

## TWO YEAR OUTCOME OF POSTERIOR MINIMALLY INVASIVE FUSION COMPARED TO OPEN FUSION FOR LOW GRADE SPONDYLOLISTHESIS.

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**INTRODUCTION:** The utility of Minimally Invasive Spine Fusion (MIS) remains controversial. Comparative evidence is lacking and limited cases series are often fraught with a wide variety of biases such as heterogeneous diagnoses and surgical techniques. Although growing in popularity among spine surgeons, within the spine industry and often perceived by patients as better, the equivalence or superiority of clinical outcomes for MIS fusion compared to open procedures has not been proven. **Objective:** The primary objective of this study was to compare patient reported outcomes (PRO) following MIS or Open fusion for low-grade spondylolisthesis. **METHODS:** A retrospective, multicenter cohort study was performed. One level instrumented fusions for low grade (I-II) spondylolisthesis from 6 centers, using either a posterior MIS (4 centers: TLIF-n=82) or Open technique (4 centers: Open TLIF-n=49 / posterolateral fusion (PSF)-n=104) with a baseline and minimum of 2 year follow-up ODI were included. Primary analysis utilized linear regression modeling to compare the pre to postoperative change in ODI as well as the number of individuals reaching minimum clinically important difference (MCID) and the substantial clinical benefit (SCB) at two years. **RESULTS:** Both groups demonstrated significant improvement in ODI (MIS – 46.6 to 20.7%; Open – 49.9 to 30.7%). Significantly more patients in the MIS compared to the Open group ( $p < 0.01$ ) reached MCID (80.5 vs. 62.1%) and SCB (68.3% vs. 47.1%). Adjusting for age, sex and baseline ODI, linear regression modeling demonstrated that MIS fusion ( $p = 0.002$ ) and baseline ODI ( $p < 0.0001$ ) were significant predictors of an improved outcome. MIS fusion patients were three times more likely to reach MCID ( $p=0.001$ ; OR=3.4; 95% CI = 1.6-7.2) and SCB ( $p=0.0004$ ; OR=3.3; 95% CI = 1.7-6.3). Multivariable comparisons between MIS vs. PSF or MIS vs. Open TLIF demonstrated similar findings for MCID and SCB. Comparison between Open TLIF and PSF showed no difference ( $p=0.79$  for MCID and  $p=0.45$  for SCB). Compared to the MIS group, the Open group had significantly more blood loss (MIS-292ml; Open-456ml;  $p < 0.0001$ ). **CONCLUSIONS:** The MIS and open posterior fusion techniques are both effective for the surgical treatment of low-grade spondylolisthesis. In this multicenter cohort study, the posterior MIS technique independently demonstrated superior outcomes at 2 years postoperatively compared to open posterior fusion for spondylolisthesis. The major strengths of this study include a homogenous diagnosis, single level procedure, and multiple centers/ surgeons. However, patient selection and other potential biases inherent to the retrospective nature of this study dictate caution when interpreting the findings of this study.

