

# Symptomatic Adjacent Segment Degeneration After Anterior Cervical Discectomy and Fusion: A Long-Term MRI Analysis

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## Introduction

Adjacent segment disease after ACDF remains an incompletely understood phenomenon. We sought to determine whether the presence of foraminal stenosis or spinal cord compression at levels adjacent to the fused segments were associated with increased likelihood of requiring additional surgery.

## Methods

We reviewed patients at our institution who underwent an ACDF between 2000 and 2010 and then developed new radiculopathy, myelopathy, or neck pain. We included patients who had an MRI both before surgery and 3 years after surgery or greater. This time point was chosen to exclude patients who had inadequate treatment, residual disease or early recurrence after the index ACDF. Pre- and postoperative MRI's were graded for the extent of spinal cord compression and foraminal stenosis at the levels immediately adjacent to the fused segments. Each adjacent level was graded using previously published criteria for segmental degeneration.

## Results

2246 patients underwent an ACDF during the study period, 95 (4%) of whom developed new symptoms requiring MRI evaluation 3 years or later after the index surgery. Mean time between pre- and postoperative MRI's was 6.2 years (range 3.0 to 13.4 years). 11 patients (12%) required additional surgery based on postoperative MRI findings. Multilevel anterior or posterior fusion was common in patients requiring additional surgery. After adjusting for age, sex, number of levels fused, location of fused segment, plating system, and diagnosis, the severity of adjacent segment degeneration was independently associated with additional surgery but the effect was very small [odds ratio 1.04 (1.01 to 1.06)].

## Conclusions

The incidence of reoperation is low for adjacent segment degeneration in patients who develop new radiculopathy, myelopathy, or neck pain several years after the index operation. Our findings do not support including asymptomatic levels in an anterior construct at the index operation, unless cervical deformity is suspected.

## Learning Objectives

1. To identify the incidence of reoperation for adjacent segment degeneration in patients who develop new radiculopathy, myelopathy, or neck pain several years after the index ACDF operation.
2. Discuss the impact of asymptomatic foraminal stenosis and posterior disk osteophyte complex at levels adjacent to the planned fusion.

## References

Okada, E., et al. (2009). "Aging of the cervical spine in healthy volunteers: a 10-year longitudinal magnetic resonance imaging study." *Spine (Phila Pa 1976)* 34(7): 706-712.