

Anterior Lumbar Interbody Fusion (ALIF) Pre-Operative Guide

What is Anterior Lumbar Interbody Fusion (ALIF)?

Anterior lumbar interbody fusion (ALIF) is a surgery performed through the front of your abdomen to treat problems in your lower back (lumbar spine). During the procedure, your surgeon will remove a damaged disc that is causing pain or nerve problems, and then fuse (join together) the bones above and below where the disc was removed.[\[1\]\[2\]](#)

Unlike surgeries performed through your back, ALIF is done through an incision in your abdomen. This approach allows your surgeon to access your spine without disturbing the muscles and nerves in your back, which can lead to faster recovery for many patients.[\[1\]\[3\]](#)

Why Do You Need This Surgery?

You may need ALIF if you have:

- **Degenerative disc disease** - wear and tear of the discs in your lower back causing chronic pain
- **Spondylolisthesis** - when one vertebra slips forward over another
- **Recurrent disc herniation** - a disc that has herniated again after previous surgery
- **Adjacent segment disease** - problems developing at levels next to a previous fusion
- **Failed posterior fusion** - when a previous fusion through your back did not heal properly
- **Foraminal stenosis** - narrowing of the openings where nerves exit the spine[\[1\]\[2\]\[4\]](#)

These conditions occur when discs in your lower back break down over time, causing pain, instability, or pressure on nerves. When non-surgical treatments like physical therapy, medications, and injections don't provide enough relief, surgery may be recommended.[\[5\]](#)

What Happens During the Surgery?

ALIF surgery typically involves two surgical teams working together:

1. **Access surgeon** (usually a vascular or general surgeon): Makes an incision in your lower abdomen and carefully moves aside your intestines and blood vessels to safely reach your spine[\[6\]\[7\]](#)
2. **Spine surgeon**: Performs the actual spine surgery once the access is complete

During the spine portion of the surgery, your surgeon will:

1. Remove the damaged disc completely

2. Place a bone graft or cage filled with bone material in the empty disc space to maintain proper height and alignment
3. Sometimes add a small metal plate and screws to the front of your spine, or place screws through your back (percutaneous posterior instrumentation) to provide additional stability while fusion occurs[\[1\]\[2\]](#). In select cases, a “standalone” can be used, where screws are placed directly through the implant and into the vertebral bodies (i.e. bones) above and below the disc space being fused.

The bone graft can come from your own body, a donor, or be made of synthetic materials. Over time, the bones above and below will grow together (fuse) into one solid bone.[\[8\]](#)

What Are the Benefits of ALIF?

Most patients experience significant improvement after ALIF:

Clinical Outcomes:

- **High success rates:** 86% of patients report successful clinical outcomes and are satisfied with their surgery[\[2\]](#)
- **Pain relief:** Back pain improves by approximately 52% and disability scores improve by 51%[\[5\]](#)
- **Improved function:** Significant improvement in ability to perform daily activities, with 94% of patients reporting functional recovery[\[4\]](#)
- **High fusion rates:** 88-94% of patients achieve successful bone fusion[\[2\]\[8\]\[9\]](#)

Surgical Advantages:

- **Preservation of back muscles:** Because the surgery is done from the front, your back muscles and ligaments remain undisturbed, which may lead to less postoperative back pain[\[1\]\[3\]](#)
- **Better disc space restoration:** ALIF allows placement of larger implants, which can better restore the height between your vertebrae (49% increase in disc height) and indirectly open up the nerve passages (foraminal area increases by 49%)[\[4\]](#)
- **Improved spinal alignment:** ALIF can significantly improve the curve in your lower back (lordosis increases by 17.5%), which is important for overall spine balance[\[4\]](#)
- **Shorter operative time and less blood loss:** Compared to some posterior fusion techniques, ALIF typically involves less blood loss (median 25 mL) and shorter surgery time[\[3\]\[7\]\[8\]](#)

Recovery:

- **Return to driving:** Most patients return to driving within 2-3 months[\[10\]\[11\]](#)

- **Return to work:** 75% of patients return to work within a median of 3 months (range 2-3 months)[\[10\]\[11\]\[12\]](#)

- **Hospital stay:** Most patients stay in the hospital for 1-4 days[\[4\]\[6\]](#)

- **Faster improvement:** Patients may experience faster return to work compared to some posterior fusion techniques[\[12\]](#)

What Are the Risks and Complications?

Like all surgeries, ALIF carries some risks. The overall complication rate ranges from 10-26%, with most complications being minor and manageable.[\[6\]\[13\]](#)

Approach-Related Complications (specific to the anterior approach):

- **Vascular injury (blood vessel injury):** Occurs in 1.4-4.8% of patients[\[6\]\[7\]\[13\]](#)

- Venous (vein) injuries are most common (1.1%), especially when operating at the L4-L5 level, and can usually be repaired safely[\[7\]](#)

- Arterial (artery) injuries are less common (0.3-0.4%) but more serious[\[7\]](#)

- Most vascular injuries can be safely managed by the access surgeon[\[6\]\[7\]](#)

- **Retrograde ejaculation (in males):** Occurs in 7-10% of male patients[\[14\]\[15\]\[16\]](#)

- This is when semen goes backward into the bladder instead of out during ejaculation

- It does not affect the ability to have an erection or orgasm, but can affect fertility

- About 25-50% of cases may resolve spontaneously over time[\[14\]\[15\]](#)

- Risk is higher at the L5-S1 level and with certain surgical approaches[\[16\]](#)

- **Important:** All male patients of reproductive age should be counseled about this risk before surgery

- **Bowel/intestinal complications:**

- Ileus (temporary slowing of bowel function): 3-4% of patients[\[7\]\[13\]](#)

- Bowel injury: Very rare (0.3%)[\[6\]\[7\]](#)

- Most cases of ileus resolve with conservative treatment[\[17\]](#)

- **Urinary retention:** 5-10% of patients may have difficulty urinating after catheter removal, usually temporary[\[13\]\[18\]](#)

Common Surgical Complications:

- **Surgical site infection:** 1.4-5.8% of patients[\[13\]\[19\]](#)

- **Neurological complications** (nerve injury or worsening symptoms): 0.1-4.1% of patients[\[13\]](#)[\[19\]](#)
- **Venous thromboembolism** (blood clots): 1.7% of patients[\[7\]](#)[\[13\]](#)
- **Postoperative hematoma** (blood collection): 1.4% of patients, with 0.6% requiring drainage[\[13\]](#)

Long-Term Considerations:

- **Pseudoarthrosis (failure to fuse):** Occurs in 6.5-12% of patients[\[5\]](#)[\[9\]](#)
 - Stand-alone ALIF (without posterior screws): 12% non-fusion rate[\[9\]](#)
 - ALIF with posterior instrumentation: 0.5-2.4% non-fusion rate[\[10\]](#)[\[20\]](#)
 - Most patients with non-fusion do not require additional surgery
- **Adjacent segment disease:** Problems developing at the disc above or below your fusion occur in approximately 12% of patients over long-term follow-up[\[5\]](#)
- **Implant-related complications:** Cage migration or subsidence (sinking) can occur but is uncommon[\[6\]](#)
- **Need for reoperation:** Overall, about 1-2% of patients require another surgery[\[13\]](#)[\[20\]](#)

Factors That May Increase Your Risk:

- Older age
- Higher body mass index (BMI)
- Multiple medical problems (higher ASA status)
- Diabetes
- Smoking (significantly increases complications and reduces fusion rates)
- Workers' compensation claims
- Multiple levels being fused
- Physically demanding occupation[\[9\]](#)[\[11\]](#)[\[13\]](#)

What to Expect for Recovery

Hospital Stay:

Most patients stay in the hospital for 1-4 days after surgery.[\[4\]](#)[\[6\]](#)

Recovery Timeline:[\[10\]](#)

- **First 2 weeks:** Initial recovery period with significant improvement in back pain
- **6 weeks:** Continued improvement; many restrictions begin to lift
- **3 months:** Most patients return to work and driving
- **6 months:** Over half of patients achieve meaningful clinical improvement
- **1 year:** Continued gains in function and pain relief
- **Fusion:** It takes about 6-12 months for the bones to fully fuse together

Pain Improvement:

Back pain typically improves significantly within the first few months, with continued improvement through the first year.[\[5\]\[10\]](#)

Activity Restrictions:

You'll have temporary restrictions on lifting (typically no more than 10 pounds for 4-6 weeks), bending, and twisting to protect your fusion while it heals. Your surgeon will provide specific guidelines based on your individual case.

Physical Therapy:

Physical therapy may be recommended to help you regain strength and mobility safely.

Bowel Function:

It's common to experience constipation or temporary slowing of bowel function (ileus) after ALIF. You may be prescribed stool softeners and should take them as directed. Most bowel function issues resolve within a few days.[\[13\]\[17\]](#)

Follow-Up:

You'll need regular follow-up appointments and X-rays to monitor your healing and fusion progress. The access surgeon (vascular or general surgeon) may also need to see you to check your abdominal incision.

What You Can Do to Improve Your Outcome

- **Stop smoking:** Smoking significantly reduces your chances of successful fusion and increases complications
- **Maintain a healthy weight:** Obesity can increase complication rates
- **Follow activity restrictions:** This protects your fusion while it heals
- **Take medications as prescribed:** Especially pain medications and stool softeners in the early recovery period

- **Attend physical therapy:** If recommended by your surgeon
- **Keep all follow-up appointments:** So your surgeon can monitor your healing and fusion progress
- **Report any concerning symptoms immediately:** Such as severe abdominal pain, fever, wound drainage, or changes in bowel/bladder function

Special Considerations for Male Patients

If you are a male patient, especially if you are of reproductive age or planning to have children, it's important to discuss the risk of retrograde ejaculation with your surgeon before surgery. While this complication does not affect sexual function or sensation, it can affect fertility. Some patients may wish to consider sperm banking before surgery if future fertility is a concern.[\[14\]](#)[\[15\]](#)[\[18\]](#)

Final Thoughts

ALIF is a well-established, effective procedure for treating lower back problems. It offers the advantages of preserving your back muscles, achieving high fusion rates, and providing significant pain relief and functional improvement. While the anterior approach carries specific risks such as vascular injury and retrograde ejaculation in males, these complications are relatively uncommon and most can be safely managed. The vast majority of patients (86%) are

References

1. [Stand-Alone Anterior Lumbar Interbody Fusion: Indications, Techniques, Surgical Outcomes and Complications.](#) Kerolus M, Turel MK, Tan L, Deutsch H. Expert Review of Medical Devices. 2016;13(12):1127-1136. doi:10.1080/17434440.2016.1254039.
2. [Outcomes of Anterior Lumbar Interbody Fusion Surgery Based on Indication: A Prospective Study.](#) Rao PJ, Loganathan A, Yeung V, Mobbs RJ. Neurosurgery. 2015;76(1):7-23; discussion 23-4. doi:10.1227/NEU.0000000000000561.
3. [A Systematic Review of Anterior Lumbar Interbody Fusion \(ALIF\) Versus Posterior Lumbar Interbody Fusion \(PLIF\), Transforaminal Lumbar Interbody Fusion \(TLIF\), Posterolateral Lumbar Fusion \(PLF\).](#) Rathbone J, Rackham M, Nielsen D, et al. European Spine Journal : Official Publication of the European Spine Society, the European Spinal Deformity Society, and the European Section of the Cervical Spine Research Society. 2023;32(6):1911-1926. doi:10.1007/s00586-023-07567-x.
4. [Anterior Lumbar Interbody Fusion \(ALIF\): Biometrical Results and Own Experiences.](#) Kapustka B, Kiwic G, Chodakowski P, et al. Neurosurgical Review. 2020;43(2):687-693. doi:10.1007/s10143-019-01108-1.

5. [Selective Anterior Lumbar Interbody Fusion for Low Back Pain Associated With Degenerative Disc Disease Versus Nonsurgical Management](#). Kleimeyer JP, Cheng I, Alamin TF, et al. *Spine*. 2018;43(19):1372-1380. doi:10.1097/BRS.0000000000002630.
6. [Retrospective Analysis of Medium-Term Outcomes Following Anterior Lumbar Interbody Fusion Surgery Performed in a Tertiary Spinal Surgical Centre](#). Srirangarajan T, Eseonu K, Fakouri B, et al. *Annals of the Royal College of Surgeons of England*. 2024;106(6):540-546. doi:10.1308/rcsann.2023.0082.
7. [Technical Approach, Outcomes, and Exposure-Related Complications in Patients Undergoing Anterior Lumbar Interbody Fusion](#). Manunga J, Alcala C, Smith J, et al. *Journal of Vascular Surgery*. 2021;73(3):992-998. doi:10.1016/j.jvs.2020.06.129.
8. [Stand-Alone Anterior Lumbar Interbody Fusion for Degenerative Disc Disease of the Lumbar Spine: Results With a 2-Year Follow-Up](#). Lammler J, Whitaker MC, Moskowitz A, et al. *Spine*. 2014;39(15):E894-901. doi:10.1097/BRS.0000000000000393.
9. [The Rate of Fusion for Stand-Alone Anterior Lumbar Interbody Fusion: A Systematic Review](#). Manzur M, Virk SS, Jivanelli B, et al. *The Spine Journal : Official Journal of the North American Spine Society*. 2019;19(7):1294-1301. doi:10.1016/j.spinee.2019.03.001.
10. [Time Course of Functional Recovery Following Single-Level Anterior Lumbar Interbody Fusion With and Without Posterior Instrumentation: A Retrospective Single-Institution Study](#). Subramanian T, Owusu-Sarpong S, Kush S, et al. *Journal of Clinical Medicine*. 2025;14(13):4397. doi:10.3390/jcm14134397.
11. [Return to Work Following Anterior Lumbar Interbody Fusion With Percutaneous Posterior Pedicle Fixation: A Retrospective Analysis From Two Academic Centers in Germany](#). Behmanesh B, Wempe H, Kilinc F, et al. *Journal of Clinical Medicine*. 2024;13(18):5636. doi:10.3390/jcm13185636.
12. [Functional and Radiological Outcome of Anterior Retroperitoneal Versus Posterior Transforaminal Interbody Fusion in the Management of Single-Level Lumbar Degenerative Disease](#). Bassani R, Morselli C, Querenghi AM, et al. *Neurosurgical Focus*. 2020;49(3):E2. doi:10.3171/2020.6.FOCUS20374.
13. [Anterior Lumbar Interbody Fusion: Single Institutional Review of Complications and Associated Variables](#). Mortazavi A, Mualem W, Dowlati E, et al. *The Spine Journal : Official Journal of the North American Spine Society*. 2022;22(3):454-462. doi:10.1016/j.spinee.2021.09.010.
14. [Retrograde Ejaculation After Anterior Lumbar Spine Surgery](#). Lindley EM, McBeth ZL, Henry SE, et al. *Spine*. 2012;37(20):1785-9. doi:10.1097/BRS.0b013e31825752bc.
15. [Quantitative Assessment of Retrograde Ejaculation Using Semen Analysis, Comparison With a Standardized Qualitative Questionnaire, and Investigating the Impact of rhBMP-2](#). Tepper G, Rabbani R, Yousefzadeh M, Prince D. *Spine*. 2013;38(10):841-5. doi:10.1097/BRS.0b013e31828bf36a.

16. [Is There a Variance in Complication Types Associated With ALIF Approaches? A Systematic Review.](#) Feeley A, Feeley I, Clesham K, Butler J. Acta Neurochirurgica. 2021;163(11):2991-3004. doi:10.1007/s00701-021-05000-0.
17. [Complication Avoidance and Management in Anterior Lumbar Interbody Fusion.](#) Than KD, Wang AC, Rahman SU, et al. Neurosurgical Focus. 2011;31(4):E6. doi:10.3171/2011.7.FOCUS11141.
18. [Retrograde Ejaculation After Anterior Lumbar Interbody Fusion With and Without Bone Morphogenetic Protein-2 Augmentation: A 10-Year Cohort Controlled Study.](#) Comer GC, Smith MW, Hurwitz EL, et al. The Spine Journal : Official Journal of the North American Spine Society. 2012;12(10):881-90. doi:10.1016/j.spinee.2012.09.040.
19. [Does the ACS NSQIP Surgical Risk Calculator Accurately Predict Complications Rates After Anterior Lumbar Interbody Fusion Procedures?.](#) Narain AS, Kitto AZ, Braun B, et al. Spine. 2021;46(12):E655-E662. doi:10.1097/BRS.0000000000003893.
20. [Primary Anterior Lumbar Interbody Fusion, With and Without Posterior Instrumentation: A 1,377-Patient Cohort From a Multicenter Spine Registry.](#) Laiwalla AN, Chang RN, Harary M, et al. The Spine Journal : Official Journal of the North American Spine Society. 2024;24(3):496-505. doi:10.1016/j.spinee.2023.10.003.