

Lumbar isthmic spondylolisthesis

AKA [Spondylolysis](#)



If the pars “cracks” or fractures, the condition is called spondylolysis.

The [lumbar spine](#) in the sagittal plane should maintain an alignment in which each [vertebral body](#) is aligned with the vertebral body above and below. In other words, the anterior inferior [endplate](#) of the vertebral body above should be aligned with the anterior superior endplate of the vertebral body below. [Spondylolisthesis](#) occurs when there is an anterior subluxation or “[slippage](#)” of the vertebral body above on the vertebral body below.

Epidemiology

Lumbar [isthmic spondylolisthesis](#) is the most common form; also called spondylolytic [spondylolisthesis](#).

It occurs with a reported prevalence of 5–7 percent in the US population.

The incidence of [double level isthmic spondylolisthesis](#) is rare.

The most common site of spondylolytic defects occurs at L-5 (85%–95%), with much of the remainder occurring at L-4 and above.

Classification

The original [Meyerding classification](#) grading of [spondylolisthesis](#) of the cranial vertebra in relation to the lower vertebra does not seem to be valid for [isthmic spondylolisthesis](#) on MRI, since hypoplasia or shortening of the cranial, spondylolytic vertebra is not taken into account. Describing a finding as spondylolisthesis rather than [spondylolysis](#) is not only a question of taxonomy, but implies a more serious state of the disease. Therefore, the term “spondylolisthesis” should be reserved for patients with a real slip and not a slip mimicked by a shortened, hypoplastic vertebra ¹⁾.

Etiology

Isthmic spondylolisthesis due to pars defects resulting from trauma or spondylolysis is not uncommon.

Isthmic spondylolisthesis is caused by a defect in the pars interarticularis area of the lamina, and is the most common spondylolytic disorder.

The reported incidence is 4%–6% of the general population ²⁾.

A slip or fracture of the intravertebral joint is usually acquired between the ages of 6 and 16 years, but remains unnoticed until adulthood. Roughly 90 percent of these isthmic slips are low-grade (less than 50 percent slip) and 10 percent are high-grade (greater than 50 percent slip).

It is divided into three subtypes:

A: pars fatigue fracture

B: pars elongation due to multiple healed stress fx

C: pars acute fracture

Clinical

[Isthmic spondylolisthesis](#) rarely produces [central canal stenosis](#) since only the anterior part of the [vertebral body](#) shifts forward. May present with [radiculopathy](#) or [neurogenic claudication](#) from compression in the neural foramen, with the nerve exiting under the pedicle at that level being the most vulnerable. May also present with low back pain. Many cases are asymptomatic

Diagnosis

Diagnosis is crucial in early-stage lumbar spondylolysis, as osseous healing can occur with conservative treatment

The X-ray confirms the bony abnormality.

If the fracture gap at the pars widens and the vertebra shifts forward, then the condition is called spondylolisthesis. Usually, the fifth lumbar vertebra shifts forward on the part of the pelvic bone called the sacrum.

If the vertebra is pressing on nerves, a CT scan or MRI may be needed before treatment begins to further assess the abnormality.

Treatment

see [Lumbar isthmic spondylolisthesis treatment](#).

Case series

Fifty-seven patients with a total of 108 pars defects and a mean age of 14.6 years were retrospectively identified. Defects with a positive SPECT or high signal change (HSC) on [T2 weighted image MRI](#) were classified as active. There were 49 active and 59 inactive defects. The active and inactive groups did not differ in age, [body mass index](#), symptom duration, lumbar lordosis, [pelvic incidence](#), slip percentage, or laterality. There was a difference in sex (35 vs 19 males; $P < .0001$) and presence of [listhesis](#) (16 vs 35; $P = .006$). Active or early juvenile spondylolysis appears to be associated with male patients and the absence of listhesis, which may be important in identifying patients with a higher potential to experience osseous healing with nonoperative treatment.

2017

From June 2008 through December 2014, multiple-level lumbar isthmic spondylolisthesis was diagnosed in 23 patients (6 men, 17 women) at Wooridul Spine Hospital (Busan, South Korea). Isthmic spondylolisthesis occurred at three spinal levels in 2 patients and at two levels in 21 patients. All patients underwent ALIF with PPF. We used the Oswestry Disability Index (ODI) and visual analog scale scores to evaluate the preoperative and postoperative functional outcome, low back pain, and radicular pain. We also evaluated segmental lordosis and the fusion status using radiographs and data from computed tomography.

Isthmic spondylolisthesis occurred from L3 to S1 and mostly occurred at two consecutive spinal levels (i.e., L4-L5 and L5-S1). Significant improvements in the ODI and visual analog scale were observed in patients at final follow up ($p < 0.05$). The mean segmental lordosis significantly increased after operation (from 22.7° to 32.7°). The mean lumbar lordosis significantly increased after operation (from 45.8 to 53.1). Radiographs of all of the patients showed solid fusion at the last follow-up. There was one case of screw fracture at the S1 level; however, in this case the last follow-up radiograph exhibited solid fusion.

Anterior lumbar interbody fusion with PPF can be an effective treatment choice and yield good clinical outcomes in patients with multiple-level isthmic spondylolisthesis ³⁾.

Case reports

A 48-year-old female recreational triathlete who had been experiencing mild low back pain since high school. She had recently developed right leg pain and had gradually worsening difficulty in running. She preferred to undergo spinal surgery without fusion so that she could return to triathlons as soon as possible, and she was referred to our hospital. Plain radiographs showed Meyerding grade 3 isthmic spondylolisthesis at L5 and a slipped L5 vertebral body. Selective nerve root block at L5 relieved the right leg pain temporarily. The final diagnosis was right L5 radiculopathy due to compression by the ragged edge of the L5 pars defect from the posterior side and by the upside-down

foraminal stenosis at L5-S1. An L4-L5 partial laminectomy was performed with resection of the ragged edge and one-third of the caudal pedicle at L5. Adequate decompression was achieved by exposing the L5 spinal nerve root from the branch portion to the outside of the L5 pedicle. The right leg pain disappeared postoperatively and she returned to participating in triathlons. One year after surgery, there was a slight radiographic progression of the slip in 5 mm; however, there had been no recurrence of the right leg pain. Several studies have reported excellent outcomes after decompression surgery in patients with isthmic spondylolisthesis. To our knowledge, this is the first report of successful lumbar decompression surgery without fusion for high-grade isthmic spondylolisthesis in a triathlete, although in short-term results ⁴⁾.

A 31-year-old man presented with a history of left radicular [leg pain](#) along the distribution of the [sciatic nerve](#). He had a [disc herniation](#) at L5/S1 and bilateral pars defects with a Grade I [spondylolisthesis](#). Dynamic radiographic studies did not show significant movement of L-5 over S-1. The patient did not desire to have a fusion. After induction of [local anesthesia](#), the patient underwent an awake transforaminal endoscopic discectomy via the extraforaminal approach, with decompression of the L-5 and S-1 nerve roots. His preoperative pain resolved immediately, and he was discharged home the same day. His preoperative [Oswestry Disability Index](#) score was 74, and postoperatively it was noted to be 8. At 2-year follow-up he continued to be symptom free, and no radiographic progression of the listhesis was noted. In this case preservation of stabilizing structures, including the supraspinous and interspinous ligaments and the facet capsule, may have reduced the likelihood of iatrogenic instability while at the same time achieving symptom control. This may be a reasonable option for select patient symptoms confined to lumbosacral radiculopathy ⁵⁾.

¹⁾
Niggemann P, Kuchta J, Grosskurth D, Beyer HK, Hoeffler J, Delank KS. Spondylolysis and isthmic spondylolisthesis: impact of vertebral hypoplasia on the use of the Meyerding classification. *Br J Radiol*. 2012 Apr;85(1012):358-62. doi: 10.1259/bjr/60355971. Epub 2011 Jul 12. PubMed PMID: 21750127; PubMed Central PMCID: PMC3486675.

²⁾
Standaert CJ, Herring SA. Spondylolysis: a critical review. *Br J Sports Med*. 2000 Dec;34(6):415-22. Review. PubMed PMID: 11131228; PubMed Central PMCID: PMC1724260.

³⁾
Hsieh CS, Lee HC, Oh HS, Park SJ, Hwang BW, Lee SH. Anterior lumbar interbody fusion with percutaneous pedicle screw fixation for multiple-level isthmic spondylolisthesis. *Clin Neurol Neurosurg*. 2017 Apr 13;158:49-52. doi: 10.1016/j.clineuro.2017.04.011. [Epub ahead of print] PubMed PMID: 28460342.

⁴⁾
Takeuchi M, Chikawa T, Hibino N, Takahashi Y, Yamasaki Y, Momota K, Henmi T, Maeda T, Sairyo K. An Elite Triathlete with High-grade Isthmic Spondylolisthesis Treated by Lumbar Decompression Surgery without Fusion. *NMC Case Rep J*. 2020 Sep 15;7(4):167-171. doi: 10.2176/nmccrj.cr.2019-0113. PMID: 33062563; PMCID: PMC7538462.

⁵⁾
Madhavan K, Chieng LO, Hofstetter CP, Wang MY. Transforaminal endoscopic discectomy to relieve sciatica and delay fusion in a 31-year-old man with pars defects and low-grade spondylolisthesis. *Neurosurg Focus*. 2016 Feb;40(2):E4. doi: 10.3171/2015.11.FOCUS15512. PubMed PMID: 26828885.

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