



# Long-term Outcomes of Patients with Multilevel Cervical Spondylotic Myelopathy after Laminectomy, Laminoplasty, and Laminectomy & Fusion: A Meta-Analysis of Observational Studies

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## Introduction

Although posterior decompression is frequently performed for multilevel cervical spondylotic myelopathy (CSM), few studies have evaluated the long-term outcomes of patients undergoing different posterior techniques. We report a meta-analysis of observational studies comparing the improvement in myelopathy and long-term complications--including the development of post-operative kyphosis and the prevalence of axial pain--in patients undergoing laminectomy, laminoplasty and laminectomy & fusion.

## Methods

A literature search was performed using MEDLINE of studies indexed between January 1980 and July 2010. Pre-determined study inclusion criteria included reporting outcomes for patients with CSM separately from other etiologies of myelopathy and a follow-up of at least six months; studies were excluded if they reported a total of twenty or fewer patients. Data on the severity of myelopathy (measured by the Japanese Orthopedic Association (JOA) scale) and long-term complications were extracted and pooled assuming random effects.

	Laminectomy	Laminoplasty	Laminectomy & Fusion
Mean JOA Score	14.0 (95% CI: 13.8-14.3)	13.6 (95% CI: 13.5-13.7)	14.0 (95% CI: 13.4-14.5)
Mean JOA Recovery Rate	57.1 (95% CI: 56.0-58.3)	61.8 (95% CI: 57.8-65.8)	51.0 (95% CI: 43.1-58.9)

## Results

: 69 studies with a total of 3,340 patients were included. Improvement in myelopathy quantified by the JOA scale showed no significant difference between approaches—14.0 points after laminectomy, 13.6 points after laminoplasty, and 14.0 points after laminectomy & fusion. In studies with a long-term mean follow-up (of at least two years), kyphosis developed in 15.8% after laminectomy, 6.2% after laminoplasty and 3.7% after laminectomy & fusion. Axial pain was present in 13.0% after laminectomy and 26.9% after laminoplasty.

## Conclusions

Substantial improvement in myelopathy was seen regardless of the posterior technique utilized. However, long-term complications--particularly the development of kyphosis and neck pain--were common after laminectomy or laminoplasty.

	Laminectomy	Laminoplasty	Laminectomy & Fusion
Kyphosis (%)	15.8%	6.2%	3.7%
Axial Pain (%)	13.0%	26.9%	Not Reported
Change in Range of Motion	-14.5°	-18.8°	Not Reported