Lateral Lumbar Interbody Fusion (LLIF)

A variety of techniques exist for fusing lumbar spine vertebrae to help alleviate back pain. Lateral access spine surgery is a minimally invasive surgery that accesses the spine from incisions on the side of the body. This procedure avoids separating the low back muscles, cutting bone, or moving aside blood vessels as required for other minimally invasive spine fusion procedures (PLIF, TLIF, ALIF). Lateral access spine surgery can treat a variety of conditions including herniations, asymmetric disc degeneration (degenerative scoliosis), nerve impingement, certain tumors, and as discussed in this animation, instability and pain resulting from disc degeneration. When treating this source of back and leg pain, most of the disc is removed, a spacer is used to restore proper disc height, and bone grafts are added to fuse the adjacent vertebrae, restoring stability. This procedure is commonly called the Lateral Lumbar Interbody Fusion, or LLIF.
Introduction
A variety of techniques exist for fusing lumbar spine vertebrae to help alleviate back pain. Lateral access spine surgery is a minimally invasive surgery that accesses the spine from incisions on the side of the body. This procedure avoids separating the low back muscles, cutting bone, or moving aside blood vessels as required for other minimally invasive spine fusion procedures (PLIF, TLIF, ALIF). Lateral access spine surgery can treat a variety of conditions including herniations, asymmetric disc degeneration (degenerative scoliosis), nerve impingement, certain tumors, and as discussed in this animation, instability and pain resulting from disc degeneration. When treating this source of back and leg pain, most of the disc is removed, a spacer is used to restore proper disc height, and bone grafts are added to fuse the adjacent vertebrae, restoring stability. This procedure is commonly called the Lateral Lumbar Interbody Fusion, or LLIF.

Incision and Dilation
A small incision, approximately two inches in length, is made directly at the side of the waist and occasionally a smaller incision (approx. one inch) is made behind it to help guide surgical instruments. A device that projects live X-ray images onto a screen, called a fluoroscope, is typically used to pinpoint the exact position on the spine where the surgery will be performed. A thin probe is inserted through the incision and directed toward the spine through a muscle lying next to the spine, called the psoas muscle. The probe is attached to nerve monitoring equipment, allowing the surgeon to detect and avoid nerves as the probe travels to the correct position on the spine. A series of dilators with increasing diameters, which are also connected to nerve monitoring equipment, are guided over the probe to safely enlarge the opening.
Retractor and Instrument Set-Up
A retractor device is placed over the dilators to hold back the muscle and expand the opening to allow room for the surgery. The dilators are removed and a lighting component is attached to illuminate the surgical field. The retractor blades are opened to hold the tissues out of the way. The surgical exposure is now complete. An endoscope or microscope is then added to the edge of the retractor to provide close-up imagery on a screen to help guide the procedure.

Disc Excision and Implant Placement
Surgical instruments are used to remove a large portion of the degenerating vertebral disc. An interbody spacer, which is an implant comprised of a titanium, carbon-fiber, or polymer structural support cage that spans the width of a vertebral body, is positioned between the adjacent vertebrae. The spacer removes pressure from nerve roots which may have been pinched, restores the proper disc height, and provides stability to the spine for supporting normal loads. The cage is often packed with processed bone from a bone bank (allograft), or a bone graft substitute (demineralized bone, ceramic extender, or bone morphogenetic protein), which encourages regeneration of bone that will permanently fuse the vertebrae.
Summary
The instruments are withdrawn and the incisions are closed and dressed to complete the procedure. The LLIF procedure is performed with minimal injury to surrounding tissues, which may allow a faster return to normal activity. The surgery may be performed more quickly with less anesthesia time, blood loss, and pain compared to other fusion techniques. Some patients are released from the hospital the day following their surgery, and most can expect to return to normal activities in about 3 months.