



Modified Laminoplasty Preserving the Posterior Deep Extensor Insertion into C2 Improves Clinical and Radiologic Results Compared with Conventional Laminoplasty: A Meta-Analysis

Qihua Qi^{1,2}, Yan Chen^{1,2}, Zemin Ling^{1,2}, Hao Hu^{1,2}, Junxuan Ma², Wei Guo^{1,2}, Manman Gao^{1,2}, Zhiyu Zhou², Xuenong Zou^{1,2}

Key words

- Cervical spondylotic myelopathy
- Laminoplasty
- Modified laminoplasty
- Range of motion

Abbreviations and Acronyms

CI: Confidence interval

JOA scores: Japanese Orthopaedic Association scores

MCSM: Multilevel cervical spondylotic myelopathy

OR: Odds ratio

ROM: Range of motion

SMD: Standard mean difference

SSC: Semispinalis cervicis

WMD: Weighted mean difference

From the ¹Department of Spine Surgery, the First Affiliated Hospital of Sun Yat-sen University, Guangzhou; and

²Guangdong Provincial Key Laboratory of Orthopaedics and Traumatology, Guangzhou, P. R. China

To whom correspondence should be addressed:

Xuenong Zou, M.D., Ph.D.

[E-mail: zxong@hotmail.com]

Qihua Qi and Yan Chen are co-first authors.

Citation: *World Neurosurg.* (2018) 111:157-165.

<https://doi.org/10.1016/j.wneu.2017.12.098>

Journal homepage: www.WORLDNEUROSURGERY.org

Available online: www.sciencedirect.com

1878-8750/\$ - see front matter © 2017 Published by Elsevier Inc.

INTRODUCTION

Although many kinds of laminoplasty have emerged in recent years, multilevel cervical spondylotic myelopathy (MCSM) remains a challenge to spine surgeons.¹⁻³ Double-door laminoplasty achieves excellent clinical outcomes with effective decompression and has been gradually accepted by surgeons to treat MCSM. With the widespread application of this technique, stable neurologic improvement usually persists for many years.⁴

Neck balancing consists of static and dynamic equilibria. Muscles and ligaments around the neck are considered the components of dynamic equilibrium.^{5,6} Posterior cervical deep extensors, especially

■ **BACKGROUND:** Whether modified laminoplasty is better than conventional laminoplasty is unclear. Thus, a meta-analysis comparing the outcomes of preserving or repairing the posterior deep extensor insertion to C2 in laminoplasty was conducted for patients with multilevel cervical spondylotic myelopathy (MCSM).

■ **METHODS:** Several electronic databases were chosen to search for relevant studies. The primary indices included preoperative and postoperative Japanese Orthopaedic Association (JOA) scores, JOA recovery rate, muscle atrophy rate, preoperative and postoperative range of motion (ROM), ROM decrease rate, and incidence of axial pain. Results are expressed as odds ratios with 95% confidence intervals for the dichotomous outcomes and mean differences for continuous outcomes.

■ **RESULTS:** Eight studies involving 763 patients were included in this study. The postoperative cervical ROM was significantly higher in the modified group ($P = 0.01$, MD = 3.0 [0.66, 5.35]), as was the cervical posterior muscle volume ($P = 0.02$, MD = 28.28 [4.42, 52.3]) and the operation time (MD = -45.04, 95% CI -49.79, -40.29; $P < 0.01$). The incidence of axial symptoms in the modified group was lower than that in the conventional group ($P < 0.01$, OR 0.28 [0.17, 0.46]), as was the rate of decrease of cervical ROM ($P = 0.004$, MD = -6.72 [-11.25, 2.19]). There was no significant difference ($P > 0.05$) between the groups in blood loss, preoperative and postoperative JOA score, or JOA recovery rate.

■ **CONCLUSIONS:** Modified laminoplasty had shorter operation times, a lower incidence of axial pain, a higher cervical ROM, and a lower atrophy rate compared with conventional laminoplasty. The clinical and radiologic results of modified laminoplasty have been partly superior to those of conventional laminoplasty to date.

the semispinalis cervicis (SSC), act as the main dynamic stabilizers, maintaining the lordosis and alignment of the cervical vertebrae. It is unavoidable to destroy the SSC insertion in conventional C3-C7 laminoplasty because most of the SSC inserts into the C2 spinous process.^{7,8} Many patients complain about the axial symptoms and the decrease of the neck range of motion (ROM), lowering their quality of life, in conventional C3-C7 laminoplasty.^{9,10} Many researchers have attributed these complications to the

destruction of the posterior cervical deep extensor, especially the SSC insertion. To address that problem, many types of modified laminoplasty preserving SSC attachments have developed, such as C4-C7 laminoplasty with C3 laminectomy, using an interlaminar approach.¹¹⁻¹³ Those surgical technique reduce axial symptoms, preserving neck lordosis and keeping the posterior deep extensor curvature.¹⁴

Currently, both the conventional laminoplasty and the modified laminoplasty are extensively used. Is the modified

Table 1. Quality Assessment of Studies Involved in the Meta-Analysis According to the Newcastle-Ottawa Scale

Study	Selection	Comparability	Exposure	Total Score
Long et al., 2006 ¹⁵	3	2	2	7
Wang et al., 2013 ¹⁶	3	2	3	8
Takeuchi et al., 2005 ¹²	3	2	3	8
Ding et al., 2009 ¹⁷	3	2	2	7
Wang et al., 2015 ¹⁸	3	2	3	8
Takeuchi et al., 2007 ¹⁹	3	2	2	7
Kotani et al., 2012 ¹³	3	2	3	8
Kotani et al., 2009 ²⁰	3	2	3	8

laminoplasty technique really better than conventional laminoplasty? To address this question, we conducted a meta-analysis to compare clinical and radiologic outcomes in patients receiving procedures that preserved the SSC (group A) and in those receiving procedures that reattached the SSC (group B) in cervical laminoplasty to treat MCSM.

METHODS

Search Strategy

The literature search was performed without restrictions such as region, publication language, and article type. The electronic databases Embase, PubMed, and Web of Science and the Cochrane library were searched for articles published from January 1960 to January 2017. The following key words and their combinations were searched in [Title/Abstract]: 1) preserving semispinalis cervicis OR preserving posterior extensor musculature OR preserving paraspinal muscles OR the deep extensor muscle preserving approach OR the deep extensor muscle preserving OR cervical laminoplasty with C3 laminectomy OR C4-C7 laminoplasty with C3 laminectomy OR the deep extensor muscles OR the semispinalis cervicis; 2) conventional C3-C7 laminoplasty OR conventional C3 to C7 laminoplasty OR the double door laminoplasty OR conventional open-door laminoplasty OR conventional laminoplasty. Relevant articles were identified from the reference lists of all retrieved studies. Review articles and conference abstracts were also used to broaden the search.

Inclusion and Exclusion Criteria of the Studies

The studies that met the following criteria were included: 1) all randomized controlled studies, 2) comparative studies (cohort or case-control studies), 3) studies concerning the impact of preserving the SSC in cervical laminoplasty, and

4) full-text articles. Review articles, editorials, case reports, letters to the editor, and animal experimental studies were excluded.

Quality Assessment and Data Extraction

This review included no randomized controlled trials but only cohort or case-control comparative studies. The quality of the studies was assessed with the modified Newcastle-Ottawa scale, which is composed of 3 parts: patient selection, comparability of the study groups, and assessment of outcomes. Among these studies, 5 scored 8 points and 3 scored 7 (Table 1); the included studies achieving 6 or more points were considered to be of high quality. Initially, all the authors read and evaluated the studies included. Two authors (Z.M.L. and H.H) independently reviewed the articles carefully. Disagreements were resolved by consultation with senior doctors (Z.Y.Z. and X.N.Z.). Two authors (Q.H.Q. and

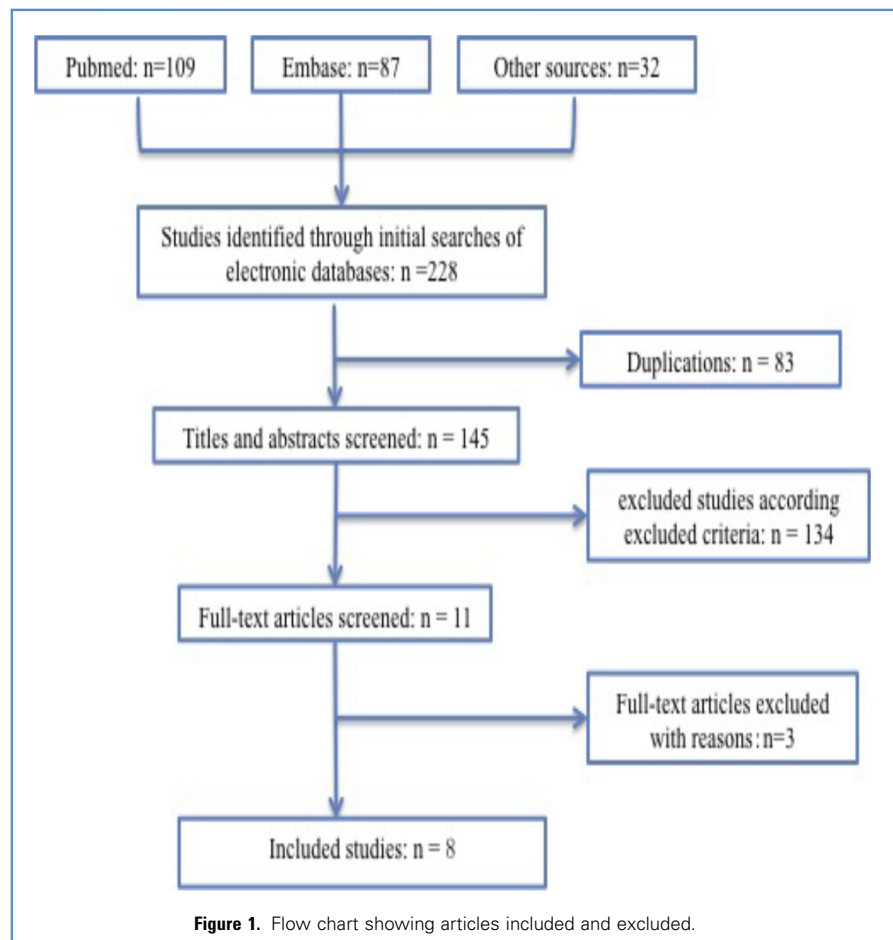


Figure 1. Flow chart showing articles included and excluded.

Download English Version:

<https://daneshyari.com/en/article/8691882>

Download Persian Version:

<https://daneshyari.com/article/8691882>

[Daneshyari.com](https://daneshyari.com)