

Treatment of Degenerative Lumbar Spinal Stenosis

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Spinal stenosis is a narrowing of the vertebral canal that compresses spinal nerves and may cause leg pain and difficulty walking. The symptoms of degenerative lumbar stenosis commonly occur in elderly adults and can be treated conservatively with pain-relieving agents or aggressively with decompressive surgery. Most studies of the effectiveness of treatments are poor in quality; however, there appear to be potential relationships between treatments, patient characteristics, and treatment outcomes. Studies indicate the following: (1) local anesthetic block can reduce symptoms on a short-term basis, while epidural steroids offer no additional benefit; (2) patients with moderate or severe symptoms benefit more from surgery than from conservative therapy; and (3) patients with leg pain and severely restricted walking ability regain mobility after surgery. Definitive evidence-based conclusions about the efficacy of conservative or surgical treatments await the results of well-designed clinical trials. (*Am Fam Physician* 2004;70:517-20. Copyright© 2004 American Academy of Family Physicians.)

ACE This article exemplifies the AAFP 2004 Annual Clinical Focus on caring for America's aging population.

See page 422 for levels-of-evidence definitions.

Spinal stenosis is a narrowing of the vertebral canal. Approximately 1.2 million people in the United States have back and leg pain that is related to spinal stenosis.¹ The narrowing of the vertebral canal may lead to compression of the spinal nerves or nerve roots, especially in the area of the lumbar vertebrae.^{2,3}

Degenerative lumbar stenosis is common in elderly adults; bony overgrowth and ligament enlargement into the spinal canal, intervertebral disc herniation, or vertebral slippage (spondylolisthesis) may be responsible for nerve compression. This compression results in low back pain, leg fatigue and pain, and reduced capacity for physical activity.

Neurogenic claudication describes a combination of low back pain, leg pain, numbness, and motor weakness that starts or intensifies on standing or walking and is eased by sitting or lying down. Although symptomatic stenosis involves some degree of neurogenic claudication, not all patients with lumbar spinal stenosis are symptomatic or exhibit neurogenic claudication.

Symptoms of lumbar spinal stenosis may be categorized as mild, moderate, or severe, based on the extent of leg pain and pain-related disability.^{4,5} Patients with severe symptoms have exercise intolerance and greatly restricted walking capacity, and may have bladder dysfunction (i.e., urinary incontinence).^{3,6} Conservative treatment with pain-relieving agents seems to be the natural choice when symptoms are mild.^{3,5} Decompressive surgery to remove the bone and ligaments around the stenosis usually is recommended for patients with severe symptoms when conservative therapy has not provided adequate pain relief.^{3,5} Patients with moderate symptoms fall into a gray zone in which the most appropriate treatment is not obvious.⁷

This article reviews the evidence for conservative and surgical treatments for degenerative lumbar spinal stenosis. A detailed discussion of the anatomy, pathophysiology, clinical history, physical examination, and differential diagnosis of lumbar spinal stenosis has appeared in *American Family Physician*.³

Our systematic review of the evidence revealed problems with study design and quality. These problems complicated the

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TABLE 1
Summary of Important Findings

<i>Intervention</i>	<i>Implication</i>	<i>Strength of recommendation</i>	<i>References</i>
Conservative treatment in patients with mild or moderate symptoms	—	*	—
Conservative treatment for severe symptoms: local anesthetic block	Local anesthetic block can reduce symptoms only on a short-term basis (one month)	B	8
Conservative treatment for severe symptoms: epidural steroids	Epidural steroids offer no benefit on a short-term or long-term basis	B	8
Surgery for mild symptoms	—	†	—
Surgery for moderate symptoms	Surgery may be more beneficial than conservative therapy	B	4, 5, 7, 9
Surgery for severe symptoms	Patients will benefit more from surgery than from conservative therapy	B	5
Surgery for severe symptoms in patients with neurogenic claudication and severely restricted walking ability	Patients regain mobility after surgery	B	6, 10-12

*—Because of the lack of controlled trials that enrolled only patients with lumbar spinal stenosis, an evidence base for the evaluation of this intervention is not available.

†—No evidence base is available for this intervention.

Information from references 4 through 12.

literature assessment for conservative and surgical interventions. However, some important findings from the better studies were identified and are summarized in *Table 1*.⁴⁻¹² Our findings should be viewed as showing potential relationships between treatments, patient characteristics, and treatment outcomes. Definitive evidence-based conclusions about the efficacy of conservative or surgical treatments for lumbar spinal stenosis await the results of well-designed clinical trials.

Data Sources

Candidate studies for inclusion in this review were identified by searching 25 bibliographic databases (including MEDLINE, Embase, the Cochrane Database of Systematic Reviews, CRISP, and CINAHL) as part of a systematic review requested by the Agency for Healthcare

Research and Quality. Search dates spanned from database inception through May 2000 and were updated through March 2003 for this article. Search terms included spinal stenosis, lumbar stenosis, sciatica, backache, spinal disease, neurogenic claudication, nerve root entrapment, nerve root compression, and spondylosis. Controlled trials of conservative treatments were included, as were any clinical studies of surgical treatment, regardless of study design. All reviewed studies enrolled 10 or more patients.

Treatment for Mild Symptoms

One randomized placebo-controlled trial⁸ examined the effects of epidural steroid injections and a local anesthetic on neurogenic claudication. The results of this study suggest that the local anesthetic mepivacaine reduces symptoms and increases walking distance in

the short-term, but effects last for no more than one month. Epidural steroids offer no additional benefit to the effects of the anesthetic block.⁸ [Evidence level B, good-quality randomized controlled trial (RCT)]

Treatment for Moderate Symptoms

In patients with moderate symptoms, surgery may be more beneficial than conservative therapy. The Maine Lumbar Spine Study⁴ (a prospective, observational cohort study) contained a subgroup of patients with moderate symptoms (31 patients underwent surgery, and 23 were treated with bed rest, physical therapy, exercise, braces, traction, transcutaneous electrical nerve stimulation [TENS], spinal manipulation, narcotic analgesics, or epidural steroids). The patients who had surgery showed significantly better improvement, suggesting that surgery may be more beneficial than conservative treatment in patients with moderate pain.⁴ [Evidence level B, clinical cohort study] After four years of follow-up, the outcomes continued to be better in patients who had moderate pain initially and underwent surgery.⁹ [Evidence level B, clinical cohort study]

Randomization of patients to surgical or conservative treatment was considered ethical in two trials^{5,7} where treatment was deemed appropriate for patients with moderate symptoms. In the first trial,⁷ 44 patients with mild to moderate leg pain were randomized to receive conservative treatment (i.e., back braces, physical therapy, and exercise programs) or surgery. Although both treatment groups showed clinically and statistically significant improvement one year after treatment, only the surgery group continued to show improvement after two years. [Evidence level B, good-quality RCT]

In the second trial,⁵ patients with moderate pain were randomized to undergo surgery or receive conservative therapy (i.e., bracing and physical therapy), patients with severe pain underwent surgery, and patients with mild symptoms received conservative therapy. Within three to 27 months of entering the study, 10 of the 18 (56 percent) conservatively treated patients with moderate symptoms crossed over to undergo surgery.

Among patients with moderate symptoms, a higher percentage of surgery patients were rated excellent or fair.

These data suggest that surgery may be more beneficial than conservative therapy in patients with moderate symptoms. However, physicians may have underestimated pain and severity of symptoms in some patients, resulting in their inclusion in the moderate group rather than the severe group. As a result, many patients who belonged in the severe group may have been assigned to the moderate group and, therefore, were randomized to receive conservative treatment. These patients would be more likely to have unsuccessful results and to need surgery, thereby artificially reducing the reported effectiveness rate of conservative treatment in moderate patients. [Evidence level B, lesser quality RCT]

Treatment for Severe Symptoms

Although the study⁵ discussed above suggests that patients with severe symptoms benefit more from surgery than conservative therapy, this theory is based on the assumption that some patients with severe symptoms were misclassified and thus received conservative therapy initially and improved after they underwent surgery. In general, data are lacking on the effect of conservative treatment in patients with severe stenosis because these patients seem to receive surgery shortly after diagnosis.⁵ [Evidence level B, lesser quality RCT]

Treatment for Neurogenic Claudication

Evidence from four prospective uncontrolled trials that measured pre- and post-surgery walking ability suggests that these patients significantly improved after surgery. Patients in these studies had severe lumbar spinal stenosis that resulted in greatly limited walking capacity and had received conservative therapy that failed to relieve their symptoms. One study¹⁰ performed an exercise treadmill test before and after surgery in 50 patients. These patients

In patients with neurogenic claudication, local anesthetic block can reduce symptoms on a short-term basis. Epidural steroids offer no additional benefit.

showed statistically significant increases in time to symptoms of first leg pain (mean increased from two minutes to 12 minutes) and total ambulation time (mean increased from seven minutes to 13 minutes). [Evidence level B: uncontrolled study]

In the other three studies, average walking distance among 30 patients increased from 100 yards to 1,320 yards (three fourths of a mile),¹¹ walking tolerance increased from less than 15 minutes in 50 of 51 patients to more than 30 minutes in 39 of 48 patients (19 with unlimited tolerance),⁶ and 50 patients with significant walking limitations (an average of 200 yards) increased to 1,000 yards.¹² [References 6, 11, and 12—Evidence level B, uncontrolled studies]

The value of walking ability as an outcome to evaluate the efficacy of surgery is limited by the extent of comorbidities in elderly patients. Leg pain could have provided an additional outcome to evaluate the efficacy of surgery, but too few studies reported this feature before and after surgery or used a similar pain measurement scale.

The full evidence report prepared by ECRI is available from the Agency for Healthcare Research and Quality. Printed copies may be obtained free of charge from the AHRQ Publications Clearinghouse by calling 1-800-358-9295 and asking for Evidence Report/Technology Assessment No. 32, Treatment of Degenerative Lumbar

Spinal Stenosis (AHRQ Publication No. 01-E048). Internet users can access the report online through AHRQ's Web site at <http://www.ahrq.gov>. ECRI is a nonprofit health services research agency and a Collaborating Center for Healthcare Technology Assessment of the World Health Organization.

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Patients who have neurogenic claudication and severely restricted walking ability regain mobility after surgery.

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