A posterior lumbar interbody fusion (PLIF) is performed to remove a degenerating disc that is the source of back or leg pain and fuse spinal vertebrae with bone grafts. It is called a posterior procedure because the spine is approached through an incision on the back. In patients with spinal instability, instrumentation is used to provide space for placing the grafts and to help stabilize the spine. Using a technique known as minimally invasive surgery, this procedure can be done with a much smaller incision than traditional open spinal surgeries and avoids damaging the low back muscles.
Introduction

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Incision and Dilation

Two short incisions, approximately 2.5 cm. (1 in.) each, are made on either side of the middle of the lower back. 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. Next, a thin wire or needle is inserted through tissues and muscle to the level of the spine on each side. Special dilators are guided down the wire to separate muscle fibers and provide access to the underlying spine without cutting through the muscles. After the initial dilators are docked on the back of the spine, larger dilators are added, gradually increasing the diameter to allow enough room for the surgical procedure on each side.
**Retractor and Instrument Set Up**

A retractor device that can expand the surgical field and hold back the muscle is placed over the dilators. The dilators are removed and a lighting component is attached to illuminate the surgical field. A hex screwdriver is used to open the retractor blades, holding the soft tissue 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.

**Excision**

Cutting instruments are used to remove portions of the lamina (laminectomy), and portions of facet joints (facetectomy) from the back of the vertebrae on each side. Removing bone here allows the surgeon to see the degenerating disc. A grasping instrument is used to remove most of the intervertebral disc by entering through the incisions on either side. Removing the abnormal disc relieves the pressure.

**Instrumentation**

Next, the vertebrae are prepared for instrumentation. A sharp awl is used to make holes in the pedicles for insertion of pedicle screws. Screws are placed through a metal plate and then into the pedicle holes, ending with the screw tips in the middle of the vertebral body. Screws and plates are placed on both sides of the spine. Two more pedicle screws are then placed through the metal plate and screwed into the lower vertebral body pedicles.
Distraction and Graft Placement
To prepare for bone graft insertion, the disc space is spread apart (distracted) by moving the vertebral bodies or applying pressure on the pedicle screws. The screws are tightened to hold the disc space in this open position. Two bone grafts are then placed between the vertebral bodies. The bone grafts allow for eventual fusion as bone grows between the vertebral bodies. In variations of this procedure, spacers, cages packed with graft material, or ground bone graft material may also be packed into the disc space to aid with the fusion.

Compression
To provide stability to the spine while the fusion occurs, the lower screws are loosened and the vertebral bodies are squeezed together (compressed). The screws are tightened in the compressed position, which allows for a tight fit of the grafts in between the vertebral bodies. Small screws called blockers are placed on the pedicle screws to lock the screws to the metal plate.

Summary
The Minimally Invasive Surgery (MIS) approach can be safely performed with less trauma to the surrounding muscles. MIS procedures can result in less postoperative pain, shorter hospitalizations and quicker patient recovery than traditional open surgical methods.