

METRx Lumbar discectomy

Spinal Surgical procedure

“Keyhole” Microendoscopic Lumbar Discectomy - METRx™ System

This is a recommended method of performing a lumbar discectomy. This is the latest evolution in performing minimally invasive spine surgery for lumbar discectomy. Minimally invasive surgery is the performance of surgery through small incision(s), usually with the aid of endoscopic/ telescopic visualization (i.e., very small devices or cameras designed for viewing internal portions of the body). This began with laparoscopic surgery of the abdomen to perform cholecystectomy (gall bladder removal), appendectomy and has expanded into many other procedures such as thoracoscopic surgery (chest/lung surgery) and orthopaedic surgery such as arthroscopy (keyhole joint surgery). It is now expanding into spinal surgery.

Why Is Minimally Invasive Spine Surgery Needed?

Minimally invasive spine surgery has developed out of the desire to effectively treat disorders of the spinal discs with minimal muscle related injury, and with rapid recovery.

Traditionally, surgical approaches to the spine have necessitated prolonged recovery time. For example, in the 1990s the state-of-the-art procedure for fusion of the lumbosacral spine has been the instrumented posterolateral fusion. In order to perform this procedure, the back muscles are moved away from their spinal attachments, allowing the surgeon space to place rods, screws, and bone graft.

First, this surgical approach (i.e., dissecting the muscles) produces the majority of the post-operative pain and delays return to full activity. The degree of the post-operative pain necessitates the use of significant pain medication with their inherent side effects. Also, the degree of the post-operative pain delays the return to normal daily activities and non-physical work.

Second, the dissection of the paraspinal muscles from their normal anatomic points of attachment results in a healing by scarring of these muscles. The layers of the individual muscles scar to one another losing their independent function.

In addition, it has been found that this type of dissection results in the loss of innervation (i.e., the supply of nerve stimulation) of the muscles with subsequent wasting (muscle shrinking). A permanent weakness of the back muscles results. This weakness itself may cause back pain and/or limit a patient's function - particularly in those who perform physical work. These side effects of the posterior approach to the lumbar spine have been called “fusion disease”.

Clearly, with such significant muscle injury, the need existed for the development of less invasive surgical techniques. It was envisioned that minimally invasive techniques would offer several advantages including: -Reduced surgical

complications - Reduced surgical blood loss - Reduced use of postoperative narcotic pain medication - Avoidance of fusion disease - Reduced length of hospital stay - Increased speed of functional return to daily activities.

Herniated Discs

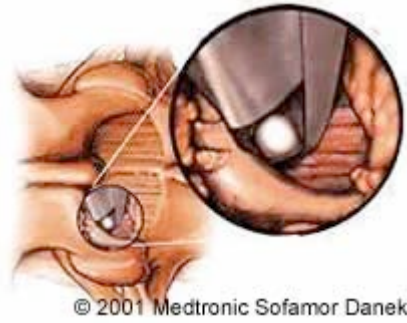
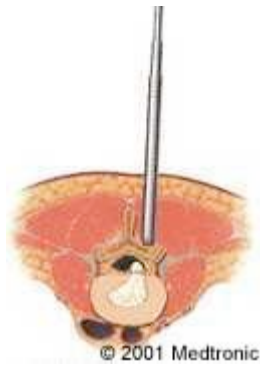
A herniated disc in the lumbar spine can cause numbness, tingling, weakness and/or pain that extend from the back into one or both legs. This is known as sciatica(**insert link**). The ruptured disc may be pinching or compressing one or more spinal nerves. Fortunately, most patients respond well to medication, physical therapy and time. Surgery only needs to be considered if significant symptoms persist despite a good trial of non-surgical treatment.



Spine Surgery: Then and Now

Traditionally, spine specialists have used an open approach to remove a herniated disc. The procedure is called a discectomy. In standard open discectomies, the attached muscles are stripped or scraped off the bony portion of the spine to enable the surgeon to see the herniation. During surgery, the affected nerves are decompressed as offending disc fragments are removed.

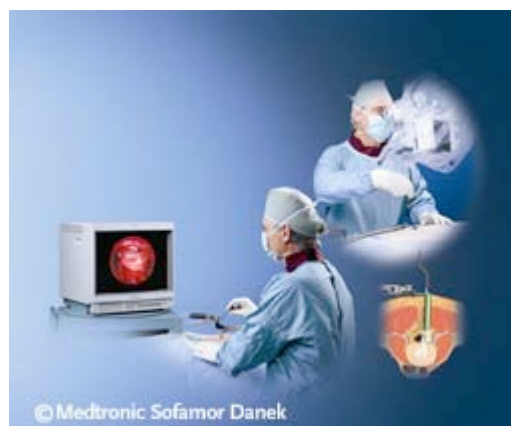
Using the METRx™ System, spine surgeons are able to perform a cervical or lumbar discectomy using minimally invasive surgical techniques. METRx™ stands for Minimal Exposure Tubular Retractor. The METRx™ System uses a minimally invasive surgical approach to the spine that places a small tubular retractor between the muscle fibers. The muscles are not scraped away from the bones of the spine, but stay attached to it. The surgeon uses a microscope or an endoscope to look through the small tubular retractor to visualize the pinched nerve root. The root is then decompressed using special microsurgical instruments.



In terms of relief of symptoms related to unpinching the nerve root, the surgical outcome using METRx™ is comparable to an open procedure. However, since the METRx™ System allows the surgeon to un-pinch the root through a small tube placed between the muscle fibres, it offers patients several advantages:

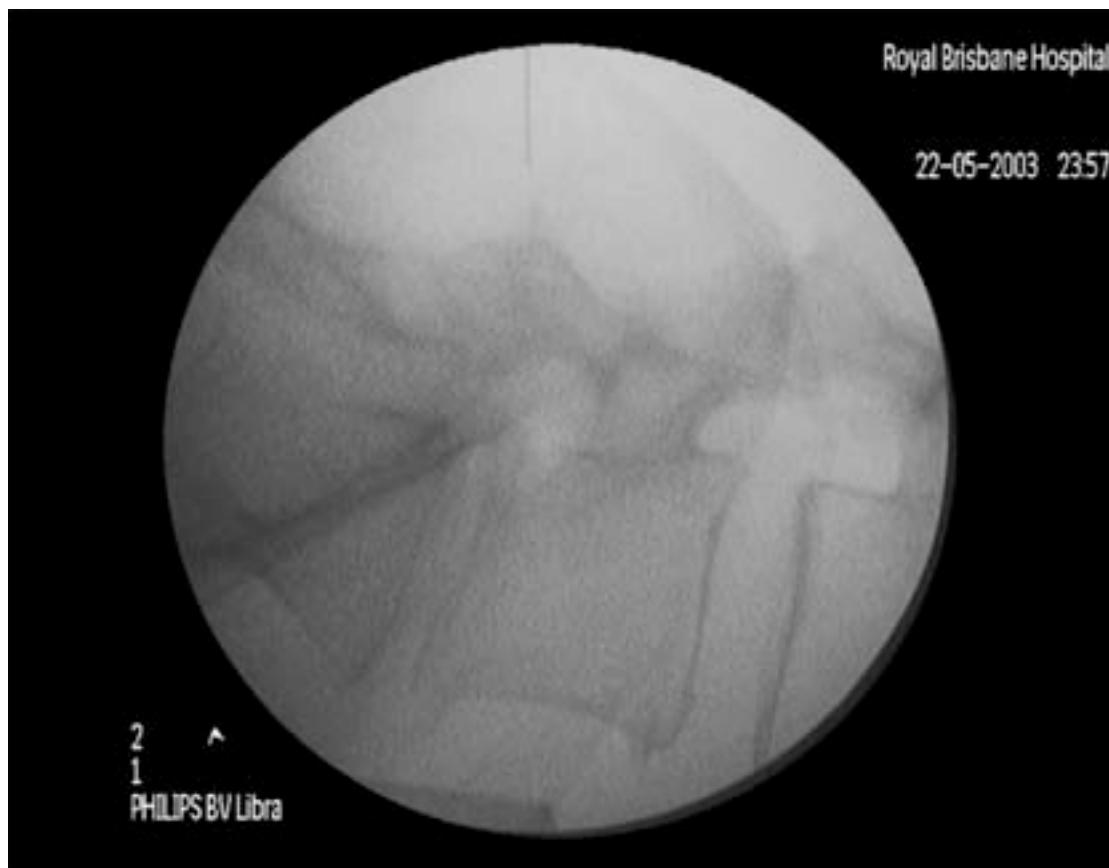
- A small incision (approximately 1-2 cm)
- Limited muscle disruption. METRx™ utilizes a system that parts and *spreads* the muscle tissue instead of *stripping* it from the bone. Not only does muscle stripping increase post-operative pain, but it also adds to the time it takes the patient to rehabilitate and recover.
- Minimal post-operative pain.
- Hospitalization is minimal and recovery is speedier. In fact, a METRx™ disc surgery can be done on an outpatient basis. The results of clinical studies report high patient satisfaction scores.

In the case of lumbar discectomy, the primary objective is to decompress the affected nerve root. The compressed nerve must be left fully decompressed and freely mobile. This may require extensive bony decompression, nerve root manipulation, and/or removal of herniated nucleus pulposus. The METRx™ System combines the reliability of conventional open surgery with the advantages of a minimally invasive technique.



How does the METRx™ System Work?

The main advantage of the METRx™ system in comparison to a traditional discectomy is a smaller incision and less damage to the muscles of the spinal column. This advantage is achieved by allowing the surgeon to expose the area where the herniated disk is located without making a large incision. A discectomy that is done with the METRx™ system begins with the surgeon precisely localizing the level of the herniated disk with a very small needle that is inserted through the muscles of the back down to the area where the disk fragments are located. The correct position of this needle is confirmed with a special type of X-ray machine that is used in an operating room called a fluoroscope.



(fig demonstrating X-ray to locate level of affected disc)

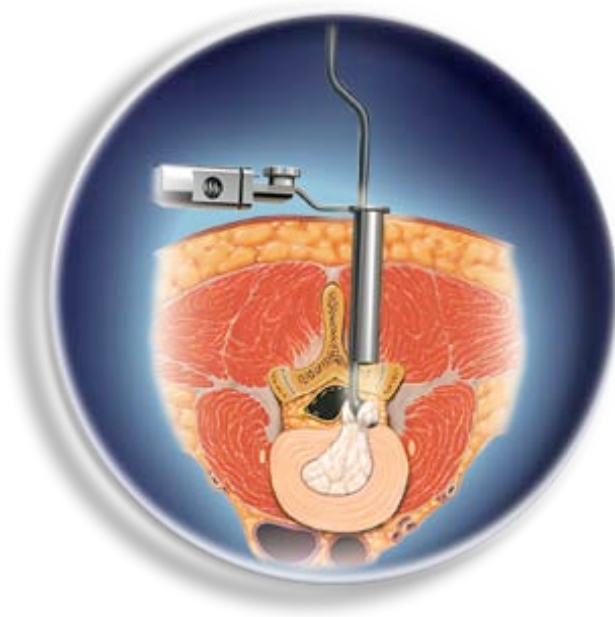
After the correct position of the needle has been confirmed with fluoroscopic guidance, a series of soft-tissue dilators are used to create a small tunnel that measures 16mm in diameter through the muscles of the back so that a hollow tube can be inserted down to the level of the spinal column.



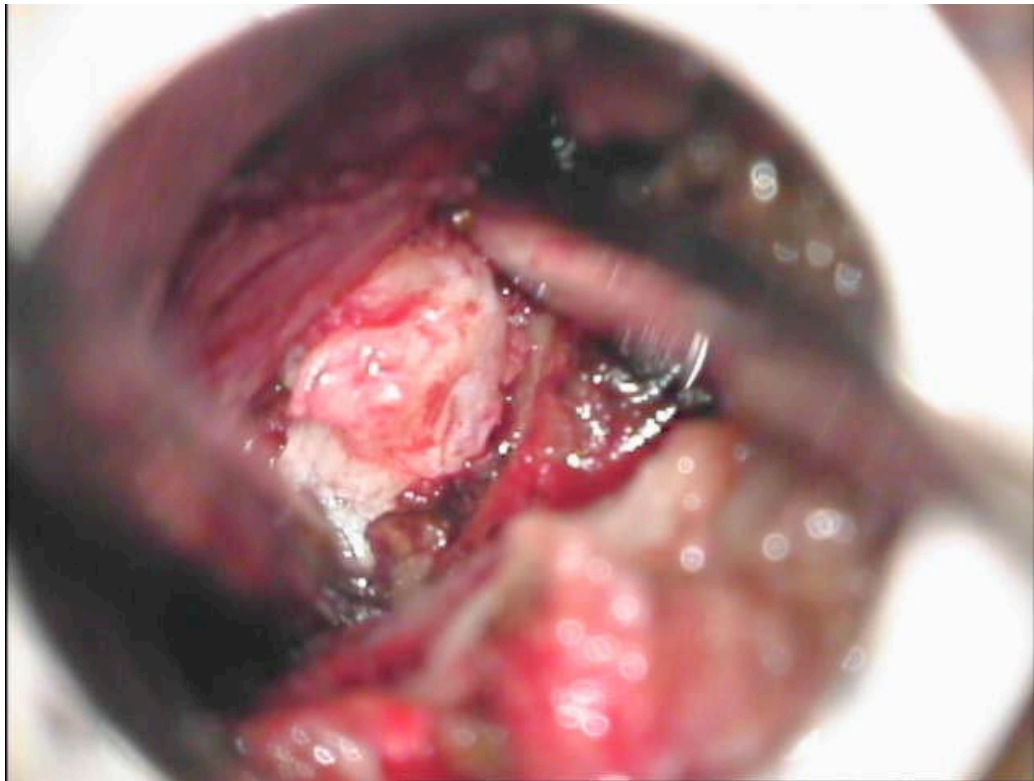
(figure demonstrating tubes inserted to dilate passage to affected disc)

This tube called a tubular retractor, using a microscope and light source allows illumination and magnification allowing the surgeon to operate safely.

Once the tubular retractor is in the correct place and the surgeon is able to visualize the area where the herniated disk is located, he or she is able to remove the fragments of the disk with special instruments that fit down the inside of the tubular retractor.

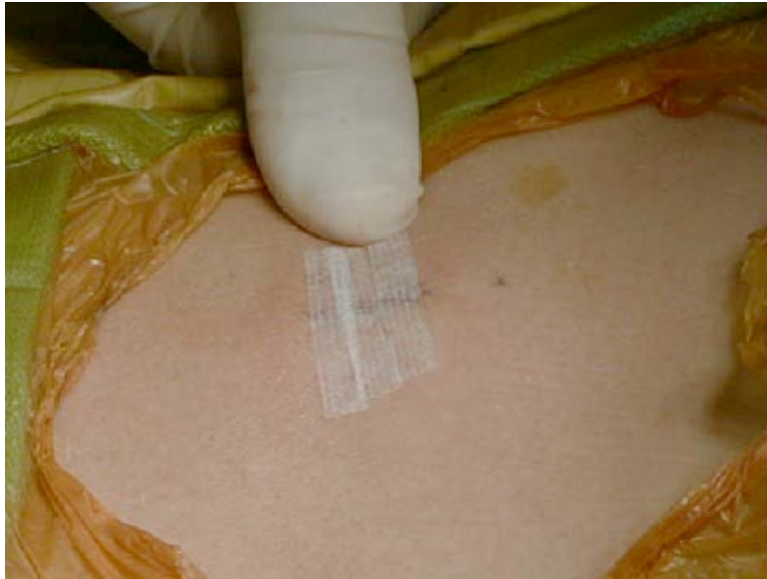


(fig demonstrating tube in place with instrument to remove disc fragment)



(INTRAOPERATIVE PHOTO DEMONSTRATING DISC FRAGMENT UNDER NERVE ROOT BEFORE REMOVAL)

When the operation is over, the tubular retractor is removed, and the incision, which is less than an inch in length, is closed and the wound is allowed to heal.



(FIG DEMONSTRATING SKIN INCISION AT END OF PROCEDURE)

Results.

Preliminary results indicate that surgeons are able to provide their patients with very high levels of pain relief and satisfaction by using the METRx™ system to perform a lumbar discectomy. These results also show that the METRx™ system provides levels of pain relief and patient satisfaction that are at least equivalent, and for the most part better, than traditional open microdiscectomy surgical procedures.

The Risks of Having Surgery

Some of the more common risks of having any surgery include excessive bleeding, infection, or a negative reaction to anesthesia. Certain unforeseen circumstances could even lead to death. Clinical experience and scientific calculation indicate that these risks are low, but surgery is still a human effort. You should feel free to ask any questions you have about your specific risk factors.

Since the METRx™ System procedure involves surgery in and around the spine, further nerve damage is a possibility. In some cases, the nerve is already so damaged that the surgical procedure required to simply reach the nerve could be the "straw that breaks the camel's back." The end result could be numbness, paralysis or a loss of bowel and bladder control. (However, deciding not to have surgery may have exactly the same consequences. Your decision should be based on a weighing of the risks of having surgery versus the risks of not having surgery.)

RECOVERY

What to Expect After Surgery

Have Realistic Expectations

Recognize that healing and recovery will not happen overnight. It is a process. You may find that much of your progress will be like taking "two steps forward and one step back." Accept it! And then do all that you can to make sure your steps "forward" are large ones and your steps "backward" are small ones.

Be Patient and Persistent

During the recovery period in the hospital and at home, try to rebuild your strength gradually. Rest when you feel fatigued-but be persistent in your efforts. It is important for you to recognize that we all heal at a different rate. The speed at which you will recover depends in part on your age, your general level of health, your overall physical fitness and your mental attitude. Generally, you will heal more slowly if you are overweight, out of shape or smoke, or if you are a diabetic or have other pre-existing medical problems.

Expect Some Pain After Surgery

It is normal to have some pain after any operation. After a METRx™ System procedure, there may be some leg "aching" which occurs as the nerve(s) attempts to heal. You also may feel some muscle spasms across your back and down your leg(s). And if there was inflammation in the nerve root, some pain may persist until this inflammation diminishes. You will be given appropriate medication to control your pain, relieve back spasms and reduce inflammation.

Be Prepared for Some Emotional Changes

It is not unusual to feel tired and discouraged for several days following surgery. These feelings may be your body's natural reaction to the cutback of extra hormones it generated during surgery. Although some emotional letdown can be expected, you must not let it get in the way of your recovery. Don't look back at past problems. It is important for you to look at even the smallest positive steps you make as progress towards your recovery goal.

Develop a Positive Mental Attitude

You should begin to work on a positive mental attitude even before your surgery is performed. Direct your energies toward the solution of your problem, rather than worrying about what caused your problem. Don't be discouraged by minor setbacks during the recovery process. Concentrate on the progress you make, and will continue to make in the future.

Commit to a Healthy Lifestyle

Now is the time to commit yourself to a healthier lifestyle. You can begin by taking these important steps:

- Watch your weight: If you are overweight, you gradually return to your proper weight. Crash diets rarely work. Commit yourself to better eating habits and stay with them for the rest of your life.
- Become more active: Your physician will tell you when you can resume normal physical activities after surgery. Make up your mind now that you will develop a regular aerobic exercise routine, such as walking, swimming, or riding a bike. However, always check with your physician before starting any exercise program.

FAQ's about the METRx™ System

Q. What are the differences between an open and a microsurgical discectomy?

A. A microsurgical discectomy performed with the METRx™ system uses a much smaller incision, generally about 1-2cm in length. This type of surgery creates a small tunnel through the muscles in the back down to the area where the herniated disk is located. In comparison, an open discectomy involves a much larger incision and also involves stripping the muscles away from the spinal column so that the surgeon can see the area where the herniated disk is located. The actual surgical procedure, removing the fragments of the herniated disk, is very similar with both techniques.

Q. How big is the actual incision for a microsurgical Discectomy?

A. The tubular retractor that is used to create a tunnel down to the spinal column where the herniated disk is located measures 1.6 cm in diameter (about $\frac{3}{4}$ of an inch). The actual skin incision is a little bit longer than this, but is generally about 2cm in length. This type of surgery uses a "muscle splitting" approach, so that the tubular retractor is passed through a tunnel in the muscles of the back, rather than stripping them away from the spine, as in an open or microdiscectomy.

Q. How long will I have to stay in the hospital?

A. One of the main advantages of performing a lumbar discectomy with the METRx™ system is less pain after the operation. This translates into a shorter hospital stay and a quicker recovery and rehabilitation. The procedure can be performed as a day case or can require an overnight stay in hospital.

Q. Is a microsurgical discectomy safe?

A. Yes. Neurosurgeons and Orthopaedic surgeons who have advanced spine training are very accomplished surgeons. With this technique, your surgeon is able to work in a surgical field that is illuminated by a very bright fiberoptic light source and magnified by a special type of video camera or microscope that provides incredible detail of the area that is being operated on. If the procedure can not be done safely with the tube technique, then the surgeon can convert the procedure to an open microdiscectomy.

Q. Is there a lot of pain after surgery?

A. There is *not* a lot of pain because of the minimally invasive nature of the procedure. You will have pain medication for when you need it. If pain is excessive you should contact your doctor.

Q. Can I shower after surgery?

A. You will have a waterproof dressing on your back. You may shower quickly but try not to soak the dressing. Do not go swimming or use a spa.

Q. What are my limitations after surgery?

A. You should take it easy. You can walk and lie down. Try to limit sitting to 10-15 minutes, sitting will tend to make you sore. A physiotherapist will see you after surgery and you will begin basic physical exercises. You will be reviewed by your surgeon a few weeks after surgery and your exercises extended.

Q. When can I play golf or tennis?

A. You need to wait 3 months to play strenuous sports or do any activity that uses a lot of twisting motion.

Q. Is this surgery experimental?

A. This surgery is not experimental. It is a minimally invasive way to perform the same procedure that has been successfully used to treat disc herniations for more than 60 years. This particular technique has been used since 1995.

Q. Will I have a large scar?

A. The incision is only 1-2cm long and usually heals very well. It is usually barely noticeable.

Q. When can I have sexual intercourse?

A. You can engage in sexual activity when you feel comfortable, usually after 1-2 weeks. Remember to moderate your activities and stop if you have any pain and then try to find a more comfortable position.

Q. Will I need medication?

A. There is usually not a lot of pain after surgery. You will be given simple painkillers for post-operative pain control.

Q. When can I drive?

A. You can drive short distances when you are comfortable sitting in a car. Sitting tends to aggravate the pain more than any other positions and limiting sitting and driving for the first 1-2 weeks is a good idea.