

EXPLORATORY ANALYSIS OF CLINICAL PREDICTORS OF OUTCOMES OF NONSURGICAL TREATMENT IN PATIENTS WITH LUMBAR SPINAL STENOSIS



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ABSTRACT

Objective: The purpose of this study was to explore potential baseline physical examination and demographic predictors of clinical outcomes in patients with lumbar spinal stenosis.

Methods: This was a secondary analysis of data obtained from a pilot randomized controlled trial. Primary and secondary outcome measures were the Swiss Spinal Stenosis (SSS) Questionnaire and visual analog scale (VAS) for leg pain. Multiple regression models were used to assess 2 different outcomes: SSS at completion of care and VAS at completion of care. Separate regression models were built for each of the 2 outcomes to identify the best subset of variables that predicted improvement. Predictors with a significant contribution were retained in a final “best” model.

Results: Three variables were identified as having an association with SSS score at completion of care: baseline SSS score, qualitative description of leg pain, and age (adjusted $R^2 = 33.2$). Four variables were identified as having an association with VAS score at completion of care: baseline VAS score, qualitative description of leg pain, body mass index, and age (adjusted $R^2 = 38.3$).

Conclusion: This study provides preliminary evidence supporting an association between certain baseline characteristics and nonsurgical clinical outcomes in patients with lumbar spinal stenosis. (*J Manipulative Physiol Ther* 2016;39:88-94)

Key Indexing Terms: *Spinal Stenosis; Manipulation; Chiropractic; Low Back Pain; Complementary Therapies; Lumbar Vertebrae; Radiculopathy*

Lumbar spinal stenosis (LSS) is a syndrome that is characterized by significant buttock or lower extremity pain—which may occur with or without back pain—associated with diminished space available for the neural and vascular elements in the lumbar spine.¹ It is important to note that the diagnosis of the clinical syndrome of LSS requires both imaging evidence of bony narrowing as well as clinical evidence of significant buttock or leg

pain.² The hallmark symptom of LSS is pain that is typically worse with walking or standing and better with sitting or lying down. The leg pain associated with LSS often leads to significant impairment in ambulation and quality of life. Lumbar spinal stenosis is a significant public health concern due to the high prevalence of this condition in the senior population and the burden caused by its associated physical impairments. It has been cited as the

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most common reason for spine surgery in patients older than 65 years.³

The fastest growth in lumbar surgery in the United States this past decade has occurred in older adults with LSS, and the rate of complex fusion procedures has increased 15-fold.³ These surgical procedures are associated with significant health care costs, risks and complications, and high rehospitalization rates.³ The natural history of patients with clinically mild to moderate LSS can be favorable in approximately one-third to one-half of patients, without any type of specific treatment. Therefore, the development of optimal nonsurgical management approaches for LSS is a high public health priority.

The largest randomized clinical trial and cohort study to date (SPORT trial) that compared surgical vs nonsurgical care for LSS concluded that patients with symptomatic LSS who were treated surgically had greater improvement in pain and function in the short term.⁴ This benefit seems to last for up to 4 years, after which the surgical and nonsurgical outcomes converge.^{5,6} The patients in the cohort study who chose surgery were younger; had higher baseline pain, greater disability, and dissatisfaction with their symptoms; and reported their symptoms as progressively worsening at baseline. However, the results from that same study also showed that approximately one-third of patients in the nonoperative group experienced significant improvement in pain and function lasting up to 4 years, with approximately one-fourth reporting a major improvement in their condition.⁴

Nonsurgical care in the SPORT trial, both before and after randomization, was not standardized, being described as “usual care” (ie, whatever nonsurgical care each patient happened to have sought). More recently, Delitto et al⁷ published the results of their randomized trial of 169 LSS patients who were randomized to either physical therapy (PT) or surgical decompression. The primary outcome was physical function score on the Short Form-36 Health Survey at 2 years. Intention-to-treat analysis showed no difference between groups at 2 years, although there was a high rate of cross-over from PT to surgery.

There are few studies in the literature regarding the nonsurgical management of LSS by chiropractors, physical therapists, or medical physicians. There is 1 systematic review of epidural injections for the nonsurgical medical treatment of chronic low back pain that includes some studies related to treatment of LSS.⁸ This review found 10 randomized controlled trials (RCTs) and 11 observational studies; only 1 small RCT⁹ and 2 observational studies were specifically related to LSS that met the inclusion criteria. Significant relief of pain was noted in only 55% to 65% of the patients in the RCT.

A systematic review of chiropractic treatment for LSS revealed 6 relevant articles but no RCTs; these included 4 case reports, 1 case series, and 1 observational cohort study.¹⁰

The chiropractic treatments in these studies included spinal manipulation, most often distraction manipulation.

Numerous other interventions including exercise, activity of daily living modifications, and various passive care modalities were selectively used in the included studies. The 1 observational cohort study involved a case series of 57 consecutive patients with LSS treated with a combination of distraction manipulation and neural mobilization.¹¹ A majority of the patients in that cohort study showed clinically meaningful improvement in pain and disability scores that were maintained for up to 18 months.

There is 1 narrative review of the physical therapy literature for LSS with a case series of 3 patients managed with PT.¹² One RCT has been published that compared 2 types of PT for treatment of LSS.¹³ This trial showed that a majority of the patients experienced clinically significant improvements in both pain and function and that these gains were maintained for up to 18 months. A survey of LSS patients receiving PT treatment reported that the following nonsurgical PT options were most commonly used: strengthening and flexibility exercises, heat/ice, massage, joint mobilization, and acupuncture.¹⁴

It would be valuable for patients and clinicians to know if there are baseline predictors of surgical and nonsurgical treatment outcomes for patients with LSS. However, most of the evidence about predictors is restricted to the surgical literature. Secondary analyses of the SPORT trial data^{15,16} found that duration of symptoms less than 12 months at baseline was a significant predictor of better outcome with either surgical or nonsurgical treatments and that diabetic patients did not do as well with nonsurgical treatments. However, diabetic patients who did have surgery for LSS showed more postoperative complications and less improvement in pain or function as compared to nondiabetic LSS patients.

A systematic review of preoperative predictors for LSS surgery¹⁷ found the following baseline predictors were associated with better postsurgical outcomes: male sex, younger age, better walking ability, better self-reported health, fewer comorbidities, and more pronounced canal stenosis. Negative predictors were depression, cardiovascular comorbidities, scoliosis, and other comorbid conditions affecting walking capacity. Smoking has also been associated with poorer outcomes in patients undergoing spine surgery, especially procedures that involve spinal fusions.¹⁸

As noted above, better walking ability at baseline was associated with better postsurgical outcomes, but we do not know if this finding generalizes to nonsurgical treatment outcomes. Previous studies have reported the important and predictive value of leg symptoms and self-reported patient information in the differential diagnosis of LSS.¹⁹⁻²¹ These studies have shown that various lower extremity symptoms are highly associated with the diagnosis of LSS, including the inability to walk long distances without sitting down, improvement in leg symptoms when flexing the lumbar spine, and inability to stand due to leg symptoms. However,

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