

**A non-surgical approach to the management of lumbar spinal stenosis:  
A prospective observational cohort study**

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FROM ABSTRACT

Background

While it is widely held that non-surgical management should be the first line of approach in patients with lumbar spinal stenosis, little is known about the efficacy of non-surgical treatments for this condition.

The purpose of this paper is to describe the clinical outcomes of a novel approach to patients with lumbar spinal stenosis that focuses on distraction manipulation and neural mobilization.

Methods

This is a prospective consecutive case series with long-term follow-up of fifty-seven consecutive patients who were diagnosed with lumbar spinal stenosis.

Disability was measured using the Roland Morris Disability Questionnaire and pain intensity was measured using the Three Level Numerical Rating Scale. Patients were also asked to rate their perceived percentage improvement.

Results

The mean patient-rated percentage improvement from baseline to the end of treatment was 65.1%.

The mean improvement in disability from baseline to the end of treatment was 5.1 points. This was considered to be clinically meaningful.

Clinically meaningful improvement in disability from baseline to the end of treatment was seen in 66.7% of patients.

The mean duration of follow-up was 16.5 months. The mean patient-rated percentage improvement from baseline to long-term follow-up was 75.6%. The mean improvement in disability was 5.2 points. This was considered to be clinically meaningful. Clinically meaningful improvement in disability was seen in 73.2% of patients.

Conclusions

A treatment approach focusing on distraction manipulation and neural mobilization may be useful in bringing about clinically meaningful improvement in disability in patients with lumbar spinal stenosis.

## THESE AUTHORS ALSO NOTE:

“Lumbar spinal stenosis is a common and often disabling disorder that generally occurs in the sixth or seventh decade of life, although it can uncommonly occur in younger individuals.”

“Lumbar spinal stenosis can lead to low back and leg pain, most typically via encroachment on the central canal, lateral recess, or lateral canal.”

The encroachment is typically from vertebral body osteophytes, hypertrophy of the ligamentum flavum or zygapophyseal joint, or the posterior longitudinal ligament.

“The development of these degenerative changes is often accompanied by restriction of segmental mobility.” **[Important]**

“One of the hallmarks of lumbar spinal stenosis is neurogenic claudication, in which the patient develops low back and/or leg pain after a period of walking that progressively worsens as walking is continued, with improvement or resolution when walking ceases and the patient sits or flexes the lumbar spine.”

Lumbar spinal stenosis is one of the most common reasons for spine surgery in older people; yet most patients with lumbar spinal stenosis should be managed non-surgically before considering surgical intervention.

Acute discogenic radiculopathy is chemical, not compressive in nature, secondary to chemical inflammatory process initiated by the presence of nuclear material. Lumbar spinal stenosis radiculopathy is more compressive.

Chronic compression of the nerve root in spinal stenosis causes compromise of blood flow leading to congestion, ischemia, and intraneural edema, “then leads to the development of periradicular fibrosis.”

“Increased pain with walking that is relieved with lumbar flexion (neurogenic claudication) is one of the hallmarks for lumbar spinal stenosis.”

“Neurogenic claudication likely arises from increased metabolic demands of the nerve root in the presence of vascular compromise and traction on the adhered nerve root when lower extremity movement occurs during walking.”

“With lumbar spinal stenosis, compression, vascular compromise and perineural fibrosis dominate the pathophysiological picture, thus maneuvers that increase IVF pressure, i.e., extension, or increase metabolic demands of the nerve root and movement of the fibrotic nerve root, as with walking, exacerbate the pain.”

Treatment should “attempt to mobilize the segment(s) involved, decompress the involved nerve root(s) and mobilize the involved nerve root(s) to break up periradicular adhesion, thus releasing nerve root entrapment, and restoring vascular function.”

Maintaining intersegmental and nerve root mobility is important in order to maximize the long-term benefit of treatment.

Distraction manipulation and neural mobilization are thought to “improve motion segment mobility (distraction manipulation) and nerve root mobility (neural mobilization).”

In this study, “Patients were treated in the manner in which the treating chiropractors in the study would normally utilize in every day practice.”

The treatments used were utilized were:

1) Cox Distraction Manipulation.

“Although other forms of manipulation are believed to be effective in patients with lumbar spinal stenosis, no form other than distraction manipulation was used with the patients in this study.”

Cox distraction manipulation is believed to decrease intradiscal pressure, create vertebral motions and increase the size of the intervertebral foramen.

2) Neural mobilization.

This is believed to mobilize nerve roots.

The patient is supine while the doctor dorsiflexed the ankle and flexed the hip with the knee extended.

The leg was raised until the doctor feels a “barrier” to additional movement.

“The foot is then moved alternately into plantar flexion and dorsiflexion repeatedly for several cycles.”

3) Exercises are taught to the patient to compliment the distraction manipulation and neural mobilization by mobilizing the lumbar spine and the involved nerve root(s).

“These included the ‘cat and camel’ exercise in which the patient is quadruped and alternately flexes and extends (within the comfort level) the cervical and lumbar spine, and ‘nerve flossing’ exercises, which attempt to mobilize the involved nerve roots.”

Patients were generally seen 2–3 times per week for 3 weeks and then re-evaluated. After the first follow up reexamination was performed, treatment either continued at a frequency of 2 times per week or 1 time per week.

Of the 57 consecutive patients in this study, the mean age was 65.2 years and the mean duration of symptoms prior to starting treatment was more than 11 years.

The majority of patients had both lateral and central stenosis.

The most common levels of involvement were

L4-5	60%
L3-4	35%
L5-S1	28%
L2-3	12%
L1-2	2%

One patient had involvement at all lumbar levels.

"The mean total number of treatments was 13.3 (range 2–50)."

"The mean duration of FU was 16.5 months (range 3–48 months)."

"Only two patients went on to require surgery."

"No major complications to treatment were seen in any patient."

"The results of this study suggest that the combination of distraction manipulation and neural mobilization may be useful for patients with lumbar spinal stenosis."

"Clinically meaningful improvement in disability was seen in over two-thirds of the patients, and the improvement appeared to be maintained over an average of 16.5 months after cessation of treatment."

"It is reasonable to conclude that the treatment approach in this study is a viable alternative to surgery for patients with lumbar spinal stenosis, and compares favorably with other non-surgical approaches that have been studied."

"As the efficacy of surgery does not appear to decrease if it is delayed in favor of a non-surgical trial, most patients with lumbar spinal stenosis should be treated non-surgically for a period of time before considering operation."

Distraction manipulation may be of benefit by reducing intradiscal pressure, widening the nerve root space, and facilitation of afferent input from mechanoreceptors, helping to improve proprioception.

"Neural mobilization is hypothesized to gently move both the anatomical structures proximate to the neural elements that are being compromised, as well as the neural elements themselves. This may help patients with lumbar spinal stenosis by releasing perineural adhesions, thus decreasing traction strain on the nerve root, especially with walking."

“It must be noted that a relatively wide range of treatment visits (2–50) was seen in this study, suggesting that individual differences in patient responses to treatment exists which necessitates greater or fewer than the mean number of treatments.”

## CONCLUSION

“The combination of distraction manipulation and neural mobilization may be a safe and effective approach for patients with lumbar spinal stenosis.”

“The outcome of this approach compares favorably with other non-surgical treatments, and treatment with distraction manipulation and neural mobilization may be a viable non-surgical option before considering surgery for lumbar spinal stenosis.”

## KEY POINTS FROM DAN MURPHY

- 1) “Lumbar spinal stenosis is a common and often disabling disorder that generally occurs in the sixth or seventh decade of life, although it can uncommonly occur in younger individuals.”
- 2) “Lumbar spinal stenosis can lead to low back and leg pain, most typically via encroachment on the central canal, lateral recess, or lateral canal.”
- 3) The encroachment is typically from vertebral body osteophytes, hypertrophy of the ligamentum flavum or zygapophyseal joint, or the posterior longitudinal ligament.
- 4) “The development of these degenerative changes is often accompanied by restriction of segmental mobility.” **[Important]**
- 5) “One of the hallmarks of lumbar spinal stenosis is neurogenic claudication, in which the patient develops low back and/or leg pain after a period of walking that progressively worsens as walking is continued, with improvement or resolution when walking ceases and the patient sits or flexes the lumbar spine.”
- 6) “Neurogenic claudication likely arises from increased metabolic demands of the nerve root in the presence of vascular compromise and traction on the adhered nerve root when lower extremity movement occurs during walking.”
- 7) Lumbar spinal stenosis is one of the most common reasons for spine surgery in older people.
- 8) Chronic compression of the nerve root in spinal stenosis causes compromise of blood flow leading to congestion, ischemia, and intraneural edema, “then leads to the development of periradicular fibrosis.”

- 9) "Increased pain with walking that is relieved with lumbar flexion (neurogenic claudication) is one of the hallmarks for lumbar spinal stenosis."
- 10) "With lumbar spinal stenosis, compression, vascular compromise and perineural fibrosis dominate the pathophysiological picture, thus maneuvers that increase IVF pressure, i.e., extension, or increase metabolic demands of the nerve root and movement of the fibrotic nerve root, as with walking, exacerbate the pain."
- 11) Treatment should "attempt to mobilize the segment(s) involved, decompress the involved nerve root(s) and mobilize the involved nerve root(s) to break up periradicular adhesion, thus releasing nerve root entrapment, and restoring vascular function."
- 12) Maintaining intersegmental and nerve root mobility is important in order to maximize the long-term benefit of treatment.
- 13) Distraction manipulation and neural mobilization are thought to "improve motion segment mobility (distraction manipulation) and nerve root mobility (neural mobilization)."
- 14) This study evaluated the effectiveness of non-surgical treatment for patients with central canal and lateral recess spinal stenosis, using 57 patients with a mean duration of symptoms exceeding 11 years. These patients were followed up at 16.5 months after treatment, with a range between 3 – 48 months. The mean number of treatments was 13.3 with a range between 2 – 50. "It must be noted that a relatively wide range of treatment visits (2–50) was seen in this study, suggesting that individual differences in patient responses to treatment exists which necessitates greater or fewer than the mean number of treatments."
- 15) The treatments used in this study were flexion distraction (after Jim Cox, DC), neural mobilization (after David Butler, PT) and mobilization exercises.
- 16) At follow-up, patient-rated improvement was 75.6%, and clinically meaningful improvement in disability was seen in 73.2% of patients.
- 17) Cox Distraction Manipulation decreases intradiscal pressure, creates vertebral motions and increases the size of the intervertebral foramen.
- 18) Neural mobilization technique mobilizes nerve roots;  
"Neural mobilization is hypothesized to gently move both the anatomical structures proximate to the neural elements that are being compromised, as well as the neural elements themselves. This may help patients with lumbar spinal stenosis by releasing perineural adhesions, thus decreasing traction strain on the nerve root, especially with walking."

- 19) The exercises "included the 'cat and camel' exercise in which the patient is quadruped and alternately flexes and extends (within the comfort level) the cervical and lumbar spine, and 'nerve flossing' exercises, which attempt to mobilize the involved nerve roots."
- 20) "No major complications to treatment were seen in any patient."
- 21) "Only two patients went on to require surgery."
- 22) "The results of this study suggest that the combination of distraction manipulation and neural mobilization may be useful for patients with lumbar spinal stenosis."
- 23) "Although other forms of manipulation are believed to be effective in patients with lumbar spinal stenosis, no form other than distraction manipulation was used with the patients in this study."