

Minimally Invasive Lumbar Spinal Fusion

Introduction

Based on your clinical symptoms, physical examination findings, diagnostic tests and the past treatments you have tried, your doctor has determined that you are a candidate for Minimally Invasive Lumbar Spinal Fusion surgery.

Indications for Surgery

Minimally Invasive Lumbar Spinal Fusion surgery is a treatment option that may be considered when persistent symptoms of low back, or other spine-related pain, have failed to respond to other treatments. There are several conditions that may contribute to persistent back pain such as arthritis, disc degeneration, herniation, deformities or the slippage of one spinal bone (vertebrae) on another which is known as spondylolisthesis.

Description of Procedure

The purpose of Minimally Invasive Lumbar Spinal Fusion surgery is to fuse or “weld” the vertebral bones together to eliminate movement at the painful or affected levels in your spine. To accomplish this, your surgeon will place pieces of bone, and/or bone graft materials, along the sides and/or between the vertebrae. The goal is for these bone cells to grow and become solid. When the bone becomes solid and the vertebrae are fused together it will eliminate movement at that level of your spine. Those spinal levels which were not surgically fused will continue to move as before.

Additional bone used at the time of surgery may be your own bone or bank bone. This is usually determined prior to surgery. Your own bone is usually taken from the pelvis. Bank bone is obtained from the American Red Cross or one of several other certified tissue banks from across the country, where it has been carefully processed and sterilized. Depending on your particular case, either your own bone, bank bone, or a combination of the two will be used. If you have a preference, please discuss it with your surgeon. If removal of bone from the pelvic area results in a substantial defect, bank bone may be used to reconstruct the area.

Your surgeon will access your spine through several small incisions in your back. X-ray imaging will be used to precisely confirm the targeted area for treatment. Through these small incisions your surgeon will use specialized tools to place the pieces of bone and/or bone regenerating materials. The surgeon will also insert instrumentation through these small incisions to stabilize the vertebrae being fused.

Instrumentation

Rigid instrumentation in the form of pedicle screws and rods will be placed. They are placed to immediately stabilize those vertebrae being fused and increase the likelihood of a solid fusion.

Until the bony fusion has become solid, great stress is placed on the instrumentation which may cause it to become loose or even break, although breakage is rare. Loose or broken instrumentation can cause low back and/or leg pain. Once the affected levels are successfully fused and if warranted, the instrumentation can be surgically removed.

After Surgery

Most patients remain in the hospital for one to three days after surgery, but some patients require a longer stay. When you are discharged following surgery, we expect that in most cases you will be self-sufficient in your personal care. However, depending upon your home situation, arrangements may need to be made for additional help. These arrangements, including home care services and/or medical equipment for home use, are made in the hospital before discharge.

Medication

You may be provided prescriptions prior to your surgery. These prescriptions may include:

- A special soap-to use the day before and the morning of your surgery for the purpose of reducing risk of infection.
- Stool softener- to begin taking the night before surgery to prevent post-operative constipation.
- Calcium & Vitamin D to support bone health that should be started before surgery.
- Smooth muscle relaxer to decrease the risk of postoperative urinary retention (males with urinary history).

Paperwork

Please do not bring any paperwork that needs to be completed by our office to the hospital with you. All paperwork related to disability, FMLA or other medical legal forms should be mailed to Midwest Spine and Brain Institute, attention Medical Legal Department. Please allow 1-2 weeks for forms to be completed. Midwest Spine & Brain Institute does charge an administration fee for such paperwork to be completed. You may leave a message for our Medical Legal Department at 651-259-4522.

Questions

If you have any questions regarding your surgery, please contact our office at 651-430-3800 to talk with your care team.

Medication Instructions Before Surgery

You will need to stop taking certain medications and supplements before surgery.

If you have any questions, please contact our office at 651-430-3800.

Blood Thinning Medication

Although it is not safe to proceed with surgery while taking the following “blood thinner” anticoagulant medication, it is also not safe to stop these medications without first consulting with the medical doctor who prescribed it for you. **If you are taking blood thinning medication, discuss a plan with the doctor who is prescribing the medication.**

These medications include, but are not limited to:

- Coumadin (warfarin)
- Plavix (clopidogrel)
- Eliquis (apixaban)
- Xarelto (rivaroxaban)
- Pradaxa (dabigatran)
- Brilinta (ticagrelor)

Anti-Inflammatory Medication

It is recommended that you stop taking anti-inflammatory medications **10 days before surgery.** These medications include, but are not limited to the following:

Advil	Indocin
Aleve	Lodine
Anaprox	Motrin
Aspirin	Naproxen
Celebrex	Orudis
Daypro	Oruvail
Disalcid	Relafen
Ibuprofen	Vioxx
Excedrin	Meloxicam

Herbal Supplements

It is recommended that you stop taking the following herbal supplements **7 days before surgery.**

Danshen	Ginseng
Dong quai	Goldenseal
Echinacea	Kava
Ephedra	Licorice
Feverfew	St. John’s Wort
Garlic	Valerian
Ginger	Vitamin E
Gingko	Yohimbe
Fish Oil	Any Multivitamin
Weight Loss Medications/Supplements	

GLP-1 Agonists

It is recommended to hold the following daily or twice daily injections **one day prior to Surgery and day of surgery.**

- Exenatide (Byetta)
- Lixisenatide (Adlyxin)
- Liraglutide (Victoza, Saxenda)
- Lixisenatide with glargine (Soliqua)
- Wegovy
- Phentermine

For Weekly injections or daily oral dosing **Hold 7 days prior to surgery.**

- Albiglutide (Tanzeum)
- Exenatide (Bydureon)
- Dulaglutide (Trulicity)
- Semaglutide (Ozempic)
- Tirzepatide (GLP-1/GIPRA) (Mounjaro)
- Semaglutide (Rybelsus)

Preoperative Instruction

Dear Patient: Please take this preoperative instruction sheet to your family physician when you have your pre-op examination.

Dear Health Care Provider,

Please perform pre-operative evaluation and testing listed below, which is based on patient's health condition(s) and current evidence-based guidelines. Thank you!

Lumbar Fusion (One or Two Levels), Lumbar Artificial Disc Replacement and Laminectomy (Cervical, Thoracic and Lumbar) to Include:

- CBC
- POTASSIUM If on diuretics, anti-hypertensive or cardiac medications
- BMP If patient is taking an ACE/ARB medication
- EKG Male/Female 65 years of age or greater – needs within 1 year prior

Anterior/Posterior Spine Surgery (Cervical and Lumbar), Lumbar Spinal Fusion (3 or More Levels) and Thoracic Fusion to Include:

- CBC
- INR
- BMP
- POTASSIUM If on diuretics, anti-hypertensive or cardiac medications
- EKG Male/Female 50 years of age or greater – needs within 1 year prior

Please see the following for any additional condition specific testing:

- ❖ Cardiovascular Disease
 - CBC
 - BMP
 - EKG
 - CXR
- ❖ History of Stroke
 - EKG
- ❖ Bleeding Disorder/Anemia
 - CBC
 - INR
- ❖ Pulmonary Disease
 - CXR
- ❖ Hepatic Disease
 - CBC
 - INR
 - CMP
- ❖ Renal Disease
 - CBC
 - BMP
 - EKG
- ❖ Endocrine Disorder
 - BMP
 - EKG
- ❖ BMI >35 **AND** another risk factor
 - EKG
- ❖ Chemotherapy
 - CBC

1950 Northwestern Avenue Suite 102
Stillwater, MN 55082-7615
Phone: 651-430-3800
Fax: 651-430-3827
www.midwestspineandbrain.com

Attention: Medical Facilities Performing Pre-Op Examinations

Please fax a copy of the pre-op exam to the hospital where the patient is having their surgery performed. Also, please fax a copy to Midwest Spine & Brain Institute. It is imperative that the hospital and Midwest Spine & Brain Institute have a copy before the surgery can be performed. Many times the surgery is early in the morning and the clinic where the pre-op was performed has not opened making it difficult to obtain a copy of the pre-op if necessary. Please ask the patient what particular hospital they will utilize.

Please bring a copy of your pre-op physical to the hospital ONLY if your surgery is scheduled for the next day.

Midwest Spine & Brain Institute fax number: 651-430-3827

Fax Numbers to commonly used Hospitals and Surgery Centers:

Fairview Ridges Hospital	952-892-2078
Fairview Ridges Surgery Center	952-898-3482
Greenway Surgery Center	612-728-2660
Maplewood Surgery Center	651-471-9748
North Memorial Health Hospital	763-581-3821
St. Croix Regional Medical Center	715-483-0519
St. John's Hospital (HealthEast)	651-326-8631
United Hospital	651-241-5073
Woodbury Surgical Suites	651-493-0344

Thank you for your assistance.

Surgery Prep for Spinal Fusion: Thoracic and Lumbar

- Beginning at 12 noon the day before surgery, limit your intake to ONLY clear juices, tea, water, clear broth and Jell-O.
- Nothing to eat or drink beginning at midnight the night before surgery.
- No nicotine containing products (cigarettes, E-Cig's, chewing tobacco, etc.) 24 for hours prior to surgery.
- If your surgeon has recommended a brace or corset, please bring this with you to the hospital or surgery center on the day of your surgery.
- Bring at least 3 or 4 pre-washed cotton t-shirts to wear under your brace with you to the hospital or surgery center on the day of your surgery.
- Bring tennis shoes or walking shoes with you to the hospital or surgery center on the day of your surgery.
- Make sure to have 4x4 gauze dressings available at home (which will be needed following discharge).
- Patient's having Anterior Fusion Surgery:
 - Laxative: The day before surgery, take one full tablespoon of Citroma (or any other magnesium citrate oral laxative) with a full glass of water after 5:00 pm.
- Please make sure to identify if you have a history of voiding trouble or urinary issues. A medicine (Flomax) can be taken the day before your surgery to help stimulate the bladder and avoid post-operative urinary retention (males only). An RN will need to call in a prescription for you, so please make this known well ahead of your surgery.

This information is important.

Please follow the instructions precisely.

If you have any questions please contact us at 651-430-3800.

Recovery at Home after Back Surgery

Recovery Time

The symptoms you had before surgery can take weeks or months to improve. It is common for these symptoms to come and go after surgery.

Be patient and allow your body time to heal.

Bathing

For three to six weeks after surgery, or until your incision is healed, you can only take showers. Do not take baths.

- Cover your incision with plastic wrap and tape until drainage stops. Once your incision is no longer draining, you may shower with it uncovered.
- You may use a stool to sit on (like you did in the hospital).
- Keep your soap, shampoo and other items within reach.
- If you drop something, do not try to pick it up. Ask for help or have extra supplies handy.

Dressings & Bandages

- Change your dressing daily, using light gauze and tape, until drainage stops.
- Once drainage has stopped, you can leave your incision uncovered.
- Keep your incision clean and dry.
- Change your dressing after showering, and when it becomes wet.

Stitches & Staples

- If you have staples along your incision, they will be removed at your follow-up visit two to three weeks after surgery.
- If you have small strips of tape (Steri-Strips) along your incision, they will fall off on their own within 2-3 weeks. Do not pull these off. When they fall off, they do not need to be replaced.

Call an Ambulance

CALL 911 IF YOU ARE EXPERIENCING CHEST PAIN, SHORTNESS OF BREATH, OR DIFFICULTY BREATHING

Call Your Care Team

Call 651-430-3800 to speak with your care team if you have:

- a temperature of 101° F or higher
- yellow or green drainage or more than a slight amount of bloody drainage from your incision
- redness, swelling, or warmth by your incision
- new or unusual pain, numbness, or tingling
- pain you cannot control
- any bowel or bladder changes
- an opening in your incision
- pain in your calf or pressure in your legs
- been sent home from surgery with a drain
- any other questions or concerns

Movement & Exercise

Walking

- Initially, walk for exercise and to regain your strength and endurance. Begin slowly, and increase the amount you walk as tolerated.
- If you become sore or have pain, decrease the amount of walking for 1-2 days. Slowly increase the amount you walk again as tolerated.

Sitting

- Practice good posture.
- Use fatigue as a reminder to rest.
- Increase the length of time you sit as necessary and as tolerated.

Bending, Twisting & Lifting

- Do not bend or twist a lot.
- If bending and lifting are necessary, do so at your knees and keep your back straight.
- Use a “reacher” to pick items up off the floor.
- Try not to lift items heavier than 5 pounds until your first follow up appointment.

- Carry items close to your body at waist level.
- Avoid activities like sweeping and vacuuming.

Steps

- Limit steps to only a few initially. You may gradually increase the number of steps you take as tolerated.
- Take your time. Steps may be challenging as surgery may make it hard to see where your feet are placed. Be sure your feet are firmly placed on each step before shifting your weight.

Driving

- Do not drive while taking prescription pain medication.

Sexual Activities

- You may resume sexual activities as your symptoms allow.

Bracing

- If a brace has been recommended, wear it as directed by your surgeon.
- Do not take your brace off before you are supposed to, even if you are feeling better.
- Your provider will review your x-rays at follow-up visits and will discuss wearing your brace less.
- Keep your skin healthy under your brace.
 - Wear a dry, wrinkle-free cotton undershirt under the brace.
 - Apply Witch Hazel with brisk but gentle slapping movements until dry.
 - Use powders sparingly.
 - Contact your orthotist if you develop redness, pressure areas or sores under your brace. Your orthotist may be able to adjust your brace.
 - Wash your brace and pads daily using a damp cloth and clean water.

Avoid Constipation

Prescription pain medicine, anesthesia and decreased activity can slow your digestion and cause constipation.

- Take stool softeners, such as Colace, as needed while you are taking narcotic pain medicine.
- Do not strain to have a bowel movement.
- You may try Milk of Magnesia or Miralax if stool softeners are not effective.
- Drink plenty of water.
- Include fruits and vegetables into your diet.

Prescription Pain Medication

Depending on your surgery and condition, your medicine will be refilled for a short time after surgery. If you still need pain medication after this time, your provider may refer you to your primary care physician or a pain clinic for further management.

- Take your recommended doses when your pain is at its worst. Slowly cut back (taper) on the narcotic when you think your pain is under control.
- Benzodiazepines (medications to calm or relax you) may need to be reduced or stopped before surgery and while taking any pain medication after surgery. Please discuss a plan for this with your primary care physician.
- Please call your care team if you have questions about your pain medication plan.

Medications That Affect Bone Healing

- If you have had a fusion surgery, take Calcium and Vitamin D for 12 months after surgery.
- If you had a fusion surgery:
 - Do not take nonsteroidal anti-inflammatory medications (known as NSAIDS) such as ibuprofen (Advil® or Motrin®) and naproxen (Aleve®) for 6-12 months after surgery.
 - Do not take Bisphosphonates, including Reclast®, for 12 months after surgery.
 - The above medications can interfere with bone healing.

Questions

Call 651-430-3800 to speak with your care team.

Potential Risks and Complications of Surgery

Although the most likely complications are identified below, this is not a complete list, and other complications can occur. These risks should not be taken lightly, however, the possibility of any of these happening is very low. Risks specific to certain spine surgeries are outlined in addition to the general spine surgery risks below.

- Your surgeon cannot guarantee relief of pain or other symptoms following surgery.
- X-ray may be used during your surgery. If you are pregnant, this could be unsafe for your baby.
- There is a risk for an allergic reaction to general anesthesia (being put to sleep).
- Lung problems (such as pneumonia), blood clots, heart attack, stroke, fluid or blood accumulation near the wound, injury to a major blood vessel and wound infections can occur.
- If a spinal nerve is injured, it could result in permanent pain, numbness, or weakness in a limb, or loss of bowel or bladder control.
- If the spinal cord is injured, it could result in permanent paralysis in the legs and possibly parts of the arms.
- The spinal nerves and spinal cord travel through the vertebrae in a sac filled with spinal fluid. If the sac is punctured, spinal fluid will leak out. This is known as a dural leak. If this occurs you may be advised to remain flat in bed to prevent a spinal headache and allow the puncture site to heal. On rare occasions, an injection or further surgery may be required to seal the puncture site.
- A significant amount of blood can be lost during spine surgery, which may require you to have a blood transfusion. Your surgeon may recycle your own blood during surgery so, if needed, you may receive it back in a transfusion during or after surgery. We will help you make the necessary arrangements. If you do need blood from a blood bank, risks include hepatitis, allergic reactions, and on extremely rare occasions HIV/AIDS.
- If hardware or other implants are used during your surgery, there is a chance this could become loose or dislodged. Additional surgery may be required to correct this.

Anterior Cervical Surgery

- The incision for an anterior neck surgery is located near the esophagus, trachea, and major blood vessels such as the carotid artery. Injury to the esophagus or trachea could result in severe infection. Injury to the carotid artery could result in stroke. Recurrent laryngeal nerve injury, swallowing difficulty, temporary speech difficulty/hoarseness can also occur.

Anterior Lumbar or Thoracic Surgery

- The incision for an anterior surgery of your low or mid back is made on the abdomen or thorax (rib cage). For male patients only, small nerves may be cut causing sterility. Following surgery, sperm are still produced but are not ejaculated outside the body. The male patient's ability to achieve erection and orgasm are not affected.

Discectomy, Laminectomy, and Decompression Surgery

- Because some of the inner jelly-like material may remain after surgery, there is a small risk of developing another disc protrusion in the same area.

Fusion Surgery

- Unfortunately, there is no way to guarantee the bone in your fusion will mature and become solid.
- Solid fusions will not always eliminate your pain.
- Factors such as metabolism, age, and activity level play a role in your body's ability to "weld" together the pieces of bone placed during surgery. The process of your fusion will be monitored with x-rays at your follow-up appointments.
- Studies have clearly documented that smokers have a significantly lower rate of successful solid fusions as compared to non-smokers. For this reason, it is strongly recommended that any patients contemplating spinal fusion surgery stop smoking prior to their surgery.
- Occasionally, fusion cases include harvesting bone from the patient's pelvis. Immediately following surgery, this area may be the greatest source of pain. In most cases, the pain subsides over time but may not completely go away.

- Some fusions require the use of bone plugs or synthetic cages. During the first several months following surgery, and before the fusion is solid, these bone plugs can become dislodged. Depending on the amount of movement that occurs, additional surgery may be required to reposition the bone plug.
- A fusion surgery places extra pressure/stress on levels immediately above and below your surgical site. This added stress can cause degeneration at those levels and may cause a need for additional surgery in the future.

Spinal Cord Stimulator Surgery

- A successful trial does not guarantee the leads will be placed in the exact same spot during the permanent implant.
- Reprogramming of the spinal cord stimulator following the implant may be necessary depending on your pain and symptoms.

Coccygectomy Surgery

- The rectum lies in front of the coccyx (tailbone). During removal of the coccyx, the rectum, if punctured, can become infected. While the chance of this happening is low, a diverting colostomy (redirecting the colon to evacuate feces via the abdomen) would be necessary to allow the rectum to heal.

Kyphoplasty

- Occasionally, local anesthesia is used in place of general anesthesia. Risks of bruising, numbness, tingling and weakness at the insertion site, temporary blurred vision, dizziness, vomiting, headache, and muscle twitching can occur.
- The cement can leak into, or up against, organs, vessels, and/or nerves.

I understand the potential benefits of the proposed treatment and any alternative forms of treatment, including my option of receiving no treatment. By signing below, I agree that I have had the opportunity to ask any and all questions that I may have and wish to proceed with surgery.

Patient (or Representative) Signature: _____ **Date:** _____

Witness Signature: _____ **Date:** _____

Notice of Disclosure

The following disclosures may apply to the treatment you receive at Midwest Spine & Brain Institute (MSBI). Please contact your MSBI physician or Administration if you have any questions about any of the following disclosures.

Disclosure of Ownership in Ambulatory Surgery Centers

If your MSBI physician refers you to Maplewood Surgery Center, Woodbury Surgery Center or Greenway Surgery Center, the following disclosure applies:

Your health care provider is referring you to a facility or service in which your health care provider has a financial or economic interest. The MSBI physicians who are listed below have an ownership interest in these ambulatory surgery centers. You are free to choose a different ambulatory surgery center. If you would like to do so, please notify your physician and we will be happy to accommodate your request.

This disclosure applies to the following MSBI Physicians for Maplewood Surgery Center: David T. Chang, M.D., Ph.D.

This disclosure applies to the following MSBI Physicians for Greenway Surgery Center: Stefano M. Sinicropi, M.D.; Glenn R. Buttermann, M.D., M.S.; David T. Chang M.D. Ph.D.

This disclosure applies to the following MSBI Physicians for Woodbury Surgery Center: Glenn R. Buttermann, M.D., M.S.

This disclosure applies to the following MSBI Physicians for Valley Surgery Center: Eduardo Perez, M.D.

Disclosure of Ownership in Outside Facilities

Your health care provider is referring you to a facility or service in which your health care provider has a financial or economic interest. The MSBI physician listed below has an ownership interest in this outside clinic. You are free to choose a different clinic. If you would like to do so, please notify your physician and we will be happy to accommodate your request.

This disclosure applies to the following MSBI Physicians for HyperCharge Clinic: Stefano M. Sinicropi, M.D.

Disclosure of Industry Relationships

If you are scheduled to receive a neurosurgical or orthopedic implant, biologic product or device during your surgical procedure, it is possible that your spine surgeon may have a financial relationship with the manufacturer. Your surgeon will be glad to discuss the reasons for his/her choice of implant/product. You have the right to choose another facility or provider for your procedure. Glenn R. Buttermann, M.D., M.S., holds multiple patents. His industry consulting relationships include FG Solco. He also owns shares in Nexxt Spine LLC.

Insurance Coverage for Other Facilities

Some facilities may be out of network for certain health plans. Please contact the facility as well as your insurance plan for details regarding your coverage.

Frequently Asked Questions after Surgery

Who do I contact if I need refills of my medications?

- MSBI does not accept refill requests from the pharmacy. Please call your care team 2-3 business days before you run out of pain medication.
- MSBI will prescribe pain medication for a short time after surgery. Please call your care team if you have questions regarding your pain medication plan.
- Benzodiazepines (medications to calm or relax you) may need to be reduced or stopped before surgery and while taking any pain medication after surgery. Please discuss a plan for this with your primary care doctor.

Why am I having shooting or different pain, numbness or tingling or uncontrolled pain after surgery?

- Symptoms you had before surgery may still be present after surgery. It will take time for your nerves to heal and your pain to get better.
- Call your care team if you have concerns about new numbness, tingling, or pain after surgery.
- If your pain is not controlled, call your care team. Do not take more pain medication than prescribed.

How do I care for my incision?

- Check your incision daily for redness, swelling, or drainage. Keep your incision clean and dry.
- Change your dressing daily or more often while drainage is present.
- Neck Surgery: Cover your incision while showering for the first 5 days after surgery unless you have surgical glue. Surgical glue does not need to be covered.
- Back Surgery: Cover your incision while showering for the first 10 days after surgery.
- Do not take tub baths for 6 weeks after surgery, and until your incision is completely closed.
- Do not use creams/ointments on your incision until it is completely healed.
- Stitches and/or staples will be removed at your first follow-up appointment.

What if I was sent home with a drain?

- Before leaving the hospital, a nurse will talk with you about how to care for your drain at home.
- Please call your care team the morning after you go home from surgery to set up a time to have the drain removed in clinic.

What if I was given a brace?

- If you were given a brace, wear it as directed by your treating surgeon. You can remove your brace to shower.
- If you have questions regarding your brace, please call your care team.

When should I call my Care Team?

Call your Care Team if you have:

- a temperature of 101°F or higher.
- yellow or green drainage or more than a slight amount of bloody drainage from your incision.
- redness, swelling, or warmth around your incision.
- new or unusual pain, numbness, or tingling.
- any bowel or bladder changes.
- an opening in your incision.
- pain in your calf or pressure in your legs.
- been sent home from surgery with a drain.
- questions or concerns.

Do I need physical therapy?

- Walking is the best exercise to regain your strength and endurance. Your doctor will discuss the need for physical therapy at your follow up visit.

Will I need antibiotics prior to a dental procedure?

- Antibiotics before a dental procedure are not needed if you have had spinal surgery.

Please refer to your surgery packet for additional information. If you have further questions after reviewing your surgery packet, please call your care team.