What is dualPortal Endoscopic Spine Surgery and How Does it Differ from Uniportal Endoscopic Spine Surgery

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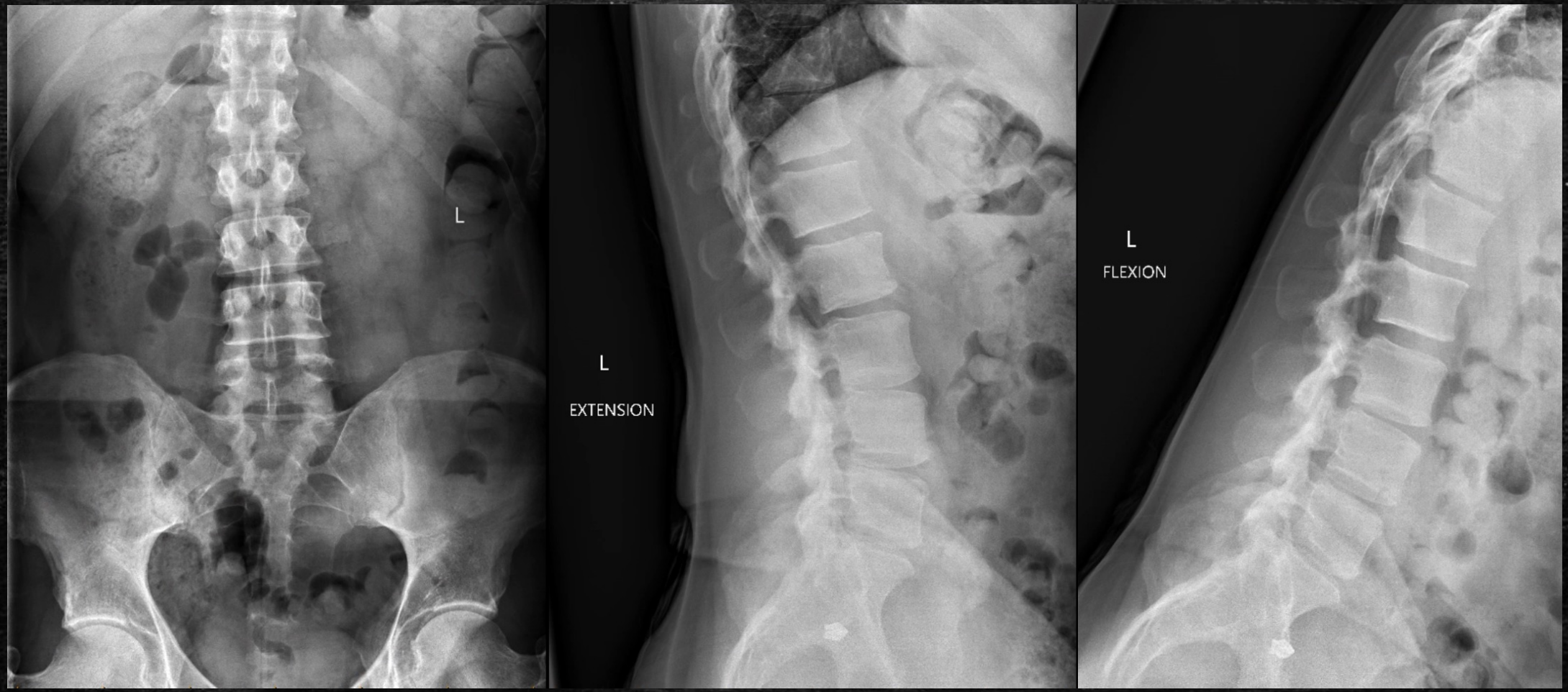
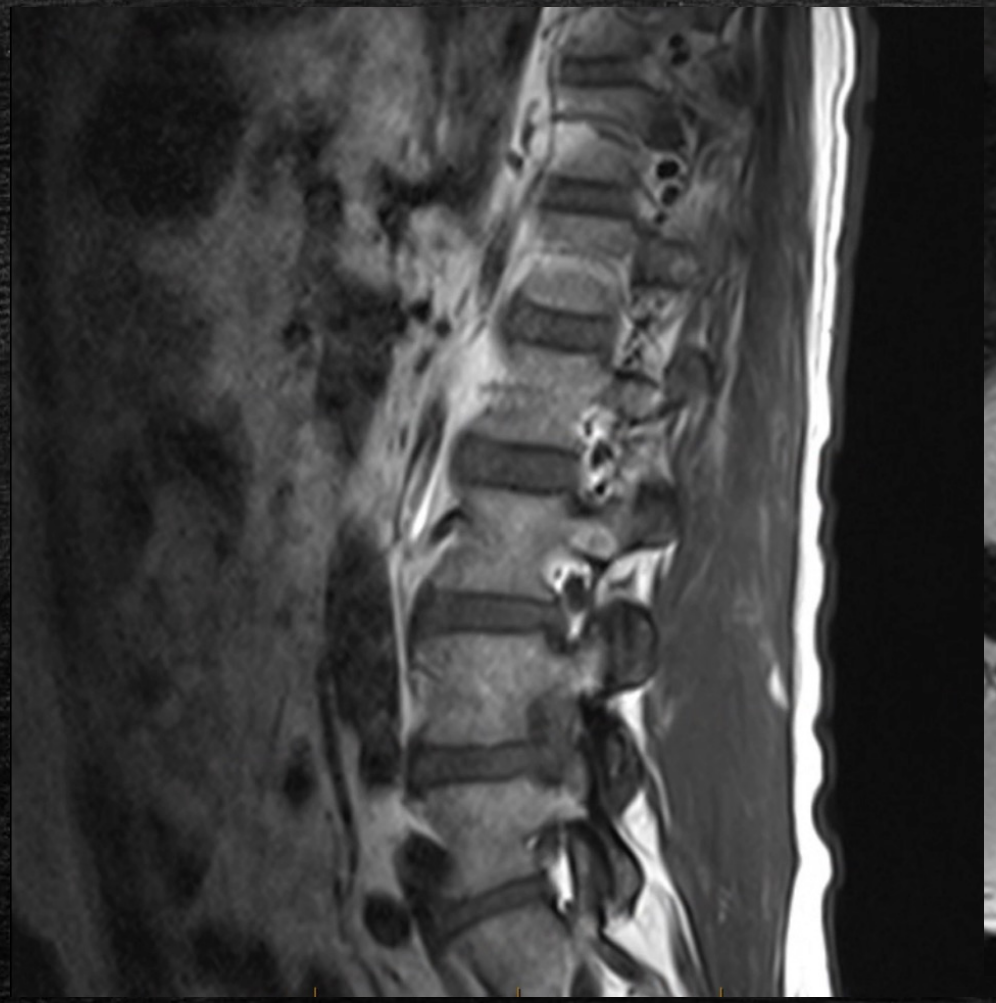
Case Example

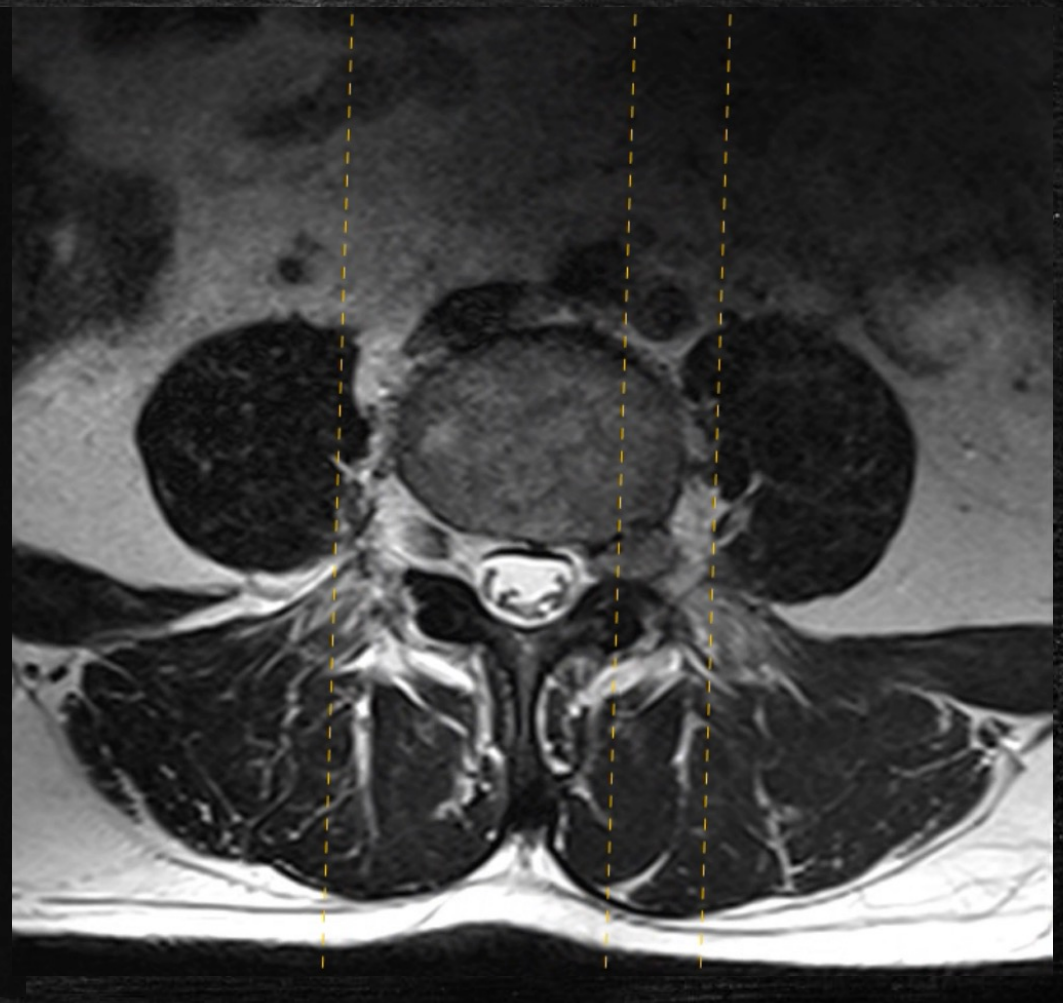
- 64 yo M
- Hx of LLE pain, L4 pattern numbness
- VAS: 7/10, 90/10 leg/back
- PMH: HTN
- Failed chiropractic care, PT, epidural injections
- Currently on Neurontin, PRN NSAIDS

Case Example



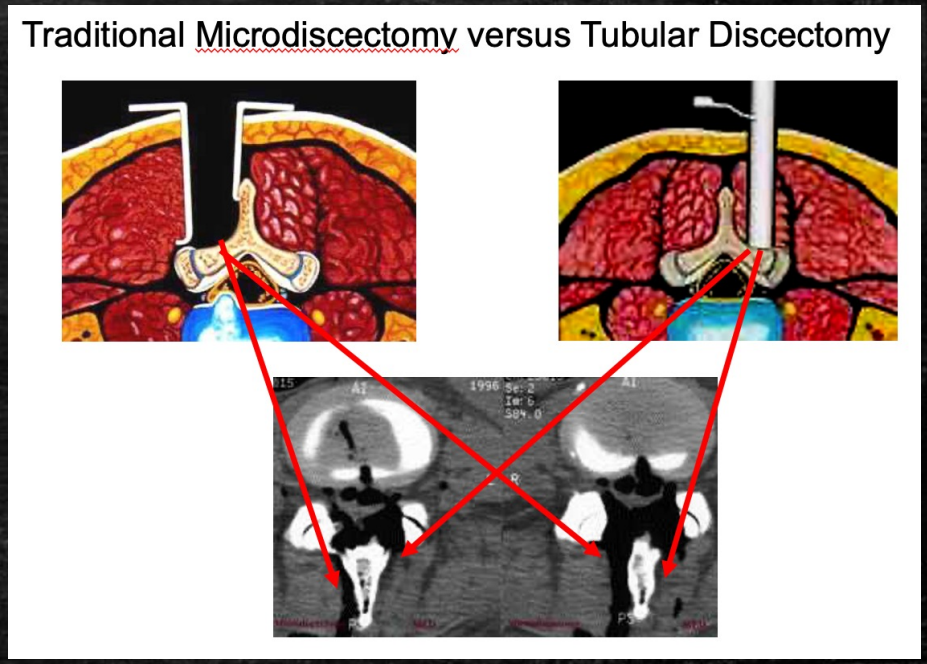
Case Example





Historical Context

- Spine surgery evolved to become less invasive
- Goals:
  - lower morbidity
  - less pain
  - faster recovery
- 1980's, John McCulloch, microdiscectomy technique with dedicated retractor system under microscope
- Richard Fessler, Kevin Foley with tubular retractor system, remains gold standard

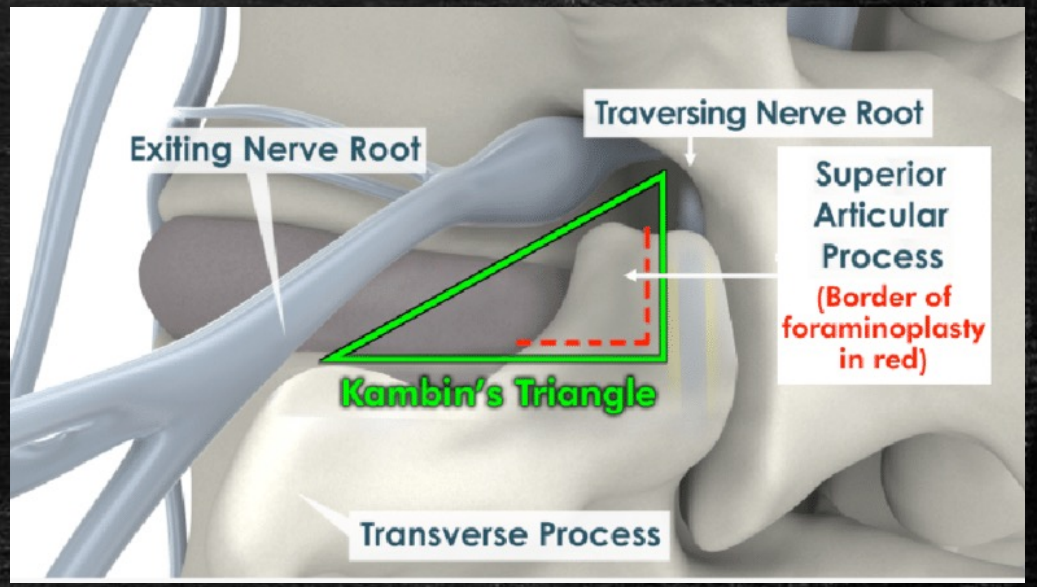


McCulloch JA. Focus issue on lumbar disc herniation: macro- and microdiscectomy. Spine. 1996;21(24 Suppl):45S–56S.

Perez-Cruet MJ, Foley KT, Isaacs RE, et al. Microendoscopic lumbar discectomy: technical note. Neurosurgery. 2002;51(5 Suppl):S129–36.

Historical Context

- Percutaneous treatments commonplace in many surgical specialties
- 1980's, P. Kambin, S. Hijikata, system of needles and cannulas to target safe entry point into spinal canal through transforaminal approach called Kambin's triangle
- Percutaneous endoscopic assisted disectomy in early 1990's



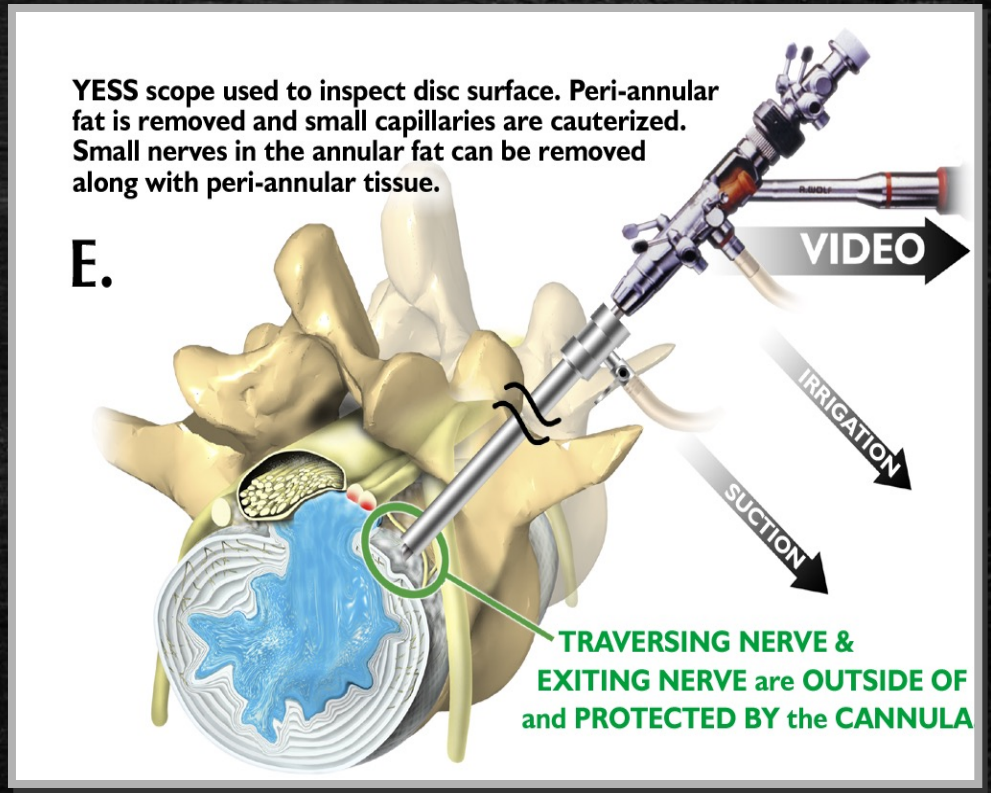
Kambin P, Sampson S. Posterolateral percutaneous suction-excision of herniated lumbar intervertebral discs. Report of interim results. Clin Orthop Relat Res. 1986;(207):37–43.

Hijikata S. Percutaneous nucleotomy. A new concept technique and 12 years' experience. Clin Orthop Relat Res. 1989;(238):9–23. doi:10.1007/BF00436774.

Kambin P. Percutaneous endoscopic discectomy. J Neurosurg. 1993;79(6):968–969.

Historical Context

- Yeung Endoscopic Spine Surgery system first fully functional endoscopic discectomy system
- Multichannel 7mm endoscope with working channel
- Dedicated dilators, reamers, instruments
- Hoogland, Ruetten, Sang-Ho Lee, etc. furthered the field

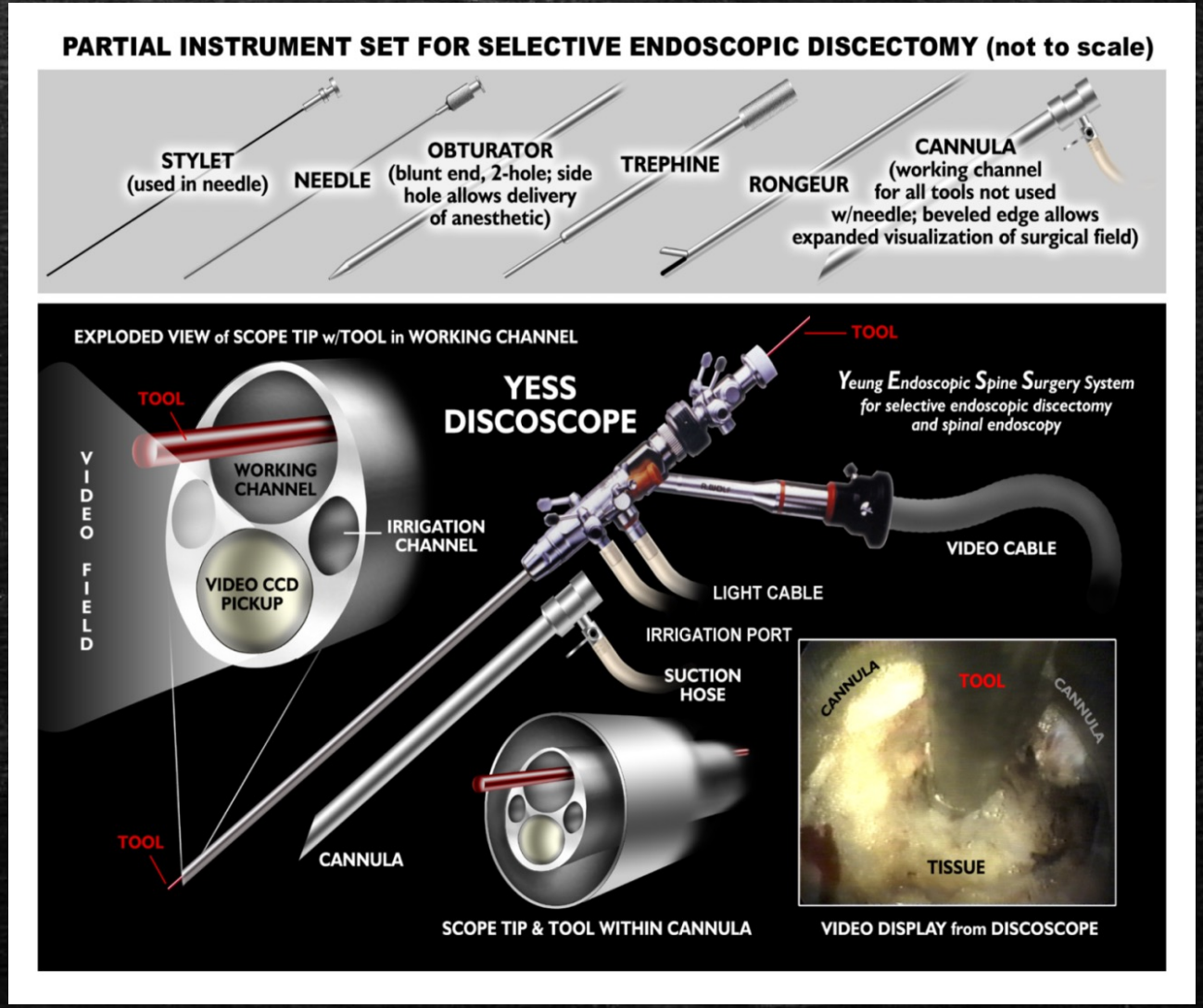


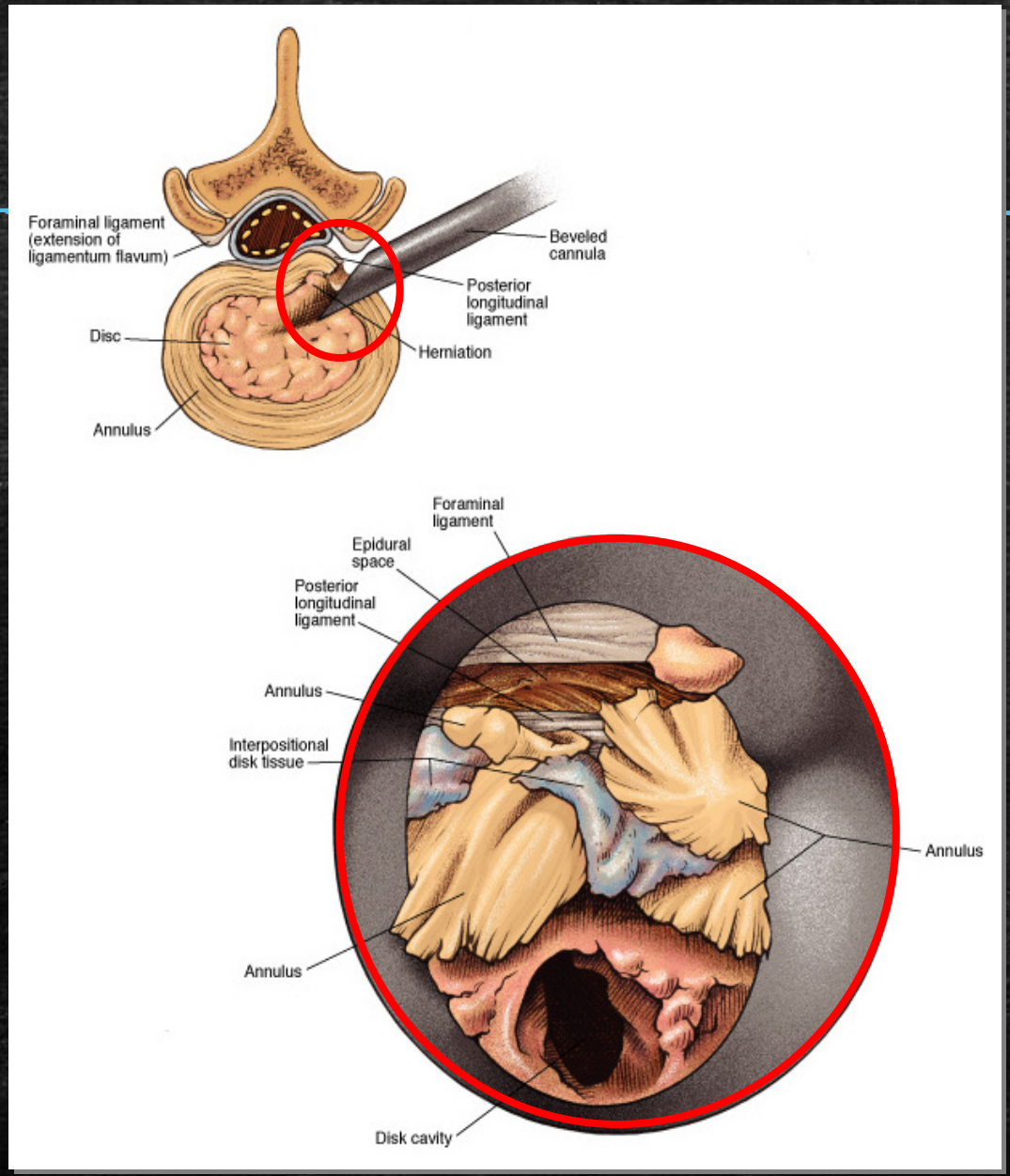
Yeung AT. Minimally invasive disc surgery with the Yeung Endoscopic Spine System (YESS). Surg Technol Int. 1999;8:267–277.

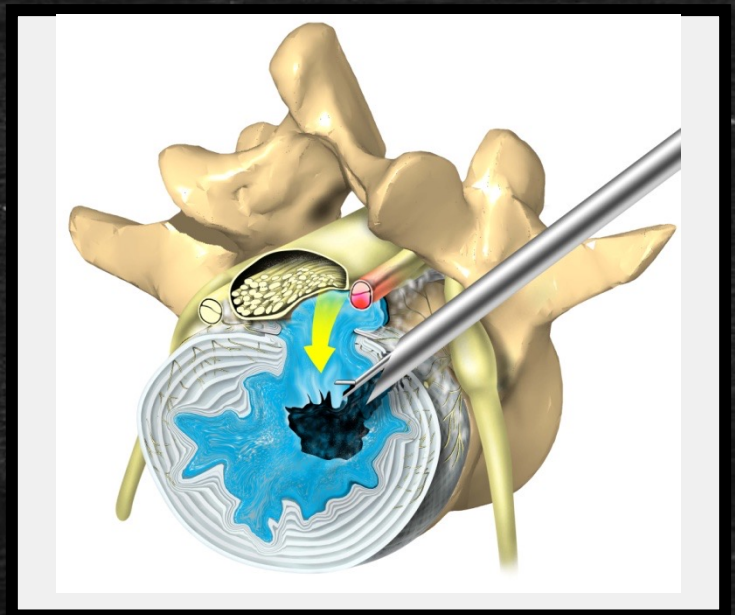
Ruetten S, Komp M, Godolias G. A New full-endoscopic technique for the interlaminar operation of lumbar disc herniations using 6-mm endoscopes: prospective 2-year results of 331 patients. Minim Invasive Neurosurg. 2006;49(2):80–87.

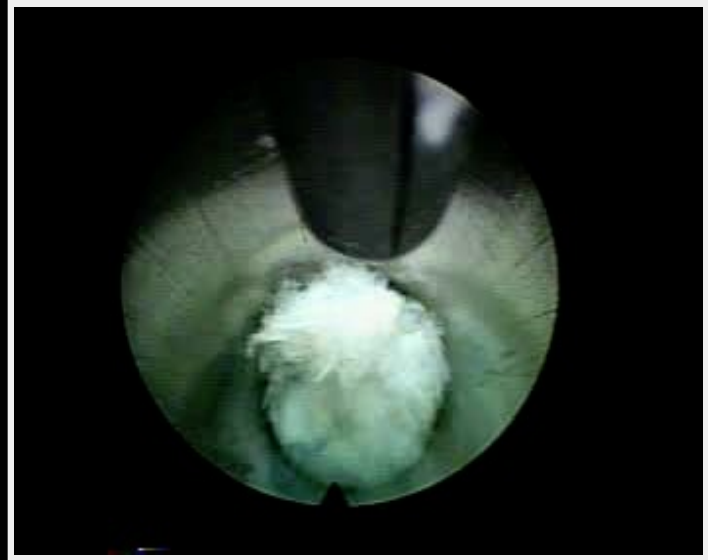
Historical Context

- Richard Wolf
- Joimax
- Storz
- Maxmore




Foraminal ligament (extension of ligamentum flavum)
Beveled cannula
Posterior longitudinal ligament
Disc
Herniation
Annulus
Foraminal ligament
Epidural space
Posterior longitudinal ligament
Annulus
Interpositional disk tissue
Annulus
Annulus
Disk cavity






PLAY

Foraminal/Extraforaminal HNP

Choi G, Lee SH, Bhanot A, Raiturker PP, Chae YS.

Percutaneous endoscopic discectomy for extraforaminal lumbar disc herniations: extraforaminal targeted fragmentectomy technique using working channel endoscope. **Spine**

- 41 pts @ 34 month F/U
- **92%** success

Jang JS, An SH, Lee SH.

Transforaminal percutaneous endoscopic discectomy in the treatment of foraminal and extraforaminal lumbar disc herniations. **J Spine Dis**

- 35 pts @ 18 month F/U
- **86%** success

Migrated Fragments

Lee SC, Kim SK, Lee SH, Kim WJ, Choi WC, Choi G, Shin SW.

Percutaneous endoscopic lumbar discectomy for migrated disc herniation: classification of disc migration and surgical approaches. **Eur Spine J.**

- 116 pts
- **91%** success

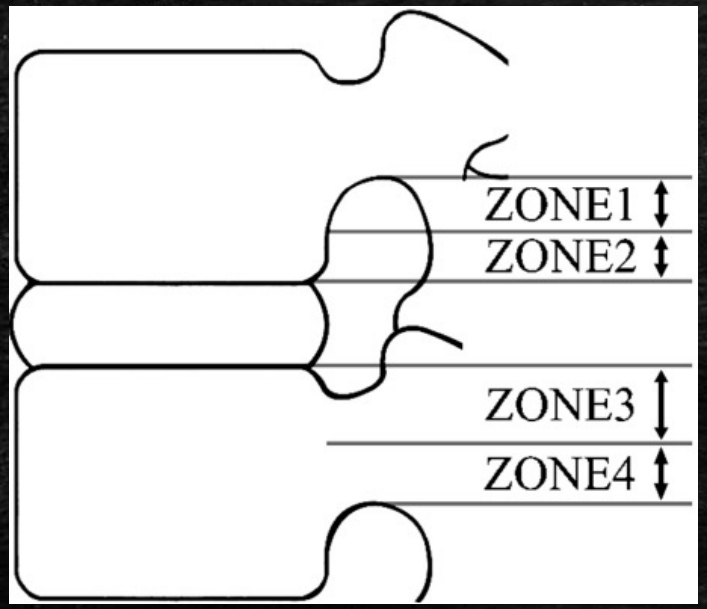


Table 2 Clinical outcome according to the Macnab criteria

Zones	Number of patient (% in each zone)				
	Excellent	Good	Fair	Poor	Total
Zone 1	0 (0.0)	3 (75.0)	1 (25.0)	0 (0.0)	4
Zone 2	3 (60.0)	[illegible]	[illegible]	0 (0.0)	5
Zone 3	39 (53.4)	32 (43.8)	1 (1.4)	[illegible]	73
Zone 4	10 (29.4)	17 (50.0)	1 (3.0)	6 (17.6)	34

Foraminoplasty

Knight MT, Goswami A, Patko JT, Buxton N.

Endoscopic foraminoplasty: a prospective study on 250 consecutive patients with independent evaluation. **J Clin Laser Med Surg**

- 250 pts @ 30 month F/U
- 6.1 years average duration of Preop pain
  - 30% had prior open surgery
- 73% clinically relevant improvement (VAS/ODI)
  - 60% good/excellent results (>50% ↓ in ODI/VAS)
- 95% required no further surgery

Knight M, Goswami A.

Management of isthmic spondylolisthesis with posterolateral endoscopic foraminal decompression. **Spine**

- 24 pts @34 month F/U
- **79%** good/excellent results (>50%↓ in ODI and VAS)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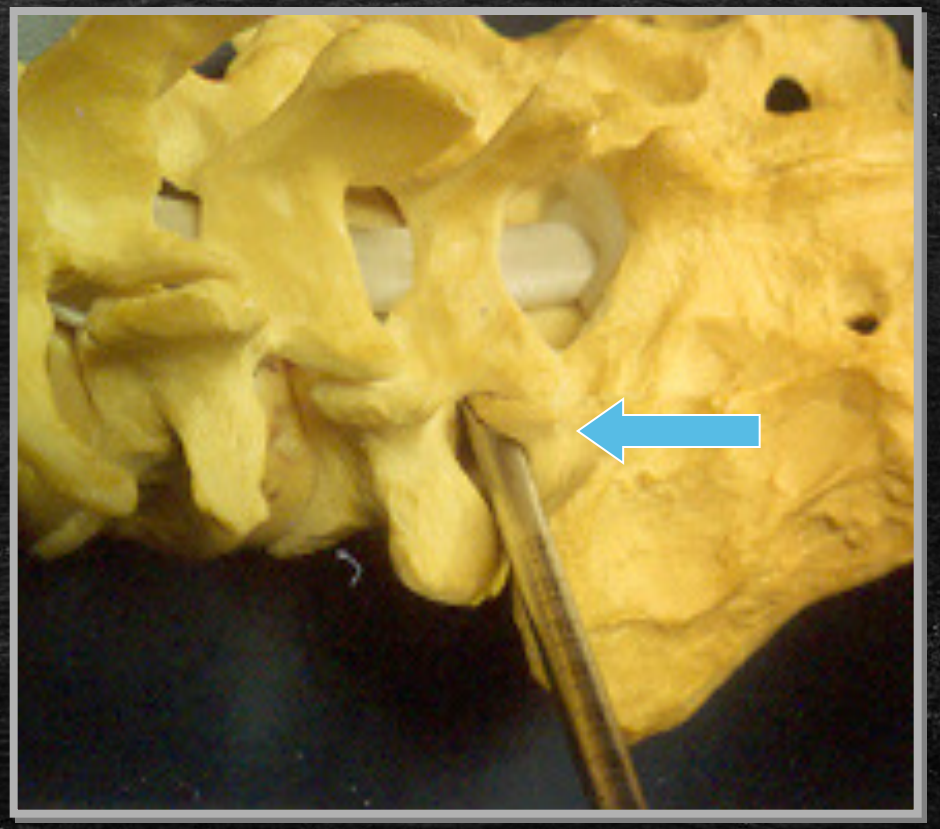
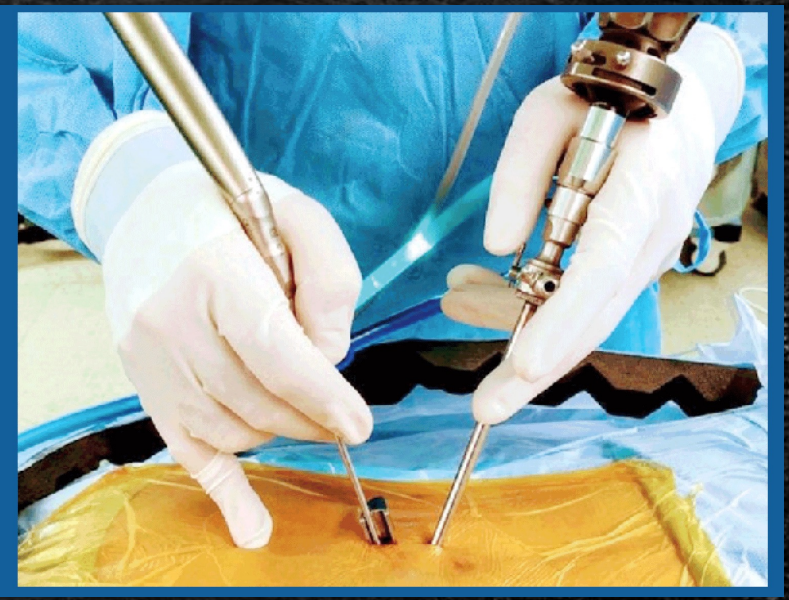


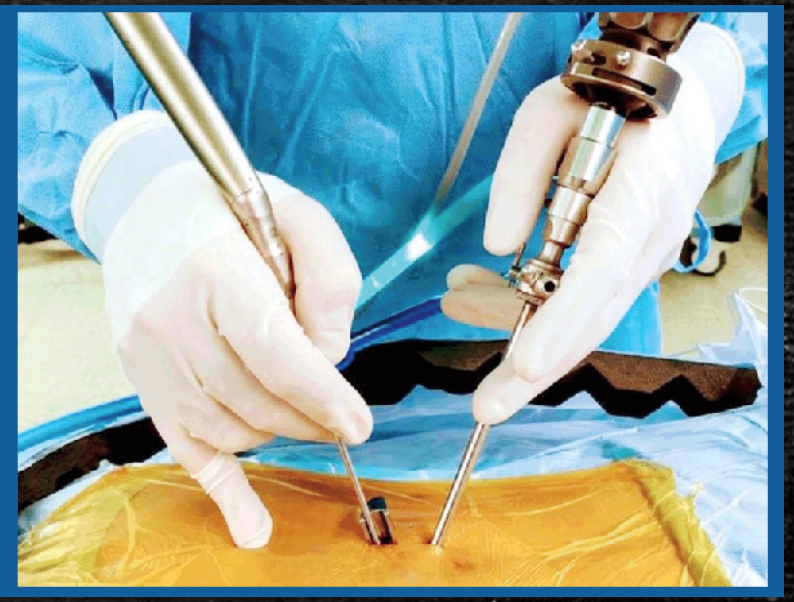
dualPortal Endoscopic Surgery

- Decouples the endoscopic camera from the surgical instruments
- Workflow similar to familiar posterior approach, lower learning curve
- Stab wound for camera portal, working portal ~7mm, smaller than current tubular approach
- Superior visualization with high definition camera and different viewing/camera angles



dualPortal Endoscopic Surgery

- Standard arthroscopic/endoscopic tower in most hospitals and ASCs can be utilized
- 7mm working portal now allows for standard, off the shelf laminectomy instruments
- Can address pathology beyond what is accessible through the foramen alone; other areas of spine
  - Lateral recess/central canal decompression
  - Unilateral approach bilateral decompression
  - Posterior lumbar interbody fusion
  - Easily converted to microscopic access if needed



Conclusions

- Both uniportal/posterolateral and dualPortal endoscopic techniques are excellent with reproducible outcomes
- Both provide the least invasive/smallest access channels and belong in "toolbox"
- dualPortal technique may be easier to adopt due to lower learning curve, lack of need for specialized equipment
- dualPortal more versatile with broader indications