

Surgical Interventions

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Discectomy

The term discectomy refers to a procedure used to remove a portion of a disc to relieve pressure on a nerve, to reduce pressure on the spinal cord or other adjacent tissue. During a traditional discectomy, the spine surgeon will remove a portion of a disc or the entire disc that is causing or contributing to pain and/or neurological damage. Typically, the portion of the disc, which lies adjacent to the compromised nerve or spinal cord is removed. In the lumbar spine the surgical entrance to the spine is through a small incision in the back. In the cervical spine the easiest way to get to the spine is from the front side. Whether the surgery is in the neck or low back, the surgery is performed while the patient is under general anesthesia.

For lumbar surgery, the patient is usually placed in a face down position. The incision is made over the lumbar region. Muscle tissue is retracted or removed from the bone over the area to be operated on. In most cases some bone and part of the spinal ligaments have to be removed to create a window that the surgeon can use to visualize and gain access to the intervertebral disc without damaging neurological and other adjacent tissue. In many cases, part of the damaged portion of the disc is left between adjacent vertebra to serve as a spacer and to act as a shock absorber. The open discectomy is one of the most common surgical treatments used for ruptured herniated discs in the lumbar spine. The procedure has been performed on hundreds of thousands of patients over the last 60 years. However, not all patients who have a herniated disc are candidates for the procedure.

Microdiscectomy

The term microdiscectomy refers to the use of a microscopic approach to disc surgery. In some patients, the size and location of a disc herniation will allow for the surgeon to make a smaller incision and limit the amount of herniated disc material that needs to be removed during surgery. Not all herniated discs can be operated in this fashion due to the anatomy of the region as well as the size and location of the disc herniation. In some cases the disc herniation is in an area that is not easy for the surgeon to reach, therefore, an open surgical discectomy is more appropriate.

Percutaneous Discectomy

Percutaneous discectomy was first introduced in the field of spine surgery during the late 1980s. To perform this procedure on the low back, the surgeon usually makes a 1- $\frac{1}{2}$ - inch incision. The percutaneous discectomy is performed using a surgical probe, approximately the width of a ballpoint pen. The surgeon can maneuver the end of the probe near the herniated disc. At the tip of the probe, there are tiny scissors, which can be used to cut and remove select portions of herniated disc tissue. Some procedures

are performed with fiberoptic cameras that enable the surgeon to guide the probe to the precise position. Once positioned, the camera can be replaced with cutting blades. Not all patients qualify for a percutaneous microdiscectomy. It is not a good procedure for somebody who has already had back surgery.

Laser Discectomy

Laser discectomy was first performed in 1991. It is considered a very minimally invasive form of discectomy similar to percutaneous discectomy. Instead of using a mechanical forceps or nucleotome to remove the select portion of disc material, a laser is utilized to vaporize the compromising disc material. To have a favorable outcome with any kind of percutaneous procedure the intervertebral disc must be accessible through a minimal incision and be visualized. Because the laser also cauterizes the tissue at the same time, some surgeons report a faster recovery with this technique.

Laminectomy or Laminotomy

The laminectomy or laminotomy (partial laminectomy) is traditionally performed for one of two reasons. The first reason is to make more room for the spinal contents particularly the nerves and blood vessels. The second reason is to create a surgical window through which a surgeon can operate on the site of involvement. This latter procedure is used to access the spinal canal from the back of the spine. It is a more common procedure in the lumbar spine. To perform the laminectomy the spine surgeon will make a 1-2 inch incision over the back. The surgeon then moves spinal muscles away from the spine exposing the bone (lamina). He or she then uses a surgical instrument to remove bone of the lamina from one or more vertebrae to gain access to the spinal canal and the intervertebral disc. The bony lamina essentially forms a roof over the central spinal canal. The lamina can be removed on one or both sides in order to provide greater volume to the spinal canal and to decompress the exposed contents of the central spinal canal.

During a microdiscectomy, partial removal of the lamina is usually sufficient to gain access to the affected nerve root. In the case of degenerative spinal stenosis, a more extensive decompressive laminectomy is usually performed which may require removal of the entire lamina on both sides of the midline including the spinous process. The procedure may include removal of the lamina and spinous process at more than one adjacent level. In rare cases it is necessary to remove the entire bony lamina and a portion of the adjacent spinal (facet) joint. This is referred to as a wide laminectomy. When a wide laminectomy and partial facetectomy is performed there is greater risk for developing excessive movement of the vertebrae (instability) secondary to the removal of supportive tissue. If a surgeon is concerned that the wide laminectomy may lead to instability, a fusion may be performed in addition to the laminectomy. A laminectomy can be used to gain access to numerous problems in the spine including hematoma, tumor, and blood vessel abnormalities, to reach a bone spur, and to access to any disc problems.

Foraminotomy

The foramina refer to the small openings along the right and left sides of the spine. The spinal nerves exit the spine through the foramen. Degenerative disc disease associated with a loss of disc volume can lead to narrowing of the bony foramen. Degenerative changes leading to thickening of the facet joint capsule, bony overgrowth and bone spur projection all contribute to narrowing of the foramen. Narrowing of the foramen can result in compromise of the exiting nerve roots. A surgical

foraminotomy refers to careful shaving off of bone around the foramen to increase the volume of the opening and to make more room for the nerves and their blood vessels. A successful foraminotomy decompresses the nerve and results in reduced irritation and inflammation of the nerve.