

Surgical Procedures for Spine Pathology

Part 1 - By Stewart M. Kerr, MD

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 cervical and thoracic spine.

Cervical Procedures: ACDF, ACDA, Corpectomy with fusion, PCDF

In the upper, neck-based spine, common procedures include anterior cervical decompression with either fusion or arthroplasty. These are commonly abbreviated ACD(F) or ACD(A). This classically involves a small incision along the skin folds of the anterior neck tissue. Dissection between neck muscles to the spine is next accomplished allowing placement of retractors which allow for direct visualization of the pathological inter-vertebral disk segment. The herniated disk is fully removed to decompress the spinal cord and/or exiting brachial plexus nerve root(s). The void resulting from disk removal is then either filled with a bone-growth spacer to fuse the upper and lower vertebral bodies or with a synthetic inter-vertebral disk that allows for continued motion. These procedures are useful in the surgical treatment of cervical radiculopathy and 1 or 2 level myelopathy.

Cervical corpectomy is similar to an ACD but involves removal of approximately 16 millimeters of the vertebral body in order to decompress the spinal cord. This technique is more demanding operatively as the vertebral arteries course just lateral to the vertebral bodies and can be injured during the operation leading to life-threatening hemorrhage or stroke. Cervical corpectomy is most often indicated for spinal cord compression with more extensive involve-

ment than can be addressed with traditional ACD. Fusion with either allograft bone or a synthetic bone substitute in a cage construct with plate fixation is required following.

Cervical spine pathology can also be managed from the posterior or back of the neck. This procedure, a PCDF, or posterior cervical decompression and fusion, involves a longitudinal midline incision to the outer or lateral mass structures. Retractors are next placed and after careful identification of the correct levels, the rear spinal canal bone structures (the laminae) are shaved down with a high-speed burr and removed. Stabilization is achieved by instrumentation with lateral mass/pedicle screws, rods and bone grafting. PCDF is most useful for multi-level cervical spinal cord compression and can be combined with anterior procedures for circumferential (front-back) decompression. Post-operatively, patients are protected in a cervical collar orthosis while awaiting biologic fusion.

Thoracic Procedures: PTDF, PTLIF, Corpectomy with fusion, Kyphoplasty

Surgery involving the thoracic spine most often is due to instability following trauma or progressive deformity as is seen in some patients with scoliosis or ankylosing spondylitis. This includes posterior thoracic instrumented fusion. Occasionally this also includes corpectomy or pedicle subtraction osteotomy (e.g. total or partial vertebral body resection) with re-alignment reconstruction of the anterior "vertebral body" column. This can be achieved with allograft bone or with bone-filled tubular cages similar to that described above in the cervical corpectomy section.

Posterior thoracic or thoraco-lumbar instrumentation and fusion with pedicle screw placement is very powerful at deformity correction. Thoraco-lumbo-sacral-orthosis or TLSO braces are commonly prescribed post-operatively to assist with holding the spine stable while awaiting fusion. Bracing is important in reducing the bone-implant interface failure rate--an important concept especially in those patients with poor bone quality such as osteoporosis.

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Kyphoplasty is a technique that uses bone cement (PMMA) to fill a balloon-created bone void. This procedure is helpful in the management of osteoporotic compression fractures and some neoplasms such as multiple myeloma. ❧

Please see our June issue for Part II of this article regarding surgical procedures of the lumbar spine.

ABOUT THE AUTHOR



Stewart Kerr, MD, is a full-time, attending orthopaedic surgeon-educator at a resident teaching program. He completed a combined orthopaedic and neurosurgical spinal surgery fellowship at the prestigious Rothman Institute in Philadelphia, Pennsylvania. His practice and research interests include restoring high-level function in U.S. Navy SEALs and U.S. Marines following extremity and axial skeleton injury. He is available for independent medical examinations exclusively through OMAC.

Dr. Kerr is available in our Spokane clinic on May 15 and our Olympia (morning) and Southcenter/Tukwila (afternoon) clinics on May 16.