

Interlaminar Versus Sublaminar Lumbar Decompression: Patient Satisfaction as Measured by PROMIS Outcomes

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INTRODUCTION:

Lumbar laminectomies are the most common approach to managing symptomatic lumbar stenosis. Traditional lumbar laminectomy, though effective, risks damage to paraspinal muscles and posterior ligamentous structures. Surgical techniques have thus evolved from full laminectomies to more conservative decompressions, such as interlaminar or sublaminar decompression. While prior studies have looked at the amount of decompression from a technical perspective and based on imaging findings, there have not been any head-to-head patient outcome studies comparing interlaminar decompression to sublaminar decompression.

The objective of this study is to determine the difference in patient-reported outcomes between those who underwent sublaminar versus interlaminar decompression and fusion of the lumbar spine for treatment of symptomatic lumbar stenosis. Our primary objective was to compare patient-reported outcomes, specifically PROMIS pain interference and physical function (PF) scores, following interlaminar versus sublaminar lumbar decompression with fusion. As a secondary objective, this study analyzed the effect of the number of levels decompressed during surgery had on postoperative outcomes.

METHODS: This retrospective study analyzed 74 patients aged 18–85 who underwent lumbar decompression with fusion at a Level 1 Trauma Center in the United States from January 2022 to March 2024. Patients were included if they had both preoperative and postoperative PROMIS pain and function scores with follow up within 6 months of surgery. Patients were categorized into decompression type based on the description in the operative note and by the physician who performed the operation. In addition, patient age, BMI, and the number of levels decompressed were recorded. Statistical analysis included 2-sided t-tests to compare the mean difference between post-operative and pre-operative PROMIS scores for both pain and function at multiple post-surgical time points. A multi-level ANOVA with interactions between decompression type and category of BMI was also performed on all mean differences as stated prior. This study used post-surgical time points of 2 weeks, 4 weeks, 3 months, and 6 months.

RESULTS: At 2 weeks postoperatively, sublaminar patients reported significantly higher pain scores ($\Delta = +4.65$) and lower function scores ($\Delta = -7.84$) compared to interlaminar patients. At 4 weeks, these differences were no longer significant. At 3 months, a significant interaction was observed between BMI and surgical type: normal-BMI patients undergoing sublaminar decompression reported higher pain ($\Delta = +11.58$) and worse PF scores ($\Delta = -10.57$) than their normal-BMI counterparts undergoing interlaminar decompression. At 6 months, sublaminar decompression was associated with higher pain scores ($\Delta = +5.33$, $p = 0.0315$), though physical function differences were not statistically significant ($\Delta = -4.82$, $p = 0.0503$). At both the 2-week and 6-month time points, no significant interactions were noted between BMI category and decompression type, yet the average BMI in both groups was not significantly different.

DISCUSSION AND CONCLUSION:

This study represents a novel, head-to-head retrospective review comparing patients undergoing either interlaminar and sublaminar types of lumbar decompression. Our findings highlight greater decreases from pre- to post-operative pain levels at the 2-week, 3-month, and 6-month post-operative time points in interlaminar compared to sublaminar type decompressions, as measured by the PROMIS scoring system. Interlaminar decompressions noted greater increases in physical function scores compared to sublaminar at the same time points noted prior. The differences in these scores exceed minimum clinical differences in PROMIS pain and physical function scoring systems per previous studies. This suggests interlaminar decompression may offer clinically significant improvements to short-term patient-reported outcomes relative to sublaminar decompression.

Intentional methods of decreasing the subjectivity of patient-reported post-surgical outcome scores are necessary in such retrospective reviews. In this study, it was mitigated by analyzing the differences between post-operative and pre-operative scores within each patient rather than raw outcome scores. Despite this limitation, patient-reported outcomes are important to study specifically in lumbar decompression procedures given the variable nature of pain, physical function, and anatomy between patients. This study revealed a difference in patient-reported outcome between two different surgical techniques used to treat lumbar stenosis, suggesting that technique can affect patient outcome and patient satisfaction. A large-scale, multi-institution study comparing different lumbar decompression techniques can provide more context to this study's single-institution retrospective review.