

## Learning Objectives

1. Describe the incidence of adjacent level reoperation following a two level axial lumbar interbody fusion.
2. Determine the most common indications for reoperation.

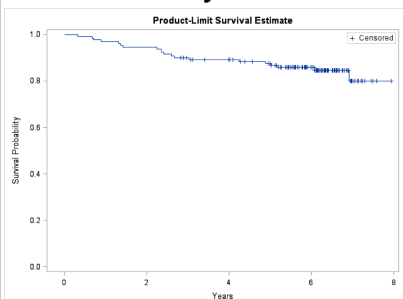
## Introduction

While long-term studies have evaluated adjacent segment degeneration (ASD) in posterior lumbar spine arthrodesis, no such studies have evaluated the axial interbody fusion technique. To our knowledge, this is the largest reported number of cases that underwent the Axial Lumbar Interbody Fusion (AxiaLIF) in the United States. An analysis was performed to determine the incidence of adjacent segment disease in patients who have undergone index one or two level interbody fusion via the presacral approach using the AxiaLIF System with concurrent percutaneous pedicle screw fixation.

## Methods

We retrospectively reviewed the medical records of 154 patients who underwent index axial lumbar interbody and had both presurgical and at least 2-year radiographic and clinical follow-up. The average duration of follow-up was 5.0 years. ASD was defined as both radiographic and clinically significant disease at a level adjacent to a previous fusion requiring surgical intervention. 1,2

**FIG 1. Two Level Axial Lumbar Interbody Fusion**



Kaplan-Meier survivorship curve. Each data point represents the total percentage of patients who entered a given year of follow-up and were expected to remain free of symptomatic adjacent-segment disease.

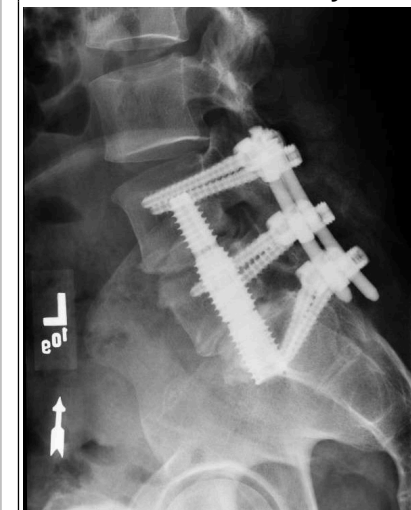
## Results

A single-level L5-S1 fusion was performed in 5 patients and a 2-level (L4-S1) fusion was used in 149 patients. Of the patients undergoing 2-level (L4-S1) fusion, 20 (13.4%) underwent subsequent laminectomy or laminectomy with extension of fusion at the adjacent L3 level. Reasons for reoperation included a combination of radiculopathy, spinal stenosis, instability or progressive loss of sagittal balance. Kaplan-Meier analysis predicted a disease-free survival rate of 90% (95% confidence interval, 84.9% to 95.2%) at two years and of 85% (95% confidence interval, 79.2% to 91.7%) at five years for 2-level (L4-S1) fusion. None of the patients with a single level (L5-S1) fusion underwent reoperation.

## Conclusion

For 2-level AxiaLIF, the rate of symptomatic ASD warranting either decompression or arthrodesis was found to be 10.0% at two years and 15.0% at five years. This is similar to retrospective studies by Ghiselli et al.<sup>3</sup> and Sears et al.<sup>4</sup> who found ASD requiring reoperation after posterior lumbar arthrodesis to be 16.5% and 13.6% respectively at five years. The greatest indications for reoperation were radiculopathy, spinal stenosis, instability or loss of sagittal balance. There appears to be a higher incidence of adjacent level disease following multi-level vs single level fusions.

**FIG 2. Lateral X-ray**



L4-5, L5-S1 Axial Lumbar Interbody Fusion.

## References

1. Bydon M, et al. The incidence of adjacent segment disease after lumbar discectomy: A study of 751 patients. *J Clin Neurosci.* 2017.
2. Lee JC, Let al. Adjacent segment pathology requiring reoperation after anterior cervical arthrodesis: The influence of smoking, sex, and number of operated levels. *Spine (Phila Pa 1976).* 2015;40:E571-577
3. Ghiselli G, et al. Adjacent segment degeneration in the lumbar spine. *J Bone Joint Surg Am.* 2004;86-A:1497-1503
4. Sears WR, et al. Incidence and prevalence of surgery at segments adjacent to a previous posterior lumbar arthrodesis. *Spine J.* 2011;11:11-20