
WORLD INSTITUTE OF PAIN®
WIP
29th Annual Gabor Racz
Advanced Interventional
Pain Conference and Workshop
Budapest, Hungary August 24-26, 2026
Cryoneurolysis in
Pain Medicine
Andrea Trescot MD ABIPP
FIPP CIPS

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Conflict of Interest

Andrea Trescot, MD, ABIPP, FIPP, CIPS

Former Professor, University of Washington

Former Director, Pain Fellowship Program, University of Washington and University of Florida

Past President, American Society of Interventional Pain Physicians

East Coast Elite Care – Jacksonville, FL USA

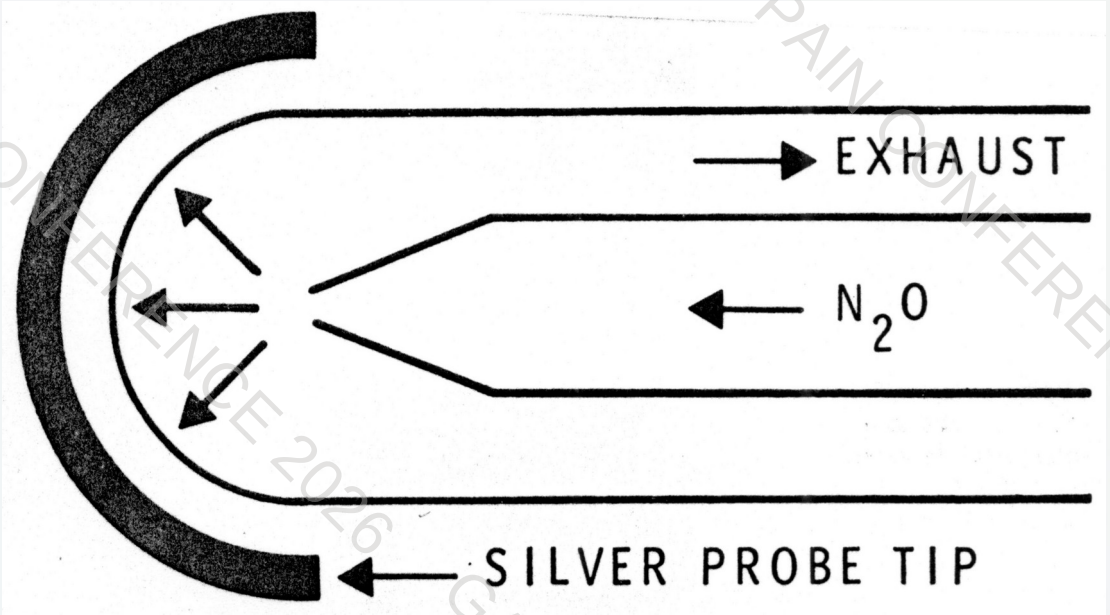
Chief Medical Officer - Curonix

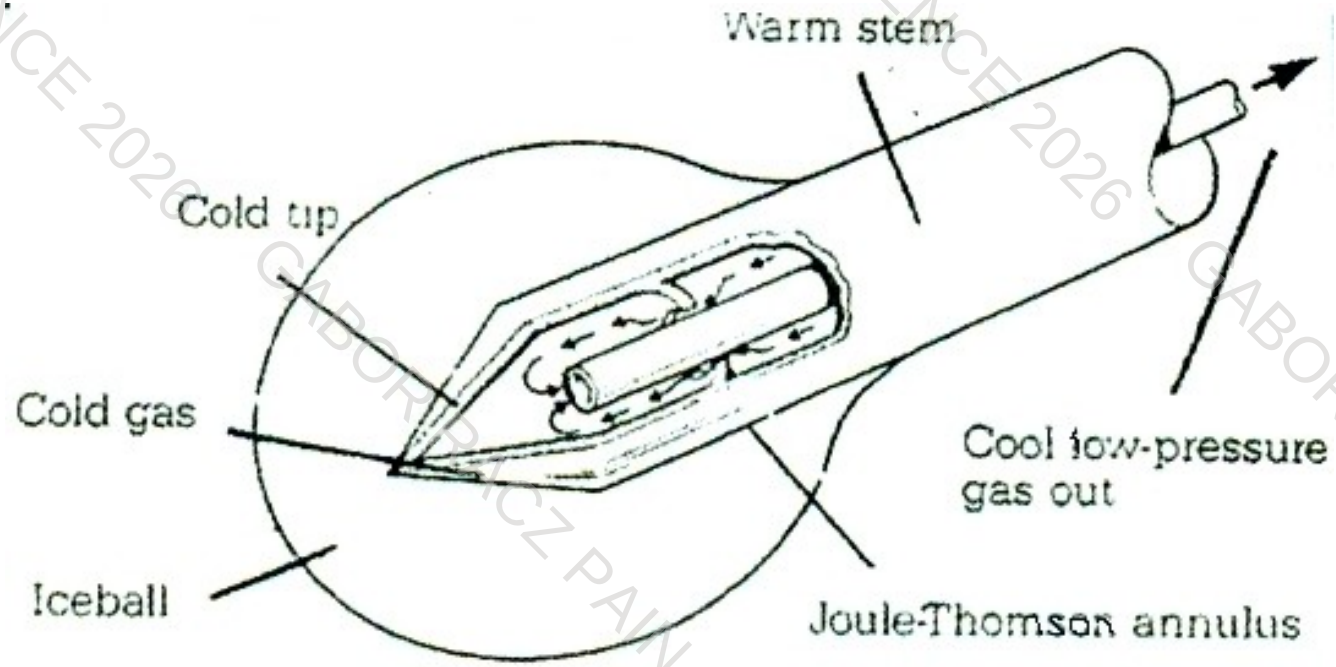
History

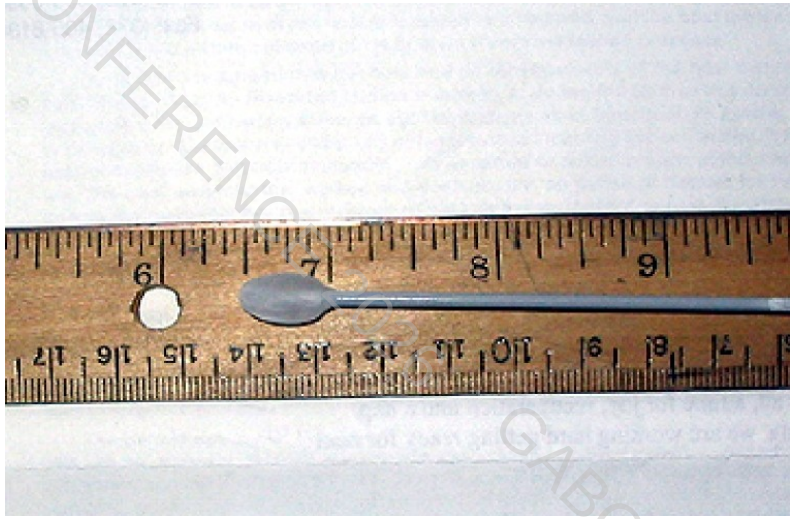
- 1777 John Hunter described tissue destruction after cooling rooster combs. Noted good healing and recovery
- 1919 W. Trendelenburg noted freezing caused severe damage to nerves
  - Prolonged loss of function but eventual healing without scarring
- 1961 Cooper developed 1st cryo probe
- 1976 Lloyd coined the term “cryo-analgesia”

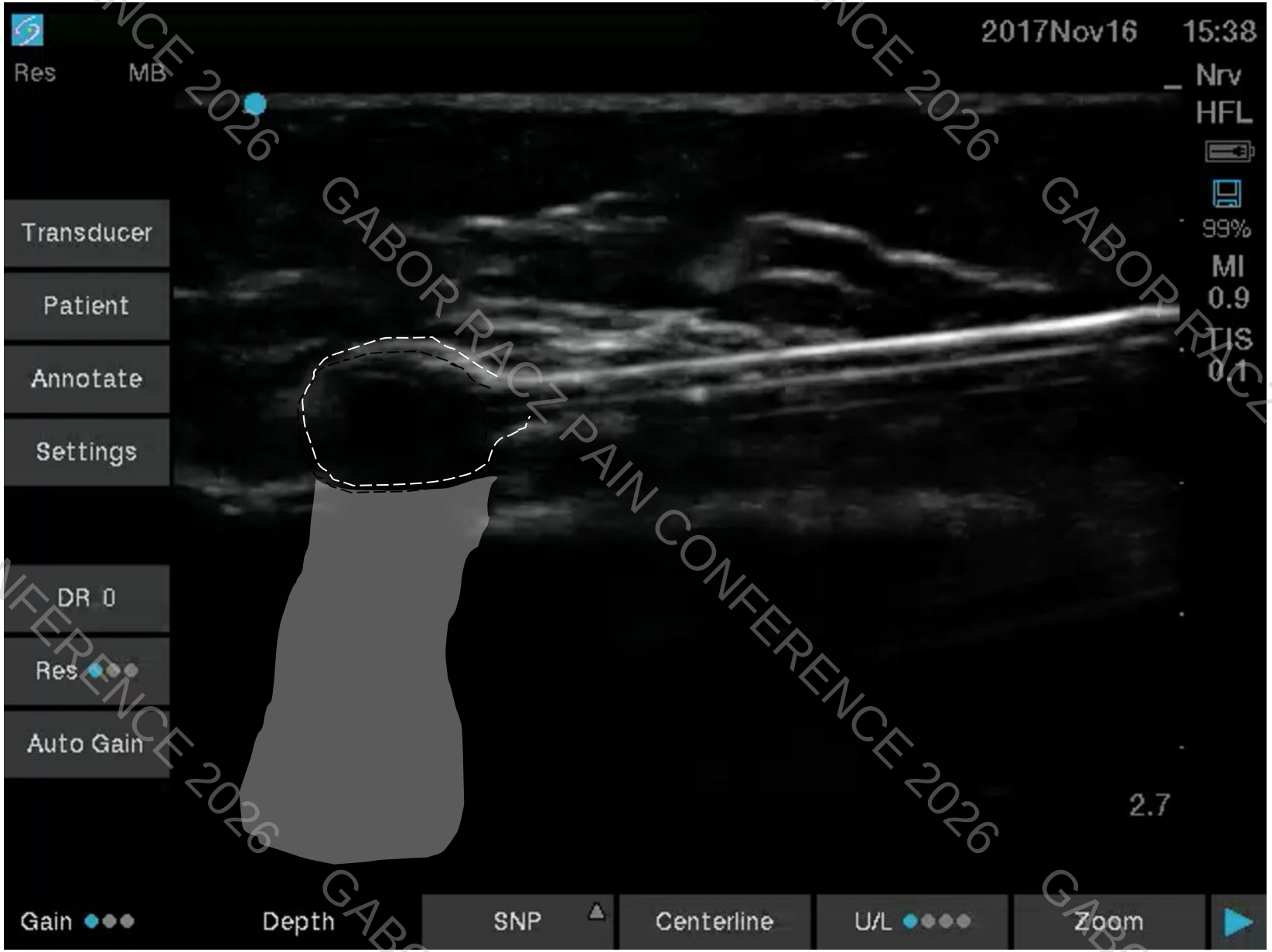
Cryo Physics

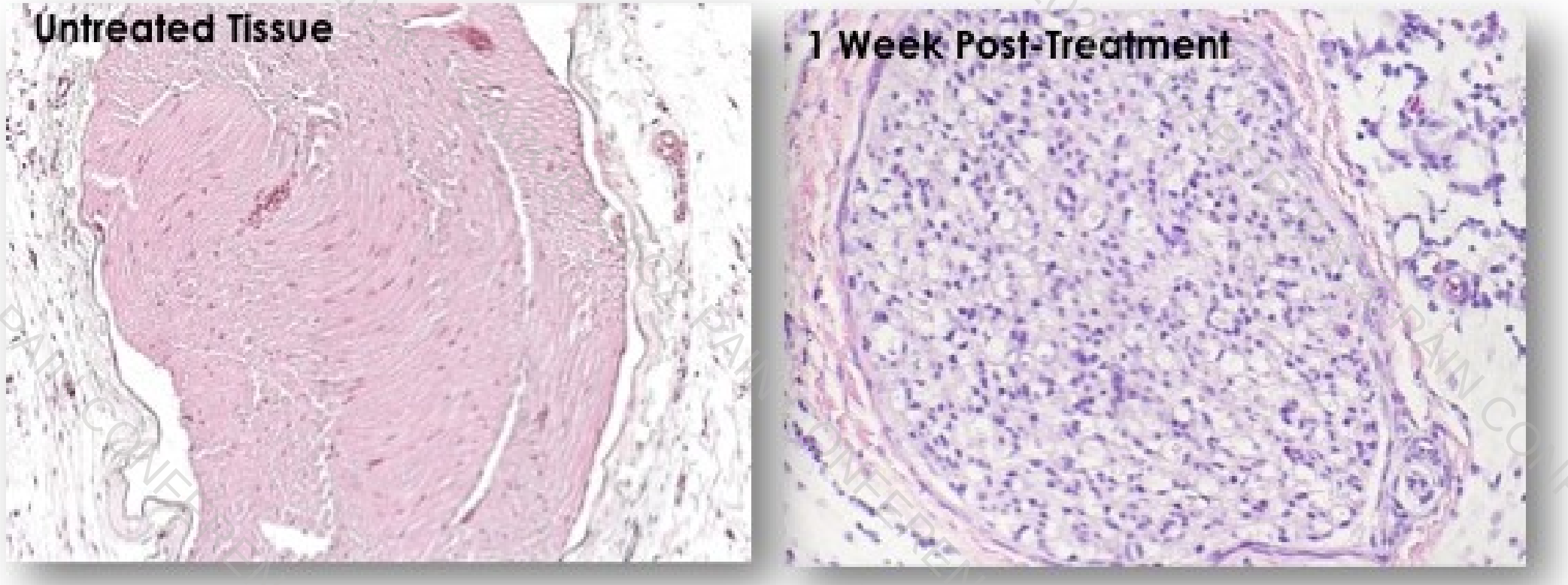
- A compressed gas (CO2 or nitrous) is released through a tiny opening and expands
- The tip goes to -70°C (Joules-Thomson effect)



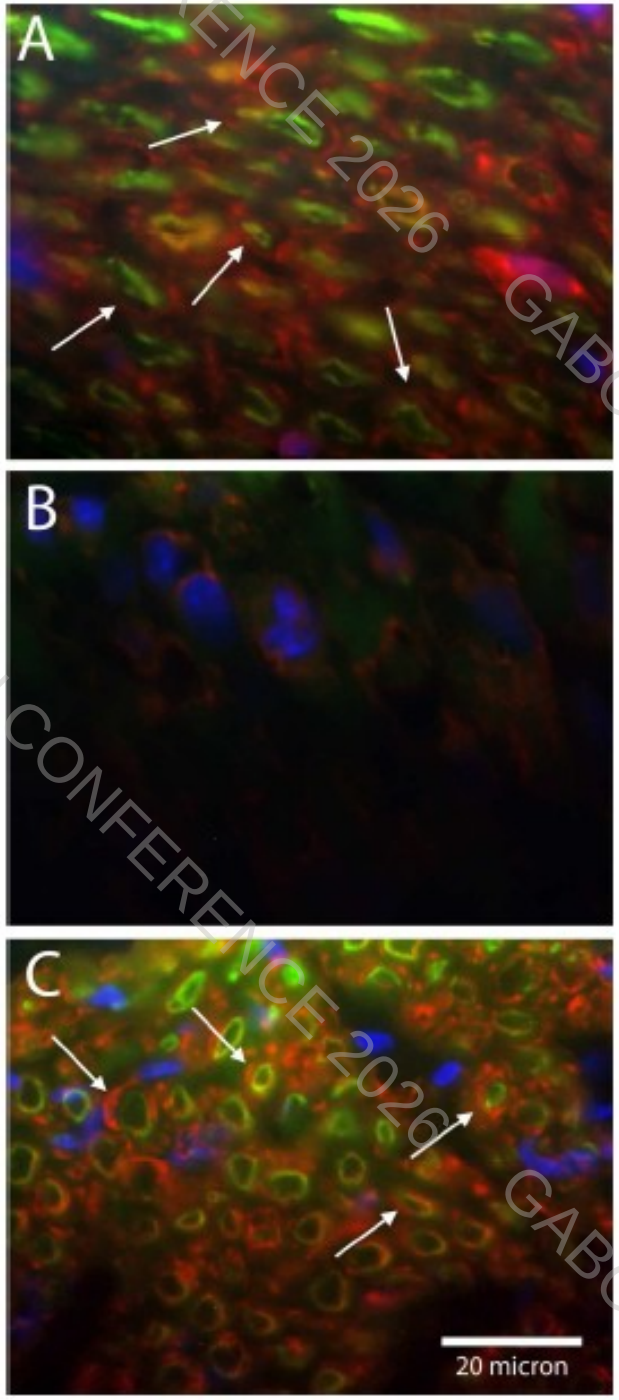








Wallerian degeneration but myelin sheath intact



Immnuofluorescence staining

Green = neuron

Red = Schwann cell

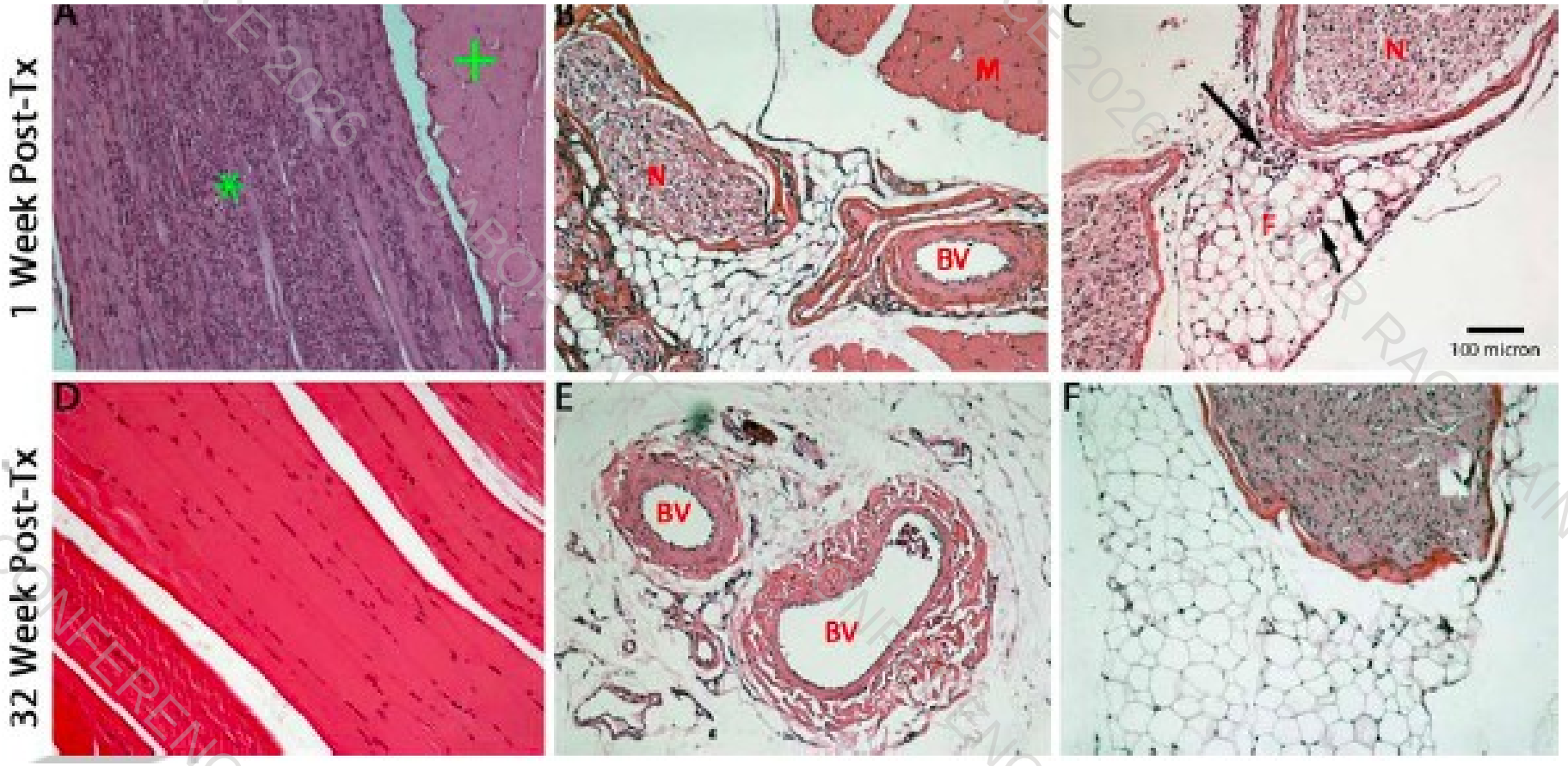
Blue = nuclei

A = untreated control

B = 1 week after cryo

C = 32 weeks after multiple refreezes

Hsu M, Stevenson FF. Wallerian degeneration and recovery of motor nerves after multiple focused cold therapies. Muscle Nerve. 2014.



MUSCLE BLOOD VESSELS FAT

No damage to adjacent structures (muscles, blood vessels, or fat)

Hsu M, Stevenson FF. Wallerian degeneration and recovery of motor nerves after multiple focused cold therapies. Muscle Nerve. 2014.

Cryo Machine

Image courtesy of Metrum Cryoflex

- Built in nerve stimulator (sensory and motor)
- Thermister
- Gas flow monitor
- Defrost cycle

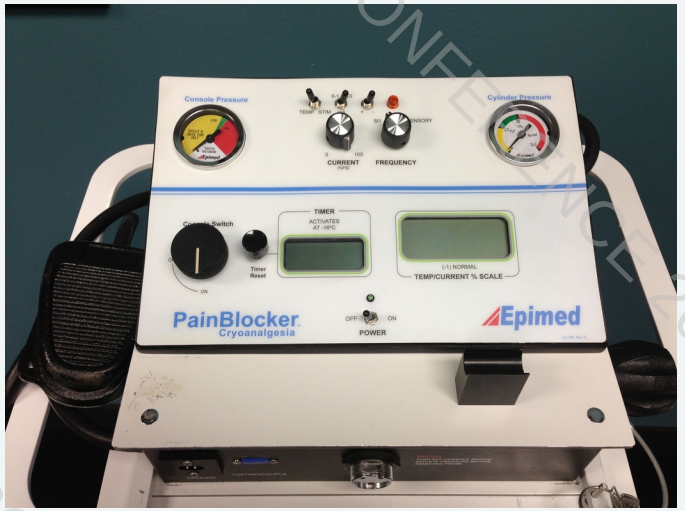


Image courtesy of Epimed

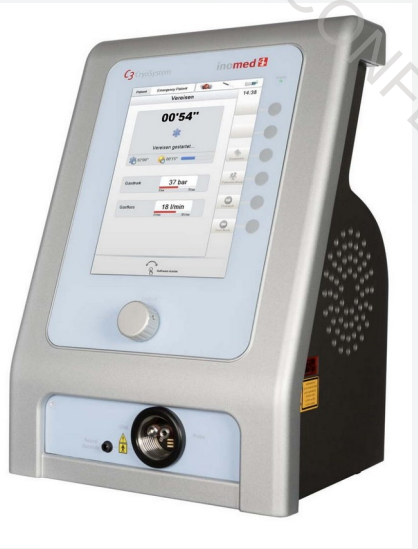
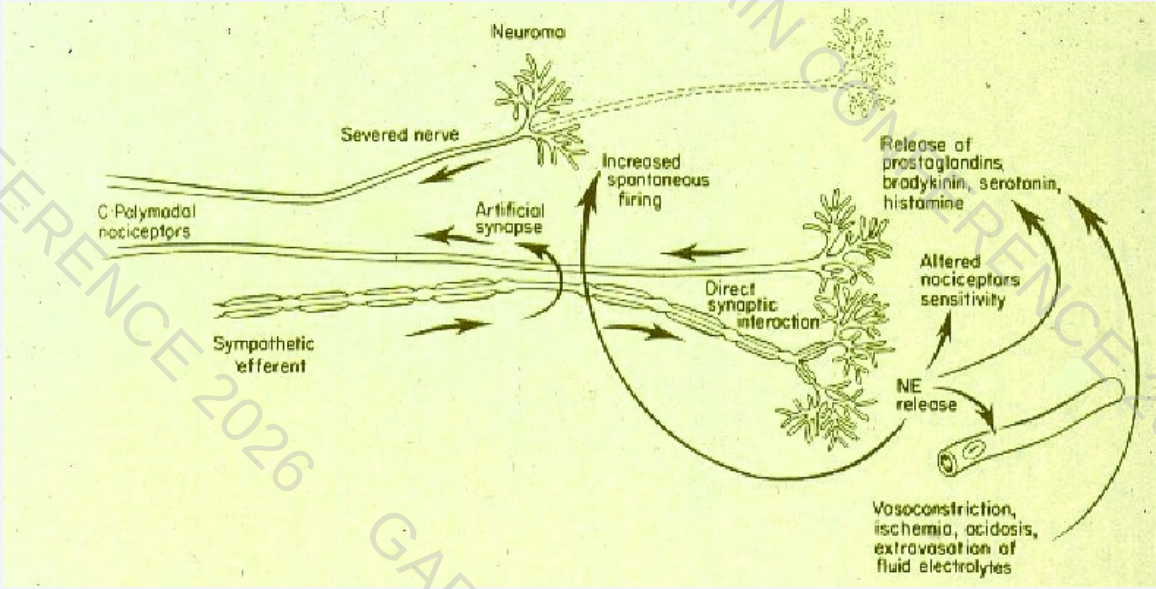


Image courtesy of Inomed

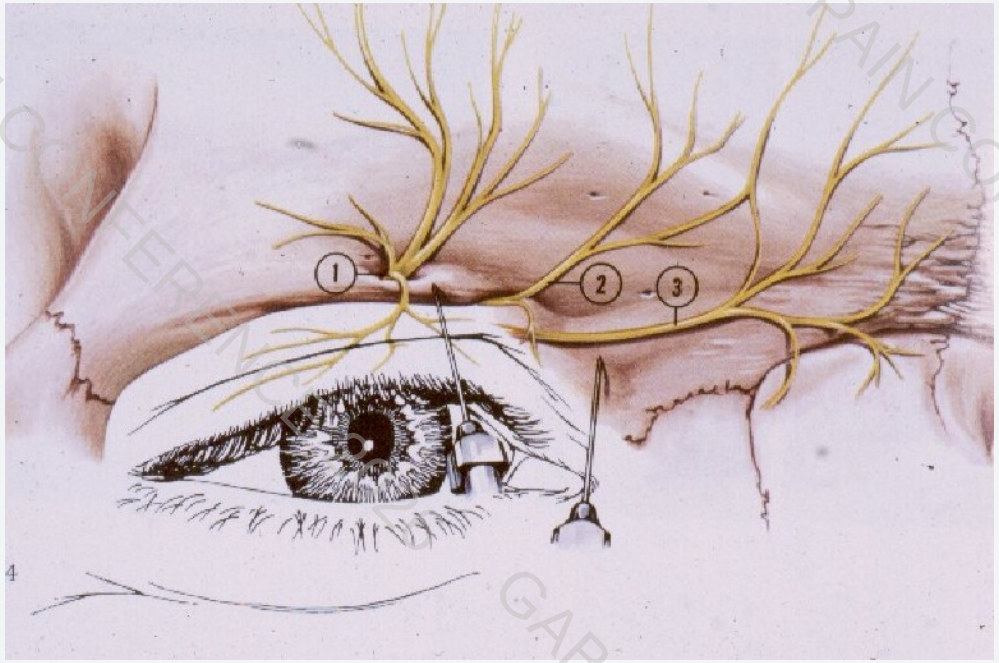
Cryo Advantages

- No neuroma formation
- Can be used on large, myelinated nerves
- Can be repeated - the nerve grows back
- May address “wind-up”



Cryo Supraorbital

- Confused with migraine, cluster headaches, frontal sinusitis
- May need to treat supratrochlear as well
- Small probe, avoid brow line

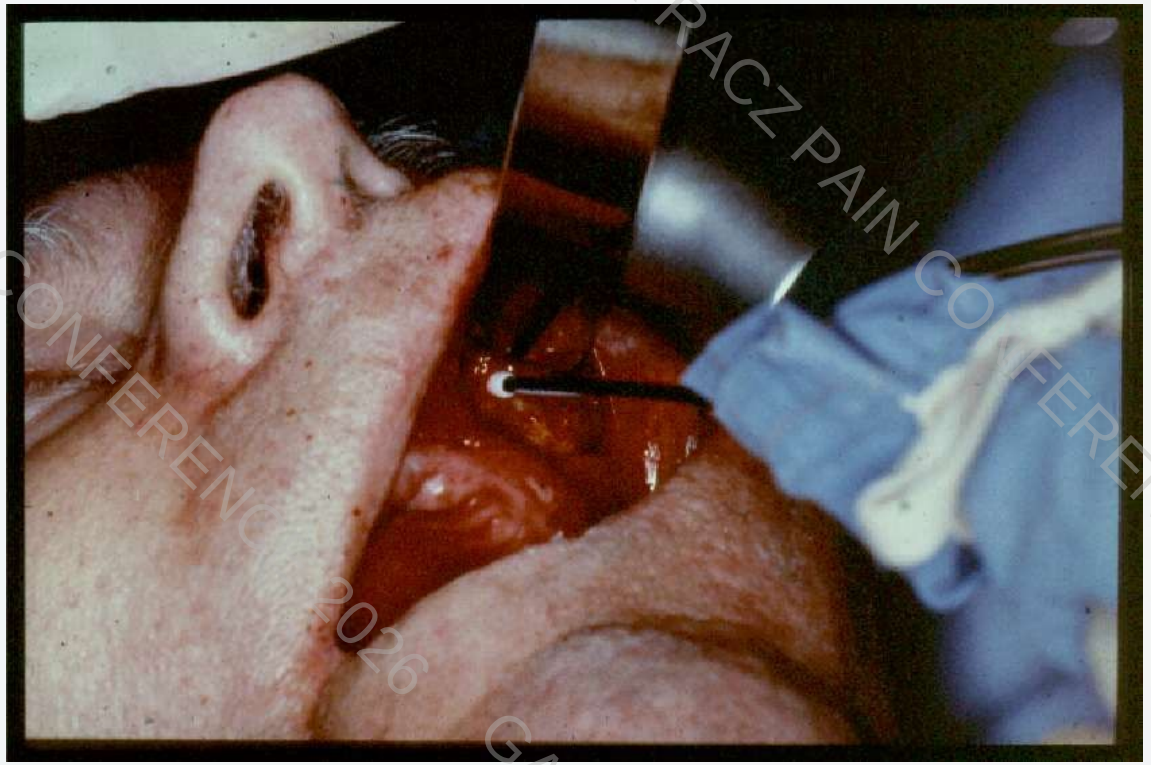


Cryo Infraorbital

- Confused with maxillary sinusitis, dental pathology
- 2° to facial trauma
- Worse with smiling and laughter
- Extraoral or intraoral approach

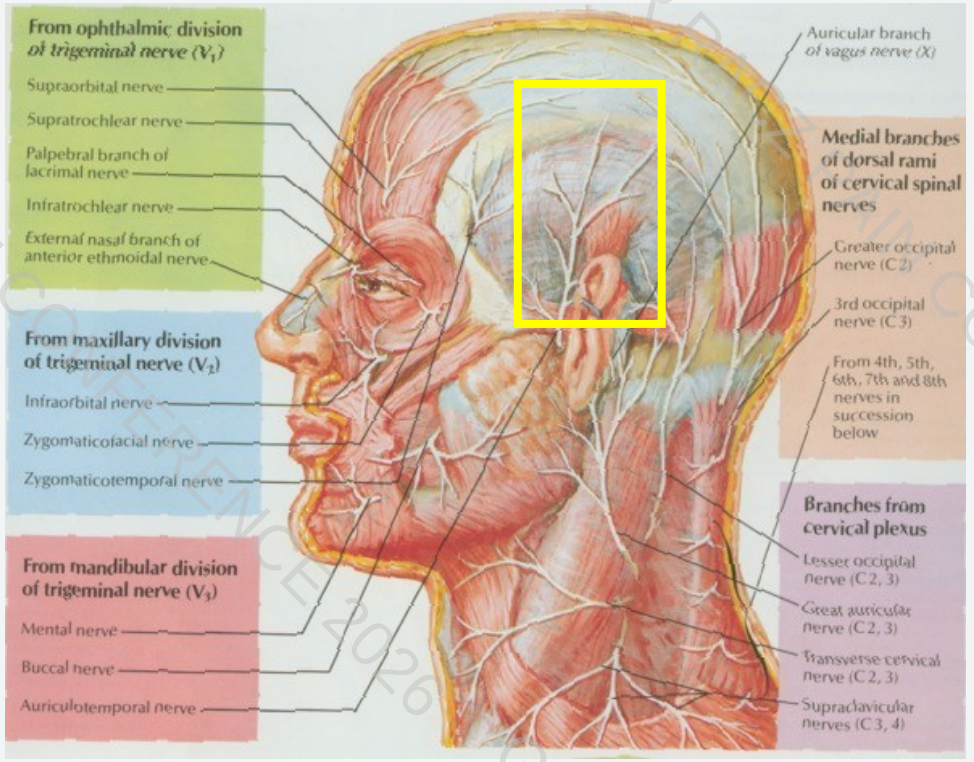
Cryo Intraoral

- Allows larger probe (no cosmetic issues)
- Possible open procedure (mucosa incision)
- Infraorbital, mental



Cryo Auriculotemporal

- Temple headache, menstrual migraines, refers to retro-orbital region
- Misdiagnosed as TMJ
- 4 am headache 2° to bruxism



Cryo Trigeminal at Foramen Ovale

- Tic douloureux
- Facial pain
- Facial cancer

Always evaluate distal sites first

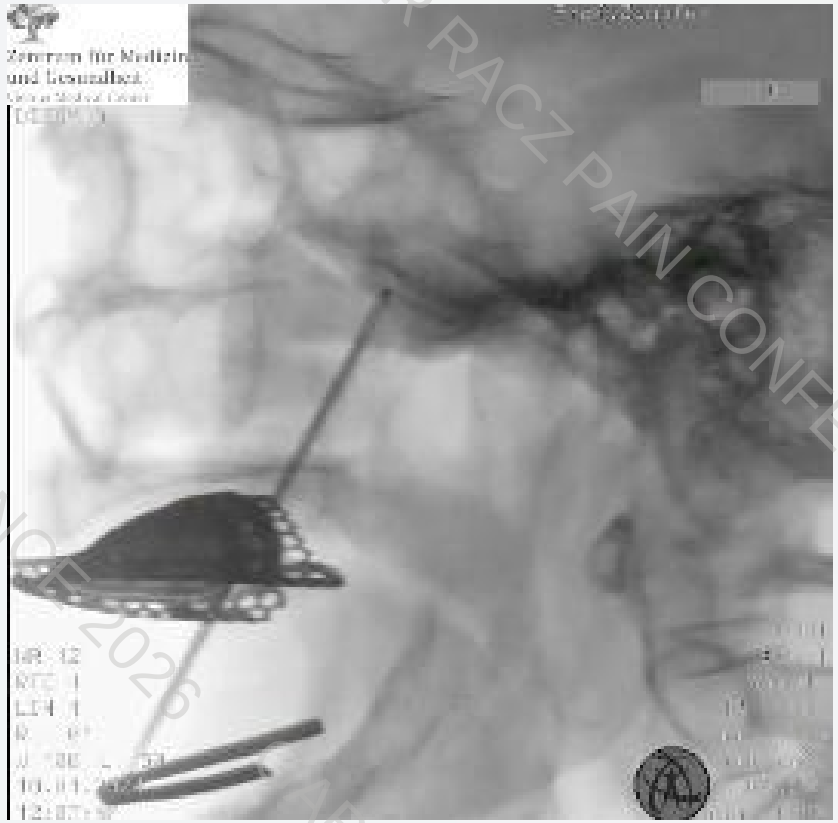
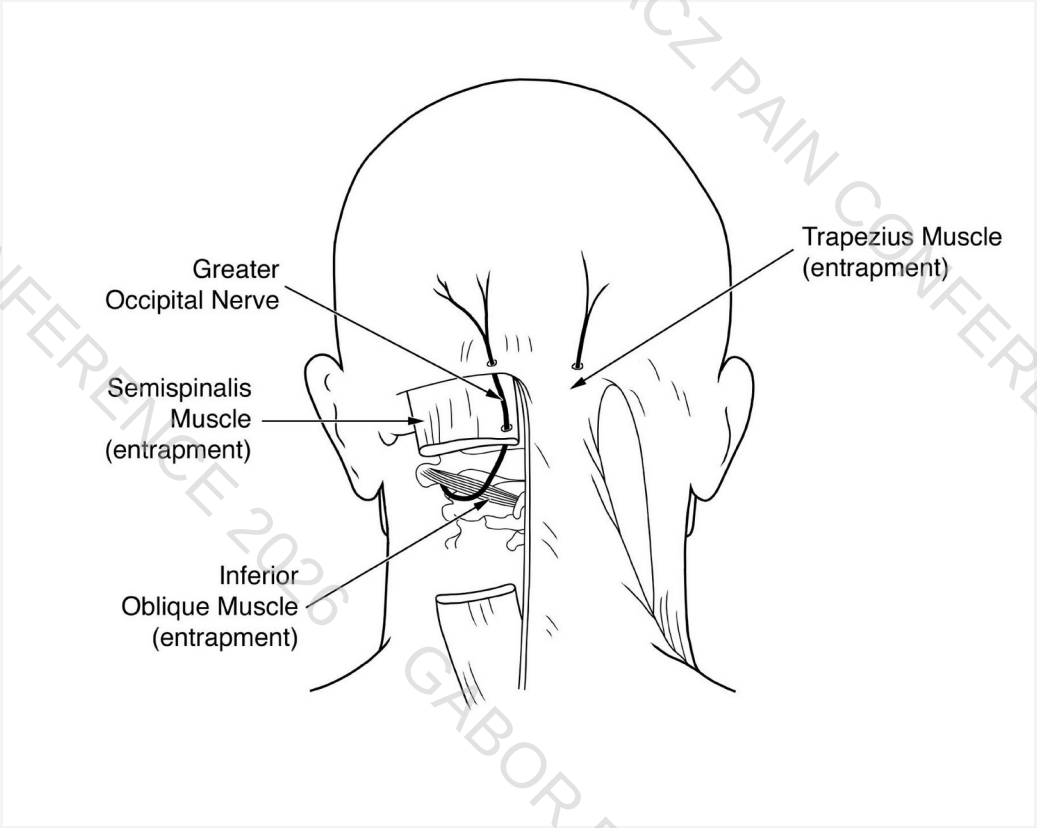
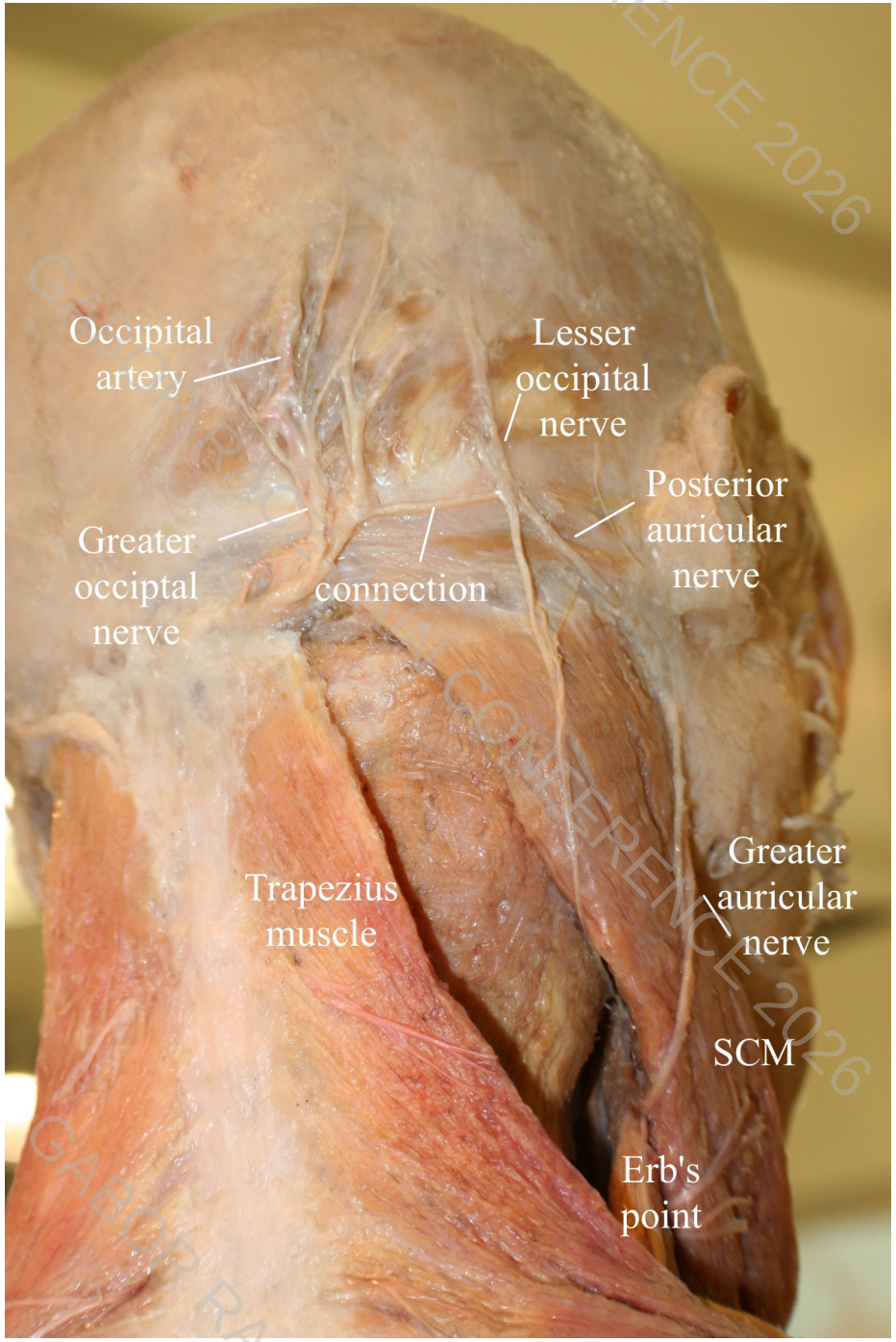


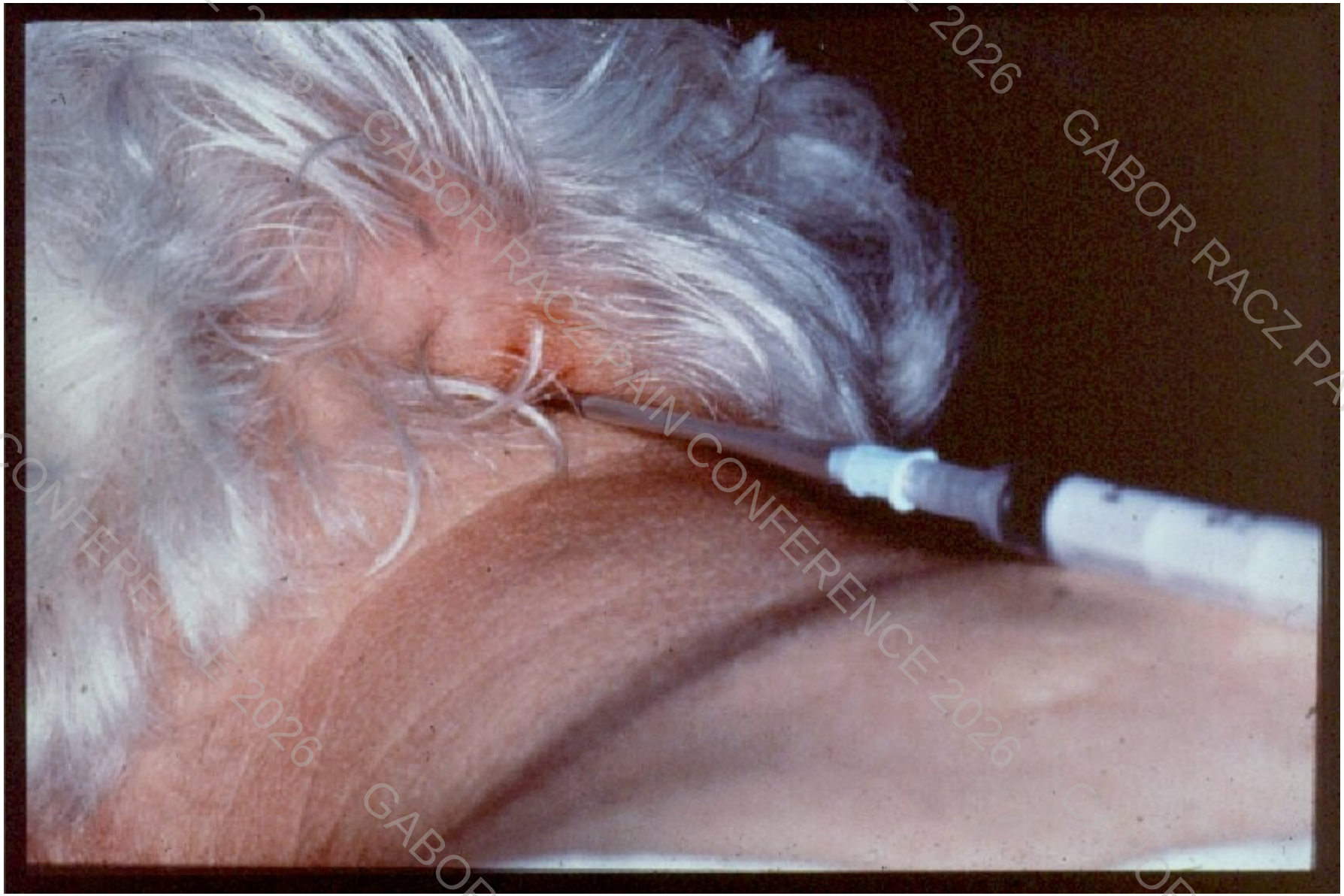
Image courtesy of Dr. Michael Zimpfer

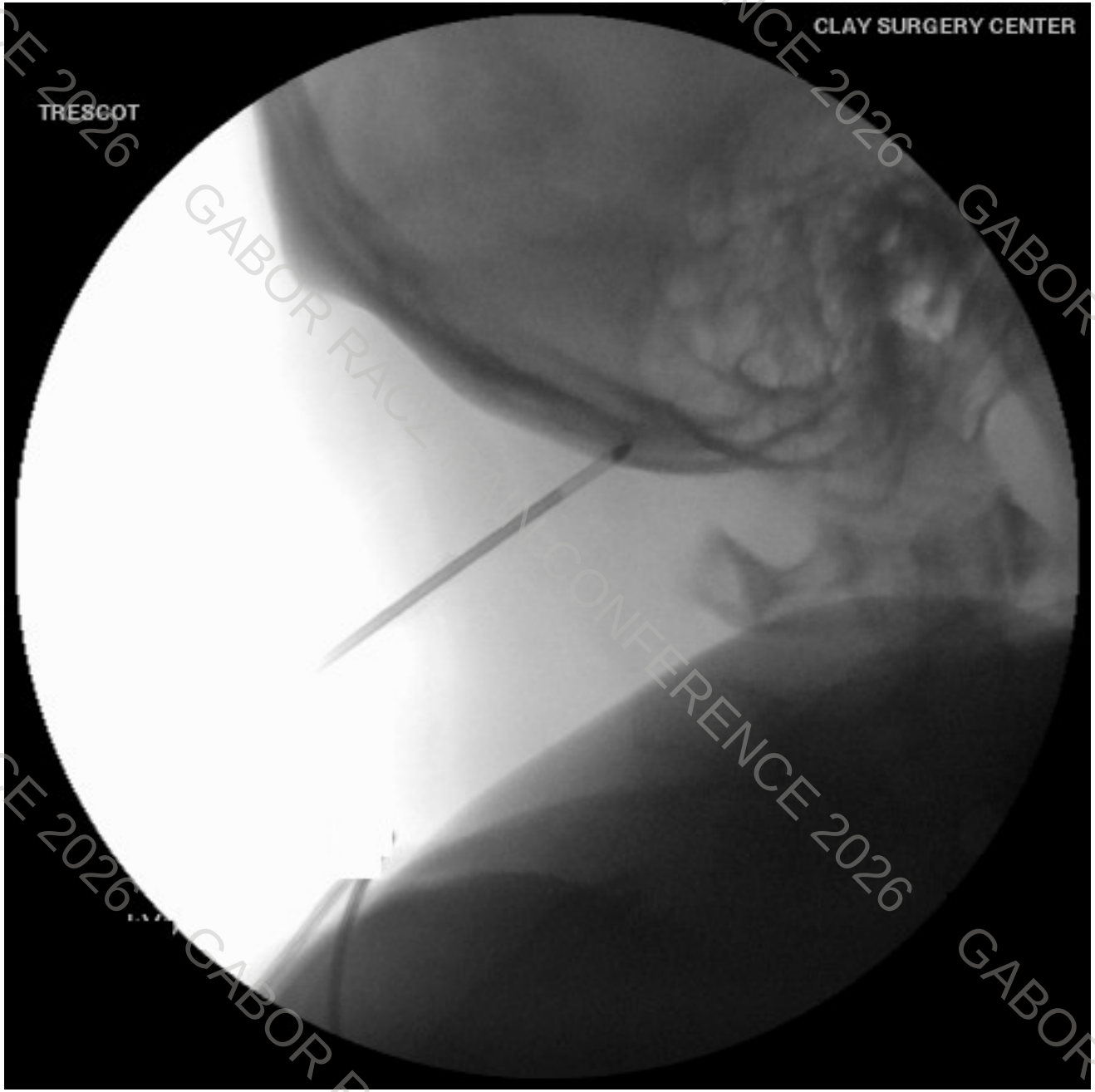
Cryo Greater Occipital

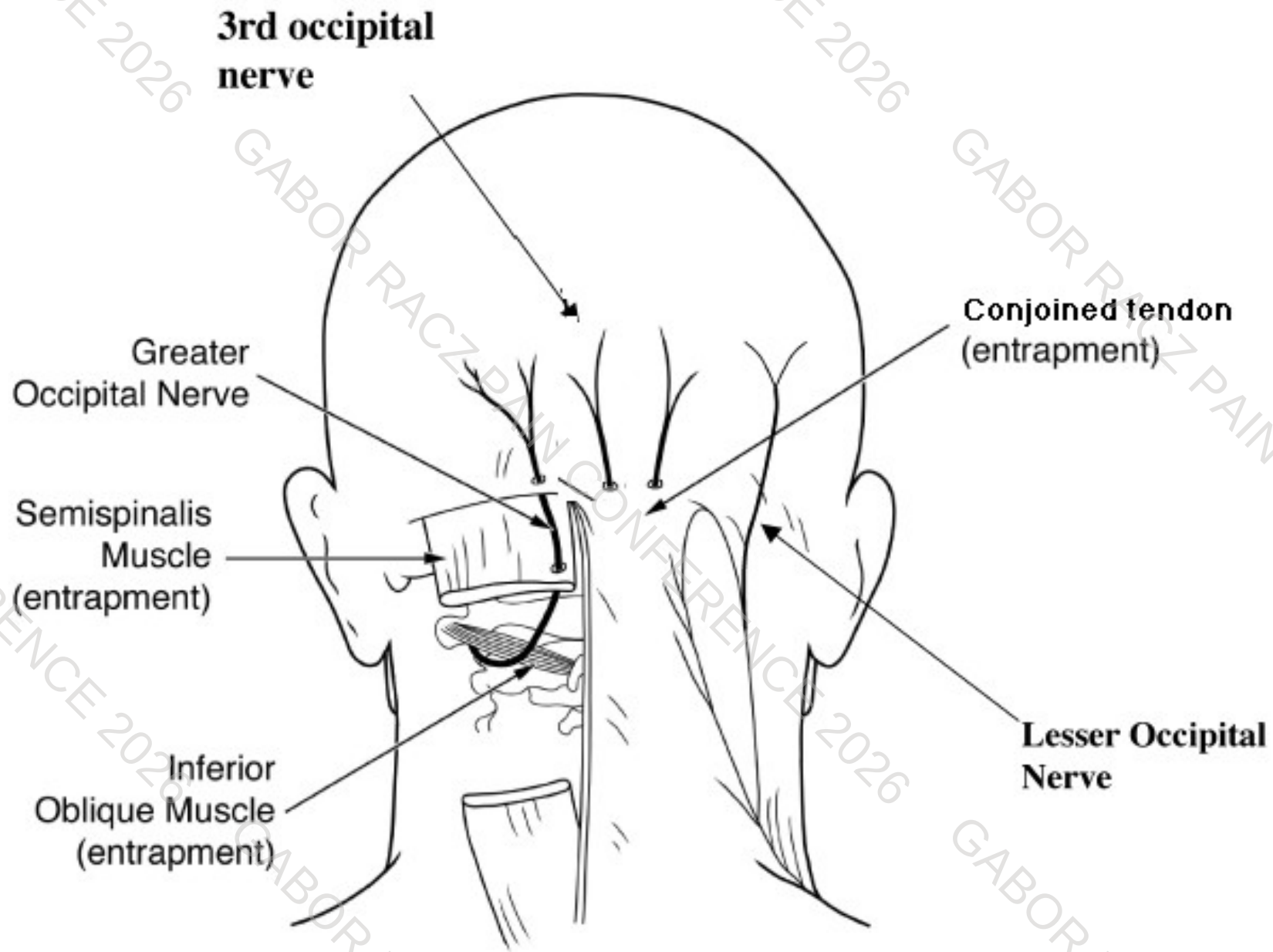
- Occipital headaches
- Can refer to frontal/retro-orbital regions
- May need to be repeated proximally (C2)

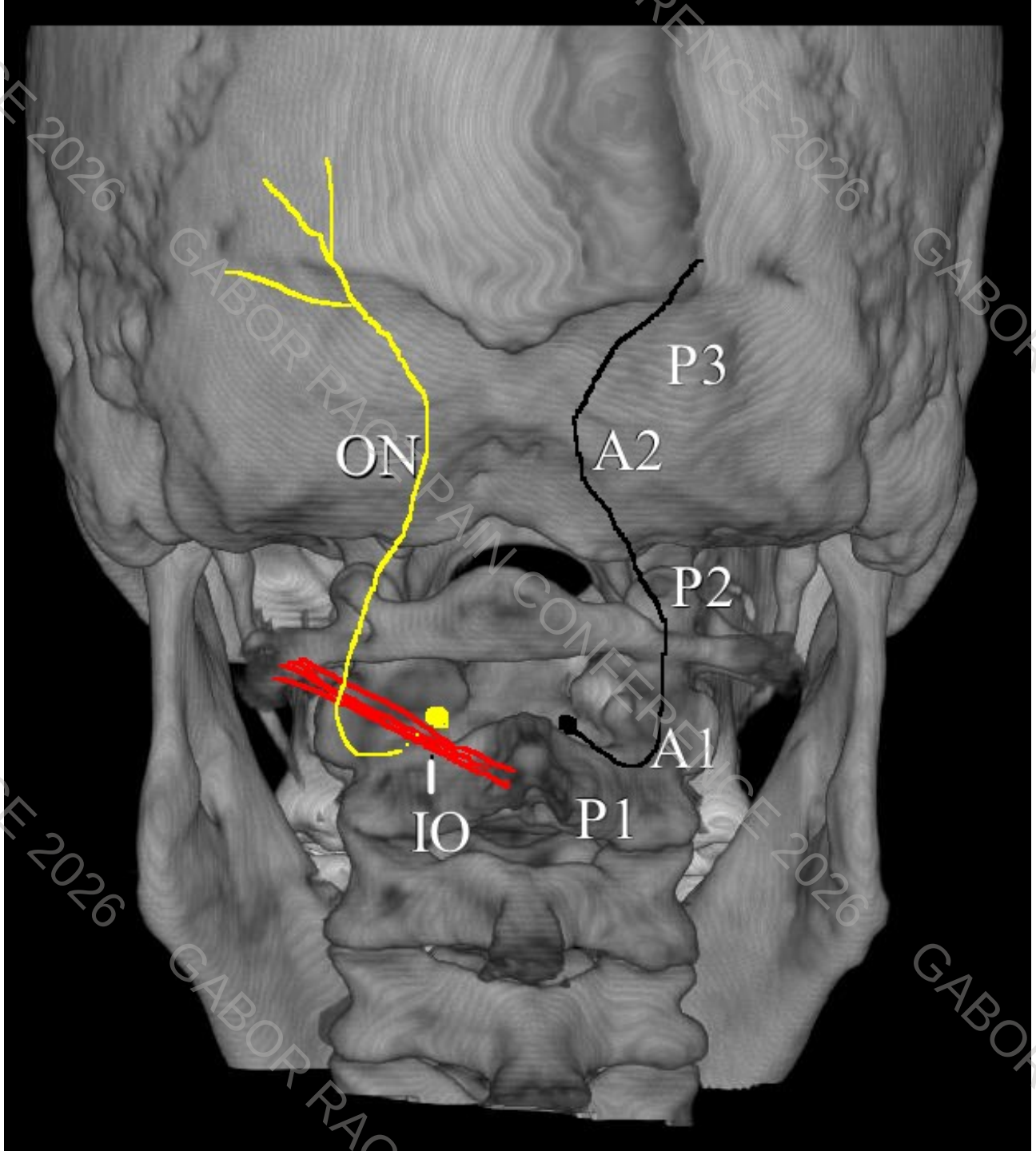








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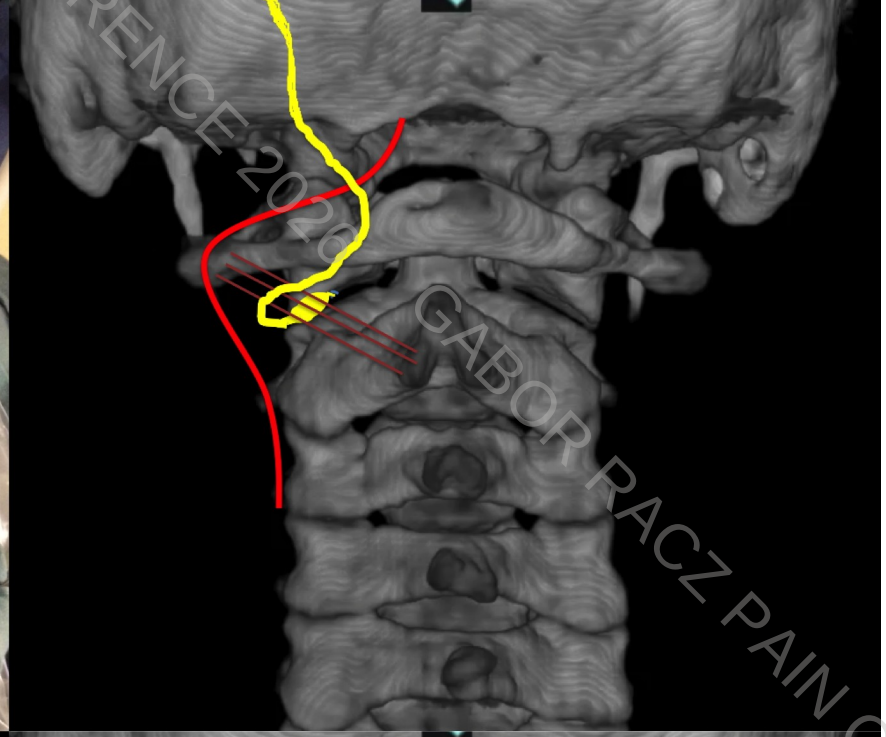
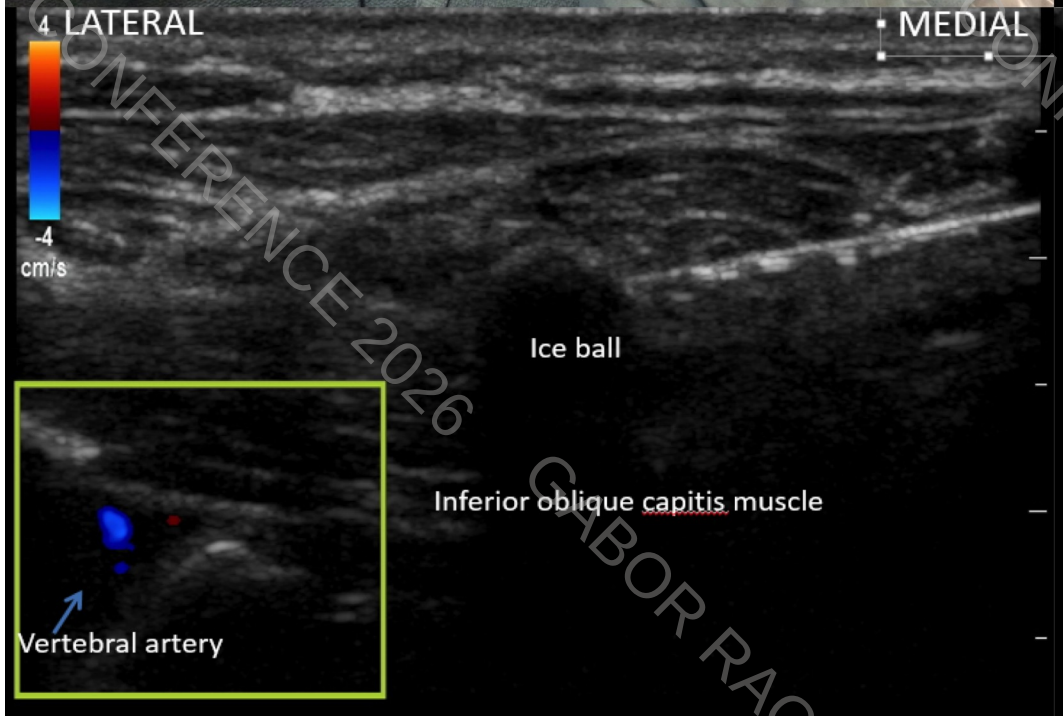
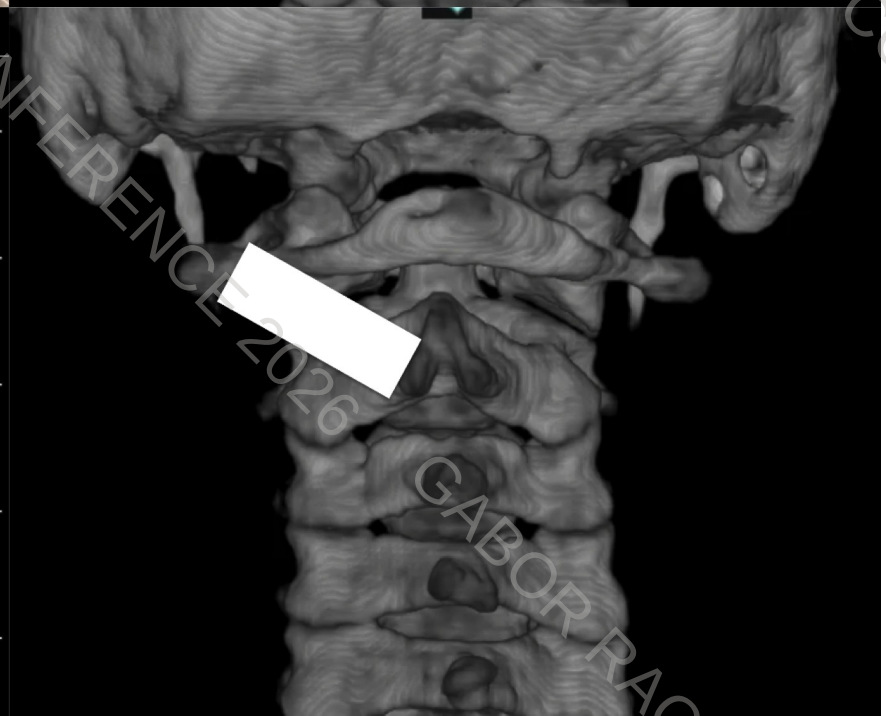
A2
P2
A1
IO
P1

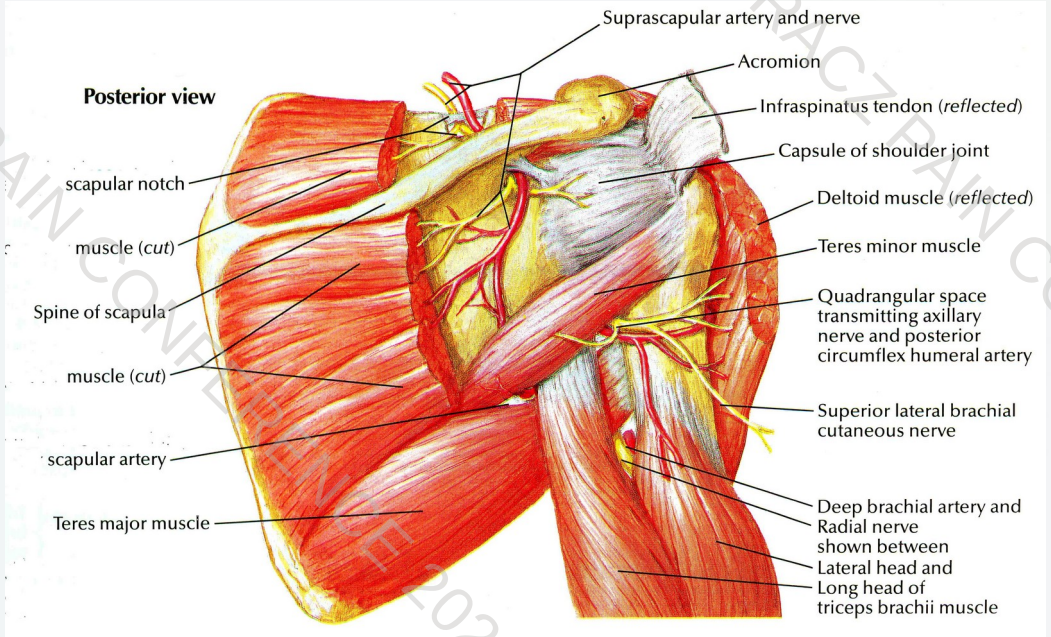


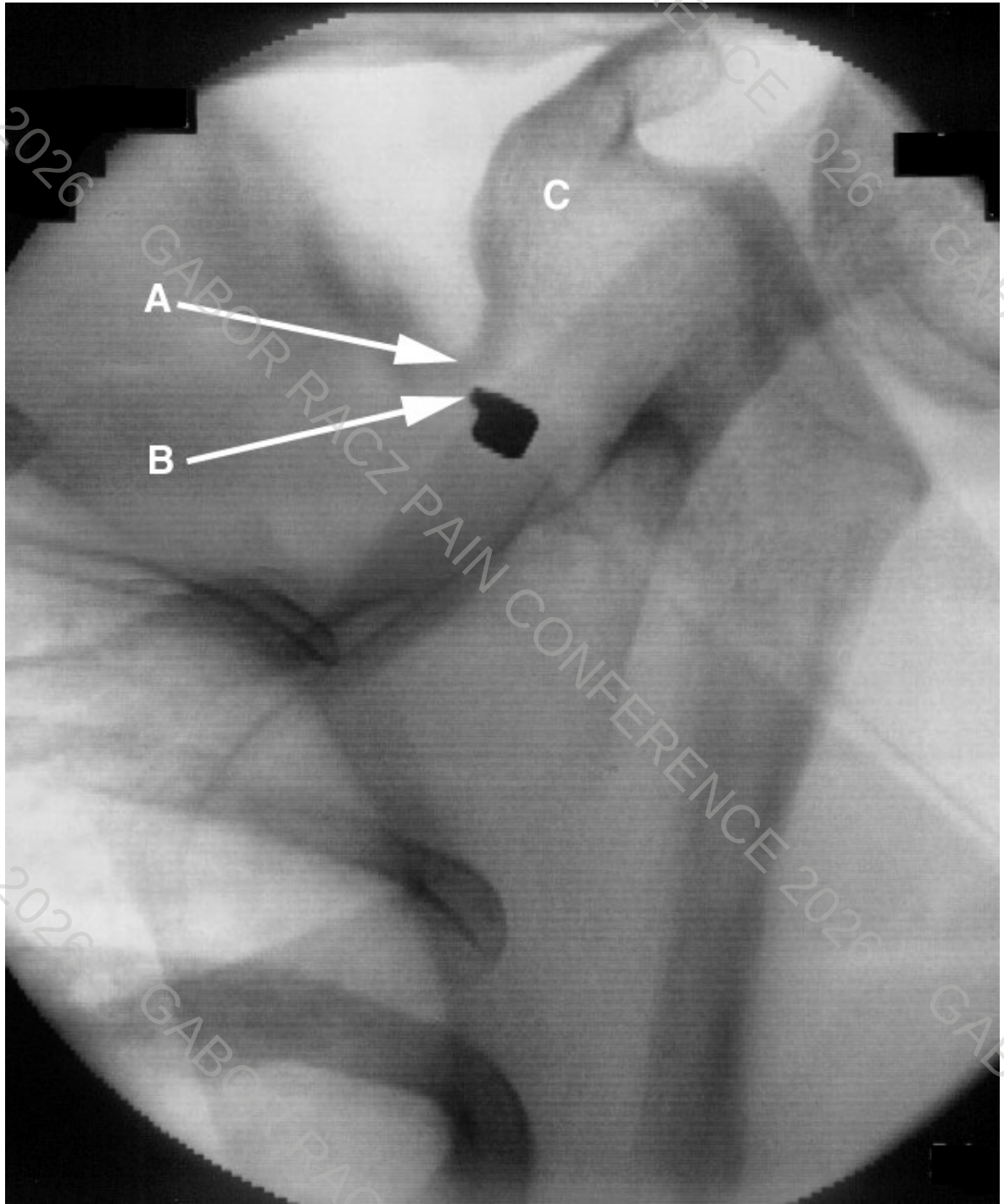


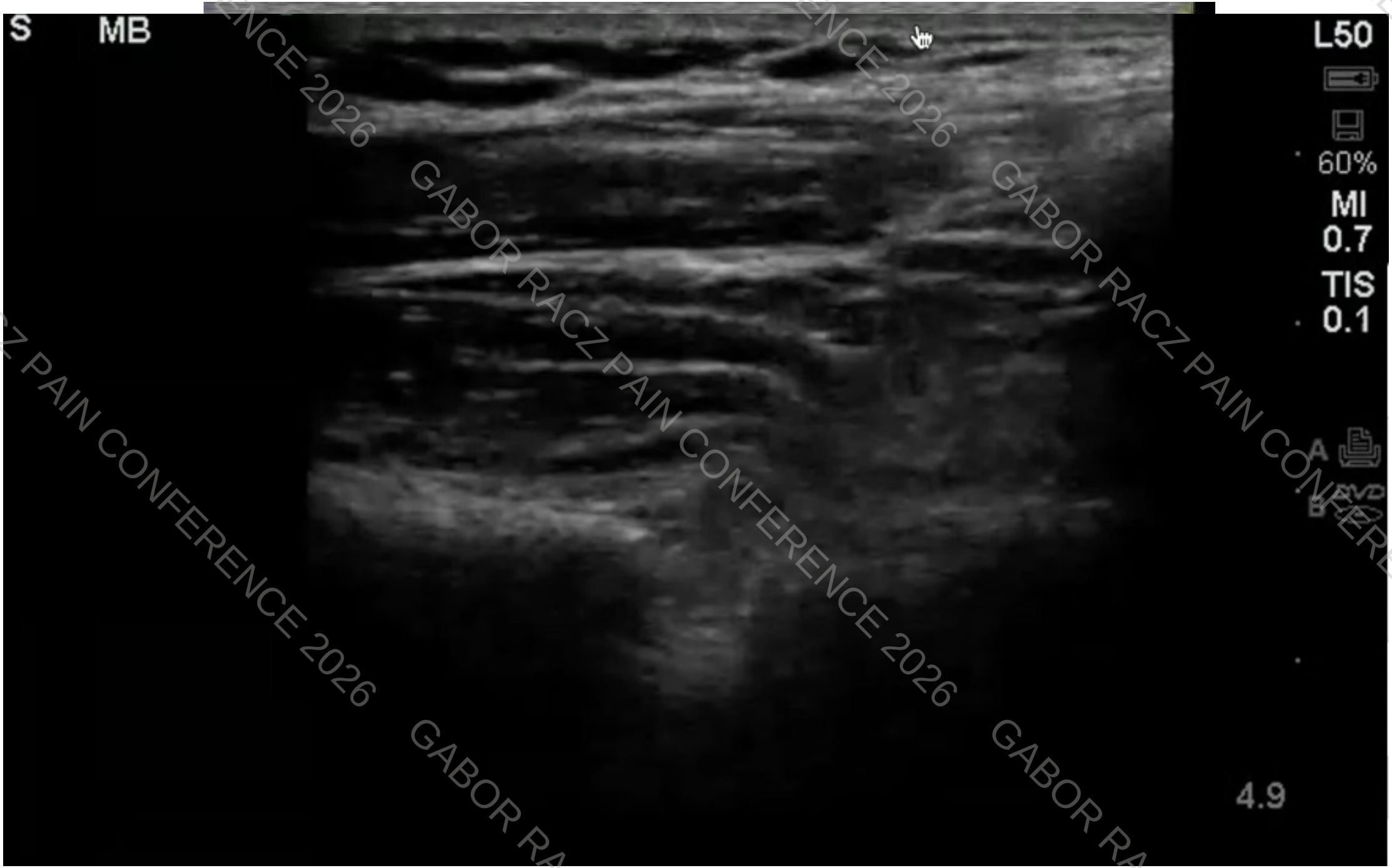


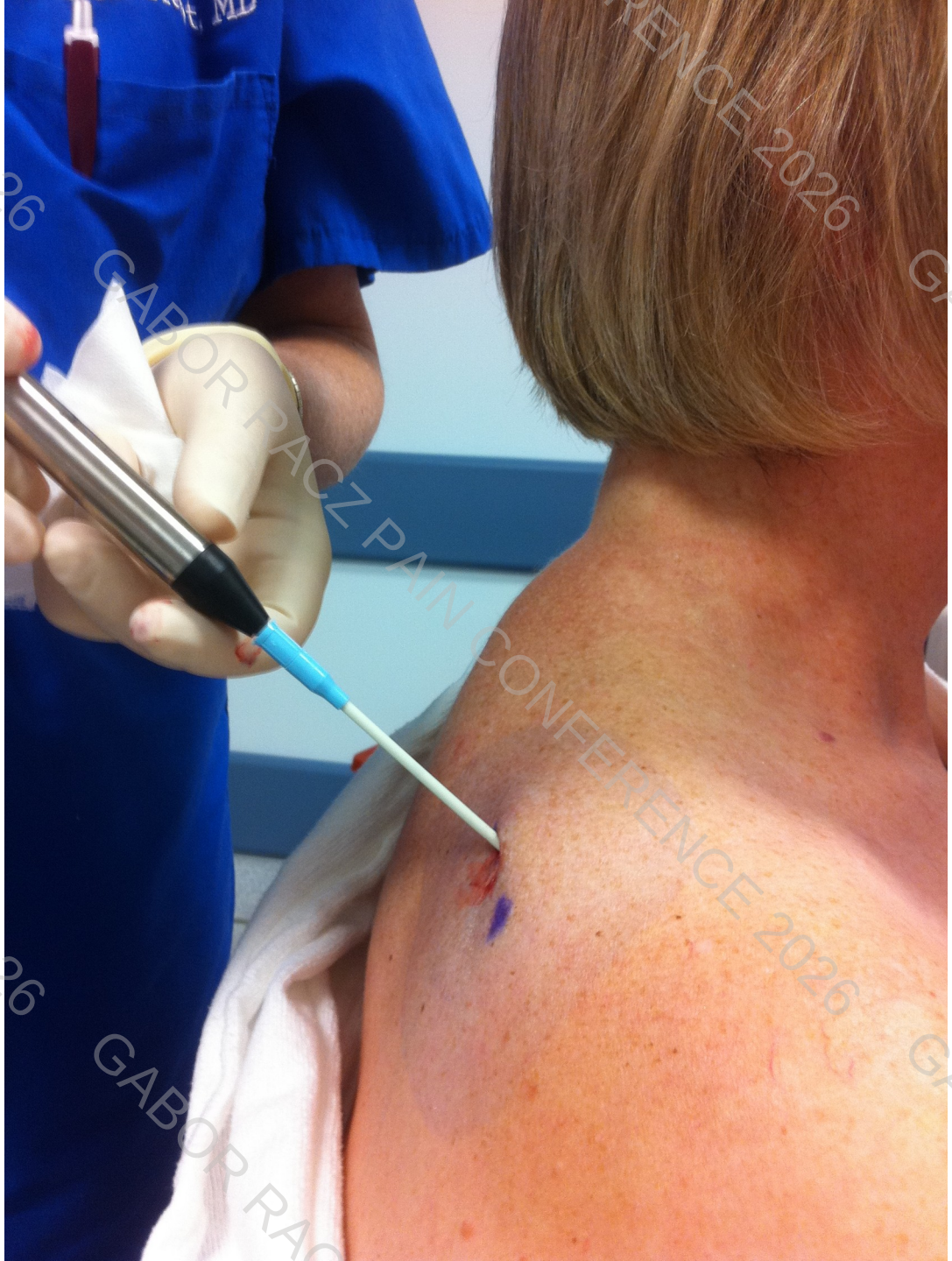
Cryo Suprascapular

- Innervates supraspinatus, infraspinatus, shoulder joint
- Entrapped by internal rotation
- “frozen shoulder”
- Approach perpendicular to scapula



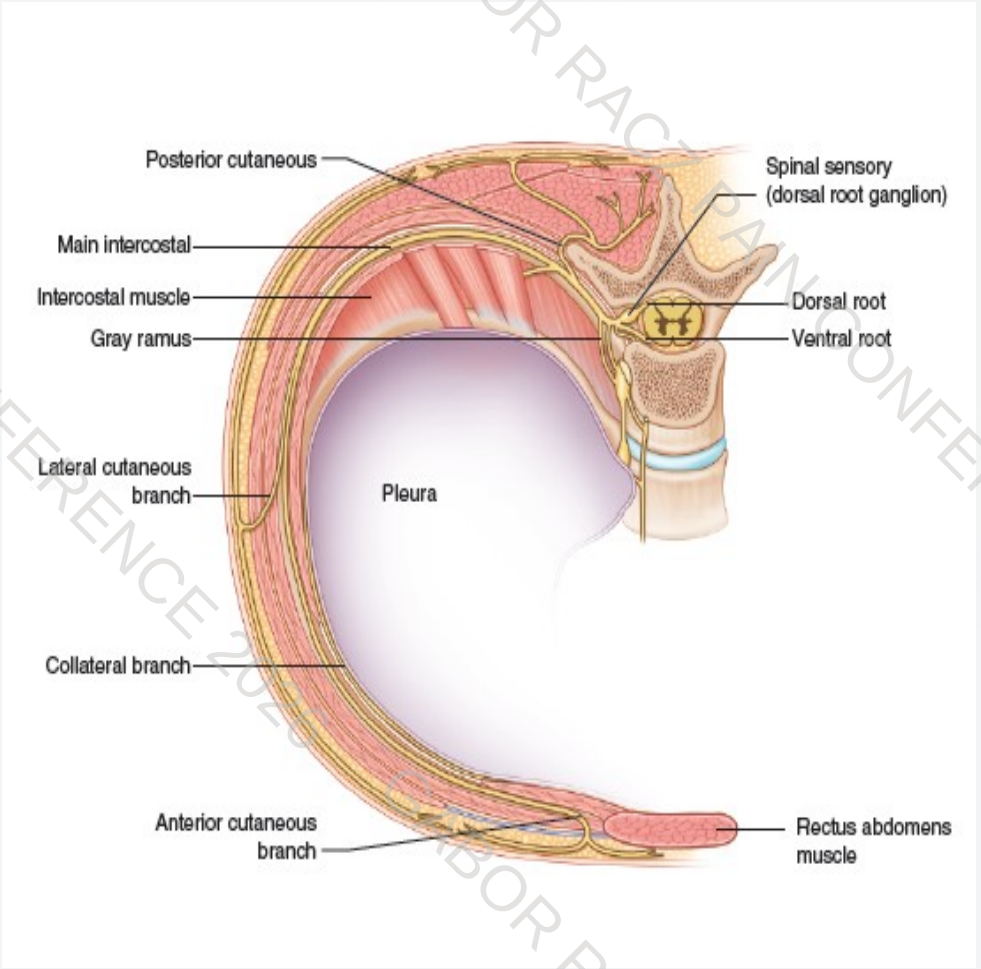




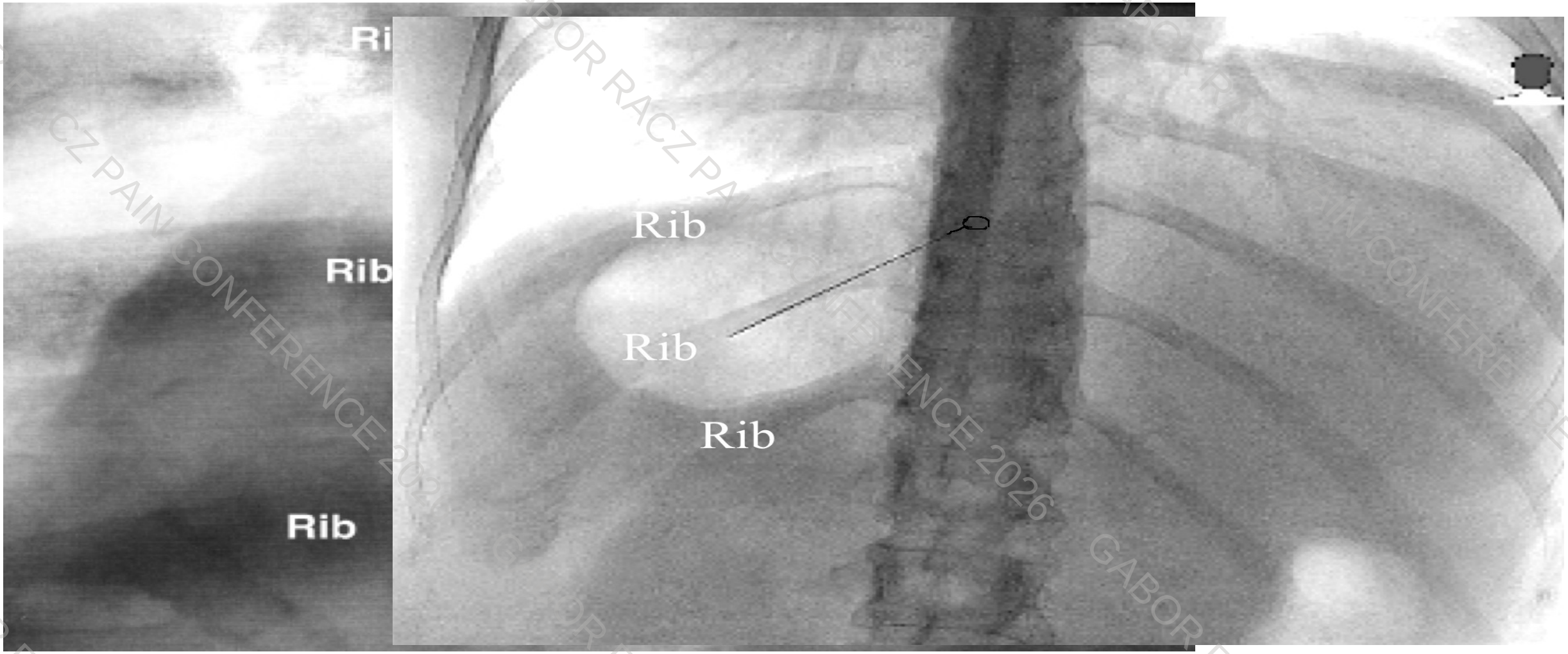


Cryo Intercostal

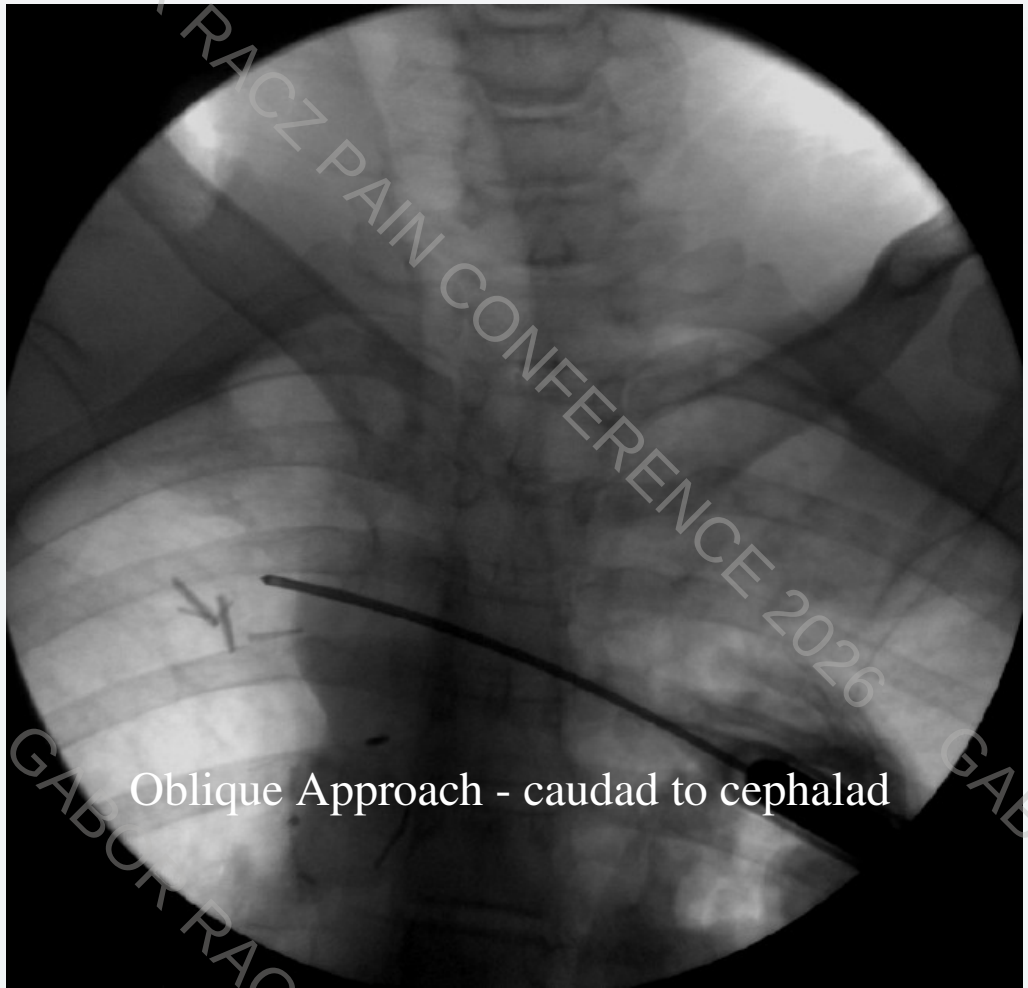
- Intercostal neuralgia (postop, post herpetic, post traumatic)
- Oblique approach, caudad to cephalad
- Lower risk of pneumothorax



Intercostal Injection Fluoro



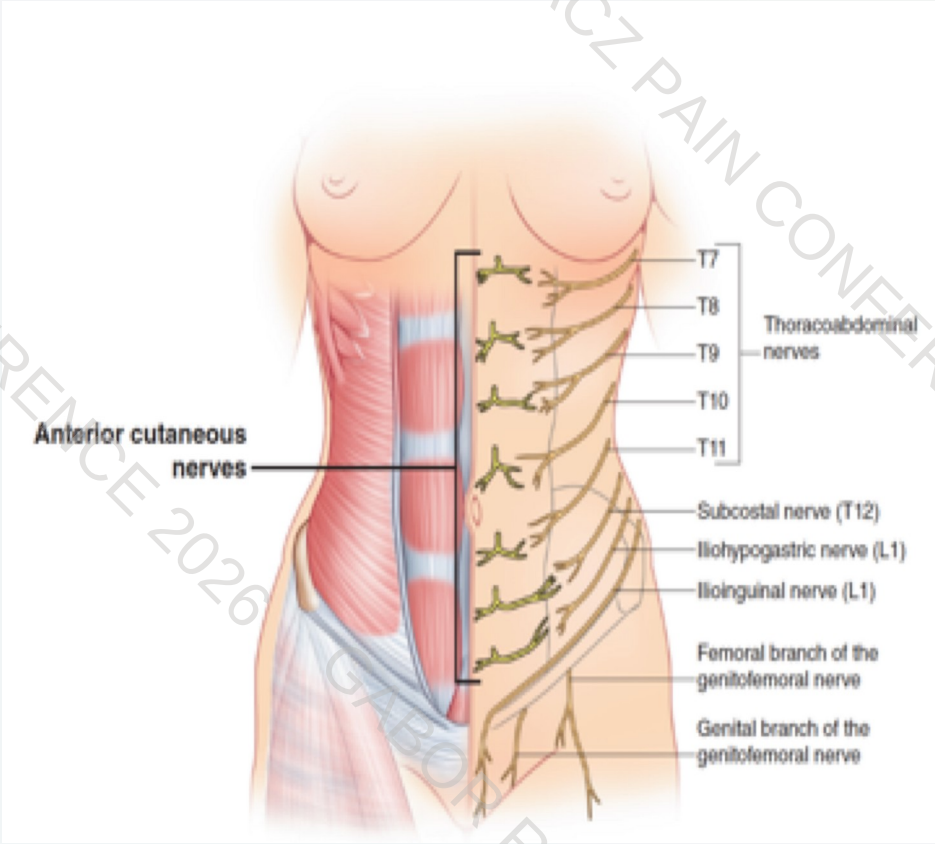
Cryo Intercostal

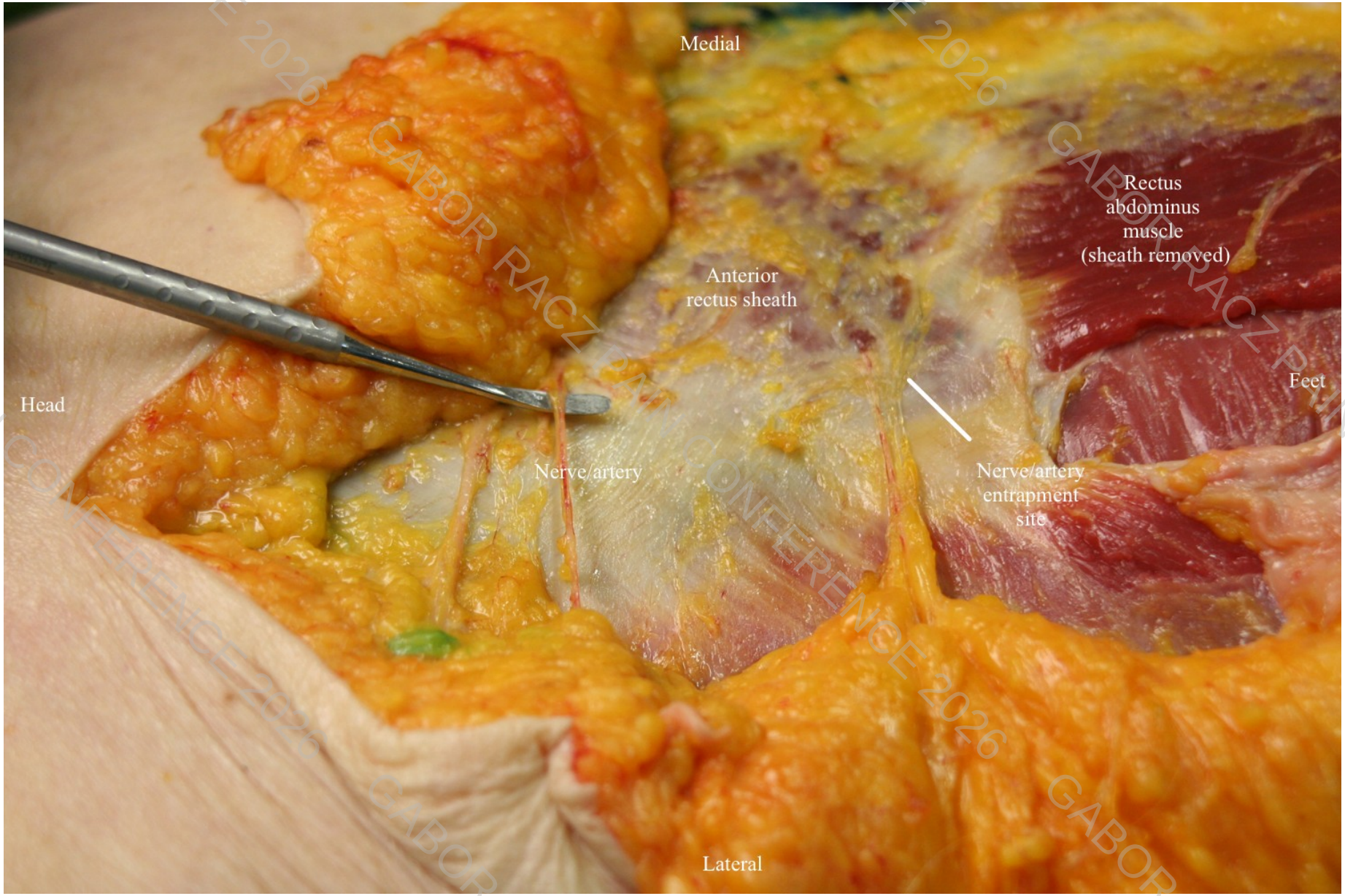


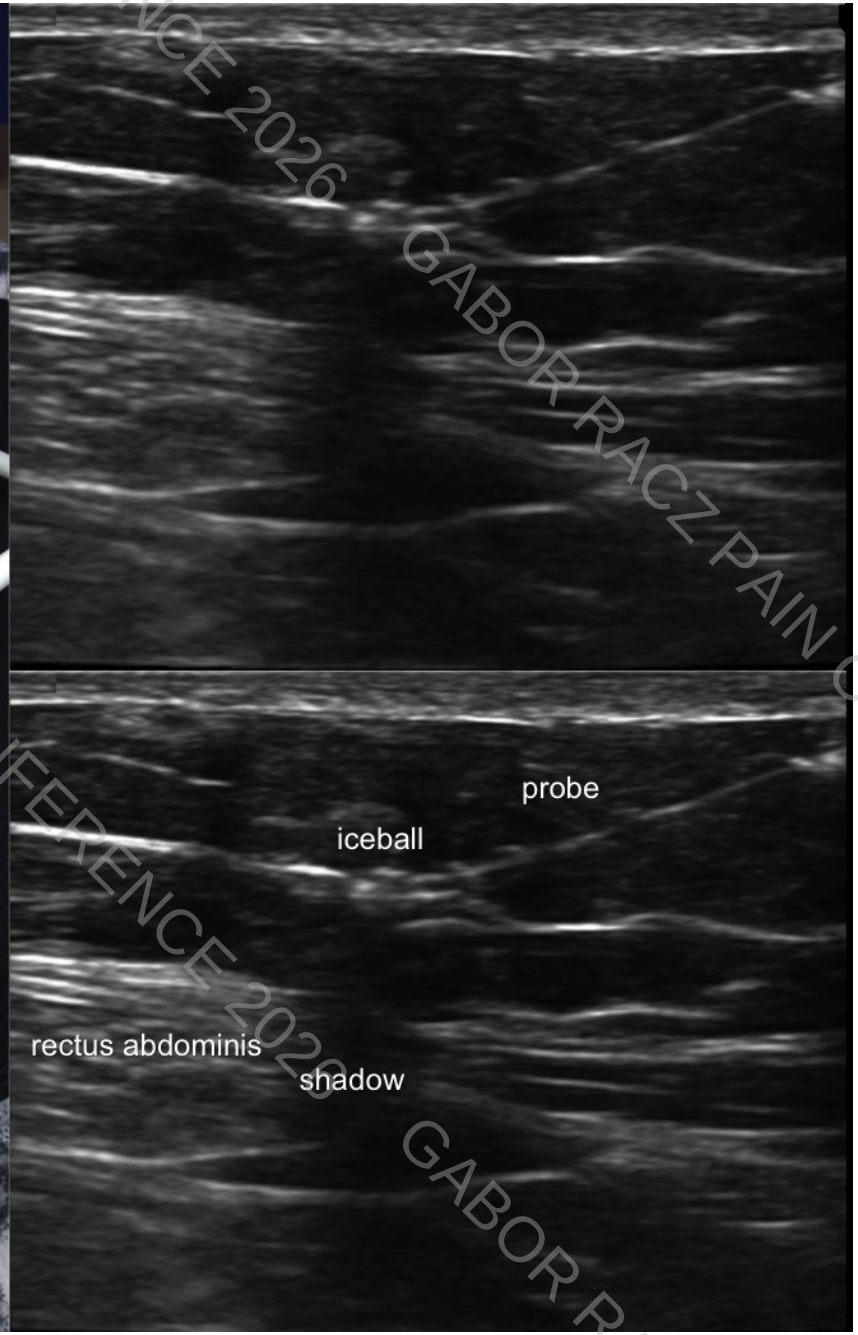
Oblique Approach - caudad to cephalad

Cryo Iliohypogastic, Ilioinguinal, Anterior Cutaneous Nerve Entrapment (ACNE)

- Usually trapped at lateral rectus border
- Mimic appendicitis, GB, “endometriosis”, pelvic pain
- Common after Pfannenstiel/hernia incisions

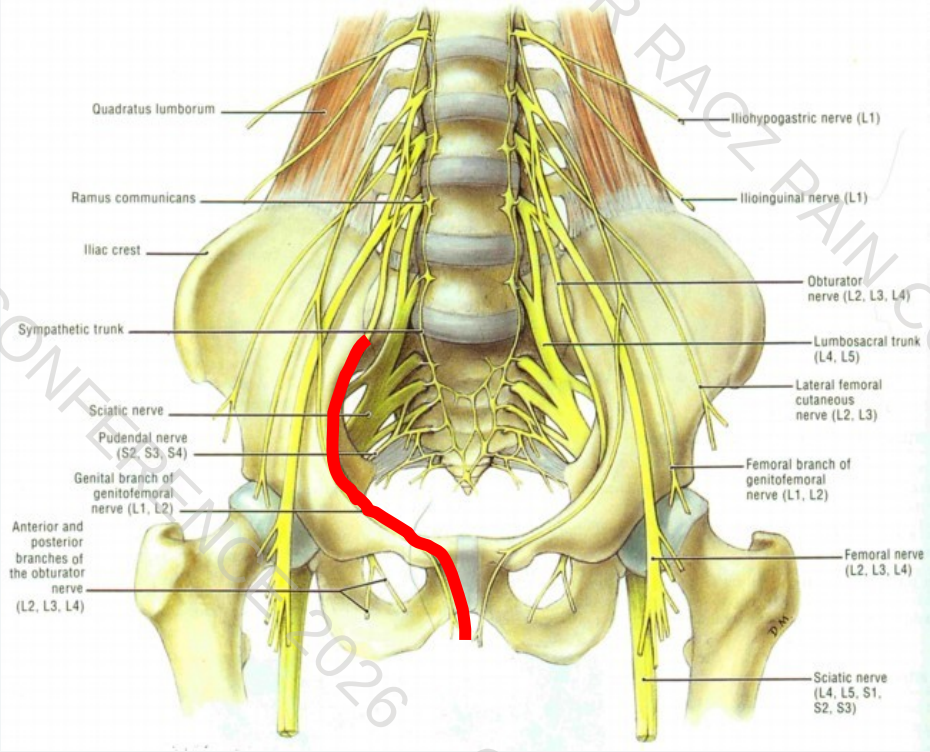


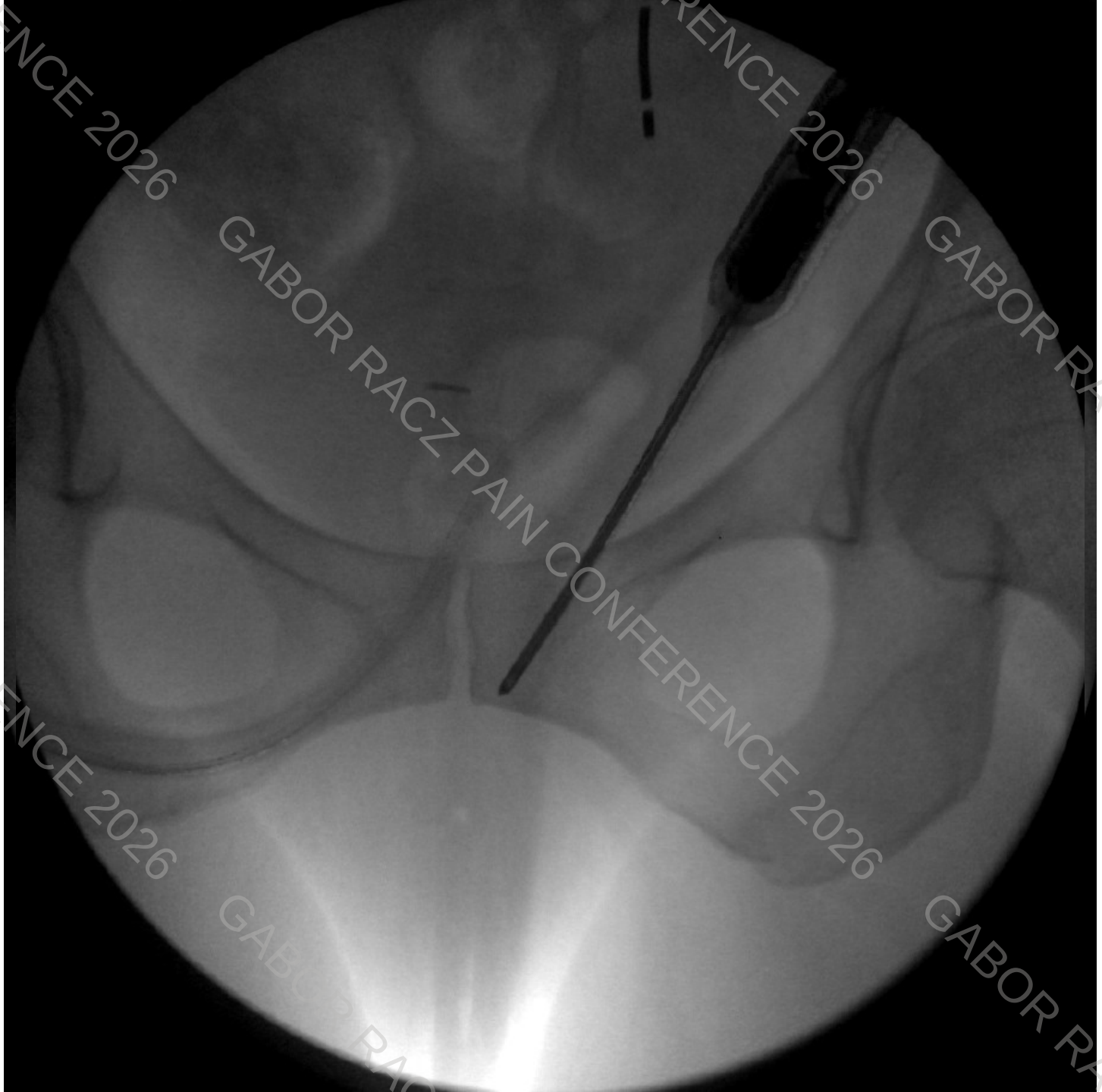

Medial
Rectus
abdominus
muscle
(sheath removed)
Anterior
rectus sheath
Head
Feet
Nerve/artery
Nerve/artery
entrapment
site
Lateral



Cryo Genitofemoral Nerve

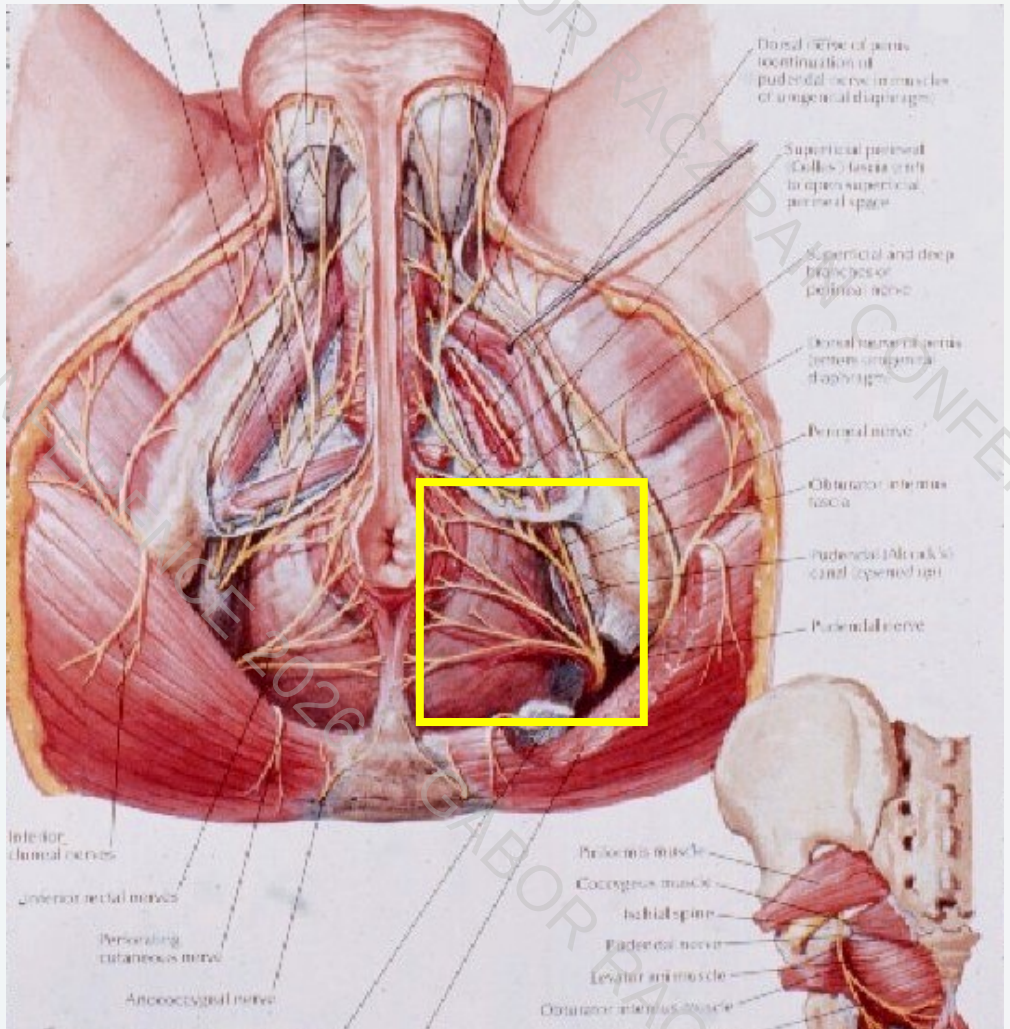
- Suprapubic pain, radiating into medial thigh
- Entrapment occurs at the pubic tubercle
- Mimics pelvic pain, IC, endometriosis, dysparunia



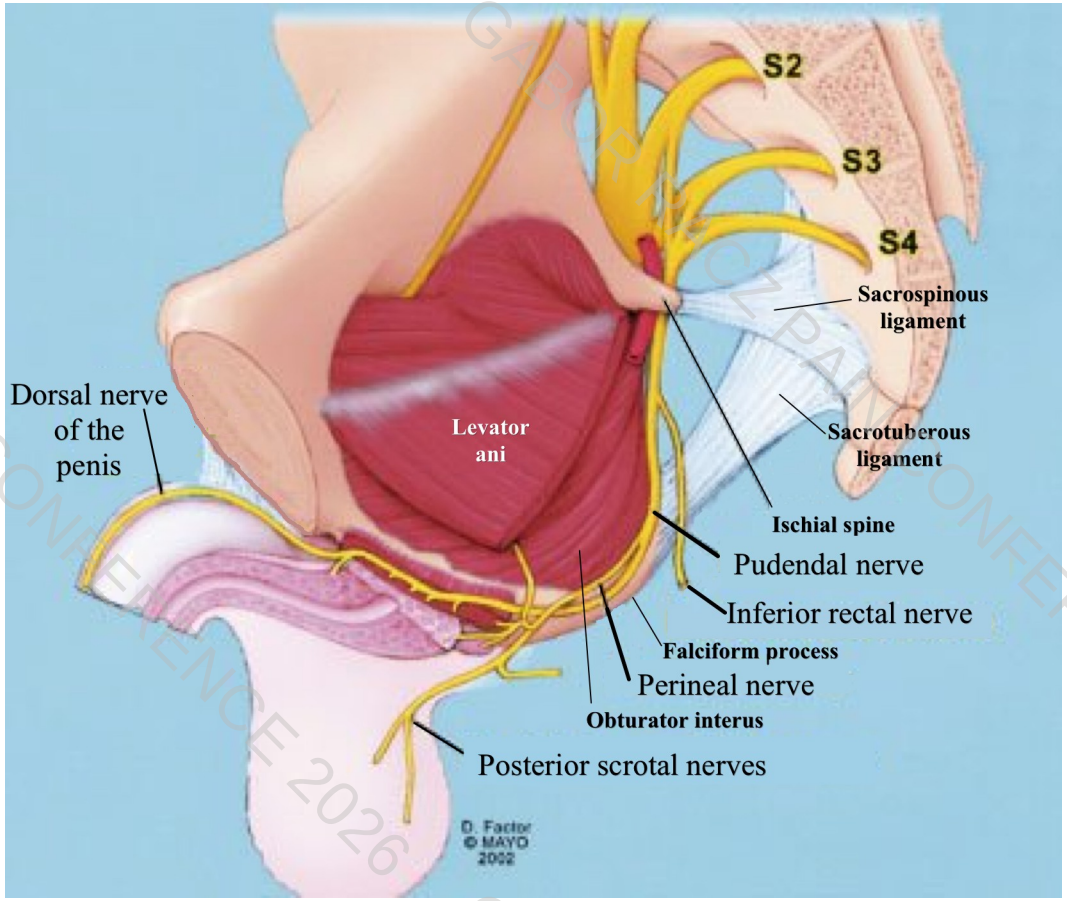


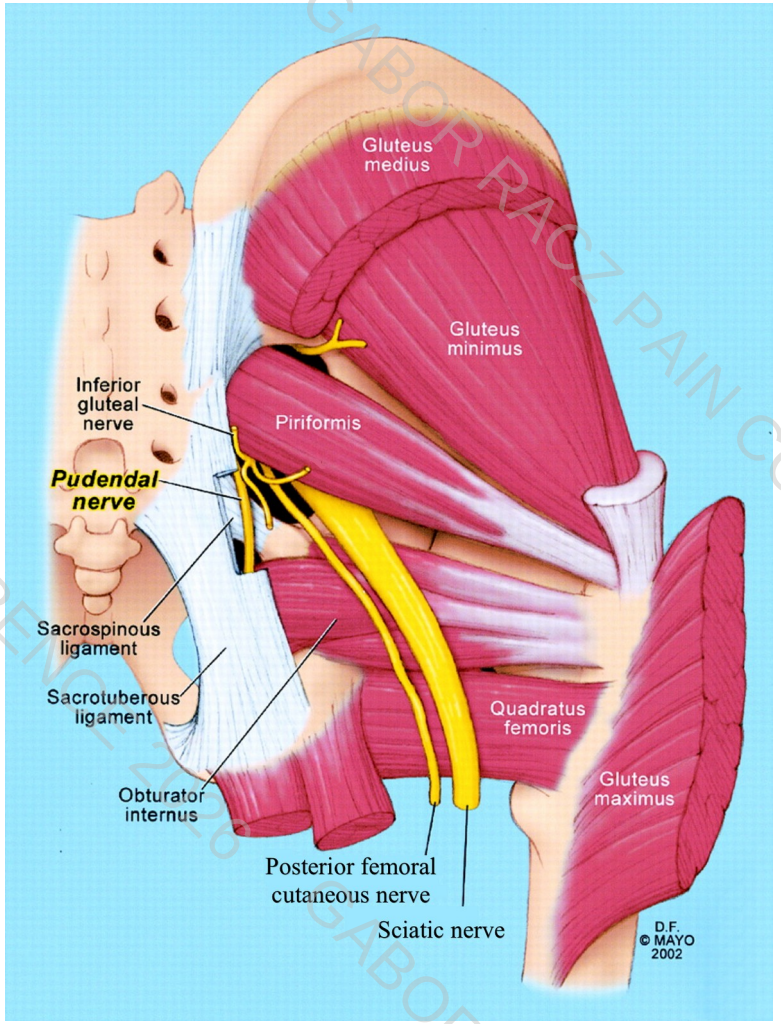
Cryo Pudendal Nerve

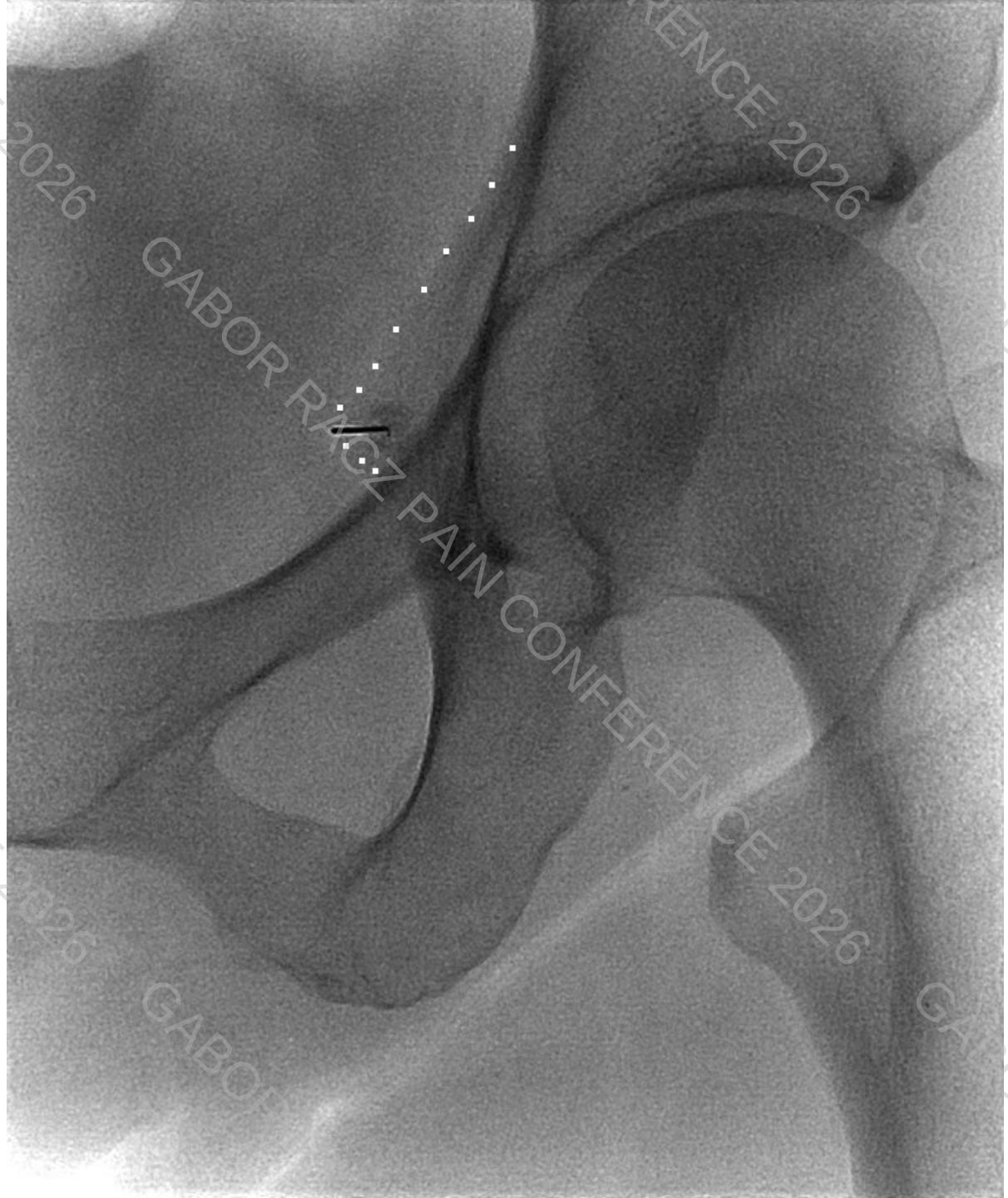
- Perineal, perirectal, vaginal/scrotal pain
- Coccydynia
- Anterior or posterior or intravaginal approach
- Selective branches to avoid unwanted effects

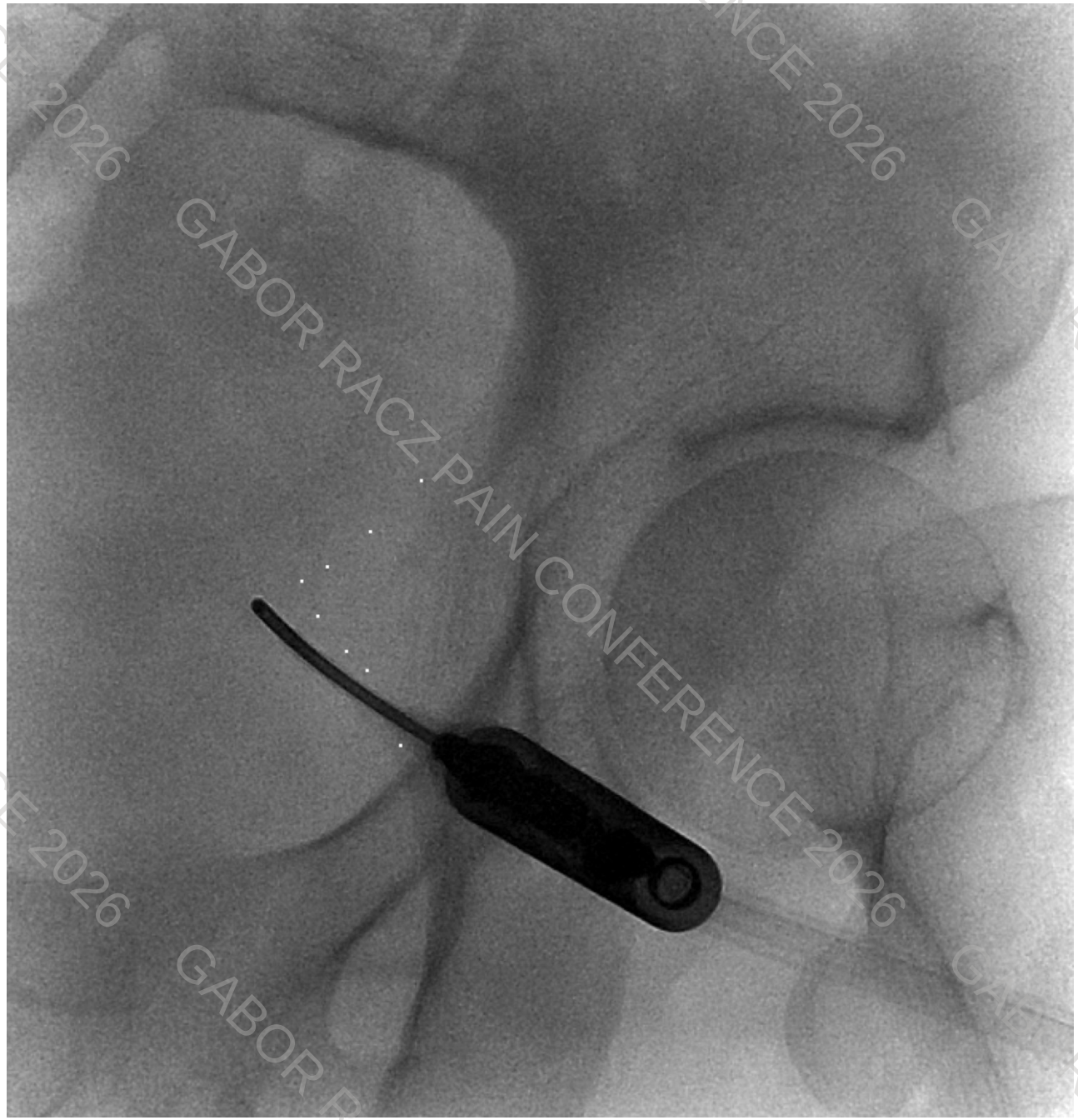


Pudendal Anatomy

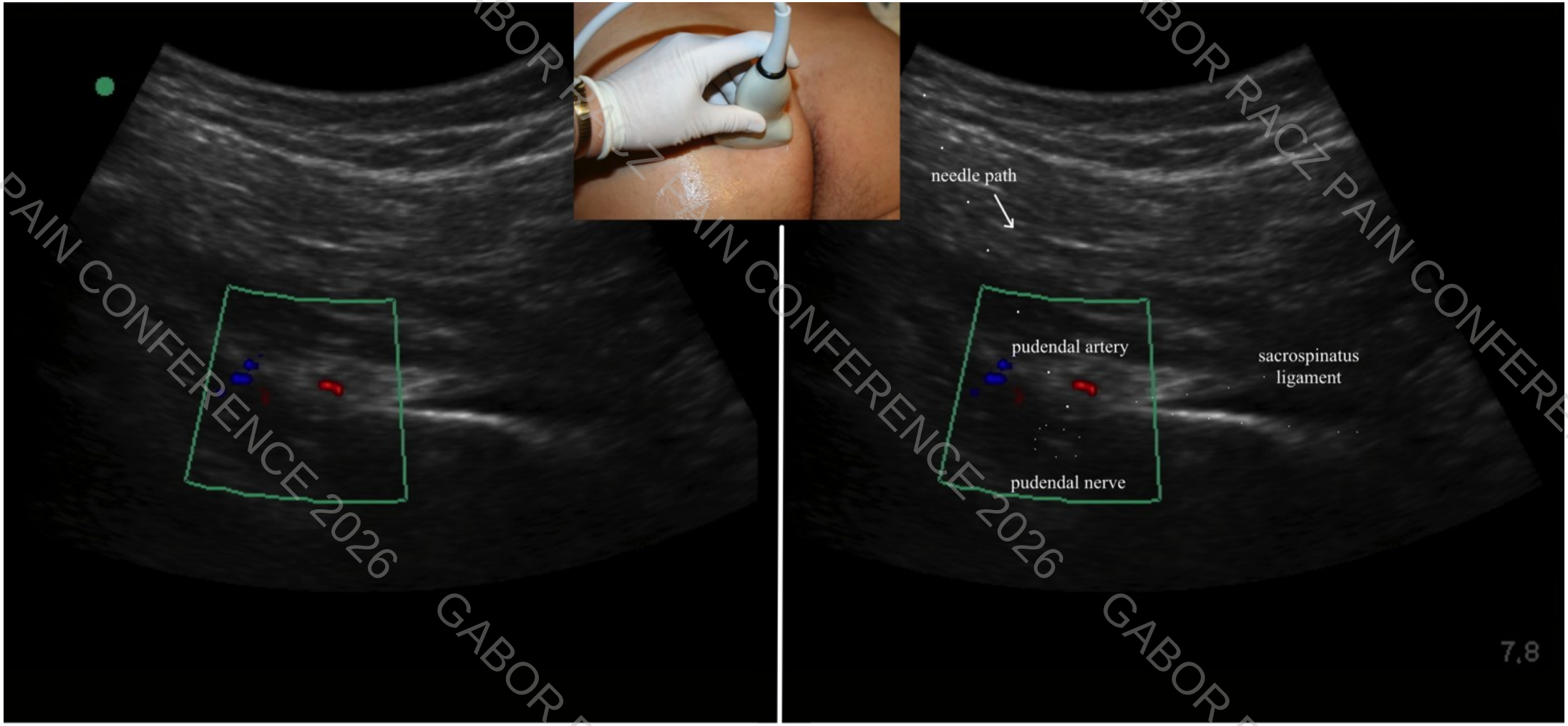


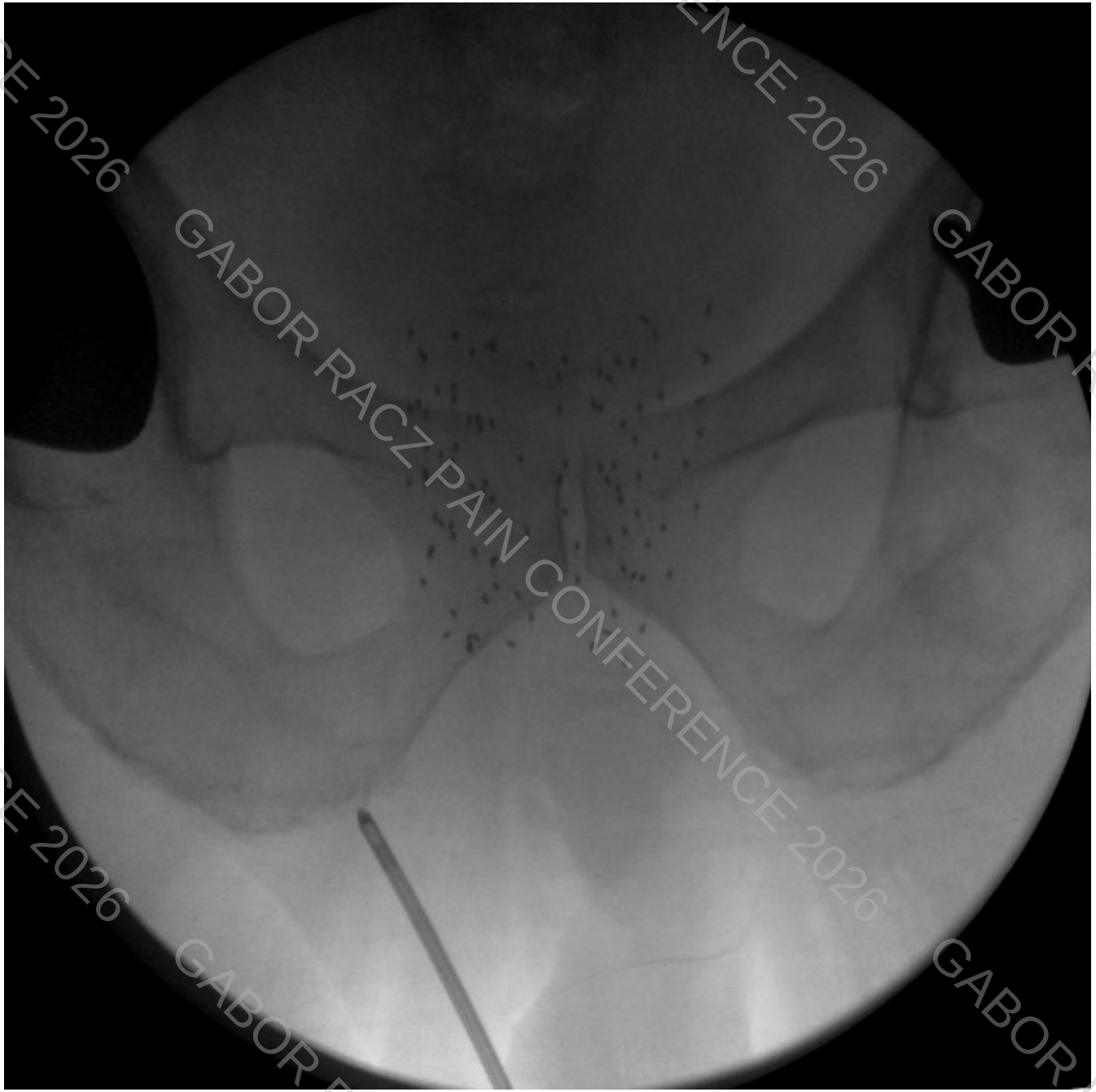






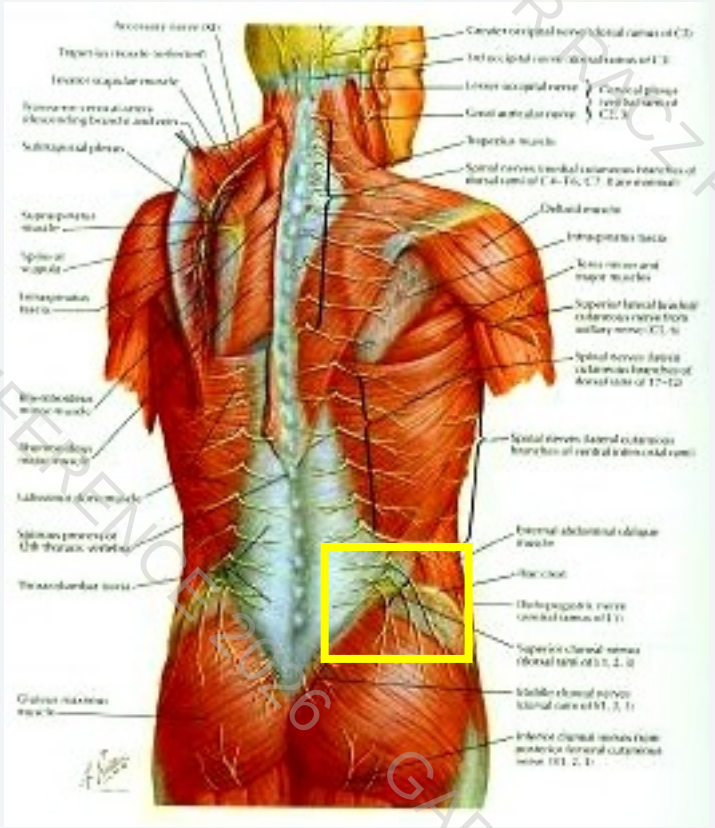
Pudendal under US

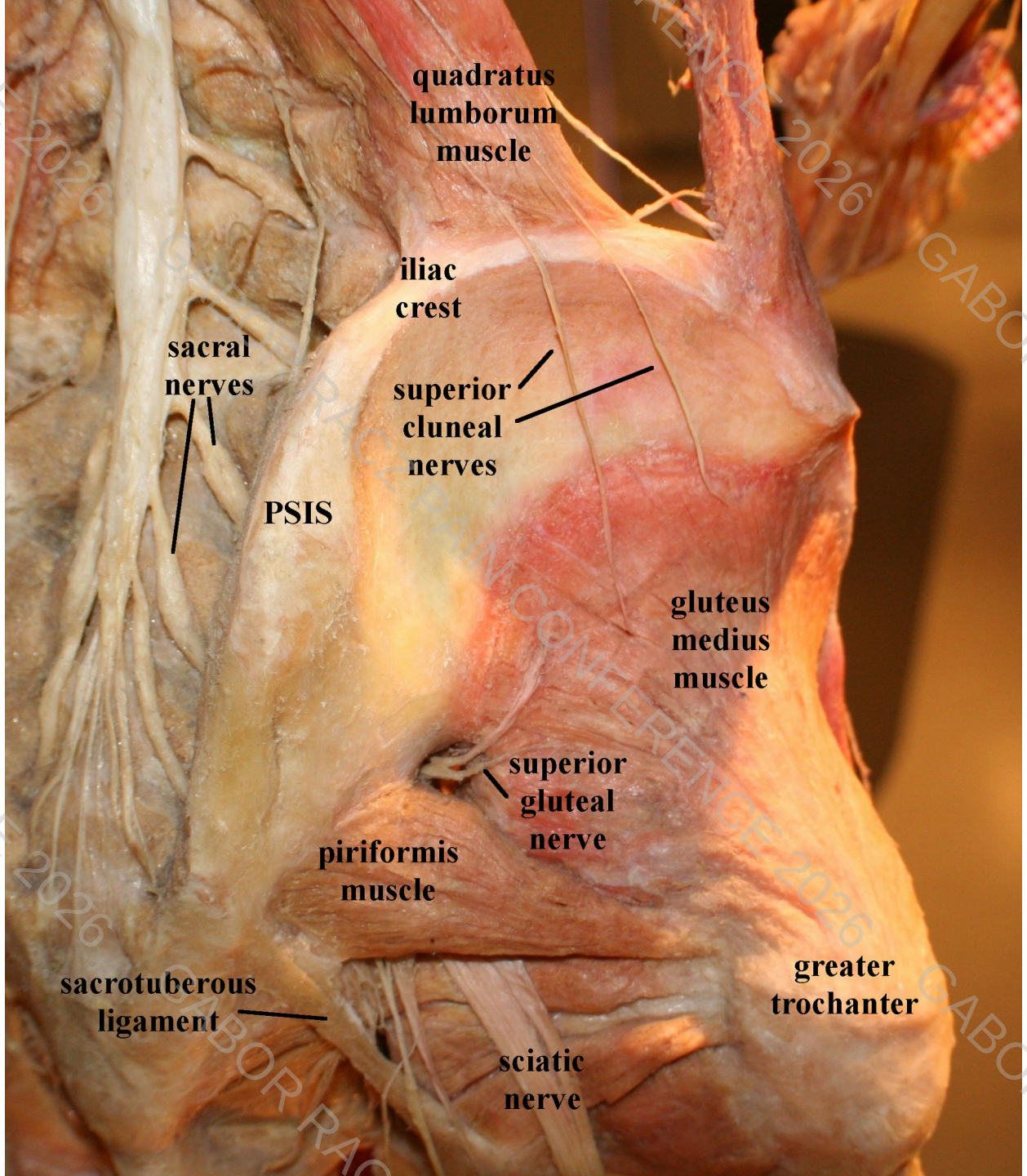




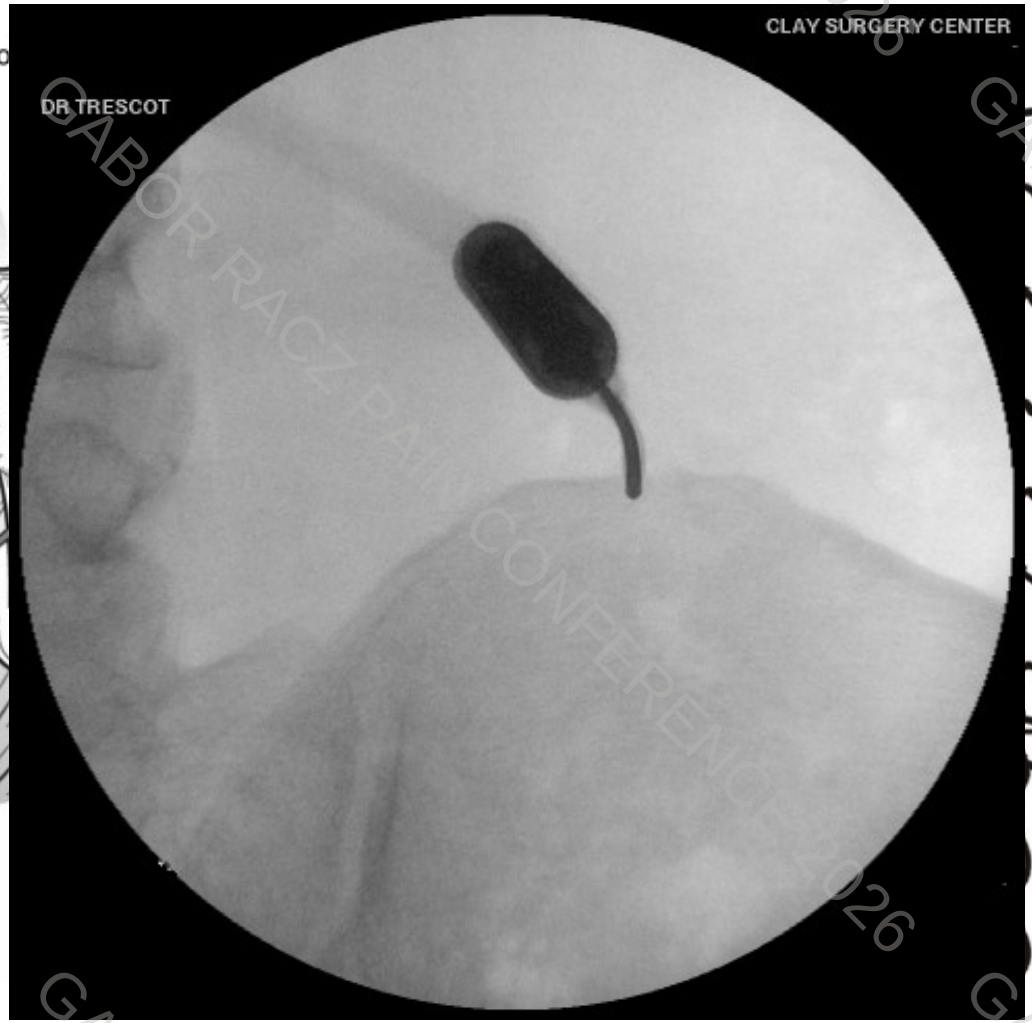
Cryo Superior Cluneal Nerve

- Iliac crest bone graft
- Thoracolumbar muscle entrapment
- Cluneal originates at thorocolumbar junction (L1,2,3)
- Maigne syndrome
- Refers to buttocks, posterior leg to the foot
- “Pseudosciatica”

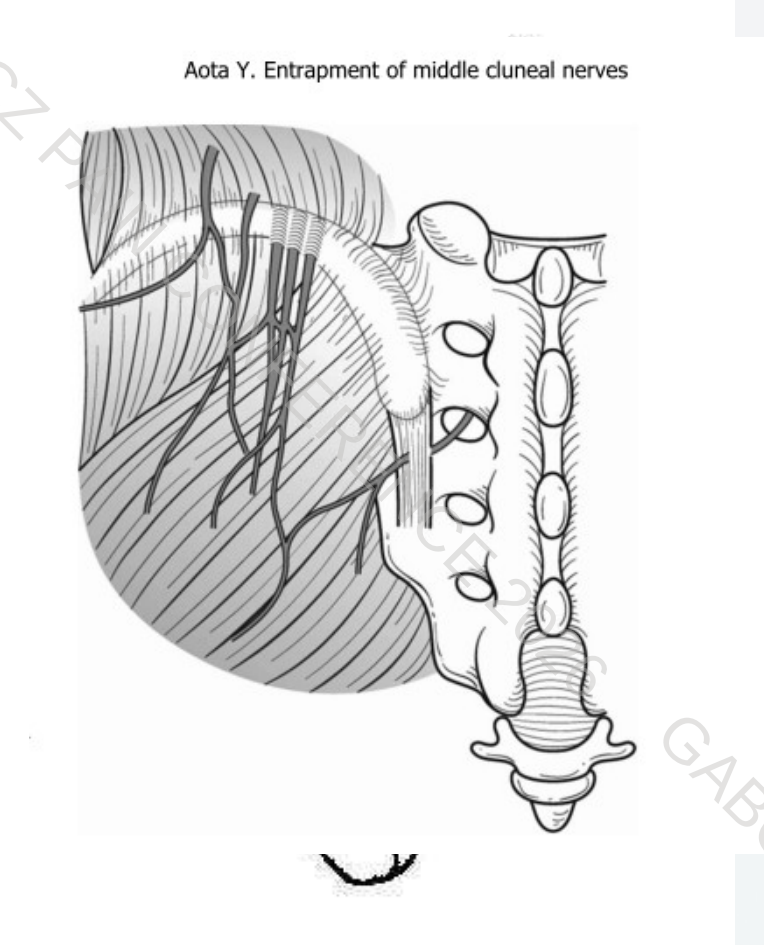


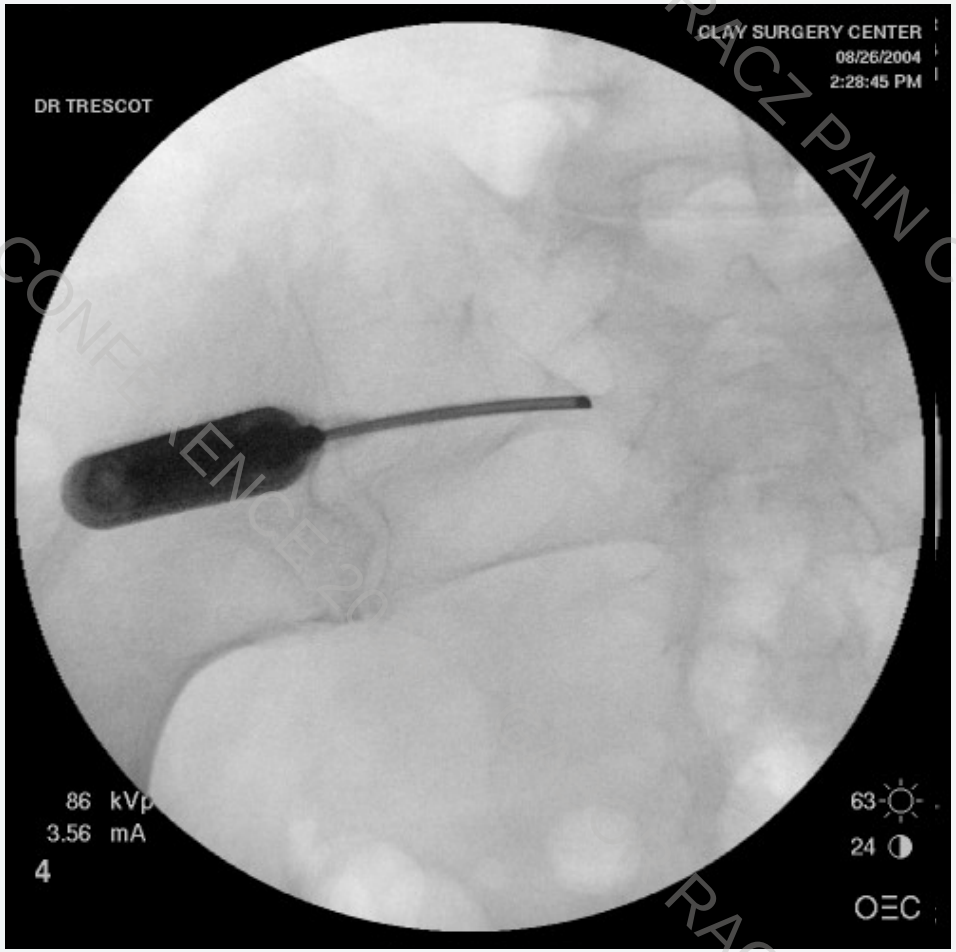

quadratus lumborum muscle
iliac crest
sacral nerves
superior cluneal nerves
PSIS
gluteus medius muscle
superior gluteal nerve
piriformis muscle
sacrotuberous ligament
greater trochanter
sciatic nerve

Aota Y. Entrapment o



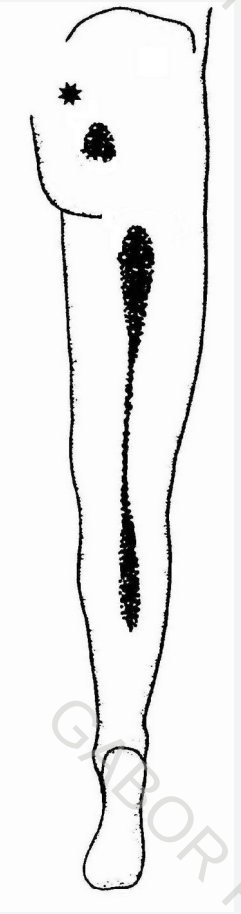
Cryo S2 Middle Cluneal Nerve

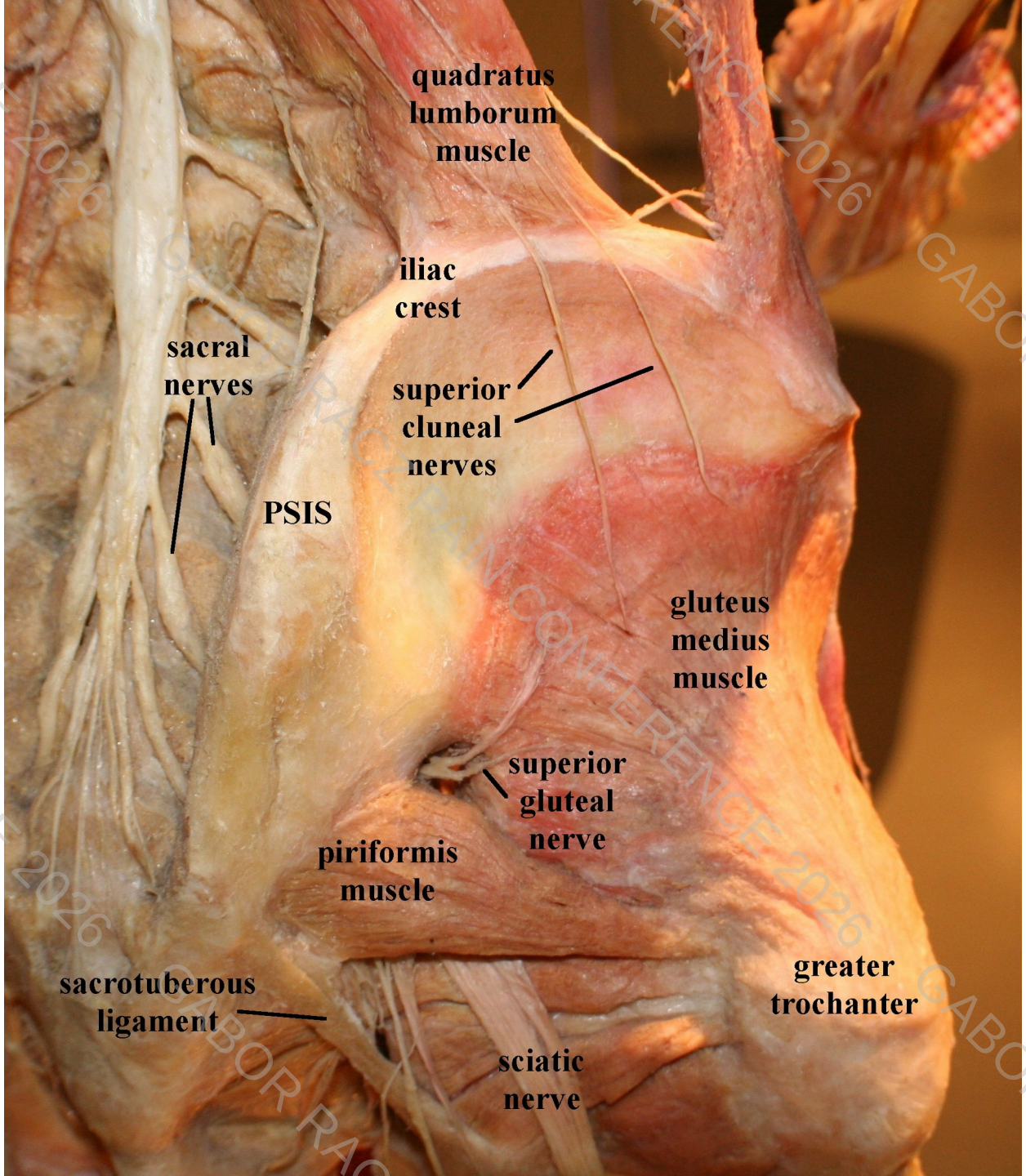


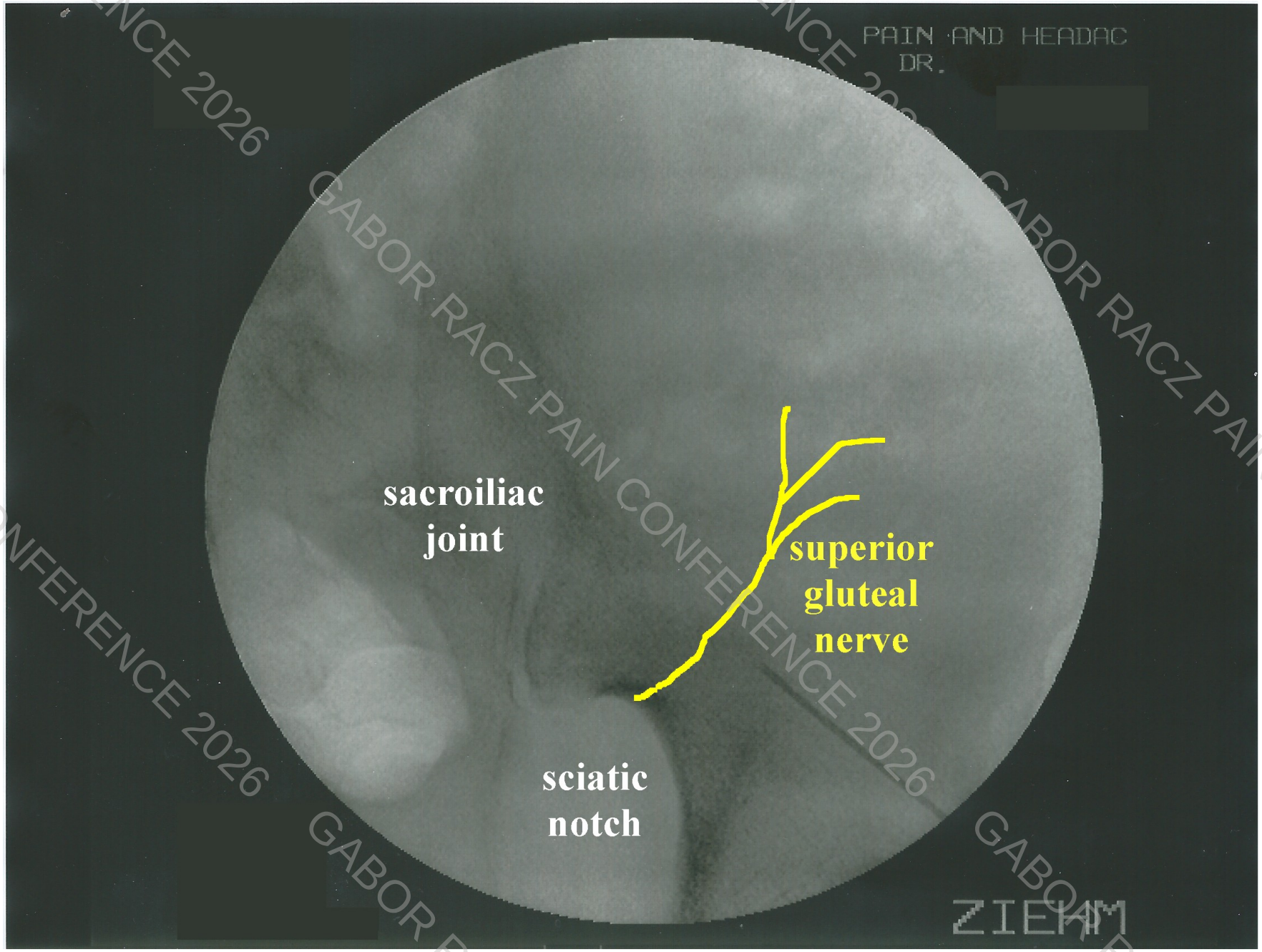


Cryo Superior Gluteal Nerve

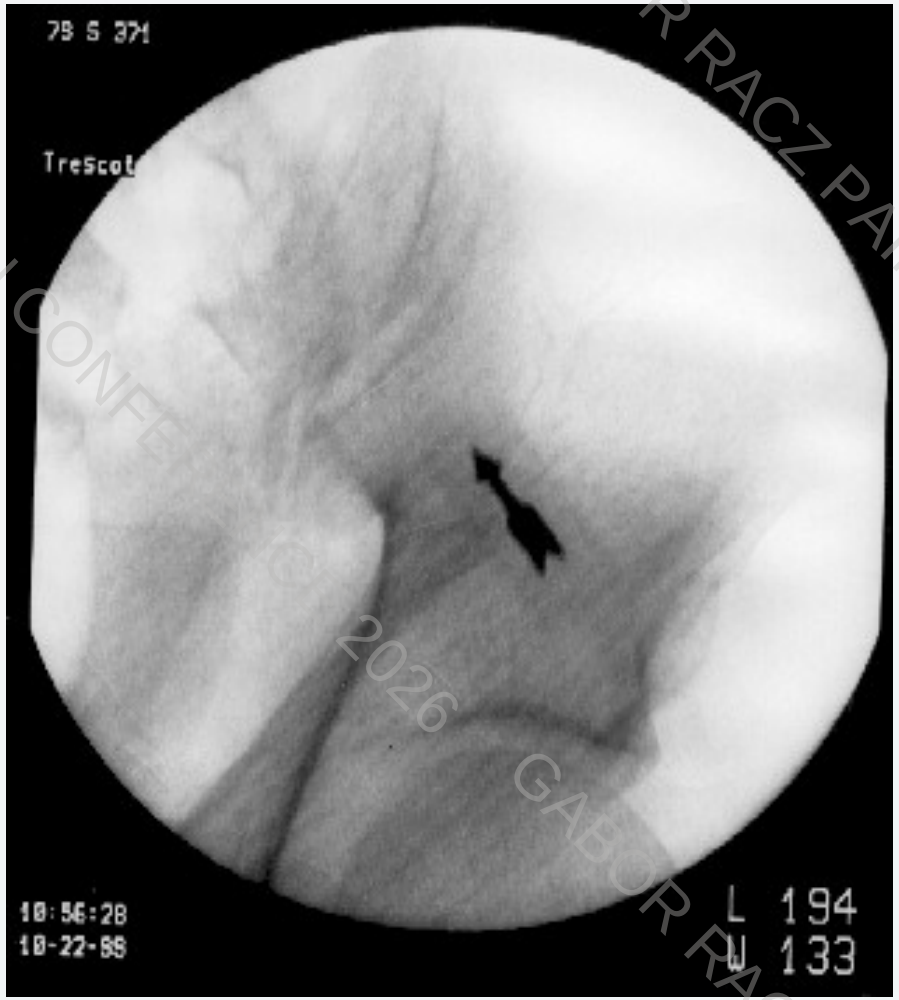
- Twisting/bending injury or fall on buttocks
- Pain from buttocks to foot
- Increased with standing and walking, better with sitting
- Difficulty getting out of a chair or climbing stairs

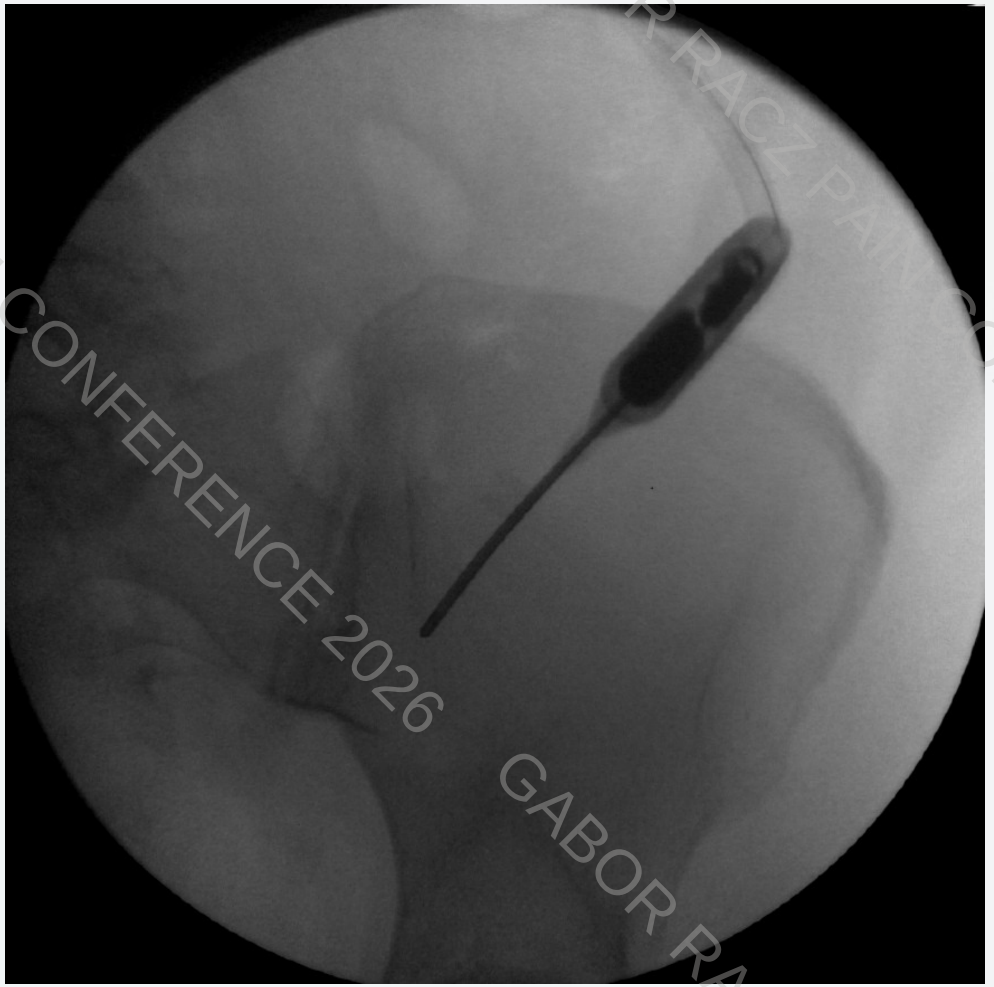




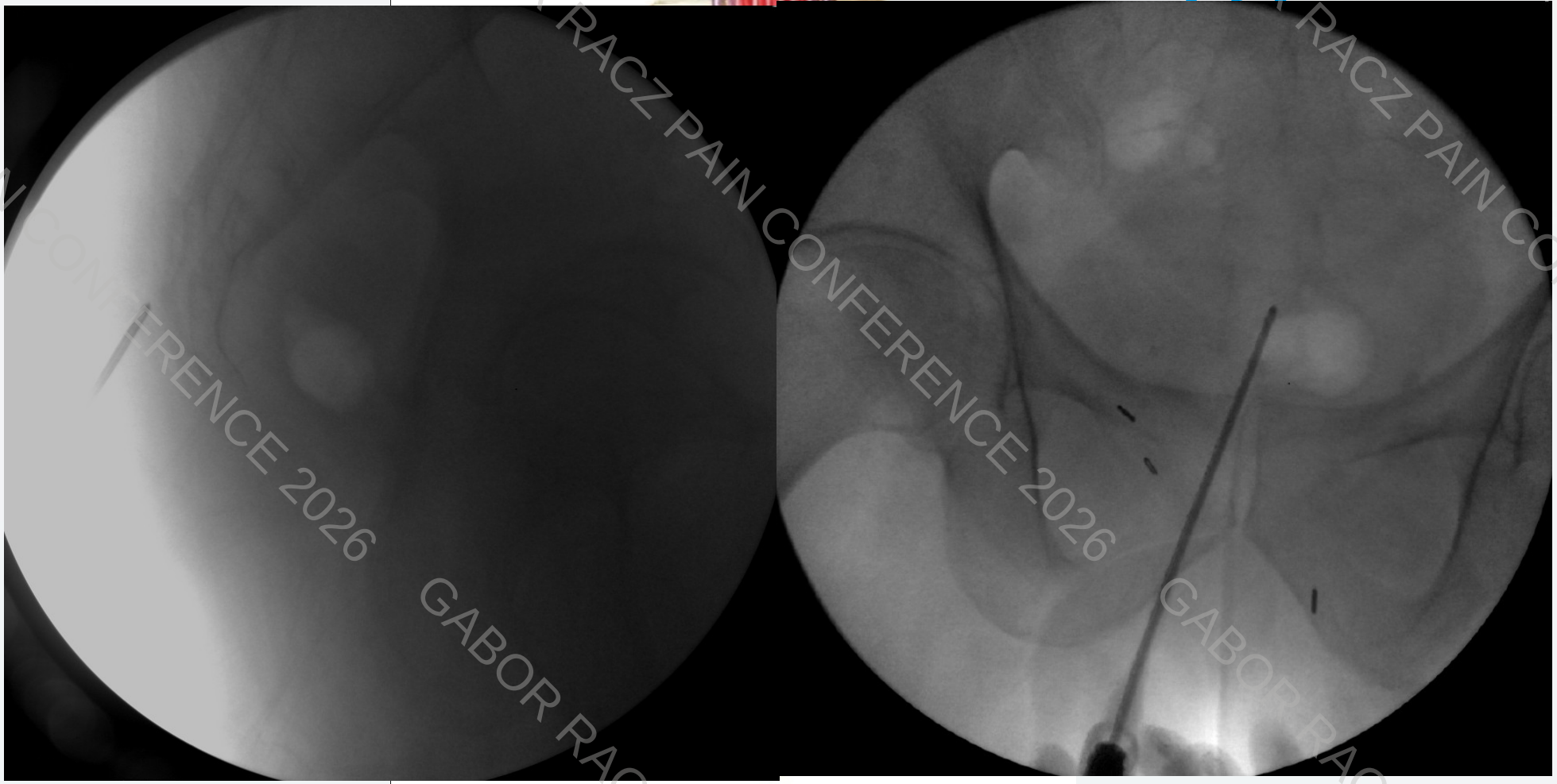


Cryo Superior Gluteal Nerve





Cryo Sacrococcygeal

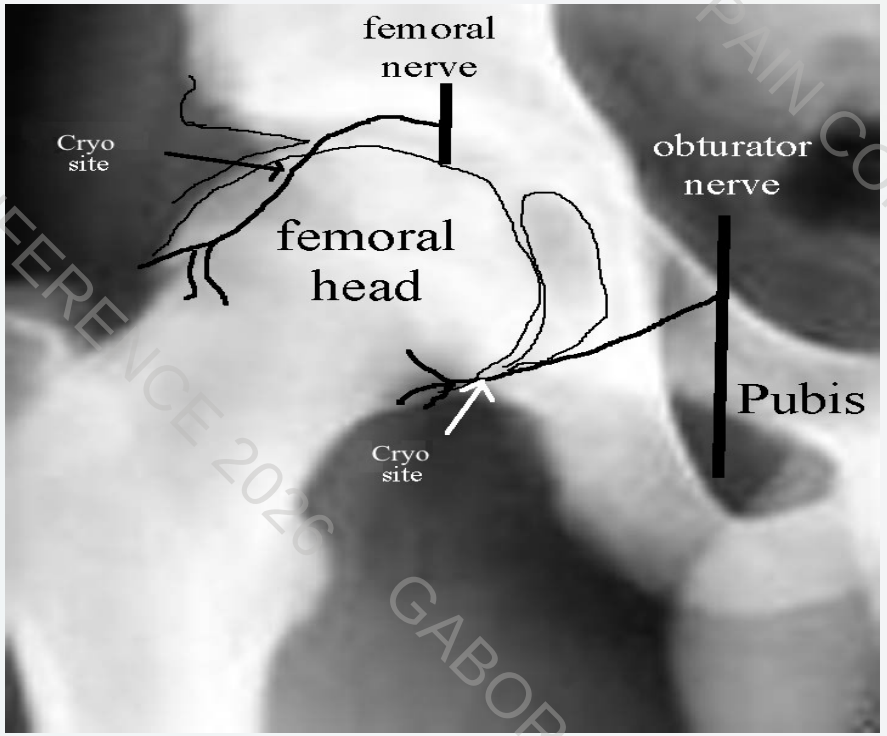


Cryo Ganglion of Impar (Walther)

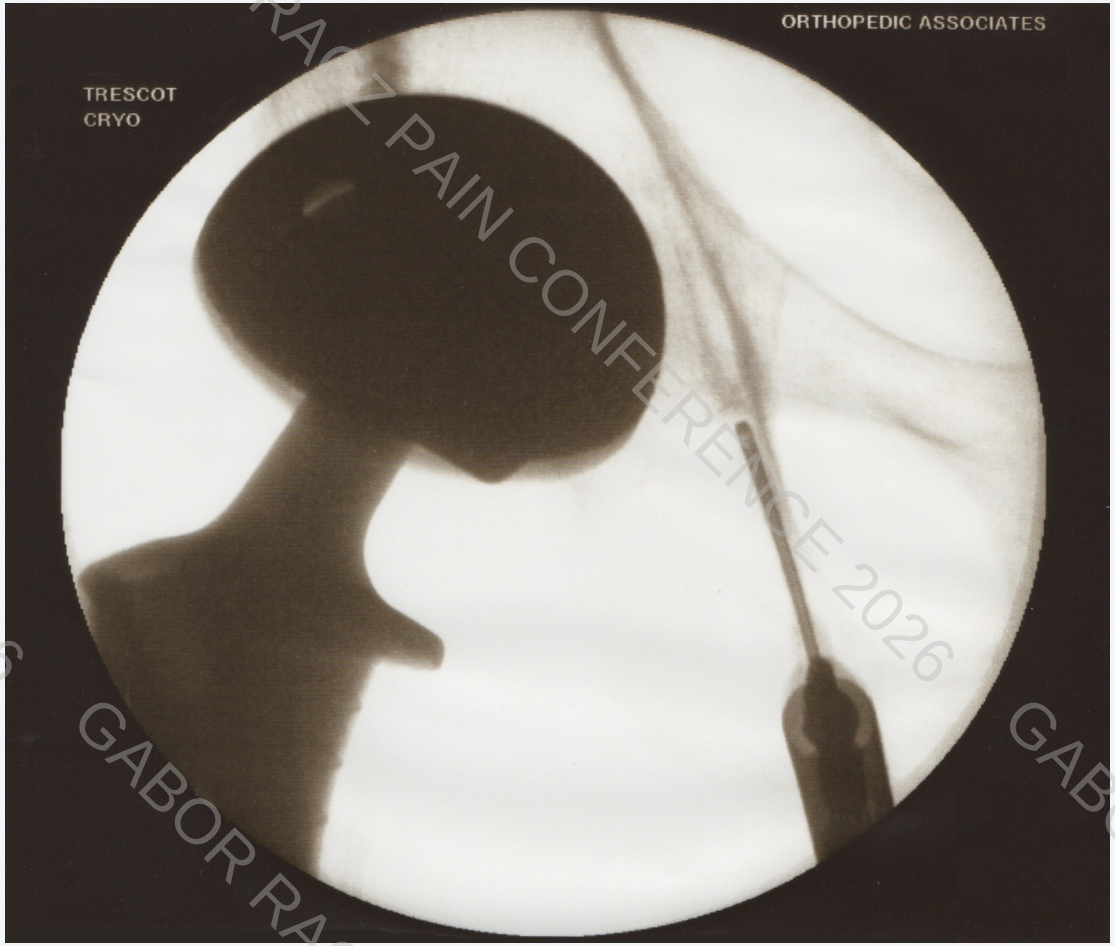
Image courtesy of Dr. Eleni Episkopou

Hip Joint Neuralgia

- The hip is innervated by branches of the femoral and obturator nerves
- Cryo denervation is used for hip DJD patients that are not surgical candidates and for postop pain

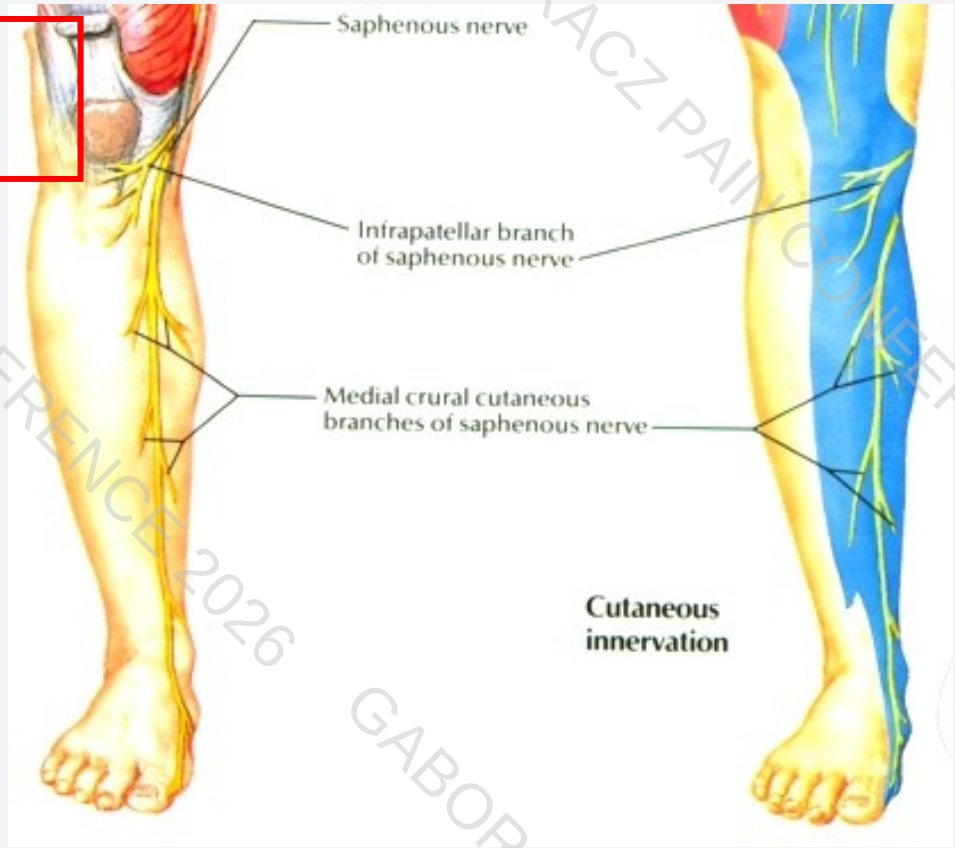


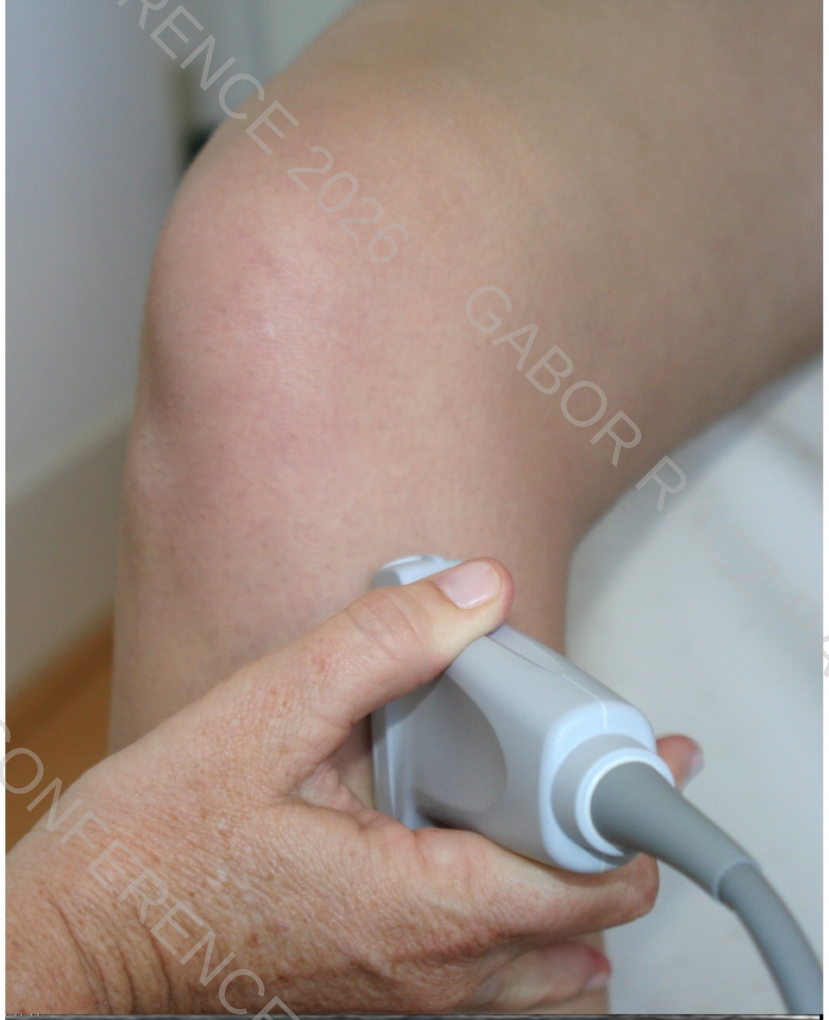
Cryo Obturator Nerve

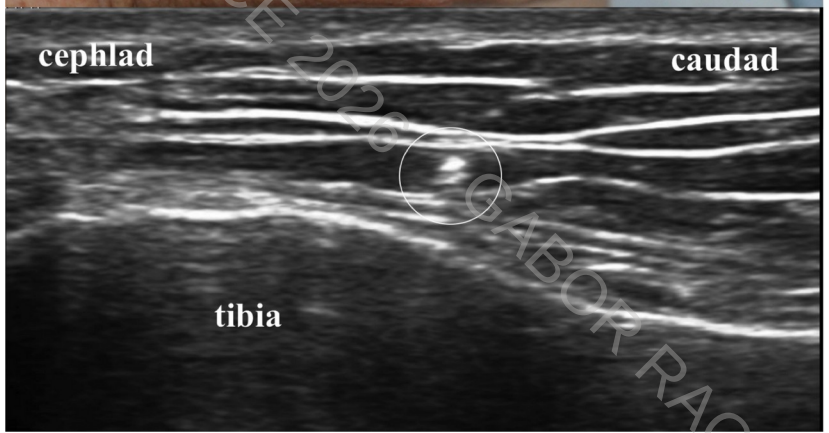


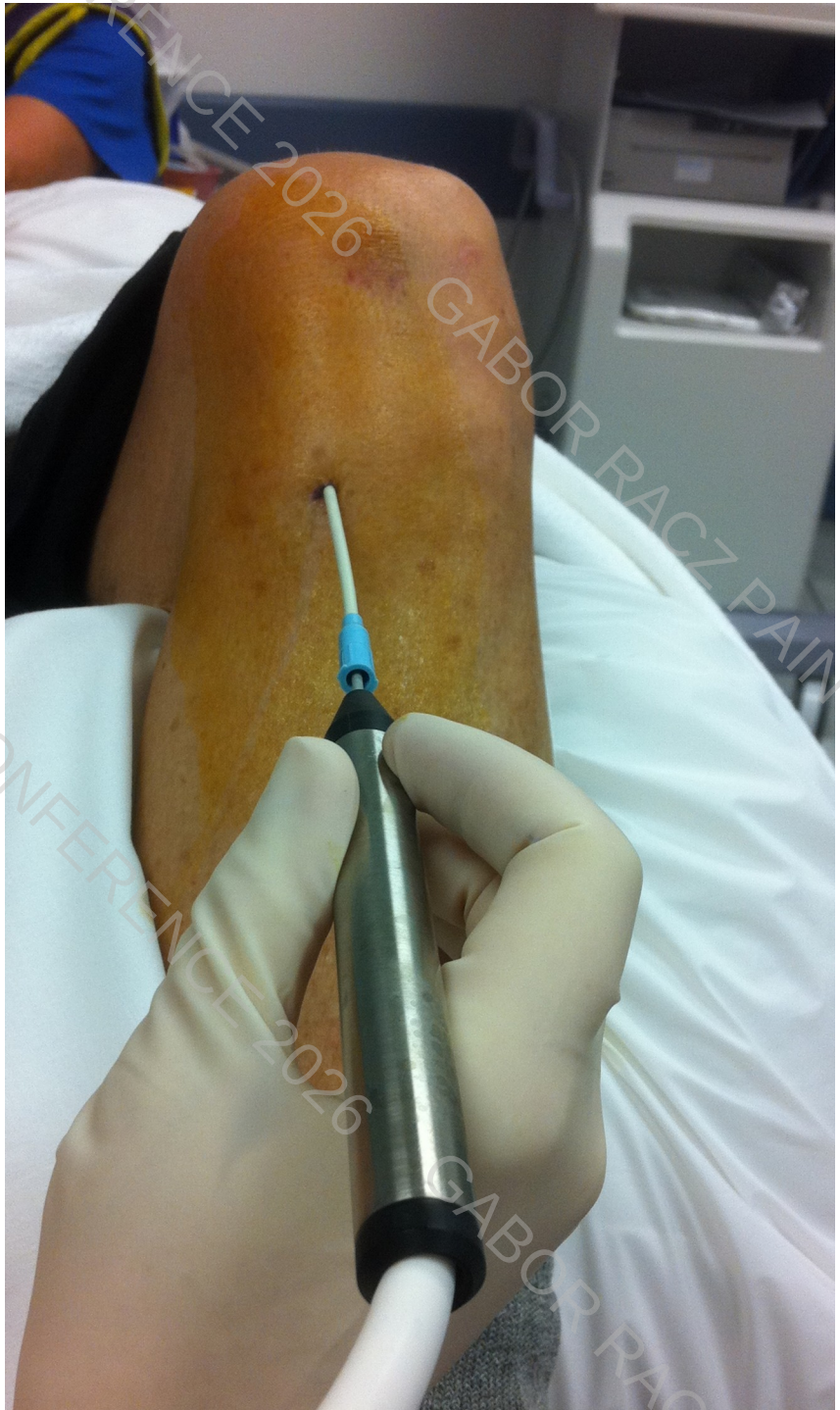
Cryo Infrapatellar Saphenous

- Blunt injury to tibial plateau or TKR
- Patients can't localize ("whole knee hurts")
- Occasionally refers to medial calf
- "CRPS"



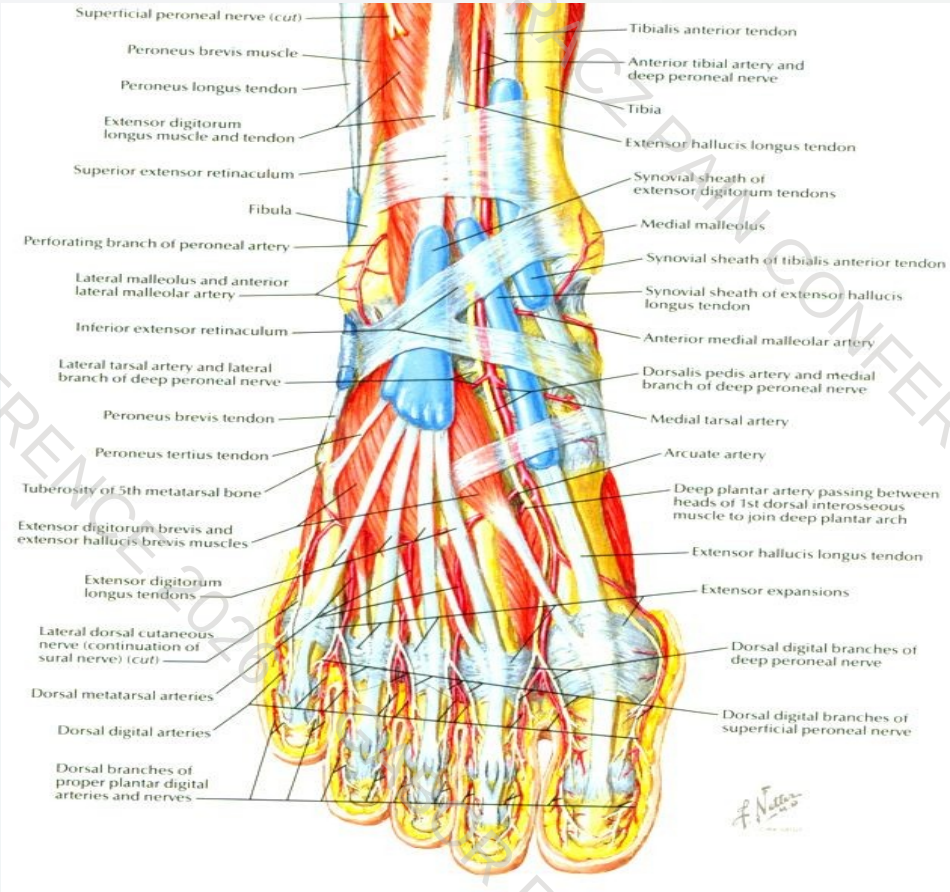


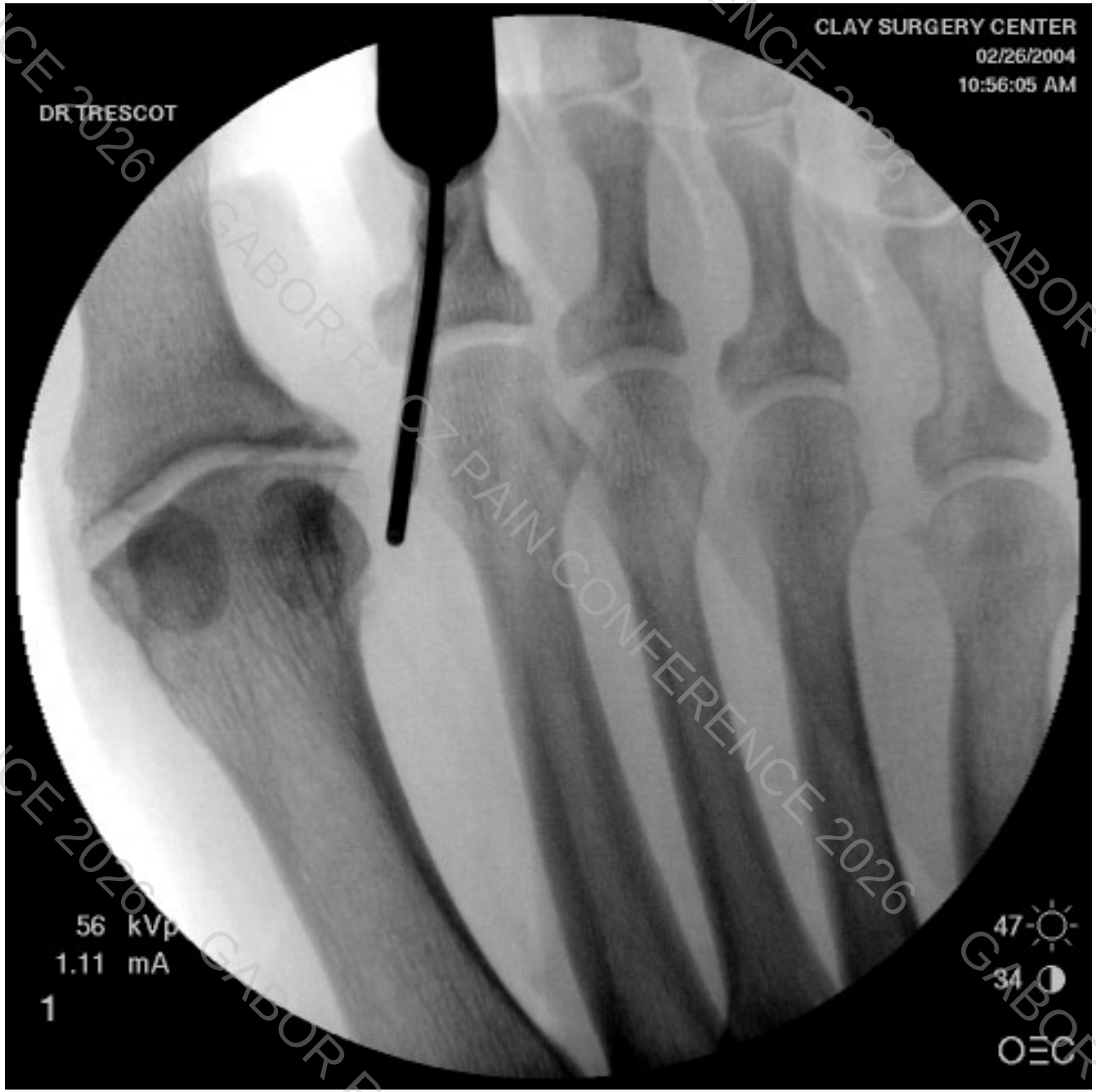




Digital Neuralgia

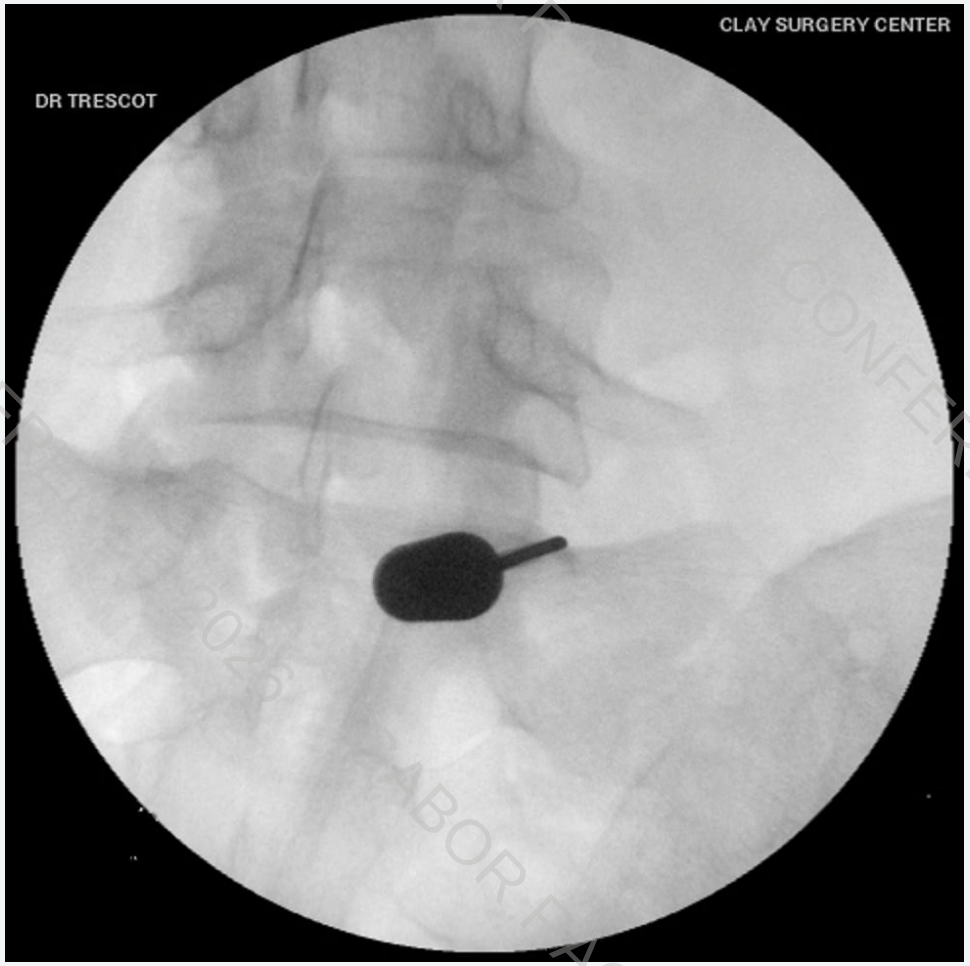
- Morton's Neuroma
- Dull or burning pain to toes or ball of foot, increased with standing
- Diabetics, poor fitting shoes
- Post op needs to be tx'd more proximally
- Deep peroneal treated similarly
- Treatment for peripheral neuropathy





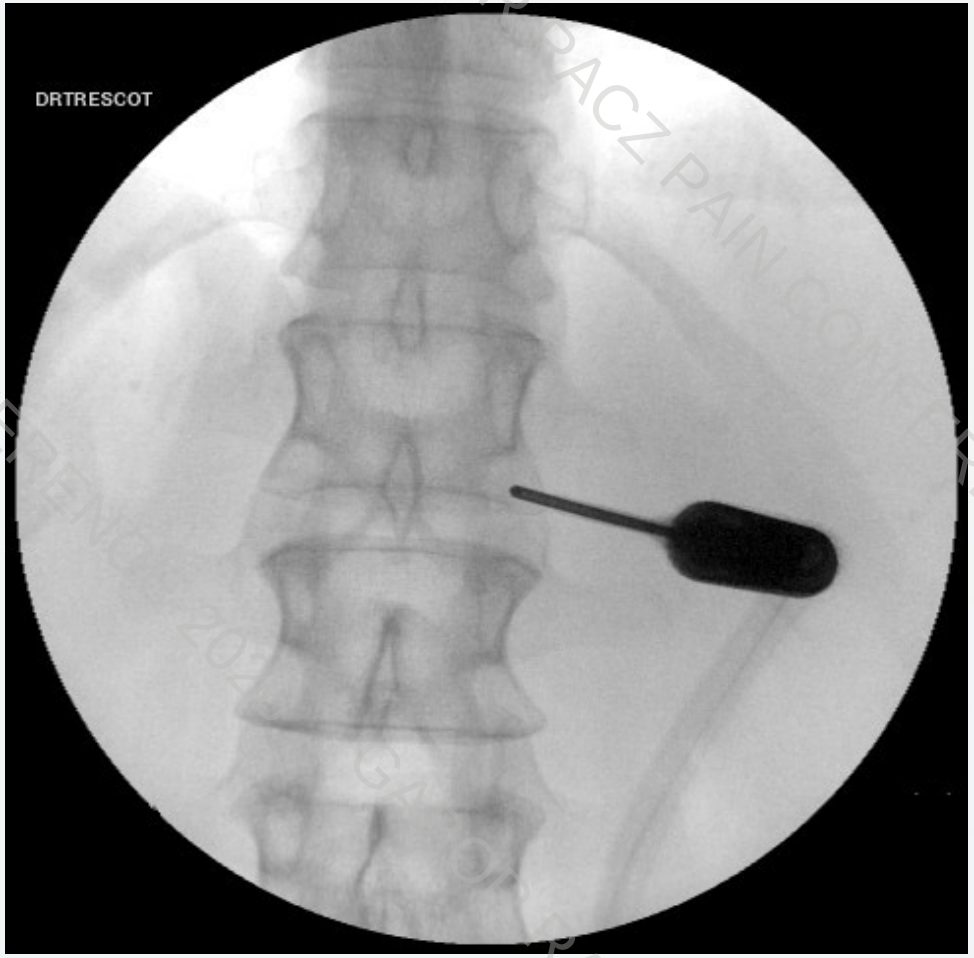
Cryo Facets

- Median branch denervation
- Large lesion
- No postop flair
- “Virgin” backs
- Best if coupled with rehabilitation
- Avoids “Charcot joints”



Cryo DRG

- Cryo denervation of the proximal nerve root and DRG can be used to treat neuropathic pain at its source without neuritis and with reliable return of full motor function



Cryo Postop Pain

Ultrasound-Guided Percutaneous Cryoneurolysis for

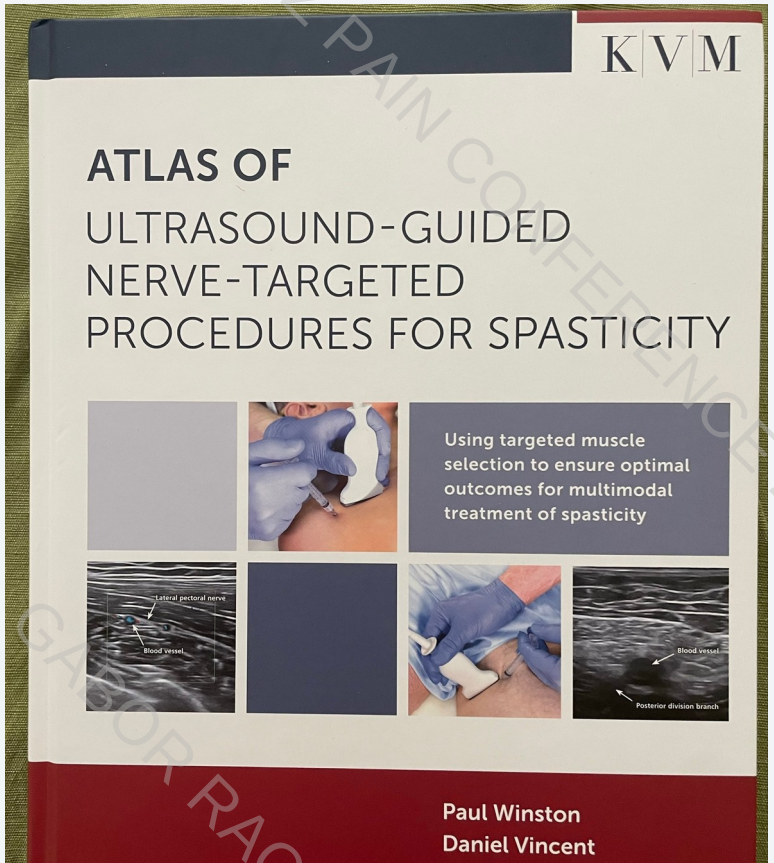
British Journal of Anaesthesia **119** (4): 709–12 (2017)
Advance Access publication 14 July 2017 • doi:10.1093/bja/aex142

Ultrasound-guided percutaneous cryoneurolysis for treatment of acute pain: could cryoanalgesia replace continuous peripheral nerve blocks?

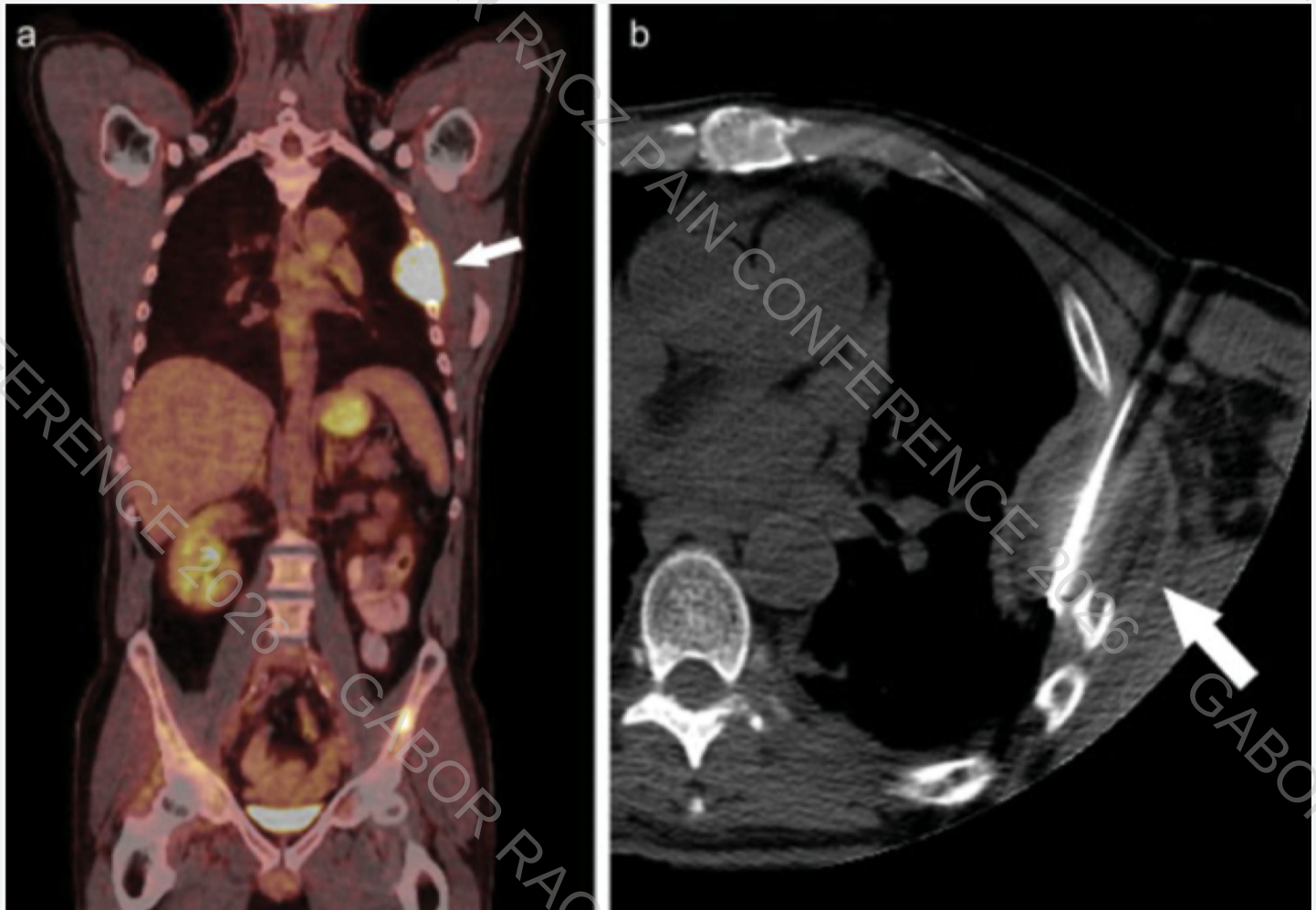
Ultrasound-Guided Lateral Femoral Cutaneous Nerve Cryoneurolysis for Analgesia in Patients With Burns

Article *in* Journal of burn care & research: official publication of the American Burn Association · November 2019
DOI: 10.1093/jbcr/irz192

Cryo For Spasticity



Cryo for Tumors



Original Article

Management of Pleural Space After Lung Resection by Cryoneuroablation of Phrenic Nerve: A Randomized Study

Surgical Innovation
1–5

DOI: 10.1177/1553350616685201
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Cryo Vagotomy for Hunger

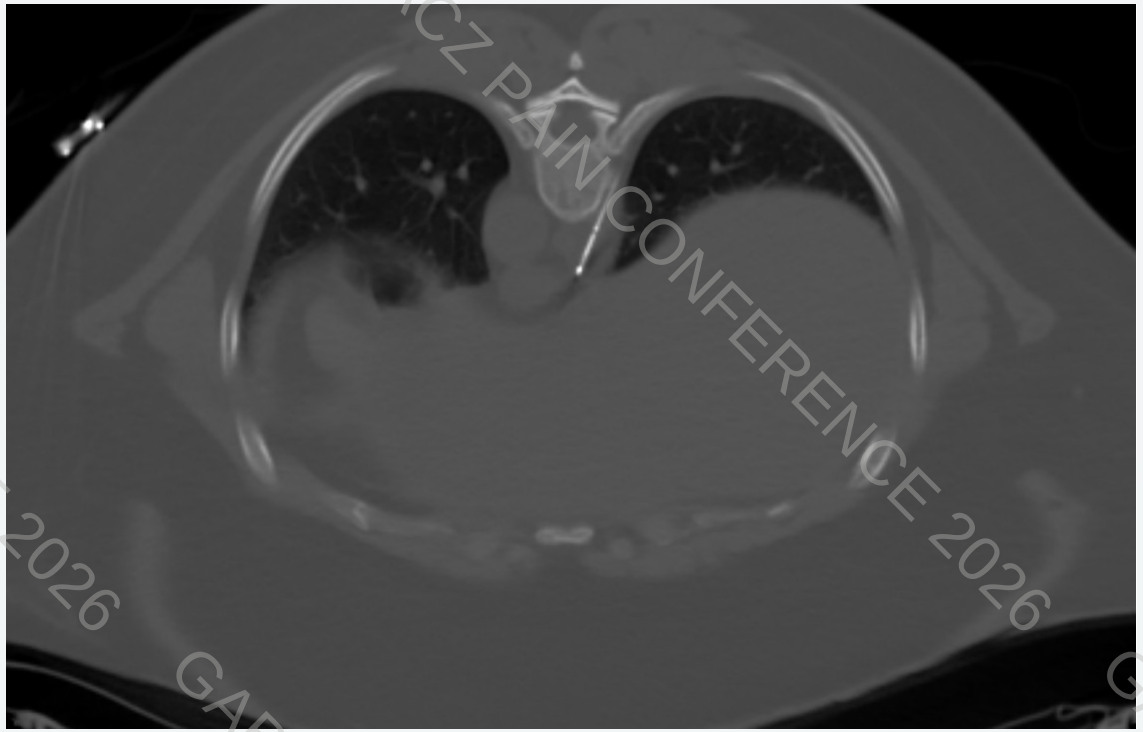

Image courtesy of Dr. David Prologo

Cryo Advances

- Cryoneuroablation is resurging because of a combination of
  - New recognition of peripheral nerve pathology
  - New imaging techniques (ultrasound)
  - New equipment
- It is the treatment of choice for treatment of entrapment of large, myelinated nerves

Cryo Advantages

- Immediate pain reduction
- No neuroma formation - no risk of secondary pain
- High efficiency: pain reduction from 6 months to lifelong
- Can be repeated - nerve grows back
- Simple diagnostics: fluoroscopy or ultrasound
- No scar tissue formation
- Suitable for patients with pacemakers and stimulators
- No risk of vessel proliferation and obliteration

Conclusion

- Cryoneuroablation is particularly well suited to treat peripheral nerve entrapment and neuromas
- Ultrasound is particularly well suited for identification of peripheral nerve entrapments and neuroma identification
- The marriage of cryoneuroablation and ultrasound should improve the diagnosis and treatment of peripheral nerve pathology


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The Power of Ice

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