

Endoscopic Spine Surgery for Lumbar Disc Herniation and Lumbar Spinal Stenosis: A Comprehensive Review of Surgical Techniques, Outcomes, Complications, and Socioeconomic Considerations

Mikael Klingenstierna MD, Joel Beck MD, PhD, Olof Westin MD, PhD, Adad Baranto MD, PhD.

Department of Orthopaedics, Institute of Clinical Sciences at Sahlgrenska Academy, University of Gothenburg and Sahlgrenska University Hospital, Gothenburg, Sweden.

Introduction: Lumbar disc herniation (LDH) and lumbar spinal stenosis (LSS) are common spinal pathologies causing significant morbidity. Traditional open surgeries have been an effective solution but often involves considerable tissue disruption, complications, and a prolonged recovery. Endoscopic spine surgery (ESS) has emerged as a viable alternative to conventional open procedures, offering potential advantages in terms of reduced tissue trauma, a decreased recovery time, and improved patient outcomes. This review synthesizes current knowledge on surgical techniques, outcomes, complications, and socioeconomic aspects associated with endoscopic procedures for LDH and LSS.

Methods: ESS techniques for LDH typically involve accessing the LDH through a minimal incision while using specialized endoscopic instruments. For LSS, decompression of the spinal canal can be achieved through various endoscopic approaches, including posterior laminotomy or a lateral foraminotomy.

Results and Prognosis: RCTs and PROMs have consistently demonstrated favourable outcomes following endoscopic procedures for LDH and LSS, including significant improvements for back and leg pain, physical function and quality of life when compared to conventional open procedures. While ESS is associated with a lower complication rate compared to open surgery, potential risks include nerve injury, infection, dural tears, and iatrogenic postoperative spinal instability.

ESS offers potential cost savings compared to traditional open surgery due to shorter hospital stays, less complications, and a faster return to work. A faster recovery time enables an earlier return to activities and sports when compared to open procedures. This accelerated rehabilitation can have positive socioeconomic implications, including reduced disability and healthcare utilization.

Conclusion: ESS represents a promising option for the management of LDH and LSS, offering comparable or superior outcomes to traditional open surgeries with fewer complications and a faster post-operative recovery.

References:

1. Choi G, Lee SH, Raiturker PP, Lee S, Chae YS. Percutaneous endoscopic interlaminar discectomy for intracanalicular disc herniations at L5-S1 using a rigid working channel endoscope. *Neurosurgery*. 2006;58(1 Suppl):ONS59-68; discussion ONS59-68.
2. Ruetten S, Komp M, Merk H, Godolias G. Full-endoscopic interlaminar and transforaminal lumbar discectomy versus conventional microsurgical technique: a prospective, randomized, controlled study. *Spine (Phila Pa 1976)*. 2008;33(9):931-939.
3. Ahn Y, Lee SH, Park WM, Lee HY, Shin SW, Kang HY. Percutaneous endoscopic lumbar discectomy for recurrent disc herniation: surgical technique, outcome, and prognostic factors of 43 consecutive cases. *Spine (Phila Pa 1976)*. 2004;29(16):E326-332.

4. Kamper SJ, Ostelo RW, Rubinstein SM, Nellensteijn JM, Peul WC, Arts MP, van Tulder MW. Minimally invasive surgery for lumbar disc herniation: a systematic review and meta-analysis. *Eur Spine J.* 2014;23(5):1021-1043.
5. Successful Introduction of Full-Endoscopic Lumbar Interlaminar Discectomy in Sweden. Beck J, Westin O, Klingenstierna M, Baranto A. *Int J Spine Surg* 2020;14(4):563-570.
6. Full-Endoscopic Lumbar Discectomy vs Standard Discectomy: A Noninferiority Study on Clinically Relevant Changes. Beck J, Westin O, Klingenstierna M, Baranto A. *Int J Spine Surg.* 2023 Jun 14:8458. doi: 10.14444/8458.