



## Treatment of Single-Level Lumbar Spondylolisthesis

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### DESCRIPTION

Lumbar spondylolisthesis is one of the most prevalent illnesses requiring spine surgery, with a 5.9% to 11.5% incidence for L4-5 and L5-S1. Lumbar spondylolisthesis is also the most prevalent cause of lumbar canal stenosis, which frequently causes symptoms such as lumbago or radicular pain and, in severe cases, intermittent claudication, which causes sensory-motor dysfunction in the lower limbs. If conservative treatment fails, surgical treatment is frequently required. Open Posterior Lumbar Interbody Fusion (PLIF) is a traditional surgical approach for treating lumbar spondylolisthesis, although it has the disadvantages of a big incision, excessive blood loss, and stringent standards for patients' overall physical condition. Minimally invasive surgical treatment of lumbar spondylolisthesis (mild, moderate, or less than grade II spondylolisthesis) has increasingly entered the mainstream, thanks to advancements in technology and unique instruments. However, the efficiency of various surgical techniques and the complications that occur remain debatable.

Degenerative lumbar spondylolisthesis is a spine disorder marked by degenerative alterations. Lumbar spondylolisthesis and instability frequently induce apparent lumbar and leg pain. With the advancement of specially designed surgical instruments and the increasing capability of minimally invasive surgery and technology, applied anatomy, spine-pelvis parameters, and imaging evaluation for lower lumbar spondylolisthesis, minimally invasive surgery has become common in the treatment of degenerative lumbar spondylolisthesis.

Currently, minimally invasive fusion has been increasingly tried in degenerative lumbar spondylolisthesis, primarily including the surgically described fusion methods. The anterior sacral approach is used for Minimally Invasive Surgery Transforaminal Lumbar Interbody Fusion (MIS-TLIF), Oblique Anterior Lumbar Interbody Fusion (OLIF), Extreme Lateral Lumbar Interbody Fusion (XLIF), Direct Lateral Approach Interbody Fusion (DLIF), Minimally Invasive Surgery Anterior Lumbar

Interbody Fusion (MIS-ALIF), and Axial Lumbar Interbody Fusion (AxiaLIF).

Traditional open PLIF surgery is thought to be effective in the treatment of degenerative lumbar spondylolisthesis, but it has some drawbacks, such as: extensive paraspinal muscle dissection and excision of supraspinal and interspinous ligaments during PLIF surgery, which may affect the stability of the posterior column of the spine, excessive intraoperative traction of paravertebral muscles, which can lead to postoperative ischemic necrosis, PLIF surgery, on the other hand, does not necessitate substantial dissection of paraspinal muscles and soft tissues. Only a portion of the top and lower articular processes and lamina are excised using precise intraoperative fluoroscopy.

PE-PLIF surgery, on the other hand, does not necessitate substantial dissection of paraspinal muscles and soft tissues. Only a portion of the upper and lower articular processes and lamina are removed using precise intraoperative fluoroscopy, preserving the posterior structure of the spine, minimising the impact on the stability of the posterior column of the spine, and improving postoperative spine stability.

The use of MIS-TLIF in the treatment of mild to moderate lumbar spondylolisthesis is widely accepted. Less intraoperative bleeding, faster operation times, shorter hospital stays, and fewer deep infections at the surgical site are all advantages of MIS-TLIF. However, there are several drawbacks to MIS-TLIF surgery. MIS-TLIF surgery damages the facet joint on one side and disrupts the bone-muscle-ligament complex in the spine's posterior column. Furthermore, it is somewhat difficult to symmetrically implant an interbody fusion device in the intervertebral space during MIS-TLIF surgery, and postoperative spine stability is highly dependent on pedicle screw fixation.

In this commentary we described the procedure by learning several minimally invasive fusion surgeries and mastering the anatomy of the bone-muscle-ligament complex of the posterior column of the spine.

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