

# **Outpatient minimally invasive endoscopic decompression surgery without instrumentation performed on a patient with lumbar spinal stenosis associated with spondylolisthesis: A 16 month follow-up case study.**

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## **INTRODUCTION**

Degenerative spondylolisthesis is the slippage forward of one lumbar vertebra on another. It rarely occurs before the age of 50 years and most commonly occurs at the L4-L5 level (1). Degenerative spondylolisthesis is generally asymptomatic, but it can be associated with symptomatic spinal stenosis (2).

Spinal stenosis, the most common reason for lumbar surgery in adults over the age of 65, is a narrowing of the spinal canal with compression on the neural structures. Patients typically present with neurogenic claudication, pain in the buttocks or legs with walking or standing that resolves with sitting or lumbar flexion. However, spinal stenosis is frequently detected by imaging studies in asymptomatic patients; thus, clinical correlation between symptoms and imaging is critical (3).

Several studies have compared surgical techniques with degenerative spondylolisthesis; however many of these studies involved instrumentation (4-6). The objective of this case study was to assess the feasibility and efficacy of treating spondylolisthesis related spinal stenosis via a minimally invasive outpatient approach that does not involve instrumentation in hopes of determining the optimal treatment strategy for symptomatic degenerative spondylolisthesis.

## **METHODS**

Informed consent was obtained from the study participant.

This patient underwent pre- and 16 month postoperative flexion-extension imaging studies reviewed by independent radiologists blinded to the clinical results and unaffiliated with the operating institution for evidence of instability and/or progression of spondylolisthesis.

Similarly, the patient completed a pre-operative and 16 month post operative outcome survey which included the visual analog scale (VAS), the 36 item short-form general health survey questionnaire (SF-36) and the Oswestry disability index (ODI). The VAS scores range from 0 to 10, with the lower scores indicating less severe symptoms; the SF-36 scores range from 0 to 100, with higher scores indicating less severe symptoms; and the ODI ranges from 0 to 100, with the lower scores indicating less severe symptoms.

## CASE REPORT

A 60 year old male presented with progressive exacerbation of symptoms of low back pain and leg weakness. The symptoms began 5.5 years prior to surgical treatment with a gradual onset of pain that progressively got worse over time. The patient denied any injury or trauma pertaining to that particular time when the pain started to occur. Associated symptoms include bilateral back pain, bilateral leg pain, bilateral buttock pain, bilateral leg weakness and bilateral numbness and tingling. The patient stated that the pain was aggravated by standing or walking and that sitting or lying down decreased the pain. This progressive pain and weakness decreased his ability to exercise and greatly decreased his quality of life. Treatments in the past included 6 to 8 weeks of physical therapy without significant relief.

An MRI scan was recommended from the patient's primary care physician. MRI findings showed severe spinal stenosis at L4-L5 (Picture 1) and Grade 1 spondylolisthesis at L4-L5 (Picture 2). He went to a local orthopedic surgeon and was offered an open posterior laminectomy and fusion at the L4-L5 level. Seeking an alternative opinion, the primary care physician recommended another surgeon which also recommended a fusion. Patient was hesitant to have major open back surgery and decided on an outpatient minimally invasive endoscopic surgery that did not involve hardware implantation. The patient underwent an outpatient right endoscopic L4-L5 laminotomy/foraminotomy with thermal ablation of the facets bilateral at L3-L4, L5-S1 and SI joints as well as left sided facet ablation at L4-L5.

The patient tolerated the procedure well, was transferred to the recovery room via stretcher awake in stable condition and was released 2 hours post surgery. There were no complications.

## RESULTS

The same day, after surgery, the patient was up and walking and reported complete resolution of radicular pain, tingling, burning and weakness. In addition, 16 months after the procedure, upon independent review of repeat flexion/extension films, there was no change in the degree of spondylolisthesis. The patient also reported that the back pain and leg weakness has not returned, and that he has been able to start exercising regularly and has lost considerable weight.

As seen below in Table 1, there was significant VAS and ODI improvements seen at 16 months post surgery. The VAS improved from 6.3 to 1.5, and the ODI improved from 40.0 to 0.0

Similarly, as seen in Table 2, there was significant improvements seen in the physical function, physical limitation and bodily pain SF-36 metrics at 16 months post surgery.

## DISCUSSION

Many authors have challenged the traditional treatment of spinal stenosis in which wide laminectomy/facetectomy with or without instrumentation are performed (7-12). Although the goal of minimally invasive procedures without the use of instrumentation is to reduce post operative pain and disability, the issue of postoperative spondylolisthesis remains.

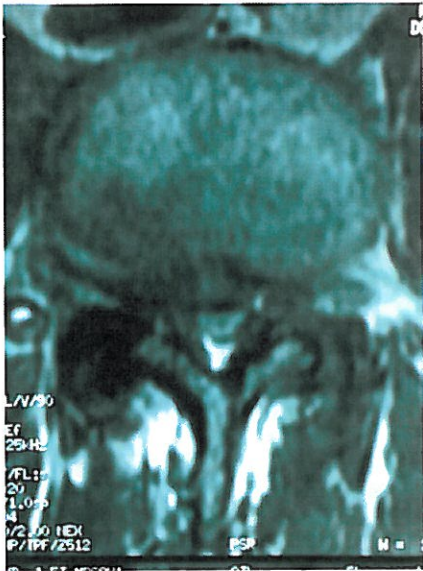
Spondylolisthesis has been regarded as a contraindication to decompression surgery, with many authors believing that concomitant fusion is indicated (6,7,13,14). In this case, not only did increased instability not occur (Pictures 3 and 4), there was complete resolution of pain and disability as seen in the VAS, ODI and SF-36 seen 16 months post surgery. Similar results were reported by Palmer et al. (15). In this study, eight consecutive patients with spinal stenosis and grade 1 spondylolisthesis underwent bilateral decompression via a similar minimally invasive outpatient approach. The mean preoperative VAS pain score was 7.6, and the average postoperative pain score was 2.

## CONCLUSION

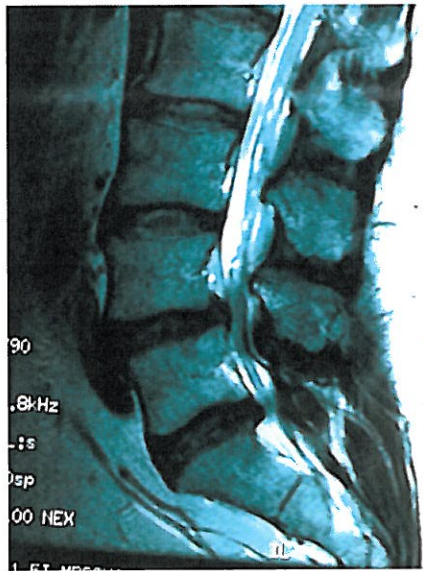
Our results demonstrate the feasibility of performing outpatient minimally invasive endoscopic decompression for spinal stenosis associated with degenerative spondylolisthesis. The maintained stability observed may be the result of increased preservation of the normal ligamentous and muscular architecture with the minimally invasive procedure. Although this is only a single case study, the lack of increased instability validates the investigation into a larger study which the authors are currently pursuing.

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Picture 1 showing severe spinal Stenosis L4-5.



Picture 2 showing spondylolisthesis L4-5.

Table 1. VAS and ODI Patient Outcomes

	Pre-operative	16 month post-operative
VAS	6.3	1.5
ODI	40.0	0.0

Table 2. SF-36 Patient Outcomes

	Pre-operative	16 month post-operative
Physical Function	44.4	88.9
Physical Limitation	25.0	100.0
Bodily Pain	45.0	90.0
Mental Well Being	88.0	84.0



Picture 3 Flex x-ray dated 6/2007



Picture 4 Flex x-ray dated 2/2009