

The Impact of Superior Segment Facet Joint Violation During Instrumented Lumbar Fusion

Jay M Levin BA; Vincent J Alentado BS; Andrew Torre Healy MD; Michael P. Steinmetz MD; Edward C. Benzel MD; Thomas

E. Mroz MD

[Institution]

Click To
Add Logo



Introduction

Although facet joint violation (FJV) during lumbar fusion has been recognized as a potential risk factor for adjacent segment disease, there is inconclusive data clarifying the true clinical implications of FJV. In the current study, we seek to illuminate the impact of superior segment FJV on reoperation rate and quality of life (QOL).

Methods

Patients who underwent lumbar fusion surgery between 2009 and 2013 with postoperative computed tomography imaging were included. Patients were placed in the FJV group if either of the superior segment facet joints were compromised, while patients with preserved facet joints were placed in the control group. Demographic, perioperative, and one-year QOL data were collected for both the FJV and control groups.

Results

Of the 241 patients included, 112 patients were found to have FJV and the remaining 129 patients were placed in the control group. One year following lumbar fusion, reoperation rates were similar between the FJV and control groups ($p=0.53$). At two-year follow-up, the reoperation rate in the FJV group was significantly higher than in the control group (17.0% and 7.8%, respectively; $p=0.02$). Multivariate logistic regression analysis showed FJV to be the only independent predictor of reoperation two years postoperatively ($p=0.03$), with an odds ratio of 2.53 (95% CI: 1.11-6.15). No significant difference was observed between the two groups in regards to 1-year postoperative Pain Disability Questionnaire, EuroQOL 5 Dimensions, or Patient Health Questionnaire-9 scores ($p=0.97$, $p=0.24$, and $p=0.79$, respectively).

Conclusions

This study is the first quantification of the impact of facet joint violation on reoperation rate and quality of life. We found that FJV does not lead to any change in reoperation rate or quality of life scores within one year following lumbar fusion surgery. However, FJV was found to be an independent predictor of reoperation two years postoperatively.

Learning Objectives

By the conclusion of this session, participants should: 1) Appreciate the negative impact facet joint violation has on patient outcomes, 2) Identify the most effective pedicle screw insertion point to avoid facet joint compromise.

References

1. Weinstein, James N., Jon D. Lurie, Tor D. Tosteson, Wenyan Zhao, Emily A. Blood, Anna N. A. Tosteson, Nancy Birkmeyer, et al. "Surgical Compared with Nonoperative Treatment for Lumbar Degenerative Spondylolisthesis. Four-Year Results in the Spine Patient Outcomes Research Trial (SPORT) Randomized and Observational Cohorts." *The Journal of Bone and Joint Surgery. American Volume* 91, no. 6 (June 2009): 1295–1304. doi:10.2106/JBJS.H.00913.
2. Kim HJ, Chun HJ, Kang KT, et al. The biomechanical effect of pedicle screws' insertion angle and position on the superior adjacent segment in 1 segment lumbar fusion. *Spine* 2012;37:1637–44.
3. Ha KY, Schendel MJ, Lewis JL, Ogilvie JW (1993) Effect of immobilization and configuration on lumbar adjacent-segment biomechanics. *J Spinal Disord* 6:99–105
4. Leone A, Guglielmi G, Cassar-Pullicino VN, et al. Lumbar intervertebral instability: a review. *Radiology* 2007;245:62–77.
5. Ha KY, Son JM, Im JH, et al. Risk factors for adjacent segment degeneration after surgical correction of degenerative scoliosis. *Indian J Orthop* 2013;47:346–51.
6. Levin DA, Hale J, Bendo JA. Adjacent segment degeneration following spinal fusion for degenerative disc disease. *Bull NYU Hosp Jt Dis* 2007;65:29–36.
7. He B, Yan L, Guo H, Liu T, Wang X, Hao D. The Difference in Superior Adjacent Segment Pathology After Lumbar Posterolateral Fusion by Using 2 Different Pedicle Screw Insertion Techniques in 9-Year Minimum Follow-up. *Spine* 2014;39:1093-1098.
8. Park P, Garton HJ, Gala VC, et al. Adjacent segment disease after lumbar or lumbosacral fusion: review of