



Lateral Lumbar Interbody Fusion (LLIF / XLIF / OLIF)

Preoperative Patient Information & Instructions

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Purpose of This Document

This document explains your upcoming lateral lumbar interbody fusion (commonly called LLIF, XLIF, or OLIF). Please review this packet thoroughly prior to day of surgery

Anatomy of the Lumbar Spine

The lumbar spine has five vertebrae (L1-L5) separated by **intervertebral discs**. Each disc has a fibrous outer ring (annulus fibrosus) and gel-like core (nucleus pulposus). The discs cushion the spine and allow motion. Adjacent vertebrae are also connected by paired **facet joints** at the back. The **psaos muscle** runs along the front side of the lumbar spine and is traversed during this surgical approach. The **lumbar plexus** is a network of nerves embedded within the psaos — protecting these nerves is a critical aspect of lateral surgery.

The Problem

Lateral lumbar fusion is well-suited for:

- **Degenerative disc disease** with mechanical back pain
- **Indirect decompression** of mild-to-moderate spinal stenosis (restoring disc height opens the canal and foramina)
- **Adult degenerative scoliosis** — particularly effective for multi-level deformity correction
- **Spondylolisthesis** (Grade I, sometimes Grade II)
- **Adjacent segment disease** above or below a prior fusion

The Procedure: Lateral Lumbar Interbody Fusion

Lateral fusion approaches the disc from the side of the body through the retroperitoneal space, avoiding the back muscles (preserving them) and the great vessels (which are anterior). The two main variants are:

- **XLIF / DLIF (transpsoas):** the surgeon passes through the psoas muscle. Neuromonitoring is used to avoid the lumbar plexus nerves.
- **OLIF (oblique, anterior to psoas):** the surgeon passes in front of the psoas muscle. Useful for L4-L5 and patients with high-riding plexus.

Surgical Steps

1. General anesthesia is induced and you are positioned on your side on a specialized table.
2. Fluoroscopy confirms the target disc.
3. A small incision (3–5 cm) is made on the flank.
4. Blunt dissection through the retroperitoneal space brings the surgeon to the psoas muscle.
5. Continuous **neuromonitoring** (EMG) is used throughout to detect proximity to lumbar plexus nerves.
6. A sequence of dilators and a retractor system is docked on the disc.
7. The disc is removed (discectomy), the cartilage is cleared from the endplates, and a large structural cage filled with bone graft is inserted.
8. **Supplemental fixation** is usually performed during the same operation or as a staged procedure: percutaneous pedicle screws from the back (most common) or a lateral plate. Stand-alone lateral cages are rarely used.
9. The retractor is removed and the small incision is closed.

Advantages of Lateral Fusion

- Preserves the back muscles (no posterior dissection at fusion levels)
- Allows placement of a very large cage that restores disc height and corrects deformity
- **Indirect decompression** — restoring disc height often opens up the spinal canal and foramina without direct decompression
- Less blood loss compared to traditional open posterior fusion
- Faster recovery and earlier mobilization in many patients

Enhanced Recovery After Surgery (ERAS)

- Multimodal preoperative analgesia (acetaminophen, gabapentinoid, celecoxib)
- Tranexamic acid to reduce blood loss
- Local infiltration with long-acting anesthetic
- Early mobilization day of surgery
- Aggressive narcotic minimization
- Goal discharge: postop day 1–2 for single-level

Preoperative Medication Instructions

CRITICAL — READ CAREFULLY

Improper medication management may result in cancellation or bleeding/fusion complications.

Medications to STOP

Medication Class	When to Stop
Aspirin (81 mg or 325 mg)	7 days before surgery
Clopidogrel (Plavix), ticagrelor (Brilinta), prasugrel (Effient)	5-7 days before surgery
Warfarin (Coumadin)	5 days before surgery — bridging may be required
Apixaban (Eliquis), rivaroxaban (Xarelto), dabigatran (Pradaxa), edoxaban (Savaysa)	72 hours before surgery (per cardiology)
NSAIDs (ibuprofen, naproxen, meloxicam, celecoxib, diclofenac)	7 days before surgery
SGLT2 Inhibitors (Jardiance, Farxiga, Invokana)	Hold 3-4 days prior to surgery (check with the anesthesia team)
Fish oil, vitamin E, ginkgo, garlic, ginseng, turmeric, CBD	7 days before surgery
GLP-1 agonists (Ozempic, Wegovy, Mounjaro, Zepbound)	1 week before surgery (anesthesia aspiration risk)
Recreational marijuana, nicotine products	Stop completely; nicotine impairs bone and wound healing

NICOTINE CESSATION IS MANDATORY

Nicotine in any form (smoking, vaping, chewing, patches) significantly impairs bone fusion, increases infection risk, and raises the risk of pseudarthrosis and revision surgery. Complete cessation is required at least 4 weeks preop and 3-6 months postop. Surgery may be deferred for active users.

Continue / Special Instructions

- Continue antihypertensives, antiseizure, thyroid, reflux, and psychiatric medications.
- ACE/ARB and diuretics: hold morning of surgery.
- Diabetes medications: hold metformin; reduce insulin per anesthesia.

Preoperative Optimization Pathway

Getting Ready for Surgery — Simple Steps for Less Pain & a Faster Recovery

Patients who follow these steps tend to have **less pain, need less medication, heal faster, and return home sooner**. Please start as early as you can — ideally **4 weeks before** your surgery date.

1. Eat Well & Hit Your Protein Target

- **Eat more protein.** Include eggs, fish, chicken, dairy, beans, or a protein shake at every meal. Protein is what your body uses to heal wounds, knit bone, and keep muscle strong.

Daily protein goal: about 1.5 grams per kilogram of body weight.

Quick guide: a **150 lb person** should aim for roughly **100 g of protein per day**, spread across meals (about **25–35 g each**). Your care team can tailor this for you.

Note: patients with significant kidney disease (advanced CKD) should discuss protein targets with their nephrologist before increasing intake.

- **Choose healing foods.** Vegetables, fruit, and whole grains lower inflammation. Cut back on sugar, processed food, and alcohol.
- **Drink plenty of water** in the days before surgery. Clear liquids are usually allowed up to 2 hours before you arrive.
- **Carbohydrate drink.** Unless you are diabetic, a clear carbohydrate drink (such as ClearFast or unconcentrated Gatorade) **2–3 hours before** surgery reduces stress and nausea. Your team will advise on the specifics.

2. Plan for Comfort & Pain Control

- **We use several mild medicines together** so we can keep you comfortable while using as little opioid medication as possible.
- **Bring a full list of your medicines.** Some blood thinners, anti-inflammatories, supplements, and diabetes/weight medicines (including GLP-1 agonists such as Ozempic, Wegovy, and Mounjaro) may need to be paused.
- **Tell us if you take pain medication regularly.** A simple plan helps us keep you comfortable afterward and prevents withdrawal symptoms.

3. Helpful Supplements (but Not Necessary)

- **Protein shake or powder** — the easiest way to reach your protein goal if appetite is low. Whey or plant blend with ~20–30 g per serving.
- **Vitamin D3** — low vitamin D is linked to slower bone healing and more pain after spine surgery. We may check your level and suggest a dose (often **1,000–2,000 IU daily**).
- **Iron** — only if you are anemic or low on iron. Correcting it before surgery lowers transfusion risk. We will test first.
- **Vitamin C and zinc** — support wound healing. A daily multivitamin usually covers both.
- **Calcium** — 1,000–1,200 mg daily, with vitamin D, supports bone fusion. Use dietary sources first (dairy, fortified plant milks, leafy greens) and supplement only as needed.

STOP these supplements about 1 week before surgery

Fish oil, vitamin E, high-dose garlic, ginkgo, turmeric (high-dose), and CBD — these can increase bleeding. Review every supplement with your surgeon before starting or stopping anything.

4. Keep Moving & Prepare Your Home

- **Walk every day.** A 20–30 minute walk builds strength and stamina. More active patients recover noticeably faster.
- **Practice the basics.** Rehearse getting in and out of bed, using a walker if needed, and slow deep breathing exercises with an incentive spirometer.
- **Set up your home.** Clear walkways, keep items within easy reach, and arrange a ride and a helper for the first day or two.

5. Other Important Steps

- **Stop smoking and nicotine.** This is the single most powerful change you can make. Quitting even 4 weeks before surgery greatly improves healing and lowers complications. Nicotine in any form (cigarettes, vapes, chewing tobacco, patches, gum) substantially impairs bone fusion and **must be stopped before and for at least 3 months after surgery.**
- **Control blood sugar.** If you have diabetes, work with your doctor to keep it well managed before surgery. Target HbA1c < 7.5% for elective cases.
- **Rest and relax.** Aim for 7–8 hours of sleep nightly. Worry can make pain feel worse — gentle breathing exercises (4-7-8 breathing), guided imagery, and mindfulness apps (Calm, Headspace, Insight Timer) help.
- **Prevent infection.** You will be asked to wash with chlorhexidine (Hibiclens) antiseptic soap the night before and morning of surgery. **Please do not shave the surgical area** — this can cause micro-abrasions that increase infection risk.

6. What to Bring on Surgery Day

- **Photo ID and insurance card.** Plus a list of all your medicines and doses.
- **Loose, comfortable clothing** and flat, non-slip shoes that are easy to put on.

- **Your CPAP machine** if you use one for sleep apnea, and any braces or walking aids.
- **A responsible adult** to drive you home and stay with you for the first 24 hours.
- **Leave valuables and jewelry at home.** Remove nail polish and contact lenses before arrival.

Preoperative Physical Therapy ("Prehab")

We strongly recommend a **preoperative physical therapy evaluation and prehabilitation course** before surgery. Multiple randomized studies demonstrate that prehab improves postoperative pain scores, accelerates functional recovery, and reduces length of stay.

Goals of preoperative physical therapy include:

- **Core activation and lumbar stabilization** — transverse abdominis, multifidus, pelvic floor coordination
- **Hip mobility and posterior chain conditioning** — glutes, hamstrings, hip flexors
- **Log-roll and supine-to-sit transfer training** — so the technique is automatic on postoperative day 1
- **BLT body mechanics** — squat, hip-hinge, and lifting form review
- **Walking endurance baseline** — establishes a functional benchmark for postoperative comparison

Our office will coordinate this referral. If you have a preferred physical therapist, please let us know.

Sessions completed before surgery do not count against postoperative PT benefits under most insurance plans, but we will verify this for your specific coverage.

Day Before & Day of Surgery

Day Before Surgery

- **Nothing to eat after midnight.** Clear liquids (water, black coffee, apple juice) are allowed up to **2 hours before** arrival unless told otherwise.
- **Chlorhexidine (Hibiclens) shower** the night before — focus on the planned surgical area.
- Sleep in clean sheets and clean clothing.
- Pack your bag: ID, insurance card, complete medication list, CPAP if applicable, loose-fitting clothing for going home, slip-on shoes.
- **Do not shave** the planned surgical site at home.

Day of Surgery

- Arrive at the time given (usually 2 hours before surgery).
- **Repeat the chlorhexidine shower** the morning of surgery.
- Brush teeth but do not swallow water.
- Do **not** wear makeup, lotions, perfumes, nail polish, or jewelry.
- Wear loose, comfortable clothing.
- Bring this packet and your medication list.
- Have a responsible adult drive you home and stay with you for the first 24 hours.

Your Countdown to Surgery

Keep this page handy — it shows what to do as your surgery date gets closer.

4-2 Weeks Before — BUILD STRENGTH	1 Week Before — GET READY	1-2 Days Before — FINAL STEPS
✓ Stop smoking & nicotine	✓ Confirm medicines to pause	✓ Antiseptic (chlorhexidine) soap wash
✓ Eat more protein (~1.5 g/kg/day)	✓ Arrange ride & helper	✓ Clear carbohydrate drink (non-diabetics)
✓ Walk 20-30 min daily	✓ Practice breathing exercises	✓ Clear liquids up to 2 hours prior
✓ Manage blood sugar & BP	✓ Keep eating protein	✓ Take pre-op medicines as instructed
✓ Correct any anemia	✓ Avoid alcohol	✓ Rest & arrive on time

Questions?

Call your care team at **301.718.9611**. Always follow the specific instructions from your surgeon and anesthesiologist — those instructions come first. This guide is for patient education and does not replace advice from your doctor.

Risks and Potential Complications

General Surgical Risks

- Bleeding, infection, anesthesia complications, DVT/PE, cardiac/pulmonary/renal complications.

Risks Specific to Lateral Lumbar Fusion

- **Anterior thigh pain, numbness, or weakness** — from psoas dissection or lumbar plexus irritation. Occurs in 15-30% of patients; usually transient (resolves in weeks to months), but can be permanent.
- **Hip flexor weakness (psoas weakness)** — typically transient; physical therapy aids recovery.
- **Genitofemoral nerve injury** — anterior thigh and groin numbness or paresthesias.
- **Lumbar plexus injury** — femoral nerve injury can cause quadriceps weakness; obturator nerve injury rare.
- **Bowel injury** — rare; the peritoneum is reflected out of the surgical field.
- **Vascular injury** — rare; the iliac vessels are anterior to the surgical corridor.
- **Ureteral injury** — very rare.
- **Cage subsidence** — sinking of the cage into the vertebral body, especially in osteoporotic bone.
- **Pseudarthrosis** — failed fusion (5-15%).
- **Hardware failure or migration**
- **Adjacent segment degeneration** over time.
- **Postoperative ileus** — temporary intestinal slowdown.

- **Incisional hernia** at the flank incision (uncommon).
- **Persistent pain.**
- **Death** — extremely rare.

Reason for Surgery

Surgery is recommended after conservative management has failed, typically 6–12 weeks of:

- Physical therapy
- Medications
- Epidural steroid injections
- Activity modification

Surgical indications include:

- Persistent mechanical back pain with documented disc degeneration
- Symptomatic spondylolisthesis
- Adult degenerative scoliosis
- Foraminal stenosis amenable to indirect decompression
- Adjacent segment disease

Hospital Stay and Discharge Planning

- Expected stay: **1–3 days** for single-level; longer for multi-level.
- Walk on day of surgery or postop day 1.
- Most patients discharge home.
- Anterior thigh discomfort may make initial walking uncomfortable; this typically improves quickly.
- Plan for help at home for 1–2 weeks.

Contact Information

Provider: Lekhaj Daggubati, MD

Practice: Washington Brain & Spine Institute

Main Phone (All Locations): 301.718.9611 — business hours

After-Hours / Urgent Concerns: 301.718.9611 — answering service will contact the on-call provider

Clinical Office Locations

Rockville: 3202 Tower Oaks Boulevard, Suite 100, Rockville, MD 20852

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Frederick: 198 Thomas Johnson Drive, Suite 17, Frederick, MD 21704

White Oak: 11886 Healing Way, Suite 401, Silver Spring, MD 20904

Emergency: Call **911** or proceed to the nearest emergency department for life-threatening symptoms — severe difficulty breathing, sudden weakness or paralysis, loss of consciousness, seizure, severe sudden headache, chest pain, or stroke-like symptoms.