Surgical Procedures for Spine Pathology
Part II - By Stewart M. Kerr, MD

In our May issue, Dr. Kerr addressed surgical procedures of the cervical and thoracic spine. The following article discusses procedures of the lumbar spine.

There are scores of contemporary techniques to address specific pathologic spinal conditions. In general terms, the majority of instrumented surgery is directed to stabilize the axial skeleton while awaiting fusion after decompressing nervous system structures (i.e. the spinal cord or specific nerve roots). Other surgery techniques are targeted at reconstructing deformity or in an attempt to relieve pain from degenerative, infectious or neoplastic conditions. Motion preservation approaches strive for continued mobility with non-fusion devices after surgical decompression has been achieved. Listed are several of the more commonly utilized techniques of the lumbar spine.

Lumbar Spine Procedures: MLD, Laminectomy/Foramenotomy, TLIF, PLIF, PLDIF, LIBF (XLIF), ISPS, ALIF, Disk Arthroplasty

Myriad surgical procedures are prescribed in the lumbar spine. Axial spine pathology is most commonly seen in the lower segments and can result in both back, buttock, thigh and leg/foot pain symptoms. The balance for surgeons is to comprehensively address the pathology with the least amount of muscle and connective tissue disruption.

Micro-lumbar disk decompression or “microdiskectomy” involves a 3 to 4 centimeter incision centered on the pathological motion segment. The muscles are gently stripped off the dorsal laminae to allow access into the spinal canal by removing portions of the laminae and ligamentum flavum. The nerve structures are gently retracted toward the midline to localize and remove the herniated disk material.

Laminectomy/Foramenotomy is the removal of all dorsal laminae to decompress central spinal stenosis. Foramenotomy uses small bone removing instruments to enlarge the nerve tracts (foramen) exiting the spinal canal. In certain circumstances, extensive decompression with removal of greater than 50 percent of the facet joints is required to fully decompress the spine. Most spinal surgeons instrument and fuse the spine when this extent of decompression is necessary. This is termed posterior lumbar decompression and instrumented fusion (PLDIF).

Transforaminal lumbar interbody fusion and posterior lumbar interbody fusion both achieve a 360 degree fusion through near-total disk removal and placement of an intervertebral body spacer filled with bone graft. These techniques also use pedicle screw-rod constructs and bone grafting between the transverse processes and sacral ala for anterior-posterior fusion.

Lateral interbody fusion is accomplished via a small incision in the flank and placement of bone graft material while the patient is positioned on their side. This procedure corrects large coronal plane deformity without the typical morbidity experienced in a traditional anterior approach. Many implant companies now have lateral inter-body implant and plate-screw stabilization systems available. The results of these devices in patients with neuroforaminal stenosis remain controversial. Patients do experience statistically decreased hospital length of stays with this technique.

Inter-spinous process spacers (ISPSs) are used to indirectly decompress patients with spinal stenosis by creating a short segment of kyphosis or forward flexion in the spine. These devices are designed to increase the spinal canal diameter by inhibiting buckling of the ligamentum flavum and by increasing the cephalad-caudal distance in the neural foramen. The clinical results following implantation of these devices remains controversial and popularity for use has significantly decreased over the most recent 24 months.

Anterior lumbar inter-body fusion and disk arthroplasty are principally used for symptomatic disk degeneration. This entity is very common and fortunately does not frequently require surgical intervention. The results of both of these technologies are predictably good in properly selected patients. Disk arthroplasty proponents argue for the theoretical advantage of decreasing adjacent motion segment degeneration that is commonly experienced following lumbar fusion. Further longitudinal studies are ongoing to discern the validity of this hypothesis.