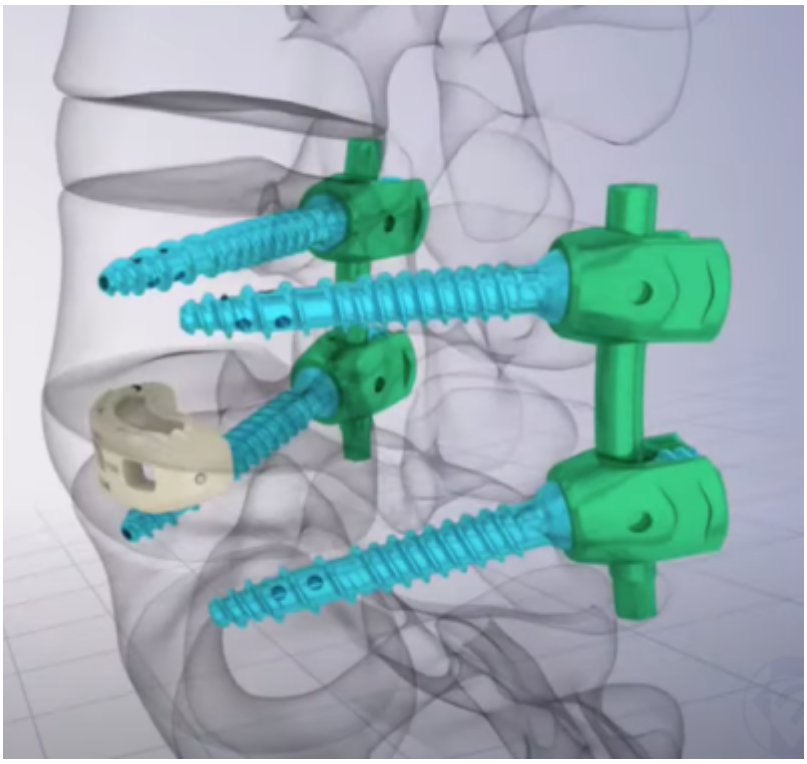
# Transforaminal lumbar interbody fusion (TLIF)



Pedicle screws and rods are attached to the back of the vertebra and an interbody fusion spacer is inserted into the disc space from one side of the spine.

Bone graft is placed into the interbody space and alongside the back of the vertebra to be fused. Bone graft is obtained from the patient's pelvis, although bone graft substitutes are also sometimes used. As the bone graft heals, it fuses the vertebra above and below and forms one long bone.

A variation on a PLIF where the graft is placed from one side (via the neural foramen) after complete removal of the facet joint on that side. Requires much less nerve root retraction than PLIF, and is often advantageous for re-operations with primarily unilateral pathology were going through the foramen avoids the scar tissue.

Since its initial description by Harms and Rolinger in 1982, [1] transforaminal lumbar interbody fusion (TLIF) has been used with high rates of success in patients who present with instability or deformity [2].

The TLIF procedure described by Jürgen Harms was a new modification and minimized complications of lumbar fusions and reduced the invasiveness of the procedure.

Nowadays a wide variety of implants and implantation techniques are available, making interbody fusions in PLIF and TLIF techniques safe and successful procedures [3].

## Types

## Minimally invasive transforaminal lumbar interbody fusion

Minimally invasive transforaminal lumbar interbody fusion (MIS-TLIF)

## Open transforaminal lumbar interbody fusion

Open transforaminal lumbar interbody fusion (Open-TLIF).

Transforaminal lumbar interbody fusion (TLIF) with bilateral facetectomy (BF) versus unilateral facetectomy (UF).

### No differences

MIS-TLIF is a safe and viable option for lumbar fusion in morbidly obese patients, and when compared to open-TLIF, resulted in similar improvement in pain and functional disability. Post-operative complications rates between both cohorts were also not significantly divergent [4].

### Differences

MI-TLIF is associated with reduced blood loss, decreased length of stay, decreased complication rates, and increased radiation exposure. The rates of fusion and operative time are similar between MI-TLIF and O-TLIF. Differences in long-term outcomes in MI-TLIF vs O-TLIF are inconclusive and require more research, particularly in the form of large, multi-institutional prospective randomized controlled trials [5].

Patients treated with MIS TLIF have less need for post-operative blood transfusion, decreased post-operative back pain, and shorter hospital admission time than those treated by open TLIF techniques [6] [7] [8].

Several studies have shown MIS TLIF to have significant improvement in 2-year VAS and ODI scores as well as a shorter time to ambulation compared to open TLIF [9] [10] [11] [12] [13].

Patients who underwent MiTLIF were exposed to 2.4-fold more radiation than those who underwent OTLIF. Although the theoretical cancer risk associated with radiation exposure may be tolerable, stochastic effects should not be disregarded [14].

# Cages

see TLIF cage

### Cost effectiveness

TLIF and LLIF produced equivalent 2-year patient outcomes at an equivalent cost-effectiveness profile [15)]

## Outcome

Stand alone TLIF may be associated with progressive lumbar spondylolisthesis at that level and are usually supplemented with pedicle screw/rod.

Age was not associated with complications nor predictive of functional outcomes in patients who underwent multilevel TLIF. Age alone, therefore, may not be an appropriate surrogate for risk. Furthermore, baseline preoperative independent ambulation was associated with better clinical outcomes and should be considered during preoperative surgical counseling. Level of Evidence: 3 [16)].

## TLIF Prolonged Length of Stay Calculator

https://spine.shinyapps.io/TLIF_LOS/

## Case series

Transforaminal lumbar interbody fusion case series.

1)
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Rickert M, Rauschmann M, Fleege C, Behrbalk E, Harms J. [Interbody fusion procedures. Development from a historical perspective]. Orthopade. 2015 Feb;44(2):104-13. doi: 10.1007/s00132-015-3076-1. German. PubMed PMID: 25626703.
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Khan NR, Clark AJ, Lee SL, Venable GT, Rossi NB, Foley KT. Surgical Outcomes for Minimally Invasive vs Open Transforaminal Lumbar Interbody Fusion: An Updated Systematic Review and Meta-analysis. Neurosurgery. 2015 Jul 24. [Epub ahead of print] PubMed PMID: 26214320.
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lumbar interbody fusion in degenerative and isthmic spondylolisthesis grades 1 and 2. Eur Spine J. 2010;19:1780–4.
7)

Schizas C, Tzinieris N, Tsiridis E, et al. Minimally invasive versus open transforaminal lumbar interbody fusion: evaluating initial experience. Int Orthop. 2009;33:1683–8.
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Karikari I. O, Isaacs R. E. Minimally invasive transforaminal lumbar interbody fusion: a review of techniques and outcomes. Spine. 2010;35(26S):S294.
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10)

Shunwu F, Xing Z, Fengdong Z, et al. Minimally invasive transforaminal lumbar interbody fusion for the treatment of degenerative lumbar diseases. Spine. 2010;35:1615–20.
11)

Peng CW, Yue WM, Poh SY, et al. Clinical and radiological outcomes of minimally invasive versus open transforaminal lumbar interbody fusion. Spine. 2009;34:1385–9.
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13)

Adogwa O, Parker S. L, Bydon A, Cheng J, McGirt M. J. Comparative effectiveness of minimally invasive versus open transforaminal lumbar interbody fusion: 2-year assessment of narcotic use, return to work, disability, and quality of life. Journal of Spinal Disorders & Techniques. 2011;24(8):479
14)

Kim CH, Lee CH, Kim KP. How High Are Radiation-related Risks in Minimally Invasive Transforaminal Lumbar Interbody Fusion Compared With Traditional Open Surgery?: A Meta-analysis and Dose Estimates of Ionizing Radiation. J Spinal Disord Tech. 2015 Nov 12. [Epub ahead of print] PubMed PMID: 26566253.
15)

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16)

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