



Radiofrequenza e Criolesione in ecoguida per dolore degli arti superiori e inferiori

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Terapia del Dolore

Azienda Ospedaliera San Giovanni- Addolorata Hospital, Roma

XXIX
CONGRESSO
NAZIONALE

ESRA Italian Chapter
CESENA, Cesena fiere

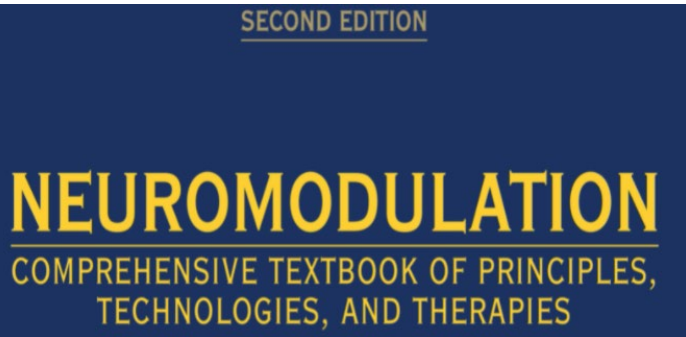
Presidente del congresso
Vanni Agnoletti
Domenico Pietro Santonastaso
Andrea Tognù



European Society of
Regional Anaesthesia
& Pain Therapy

ESRA ITALIA

What is Neuromodulation

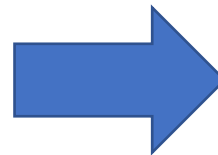


“The alteration of nerve activity through targeted delivery of a stimulus, such as electrical stimulation or chemical or physical agents, to specific neurological sites in the body”

The International Neuromodulation Society

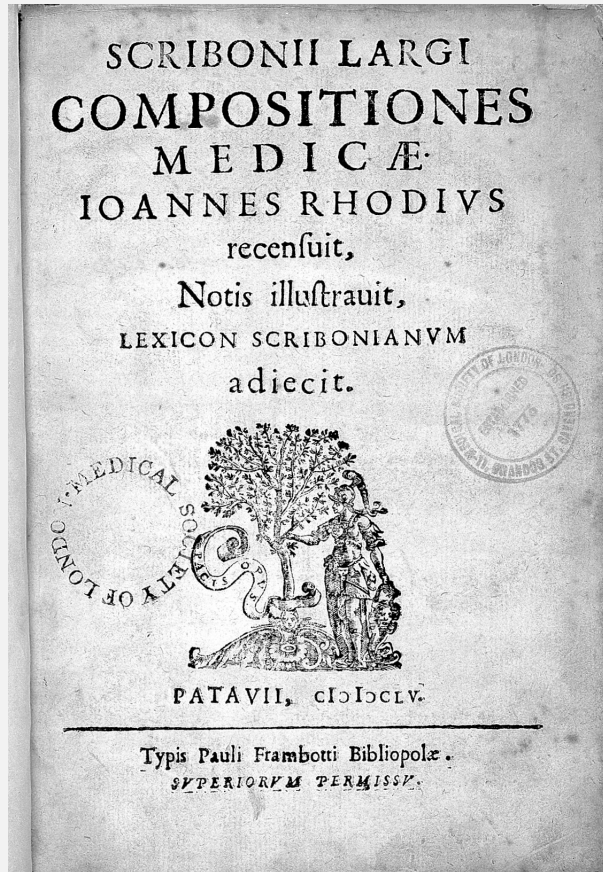
- inhibition
- stimulation
- modification
- regulation
- therapeutic alteration

electrically or chemically or physically



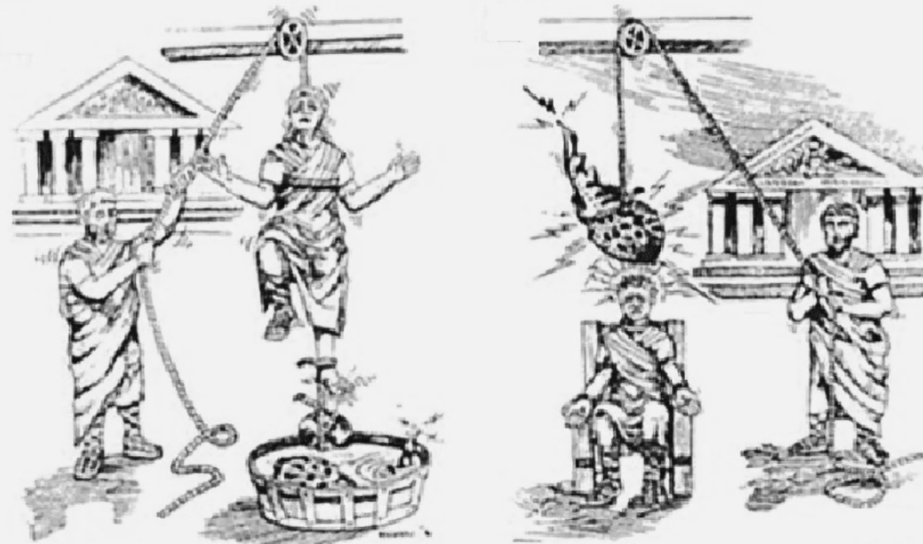
activity in the central, peripheral, or
autonomic nervous system

Objective: to maximize nociceptive block, minimize tissue destruction



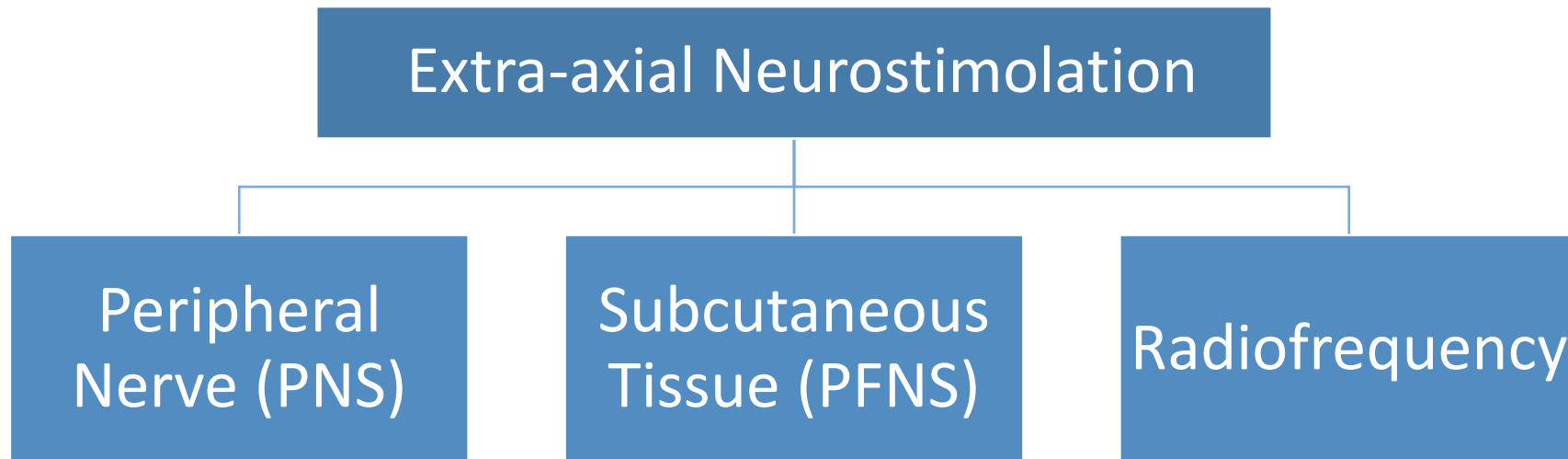
The first use of electricity for pain control

- Scribonius Largus observed the disappearance of gout pain after accidental contact with a torpedo fish (15 AD).
- Use of Mediterranean Sting-rays to cure headaches (46 AD).



Extra-axial Neurostimulation

Electrical neuromodulation (Neurostimulation)



The power of fire



RADIOFREQUENCY

CONTINUOUS (1949)

- 500 kHz with sine wave
- Temperatures between 50 and 90 °C
- Variable voltage → fixed temperature
- Damage of nerve fibers

PULSED (1998)

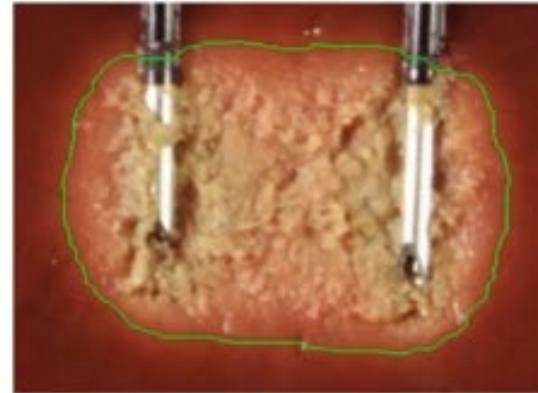
- 500 kHz with sine wave
- 2 pulses lasting 20 msec/second (2Hz)
- 480 msec pause
- Maximum 42 ° C
- 45V → temperature <42 ° C
- Minimal neurolesion or neuromodulation (?)

DIFFERENT TYPES of RADIOFREQUENCY



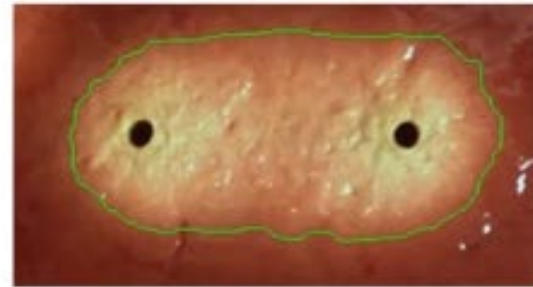
Monopolar

- Tissue heated
- Egg-shaped or spherical ablation
- Most procedures

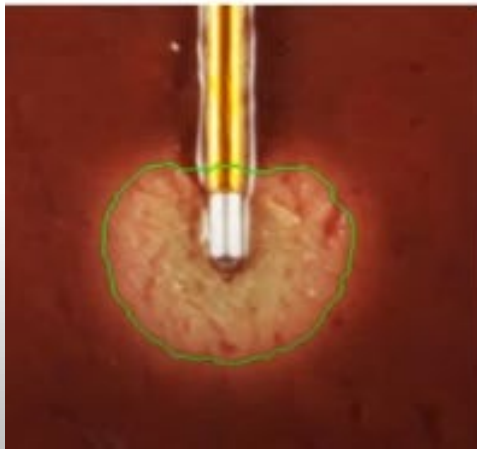


Bipolar

- Tissue heated
- RF between electrodes
- No ground pad
- Large brick-shaped ablation
- Eg SIJ Joint, Thoracic MB



Two cross sections of one ablation



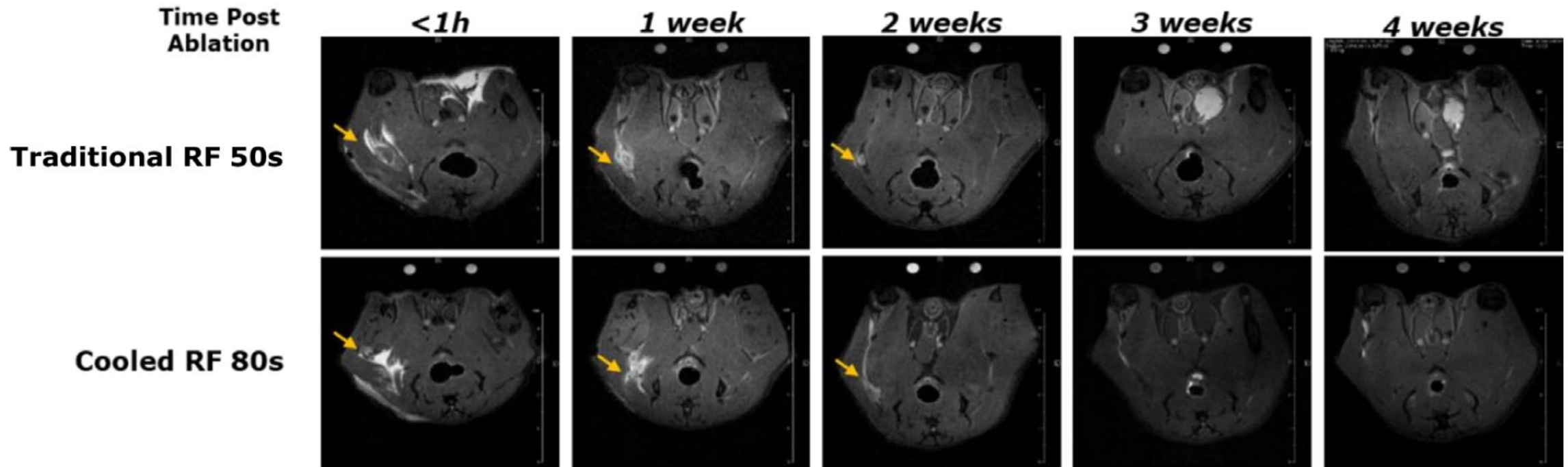
Cooled

- Tissue heated
- Spherical ablation
- Electrode cooled



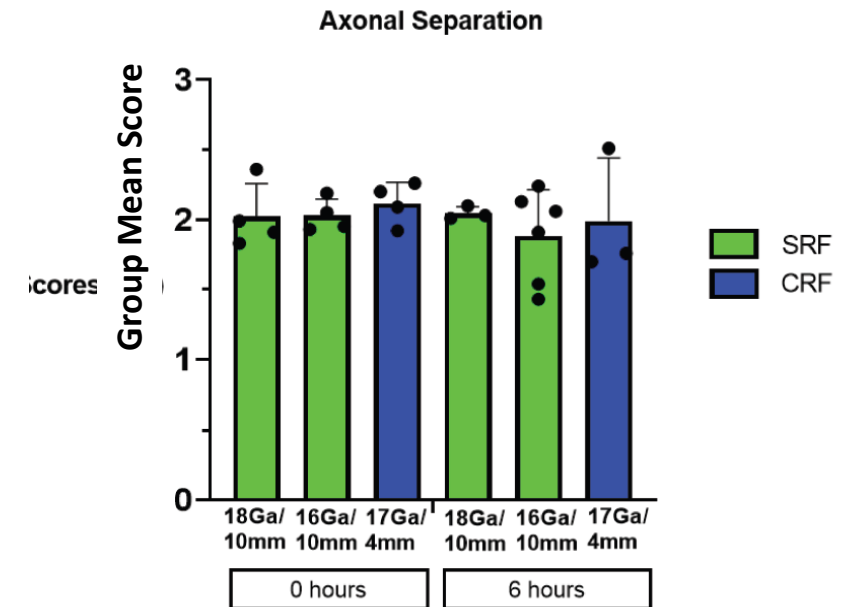
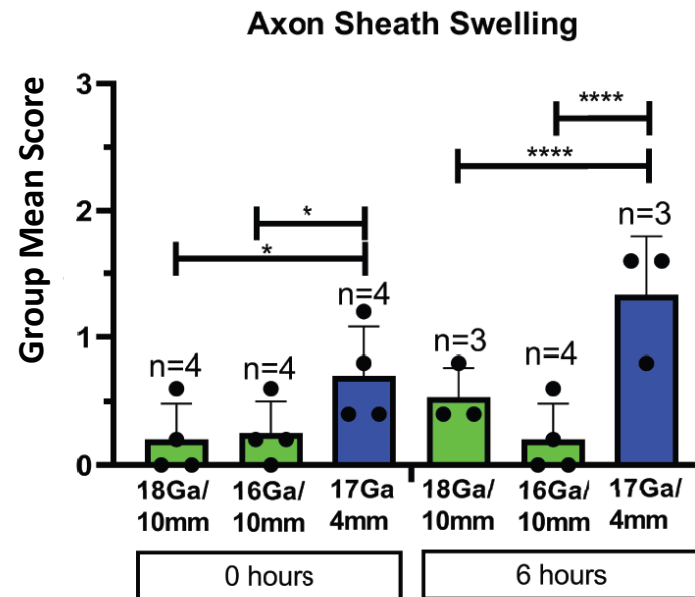
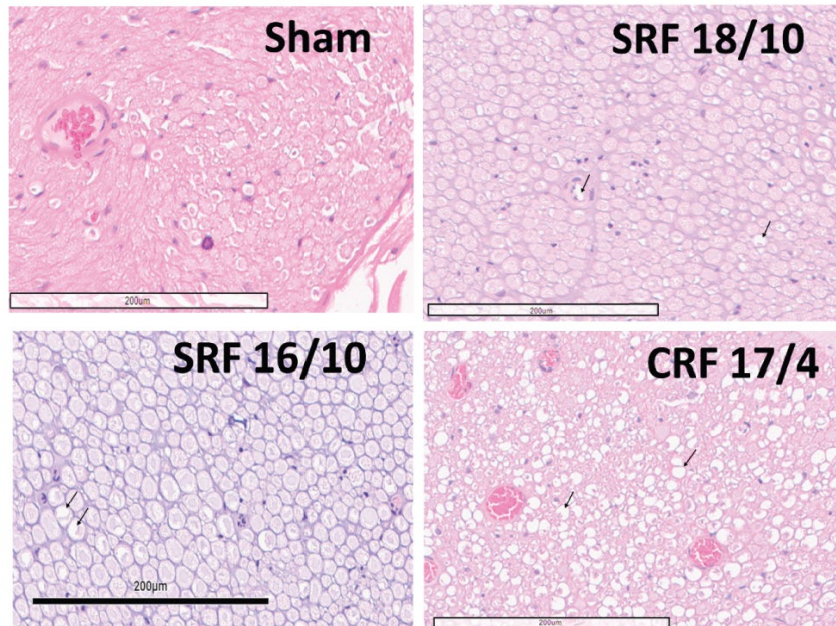
OPEN ACCESS

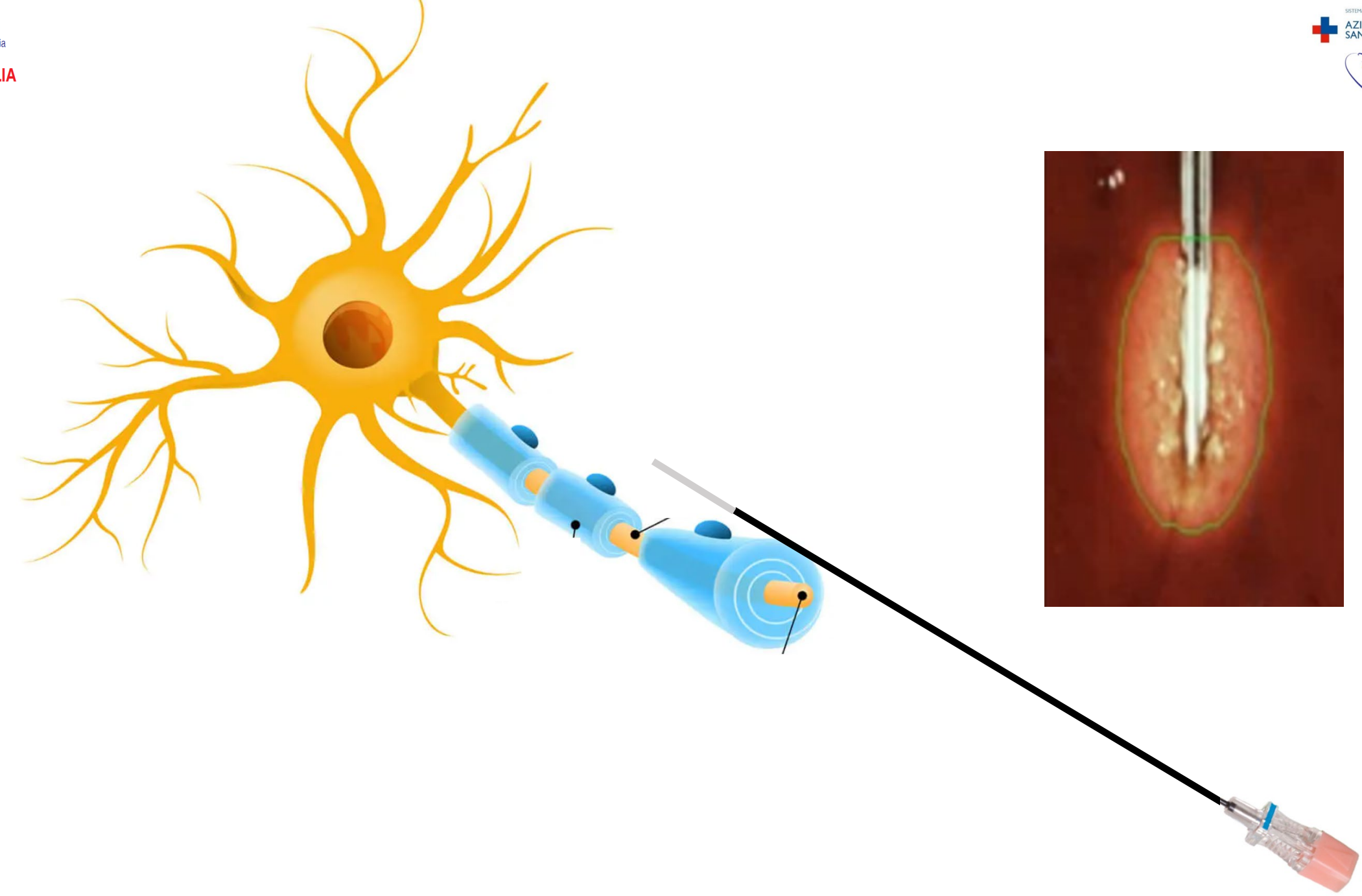
Physiological and functional responses of water-cooled versus traditional radiofrequency ablation of peripheral nerves in rats



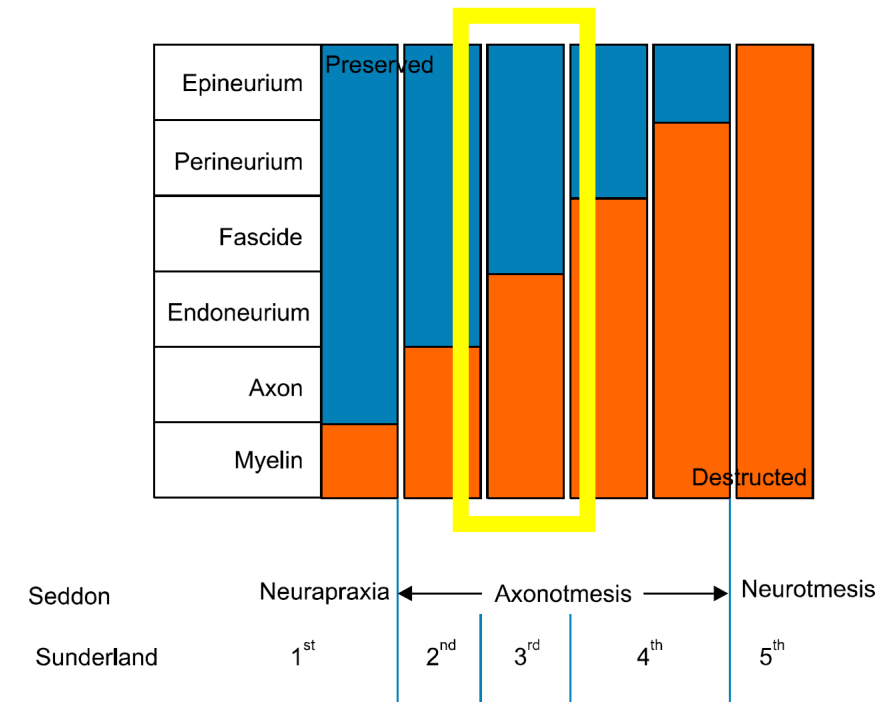
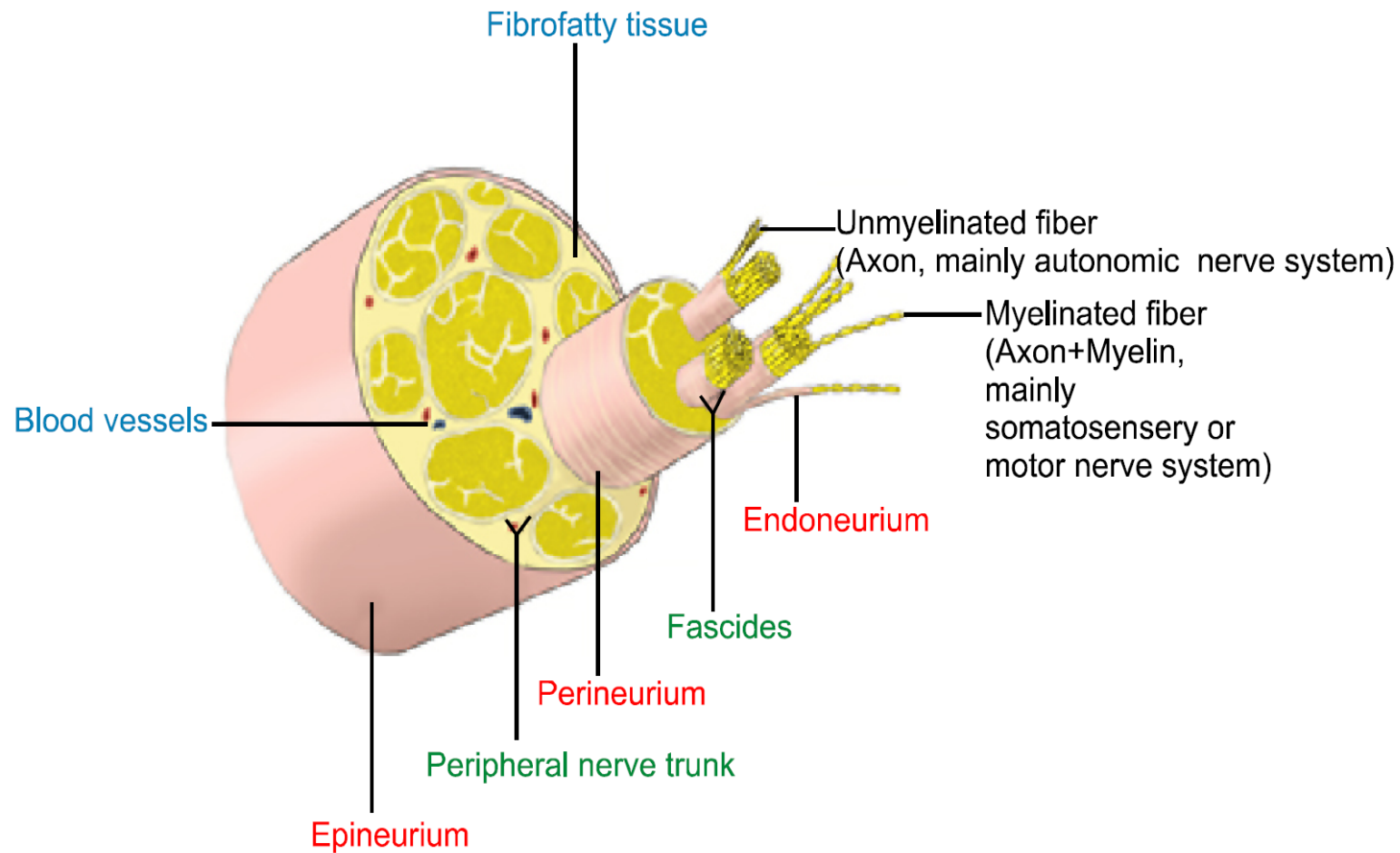


Water-circulating probes significantly modify lesion length and axon damage in cooled radiofrequency ablations when compared with similar-sized standard radiofrequency probes in rats





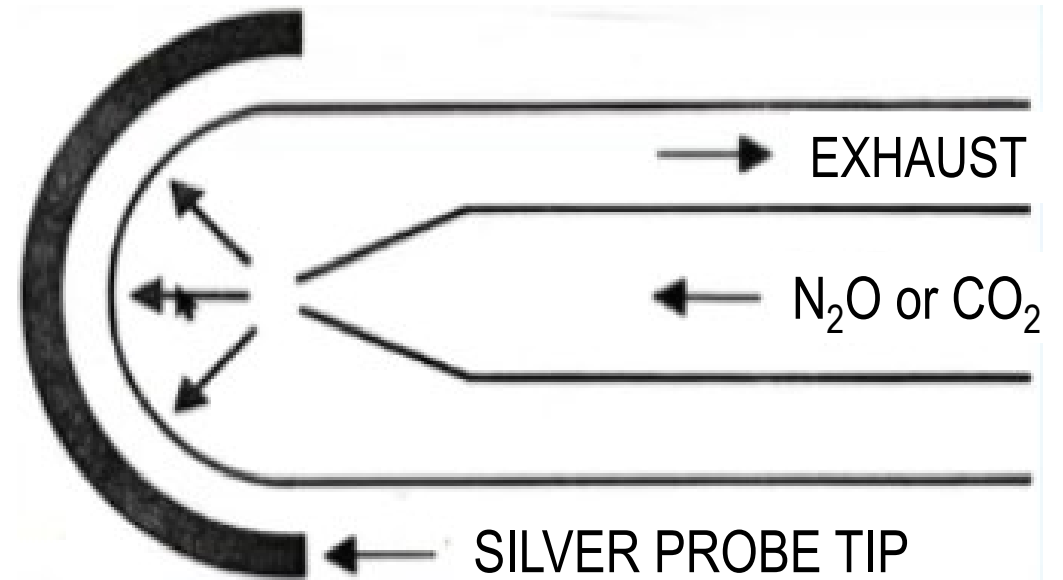
Neural Ablation and Regeneration in Pain Practice



The power of ice

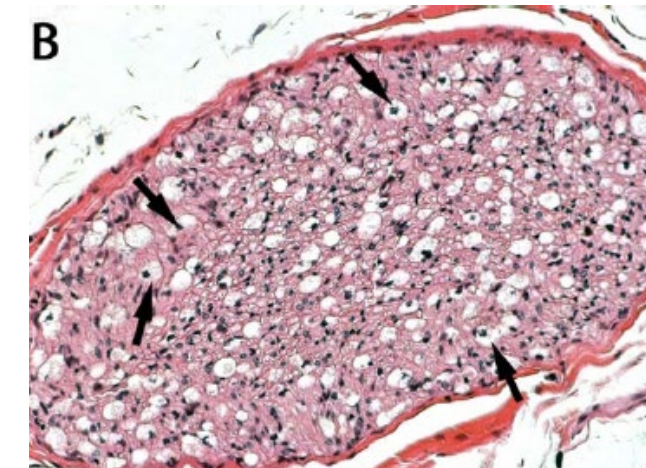
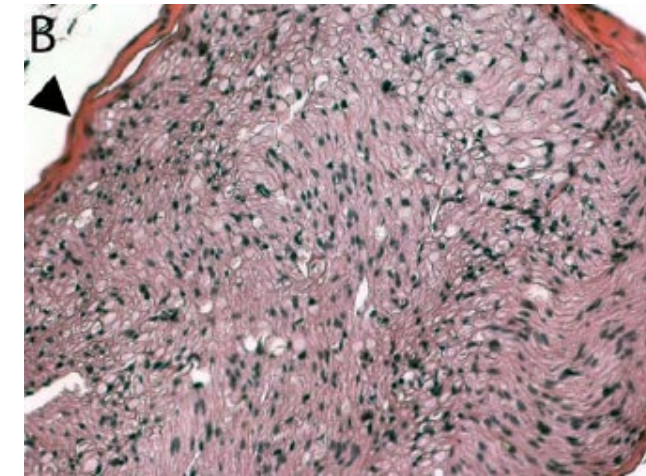
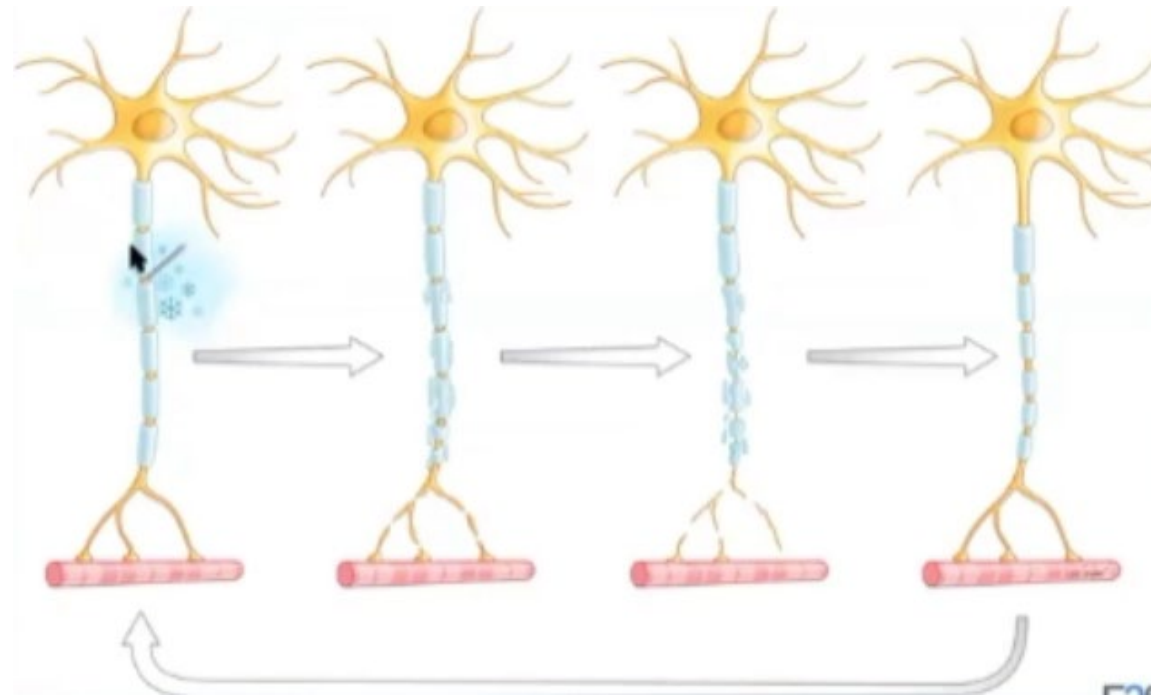
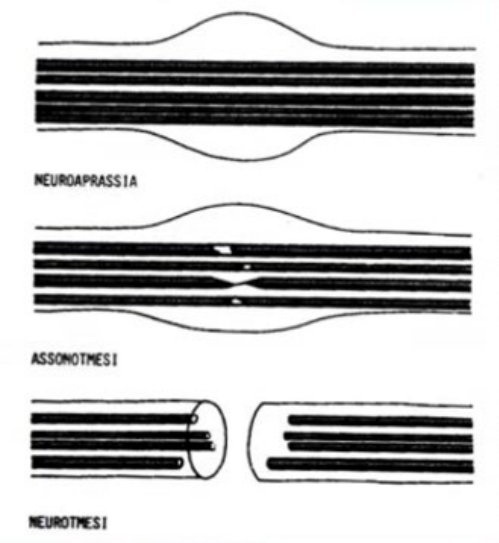


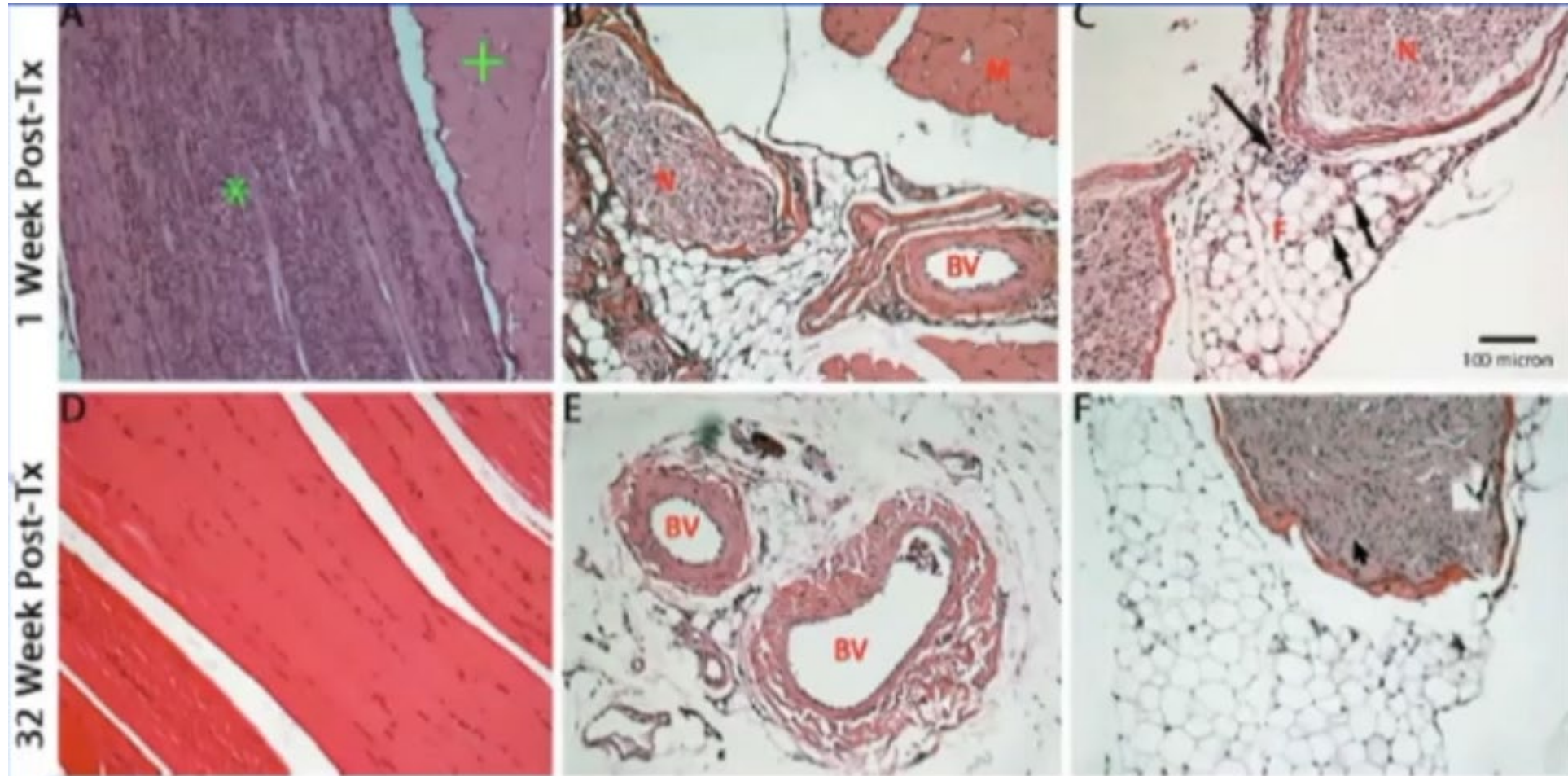
- A compressed gas (N_2O or CO_2) is released through a tiny opening and expands
- The tip goes to $-70^{\circ}C$ (Joules-Thompson effect)



WALLERIAN DEGENERATION AND RECOVERY OF MOTOR NERVES AFTER MULTIPLE FOCUSED COLD THERAPIES

MUSCLE & NERVE February 2015





MUSCLE

BLOOD VESSELS

FAT



Why Ultrasound?

1. Most typical imaging examinations and interventional procedures performed under fluoroscopy have also been reportedly performed under ultrasound guidance

Hurdle MF. Phys Med Rehabil Clin N Am. 2016;27(3):673–86.

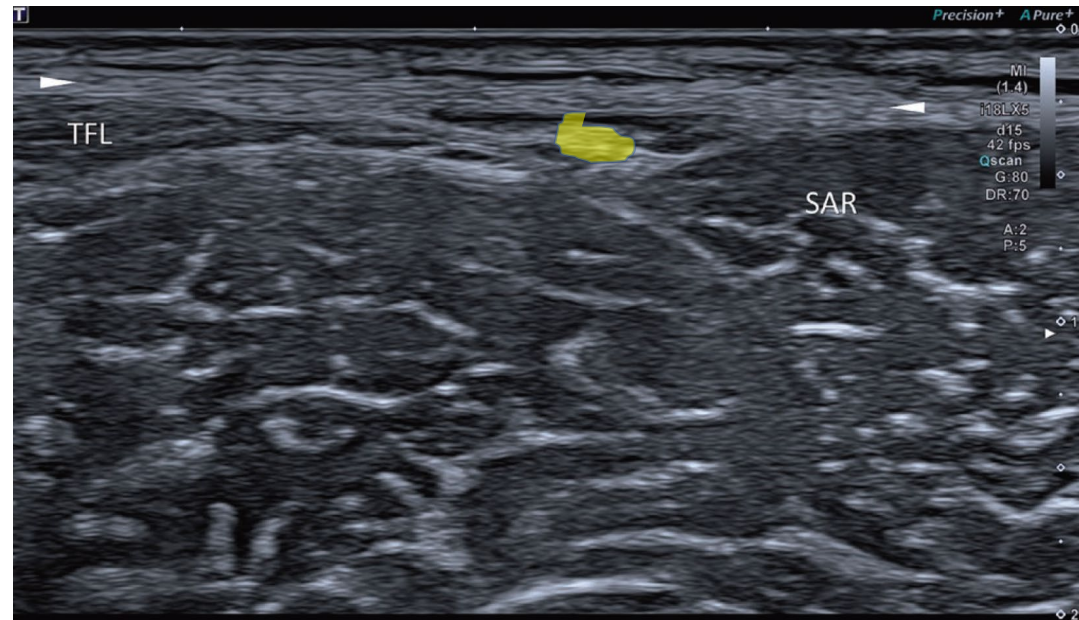
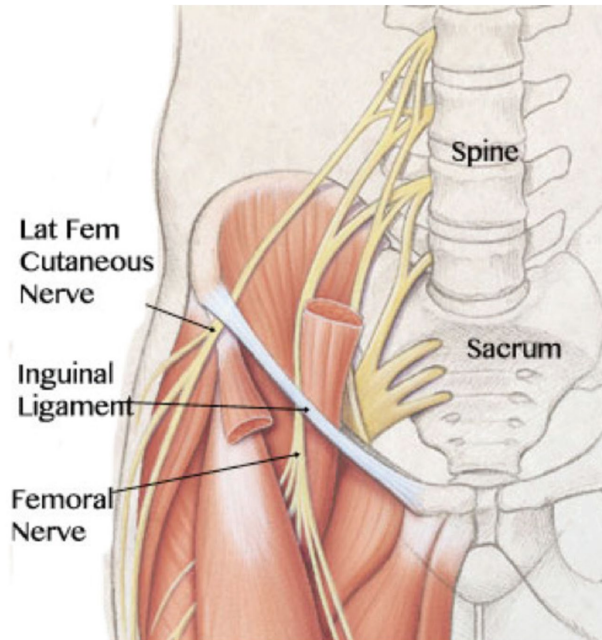
2. For certain types of cervical pain injection therapy, there is also evidence that ultrasound provides noninferior guiding effects when compared with computed tomography

Yue Ley et Al. *ì*. Clin J Pain. 2023;39(2):68–75..

3. Many advantages:
 - no ionizing radiation,
 - real-time guidance,
 - high spatial resolution,
 - excellent soft tissue contrast,
 - ability to identify and avoid critical structures

Pain Management

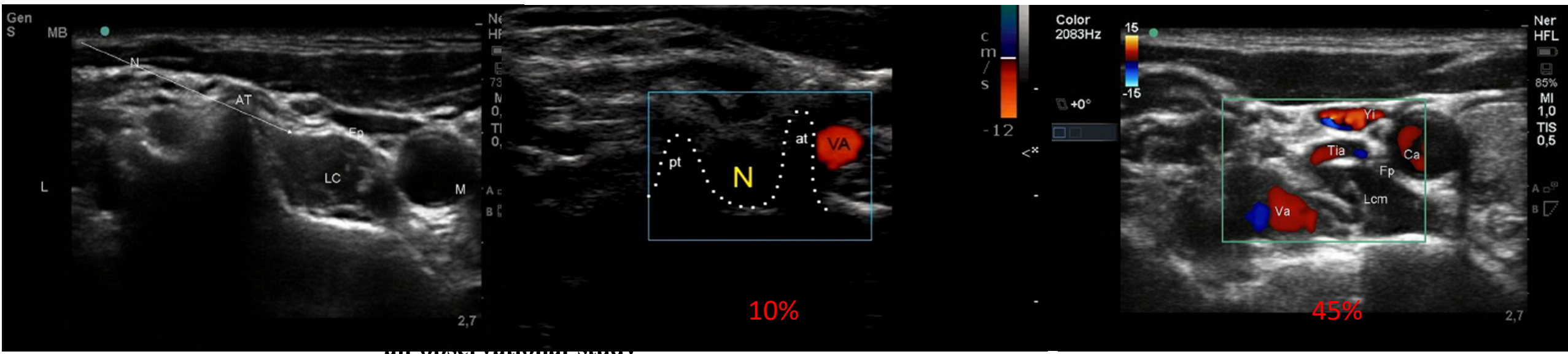
- Ensure **accuracy** of procedures



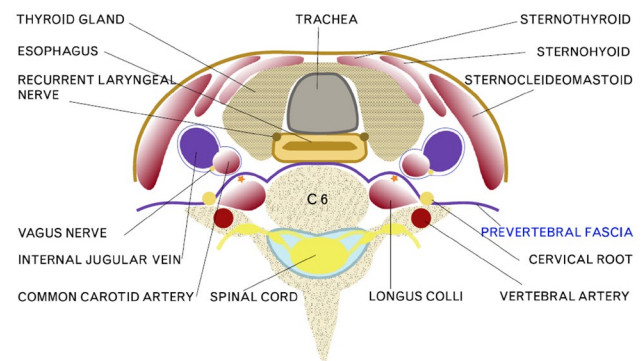
Landmark guide: 5-40%

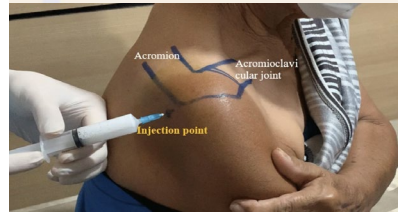
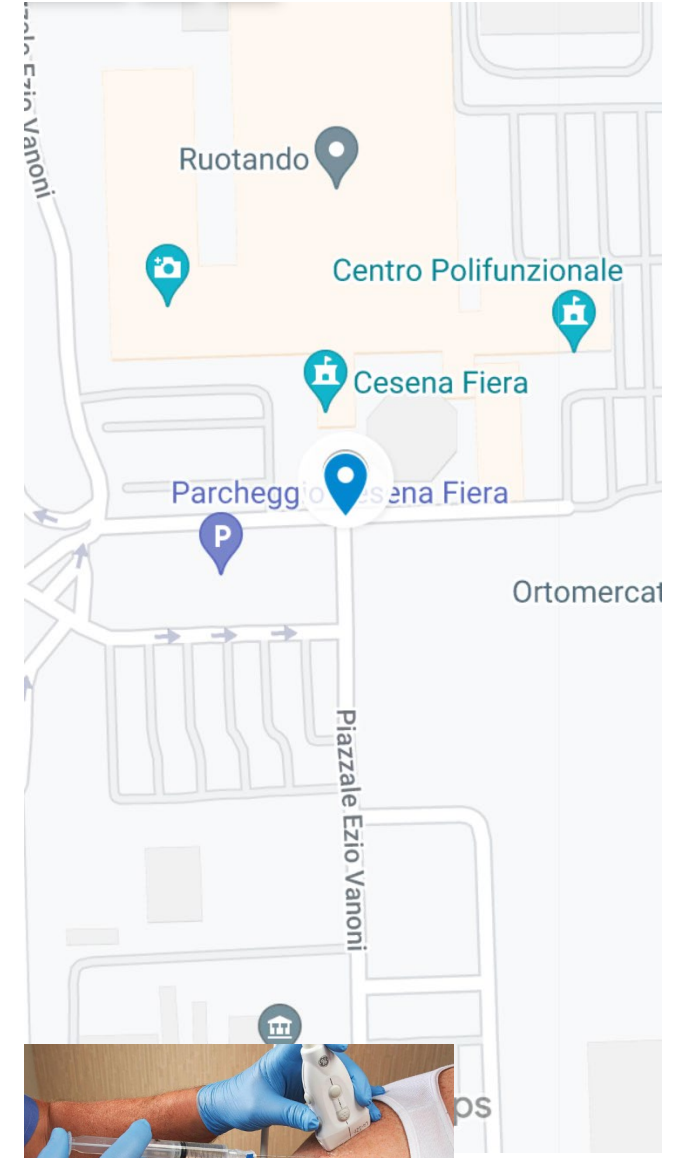
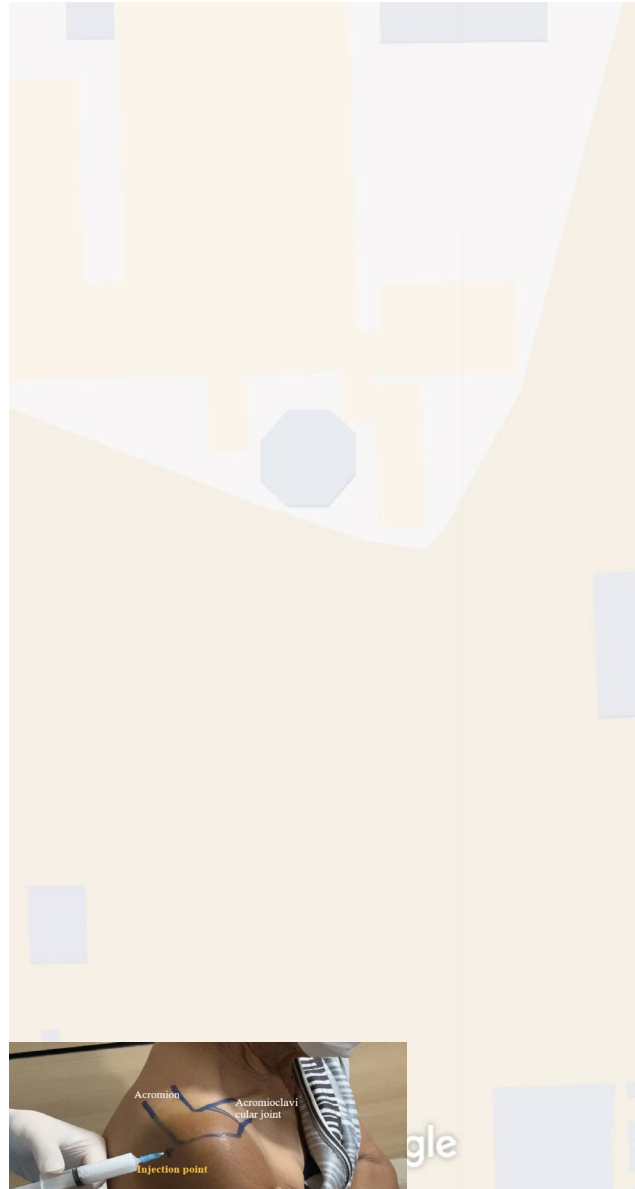
US-guidance: 95-100%

Pain Management



an observational study





Only good qualities?





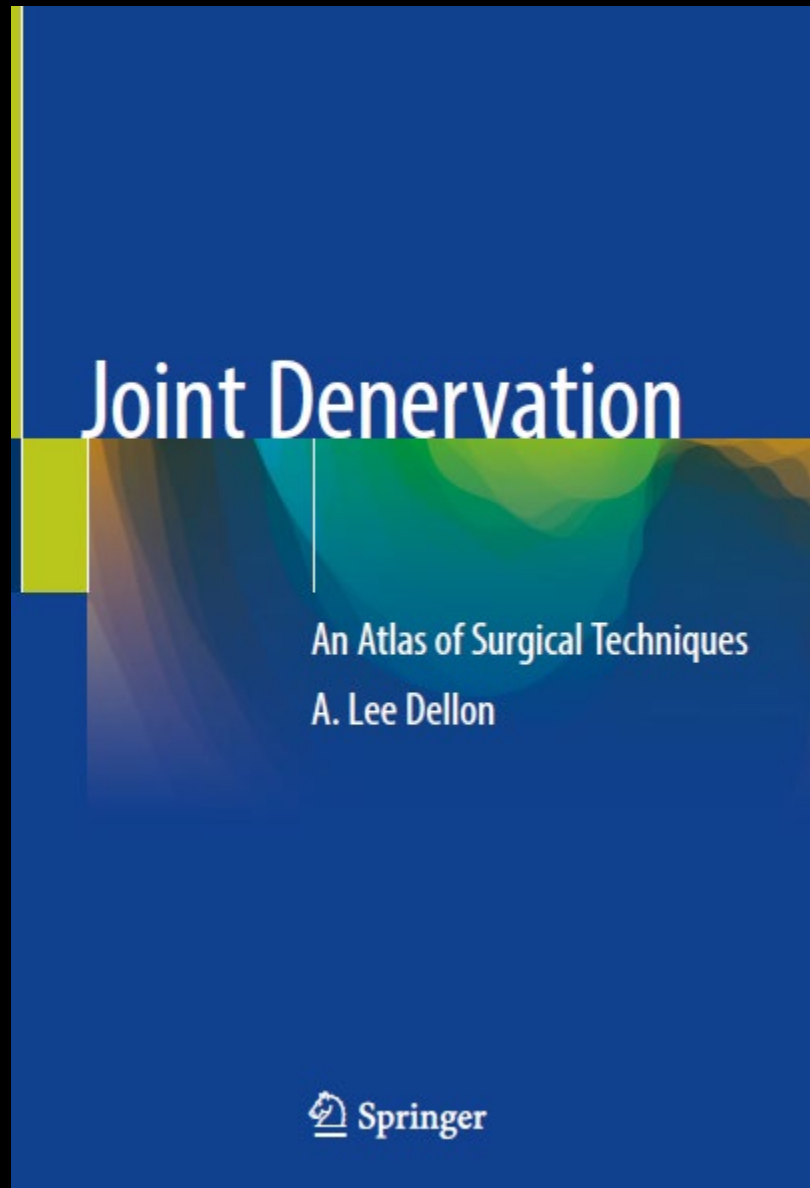
ESSR-Shoulder



ESSR-Hip



ESSR-Knee



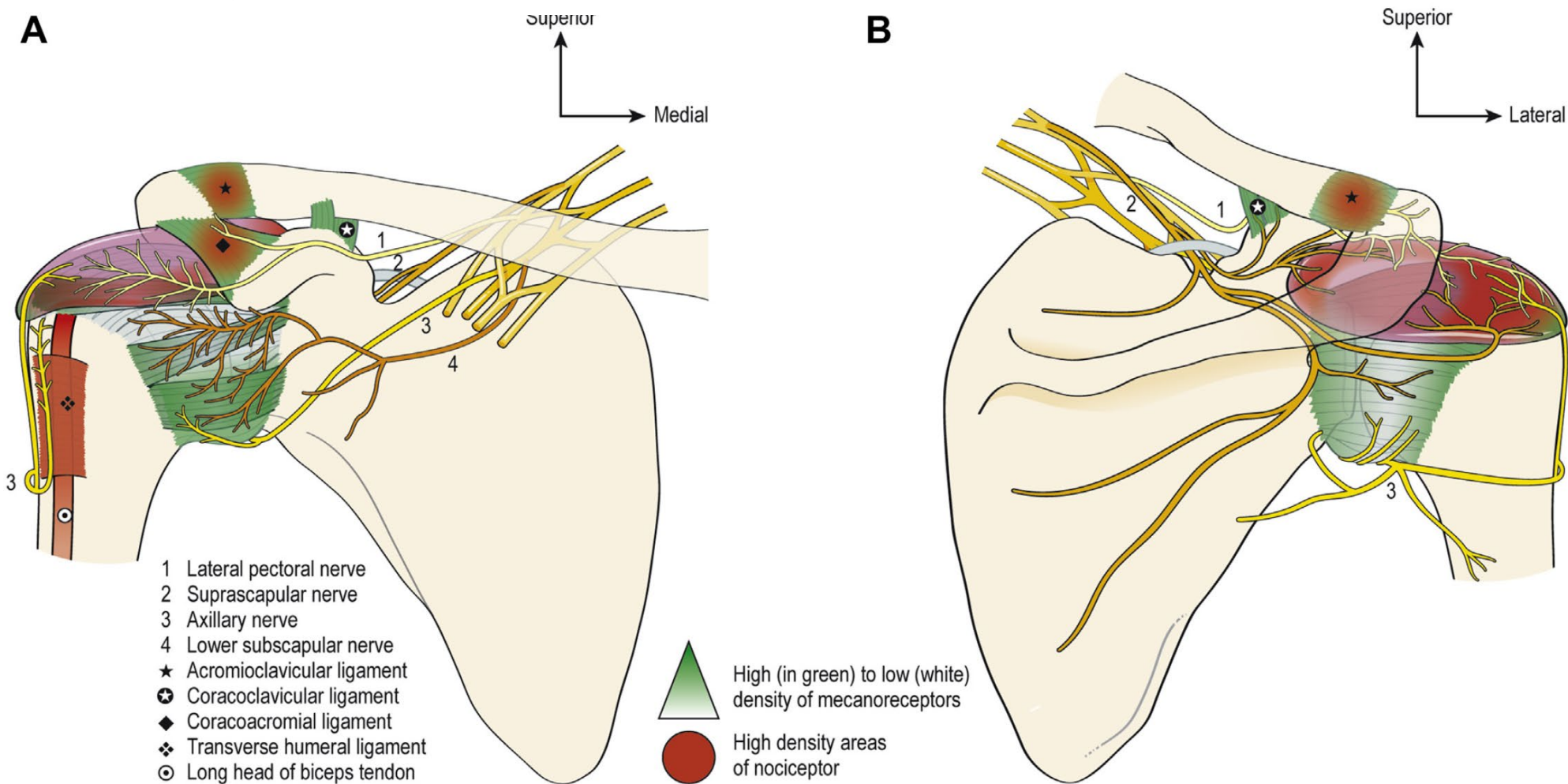
1863: John Hilton
Hilton's Law

Motor sparing



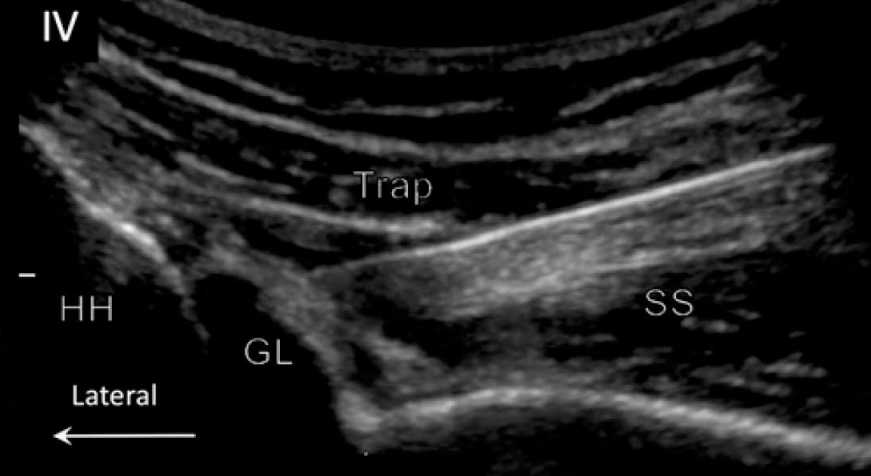
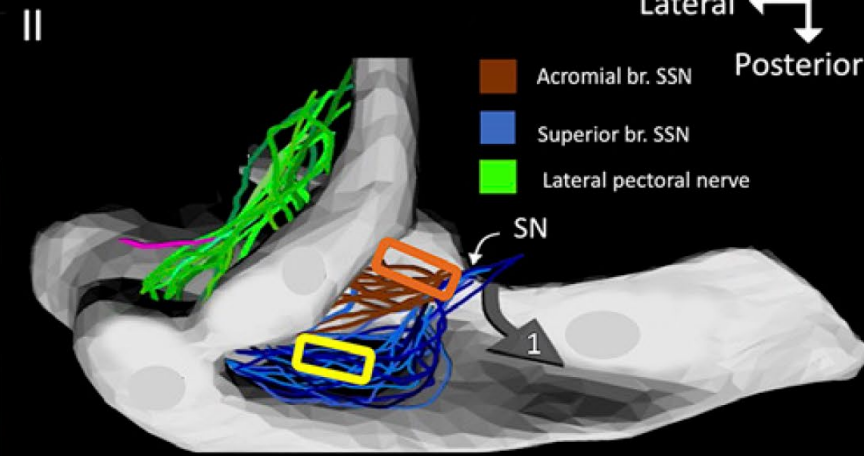
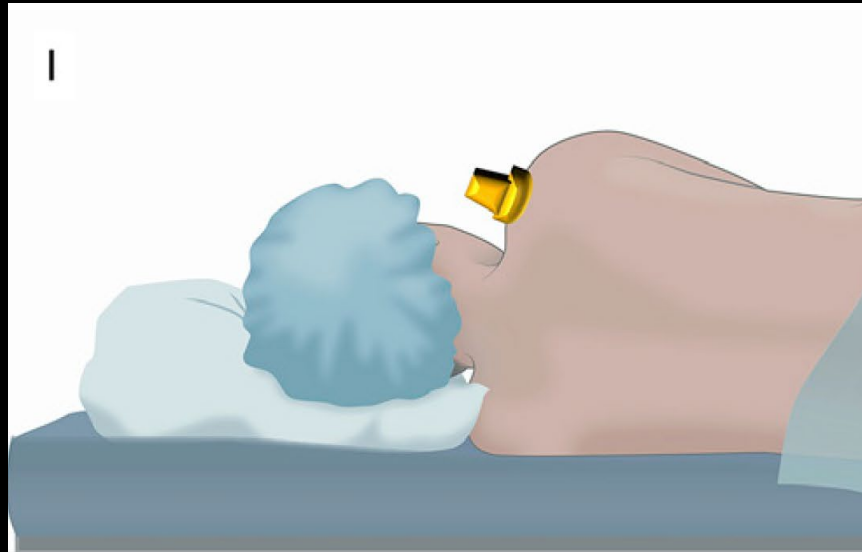
ELSEVIER

Sensory innervation of the human shoulder joint: the three bridges to break



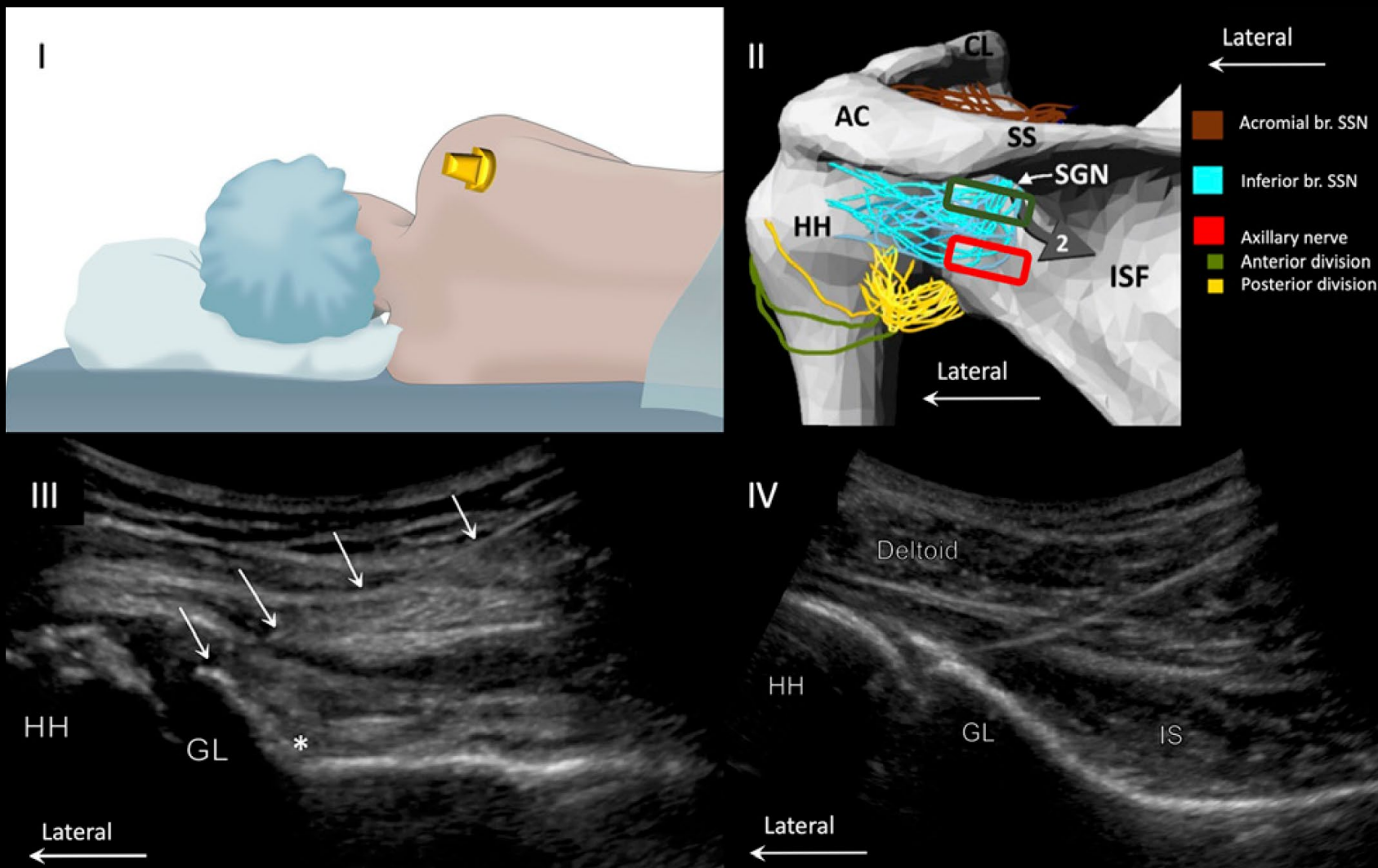
Cryoanalgesia for shoulder pain: a motor-sparing approach to rotator cuff disease

P. Reg Anesth Pain Med 2022;0:1–5. doi:10.1136/rapm-2022-103670



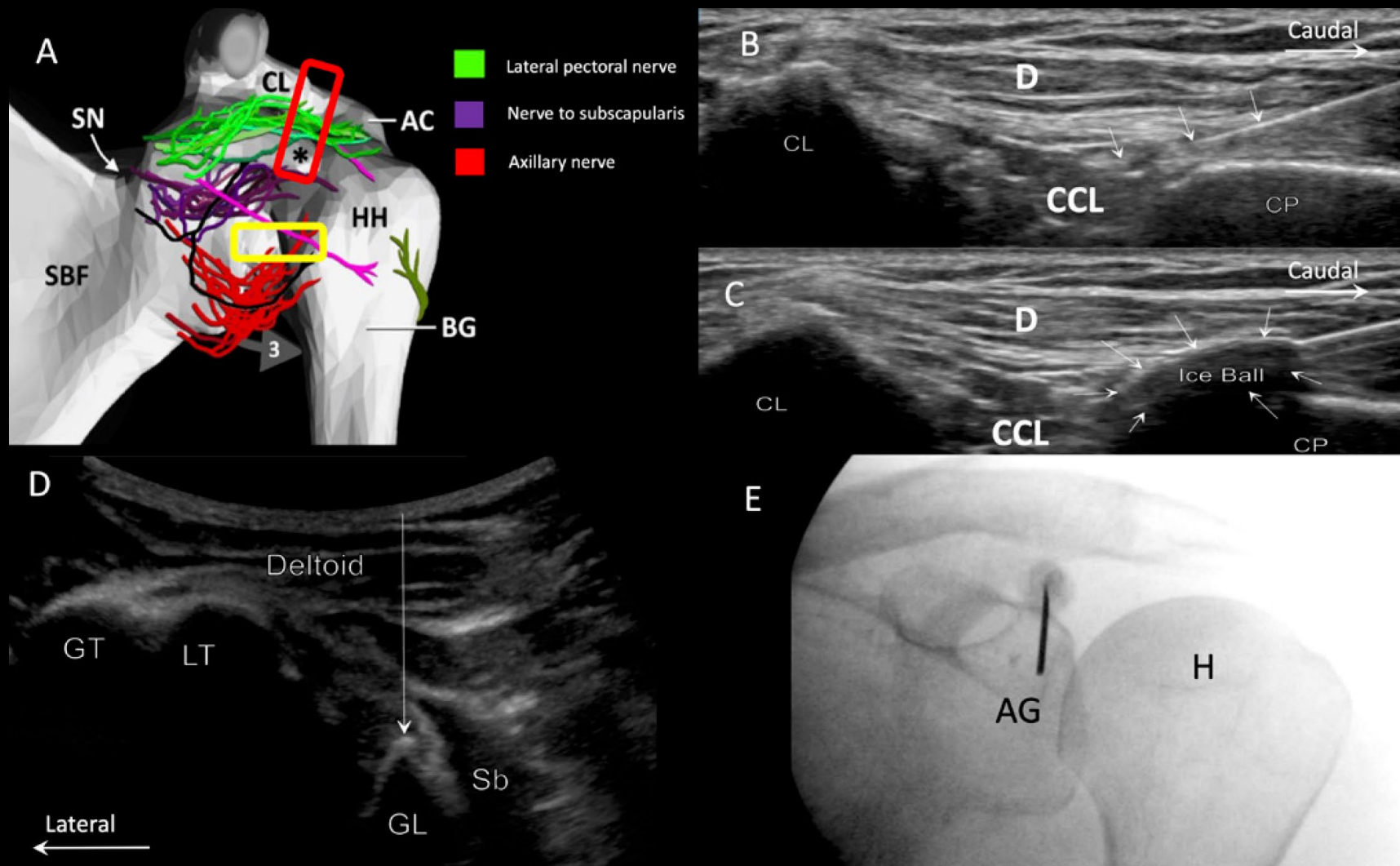
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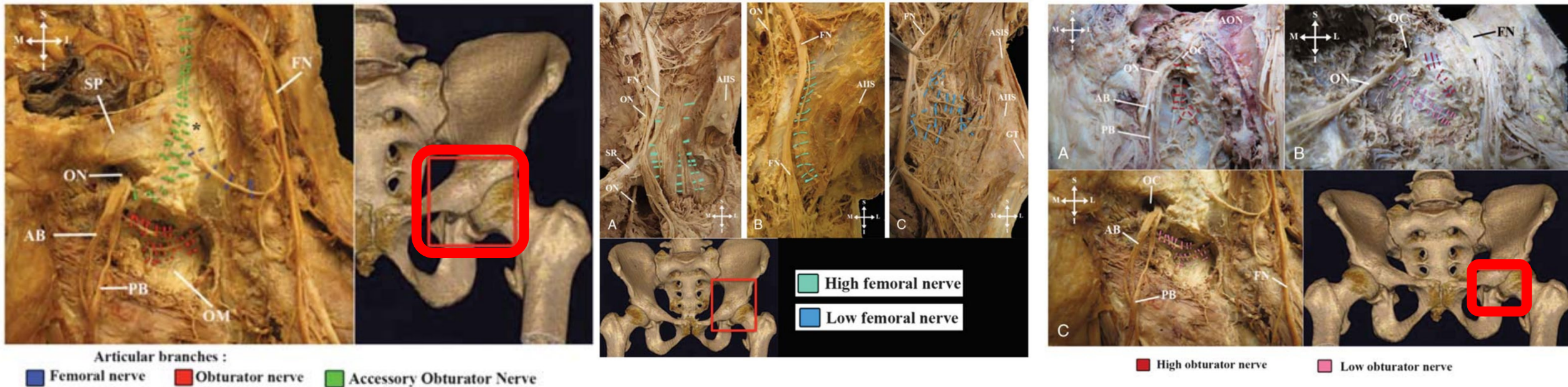
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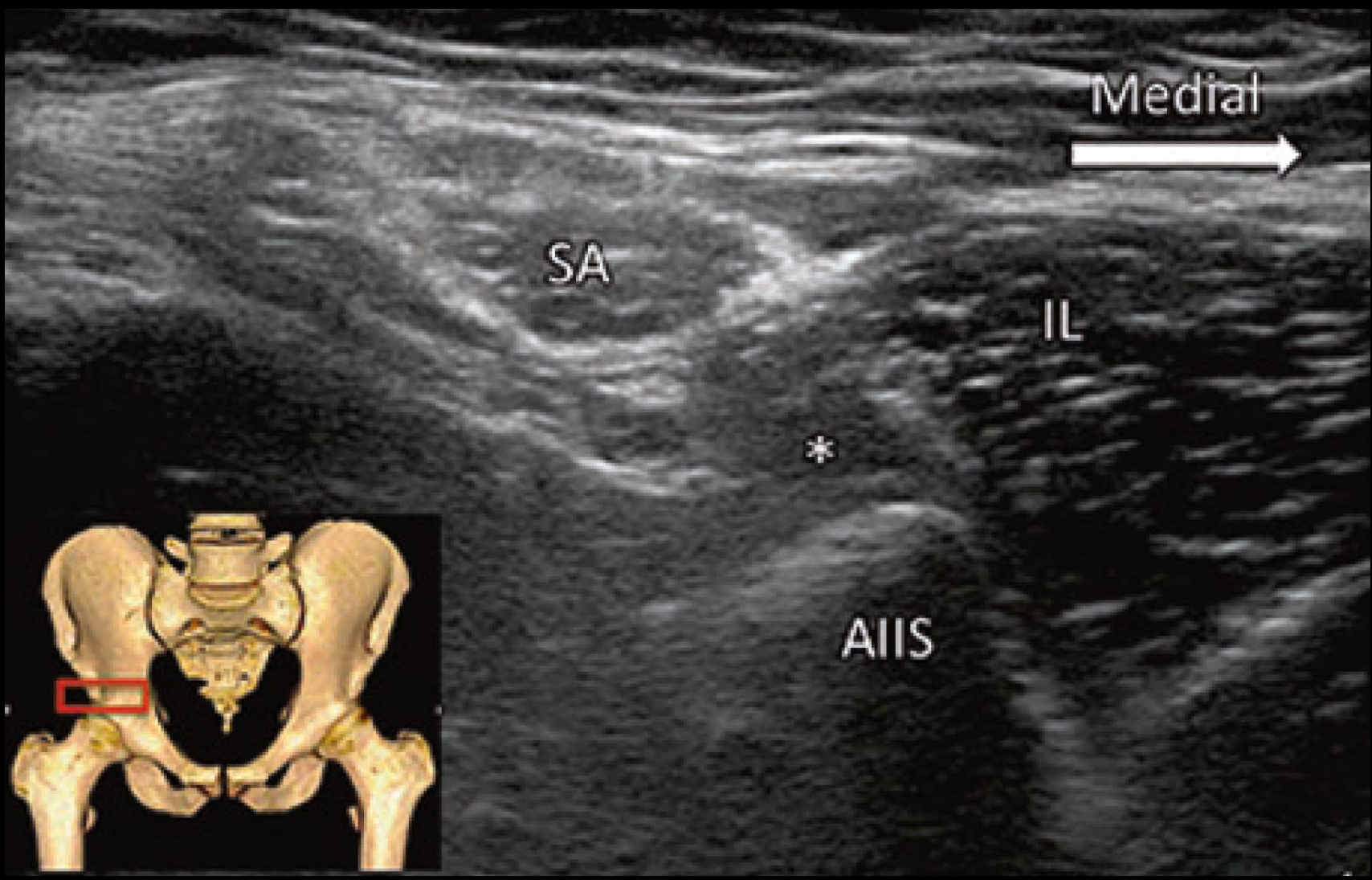


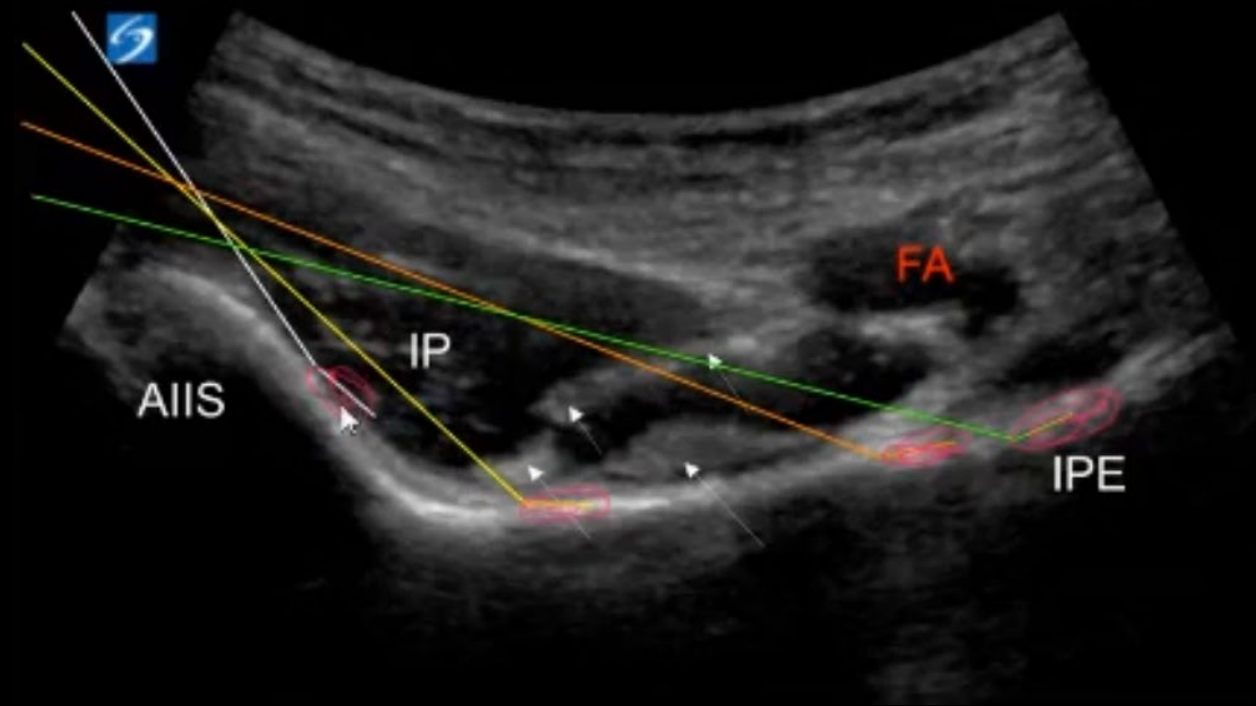
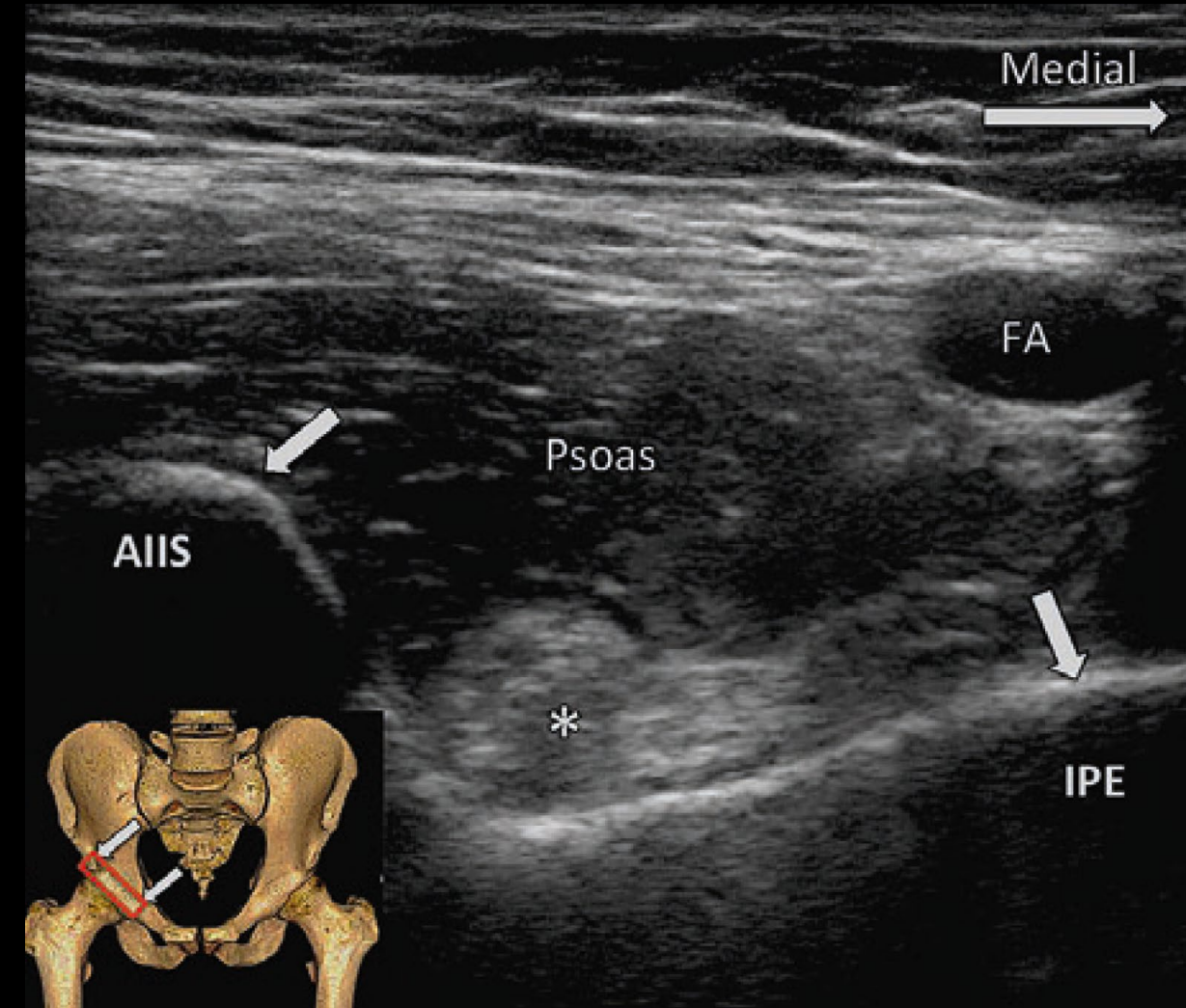
ORIGINAL ARTICLE

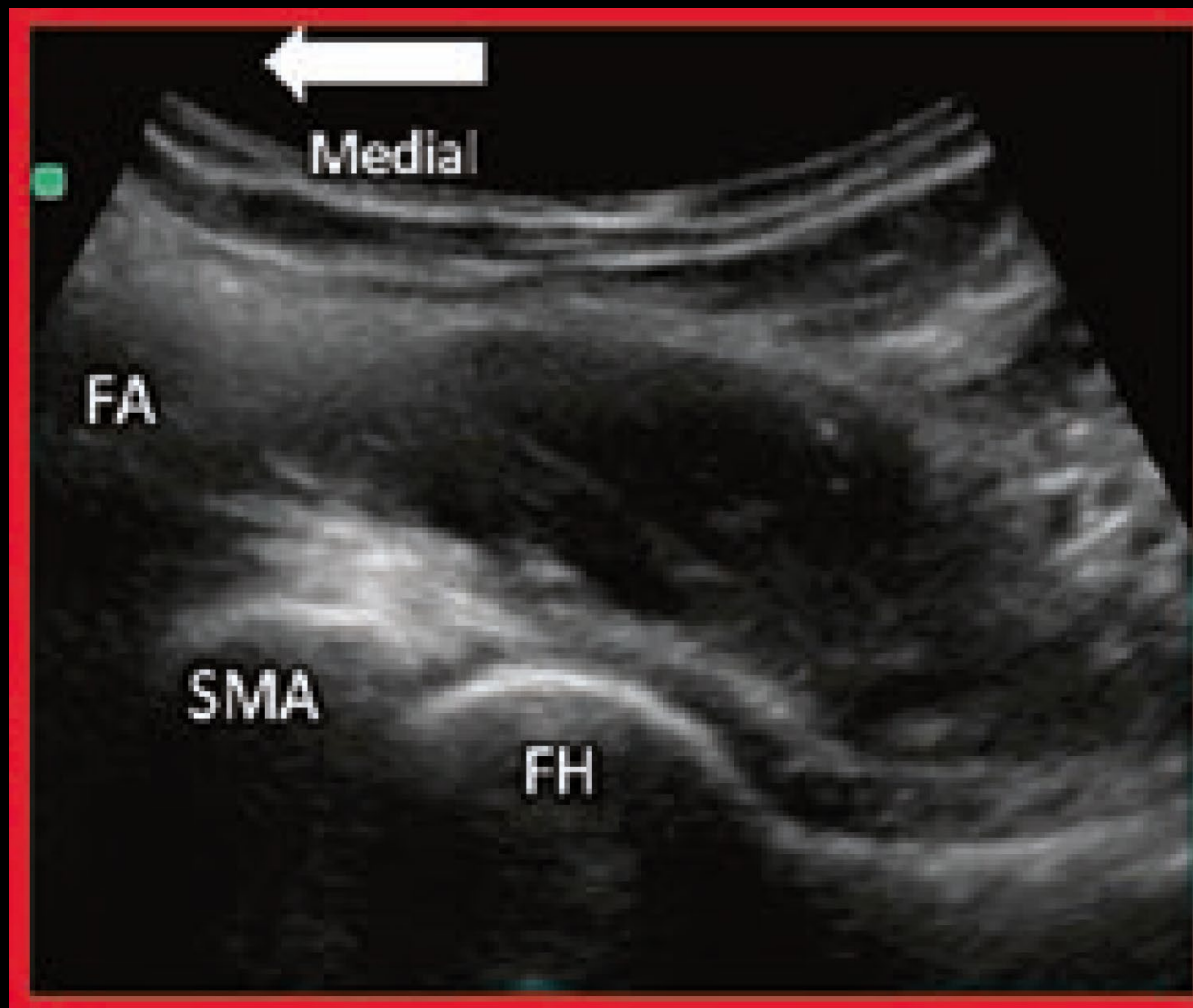
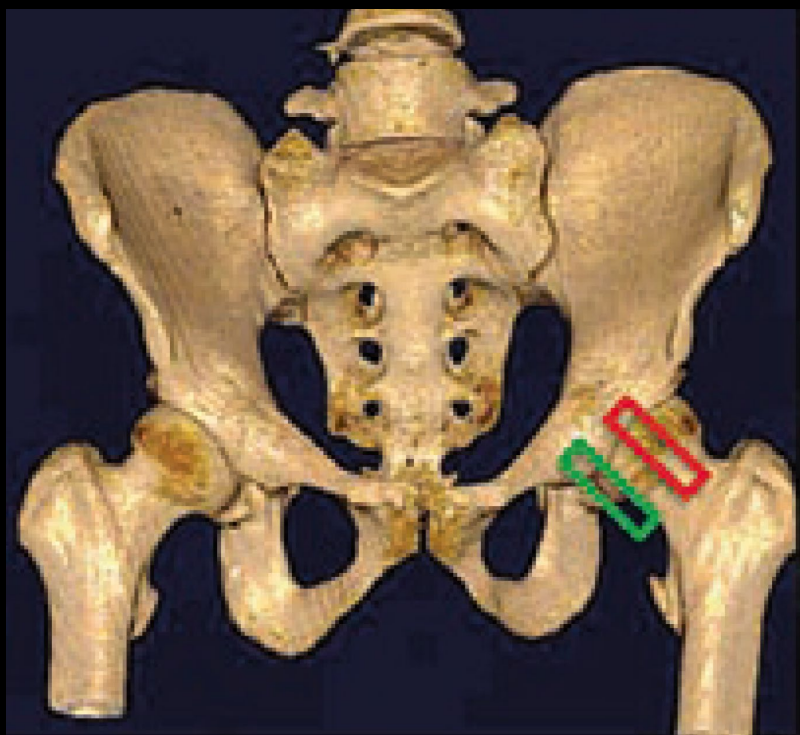
Regional Anesthesia and Pain Medicine • Volume 43, Number 2, February 2018

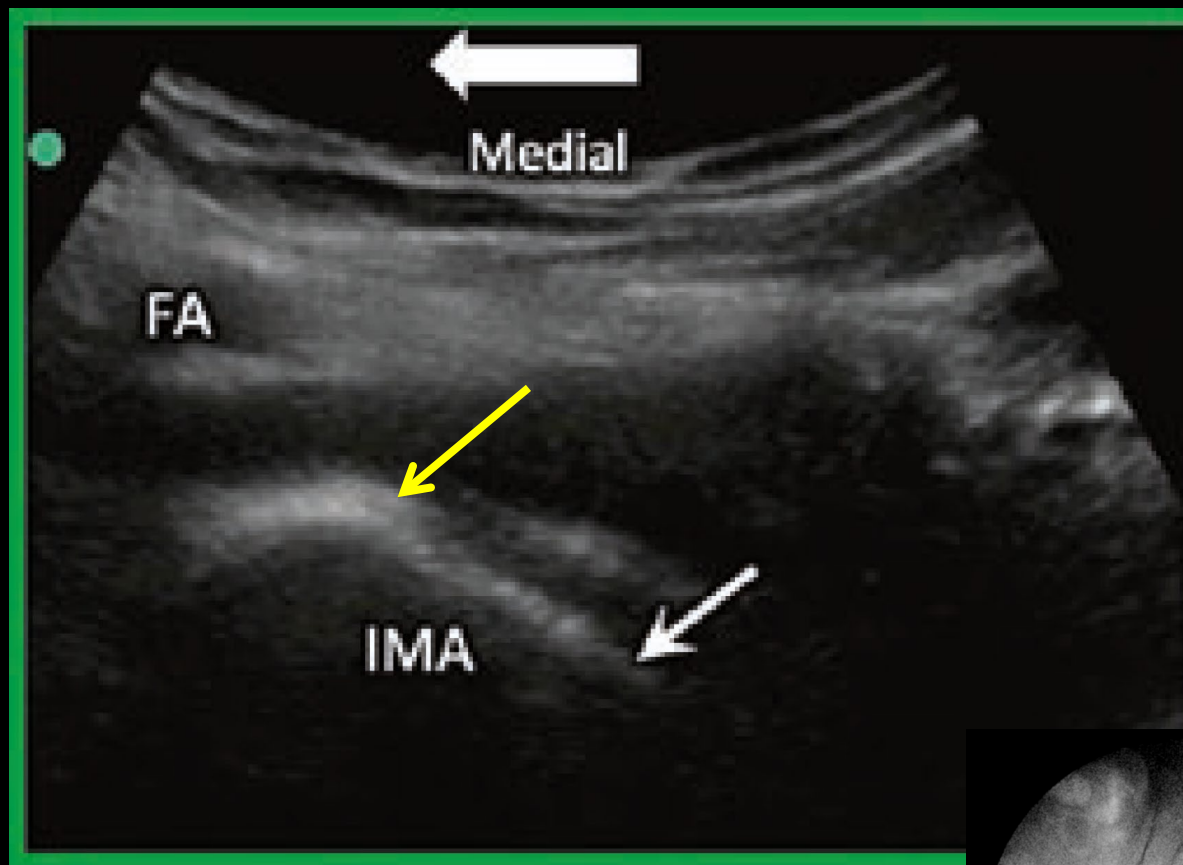
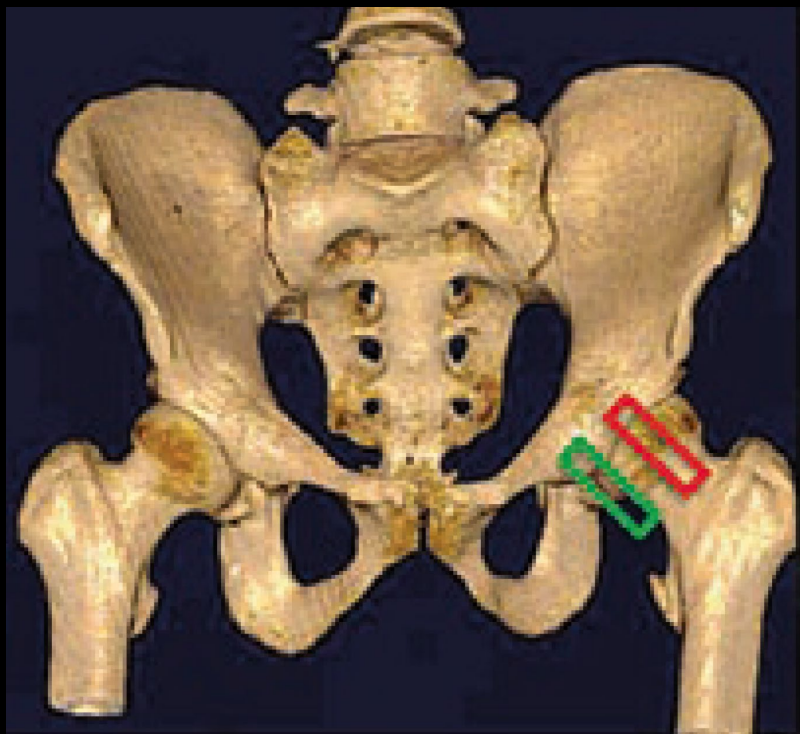
Anatomic Study of Innervation of the Anterior Hip Capsule *Implication for Image-Guided Intervention*





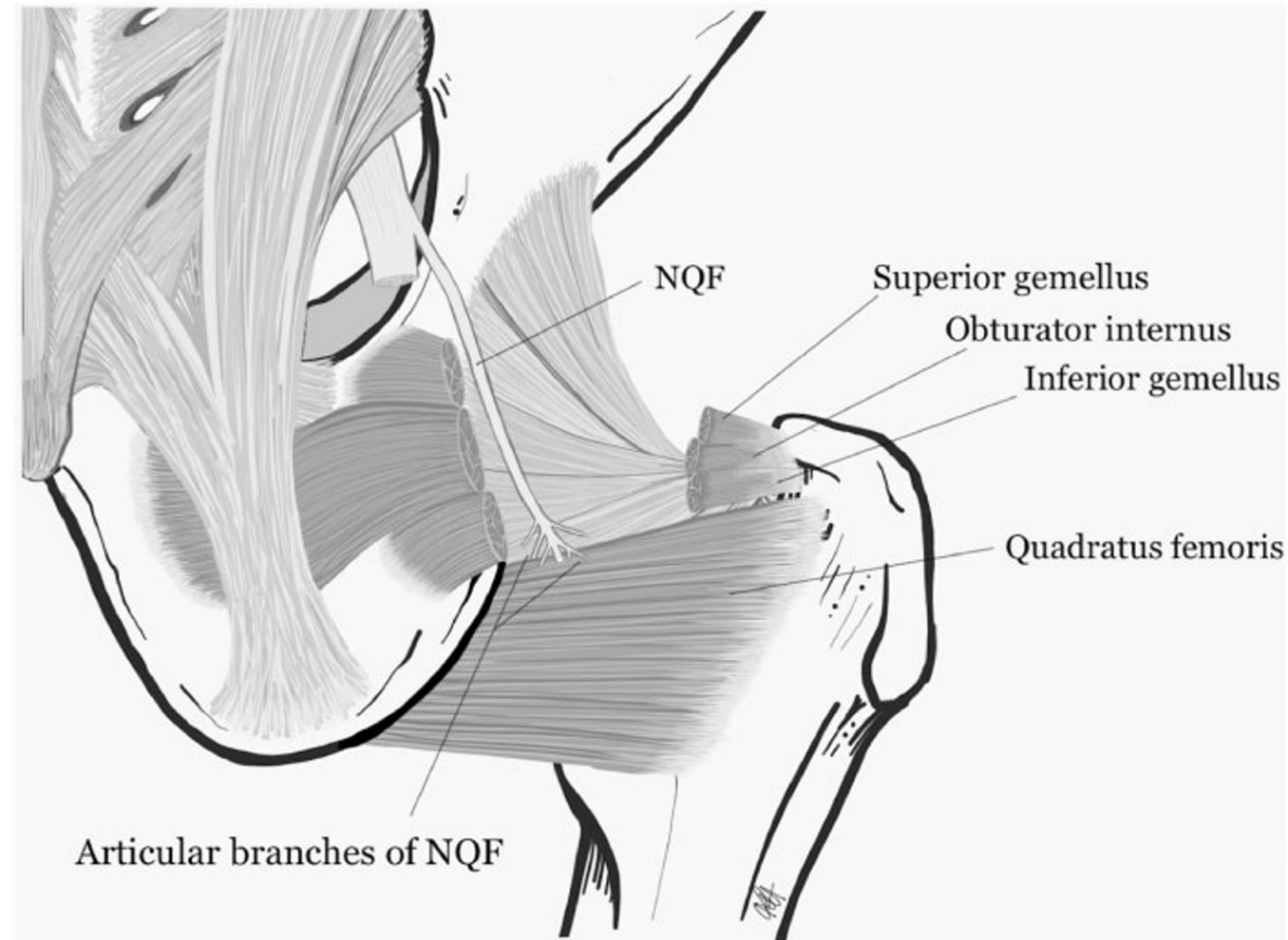




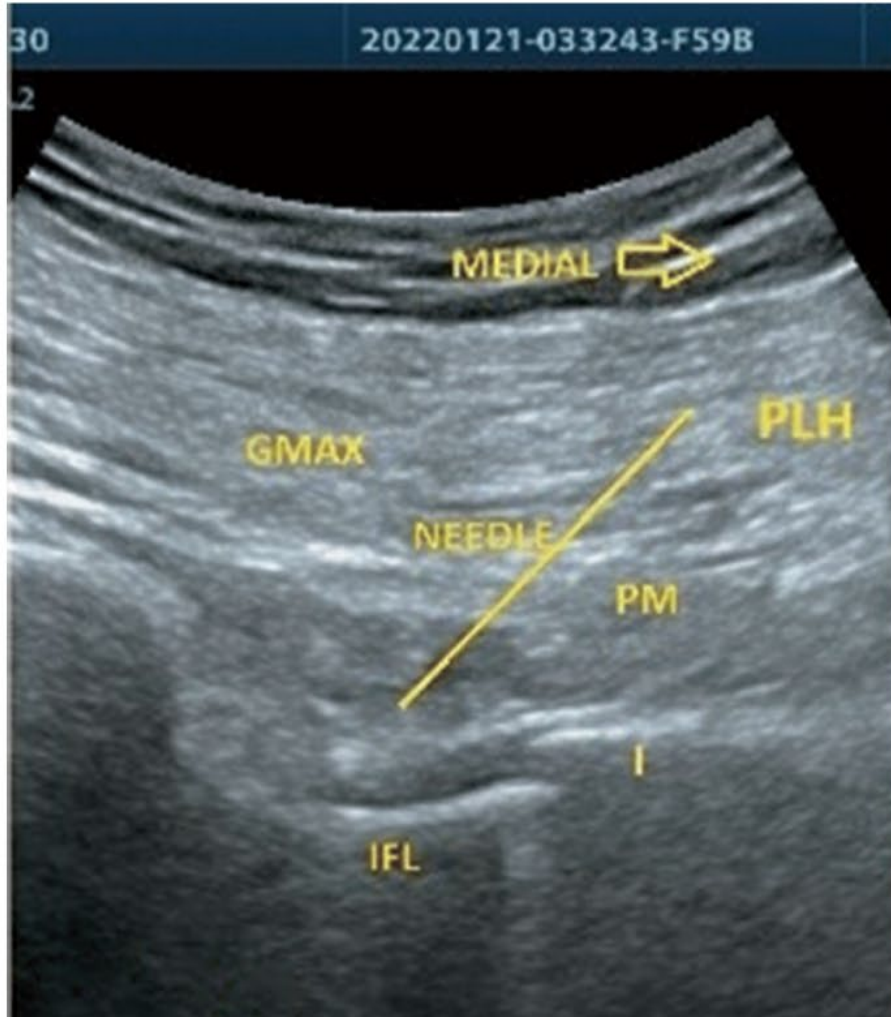


NEUROMODULATION & MINIMALLY INVASIVE SURGERY SECTION

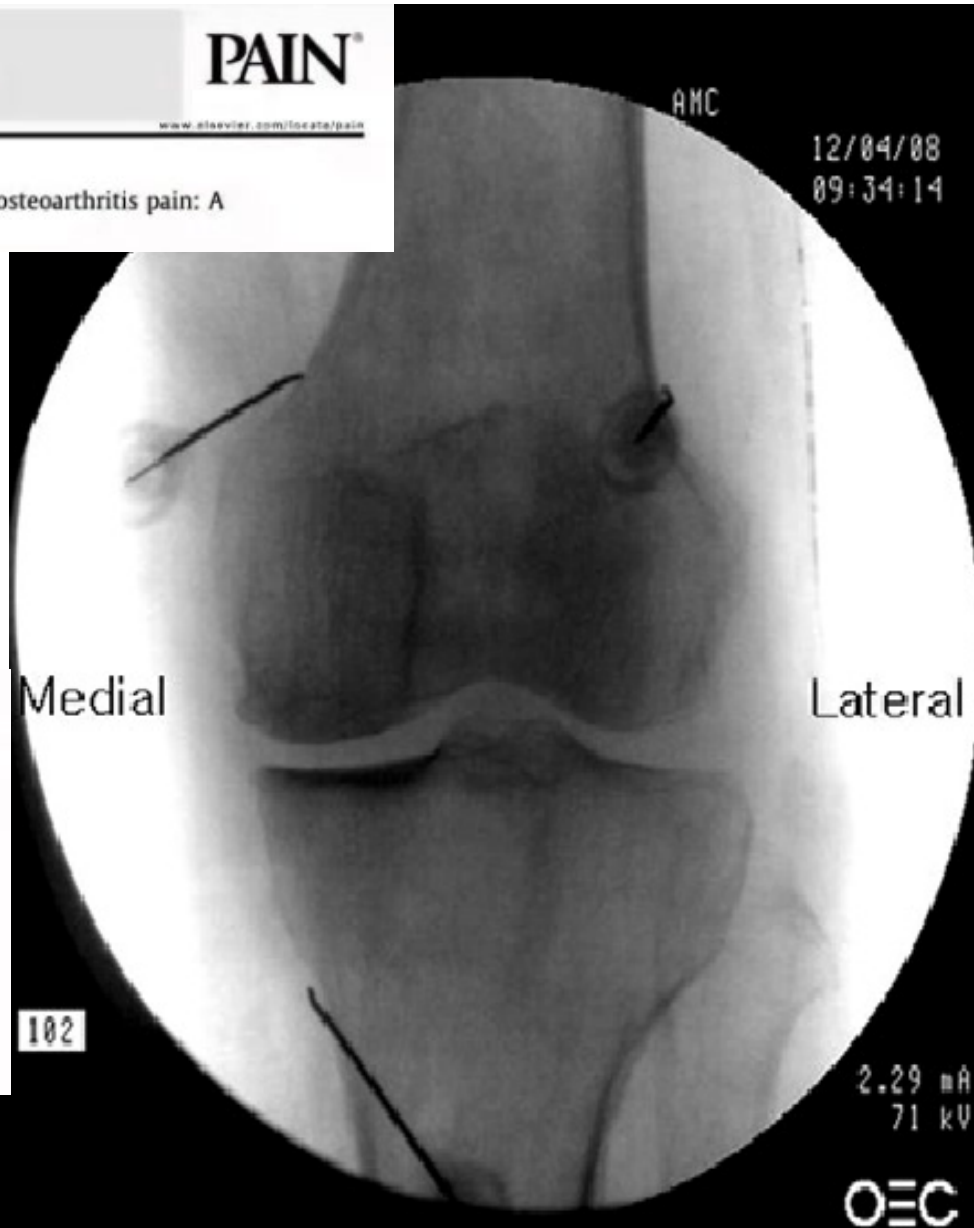
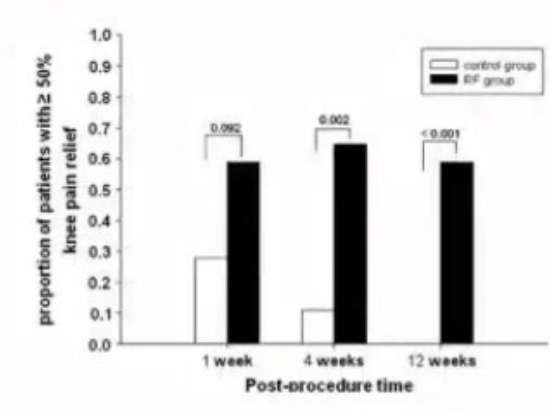
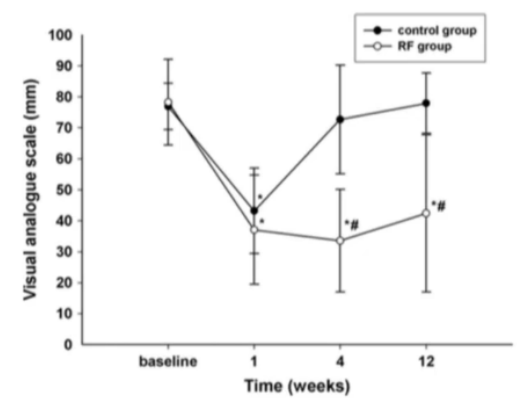
Innervation of the Posterior Hip Capsule: A Cadaveric Study



PENG and PONG radiofrequency for hip chronic pain: another step towards the future



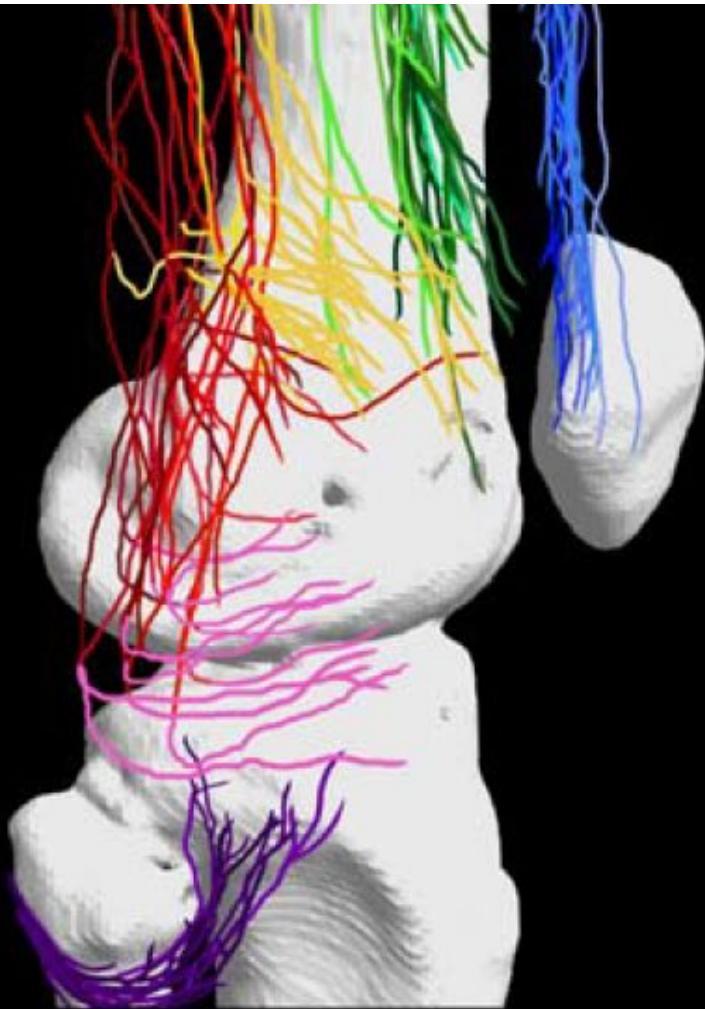
Research papers
Radiofrequency treatment relieves chronic knee osteoarthritis pain: A double-blind randomized controlled trial



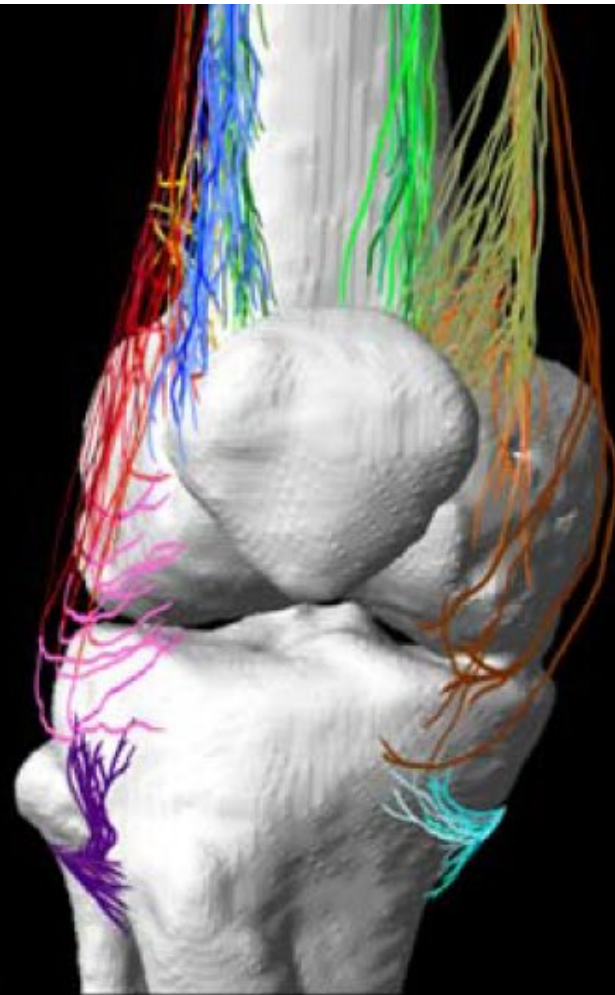
Anatomical Study of the Innervation of Anterior Knee Joint Capsule

Regional Anesthesia and Pain Medicine • Volume 43, Number 4, May 2018

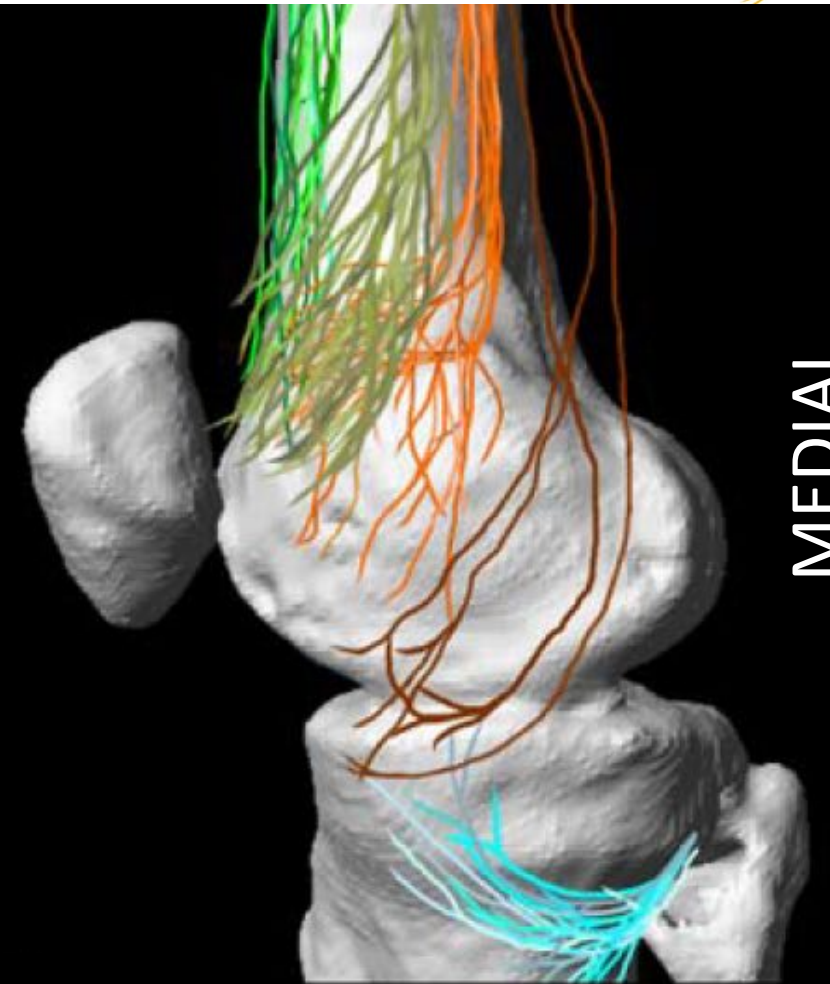
LATERAL













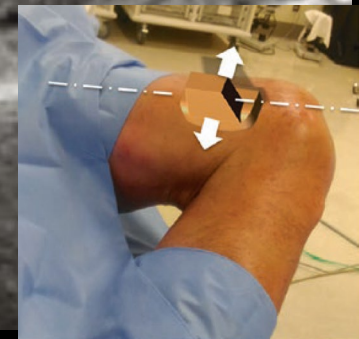
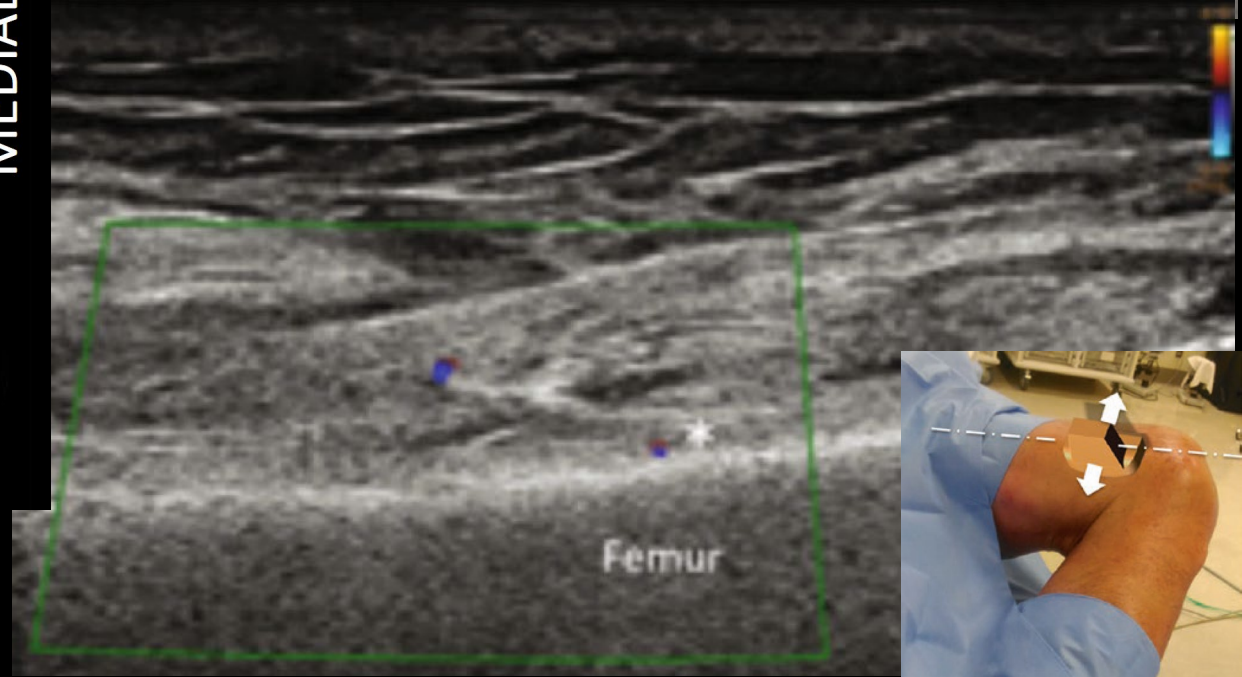
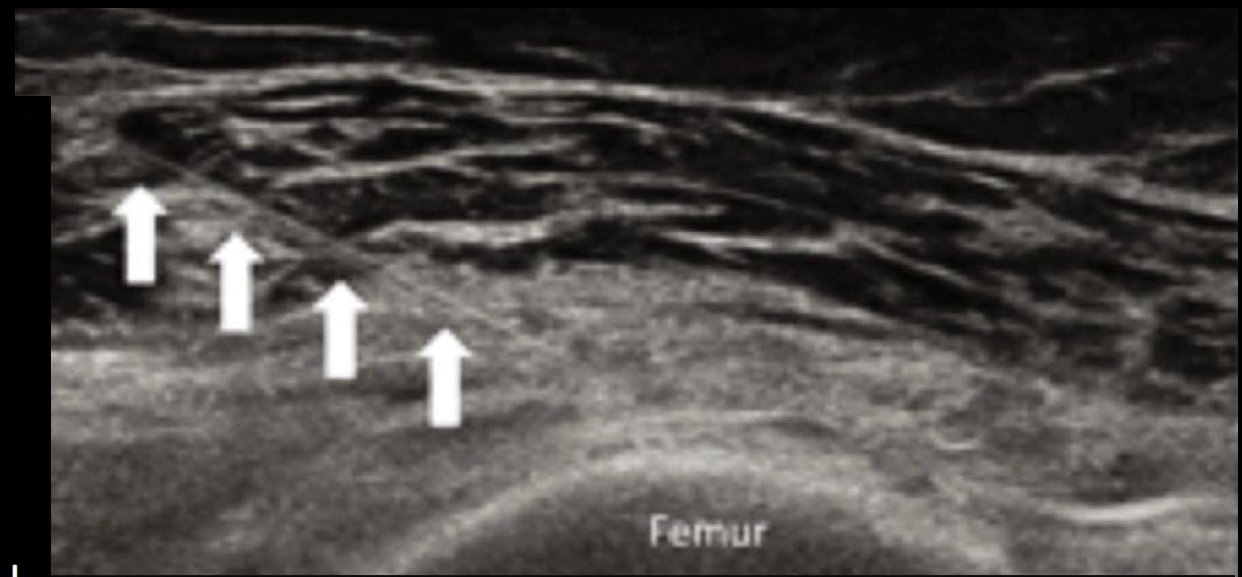
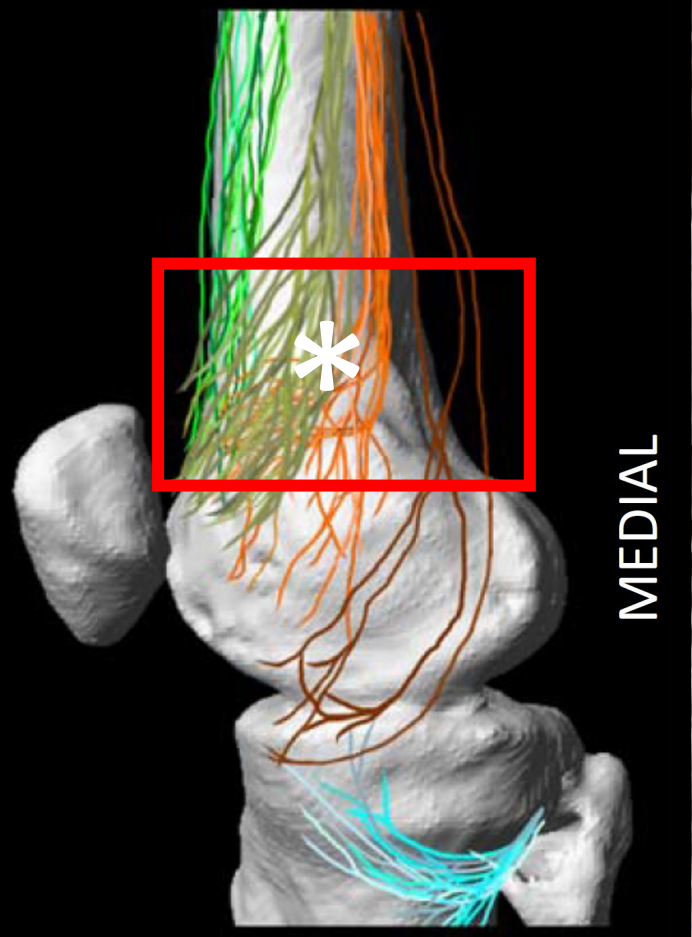
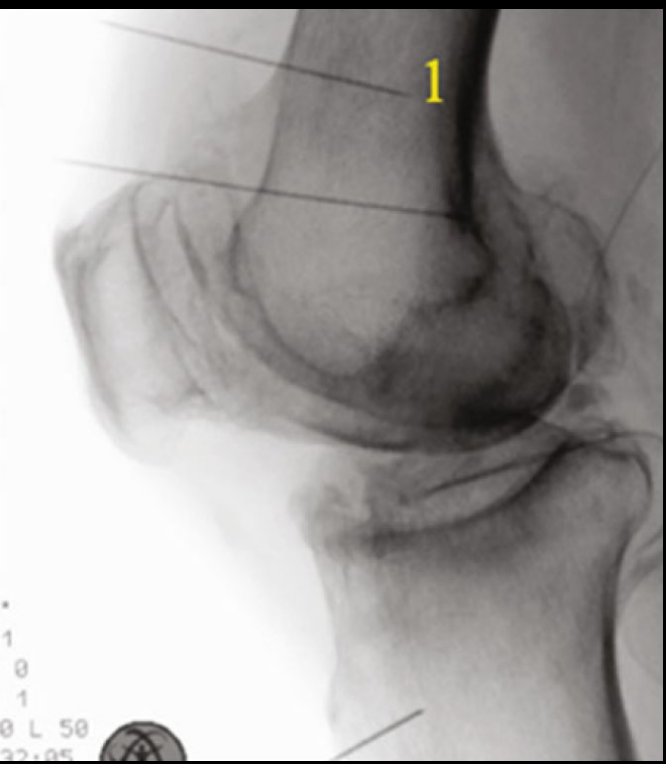
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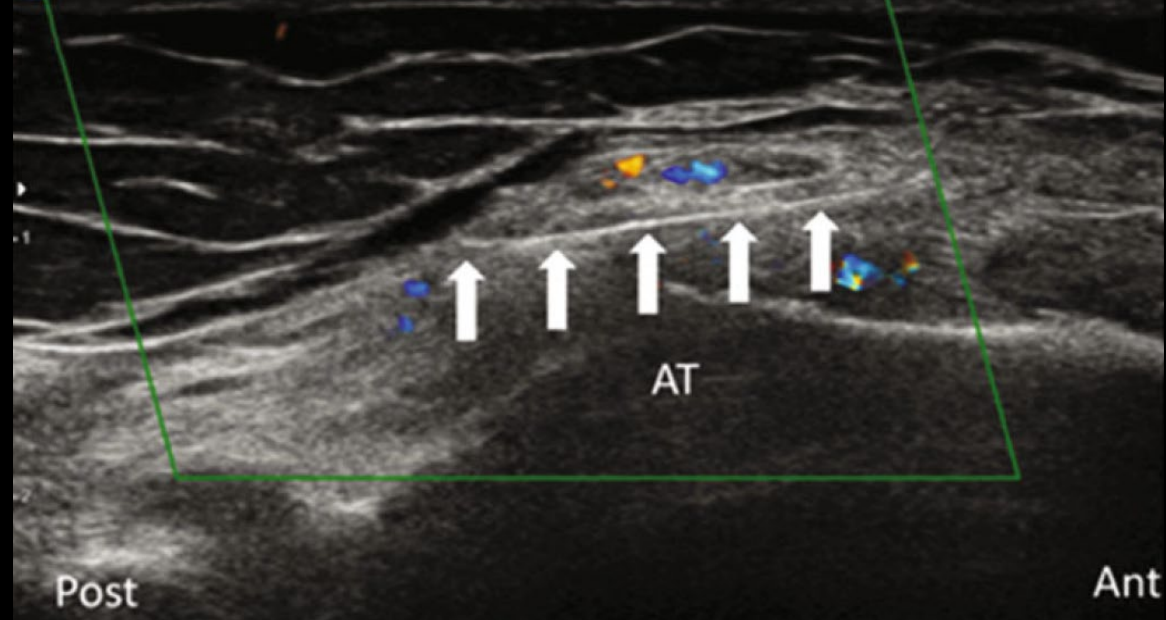
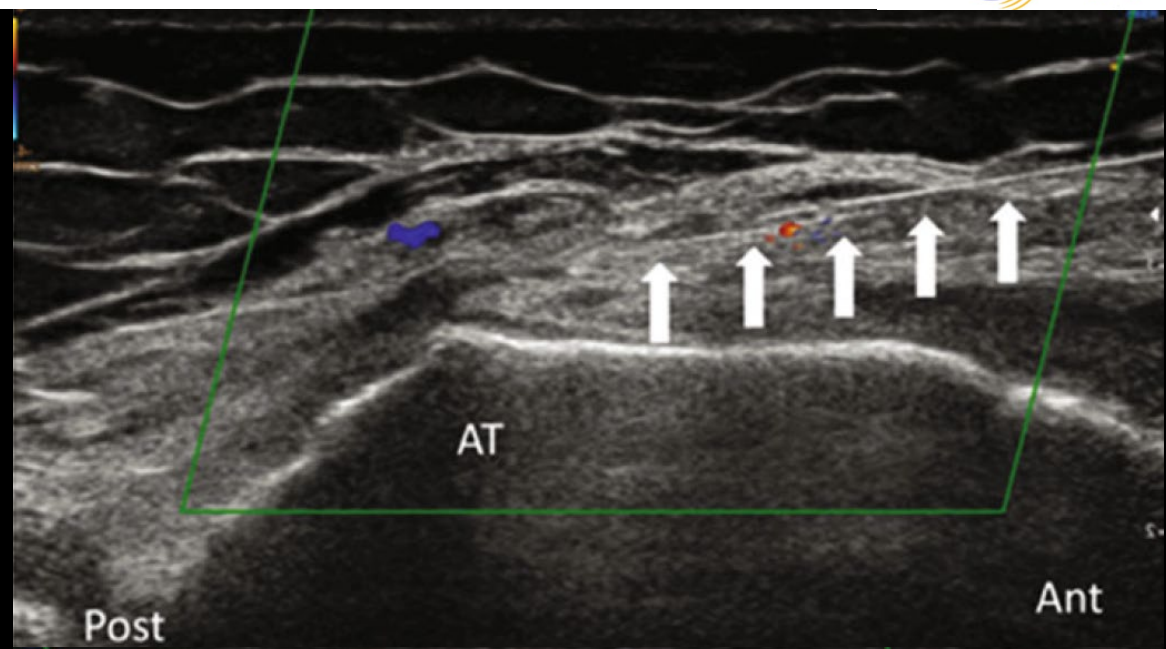
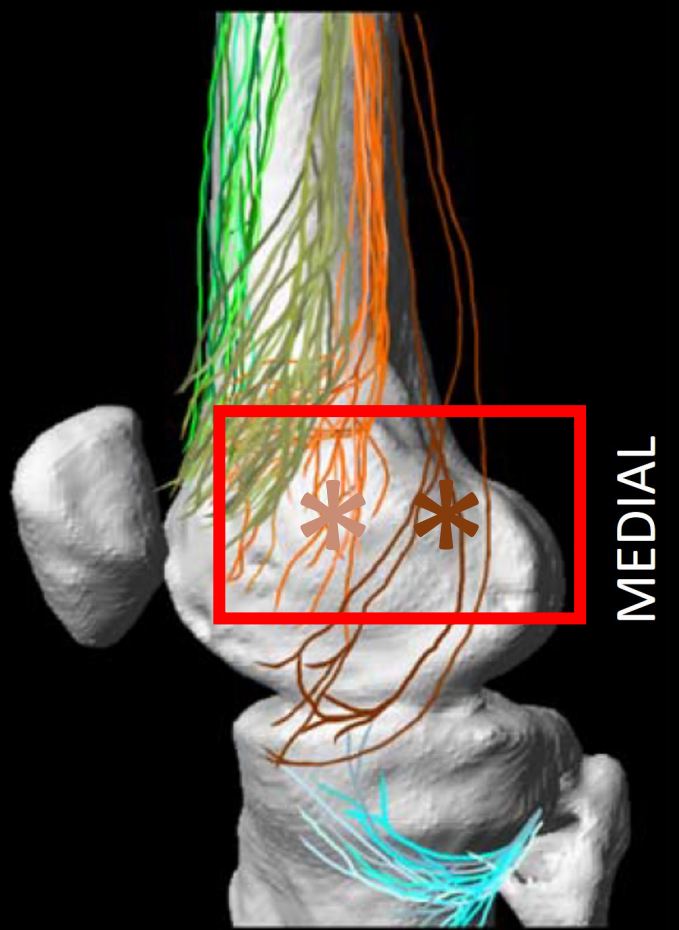
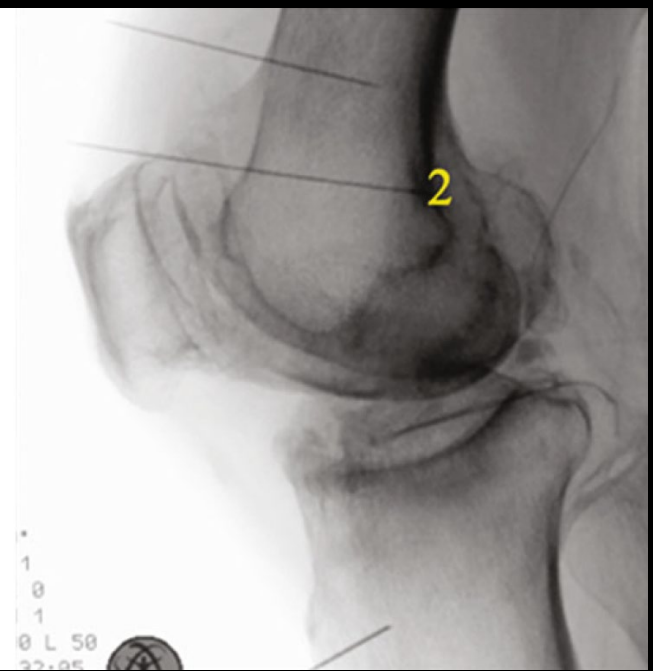


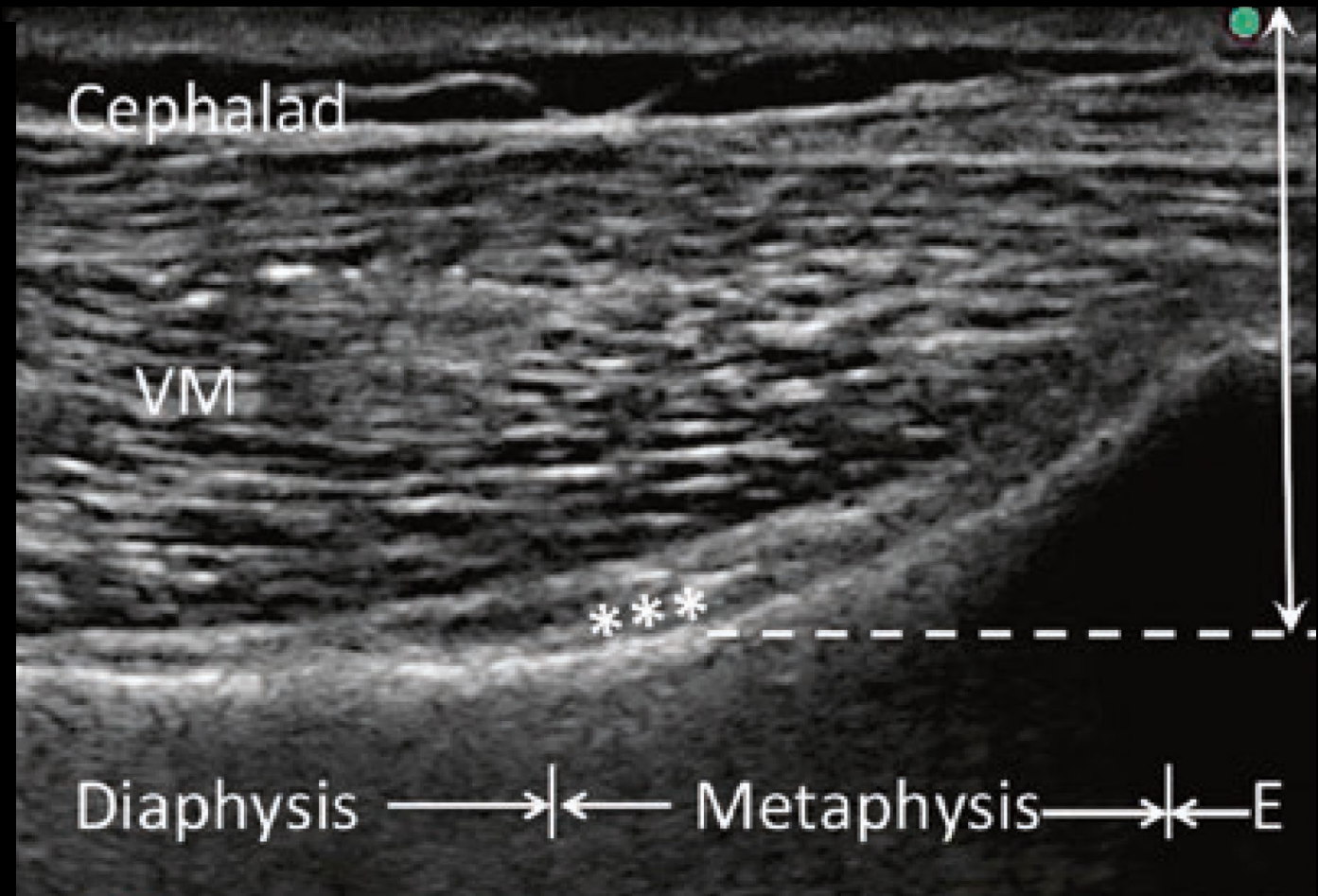
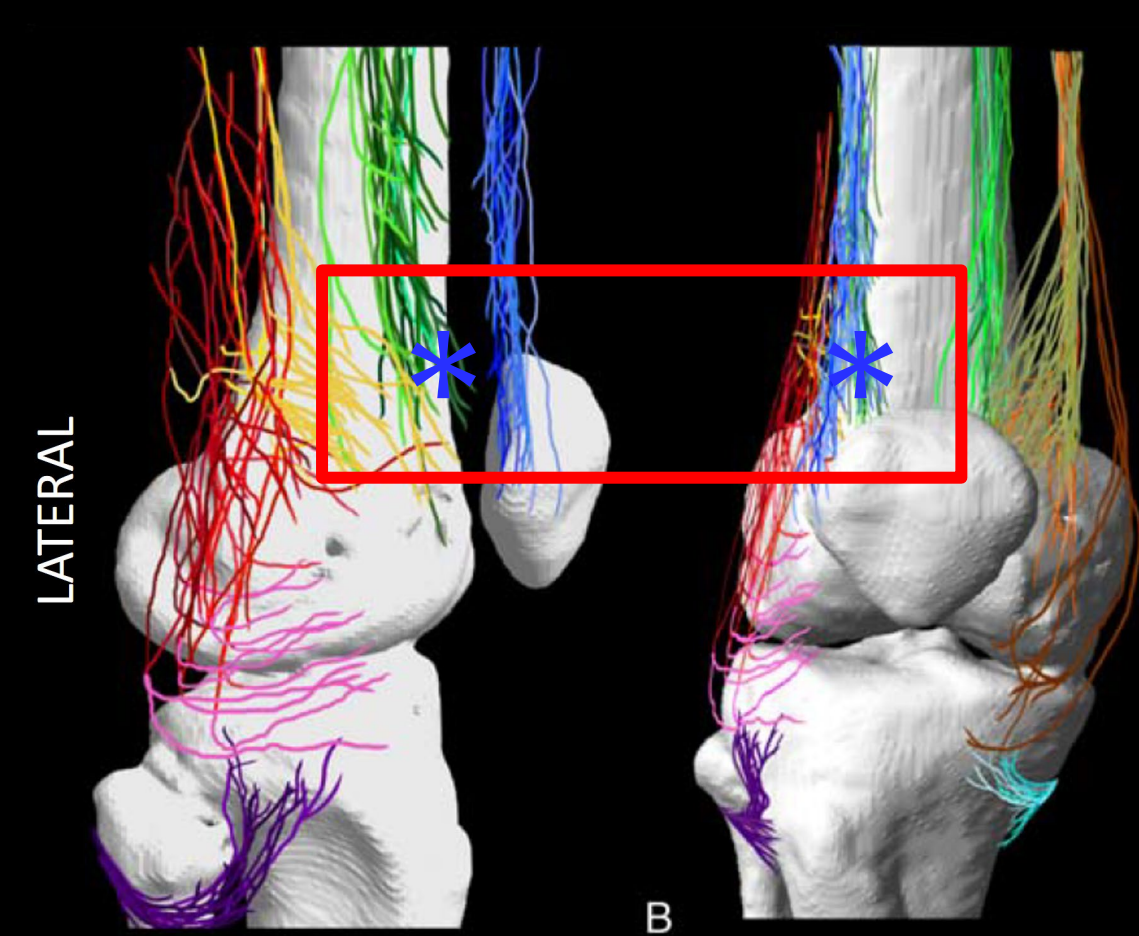
MEDIAL

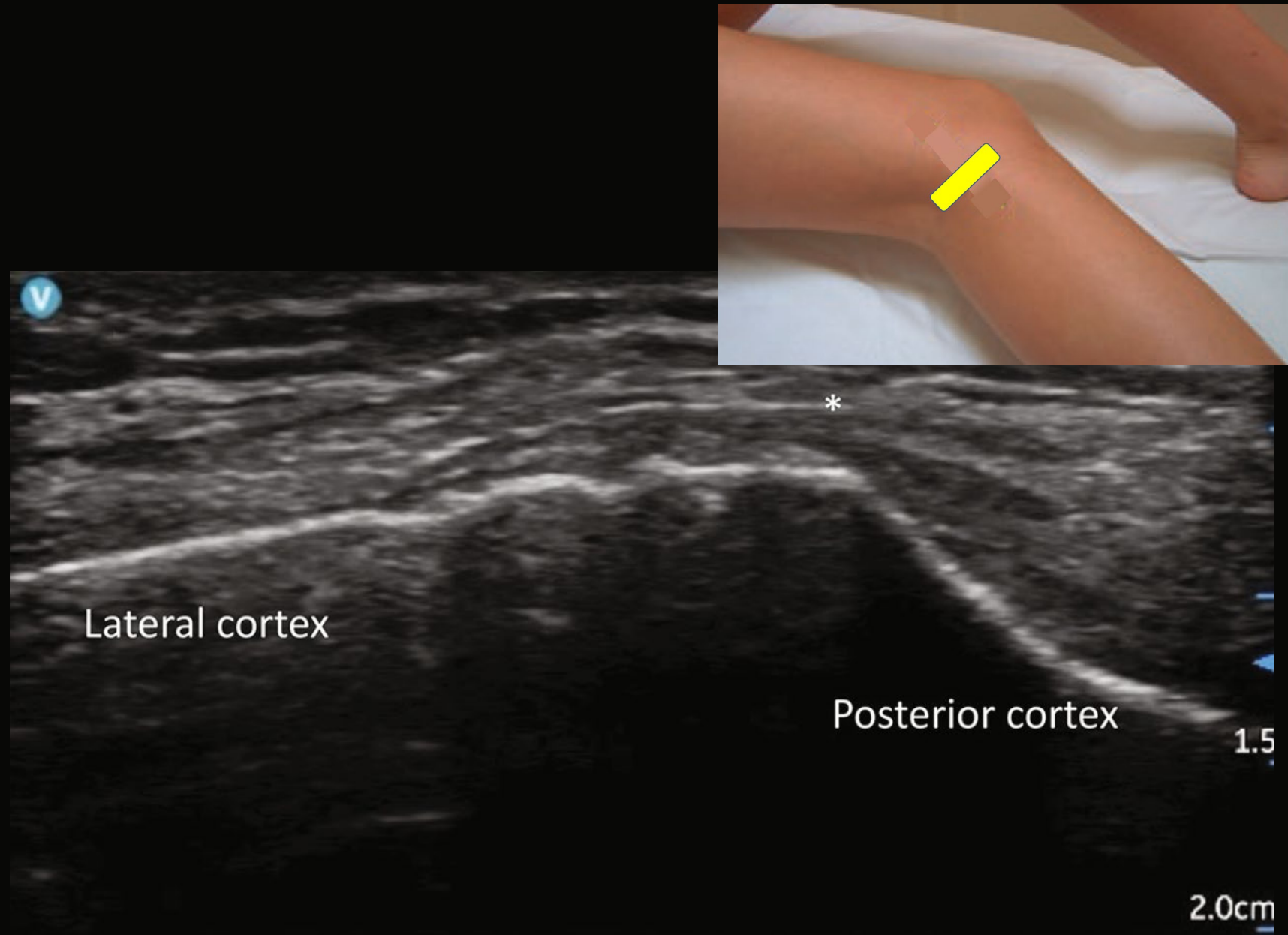
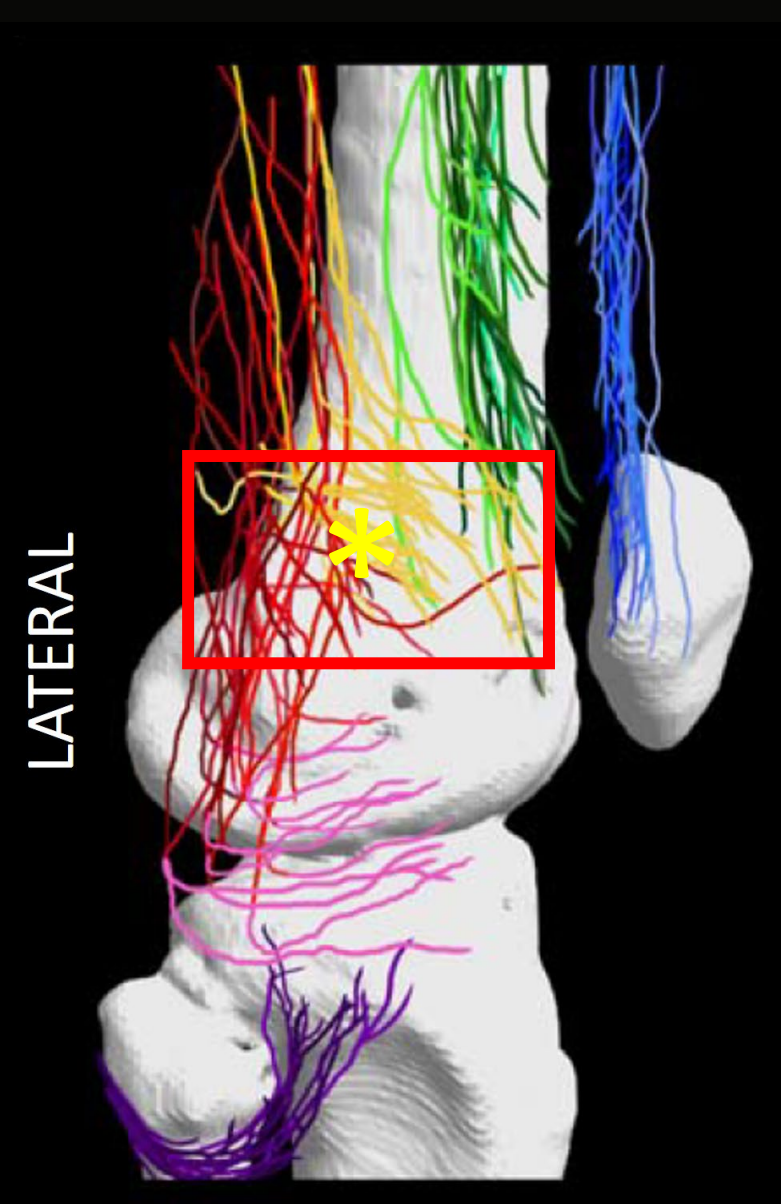


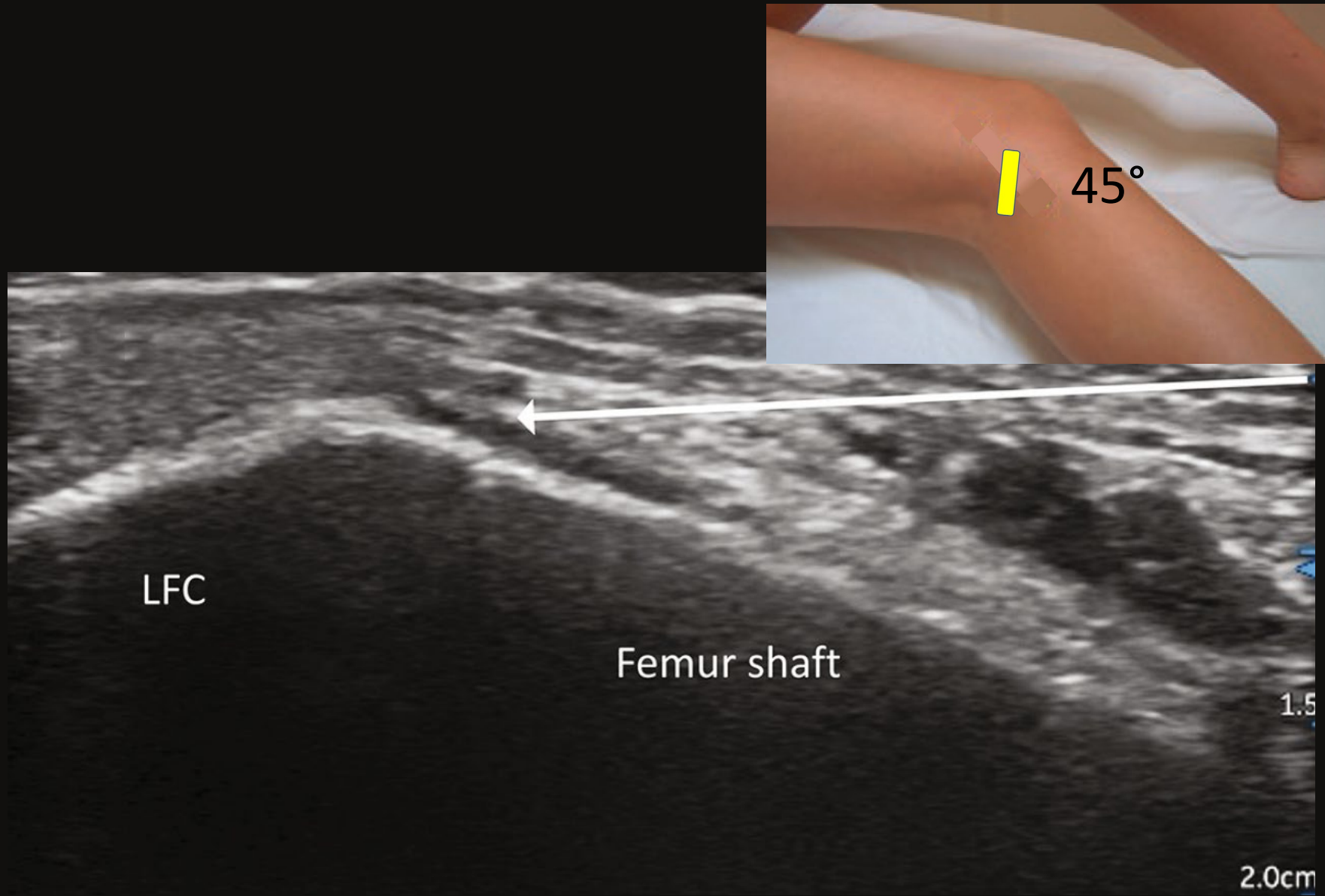
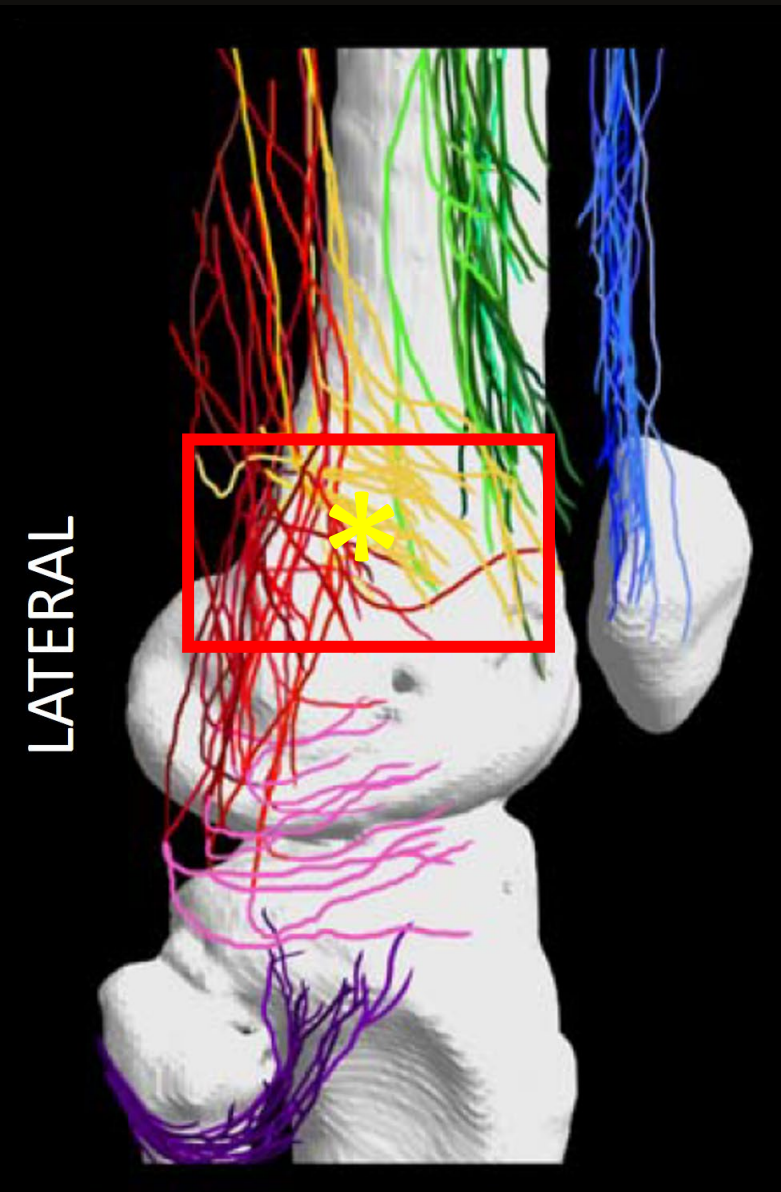
- | | | | | |
|---|---|--|--|---|
|  N. to vastus intermedius |  Superior lateral genicular n. |  Superior medial genicular n. |  Common fibular n. |  N. to vastus medialis |
|  N. to vastus lateralis |  Inferior lateral genicular n. |  Inferior medial genicular n. |  Recurrent fibular n. |  Infrapatellar br. of saphenous n. |

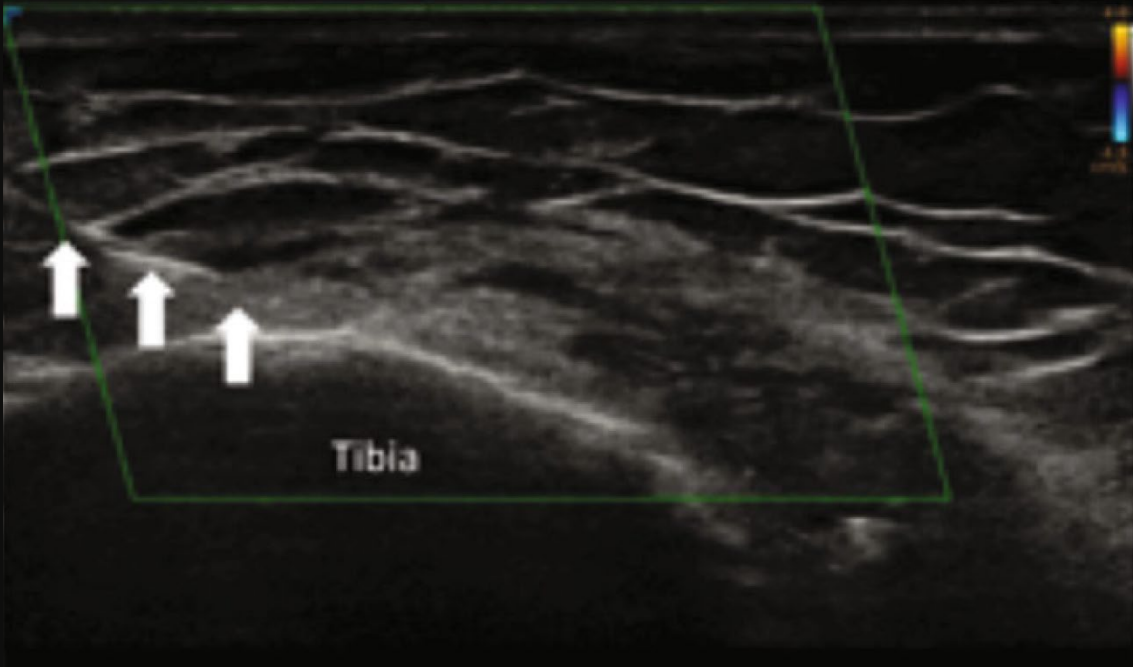
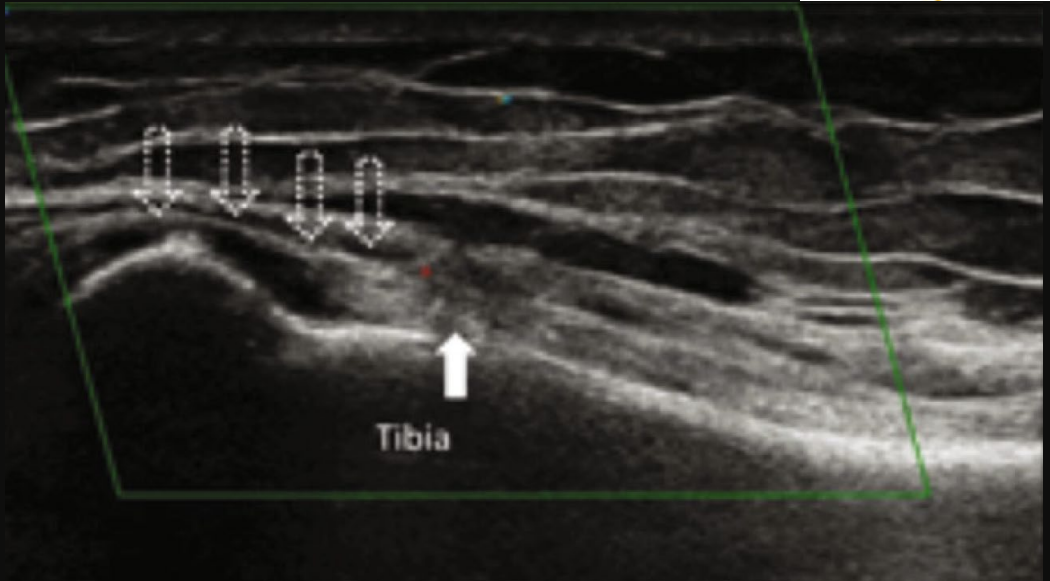
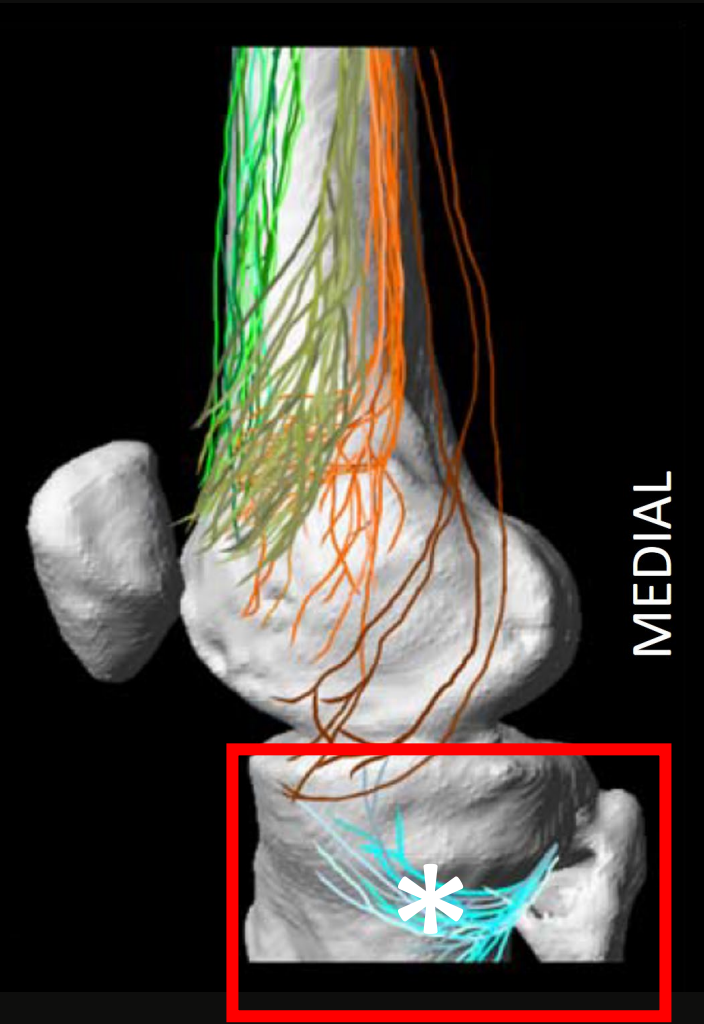
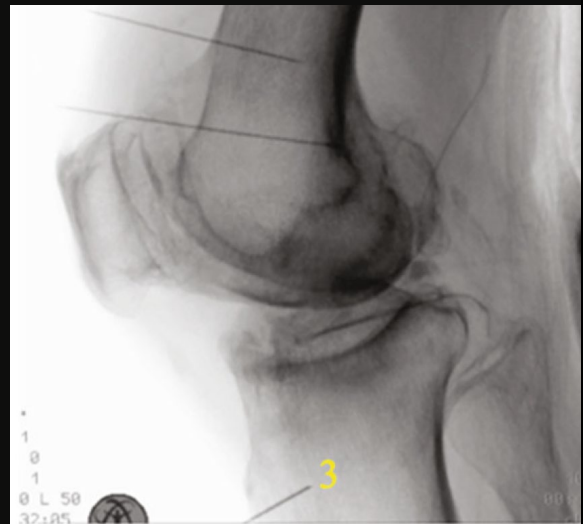


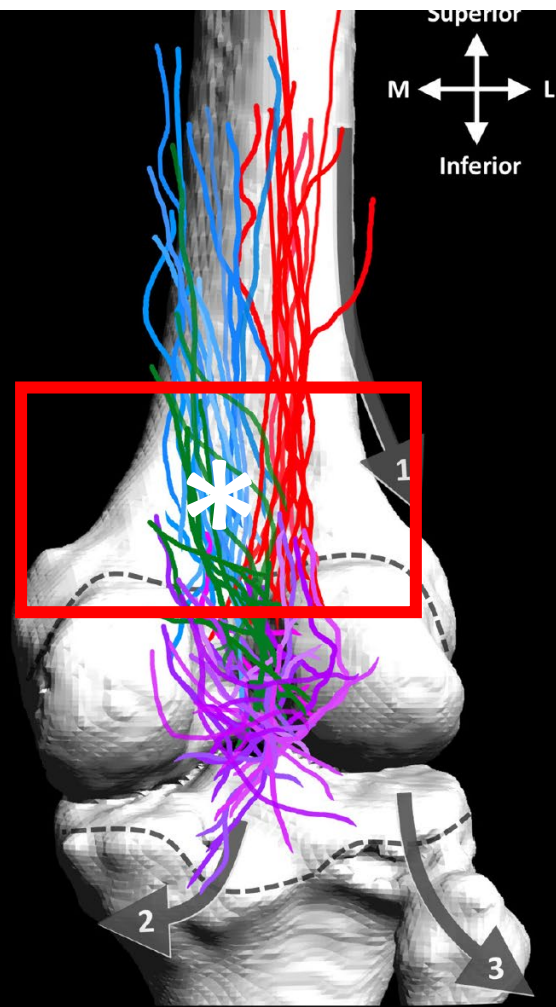




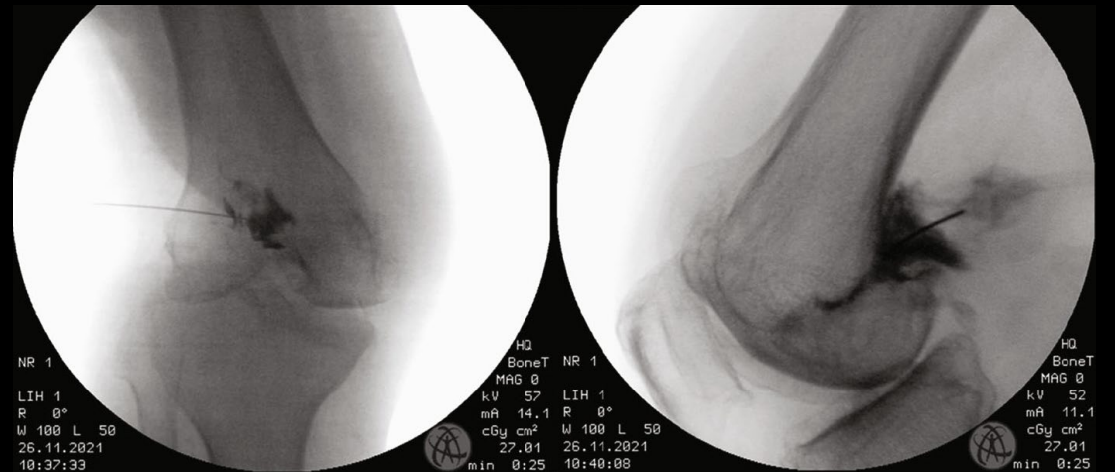
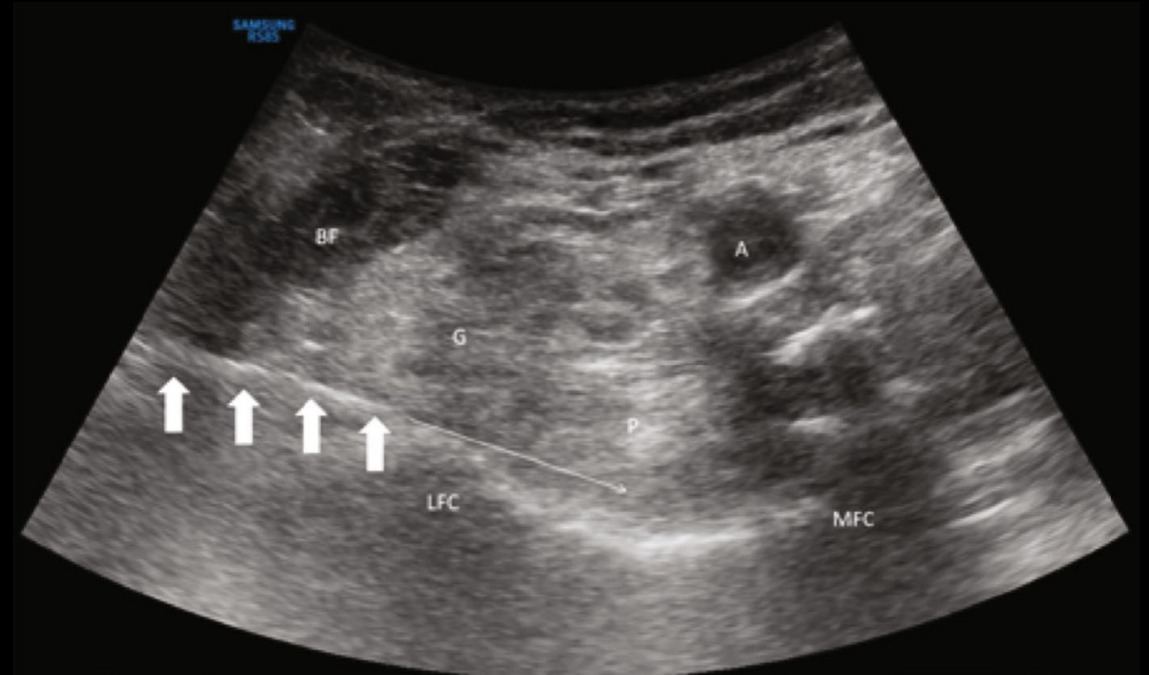









- Posterior br. common fibular/sciatic n.
- Posterior div. obturator n.
- Superior br. tibial n.
- Inferior br. tibial n.



TAKE HOME MESSAGES

1. Temperature-mediated Neuromodulation appears to be a safe and effective treatment for chronic joint pain
 2. There are c
mediated I
 3. There are r
efficacy of
 4. Anatomica
 5. US could be an important tool in the management of joint pain
- temperature-
safety and
- 



*7-9
Novembre
2024*



**Ci vediamo al prossimo
Congresso**

info@sonopain.com

