

# Current Evidence in Cervical Laminoplasty

Hansen Bow, MD PhD  
Department of Neurosurgery  
University of California, Irvine



SCHOOL OF MEDICINE  
UNIVERSITY of CALIFORNIA • IRVINE  
*Discover • Teach • Heal*

# Agenda

Cervical Spondylotic Myelopathy

Ossification of the Posterior Longitudinal Ligament

Treatment Approaches for Cervical Myelopathy

Cervical Laminoplasty

Current Evidence in Cervical Laminoplasty



# Cervical Spondylotic Myelopathy

Most common progressive spinal cord disorder in patients > 55 years old

Symptoms start with gait disturbance, then upper extremity loss of coordination and difficulty with fine motor tasks

Natural history not well known but believed to involve stepwise progression in symptoms with variable periods of stability



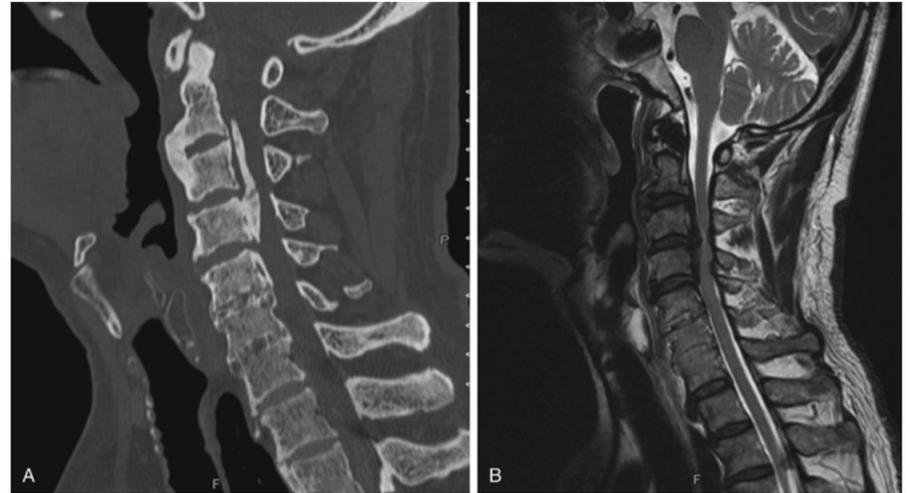
# Ossification of the Posterior Longitudinal Ligament

Higher incidence in East Asia (3-6%)  
than in Europe or North America (0.1%)

Ratio between men and women with  
cervical ossification of the posterior  
longitudinal ligament is 2:1

Average age of symptom onset is 50  
years

Heterotopic bone formation in the spinal  
canal, causing spinal cord compression



# Treatment Approaches for Cervical Myelopathy

Anterior or posterior cervical approach; no clear evidence that either more reliably affects recovery from myelopathy

In the United States, ventral and dorsal decompression/fusion dominate, with dorsal laminoplasty performed much less

In Asia and Europe, laminoplasty is a common form of cervical myelopathy treatment

# Cervical Laminoplasty

Multiple methods of performing cervical laminoplasty

Hirabayashi reported on the open-door laminoplasty in 1981, which is the most used method

Popularized in the 1980s

# Cervical Laminoplasty: Patients and Publications

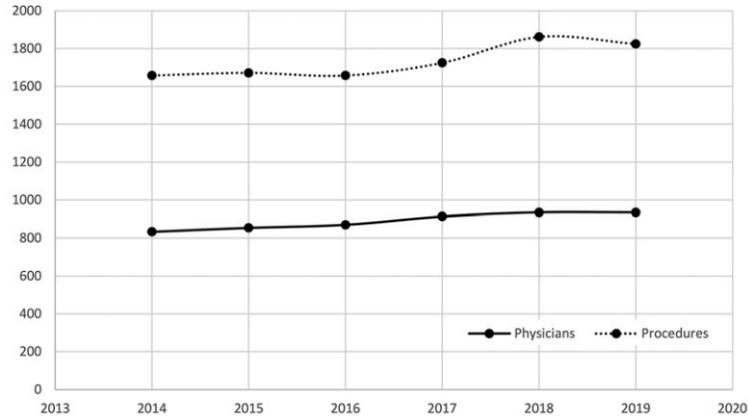


FIG. 1. Number of physicians performing laminoplasty and frequency of laminoplasty procedures performed. Data from the Center for Medicare and Medicaid Services (United States) between 2014 and 2019.<sup>4</sup>

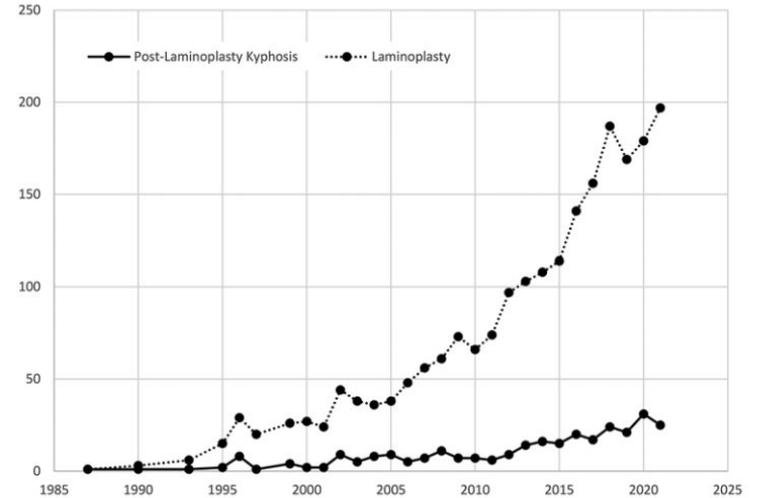
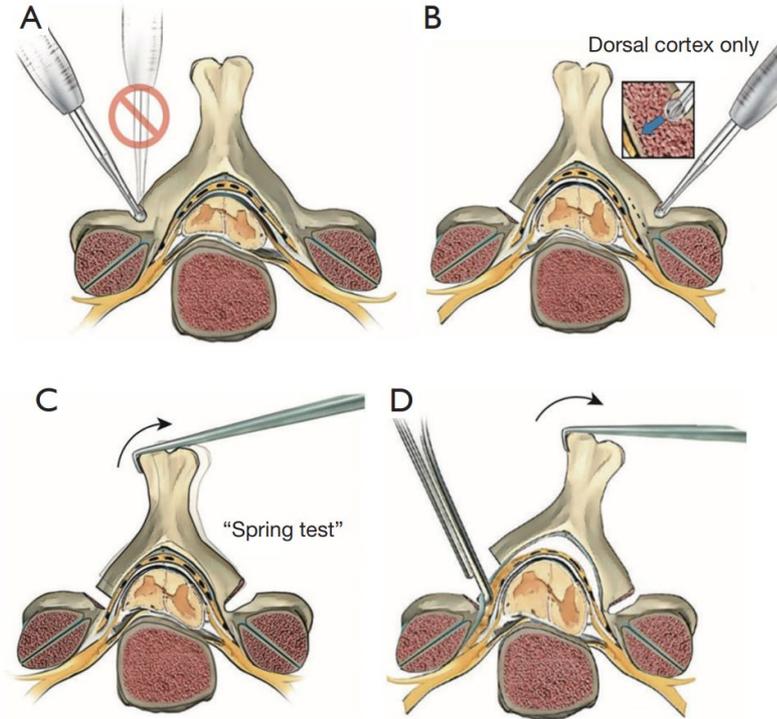


FIG. 2. Number of articles published by year in PubMed for "laminoplasty" and "laminoplasty AND kyphosis."

# Cervical Laminoplasty: Open Door Laminoplasty



# Advantages of Cervical Laminoplasty

Preservation of range of motion, however most authors report approximately 50% loss of global range of motion

Potential of maintaining cervical lordosis (compared to laminectomy alone) and reducing incidence of postoperative instability

Lower implant costs compared to posterior or anterior fusion

# Cervical Laminoplasty: Limitations and Contraindications

Not indicated for one or two-level disease

Kyphotic cervical pathology

Radiographic signs of instability

Some surgeons prefer fusion over laminoplasty in the context of cervical neck pain

Laminoplasty reimbursement for both physician and hospital has been shown to be roughly 50% of what is collected for laminectomy and fusion

## JAMA | Original Investigation

# Effect of Ventral vs Dorsal Spinal Surgery on Patient-Reported Physical Functioning in Patients With Cervical Spondylotic Myelopathy: A Randomized Clinical Trial

Ghogawala, Terrin, et al., 2021

Context: Unclear whether a ventral or dorsal approach provides best results with respect to patient-reported physical functioning

Patients 45-80 years old with multilevel cervical spondylotic myelopathy

15 large North American Hospitals, from 2014-2018

Patients randomized to undergo ventral surgery (63) or dorsal surgery (100)

## JAMA | Original Investigation

### Effect of Ventral vs Dorsal Spinal Surgery on Patient-Reported Physical Functioning in Patients With Cervical Spondylotic Myelopathy: A Randomized Clinical Trial

Ghogawala, Terrin, et al., 2021

Short Form 36 Physical Component Summary scores were not significantly different between ventral and dorsal surgery

At 1 and 2 years, dorsal laminoplasty was associated with significantly greater improvement in SF-36 PCS scores compared with dorsal fusion but NOT different with ventral fusion

Laminoplasty was associated with significantly better patient-reported functioning, fewer complications, and less health service and resource utilization compared with ventral fusion and dorsal fusion

# scientific reports

## Comparison of laminoplasty and posterior fusion surgery for cervical ossification of posterior longitudinal ligament

Nakashima, Imagama, et al., 2022

Context: Unclear whether laminoplasty or laminectomy with fusion provides better outcomes with ossification of the posterior longitudinal ligament

Patients older than 20 years with ossification of the posterior longitudinal ligament

28 academic institutions in Japan, from 2015-2017

Attending surgeon determined surgical approach and levels to decompress:  
laminoplasty (260) and laminectomy with fusion (109)

# scientific reports

## Comparison of laminoplasty and posterior fusion surgery for cervical ossification of posterior longitudinal ligament

Nakashima, Imagama, et al., 2022

Perioperative complications less common in laminoplasty than in fusion group (17% vs 30%)

C5 palsy in laminoplasty group significantly less frequent (4% vs 20%)

Patients achieved similar postoperative functional and quality of life outcomes by Japanese Orthopedic Association scores

Range of motion significantly less in fusion group compared to laminoplasty

Percentage of patients with progression in thickness of the ossified ligament significantly higher in laminoplasty compared to fusion (56% vs 30%)

# Conclusion

Cervical Spondylotic Myelopathy

Ossification of the Posterior Longitudinal Ligament

Treatment Approaches for Cervical Myelopathy

Cervical Laminoplasty

Current Evidence on Cervical Laminoplasty

