

Degenerative Spondylolisthesis

A patient guide

In brief: Degenerative spondylolisthesis is a condition in which one vertebra in the lower back slips slightly forward over the one beneath it as a result of age-related wear of the spinal joints and the intervertebral disc. What distinguishes it from other forms of spondylolisthesis is that the bony ring at the back of the vertebra, and in particular the small bridge of bone called the pars interarticularis, remains completely intact. There is no stress fracture. Because the whole vertebra, including its intact bony arch, drifts forward together, the slip tends to narrow the spinal canal and the side channels through which the nerves pass. This is why many patients with the condition experience symptoms of lumbar spinal stenosis, classically a heaviness or aching in the legs and buttocks that comes on with walking and standing and eases with sitting or leaning forward. It is most often seen in older adults, with a marked predominance in women, and the commonest level affected is L4/L5.

What degenerative spondylolisthesis is, and how it differs from other types

The term spondylolisthesis simply means that one vertebra has shifted forward relative to its neighbour. Several different mechanisms can produce this, and they behave quite differently, so it is helpful to set them apart.

In degenerative spondylolisthesis the slip arises from the gradual wear of the facet joints and the disc in later life. The facet joints are the paired joints at the back of the spine that guide and limit movement. As their cartilage thins, the joint capsules stretch and the disc loses height, the segment can become slightly unstable and the upper vertebra eases forward. The defining feature, described consistently in the literature since the early classifications of spondylolisthesis, is that the pars interarticularis is intact. There is no break in the bony arch.

This is the key contrast with isthmic spondylolisthesis. In the isthmic type there is a defect, effectively a stress fracture, in the pars interarticularis. That defect typically develops earlier in life, often relates to repetitive loading of the growing spine, most commonly affects the L5/S1 level, and tends to produce symptoms by narrowing the nerve exit channel (the foramen) and irritating the L5 nerve. Because in isthmic disease the back part of the vertebra is disconnected, the front part can slip forward while the bony arch stays behind, which means the central canal is often relatively spared.

Degenerative spondylolisthesis behaves in almost the opposite way. The bony arch is intact and moves forward with the rest of the vertebra. As it does so it drags the back wall of the canal forward, and combined with thickening of the ligaments and the worn facet joints this tends to narrow the central canal and the lateral recess. The result is lumbar spinal stenosis, a crowding of the nerves within the canal. In short, the literature describes isthmic disease as a younger condition with a pars defect, a preference for L5/S1 and foraminal nerve symptoms, whereas degenerative disease is an older condition with an intact pars, a preference for L4/L5 and central canal stenosis.

Why it affects older adults, and why more women

Degenerative spondylolisthesis is fundamentally a condition of wear, so it is uncommon before the age of fifty and becomes more frequent with advancing years. It is rarely the explanation for back trouble in younger adults.

A consistent observation across population studies is that women are affected considerably more often than men. The Copenhagen Osteoarthritis Study (the Jacobsen community study) reported a prevalence of degenerative spondylolisthesis of around 8.4 per cent in women compared with about 2.7 per cent in men, and systematic reviews of the epidemiology have echoed this female predominance. The precise reasons are not fully settled, but the literature has explored factors such as hormonal influences on ligaments, differences in facet joint orientation and the effects of previous pregnancies. These remain areas of ongoing study rather than firmly established mechanisms.

What neurogenic claudication is

The most characteristic symptom pattern associated with degenerative spondylolisthesis and the spinal stenosis that accompanies it is neurogenic claudication. Patients often describe a heaviness, aching, cramping or tiredness that builds up in the buttocks, thighs or calves on walking or standing for a period of time. A typical feature is that the discomfort is eased by sitting down or by bending forward, for example leaning on a shopping trolley or walking uphill more comfortably than down. This forward-leaning posture opens out the canal a little and relieves the crowding of the nerves.

This pattern is described in the literature as different from the leg pain of a trapped nerve from a disc, which tends to follow a single nerve in a defined line down the leg, and from the leg pain of poor circulation, which is usually brought on reliably by a fixed walking distance and relieved simply by standing still. Back ache may or may not accompany the leg symptoms, and some patients have very little back pain at all.

Will the slip get worse, and does its size matter

A common concern is whether the vertebra will continue to slide forward over time. The natural history described by Matsunaga and colleagues offers some reassurance here. In their long-term follow-up, the radiographic slip progressed in roughly a third of patients, but, importantly, the degree of slip progression on x-ray correlated poorly with how patients actually felt. Many people whose slip increased slightly on imaging did not experience a corresponding worsening of symptoms, and in their longer follow-up of patients managed without surgery, a substantial proportion of those without a neurological deficit at the outset remained functionally satisfactory many years later.

The size of the slip also tends to be modest. Degenerative spondylolisthesis is almost always low-grade, meaning grade I on the Meyerding scale, where the upper vertebra has moved forward by no more than about a quarter of the width of the vertebra below. High-grade slips are characteristic of other types rather than the degenerative form. So while the word slippage can sound alarming, the literature describes a condition that is usually small in degree, slow to change, and whose imaging appearance is only loosely linked to the symptoms a person experiences.

How it is identified on imaging

Imaging in degenerative spondylolisthesis serves two separate purposes, and different tests address each. Standing plain x-rays describe the slip and how the bones are aligned when the spine is loaded by body weight, which can reveal a slip that disappears when a person lies down. Flexion and extension x-rays, taken while bending forwards and then arching backwards, are described in the literature as a way of showing whether the slip moves between positions, that is, whether the segment is relatively stable or shows dynamic movement.

Magnetic resonance imaging (MRI) shows the soft tissues and is the test that demonstrates the stenosis itself, displaying how much the central canal and the lateral recesses are narrowed and how the nerves are affected. The picture from these tests is interpreted alongside the person's symptoms, because, as noted above, the appearance on imaging and the impact on daily life do not always march in step.

What the evidence says about management

The sections that follow describe what the published evidence and usual practice report. They are summaries of the literature, not recommendations or advice, and decisions about any individual are a matter for personal consultation.

Many people with degenerative spondylolisthesis are managed without surgery, and as the natural history work suggests, a good number remain comfortable and active over the long term. Approaches reported in the literature for the non-operative setting include measures aimed at maintaining mobility and easing symptoms.

When symptoms are limiting, surgery has been studied extensively. The Spine Patient Outcomes Research Trial (SPORT) reported greater improvement with surgery than with non-operative care over four to eight years of follow-up. An important caveat is that this trial had a great deal of crossover between groups, with many people moving from one treatment arm to the other, so its strongest conclusions come from an as-treated analysis rather than a strict comparison of the groups as originally assigned. This is a recognised limitation when interpreting the result.

The decompression versus fusion debate

The central and most debated question in the surgical literature for this condition is not whether to operate but what the operation should consist of: decompression alone, meaning surgery to create more room for the crowded nerves, or decompression plus fusion, where the affected segment is additionally joined together with the aim of stabilising it.

The historical work of Herkowitz and Kurz, and later the SLIP trial reported by Ghogawala in 2016, lent support to adding a fusion, with the SLIP trial finding a modest advantage in physical health outcomes and a lower rate of further surgery when fusion was added. Pulling in the other direction, the Swedish Spinal Stenosis Study reported by Forsth in 2016 and, in particular, NORDSTEN-DS reported by Austevoll in 2021 (the largest randomised trial focused specifically on degenerative spondylolisthesis) found that decompression alone was non-inferior, achieving comparable results while avoiding the greater operative burden of fusion.

The prevailing way the literature reconciles these apparently conflicting trials is by distinguishing between stable and unstable slips. The broad reading is that stable, low-grade slips tend to do well with decompression alone, whereas the genuinely mobile or unstable slip remains a matter of ongoing debate. Adding a fusion increases the proportion of segments that fuse solidly but also adds operative morbidity and introduces a longer-term risk of problems developing at the segment next to the fusion, known as adjacent-segment disease. Across the studies, the rates of needing further surgery have been broadly similar between the two approaches. National guidance, such as the North American Spine Society evidence review, reflects this nuanced and still-evolving picture rather than a single fixed answer.

Outlook

Taken together, the literature paints a generally reassuring long-term picture for degenerative spondylolisthesis. It is usually a low-grade, slowly changing condition; the slip seldom advances dramatically; the imaging appearance correlates only loosely with how a person feels; and many people remain functionally satisfactory over many years, whether their condition is managed with or without surgery. Where symptoms of stenosis become limiting, the surgical evidence is encouraging, while the finer details of which operation suits which slip continue to be refined by ongoing research.