

## **Transforaminal Full-Endoscopic Decompression Surgery for Lateral Recess Stenosis: Mid-Term Results and Factors Associated with Poor Outcome**

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### **INTRODUCTION:**

Full-endoscopic spine surgery (FESS) has been established as surgery for herniated nucleus pulposus. It is a minimally invasive surgery that can be performed under local anesthesia with only 8-mm skin incision. By virtue of improvements in surgical equipment such as high-speed drill, the indications for FESS have expanded to lumbar spinal stenosis. We perform transforaminal full-endoscopic ventral facetectomy (TF-FEVF) for unilateral nerve root-type lateral recess stenosis (LRS) using a transforaminal approach under local anesthesia. This technique is especially useful for elderly patients and those with many complications because it can be performed under local anesthesia. Surgical procedure was below, cannula was placed outside the disc (Fig1-A), the superior articular process (SAP) at 12 o'clock and the blue-tinted disc at 6 o'clock can be observed (Fig1-B). The entire SAP and the ventral part of the inferior articular process were removed (Fig1-C), surgery was considered complete when the ligamentum flavum on the traversing nerve was removed, adequately decompressed, and the beating of the traversing nerve was confirmed (Fig1-D. E). Good results have been reported, but no studies have identified poor performance factors.

Purpose of this study was to examine the postoperative results of TF-FEVF for LRS and to elucidate the factors associated with poor surgical outcome.

### **METHODS:**

**PATIENT SAMPLE:** 85 patients who underwent TF-FEVF for LRS under local anesthesia.

**OUTCOME MEASURES:** Clinical outcome score by leg pain visual analogue score (VAS), low back pain VAS, numbness and modified MacNab criteria and results of preoperative image findings (magnetic resonance imaging (MRI), computed tomography (CT) and flexion-extension radiographs).

**METHODS:** This study involved 85 patients (47 male) who underwent FEVF for LRS. Mean age was 70.5 years and mean follow-up duration was 14.8 months. Data were collected on sex, age, surgical level, diagnosis, history of spinal surgery at the same level, and duration of follow up. Diagnosis was categorized as lumbar spinal stenosis with or without disc bulging. Clinical evaluation was performed using the leg pain VAS, low back pain VAS, numbness and modified MacNab criteria. MRI was used to evaluate the degree of disc degeneration, vertebral endplate degeneration, disc height, thickening of the ligamentum flavum, and stenosis. Bony stenosis was evaluated using CT. We also measured sagittal translation and sagittal angulation on flexion-extension radiographs and the Cobb angle using a standing front view radiograph. Using the modified MacNab criteria, we compared all variables between patients with excellent/good outcome (E/G group) and those with fair/poor outcome (F/P group).

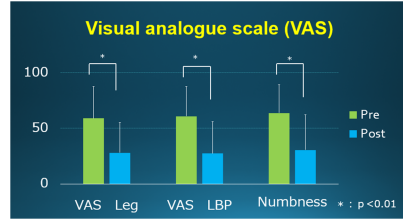
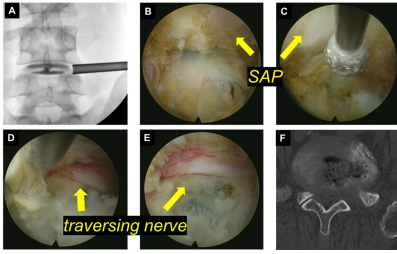
### **RESULTS:**

Postoperatively, leg pain VAS (pre:59.0 post: 27.9  $P<0.01$ ), low back pain VAS (pre:60.7 post: 27.3  $P<0.01$ ), and numbness (pre:63.7 post:30.4  $P<0.01$ ) were significantly improved at the final follow up (Fig2). According to the modified MacNab criteria, the outcome at the final follow up was excellent in 39 cases, good in 21, fair in 13, and poor in 12. In a comparison of the 60 cases (70.6%) in the E/G group and the 25 cases in the F/P group (29.4%), there was no significant difference in sex, age, diagnosis, history of spinal surgery, or duration of follow up. Imaging evaluation revealed statistically significant differences in sagittal angulation ( $4.3^\circ$  vs.  $8.1^\circ$ ,  $P<0.05$ ), sagittal translation (0.7 mm vs. 1.6 mm,  $P<0.05$ ), and Cobb angle ( $-0.5^\circ$  vs.  $-1.9^\circ$ ,  $P<0.05$ ) between the E/G group and the F/P group (Fig3).

### **DISCUSSION AND CONCLUSION:**

TF-FEVF is a minimally invasive decompression surgery for lateral recess stenosis that can be performed under local anesthesia.

Mid-term results of TF-FEVF were generally favorable. Factors associated with poor outcome of TF-FEVF were large sagittal angulation, large sagittal translation, and concave side.



### Results of comparative study Excellent/Good(60) vs Fair/Poor(25)

	Excellent/Good (60)	Fair/Poor (25)	p
LF width (mm)	9.1 ± 3.6	9.1 ± 3.5	0.979
LF length (mm)	20.1 ± 3.2	19.2 ± 3.8	0.186
LF width/length(%)	25.6 ± 8.4	26.8 ± 8.9	0.625
Intervertebral angle at flexion(°)	3.2 ± 3.9	0.4 ± 6.4	0.015
Intervertebral angle at extension(°)	7.5 ± 4.7	8.6 ± 5.3	0.422
sagittal angulation(°)	4.3 ± 3.9	8.1 ± 5.2	0.006
slip at flexion (mm)	0.9 ± 2.6	2.8 ± 4.2	0.040
slip at extension (mm)	0.3 ± 2.4	1.1 ± 3.0	0.156
sagittal translation (mm)	0.7 ± 1.1	1.6 ± 2.0	0.017
Anterior disc height(mm)	9.6 ± 2.9	9.2 ± 3.5	0.606
Posterior disc height(mm)	5.6 ± 2.2	5.9 ± 3.9	0.475
Cobb-angle(°)	0.6 ± 2.4	1.9 ± 3.1	0.010
Vertebra-SAP distance	3.4 ± 1.3	3.5 ± 1.5	0.607

LF: ligament flava