

# Instrumented Versus Non-instrumented Minimally Invasive Lumbar Fusion: Using Facet Joint Morphometric Analysis to Facilitate Decision-Making

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#### Introduction

Low back pain (LBP) is a common reason for seeking help from a physician. Despite the understanding of facet pathomorphology, few studies have shown how pre-operative morphometric facet analysis can be used to decide whether decompression versus decompression with instrumented fusion is necessary. Currently many surgeons use the flexion extension plain radiograph to help make this decision. This study analyzes the efficacy of pre-operative facet pathomorphology to decide the optimal surgical approach.

## Methods

Included 119 patients (58M, mean age 61) with various degenerative abnormalities of the spine (i.e., stenosis, neural claudication, spondylolisthesis, retrolisthesis, etc.) who underwent minimally invasive decompression with or without minimally invasive instrumented fusion.

Morphometric data was gathered from pre -operative MRIs and CTs of the lumbosacral spine and analyzed in terms of facet morphology, disease presentation, and severity of progression. Bilateral superior and inferior facets were measured for length and area; total area was also taken for the joint bilaterally. Nonoperative level facets were used for controls.



Images showing normal facet morphology versus elongation of the facets typically seen with

subluxation from spondylolisthesis.



## Results

Facet length and area were found to be significantly longer (2.6 +/- 0.4 cm) than controls (1.6 +/- 0.3 cm) for those patients who required decompression with instrumented fusion, compared to those who required decompression without instrumented fusion. Patients who received decompression without instrumented fusion showed facet levels that were markedly similar to normal levels, showing very little hypertrophy.

### Conclusions

Data in this study suggest that patients with elongated facets are appropriate indication for choosing decompression with instrumented fusion. Whereas those patient with facet morphology similar to non-surgical control level can be managed with decompression alone. Thus preoperative facet analysis can add additional decision making information aside from plain flexion extension radiographs. Images showing facet morphology used to determine approach: MIS laminectomy vs MIS TLIF.











Use of BoneBac Press (Thompson MIS, Salem, NH) to collect autograph from surgical site used in MIS laminectomy or TLIF.



MIS laminectomy preformed with hypertrophied, nonelongated facets.



pre and post-operative images at MIS TLIF preformed with elongated facets.



Unique design of implant allows for easy reduction of spondylolisthesis using percutaneous reduction screws



rade 2 spondylolisthesis with prior open laminecto



Pre-op and post-op plane radiographs

