Lumbar isthmic spondylolisthesis surgery

Surgical options

1. laminectomy: posterior (direct) decompression of central canal and neural foramina without or with fusion.

Fusion options:

a) posterolateral fusion ± pedicle screw/rod fixation

b) interbody fusion: generally not done as a “stand-alone” (i.e., usually requires additional stabilization, options here include: pedicle screws, facet screws, facet dowels, spinous process clamp…)

● posterior lumbar interbody fusion (PLIF) : usually bilateral graft placement

● transforaminal lumbar interbody fusion (TLIF): unilateral graft placement through a facet take-down on that side

2. procedures to increase disc space height and thereby indirectly decompress neural foramina without direct decompression

a) anterior lumbar interbody fusion (ALIF): through laparotomy

b) lateral lumbar interbody fusion: some techniques trademarked as extreme lateral interbody fusion (XLIF™) or direct-lateral (DLIF™)

c) axial lumbar interbody fusion (Ax-LIF): L5–1 only

3. limitation of extension by interspinous spacer: e.g. X-Stop®

Choosing which procedure to use

Items that factor into consideration when choosing which procedure to use include:

1. consider indirect decompression (lateral interbody fusion (e.g. XLIF® or DLIF®), ALIF, interspinous decompression (e.g. X-Stop):

a) when foraminal stenosis appears to be the dominant problem (e.g. with loss of disc space height, facet hypertrophy, on the concave side of a scoliotic curve)

b) previous spine surgery that might make exposure of the nerves more difficult or risky

c) when the disc space is compressed (if the disc space height is normal, it is difficult to achieve indirect decompression by further distraction)

2. consider direct decompression (e.g. laminectomy)

a) “pinpoint” central canal stenosis especially when disc height and neural foramina are

wellpreserved

b) where a significant contributor to the compression is a focal, correctable lesion, e.g. herniated disc, synovial cyst, intraspinal tumor

c) to avoid a fusion (in select cases)

3. consider motion-preservation surgery when a fusion is undertaken at a level and the adjacent level is already starting to show some degenerative changes that have not yet reached a surgical magnitude. Motion preservation at this adjacent segment theoretically shields it from some of the transmitted stresses from the fused level

4. situations where a fusion should be considered in addition to direct or indirect decompression of the nerves:

a) spondylolisthesis (especially > Grade I)

b) symptomatic sagittal imbalance or degenerative scoliosis

When spondylolisthesis is present

May occur without decompression, but is more common following surgery. However, lumbar instability following decompressive laminectomy is rare (only ≈ 1% of all laminectomies for stenosis will develop progressive subluxation). Fusion is rarely required to prevent progression of subluxation with degenerative stenosis.

For Grade I and low Grade II spondylolisthesis, laminectomy without fusion may be considered. Stability (without need for instrumentation) is thought to be maintained if > 50–66% of the facets are preserved during surgery and the disc space is not violated (maintains integrity of anterior and middle column). Younger or more active patients are at higher risk of subluxing. Patients with a tall (normal) disc space are at higher risk of subluxing than those with collapsed disc space. One approach is to obtain flexion/extension X-rays pre-op, and follow patients after decompression. Those who develop symptomatic slippage post-op are treated by fusion, possibly in conjunction with spinal instrumentation.