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Percutaneous lumbar endoscopic discectomy – A new segment within pain physician portfolio

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Michal Matias, Krzysztof Łokas, Róbert Tirpák





Disclosure

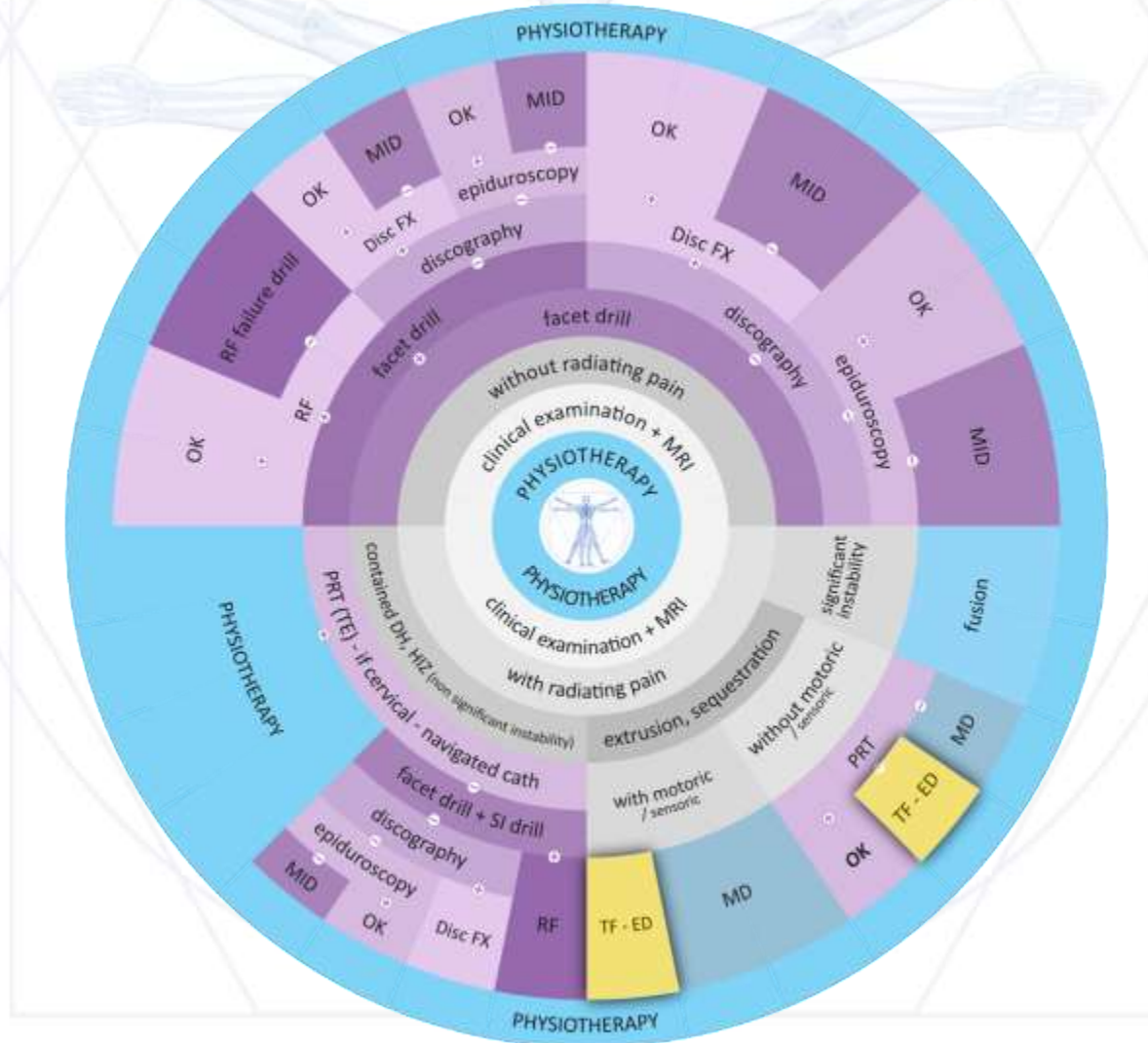
MaxMore instructor for endoscopic procedures


Endoscopic procedures in Interventional pain management

- Endoscopic facet joint and SI joint ablation
- Endoscopic discectomy
- Epiduroscopy



Procedures by therapeutic segments





IS
Pain physician
as GOOD as
Spine surgeon
?

Clinical outcome of patients after endoscopic discectomy performed by two specialists

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ABSTRACT

Background: Endoscopic lumbar discectomy (ELD) is a percutaneous minimally invasive procedure used in the treatment of lumbar disc herniation. The study (NCT02742311 ClinicalTrials.gov) compares clinical outcomes after the interventional pain physician (IPP) and spine surgeon (SPS) provided transformational discectomy. **Methods:** Subjects were followed for 12 months via planned examinations by pain physicians. Leg pain and back pain intensity was assessed by an 11-point numerical rating scale (NRS). Patient's functional disability was assessed by the Oswestry Disability Index (ODI). Re-operations between both physicians were calculated by relative risk (RR). **Results:** Study subjects showed a significant decrease in ODI scores in both groups ($p < 0.001$). The mean ODI in the IPP-group was 41.1 ± 16.4 and in the SPS-group 38.9 ± 16.3 preoperatively. Postoperatively it was 16.3 ± 11.5 in the IPP-group and 15.9 ± 14.3 in the SPS-group. Significantly lower pain scores for leg pain ($p < 0.001$) and back pain ($p < 0.001$) were also recorded at the 12-month follow-up. RR for re-herniation was 1.19 with 95% CI (0.33 to 4.26, $p > 0.05$). **Conclusion:** We did not discover any significant difference between groups in the clinical outcomes during the 12-months evaluation. There was no significant difference in re-herniation rate in groups. Overall percentage of disc re-herniation was 5.26%.

Objectives

Herniations at lumbar intervertebral levels of L1-L2, L2-L3, L4-L5, **L5 - S1**, are mostly accessed by the transforaminal (TF) approach.

The aim of this study was to compare clinical outcomes between interventional pain physician (IPP) and spine surgeon (SpS) after transforaminal discectomy.

Methods

- prospective observational multicenter clinical trial
- **NCT02742311** (ClinicalTrials.gov)
- **Pain physician** vs **Spine surgeon**
- 12 months follow-up
- **Leg pain and Back pain (NRS)**
- **Oswestry Disability Index (ODI)**
- **Relative risk of complications (RR)**

TF ED 2016-2019

160 patients calculated



Pain physician
80 pt calculated



Spine surgeon
80 pt calculated

Before procedure
81 pt included

Before procedure
85 pt included

Lost in 1year follow-up



7 pt



6 pt

1 year follow-up
69 pt

1 year follow-up
72 pt

**Not yet reached 1y
follow-up**

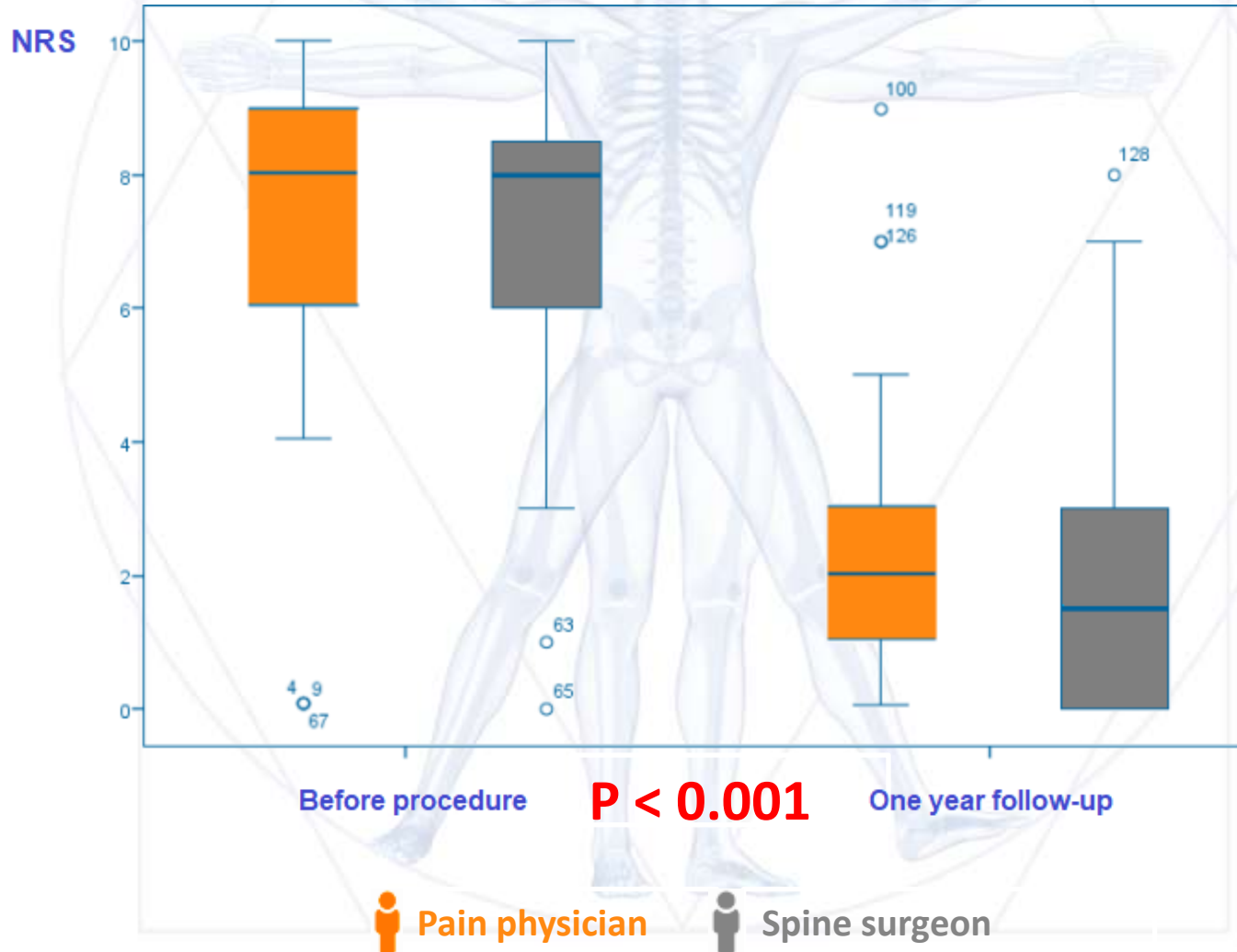


5 pt

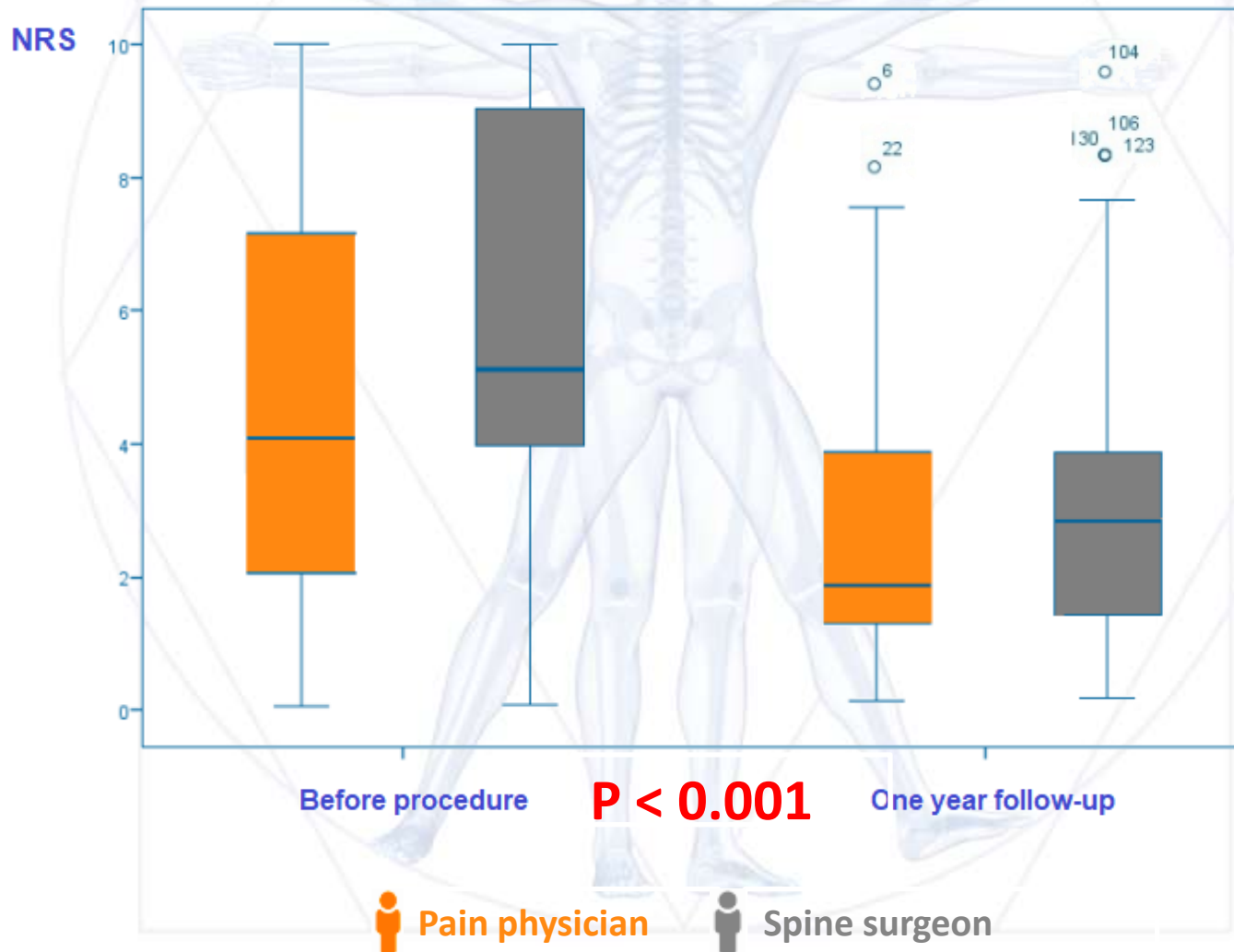


7 pt

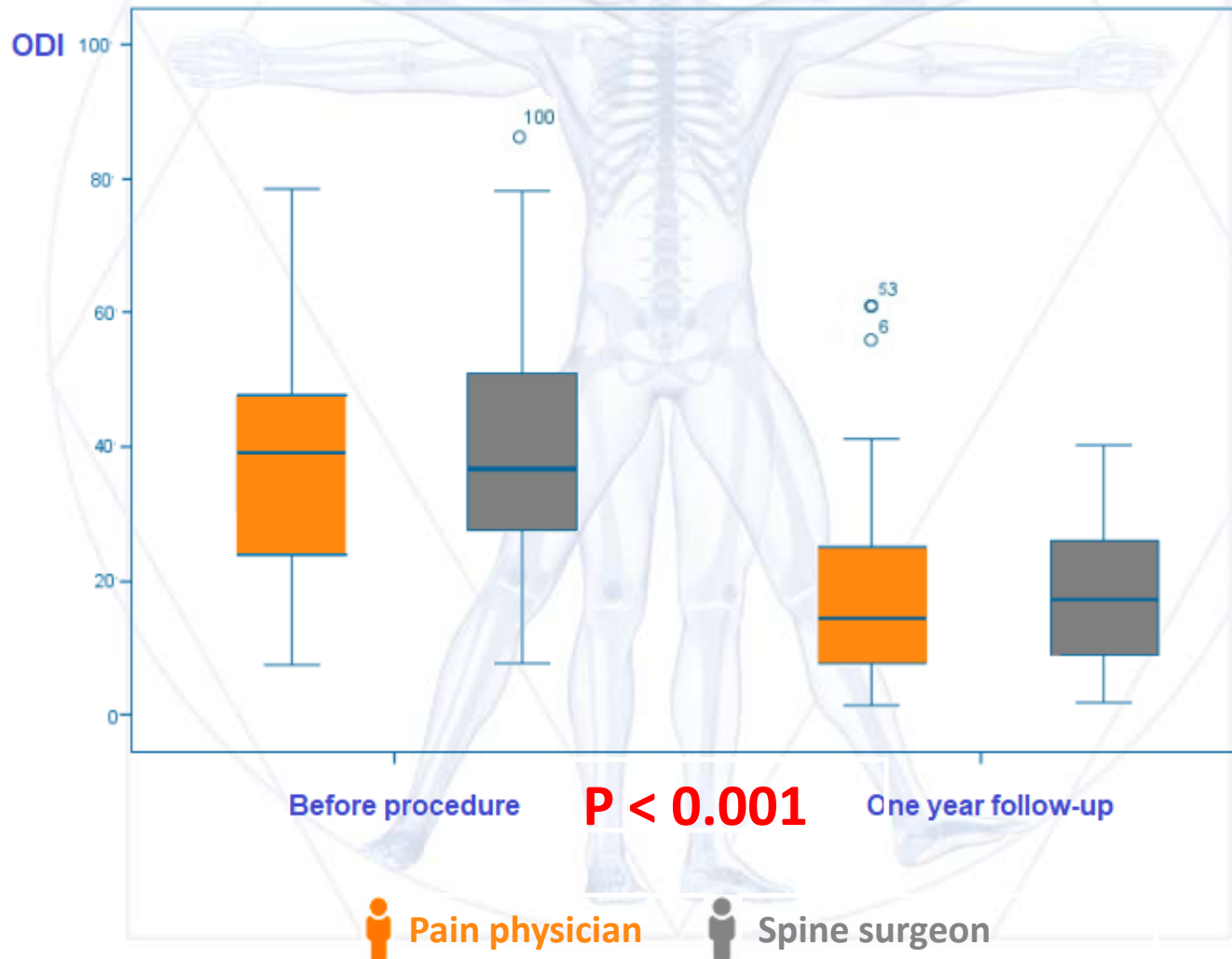
Leg pain





Back pain



Oswestry disability index



Complications	IPP 	SPS 	RR	sig
Nerve root injury	0	0	1.043	0.983
New level herniation	3	4	0.792	0.754
New level operation	2	2	1.044	0.966
Surgical errors	0	0	1.043	0.983
Dural puncture	0	1	0.348	0.515
Hematoma	0	0	1.043	0.983
Wound complications	0	0	1.043	0.983
Re-herniations	5	4	1.304	0.682
Reoperations	5	4	1.304	0.682

Conclusion 1

We did not discover any significant difference in both groups in the clinical outcomes during twelve months evaluation.

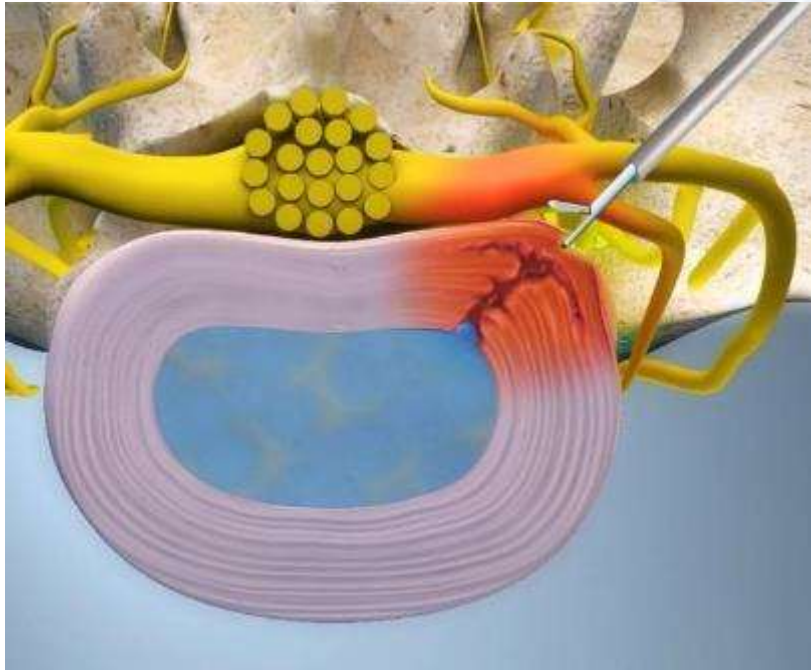
There was no significant difference in reherniations in both groups. **Overall percentage of disc re-herniations was 6.38%.**

Conclusion 2

- Appropriate method for Pain Physician if he is adequately trained
- Pain Physician “MUST” manage intraoperative bleeding
- Pain Physician “MUST” manage postoperative complications (pain, reherniations, dural puncture, discitis, wound infection)
- Pain Physician doesn’t need to manage: postoperative epidural hematoma or epidural abscess
- Risk of hematoma also with SCS, epidurals, spinals, etc.

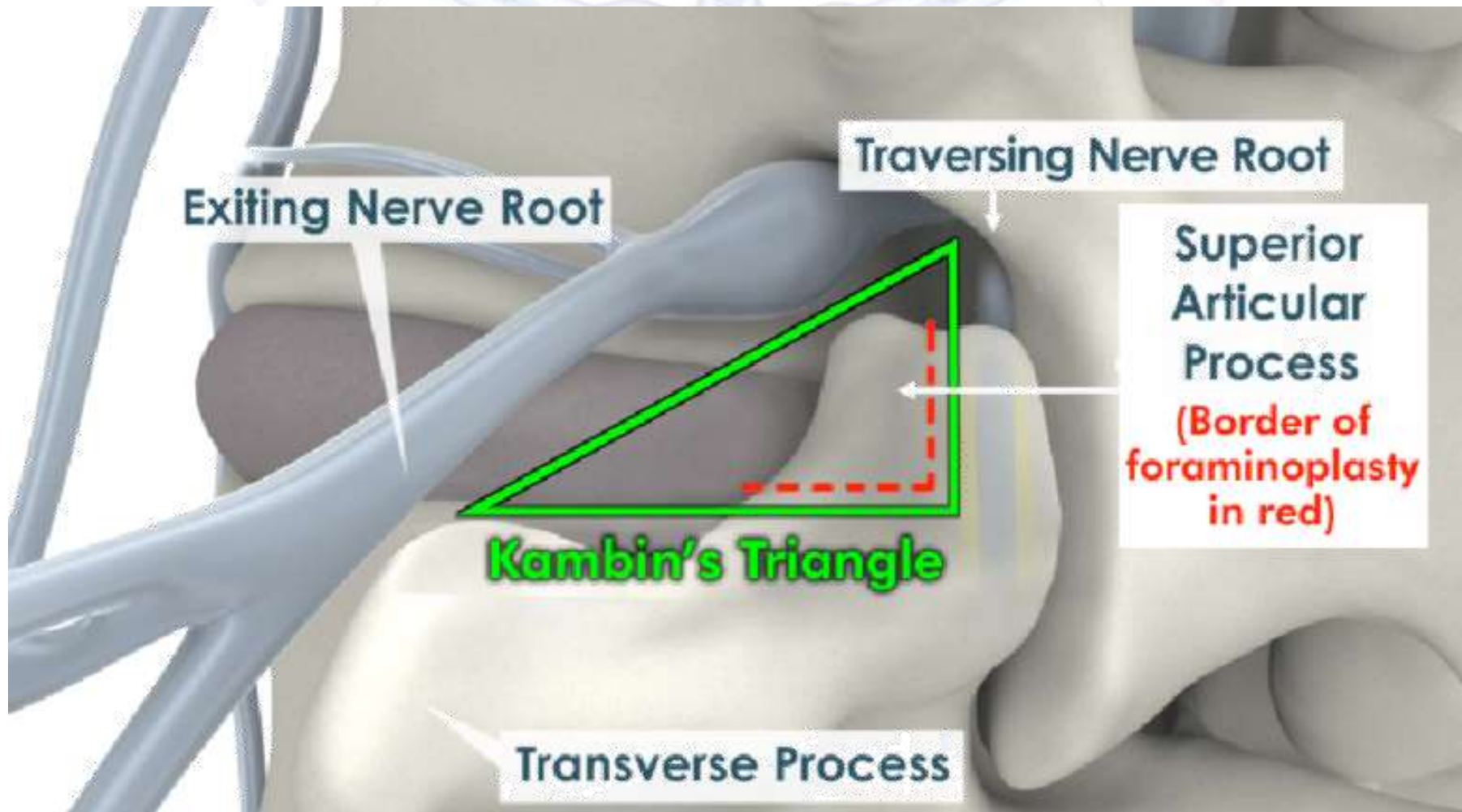
Transforaminal approach

Technical and anatomical considerations

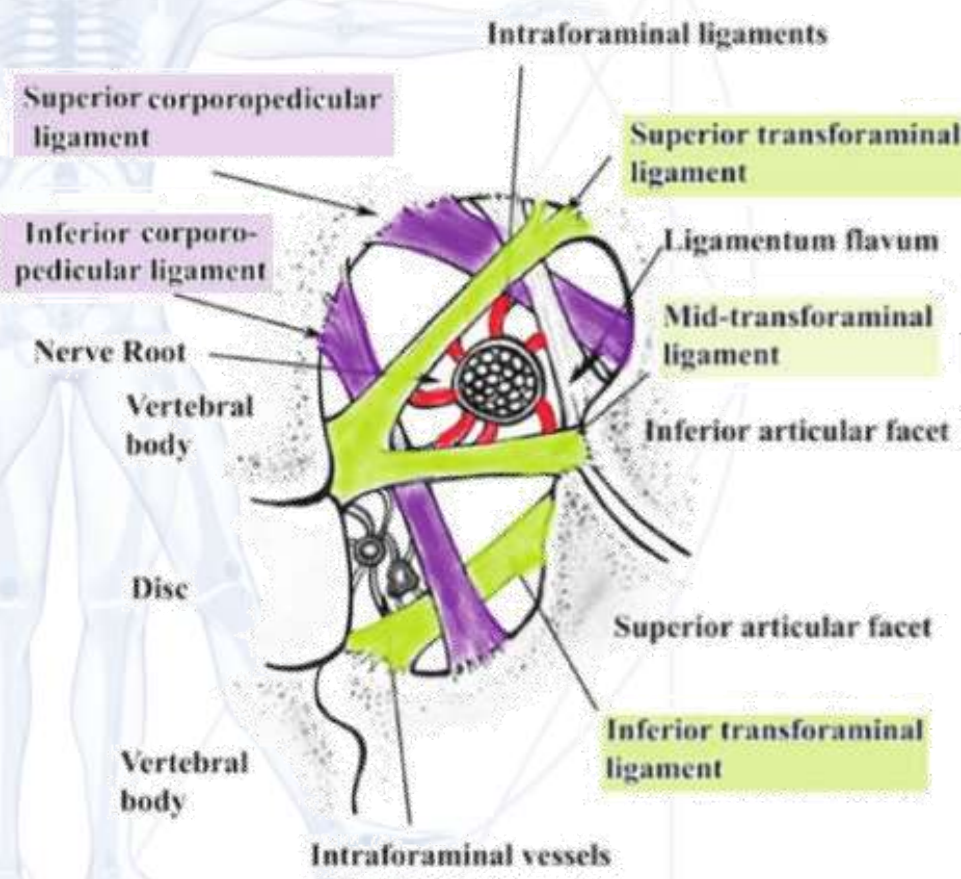
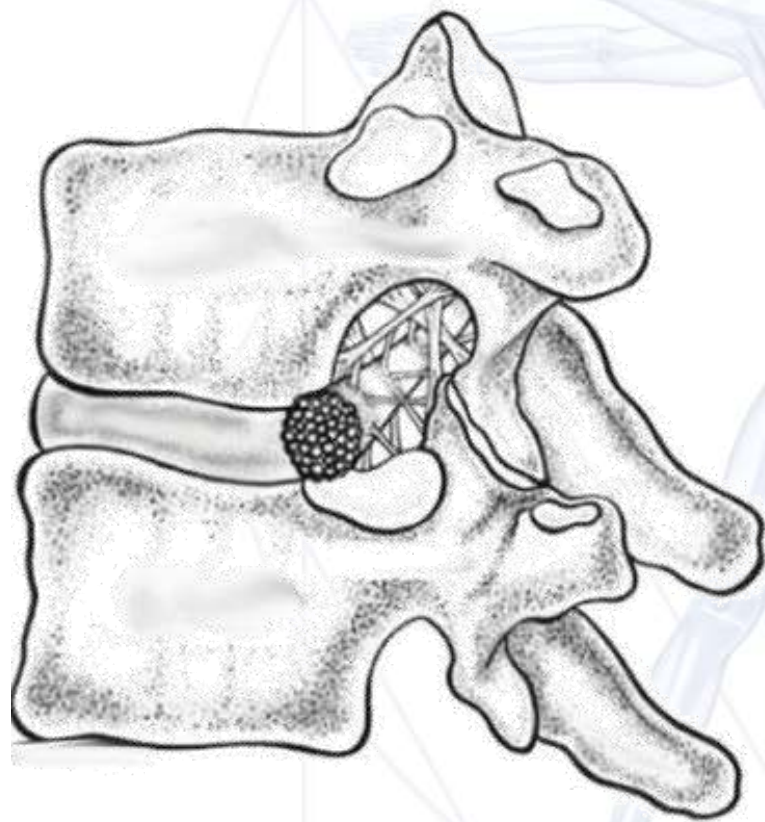


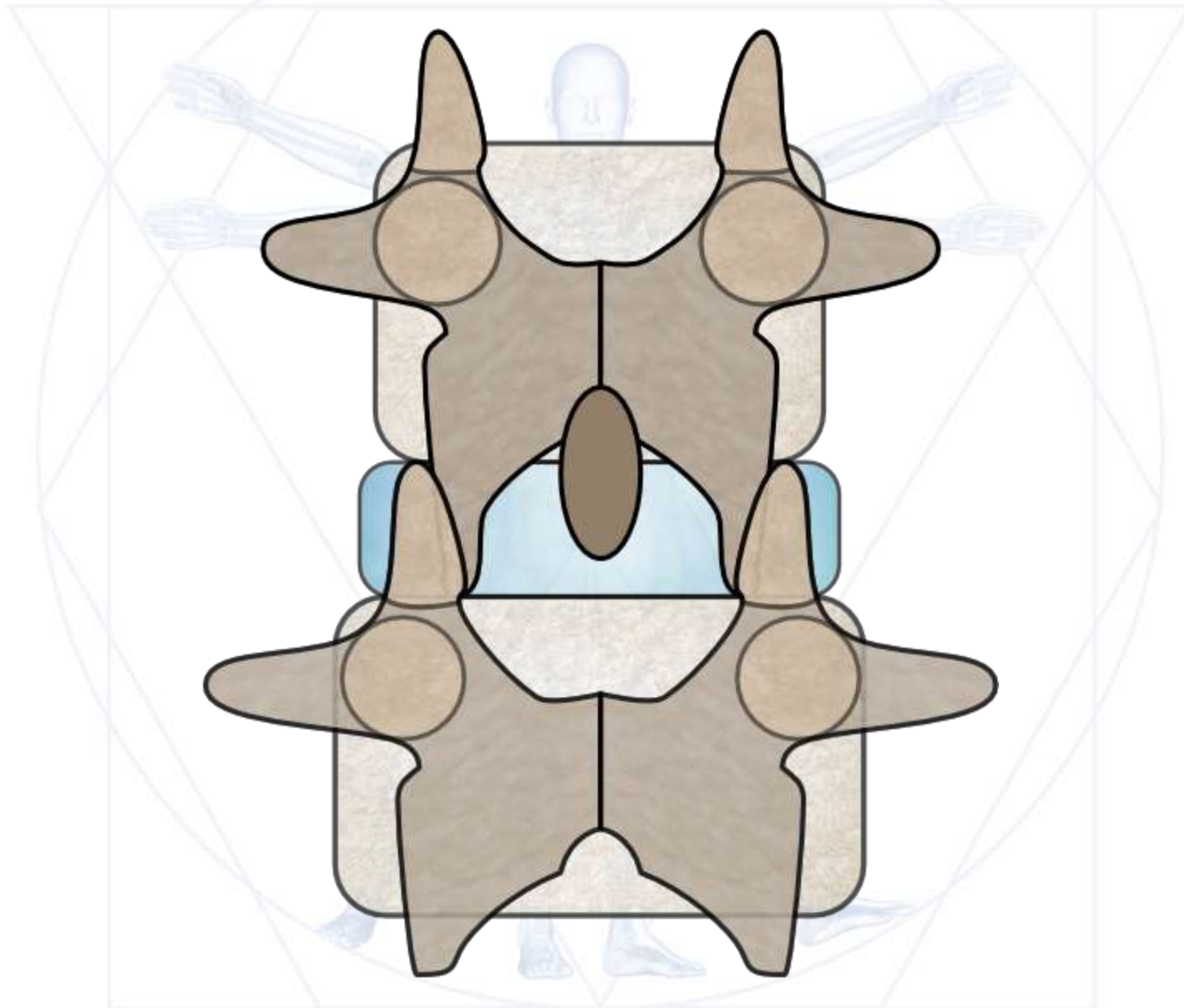
- Endoscopic transforaminal approach with MaxMore system
- Target: extraforamen, foramen, lateral recess and anterior epidural space

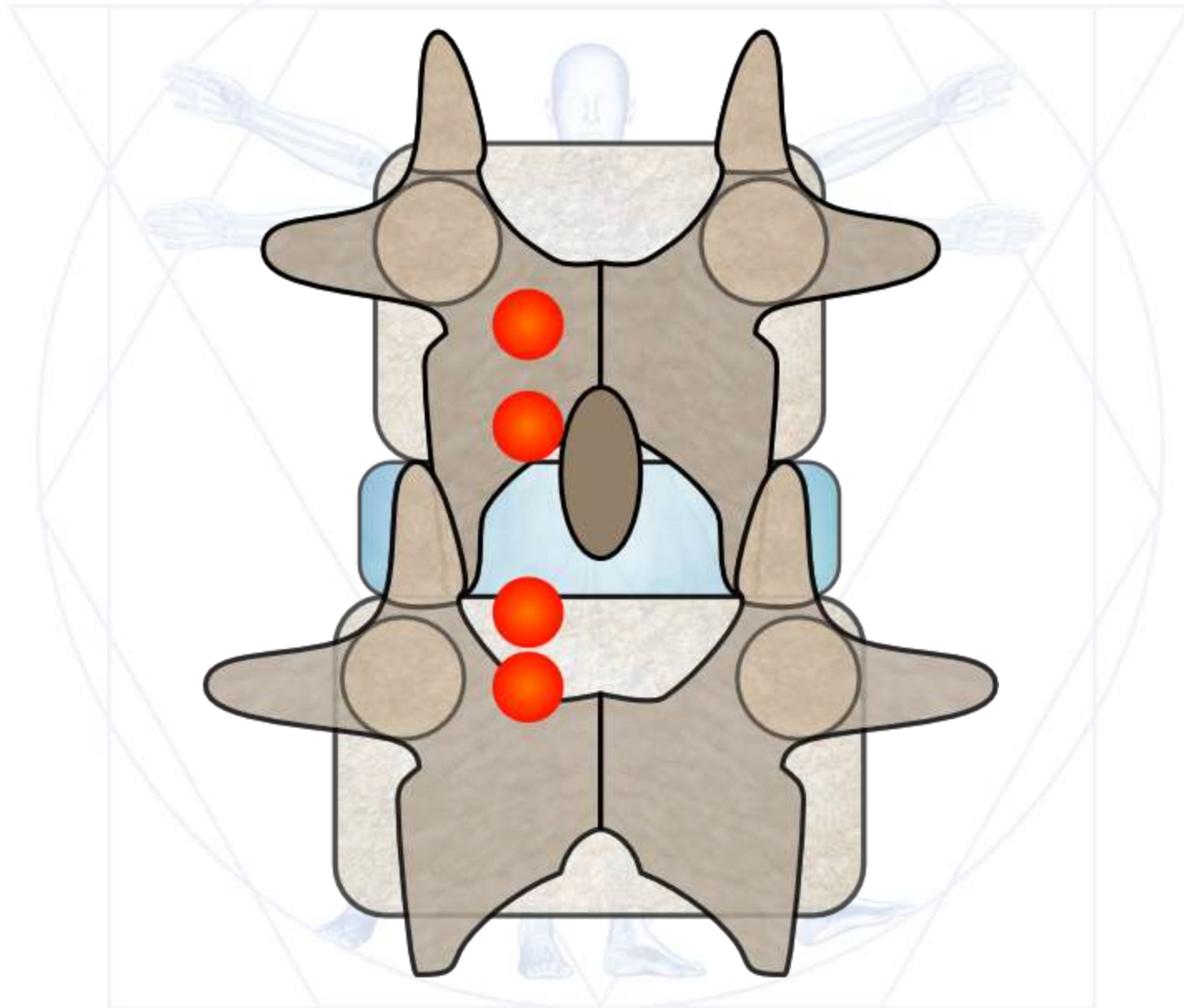
Kambin's Triangle

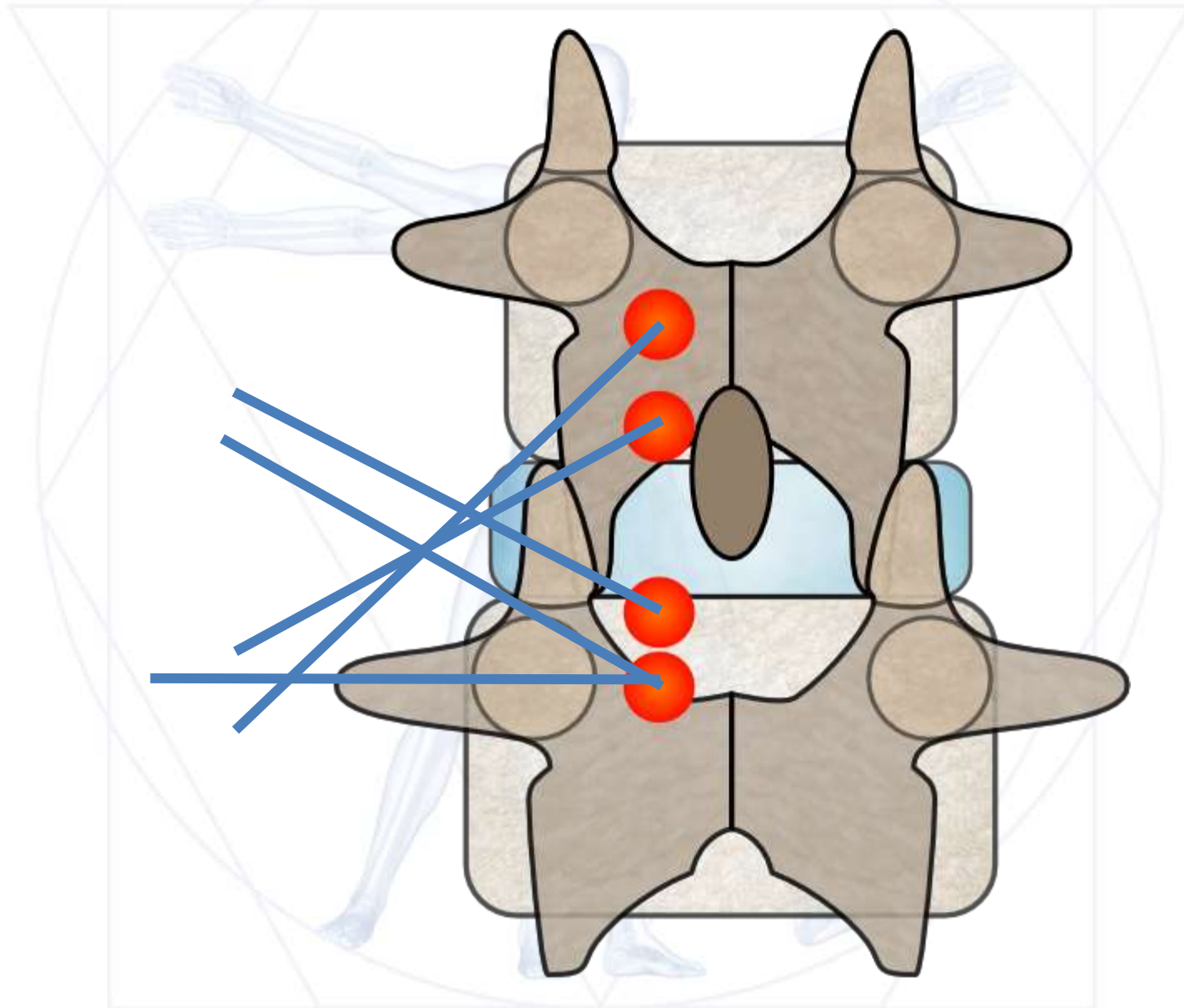


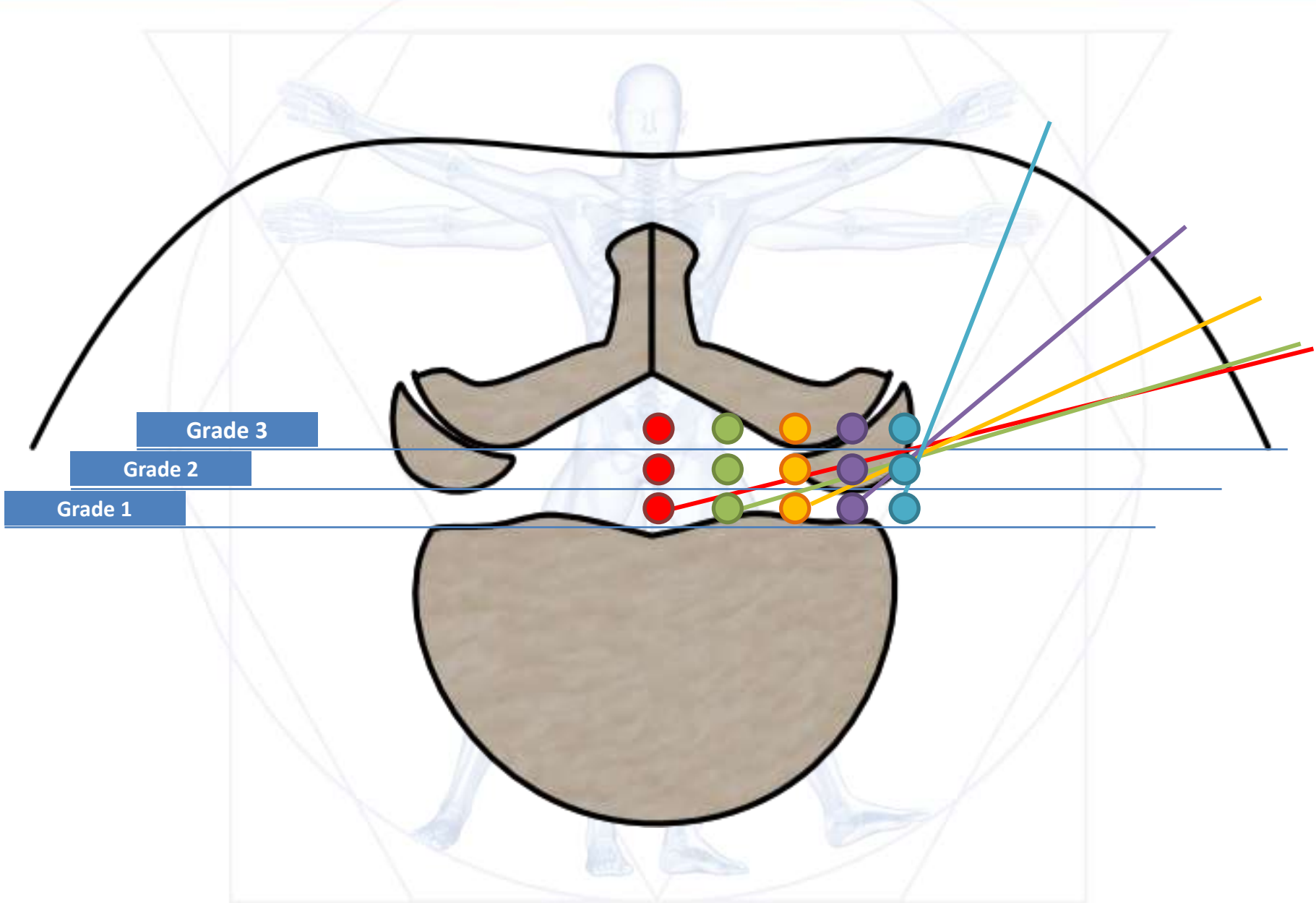
Spinal ligaments



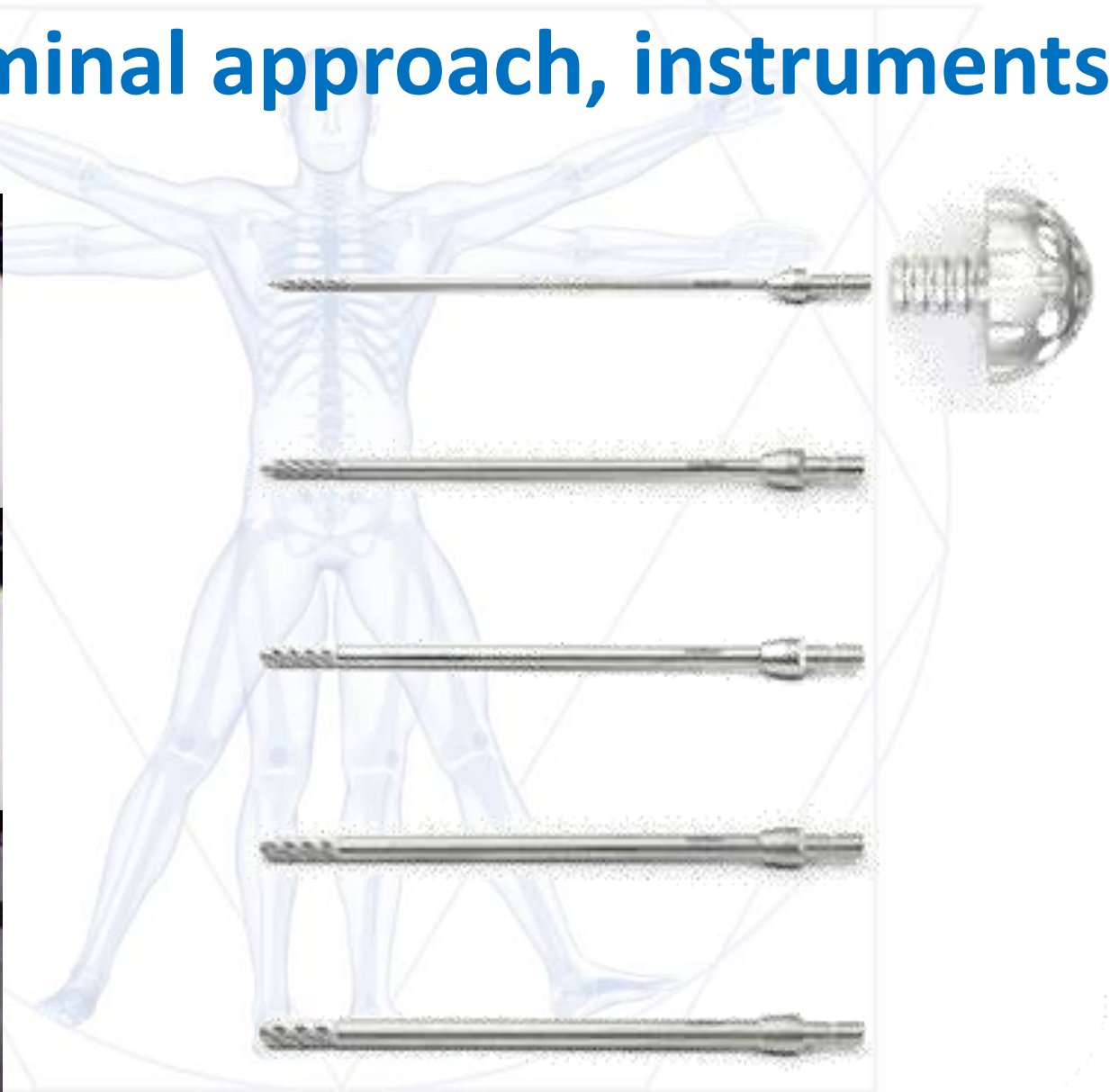








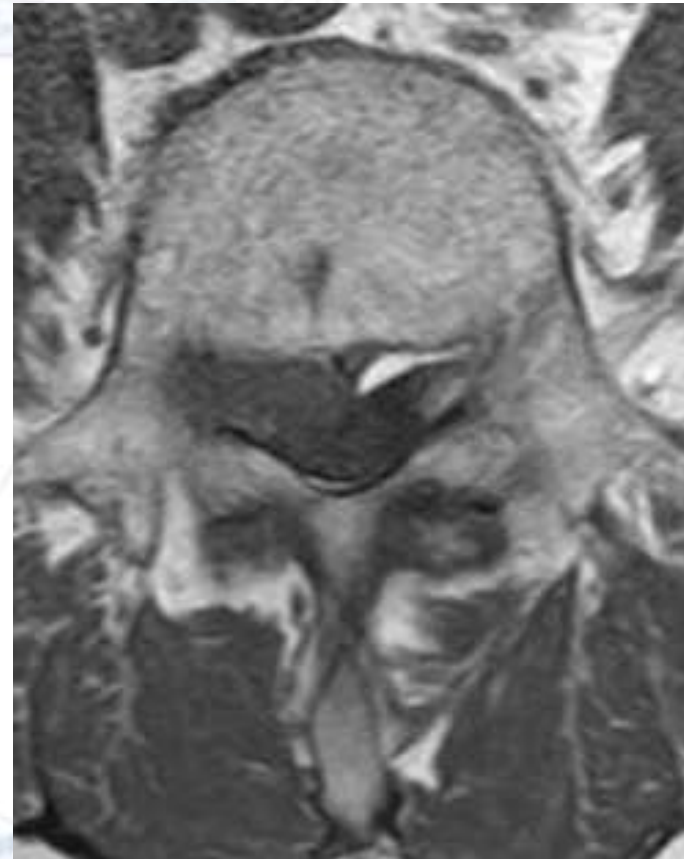
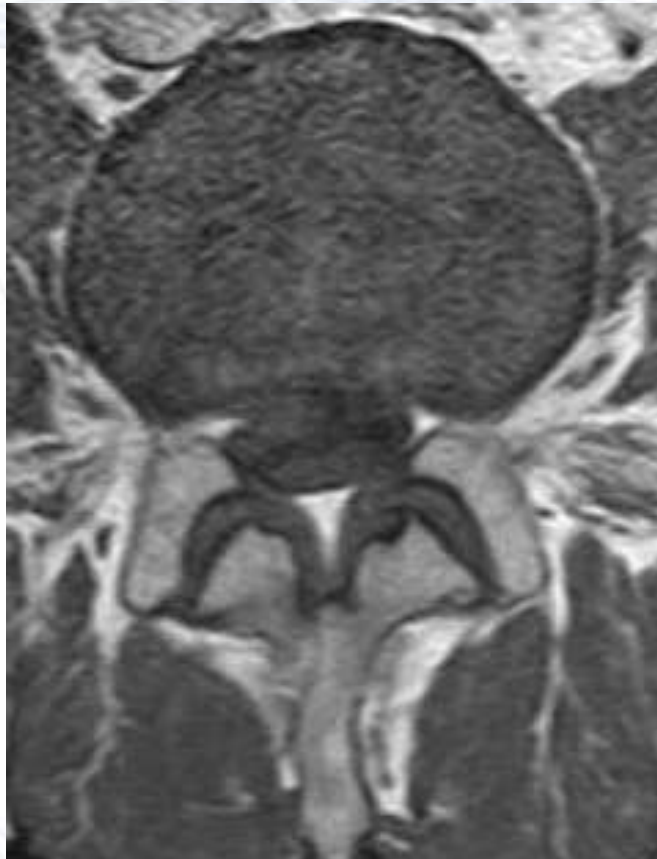
Transforaminal approach, instruments



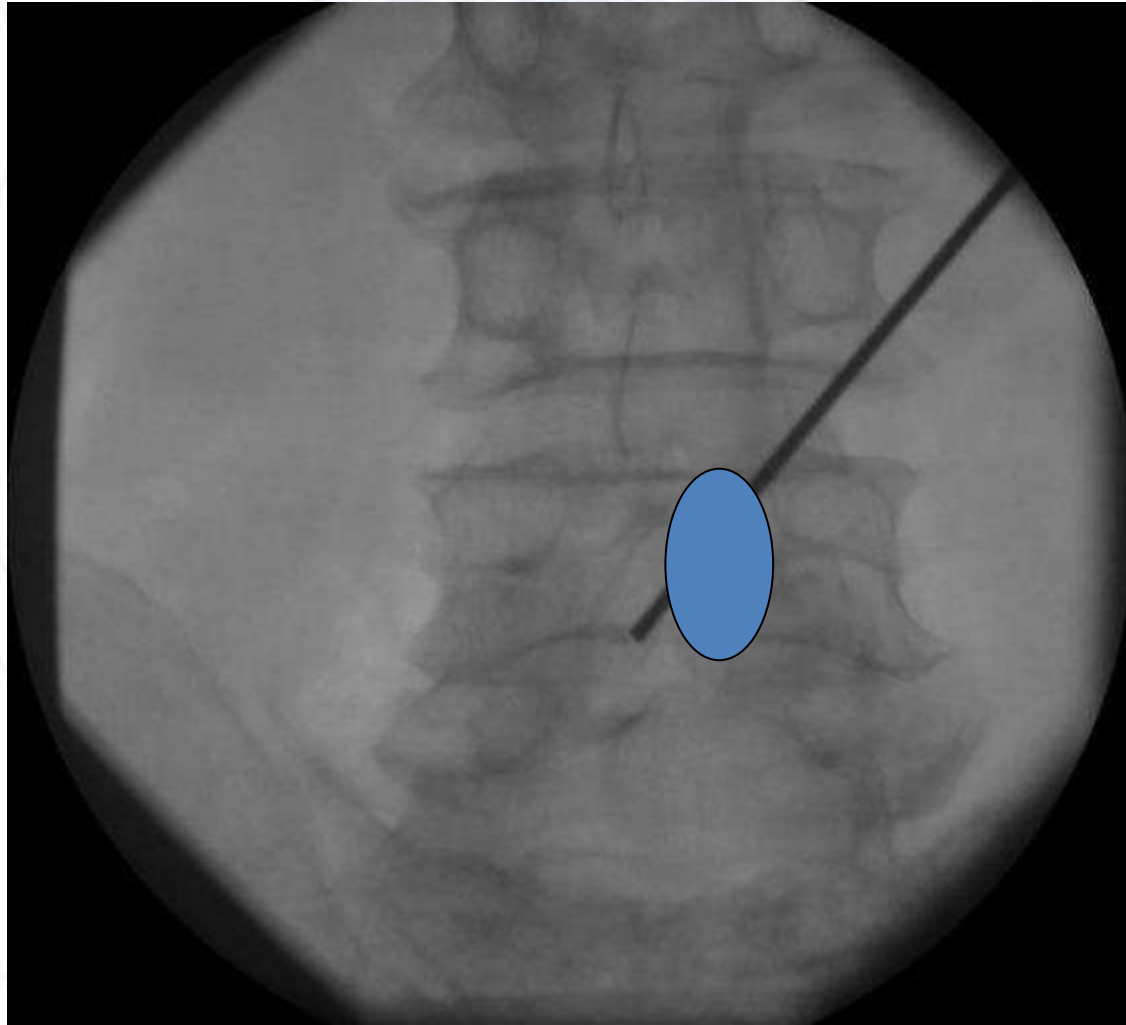
Entry point



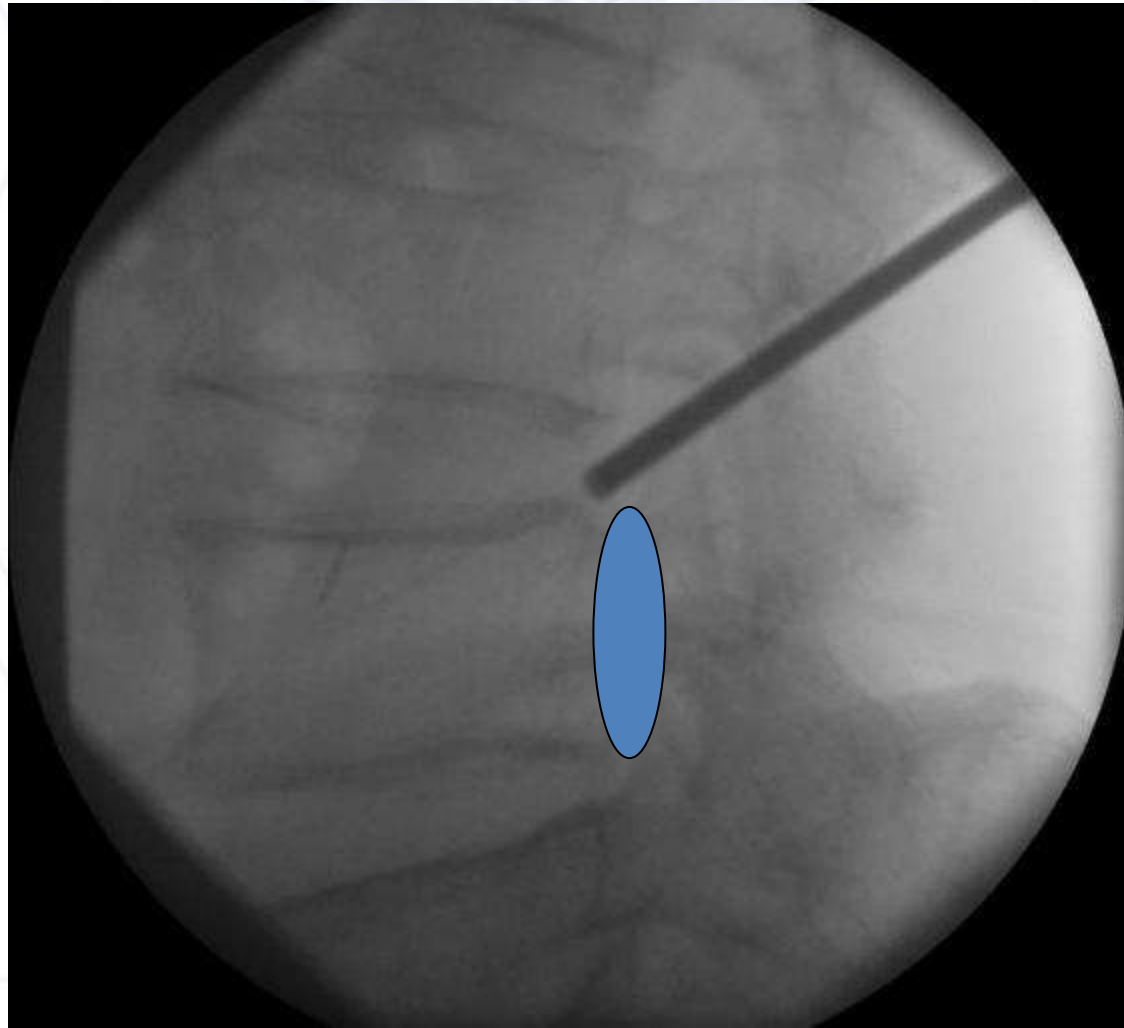
Transforaminal approach



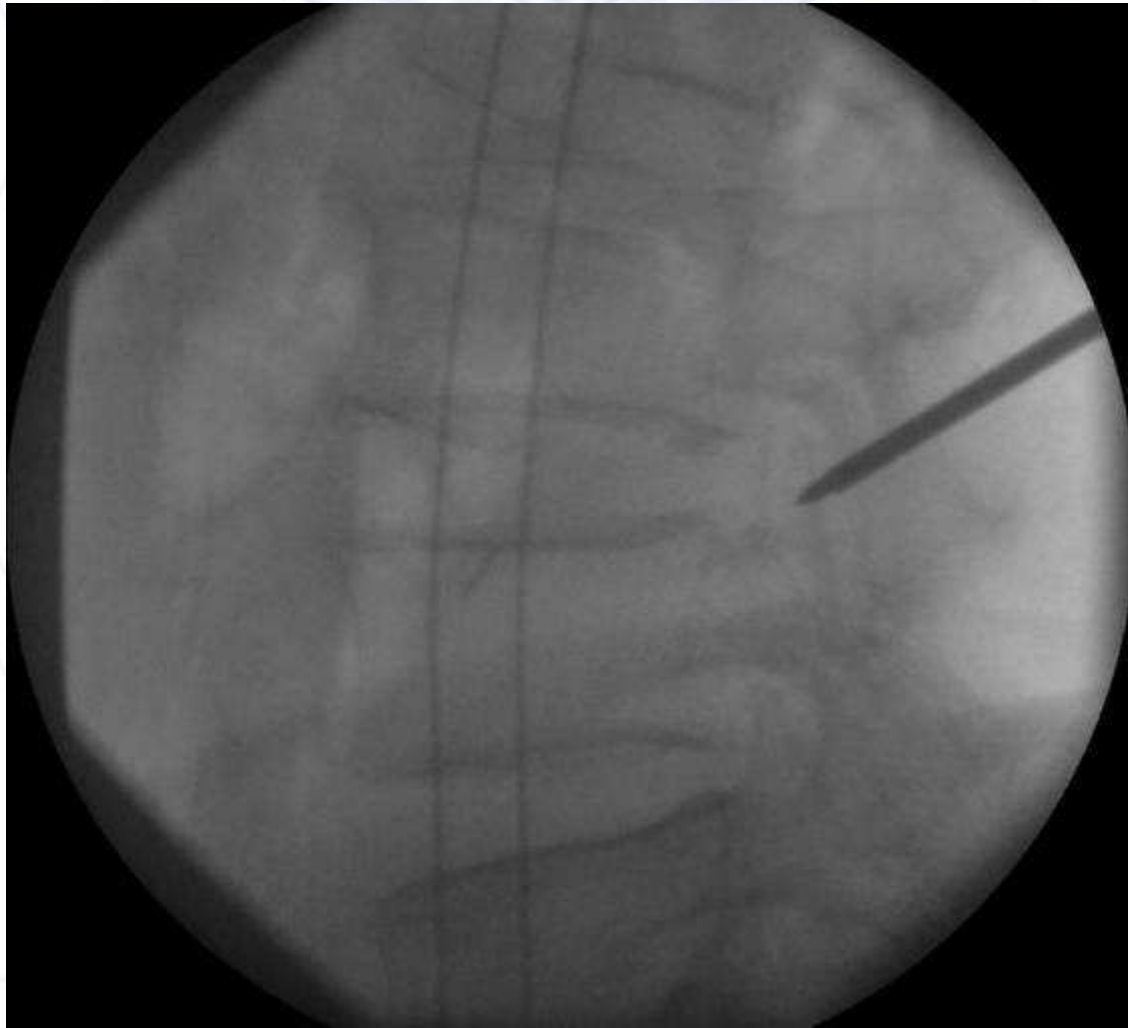
External marking, skin entry point



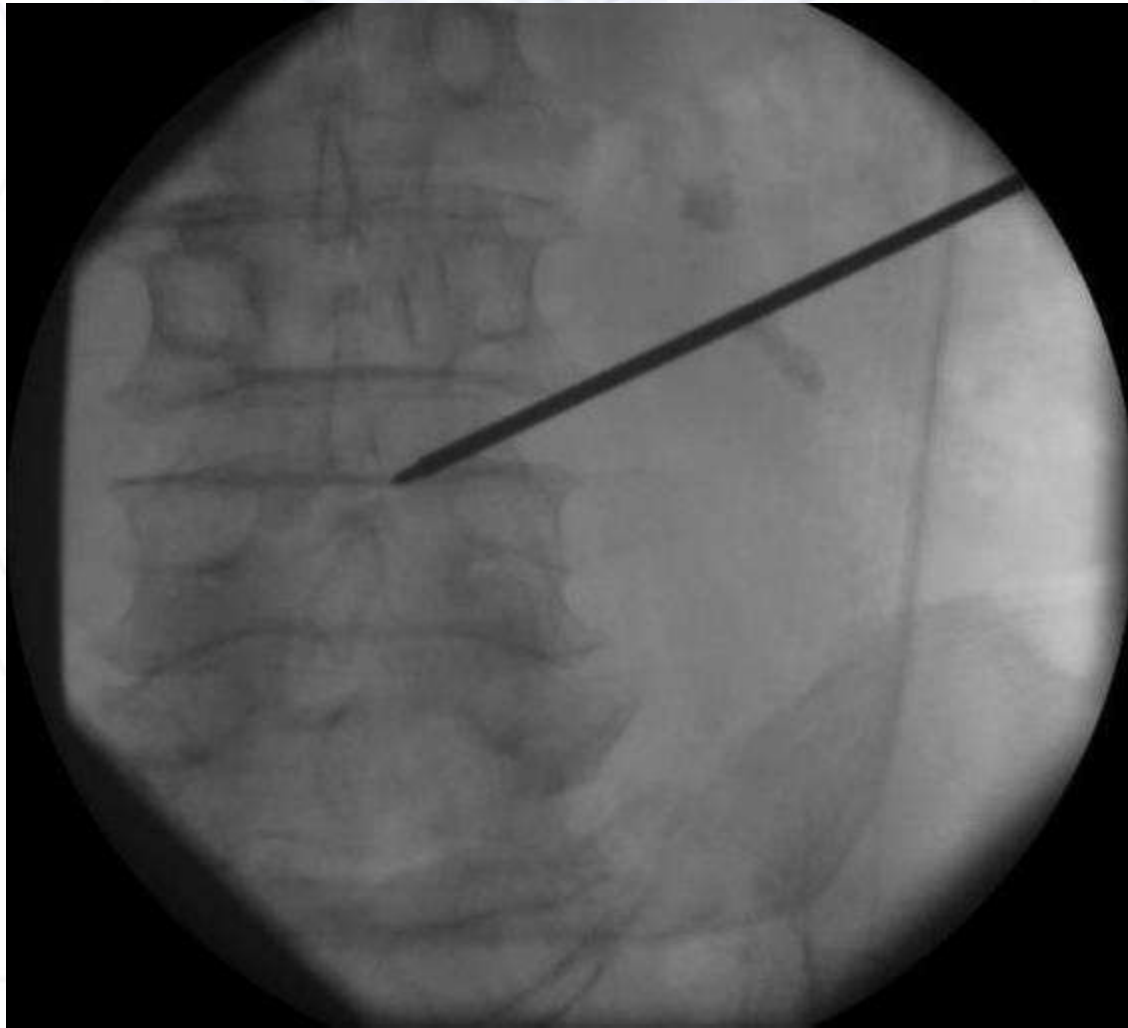
External marking, skin entry point



TOM-shidi start point at SAP Correct entry point crucial !

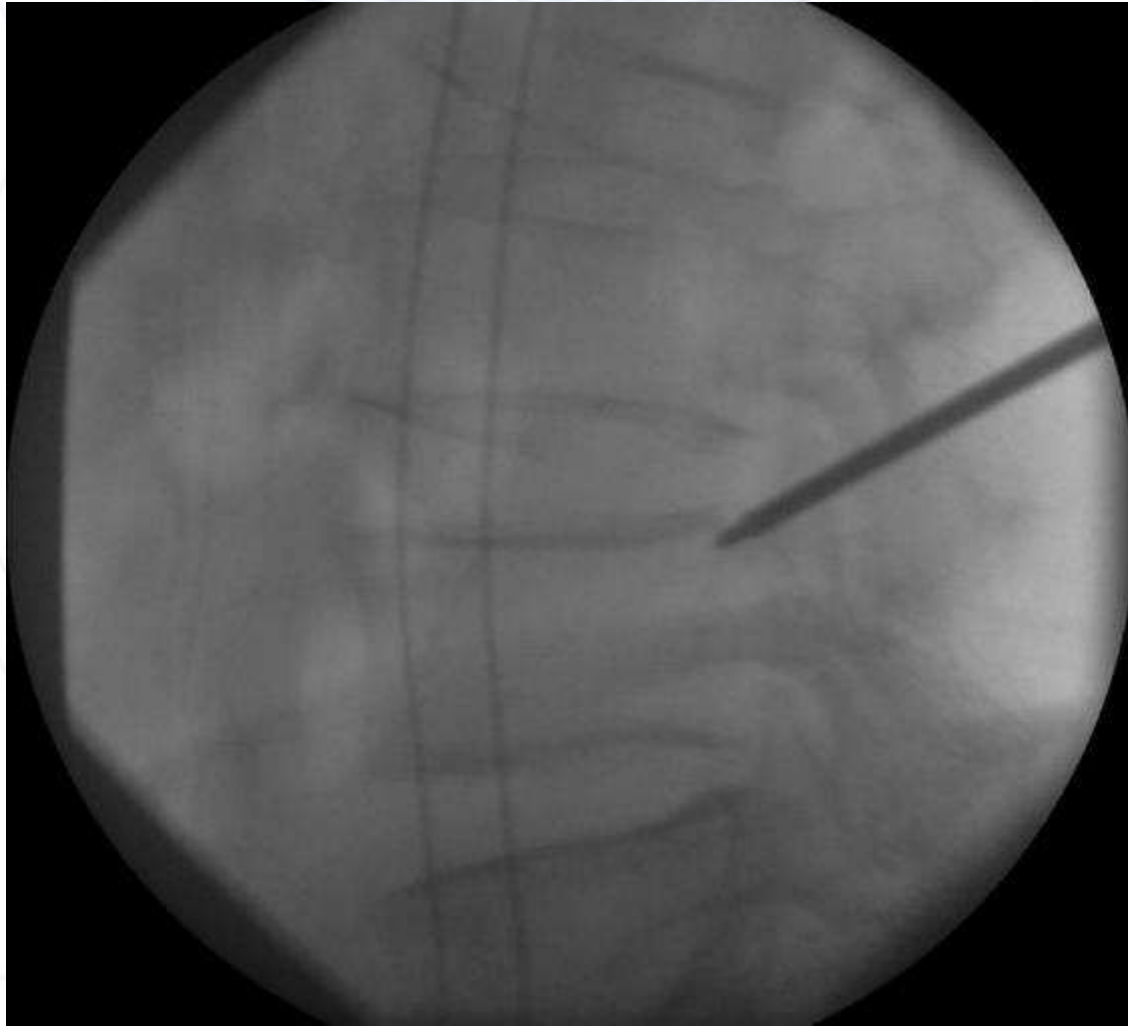


TOM-shidi ap

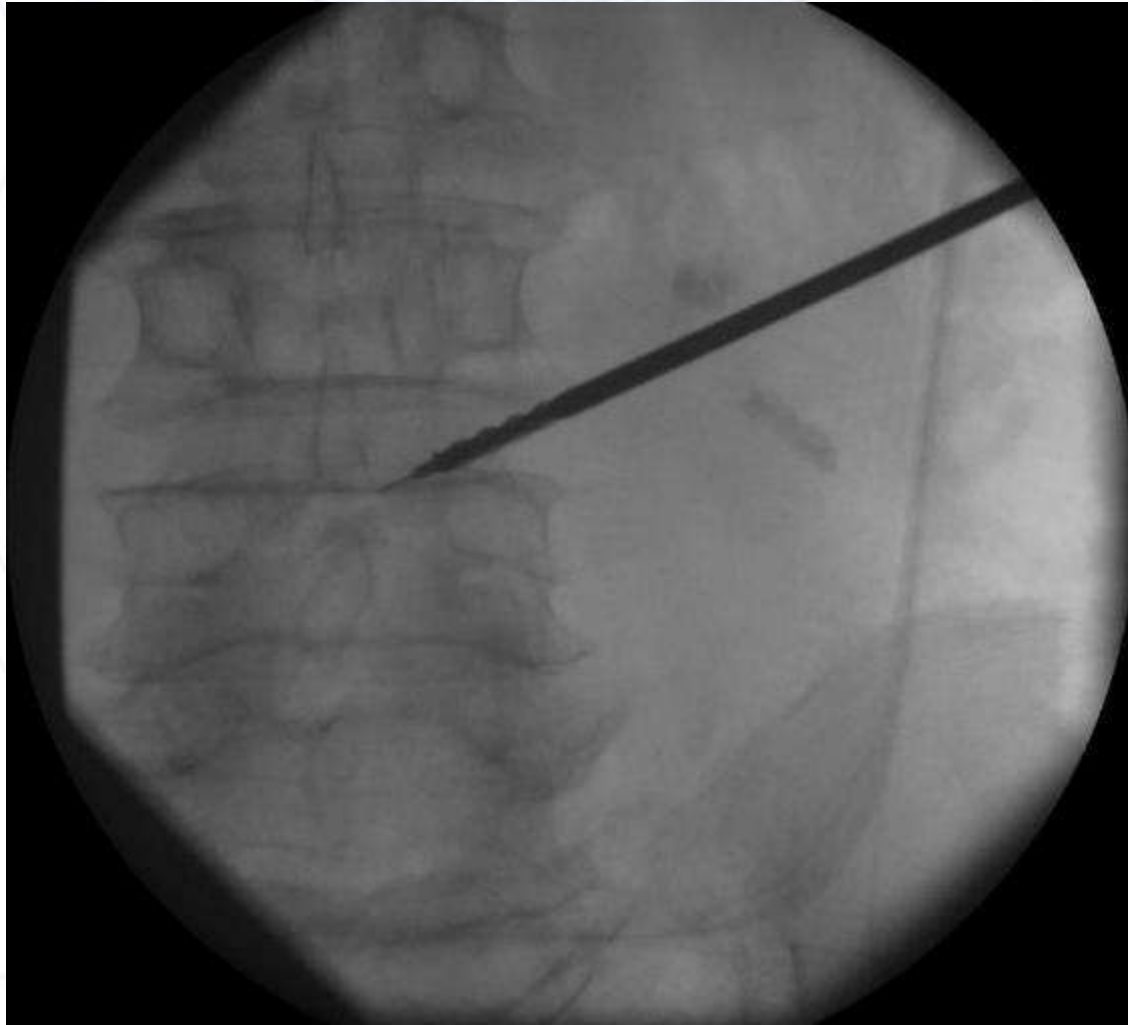




TOM-shidi lateral



4mm drill



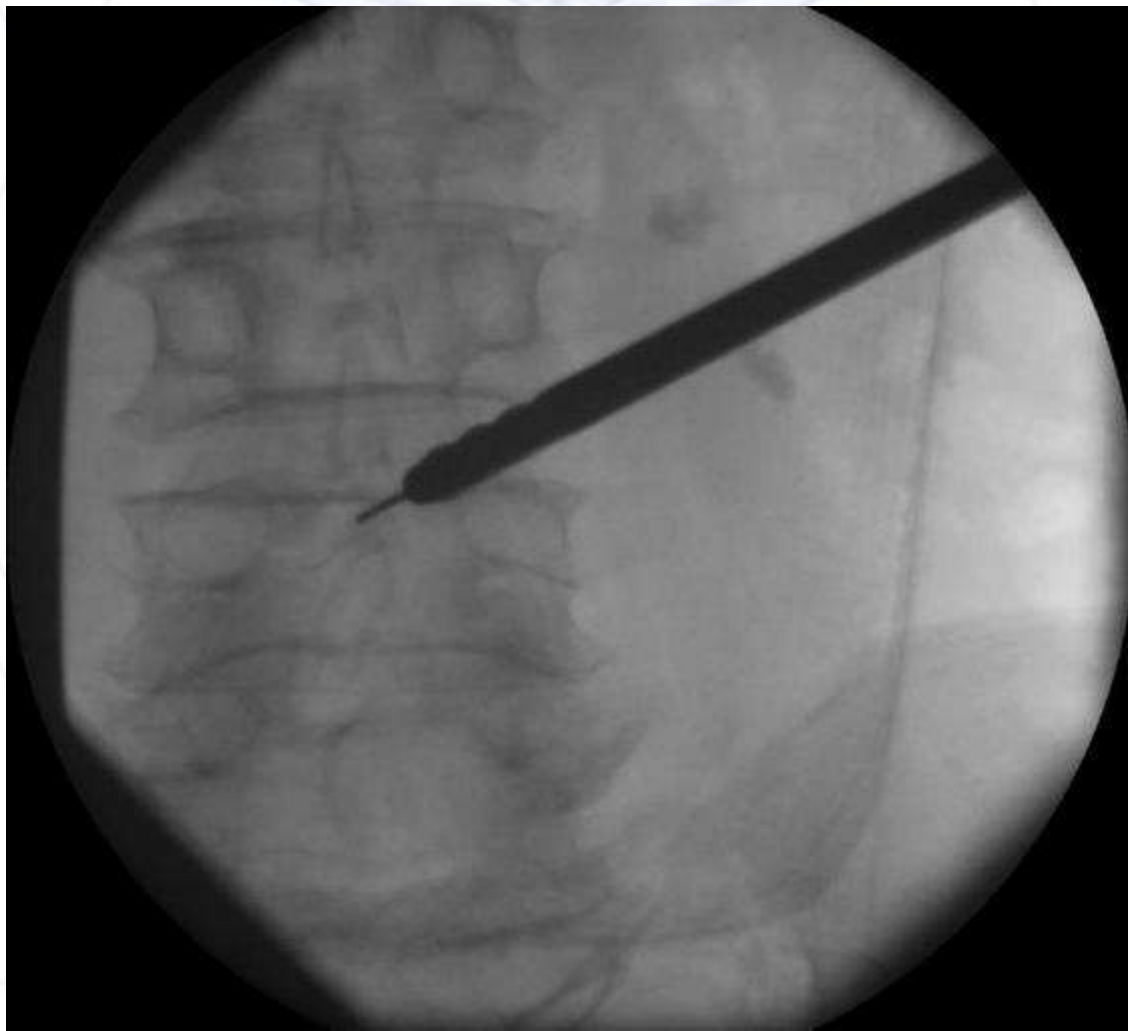
6mm early



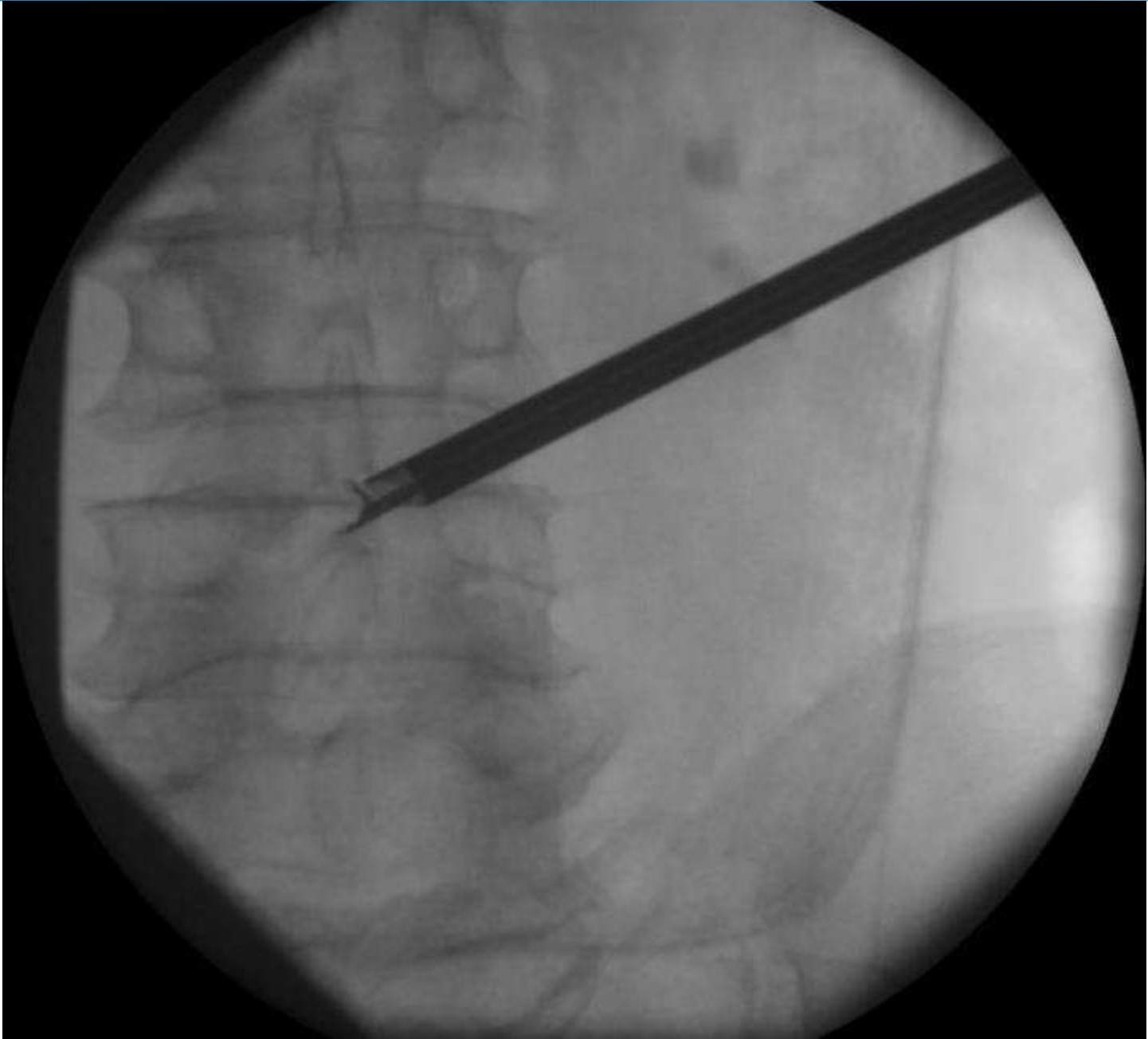
6mm final



8mm



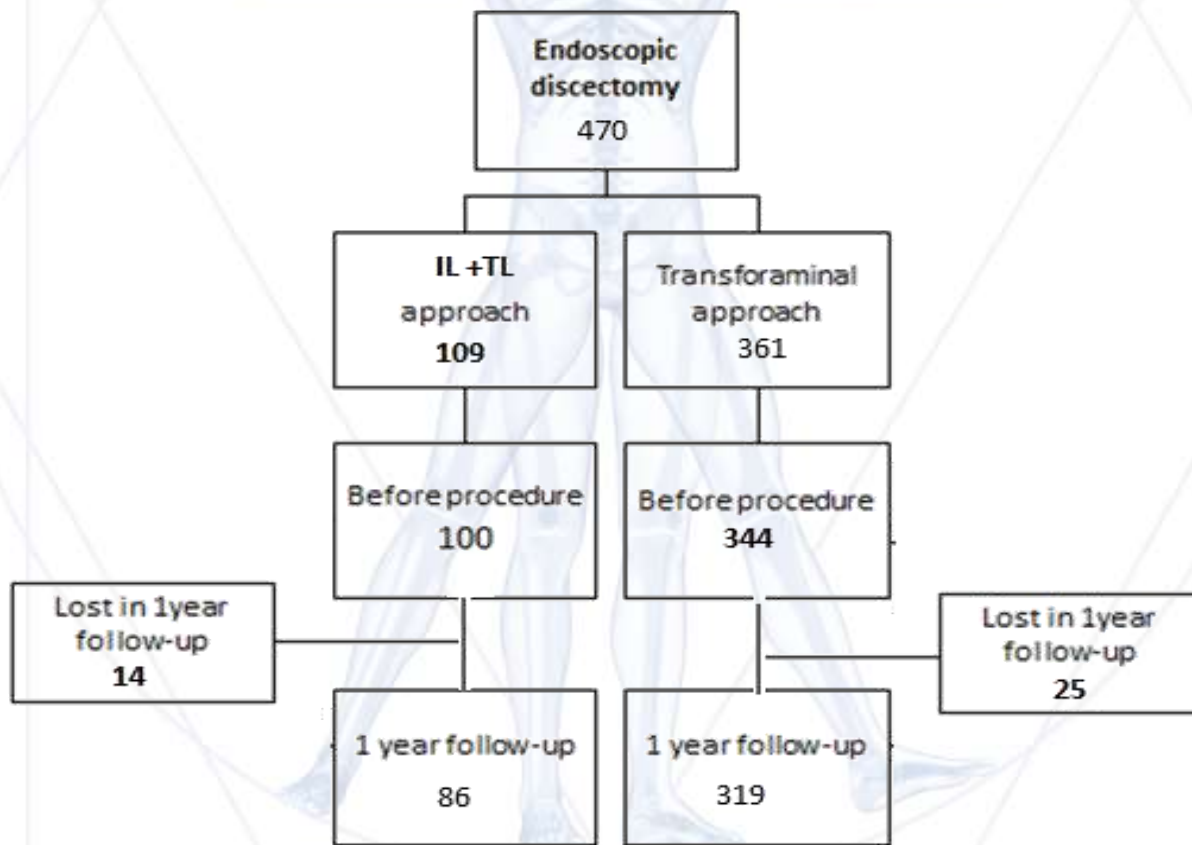








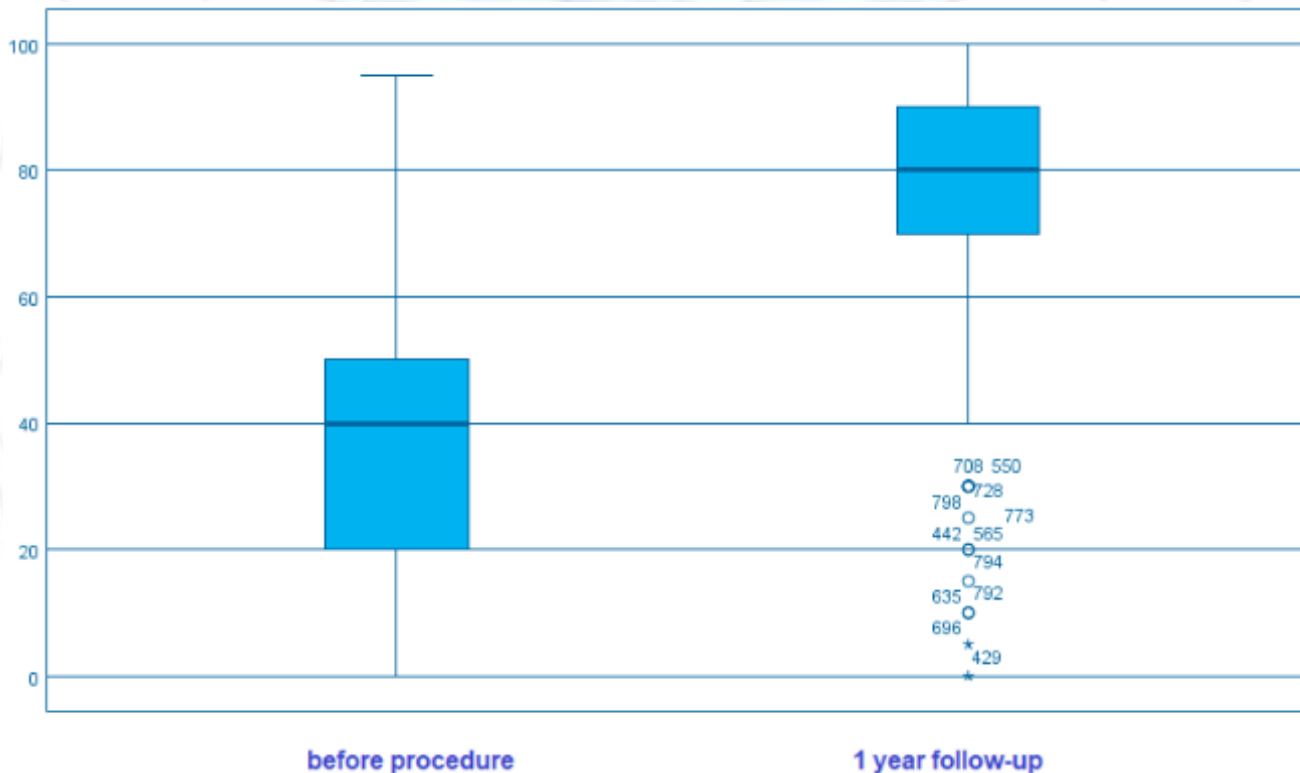
Experiences with endoscopic discectomy of the herniated intervertebral disc in the Czech and Slovak Republic focused on changes in the quality-of-life EQ-5D-5L analysis



Surgical approach	Transforaminal	Interlaminar	Translaminar
	319	74	12
Gender M/F	140/179	50/24	10/2
Age	min/max/med	min/max/med	min/max/med
	21/79/45	18/74/44	35/65/51
Level of herniation			
L1/L2	0	0	0
L2/L3	3	0	0
L3/L4	18	0	0
L4/L5	169	0	0
L5/S1	122	74	12
L3/L4 + L4/L5	6	0	0
L4/L5 + L5/S1	1	0	0
Reoperations %	7%	6%	0%

Oswestry Disability Index

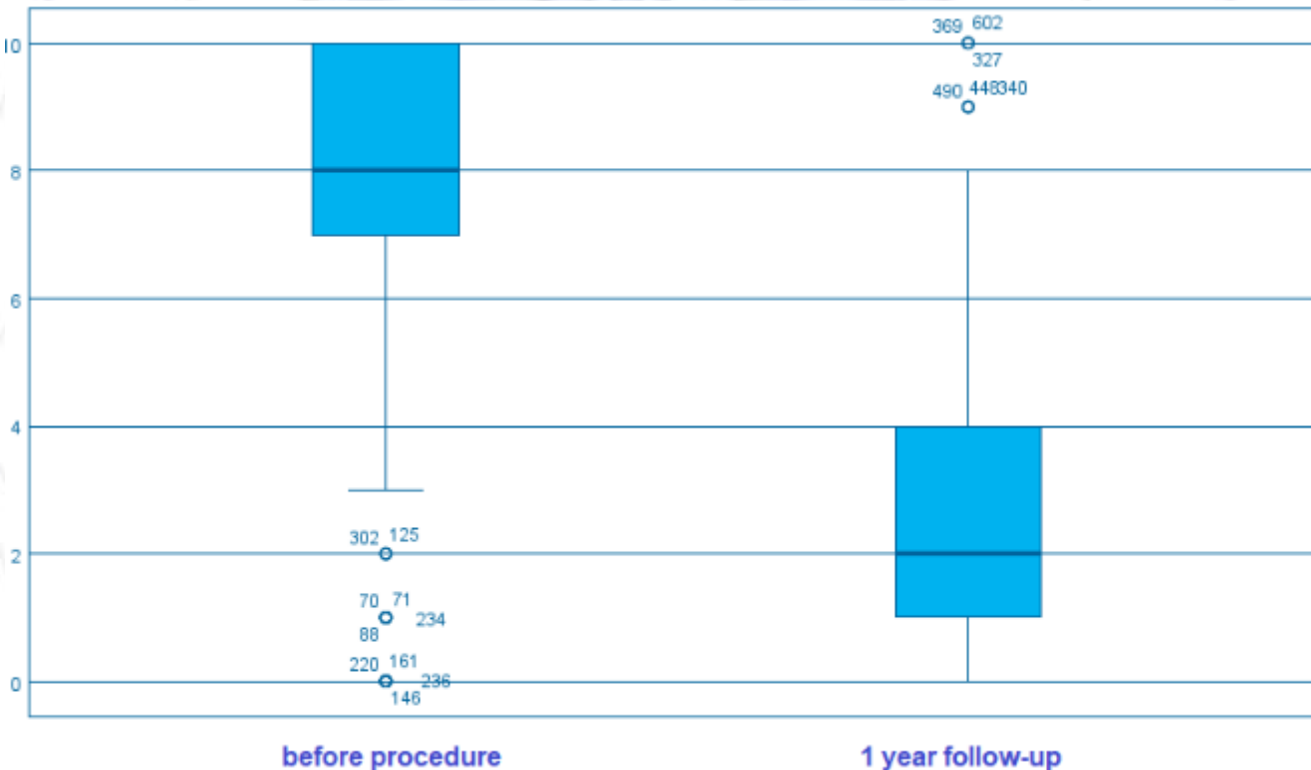
N 405pt



Paired Samples Test			95% Confidence Interval of the Difference		Sig. (2-tailed)
Mean (ODI) before procedure	Mean (ODI) 1 year follow-up	Std. Deviation	Lower	Upper	p
67,01	18,62	25,5	45,52	51,276	< 0,001

Low back pain

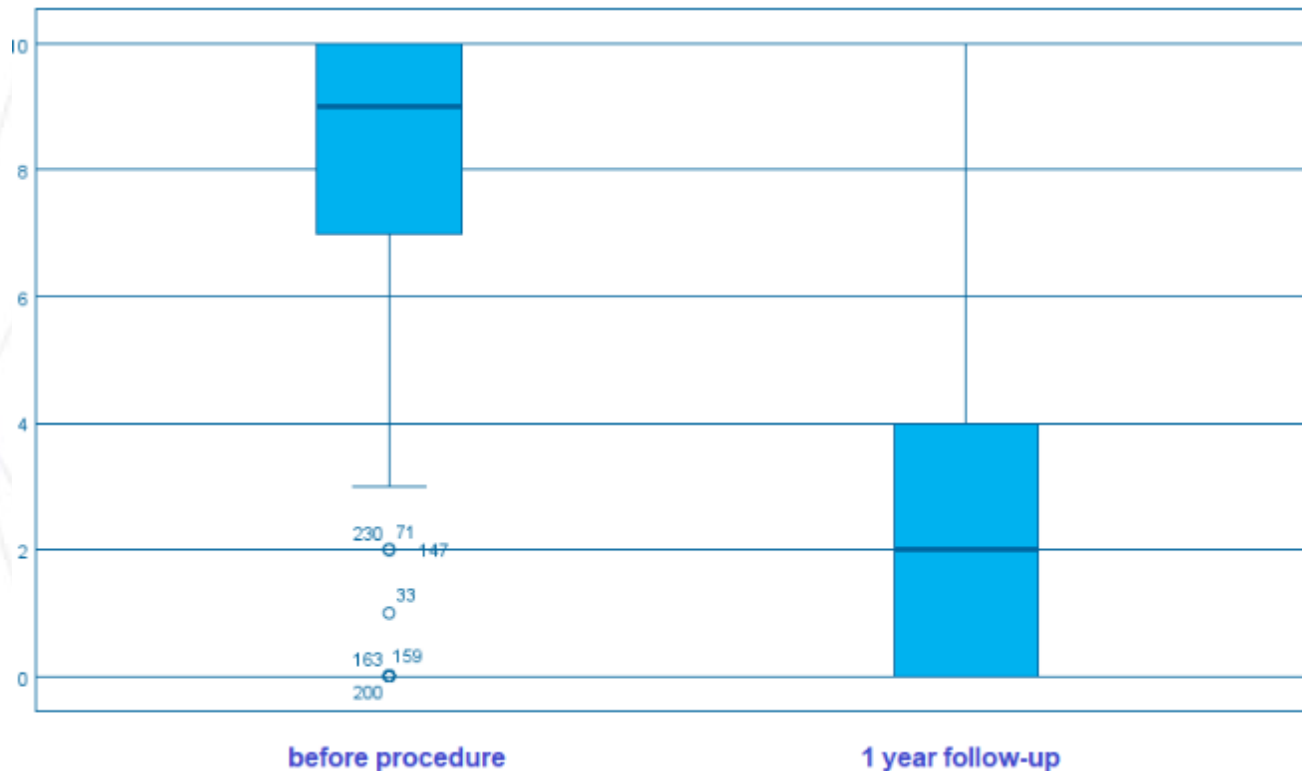
N 405pt



Paired Samples Test			95% Confidence Interval of the Difference		Sig. (2-tailed)
Mean (ODI) before procedure	Mean (ODI) 1 year follow-up	Std. Deviation	Lower	Upper	p
7,83	2,77	3,321	4,688	5,437	< 0,001

Leg pain

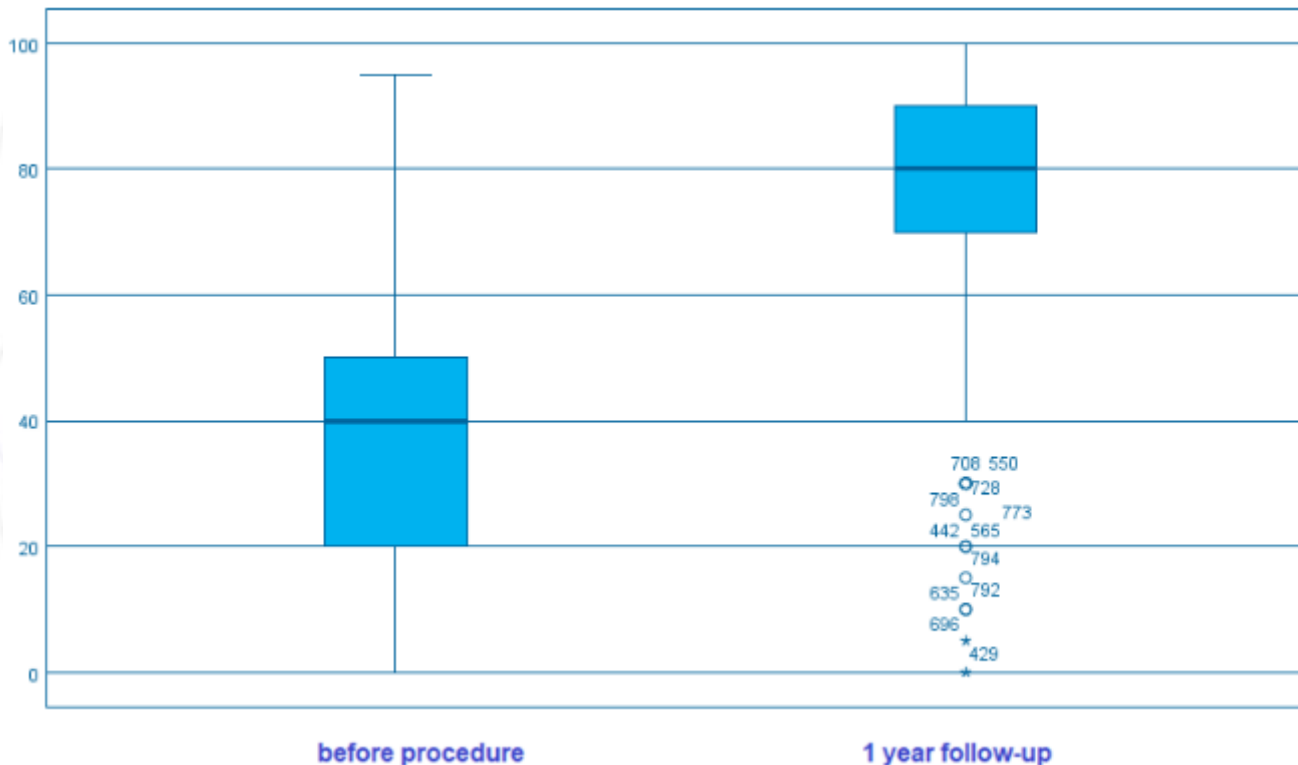
N 405pt



Paired Samples Test			95% Confidence Interval of the Difference		Sig. (2-tailed)
Mean (ODI) before procedure	Mean (ODI) 1 year follow-up	Std. Deviation	Lower	Upper	p
7,96	2,40	3,499	5,164	5,954	< 0,001

EQ-VAS

N 405pt



Paired Samples Test			95% Confidence Interval of the Difference		Sig. (2-tailed)
Mean (EQ-V) before procedure	Mean (EQ-V) 1 year follow-up	Std. Deviation	Lower	Upper	p
39,13	79,38	30,317	-43,203	-37,281	< 0,001

EQ-5D-5L



Mobility



Self-care



**Usual
activities**



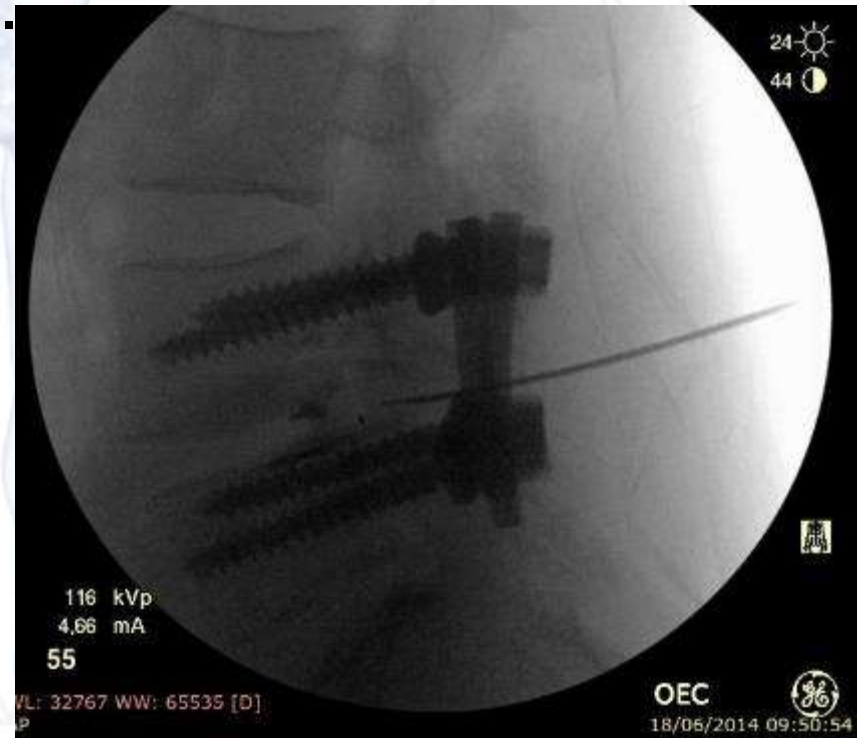
**Pain &
discomfort**



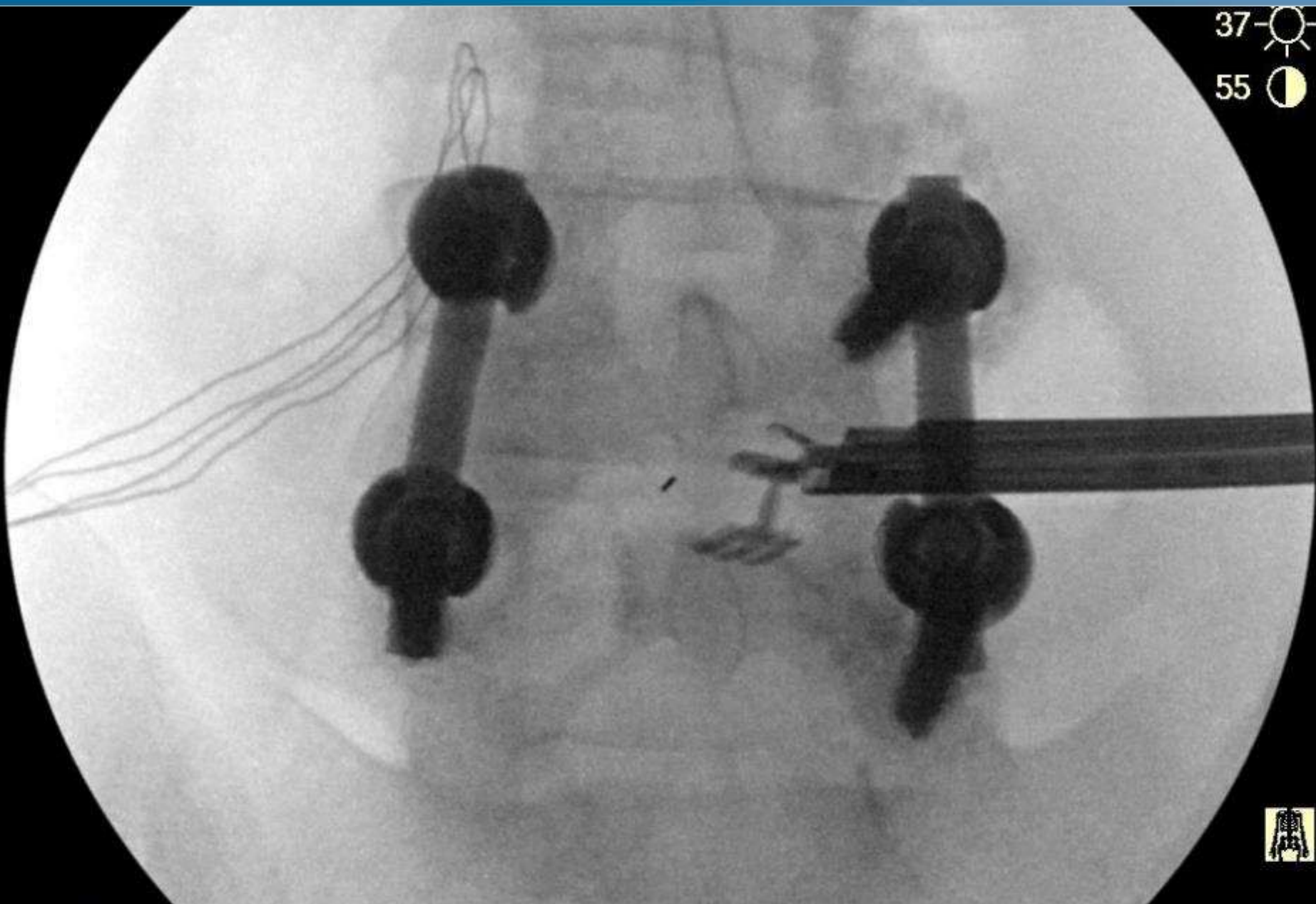
**Anxiety &
depression**

Case 1: Scar after fusion L4/5

E.G., female 45 y/o; fusion L4/5 3 yrs. ago, now newly developed sciatica right leg. Endoscopy used for exploration.



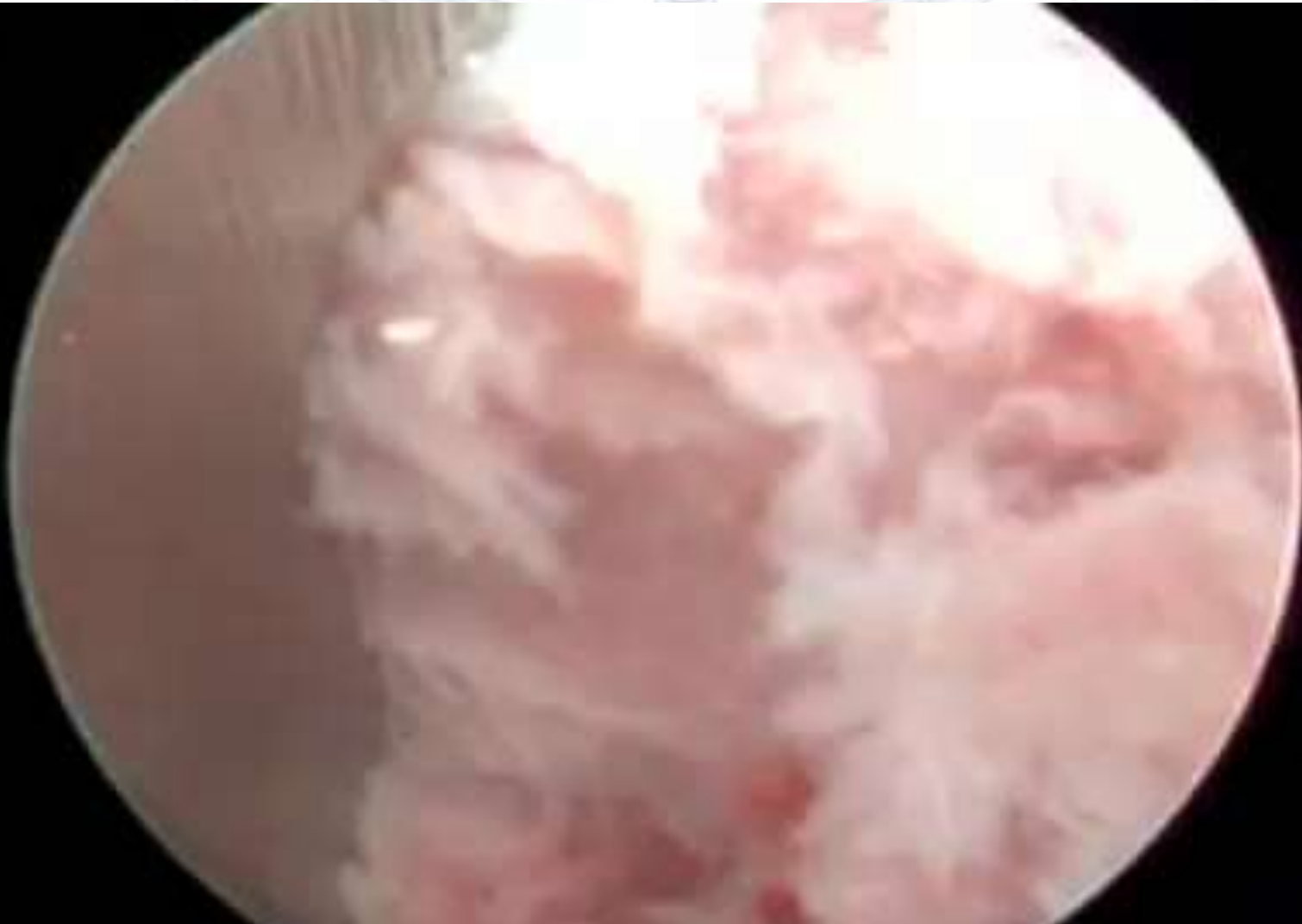
37 ☀
55 🌙



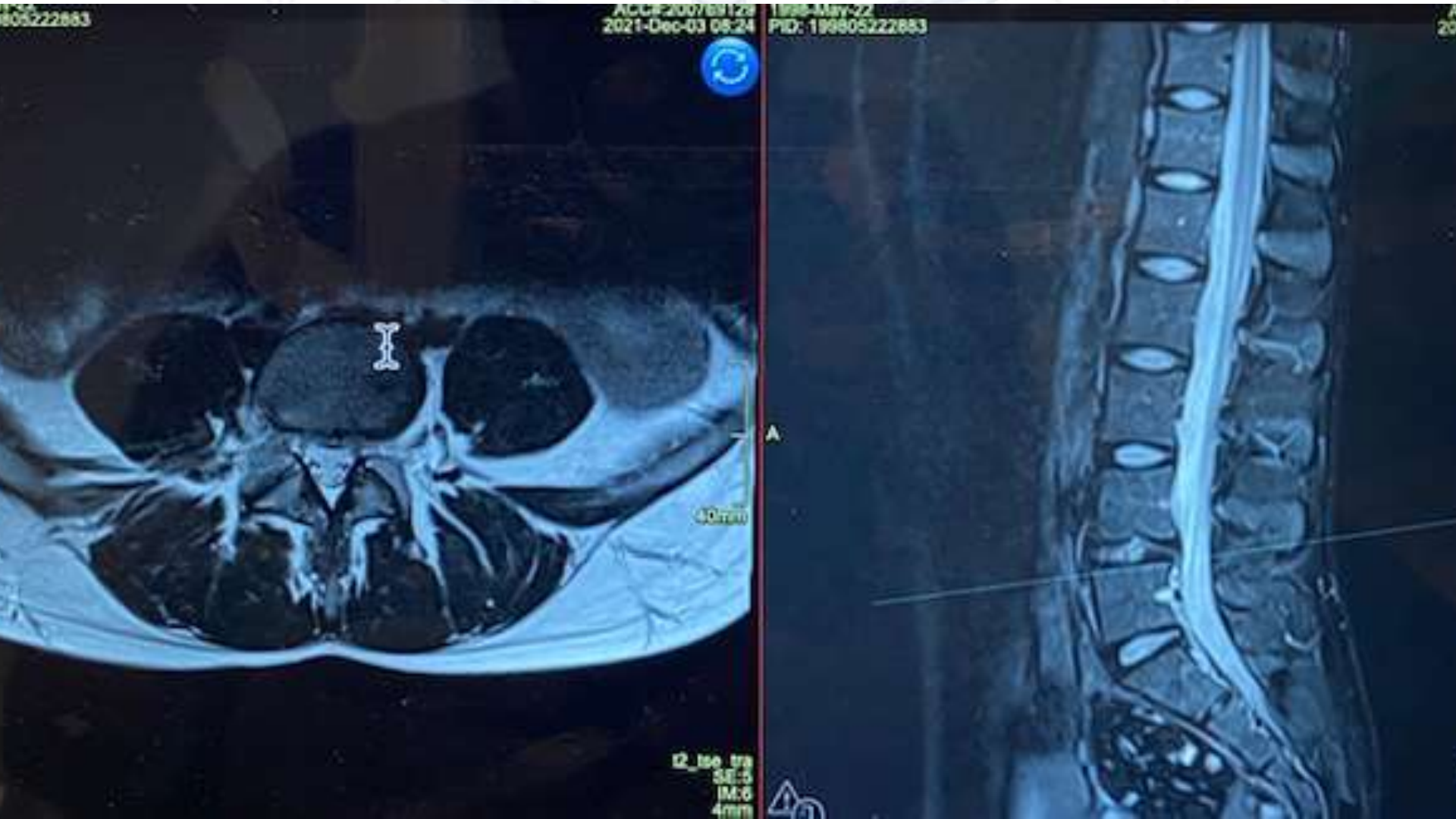
08 kVp



Case 6: Scar after fusion L4/5



What is wrong with this MRI?



Alicja Persson, Elite Swedish cross country skier



Transforaminal endoscopy with thermal annuloplasty



(A) we can assess the traversing nerve root to be decompressed, the pedicle and location of basivertebral nerve above the pedicle are observed.

(B) Application of radiofrequency ablation on the basivertebral nerve above the pedicle. Application of radiofrequency ablation on the basivertebral nerve.

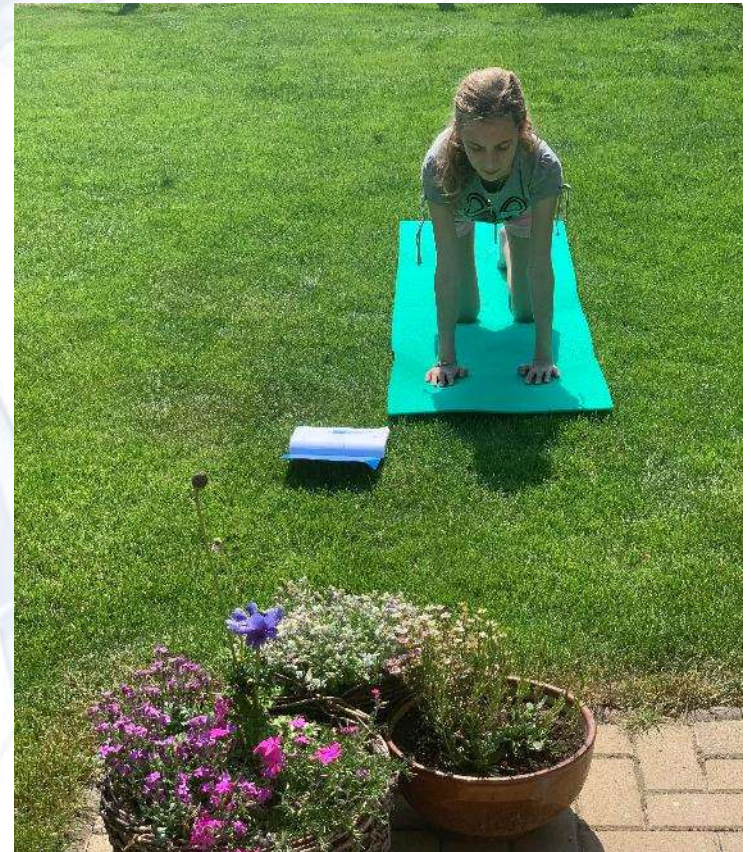
Adolescent disc herniation





A girl aged 11 - EPC clinic - April 2022

- Radicular pain in S1/L5 dermatoma, left lower extremity, back pain
- L5/S1 paramedian extrusion to the left with S1 nerve root compression, gr III
- Clinical symptoms over 6 weeks with a deterioration tendency
- Initial motor and sensory deficit
- Continuous pain 24/7, worse at night
- SLT positive 20 degrees on the left side





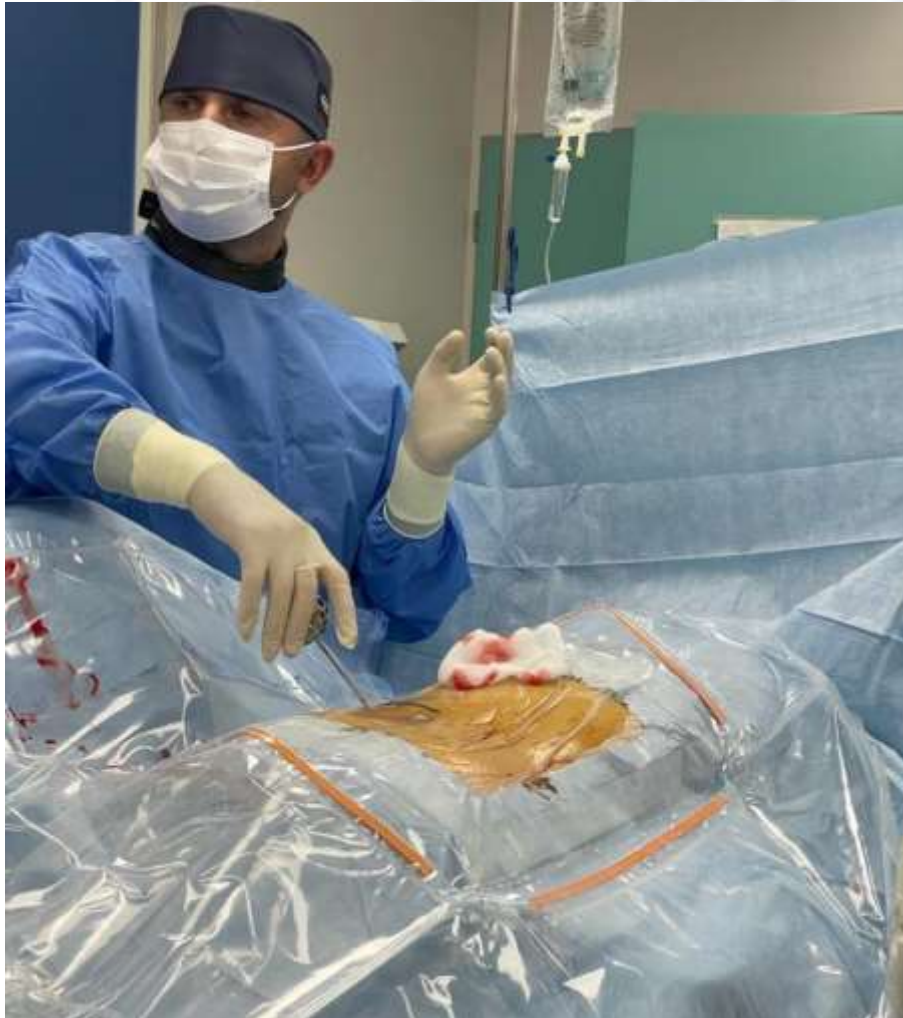
Previous medical history

- **No trauma**, no co-morbidities
- **Gained 20 cm in 6 months**
- **Referred** to neurosurgeon where no indication for surgery because of age





PELD





The girl on 5 months follow up

no medication, no clinical problems, VAS - 0



Complications

Study design: A retrospective clinical review.

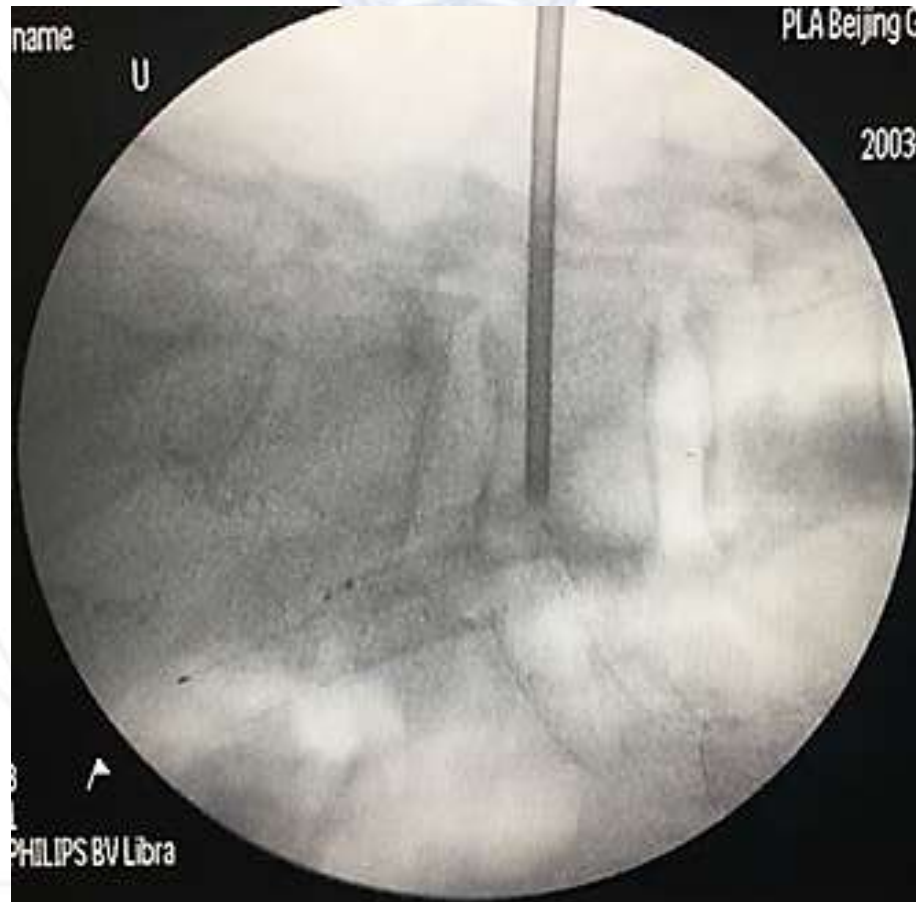
Purpose: To explore the type, morbidity, risk factors and treatment strategies of postoperative complication following percutaneous endoscopic lumbar discectomy (PELD) surgery.

Methods: 10120 patients after PELD surgery were studied.

Results: There are 2 patients died in the perioperative period and 2 patients with permanent impairment of neural function after surgery, which should be the severest complication of PELD surgery. Transient paresthesia, intraoperative bleeding and dura sac tear are the most common complications reported by 6 surgeons. There are 2 suspected cases of postoperative hematoma, several cases of surgical instruments broken during the surgery and 20 cases of infection in 10120 patients, regarded as rare complications of PELD. Recurrence rate of PELD surgery is 4.7% to 6% reported by 3 surgeons. However, recurrence defined as complications of PELD surgery remain controversial.

Conclusion: Excellent clinical outcome of large case series after PELD surgery is reported. However, we need to face the limitations and complications of the surgery. The complication rate should be reduced by caring about the treatment, surgical indications strictly selected and the guidance of experienced surgeons.

The wrong direction of puncture needle increased the risk of injury of lumbosacral plexus, blood vessels and abdominal viscera



Radiation

N	Age	G	Approach	Level and characteristics	Time (sec)	Radiation (mGy)
1	55	F	TF	L3L4 - foraminal - extrusion	00:48	28.036
2	51	M	TF	L5S1 - foraminal - extrusion	00:40	29.350
3	71	M	TF	L4L5 - posterolateral - extrusion	00:45	35.296
4	35	M	IL	L5S1 - posterolateral - extrusion	00:19	11.352
5	40	F	TF	L1L2 - central - extrusion	00:59	40.704
6	30	M	TF	L4L5 - posterolateral - extrusion	00:28	21.939
7	63	M	TF	L4L5 - posterolateral - protrusion	00:44	37.110
8	54	M	TF	L4L5 - posterolateral - down migration	00:34	23.871
9	42	M	TF	L4L5 - posterolateral - down migration	00:23	15.254
10	41	M	IL	L5S1 - posterolateral - extrusion	00:09	4.236
11	59	M	TF	L4L5 - posterolateral - extrusion	00:34	17.308
12	41	F	TF	L5S1 - central - extrusion	00:50	25.510
13	41	F	TF	L4L5 - central - extrusion	01:30	30.400
14	38	M	IL	L4L5 - posterolateral - down migration	00:09	13.860
15	72	M	IL	L5S1 - central - extrusion	00:06	5.115
16	32	M	TF	L4L5 - posterolateral - extrusion	00:42	31.963
17	39	F	TF	L4L5 - posterolateral - extrusion	00:35	37.490
18	37	F	TF	L5S1 - foraminal - extrusion	00:29	30.620
19	49	F	IL	L5S1 - posterolateral - extrusion	00:17	11.079
20	41	M	IL	L5S1 - posterolateral - extrusion	00:07	4.566

Abbreviations: F, female; G, gender; IL, interlaminar; M, male; mGy, milligray; n, number; sec, seconds; TF, transforaminal.

Conclusion

- Minimal invasive procedure
- Local anesthesia with/without sedation possible
- Fast recovery
- Wide indication, incl. recurrent herniations
- Extraforaminal herniations more advanced:
orientation difficult, no bony fixation of scope
- Decompression of foraminal stenosis and
discogenic pain treatment possible

