

# Laminoplasty vs Laminectomy and Fusion to Treat Cervical Spondylotic Myelopathy: Outcomes of the Prospective Multicenter AOSpine International CSM Study

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## Background

Cervical spondylotic myelopathy (CSM) is the most common cause of spinal cord impairment.

We analyzed the data from a large, multicenter international study which examined surgical treatments for CSM to address this question.

Recent studies conducted in North America have demonstrated benefits of surgical treatment for symptomatic CSM. However, differences in pathology, comorbidities, treatment approaches and cultural response to treatment may affect the generalizability of these findings at the global level.

## Methods

Patients receiving surgery for clinically symptomatic CSM were enrolled in a prospective multicenter, cohort study which is continuing to accrue subjects at 16 sites in Europe, Asia, North and South America. Subjects included were a part of a larger ongoing prospective observational study that has enrolled 492 subjects with CSM involving 16 clinical sites in Europe, Asia, North and South America. Of those, 108 received laminectomy and fusion; 66 received laminoplasty. The choice of surgical approach was at the discretion of the surgeon. Outcome measures were mJOA, the Nurick scale, NDI and the SF36 PCS and MCS Component Scores.

## Baseline characteristics of subjects classified by surgical approach (N=173)

	Laminectomy and Fusion (N=108)	Laminoplasty (N=65)	P
Age (years)	60.44 (10.31)	59.76 (11.84)	0.6136
Female gender	29.63%	30.77%	0.8746
Current smoker	24.07%	16.92%	0.2666
Length of hospital stay	7.69 (6.33)	15.74 (8.21)	< 0.0001
mJOA	12.60 (2.78)	11.23 (2.74)	0.0019
Nurick Score	3.32 (1.27)	3.74 (1.35)	0.0436
Neck Disability Index	38.62 (21.82)	38.54 (21.02)	0.9827
SF-36v2 PCS	34.43 (8.82)	35.78 (9.46)	0.3426
SF-36v2 MCS	39.18 (10.84)	38.47 (10.35)	0.6713
No. levels operated*	4.97 (0.91)	4.42 (0.75)	< 0.0001

\*defined by number of vertebrae (e.g. C5-6 = two vertebral levels)

## Improvement in the outcome variables at 12 months

	Laminectomy and Fusion (N=94)	Laminoplasty (N=65)	P
mJOA	2.30 (2.82)	3.00 (2.65)	0.1365
Nurick	1.29 (1.51)	1.16 (1.29)	0.6115
NDI	11.88 (17.98)	12.97 (22.10)	0.7843
SF-36v2 PCS	7.68 (9.51)	8.33 (9.48)	0.6873
SF-36v2 MCS	6.86 (10.78)	7.85 (9.03)	0.5685

## Treatment Complications

Category	Laminectomy and Fusion (N=108)	Laminoplasty (N=65)
Neurological Complications		
C5 Radiculopathy	3 (2.78)	2 (3.08)
Worsening of symptoms	2 (1.85)	0
New Radiculopathy	2 (1.85)	1 (1.54)
Progression of Myelopathy	6 (5.56)	1 (1.54)
Dural Tear	4 (3.70)	2 (3.08)
Infection (Superficial and deep)	4 (3.70)	1 (1.54)
Dysphagia	1 (0.93)	0
Hardware Failure	2 (1.85)	0

## Results

Average age was 60.2 years (SD 10.8), 29.8% were female. Subjects threatened with laminectomy and fusion had more levels operated (5.0 vs. 4.4,  $P < .01$ ), shorter length of stay (7.7 vs. 15.7 days,  $P < .01$ ) and, less severe neurologic impairment measured by mJOA (12.6 vs. 11.2,  $P < .01$ ). There were no differences in age, and baseline NDI, SF36v2 PCS and SF36v2 MCS. At 12 month follow-up, there were no differences in neurologic and functional outcomes for laminoplasty compared to laminectomy and fusion; mJOA (3.0 and 2.3, respectively,  $P=0.15$ ). Moreover, there were no differences in NDI (13.3 and 12.0, respectively,  $P=0.71$ ), SF-36v2 PCS (8.5 and 7.7, respectively,  $P=0.66$ ) and SF-36v2 MCS (7.9 and 6.9, respectively,  $P=0.56$ ).

## Conclusions

Patients undergoing laminectomy and fusion and laminoplasty surgery for CSM show similar improvements in generic and disease specific outcome measures allowing for baseline differences in clinical presentation between the two groups of patients. Longer term follow-up will be required to determine whether any differences in outcome between the two forms of treatment emerge.

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