

Diagnosing Lumbar Spinal Stenosis

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This guide is one in a series that offers evidence-based tools to assist family physicians in improving their decision making at the point of care.

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Clinical Question

What is the best way to diagnose lumbar spinal stenosis in patients with leg pain or numbness?

Evidence Summary

Lumbar spinal stenosis is an important cause of pain and disability, and surgery is beneficial for appropriately selected patients.^{1,2} Therefore, it is important for primary care physicians to distinguish patients with spinal stenosis from those with musculoskeletal low back pain, peripheral vascular disease, or spinal disk disease.

Individual signs and symptoms suggestive of lumbar spinal stenosis include older age at onset, longer duration of symptoms, symptoms that worsen with walking or standing, numbness of the lower legs with activity, symptoms that improve with bending forward, and symptoms that worsen with bending backward. The findings that most strongly suggest lumbar spinal stenosis are symptoms that improve with bending forward, urinary disturbance, and intermittent claudication.

Table 1 includes accuracy data for individual signs and symptoms.³ These data are derived from the best study to date of the clinical diagnosis of lumbar spinal stenosis.³ The study included patients presenting to an orthopedic surgeon with a primary complaint of pain or numbness in the legs. All patients had plain radiography and magnetic resonance imaging (MRI) of the lumbar spine, as well as a standardized history and physical examination. The reference standard was diagnosis of lumbar spinal stenosis by the referring orthopedic surgeon and the study coordinator; a consensus panel established the final diagnosis when the surgeon and coordinator disagreed (this occurred with 243 patients). Of the 468 patients in the study, 222 patients received a final diagnosis of spinal stenosis. This percentage is higher than in a typical primary care population, suggesting that their prediction tools may overestimate the risk of spinal stenosis.

The authors of the study developed several clinical prediction tools based on this data set. First, the authors created an integer-based scoring system using 10 history and

Table 1. Accuracy of Individual Signs and Symptoms in the Diagnosis of Lumbar Spinal Stenosis

Patient-reported signs and symptoms	Sensitivity (%)	Specificity (%)	LR+	LR-
History of urinary symptoms	14	98	7	0.14
Symptoms improve when bending forward	52	92	6.5	0.52
Intermittent claudication	82	78	3.7	0.23
Symptoms worsen when standing up	68	70	2.3	0.46
Bilateral plantar numbness	27	87	2.1	0.84
Symptoms induced when bending backward	70	55	1.6	0.55

NOTE: Data from patients with pain or numbness requiring referral to an orthopedic surgeon.

LR- = negative likelihood ratio; LR+ = positive likelihood ratio.

Information from reference 3.

Table 2. Clinical Decision Rule for the Diagnosis of Lumbar Stenosis

Findings	Points
Age	
< 60 years	0
60 to 70 years	2
> 70 years	3
Onset of symptoms occurred more than six months ago	1
Symptoms improve when bending forward	2
Symptoms improve when bending backward	-2
Symptoms worsen when standing up	2
Intermittent claudication present	1
Urinary incontinence present	1
Total:	_____
Score	<i>Probability of lumbar spinal stenosis*</i>
≤ 2	11/66 (16.7%)
3 or 4	35/120 (29.2%)
5 or 6	78/151 (51.7%)
≥ 7	98/131 (74.8%)

NOTE: Decision rule uses patient-reported symptoms.

*—Data are combined from the group of patients used to derive this decision rule and the group used to validate it. The two groups had similar results.

Adapted with permission from Sugioka T, Hayashino Y, Konno S, Kikuchi S, Fukuhara S. Predictive value of self-reported patient information for the identification of lumbar spinal stenosis. *Fam Pract.* 2008;25(4):242.

Spinal Stenosis Questionnaire

This list contains some sentences that people have used to describe themselves when they have spinal stenosis. As you read the list, think of yourself. When you read a sentence that describes you, please circle "yes." If the sentence does not describe you, please circle "no."

1. Numbness and/or pain is present in the thighs down to the calves and shins.	Yes	No
2. Numbness and/or pain increases in intensity after walking for awhile, but is relieved with rest.	Yes	No
3. Standing for awhile brings on numbness and/or pain in the thighs down to the calves and shins.	Yes	No
4. Numbness and/or pain is reduced by bending forward.	Yes	No
5. Numbness is present in both legs.	Yes	No
6. Numbness is present in soles of both feet.	Yes	No
7. Numbness arises around the buttocks.	Yes	No
8. Numbness is present, but pain is absent.	Yes	No
9. A burning sensation arises around the buttocks.	Yes	No
10. Walking nearly causes urination.	Yes	No

physical examination findings.³ This tool has good accuracy, with a likelihood ratio of 3.3 for a positive test result and 0.1 for a negative test result. However, it has not been prospectively validated. A second rule (Table 2), which does not include physical examination findings, was developed using 80 percent of the data set and validated using the remaining 20 percent.⁴ Finally, the researchers created a self-administered, 10-item patient survey (Figure 1) to identify patients with lumbar spinal stenosis and then distinguish between those with radicular lumbar spinal stenosis and those with cauda equina syndrome.⁵

A recent systematic review evaluated the accuracy of diagnostic tests for lumbar spinal stenosis.⁶ Fifteen studies of imaging for the diagnosis of the condition were identified. Although most of the studies were of poor quality and the accuracy of the tests varied considerably between studies, the authors of the review concluded that myelography, computed tomography, and MRI appear to have similar accuracy. Evidence from two studies showed that three-dimensional magnetic resonance myelography may be somewhat more sensitive than other tests, but it is more expensive.⁶

It is important for physicians to consider cauda equina syndrome in the differential diagnosis of back pain and numbness. Any patient with signs or symptoms of possible cauda equina syndrome (e.g., saddle anesthesia, bowel or bladder symptoms) should receive emergent referral to a neurosurgeon.

Applying the Evidence

A 64-year-old man presents with leg pain that has gradually worsened since its onset eight months ago. The pain worsens when he walks or stands up, improves when he bends forward, and does not change when he bends backward. He denies having urinary incontinence. What is the patient's risk of lumbar spinal stenosis?

Answer: Using the clinical decision rule in Table 2,⁴ the patient receives a score of 8 points (two points for age, one for time of onset, two for improved pain with bending forward, two for worsening pain with standing, and one for worsening pain with walking [claudication]). This puts him in the highest risk category for lumbar spinal

Figure 1. Self-administered, self-reported questionnaire for patients with symptoms of spinal stenosis.

Interpretation: Answering "yes" to questions 1 through 4 and "no" to questions 5 through 10 suggests radicular lumbar spinal stenosis. Answering "yes" to at least one of questions 1 through 4, and at least two of questions 5 through 10 suggests cauda equina syndrome.

Adapted from Konno S, Kikuchi S, Tanaka Y, et al. A diagnostic support tool for lumbar spinal stenosis: a self-administered, self-reported history questionnaire. *BMC Musculoskelet Disord.* 2007;30(8(suppl)):102. <http://www.biomedcentral.com/content/supplementary/1471-2474-8-102-S2.doc>. Accessed October 7, 2009.

stenosis (75 percent probability). After ruling out peripheral vascular disease by confirming that his ankle brachial indices are normal, you order an MRI to confirm lumbar spinal stenosis.

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REFERENCES

1. Weinstein JN, Tosteson TD, Lurie JD, et al., for the SPORT Investigators. Surgical versus nonsurgical therapy for lumbar spinal stenosis. *N Engl J Med.* 2008;358(8):794-810.
2. Malmivaara A, Släts P, Heliövaara M, et al., for the Finnish Lumbar Spinal Research Group. Surgical or nonoperative treatment for lumbar spinal stenosis? A randomized controlled trial. *Spine.* 2007;32(1):1-8.
3. Konno S, Hayashino Y, Fukuhara S, et al. Development of a clinical diagnosis support tool to identify patients with lumbar spinal stenosis. *Eur Spine J.* 2007;16(11):1951-1957.
4. Sugioka T, Hayashino Y, Konno S, Kikuchi S, Fukuhara S. Predictive value of self-reported patient information for the identification of lumbar spinal stenosis. *Fam Pract.* 2008;25(4):237-244.
5. Konno S, Kikuchi S, Tanaka Y, et al. A diagnostic support tool for lumbar spinal stenosis: a self-administered, self-reported history questionnaire. *BMC Musculoskelet Disord.* 2007;30(8):102.
6. de Graaf I, Prak A, Bierma-Zeinstra S, Thomas S, Peul W, Koes B. Diagnosis of lumbar spinal stenosis: a systematic review of the accuracy of diagnostic tests. *Spine.* 2006;31(10):1168-1176. ■