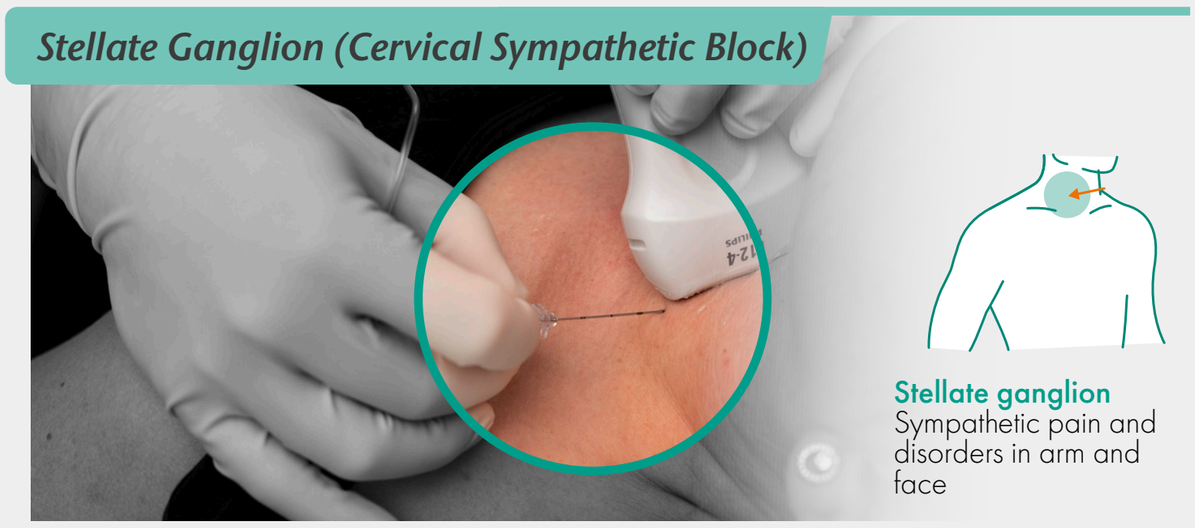
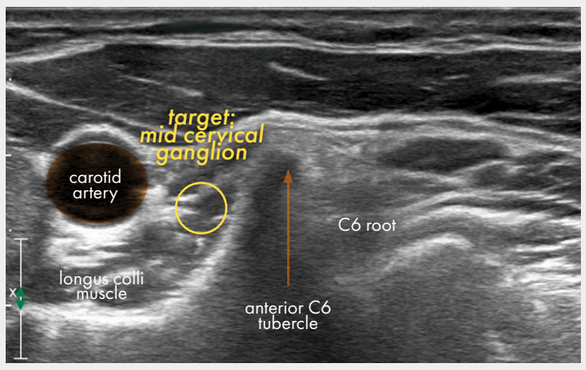
Ultrasound-Guided ***Injections Upper Extremity***

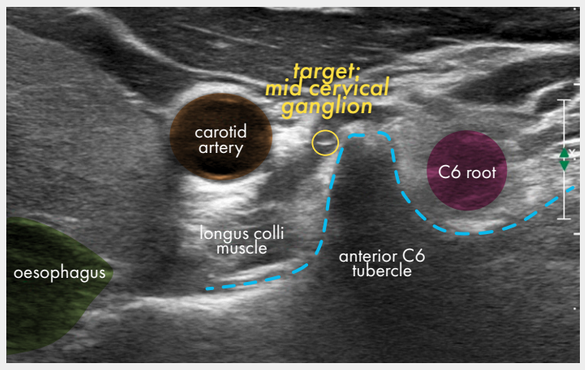
PAIN MANAGEMENT

Stellate Ganglion (Cervical Sympathetic Block)



Stellate ganglion
Sympathetic pain and disorders in arm and face





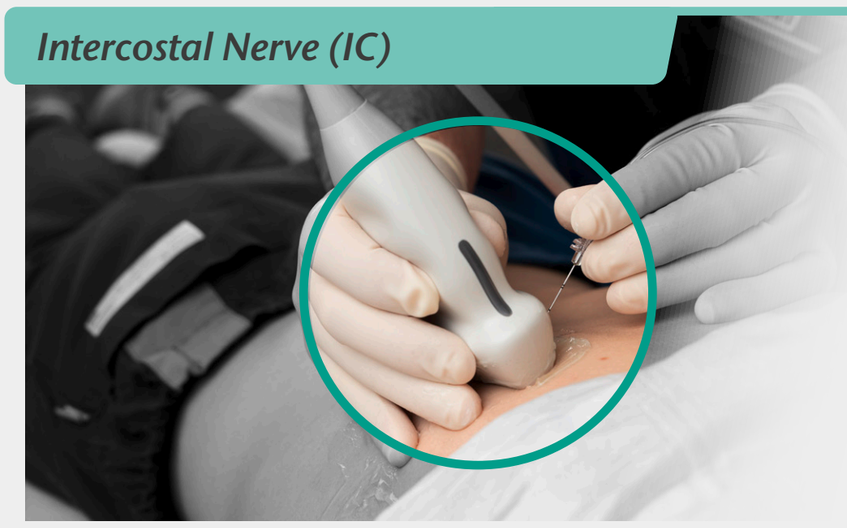
Identify: Use a high frequency linear probe and avoid turning the head too much to the contralateral side (max. 10°). Identify first the interscaleen plexus. Move cranial and follow C6 root the neuroforamen. The anterior tubercle (Chassaignac tubercle) is more pronounced at this level than the posterior tubercle. The Longus Colli muscle lies on the medial side of the anterior tubercle. The Longus Colli muscle is covered with the prevertebral fascia.

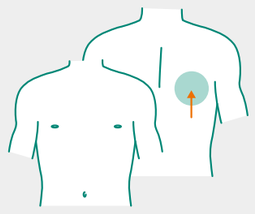
Target: Use an in-plane approach at the C6 neuroforamen level. The mid cervical ganglion is lying underneath the prevertebral fascia of the Longus Colli muscle. The needle must be advanced from lateral to medial avoiding blood vessels and C5 root until the anterior tubercle is passed.

Tips: Approach from lateral to medial. First visualize important vessels, using color Doppler, like the Jugular vein, Carotid artery, Inferior Thyroid artery and Vertebral artery. Use hydro dissection with saline, before using your local anesthetic.

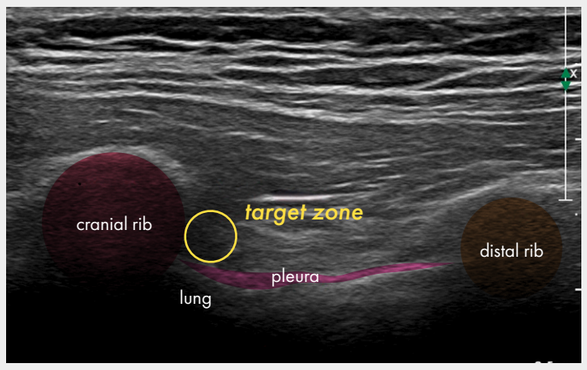
Avoid: Puncturing through the Jugular vein, because of negative pressure it might absorb your local anesthetic. Avoid puncturing the oesophagus, which is located mostly on the left side of the trachea, medial to the Longus Colli muscle. You can ask the patient to swallow, in order to visualize it more easily.

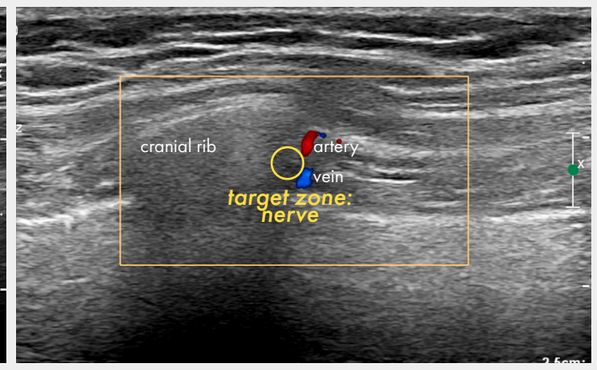
Intercostal Nerve (IC)





Intercostal nerve
Intercostal neuralgia





Identify: The IC nerve is situated just under (caudal) of the ribs close to the artery and vein. The vein is most cranial, in between the artery and most caudal the IC nerve. The neve is superficial to the pleura.

Target: Under the rib, indentify the vein and artery, the nerve is more caudal. Also identify the pleura and lung.

Tips: Use Doppler to identify the artery and look for lung sliding. Only a small volume is needed.

Avoid: The pleura and thus the risk for a pneumothorax. Can be very superficial, normally between 2-4 cm.

Cervical Medial Branch (CMB)

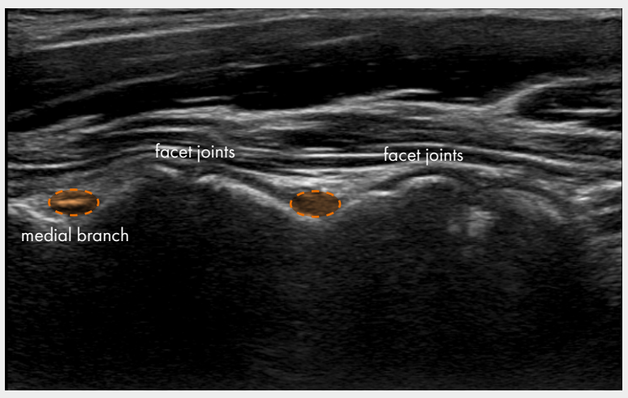
Cervical medial branch
Neck pain

Identify: C6 (prominent transverse process with large anterior tubercle) and C7 (absent anterior tubercle) should be identified in transverse plane or C2C3 joint in coronal plane to determine the levels of interest.

Target: Aim for the deepest point between the facet joints with the probe in the coronal plane and an out-of-plane approach. In transverse plane the needle should be placed on the smooth surface of the articular pillar so it is located in its waist.

Tips: At C7 it is recommended to combine ultrasound with fluoroscopy to determine the target point.

Avoid: Placing the needle from anterior to posterior avoids puncturing the nerve root and vertebral artery in front of the facet column



Third Occipital Nerve (TON)

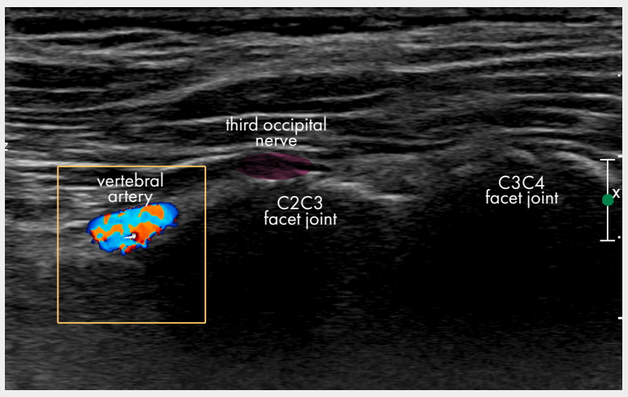
Third occipital nerve
Neck pain

Identify: Cervical articular column situated posterior to transverse processes and anterior to cervical musculature. Identify the C2C3 facet joint with the vertebral artery cranial and anterior to it.

Target: Using an out-of-plane approach from anterior of the probe the needle is aimed for the C2C3 articulation. The probe can be turned in transverse position to place the needle in-plane above the articulation.

Tips: The C2C3 joint has a steep drop at its cephalad side representing the C2 lamina.

Avoid: Blood vessels should be avoided. Use color Doppler to determine a safe needle trajectory.



Greater Occipital Nerve (GON)

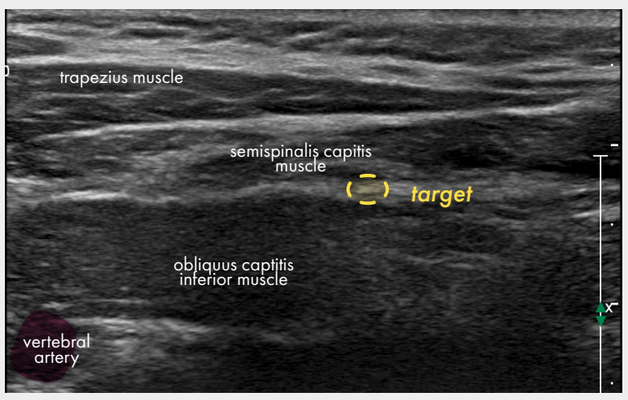
Greater occipital nerve
Headache

Identify: The bifid spinous process of C2. Then move the transducer laterally to visualize the obliquus captitis inferior muscle (OCIM) an the semispinalis capitis muscle (SsCM).

Target: The greater occipital nerve is identiefied as an oval shaped hypoechoic structure between the SsCM and the OCIM. Use an in-plane technique and hydro-dissection to place the needle tip between the OCIM and SsCM.

Tips: Always start from C2 and than move your probe more laterally and slightly oblique to identify the position of the GON.

Avoid: Puncture of the vertebral artery (VA). Always use color Doppler to identify the position of the VA. Also distinguish the GON from the second dorsal root ganglion which is deeper (anterior to OCIM).



Ilioinguinal & Iliohypogastric Nerves

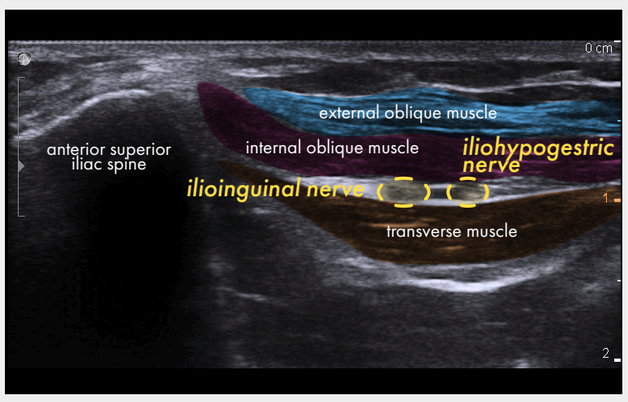
Ilioinguinal and Iliohypogastric nerve
Groin pain

Identify: Innervate part of the suprapubic area (1) and the inguinal and genital zones (2). Both run between the transverse abdominis and the internal abdominal oblique muscle. Anteromedial of the iliac crest and along the crest posterior to anterior. Identitfy anterior superior iliac spine (ASIS). Scan zone: between umbilicus and spina, closer to the latter. Depth is between 3-5 cm.

Target: Between transverse and internal muscle, medial of the ASIS, diameter: mostly 3-8 mm. The ilioinguinal is closer to the crista, both are max 1.5 cm afar of the crista edge.

Tips: Use the peritoneum and bowel movements to identify max depth. Use a high MHz probe, linear. Normal block volume 10-15 ml.

Avoid: Peritoneum and thus entering the abdominal cavity should be avoided at all cost.



FOR FURTHER INFORMATION

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This poster was developed in collaboration with:

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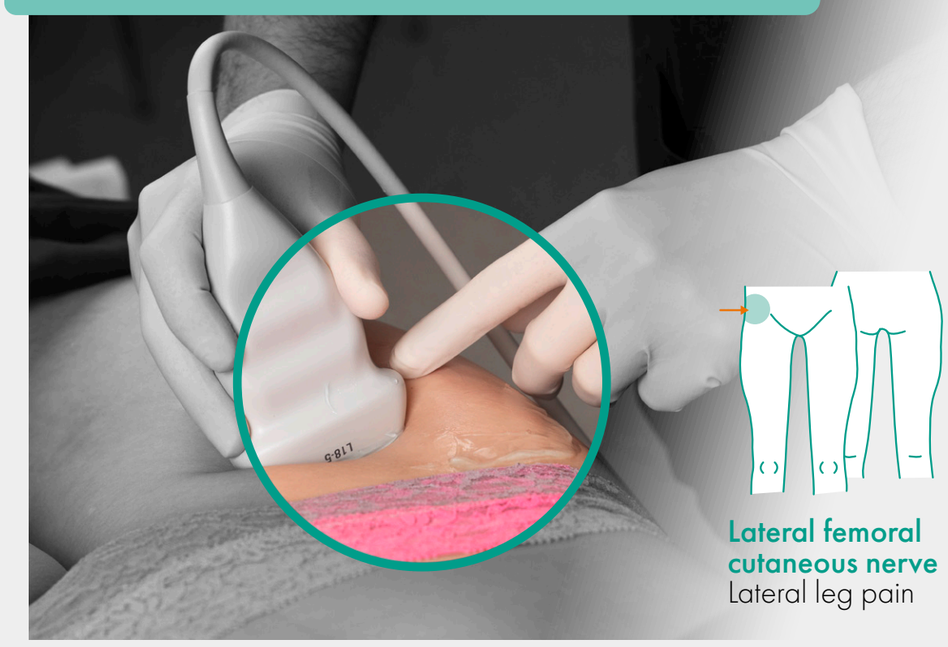
*This poster is an educational aid. It should not be used as a sole source of information for a new technique. Variations in anatomy are to be expected and no responsibility can be accepted for the technical ability of the practioner and individual patient outcomes.

Ultrasound-Guided **Injections Lower Extremity**

PAIN MANAGEMENT

Lateral Femoral Cutaneous Nerve



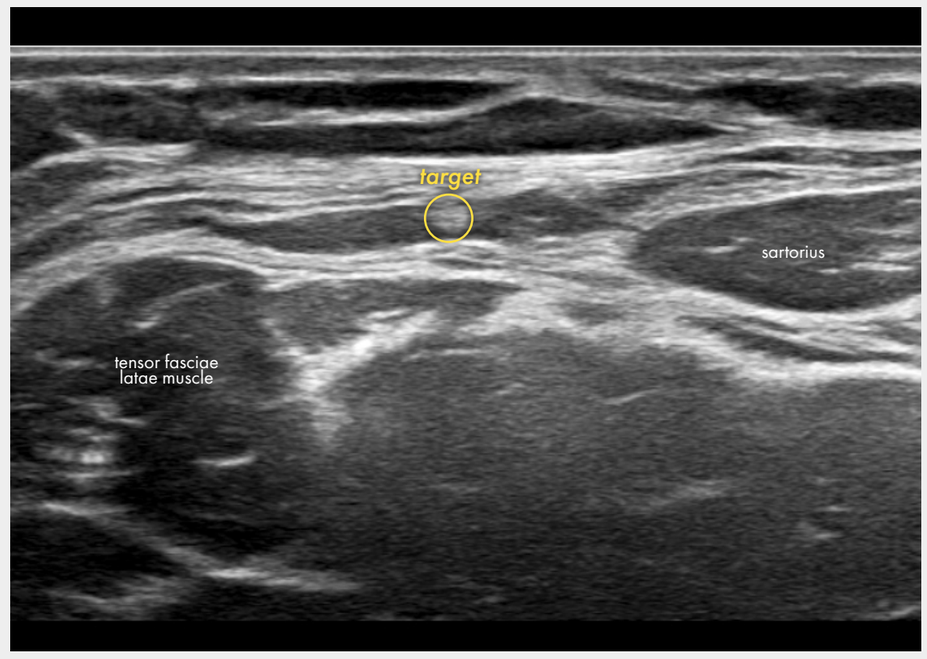
Lateral femoral cutaneous nerve
Lateral leg pain

Identify: Scan medially and inferiorly starting from the anterior superior iliac spine. Identify the sartorius muscle and the tensor fasciae latae muscle.

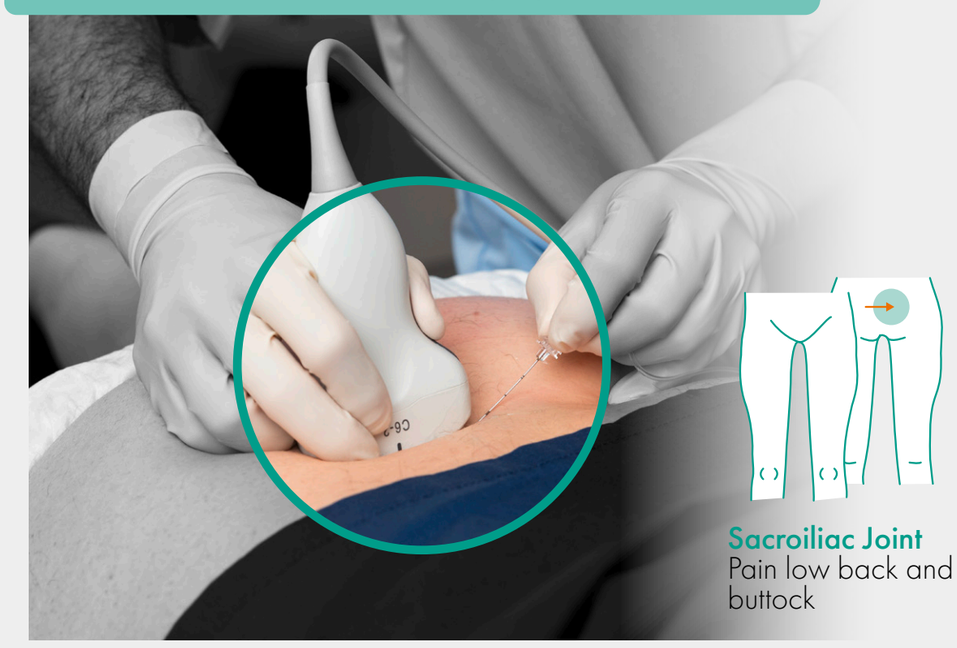
Target: The lateral femoral cutaneous nerve is a small hyperechoic structure found in the interfascial plane above the sartorius muscle or it can be found in the hypoechoic fat filled space between the sartorius and the tensor fasciae latae muscle (TFL). Use an in-plane approuch.

Tips: Use nerve stimulation to confirm correct position. Try to inject as close to the inguinal ligament as possible in case of meralgia paresthetica.

Avoid: To identify hyperechoic structures in the sartoirus muscle and by mistake think this is the LFCN



Sacroiliac Joint Infiltration (SIJ)



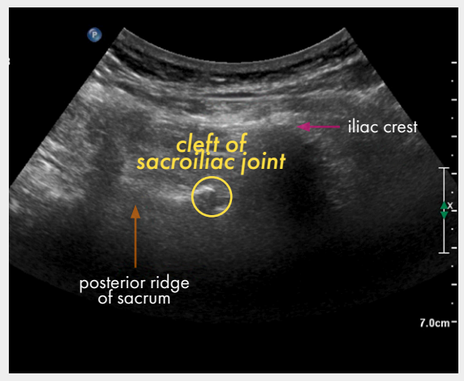
Sacroiliac Joint
Pain low back and buttock

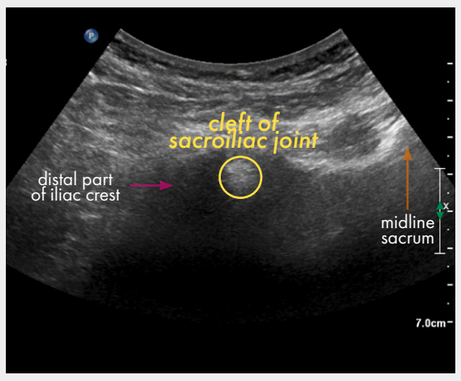
Identify: Place the low frequency curvilinear probe transversely over the sacrum and identify the middle ridge of the sacrum or the sacral hiatus. Subsequently slide laterally and identify the bony contour of the ileum. To identify the cleft of the joint you might need to slide distally.

Target: The SIJ is the hypo echogenic cleft between the ileum and dorsal surface of the sacrum. The needle needs to come (in-plane) from medial to lateral. In this way the SIJ aligned in the same direction and easily entered.

Tips: Slide up and downwards over the bony ileum contour and identify the best position to visualize the SIJ cleft. Visualize the sacral neuroforamina in the middle of the dorsal surface of the sacrum.

Avoid: Entering the SIJ cleft where the shadow of the ileum is too large and you are not able to identify the cleft.





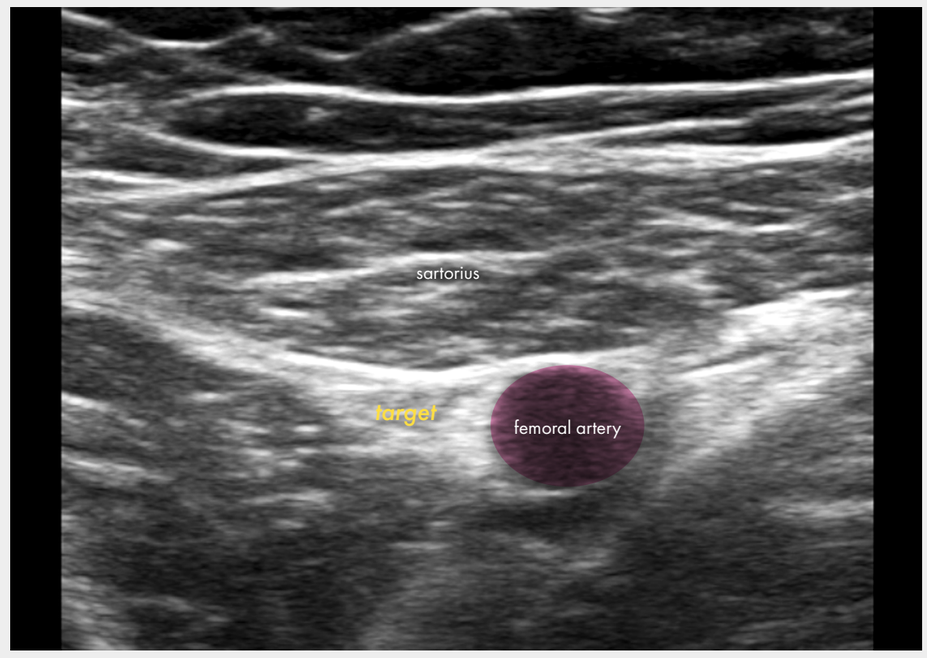
Saphenous Nerve

Saphenous nerve
Knee pain and saphenous neuralgia

Identify: The femoral artery and the sartorius muscle. Then scan from proximal thigh to distal thigh.

Target: The saphenous nerve is hyperechoic. In the distal thigh the nerve is located deep to the sartorius muscle in the subsartorial compartment next to the femoral artery. More distally in the thigh the nerve becomes superficial and can be found in the fascial plane between the vastus medialis and the sartorius muscles. Use an in-plane approach.

Avoid: Inadequate needle length, direct nerve trauma, intravascular injection



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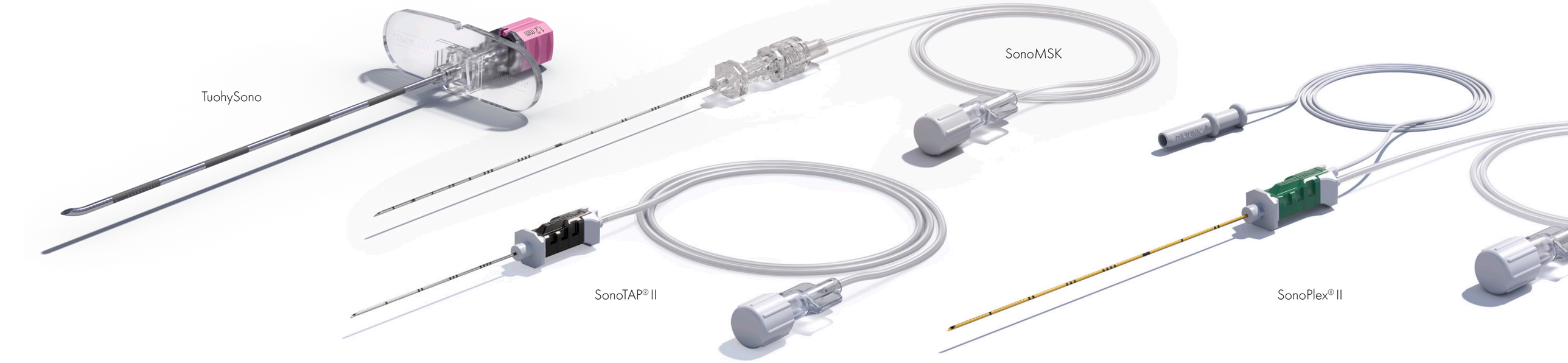

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