# **Tubular Retractor System in Spine Surgery**



# Indications

The **tubular retractor system** is used in minimally invasive spine surgery (MISS) to access the spinal canal or neural foramen through a small corridor with muscle-splitting rather than muscle-stripping dissection. Indications include:

### **Common Indications**

- Lumbar Disc Herniation
  - 1. Microdiscectomy via tubular approach
  - 2. Especially effective for paramedian or foraminal herniations
- Lumbar Spinal Stenosis
  - 1. Unilateral or bilateral laminotomy via unilateral approach
  - 2. Lateral recess decompression
- Far Lateral Disc Herniation
  - 1. Allows targeted approach without destabilizing the spine
- Synovial Cysts
  - 1. Removal of juxtafacet cysts causing radicular compression
- Foraminotomy
  - 1. Decompression of exiting nerve root in foraminal stenosis
- Minimally Invasive TLIF (Transforaminal Lumbar Interbody Fusion)
  - 1. Access to disc space and placement of interbody cage
- Tumor Biopsy or Resection
  - 1. Intradural extramedullary or metastatic lesions (select cases)

### ${\ensuremath{\bigtriangleup}}$ Relative Indications / Consider with Caution

- Recurrent Disc Herniation
  - 1. Scar tissue may limit visualization and increase dural tear risk

### • Low-grade Spondylolisthesis

- 1. Can be used with MISS fusion techniques
- Obese Patients
  - 1. May benefit from minimal dissection but increased depth complicates angulation
- Multilevel Pathology
  - 1. Possible with expanded exposure but increased complexity

### Contraindications

- High-grade Spondylolisthesis or Instability
- Severe Deformity (e.g. scoliosis requiring osteotomy)
- Extensive Epidural Scarring (post multiple surgeries)
- Multilevel Central Stenosis with Calcified Ligamentum Flavum
- Poor visualization due to bleeding, coagulopathy, or poor anatomical landmarks

# **Summary**

The tubular retractor system is a versatile tool in MISS for degenerative, neoplastic, and some traumatic spine pathologies, offering less tissue trauma and faster recovery. However, proper case selection is critical to avoid complications and incomplete decompression.

## **Retrospective Comparative Cohort Studies**

In a retrospective cohort study Salmanian et al. <sup>1)</sup> compare the safety, effectiveness, and perioperative outcomes of Endoscopic vs. Tubular Minimally Invasive Spine Surgery in patients undergoing decompression for lumbar spinal stenosis

#### $\Box$ 1. Retrospective $\neq$ Evidence-Based

This is a retrospective single-center chart review, not a prospective trial. The authors claim superiority of one surgical technique over another based on data collected without randomization, standardized protocols, or independent assessment. Such studies are hypothesis-generating at best, not practice-changing. But the language used implies definitive clinical conclusions, which is intellectually dishonest.

□ If you start with weak design, you end with weak claims—no matter how many p-values you sprinkle in.

2. Pain Scores and P-Values: An Exercise in Overinterpretation

Yes, the endoscopic group had statistically lower immediate postoperative pain (p = 0.001), but the study fails to define the clinical relevance of that difference. There's no mention of minimal clinically important difference (MCID), no long-term follow-up, and no correlation with functional outcomes like

#### ODI or SF-36.

□ Statistical significance without clinical context is scientific smoke and mirrors.

3. Infection Rate: A Red Herring

The authors report zero infections in the endoscopic group and a 5% infection rate in the tubular group (p = 0.045). This result is statistically fragile and clinically suspect:

### Small sample size

No information about perioperative protocols

No microbiological confirmation or long-term surveillance

Most likely, this reflects operator bias or institutional noise, not technique superiority.

Absence of infection is not proof of superiority—it's just the statistical ghost of small numbers.

4. Learning Curve and Surgeon Effect Not Addressed There is no mention of surgeon experience, case distribution, or learning curves. Endoscopic spine surgery has a well-known steep learning curve. If these were senior endoscopic surgeons compared to junior tubular users, then the study is not comparing techniques—it's comparing surgeons.

U Without controlling for operator experience, this is not science—it's surgical showmanship.

 $\Box$  5. Hospital Stay: The Silent Contradiction Despite all claimed benefits (less pain, fewer infections, faster wound closure), hospital stay was statistically identical (p = 0.138). This undercuts the central thesis of "reduced burden". Either the benefits were not impactful enough to accelerate discharge, or other variables—such as discharge protocols or social factors—were more decisive.

[] If the burden isn't reduced at the discharge desk, the title belongs in the fiction section.

□ 6. Overreaching Conclusions The authors conclude that their findings "support the growing role" of endoscopic surgery. That's a marketing pitch, not a scientific conclusion. With no randomization, no long-term outcomes, and no cost-effectiveness data, the only thing this study supports is the need for proper trials.

△ This paper tries to turn a retrospective chart review into a surgical revolution—don't be fooled.

[] Final Verdict: This study is a methodologically limited, statistically inflated, and clinically premature comparison of two surgical approaches, presented with unjustified enthusiasm. It adds to the noise of spine literature, not its signal.

Rating:  $\star \Leftrightarrow \Rightarrow \Rightarrow \Rightarrow (1/5)$  — One star for effort, zero stars for scientific restraint.

#### 1)

Salmanian S, Schimmel S, Clampitt B, Toothman M, Allen P, Chose C, Carballo C, Soto-Rubio D, Kumar J, Alikhani P, Kim P. Enhanced Visualization, Reduced Burden: Endoscopic vs. Tubular Spine Surgery for Lumbar Stenosis. World Neurosurg. 2025 Jun 14:124186. doi: 10.1016/j.wneu.2025.124186. Epub ahead of print. PMID: 40523427.

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