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**A Non-Surgical Approach to the Management of Lumbar
Spinal Stenosis: A Prospective Observational Cohort Study
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Abstract and Background

Abstract

Background: While it is widely held that non-surgical management should be the first line of approach in patients with lumbar spinal stenosis (LSS), little is known about the efficacy of non-surgical treatments for this condition. Data are needed to determine the

most efficacious and safe non-surgical treatment options for patients with LSS. The purpose of this paper is to describe the clinical outcomes of a novel approach to patients with LSS that focuses on distraction manipulation (DM) and neural mobilization (NM).

Methods: This is a prospective consecutive case series with long term follow up (FU) of fifty-seven consecutive patients who were diagnosed with LSS. Two were excluded because of absence of baseline data or failure to remain in treatment to FU. Disability was measured using the Roland Morris Disability Questionnaire (RM) and pain intensity was measured using the Three Level Numerical Rating Scale (NRS). 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 improvement in "on average" pain intensity was 1.6 points. This did not reach the threshold for clinical meaningfulness. The mean improvement in "at worst" pain was 3.1 points. This was considered to be clinically meaningful. The mean duration of FU was 16.5 months. The mean patient-rated percentage improvement from baseline to long term FU 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. The mean improvement in "on average" pain intensity from baseline to long term FU was 3.0 points. This was considered to be clinically meaningful. The mean improvement in "at worst" pain was 4.2 points. This was considered to be clinically meaningful. Only two patients went on to require surgery.

No major complications to treatment were noted.

Conclusion: A treatment approach focusing on DM and NM may be useful in bringing about clinically meaningful improvement in disability in patients with LSS.

Background

Lumbar spinal stenosis (LSS) is a common and often disabling disorder that generally occurs in the sixth or seventh decade of life,^[1] although it can uncommonly occur in younger individuals.^[2] The incidence of this condition has been reported to be 8-11%,^[3] with a slight preponderance in women.^[1] LSS can lead to low back and leg pain, most typically via encroachment on the central canal, lateral recess, or lateral canal. The source of the encroachment is typically vertebral body osteophytes, hypertrophy of the ligamentum flavum or zygapophyseal joint, or a combination of these.^[1] The posterior longitudinal ligament may be involved in some individuals.^[4] The development of these degenerative changes is often accompanied by restriction of segmental mobility.^[1]

One of the hallmarks of LSS 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.^[5]

LSS is one of the most common reasons for spine surgery in older people,^[6] although little is known about the efficacy of surgical management of patients with LSS,

particularly compared to non-surgical management.^[7] It is generally felt that most patients with LSS should be managed non-surgically before considering surgical intervention,^[8] but little is also known about what non-surgical approaches are most efficacious.

LSS can involve the central canal, the lateral recess, the lateral canal, or any combination of these.^[6] This can lead to nerve root pain and dysfunction, i.e., radiculopathy. The pathophysiology of radiculopathy secondary to LSS is different from that of radiculopathy secondary to herniated disc (HD). In recent years it has increasingly become clear that much of the pain with acute radiculopathy secondary to HD is chemical, not compressive in nature.^[9,10] The chemical inflammatory process with HD is initiated by the presence of nuclear material. But with LSS, it is likely that a different, or additional, mechanism that is involved in the production of nerve root pain.

Experimental evidence has suggested that chronic compression of the nerve root in LSS causes compromise of blood flow leading to congestion, ischemia, and intraneural edema.^[11] This then leads to the development of periradicular fibrosis.^[12] Increased pain with walking that is relieved with lumbar flexion (neurogenic claudication) is one of the hallmarks for LSS. Neurogenic claudication likely arises from increased metabolic demands of the nerve root in the presence of vascular compromise^[13] and traction on the adhered nerve root when lower extremity movement occurs during walking.^[14] This may explain why the SLR is often negative in pts with LSS,^[8] but is typically positive in patients with herniated disc. With LSS, compression, vascular compromise and perineural fibrosis dominate the pathophysiological picture, thus maneuvers that increase IVF pressure, i.e., extension,^[15] or increase metabolic demands of the nerve root and movement of the fibrotic nerve root, as with walking, exacerbate the pain.

A non-surgical approach that attempts to target the unique pathophysiology of LSS may be best able to rapidly improve pain and function in these patients. Such a treatment strategy would 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. It would appear that maintaining intersegmental and nerve root mobility would then be important in order to maximize the long term benefit of treatment.

The purpose of this study was to assess, using rigorous outcome measures, the results of a non-surgical management strategy for patients with LSS that focuses on distraction manipulation (DM) and neural mobilization (NM). Theoretically, these methods were employed in order to improve motion segment mobility (DM) and nerve root mobility (NM). It is not known whether these modalities actually create these effects, and this study does not evaluate these theoretical mechanisms. But the outcome of a strategy that focused on these methods was assessed. This strategy has not previously been evaluated.

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