

# Minimally invasive spine surgery

## **Overview**

Minimally invasive surgery (MIS) uses advanced technology to treat back and neck pain caused by various spinal conditions. As the words suggest, the surgical "invasion" of the body is minimized. Special instruments and viewing systems allow surgeons to work through small incisions, sometimes shorter than an inch. These include tubular retractors, image-guidance systems, and endoscopes. Although surgeons have been doing traditional "open" approaches a lot longer than MIS, open techniques use larger incisions and disrupt more of the back muscles.

#### **Benefits of MIS**

- reduced pain, blood loss, and trauma to the body
- smaller incisions
- shorter time under anesthesia
- shorter hospital stay
- reduced need for pain medications after surgery
- faster recovery and return to normal activities
- reduced risk of infection and injury to healthy tissue

### Who is a candidate for MIS?

Surgery is not for everyone. If surgery is advised, your surgeon will discuss which options might be most beneficial to you. Many factors are considered, including diagnosis, location of the neurological issue, and your age and overall health. Whether you are a candidate for MIS or open surgery, your surgeon will use the most modern and appropriate technology available to treat your condition.

#### **Common MIS procedures**

**MIS tubular discectomy** is performed to remove a herniated disc and bone spurs. A small incision (less than 1 inch) is made into one side of your back (Fig. 1A). Next, a series of progressively larger dilators are passed, one around the other. These gradually separate the muscles and create a tunnel to the bony spine (Fig. 1B). Through this tunnel, the surgeon removes bone (lamina), gaining entry to the spinal canal and view of the injured disc and nerves. By removing the ruptured portion of the disc, the surgeon decompresses the pinched nerve to relieve the pain and inflammation. The entire disc is not removed. The surgery lasts 1 to 2 hours and patients typically go home the same day.



Figure 1A. Skin incision is smaller for a minimally invasive discectomy (green line) than a traditional open discectomy (black line).



Figure 1B. Inserting a series of progressively larger dilators, one around the other, gradually separates the muscles and creates a tunnel to the bony vertebra. Working through the tunnel, the surgeon removes he herniated disc and bone spurs.

#### MIS transforaminal lumbar interbody fusion

(TLIF) is performed to remove a degenerative disc and then fuse two vertebrae together. After making a 1-inch incision in the lower back, the surgeon then gradually dilates (widens) it with increasingly larger tubes. This forms a tunnel to the spine. Through this tube, the surgeon removes the damaged disc and inserts a bone spacer into the empty disc space (Fig. 2). Over time, new bone growth will fuse the two vertebrae together. Pedicle screws and rods may be inserted to stop painful motion in the facet joints and provide stability. The surgery is done without splitting the spinal muscles.

Axial lumbar interbody fusion (AxiaLIF) is a MIS used to fuse the fifth vertebrae (L5) of the lower spine and the first vertebra (S1) of the sacrum (tailbone). After making a 1-inch incision near the tailbone, the surgeon passes a long, narrow tube to reach the spine. Using long instruments, the disc is removed and a special rod (screw) is inserted to permanently join the two vertebrae together (Fig. 3). Fusing bones together can prevent painful motion and provide stability. AxiaLIF may be performed in patients with spinal stenosis, spondylolisthesis (a slipping forward of the vertebral bone), or degenerative disc disease. The surgery is done without splitting the spinal muscles. The surgery typically takes 1 to 2 hours and patients go home the same day.

**X-STOP**<sup>®</sup> **interspinous decompression** is a spacer device inserted between two bones in the lower back for treatment of spinal stenosis. It prevents the patient from bending backward, thus preventing a position that can pinch the nerve and cause sciatica or lower back pain. Once in place, the spacer lifts and opens the spinal canal effectively relieving the pressure on the spinal nerves. The spacer device is not attached to bone or ligament, and does not result in spinal fusion (Fig. 4). The surgery can be done under local anesthetic. The interspinous spacers are an alternative to lumbar laminectomy and decompression surgery.

#### Sources & links

If you have more questions, please contact the Mayfield Clinic & Spine Institute at 800-325-7787 or 513-221-1100.

#### www.MayfieldClinic.com



Figure 2. In a MIS TLIF, the degenerative disc is removed and a bone graft is placed through the working tunnel.







Figure 4. An interspinous spacer lifts and opens the spinal canal to relieve pressure on the nerve.

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