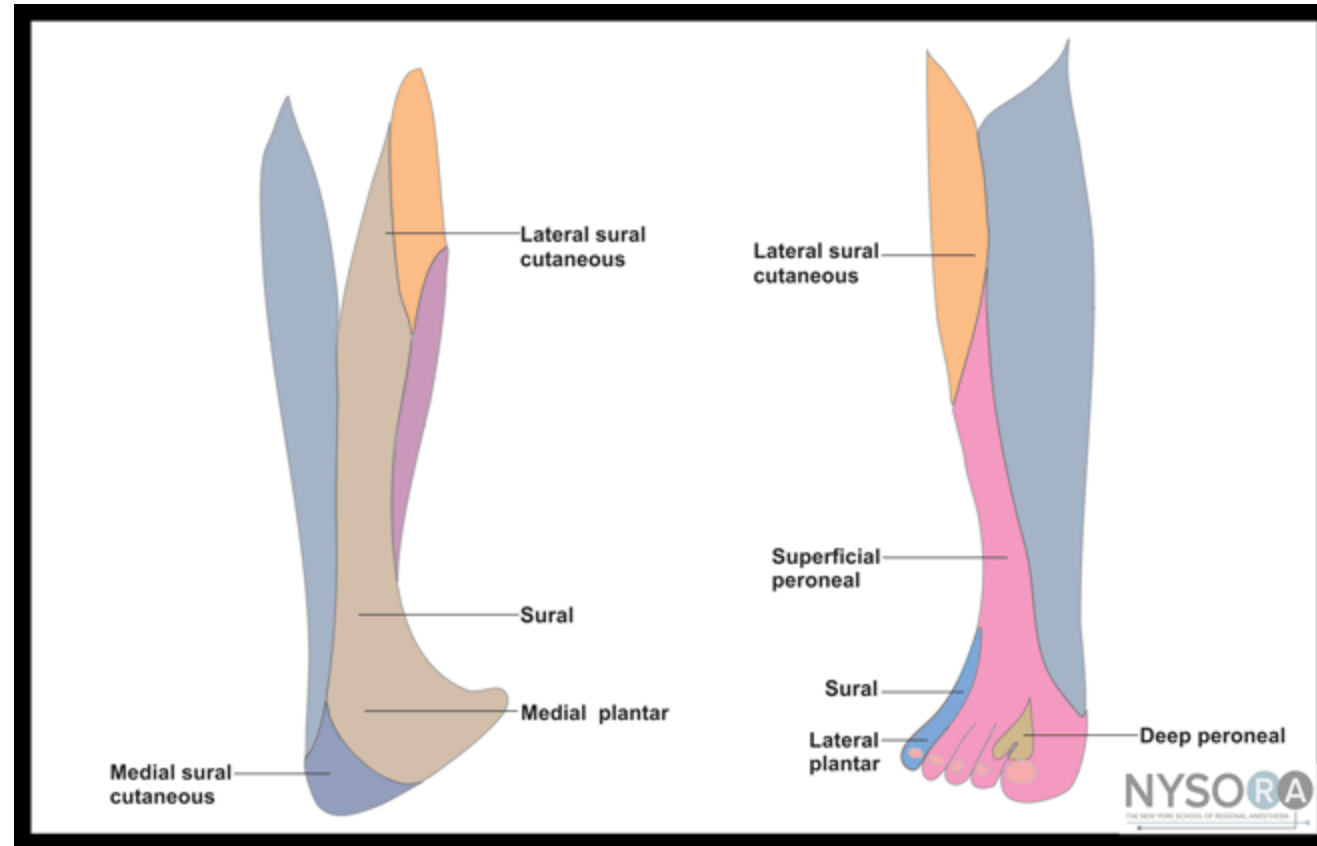


Prone



Supine

Sensory distribution of block except blue area



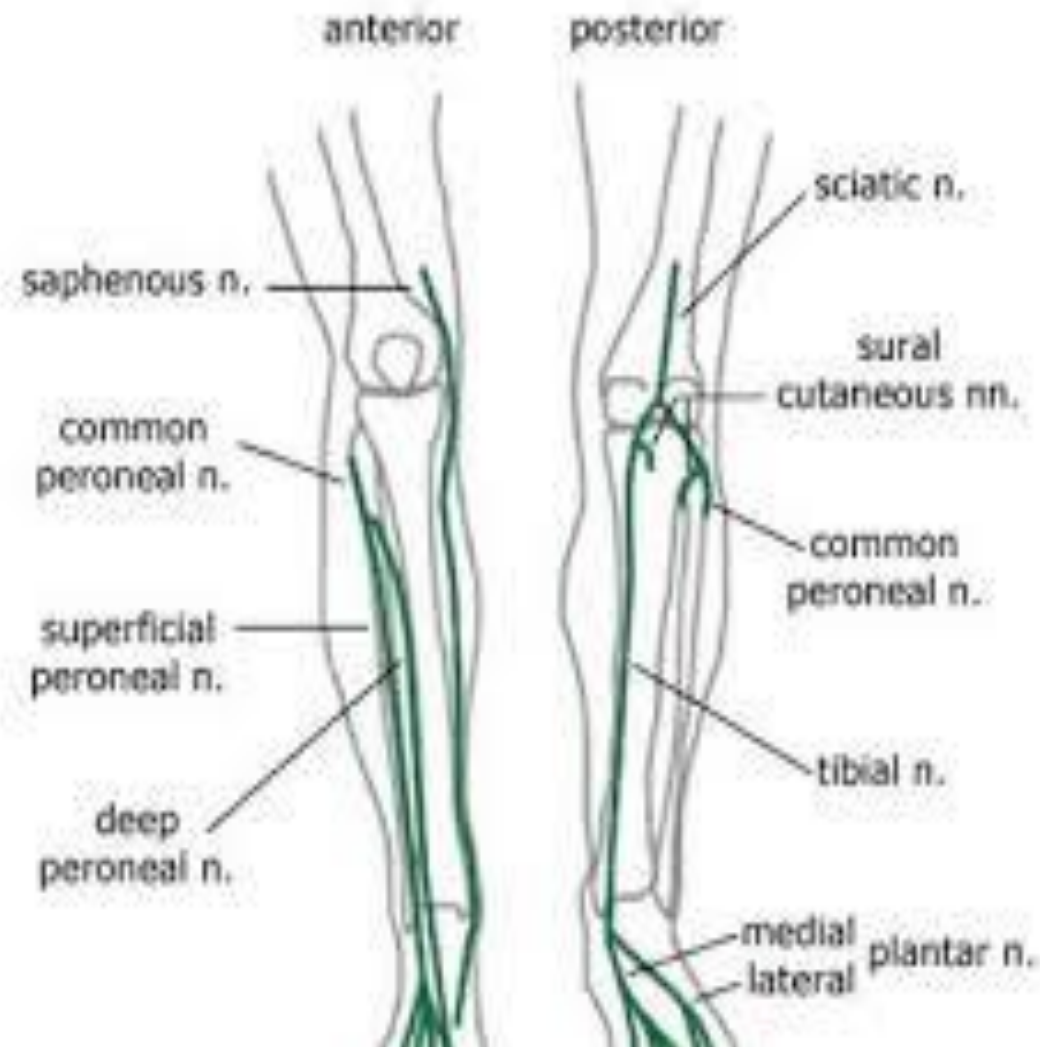
Ankle block

- The ankle block is performed at the tibial nerve and the deep and superficial aspects of the peroneal nerve. The peripheral nerves at the ankle and metatarsal level are the terminal branches of the sciatic (posterior tibial, superficial peroneal, deep peroneal, sural) and femoral saphenous nerves.
- Indicated for surgery of the foot.
- The pertinent landmarks are the posterior tibial and dorsalis pedis arteries, tendon of the hallucis longus and

Ankle Block

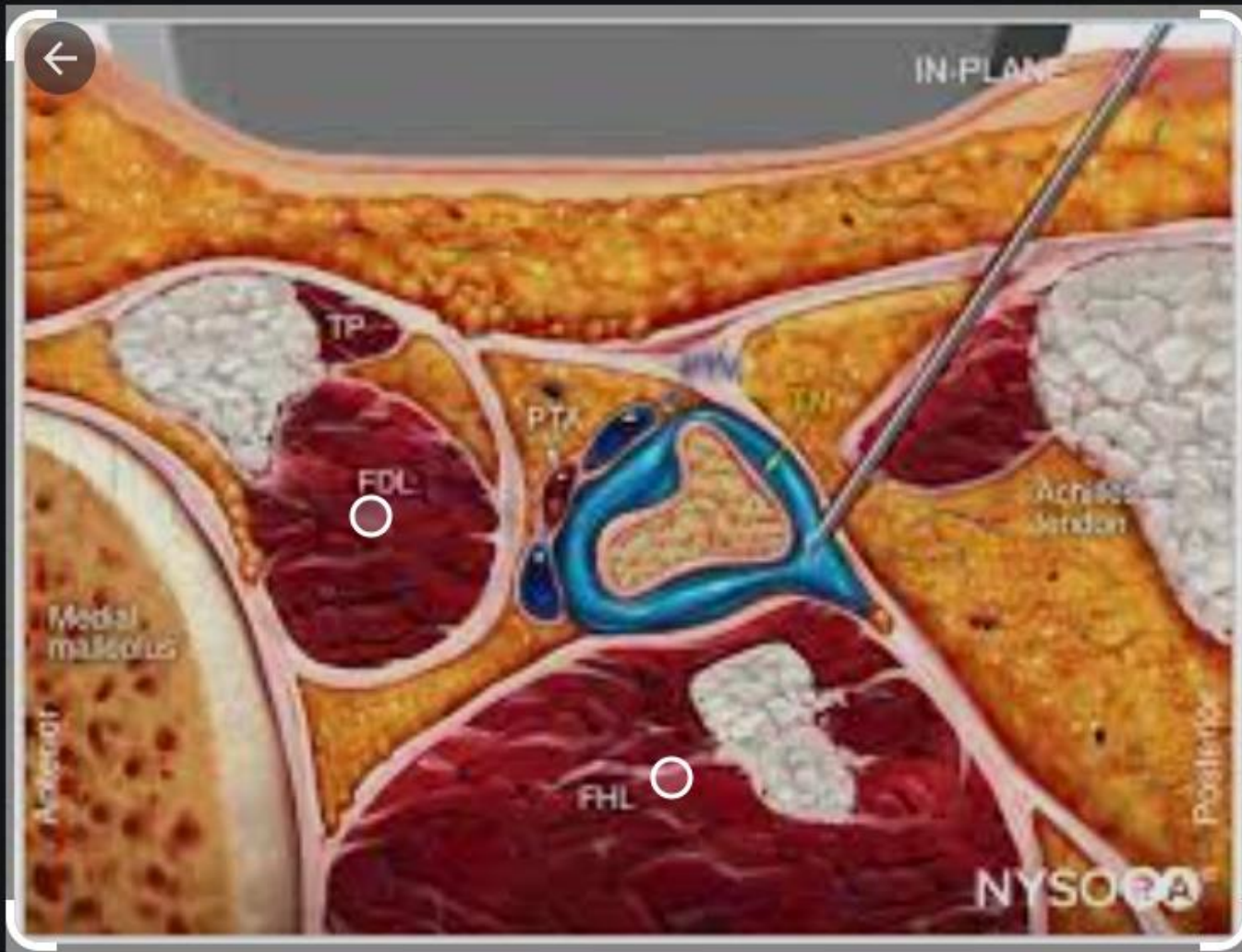
- Patient is positioned in a supine position. Elevation of the patients calf permits the various insertion sites (ring-like) to be more easily accessed.
- An uncomfortable block requiring 5 different injections
- Epinephrine is contraindicated. Potential arterial vasoconstriction may lead to foot and/or toe ischemia secondary to the lack of collateral circulation at that location.

Lower extremity nerve anatomy



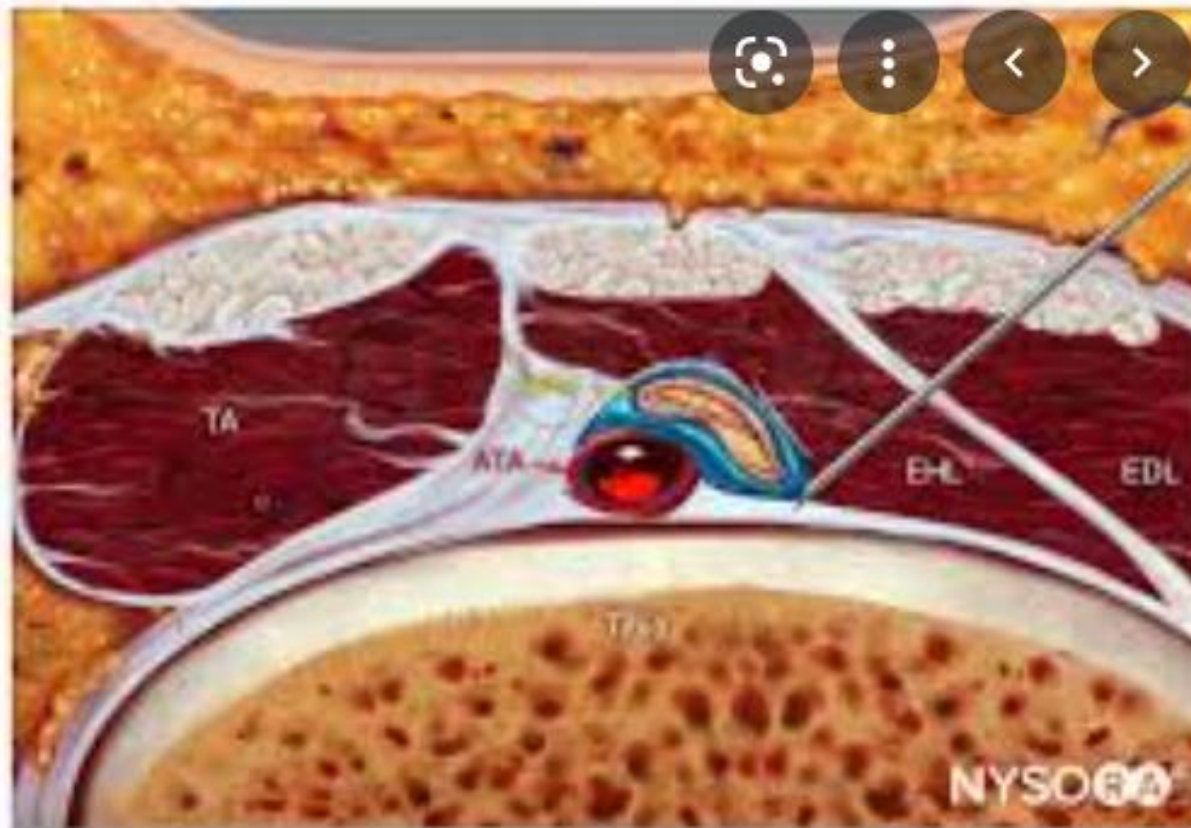
Ankle Block

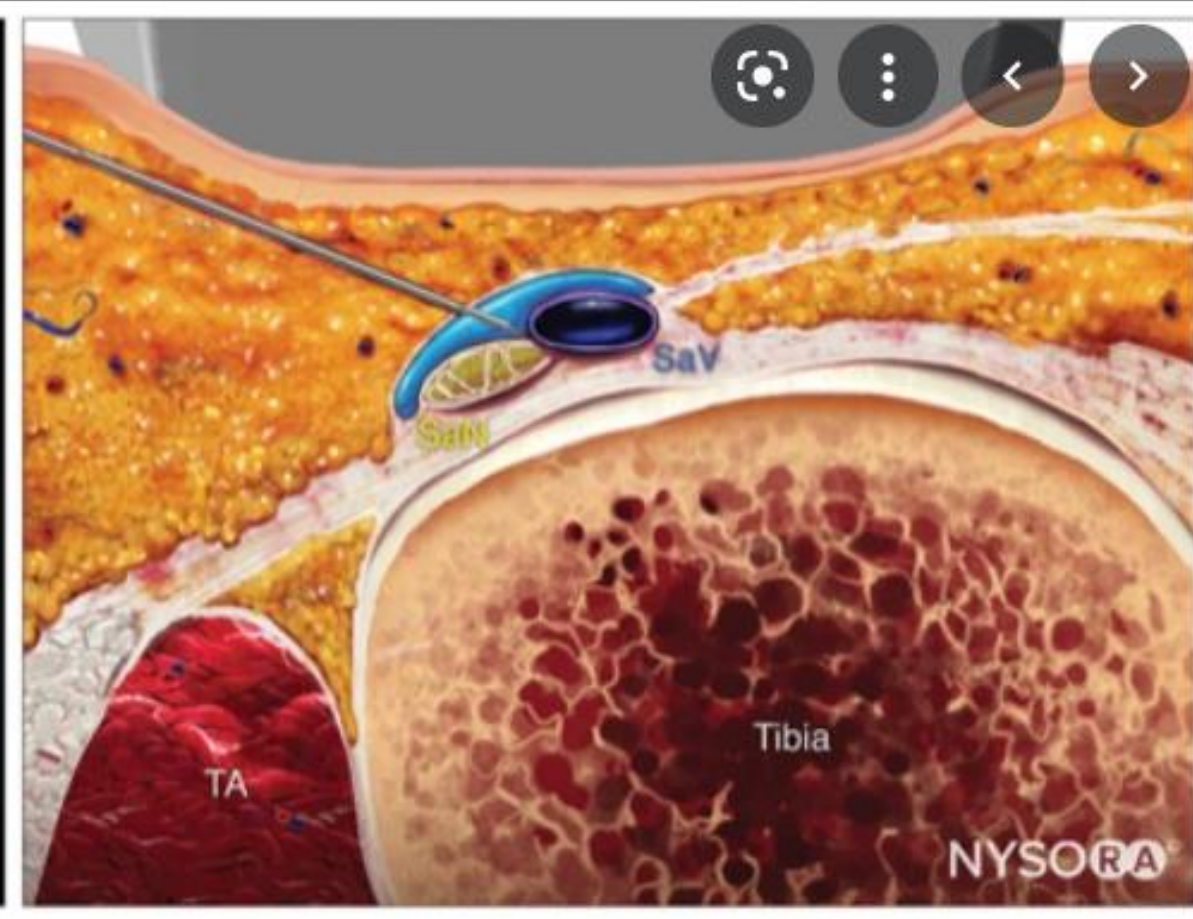


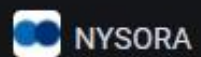




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Ultrasound-Guided Ankle Block: NYSORA Web App - NYSORA

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