Spinal Endoscopy
State of the Art

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Nord – Grupul Medical Provita

Disclosure

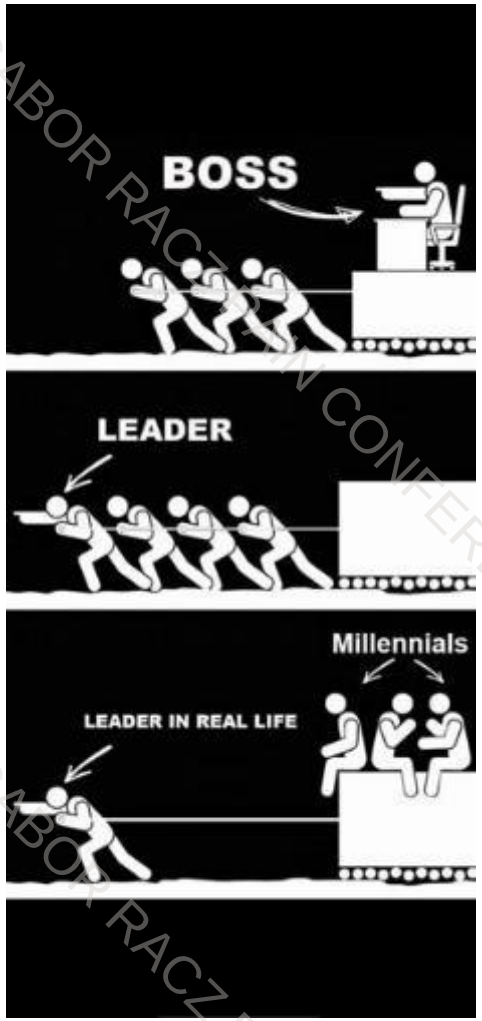
- Elliquence consultant and trainer
- I didn't use AI for this presentation

Who are we, who am I?

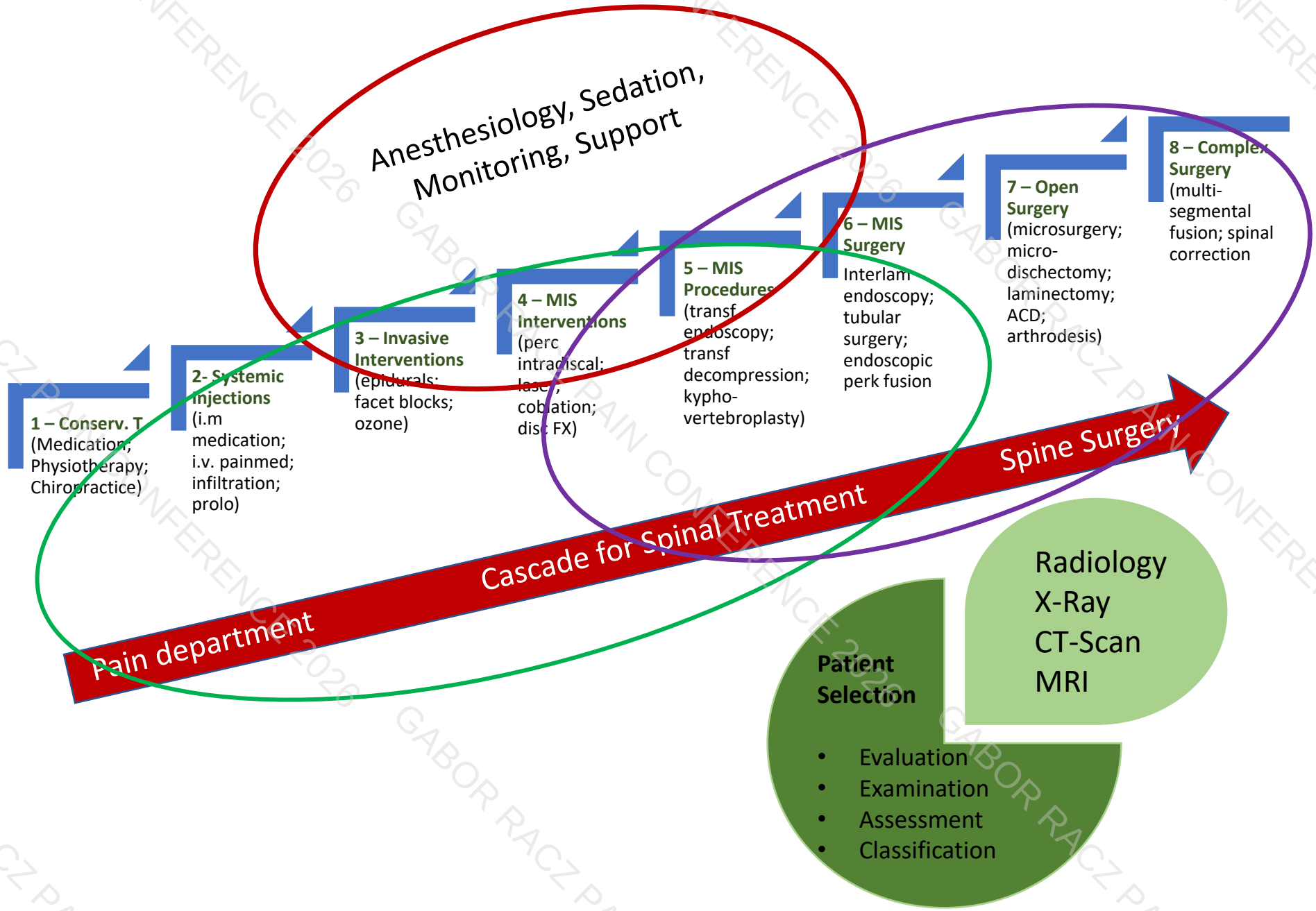
- Anesthesia and Critical Care
- 2010 Pain Management
- 2012 1st Multidisciplinary Pain Ctr
- 2016 ProVita Hospital Bucharest
- 2024 Nord Hospital

NORD Hospital, Bucharest Romania

What is State of the Art?



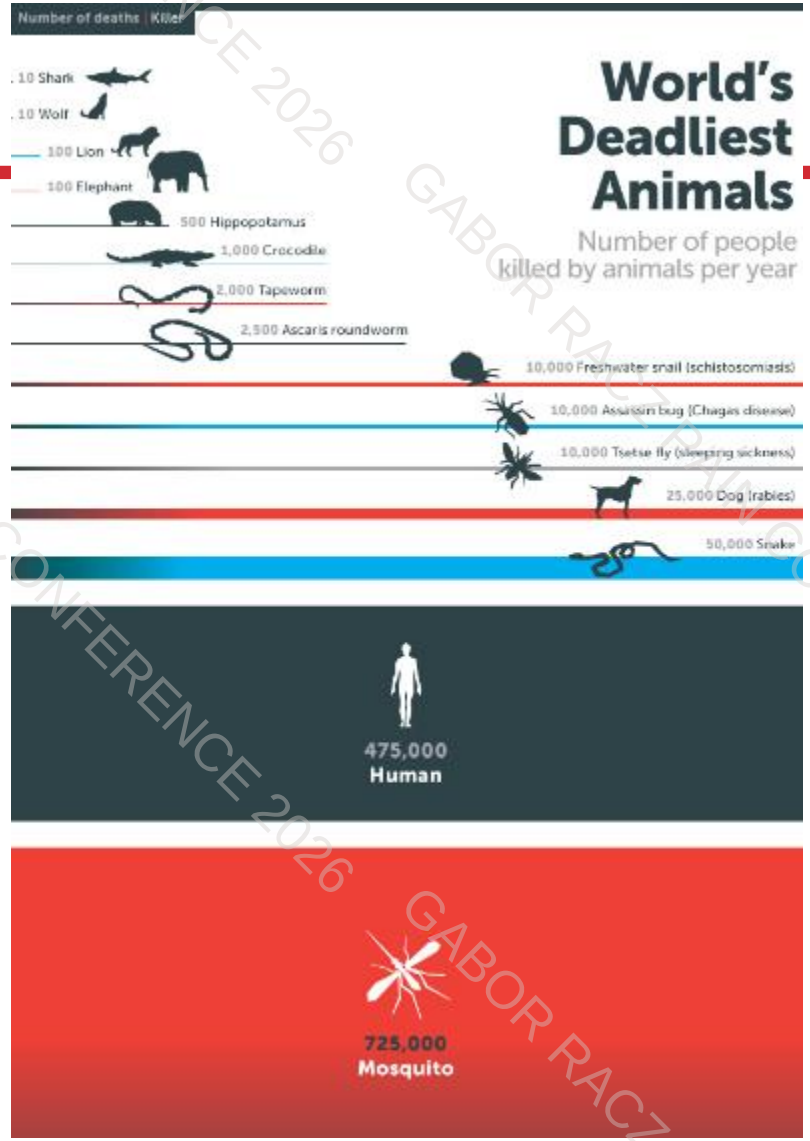
- We all know what It means ...but:
  - State of the Art versus Standard of Care
  - Cross the lane?
  - Where do you stop?
  - Did you reach your limit?
  - Didn't you take too much risk?
  - Deal with the complications


Anesthesiology, Sedation, Monitoring, Support
1 – Conserv. T (Medication; Physiotherapy; Chiropractice)
2- Systemic Injections (i.m medication; i.v. painmed; infiltration; prolo)
3 – Invasive Interventions (epidurals; facet blocks; ozone)
4 – MIS Interventions (perc intradiscal; laser; coblation; disc FX)
5 – MIS Procedures (transf endoscopy; transf decompression; kypho-vertebroplasty)
6 – MIS Surgery Interlam endoscopy; tubular surgery; endoscopic perk fusion
7 – Open Surgery (microsurgery; micro-dischectomy; laminectomy; ACD; arthrodesis)
8 – Complex Surgery (multi-segmental fusion; spinal correction
Pain department
Cascade for Spinal Treatment
Spine Surgery
Radiology
X-Ray
CT-Scan
MRI
Patient Selection
Evaluation
Examination
Assessment
Classification

A Hungry Doctor is a DANGEROUS Animal!

The Goal Today:

- Push the limits?
- New Horizon?
- Think Outside the box?

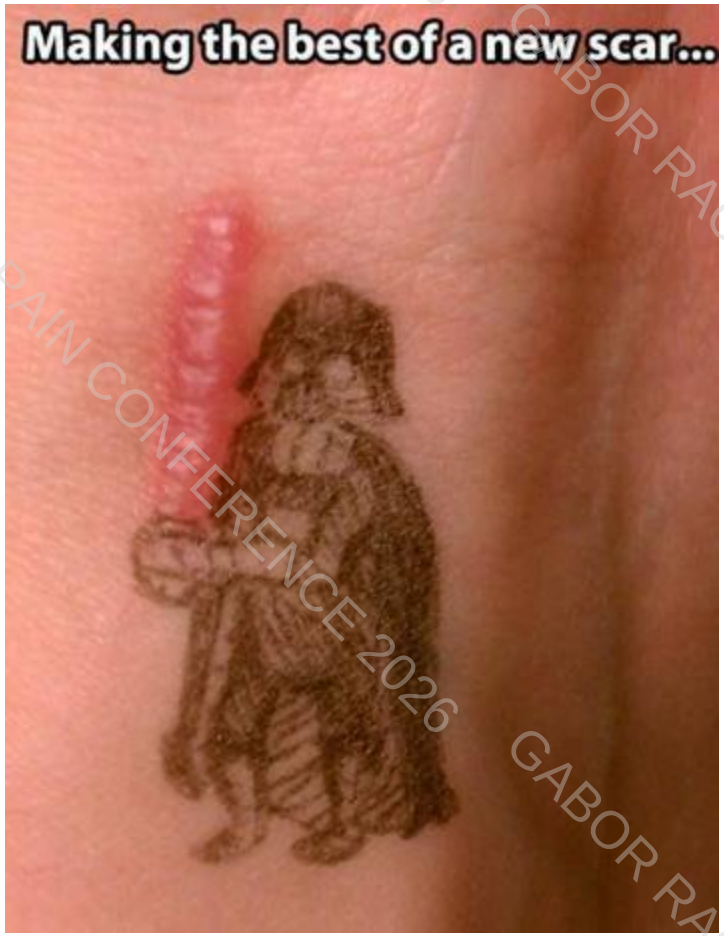


PELD or Classic?

What is better:

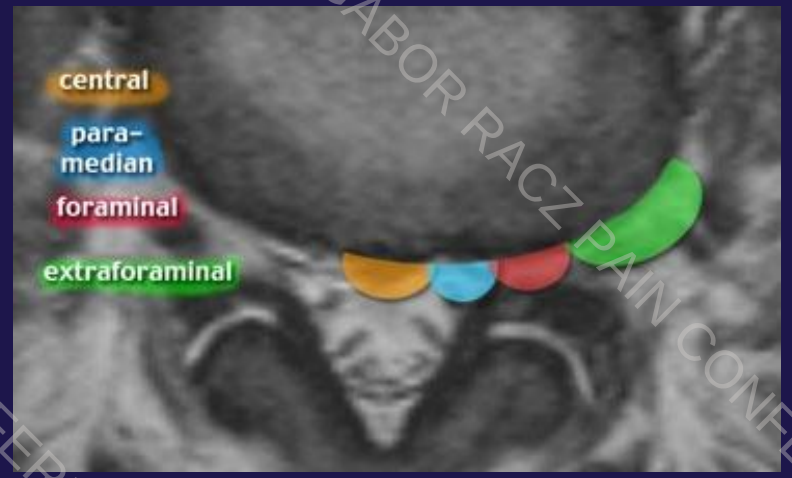
- Gas or Electric?

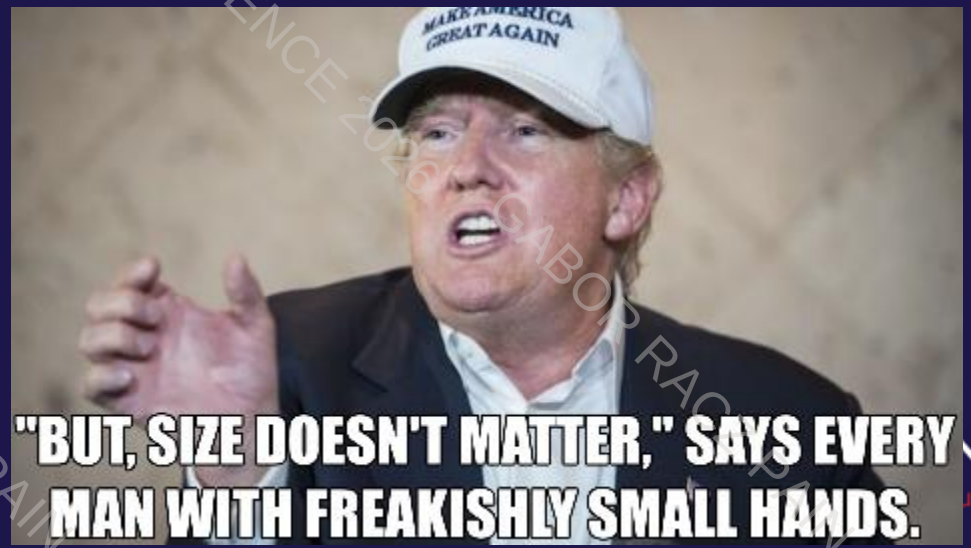
End of an Era



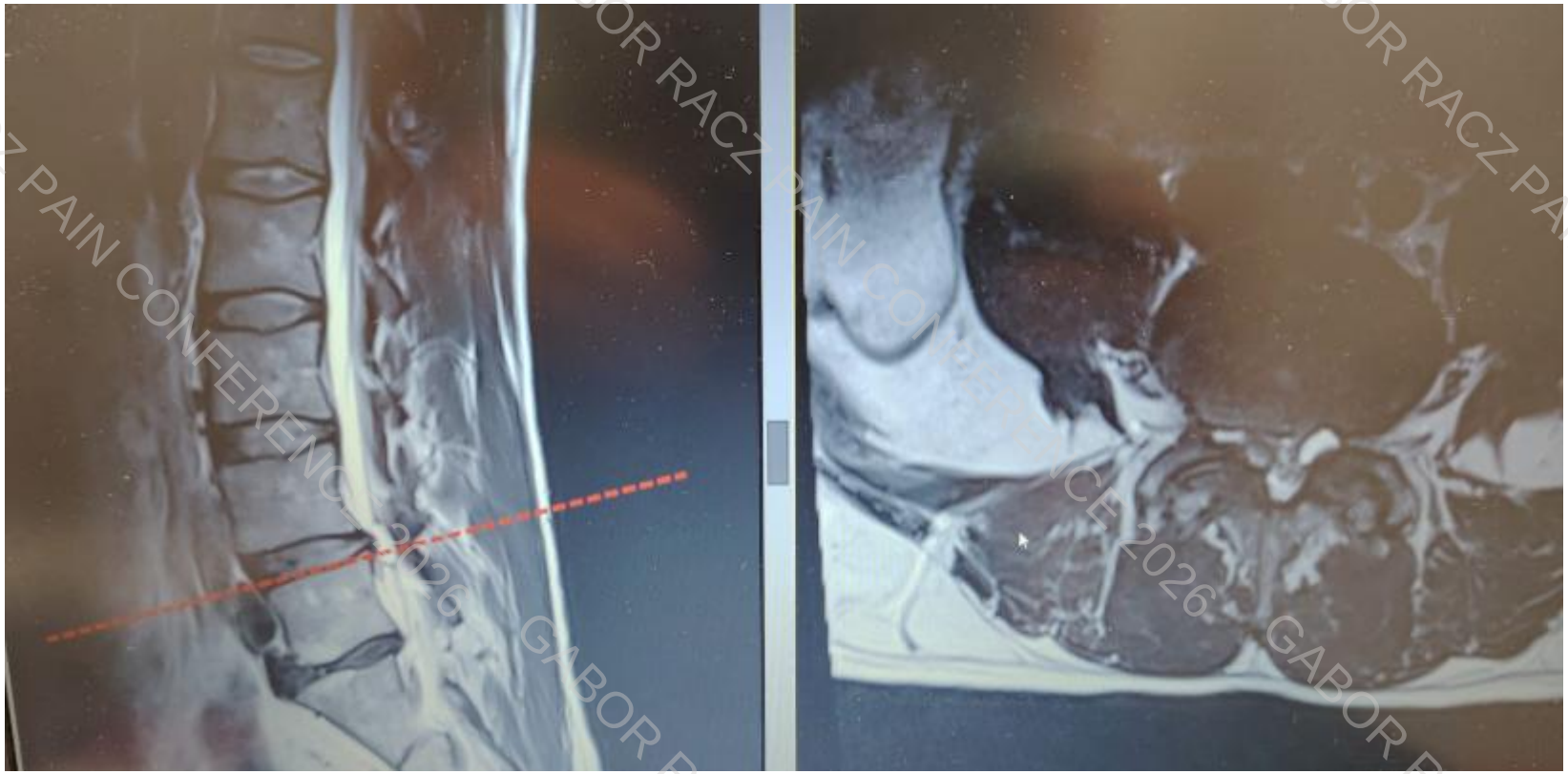
Indications – any source of root irritation

- Pretty much any type of Lumbar Hernias and higher!!
- Foraminal Stenosis
- Recess Stenosis
- *Recurrent Hernia*
- Spinal Stenosis
- Cyst
- Failed back?





Synovial Cyst by PELD



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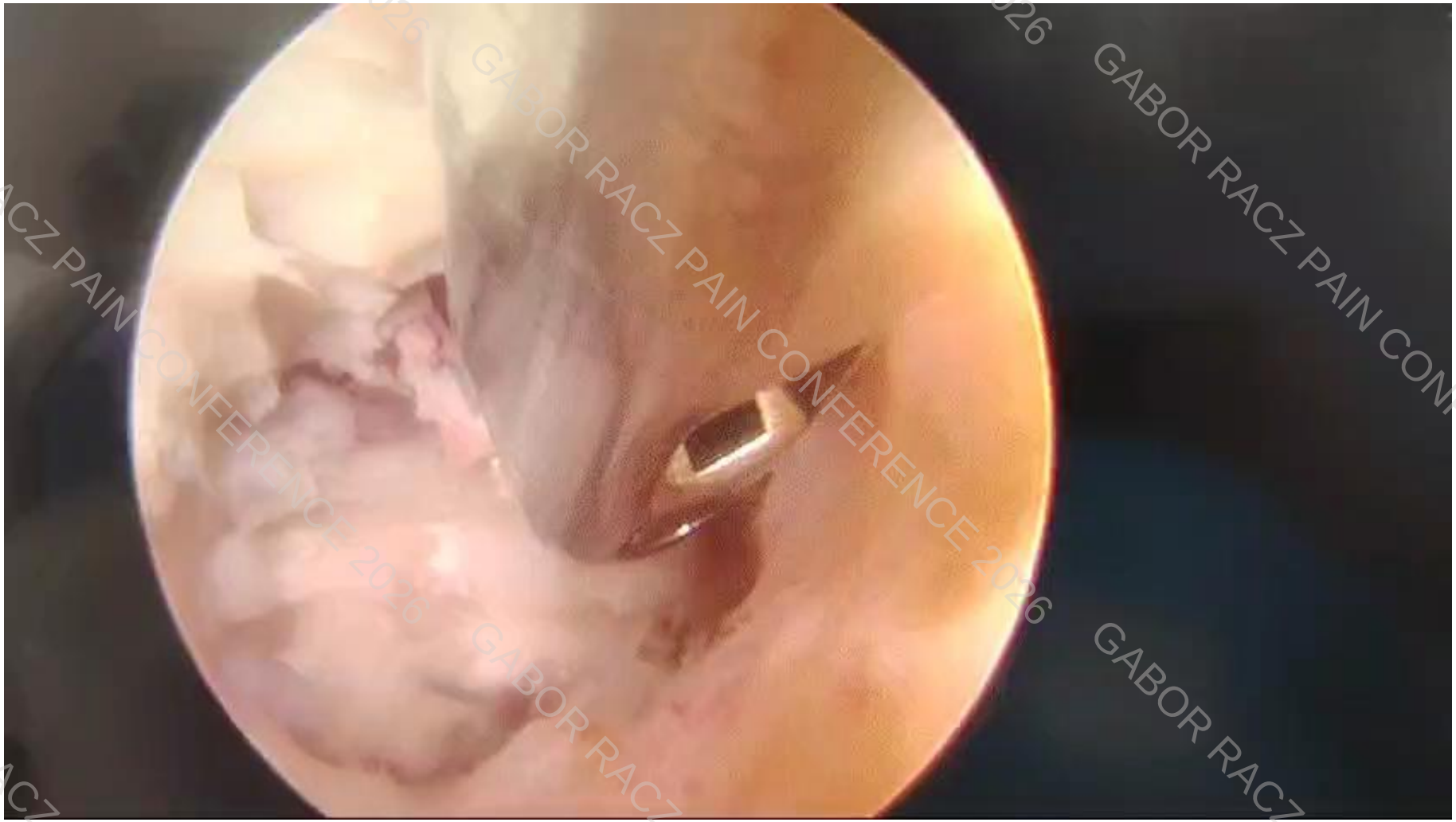

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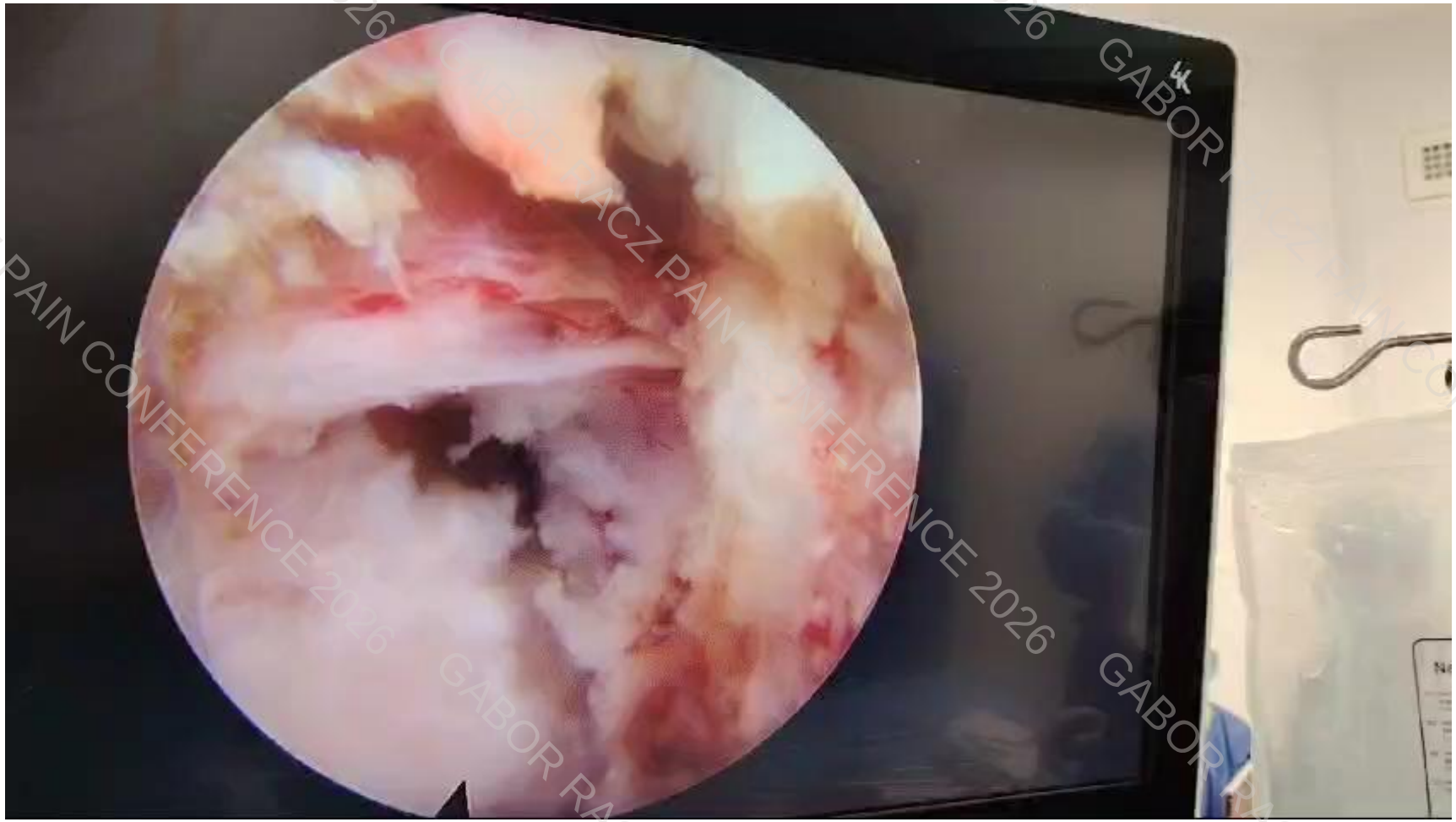

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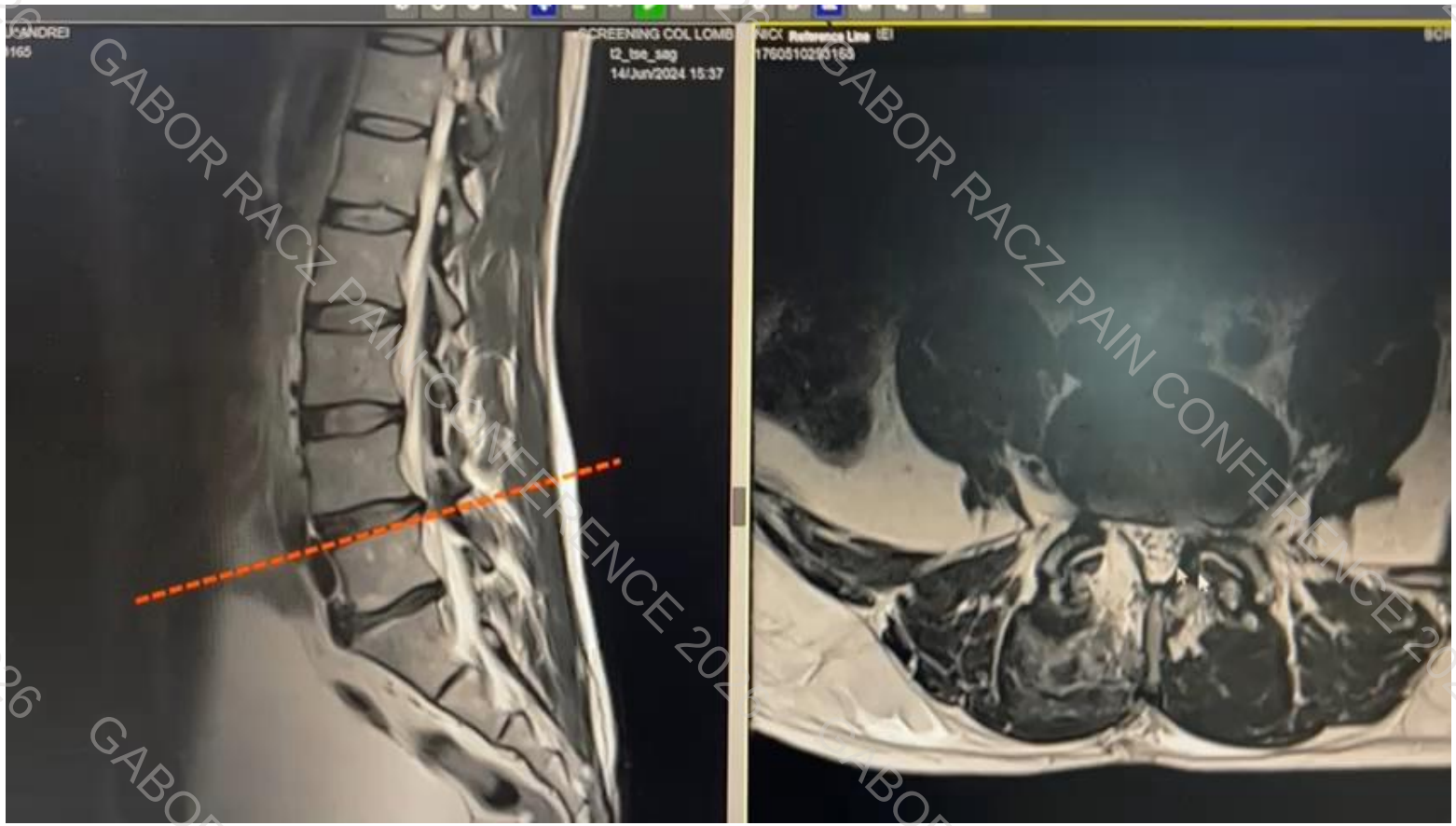

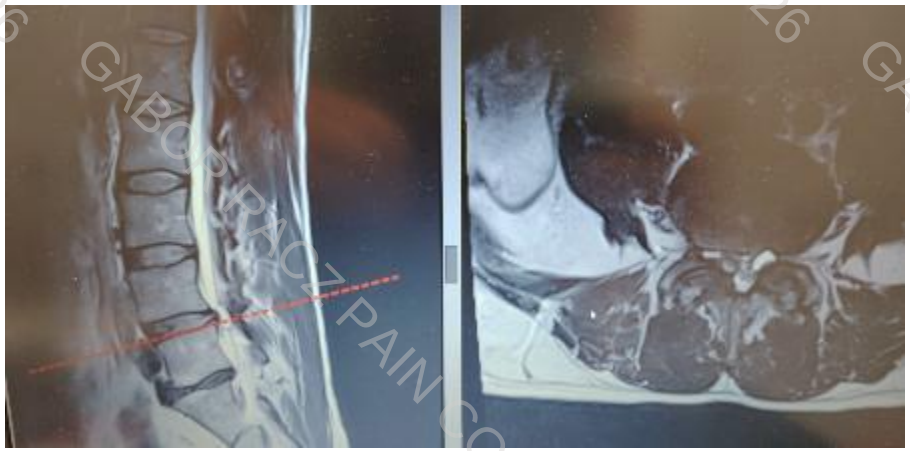

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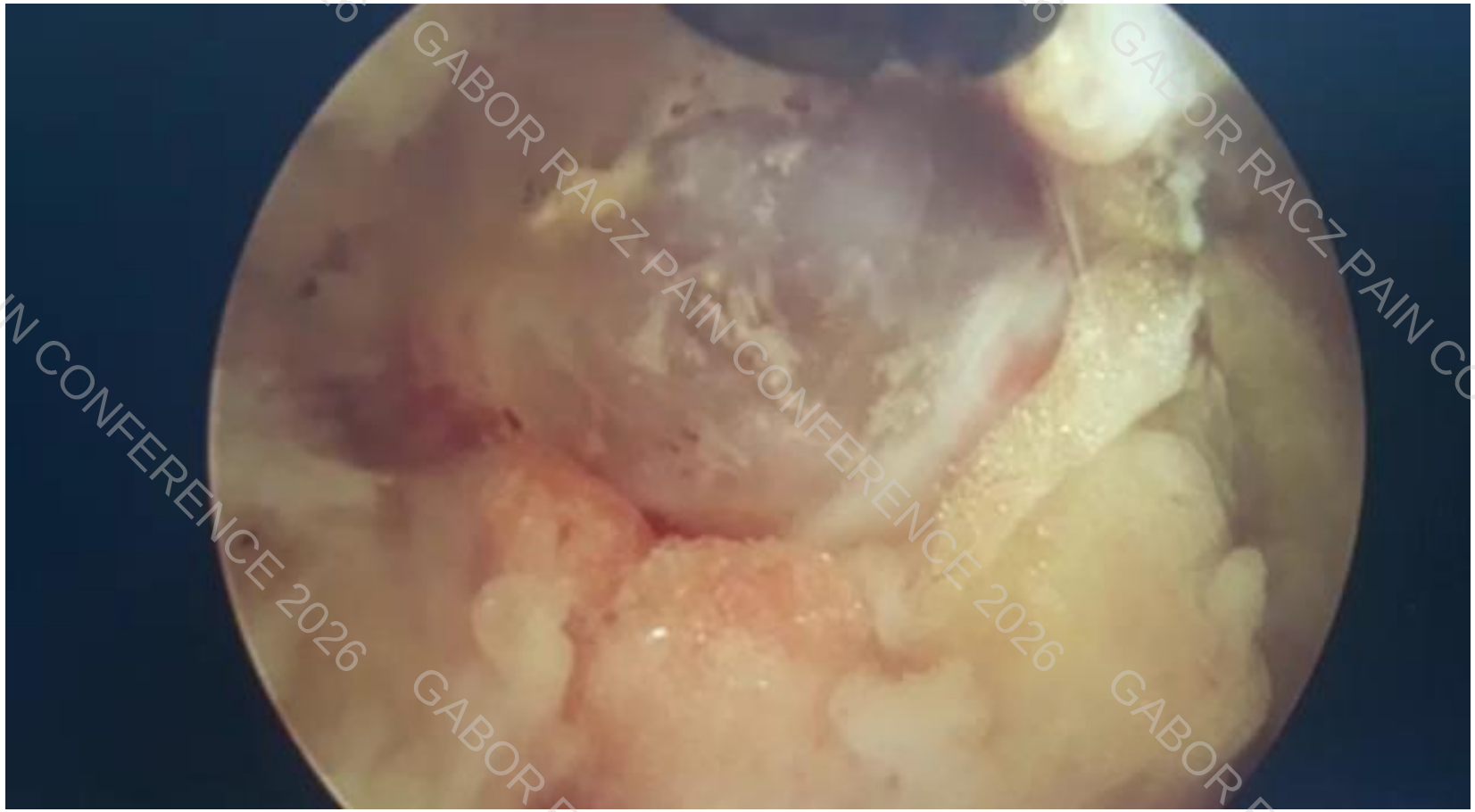
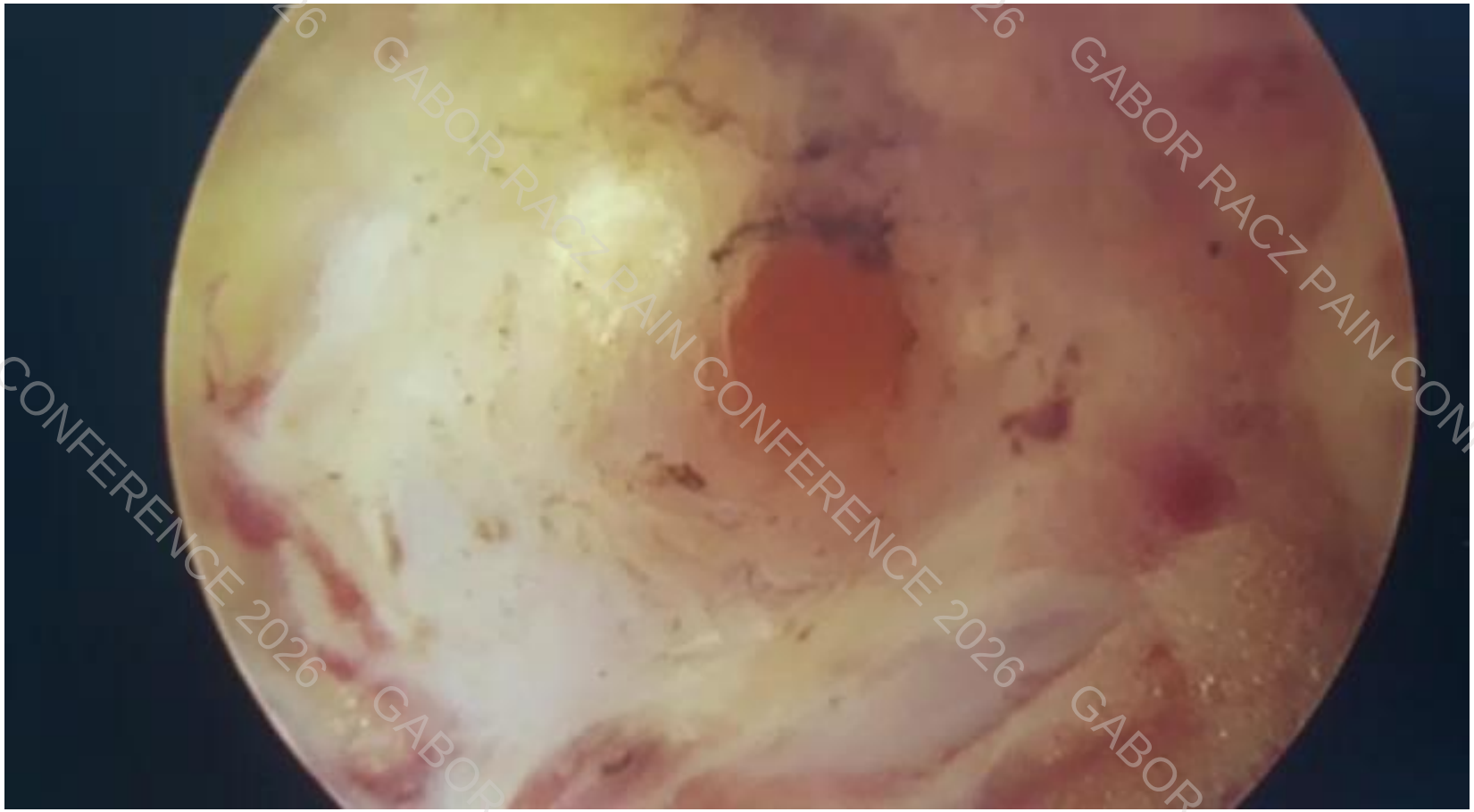
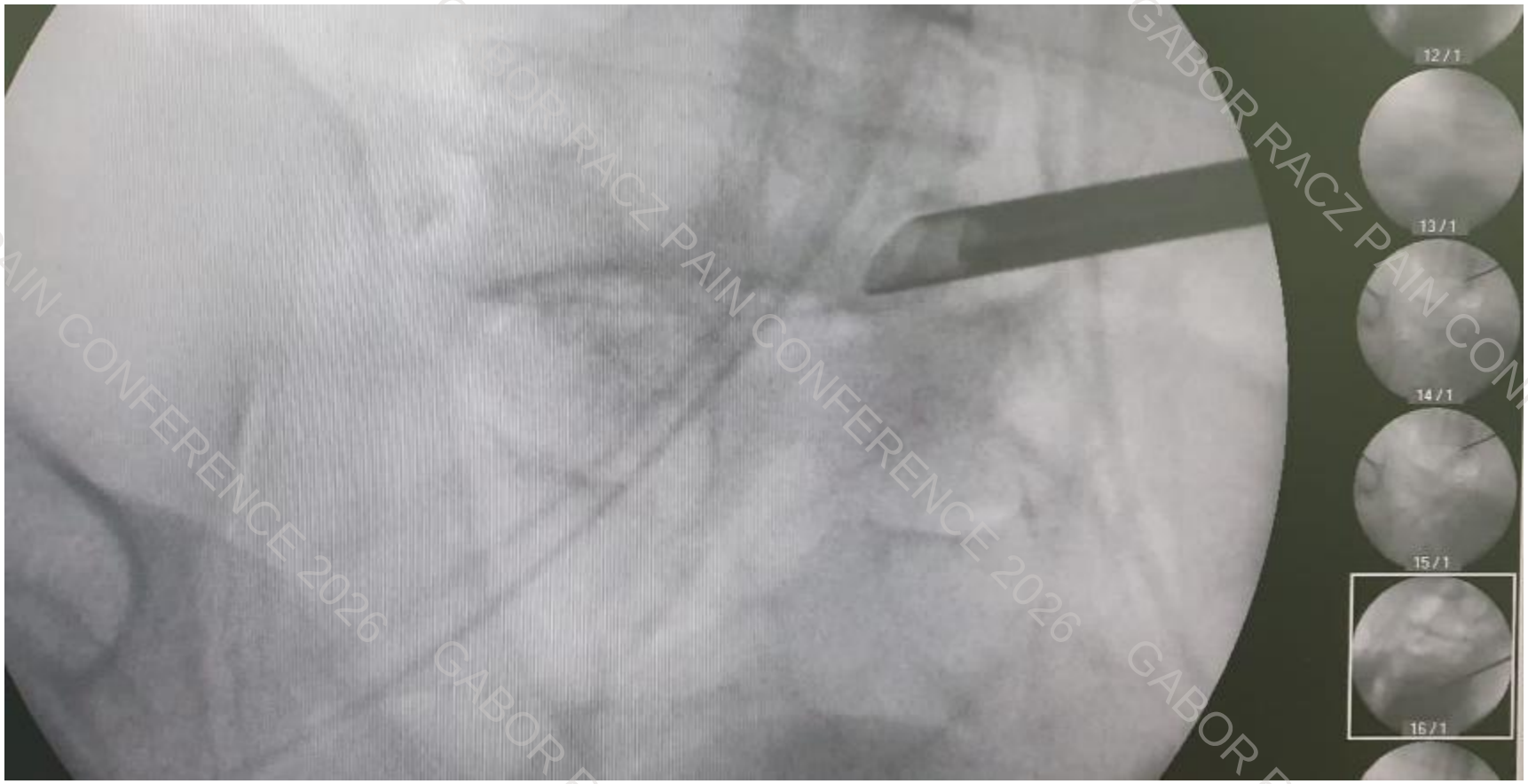
Facet cyst foraminal - lateral

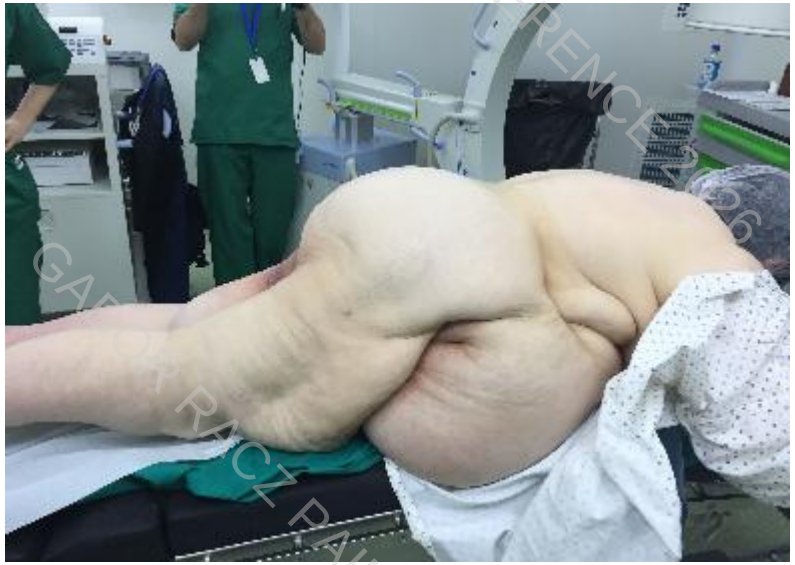


Facet cyst foraminal - lateral



Foraminal Stenosis





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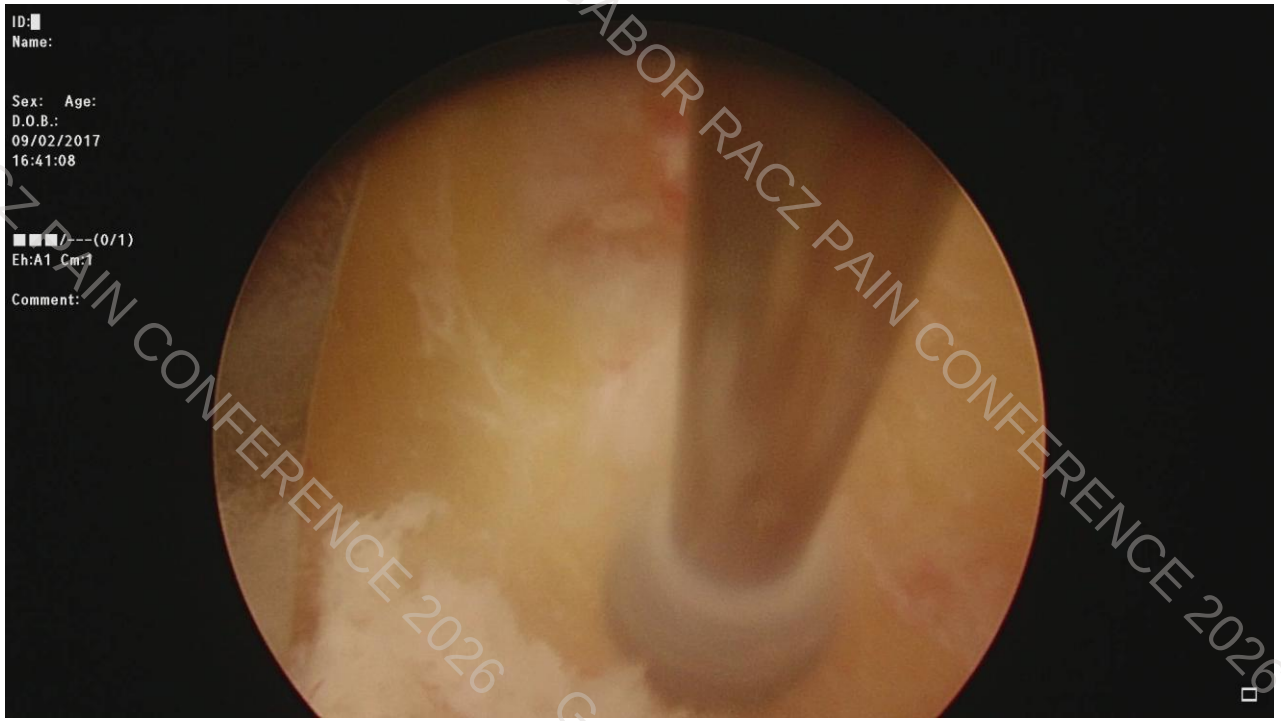

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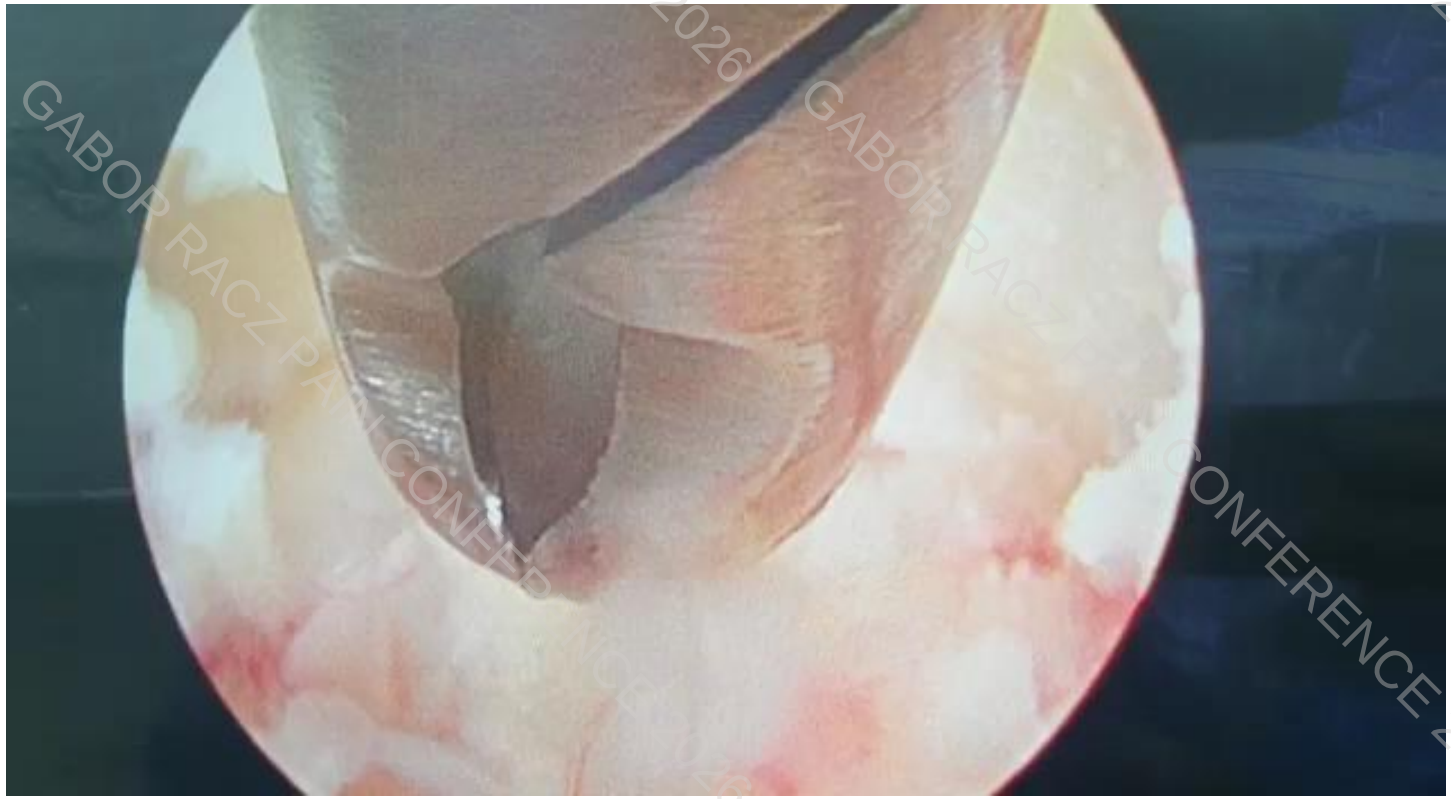
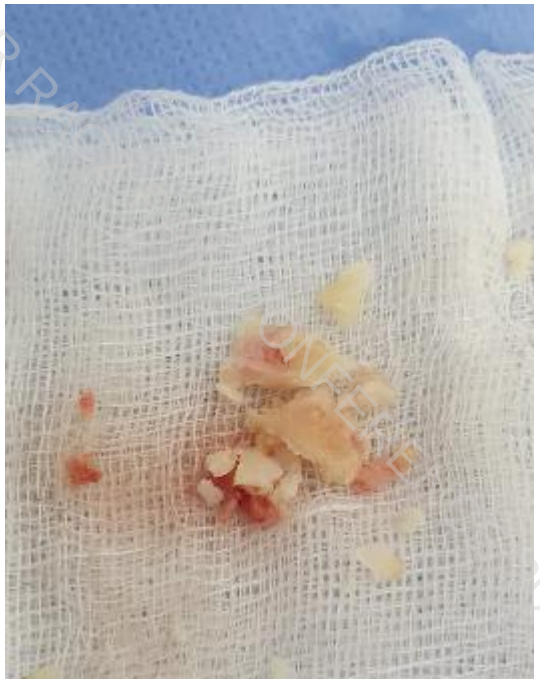
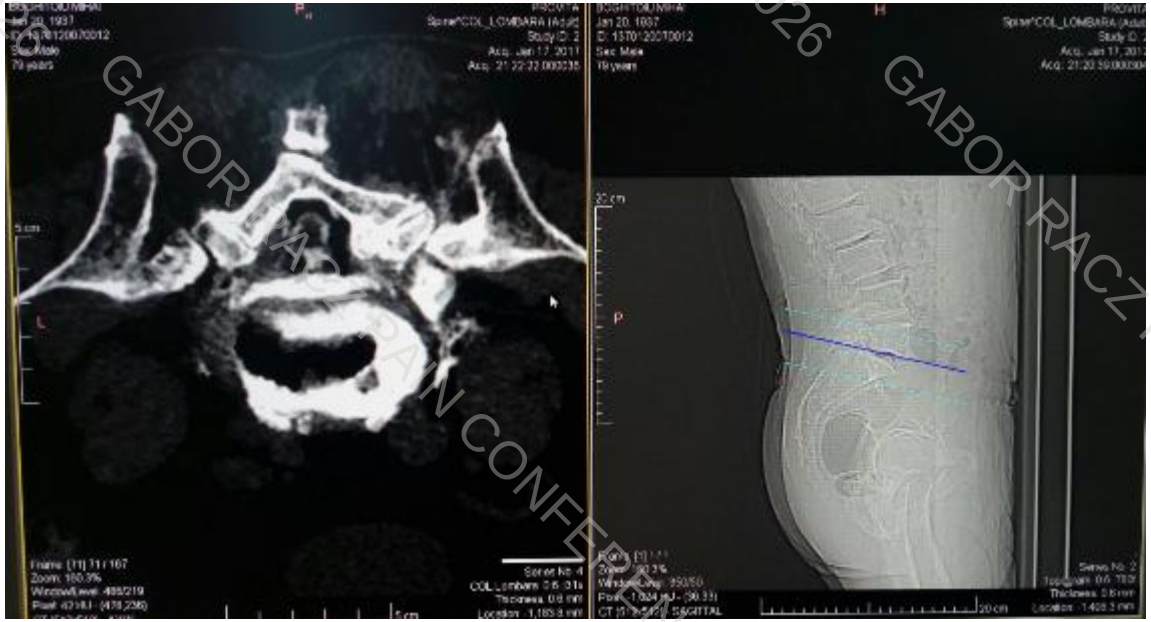
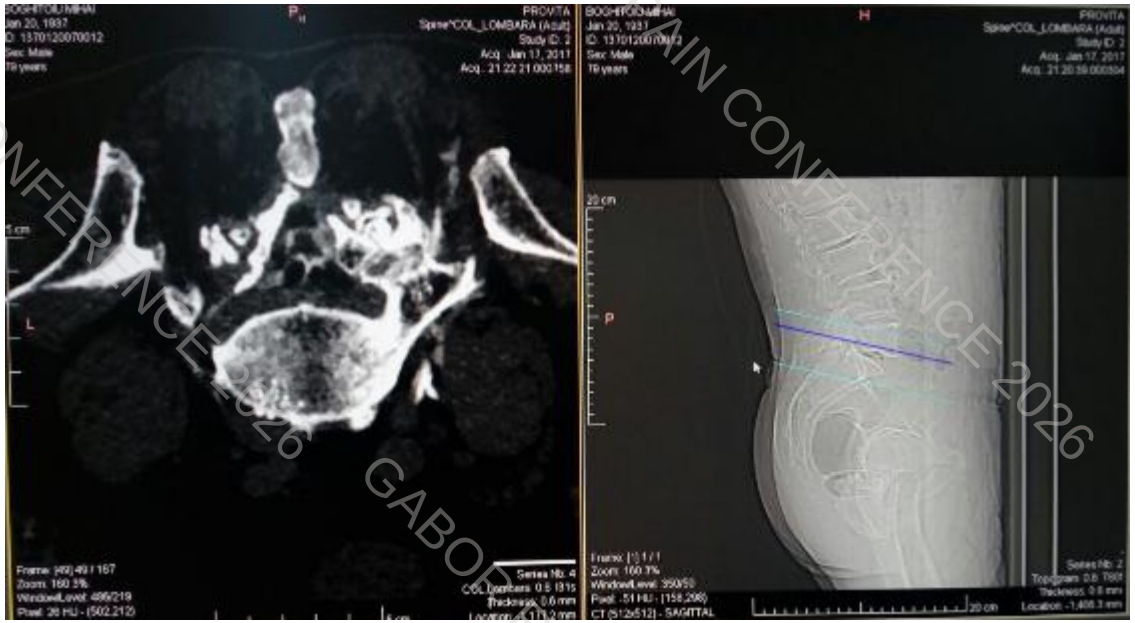




Foraminal Stenosis





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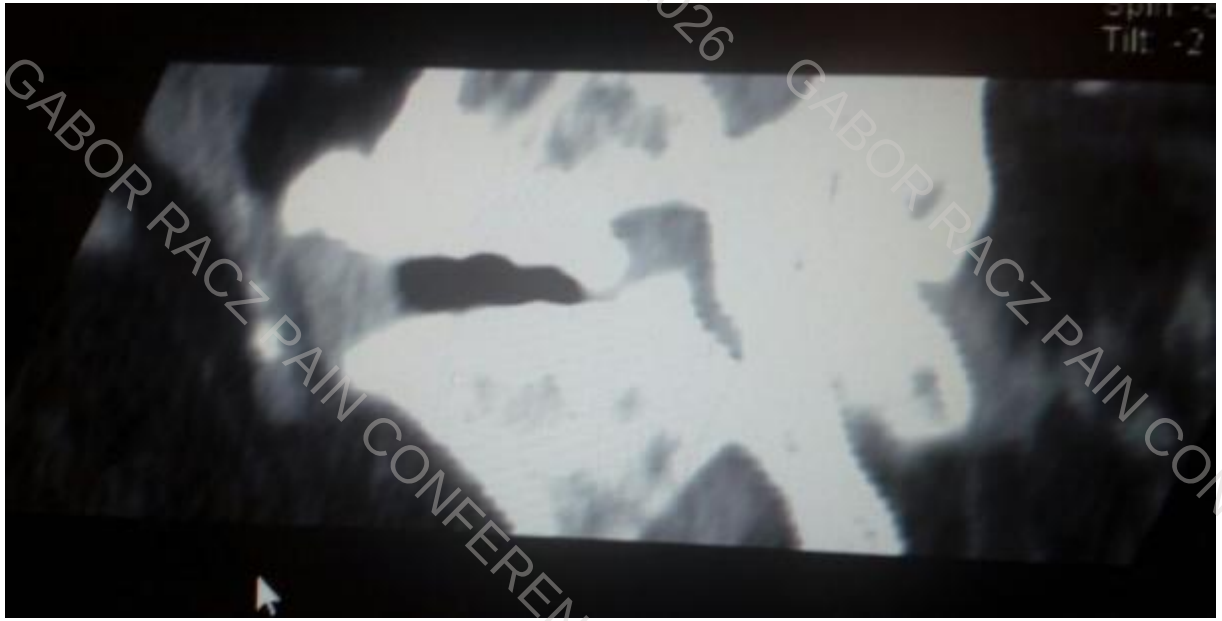
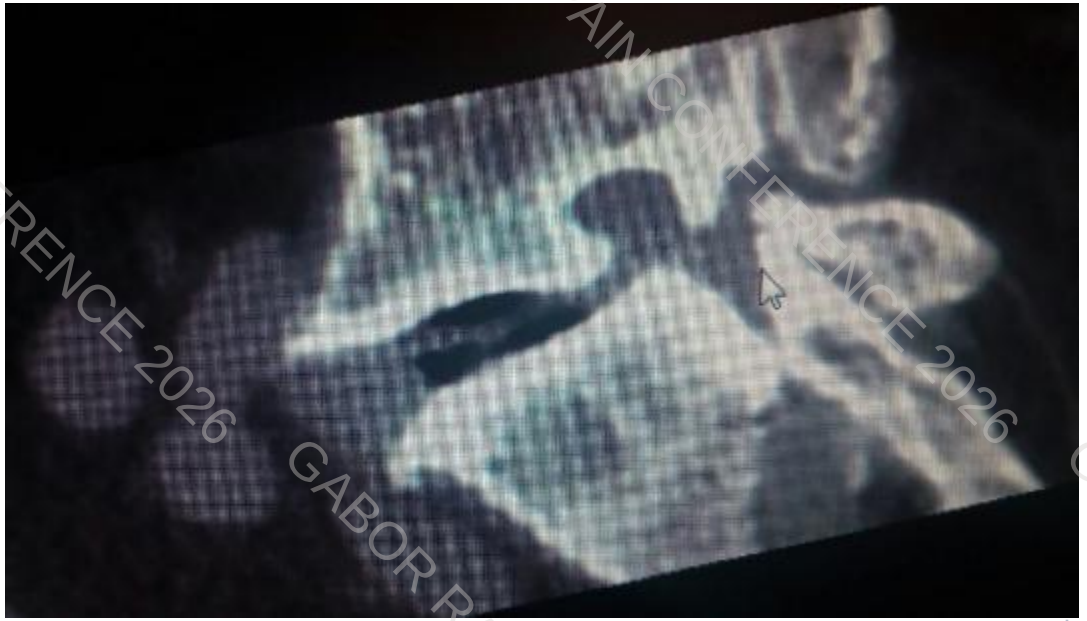
Foraminal Stenosis





Foraminal Stenosis

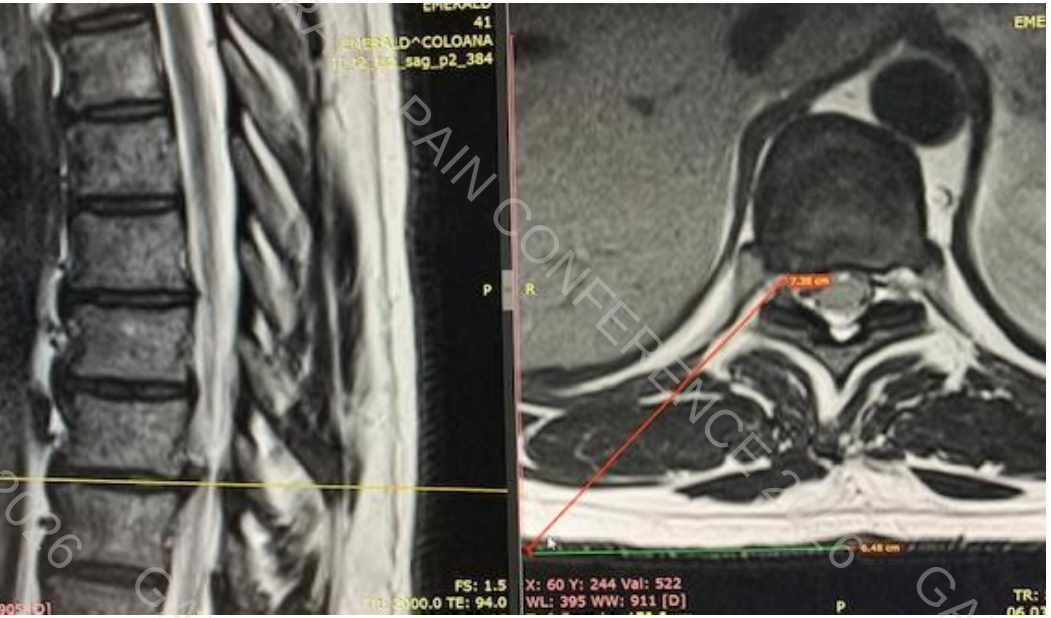
- Increase in the area of the foramen 1.5 times
  - Morphometric Changes of the Lumbar Intervertebral Foramen after Perc Endo Foraminoplasty under Local Anesthesia"

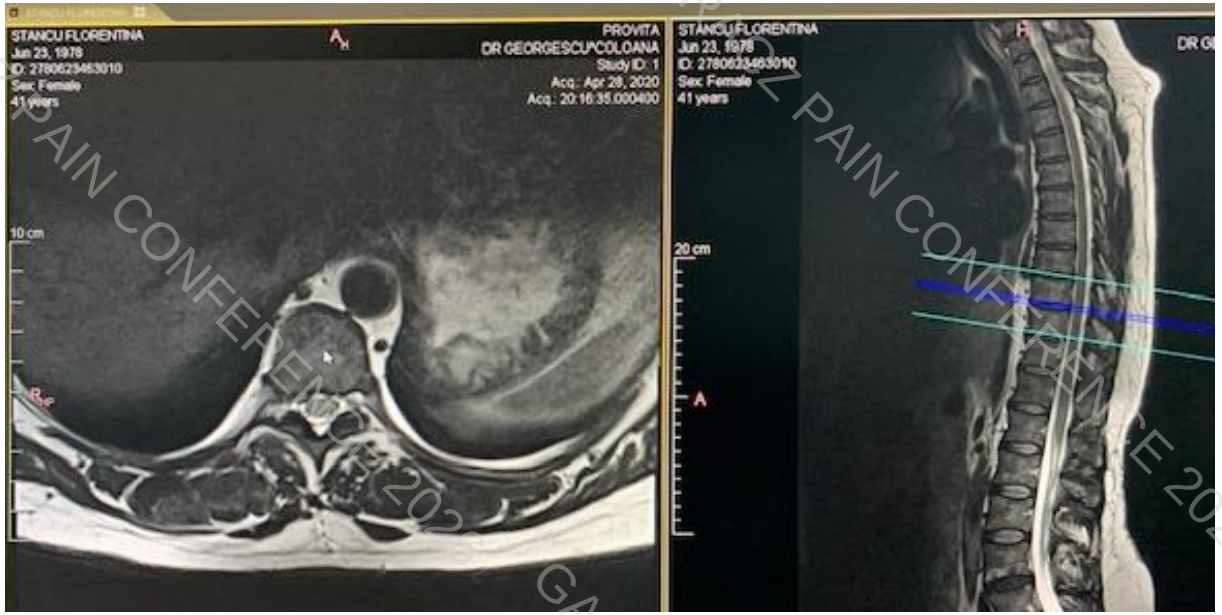
    Henmi et al, J Neurol Surg 2017

- Excellent and good results in 90.5%, including fair 97%
  - Perc Lumbar Foraminoplasty and perc endoscopic lumbar decompr. for lateral recess stenosis through transforam approach

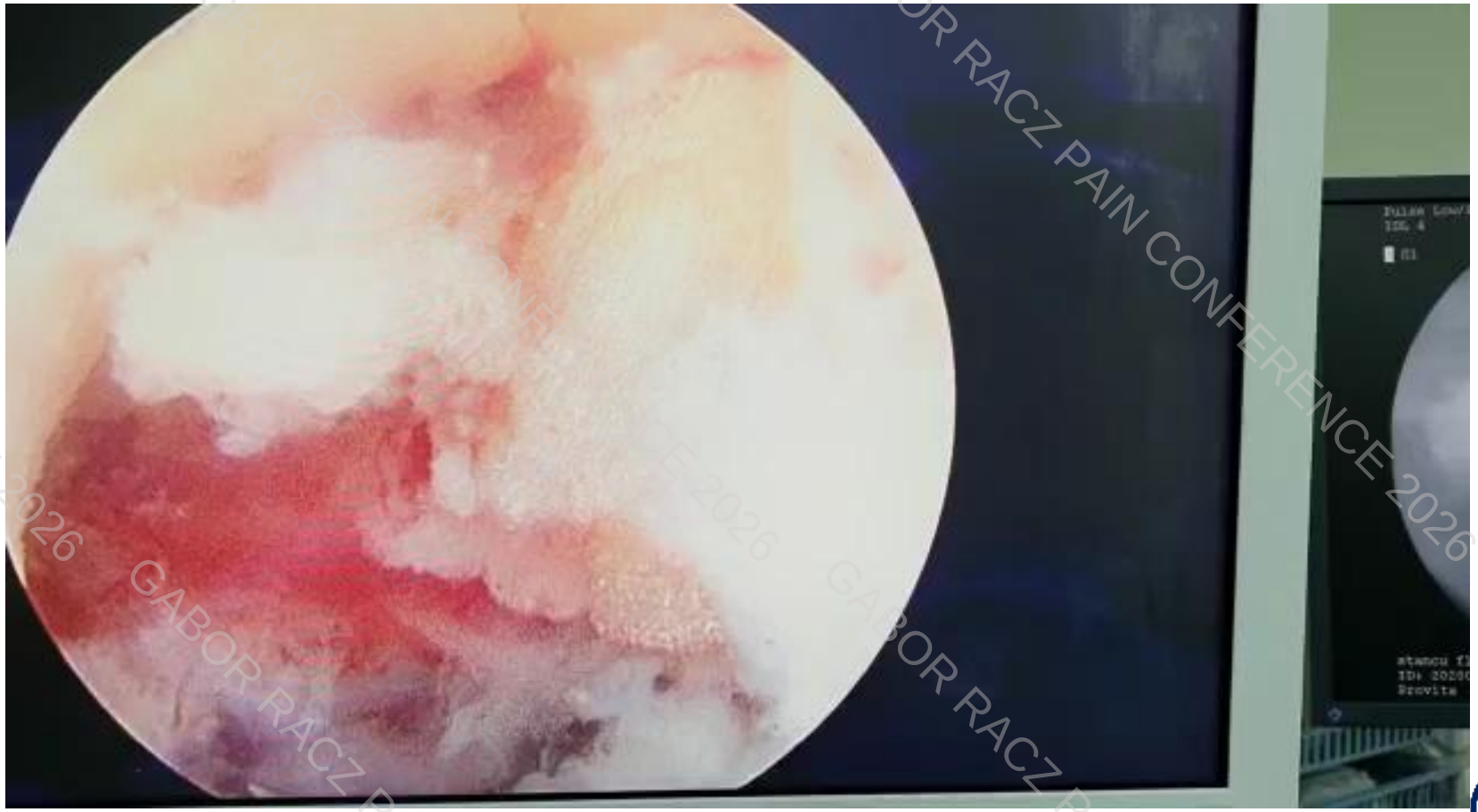
    Li ZZ et al, Clinical Neurol Neurosurg 2016

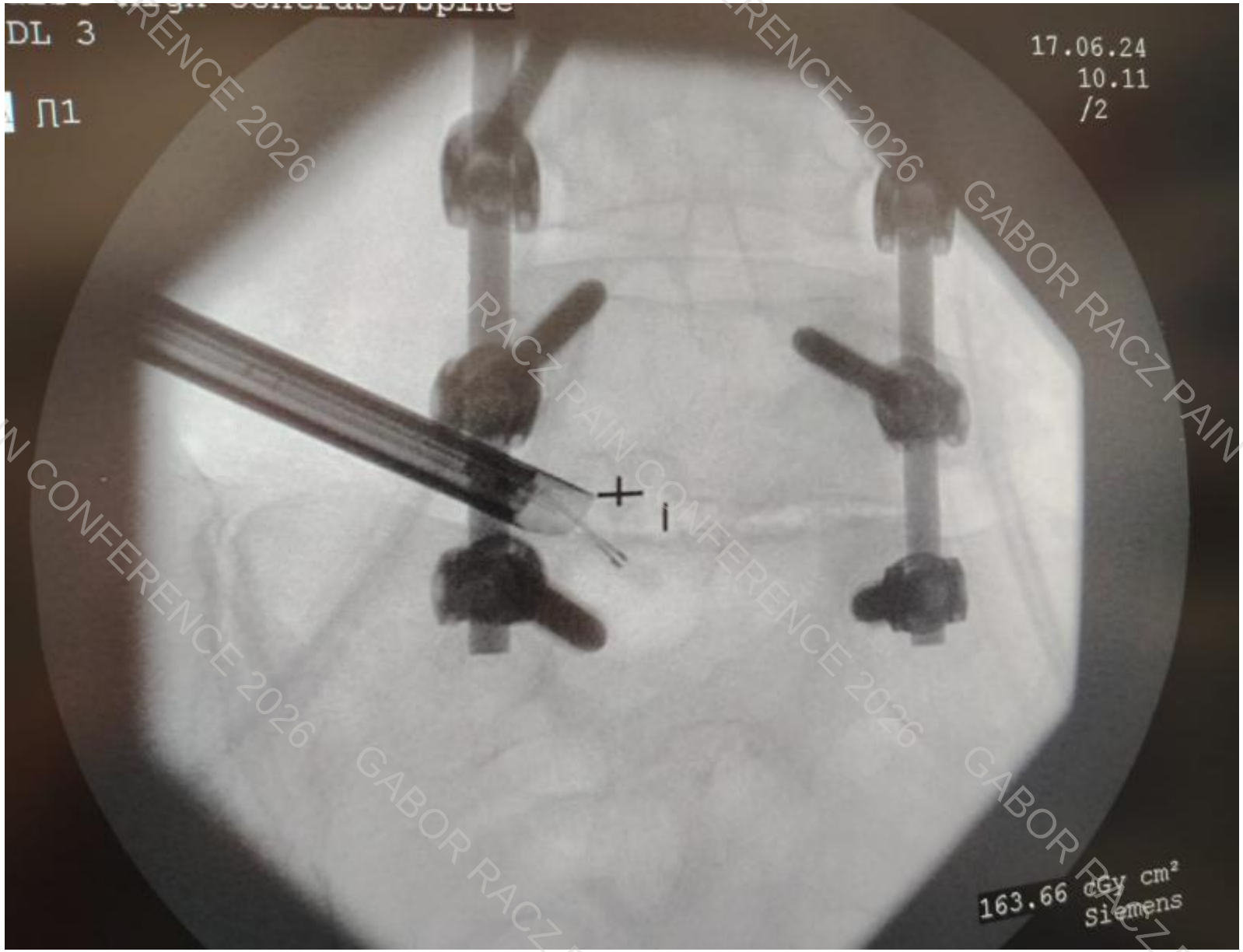
T9-10 Hernia



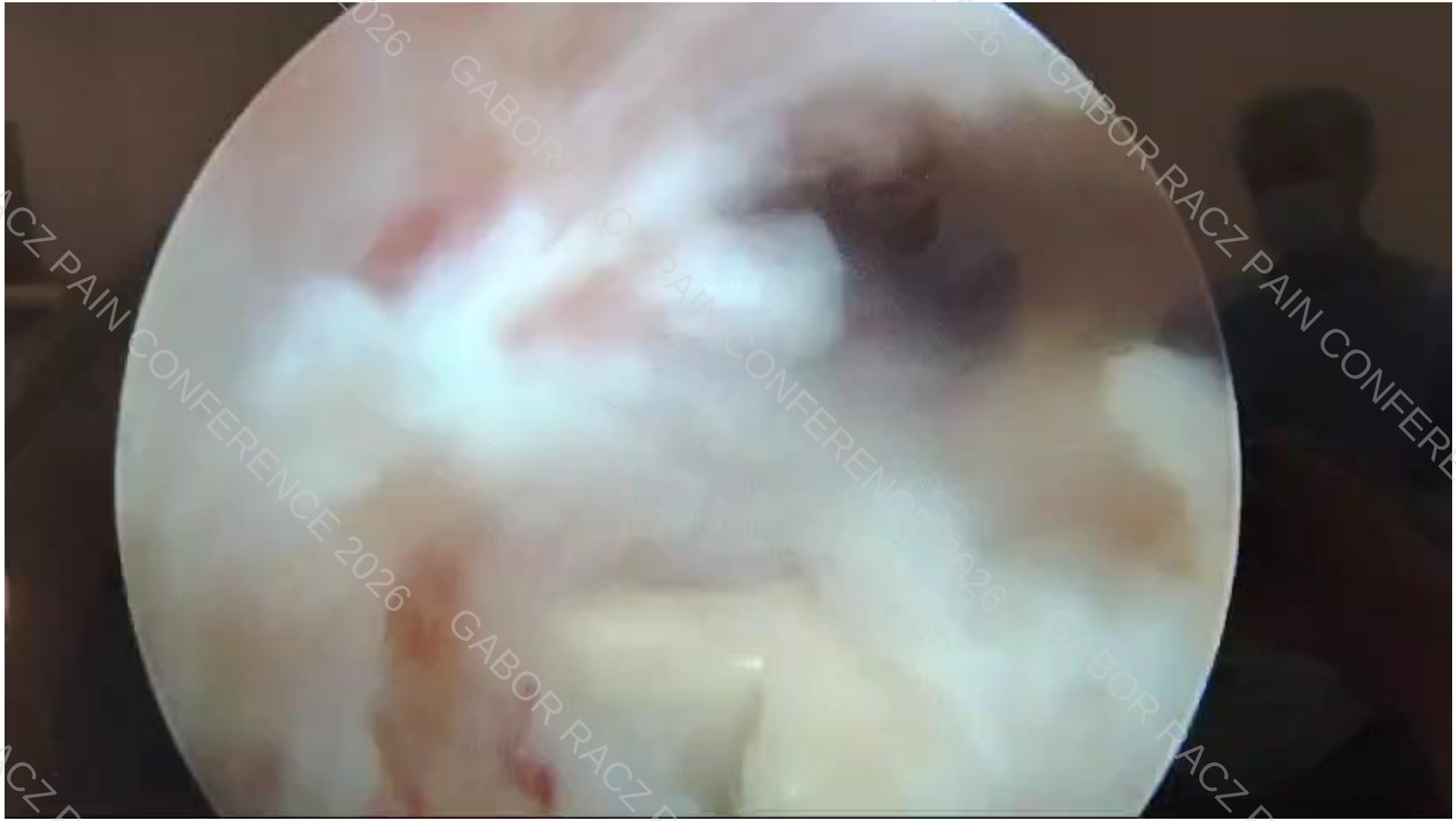


T9-10 Hernia





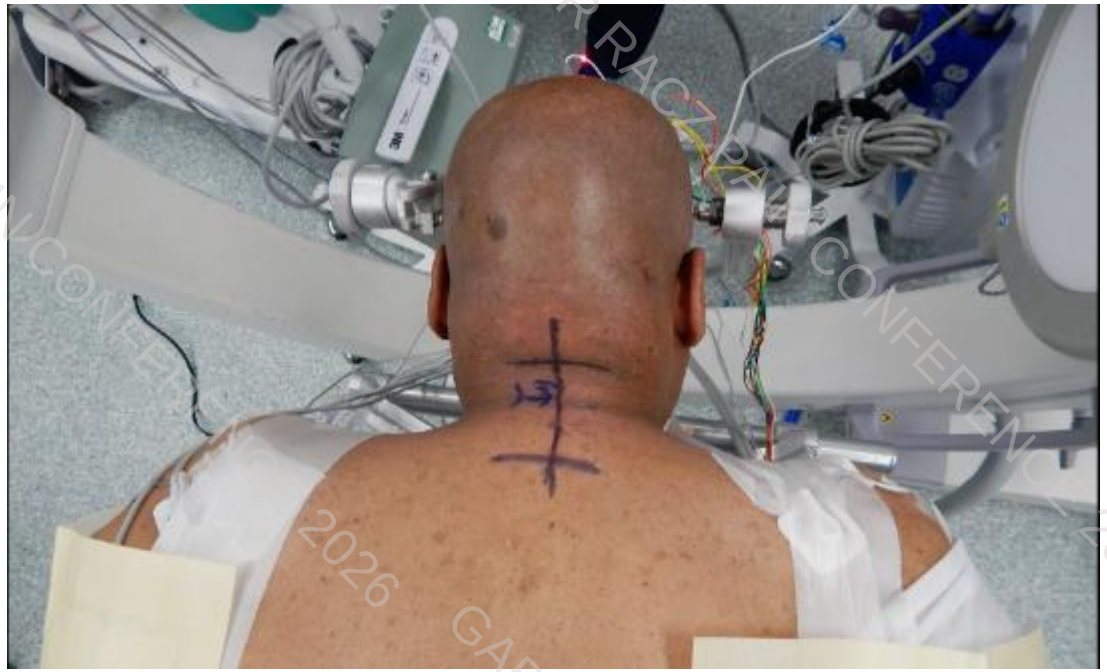
FBSS management with PELD



Cervical Endoscopy Using the Uniportal Approach

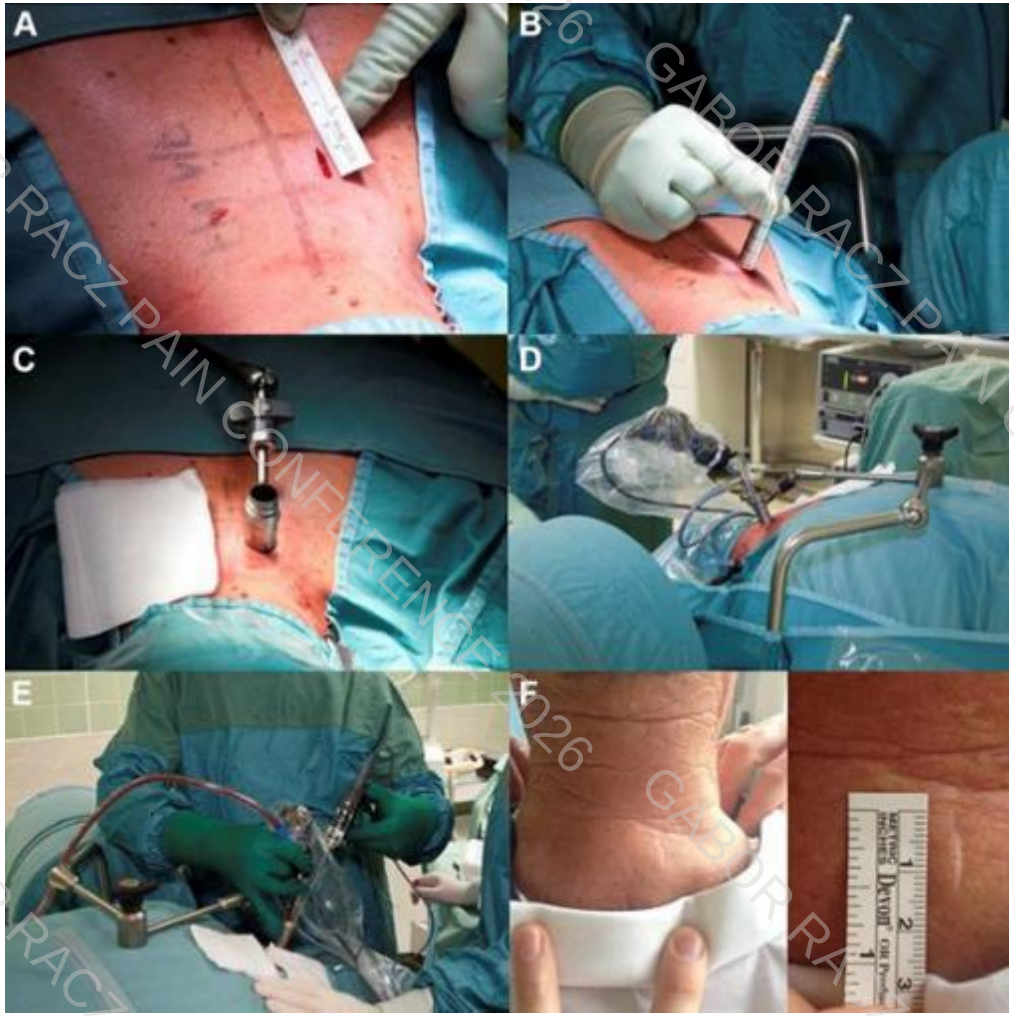
Before the introduction of the endoscopic technique, a posterior approach involved extensive disruption of the paraspinal musculature that contributed to increased complications, pain, and disability.

Then..



Cervical Endoscopy Using the Uniportal Approach

Now!

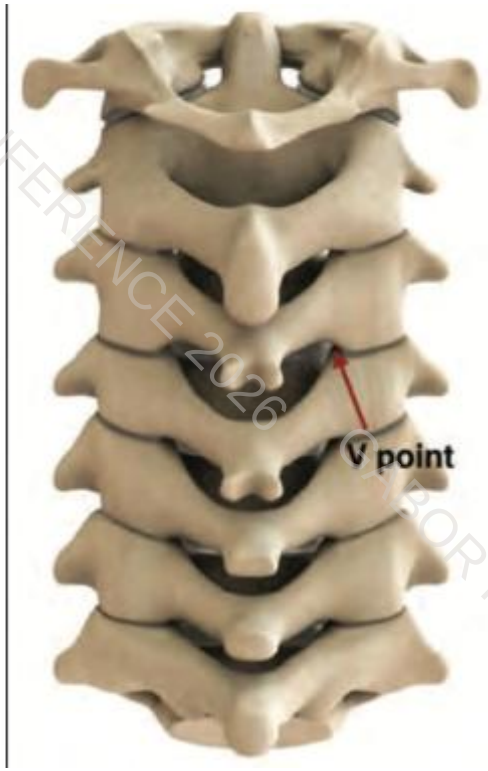


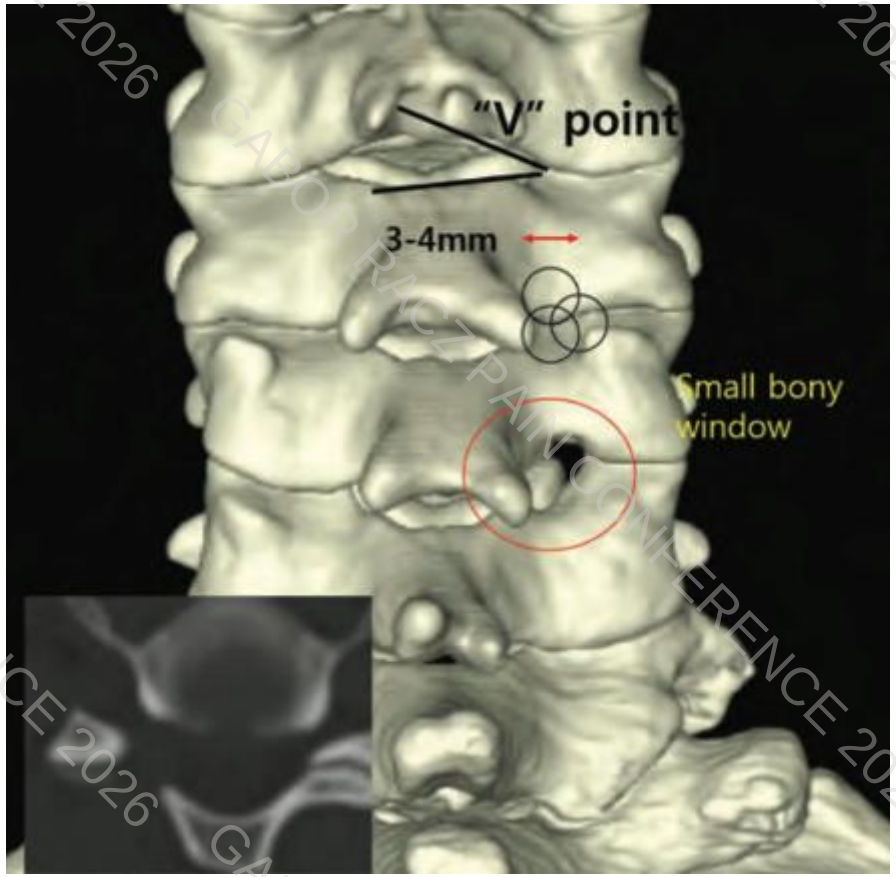
Benefits:

- Minimizes tissue trauma
- Reduces operative time
- Potentially faster recovery
- Lower risk of complications
- IT DOESN'T CHANGE THE DYNAMIC MECAHNICS OF THE CERVICAL SPINE!

Needle Insertion

The target point for the needle tip is ***the V point of the cranial lamina*** on the symptomatic side, the lateral-most part of the lamina approximately correlating with the location of the pedicles.





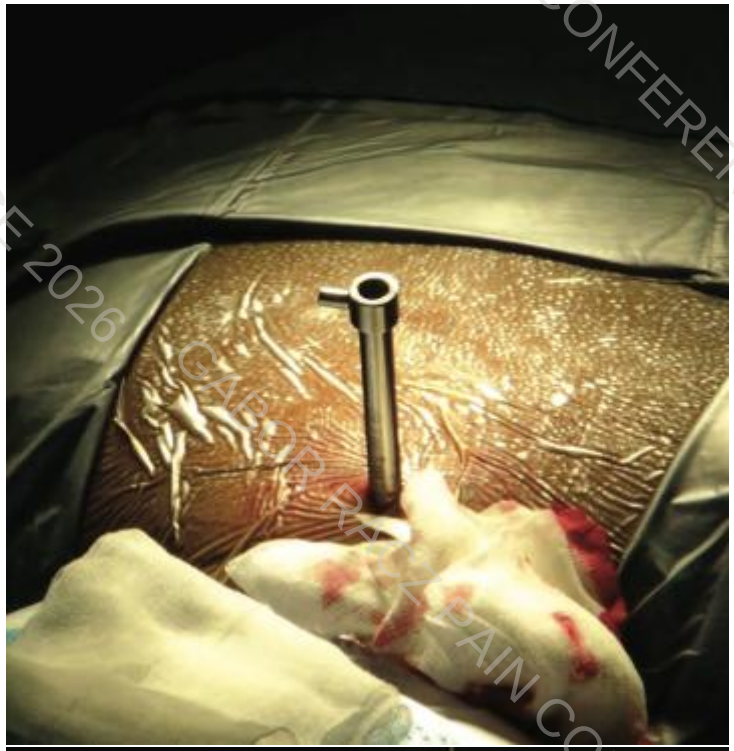
INSTRUMENT PLACEMENT

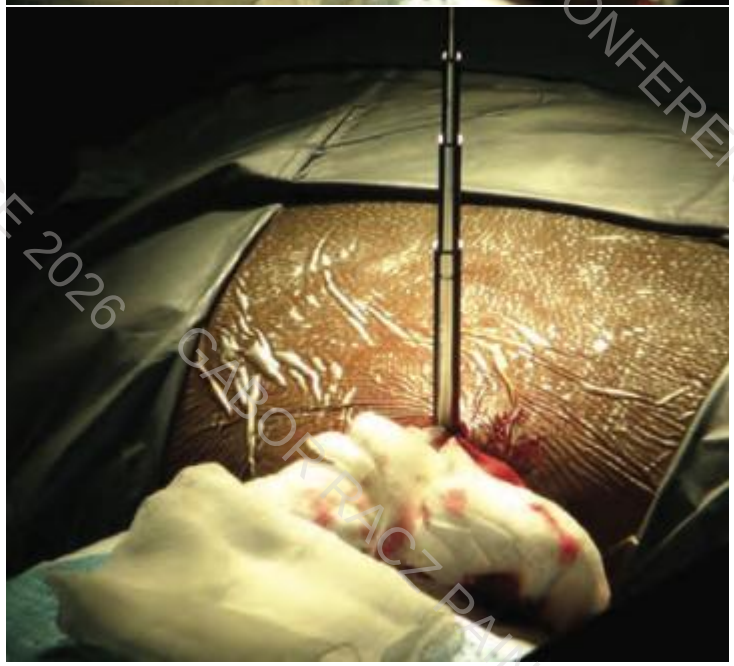
A *1-cm skin incision* allows passage of sequential dilators over the guidewire.

It is essential to ensure that the serial dilators are **held securely against the lamina** to make sure that no soft tissue obliterates the endoscopic view.

Serial dilators avoid the need for *soft tissue dissection* by pushing the tissue away.

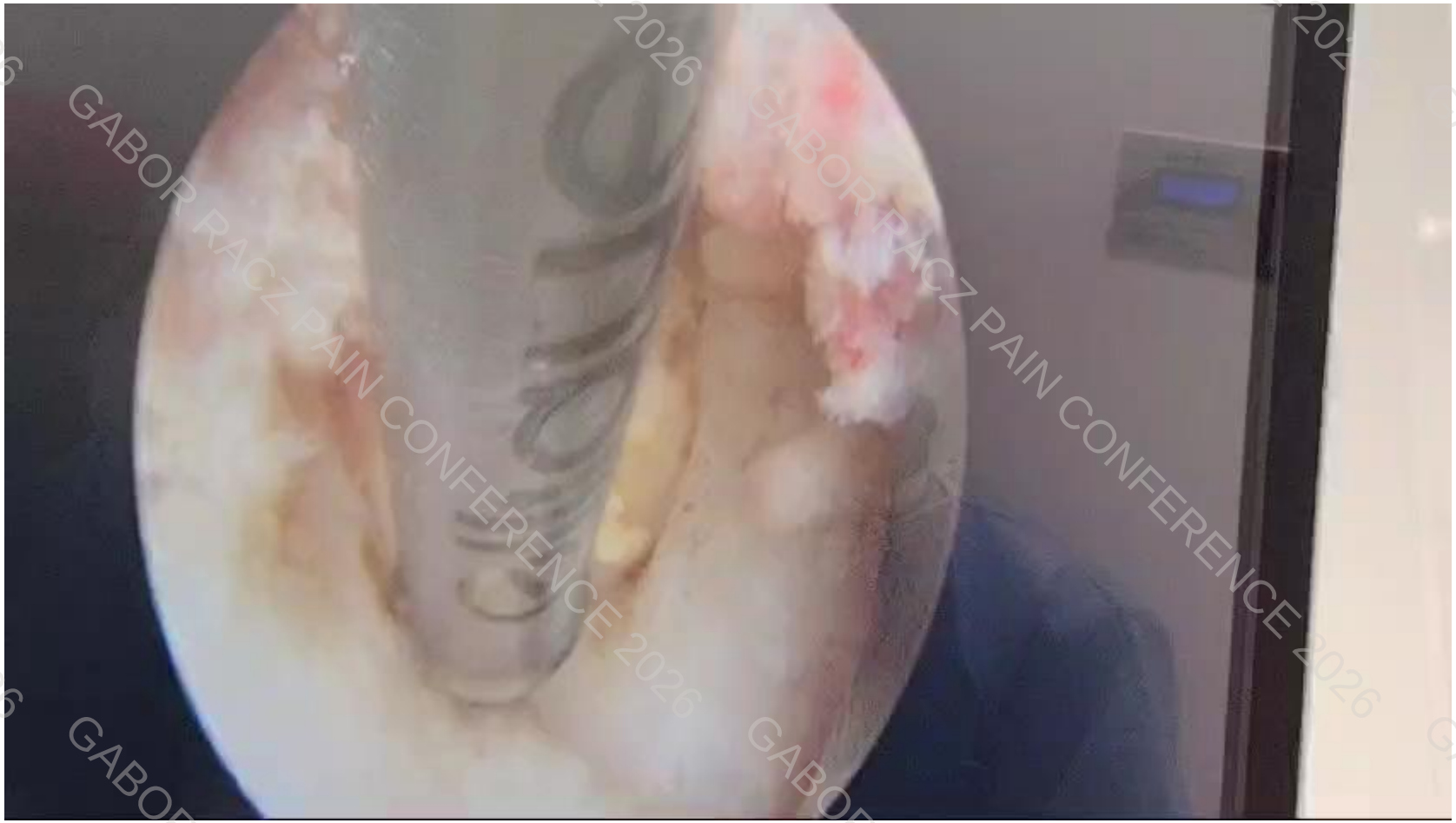
The dilators are followed by the passage of a 7.5-mm round working cannula.

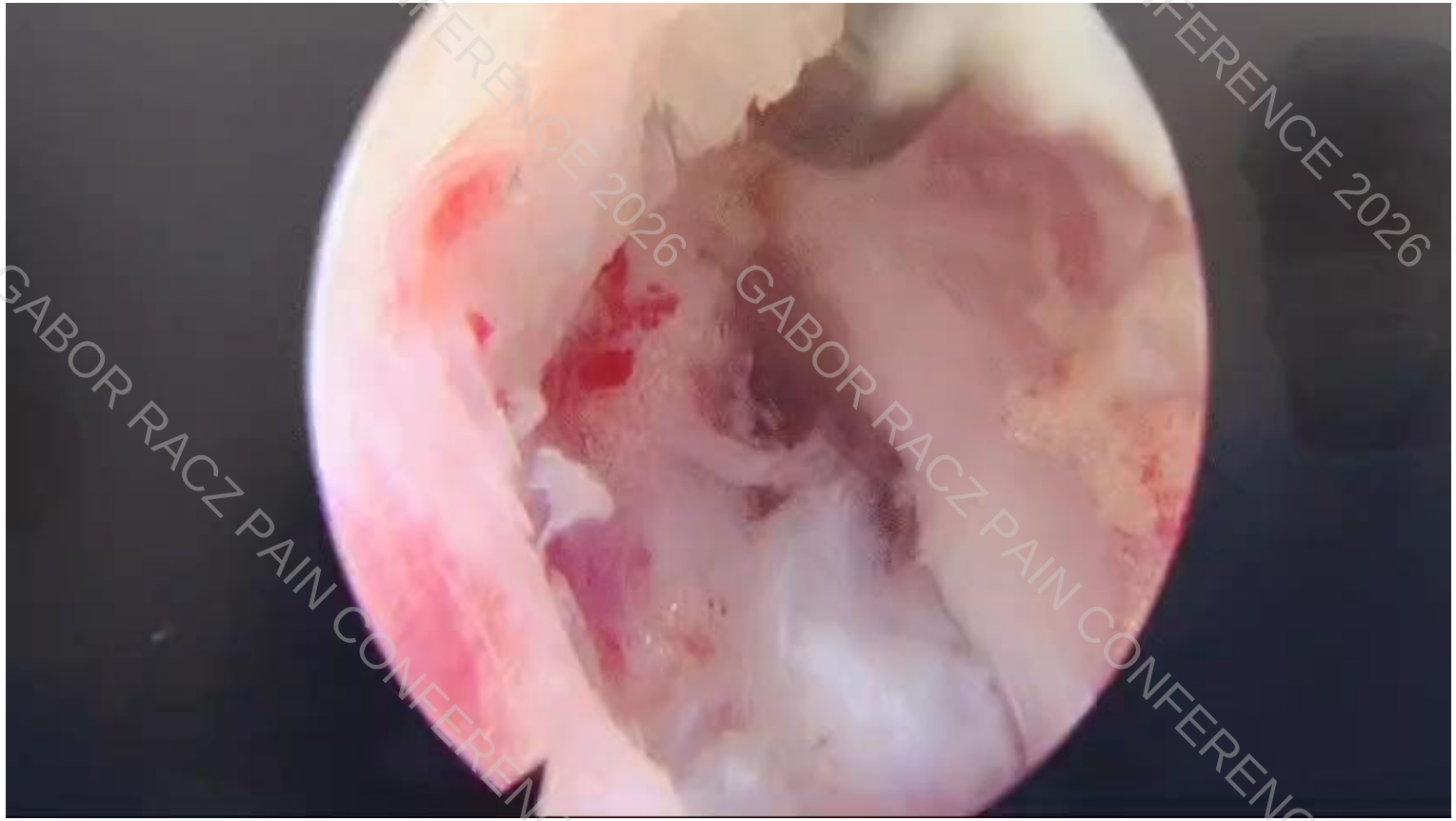




Laminoforaminotomy C7-T1

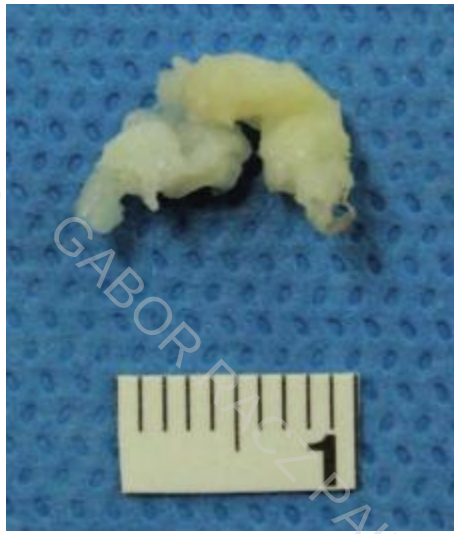
Initial hemostasis and soft tissue clearance are done with a radiofrequency (RF) probe.

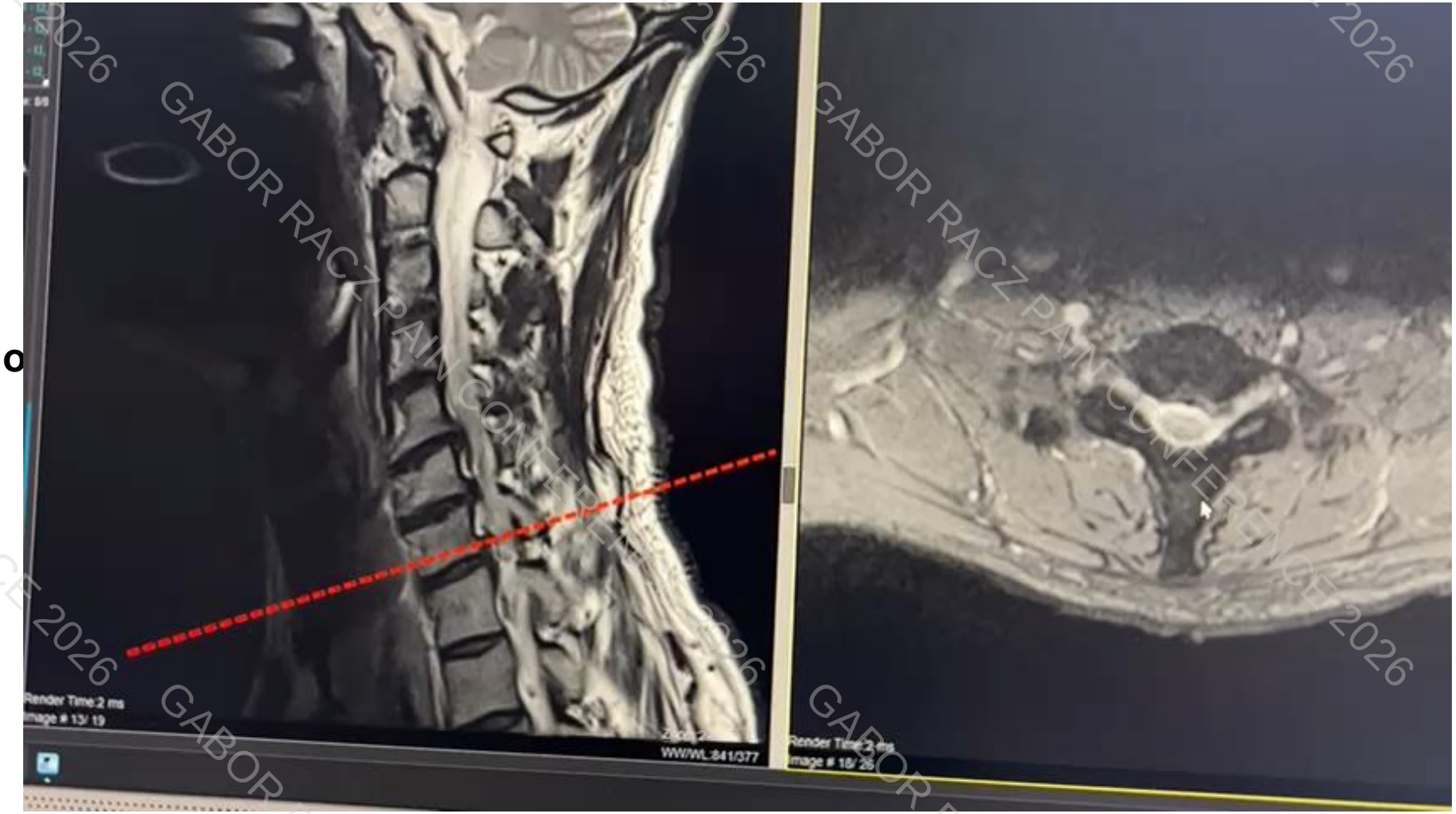




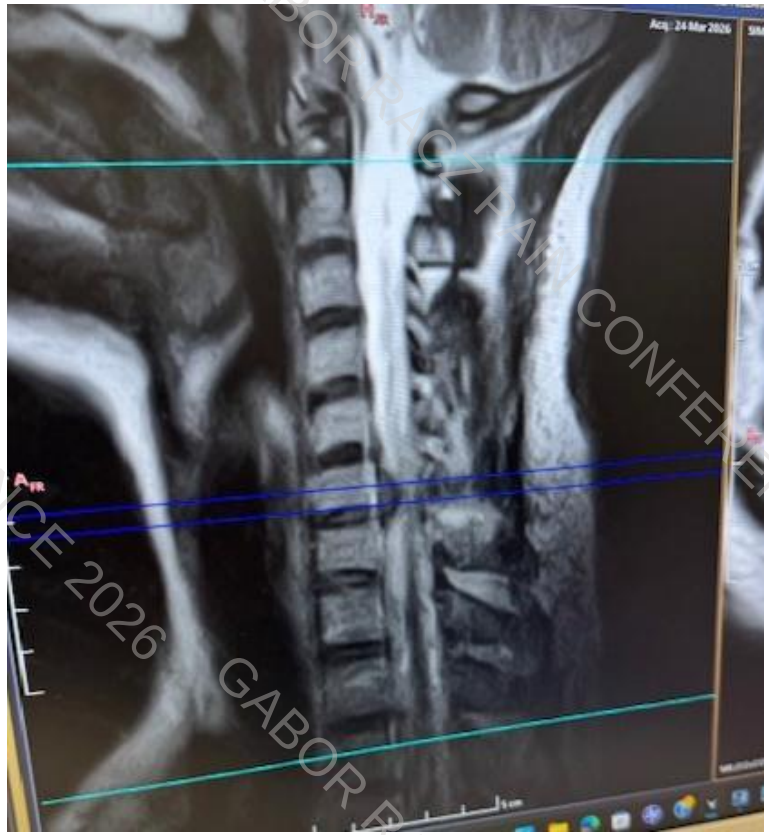
An ***endoscopic drill (bur)*** is used to begin the decompression from the V point of the cranial lamina extending laterally toward the apex of the interlaminar space and caudally on to the inferior lamina.

•Ruptured disk material is removed and **internal decompression of disk is no performed.**





Cervical Discectomy state of the art



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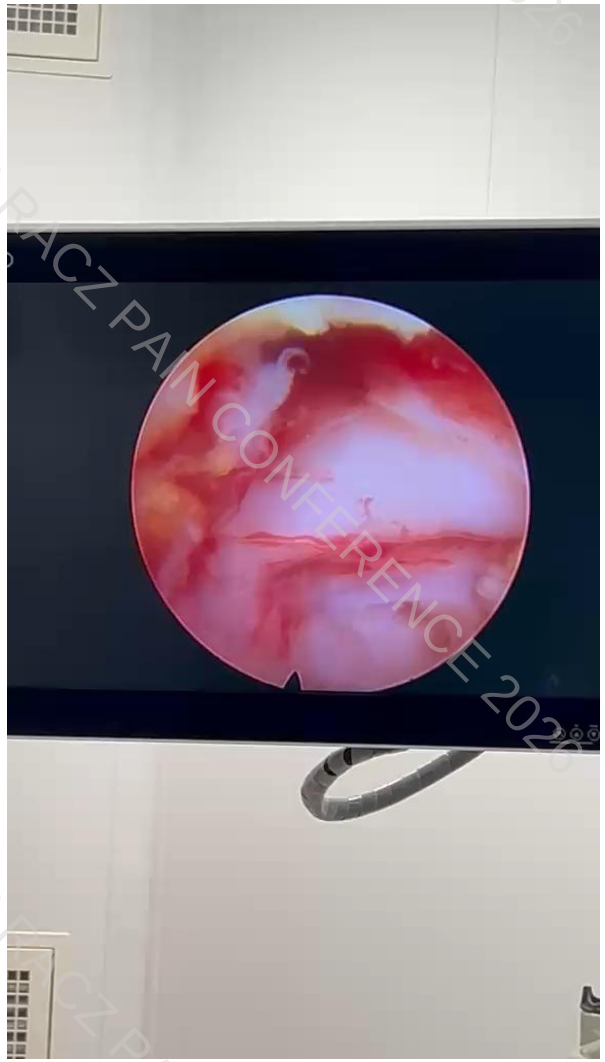
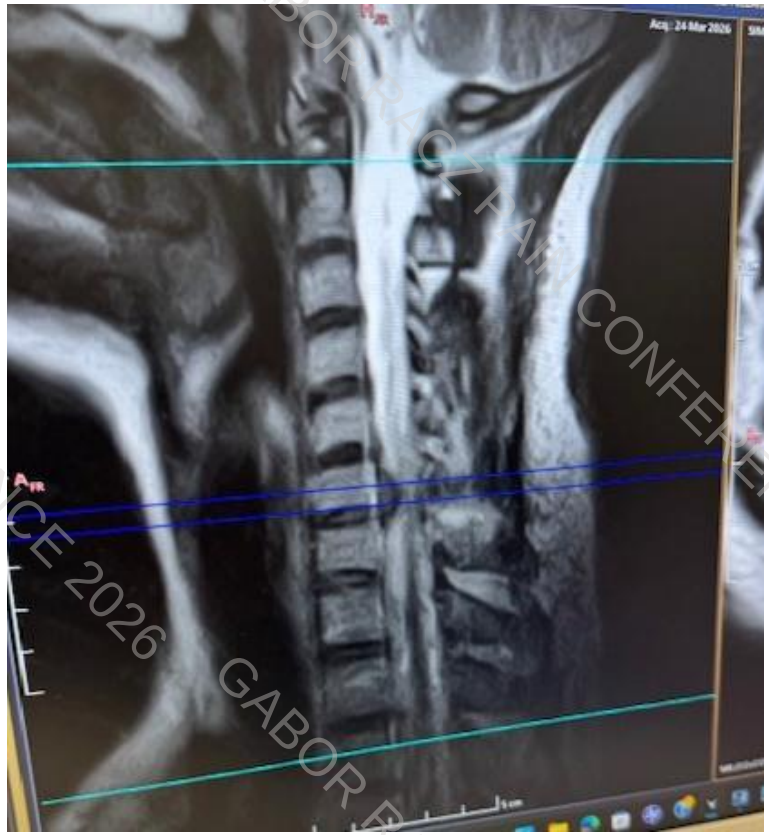
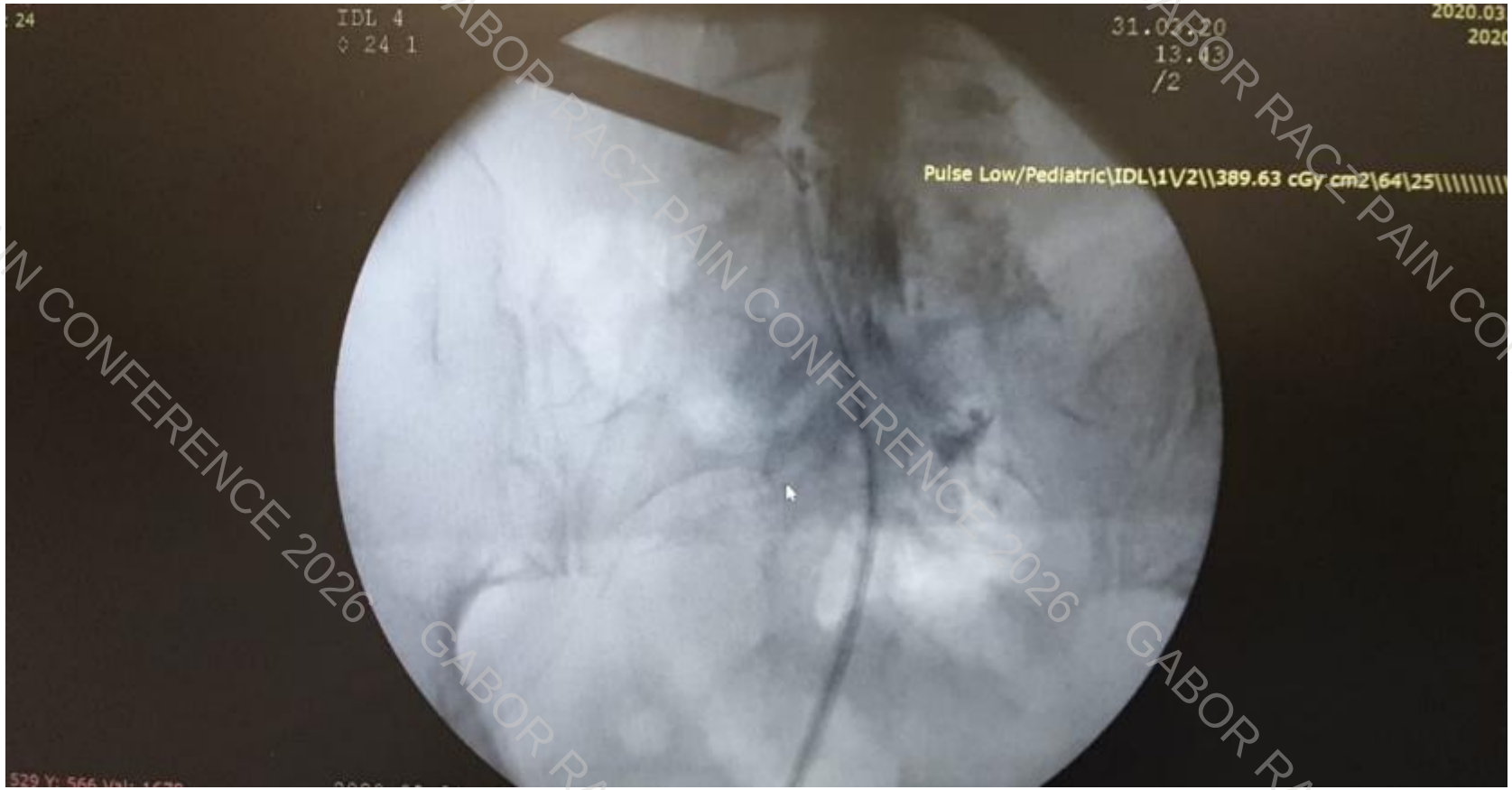




Cervical Dural Tear

FBSS management with PELD



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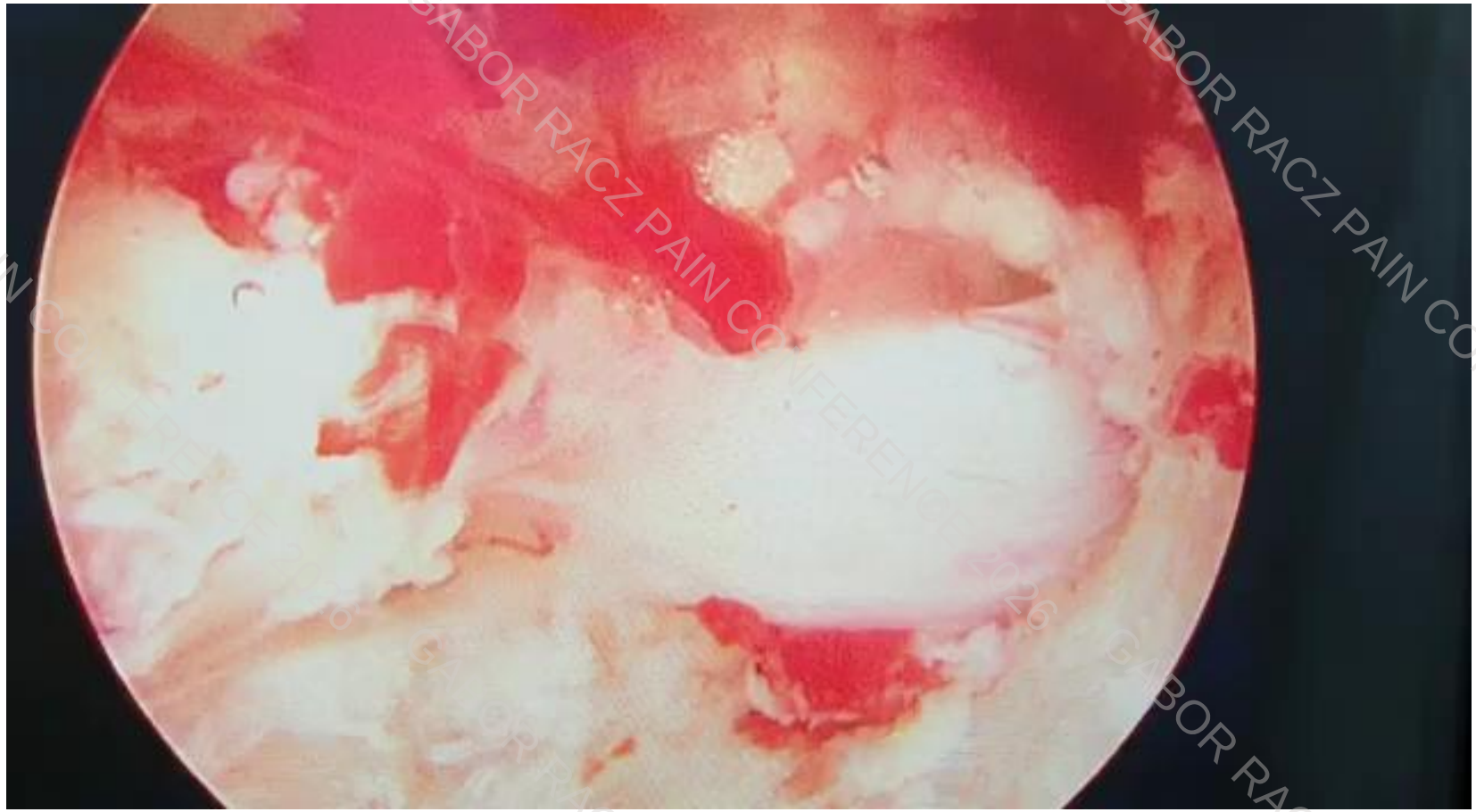

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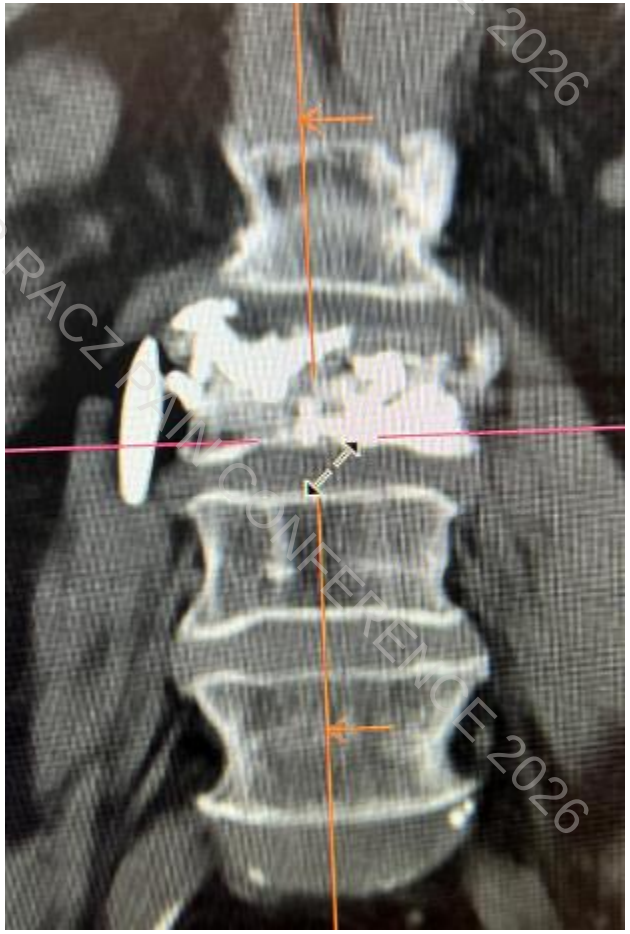
FBSS management with PELD

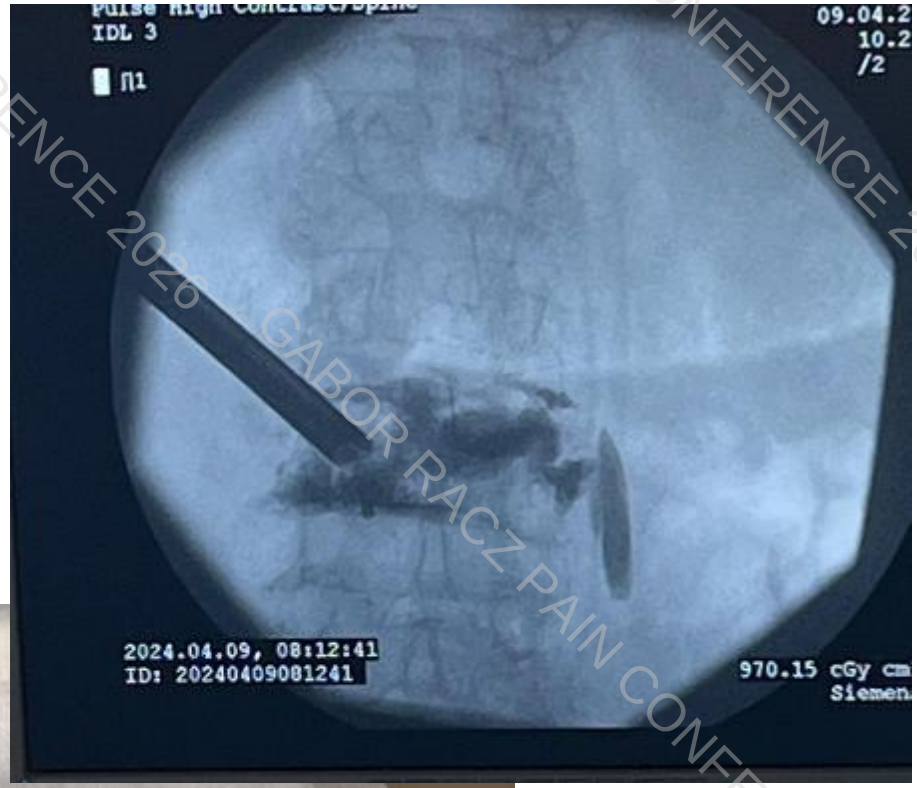
Case Presentation

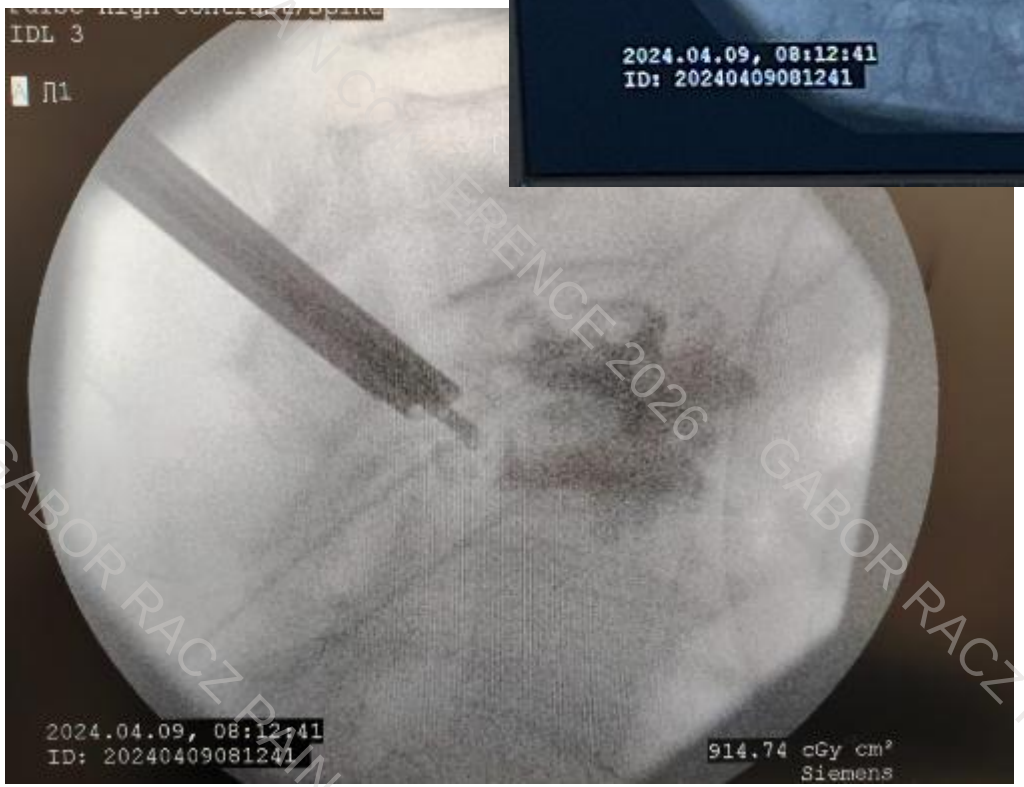
85,F

84 yo Obese, diabetic, A fib, HTN, CAD
Symptoms:

- **Severe lower back pain**
- **Significant limitation of mobility – bed bound**
- **Pain radiating to the thoracic and lumbar regions**
- **Onset:**
  - 2 months in bed with vertebral collapse, vertebroplasty 1 month ago with cement extravasation and spinal stenosis
  - new finding bilateral pedicle fractures.
- **Current Status:** The pain has intensified.

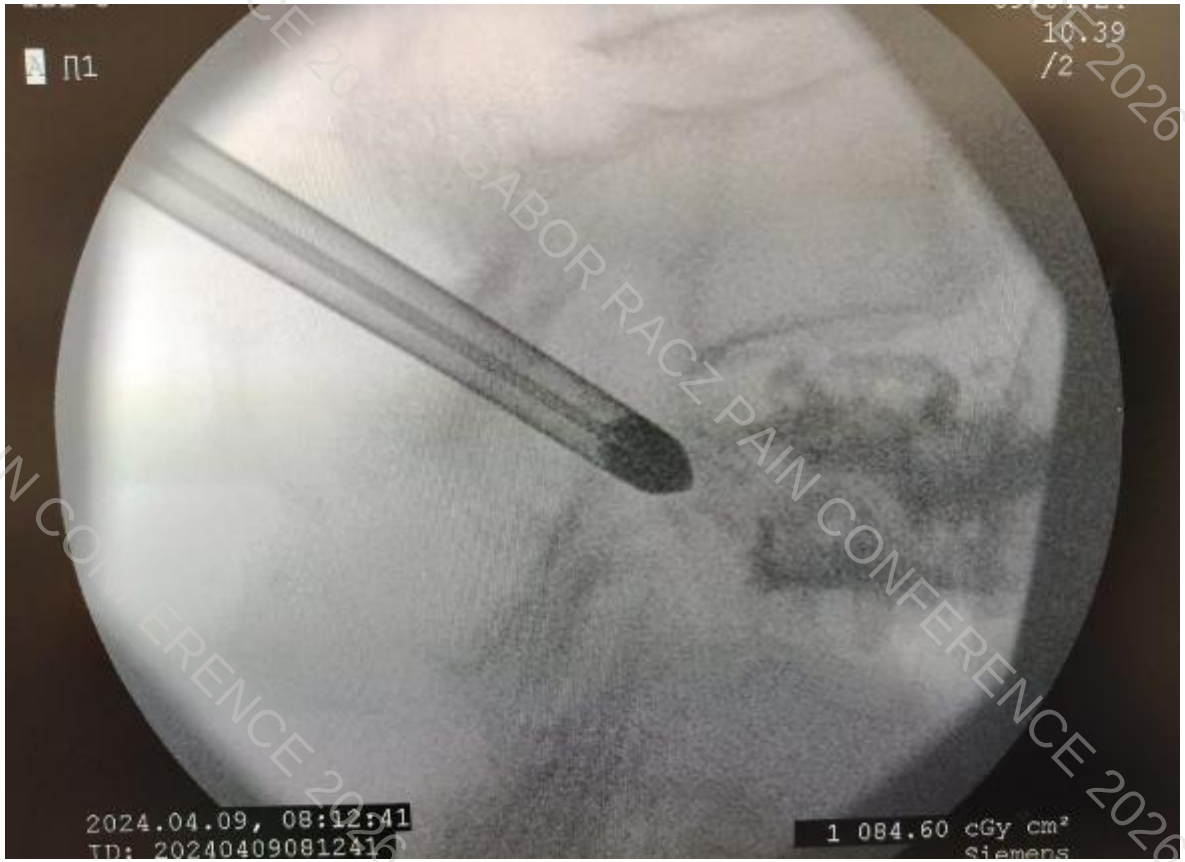


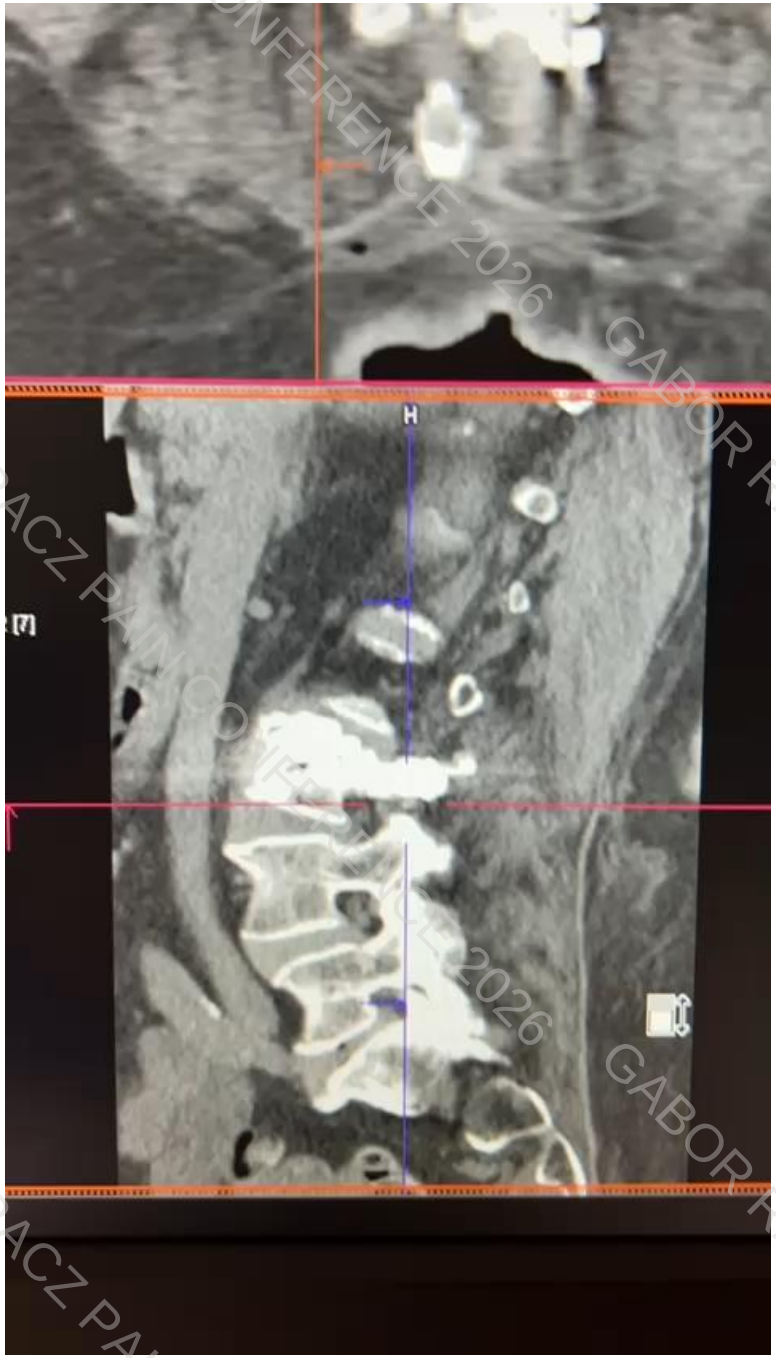


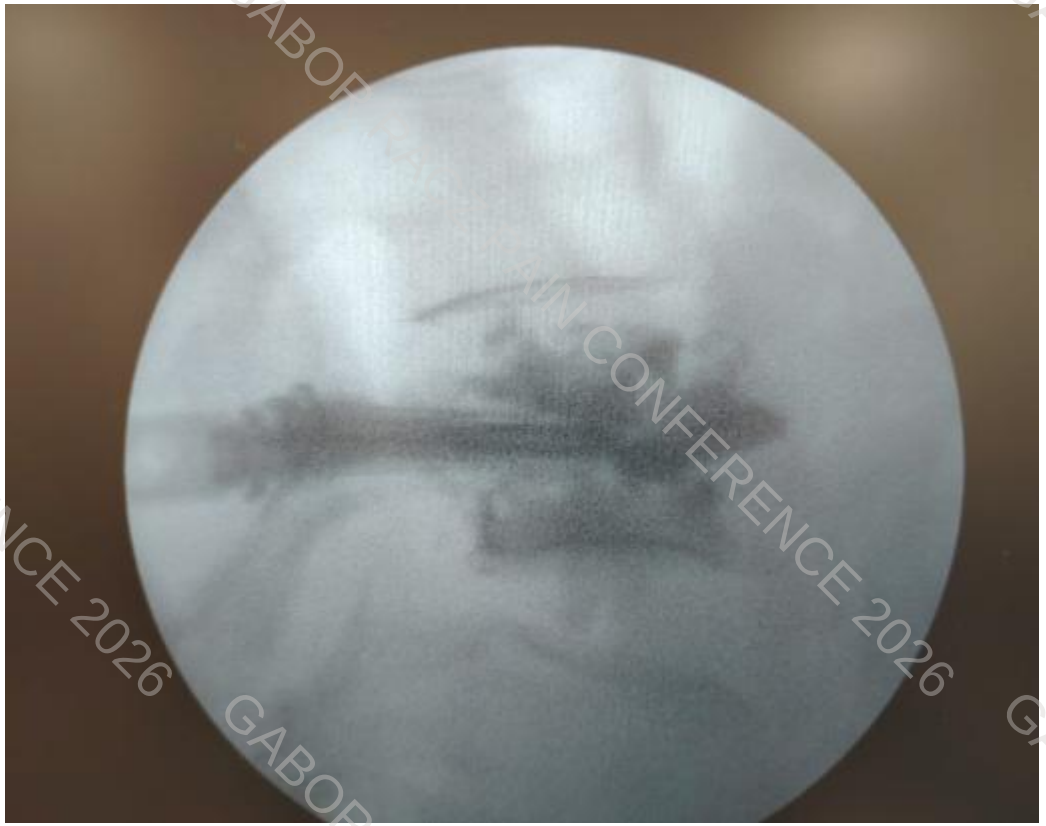


Initial Intervention

- Initially, a percutaneous **endoscopic L3 decompression** was performed (**transforaminal L2-L3 left-sided radicular endoscopic decompression**) along with **fixation using Sycamore perc pedicle screws**
- **Patient under sedation!**
- **Postoperative Status:** Favorable, with early mobilization and complete resolution of pain in all ranges of motion.







Follow-Up and Second Intervention

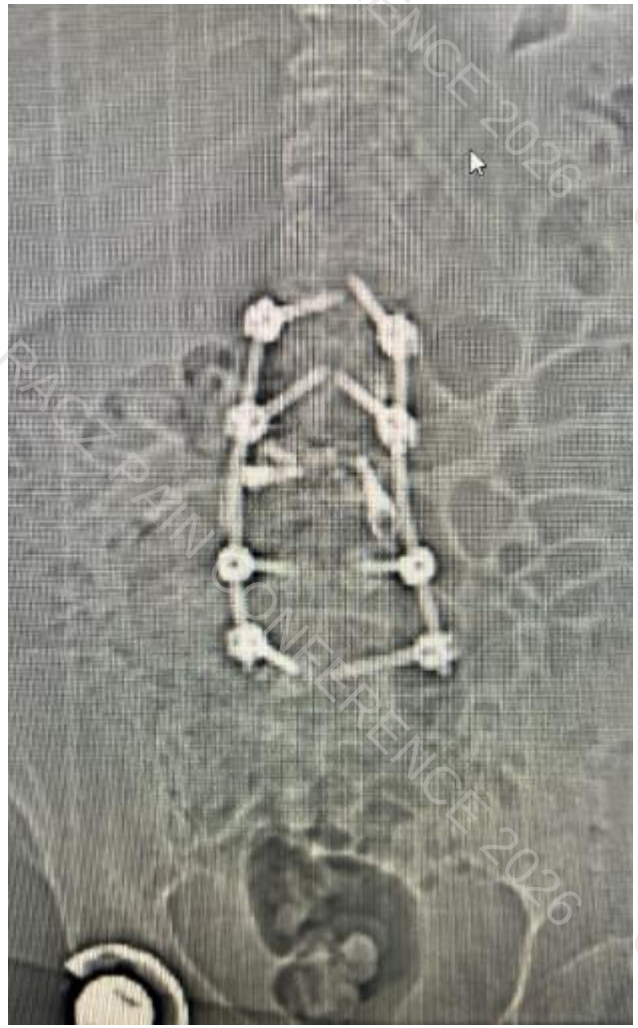
Approximately one month later, the patient again reported **severe mechanical lower back pain after strenuous activity** with significant impairment of walking and standing, accompanied by pain and decreased muscle strength in the left lower limb.

•**Spinal CT Scan:** Revealed worsening compression of the L3 vertebral body, with lumbar kyphosis and canal compression by bone fragments and residual cement.

•**Decision:** 2 nd Decompression of the dural sac via a transforaminal endoscopic approach, with removal of bone material, disc fragments, and acrylic cement.

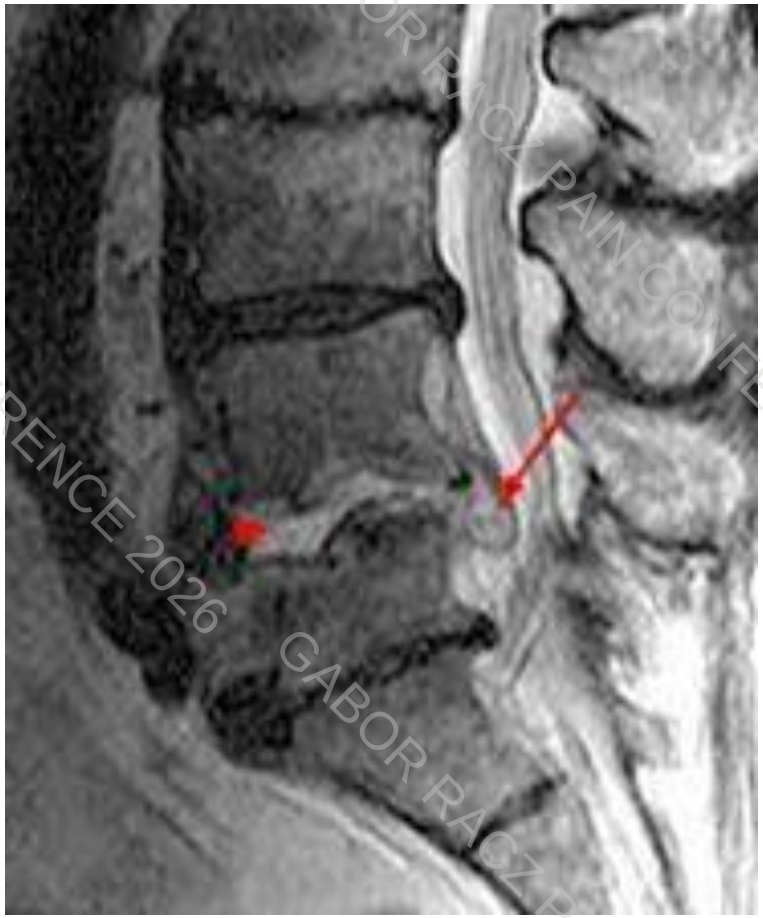
•**Subsequent Intervention:** Bilateral placement of transpedicular screws at L1-L2-L4-L5 with acrylic cement augmentation via percutaneous approach under radiological guidance.

•**Postoperative Evolution:** The patient's condition

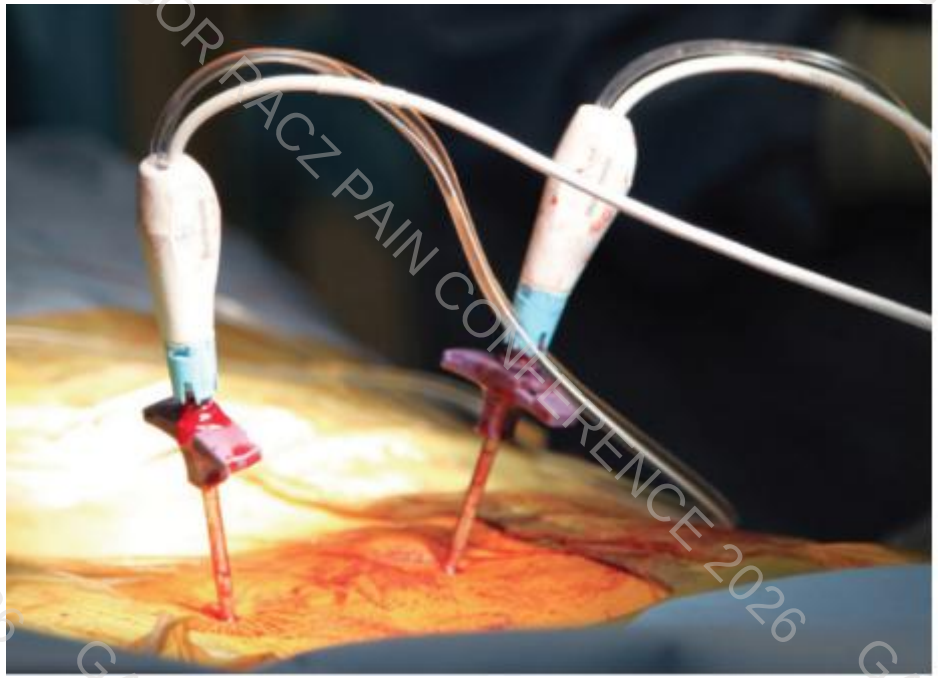


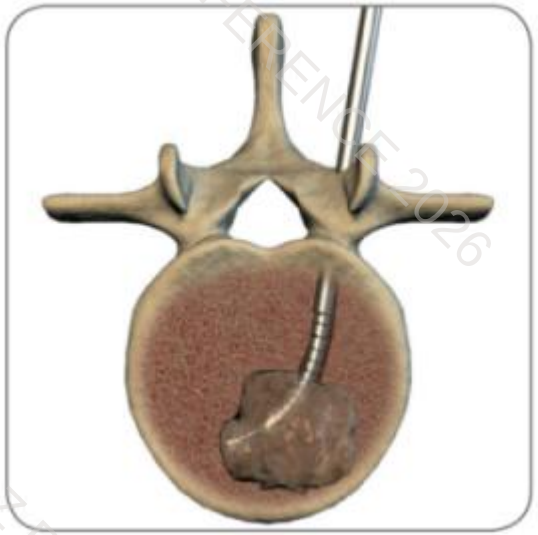
Just Degeneration???

- Discitis is by far a better aproach than open!
  - Most of them are postop and patinet is destabilized by both procedure and disease
  - You get tissue culture
  - Irrigation with antibiotic in the disc and
    epidural space – better and faster penetration
  - NO DESTABILIZATION
  - They mobilize sooner – 10 days tops

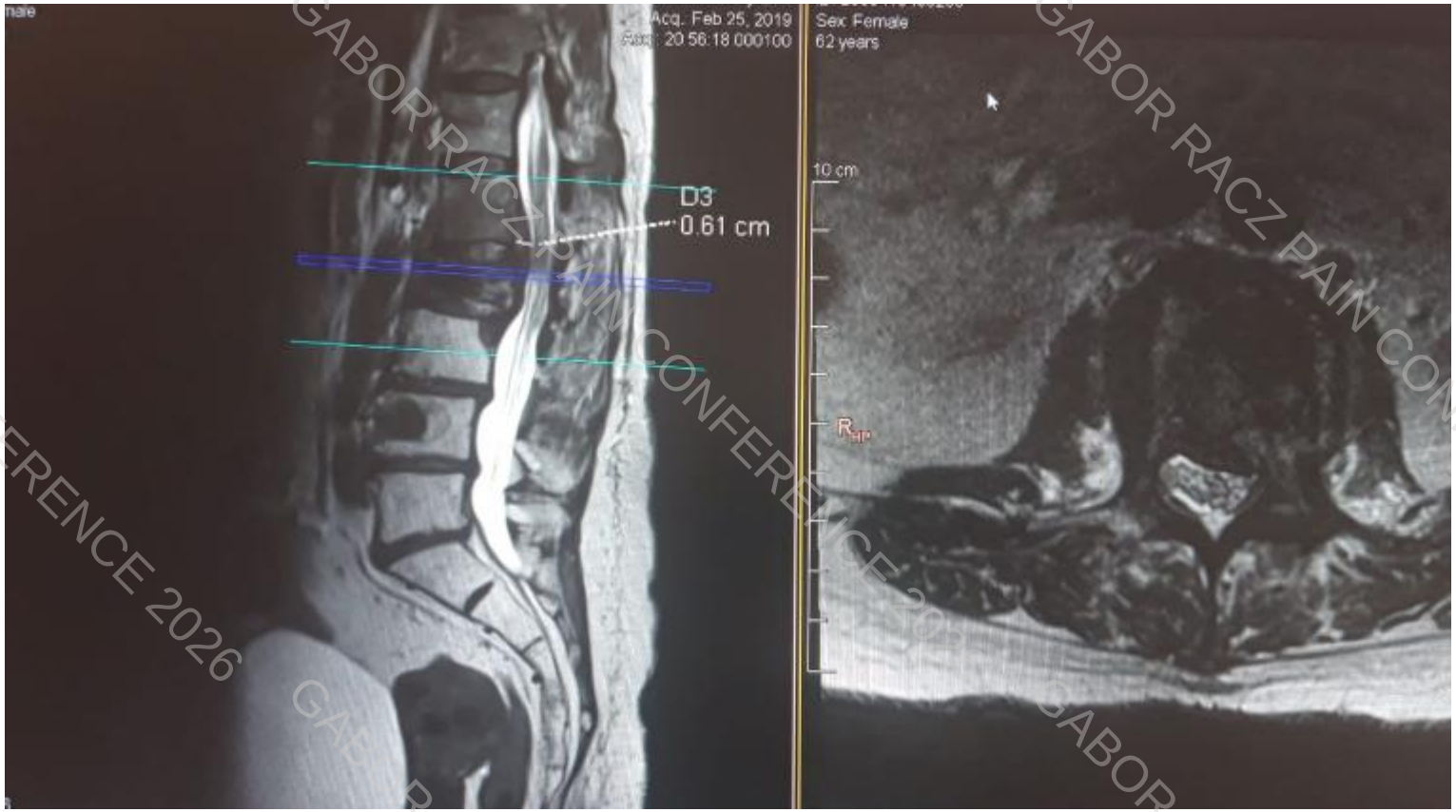


Radiofrequency Tumor Ablation

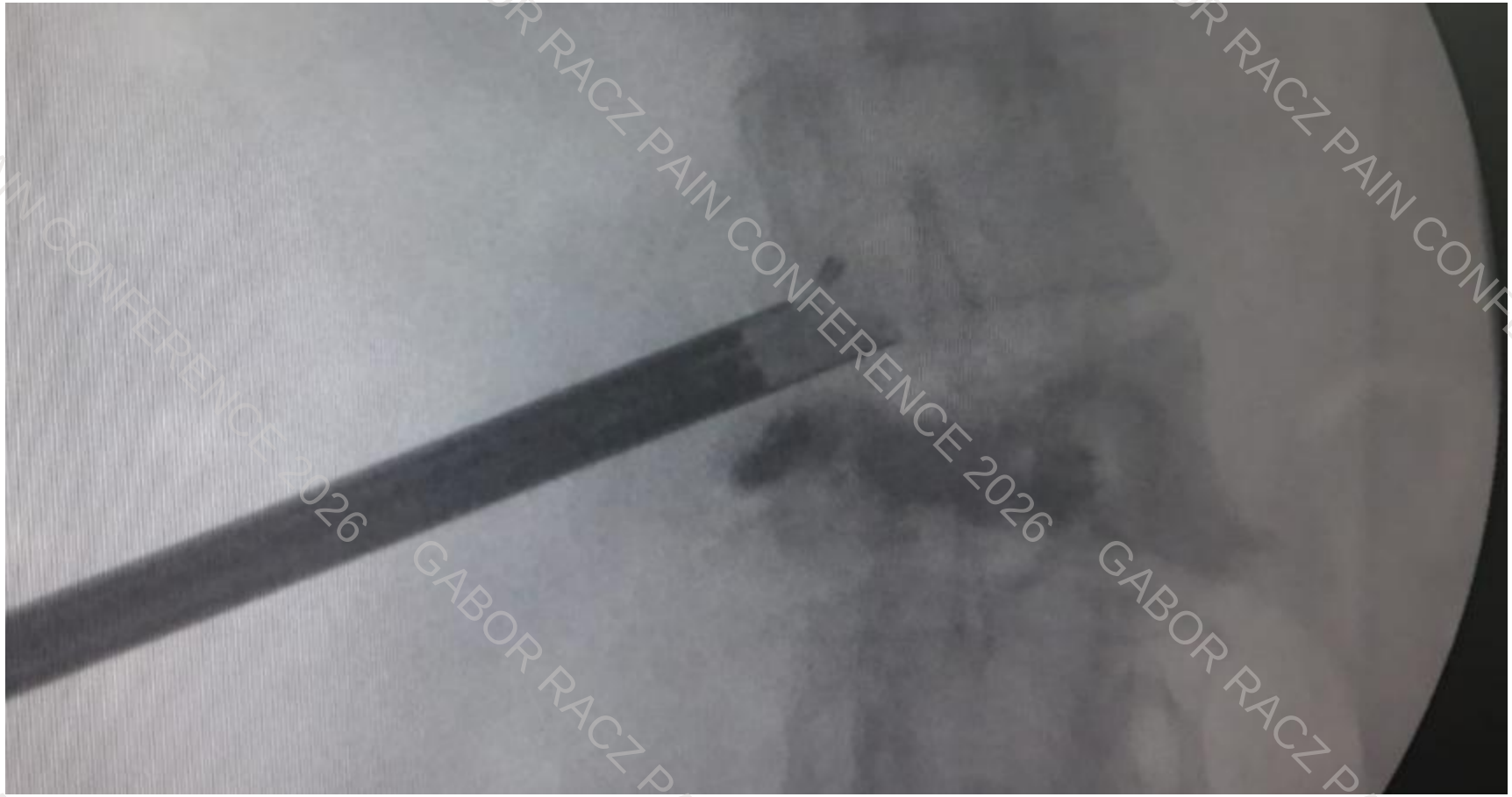




Colon Met



Percutaneous Decompressions
What are we taking here??



Percutaneous Decompressions
What are we taking here??

Spinal CHORDOMA

Symptoms:

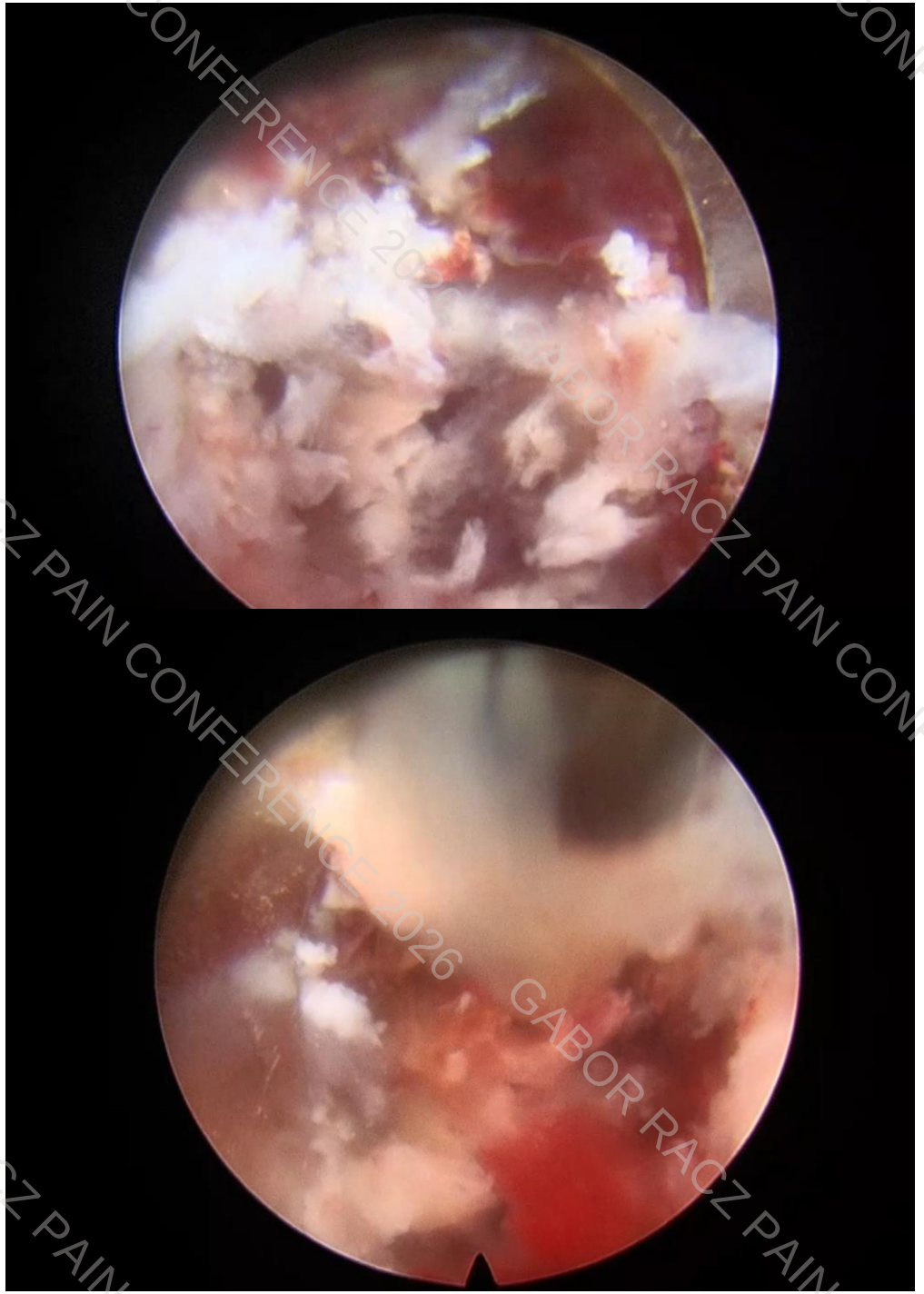
- **Severe lower back pain**
- **Mild paraparesis with progressive motor and balance disturbances over the past few months**

History:

- **Vertebral oncologic pathology** (lumbar chordoma, operated in February, July, and December 2023).
- **Treatment History:** Underwent 27 sessions of proton therapy in Austria.

Lumbar MRI Findings:

- **Bone defect at T12-L1** (post-surgical and tumor invasion)
- **Residual tumor** in direct contact with the thoracolumbar spinal cord.

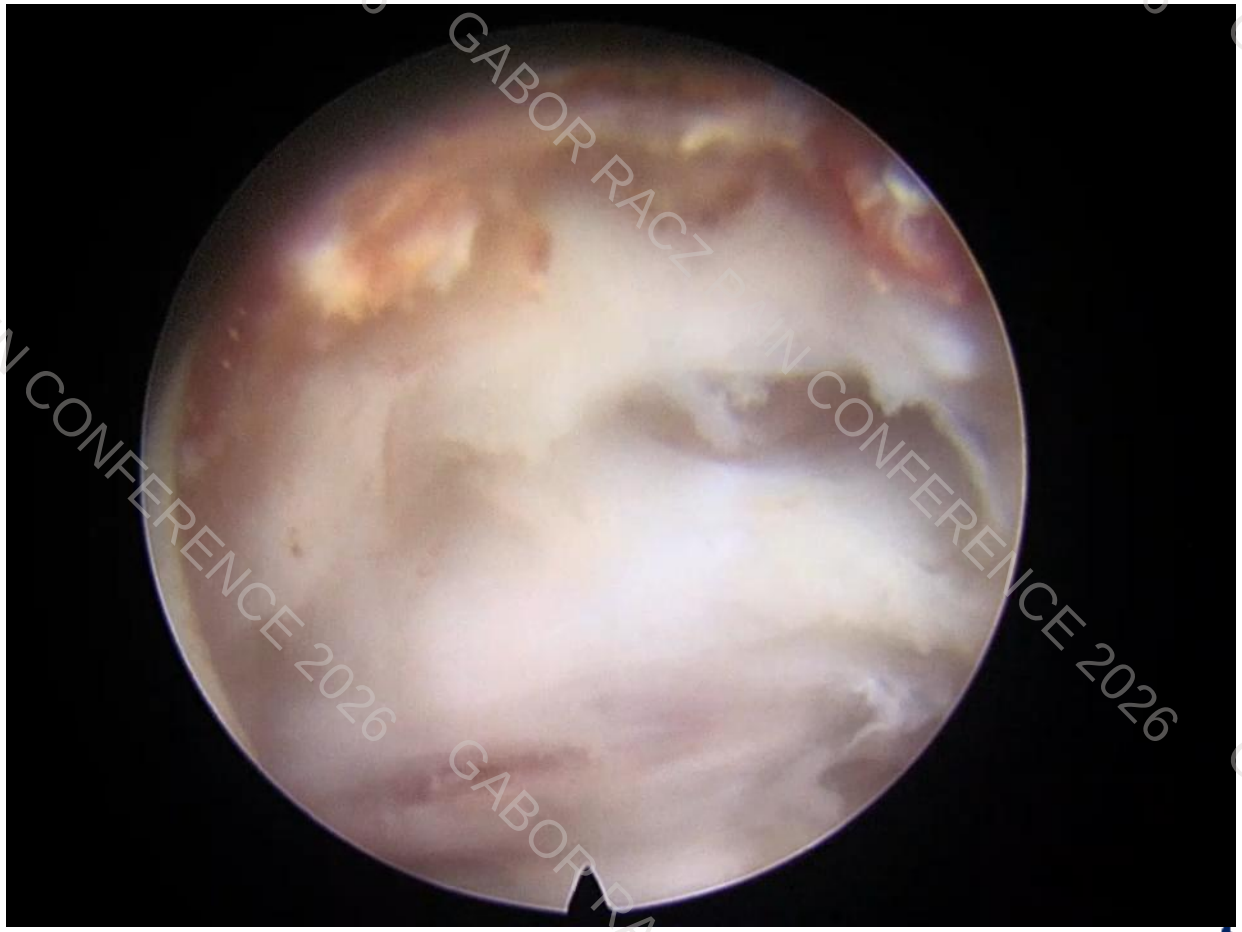


36,M

Spinal CHORDOMA

Therapeutic Plan

- **Endoscopic tumor decompression** to allow the continuation of proton therapy.
- **Outcome:** Complete tumor decompression was achieved, with regression of neurological symptoms.



71Y, M

- Imaging: Lumbar spine MRI (June 2020)
  - T12, L2 metastatic disease contained in the vertebral bodies; L3 metastatic disease invading the posterior wall, the anterior epidural space and compressing the dural sac and structures;
- Left L3 pedicle invasion
- L3 anterior arachnoiditis

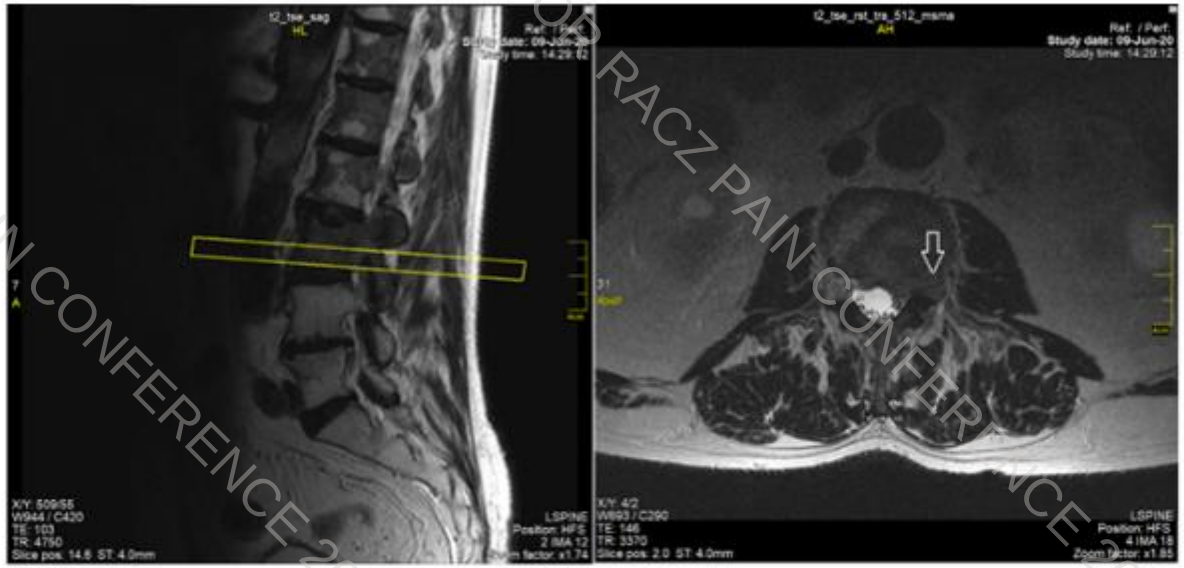


Figure 2. T2-weighted sagittal and axial MRI images of the patient's spine with focus on the L3-4 foramen showing tumor invasion

71Y, M

Therapeutic alternatives?

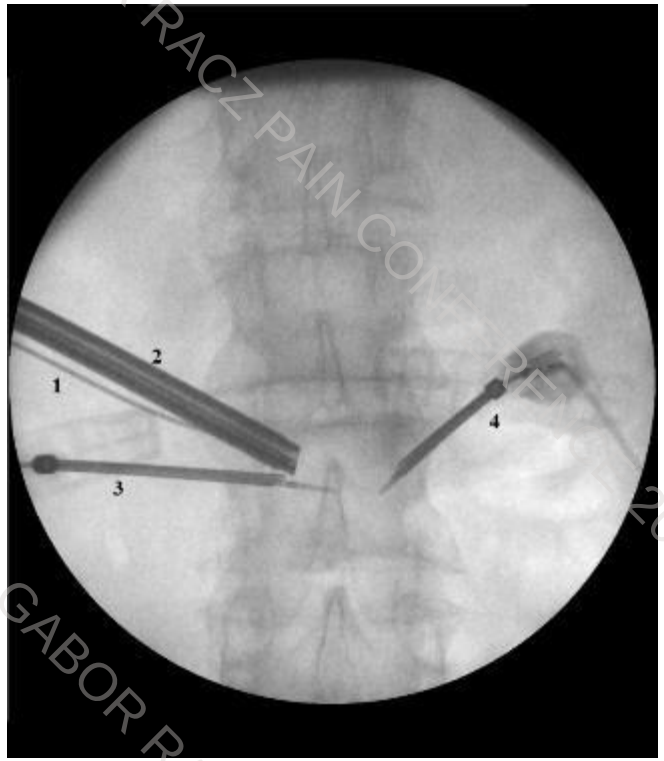
- Radiotherapy evaluation after biopsy with immuno/chemotherapy as per oncologist coordination.
  - ➢ low risk, low reward

- Surgical intervention involving corpectomy and lumbar fixation with screws and rods.
  - ➢ complex intervention, risky for patient with low biological resources

- Hybrid approach with radiofrequency ablation + left L2-3 percutaneous transforaminal endoscopy with metastasectomy and decompression + epidurolysis + vertebroplasty
  - ➢ hybrid method, minimally invasive

Percutaneous Decompressions
What are we taking here??

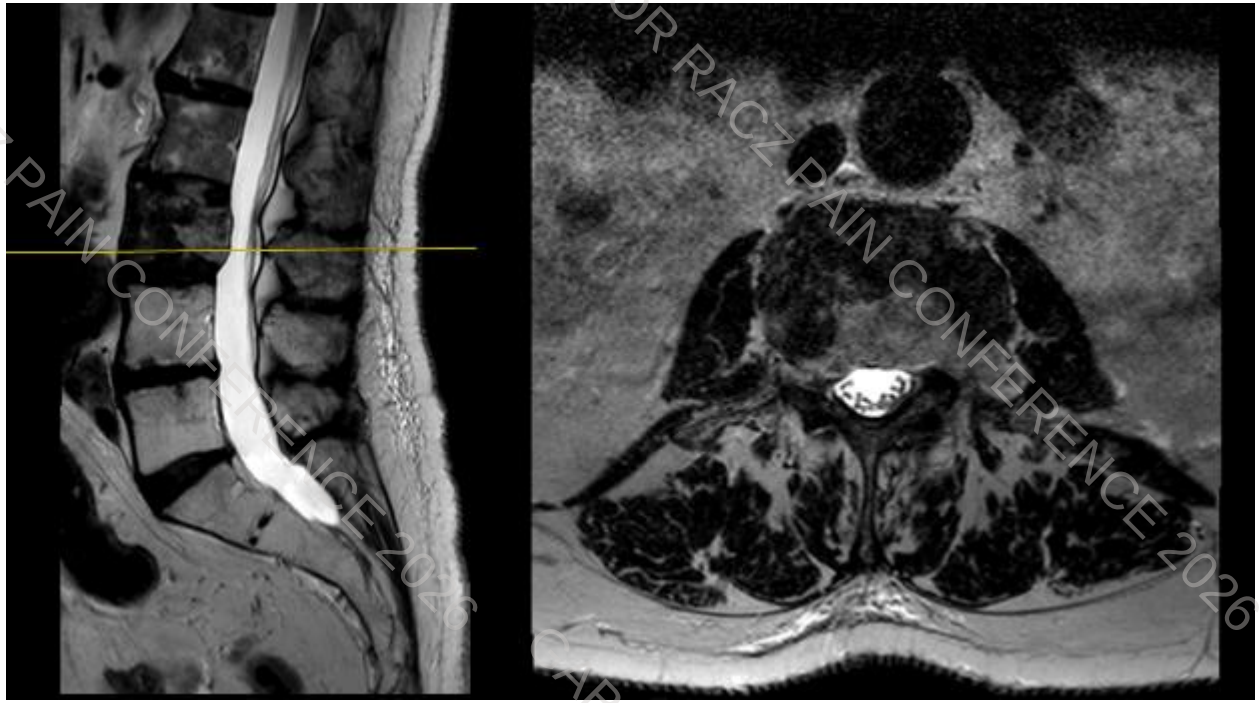
- Technical Approach: Hybrid minimally invasive intervention
  - OstecoolTM Radio Frequency L3 tumour ablation, Xray guided
  - Endoscopic decompression spine canal at L2-3 with metastasectomy and epidurolysis
  - Cementoplasty of the L3 body, Xray guided



- Rx image showing the temperature monitoring probe (1) the endoscope working channel (2) and the two 10G needles harboring the RF ablation probe (3,4)

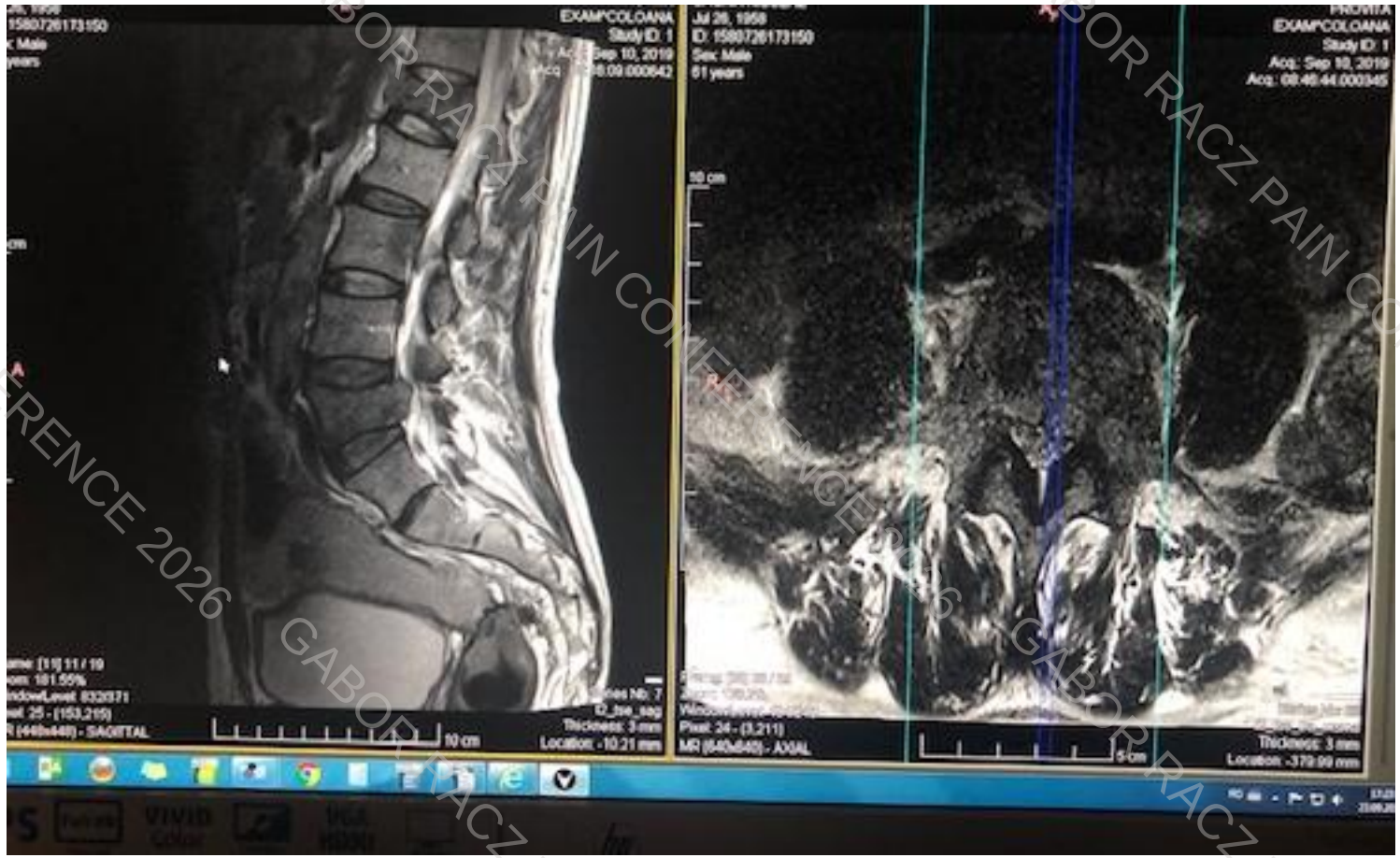
Pain Interventions

2 years postop

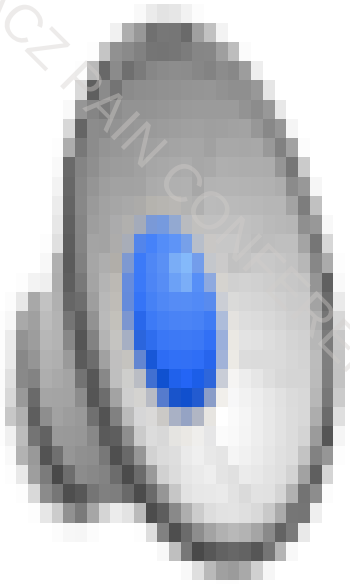


- Slight left thigh discomfort

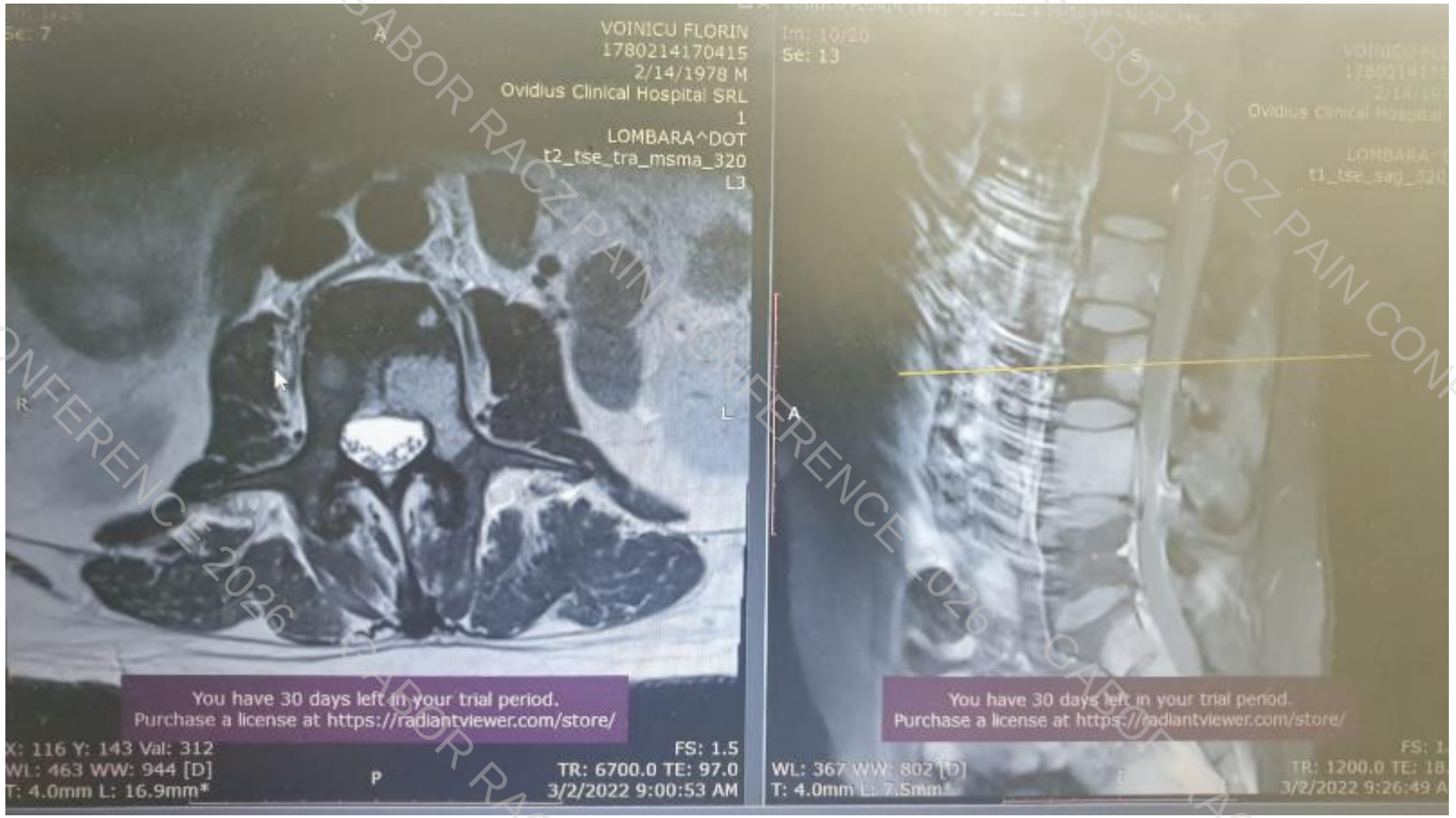
L5 Colon Met



Percutaneous Decompressions
What are we taking here??



Epiduritis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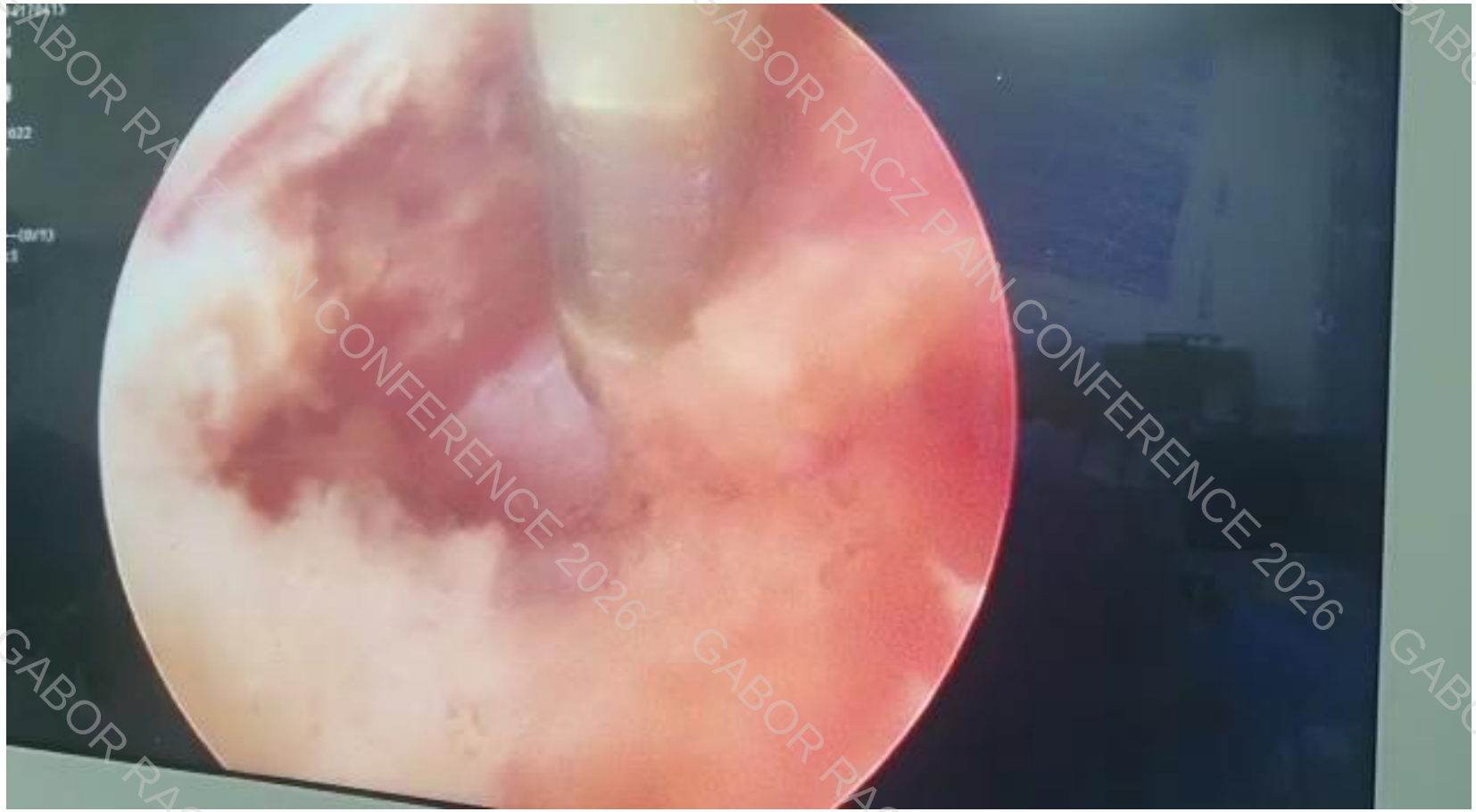
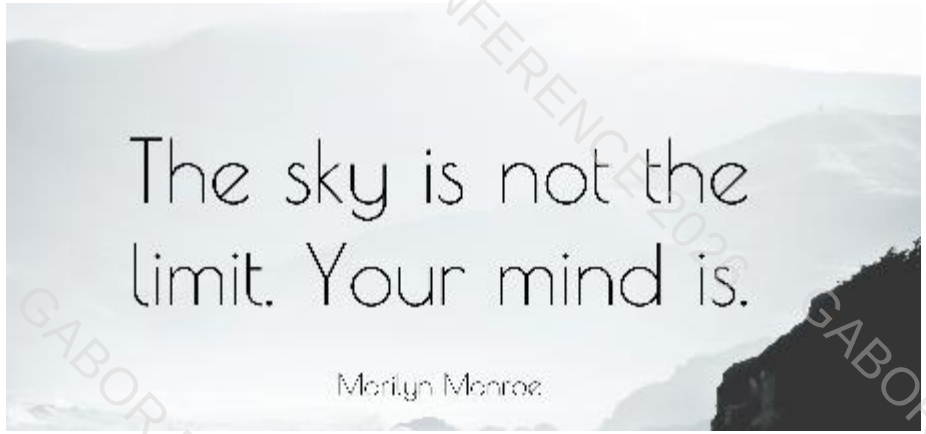
Percutaneous Decompressions
What are we taking here??



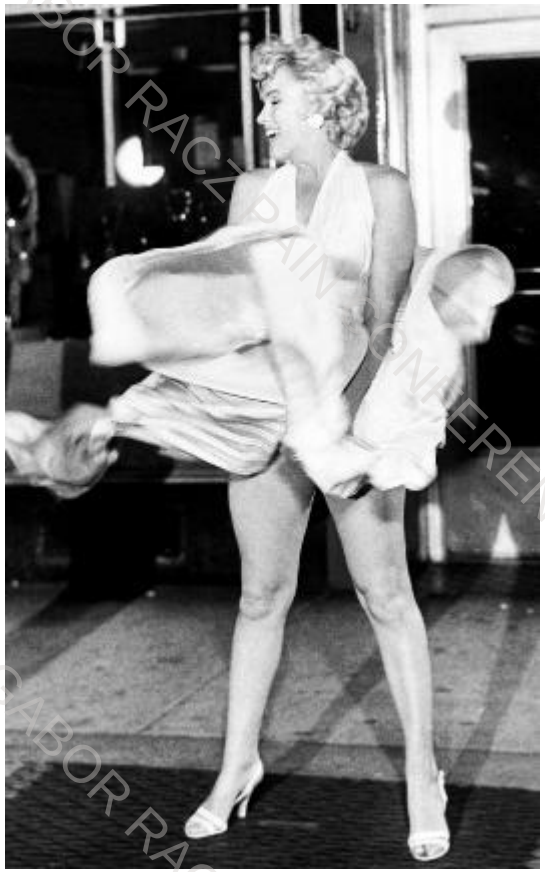
Challenges

- Expensive technology
- No randomized studies to compare the technologies between themselves – young technology
- Very different level of expertise and different techniques
- Out of pocket pay!!!!!



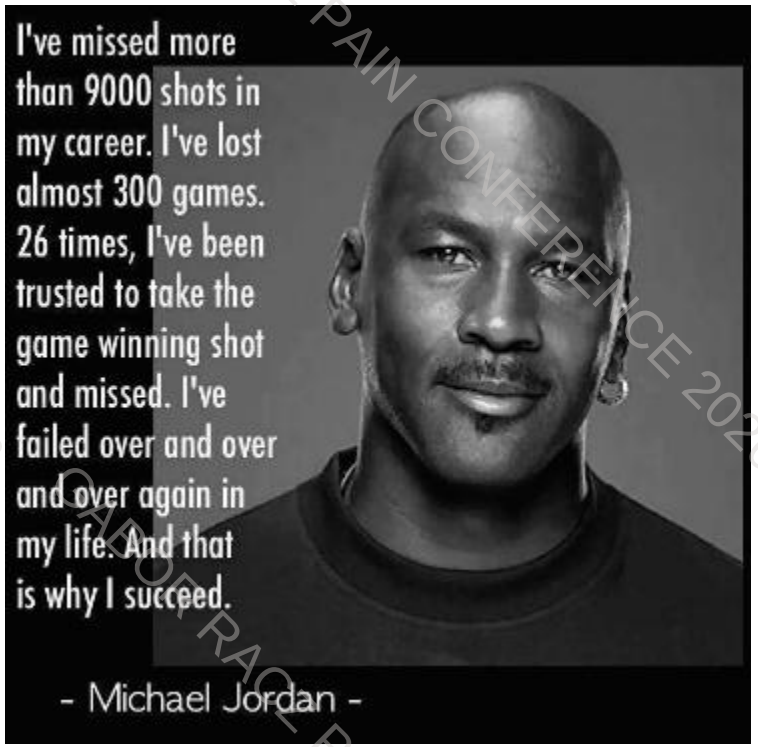
Advantages are huge!

- Outpatient Interventions
- Minimal Anesthesia
- Fast Recovery
- Little Pain
- Comparable outcomes or better to open Surgery
- Less morbidity – less infections, less bleeding!
  - Trans catheter embolization can also be performed prior to surgical resection to reduce intra-operative blood loss
- If failure to respond, Open Surgery still stands as an alternative



Take home message ….
DON ‘T HUNT ALL ANIMALS/PATIENTS WITH THE SAME WEAPON!

- Multidisciplinary team is THE ONLY SOLUTION
- We have the radiological support and the expertise for these techniques
- Technology is here and more is coming



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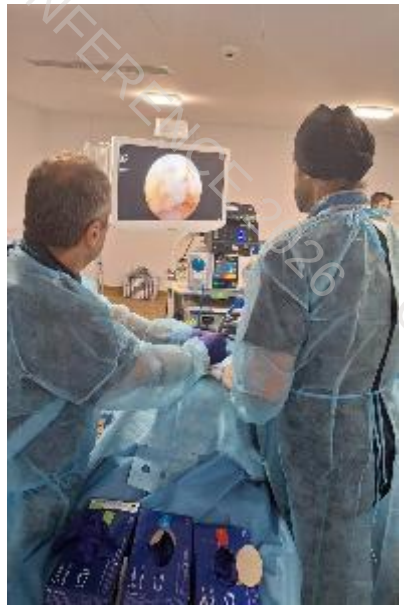

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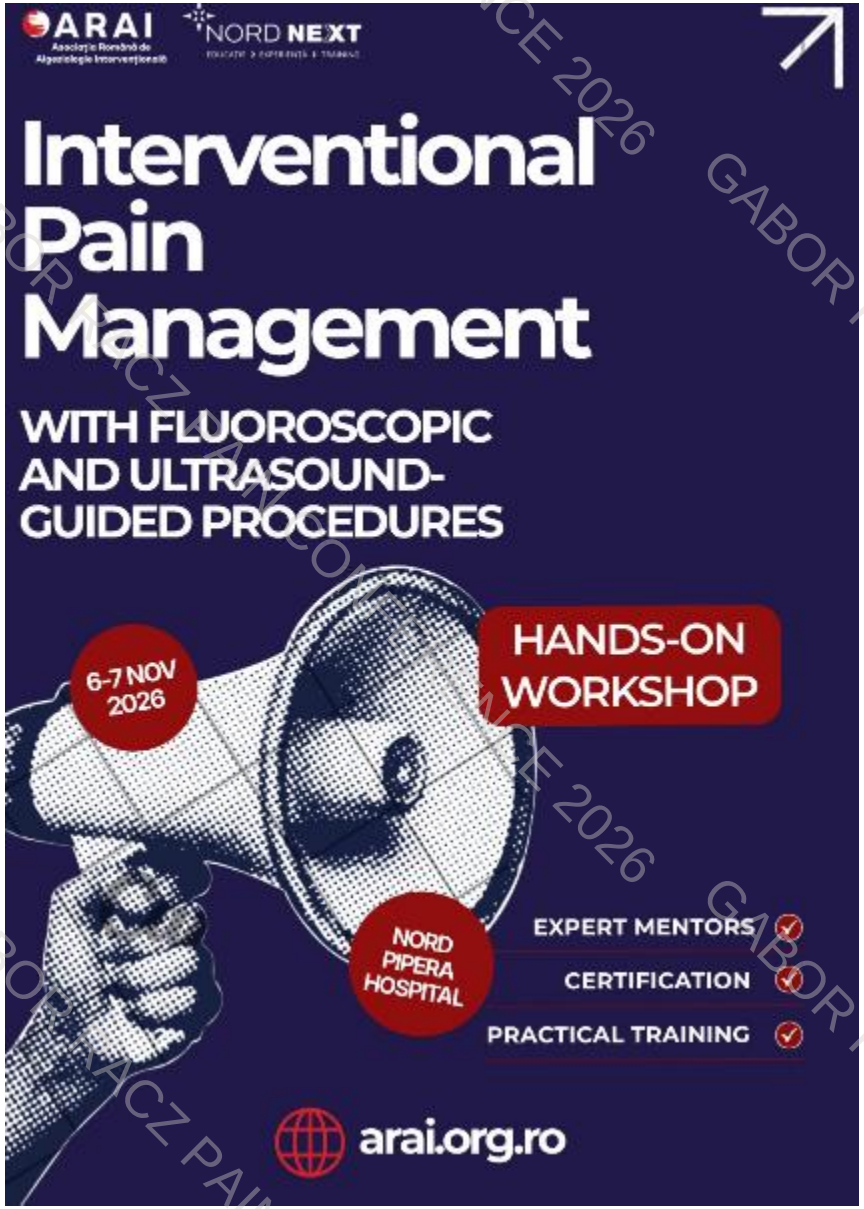

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