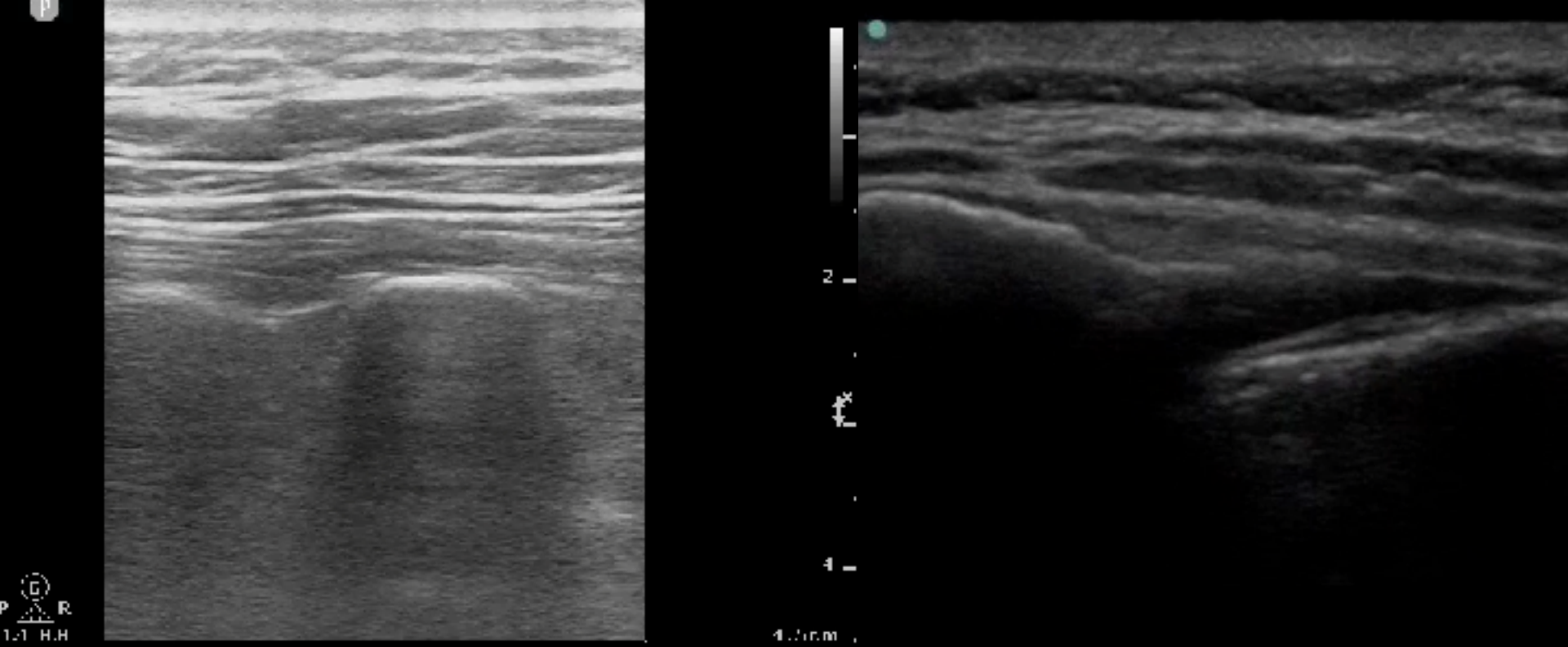




NERVE BLOCKS IN ED TRUNK

陳國智醫師 雙和醫院急診醫學科

juice119@gmail.com

POCUSacademy.com

Resuscitative
急救復甦

Diagnostic
臨床診斷

Procedural
Guidance
處置導引

Symptom- or
Sign-Based
症狀導引

Therapeutic
輔助治療



Core Applications (2023 ACEP Emergency Ultrasound Guidelines)
15項急診超音波核心應用

陳國智醫師

Aorta

DVT

Trauma

Thoracic/Airway

Cardia/HD assessment

Procedural Guidance

US-guided NB

Testicular

Ocular

Skin & Soft tissue

Hepatobiliary

Urinary tract

Pregnancy

Bowel

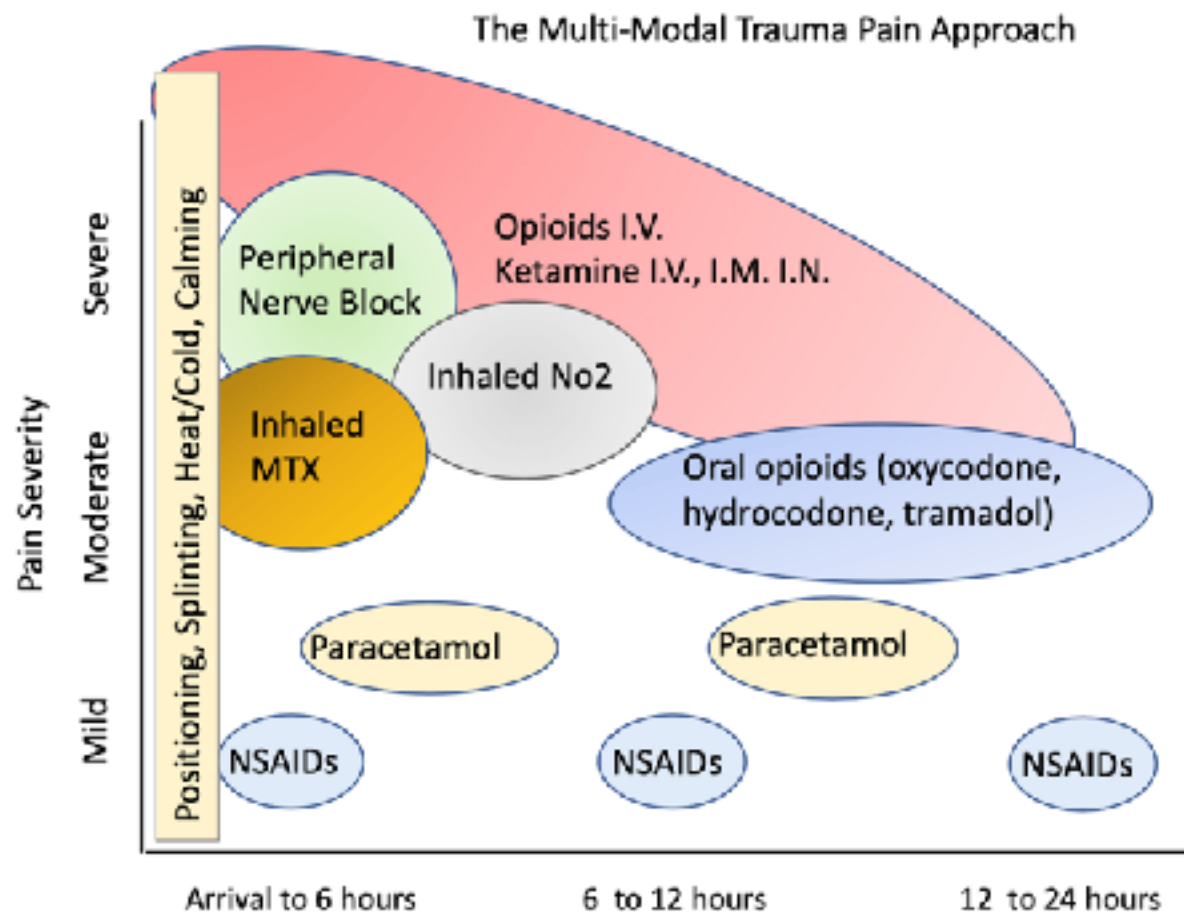
MSK



Review

The Pain Management of Trauma Patients in the Emergency Department

Andrea Fabbri ^{1,*}, Antonin Voza ², Alessandro Riccardi ³, Sossio Serra ⁴
and Fabio De Iaco ⁵ on behalf of the Study and Research Center of the Italian Society of Emergency Medicine (SIMEU)





熟悉解剖

臨床情境

穩定運針

辨識血管

利弊分析

小心LAST



Ultrasound for Interventional Pain Management

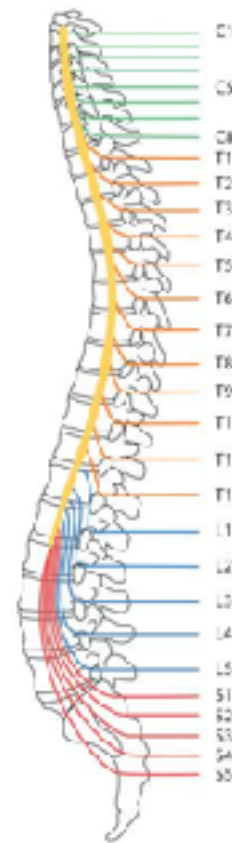
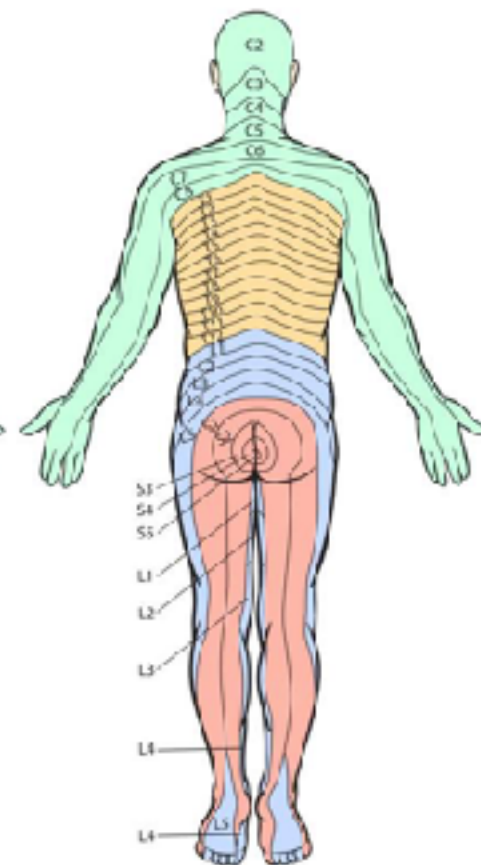
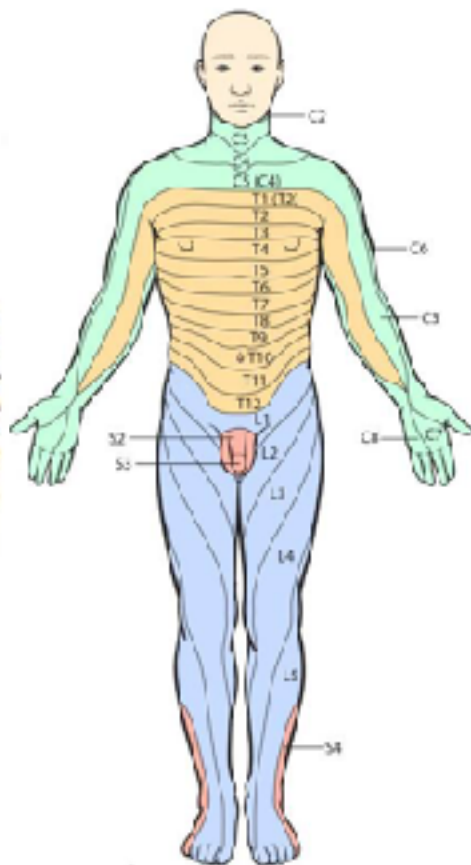
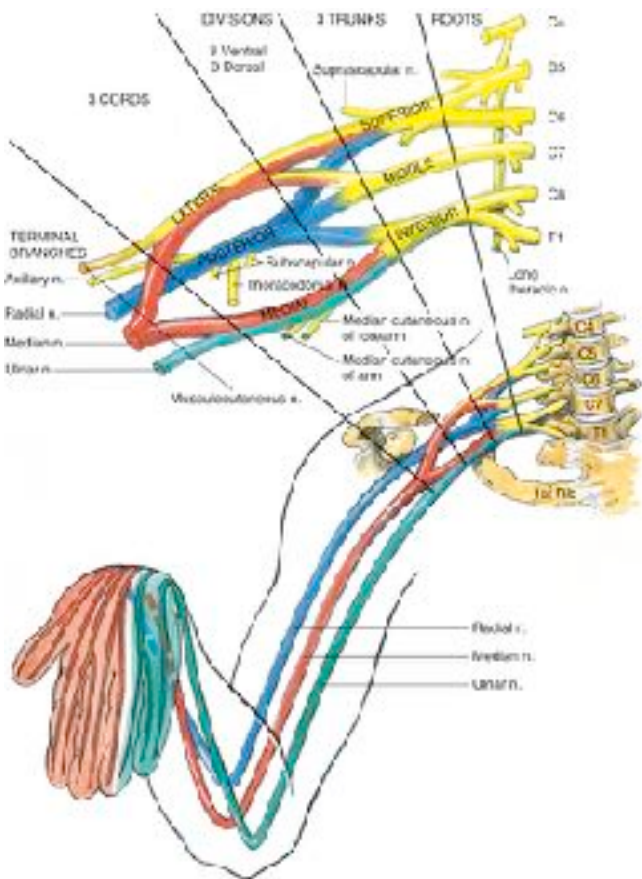
An Illustrated Procedural Guide

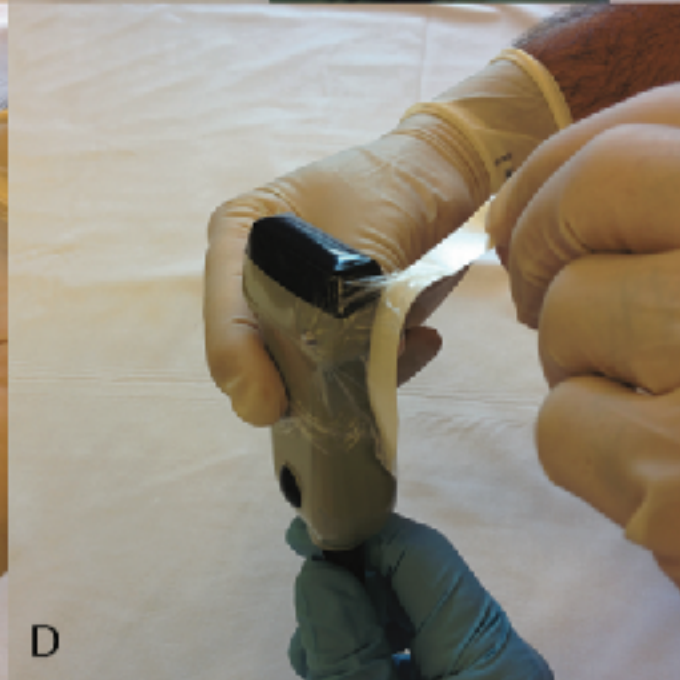
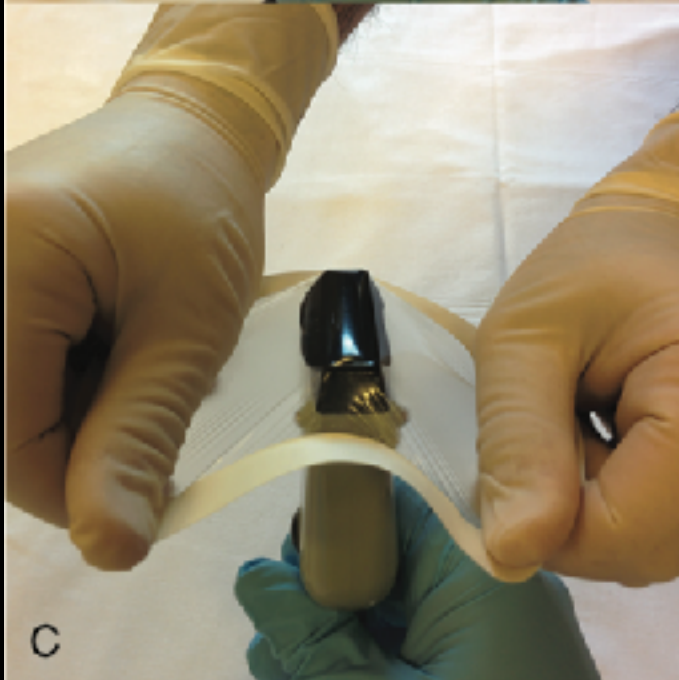
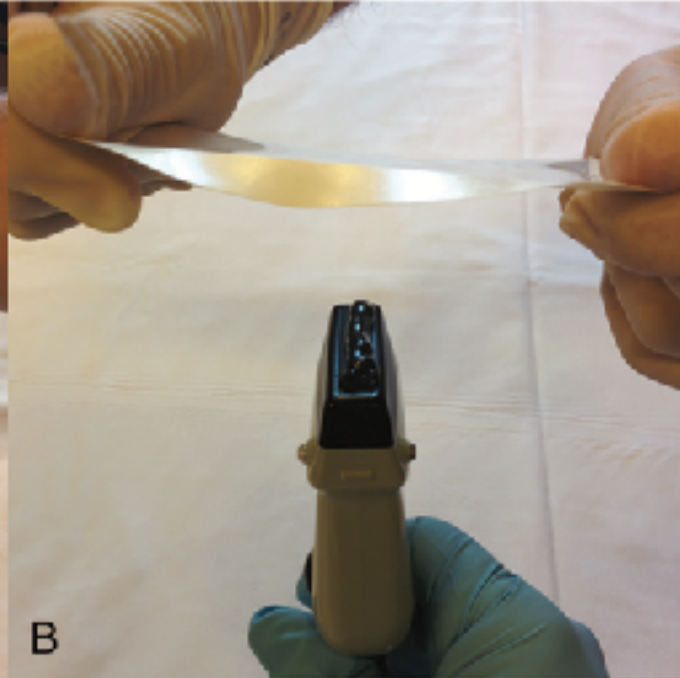
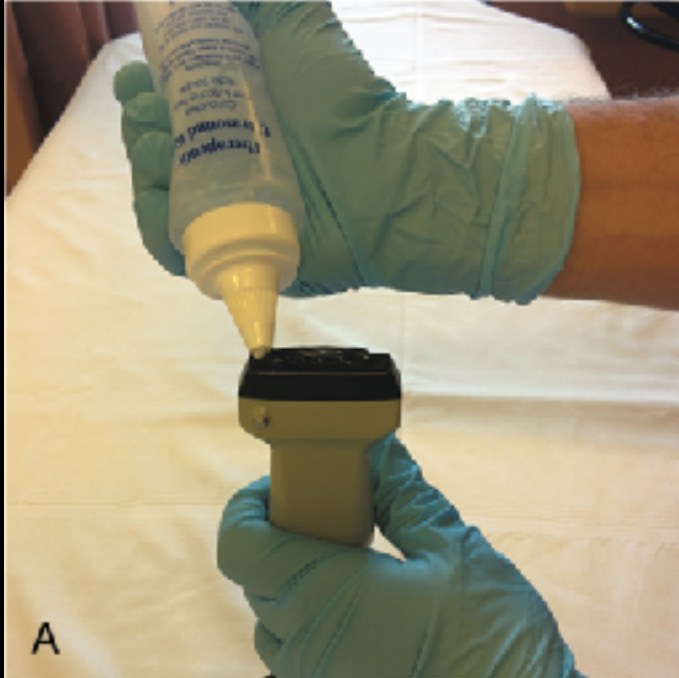
Philip Peng
Roderick Finlayson
Sang Hoon Lee
Anuj Bhatia
Editors

The Ultimate Guide to Point-of-Care Ultrasound-Guided Procedures

Srikanth Adhikari
Michael Blais
Editors

2024 ICEM





NIPRO

単位使用皮下注射用針

ニプロ カテラン針 GA

無菌状態を維持
ガンマ線照射済み 使用1回限り

100本入

本製品は使用中、損傷防止包装を破損し、
2. 露光存放時、照射による放射線量が増加する
3. 照射による放射線量が増加する
4. 照射による放射線量が増加する

ニプロ カテラン針 GA 21G x 70mm | 30A

NIPRO

単位使用皮下注射用針

ニプロ カテラン針 GA

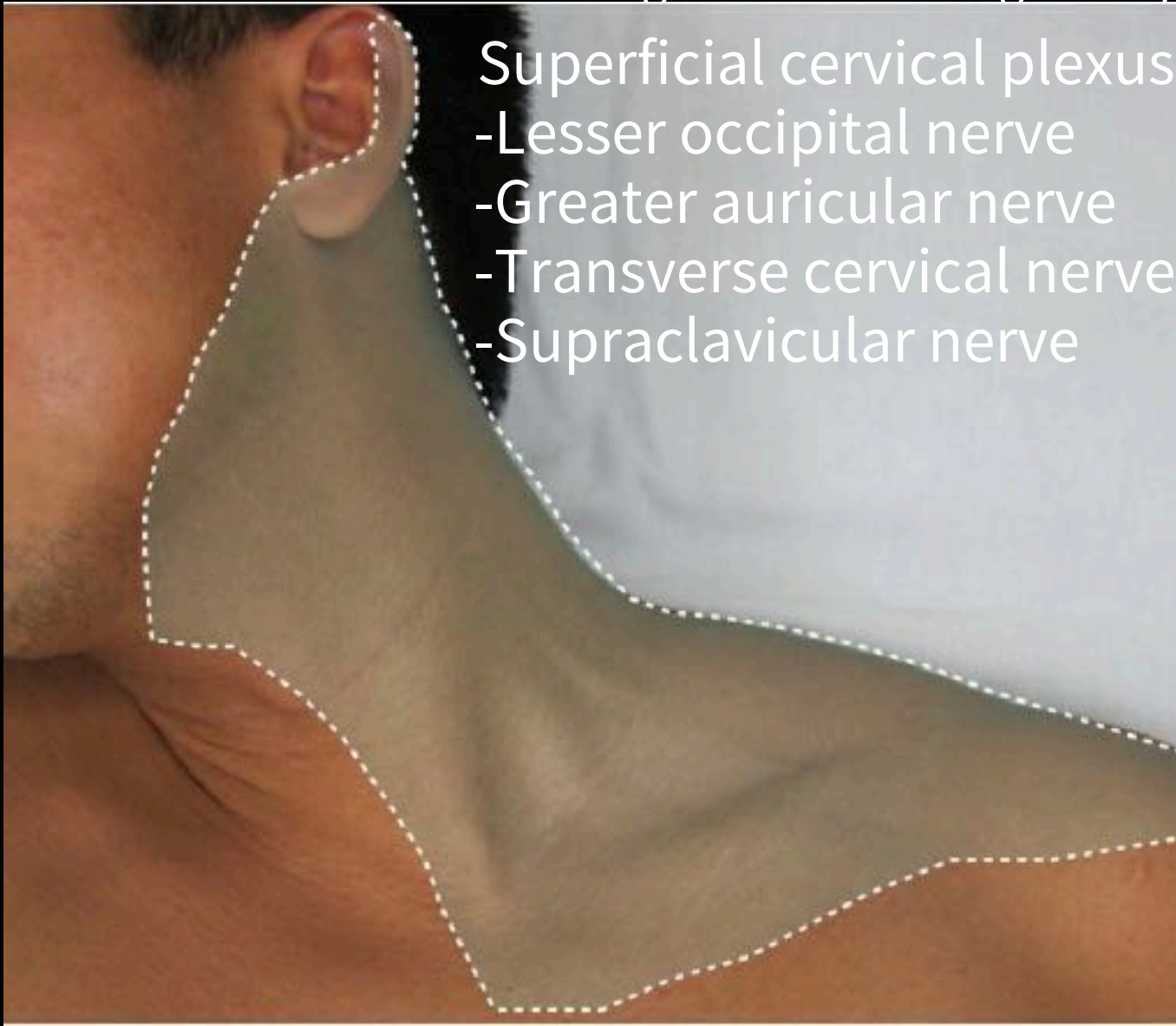
無菌状態を維持
ガンマ線照射済み 使用1回限り

100本入

1. 使用中、損傷防止包装を破損し、
2. 露光存放時、照射による放射線量が増加する
3. 照射による放射線量が増加する
4. 照射による放射線量が増加する

SCP sensory distribution

The ultimate guide to POCUS-guided procedures



Superficial cervical plexus

- Lesser occipital nerve

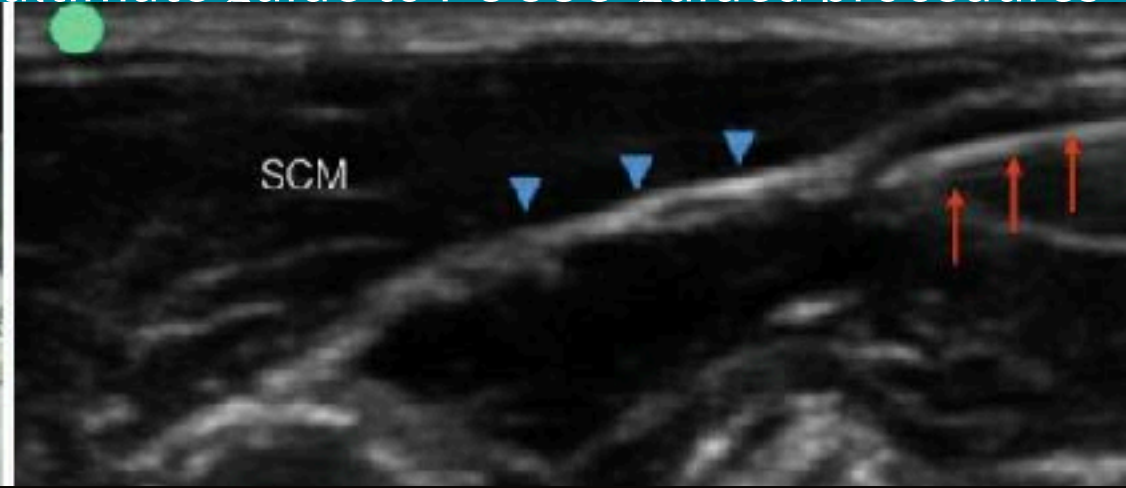
- Greater auricular nerve

- Transverse cervical nerve

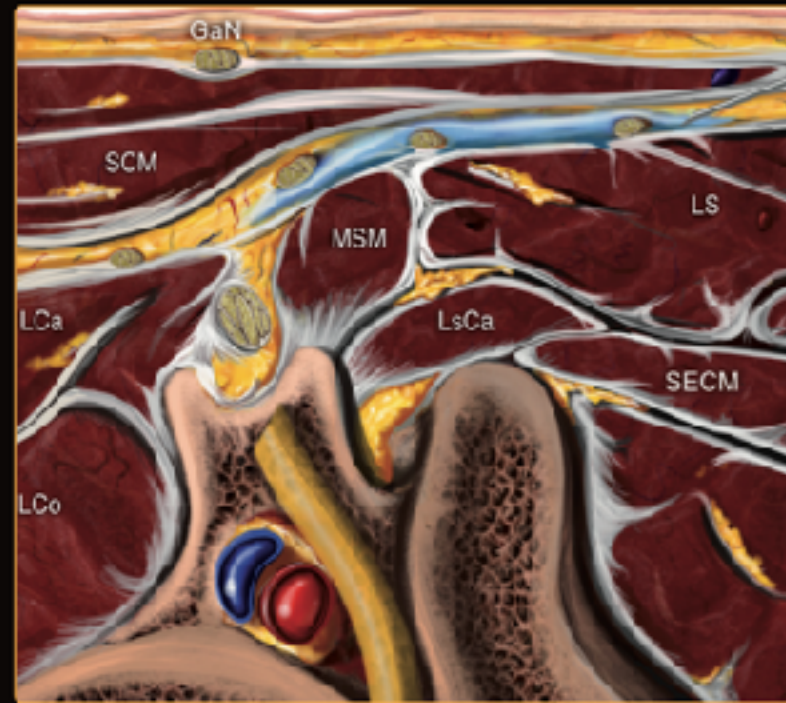
- Supraclavicular nerve

SCP block: in-plane approach

The ultimate guide to POCUS-guided procedures

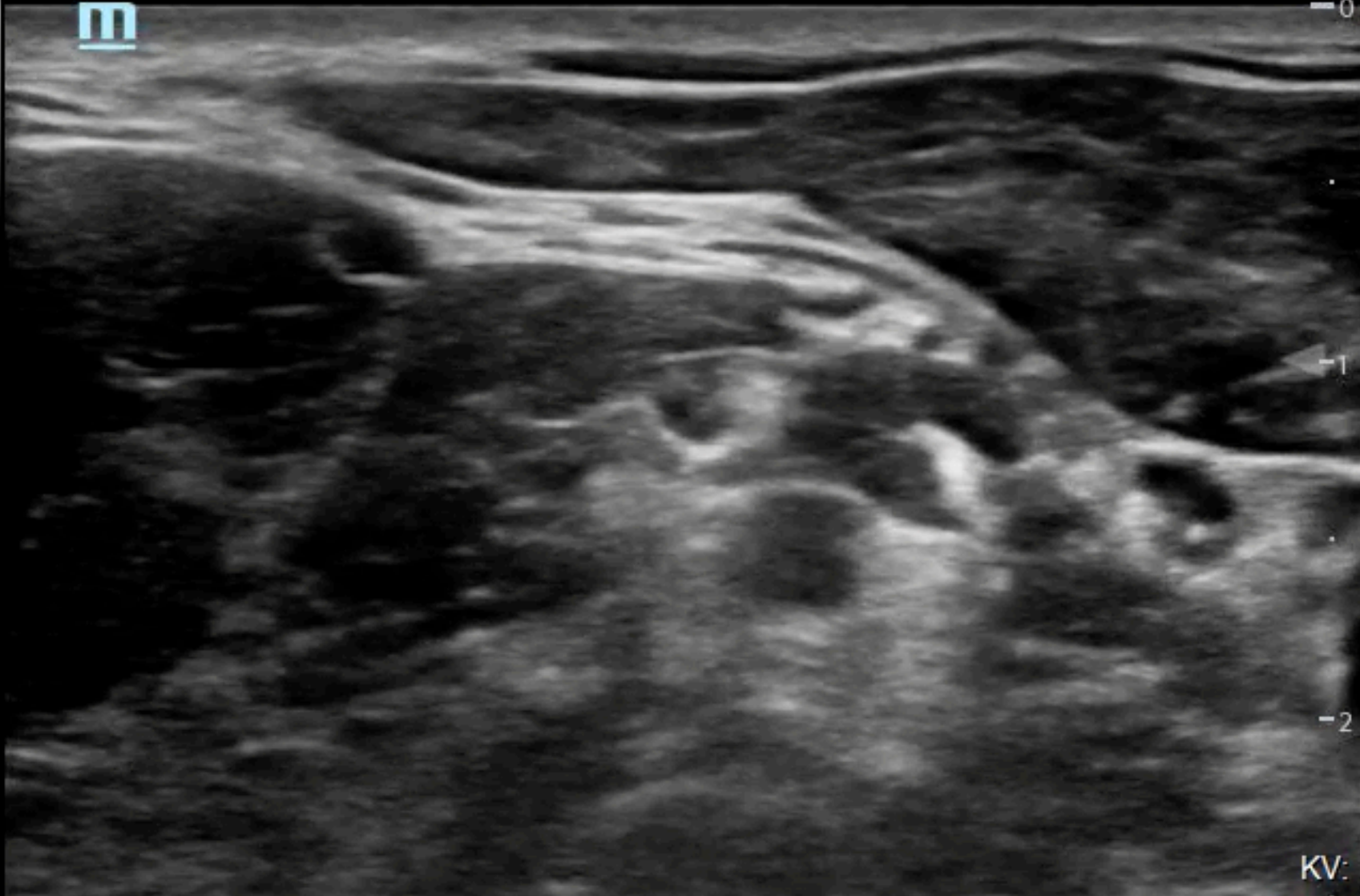


LA: 5-8 ml



SCP block

F 6.6~13.0
DR 115
FR 45
D 2.5
G 60



0

-1

-2

KV:

mséc

ALQ

iNeedle

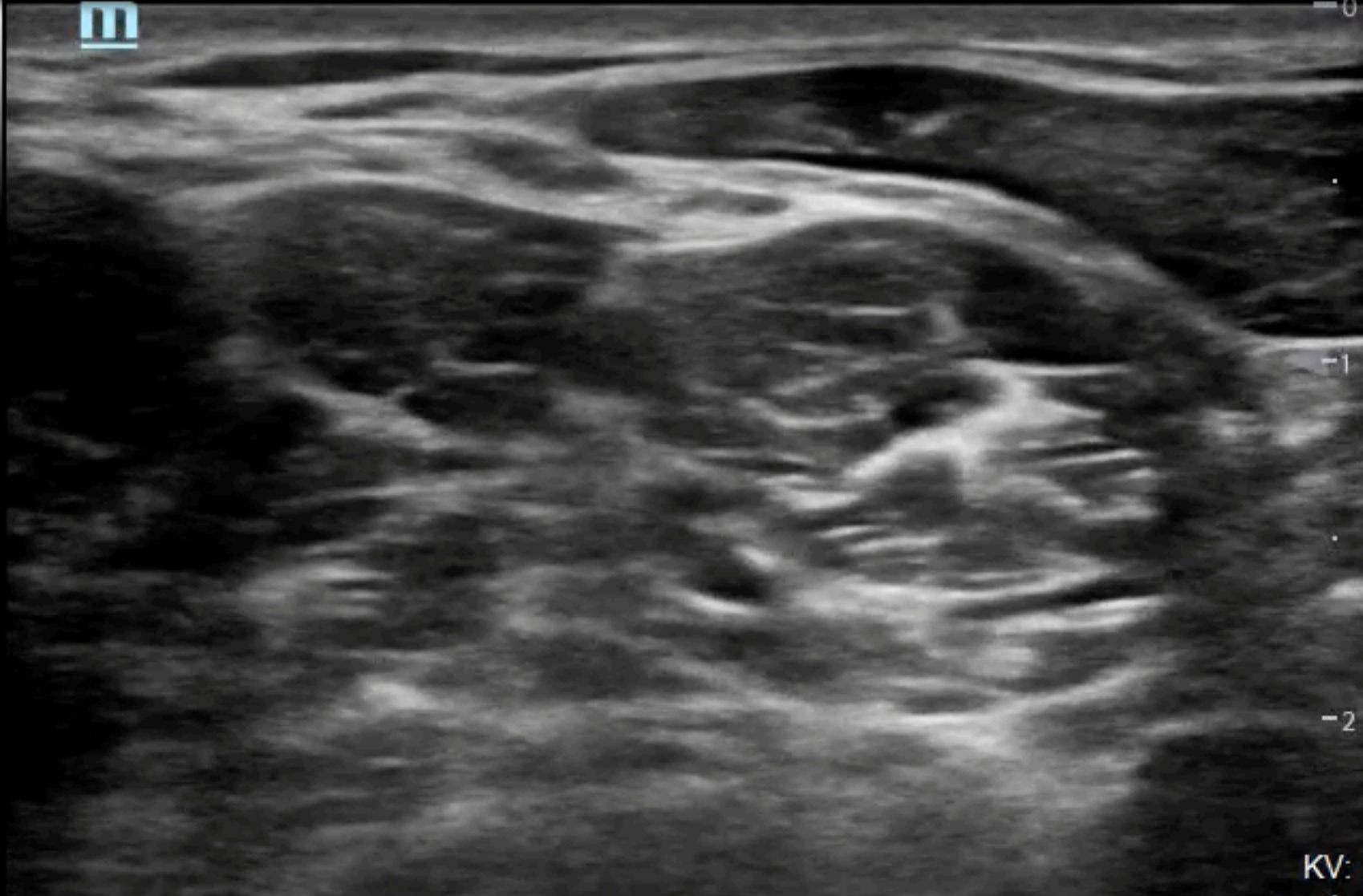
iTouch

thk: mm

DFOV:

Supraclavicular nerve

DR 115
FR 45
D 2.5
G 60



0
-1
-2

iNeedle

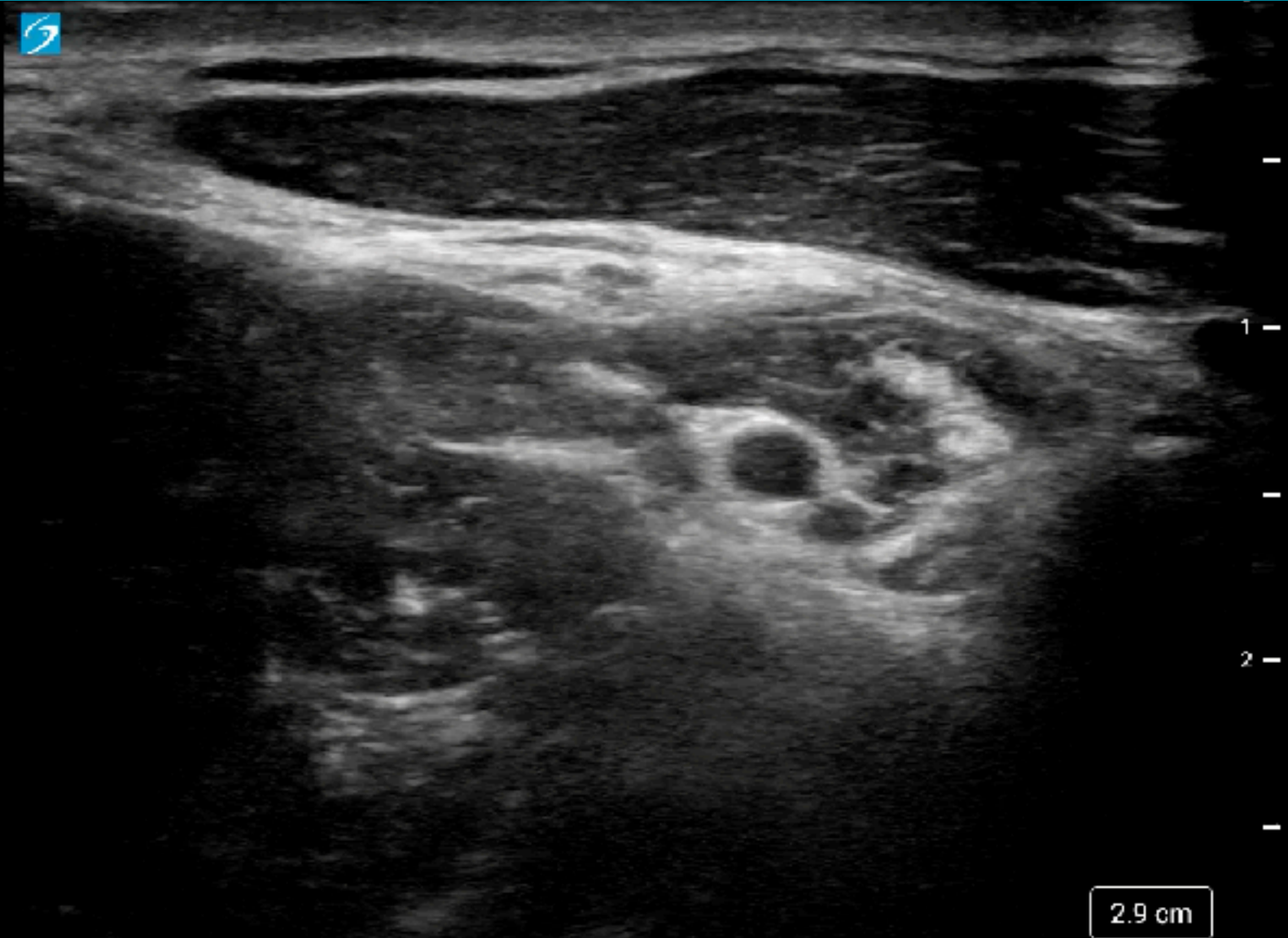
iTouch

thk: mm

DFOV:

KV:
mséc
AL G:

Supraclavicular nerve

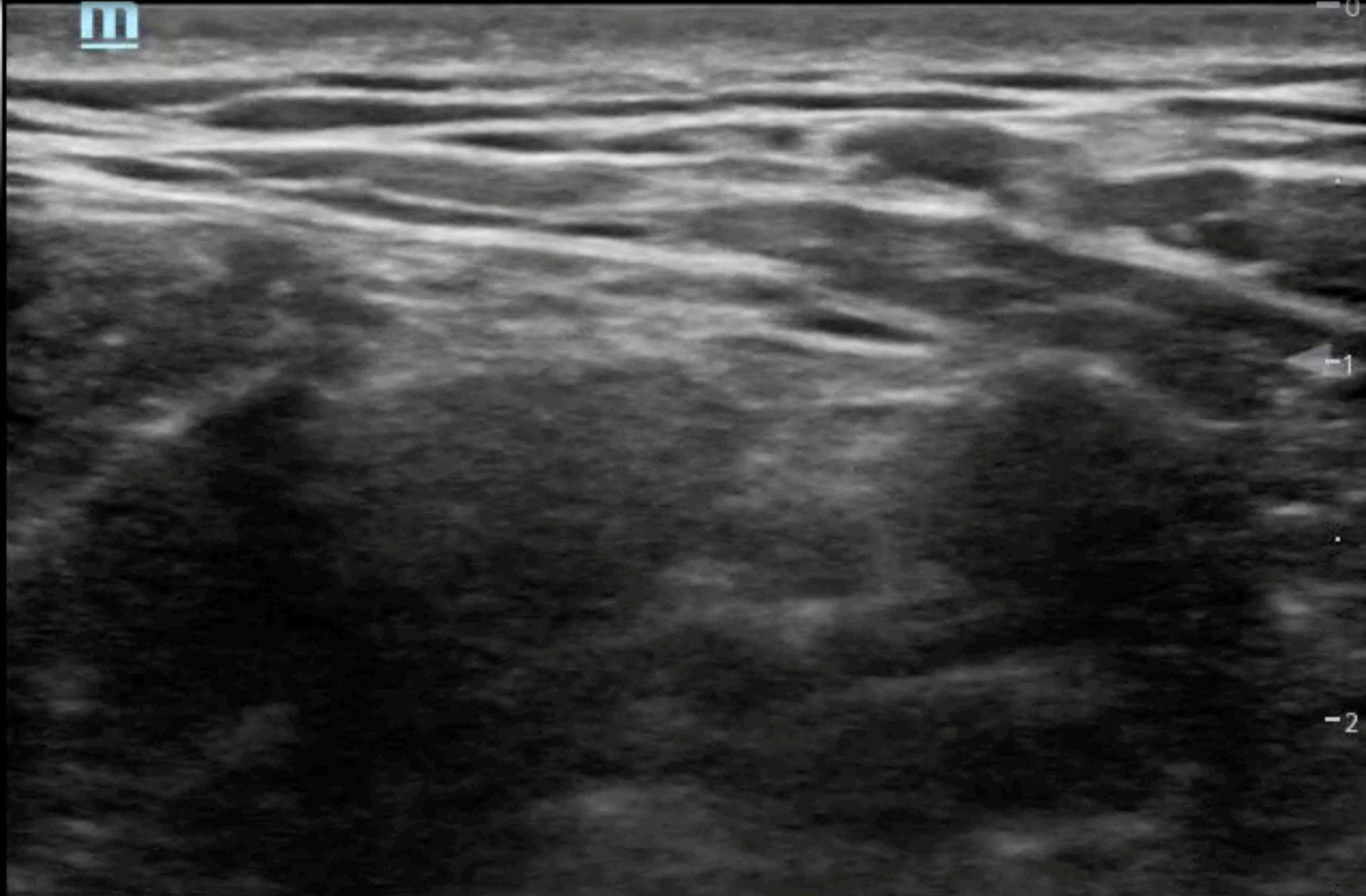


SCN for clavicle fracture



SCN for clavicle fracture

DR 115
FR 45
D 2.5
G 73

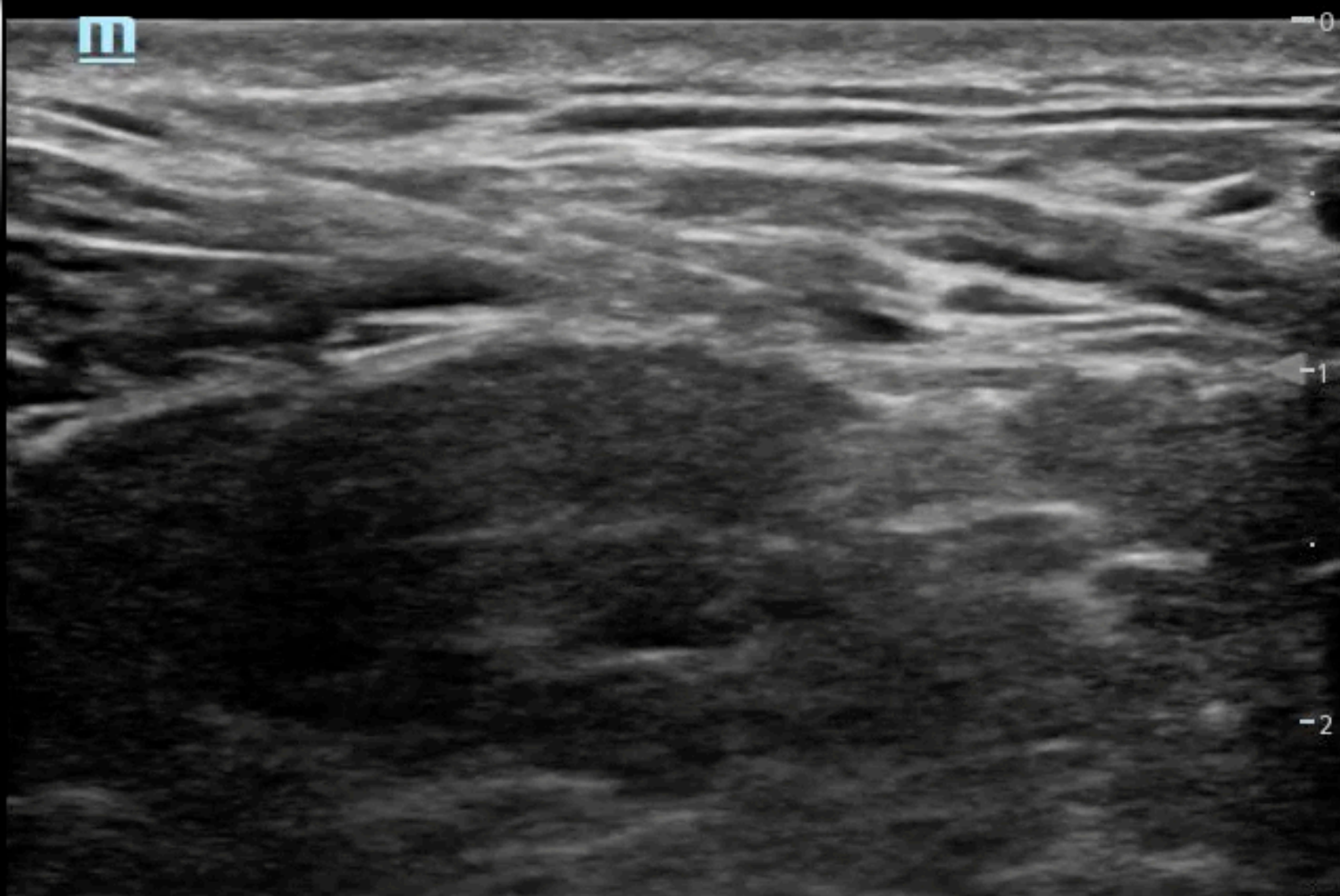


iNeedle

iTouch

SCN for clavicle fracture

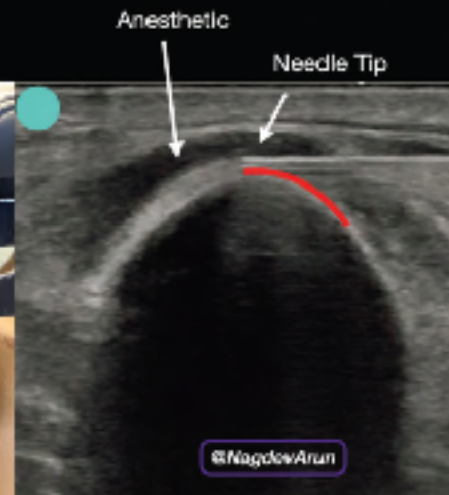
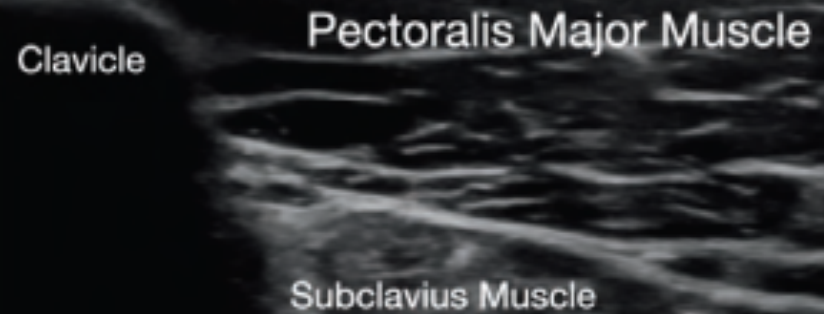
F 6.6~13.0
DR 115
FR 45
D 2.5
G 70



iNeedle

iTouch

Clavipectoral fascial plane block



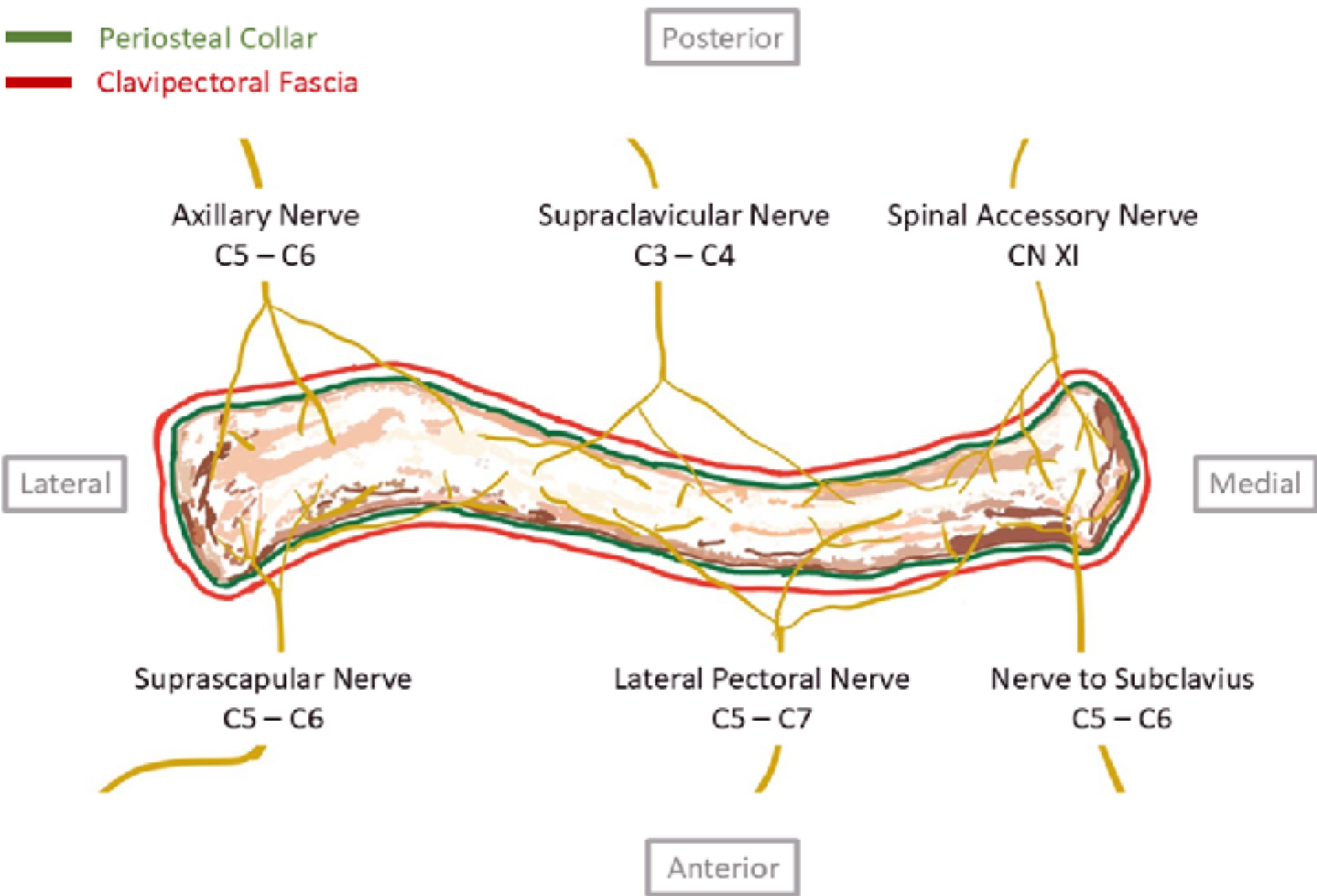
Regional anesthesia for clavicle fractures in emergency medicine: A scoping review

En-Hsien Su, Cheng-Chien Chen, Kuo-Chih Chen, Su Weng Chau, Yi-Kung Lee, Tou-Yuan Tsai

First published: 26 December 2024 | <https://doi.org/10.1002/hkj2.12078>

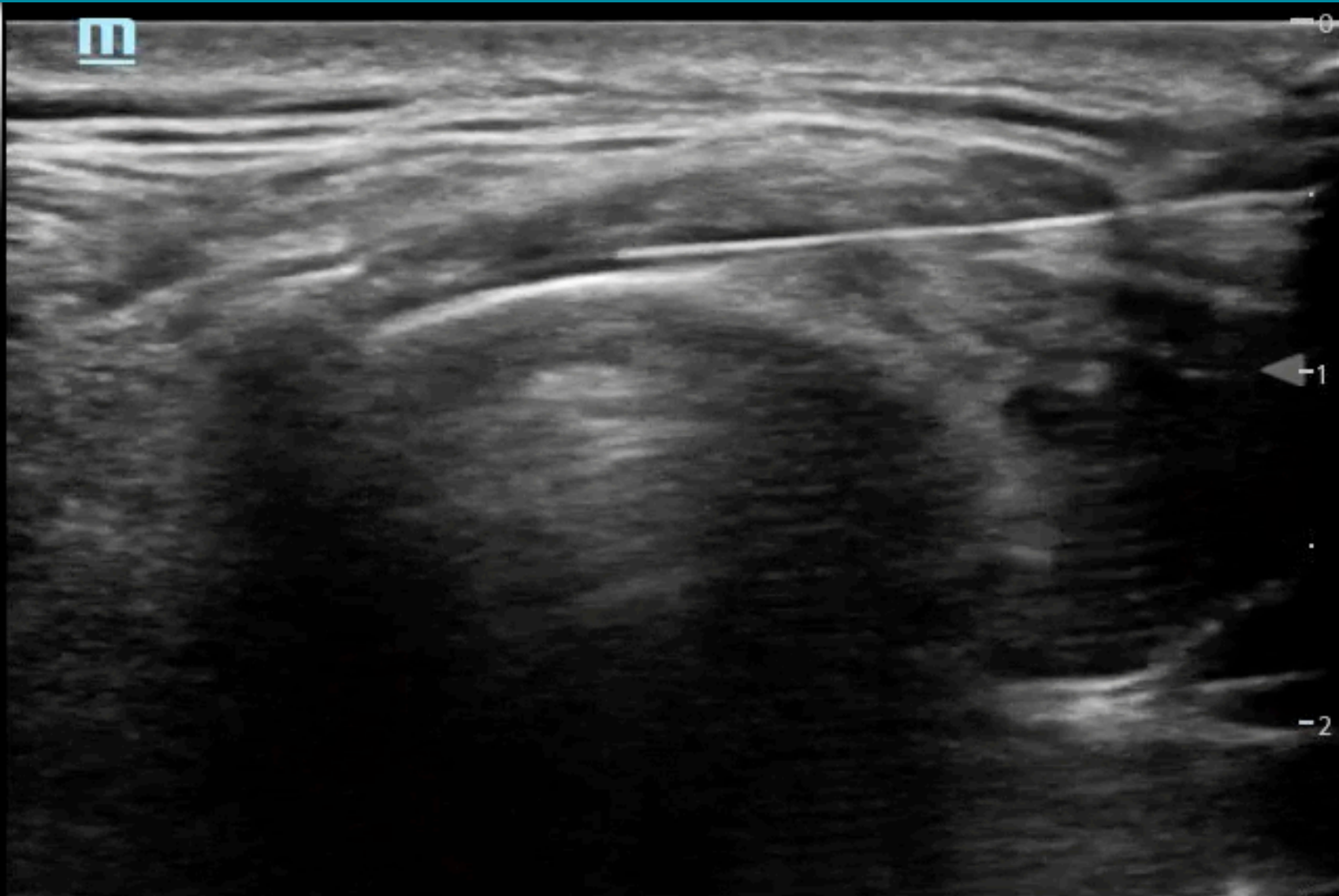
Sensory Innervation	Dermatomes	Myotomes	Osteotomes
Involved root	C3–C5	C3–C7	C3–C7
Individual nerve	1. Supraclavicular nerve (C3–C4) 2. Ventral rami of C5	1. Axillary nerve (C5–C6) 2. Suprascapular nerve (C5–C6) 3. Lateral Pectoral nerve (C5–C7) 4. Nerve to subclavius (C5–C6) 5. Spinal accessory nerve (CN XI) 6. Trapezius branch of cervical nerves (C3–C4)	1. Axillary nerve (C5–C6) 2. Suprascapular nerve (C5–C6) 3. Lateral Pectoral nerve (C5–C7) 4. Supraclavicular nerve (C3–C4) 5. Nerve to subclavius (C5–C6) 6. Spinal accessory nerve (CN XI) 7. Trapezius branch of cervical nerves (C3–C4)

- Periosteal Collar
- Clavipectoral Fascia



Clavipectoral fascial plane block

F 6.6~13.0
DR 115
FR 45
D 25
G 70

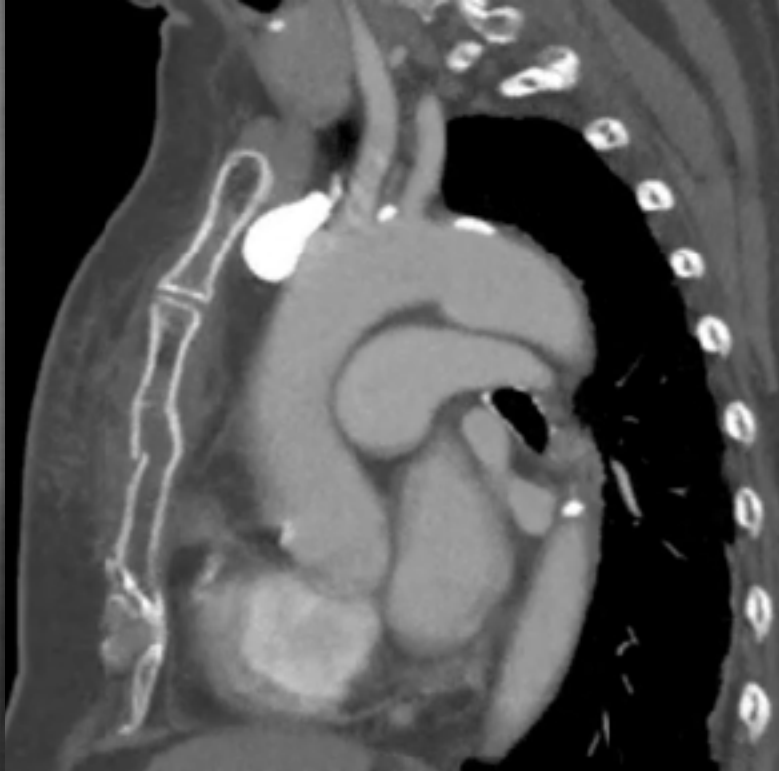


iNeedle

iTouch



7/06/07
4:15



Intercostal Block

► QUICK FACTS

Indications: Analgesia for rib fractures, postsurgical analgesia for chest and upper abdominal surgery (i.e., thoracotomy, thoracostomy, mastectomy, gastrostomy, and cholecystectomy), herpes zoster or post-herpetic neuralgia.

Goal: Local anesthetic spread in the intercostal sulcus around the intercostal nerve.

Patient position: An intercostal nerve block can be performed with the patient in the seated, lateral decubitus, or prone positions.

Landmarks: The US transducer is placed parasagittal to identify the ribs.



Linear

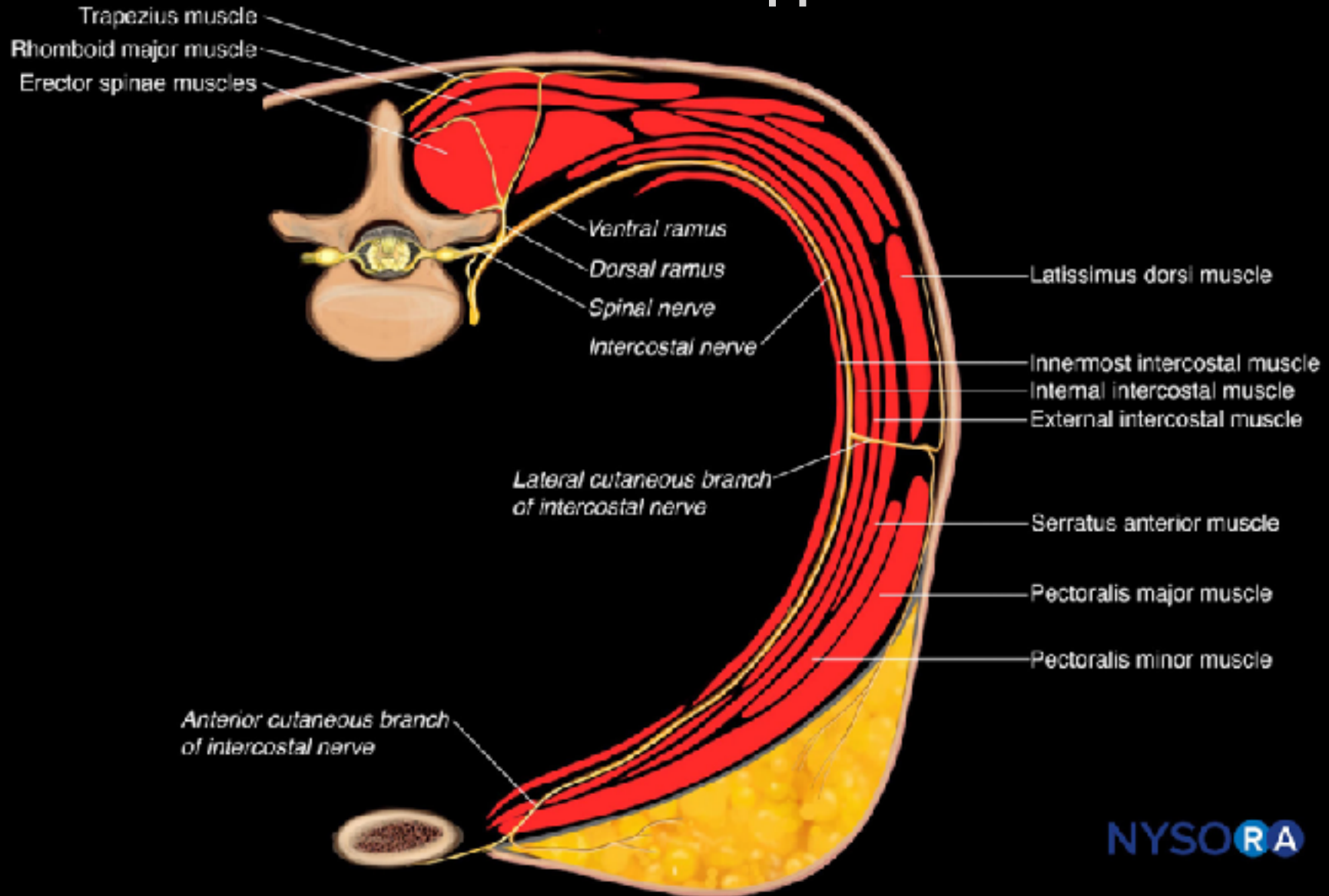


22-25 gauge,
3-5 cm



3-5 mL at each level

T2-T12 spinal nerve - thoracic wall & upper abdomen



NYSORA

Fig-1. Anatomy of the thoracic spinal and intercostal nerves.

Erector spinae
muscles

Dorsal ramus of
thoracic nerve

Internal intercostal
membrane

Intercostal nerve, artery
and vein

Sympathetic trunk
and ganglion

Thoracic aorta

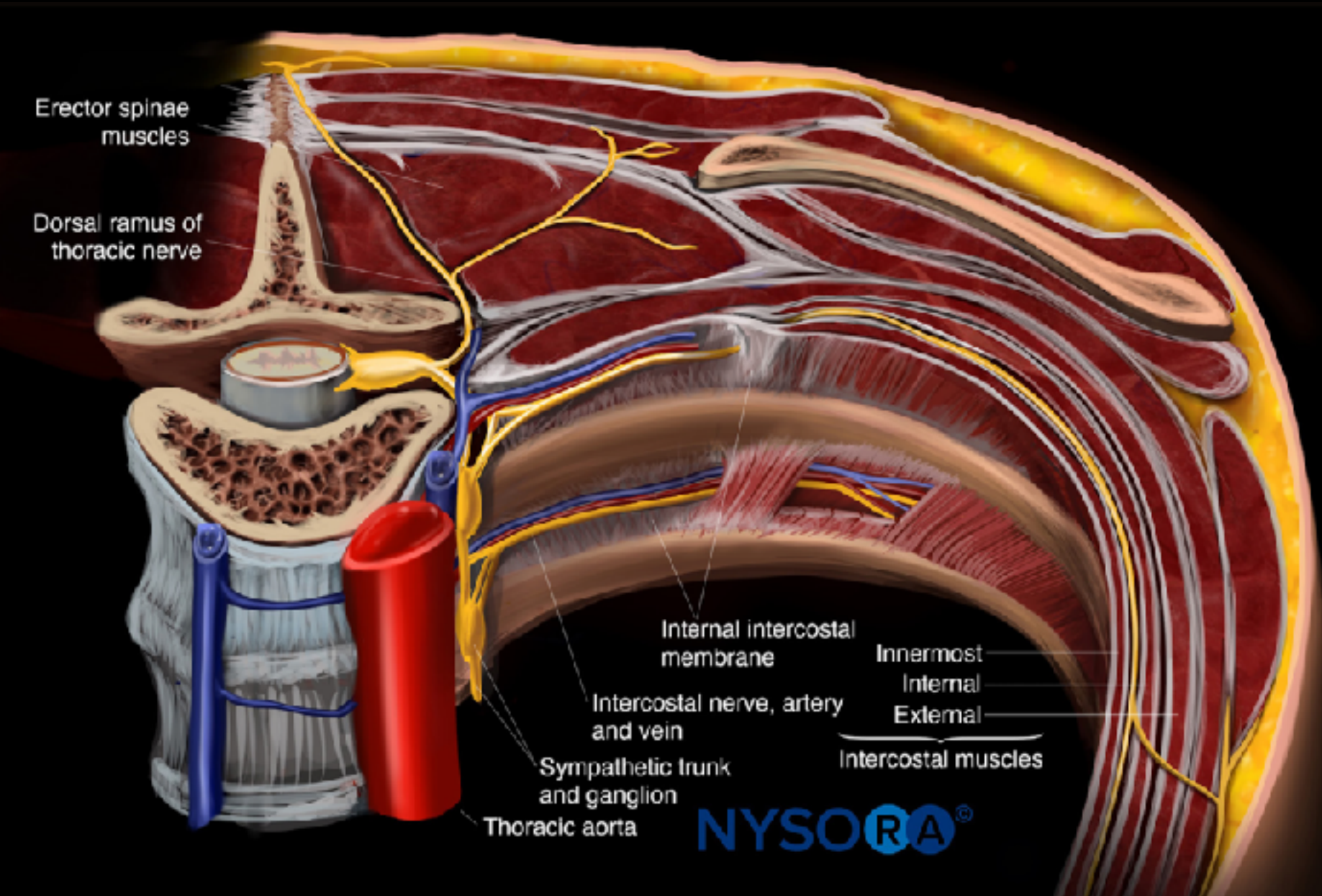
Innermost

Internal

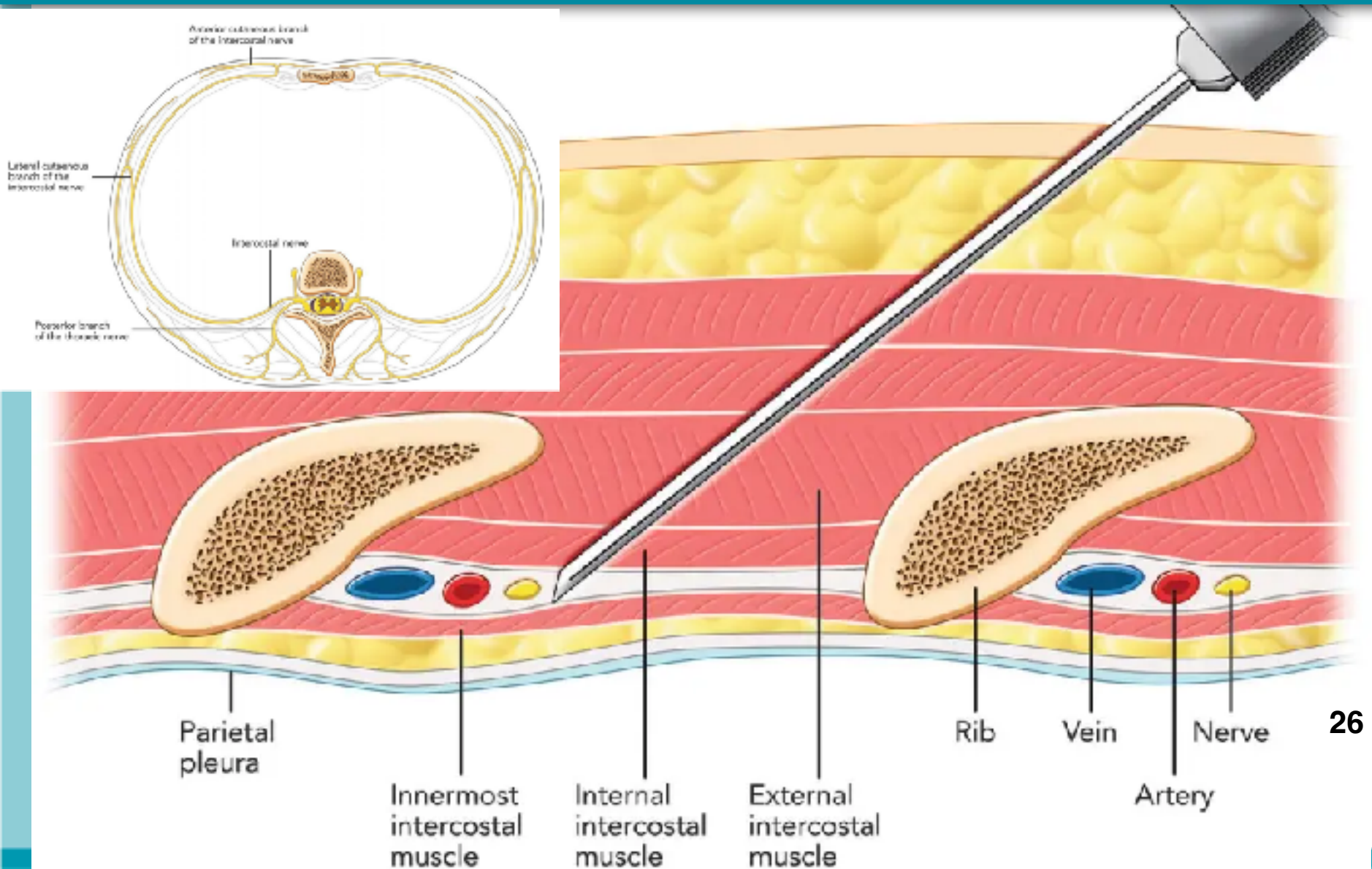
External

Intercostal muscles

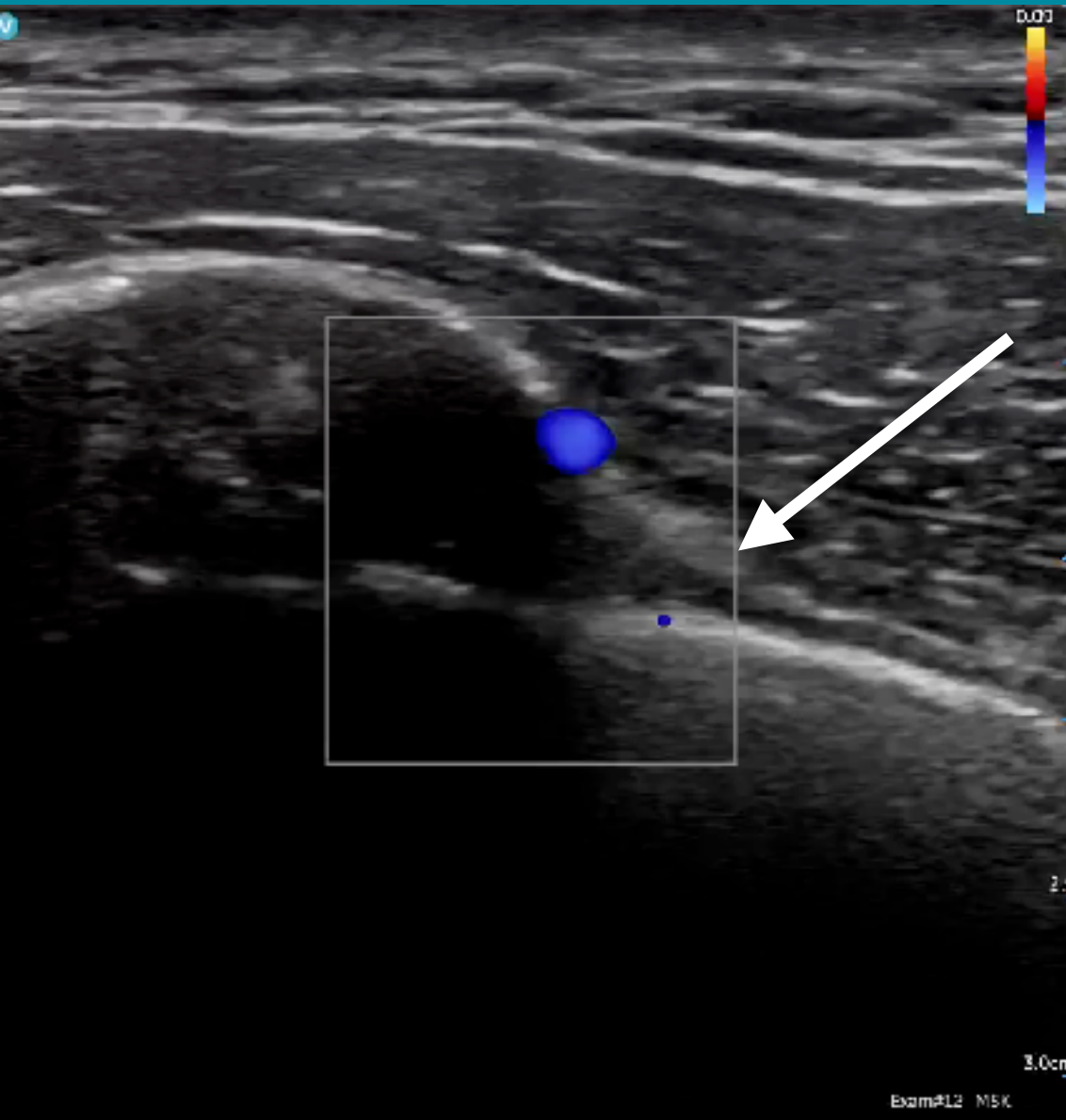
NYSORA®



Intercostal nerve block



Intercostal nerve block



Correct level

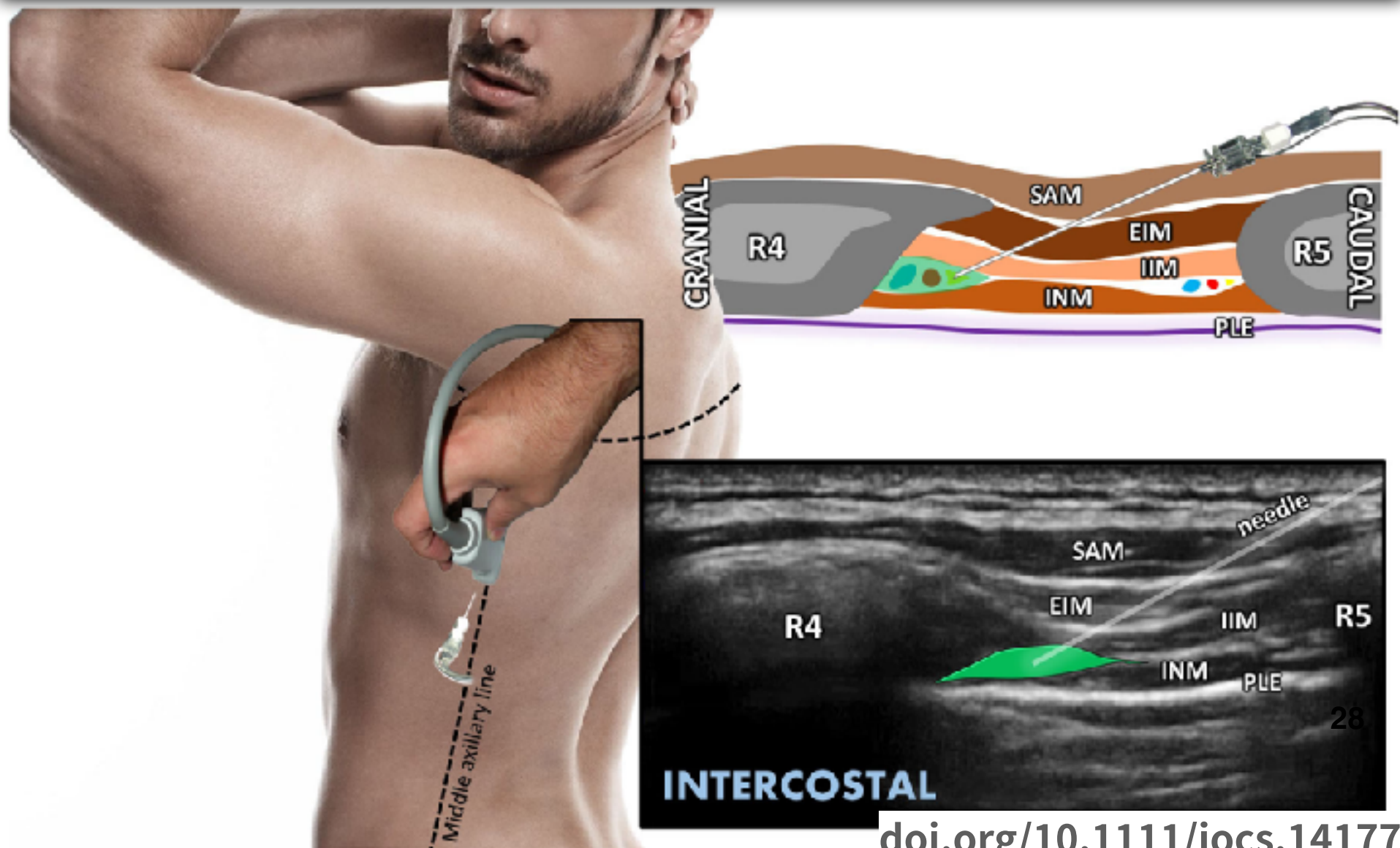
Inferior border

3-5ml/IC level

Hydrodissection

Consider 3 levels

Intercostal nerve block





U
F-P5.0
DB 11.0
FR 70
D 3.5
G A 8



iNeedle

iTouch

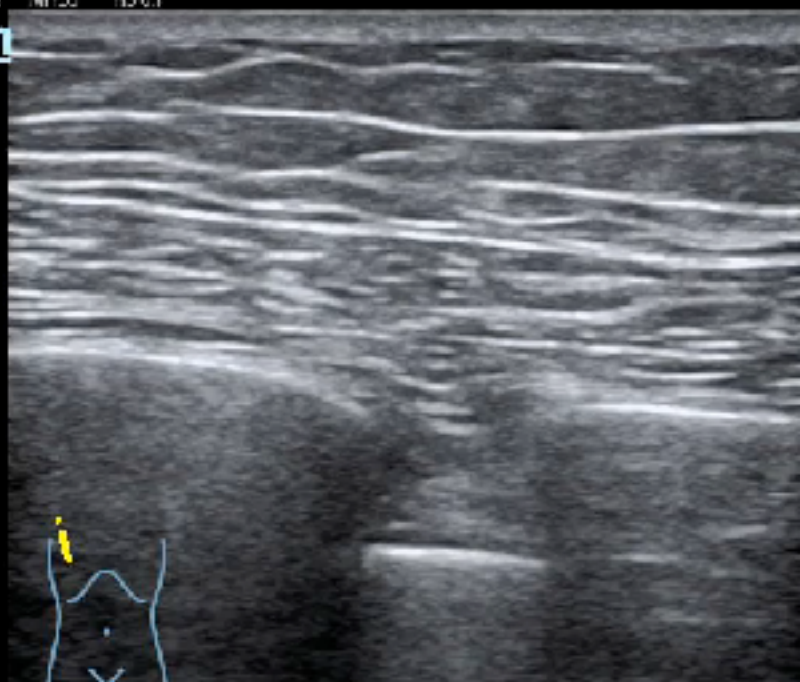
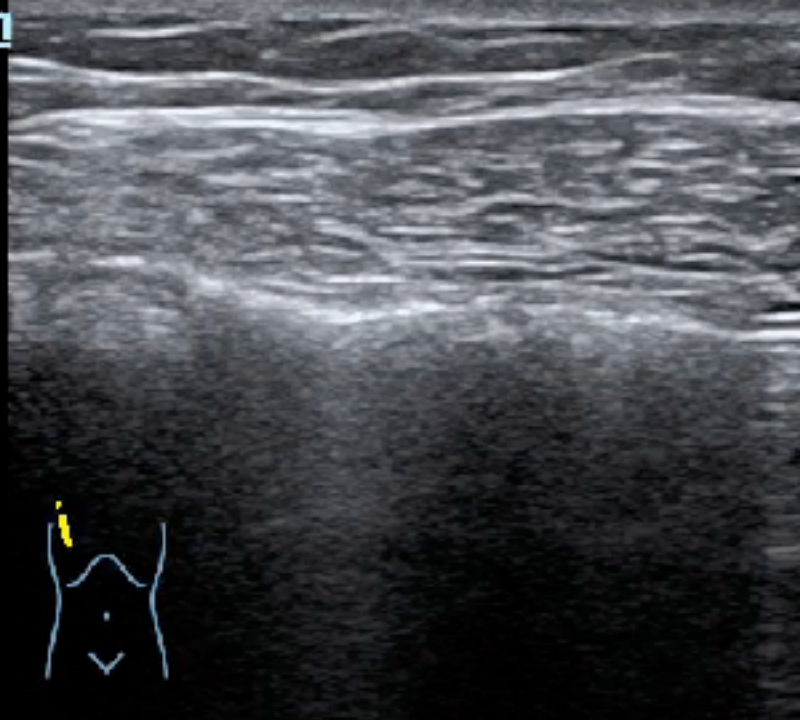
LT2 45 AP 96.6% MI 55 IS 0.1

U
F-P5.0
DB 11.0
FR 70
D 3.5
G A 8



iNeedle

iTouch



PVB (paravertebral block)

Indications: Analgesia after breast surgery, thoracotomy, rib fractures, and procedures involving the thoracic and upper abdominal wall.

Goal: Infiltration of local anesthetic into the paravertebral space.

Patient position: The PVB is frequently performed with the patient in a sitting position. Alternatively, it can be performed with the patient in the prone or in the lateral position with the side to be blocked facing upwards.

Landmarks: The transducer is placed parasagittal, about 3 cm from the midline, to identify the transverse processes.



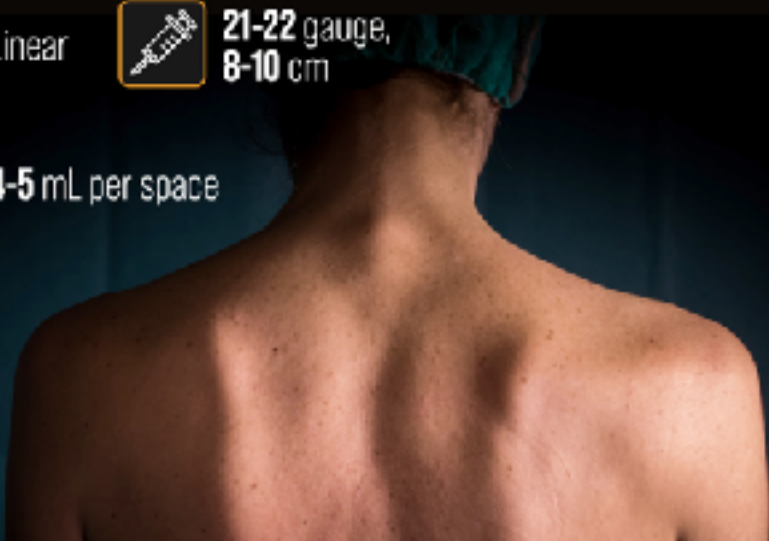
Linear



21-22 gauge,
8-10 cm

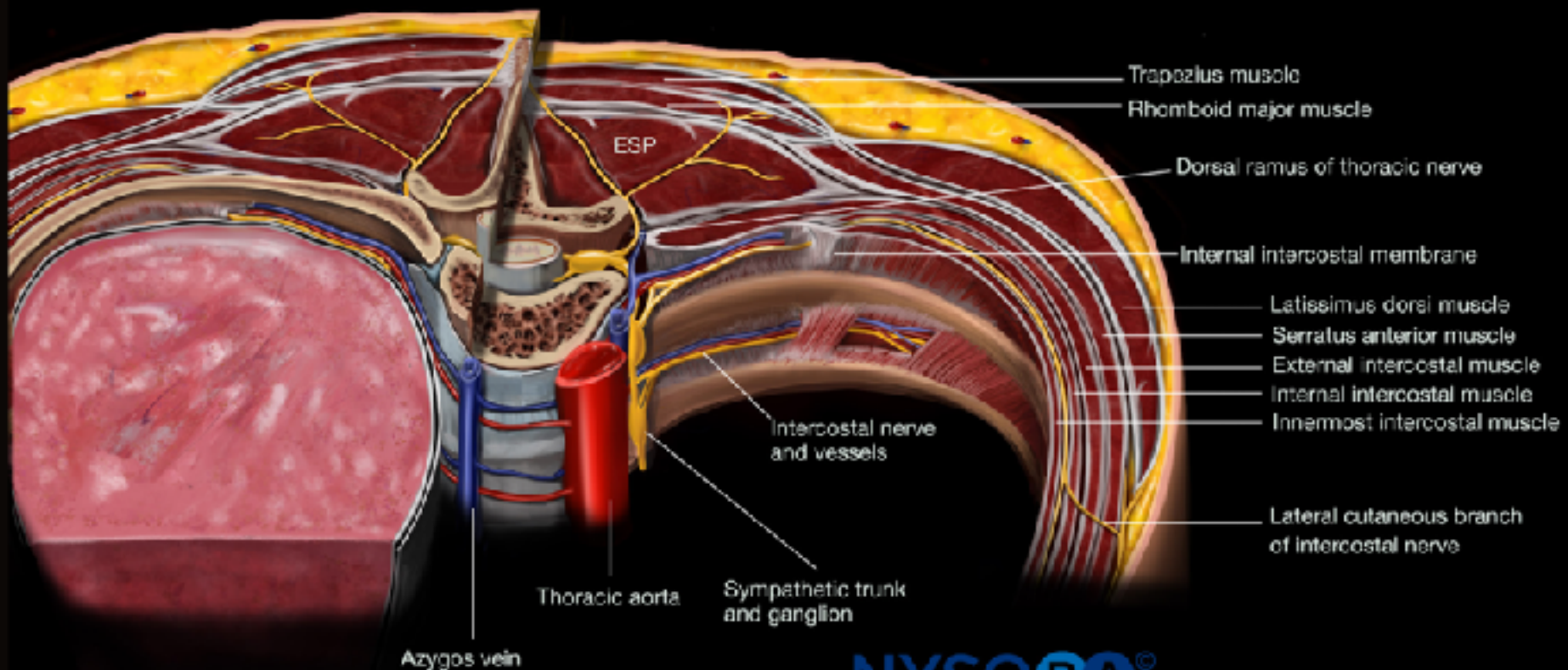


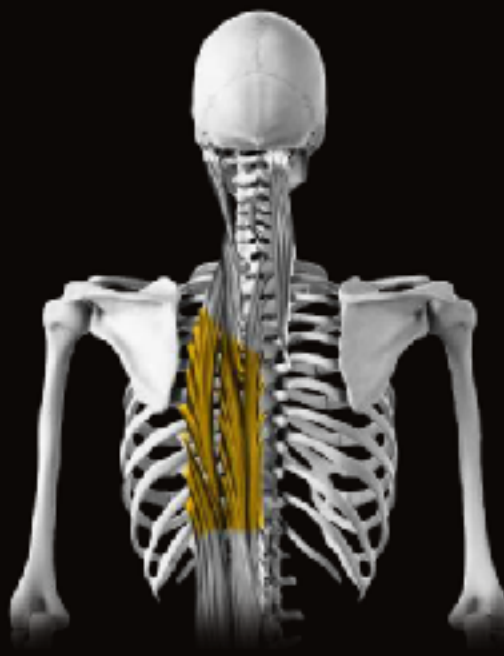
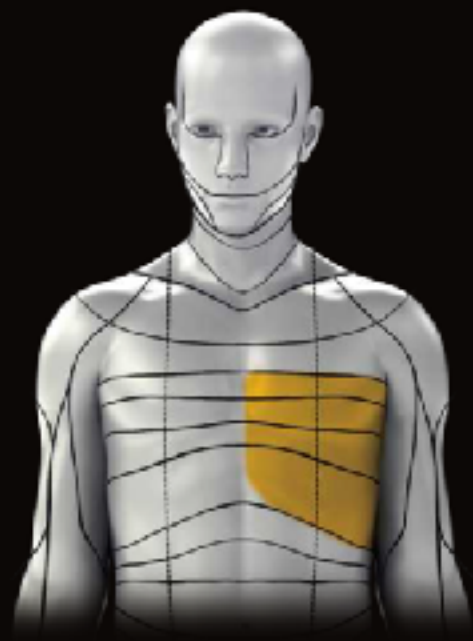
4-5 mL per space



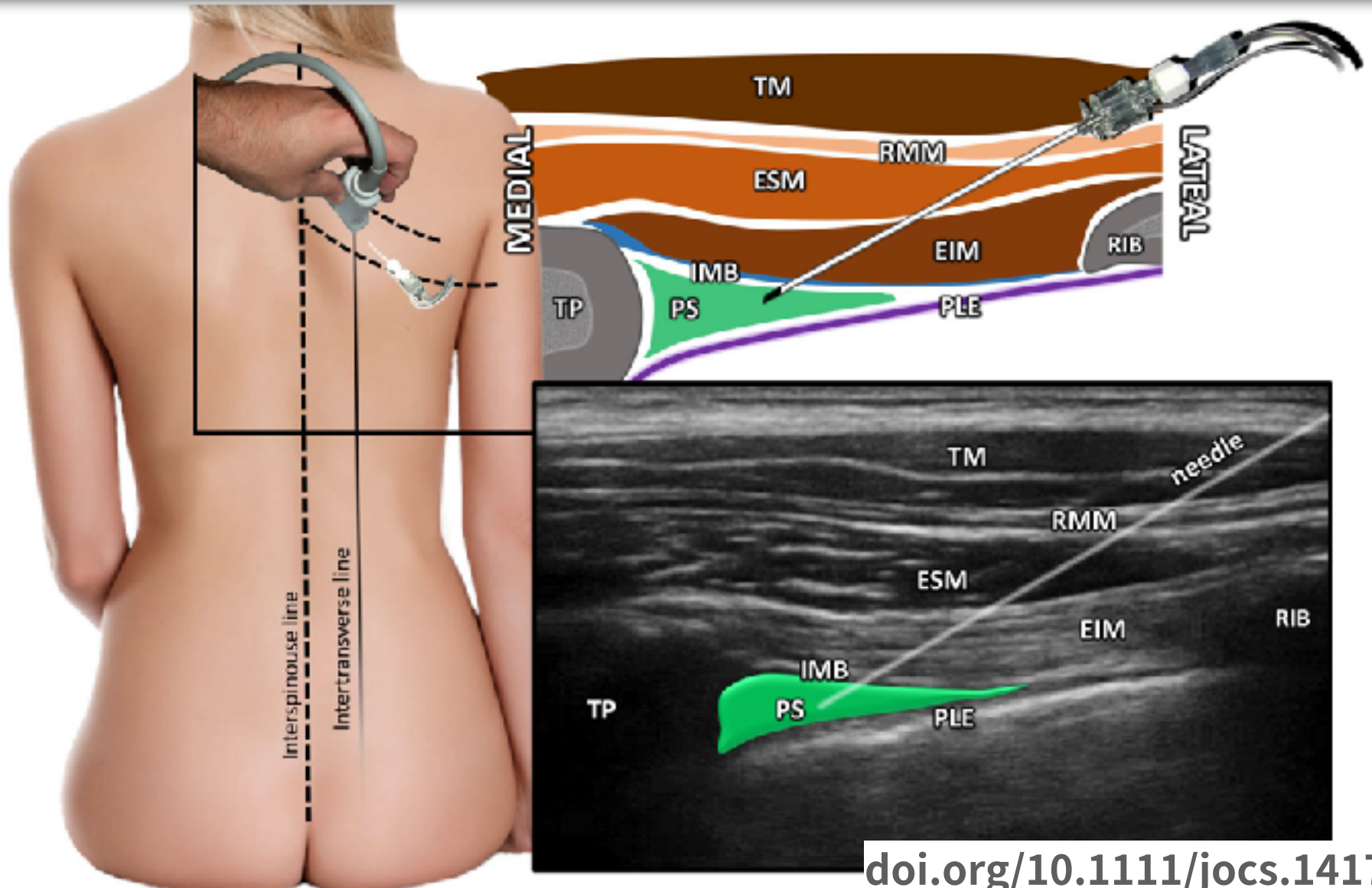
PVB (paravertebral block)

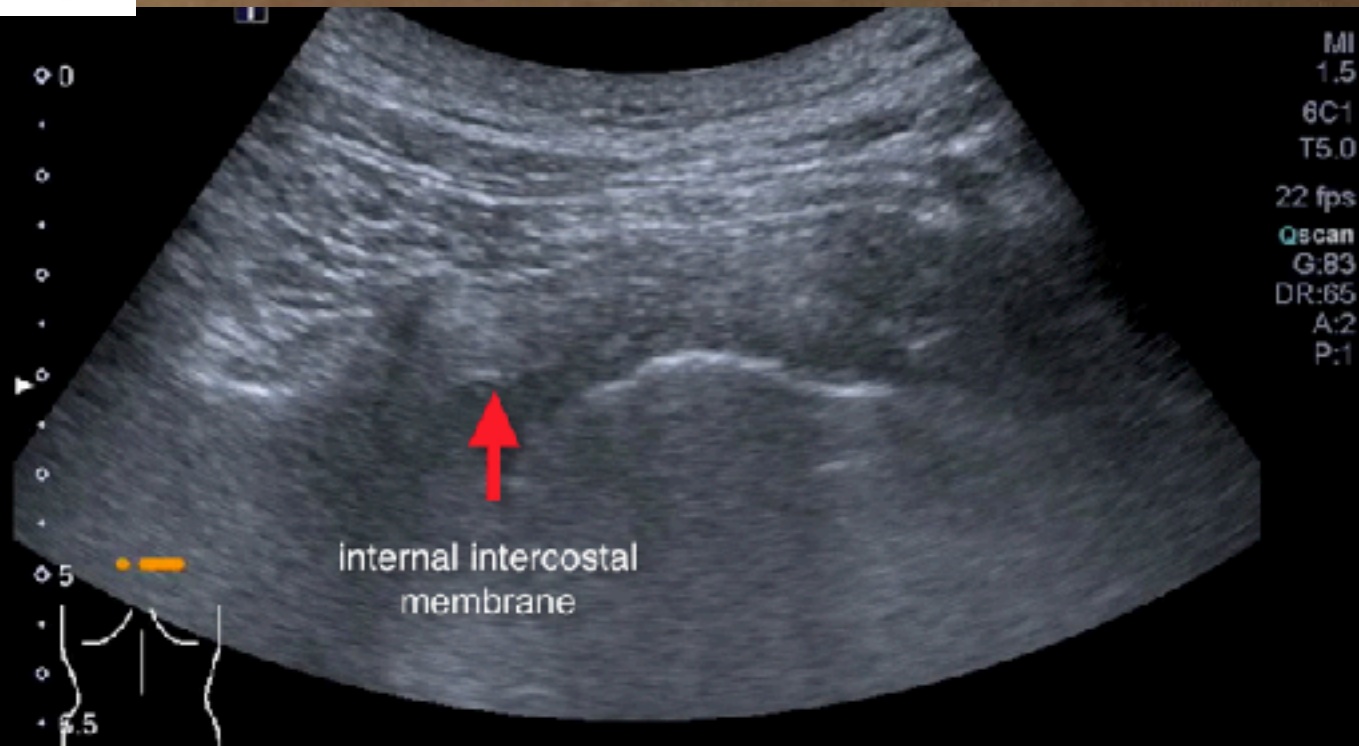
Superior costotransverse ligament
Parietal pleura
Vertebral body & intervertebral disk



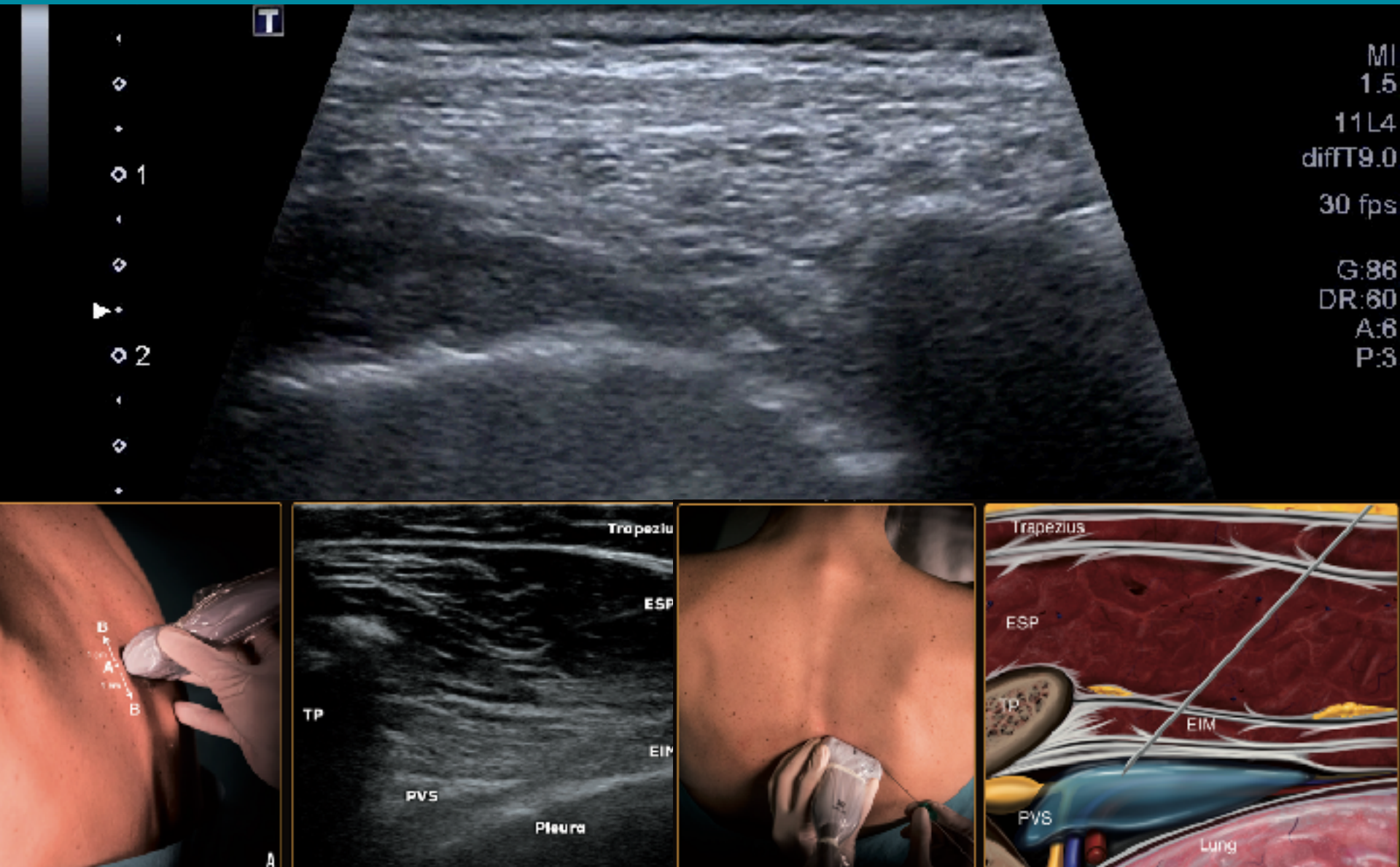


PVB (paravertebral block)





PVB for postherpetic neuralgia



Pectoralis / Serratus Plane block

Indications: PEC I: Analgesia for breast surgery, clavicle, and acromioclavicular procedures.

PEC II: Extensive breast surgery, thoracic wall procedures, sentinel node excision.

Serratus anterior plane: Anterolateral thoracic wall surgery and rib fractures.

Goal: Injection of local anesthetic in the fascial planes between the pectoral muscles and the serratus anterior muscle.

Patient position: Supine or semi-lateral position with the ipsilateral arm abducted 90 degrees.

Landmarks: The clavicle, pectoralis major muscle, anterior and midaxillary lines.



Linear



22 gauge,
5-10 cm short bevel

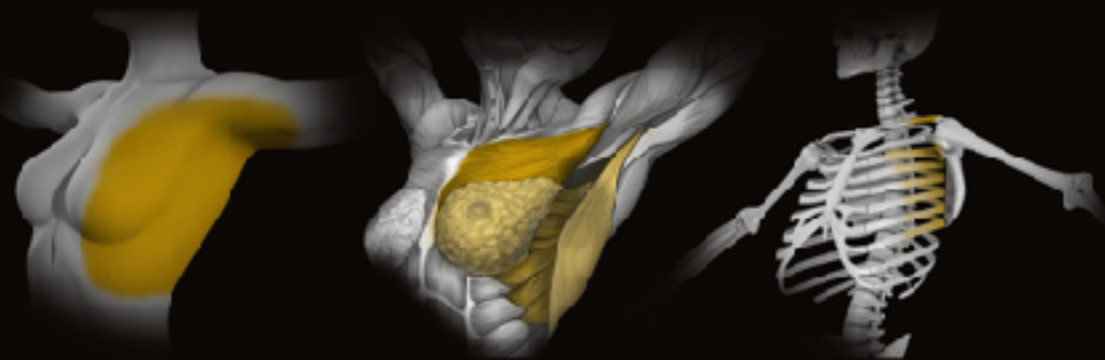
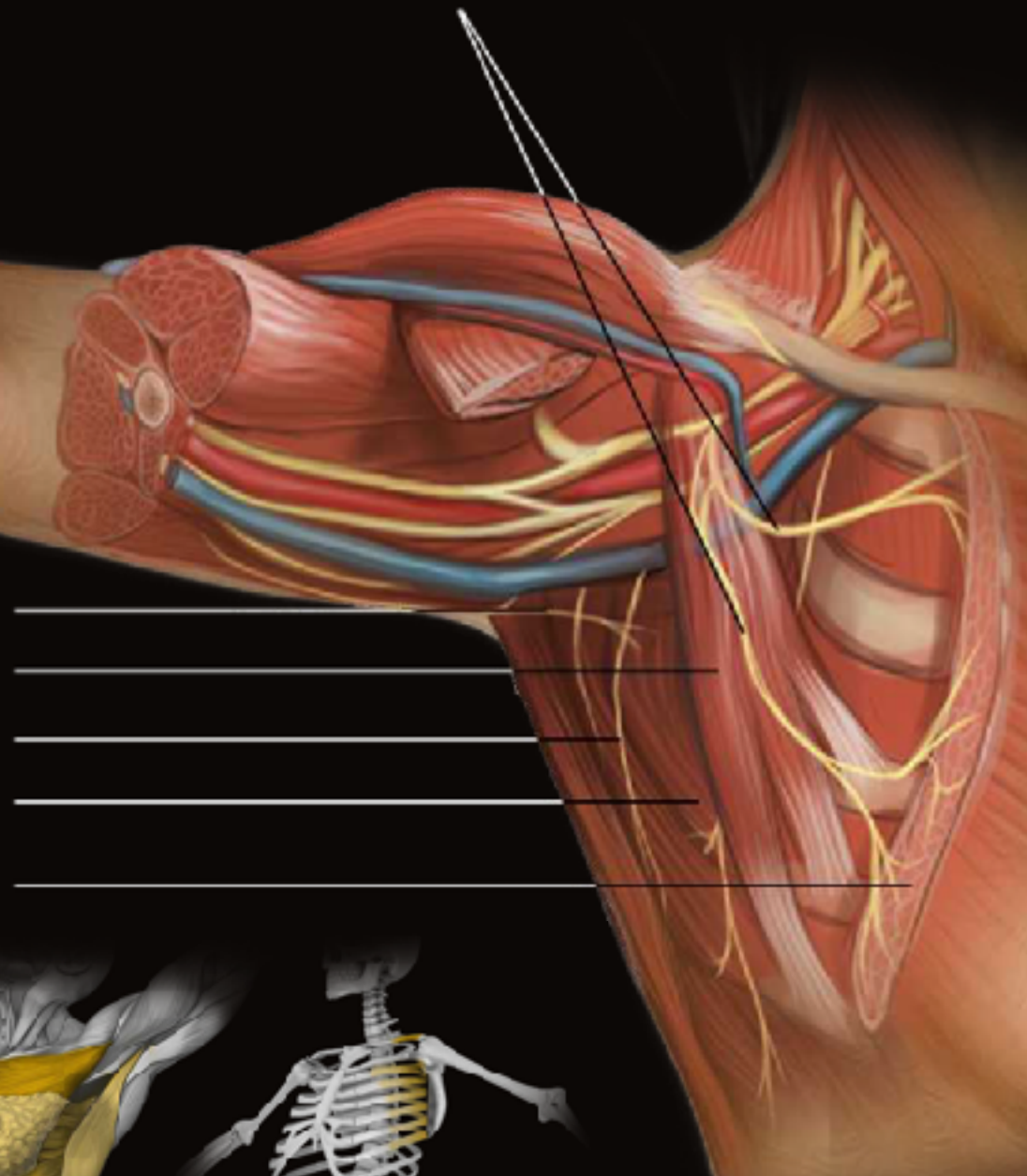


10-20 mL

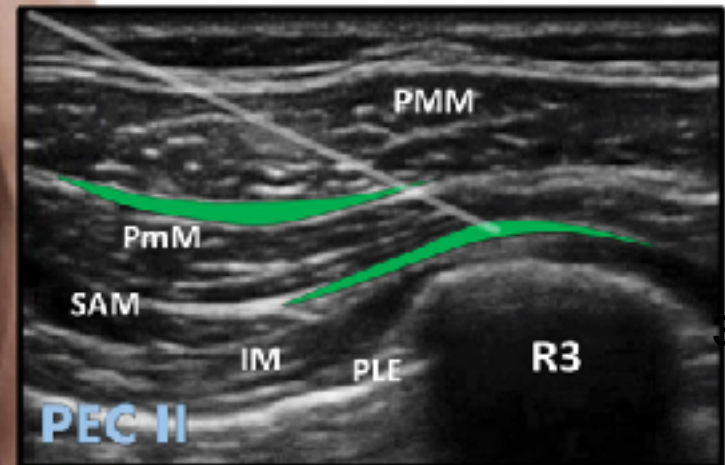
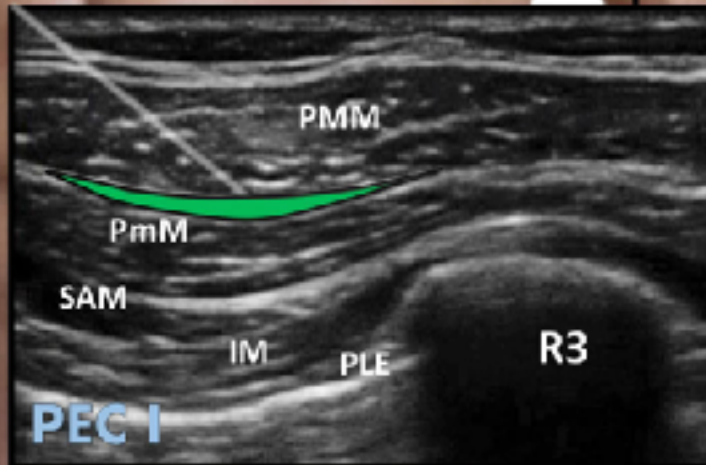
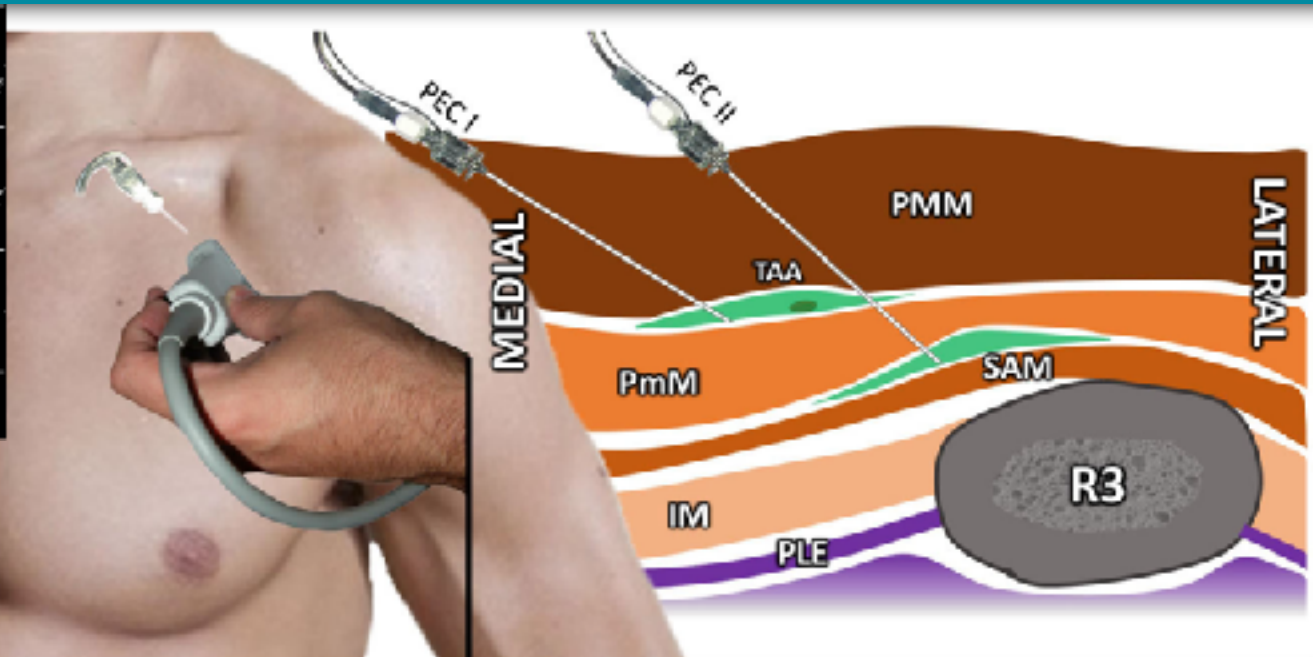
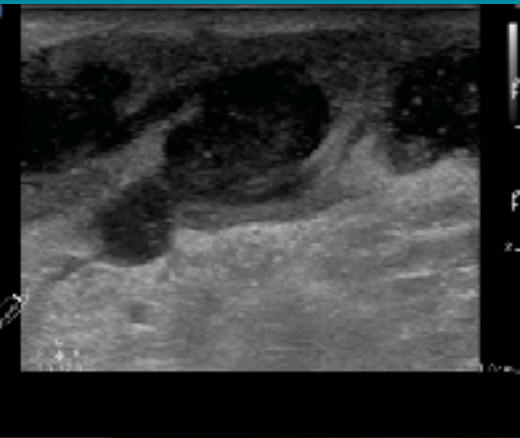


Lateral and medial pectoral nerves

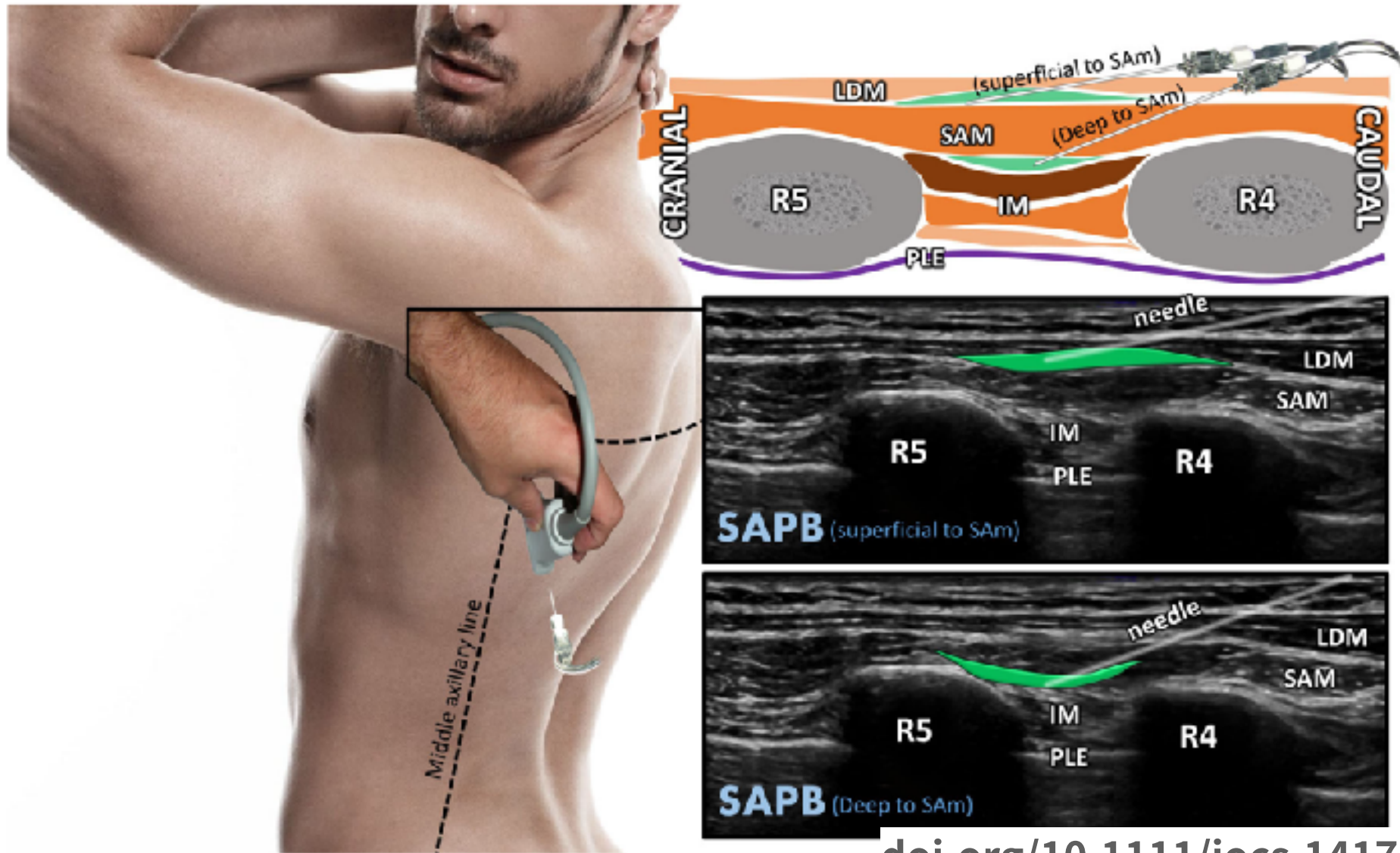
- Intercostobrachial nerve
- Pectoralis minor
- Thoracodorsal nerve
- Serratus anterior
- Pectoralis major (cut)



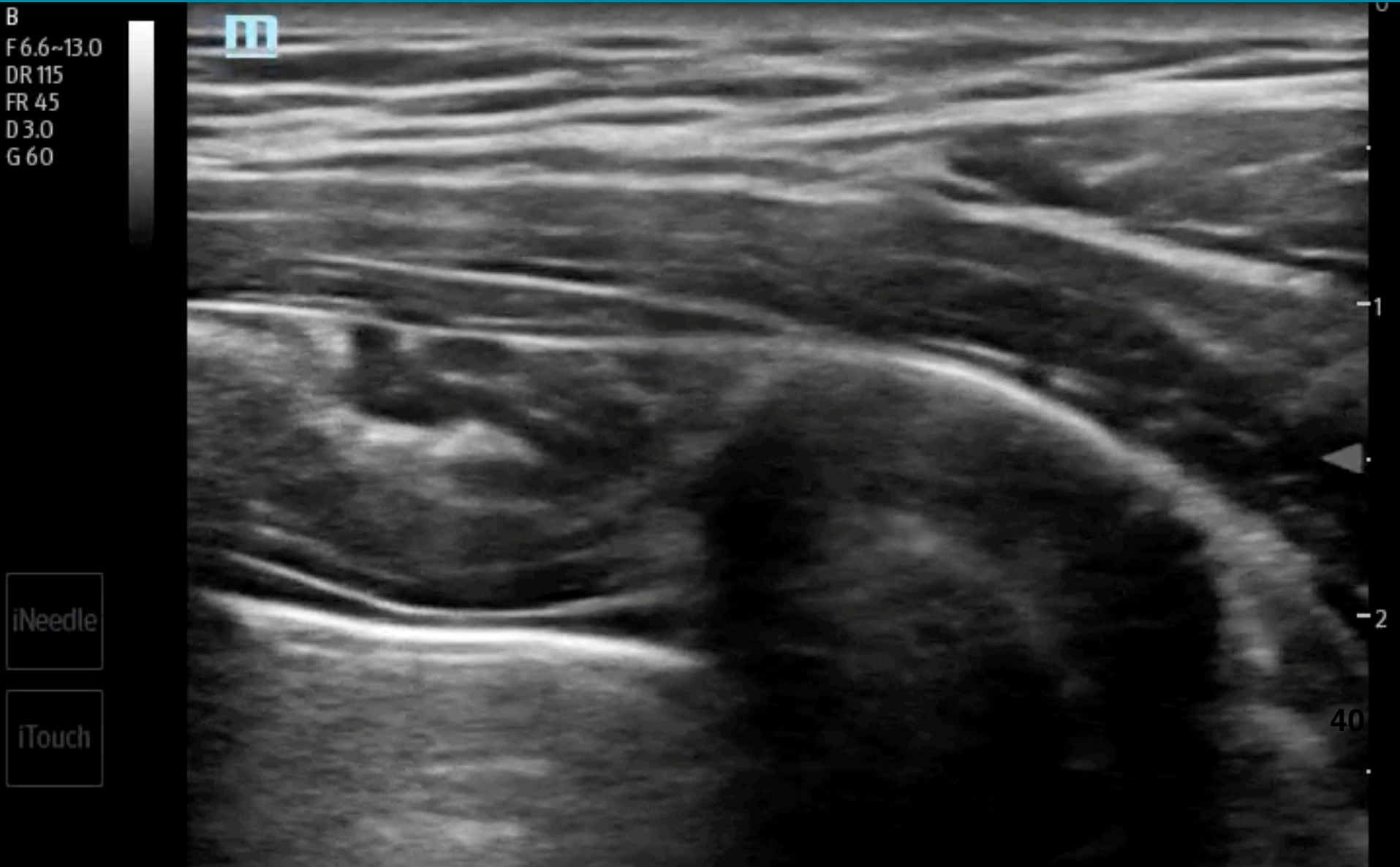
PEC I & II block (pectoral fascial)



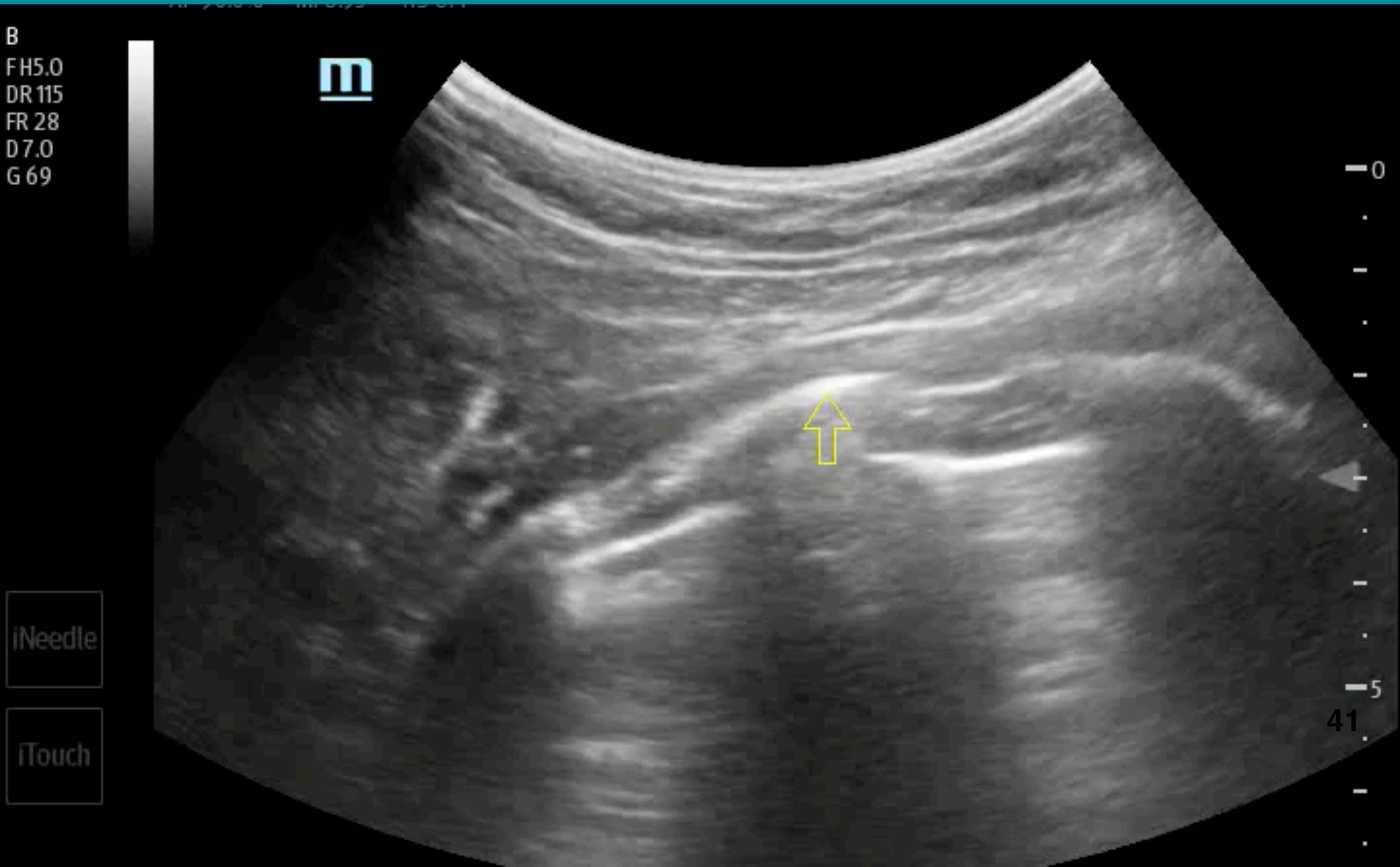
SAPB (serratus anterior plane block)



SAPB (serratus anterior plane block)

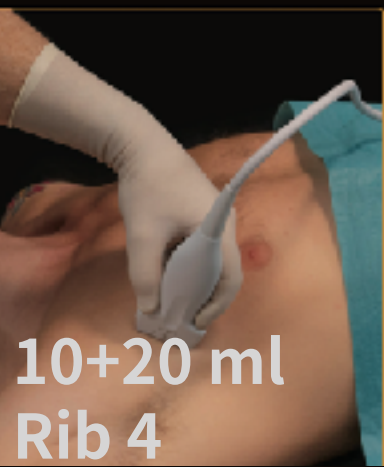
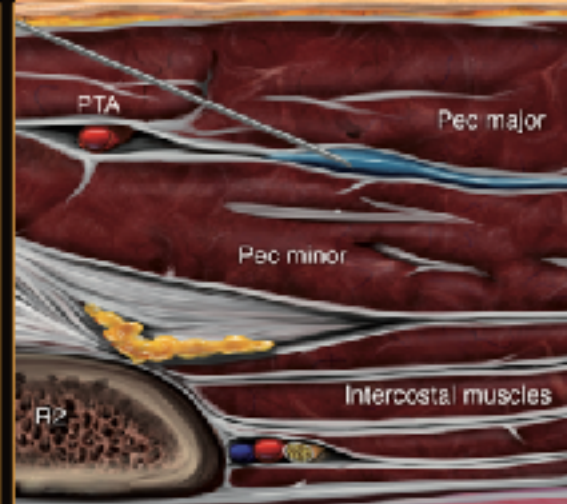
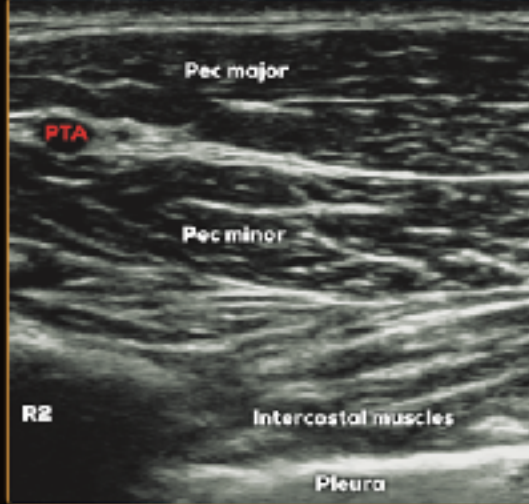


SAPB (serratus anterior plane block)

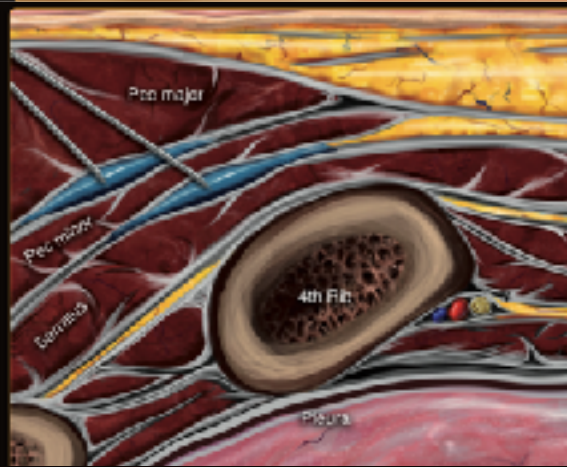
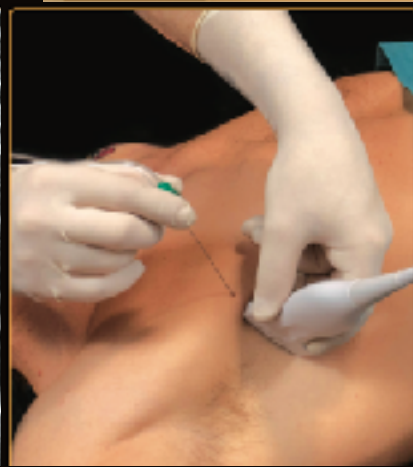
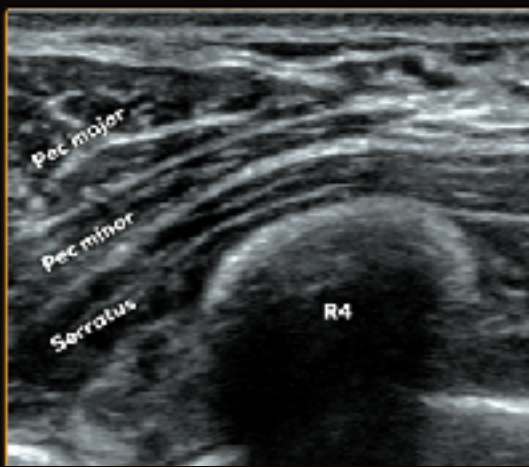




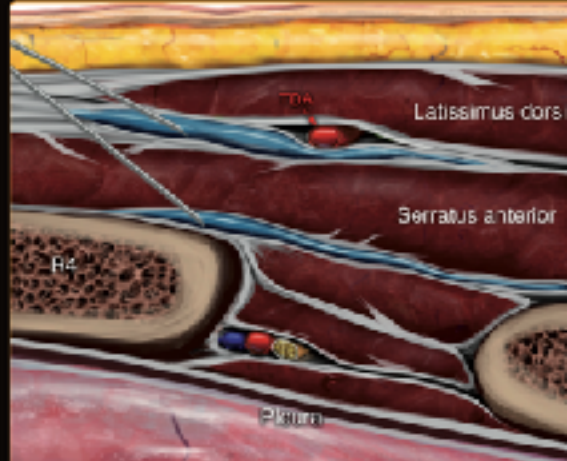
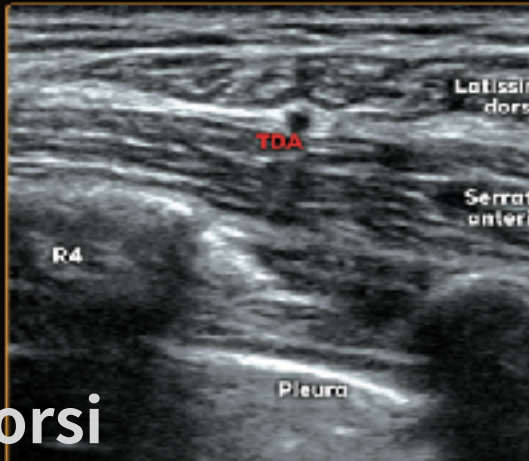
20 ml
Rib 2

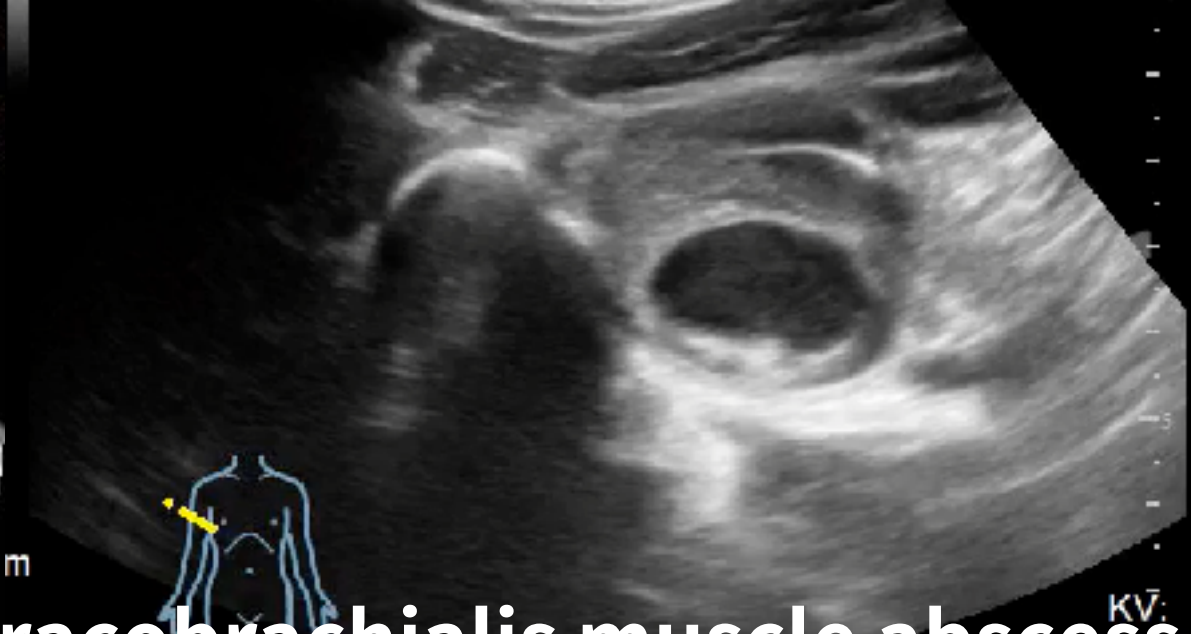
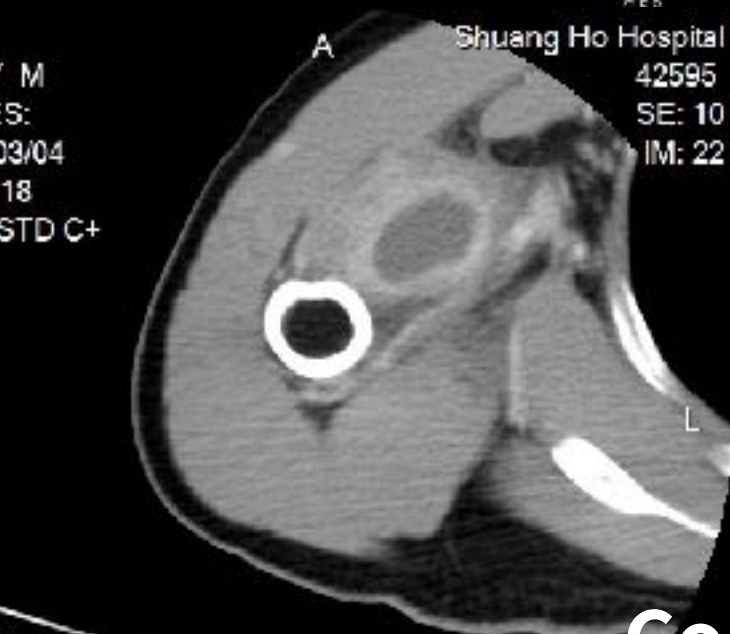


10+20 ml
Rib 4

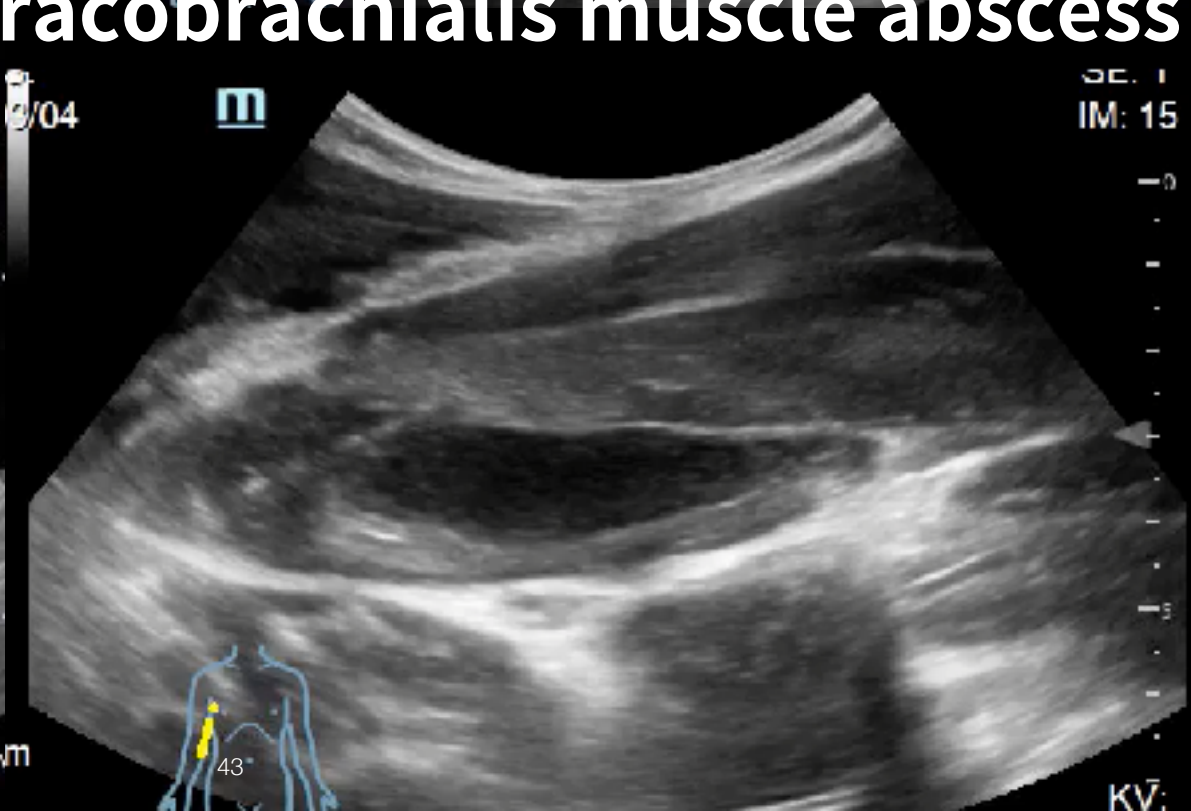


20 ml
Rib 5
Mid-axillary
Latissimus dorsi





Coracobrachialis muscle abscess



CES:
13.0
25/03/04



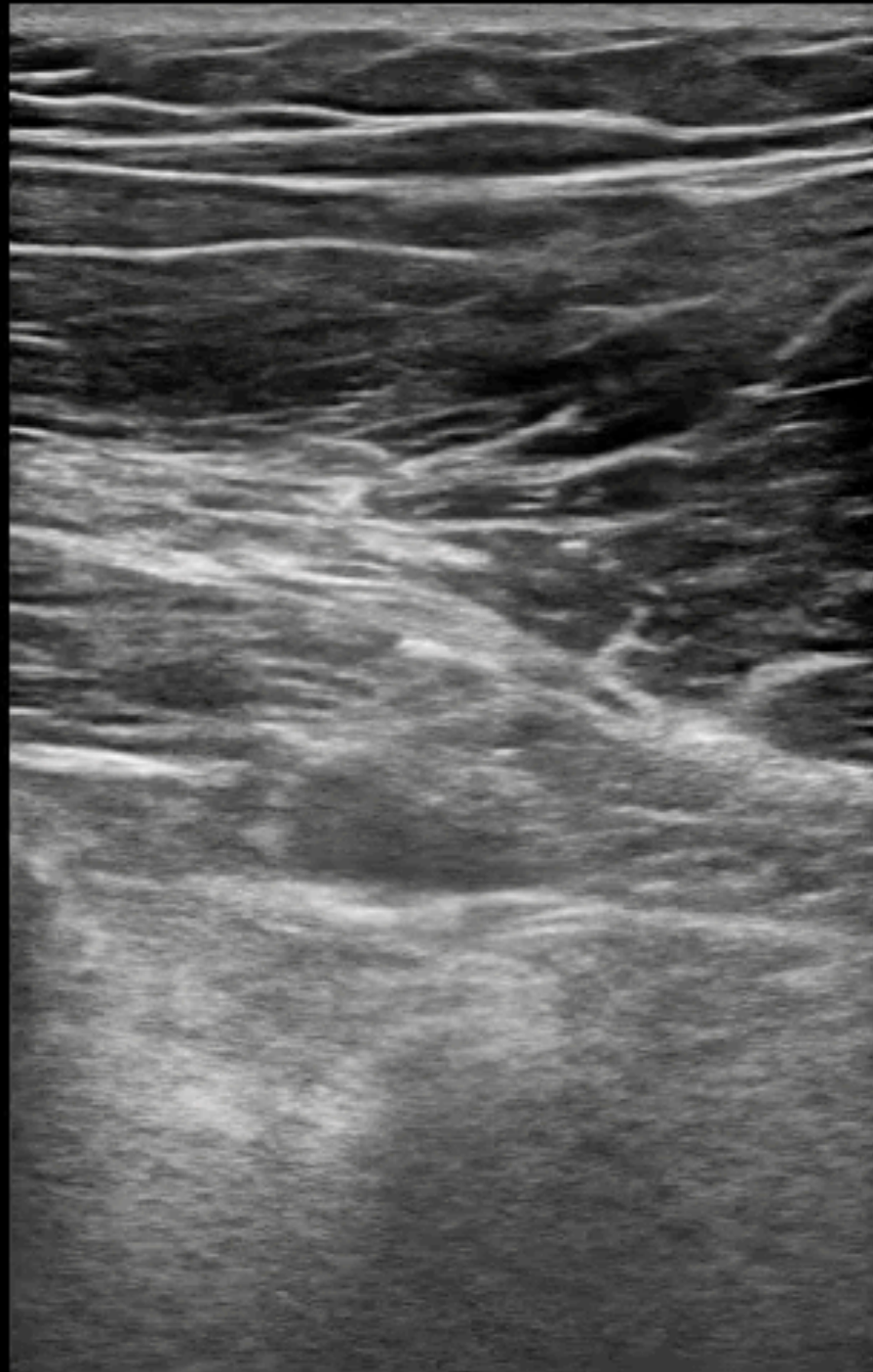
19007BER

dle

ch
: mm

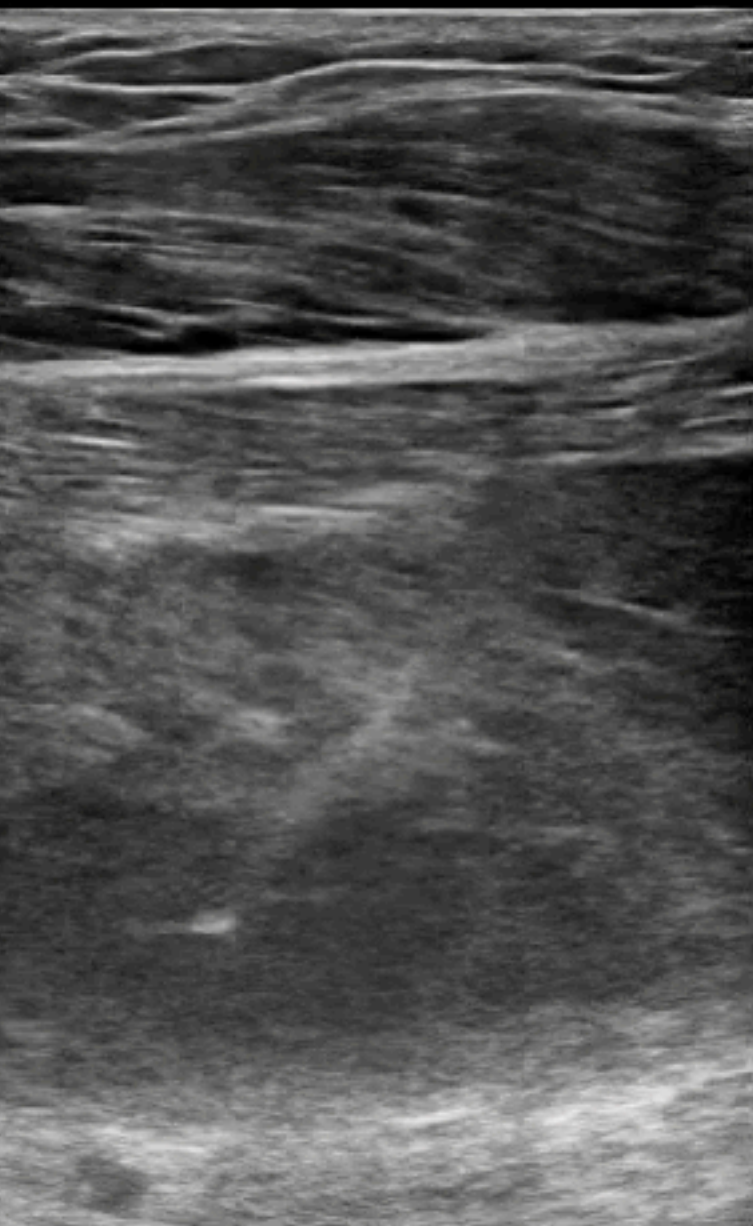
19007BER

OV:



SE
IM

K
ms
AL



SE: 1⁰
IM: 15



5
KV:
msec
ALG:



ESPB (erector spinae plane block)

Indications: Analgesia for rib fractures, back and chest wall surgeries.

Goal: Injection of local anesthetic in the plane deep to the erector spinae muscles and superficial to the transverse processes, to achieve a craniocaudal distribution along several vertebral levels.

Patient position: The patient is best positioned in a sitting, lateral decubitus or prone position. Identify the desired level for injection by counting down from the first rib (with ultrasound), or by taking into account the bony landmarks of the back, and their corresponding vertebral levels.

Landmarks: Midpoint of the clavicle and the coracoid process.



Linear or curved



22 - gauge,
5-10 cm short bevel

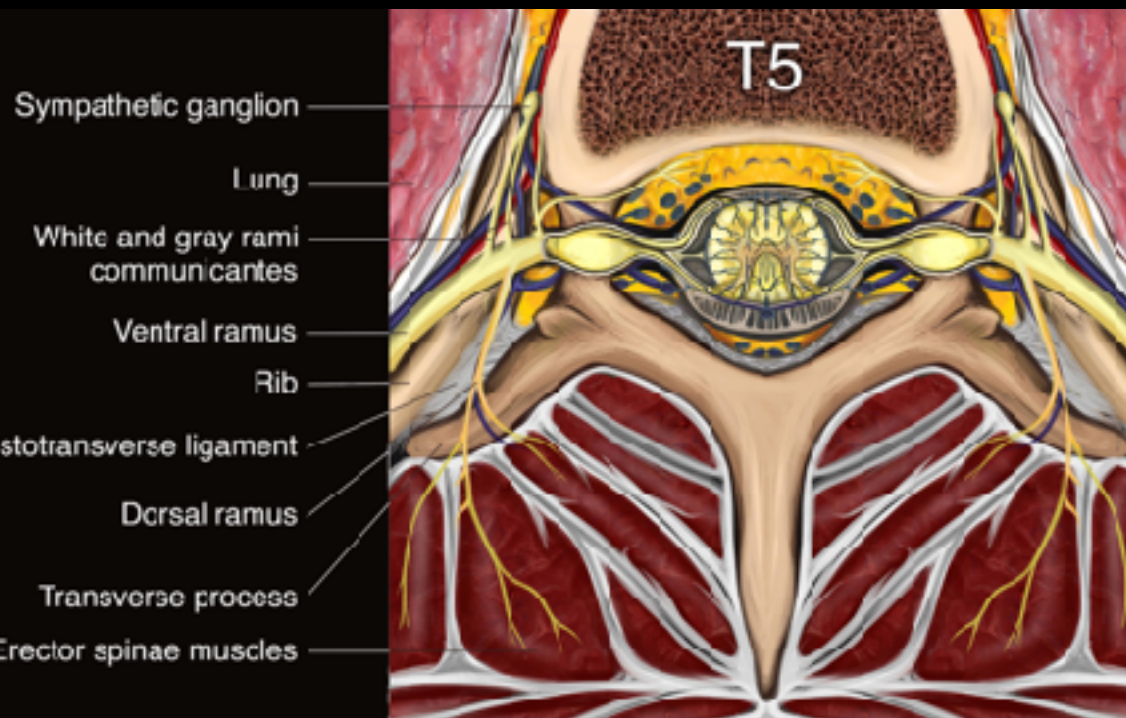


20-30 mL



ESPB (erector spinae plane block)

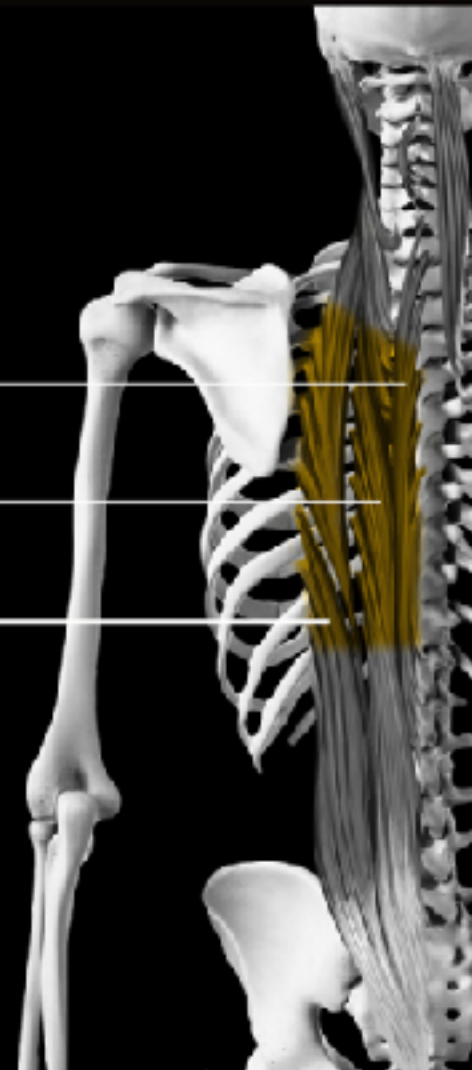
Interfascial spreading



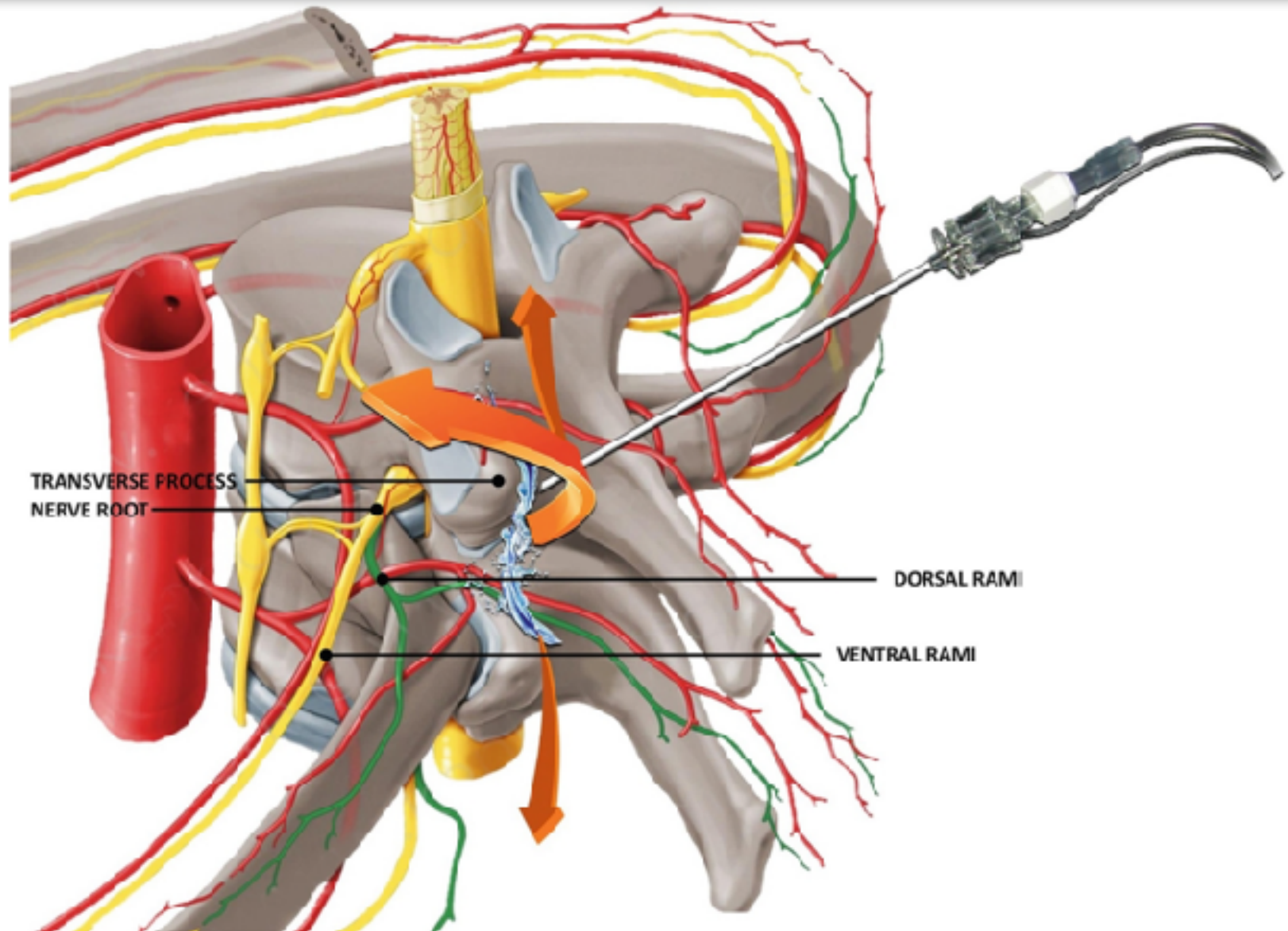
Spinalis

Longissimus

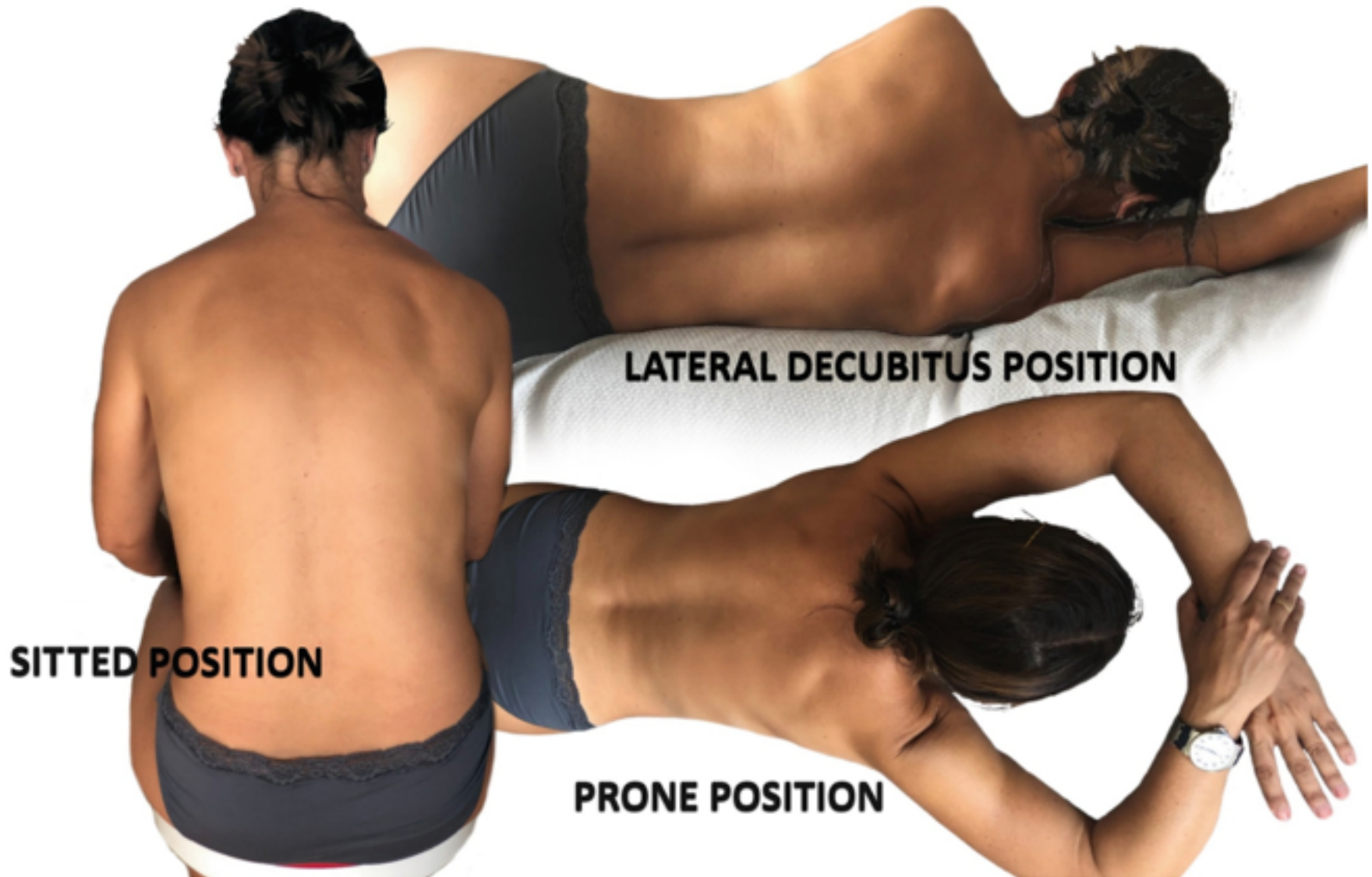
Iliocostalis



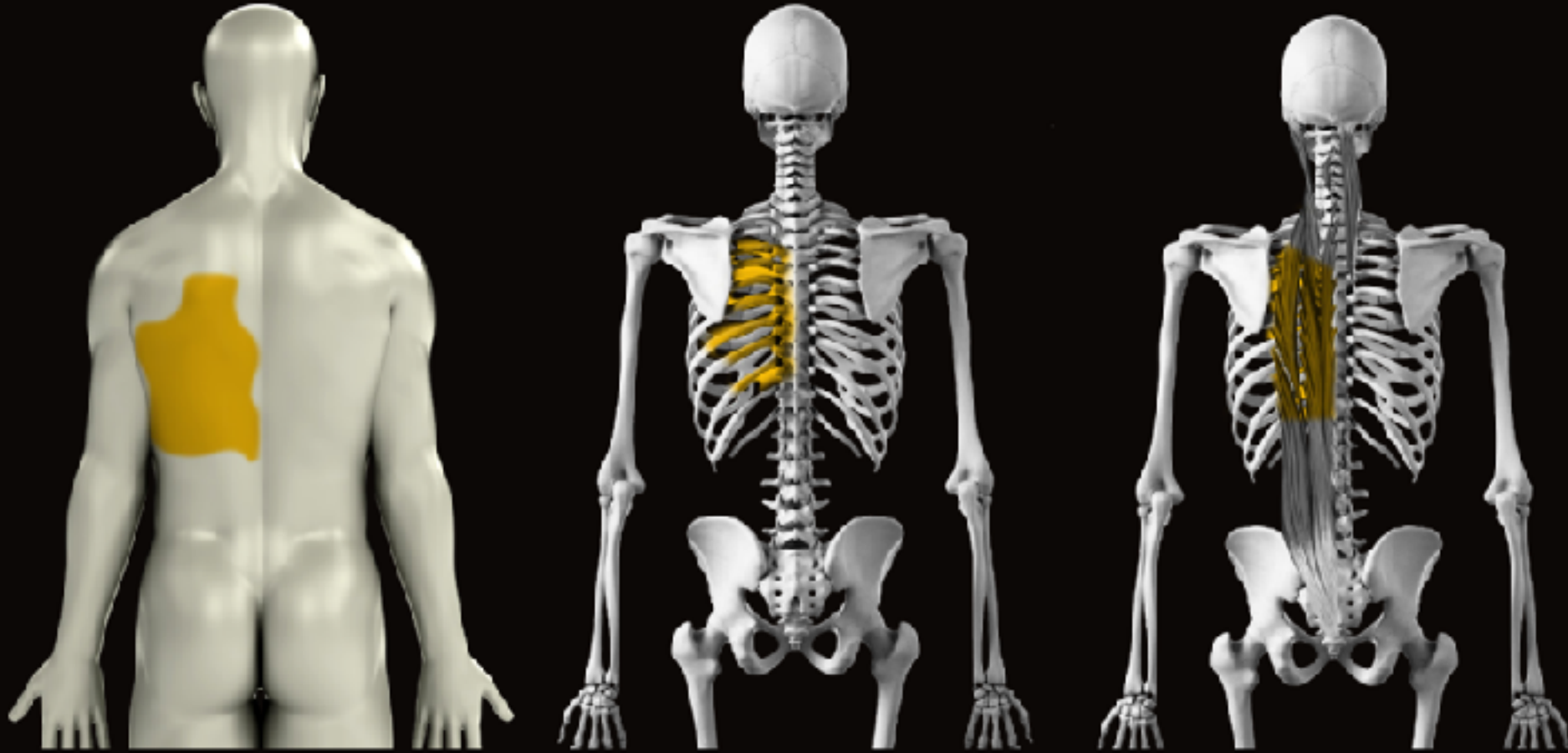
ESPB (Interfascial spreading)



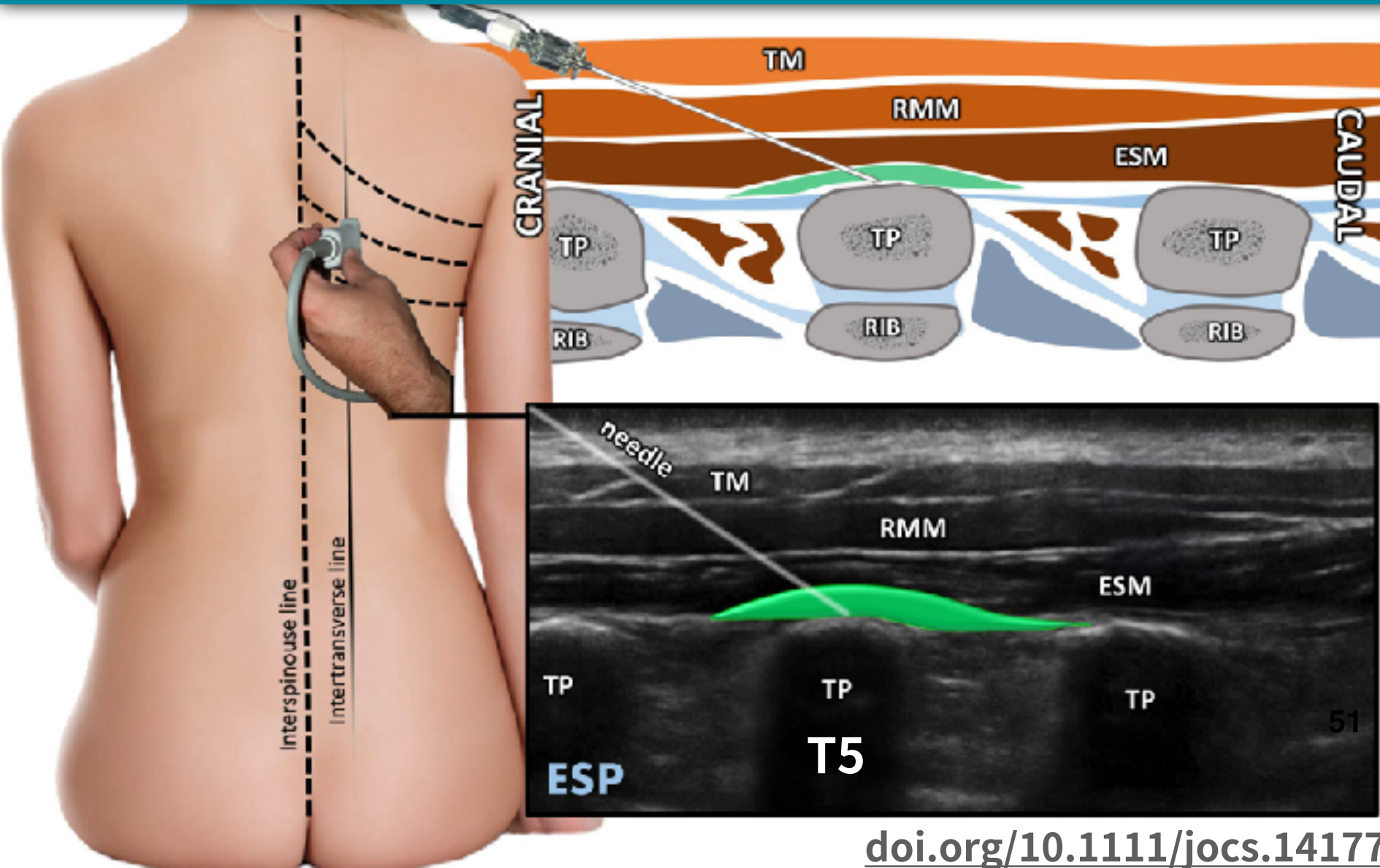
ESPB (erector spinae plane block)



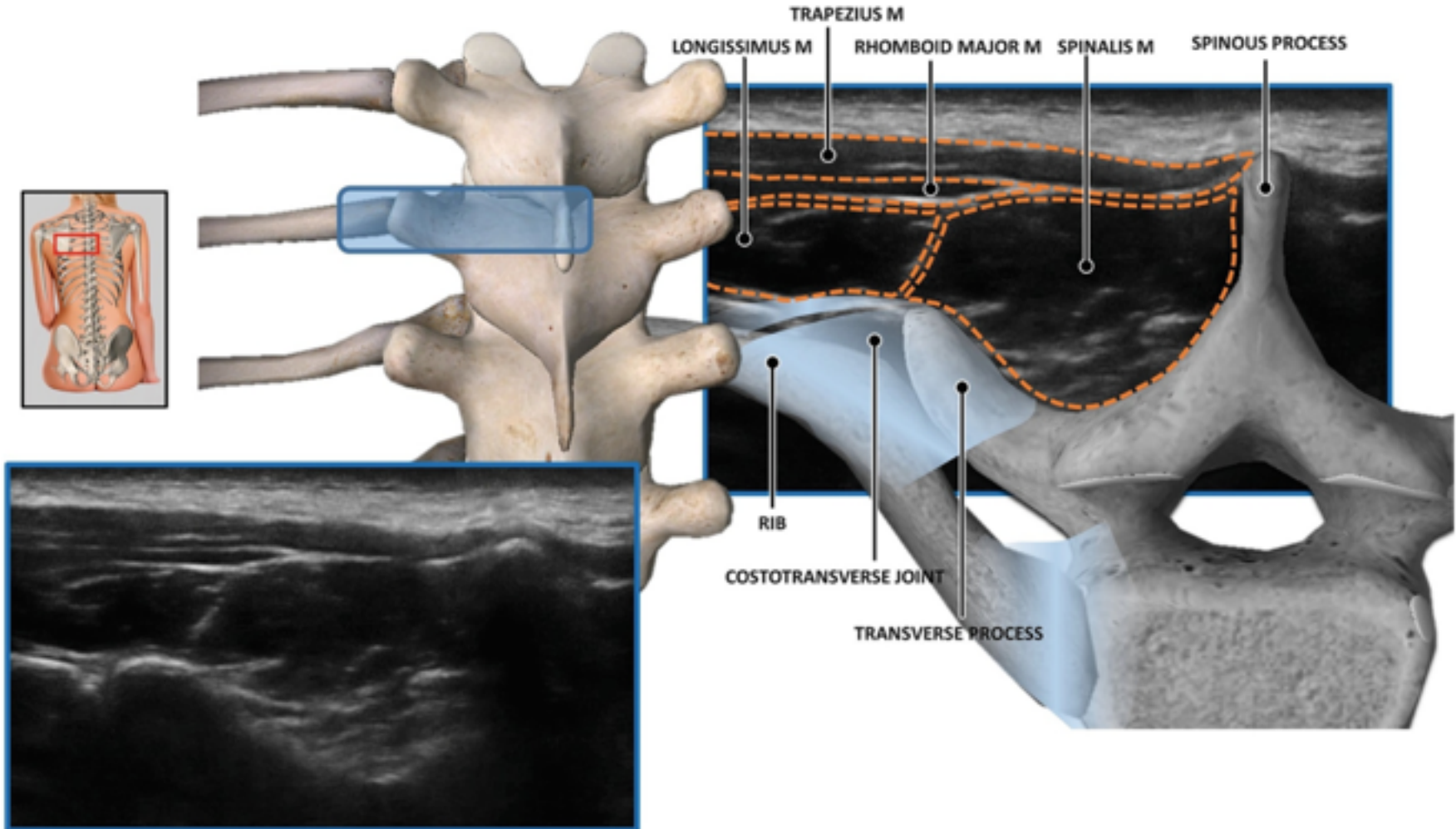
ESPB (erector spinae plane block)



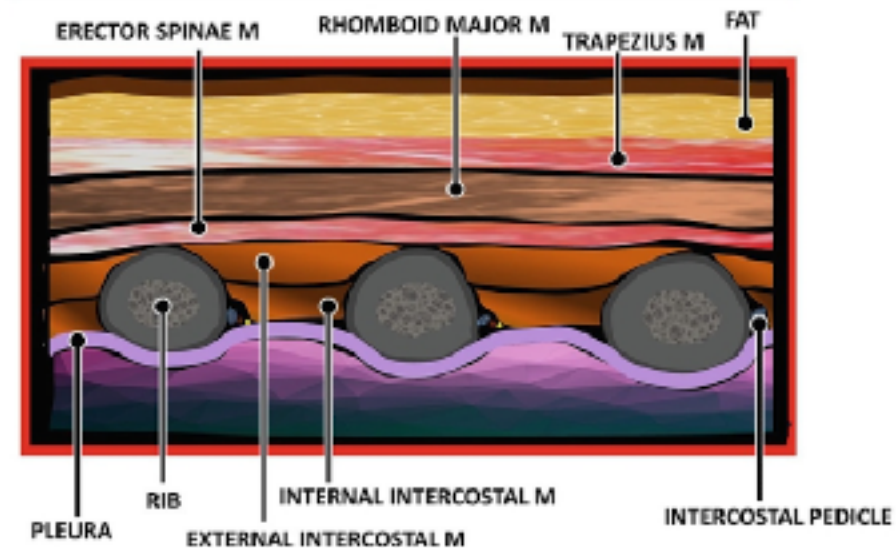
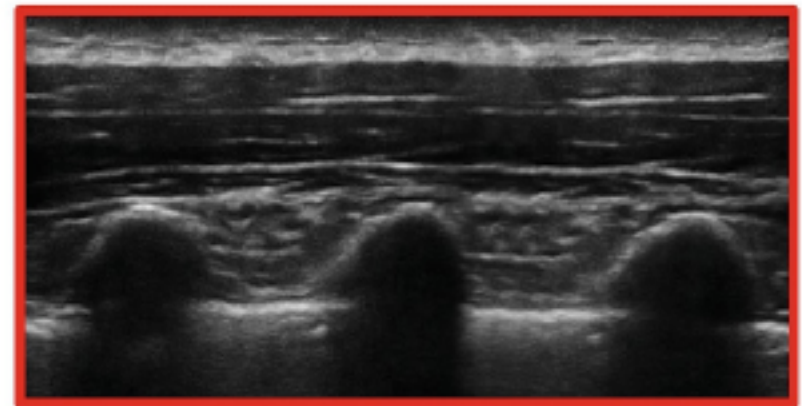
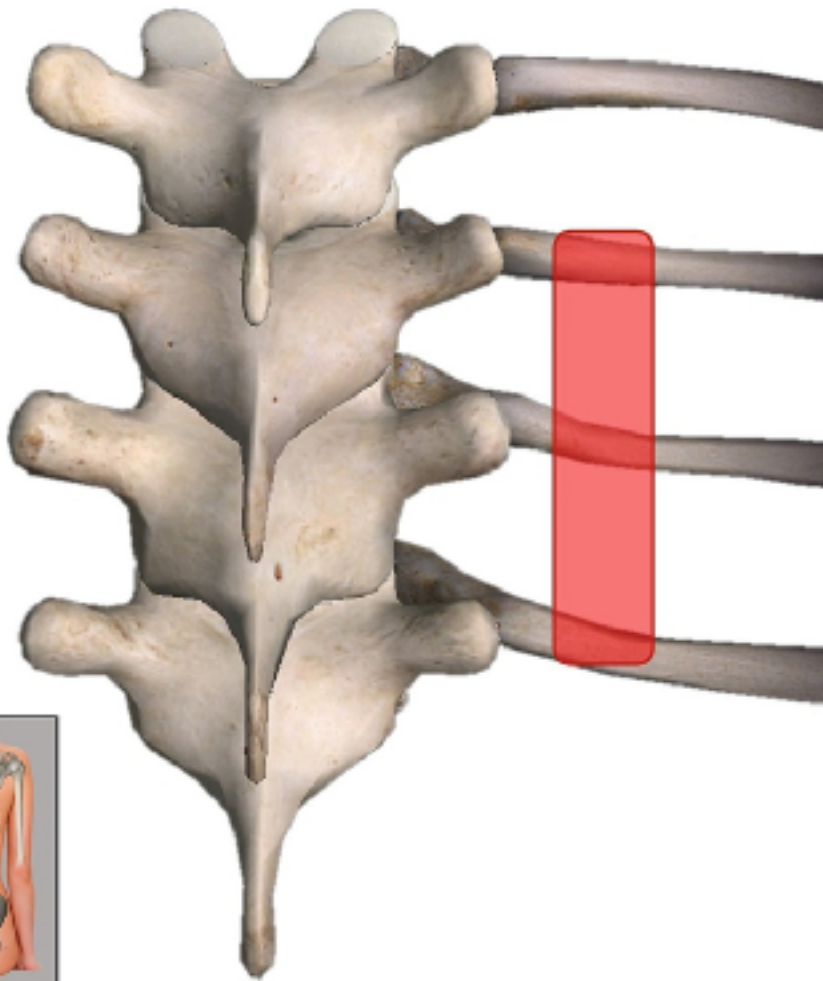
ESPB (erector spinae plane block)



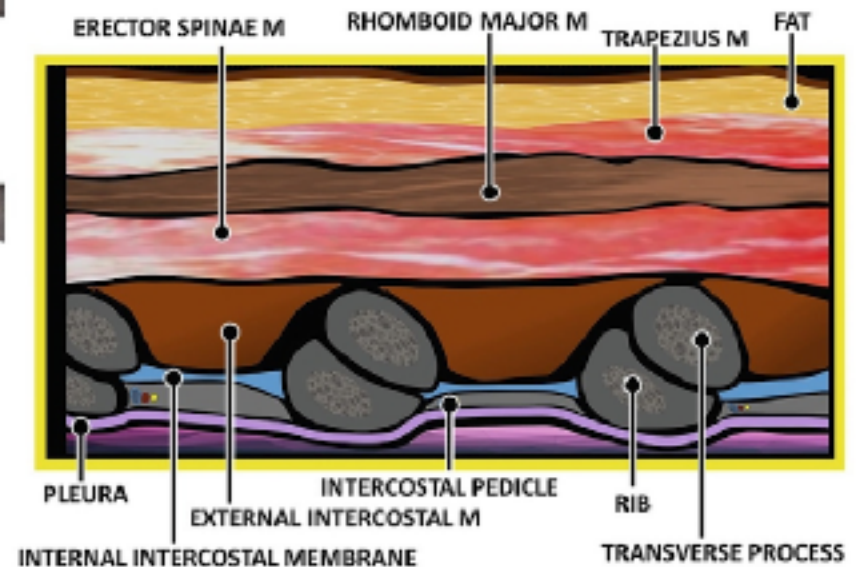
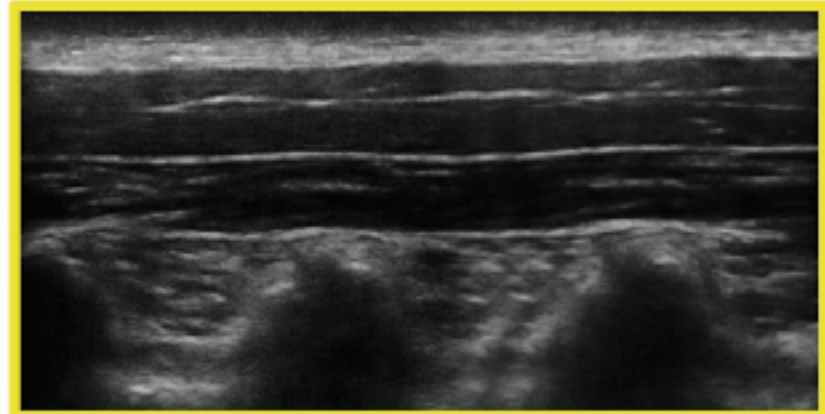
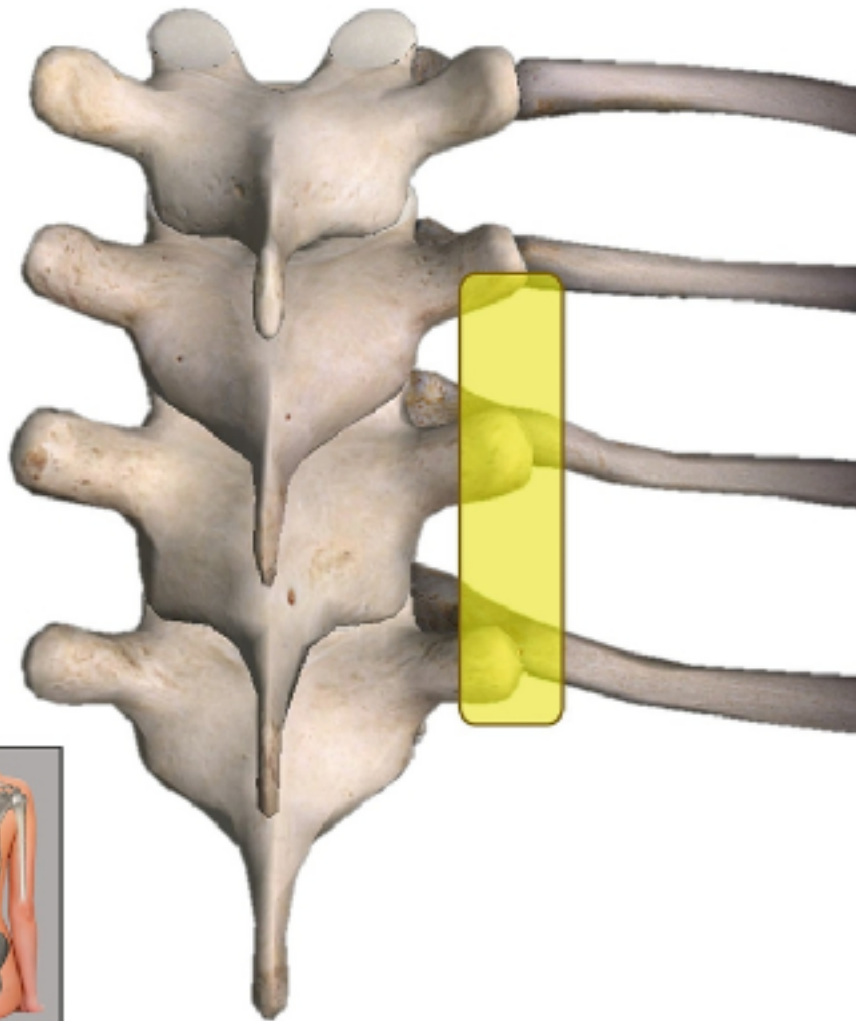
ESPB (erector spinae plane block)



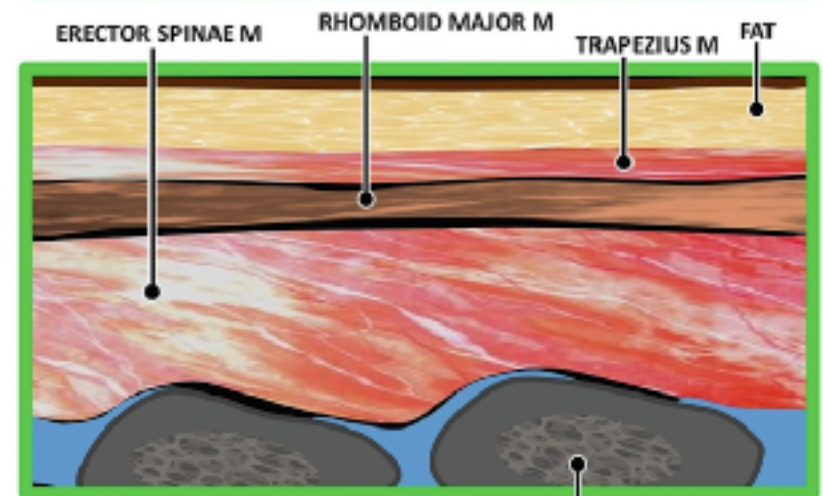
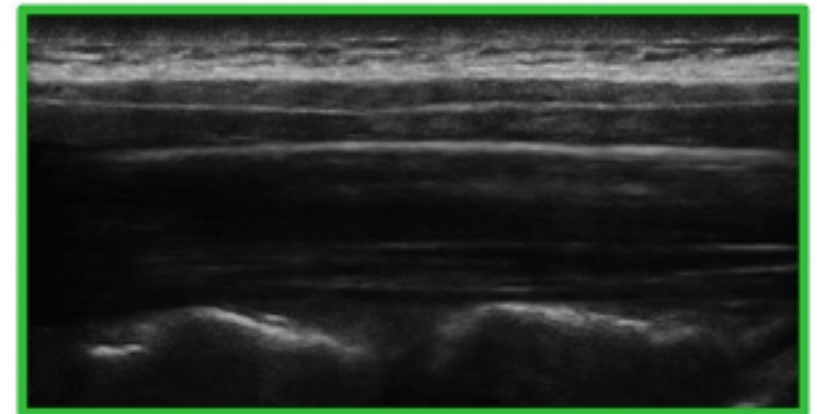
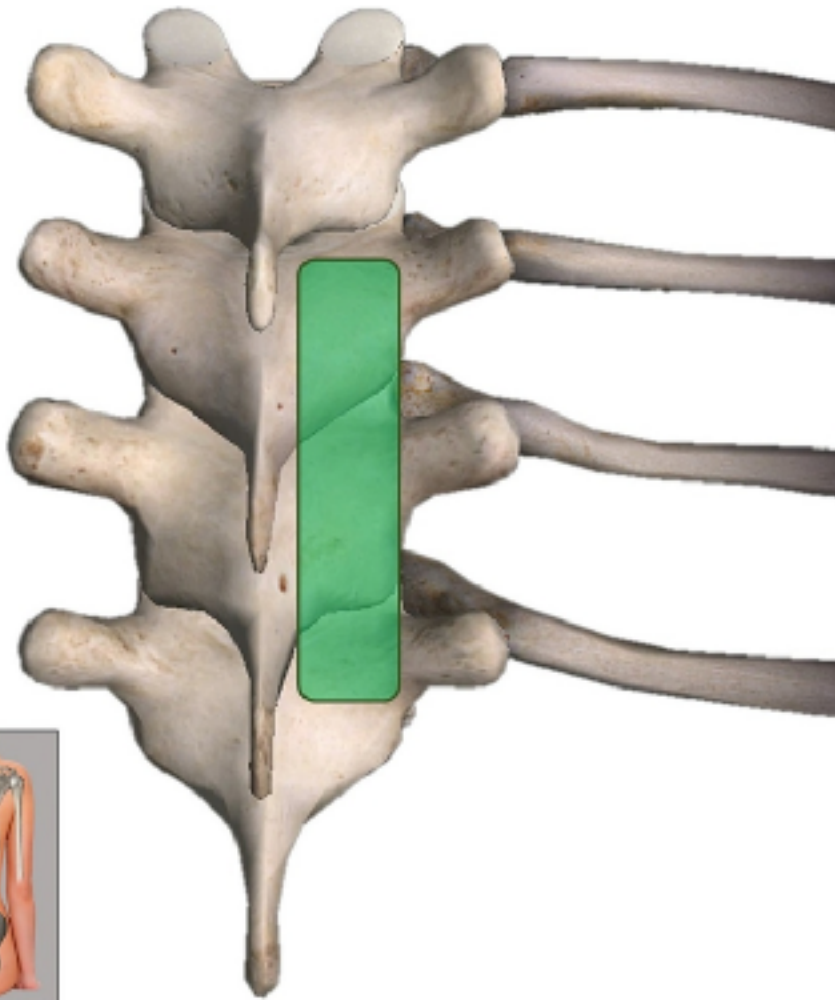
ESPB (Rib level)



ESPB (Rib / TP level)

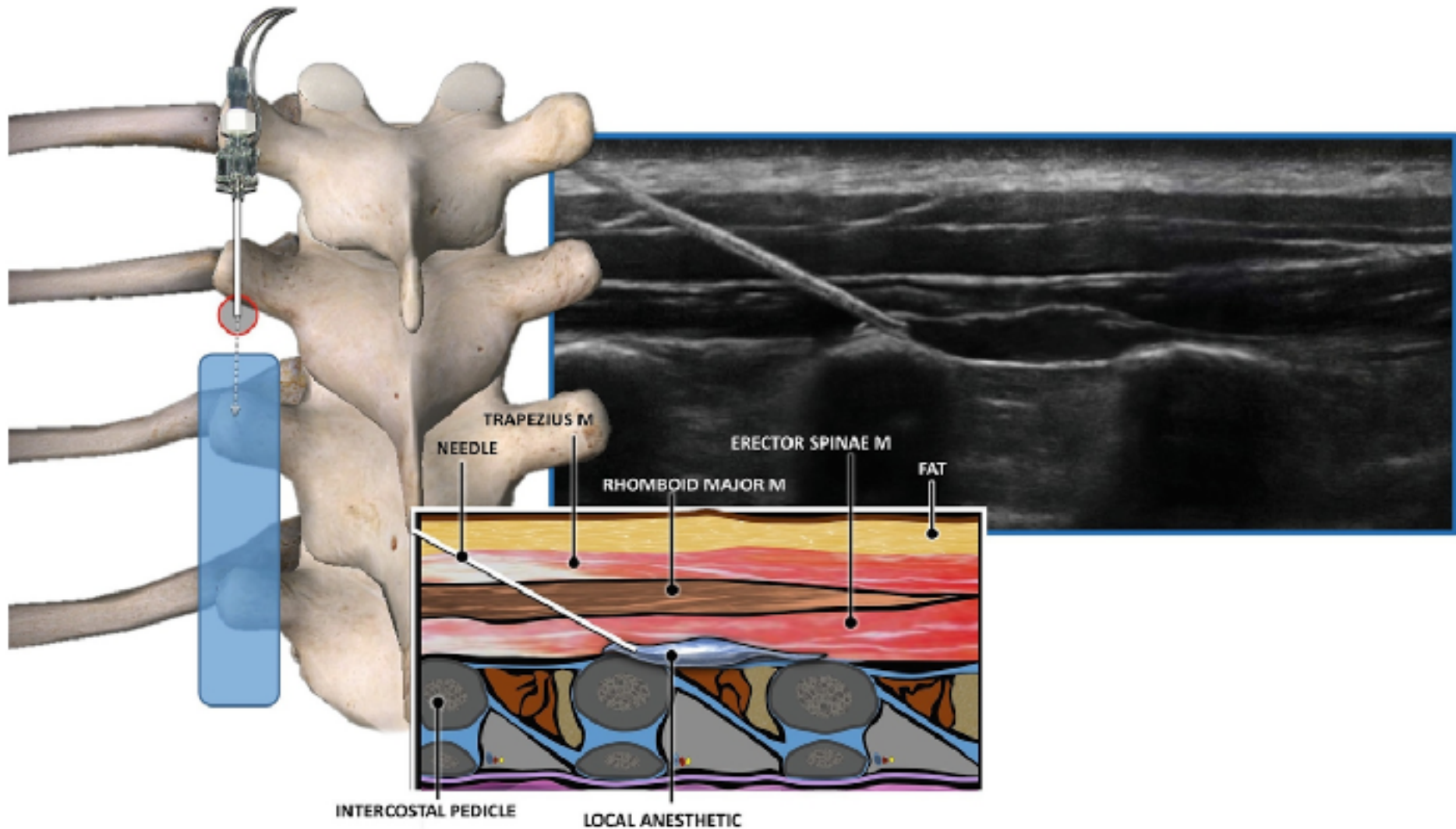


ESPB (lamina level)

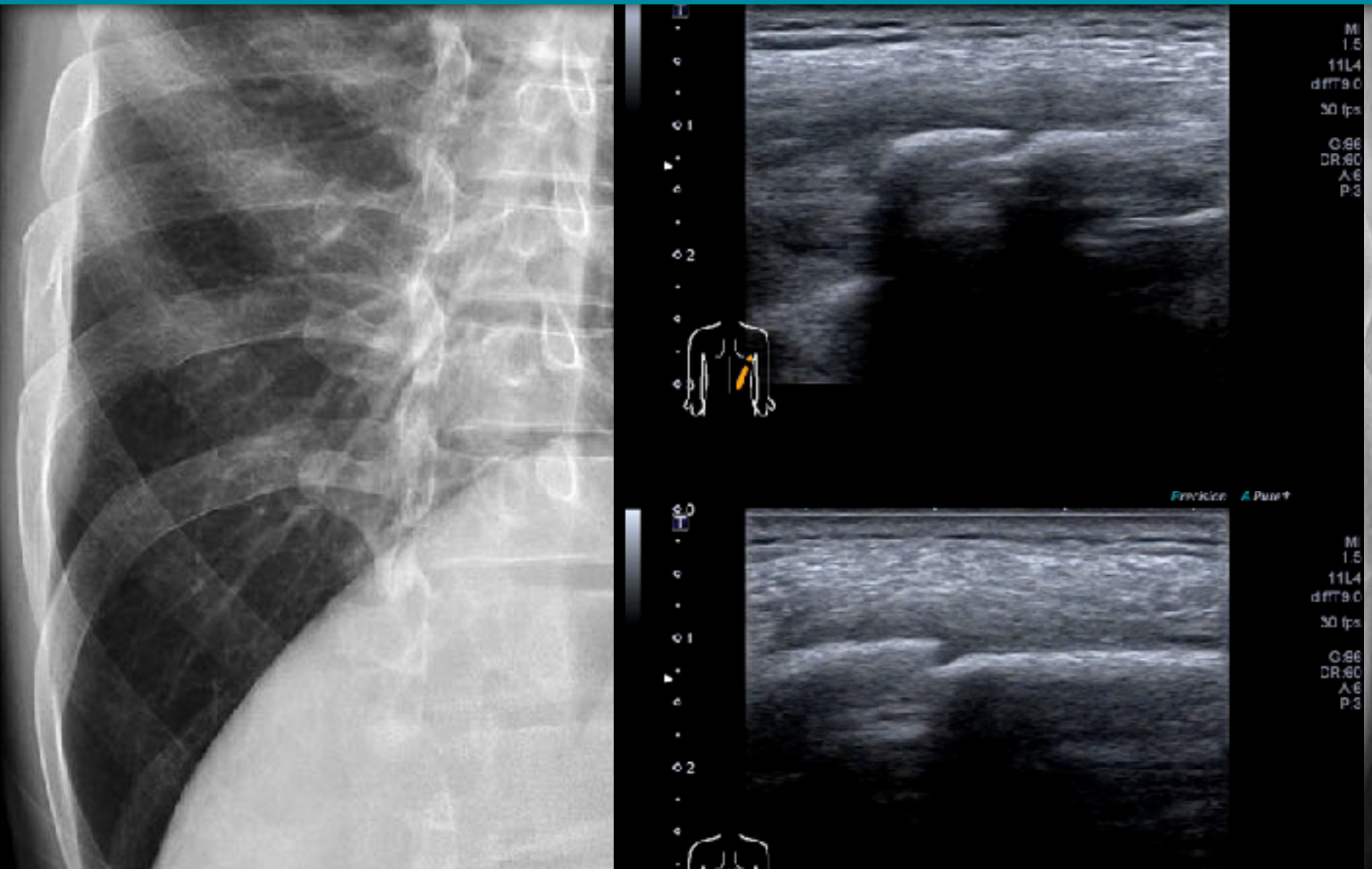


INTERCOSTAL PEDICLE

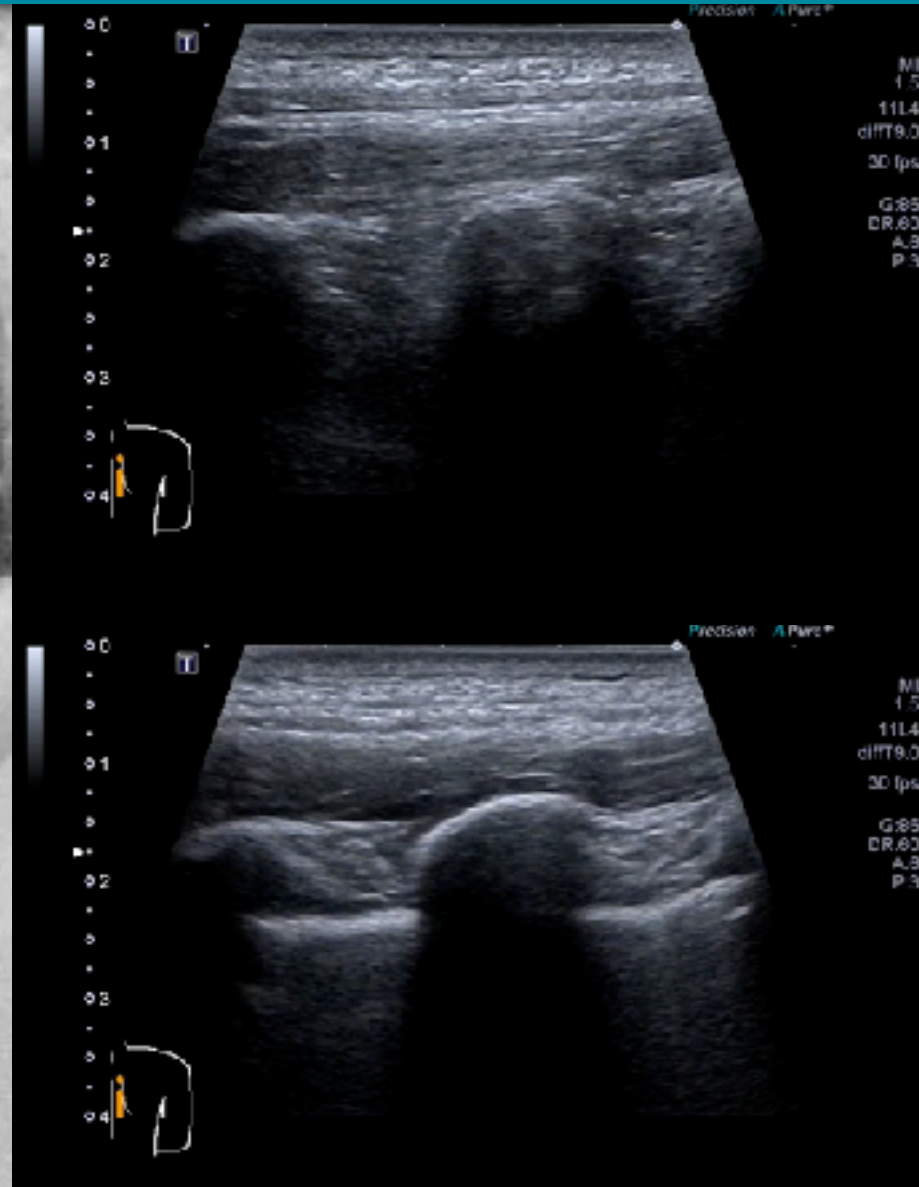
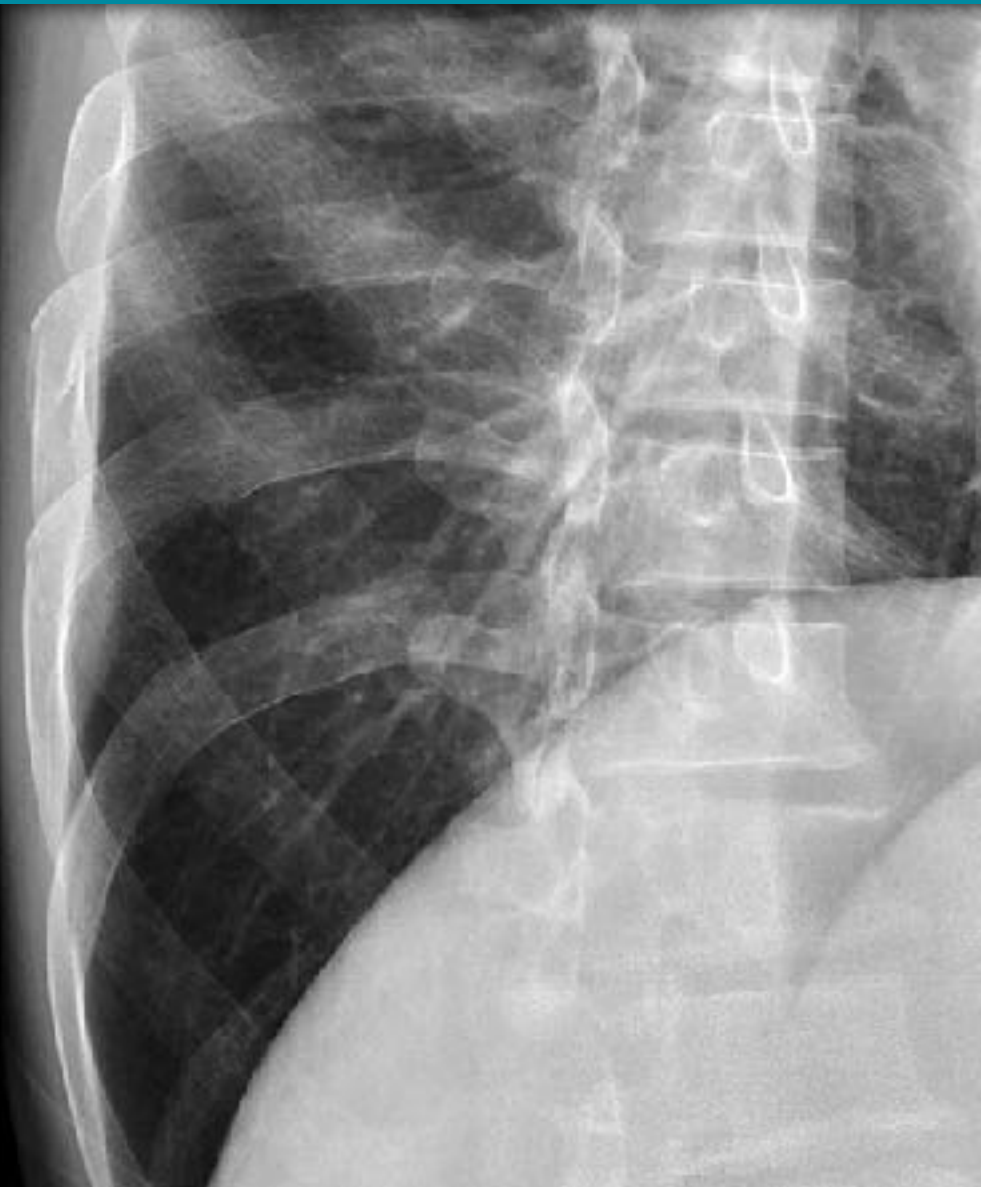
ESPB (TP level - target of ESPB)



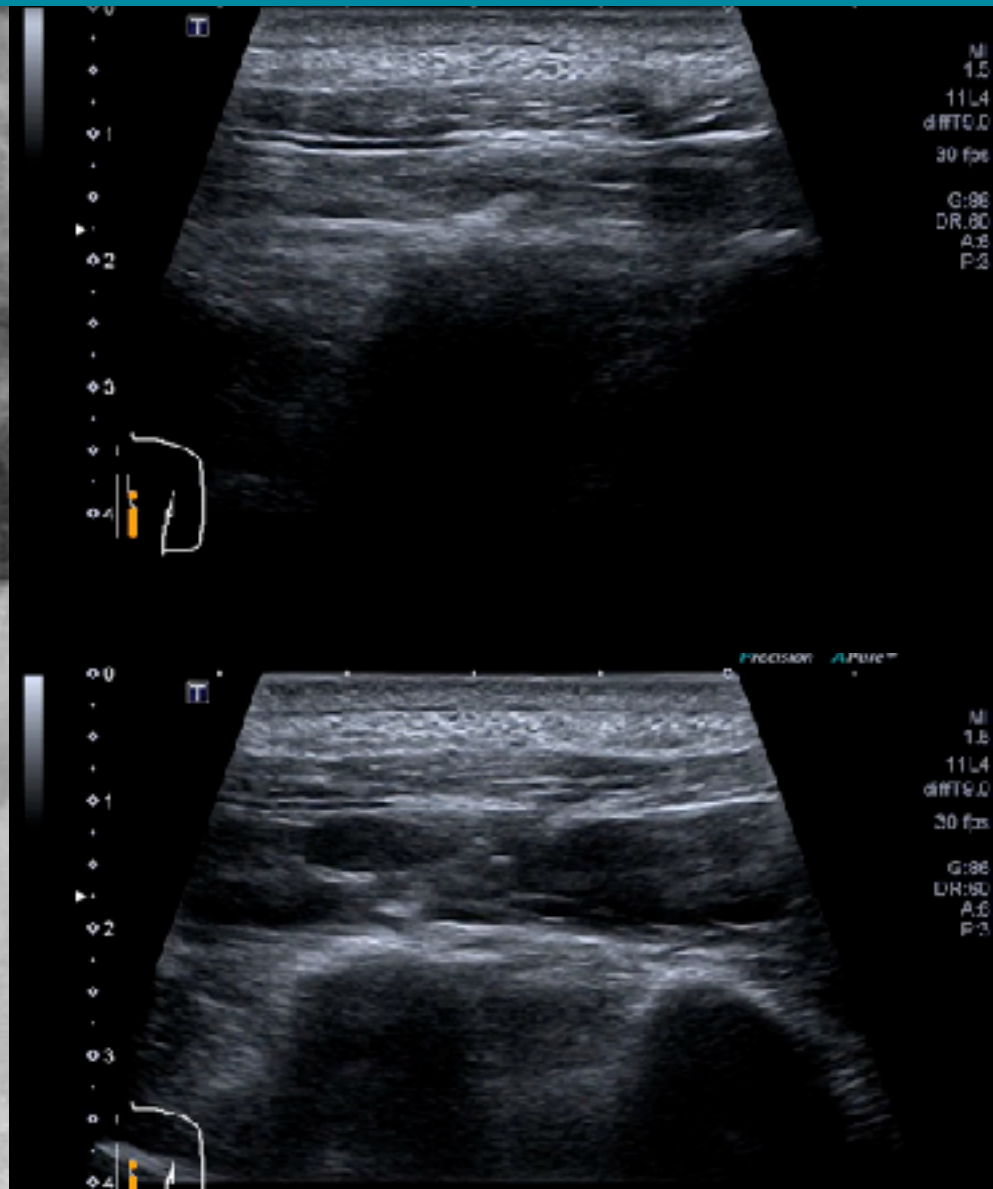
ESPB (TP level - target of ESPB)



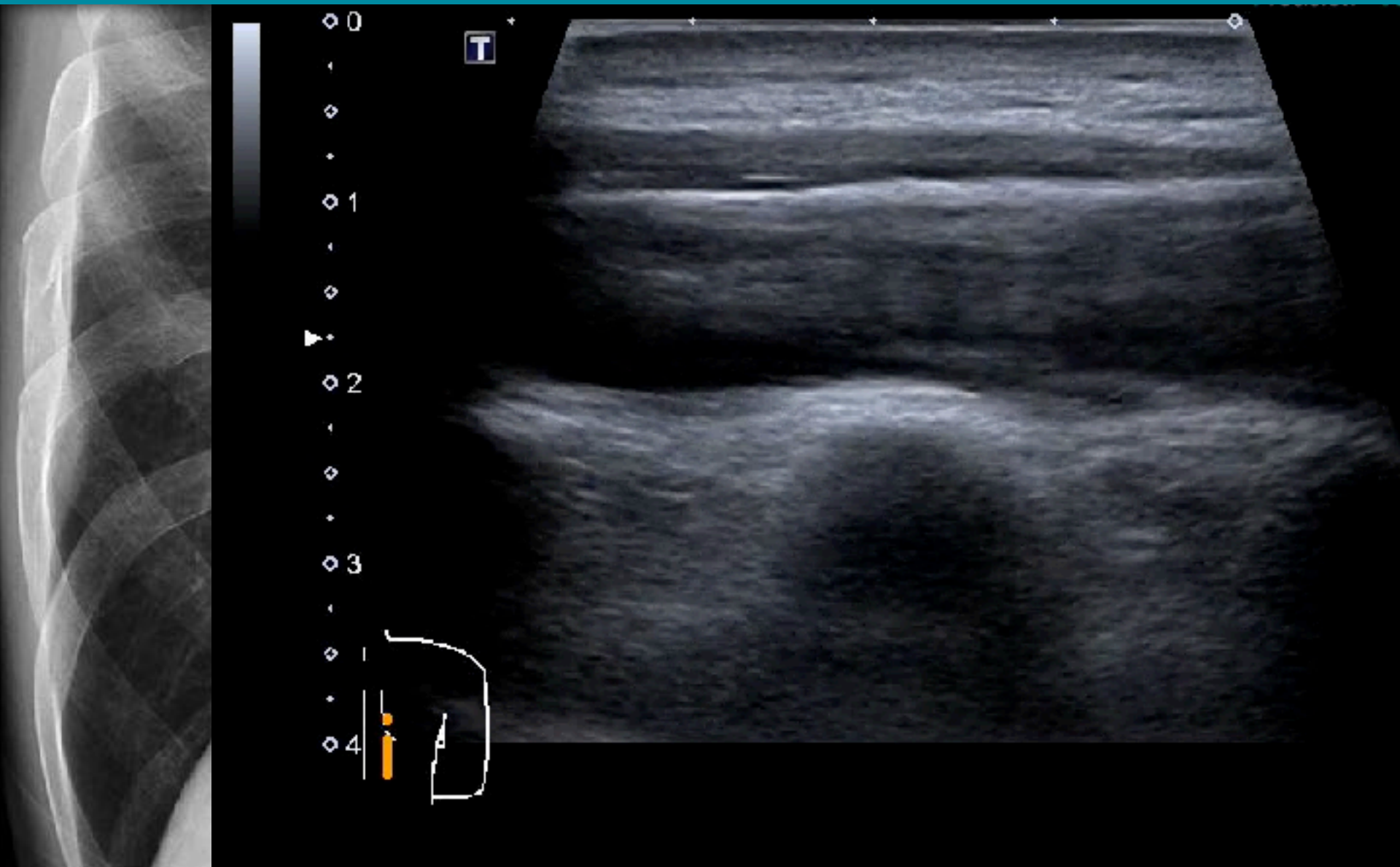
ESPB (TP level - target of ESPB)



ESPB (TP level - target of ESPB)

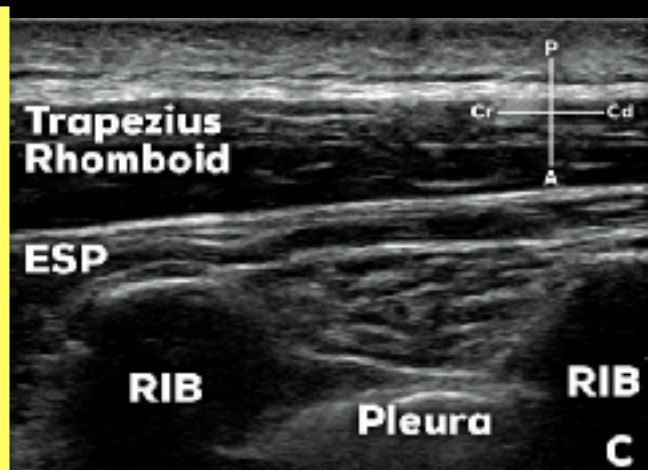
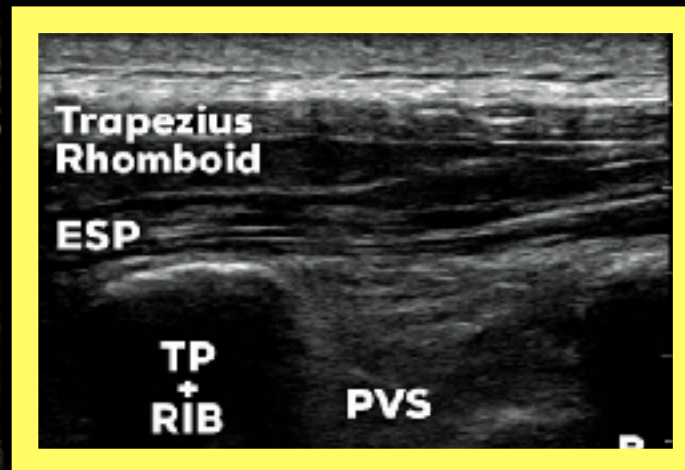
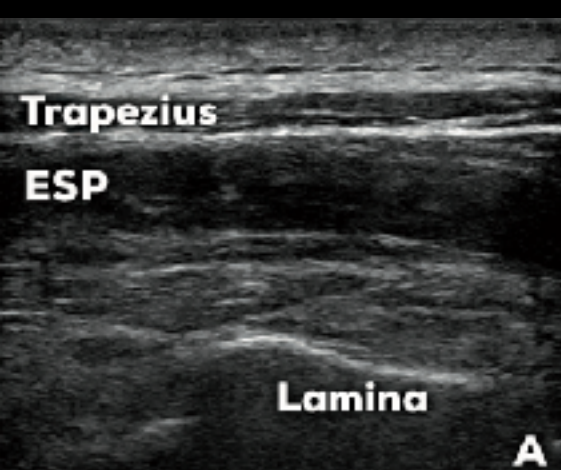
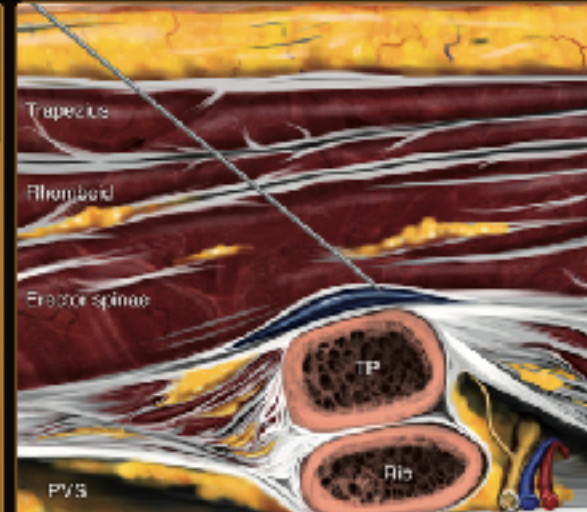
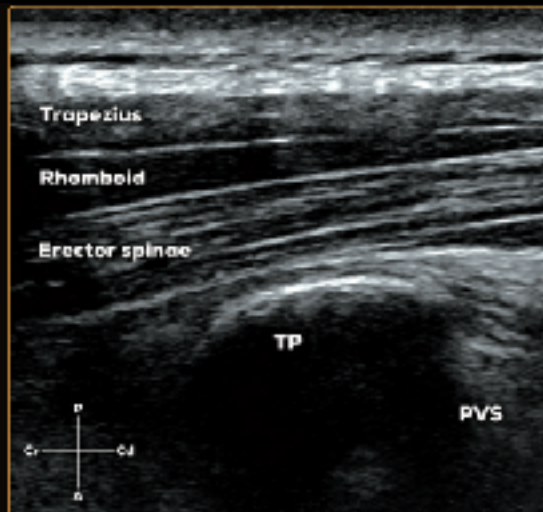


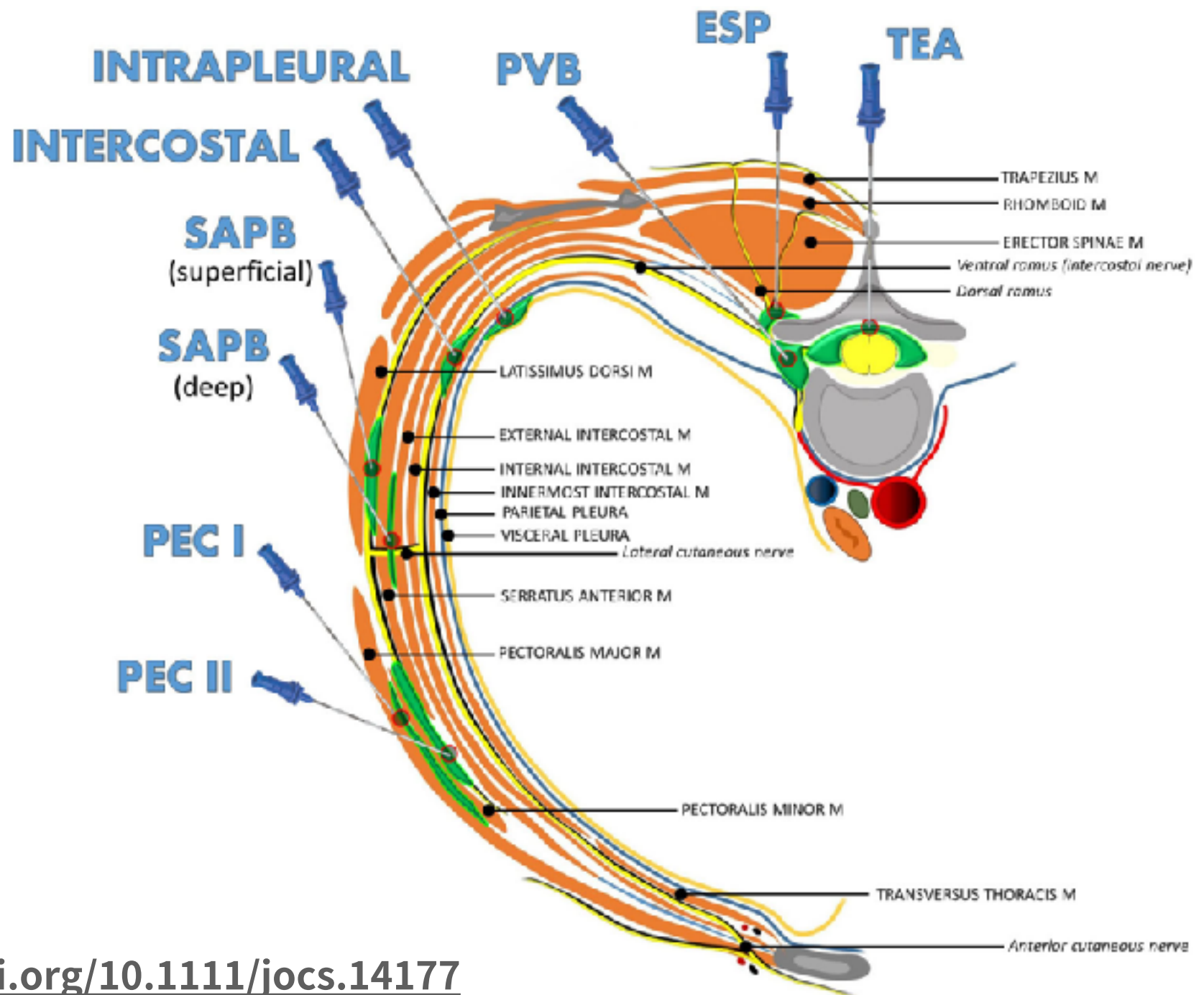
ESPB (TP level - target of ESPB)



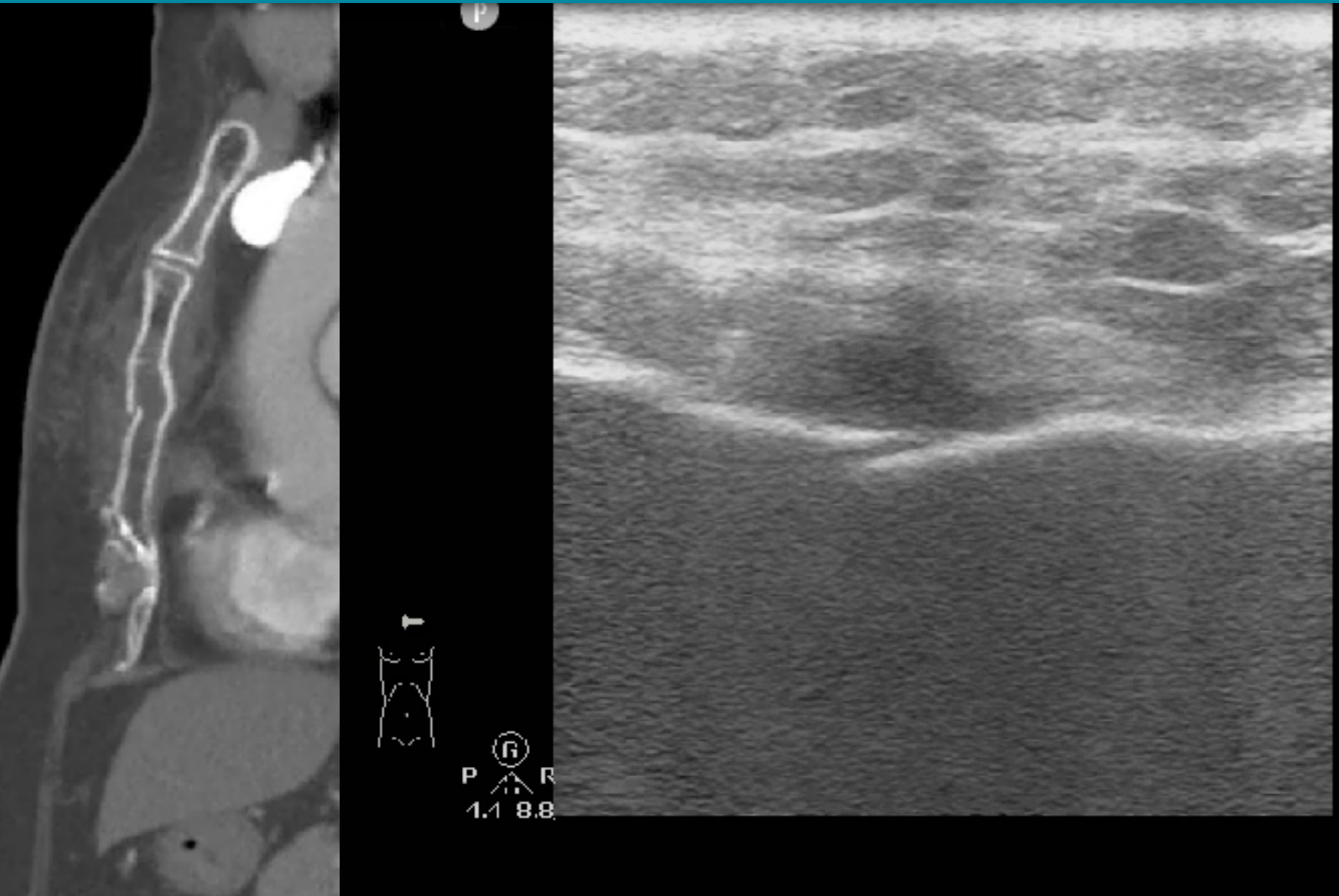
ESPB (TP level - target of ESPB)

Fascial block: at least 20 ml

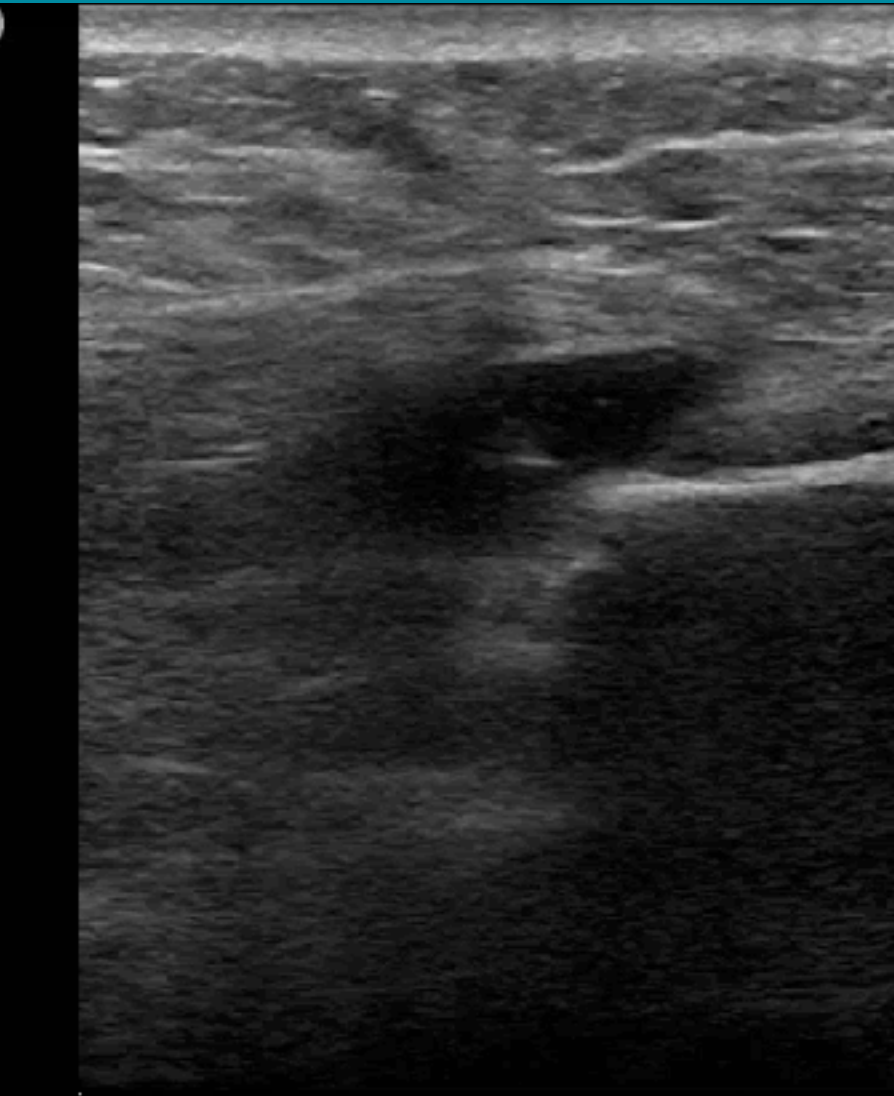
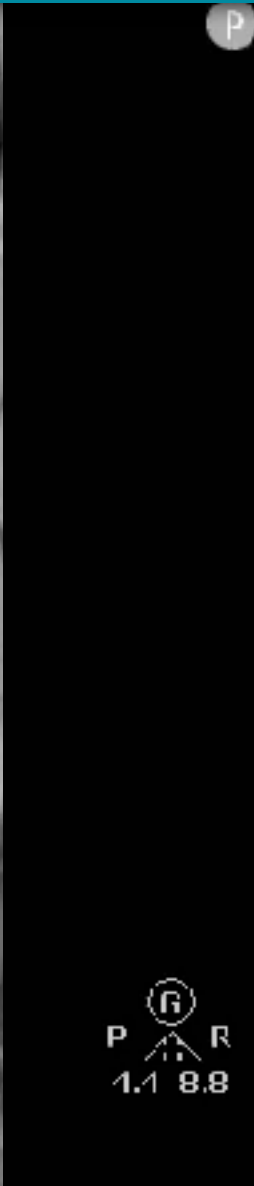
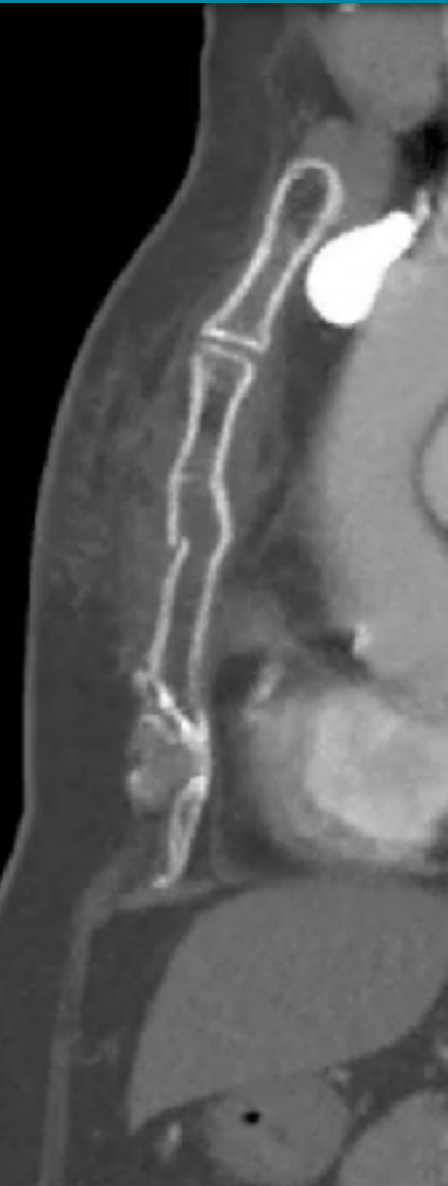




Sternal fracture hematoma block



Sternal fracture hematoma block

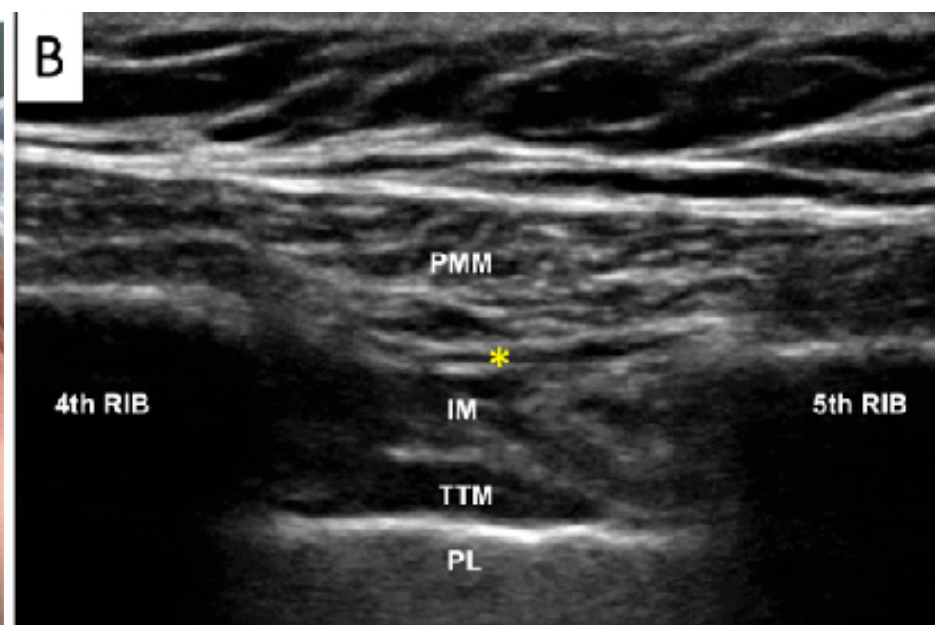
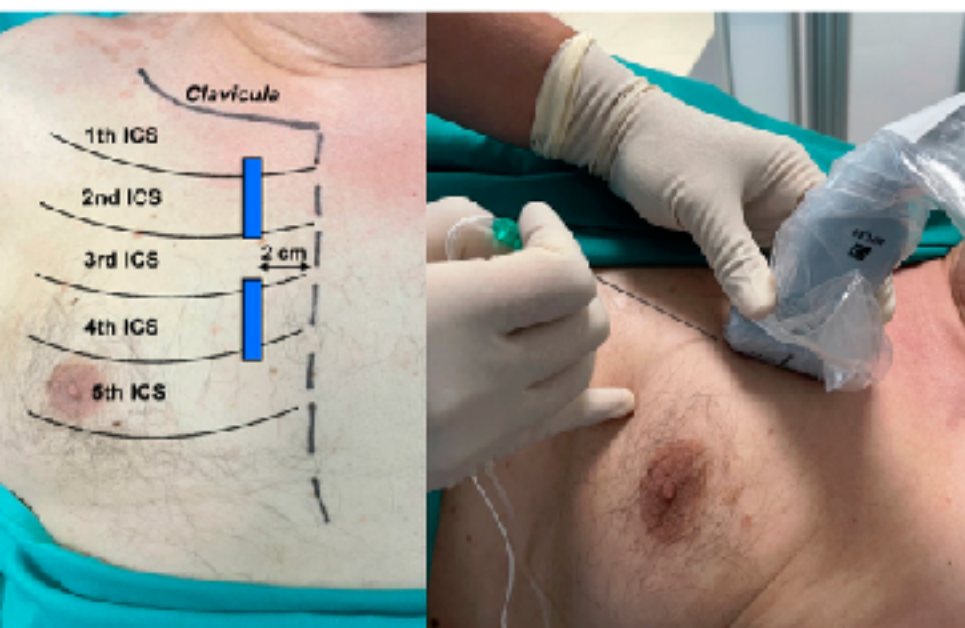




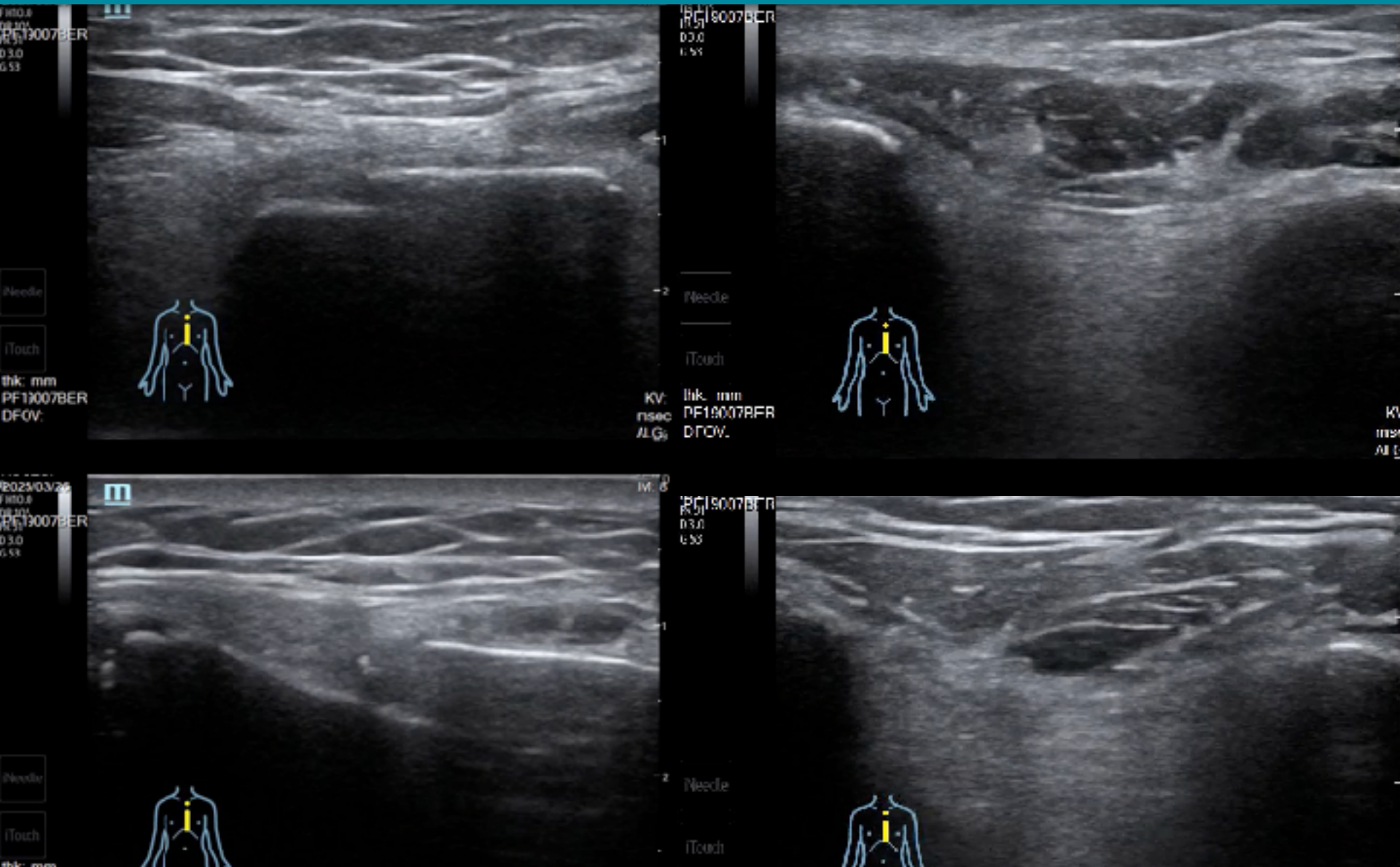
Article

Ultrasound Guided Parasternal Block for Perioperative Analgesia in Cardiac Surgery: A Prospective Study

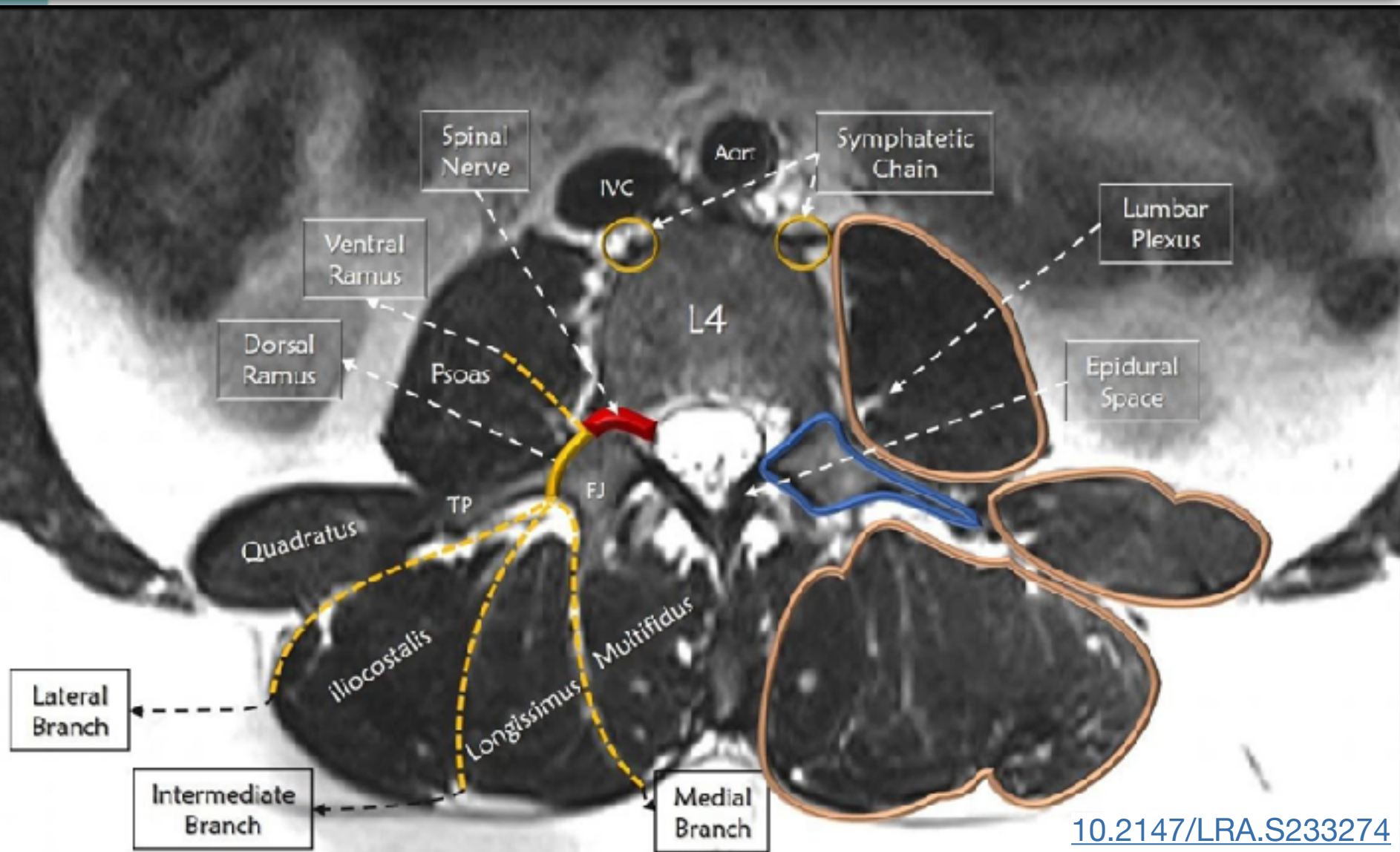
Giuseppe Pascarella ¹, Fabio Costa ¹, Giulia Nonnis ², Alessandro Strumia ^{1,*}, Domenico Sarubbi ¹, Lorenzo Schiavoni ¹, Annalaura Di Pumpo ¹, Lara Mortini ¹, Stefania Grande ¹, Andrea Attanasio ³, Giovanni Gadotti ⁴, Alessandro De Cassai ⁵, Alessia Mattei ¹, Antonio Nenna ⁶, Massimo Chello ⁶, Rita Cataldo ¹, Felice Eugenio Agrò ¹ and Massimiliano Carassiti ¹



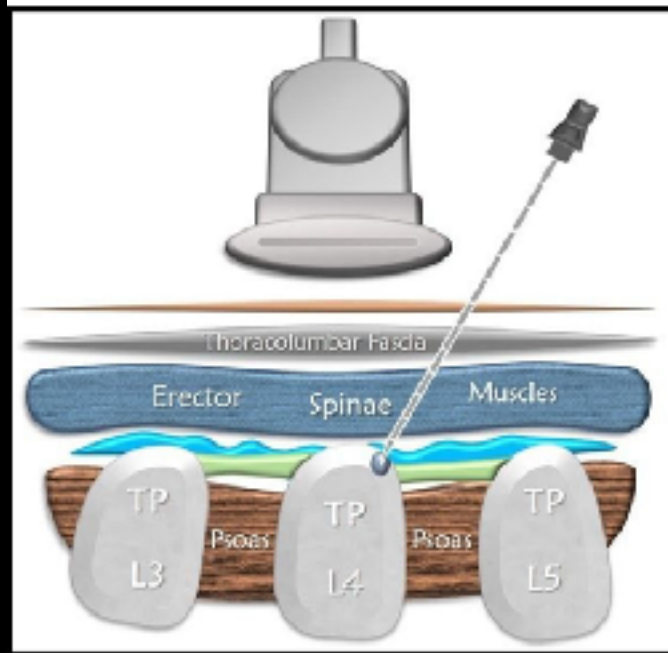
Parasternal block for Sternal fracture



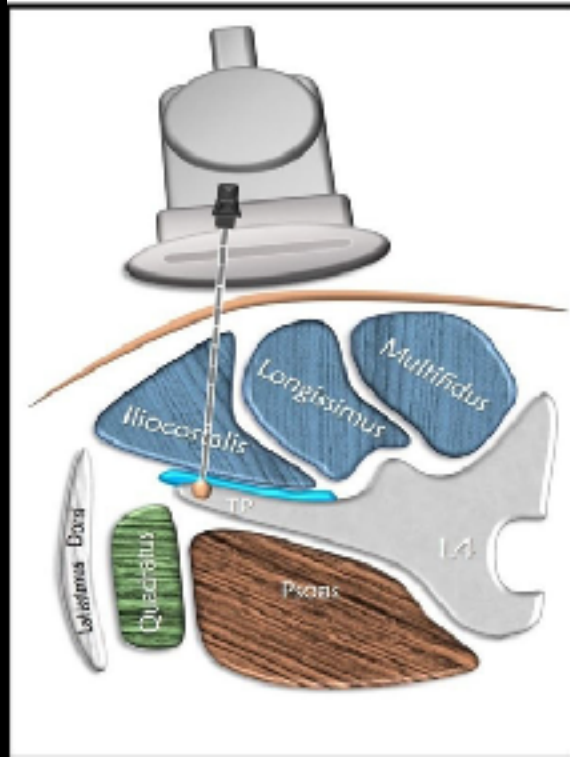
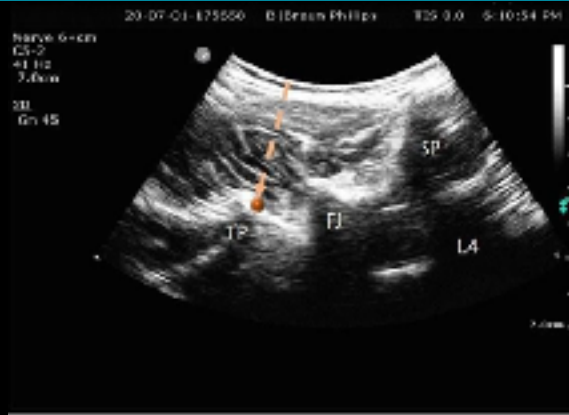
Lumbar ESPB



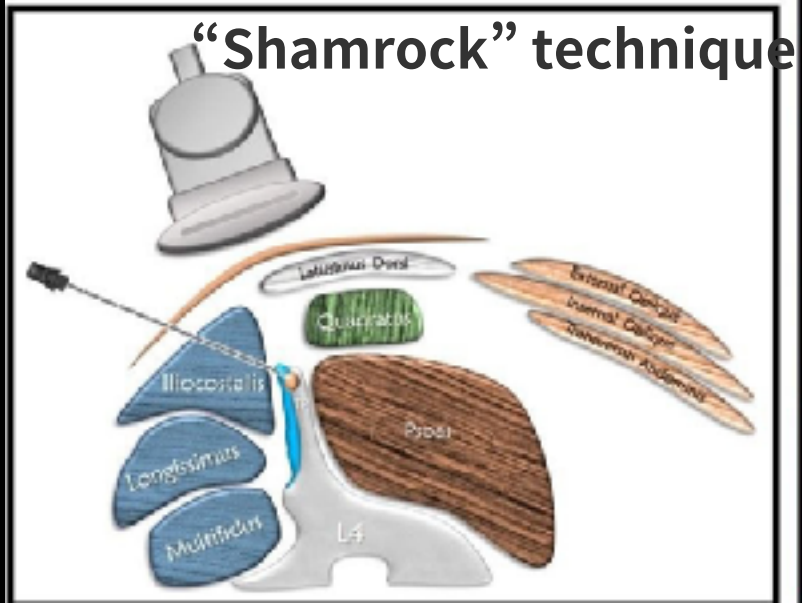
Lumbar ESPB - parasagittal



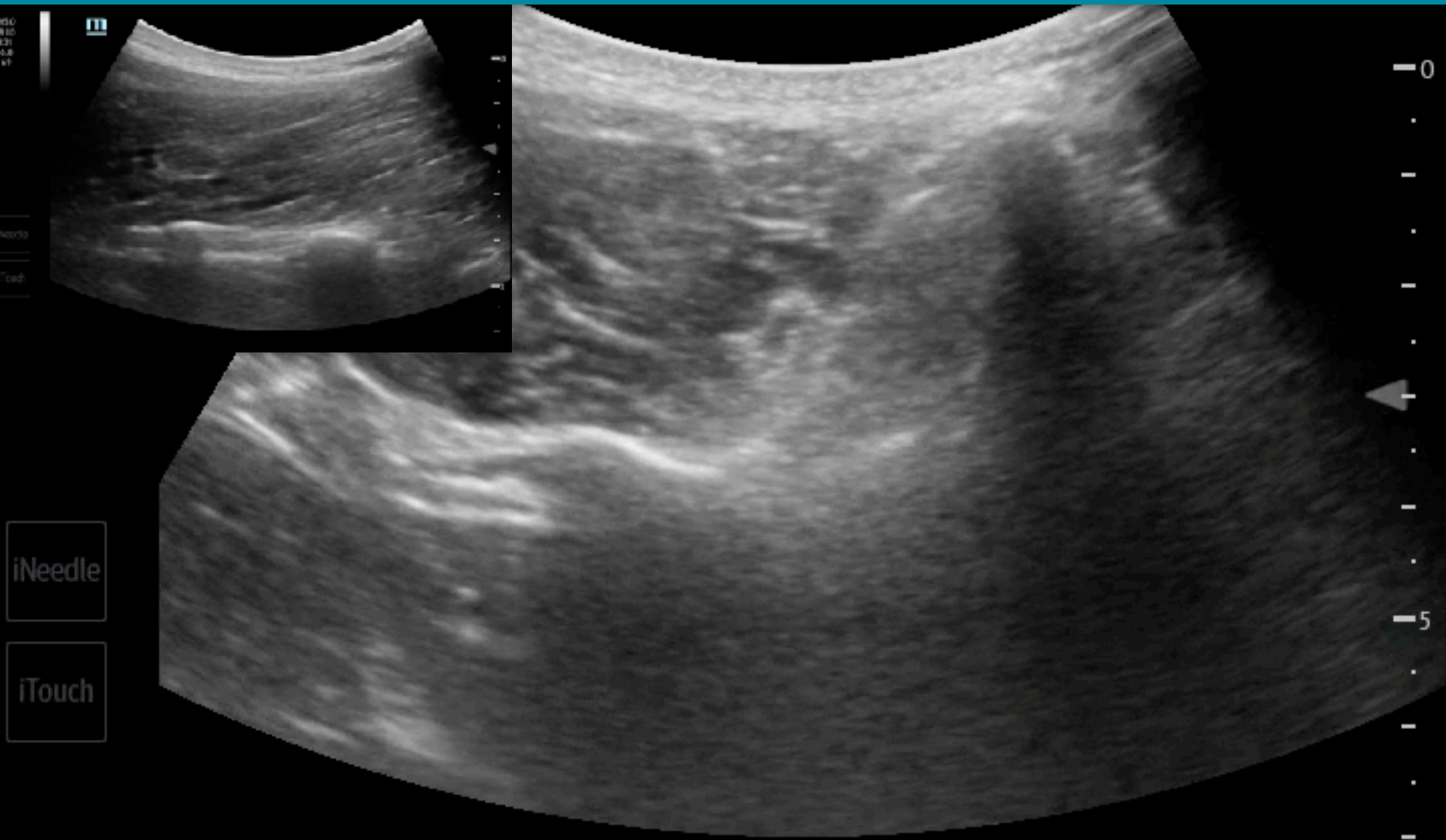
Lumbar ESPB - transverse



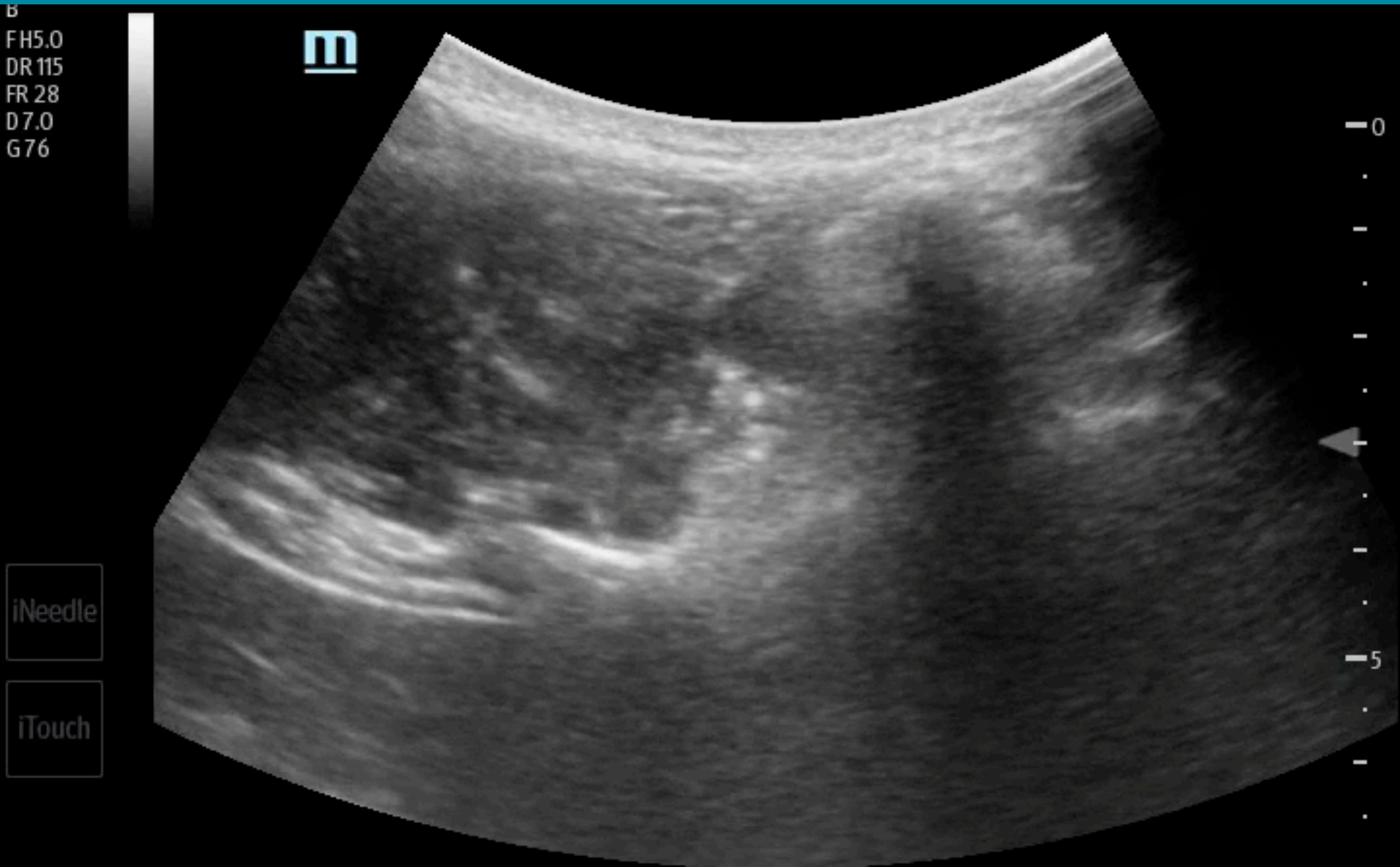
Lumbar ESPB – Aksu approach



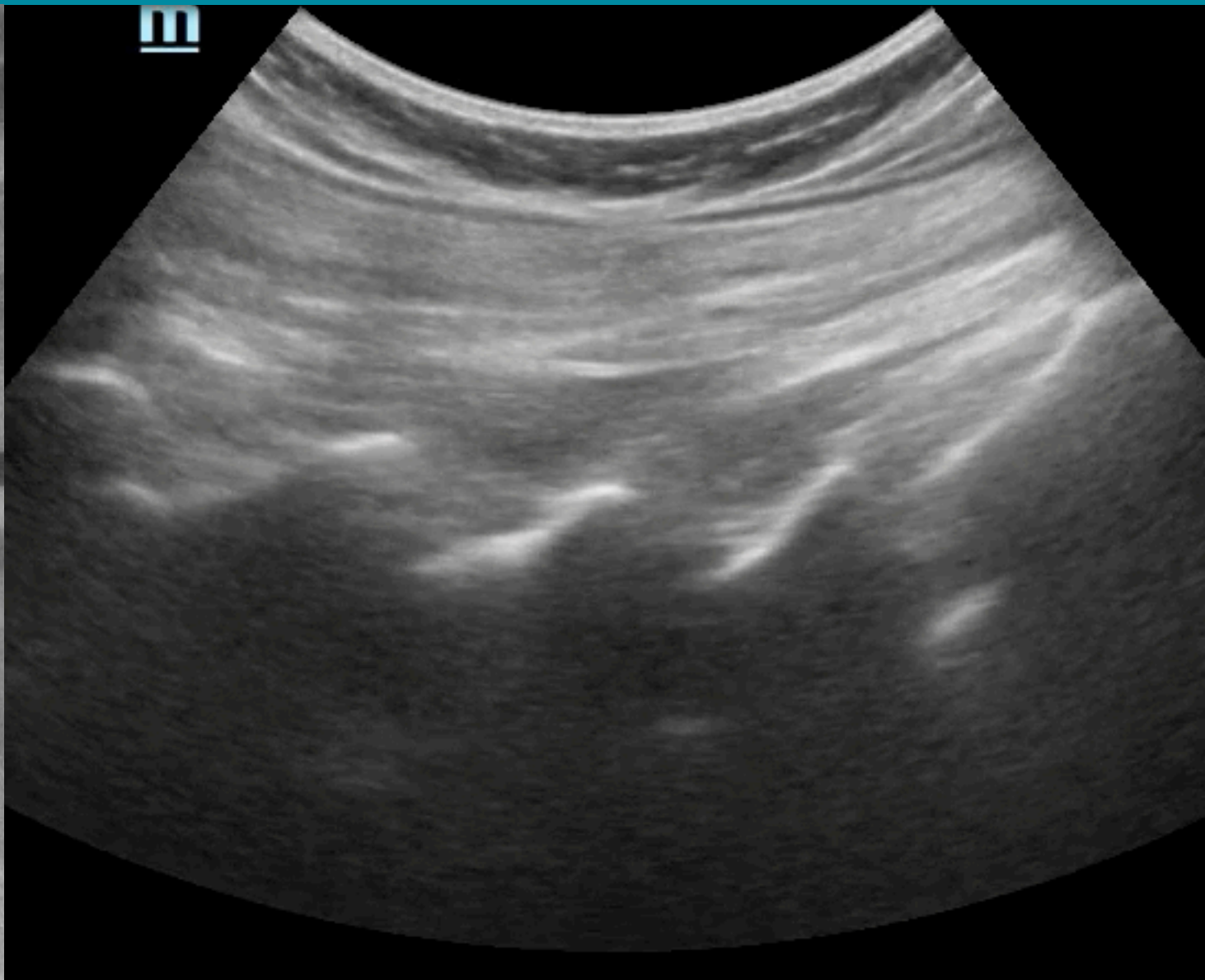
Lumbar ESPB



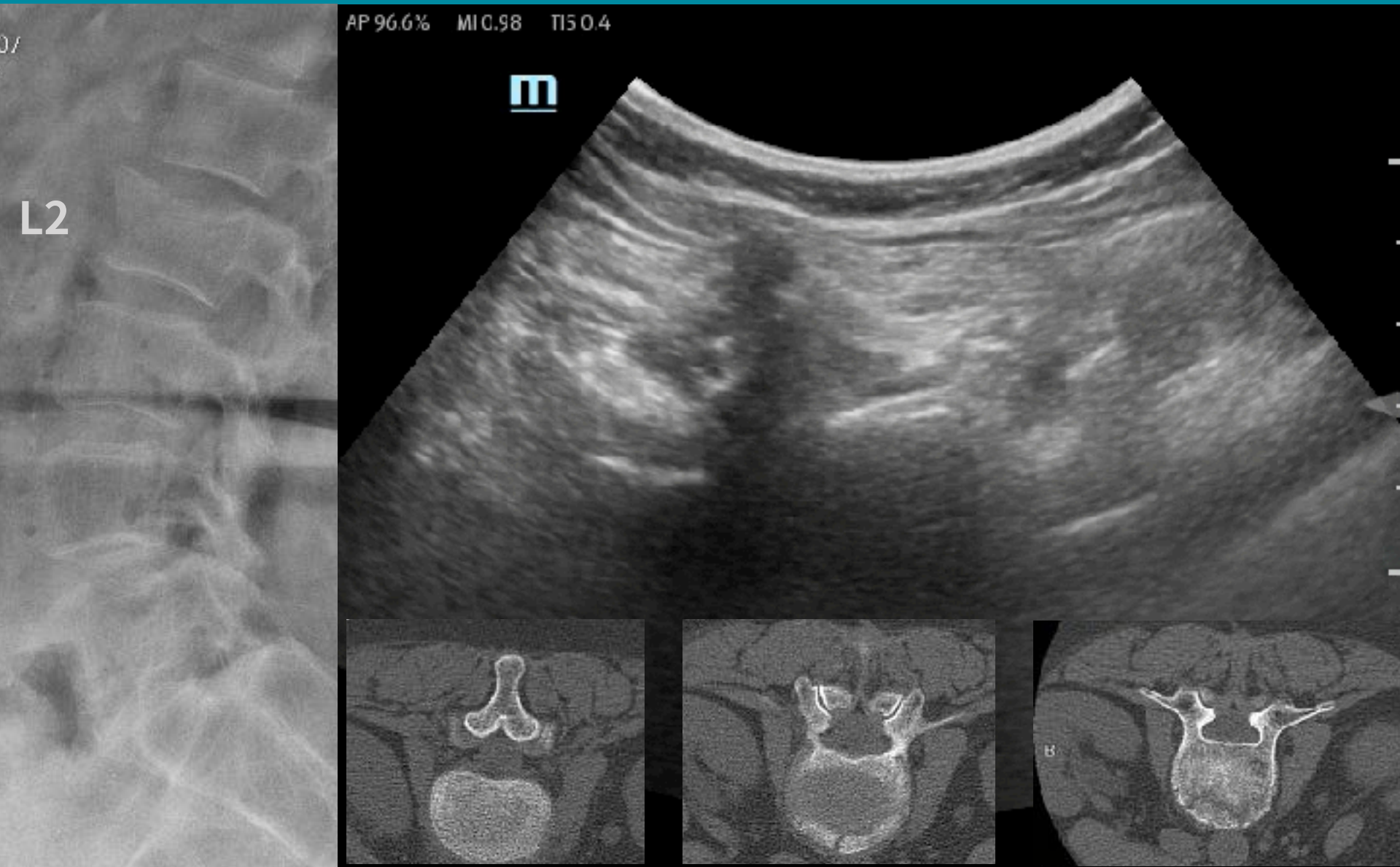
Lumbar ESPB



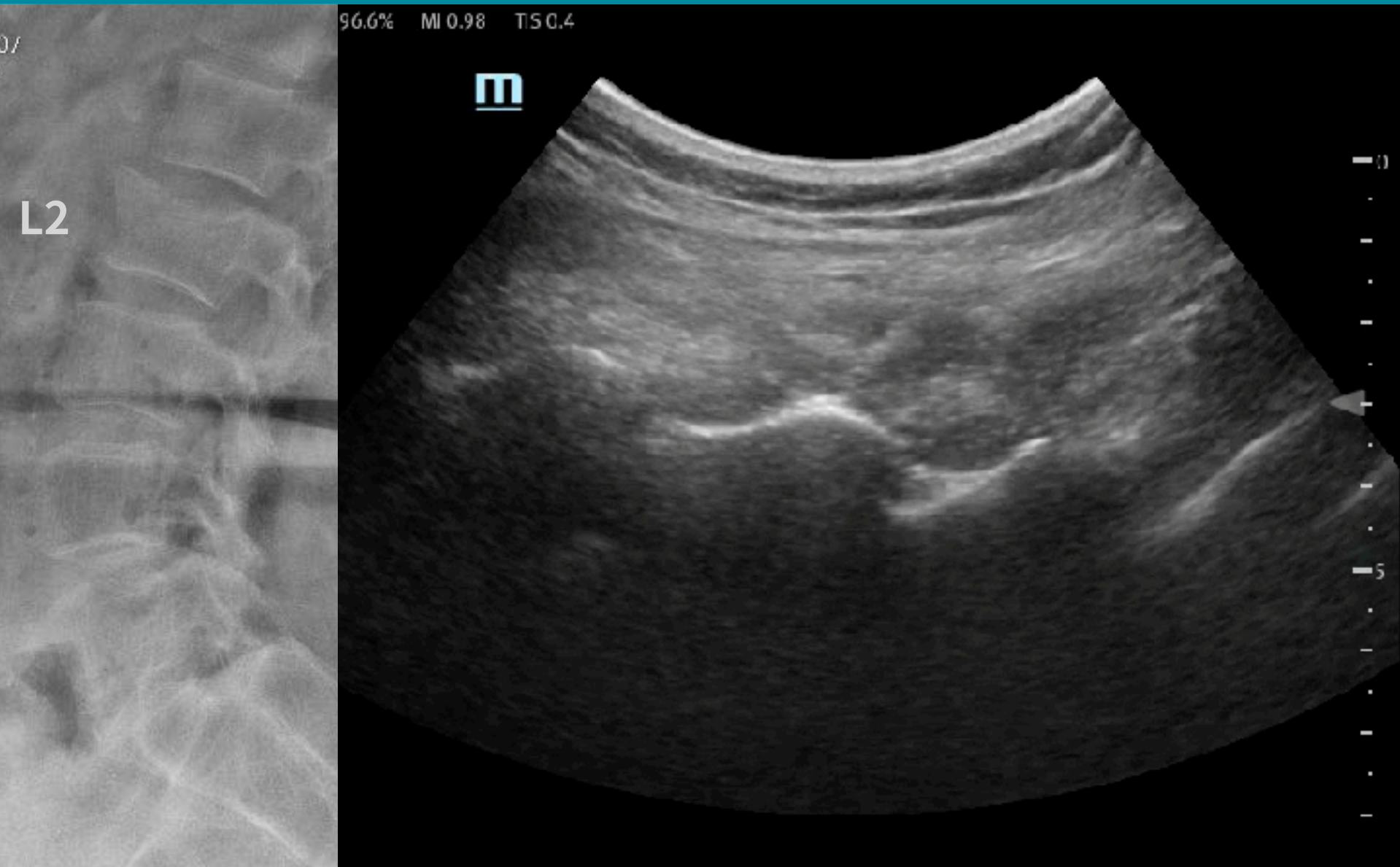
Lumbar ESPB



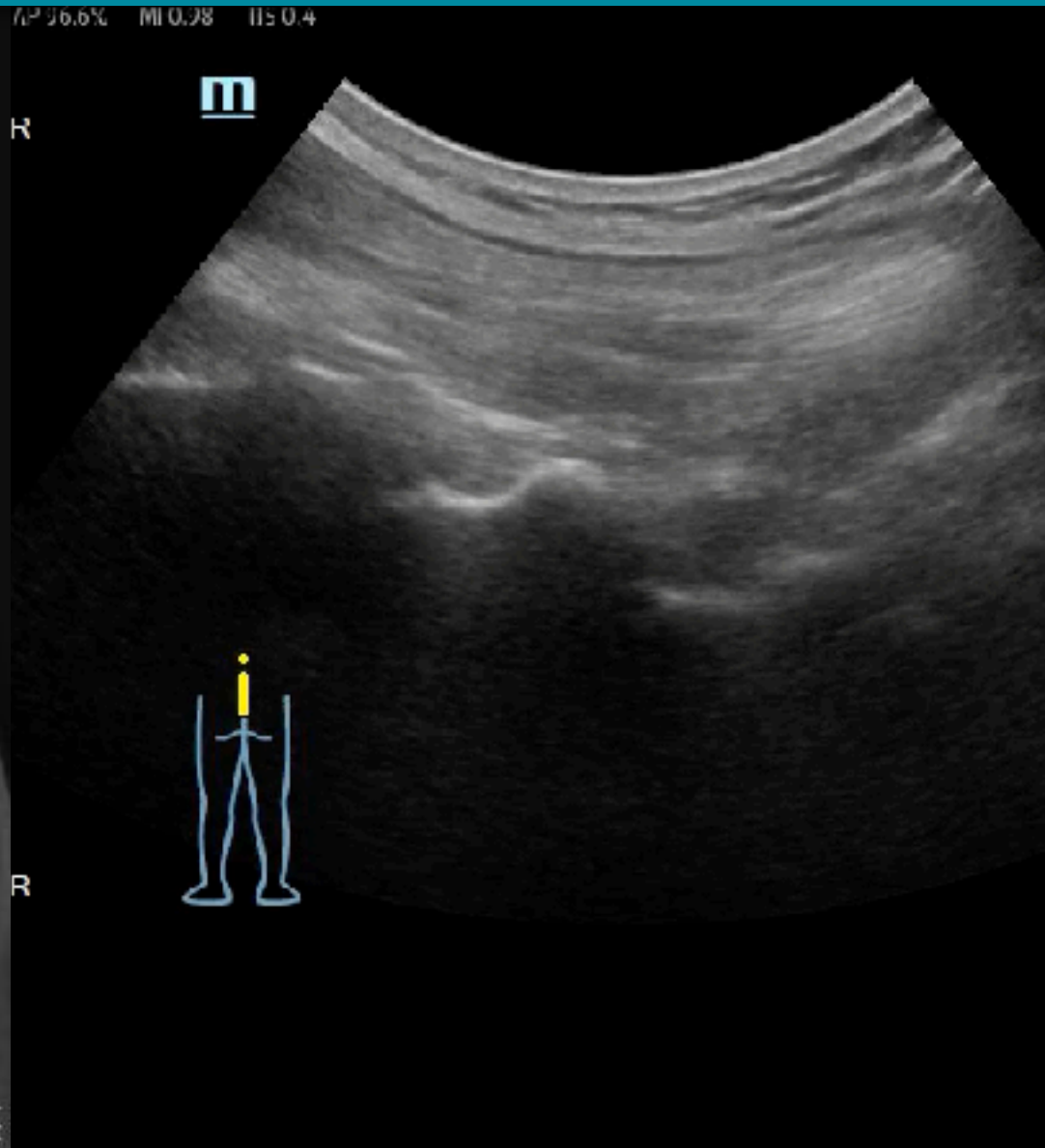
Lumbar ESPB



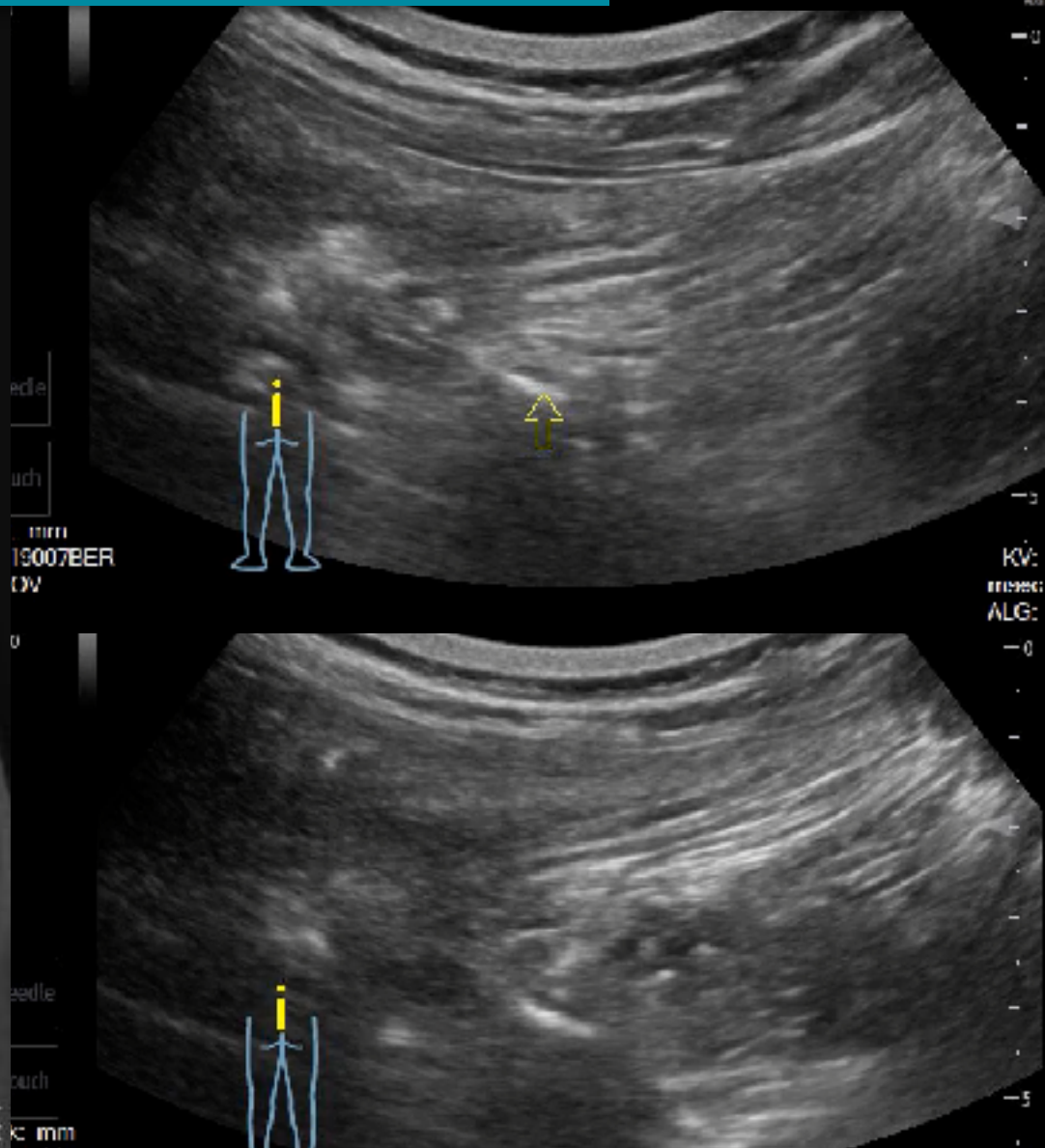
Lumbar ESPB

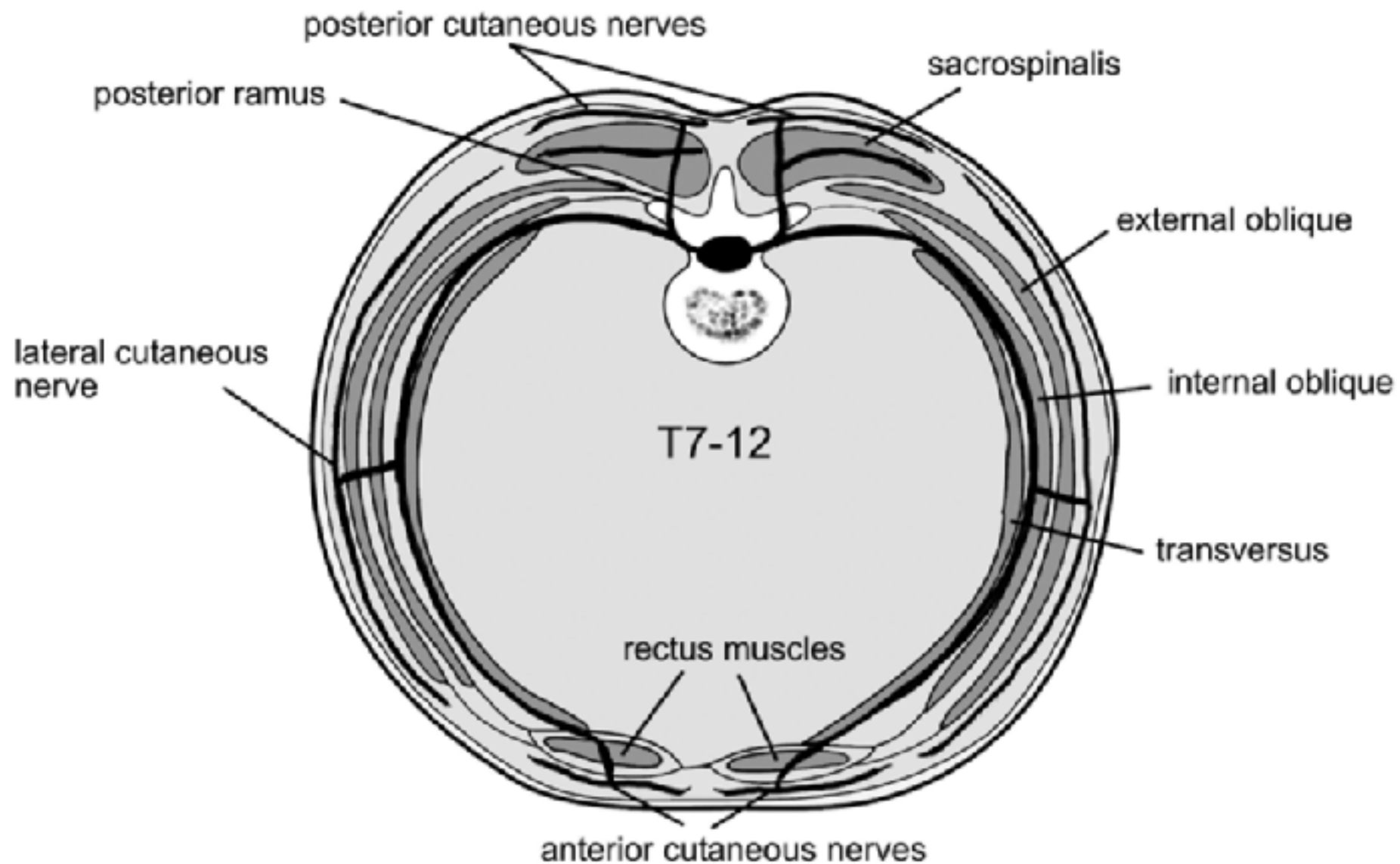


ESPB - L3 bursae fx



Lumbar ESPB





TAP Block

Indications: Analgesia for the abdominal wall and the parietal peritoneum.

Goal: Local anesthetic spread in the transversus abdominis plane (TAP): The plane between the internal oblique and transversus abdominis muscles.

Patient position:

- For the lateral and subcostal TAP blocks: Supine.
- For the posterior TAP block: Lateral decubitus.

Landmarks:

- **Subcostal TAP block:** Subcostal margin and xiphoid process.
- **Lateral and posterior TAP blocks:** Iliac crest and midaxillary line.
- **Ilioinguinal-iliohypogastric block:** Anterior superior iliac spine and the umbilicus.



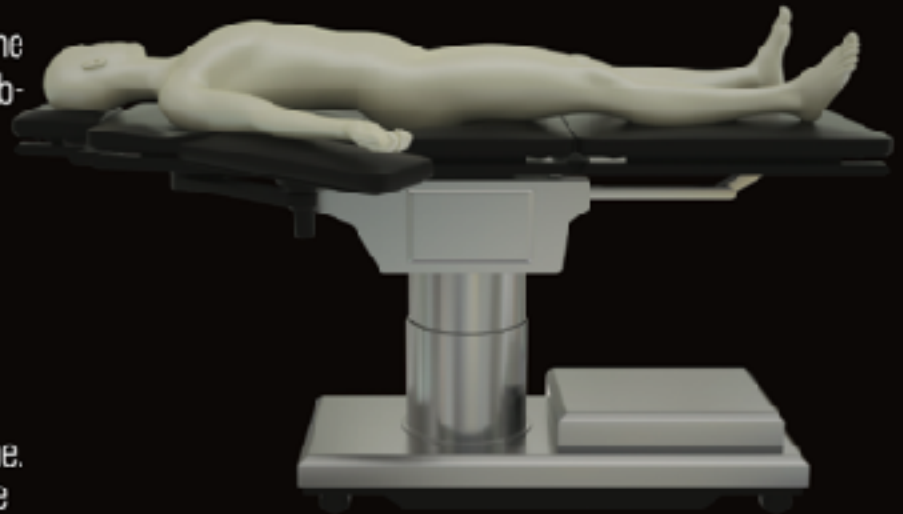
Linear or curved
[larger patients]



22 gauge,
5-10 cm



15-30 mL



Dorsal root
(Sensory root)

Ventral root
(Motor root)

Spinal ganglion

Meningeal ramus

Spinal nerve

Dorsal ramus (posterior)
with medial ramus and
lateral ramus

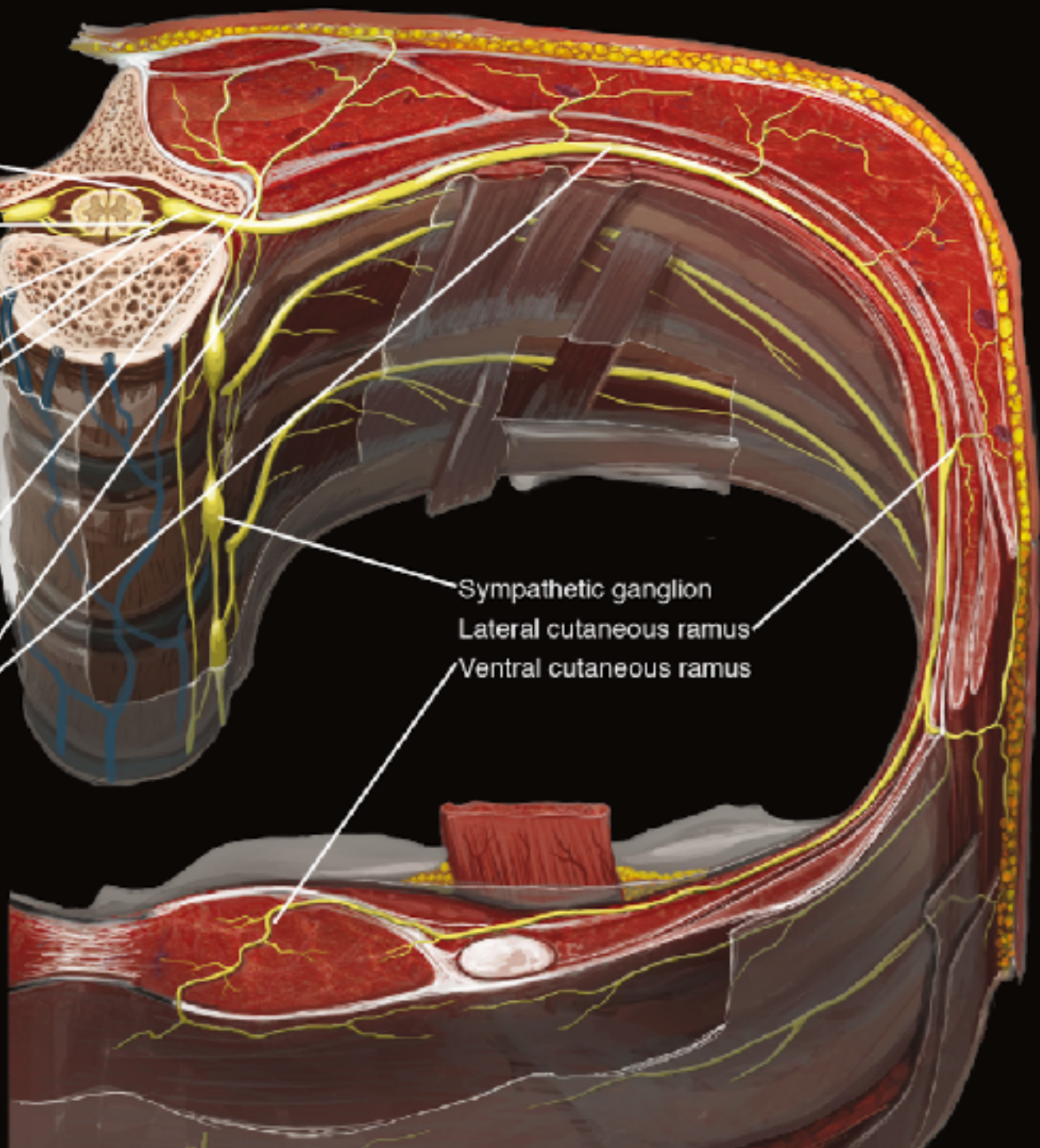
Ramus communicans

Ventral ramus

Sympathetic ganglion

Lateral cutaneous ramus

Ventral cutaneous ramus



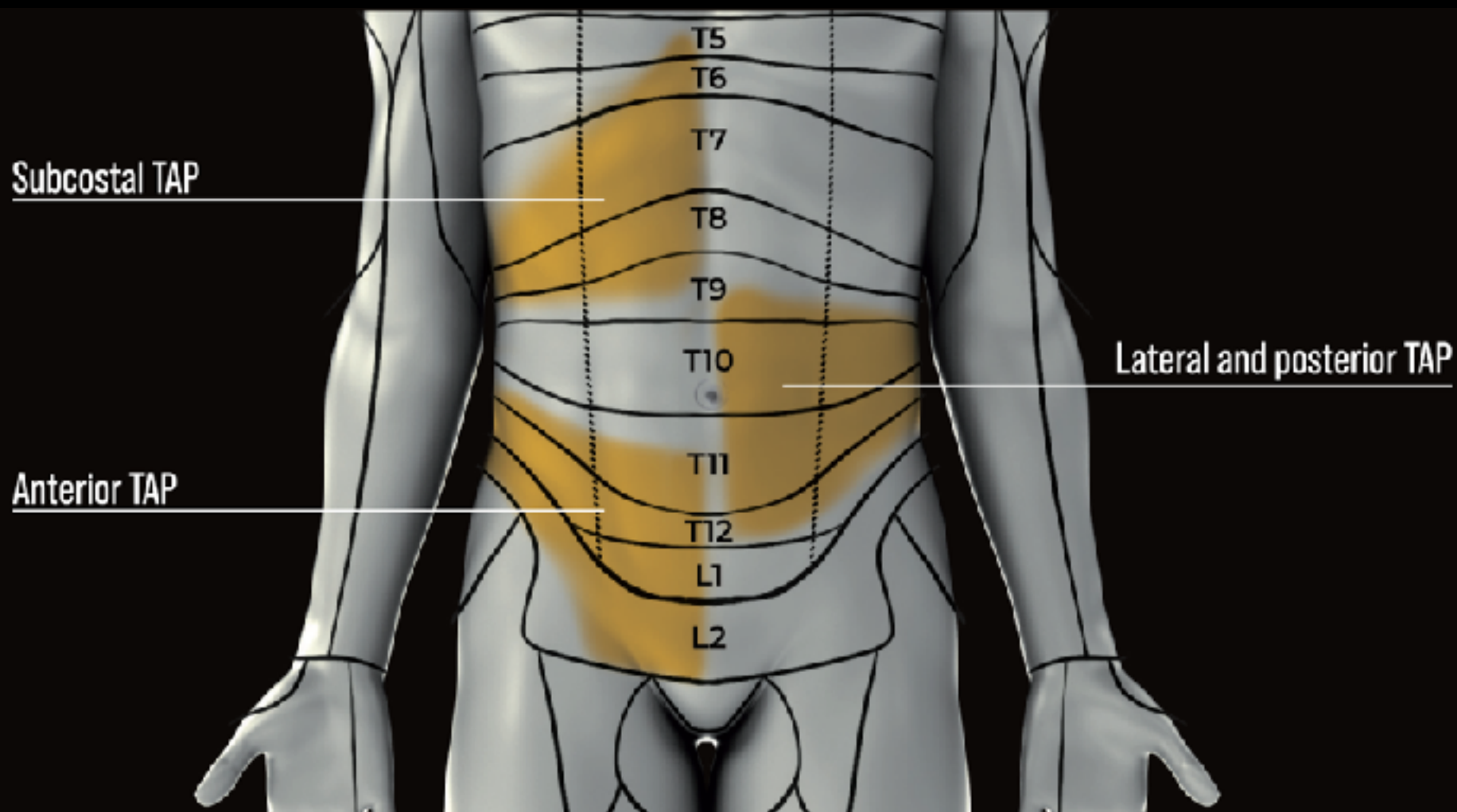
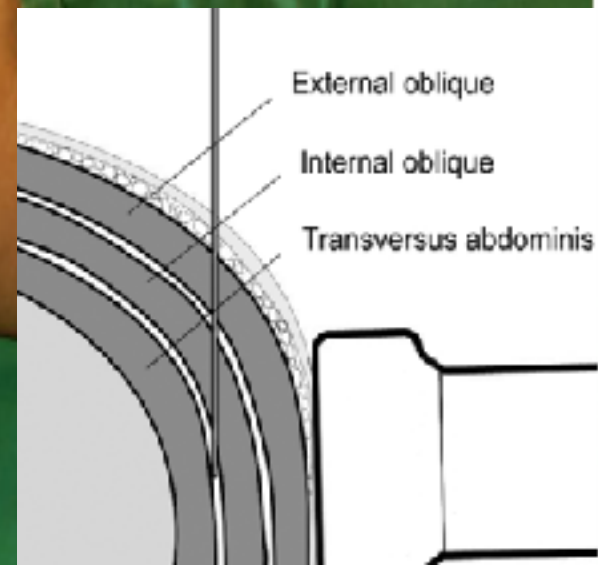
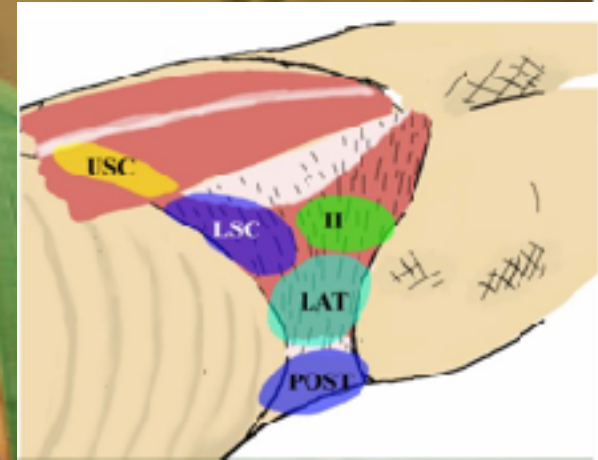


Fig-3. Expected sensory distribution of the different approaches for a TAP block.

TAP Block - surface landmark

triangle of Petit



Transversus Abdominis Plane Blocks

Mid-axillary line

Anterior axillary line

Mid-clavicular line

Anterior rectus sheath (cut)

Posterior rectus sheath

Transversus abdominus m.

Internal oblique m. (cut)

External oblique m. (cut)

Rectus abdominus m. (cut)

Iliohypogastric n.

Ilioinguinal n.

External oblique aponeurosis (cut)

Internal oblique aponeurosis (cut)

Lateral cutaneous branches of thoracoabdominal nn. (T6-T12)

Anterior cutaneous branches of thoracoabdominal nn. (T6-T12)

External oblique m. and aponeurosis

Transversalis fascia

Lateral branch of T6 thoracoabdominal n.

Rectus abdominus muscle

Lateral branch of iliohypogastric nerve

EOM

IO M

TAM

RAM

Lateral

USG subcostal TAP block

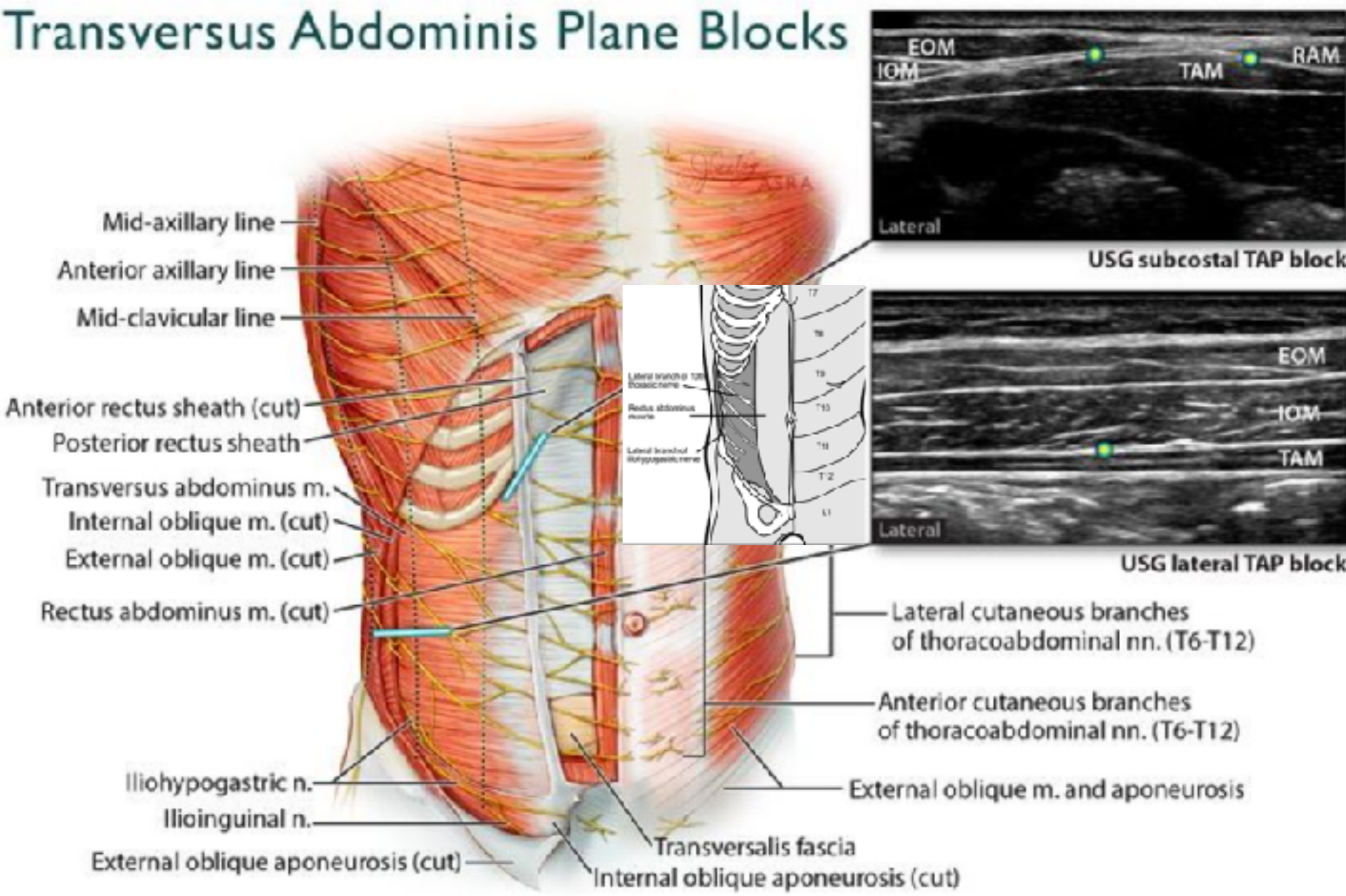
EOM

IO M

TAM

Lateral

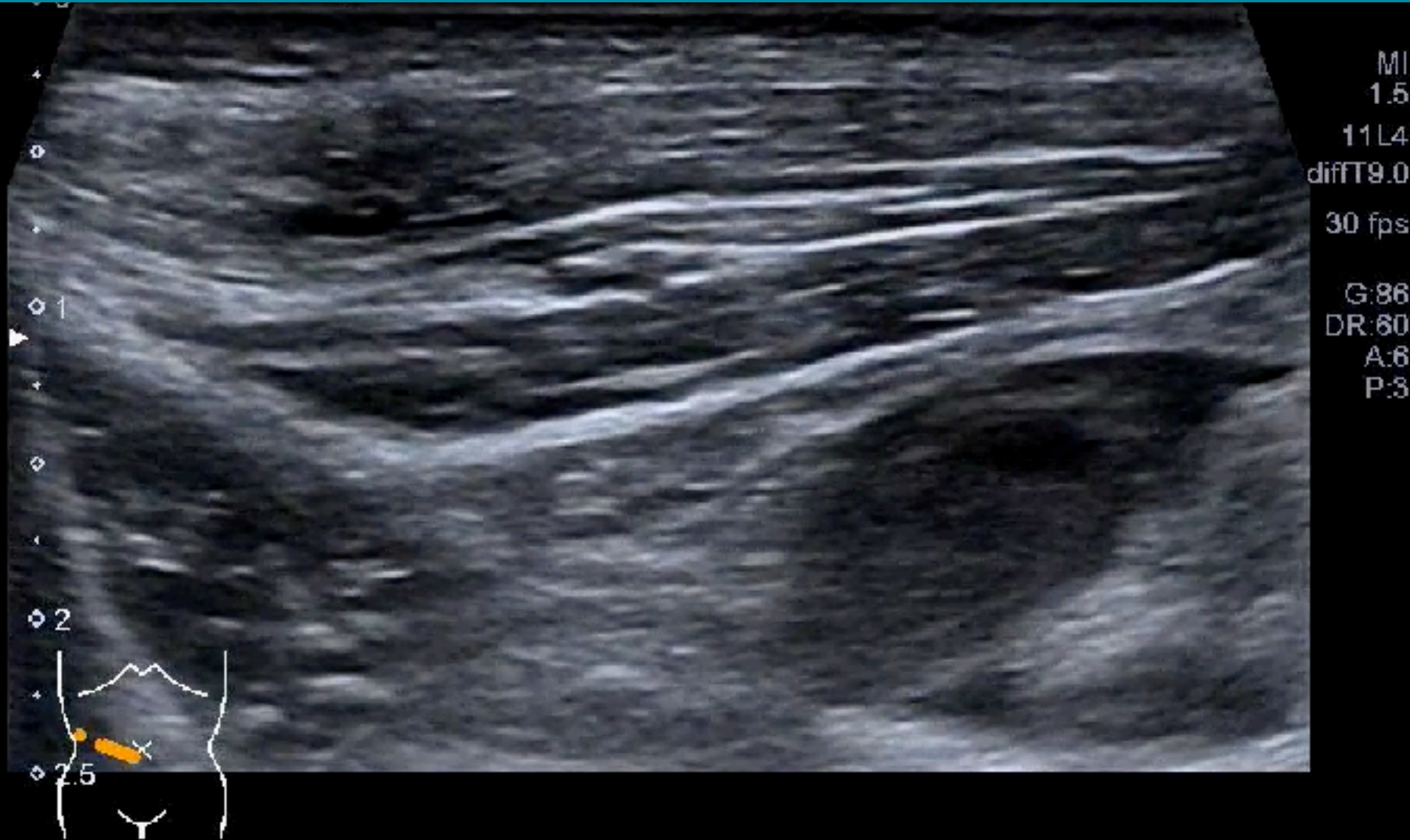
USG lateral TAP block



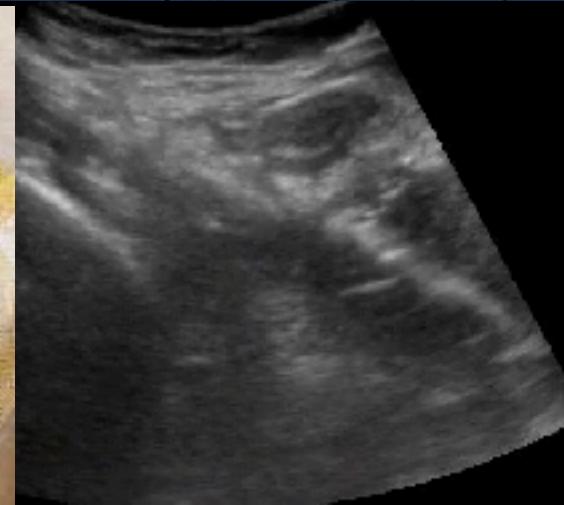
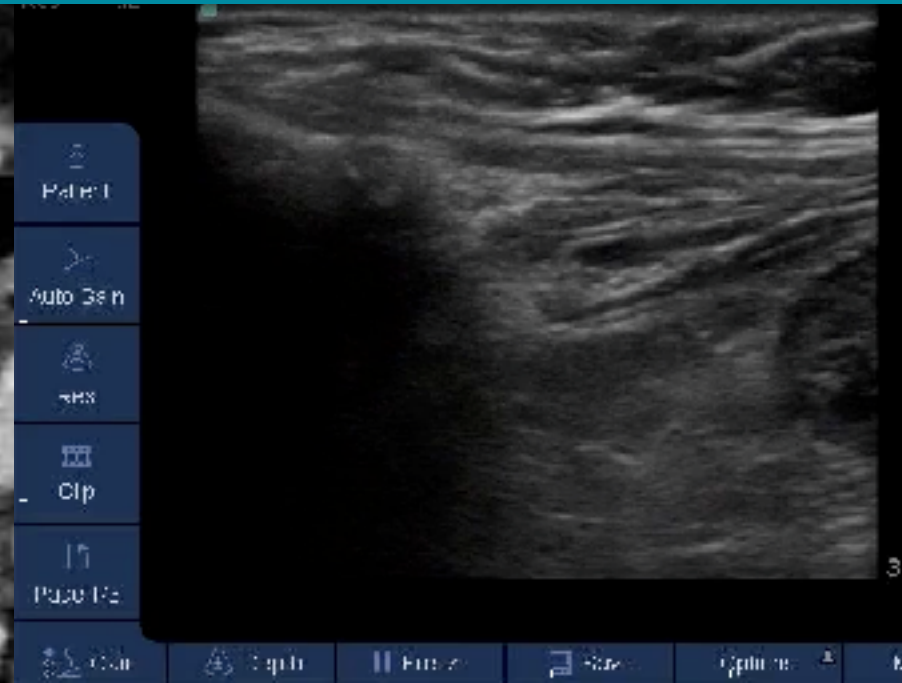
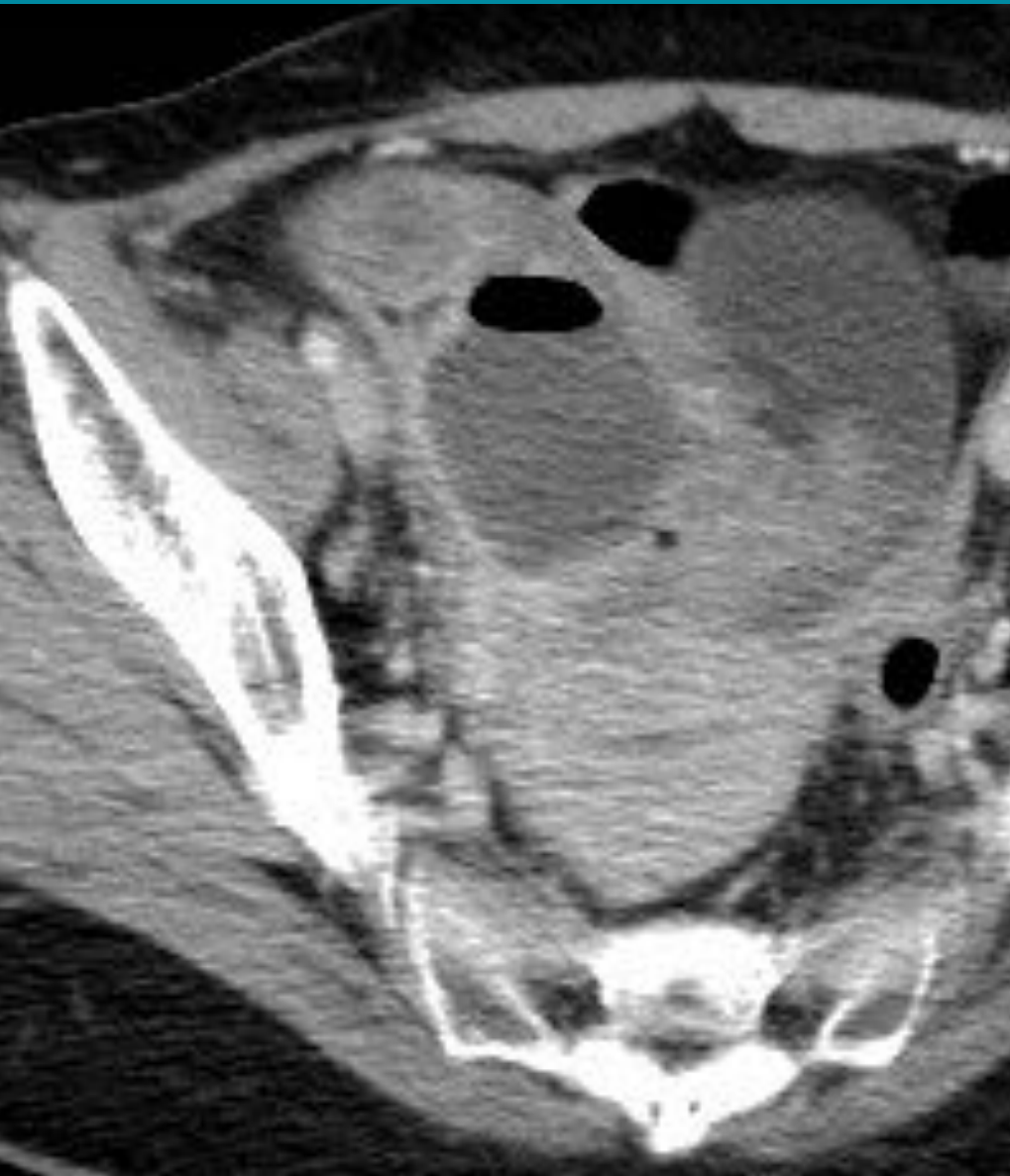
TAP Block



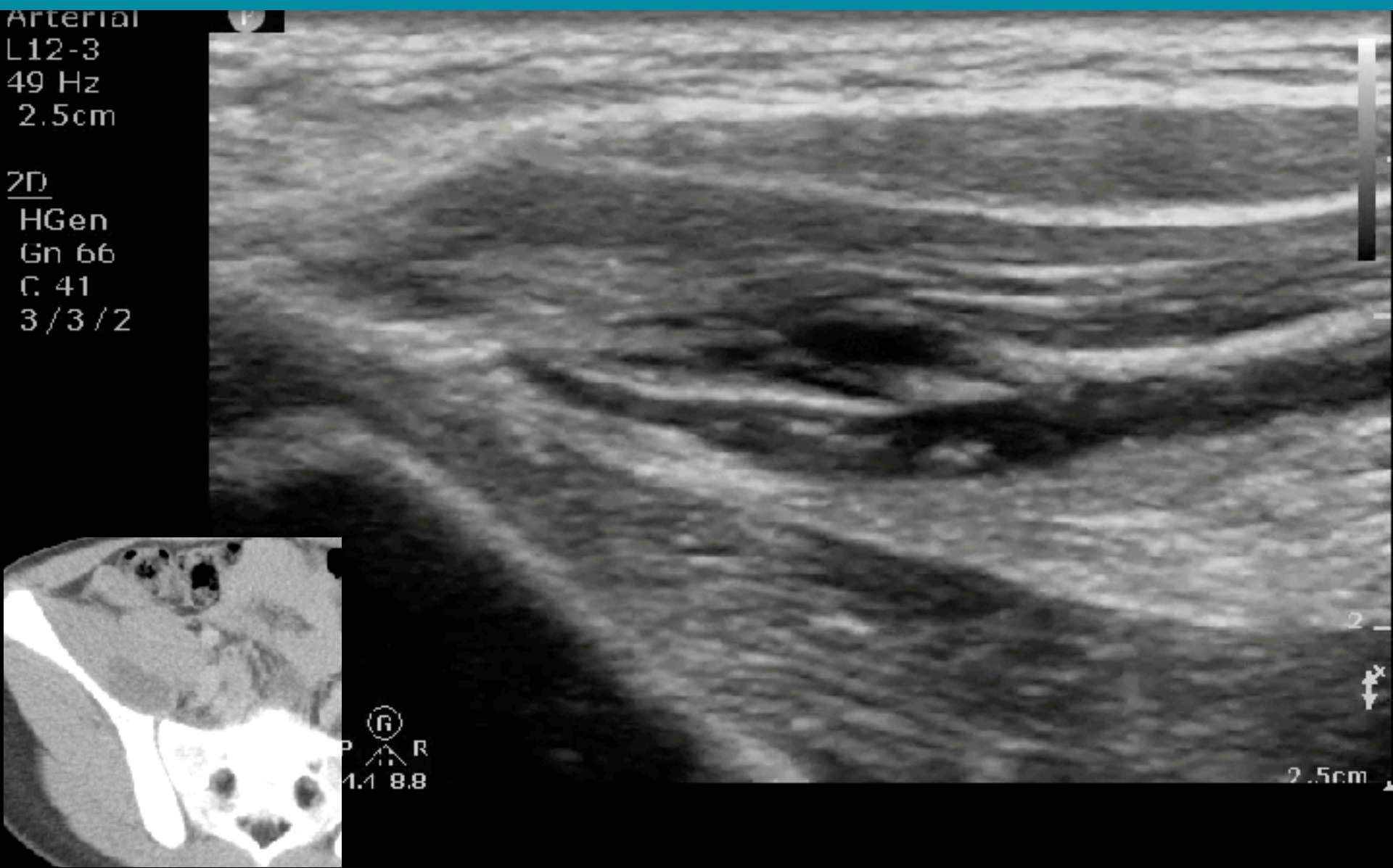
Anterior TAP (Ilioinguinal-iliohypogastric)



Anterior TAP (Ilioinguinal-iliohypogastric)

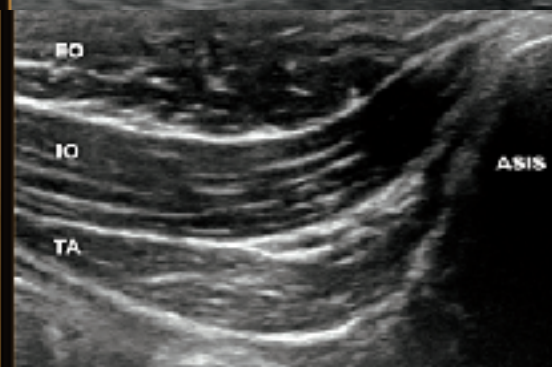
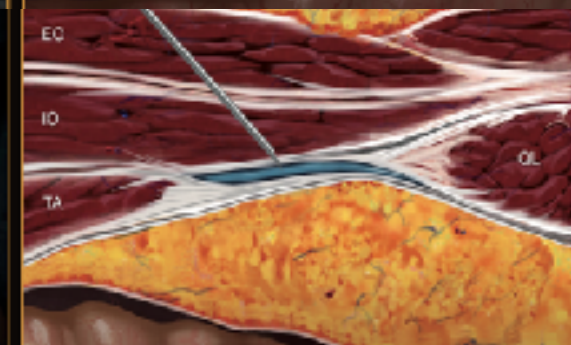
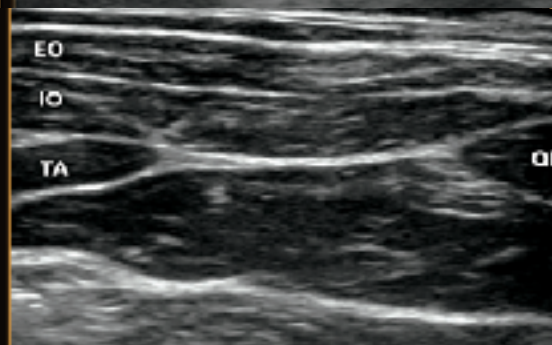
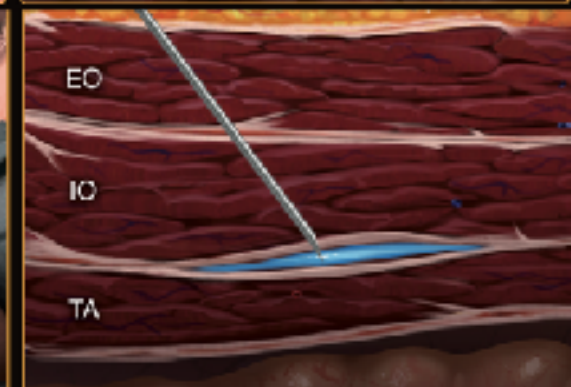
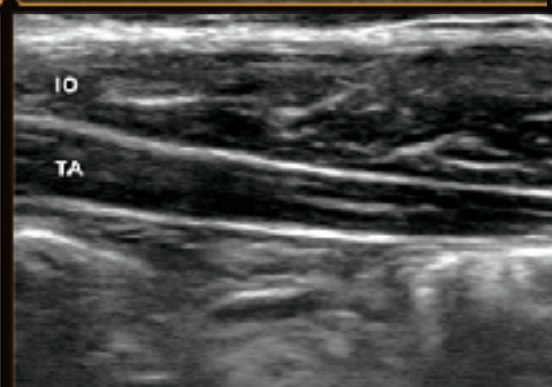
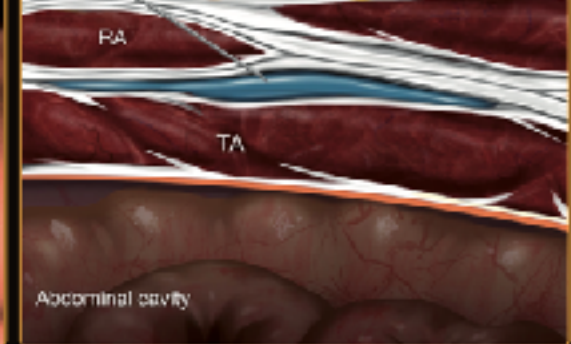
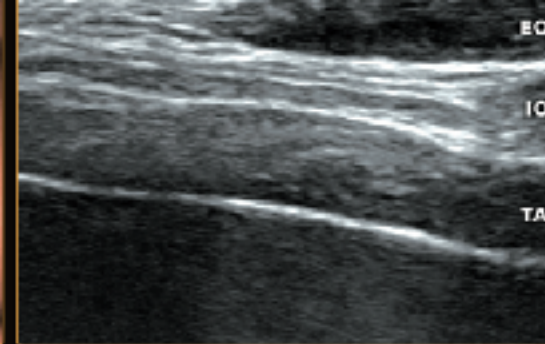


Anterior TAP (Ilioinguinal-iliohypogastric)

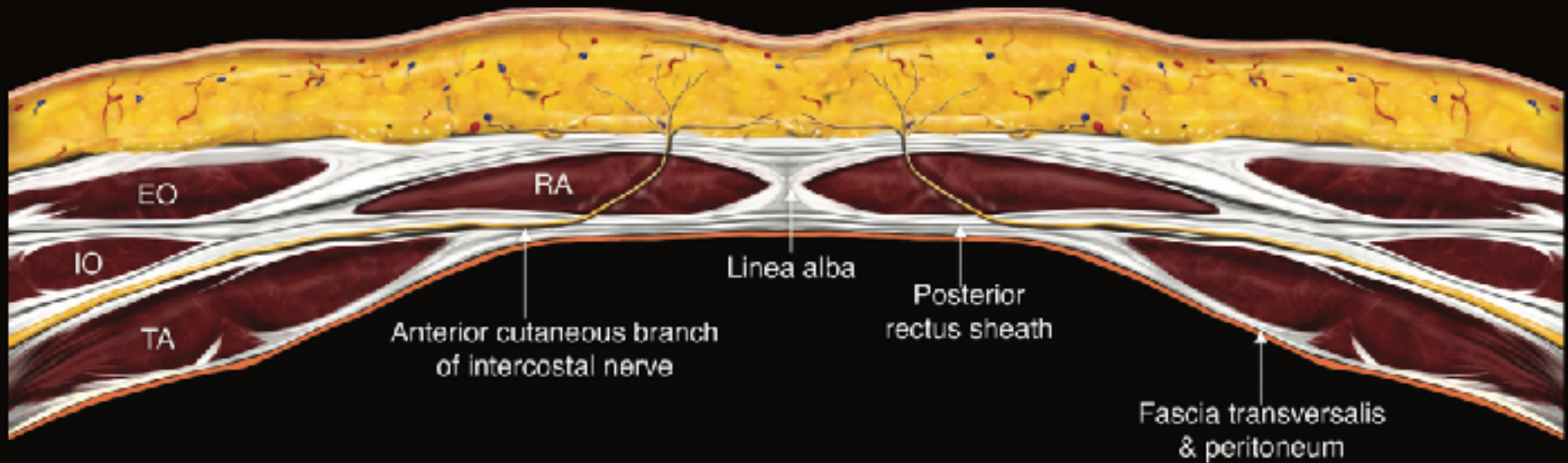


Anterior TAP (Ilioinguinal-iliohypogastric)

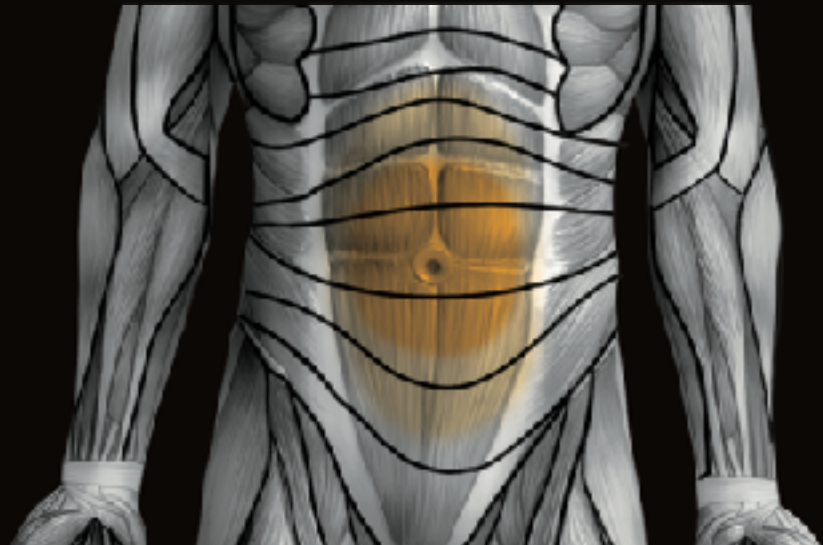
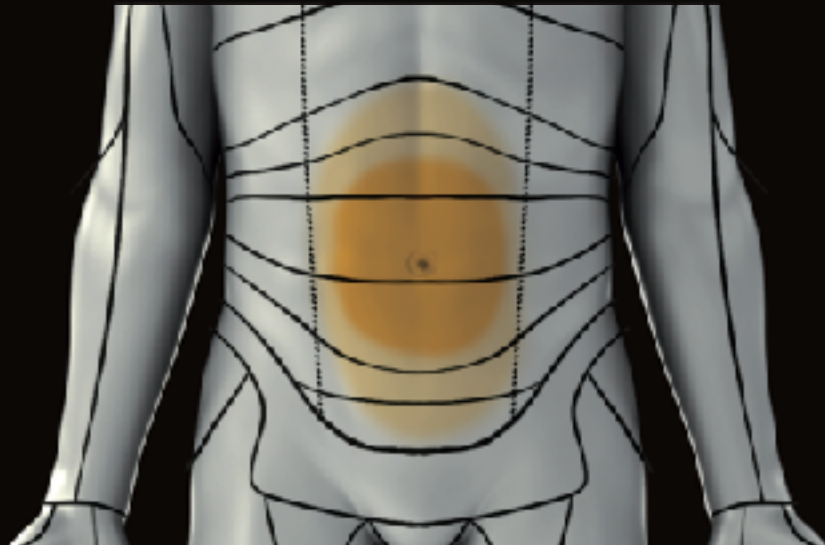




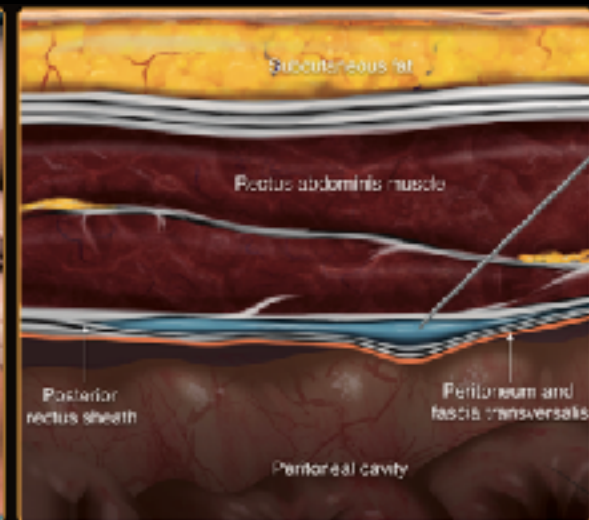
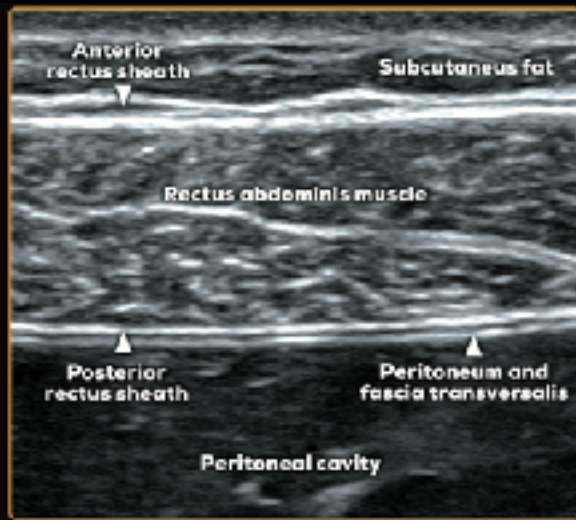
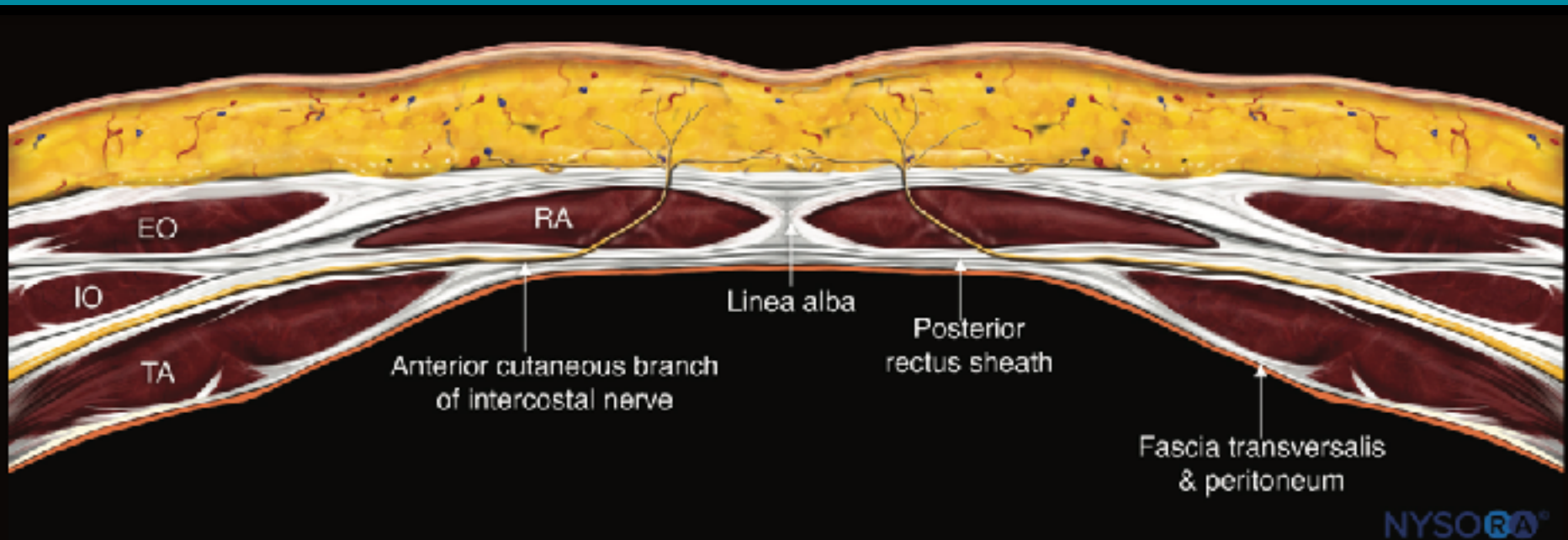
Rectus sheath block



NYSORA®



Rectus sheath block



Quadratus lumborum block

Indications: Analgesia for the anterolateral abdominal wall and parietal peritoneum.

Goal: Local anesthetic injection lateral (QL1), posterior (QL2) or anterior (QL3) to the quadratus lumborum muscle.

Patient position:

- The lateral decubitus position is preferred over the supine position as it provides better ergonomics and a better view of the relevant ultrasound images and neuraxis. The QL1, QL2 and QL3 blocks can be performed in this position.
- The supine position is suitable only for the QL1 approach.

Landmarks: Iliac crest, costal margin, and the posterior and midaxillary lines.



Linear or
Curved



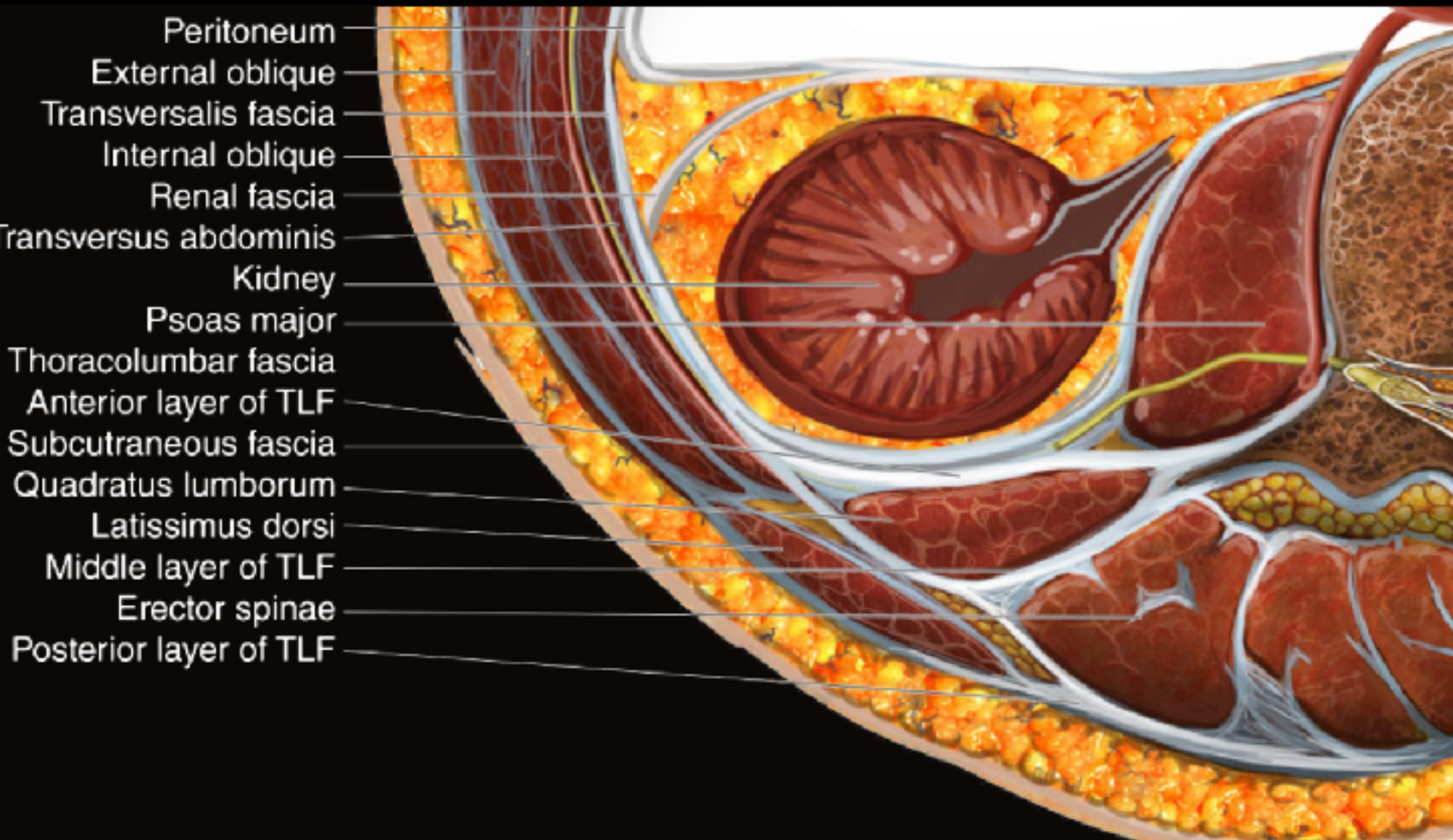
22 gauge,
5-10 cm short bevel



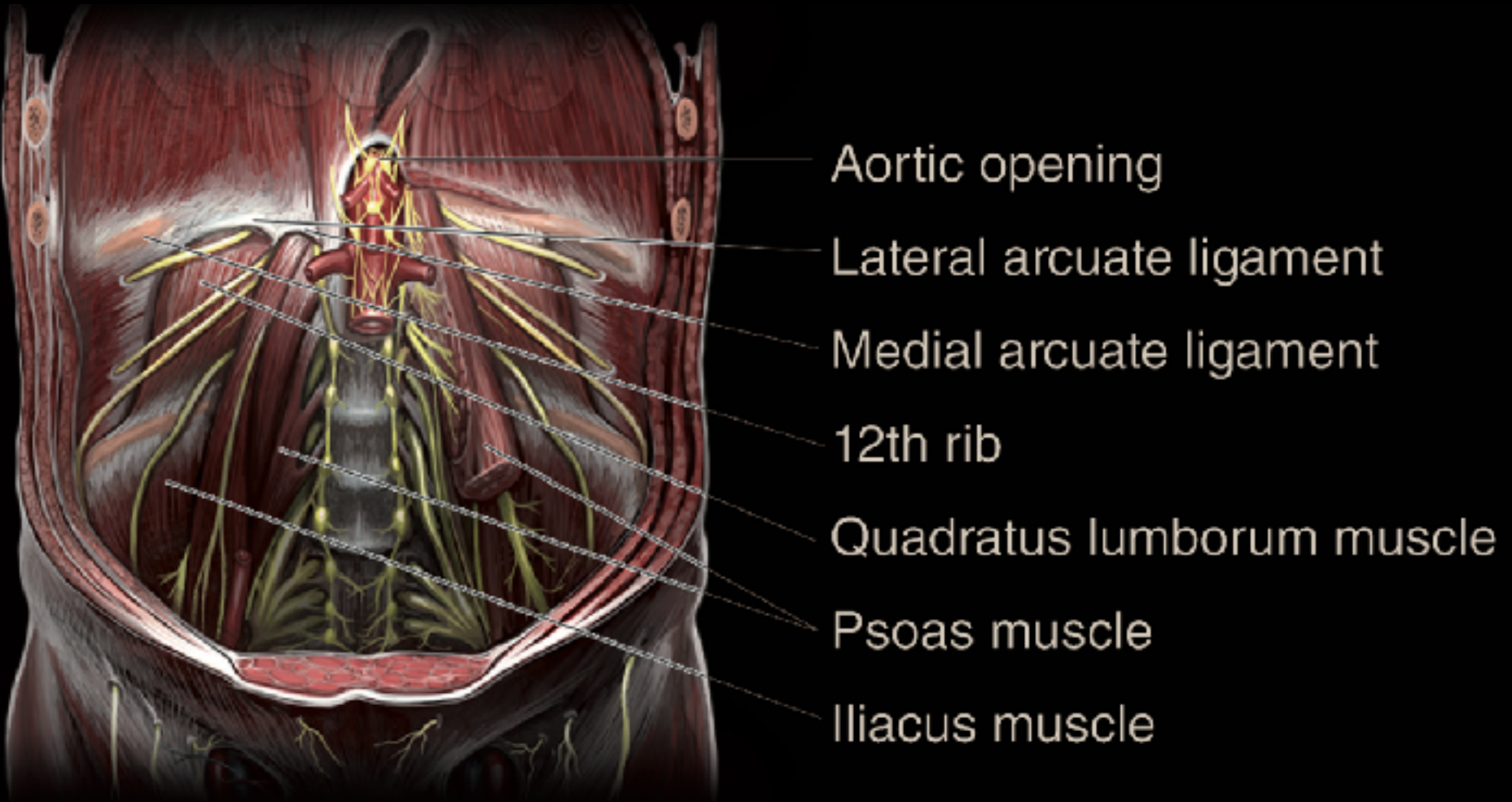
15-20 mL



TLF (thoracolumbar fascia)

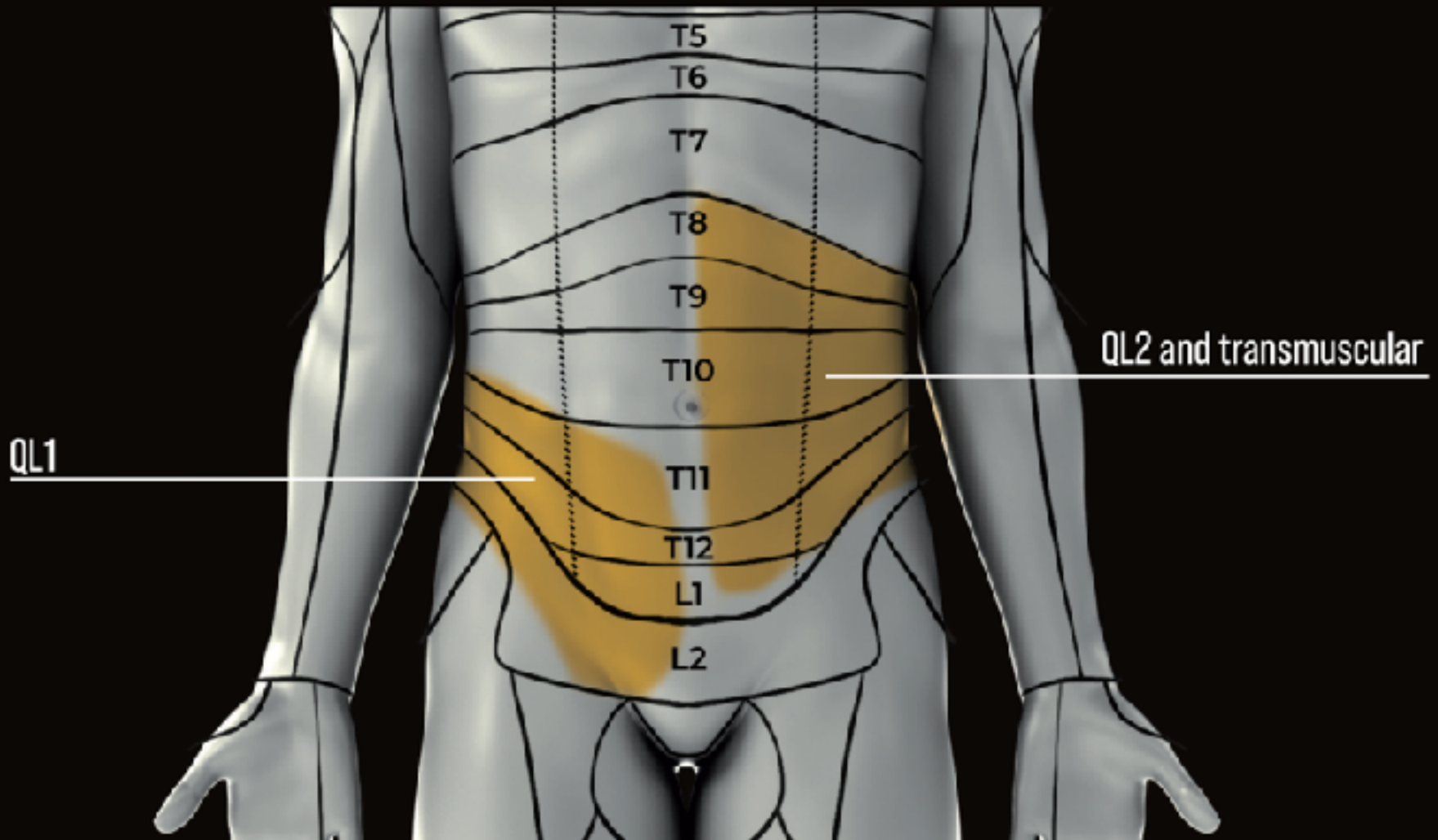


Quadratus lumborum (T7-L1)

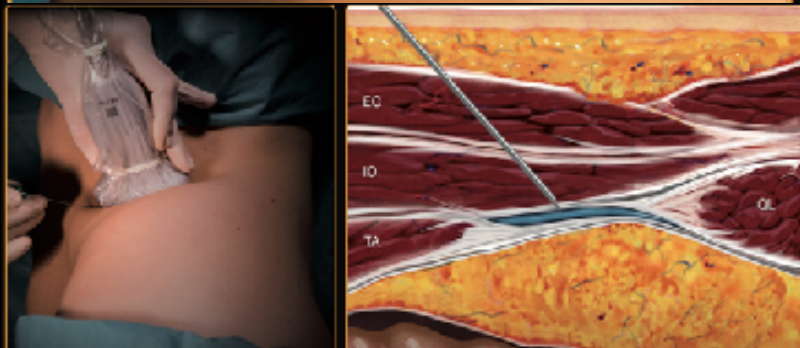
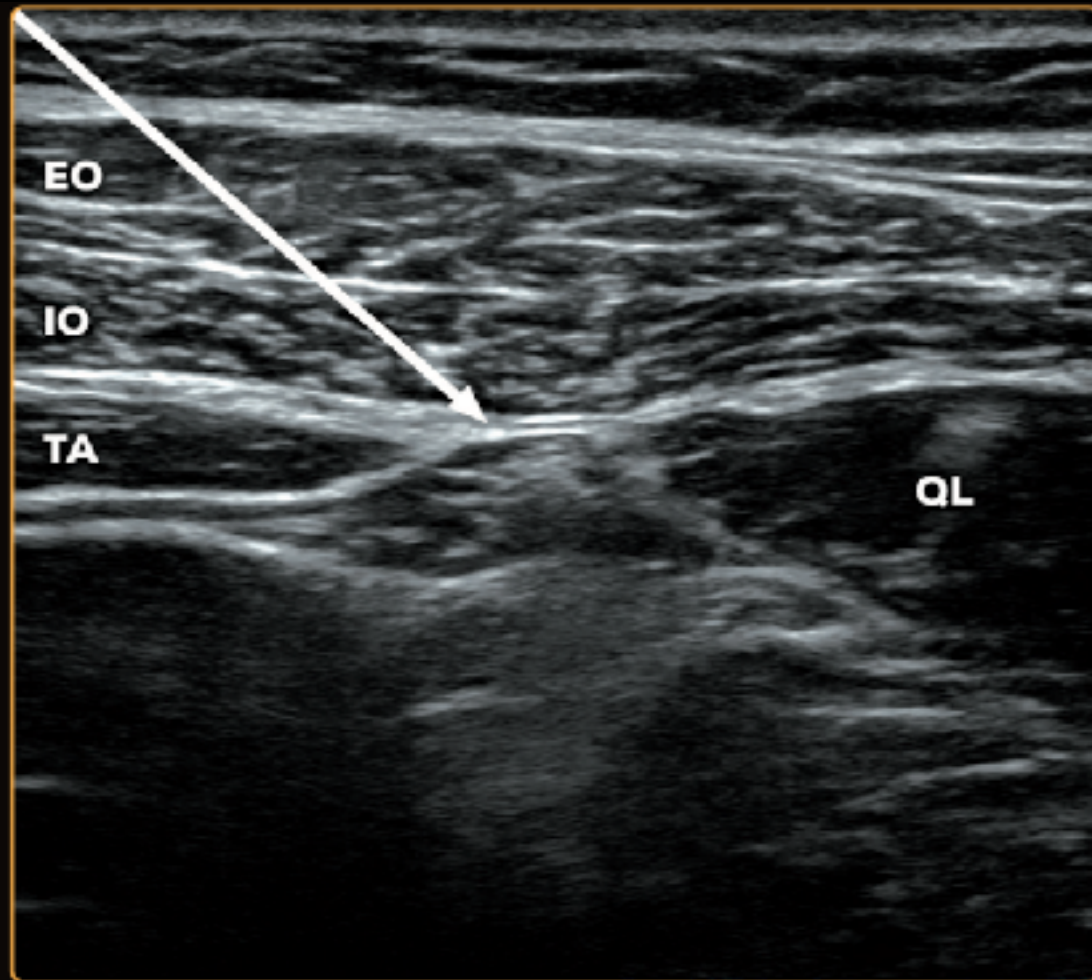


QL block

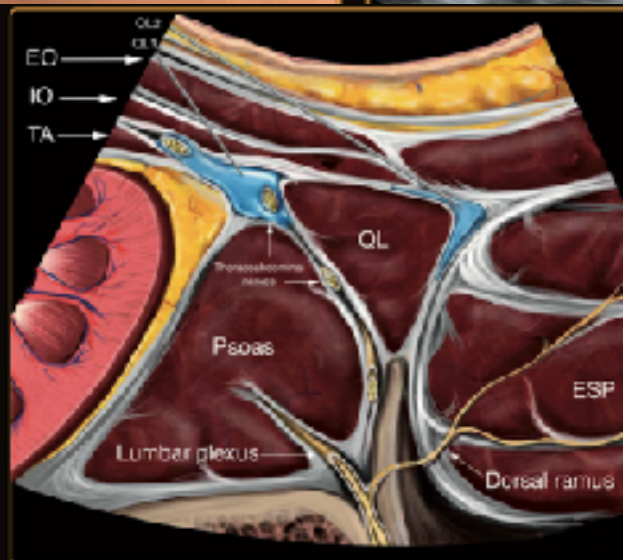
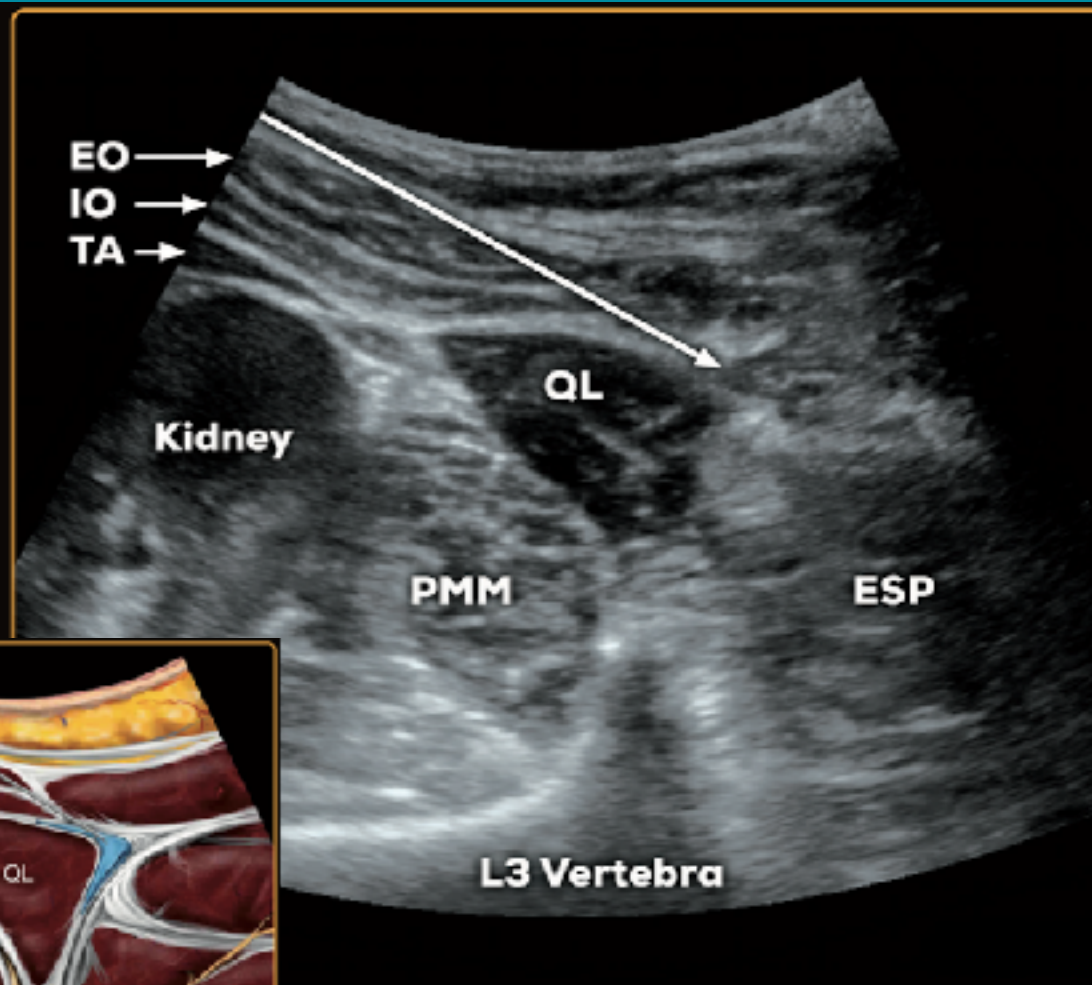
(T7-12 / Paravertebral space / sympathetic chain)



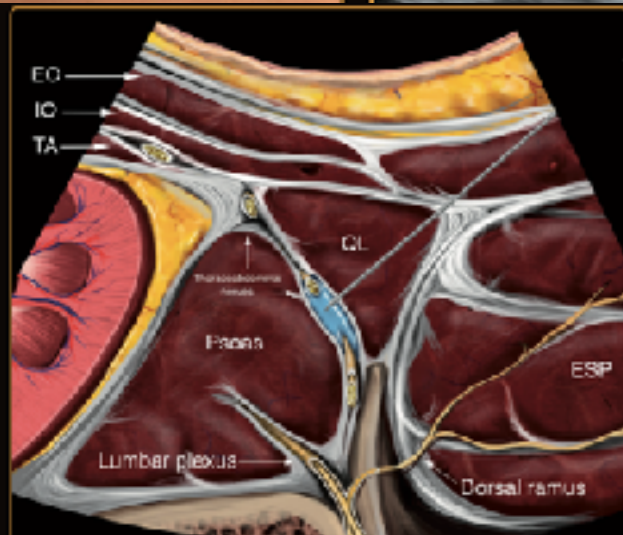
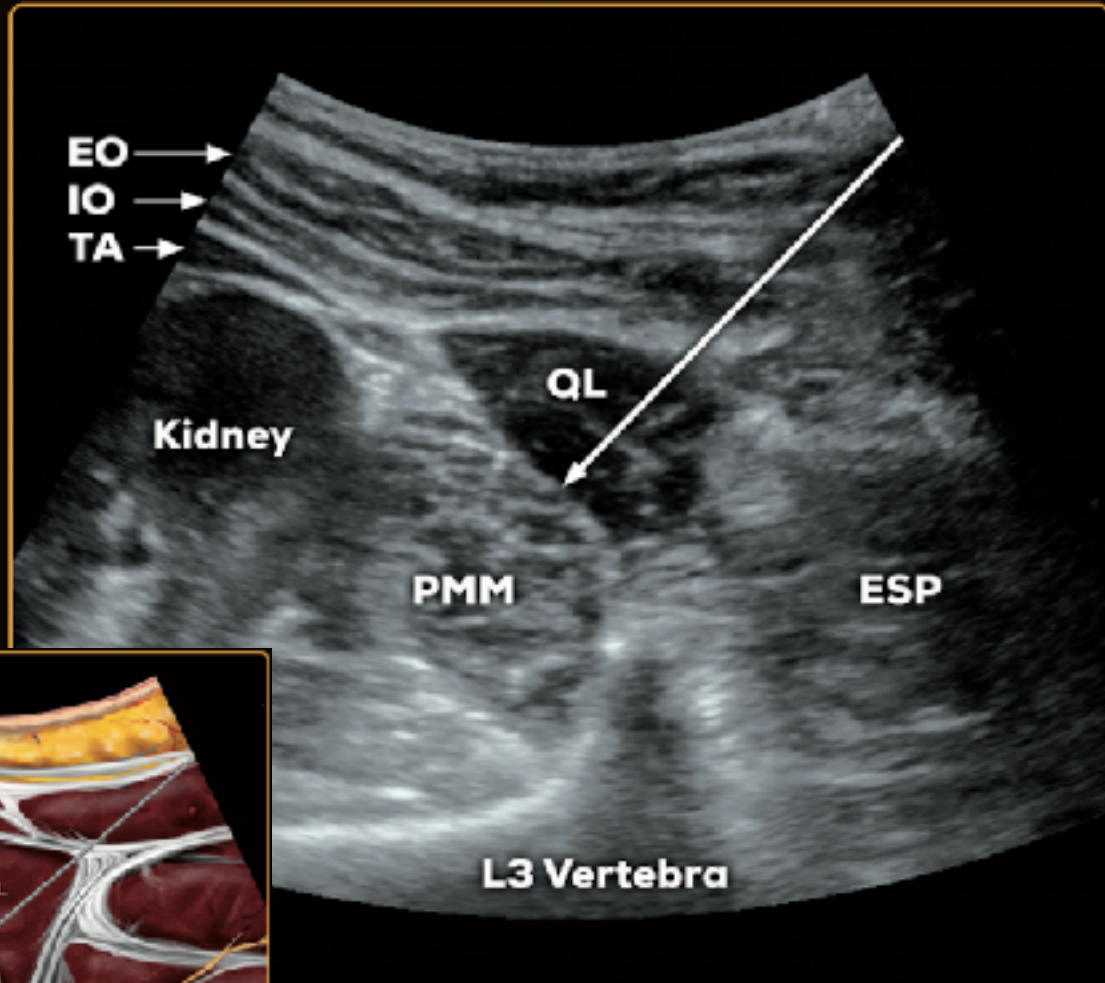
QL 1 (lateral) block



QL 2 (posterior) block

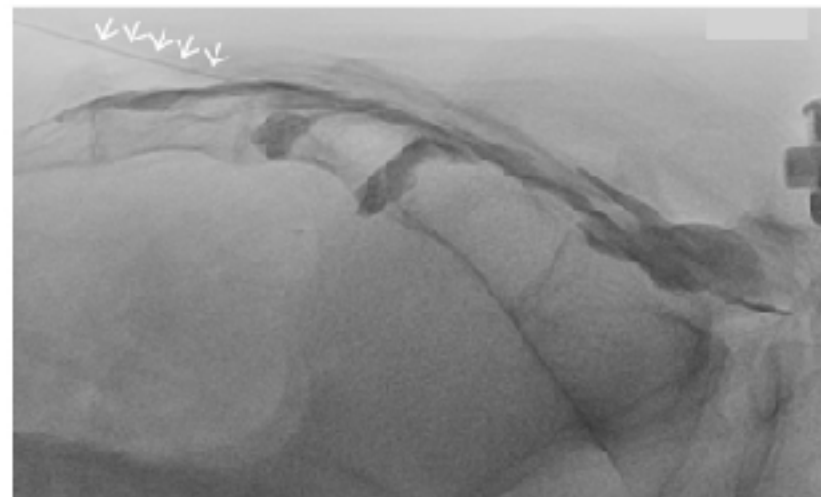
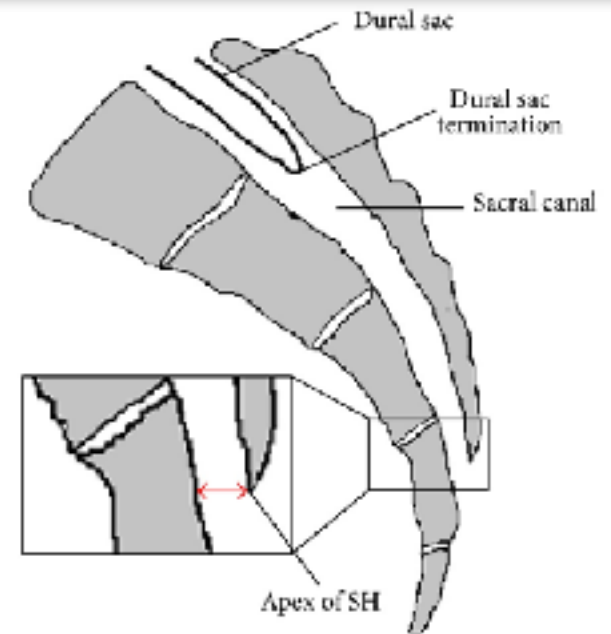
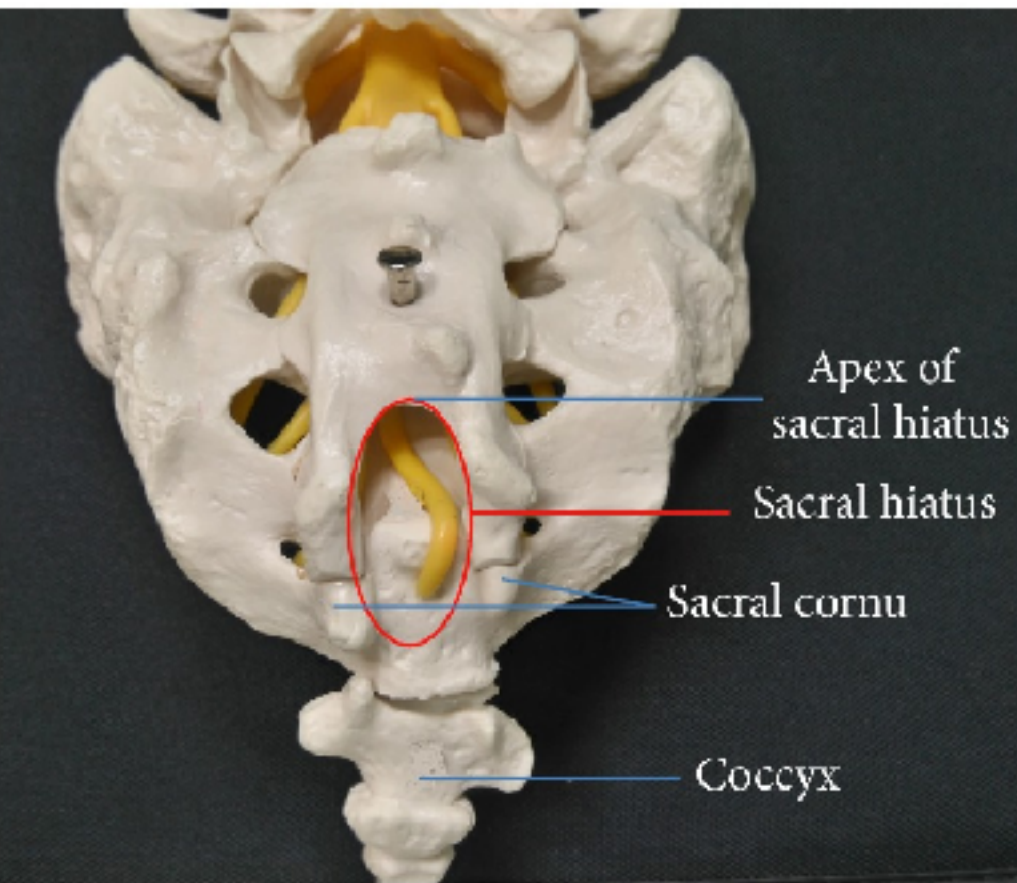


QL 3 (anterior) block

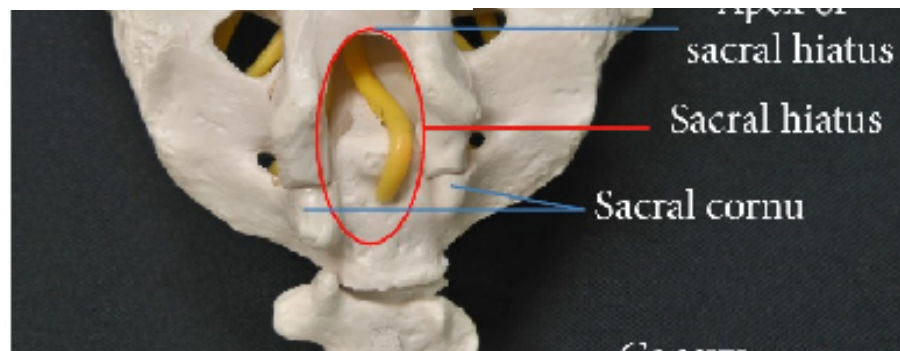
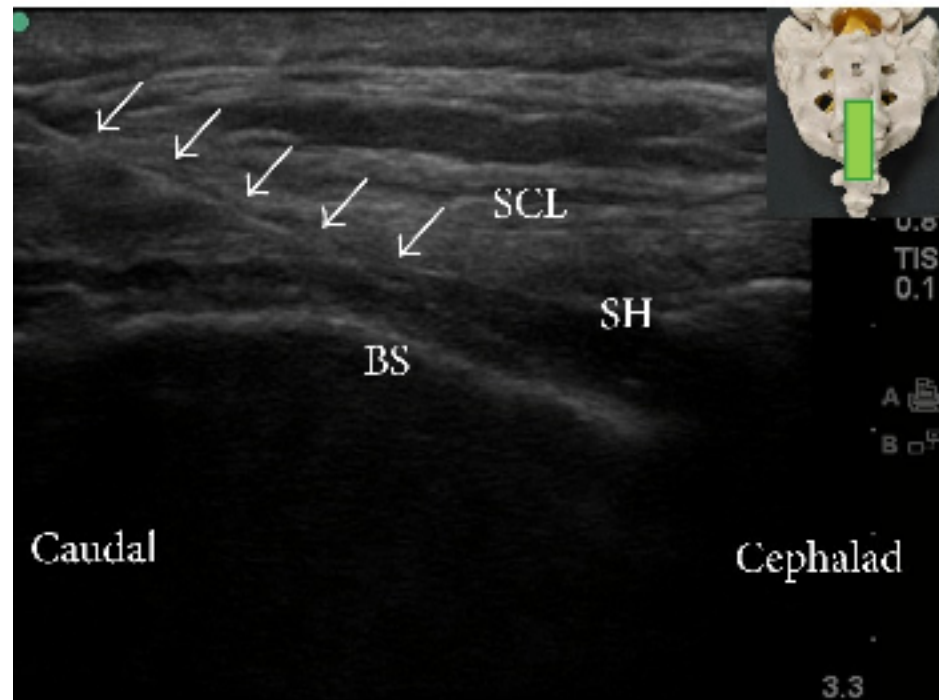
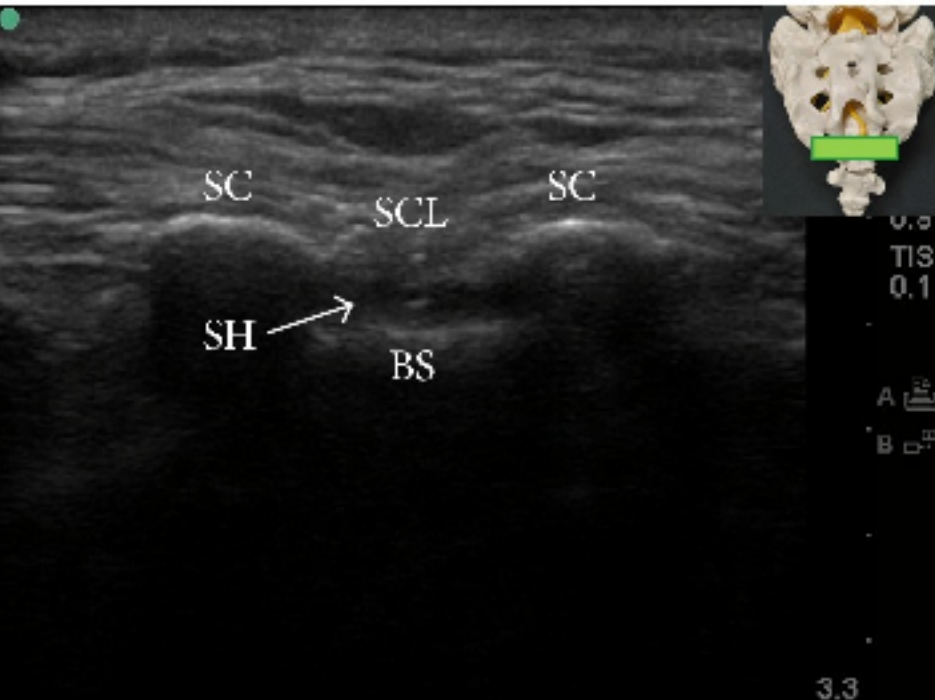


Shamrock sign

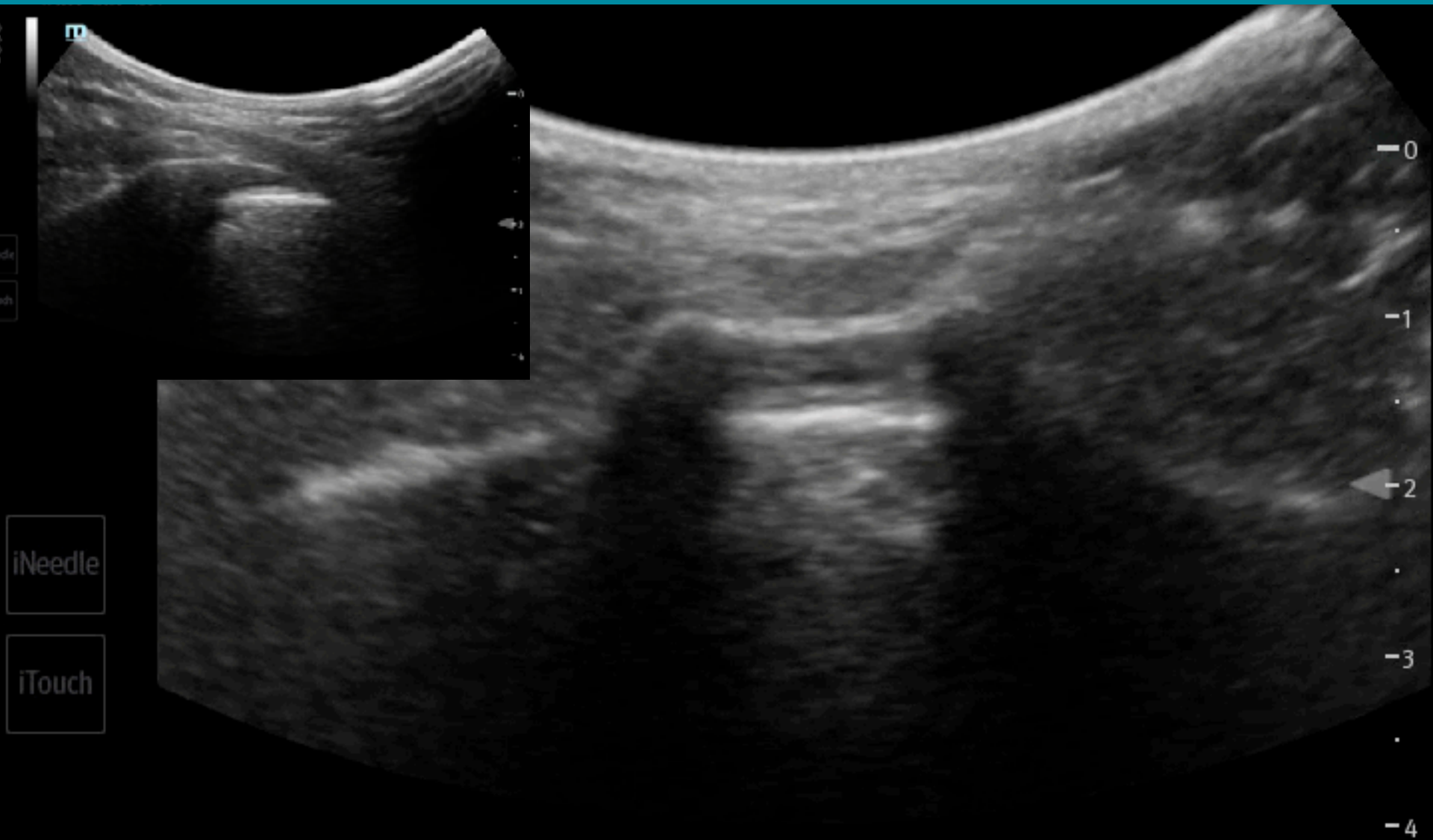
Caudal block



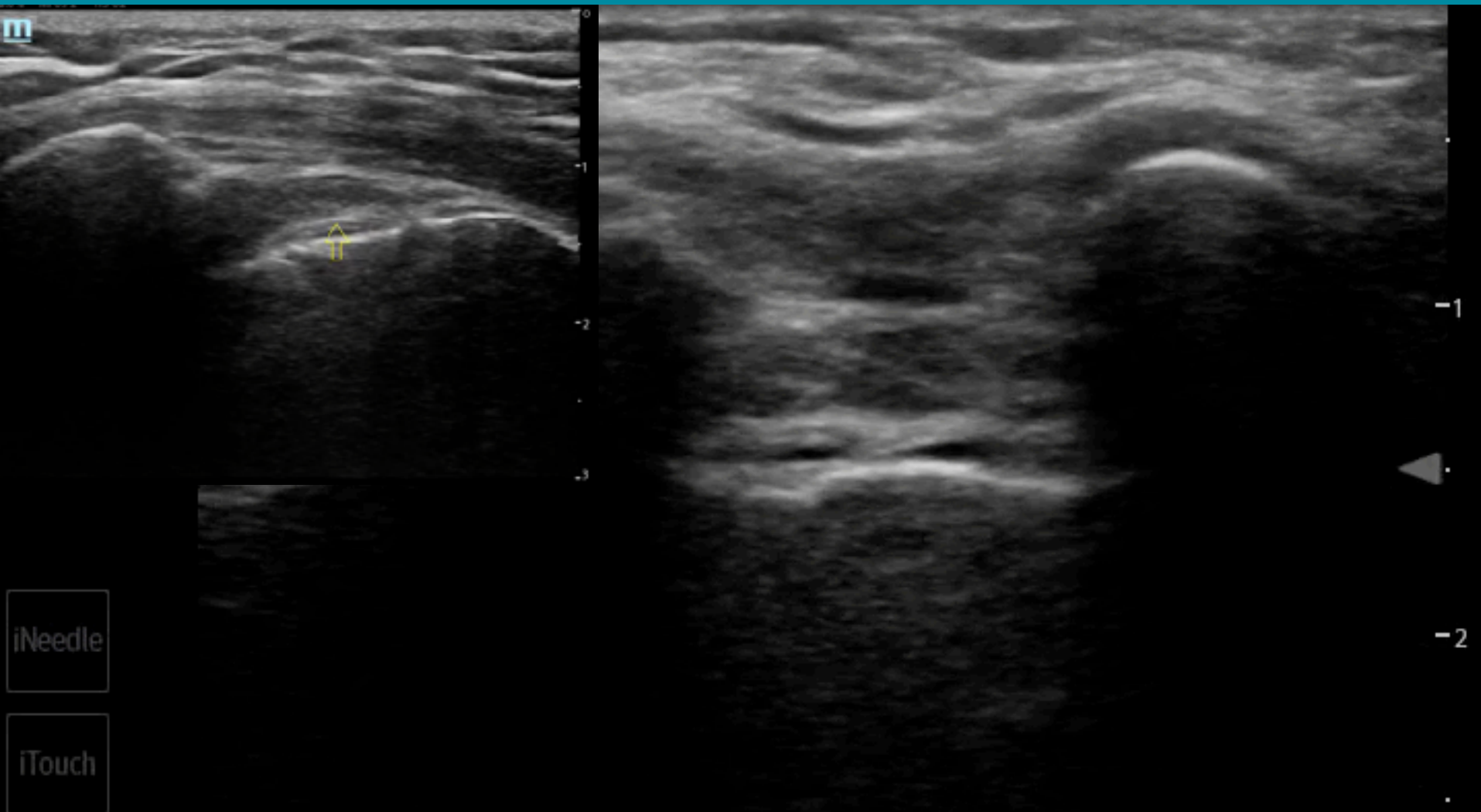
Caudal block



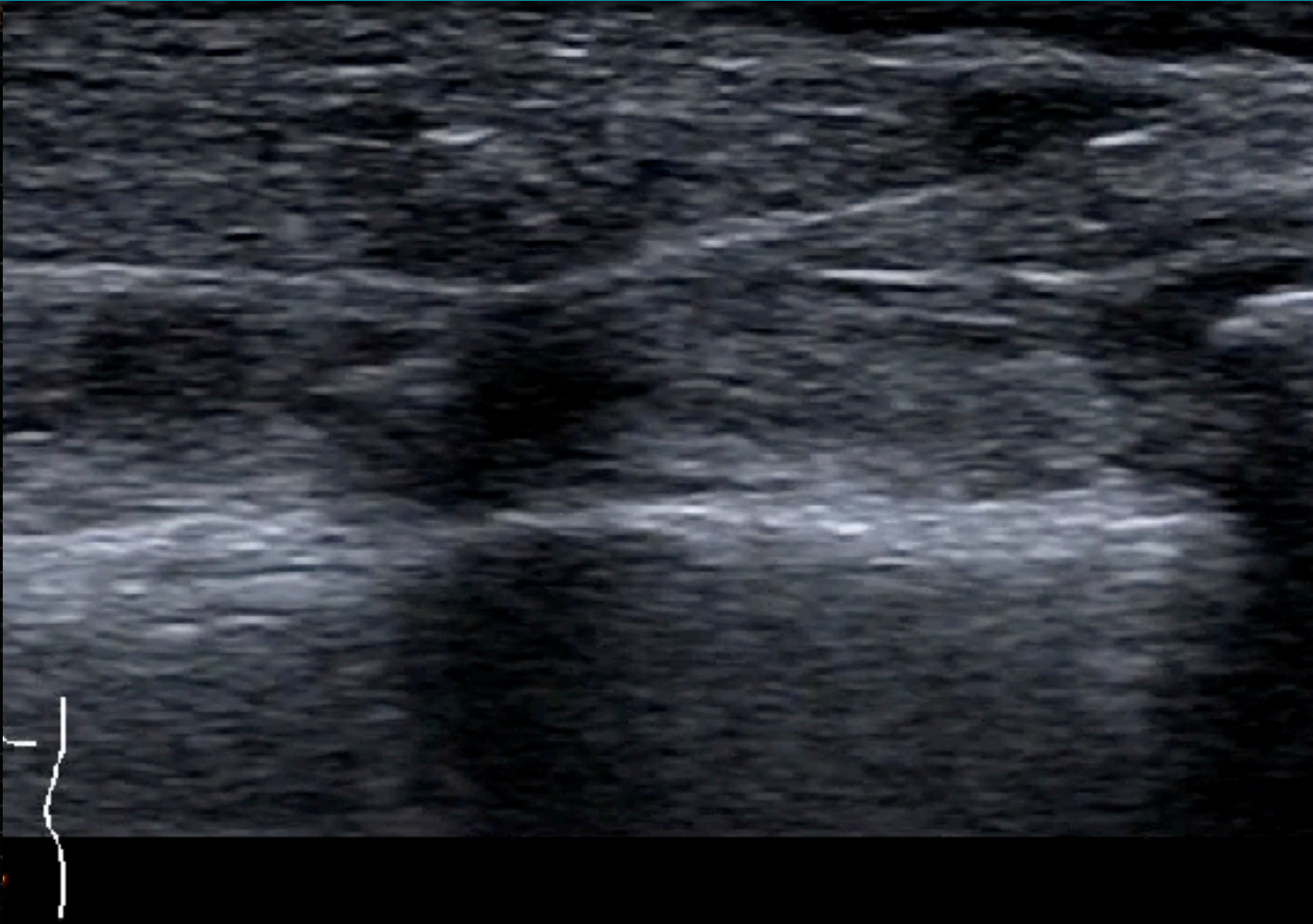
Caudal block



Caudal block



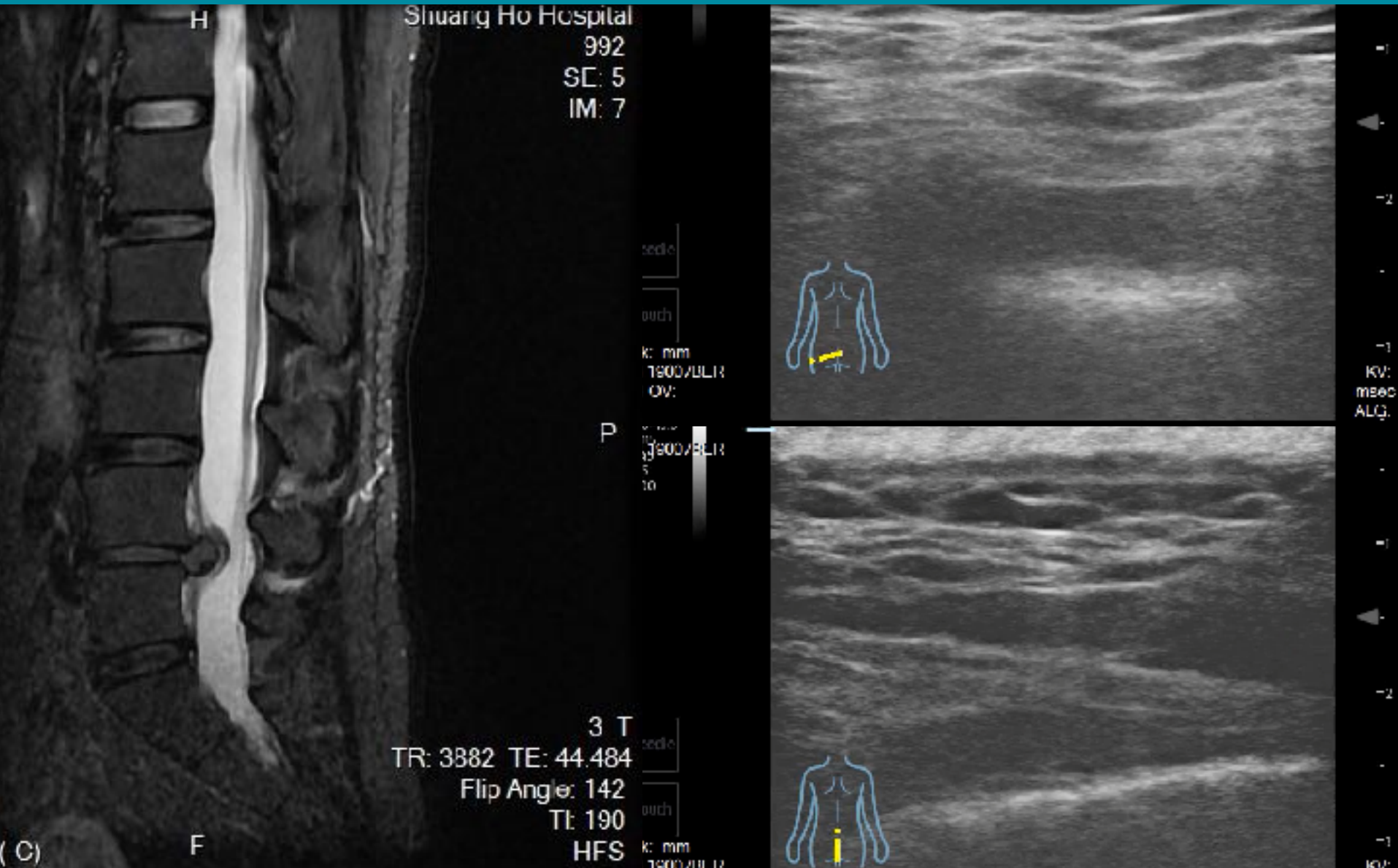
Caudal block for chronic low back pain



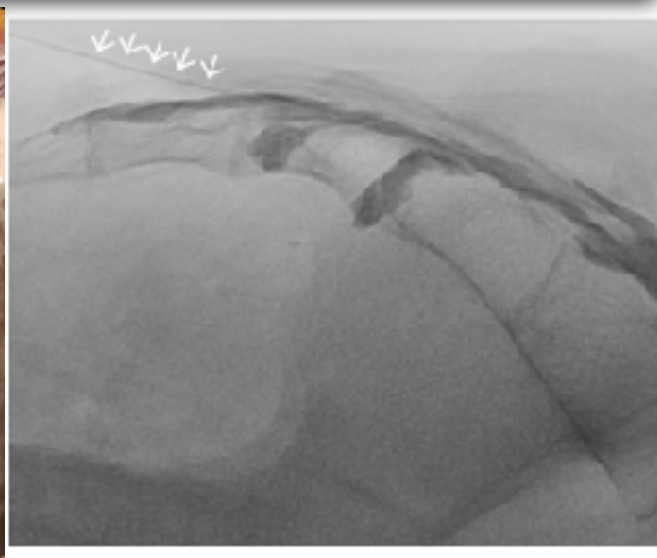
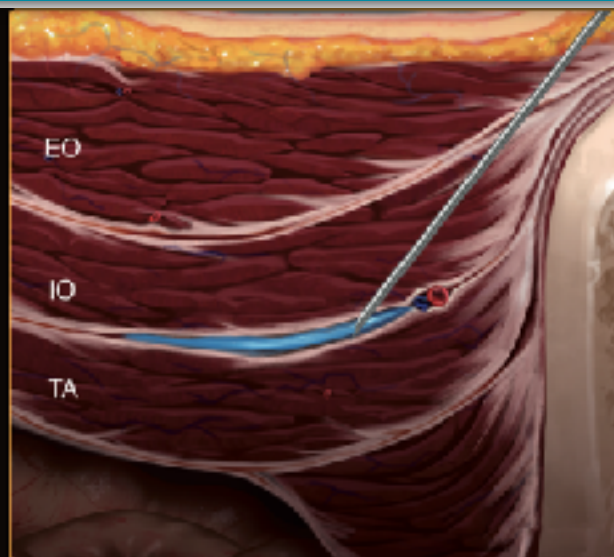
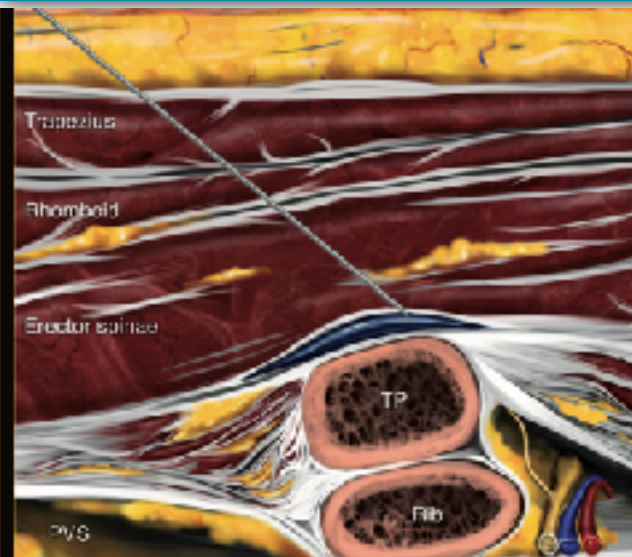
Caudal block for radiculopathy



Caudal block for radiculopathy



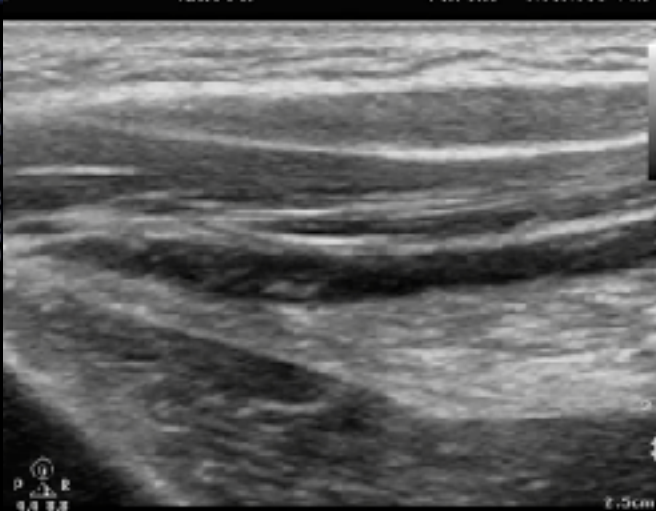
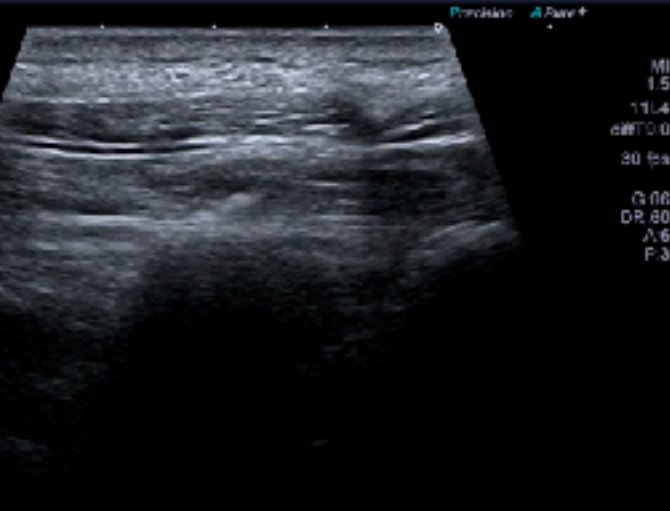
Take Home Skills



Hospital MSK 3 3158 12:45:11 AM

MSK FR

TIS 0.2 5:13:12 PM



Depth

Freeze

Save

Optic

TRUNK BLOCKS

Clavipectoral block	Intercostal block	Rectus sheath block
Parasternal block	PVB	TAP - subcostal
PEC I	ESPB - thoracic	TAP - lat / posterior
PEC II	ESPB - lumbar	TAP - ant (IN-IH)
SAPB	Caudal block	QL block (1 / 2 / 3)