Endoscopic Minimally Invasive Discectomy

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Hyde Park, MA

Endoscopic Minimally Invasive Discectomy

SCIENCE: Continues to advance:

In the old days:

Gallbladder surgery (Extremely Painful) : Then vs Now (open vs closed).

Cardiac Surgery: Open chest vs Stent placements.

Endoscopic Minimally Invasive Discectomy

Similarly, to other specialties, Pain Management and Interventional Pain Management has also advanced, progressing to minimally invasive procedures and surgeries:

We can now perform: Discectomies, fusions, laminectomies, ablations/lysis of nerves under direct vision, amongst others.

All facilitated by companies like Elliquence, and others, who have focused and developed equipment and supplies which facilitates our capacity to do "less and achieve the same results."

Endoscopic Minimally Invasive Discectomy

*We can now **do and achieve the same results doing LESS**: Discectomy using Elliquence DiscFX, tools and supplies.*

How?
Anatomy of a disc: Annulus Fibrosa, Nucleus Pulposus
Disc Degeneration
Herniations/ Bulges VS Sequestered/ Prolapsed

Endoscopic Minimally Invasive Discectomy

Patient Selection is key:
Recommendation: Anatomy of posterior annulus remains intact (herniated/bulge) NOT sequestered/prolapse.

For Sequestered/Prolapse discs, refer for a more invasive procedure (the surgeons).

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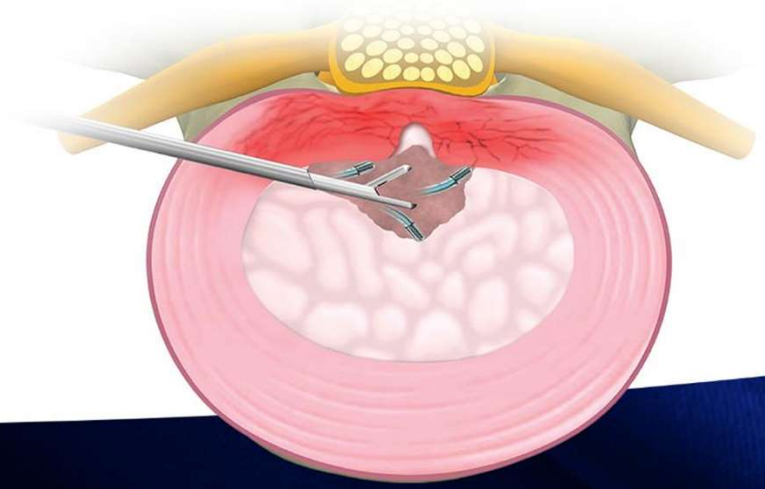
DISC-FX®

An Innovative Minimally Invasive Discectomy System



Disc-FX® System / Accessories

Guidewire*

Tapered Dilator*

Depth Stop

Cannula, Beveled*

Cannula, Straight*

Trephine*

Trigger-Flex® Bipolar System*

Spine Needle (16g: DFX-N6)

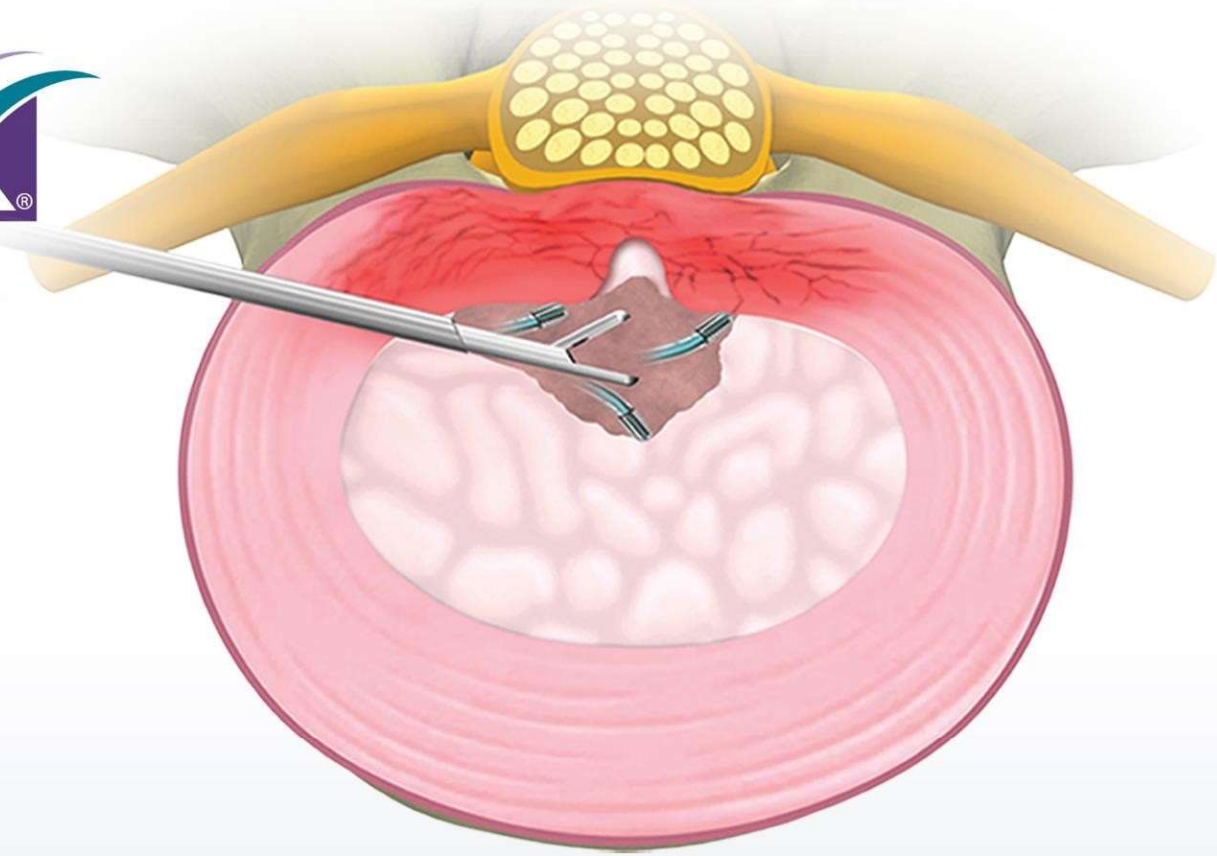
Grasping Forceps (DFX-G)

Instruments are not to scale

Disc-FX kit, sterile, single use

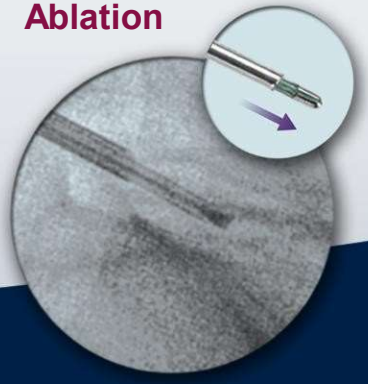
DISC-FX®

Get Back in Motion.



Specimen/ Debulking

Nucleus Ablation



Annulus Modulation

Visualization

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Specific Clinical Indications

- Patient with symptomatic lumbar contained herniation, protrusion or black disc (DDD)
- Contained Lumber Disc herniation must be no greater then 1/3 of the sagittal diameter of the spinal channel
- Annular Tear- Discogram (+)
- Discogenic Low Back Pain - Discogram (+)
- Radicular Pain
- Patient who failed 6 weeks conservative treatment, including medications, physical therapy and epidural injections
- Patient has concordant clinical signs (pos. SLR, radiating pain, axial pain, coughing pain, sensory signs) with images (CT or MRI)

Specific Clinical Contraindications

- Patient with spinal fracture or tumor
- Infection of the spine
- Clinical evidence of cauda equina syndrome
- Grade 2 spondylolisthesis or unstable Grade 1 spondylolisthesis (confirm with flexion/extension lateral X-ray of LS spine)*
- Progressive neurological deficits
- Allergy to contrast media or the drugs to be used in the procedure
- Evidence of sequestered disc herniation on MRI

**Modification – AJ Rastogi, MD*

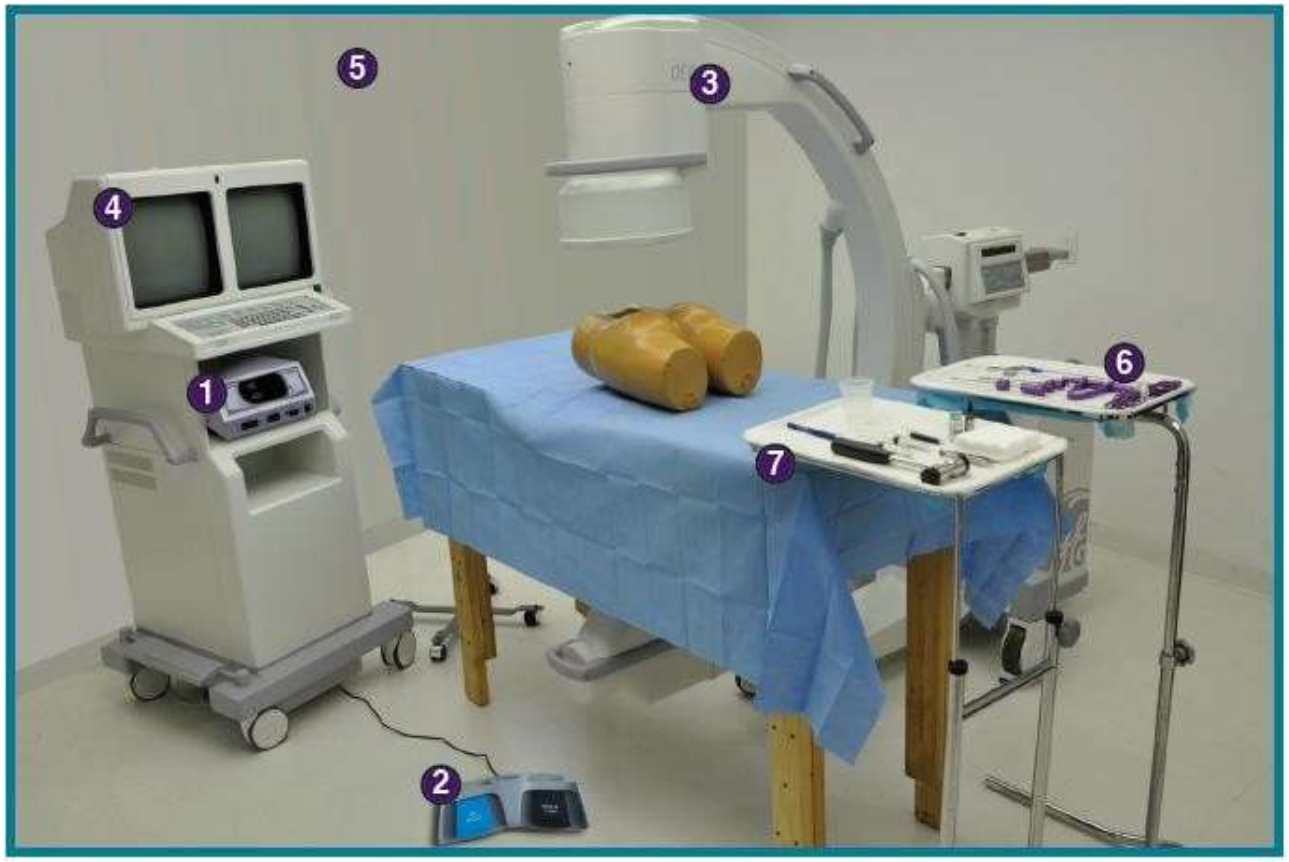
Anesthesia

1. I.V. sedation with Versed 1-2 mg initially, then can add on to total 2-4 mg

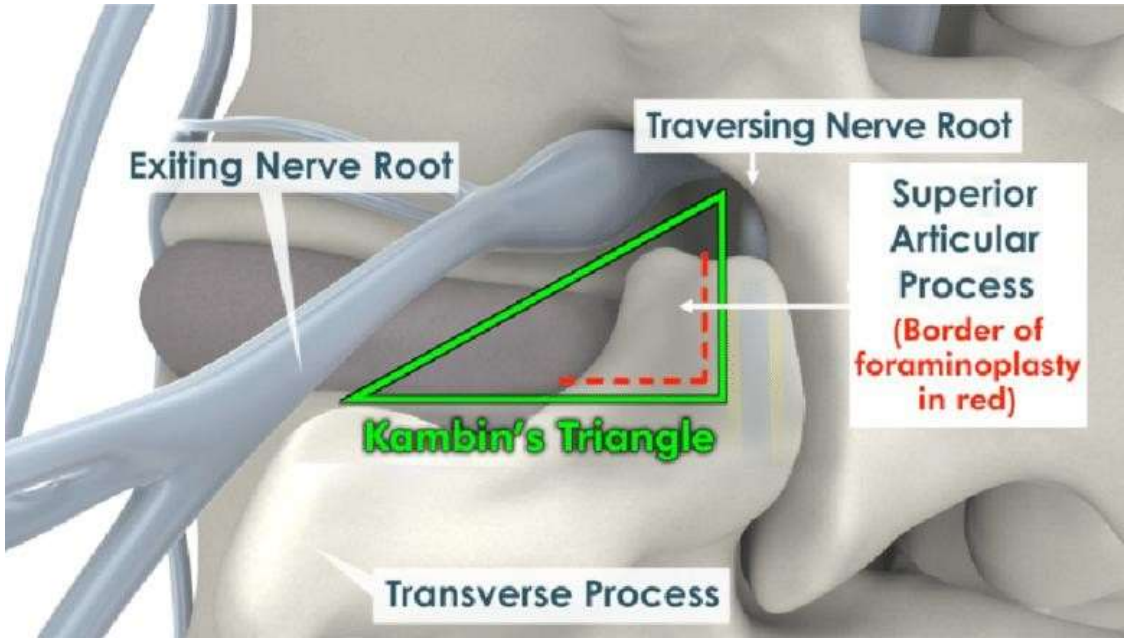
2. Fentanyl 50 mcg I.V. for pain control. No Propofol

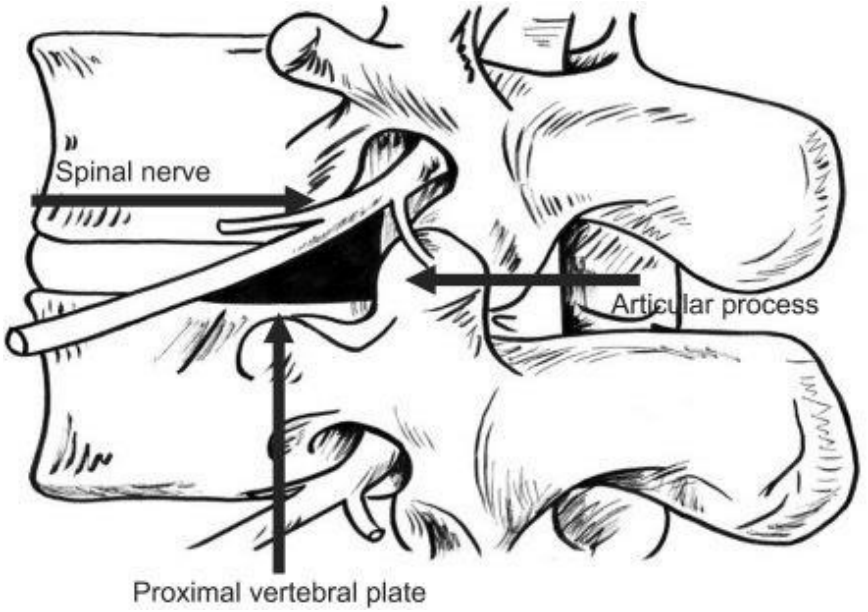
3. I.V. antibiotics 30’ before procedure

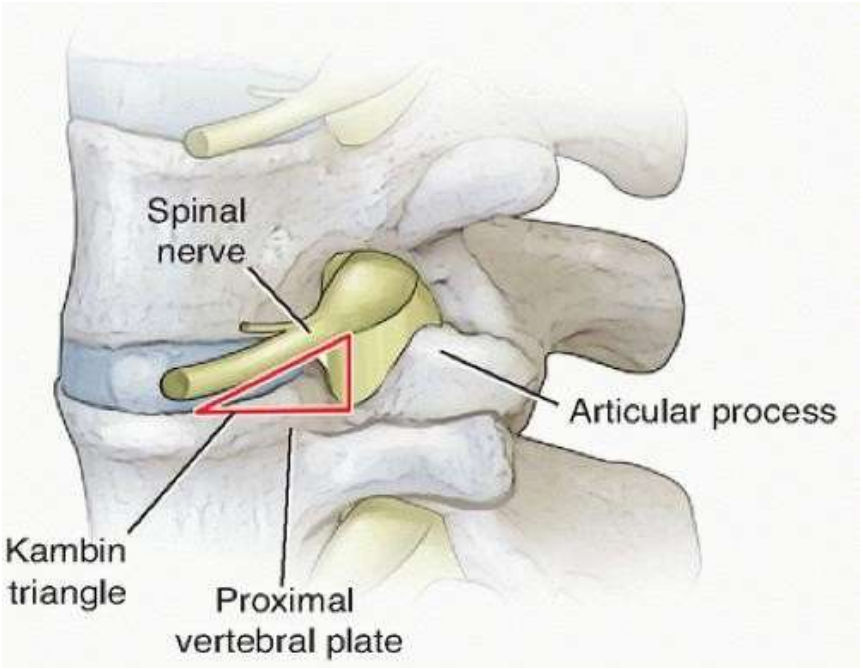
Procedure Setup Guide

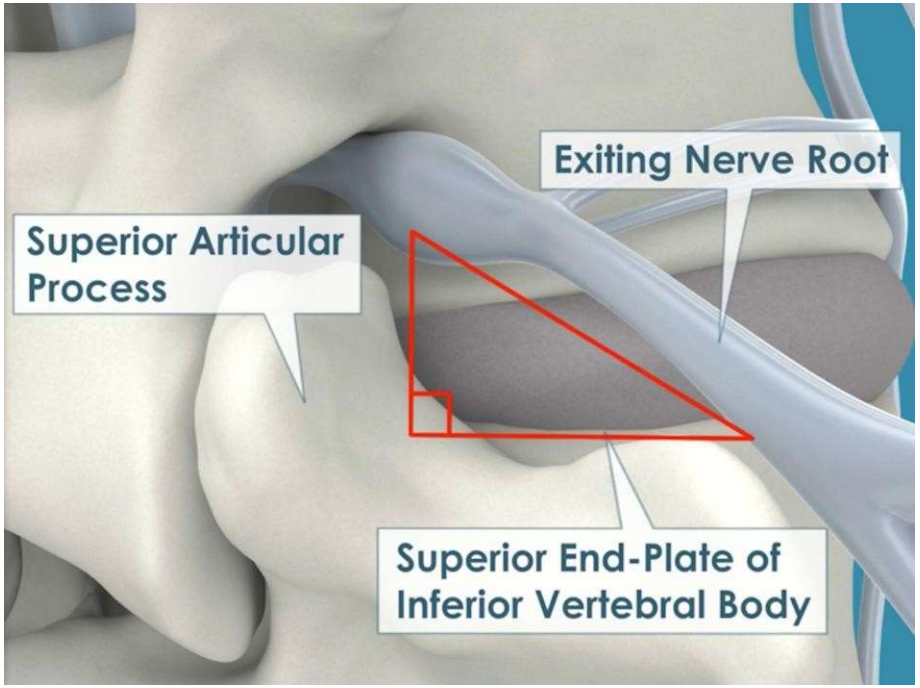


1. **Surgi-Max® Plus Energy Source (IEC4-SP)**
2. **Dual BiPolar Footswitch (BF-FSC#)**
3. C-Arm
4. C-Arm Monitor
5. IV Stand with Pressure Bag
6. Mayo Stand 1
7. Mayo Stand 2


Exiting Nerve Root
Traversing Nerve Root
Superior Articular Process
(Border of foraminoplasty in red)
Kambin's Triangle
Transverse Process


Spinal nerve
Articular process
Proximal vertebral plate


Spinal nerve
Articular process
Kambin triangle
Proximal vertebral plate


Exiting Nerve Root
Superior Articular Process
Superior End-Plate of Inferior Vertebral Body

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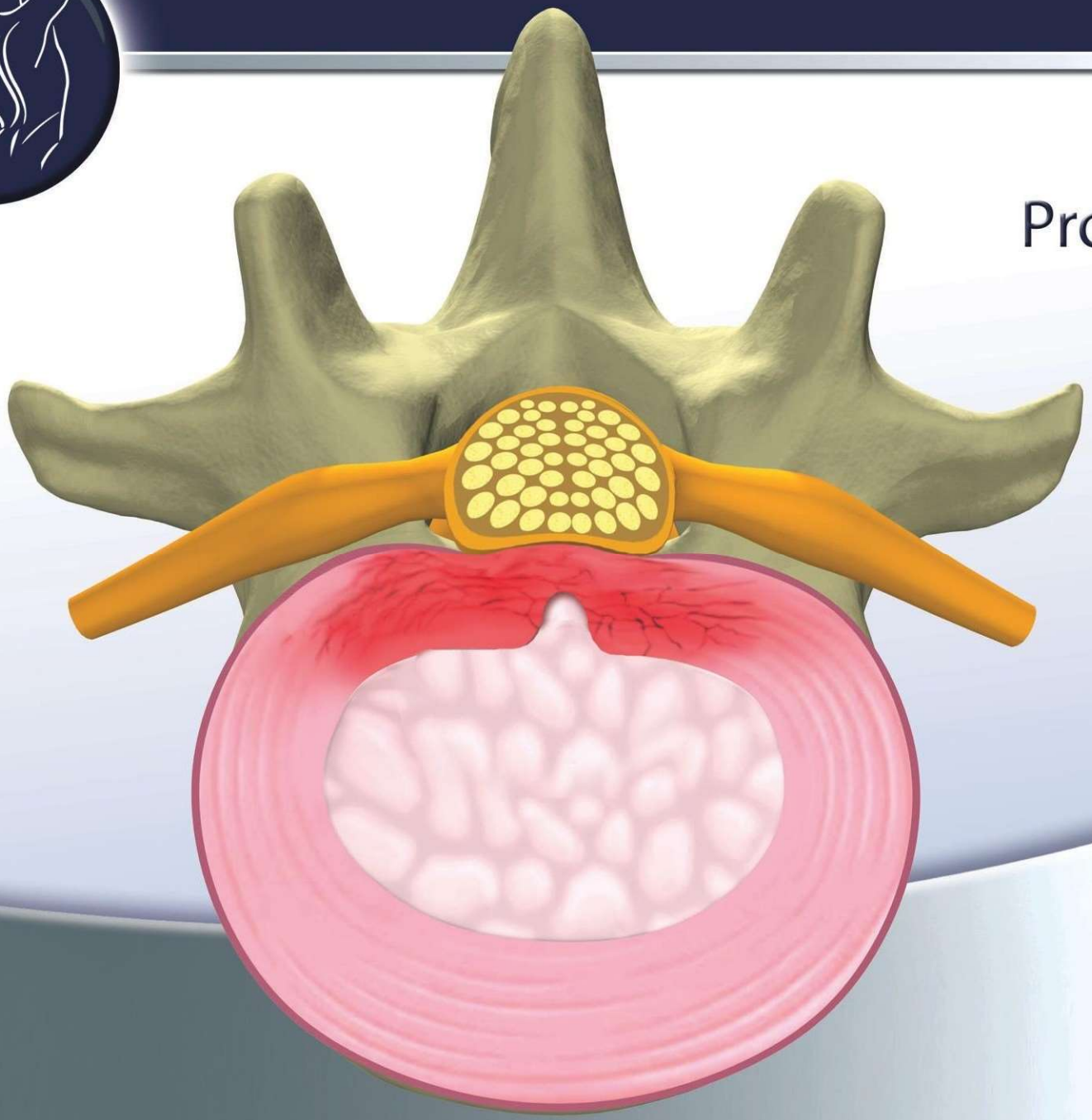
Disc-FX® Step by Step

Procedure Overview



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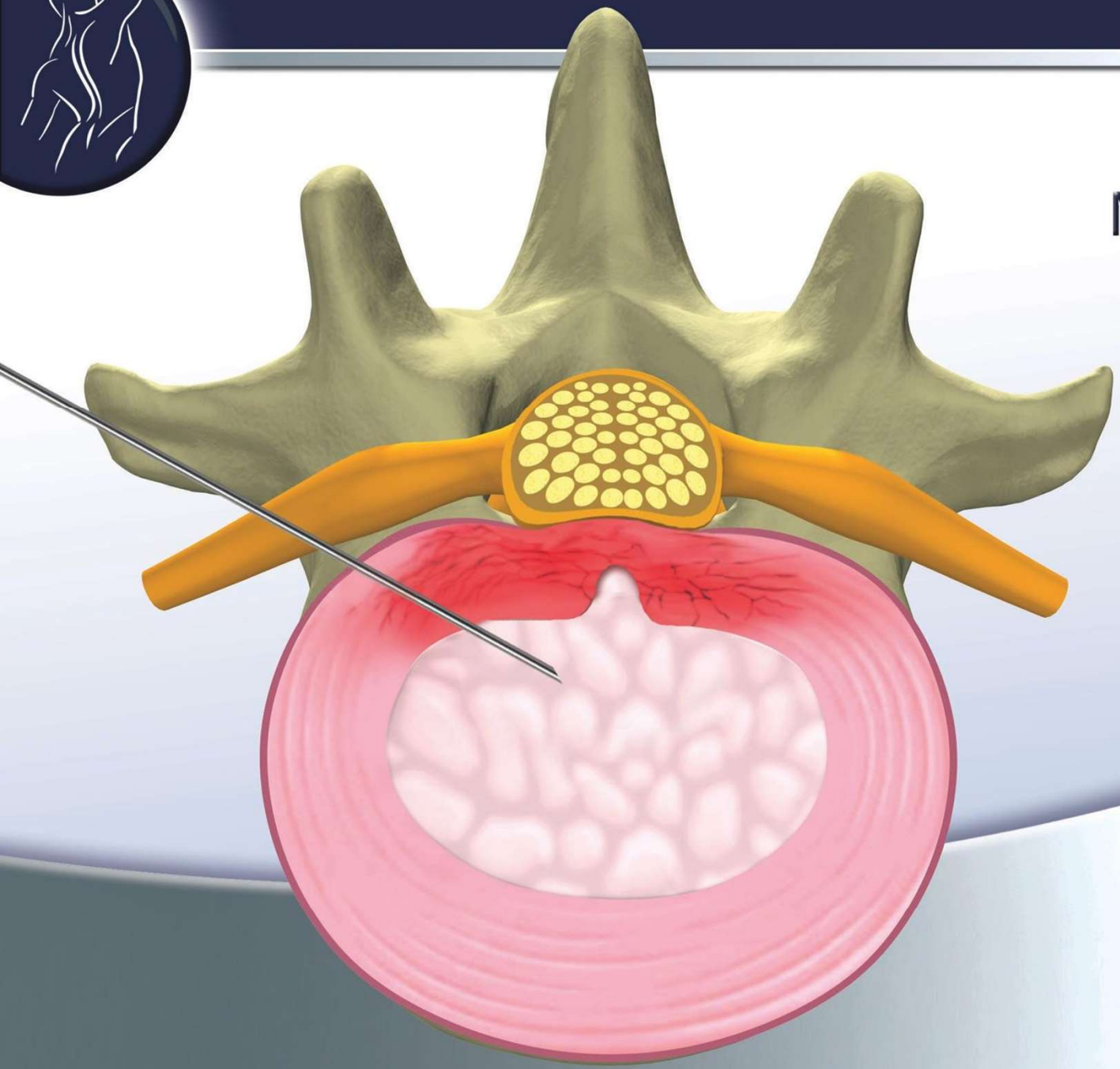
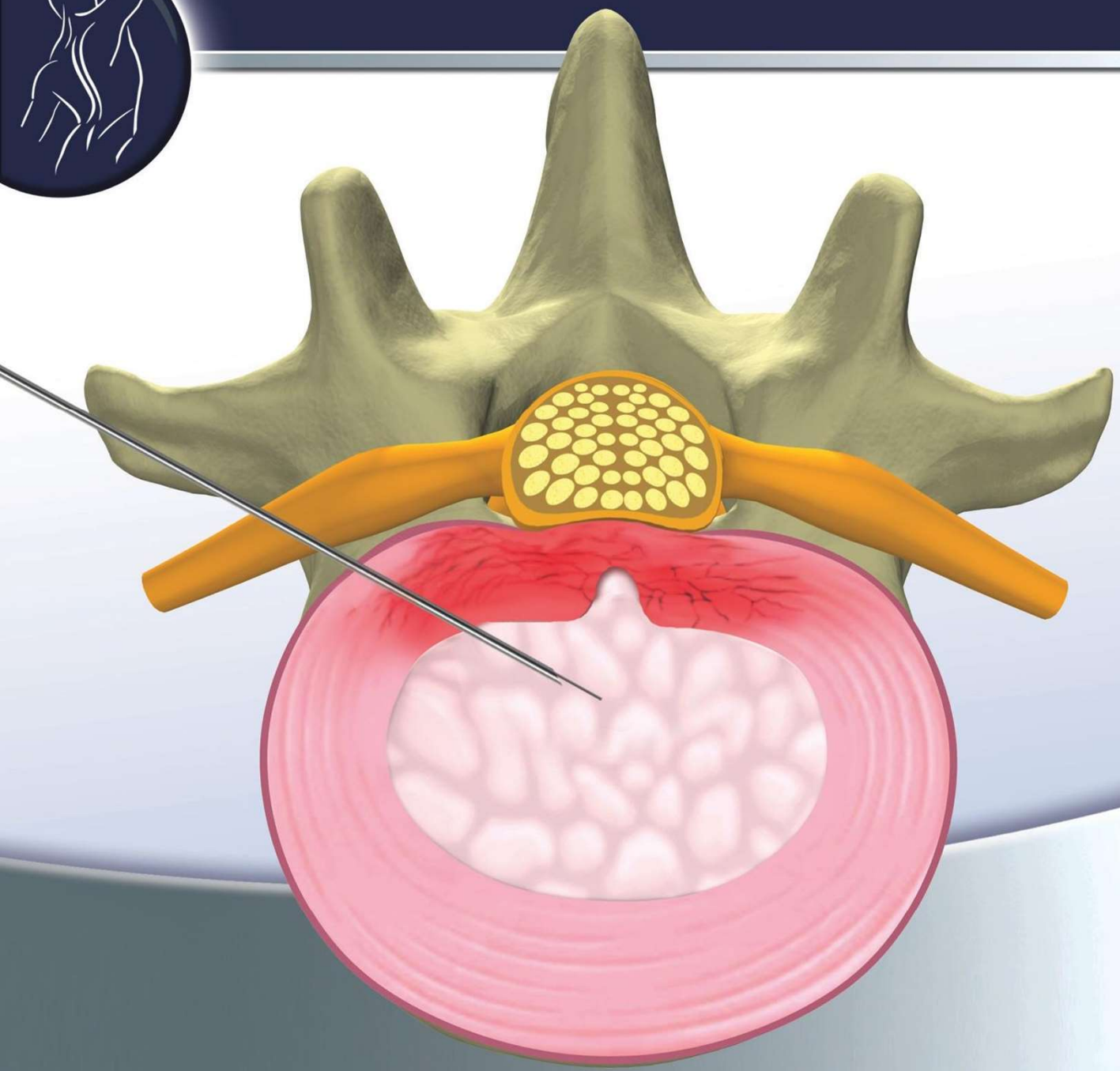
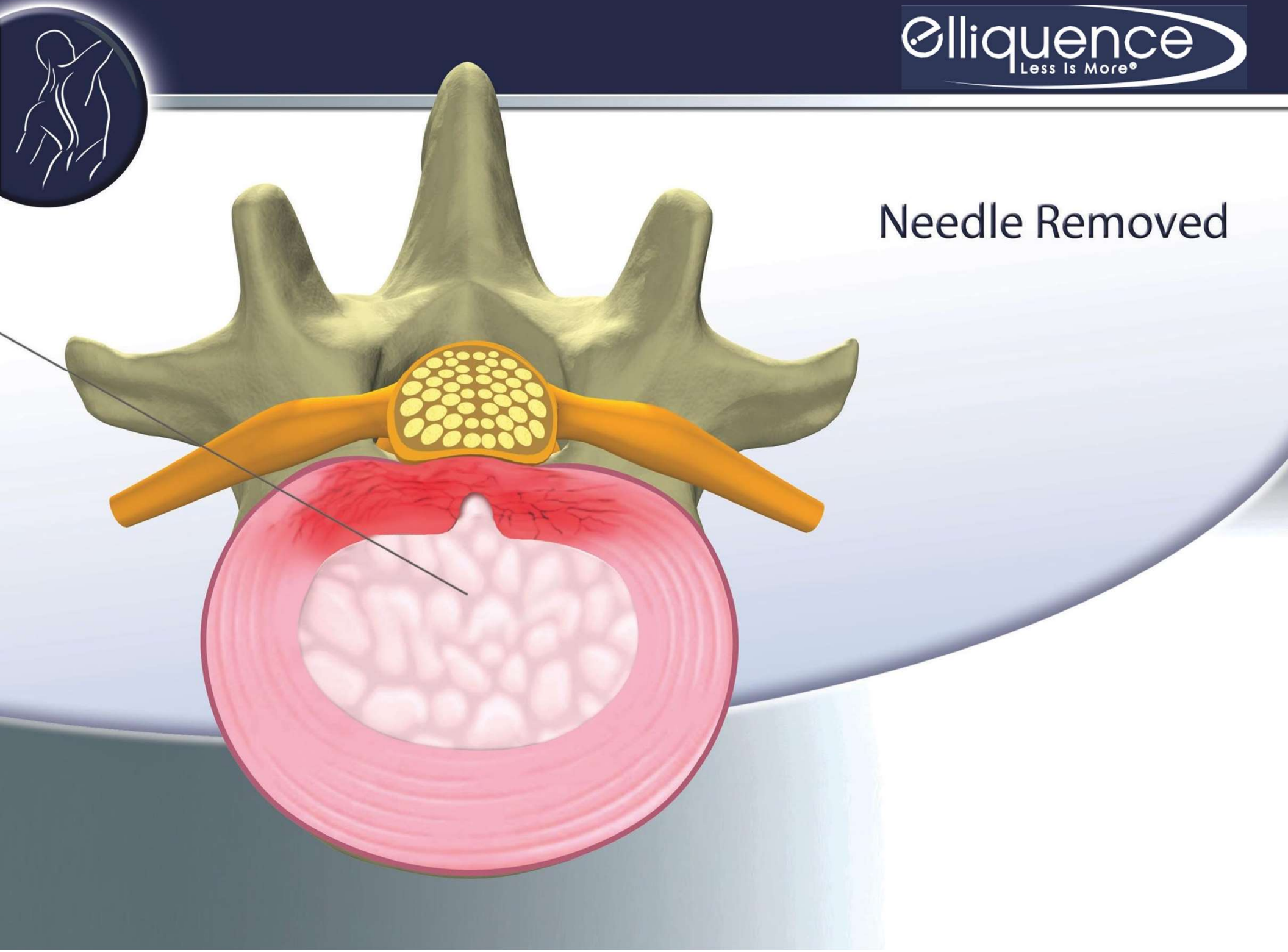
Needle Placement





Guide Wire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Less Is More®
Needle Removed

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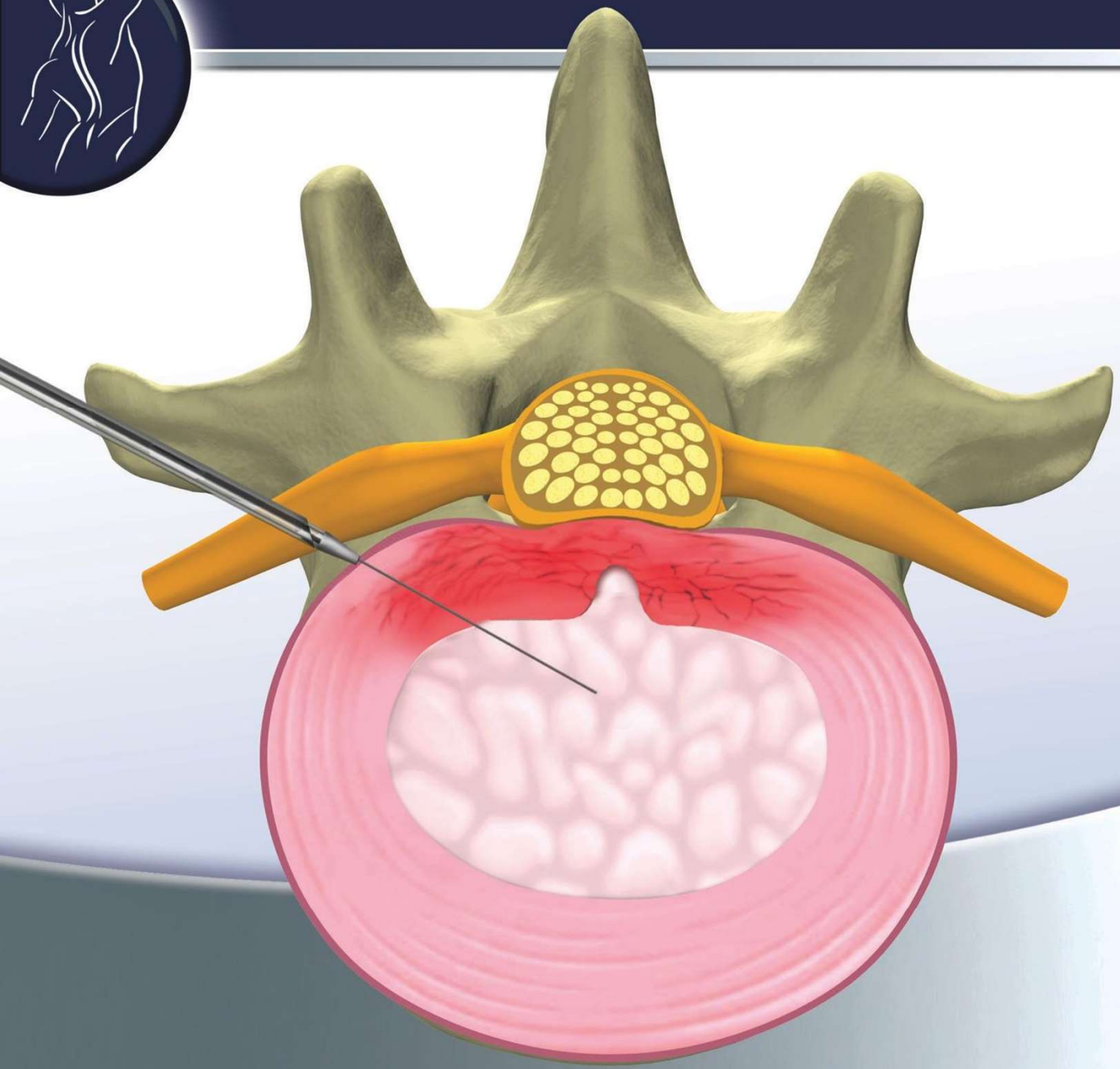
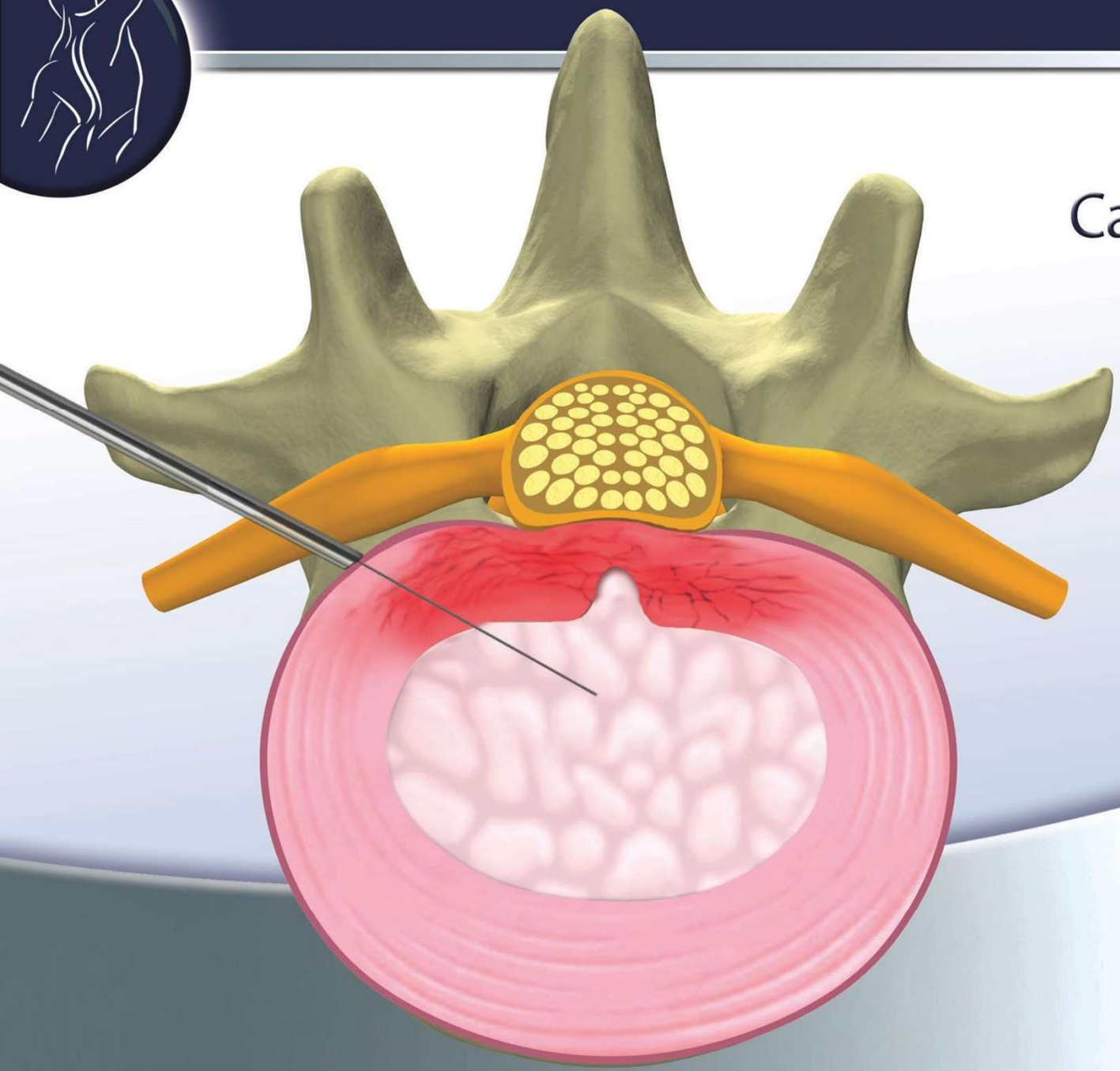
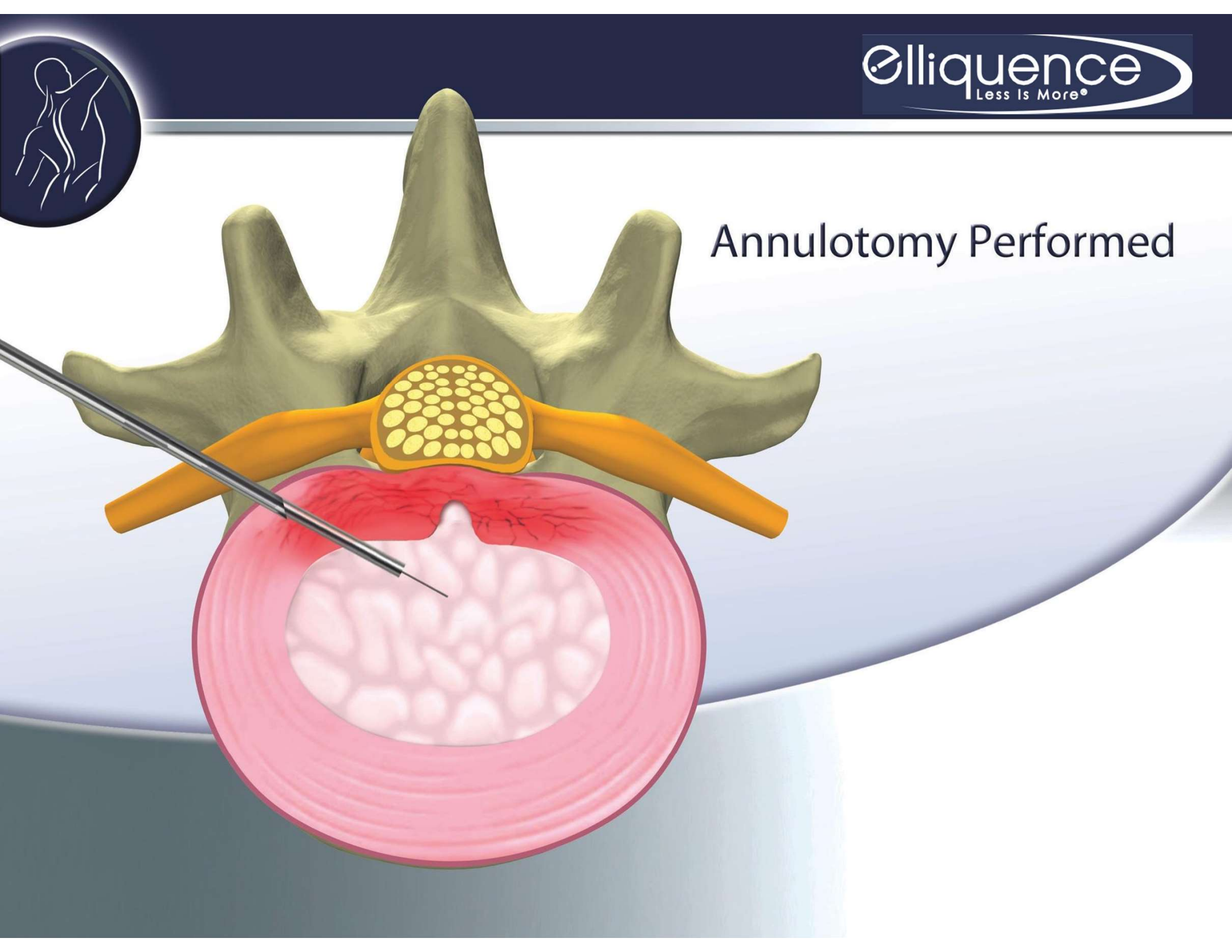
Cannula & Dilator





Cannula & Trephine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Annulotomy Performed

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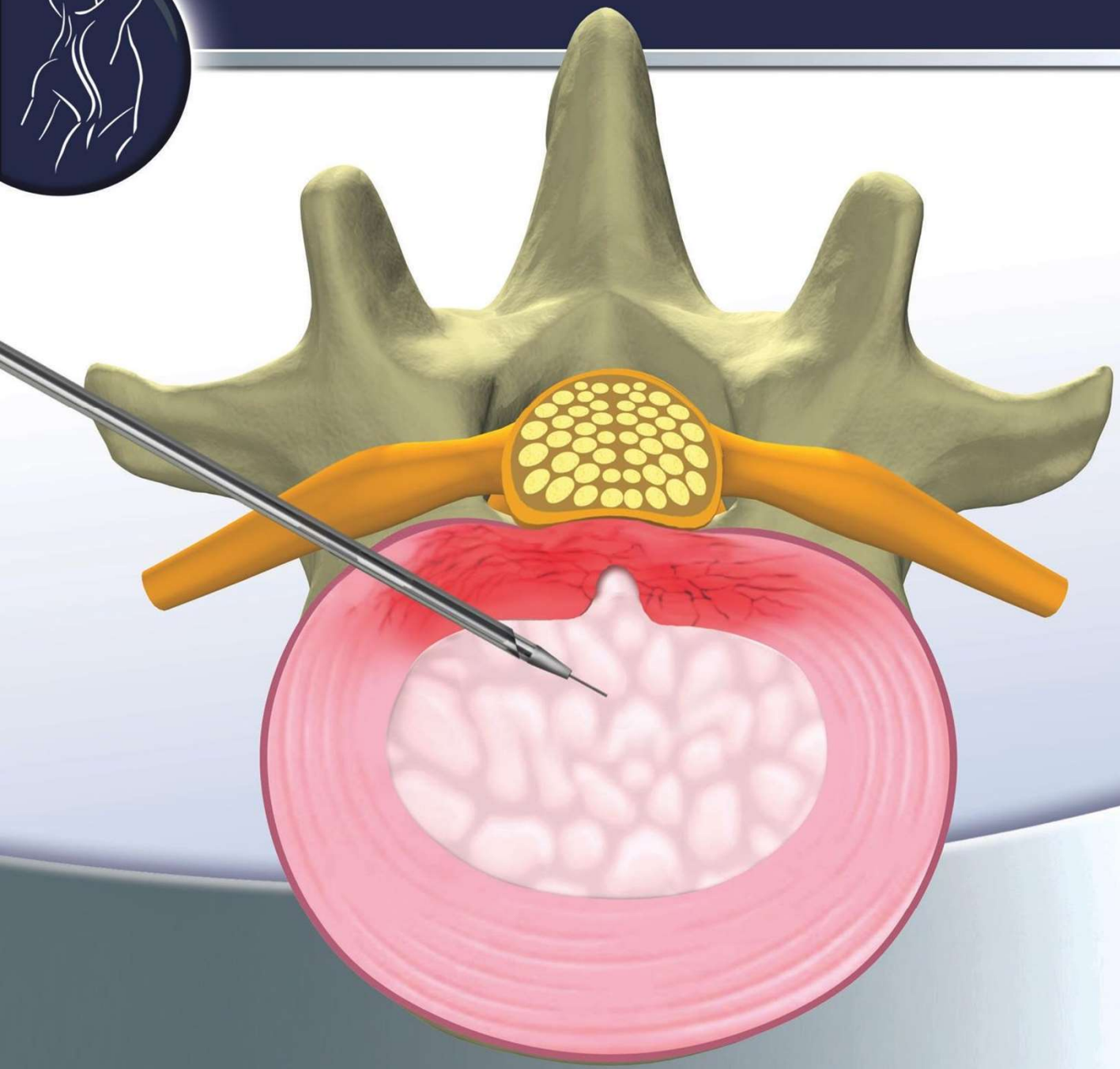
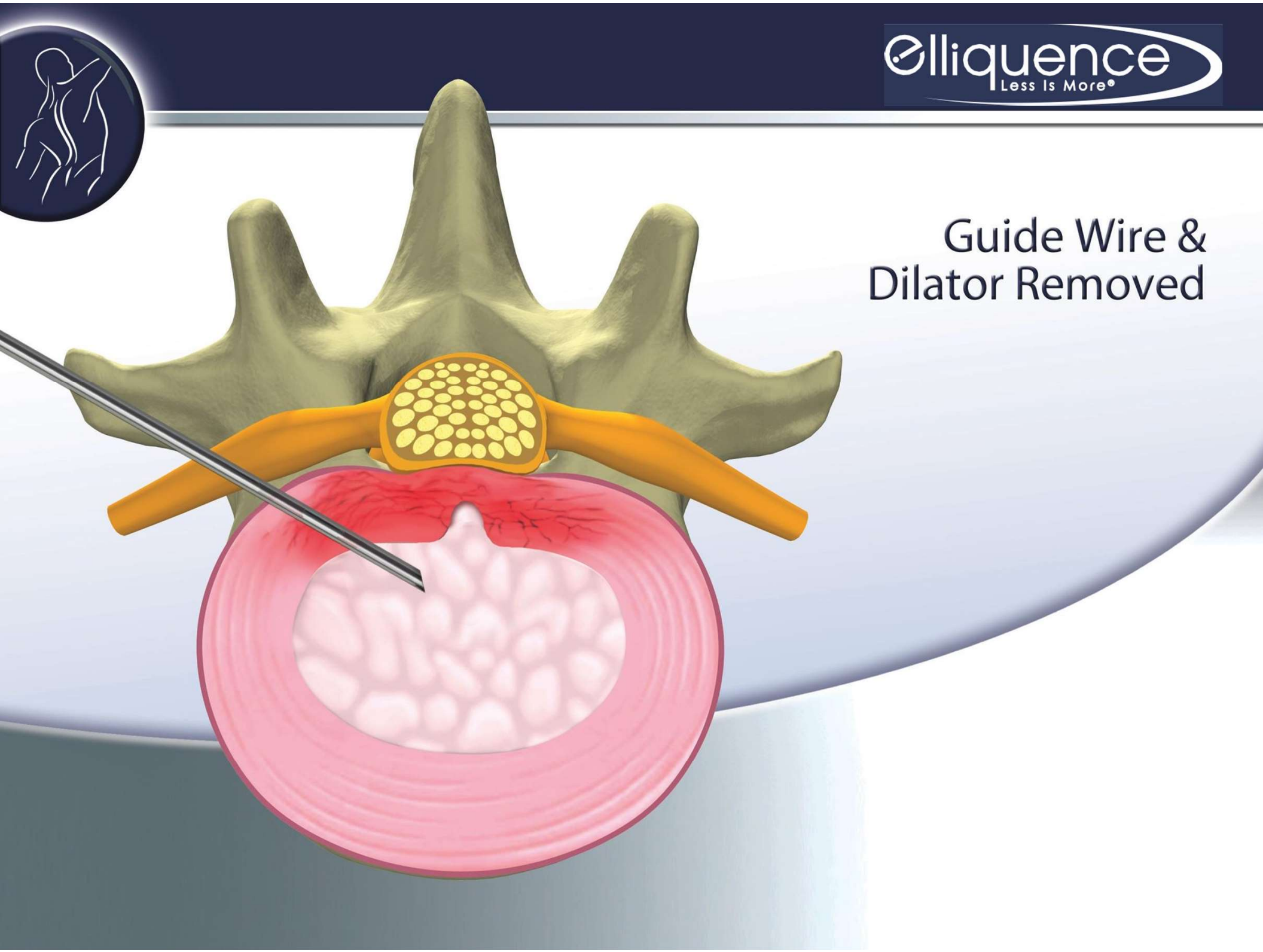
Cannula & Dilator Reach Nucleus

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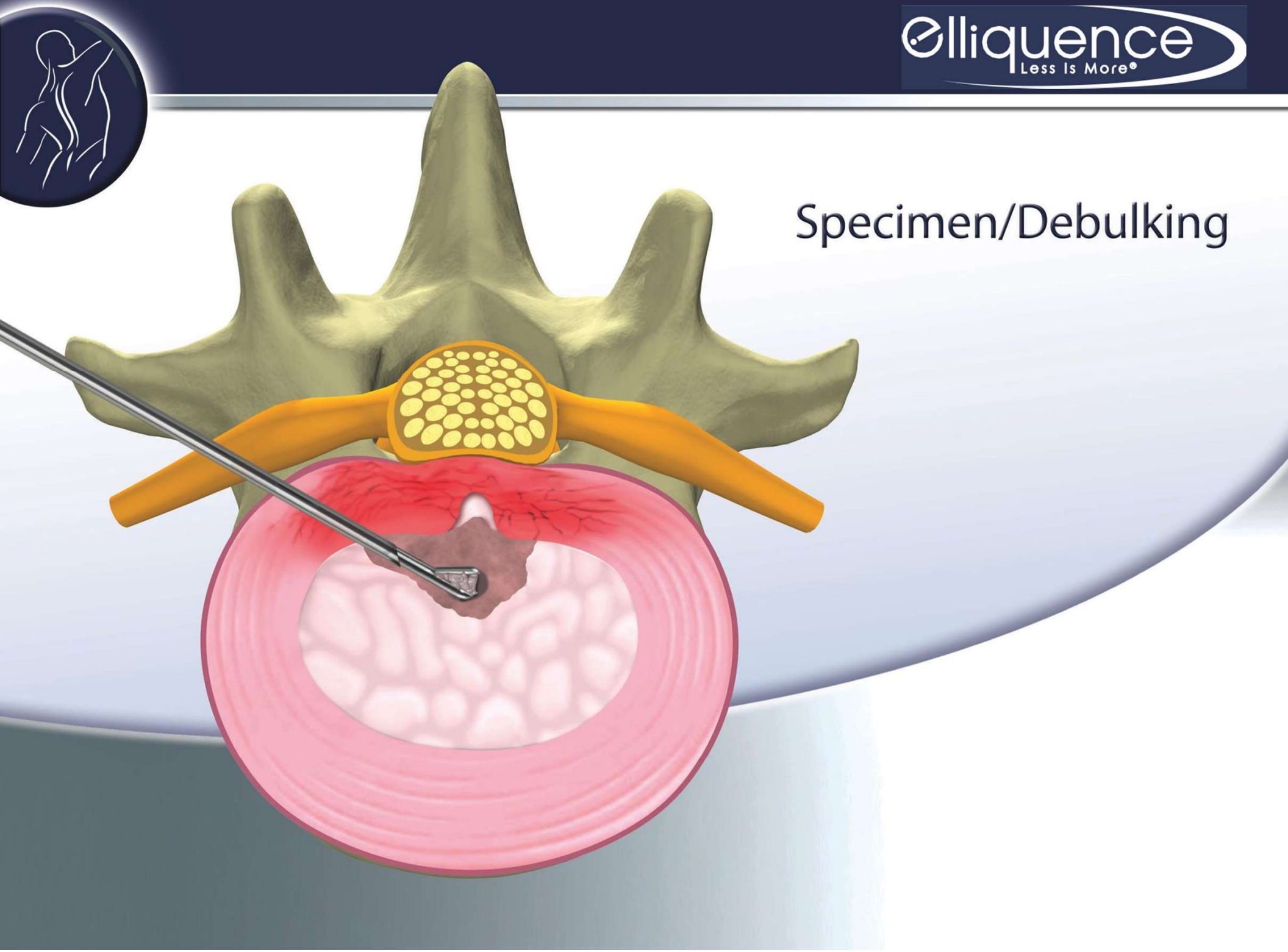
Guide Wire &
Dilator Removed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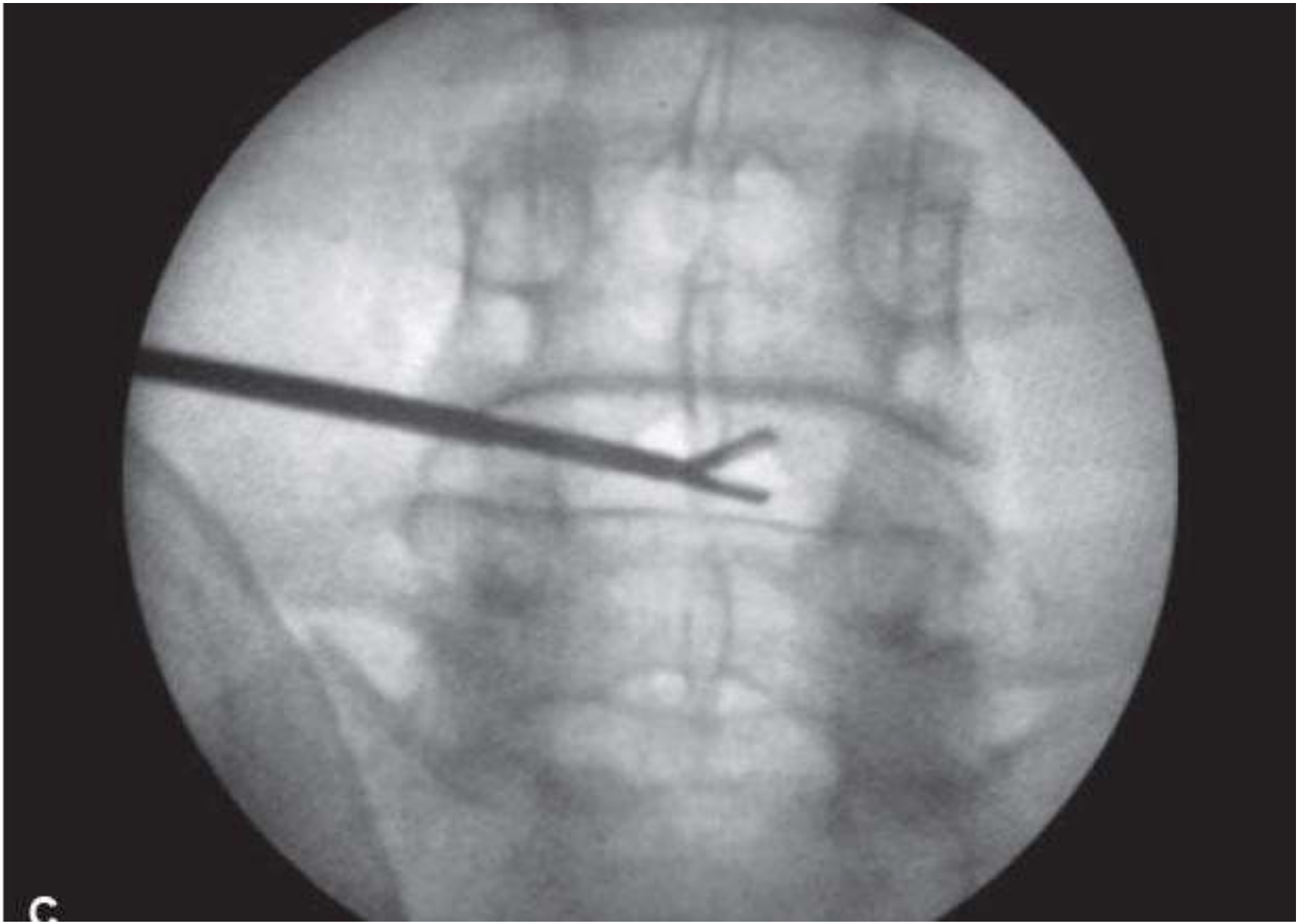
Specimen/Debulking


GE-OEC Fluorostar Isar Kliniken GmbH
106 kV
4.90 mA
266.90 mGy*cm²
13/14
15.01.2014
10:07:52
R
Autowindow
33
37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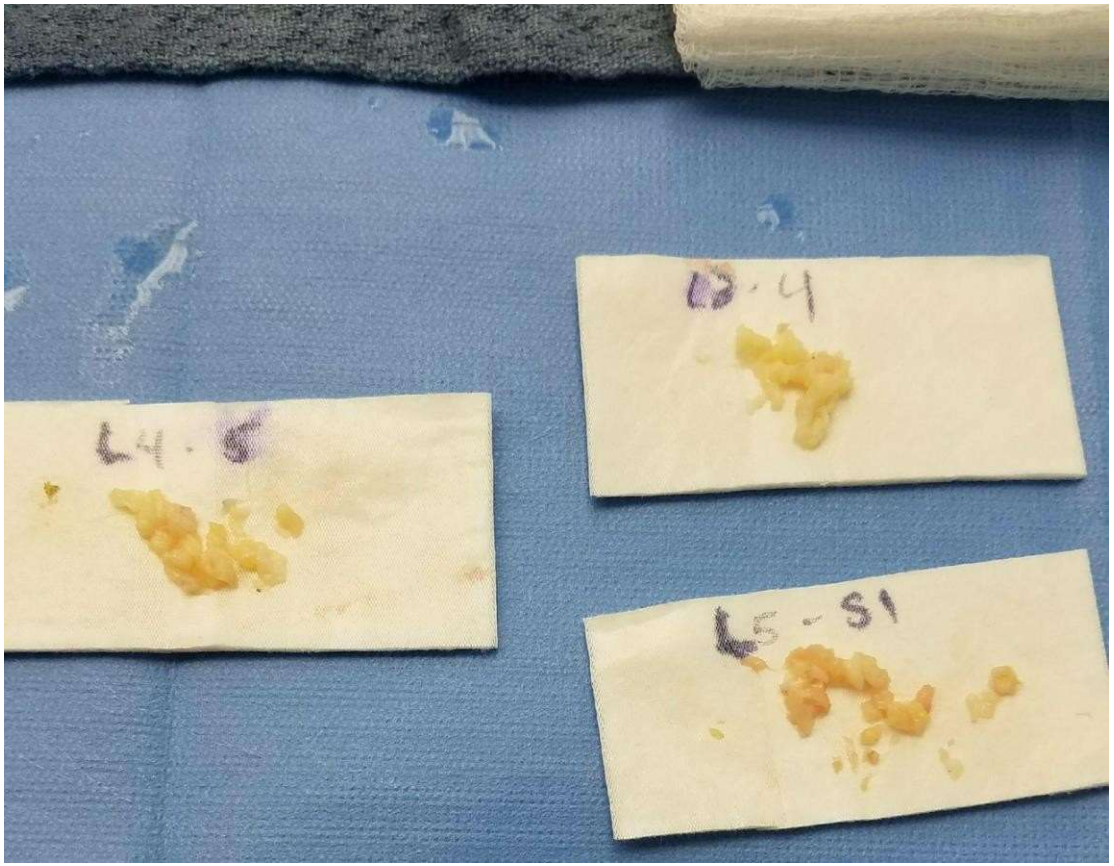
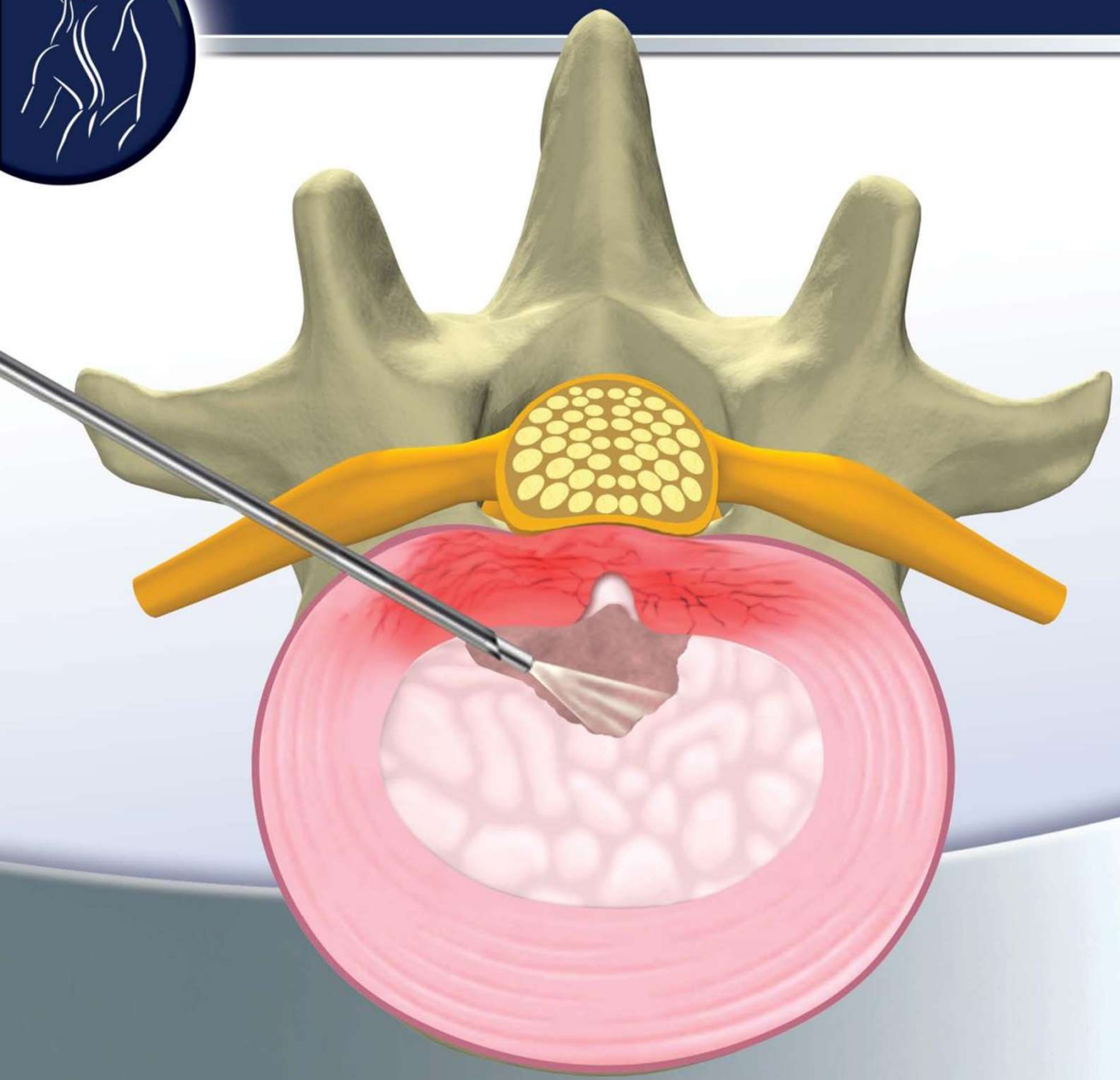

L4-5
L5-S1


L4-L5



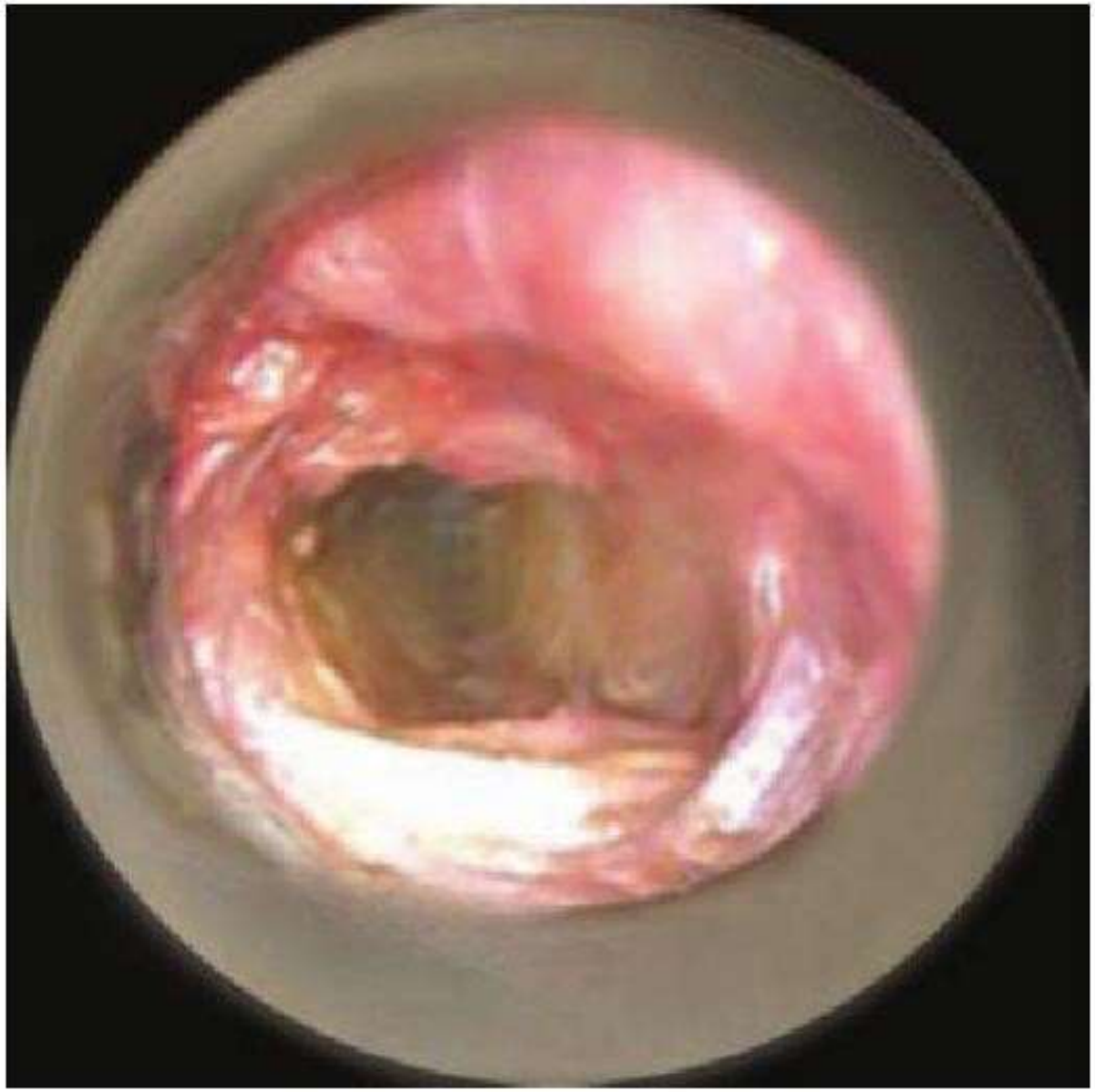
Endoscopic Visualization

(Optional)

2.7mm endoscope

As an option, a small 2.7 endoscope can be used periodically during the procedure

Figure 6: Decompression of Intervertebral Discs and Spinal Canal Visualised with Endoscopic Control



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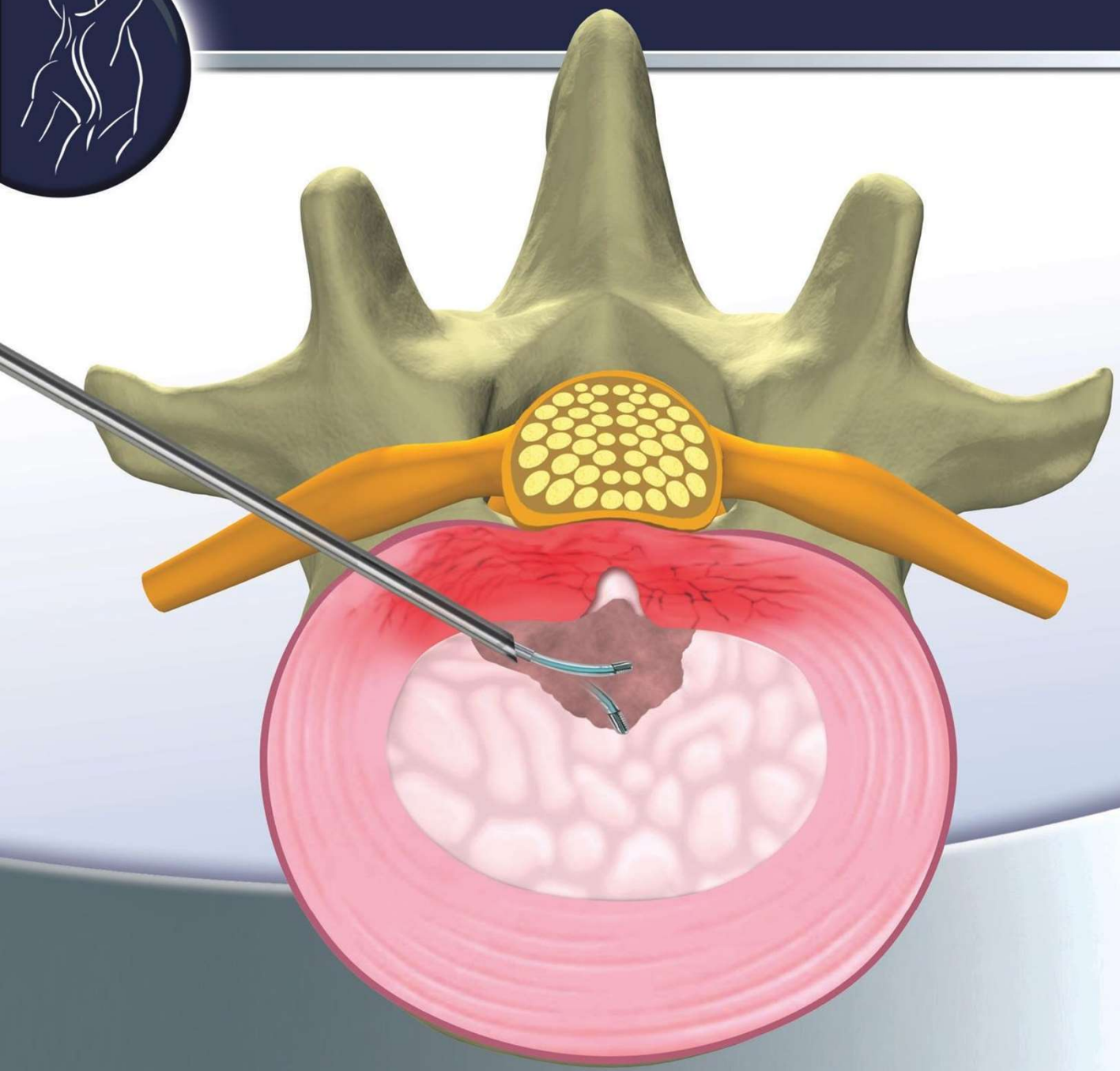
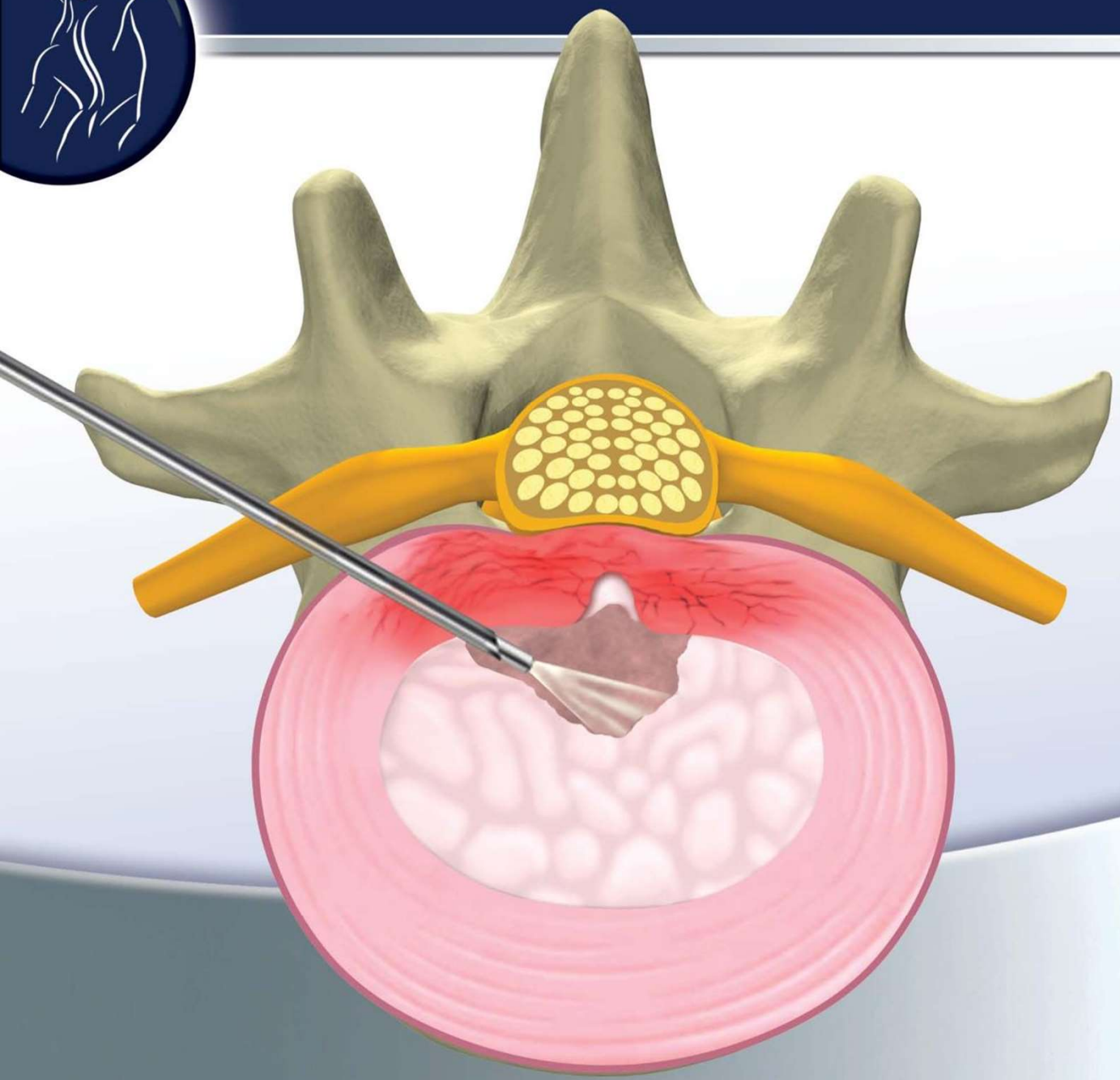
Nucleus Ablation





Endoscopic Visualization

(Optional)

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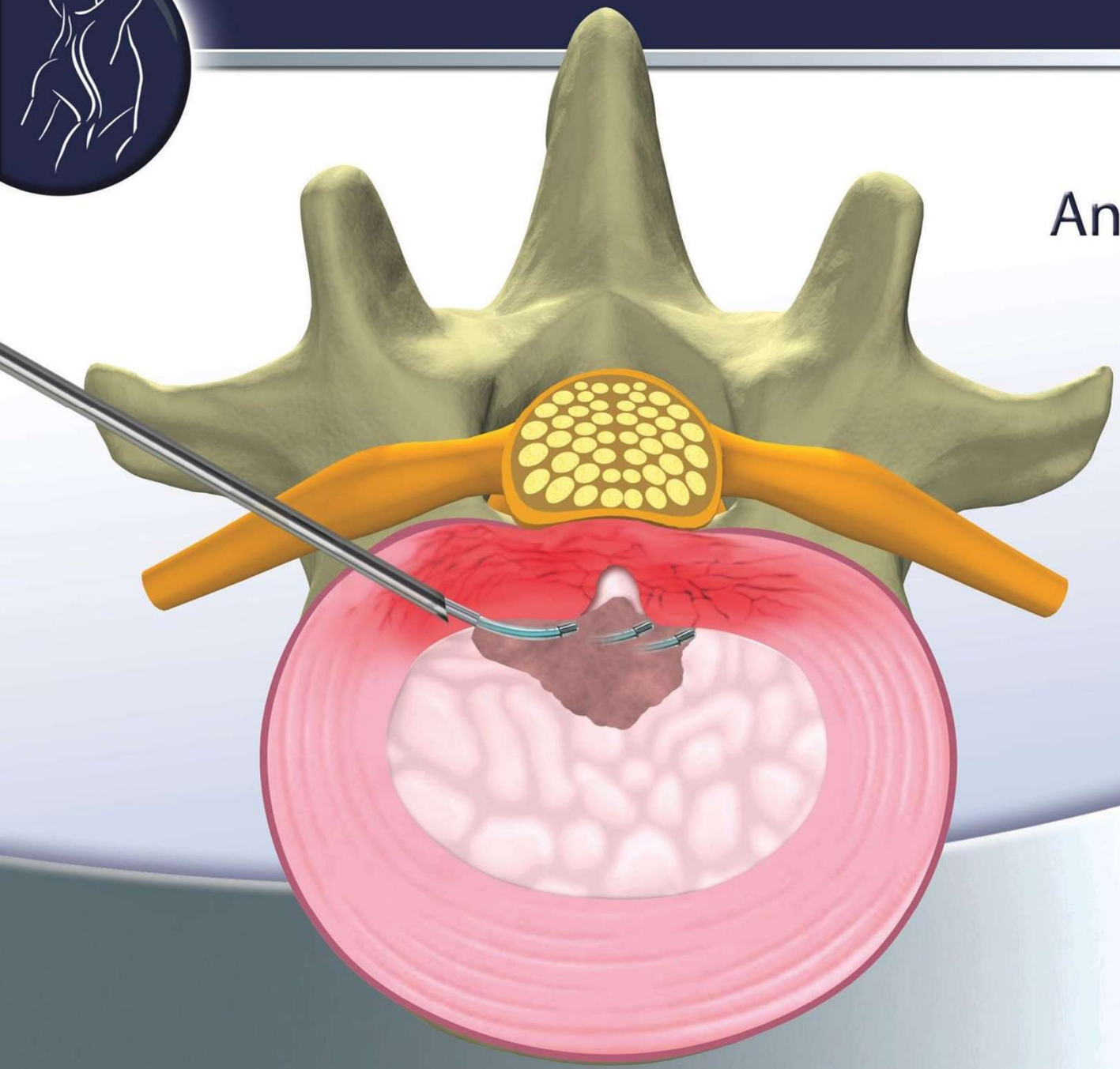
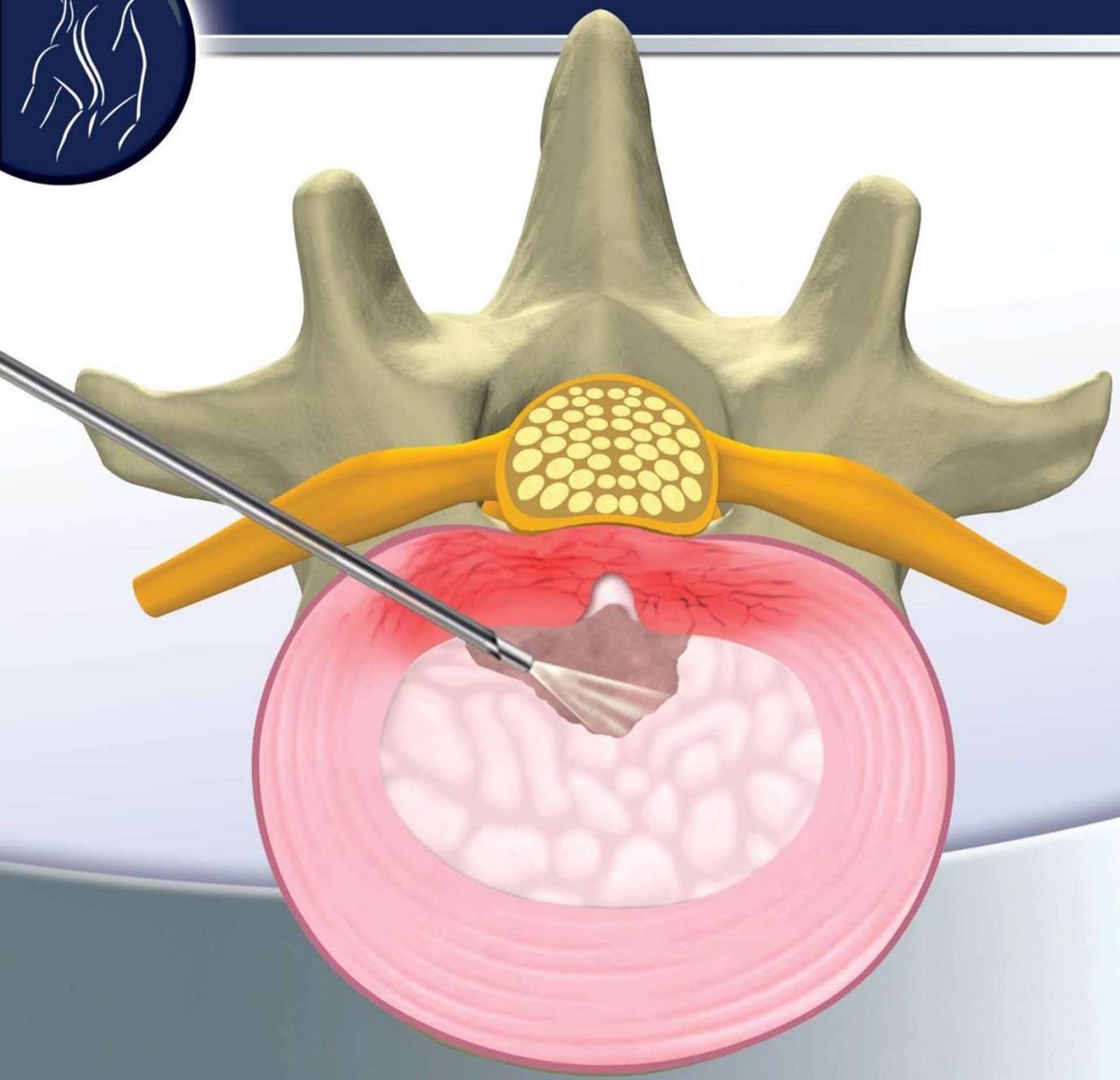
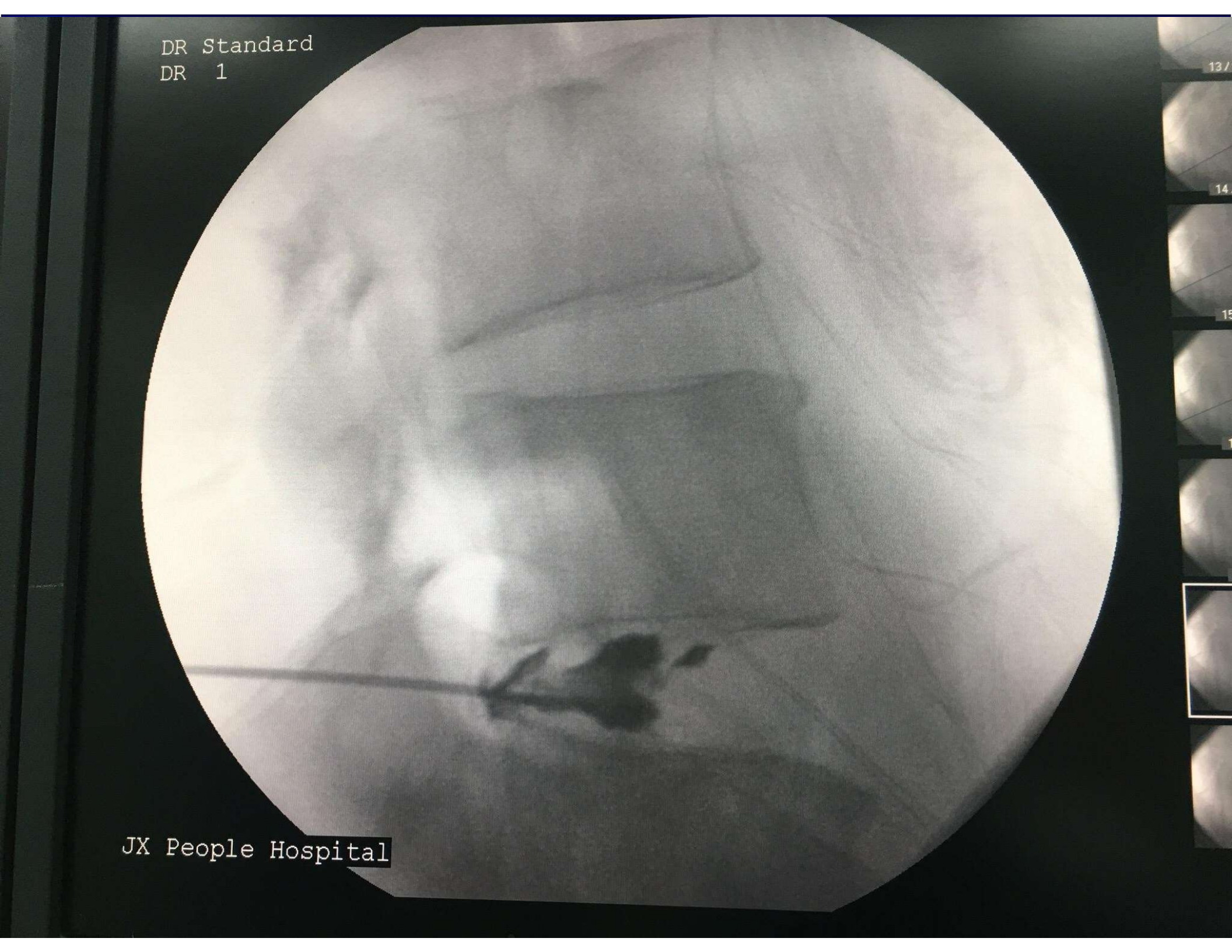
Annulus Modulation

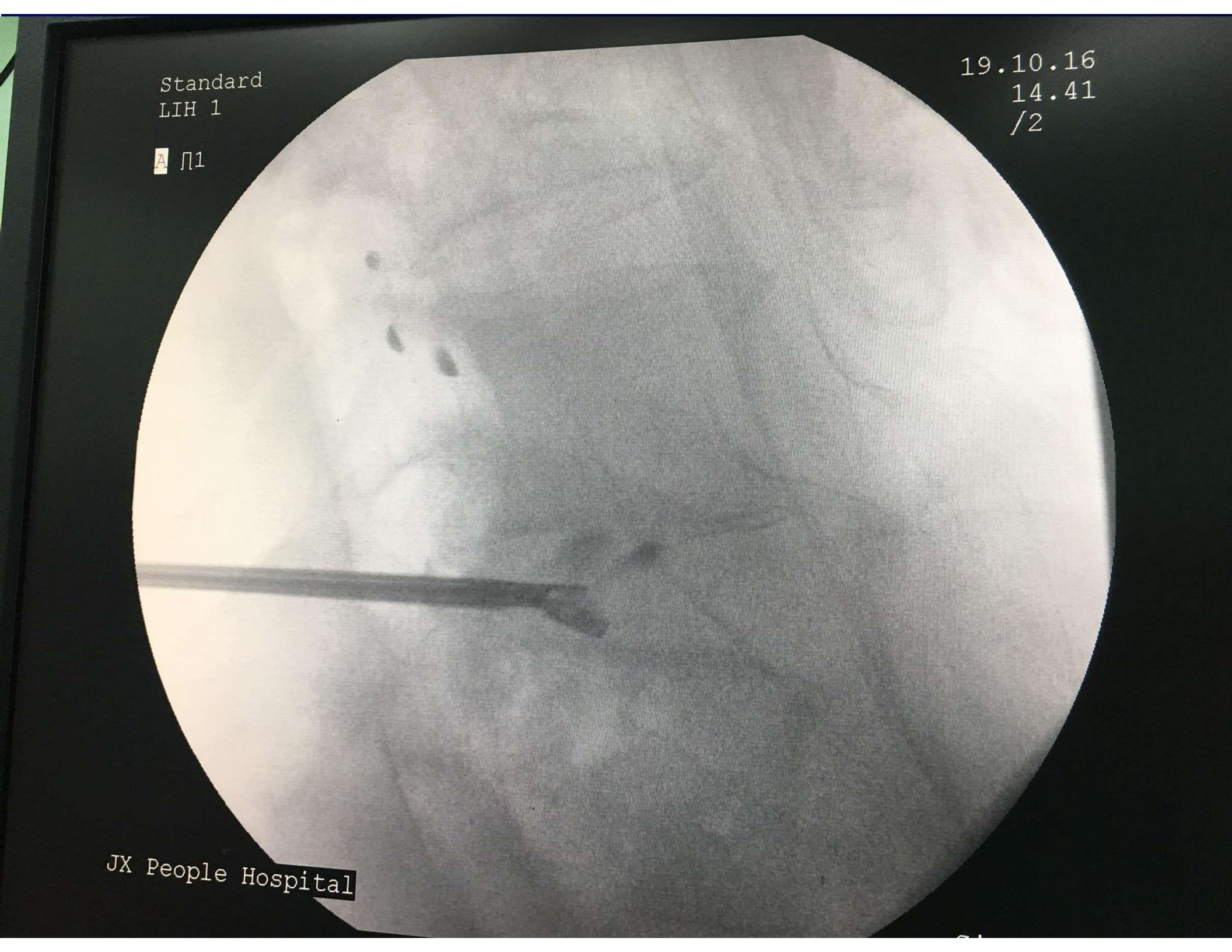




Endoscopic Visualization

(Optional)


DR Standard
DR 1
JX People Hospital


Standard
LIH 1
A Л1
19.10.16
14.41
/2
JX People Hospital

Post-Op Regime

1. Reclined position in bed or lie in the bed with head lifted up
2. Ice pack on the entry site with lumbar brace
3. Appropriate pain medication: Percocet or other medication
4. Light physical therapy depending on the patient
5. Gradually return to regular daily activity without lifting for 6 weeks.
6. LSO brace to be worn at least two weeks to avoid re-herniation.
7. Avoid prolonged sitting, bending, lifting, driving, or other activities that may result in increased intra-discal pressure

Potential Complications

- Discitis – septic or aseptic
- Nerve root injury
- Epidural hematoma
- Dural tear
- Exacerbation of pain
- Failure to relieve the pain either short or long term
- Allergic reactions

INTERNATIONAL JOURNAL of SPINE SURGERY

Treatment of contained lumbar disc herniations using radiofrequency assisted micro-tubular decompression and nucleotomy: four year prospective study results.

Stefan Hellinger, MD

ISAR Clinic Munich, München, Germany

Abstract

Background

Patients with radiculopathy caused by contained disc herniations are less likely to have good outcomes following discectomy surgery than patients with disc herniations that are not contained. The author presents his 4-year results from a prospective trial regarding the efficacy and safety of a tubular transforaminal radiofrequency-assisted manual decompression and annulus modulation of contained disc herniations in 58 patients.

Methods

Fifty-eight patients with lumbar radiculopathy due to a contained disc herniation were enrolled in a prospective clinical study. Visual analog scores (VAS) for back pain and leg pain, quality of life assessment, Macnab criteria, and SF-12 were collected from patients before treatment, at 2-years and 4-years post-treatment.

Treatment of Contained Lumbar Disc Herniations via Radiofrequency Assisted Micro-Tubular Decompression and Ablation: Four Year Results in a Prospective Cohort of 74 patients (S. Hellinger)

- Prospective study by a fixed protocol for the clinical outcome, recurrence rate, and complications after 4 years
- 47 patients with pre-op VAS >5/10, radicular or discal pain (due to HNP or DDD), 6 weeks of unsuccessful conservative treatment
- Back Pain = 8.6/10 reduced to 2.3 (73% reduction)
- Leg Pain = 7.8/10 reduced to 2.3 (70% reduction)
- 83% of patients satisfied with their outcomes and quality of life
- Long term re-occurrence rate was 6.4% & no reported complications

Conclusion: Comparing the outcomes to open surgery, the procedure causes less surgical trauma and should be considered as an excellent alternative treatment in the presence of controlled hernias.

* Courtesy - AJ Rastogi, MD

Original Article

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SAGE

Annulo-Nucleoplasty Using Disc-Fx in the Management of Degenerative Lumbar Disc Pathology: How Long Can the Effect Last?

Naresh Kumar, FRCS (Orth & Trauma), DM (Orth)[1], Aye Sandar Zaw, MPH[1], Nishant Kumar, MS (Ortho)[1], Dhiraj Sonawane, MS (Ortho)[1,2], Hwee Weng Dennis Hey, FRCSEd (Orth), FAMS (Orth)[1], and Aravind Kumar, FRCS (Orth & Trauma)[3]

Abstract

Study Design: Prospective analysis.

Objectives: To evaluate 2-year clinical outcomes in patients undergoing Disc-FX for the management of low back pain (LBP) due to degenerate disc (DD) or contained lumbar disc herniation (CLDH). To study salient factors that can potentially influence the clinical outcomes.

Methods: We analyzed the prospectively collected data of 51 patients who underwent Disc-FX procedure for DD or CLDH, nonresponsive to 6 months of nonoperative treatment. Clinical outcome measures collected were visual analogue scale (VAS), Oswestry Disability Index (ODI), and MacNab scores. These preoperative values were compared with respective values at immediate, 6 months, 1 year, and 2 years postoperation. Minimum clinically important difference values for these outcomes in accordance with previously published data was used to evaluate the effectiveness of Disc-FX intervention.

Results: Of 51 patients, 84% had DD and 16% had CLDH. Significant improvement ($P < .01$) in VAS and ODI scores was observed at all assessment periods compared to the respective preoperative values. Based on the MacNab scores, there was significant increase ($P < .01$) in the proportion of patients with excellent/good MacNab outcomes at each time point after the procedure; 78% achieving excellent/good outcomes at 2-year follow-up. Ease of access to the disc space was significantly influencing VAS, ODI, and MacNab scores at 1-year and 2-year follow-ups. VAS and MacNab scores were negatively influenced by high body mass index and smoking status at 6 and 12 months postoperation.

Conclusions: Our data suggests that Disc-FX may be helpful in selected patients with symptomatic degenerative disc disease providing favorable outcomes lasting up to 2 years or more. The results were more favorable in patients with easier access to disc space.

Keywords

degenerative disc, contained lumbar disc herniation, degenerative disc disease, radiofrequency, annulonucleoplasty

Introduction

Low back pain (LBP) due to degenerative disc disease is a global health problem, which has been estimated to be 28% to 40% of all types of LBP.[1,2] It can cause significant disability leading to difficulty in daily activities and work.[3] Pain can present as a spectrum ranging from mild and manageable pain to severe and disabling pain. Two common subtypes of degenerative disc disease are degenerate disc (DD) or contained lumbar disc herniation (CLDH). Patients with DD will have

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Email: doskn@nus.edu.sg

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Hirano et al., J Spine 2018, S7
DOI: 10.4172/2165-7939.S7-015

Case Report Open Access

Advantages of Endoscope-Assisted Disc-FX in Surgical Management of Lumbar Disc Herniation: A Report of 10 Cases

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[1]Department of Neurosurgery, Southern Tohoku Research Institute for Neuroscience, Koriyama, Fukushima, Japan
[2]Department of Paediatric Neurosurgery, Narayana Health-SRCC Children's Hospital, Mumbai, Maharashtra, India
[3]Department of Neurosurgery, Institute of Neurosciences, BLK Super-specialty Hospital, New Delhi, India

Abstract

Objective: Microsurgical discectomy is the gold standard treatment for the herniated nucleus pulposus (HNP) of the lumbar spine. On the other hand, less invasive procedures have been developed and accepted rapidly. Percutaneous endoscopic lumbar discectomy (PELD) was developed as one of the minimally invasive techniques for HNP of the lumbar spine, and satisfactory outcomes have been reported. For the contained type HNP or discogenic pain, however, surgical indication of PELD is sometimes controversial. We describe our experiences of surgical treatment with Disc-FX, focusing on advantages of endoscopic observation.

Patients and Methods: A total of 10 patients with contained type HNP were treated with Disc-FX system. Disc-FX was carried out percutaneously under local anesthesia using a cannula of 3.4 mm diameter, with a trajectory compatible with the transforaminal approach of the PELD. Endoscope was introduced intermittently in 5 patients to observe the results of each procedure.

Results: Sufficient pain relief was achieved in all patients, and Japanese Orthopedic Association score improved from 7-16 (mean 13.0) to 22-29 (mean 25.9), and visual analogue scale improved from 6-10 (mean 8.0) to 0-3 (mean 1.2). Endoscopic observation enabled the procedure almost equivalent to targeted fragmentectomy, and contributed in better surgical outcome.

Conclusion: Disc-FX is a promising procedure in the armamentarium of minimally invasive surgery for the selected conditions of patients, and endoscopic observation is considered to be beneficial in more accurate and adequate decompression.

Keywords: Lumbar disc herniation; Minimally invasive surgery; Disc-FX; Endoscopic observation

Introduction

Microsurgical discectomy is the gold standard treatment for the herniated nucleus pulposus (HNP) of the lumbar spine. Conventional microsurgery is associated with good results, but some damage is caused to the surrounding musculoskeletal structure. To achieve good results with less invasiveness, percutaneous posterolateral nucleotomy was introduced in the early 1970s [1-3]. The initial concept was central disc decompression, but the surgical techniques have evolved during the subsequent 3 decades into targeted fragmentectomy [4]. The term percutaneous endoscopic lumbar discectomy (PELD) is frequently used today to describe various techniques including targeted fragmentectomy. This percutaneous surgical procedure can adopt the transforaminal [5-7], extraforaminal [8], or interlaminar approaches [6,7,9]. Satisfactory success rates (85% to 92%) have been reported, and the advantages of this minimally invasive procedure have been reported [4-13].

Surgical indication for contained type HNP and discogenic pain is controversial [14,15]. There may be no indication of conventional microsurgical discectomy, and application of PELD may also be questionable. But the patients complain of persistent radiculopathy and low back pain despite any kind of conservative therapy, and this condition affects their quality of life. For these conditions, the radiofrequency treatment, Disc-FX (elliquence, New York, USA), is a promising option to provide solutions [16-20]. Disc-FX is carried out percutaneously under local anesthesia using a cannula of 3.4 mm diameter, with a flat horizontal trajectory compatible with the transforaminal approach of the PELD. This technique allows:

- Partial nucleotomy with 2.9 mm grasping forceps.
- Nucleus ablation with Trigger-Flex bipolar turbo mode.
- Annulus modulation with Trigger-Flex bipolar hemo mode.
- Intermittent endoscopic observation is also possible, and similar result as targeted fragmentectomy may be expected with assistance of endoscopic observation.

We report our surgical experiences with Disc-FX, and advantages of intermittent endoscopic observation are discussed with some review of the pertinent literature.

Patients and Methods

Since December 2013, a total of 10 patients were treated by Disc-FX system in the Southern Tohoku Research Institute for Neuroscience. There were 8 male and 2 female patients, with age 30-72 years (mean 47.2 years). Affected levels were L4-L5 in 6 patients, L5-S1 in 2 patients, and 1 patient each at L3-L4 and L1-L2. Operations were carried out under local anesthesia (10 ml of 1% lidocaine), and followed standard procedure (debulking, nucleus ablation, and annulus modulation) under fluoroscopy. Endoscope of 2 mm diameter and straight view was introduced intermittently in 5 patients to observe the results of each

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