



CLINICAL UPDATES

Lumbar spinal stenosis

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What you need to know

- Suspect lumbar spinal stenosis in people over 50 who describe leg pain or paraesthesia on walking or prolonged standing, and who are walking reduced distances as a result
- Imaging is not required during initial assessment as the correlation between imaging findings and symptoms is poor
- Conservative treatment, which includes supervised exercise and manual therapy, is advised as first line treatment; about 30-50% of patients with mild to moderate symptoms experience spontaneous improvement in pain and ability to walk greater distances
- Prescribe pain medication only for a short period and after careful consideration, taking into account the important side effects, especially in older people, and the absence of good evidence for efficacy
- Refer patients with severe symptoms, neurological deficits, or no improvement after 3-6 months of conservative treatment to a spine specialist for imaging and further intervention or surgery

Lumbar spinal stenosis (LSS) affects about 11% of the population,¹ and primarily affects older adults.¹ Pain in legs and difficulty walking can limit function and participation in daily activities, which can have negative psychological effects.²

Diagnosis can be challenging because of the overlap of symptoms with other conditions that cause leg or low back pain in older adults. Lumbar spinal stenosis can usually be diagnosed clinically and managed conservatively in primary care. Patients with severe symptoms may require referral for imaging and intervention. The evidence for most treatment options is limited.³⁻⁵ Shared decision making with patients must consider the severity of symptoms and their impact on the person's life, risks and benefits of treatments, and individual preferences.

What causes LSS?

Degenerative changes in the spine can cause narrowing of the central spinal canal, lateral recesses, or intervertebral foramen. Changes include disc degeneration and bony or soft tissue changes, such as facet joint arthrosis and hypertrophy of the ligamentum flavum, which occur with ageing⁶ (fig 1). Narrowing may occur, which can cause compression and/or ischaemia of the associated neural and vascular structures.

How common is it?

About 11% (95% confidence interval (CI) 0.04 to 0.18) of adults in the general population experience symptoms of LSS, as per a systematic review (four

studies, 6108 participants).¹ The pooled prevalence of clinical symptoms of LSS in primary care patients is 25% (95% CI 19 to 32%) (four studies, 171 157 patients). Prevalence varies between studies because of differences in population characteristics and diagnostic criteria used.

Prevalence increases with age. The mean age in the general population and primary care patient population is 62 and 69 years, respectively (age range 19-93).¹ Patients with congenital LSS are often younger.

How do patients present?

Patients describe being able to walk reduced distance because of pain in buttocks and/or legs (neurogenic claudication).⁷ Symptoms are aggravated by walking or prolonged standing and relieved by forward bending (shopping cart sign) or sitting.⁸ Pain is bilateral in central LSS and may be accompanied with paraesthesia, or weakness in the buttocks, thighs, or lower legs. Low back pain may be present.⁹ The severity can range from mild discomfort when walking to being unable to walk. Impaired balance and forward flexion when walking may increase the risk of falling.

Lateral recess or foraminal stenosis can cause affection of single nerve roots (radiculopathy). Leg symptoms such as pain and paraesthesia will then often follow a more specific distribution and can be unilateral or bilateral. Combinations of these subtypes are common.

How is it diagnosed?

History and examination help make a presumptive diagnosis of LSS to initiate management. Buttock and/or leg symptoms that worsen on extension postures and are relieved with flexion can guide diagnosis. Box 1 lists clinical features that increase the certainty of a diagnosis of LSS. Patients may not always clearly distinguish buttock pain from low back pain. You may attempt to trigger the symptoms by asking the patient to walk or by standing in a lumbar spine extension posture for 30 seconds.^{8 10} Neurological examination is usually normal. Neurological deficits (eg, muscle weakness, absence of tendon reflexes, and sensory deficit) indicate severe disease. Rarely a patient may present with urinary retention or decreased anal sphincter tone, which suggest cauda equina. This requires prompt referral.¹¹

What differential diagnoses to consider?

Vascular claudication, a result of peripheral arterial disease, causes leg pain which—like LSS—is triggered by walking and relieved with rest. Forward flexion,

using a shopping cart, cycle, or stationary bike, does not improve symptoms as is expected in LSS. Cycling is usually tolerated in people with LSS. In addition, patients may have cold feet or legs and skin discoloration on the feet. Check for foot pulses and abnormal ankle-brachial index.

Hip osteoarthritis also presents with buttock, groin, lateral hip, and leg pain provoked by weightbearing gait. Patients may limp and have limited walking ability. On examination, pain may be localised to one hip or both. Passive flexion and internal rotation of the hip are usually limited in range and painful.

Trochanteric bursitis presents with pain overlying the lateral aspects of the hip aggravated by lying on the affected side. Pain can extend along the lateral hip to the knee. You may elicit point tenderness with palpation of the trochanteric area. Pain is present on active and resisted abduction, passive adduction of the hip, and during combined passive flexion, abduction, external rotation, and extension.

Box 1: Key clinical features for a diagnosis of lumbar spinal stenosis, based on international consensus⁹

Patient over 50 with the following symptoms:

- leg or buttocks pain while walking
- forward flexion to relieve symptoms
- relief experienced when using a shopping cart or bicycle
- motor or sensory disturbance while walking
- normal and symmetric foot pulses
- lower extremity weakness
- lower back pain

What are the investigations?

Imaging is not recommended as part of the initial assessment.¹² Imaging can confirm a clinical diagnosis of LSS,¹³ but it is not a strong diagnostic tool. The association between imaging findings and symptoms or severity is unclear.⁴ A systematic review (nine studies, 714 participants) found that 11% (95% CI 0.11 to 0.18) of people with no symptoms had radiological signs of LSS, and this rose to 21-33% of people over 60.¹

Magnetic resonance imaging (MRI) of the lumbar spine (or computed tomography (CT) if MRI is contraindicated), can be done in patients being considered for surgery^{4 14} (fig 2).

Patient perspective

We asked a patient in her 70s to share her experience of living with lumbar spinal stenosis. The patient received intensive six week structured treatment with supervised mobilisation exercises and manual treatment twice a week. This was supplemented with self-managed daily mobilisation and strengthening exercises and a stationary bike workout.

I was in incredible pain every single day and sometimes had to walk bending forward. The thought of having to walk the 400 metres to the bus was a nightmare. Sometimes I could not walk more than 100 metres and I had to stand still for quite a long time before I was able to walk again. I was worried about whether I could reach the bus and I didn't like to feel pathetic.

I started treatment 2-3 months ago. For the first few weeks, I was in pain after the treatment. It was stressful with the cycling and exercises I had to do every day. Then it started to help. Now I can walk to the bus. I only have minor pain and it does not restrict my activity. Last Sunday, I took part in a city walk of two hours. I have gained a new independence.

How is it managed?

Assess the impact of symptoms on the patient's life. Pain, limited walking ability, and low mood can affect participation in recreational and social activities.² Consider severity of symptoms and the patient's preferences when deciding the approach to management. Evidence to recommend any single treatment approach is limited.¹⁵

Conservative management

LSS is degenerative in nature, therefore the aim of treatment is to improve or stabilise symptoms rather than cure. About a third to half of patients with mild to moderate symptoms experience improvement over time with reduced pain and increased walking distance.^{4 16} Patients rarely experience rapid symptom deterioration.¹⁶

National Institute for Health and Care Excellence (NICE) has not published guidelines on LSS. Other guidelines recommend exercises and manual therapy involving spinal mobilisation and manipulation.^{5 17} Systematic reviews find that a limited number of randomised controlled trials of low methodological quality explore exercise and manual therapy in patients with LSS.¹⁸⁻²¹ Supervised exercise and manual therapy resulted in a higher proportion of patients seeing an improvement in symptom severity, walking distance, physical function, and pain at 6 to 8 weeks compared with home or self-directed exercise or group exercise in recent small trials.²²⁻²⁴ It is unclear if benefits sustain longer.

The efficacy of pain medications for LSS is uncertain primarily owing to low quality studies or lack of studies.²⁵ Prescribe pain medications only sparsely and after discussing their side effects with the patient.⁵ Pain medication may be used for short term pain relief or to bridge waiting time in patients undergoing surgery.

Spinal injections

Reviews of interventional pain medicine in 2019 give a weak recommendation that local epidural anaesthesia injections without steroids could be considered in LSS, based on low quality evidence.^{26 27} Owing to the potential adverse effects of steroids and no evidence of benefit, epidural administration of local anaesthetics alone may be considered.²⁶ Inform patients about possible side effects, short term effects of treatment, and the need for repeat injections.

A large, well conducted, randomised controlled trial (400 patients) showed no difference at 6 weeks between patients receiving epidural injections of glucocorticoids plus lidocaine or lidocaine alone.²⁸ Approximately 30-40% of patients achieved a 30% reduction in disability and 50% achieved a 30% reduction in leg pain at 6 week follow-up. One or more adverse events such as pain, skin irritation, fever, headache, dizziness or numbness was reported by 15-20% of patients. This was higher in the group receiving steroids. No trials have compared the effect of local anaesthetics with placebo.

Surgery

A minority of patients in primary care need surgery. Surgery aims to increase the space around the compromised neural structures. This is commonly achieved by decompressive laminectomy, in which part or all of the vertebral lamina are removed. Lumbar fusion as an add-on can be necessary in case of instability. Surgery may be considered in patients with severe symptoms or neurological deficits or those with no improvement or worsening symptoms after 3-6 months of conservative management.^{5 14} Offer referral to a spine specialist.

A cohort study published in 2020 (2559 patients) reported unsatisfactory outcomes with surgery for LSS in patients with mild leg pain (3 on a 10 point scale).²⁹ A Cochrane review (five randomised controlled trials, 643 patients) in 2016 reported no clear benefits with surgery compared with non-surgical treatment. In patients undergoing surgery, 10-24% experienced side effects compared with none with non-surgical management.²¹ A systematic review (64 cohort studies, 3774 participants) found a 50% reduction in pain and disability three months post-surgery but mild-to-moderate pain and disability persisted at five years.³⁰

Ongoing trials are evaluating surgery and physiotherapy interventions in patients with LSS, which will add to the evidence.^{31 32}

Education into practice

- How would you discuss lumbar spinal stenosis and the available treatment options with a patient receiving a new diagnosis?
- At your practice, how are patients included in decision making when choosing treatment?

Sources and selection criteria

We searched Medline and the Cochrane Database of Systematic Reviews from 2016 to 2020 to build on the literature used in a clinical review published in the *BMJ* in 2016. We used the search terms “lumbar spinal stenosis” and “neurogenic claudication” and focused primarily on clinical guidelines and systematic reviews.

Questions for future research

- What is the extent and intensity of lumbar spinal stenosis symptoms in the general population?
- What is the natural course and prognosis of lumbar spinal stenosis?
- What are the optimal treatment modalities and duration of conservative treatment?
- What are the criteria and what is the optimal timing to consider surgery?

Additional educational resources

- National clinical guidelines for surgical and non-surgical treatment of lumbar spinal stenosis. Danish Health Authority (in English) (free). 2017. <https://www.sst.dk/-/media/Udgivelser/2017/NKR-lumbal/NKR-51-Lumbal-Spinal-stenose.ashx?la=da&hash=18B177091A2AC453FBE511CB2BA2C4ECBEA68006>
- Non-surgical interventions for lumbar spinal stenosis leading to neurogenic claudication: a clinical practice guideline. 2021 (free) [https://www.jpain.org/article/S1526-5900\(21\)00188-7/fulltext](https://www.jpain.org/article/S1526-5900(21)00188-7/fulltext)
- North American Spine Society. Evidence-based clinical guidelines for multidisciplinary spine care. Diagnosis and treatment of degenerative lumbar spinal stenosis (revised 2011) (free) <https://www.spine.org/Portals/o/Assets/Downloads/ResearchClinicalCare/Guidelines/LumbarStenosis.pdf>
- “Patient” website provides clinical information about lumbar spinal stenosis aimed at healthcare professionals (free) <https://patient.info/doctor/spinal-stenosis-pro>
- National Health Service (NHS) provides information about shared decision-making to help clinicians support patients to reach a decision about their treatment (free) <https://www.england.nhs.uk/shared-decision-making/>
- National Institute for Health and Care Excellence (NICE) guidelines on low back pain and sciatica in over 16s: assessment and

management. 2020 update. (free)

<https://www.ncbi.nlm.nih.gov/pubmed/33090750>

- National Institute for Health and Care Excellence (NICE): Clinical Guidelines. Neuropathic pain in adults: pharmacological management in non-specialist settings. 2020 update. (free) <https://www.ncbi.nlm.nih.gov/pubmed/31961628>

Information resources for patients

- Clinical information produced by healthcare professionals for patient (free) <https://patient.info/bones-joints-muscles/back-and-spine-pain/spinal-stenosis>
- British Association of Spinal Surgeons provides patient information for common spinal treatments (free) www.spinesurgeons.ac.uk
- International Association for the Study of Pain (IASP) provides a list of webpages for pain associations and pain management for patients (some are free) <https://www.iasp-pain.org/PatientResources?navItem-Number=678>

How patients were involved in the creation of this article

We asked a patient about the impact of LSS on their daily living, diagnosis, and treatment, in an informal interview (box “Patient perspective”). A patient with LSS from primary care kindly reviewed an early draft of this paper and suggested alterations to the language style and inclusion of additional illustrations. In addition, a patient reviewer kindly reviewed this paper for *The BMJ* and suggested information resources for patients. We have revised the article to incorporate their suggestions and are grateful for their input.

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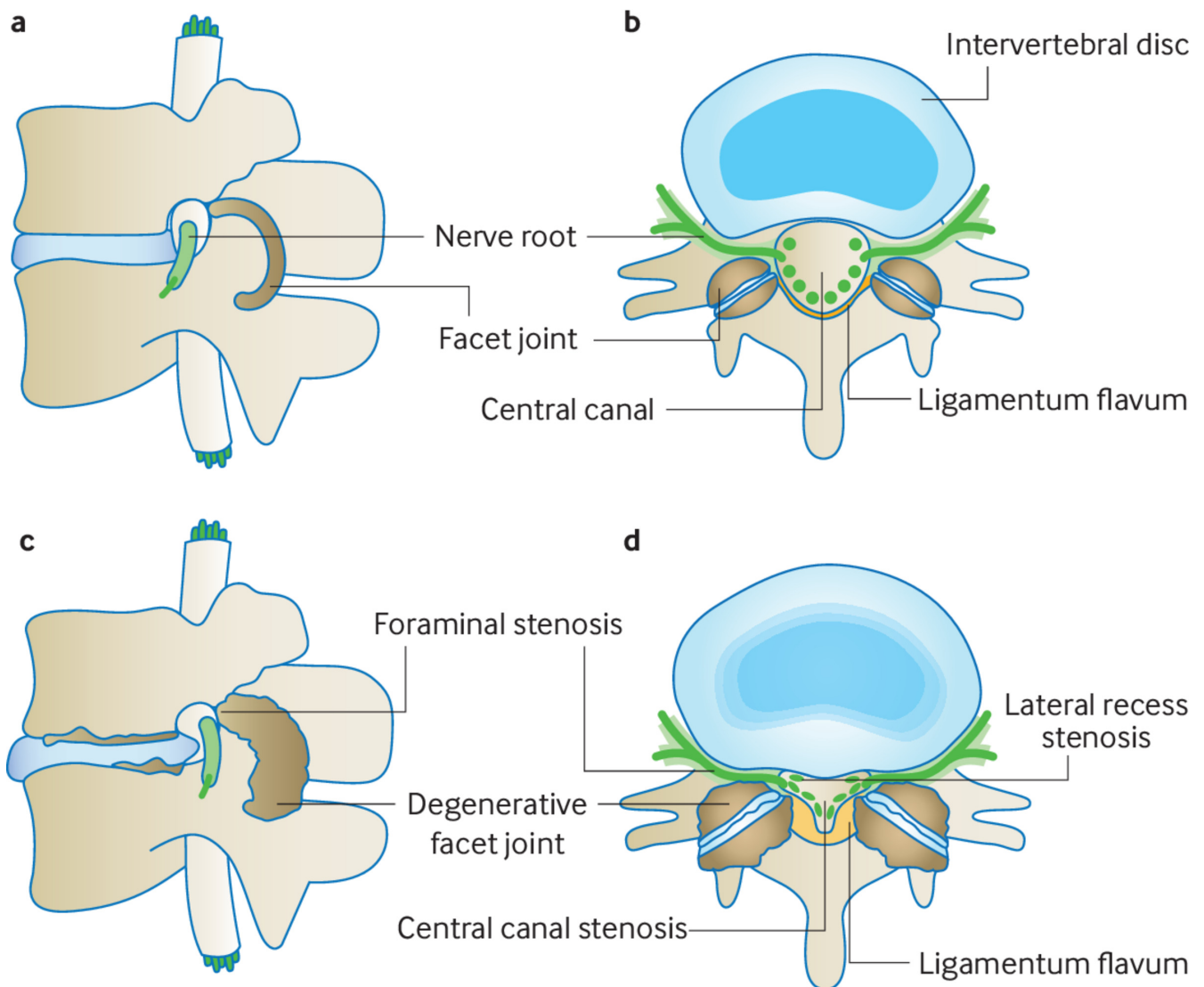


Fig 1 | Normal vertebral motion segment (A (sagittal) and B (axial)) and degenerative lumbar spinal stenosis (C (sagittal) and D (axial)). Narrowing of the central spinal canal and recess (D) is only minor to allow for visualisation of the nerve structures (small green dots). Sagittal (C) and the left side of the axial (D) illustrates a moderately compromised nerve root in the intervertebral foramen. Figure reproduced with permission from the Danish Chiropractors' Association

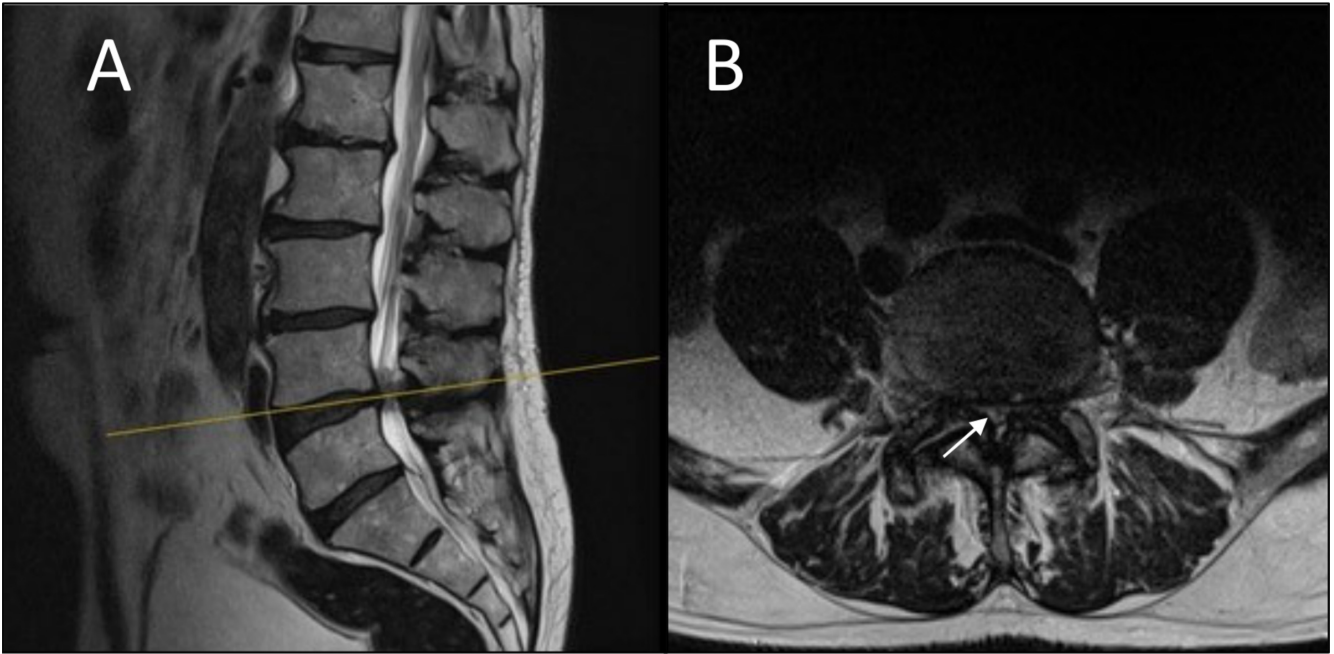


Fig 2 | Lumbar spinal central stenosis on MRI. Sagittal (A) and axial (B) T2-weighted MRI of the L4/L5 lumbar segment of a 57 year old patient. The yellow line on image A indicates the level of the visual slice shown in image B. The images are showing limited space in the central spinal canal (arrow) owing to disc bulge, hypertrophy of the ligamentum flavum and osteoarthritis of the facet joints