

# What is Minimally Invasive Spine Surgery?

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The mere thought of Minimally Invasive Spine Surgery (MIS) may evoke images of the latest sci-fi thriller. Perhaps a space-age healer with abilities to fix defects with new replacement parts or perhaps even without touch to heal with rays of light. As exciting as it may seem what it actually represents is a major change in the way that spine surgery is being done.

Only a decade ago outpatient surgery on the spine was unheard of. Recovery for certain types of spine surgery would require a week, maybe more, in the hospital, yield lengthy incisional scars, and require perhaps a year recovery time. Minimally invasive surgery has evolved with the desire to minimize muscle trauma and expedite recovery. The key to minimizing disruption of surrounding tissues is through the use of tiny portals or incisions. During conventional spinal surgery the muscles must be stripped from the bone necessitating longer incisions, more blood loss, more anesthesia time, more post-operative pain, longer hospitalization, and a lengthier healing time. For good reason the trend in spine surgery has moved to minimally invasive procedures.

Minimal access technology involves using tubular retraction thereby minimizing muscular trauma as well as the use of fluoroscopy (x-ray) to localize the exact spot to make the incision. How it is done is really very straightforward. Under x-ray guidance a small wire is passed to the desired area of the back. As the fluoroscope shows the correct operative level this is then marked on the skin for incision. With sequentially larger tubes the area is dilated to the largest tube available for working, usually about 22mm in diameter. In other procedures a special retractor can be placed for more extensive procedures. Retractors are used in all types of surgery and their purpose is to hold back the surrounding structures. In the case of spinal surgery this tends to be the paraspinal muscles of the back, a very thick and in some cases very deep group of muscles. At this point using magnification with a microscope or loupes the procedure commences. The procedures depending on the condition are applicable to the cervical, thoracic, and lumbar spine.

As procedures continually evolve i.e. how to build a better mouse trap, it requires physicians to maintain the highest level of training and an understanding of applying old procedures in newer and more advanced methods. An understanding of surgery at its core is to understand anatomy. What makes minimally invasive surgery challenging is the lack of anatomical relationships as the surgical field has been significantly shrunk. This is tantamount to trying to locate your destination instead of using multiple avenues as points of reference but instead the point next door to where you are going. For this reason developing and practicing these procedures are of a necessary importance before bringing them to our patients.

## WHAT PROCEDURES CAN BE DONE?

### **HERNIATED DISC**

A disc herniation occurs when the soft spongy portion of the disc bulges or ruptures outside of its normal location. This results in pressure and irritation of a nerve root producing sciatica. Patients may report severe, disabling pain, numbness, and weakness in the extremity. When surgery is performed a 22-mm incision is made over the disc space involved and a small window in the bone is made with a high speed drill. The nerve root is carefully moved and the disc fragment is evacuated. The procedure lasts 30-45 min and the patient is discharged within a few hours of the operation. Patients generally report significant improvement in their pain almost immediately.

### **SPINAL FUSION**

For some patients with spondylolisthesis, degenerative disc disease, or back pain associated with nerve root compression fusion surgery may be the treatment of choice. Fusion requires the healing of one bone to the next, in this case one vertebra to the next. Numerous techniques exist and fusion can be performed via the front of the spine or the back. When addressing this from the back this can be done via a transforaminal lumbar interbody fusion (TLIF). The advantage of a TLIF is that it addresses fusion in the front of the spine as well as the back of the spine all with one procedure. It is performed through the foramen of the nerve root (nerve tunnel) which avoids working within the canal which may damage the nerve or create scar tissue around the nerves. Using the small tubular retraction system the disc is removed and an implant is placed between the vertebra to restore disc height and to provide a means for fusion (interbody fusion). Then screws and rods are placed with the use of x-ray through two very small stab incisions. Blood loss is usually small and one to two days in the hospital are all that is needed.

### **SPINAL STENOSIS**

Spinal stenosis is a condition that most often arises as a result of an arthritic narrowing of the spinal canal. This creates a condition causing buttock or leg pain which may be worse with standing or walking and improves with rest. For those needing surgery for this condition several possible procedures may be available. Using x-ray to localize the incision site the contributing bone spurs and lamina are easily visualized and removed with use of a high speed burr. This opens up the nerve tunnels allowing in relief of buttock or leg pain. The entire spinal canal is visualized from one small portal and multiple levels can be addressed. Some patients may require fusion for their condition and this would change their course of treatment. Patients can be discharged same day depending on their age and tolerance of anesthetic.

These are just a few of the spinal disorders treated well with minimal access techniques. It is important to point out however that not all conditions can be treated with minimal access techniques. Please be sure to discuss these options with your surgeon.

