



## Minimal Invasive Spine Transforaminal Lumbar Interbody Fusion Outcome (MIS-TLIF) : Technique and Results

### KEYWORDS

Minimally invasive, Transforaminal, Fusion

**Dr Vipin Garg**

12 saraswati nagar, university road, thatipur, gwalior 474011

**ABSTRACT** *introduction: A minimally invasive transforaminal lumbar interbody fusion (MIS TLIF) has recently been introduced. However, MIS TLIF is a technically challenging procedure.*

*Methods: Twenty patients were treated by MIS TLIF. Perioperative and clinical outcomes were assessed. Clinical outcomes were assessed using Oswestry Disability Index (ODI) and Visual Analogue Scores (VAS).*

*Conclusion: MIS TLIF achieved good clinical outcomes. Our findings show that MIS TLIF performed with a single interbody cage and a tubular retractor system can be used as a standard MIS TLIF technique.*

### Introduction

A transforaminal lumbar interbody fusion (TLIF) is a surgical procedure that stabilizes the spine and reduces back and leg pain by joining two or more vertebral bones to prevent abnormal movement.

Minimally invasive spine surgery is performed through small incisions in the back and uses intraoperative X-ray, microscope, tubular retractors, and special instruments to avoid extensive damage to the back muscles.

Minimally invasive surgery has many advantages over traditional (or open) spine surgery that include smaller incisions, less surgical blood loss, smaller scars, a shorter hospital stay, less pain during recovery, and a faster return to work and daily activities.

### Aims & Objectives

To evaluate the results of 20 minimal invasive transforaminal lumbar interbody fusion (MIS-TLIF) in terms of efficacy in Primary cases.

### Material and Method

- 20 consecutive patients were treated with MIS-TLIF for degenerative spondylolisthesis with canal stenosis
- All patients had preoperative dynamic Xrays and MRI (Magnetic Resonance Imaging)
- Operated by a single surgeon using SEXTANT percutaneous screw system along with METRX tubular system (Medtronic Inc; Memphis, TN).
- The results were evaluated using VAS (Visual Analog Score 0 to 10) for back and leg pain and ODI (Oswestry Disability Index) preoperatively and postoperatively VAS at discharge and suture removal and VAS with ODI at 6 weeks, 3 months and 6 months.
- Surgical Technique
- The surgery is performed utilizing general anesthesia. A breathing tube (endotracheal tube) is placed and the patient breathes using a ventilator during the surgery. Preoperative intravenous antibiotics are given. Patients are positioned in the prone (lying on the stomach) position, generally using a special operating table/bed with special padding and supports. The surgical region (low back area) is cleansed with a special cleaning solution. Sterile drapes are placed, and the surgical team wears sterile surgical attire such as

gowns and gloves to maintain a bacteria-free environment.

- A 1 inch (depending on the number of levels) poke-hole incision is made on each side of the low back, directly over the involved spinal levels. The fascia and muscle is gently divided using special cannulated retractors and sleeves. The pedicle screws and rods are implanted. A partial laminectomy (removal of lamina portion of bone) and complete facetectomy is performed to allow visualization and removal of the intervertebral disc. The intervertebral disc is then removed using special biting and grasping instruments (such as a pituitary rongeur, Kerrison rongeur, and curettes), an operating microscope, and x-ray guidance. Special distractor instruments are used to restore the normal height of the disc, as well as to determine the appropriate size spacer to be placed. A bone spacer (metal or plastic spacers may also be used) is then carefully placed in the disc space with autogenous bone graft.
- The wound areas are usually washed out with sterile water containing antibiotics. The deep fascial layer and subcutaneous layers are closed with one or two sutures. The skin can usually be closed using special surgical glue, leaving a minimal scar and requiring no bandage.

### Results

- The mean age of the patients was 61.4  $\pm$  11.8 years (range 31-82 years) with 48% male and 52% female patients.
- The mean VAS scale for back and leg pain improved from 7.596  $\pm$  0.832 to 2.545  $\pm$  1.288.
- The mean ODI improved from 0.692  $\pm$  0.108 to 0.239  $\pm$  0.134.
- The mean operative time was 211.9  $\pm$  44.4 minutes.
- The mean blood loss was 175  $\pm$  143.6 ml.

One patient had a cage back-out and underwent revision surgery.

### Conclusion

- Minimal invasive surgery in FBSS leads to adequate and safe neural decompression despite distorted anatomy from previous surgery.
- Preservation of midline spinal structures.
- In our experience MIS-TLIF benefits patients with medical co-morbidities by early mobilisation, less

blood loss, early postoperative recovery and improved quality of life, and also good cosmesis.



Preop x ray



preop MRI



intraop



Postop x ray -AP



postop x ray-lateral

## References

- Antonio Tsahtsarlis , Martin Wood (2012) Minimally invasive transforaminal lumbar interbody fusion and degenerative lumbar spine disease. *Eur Spine J* 21 : 2300–2305
- Ali Habib, Zachary A. Smith, Cort D. Lawton, and Richard G. Fessler (2012) Minimally Invasive Transforaminal Lumbar Interbody Fusion : A Perspective on Current Evidence and Clinical Knowledge. Hindawi Publishing Corporation : Minimally Invasive Surgery Volume 2012, Article ID 657342
- Kong Hwee Lee, Wai Mun Yue, William Yeo, Henry Soeharno, Seang Beng Tan (2012) Clinical and radiological outcomes of open versus minimally invasive transforaminal lumbar interbody fusion. *Eur Spine J* 21:2265–2270
- Chang Kyu Lee, M.D., Jeong Yoon Park, M.D., Ho Yeol Zhang, M.D., Ph.D. (2010) Minimally Invasive Transforaminal Lumbar Interbody Fusion Using a Single Interbody Cage and a Tubular Retraction System : Technical Tips, and Perioperative, Radiologic and Clinical Outcomes. *J Korean Neurosurg Soc* 48 : 219-224, 2010
- Sang- Hyuk Min, Myung -Ho Kim, Joong- Bae Seo, Jee -Young Lee, Dae-Hee Lee (2009) The Quantitative Analysis of Back Muscle Degeneration after Posterior Lumbar Fusion: Comparison of Minimally Invasive and Conventional Open Surgery. *Asian Spine Journal* Vol. 3, No. 2, pp 89-95
- Foley KT, Simon DA, Rampersaud YR: Virtual fluoroscopy. *Op Tech Orthop* 10:77–81, 2000
- Foley KT, Simon DA, Rampersaud YR: Virtual fluoroscopy:computer-assisted fluoroscopic navigation. *Spine* 26:347–351,2001 *Neurosurgical Focus / Volume 10 / April, 2001*
- Foley KT, Smith MM: Microendoscopic discectomy. *TechNeurosurg* 3:301–307, 1997
- Gaines RW: The use of pedicle-screw internal fixation for the operative treatment of spinal disorders. *J Bone Joint Surg Am* 82-A:1458–1476, 2000
- Lowery GL, Kulkarni SS: Posterior percutaneous spine instrumentation. *Eur Spine J* 9 (Suppl 1):S126–S130, 2000
- Magerl F: External skeletal fixation of the lower thoracic and the lumbar spine, in Uhthoff HK, Stahl E (eds): *Current Concepts of External Fixation of Fractures*. New York: Springer-Verlag, 1982, pp 353–366