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Lateral Lumbar Interbody Fusion

Introduction

Dear Patient,

You are about to embark on an important journey to improve your overall health and quality of life. Our goals are the same as yours: To relieve your pain and return you back to a more active and healthy lifestyle as rapidly, comfortably and safely as possible.

In order to achieve this, we have assembled a large multidisciplinary team of anesthesiologists, pain management experts, skilled peri-operative and intra-operative orthopaedic nurses, physical therapists, physician assistants, nurse practitioners, office support staff and clinical care coordinators. All of these team members are focused on making your spine surgery a success. Working together we have combined our expertise to develop a spine surgery program with your safety and satisfaction as the number one priority.

The purpose of this guide is to provide you and your family with information regarding your medical condition and planned surgery. This information is part of your medical “Informed Consent”. Please read it and follow the advice carefully. You should retain the guide for future reference and bring it with you to office appointments and to the hospital for reference. Your active participation and willingness to recover is needed to make your surgery a success and to ensure the best possible outcome. It is therefore imperative that you read this entire booklet and carry it with you throughout the process. It will serve as your “playbook” and provide you with crucial information. Please share this booklet with those who are closest to you and who will be serving as your support system throughout your recovery. We highly recommend that you establish one point person who will serve as your “coach” through this process.

Above all, remember that you are never alone!

If there are any issues that you feel are necessary to discuss, please remember to call Keystone Spine and Pain Management at any time.

Dr. DelSole’s Team:

Mellisa Carroll – Administrative Assistant and Surgical Scheduler
Courtney Bates, CRNP – Spine Specialized Nurse Practitioner

Changes in Your Medical Status

We want you to be in your best possible health for your surgery. If you develop any new medical problems (e.g., sore throat, colds, fevers, infections, skin eruptions, dental issues, etc.) or any changes in your medical status, you must inform Dr. DelSole's team immediately by phone. If you have young children and are exposed to any viral illness like chicken pox within two weeks of surgery, you must also call the office.

Scheduled Pre-Operative Appointments

Please write down and review all appointments made for you. Do not change or cancel any appointments without consulting our office. If you need to change the time for any of your appointments, please call our office. We will do what we can to accommodate you.

If you show up more than one hour late for any of your pre-operative appointments, the appointment will be canceled and your surgery may also be canceled. You will have the following pre-operative appointments:

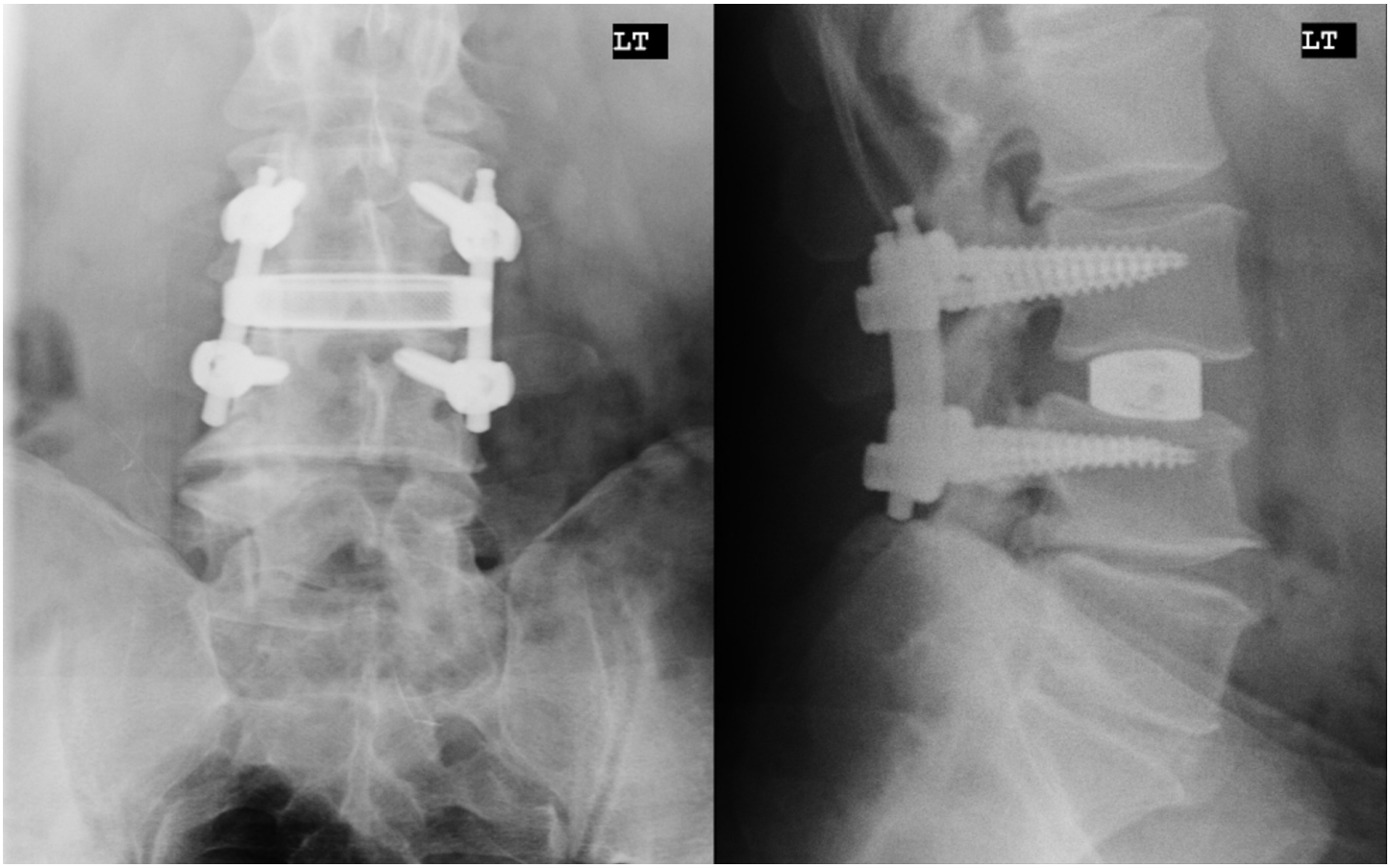
- Pre-Operative Bloodwork appointment will be scheduled after you schedule surgery.

- History and Physical – If you were seen by Dr. DelSole more than 30 days before your scheduled surgery, you will need to return to the office for a history and physical visit with a team member.

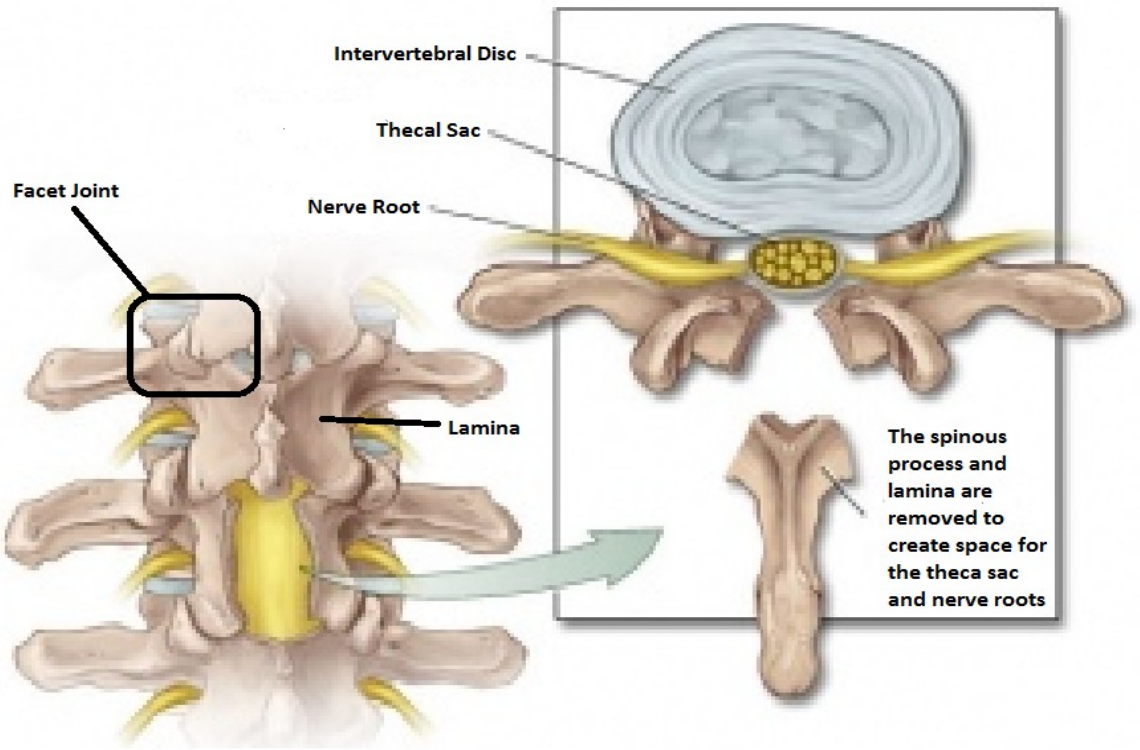
- Medical Clearance or Subspecialty Clearance – If necessary for your medical safety during surgery, you may have to attend pre-operative visits with your primary care physician or your subspecialty physician (for example, your cardiologist) to get their approval that it is safe to proceed with surgery. *If we do not have approval to proceed with your surgery 10 days prior to surgery, your surgery may need to be rescheduled to a later date.*

What is Going to Happen to Me?

In your case, it has been determined that your spinal condition is best addressed with a two-stage operation. The first stage is called *lateral lumbar interbody fusion*. This operation is performed through an incision on the side of the belly. The muscles are separated (not cut), and your internal organs are moved to the side in order to gain access to the spine. Dr. DelSole will then address your spinal problem using a metal device called a cage (pictured below).



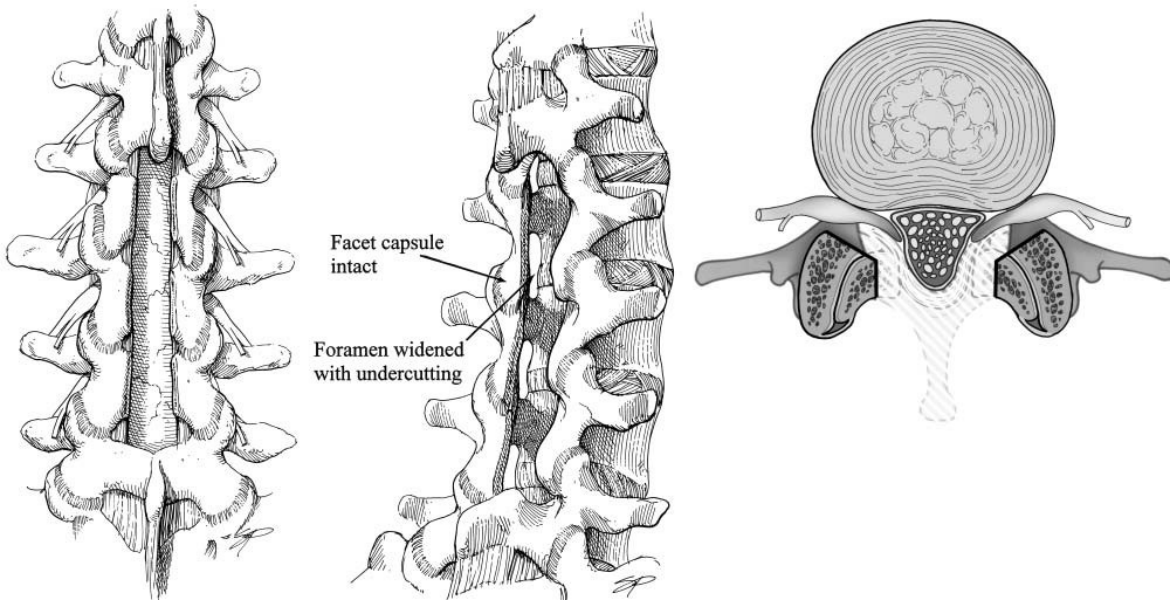
At the conclusion of this operation, Dr. DelSole may position you for a second stage of the operation – this is called the *posterior lumbar fusion*. This will involve placement of screws, rods, and sometimes bone graft through incisions on your back. Sometimes, only the anterior procedure is required. Depending upon your specific spinal condition, Dr. DelSole may need to remove bone and ligament from the spine to take pressure off of compressed nerves. This is called a *decompression* and it is pictured below.



Dr. DelSole will enlarge the spinal canal and, if needed, remove bone spurs and disc herniations that are causing spinal stenosis. You will have an incision on your low back. In order to do this, Dr. DelSole will expose the bones and take an xray to verify the location. He will then will remove the lamina bone to enlarge the spinal canal and remove any bone spurs, disc herniations, or other soft tissue which may be causing compression of the nerves. Dr. DelSole will preserve the important stabilizing joints on the back of the spine called the facet joints.

It is important to note that **not all patients will require a decompression**. If you have questions about this, please ask Dr. DelSole or his team.

On the attached photo, the shaded portions will be removed.



If you are having a laminectomy, Dr. DelSole will use the bone taken from the laminectomy and place it along the side of the vertebral bodies. This also helps the bones to heal together. Usually bone graft from a donor or bone growth factors are used to help the bones fuse.

The implants are inside of the bone for the most part. They do not move. They do not need to be removed in most cases. They are made of a titanium or other surgical grade metals. They do not rust or corrode. They will not prevent you from obtaining an MRI. In most cases, they do not set off metal detectors.

Once the procedure is completed, the incision is washed out with antibiotics and clean fluid. A drain may be placed into the wound and then your incision will be carefully closed in layers paying special attention to the muscles. If a drain is placed, it is typically removed 24 to 48 hours after surgery.

What is Fusion?

Fusion refers to the process of *bone healing between the vertebral bones*. Dr. DelSole will take great care to create an environment in the spine in which the bones can heal to one another. This will prevent painful, abnormal motion in the spine and also ensure any corrected deformity maintains its correction. In order for bones to fuse, bone graft is applied. Dr. DelSole uses your own bone taken from your spine to do this. If more bone is needed, bone can be taken from an organ donor and mixed with your own. This bone has been sterilized to prevent infections. In rare cases Dr. DelSole will take bone from your hip/pelvis in order to achieve a fusion. In those cases, Dr. DelSole will speak with you explicitly about this part of the operation.

How big is my incision?

“As big as it needs to be to perform the procedure.” A single level incision is about 3-4 inches long. Multilevel incisions can be longer as each additional level requires about 2 inches. Therefore, for instance, a two level incision will be approximately 6 inches long.

How Long Does the Surgery Take?

This depends on the number of levels being treated, but on average, the surgery takes about 2-4 hours to complete.

How long do I stay in the hospital?

The length of stay in the hospital is patient specific and depends upon factors such as your health and the number of lumbar levels which must have the pressure removed. Most patients only spend 1 or 2 days in the hospital after a lumbar fusion.

Do I Need a Plate/Screws/Rods?

Sometimes. For some patients with deformity or spinal instability, performing surgery without screws and rods has been associated with increased instability of the spine which can lead to more problems. In addition, the use of screws and rods significantly increases the likelihood that fusion will occur. If Dr. DelSole recommends the use of screws and rods, this it is for this reason.

How Much Motion Will I Lose?

Because this is a fusion surgery you should expect some motion loss with bending and twisting. Despite this, many patients actually feel that their motion is improved after surgery because their pain is improved and their overall mobility increases.

Can This Surgery Be Done With a Laser?

No. In order to safely see your spinal nerves and eliminate the nerve compression, you need the minimally invasive surgery that we have described here. Contrary to what you may expect, the Laser is only a cautery instrument to stop bleeding. A traditional skin incision is required and many of the same steps are necessary. We do have Lasers available at the hospital and Lasers are very effective in other types of surgery such as urology, eye surgery and brain surgery.

In the spine, I am concerned that the heat from the Laser can cause scarring and nerve damage. The Laser can cause temperatures of over 200 degrees! Therefore, I use standard electrocautery and sometimes a different, saline cooled cautery device to control your bleeding without making excess heat. Most spine surgeons do not use a laser for that reason. A prominent surgical society, the North American Spine Society, even reviewed the evidence available and reported that there was **no evidence** to support the claims of 98% satisfaction with Laser Spine surgery. It is probably just a marketing strategy. If a Laser were demonstrated to be successful, we would of course use one.

How Does Dr. DelSole Protect My Spinal Cord During Surgery

Everyone worries about being paralyzed during spine surgery. To protect you, Dr. DelSole uses electrical circuits to monitor your nerves during the surgery to ensure that your nerves are safe and protected. This is called *intraoperative neuromonitoring*. Before your surgery, another provider will place small monitors on your head and arms and legs. Sometimes, these are very tiny needles. Throughout the surgery, we will measure the conduction of your nervous system from your brain to the arms and legs to ensure that your nervous system is safe. There is another doctor who will monitor your nervous system during the surgery at all times and will alert Dr. DelSole if there are any problems. If there are any changes in nerve status, we can take protective actions to prevent you from having most neurological injuries. We will also electrically test the screws that are placed into your bone to ensure that they are in the proper position. Finally, xrays are used during the procedure to triple check the final outcome and ensure your safety.

What Results Should I Expect from my Surgery?

There is a high likelihood that most of the buttock and leg pain will be go away, and you will be able return to normal activities. Additionally, when the nerve root is decompressed, you will have the ability to regain strength, but that it may takes six months or more to regain strength, and furthermore, the amount of strength regained is predicated on the severity of the weakness pre-operatively, the length of time the weakness has been present, and the effort put forth in postoperative rehabilitation. Lastly, the resolution of numbness and back pain is unpredictable, and this should not be the major reason why you elect to have surgery. For many patients, it is unlikely that back surgery will cure all back pain.

Unrealistic expectations, such as a "perfect back" and "perfect life" are not helpful to the healing process. The surgery can help improve function and decrease your pain. Realistic expectations are critical to a successful operation. You can speak to Dr. DelSole about this at any point in time.

When can I expect my symptoms to go away?

Patients' leg pain is usually improved/relieved within a few days of surgery. About 10-20% of patient's pain will continue until the nerves start to heal. Operating around nerves sometimes causes inflammation which may cause some temporary increase in pain. There is some variability in how quickly patients improve following surgery. Numbness, tingling, and weakness can take up to 1 year to resolve depending on how severely the nerves where compressed. In addition, the amount of time that your nerves have been compressed can influence how quickly you recover after surgery. In the setting of severe compression which has been present for greater than 1 year, nerves may never fully recover or take many months to do so. Numbness and strength take the longest to improve, and in some cases do not improve no matter what operation is performed. Diabetes also makes it more difficult for the nerve to heal.

Why should I participate in physical therapy after surgery?

Physical therapy is thought to help prevent binding of nerve roots through fibrous adhesions called *epidural fibrosis*. Specific stretches can help reduce effects of postoperative scarring around the nerve root resulting in better outcomes. You will begin exercising and moving immediately after surgery. When you go home, you will have home exercises to do, and, most patients begin formal outpatient physical therapy 3-6 weeks after their surgery.

What can I do to prepare for activities after surgery?

It is very common to feel run down a couple weeks after surgery because your body is getting acclimated to the new changes in your body. You are encouraged to walk around to help increase blood flow throughout your body. Shifting positions frequently between standing, sitting, and lying down are good to help avoid pain/stiffness. Gradually increasing physical activities are good, but should be stopped if you start to experience increasing pain or exhaustion. You should not do activities that require bending at the waist and lifting anything over 10 lbs or a gallon of milk. Activities that include bending/twisting/lifting such as laundry, grocery shopping, caring for pets should be left for others so that you can avoid potential injury. Possible items to create a safer environment are listed below.

- **A "grabber" device**. Bending and reaching up can be avoided with this lightweight tool, often sold at pharmacies and discount stores.
- **Toilet and shower equipment**. Adding a shower mat, toilet riser, and a shower seat makes the bathroom safer and easier to use. Home health equipment is often covered by insurance.

- **A cane or walker**. Patients who think a cane or walker would help them feel more stable can discuss this option with the surgeon.
- **A mini-fridge or cooler**. Keeping cool drinks and ice packs close at hand helps patients avoid climbing stairs more than necessary.
- **A recliner or extra cushions**. The seating position in a recliner takes some pressure off the lower back. Sitting on a cushioned surface is also likely to be more comfortable.
- **Fall prevention**. It is best to remove anything that may be a tripping hazard, such as loose rugs or clutter. Some people also install handrails as needed, such as on stairs or in the shower.

What can I do before surgery to control my pain after surgery?

Some patients needing spine surgery are on a course of narcotics for pain management. Patients taking these narcotics develop a known tolerance to the medication, meaning that potentially unsafe doses are required in order to get control of the pain. You can better your chances of having adequate pain control by slowly decreasing your narcotic pain medication over the weeks just before surgery. By decreasing your tolerance your body may respond better to postoperative pain medications such as these narcotics.

Will I Have To Wear A Brace?

Dr. DelSole provides a lumbar spine brace to improve low back support during the healing period. This brace also functions to remind you not to bend over, twist, or lift anything heavier than 5lb during the healing process. Excessive motion can cause the screws/rods to break, which will necessitate further surgery. You should expect to wear your brace for *6 weeks*.

What Does Dr. DelSole Do to Reduce My Postoperative Pain?

Dr. DelSole is committed to making your surgery as painless as possible. Our team uses an advanced protocol to control your pain after surgery as much as possible. Advanced pain medications are given before your surgery even begins.

If needed, you will have access to Percocet, Roxicodone, or Vicodin. However, the narcotic medications can create constipation and urinary retention, so use them with care! Narcotics are very effective for pain relief *from surgical* pain but may cause other side effects. The possible effects vary among patients and may include: sleepiness, nausea, constipation, loss of appetite, flushing, sweating, and occasionally euphoria or confused feelings. If these occur notify your nurse.

If taken in high doses, these drugs can cause inhibition of breathing and death. For your protection, you will receive narcotic medication only when you request it and if deemed medically appropriate by your physician.

What If I Have More Numbness After Surgery?

After surgery you may experience pain in the region of the incision. You may also experience leg or foot numbness. Initially it may be of greater intensity than pre-operatively, but this should subside over time as the healing process occurs. Please report any new sensations or numbness to Dr. DelSole. However, in most cases, the numbness occurs from nerve manipulation and will decrease with time.

Will I Require Inpatient Rehabilitation after my Surgery?

This is a popular question. Rehab may seem necessary, but in nearly all cases the patient is able to do the rehab on their own. The most important rehab is to walk as much as possible. Patients who undergo simple lumbar fusions rarely need to go to a rehabilitation facility. Dr. DelSole encourages patients to go home whenever possible because we are all most comfortable in our homes. Additionally, the infection rate is lower in patients who go home. Approximately 3 weeks after surgery, you will be started in formal physical or occupational therapy. With time and at home ambulation, patients create a quality healing environment for themselves.

Activity

Feel free to move about in your bed. The nurse or therapist will assist you in getting out of bed a few hours after surgery. You will be instructed to be up walking every 2 to 3 hours during the day and evening. The nurse will allow you to do this independently once you are steady and feel comfortable.

Early activity after surgery is extremely important to help prevent the complications of prolonged bed rest such as pneumonia and blood clots. It also promotes recovery, relieves muscle stiffness, allows for development of a well-organized scar, and improves your outlook.

Do not start any programs of exercise or physical therapy unless discussed directly with Dr. DelSole.

Diet

Your diet will begin with clear liquids, and be advanced to your normal daily diet as soon as your condition permits. Your IV will be removed at the conclusion of your hospitalization.

Bowel and Bladder Function

During surgery you may have a catheter (tube) in your bladder to monitor your urine output. Upon its removal you may feel a stinging sensation for 2 to 3 days, which is normal. Some patients may have difficulty urinating after surgery. If this occurs, notify your nurse who may assist you in voiding techniques. Rarely, this may require placing a catheter in your bladder. After surgery, constipation frequently occurs from inactivity and the side effects of pain medication. Dr. DelSole's recommendation is to buy Miralax at the pharmacy and take this once per day during the three days leading up to your surgery. After surgery, you should take Miralax three times per day until you are able to use the bathroom without constipation.

Respiratory Hygiene

Deep breathing is very important after surgery to maintain lung expansion and reduce the risk of pneumonia. You will be provided with an incentive spirometer and instructed about its use before surgery. This device should be used every 15 to 30 minutes during your waking hours initially, then every 1 to 2 hours as your activity returns to normal. This device is yours to take home. Continue to use it at home for at least 1 week after your discharge. (Use it during TV commercial breaks).

Smoking is absolutely forbidden. There is clear evidence that smoking dramatically increases your risk of post-operative complications. There is also evidence that smoking adversely effects bone healing and nerve recovery. Second hand smoke also applies.

Follow-Up Appointment

Patients are generally discharged from the hospital 1 to 3 days after surgery. A follow-up appointment was made for Dr. DelSole's office 3 weeks from the date of surgery. At your first follow-up visit, you will be evaluated and the incision will be checked. You will then be seen at 8 weeks by telemedicine, 14 weeks in the office, 6 months, and possibly 1 year or more after surgery.

Incision Care and Hygiene

Your dressing should remain in place for 7 days and then can be removed. You may shower on the 3rd day after surgery, trying to keep the dressing dry if possible. Allow it to air dry. Do not soak your dressing or incision. Once the dressing is removed, the incision may get wet. Allow it to air dry. There may be steri-strips or skin glue on your incision. Allow these to fall off on their own. **NO LOTIONS/OINTMENTS, BATHS, HOT TUBS, OR POOLS FOR 6 WEEKS AFTER SURGERY**, it will increase your risk of infection.

Collagen Dressings

In some cases, when insurance will approve it, we will ship collagen dressings to your home. There is evidence that these dressings can create an environment for optimal wound healing. Please note that if you are not approved for collagen dressings, Dr. DelSole is still confident that your wound will heal appropriately. Instructions for applying collagen dressings will be supplied to you, but in general, plan to apply the dressings once per day, beginning when you have received the dressings, and then the original surgical dressing has been removed.

Inflammation

Please take your temperature every afternoon for the first week after you are discharged from the hospital. Call your physician if:

1. Your temperature, taken by thermometer, is more than 101.5 degrees,

OR

2. Your incision becomes reddened, swollen or any increase or change in drainage occurs.

3. You develop difficulty with swallowing or talking that seems to be worse since you left the hospital.

Nutrition

A well-balanced diet is necessary for good healing and recovery. This includes food from the four basic food groups: dairy products, meat, vegetables and fruit. Use of narcotic pain medication and prolonged rest may cause constipation. Drinking plenty of fluids and eating high fiber foods (whole grains, raw fruits and vegetables) will help regain normal bowel function. It is recommended that all patients take Vitamin D and a protein supplement in the time leading up to and following surgery. For more information, please ask Dr. DelSole.

Perioperative nutritional supplements are available from Keystone Spine and Pain Management and recommended to optimize your nutrition surrounding surgery. Please ask Dr. DelSole's team if you would like more information on this.

Home Pain and Medication

When we surgically relieve pressure from an inflamed, damaged nerve, it does not always recover instantaneously. The surgical procedure does not heal the nerve - only the body is capable of that. The goal of surgery is to create the best possible environment for the body to heal itself and to prevent further damage. This will take a variable length of time depending on the duration and degree of nerve damage and the body's own healing abilities. Most of the healing occurs in the first few months but can take up to a year.

Everyone has a different pain tolerance that will dictate the amount of pain medication required. A decreased dose and less frequent use of pain medication will occur during your recovery period. A

gradual weaning of medications should begin as soon as possible, generally within 2 to 4 weeks. Conservative use of narcotic pain medication is advised. While using narcotic pain medication you SHOULD NOT drive. One should try non-narcotic medication, such as Tylenol and reserve narcotics for only the difficult times. Importantly, some of the narcotic medications can have Tylenol as a component (Tylenol may also be called acetaminophen or APAP), and it is important not to take more than 3,000 mg of Tylenol per day

Patients will be prescribed no more than 6 weeks of narcotic pain medications following surgery. Further narcotic requirements must be supplied by your pain management or primary care physician. The goal should be *complete taper off of these medications*.

Driving

The ability to resume driving depends on the patient. All patients refrain from driving for a minimum of two weeks after surgery. After this, the patient must be off all narcotic pain medications, and must feel comfortable quickly looking over the shoulder, applying the break and applying the gas. At 2-3 weeks after surgery if you are off of narcotic pain medication you may begin to drive. I recommend going out for a drive with a "spotter" in the passenger seat for the first few times out after surgery.

The First Week

- Early to bed, late to rise and frequent rest periods throughout the day. Get at least 8 hours of sleep each night. A disrupted sleep pattern is common after discharge from the hospital and will return to normal over time.
- You may not drive, but you may be driven, for short distances, using proper restraints such as shoulder and lap belts. At 2-3 weeks after surgery if you are off of narcotic pain medication you may begin to drive. I recommend going out for a drive with a "spotter" in the passenger seat for the first few times out after surgery.
- No lifting of more than 10 pounds
- May climb stairs with hand rail
- Avoid sitting for longer than 20 minutes at a time
- Begin a daily walking program with 1 to 2 blocks initially; schedule a daily time and increase distance daily.
- Eat a regular, balanced diet.
- Take medications as prescribed, using narcotics only as needed.

The Second Week

- Resume normal rising and retiring schedule
- Continue to wear your brace as instructed if applicable.
- You may not drive.
- No lifting of anything weighing more than 10 pounds.
- May climb stairs with hand rail
- Continue scheduled walking, increasing distance and frequency as able.
- May resume sexual relations when comfortable.
- Begin narcotic weaning as pain diminishes, relying mainly on non-narcotic medication

The Third Week

- Resume normal rising and retiring schedule, resting as needed.
- May resume light work around the home; lifting not to exceed 10 pounds.
- Continue scheduled walking.

The Fourth Week

- Resume normal rising and retiring schedule, resting as needed.
- May resume light work around the home; lifting not to exceed 10 pounds.
- Continue scheduled walking.
- Begin physical therapy and progress with activity and lifting under the supervision of your therapist.

Disability

The usual period of recovery for lumbar fusion surgery is 8 to 12 weeks and complete healing may take from 6-12 months. Some patients may return to work sooner than others depending on their job, response to surgery, and ability to perform other lighter tasks in the work place. Physician approval is required prior to returning to work.

If your employer requires documentation of your work status, our office will provide the necessary information to your employer or other concerned parties. All disability matters may be handled by contacting our office.

Medication Management

There are certain general medications that you should continue taking throughout your surgical event. These include most cardiac, pulmonary, seizure, anxiety, thyroid, reflux, stomach, and antibiotic medications. Some specific examples are below.

You should continue your beta blockers. Examples of beta blockers include…

- Betapace
- Blocadren
- Bystolic
- Cartrol
- Coreg
- Corgard
- Corzide
- Inderal
- Inderide
- Kerlone
- Levatol
- Lopressor
- Normodyne
- Sectral
- Tenoretic
- Tenormin
- Timolide
- Toprol
- Triandate
- Viskazide
- Zebeta
- Ziac

You should continue your cholesterol medications. Examples of cholesterol medications include…

- Advicor
- Altoprey
- Caduet
- Crestor
- Lescol
- Lexcol
- Lipitor
- Mevacor
- Pravachol
- Simcor
- Vytorin
- Zocor

You should continue medications for Attention Deficit Hyperactivity Disorder (ADHD). Examples of ADHD medications include…

- Metadate
- Methylin

You should continue certain anti-psychotic medications such as…

- Isocarboxazid
- Phenelzine
- Selegiline
- Tranylcypromine
- Rasagline

Stopping Medications Before Surgery

(1) Blood Thinners

As soon as you schedule your surgical date, you must speak to your primary care physician or cardiologist about stopping any blood thinners that you may be taking. Your primary care physician or cardiologist may suggest an alternate timeline, or wish to switch you to a different blood thinner. This is especially important if you are taking a blood thinner because of a previous stroke or cancer. If possible, *all blood thinners should be held for 7 days following spine surgery to prevent excessive bleeding*.

Dr. DelSole suggests the following timeline to stop blood thinners before surgery. Please share this timeline with your other physicians.

- Warfarin (Coumadin) INR < 1.5
- Eptifibatide (Integrilin) 8 Hours
- Tirofiban (Aggrastat) 8 Hours
- Enoxaparin (Lovenox) 40mg 24 Hours
- Enoxaparin (Lovenox) 1.5mg/kg 24 Hours
- Abxicimab (Reopro) 48 Hours
- Apixaban (Eliquis) 48 Hours
- Rivaroxaban (Xarelto) 48 Hours
- Dabigatran (Pradaxa) 7 Days
- Clopidogrel (Plavix) 7 Days
- Prasugrel (Effient) 7 Days
- Ticlopidine (Ticlid) 14 Days

You should also avoid the following medications that can affect a person's normal blood clotting process…

- Davron Compound
- Decagesic
- Fiorinal
- Measurin
- Meclomen
- Pepto Bismol
- Stilbestrol
- Vitamin E
- Zactirin
- Zomax

You should also avoid hormonal medications that can increase your risk of blood clots. Examples of those medications are the following…

- Female hormones
- Premarin
- Hormonal birth control (pills, ring, patch, injection)

(2) Herbal Medications

You should stop all herbal and alternative medications at least 10 days prior to surgery.

(3) Diuretics ("Water Pills")

You should not take any diuretic medication on the morning of the surgery, unless you have a diagnosis of congestive heart failure (CHF). If you have been diagnosed with CHF, then please take your diuretic as prescribed the morning of surgery. Examples of diuretics are the following medications…

- Aldactazide
- Aldactone
- Amiloride
- Bumex
- Demadex
- Dyazide
- Edecrin
- Enduron
- Hydroclorothiazide
- Lasix
- Lozol, Lozide
- Maxzide
- Moduretic
- Thalitone
- Triamterene
- Zaroxolyn

(4) Blood Pressure Medications

You should not take any blood pressure medications on the morning of surgery. Examples of blood pressure medications are the following…

- Lotensin
- Vasotec
- Monopril
- Prinivil, Zestril
- Univasc
- Aceon
- Accupril
- Altace
- Mavik
- Vaseretic
- Prinizide, Zesoretic
- Uniretic
- Accuretic
- Tarka
- Edarbi
- Atacand
- Teveten
- Avapro
- Cozaar
- Benicar
- Micardis
- Diovan
- Avalide
- Hyzaar
- Azor
- Tribenzor
- Twynsta
- Exforge
- Valturna
- Tekturna
- Valturna

(5) Diabetes Medications

You should not take any diabetes medications the morning of surgery. There are also some diabetic medications that you should not take the night before surgery (marked with an *). Examples include…

- *Actoplus*
- Amaryl
- *Avandamet*
- Avandaryk
- Avandia
- Diabeta
- Diabinase
- Duetact
- Glucamide
- *Glucophage*
- Glucotrol
- *Glucovance*

- Glycron
- Glynase
- Glyset
- *Junamet*
- Junavia
- *Metaglip*
- Micronase
- Onglyza
- Orinase
- Oramide
- *Prandimet*
- Prandin
- Precose
- Ronase
- Starlix
- Tolinase

PLEASE NOTE: SGLT-2 Inhibitor Medications Must be stopped 4 days prior to surgery. These include:

- Jardiance (empagliflozin)
- Invokana (canagliflozin)
- Farxiga (dapagliflozin)
- Steglatro (ertugliflozin)

(6) Insulin

You must follow the exact recommendations of your primary care physician or endocrinologist regarding the use of insulin before your surgery. In the hospital, we will check your blood sugar and administer insulin to you.

(7) Other Medications:

There are some other medications that you might need to stop before surgery. Examples include…

- Iron Supplements. If you do not currently take oral iron supplements, please do not start taking iron supplements before your surgery. This may differ from the recommendations that you are given by other healthcare providers. However, if you were already taking oral iron supplements prior to meeting Dr. DelSole, you may continue to take the same doses that you were already taking.

- Opiate Pain Medications. If you are already taking opiate pain medication, you must gradually cut your doses in half in the weeks leading up to your surgery. If you do not taper down your dose, it will be more difficult to control your post-operative pain.

- Diet pills

- Prostate medications

- Vitamins or Homeopathic medications

- Hormones

(8) Biologics

If you are being treated for rheumatoid arthritis, psoriatic arthritis, lupus, ankylosing spondylitis, Crohn's disease, ulcerative colitis, or another inflammatory disease you may be taking biologic medications. These medications must be stopped in anticipation of surgery.

BIOLOGIC AGENTS: STOP these medications prior to surgery and schedule surgery at the end of the dosing cycle. RESUME medications at minimum 14 days after surgery in the absence of wound healing problems, surgical site infection, or systemic infection.	**Dosing Interval**	**Schedule Surgery (relative to last biologic agent dose administered) during**
Adalimumab (Humira)	Weekly or every 2 weeks	Week 2 or 3
Etanercept (Enbrel)	Weekly or twice weekly	Week 2
Golimumab (Simponi)	Every 4 weeks (SQ) or every 8 weeks (IV)	Week 5 Week 9
Infliximab (Remicade)	Every 4, 6, or 8 weeks	Week 5, 7, or 9
Abatacept (Orencia)	Monthly (IV) or weekly (SQ)	Week 5 Week 2
Certolizumab (Cimzia)	Every 2 or 4 weeks	Week 3 or 5
Rituximab (Rituxan)	2 doses 2 weeks apart every 4-6 months	Month 7
Tocilizumab (Actemra)	Every week (SQ) or every 4 weeks (IV)	Week 2 Week 5
Anakinra (Kineret)	Daily	Day 2
Secukinumab (Cosentyx)	Every 4 weeks	Week 5
Ustekinumab (Stelara)	Every 12 weeks	Week 13
Belimumab (Benlysta)	Every 4 weeks	Week 5
Tofacitinib (Xeljanz): STOP this medication 7 days prior to surgery.	Daily or twice daily	7 days after last dose

Goodman et al. 2017 ACR/AAHKS Guidelines, *Arthritis Care and Research*

(9) Aspirin

If you take aspirin every day, it may be important to stop your aspirin if possible before your spine surgery. Dr. DelSole's preference is:

- Aspirin 325mg daily – stop this medication 7 days prior to surgery
- Aspirin 81mg daily – if possible, this medication should be stopped 5 days before surgery

Exceptions to this rule would be only if your cardiologist says it is absolutely necessary to continue this medication through surgery. *This will have to be discussed in detail with Dr. DelSole as there will potentially be added risk if continued through the operation*.

(10) GLP-1 Agonists

This is a class of medications used to manage diabetes and can assist with weight loss. ***These medications must be stopped 1 week prior to surgery. If you take these medications, it is important that you have only clear liquids for your diet beginning 24 hours prior to surgery.*** If you take any of the medications listed in the chart below, please follow the instructions in the chart.

Brand Name	**Generic Name**	**Stop Medication**	**Clear Liquid Diet**

			Required
Trulicity	Dulaglutide	1 week prior to surgery	24 hours prior to surgery
Mounjaro	Tirzepatide	1 week prior to surgery	24 hours prior to surgery
Bydureon Bcise	Exenatide (ER)	1 week prior to surgery	24 hours prior to surgery
Ozempic	Semaglutide	1 week prior to surgery	24 hours prior to surgery
Wegovy	Semaglutide	1 week prior to surgery	24 hours prior to surgery
Byetta	Exenatide (IR)	Stop the day of surgery	24 hours prior to surgery
Saxenda	Liraglutide	Stop the day of surgery	24 hours prior to surgery
Adlyxin	Lixisenatide	Stop the day of surgery	24 hours prior to surgery
Rybelsus	Semaglutide	Stop the day of surgery	24 hours prior to surgery

(11) Anti-Inflammatory Medications

Please Stop Taking NSAIDs 1 Week Before Surgery

Before your surgery with Dr. DelSole, it's very important to stop taking any NSAID medications (non-steroidal anti-inflammatory drugs) at least **7 days before your surgery date**.

NSAIDs can increase your risk of bleeding during surgery. Stopping them ahead of time helps keep you safe during and after your procedure.

Common NSAIDs to Stop Taking Include:

- **Ibuprofen** (Advil®, Motrin®)
- **Naproxen** (Aleve®, Naprosyn®)
- **Meloxicam** (Mobic®)
- **Diclofenac** (Voltaren®)
- **Celecoxib** (Celebrex®)
- **Indomethacin** (Indocin®)
- **Ketorolac** (Toradol®)
- **Etodolac** (Lodine®)
- **Piroxicam** (Feldene®)

If you're not sure whether a medication you take is an NSAID, please ask your doctor or pharmacist. Also, let us know about **all** the medications and supplements you are taking.

Hydration Before Surgery

Please remember to adequately hydrate on the final days leading up to your surgery. We encourage the use of electrolyte drinks like Catalyte. It is recommended that you do not drink any alcohol whatsoever the week prior to your surgery.

The Final Days Before Surgery

You will receive a phone call before your surgery to tell you what time to arrive at the hospital. If you have not been called by 7:00 pm the business day before your procedure, please call our office.

Very Important: There are restrictions to what you can eat or drink before surgery:

- Clear Liquids = Stop 2 hours before surgery
- Light Meal (e.g. toast and clear liquids) = Stop 12 hours before surgery
- Fried foods, fatty foods, meats = Stop 12 hours before surgery

As a general rule, **do not eat after midnight the night before surgery**. You may have clear liquids (Water, Gatorade) up until 2 hours prior to your surgery.

Similarly, do not use any kind of tobacco product after midnight on the night before your surgery.

On the day of surgery, you do not need to bring any of our own medications to the hospital. The hospital has a list of your medications that you provide to us before surgery

You do not need to donate blood for the surgery. If significant blood loss is expected, we will use an intraoperative blood salvage system to collect and return your blood to you. In some cases, blood loss from spine surgery can necessitate blood transfusion. If you are opposed to blood product transfusion for religious or other reasons you must discuss this with Dr. DelSole prior to your surgery.

Information About Anesthesia

The Department of Anesthesiology will help care for you when you have your surgery or procedure. At this time, Dr. DelSole performs all spine surgeries under general anesthesia. This means that you are completely asleep, and a breathing machine (ventilator) breathes for you. This is the standard of care for spine surgery across the globe. You can discuss this in detail with the anesthesiologist or Dr. DelSole at your office visit.

Good luck! We look forward to taking care of you and helping you get back to a normal life and routine. Please stop and ask questions along the way. The entire team is here for YOU!

Edward M. DelSole, MD

Patient Disclosure: Consulting Agreements with Orthopaedic Companies

Dear Patient:

As you prepare for your upcoming surgery, I want to provide you with some information regarding my consulting agreements with orthopaedic companies.

In my career I have been active in research and development of new implants, as well as improving surgical and biological techniques in spine surgery. As part of my work, I collaborate with orthopaedic companies and other national and international surgeons to provide consulting services on orthopaedic products as well as input on new product research and development. In addition, I conduct instructional lectures on implants and surgical techniques for other surgeons and medical personnel. In return for this time and expertise as a fellowship-trained spine surgeon, I receive consulting fees.

I regularly use products from several major orthopaedic companies such as Depuy/Synthes, Medacta International, Globus Medical, Nuvasive, Cerapedics, SI-BONE, Alevio Spine, and Medtronic. Currently, I am a clinical consultant for:

- Depuy/Synthes
- Medacta International
- Cerapedics
- Alevio Spine
- Foundation Surgical

I am also a shareholder of ROMTech, a rehabilitation company that provides in-home physical therapy services. I am also a shareholder and Clinical Advisory Board member of RevelAI, a healthcare-related artificial intelligence company.

I want to assure you that the selection of which product I use in your care is based solely on what I believe is best for you, not on which company makes the product. Furthermore, consulting agreements are specifically written and reviewed to remain independent of product selection and usage. In other words, I do not receive fees for using specific implants in your surgery.

I am certified by the American Board of Orthopaedic Surgery and am a fellow of the American Academy of Orthopaedic Surgeons (AAOS). Both groups hold their members to extremely high ethical standards to protect the trust that patients place in their surgeons. Furthermore, the AAOS has adopted Standards of Professionalism that require its orthopaedic surgeon members to identify and disclose all consulting agreements to their patients, the public, and colleagues. These standards also clearly articulate how and under what circumstances AAOS members may work with and be compensated by orthopaedic companies.

You can learn more about these standards of professionalism at the AAOS website:
http://www.aaos.org/member/profcomp/SOPConflictsIndustry.pdf

It is important to me that you are aware of my consultation with orthopaedic companies. I put the interests of my patients first, and am available to answer any questions that you may have.

Sincerely,

Edward M. DelSole, MD, FAAOS
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Keystone Spine and Pain Management
2607 Keiser Blvd., Unit 200
Wyomissing, PA 19610
Phone: (484) 509-0840