

# SURGERY FOR LUMBAR DEGENERATIVE SPONDYLOLISTHESIS

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Degenerative spondylolisthesis (DS) may cause back pain, claudication, radicular pain or neurological impairment. It is principally caused by degenerative disc disease. Other classifications for spondylolisthesis include (i) isthmic where there are associated defects of the pars interarticularis, (ii) acquired following factors such as surgery at the same or an adjacent level, and (iii) dysplastic associated with congenital structural anomalies. Risk factors for DS include age (>50 years), sagittally oriented facet joints, degenerative disc disease, ligamentous laxity, hyperlordosis, and a higher pelvic incidence. It is a common condition in the older general population and most (80%) of patients do not progress under observation. The degree of slip is generally < 25% of the vertebral surface.

Patients may become symptomatic from (i) lateral spinal canal stenosis (affecting the L5 nerves at L4/5) (ii) foramen stenosis (affecting the L4 nerves) (iii) spinal canal stenosis affecting the sacral nerves or (iv) from segmental instability and degeneration of facet joint and disc. Erect flexion and extension X-rays may show horizontal translation or excessive angulation at the same level but there is no universal definition of instability.

There is good evidence that lumbar cortisone injections are ineffective for spinal stenosis. Conservative treatments do not improve outcome. There is no universal consensus on the indications for surgery for DS but most surgical series only include patients with (i) persistent impairment from back and leg pain from nerve compression after a trial of conservative treatment or (ii) neurological deficit, or (iii) cauda equina symptoms.

There is a long history of lumbar laminectomy or posterolateral pedicle screw fusion being used for DS and these operations have dominated the surgical evidence based literature. Surgical evolutions include (i) interbody cages, (ii) minimally invasive interbody fusions, (iii) pedicle screw guidance systems, (iv) minimally invasive focal lumbar decompression, (v) anterior lumbar fusions for DS (vi) lateral lumbar fusion for DS, (vii) implants modified for osteoporotic patients and (viii) the use of adjuvants to enhance fusion.

In the light of these evolutions there is a great deal of variation in surgical approaches to DS based on surgical judgement, individual patient characteristics and a surgeon's familiarity and training. There is good evidence that surgical approaches are superior to conservative treatment for DS. Older studies showed superiority of fusion compared with laminectomy. There are multiple recent studies showing sustained good clinical results from minimally

invasive unilateral laminotomy spinal canal decompression for stable DS with less than 10% likelihood of post-operative spondylolisthesis progression. Surgeons attempt to estimate the likelihood for future slip progression after decompression from patient specific factors such as radiological instability and disc and facet joint anatomy. There is inadequate evidence to recommend a particular fusion method for DS but interbody fusion cages and pedicle screws are now used in the majority of cases. After posterior fusion clinical satisfaction rates are heterogeneous but of the order of 80 to 90% for DS. Complication rates are also heterogeneous but are of the order of 5 to 15%. There are multiple clinical studies of anterior lumbar fusion for

DS. These reports describe heterogeneous clinical satisfaction rates of 75 to 95% and complication rates of 5 to 15%. There are no prospective controlled trials comparing anterior and posterior fusion for DS but anterior fusion has a theoretical reduced risk of adjacent segment degeneration, and more reliable correction of lordosis without the need for osteotomy techniques. On the other hand anterior fusion has a risk of venous thrombosis, and revision surgery is hazardous although rarely necessary.

*References available on request.*

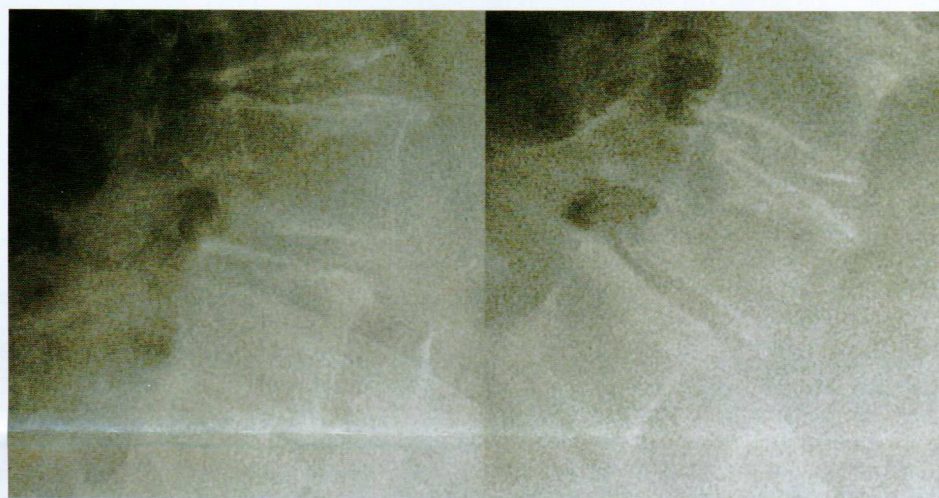


Figure 1. L4/5 degenerative spondylolisthesis in a 80 year old woman evident on erect flexion x-ray. Symptoms were relieved by a microscopic unilateral laminotomy and bilateral decompression.



Figure 2. Plain lateral X-ray of a 78 year old woman after L3/4 anterior lumbar fusion for degenerative spondylolisthesis. She has a past history of lumbar fusion at L4/5 and L5/S1 and intrathecal morphine pump.