Overview of Lumbar Anatomy

The lumbar spine (low back) is below the cervical spine and the thoracic spine. The five vertebrae of the lumbar spine (L1 to L5) are stacked on top of one another. Between each vertebra is an intervertebral disc, which is a gel-like cushion. The discs absorb pressure, distribute stress, and keep the vertebrae from grinding against each other. The vertebrae and discs are held together by groups of ligaments, and tendons connect muscles to the vertebrae. Ligaments and tendons help to stabilize the spine and guard against excessive movement in any one direction.

Facet joints, which are located at the posterior area of the spinal column, link the vertebrae together. These lumbar spine joints help make the spine flexible, allowing it to bend forward, backward, and side to side.

The spinal canal is the space in the vertebral column formed by the vertebrae through which the spinal cord passes. The bones that create the spinal canal help protect the spinal cord from injury. The spinal cord descends from the brain, through the cervical and thoracic spines in the spinal canal, and ends in between the first and second lumbar vertebrae. Below that, a group of nerves called the cauda equina travels through the spinal canal and branches off to various parts in the lower half of the body.

Managing Low Back Pain

The initial evaluation of patients with low back pain involves ruling out potentially serious conditions that suggest the need for early diagnostic testing such as infection, malignancy, or spinal fracture; a rapidly progressing neurologic deficit suggestive of cauda equine syndrome; or bowel or bladder dysfunction or weakness. Patients without these conditions are initially managed with conservative therapy.

Conservative management of low back pain includes:

- Avoidance of activities that aggravate pain;
- Chiropractic manipulation in the first four weeks if there is no radiculopathy;
- Cognitive support and reassurance that recovery is expected;
- Education regarding spine biomechanics;
- Exercise program;
- Heat / cold modalities for home use;
- Limited bed rest with gradual return to normal activities;
- Low-impact exercise as tolerated (for example, stationary bike, swimming, walking);
- Pharmacotherapy:
  - Non-narcotic analgesics;
o NSAIDs (as second-line choices);

o Avoid addictive muscle relaxants (or only use during the first week); and

o Avoid narcotics.

Generally, conservative therapy is not recommended in the presence of progressive neurologic deficits, when spinal fracture or dislocation is unstable, or for progressive spinal deformity. There is currently no consensus regarding the optimal duration for conservative treatment prior to surgical intervention for low back pain; recommendations range from at least three months to greater than one year.

Lumbar fusion is a procedure that joins, or fuses, two or more vertebrae in the low back. There are different methods of spinal fusion. Bone can be taken from the patient’s pelvis (autograft) or from a bone bank (allograft) and used to make a bridge between vertebrae that are next to each other; this bone graft helps new bone grow. Another option is to use metal implants to hold the vertebrae together until new bone grows between them.

Potential complications of spinal fusion include infection, urinary problems, pseudoarthrosis (that is, the bone graft site causes pain and can lead to a fusion that does not heal), and blood clots. One of the most significant risks associated with spinal fusion is adjacent segment disease (ASD), which occurs when the spinal discs either above or below the fusion wear out and become extremely painful. Patients with ASD require re-fusion of the spine to include the newly affected areas.

**Indications for Lumbar Fusion**

The indications for lumbar fusion are controversial, especially when it is used to treat patients with spinal stenosis with or without spondylolisthesis, recurrent disc herniation, and degenerative disc disease. Less controversial indications for lumbar fusion are summarized below.

**Emergency Situations**

Lumbar fusion surgery is medically indicated in any emergency situation when the attending surgeon judges fusion to be a necessary part of surgical intervention. An emergency situation is any medical situation where the patient risks permanent neurologic or functional deficit if (s)he is not operated on emergently. These situations may include, but are not limited to, clinical signs of cauda equina syndrome or other significant neurologic impairment.

**Trauma**

Lumbar fusion may be indicated to treat fractures or displacement of lumbar vertebrae resulting from trauma such as motor vehicle collisions, construction accidents, and vertical falls.

**Revisions**

Lumbar fusion may be indicated for some revisions at the same level of a previous surgery that shows evidence of complications either causing clinical symptoms or risking harm to the patient. These situations may result from device failure, iatrogenic instability, ASD, or pseudoarthrosis.

**Tumor**

Lumbar fusion surgery may be medically indicated when treating a primary spinal tumor, metastasis to the spine, an abscess, or other growths that damage or displace the spine and/or the neural tissues.

**Infection**

Lumbar fusion surgery is often medically indicated to treat infection such as tuberculosis, osteomyelitis, and discitis.
Congenital Structural Issues

Lumbar fusion is medically indicated to treat idiopathic scoliosis and isthmic spondylolisthesis.

Contraindications to Lumbar Fusion

Initial laminectomy/discectomy related to unilateral compression of a lumbar nerve root is an absolute contraindication to lumbar fusion. There are a number of relative contraindications to lumbar fusion, including:

- Current evidence of a factitious disorder;
- Current smoking;
- Greater than 12 months of disability (time-loss compensation benefits) prior to consideration of fusion;
- High degrees of somatization on clinical or psychological evaluation;
- Multiple level degenerative disease of the lumbar spine;
- No evidence of functional recovery (return to work) for at least six months following the most recent spine surgery;
- Presence of a personality disorder or major psychiatric illness;
- Psychosocial factors that are correlated with poor outcome, such as history of drug or alcohol abuse; and
- Severe physical deconditioning.

Practice Parameters and Guidelines for Lumbar Fusion

The North American Spine Society (NASS) Coverage Policy Recommendations describe specific criteria for the use of lumbar fusion to treat infection, tumor, traumatic injuries, deformity (for example, scoliosis), stenosis, disc herniations, synovial facet cysts, discogenic low back pain, and pseudoarthrosis. The NASS recommendations state that lumbar fusion is not indicated for disc herniation in the absence of instability or spondylolisthesis; stenosis in the absence of instability, foraminal stenosis, or spondylolisthesis; and discogenic low back pain that does not meet the recommended criteria.

According to guidelines developed by the American Association of Neurological Surgeons (AANS) and the Congress of Neurological Surgeons (CNS), lumbar fusion is recommended for patients whose low back pain is refractory to conservative treatment (physical therapy or other non-operative measures) and is due to one- or two-level degenerative disc disease without stenosis or spondylolisthesis (grade B, based on multiple level II studies). AANS and CNS do not recommend lumbar spinal fusion as routine treatment following primary disc excision in patients with a herniated lumbar disc causing radiculopathy (grade C, level IV evidence). In addition, in the absence of deformity or instability, lumbar fusion is not recommended, as it has not been shown to improve outcomes in patients with isolated stenosis (grade C, level IV evidence).

Determining Medical Necessity for Lumbar Fusion

Most health plans cover lumbar fusion when specific criteria are met. For example:

- Lumbar spinal fusion surgery meets a plan’s medical criteria for coverage for any of the following indications regardless of smoking status:
  - Emergency situations:
    - Acute spinal fractures less than three months’ duration with instability resulting in neural compression or spinal dislocation; or
    - Trauma (for example, motor vehicle collisions, vertical fall);
  - Tumors:
Indications for Lumbar Fusion: Establishing Standards for Medical Necessity

- Primary spinal tumor(s);
- Metastasis to the spine; or
- Abscess or other growth creating a mass affect that damages or displaces the spine/spinal cord/nerves; and
  - Infections affecting the spine (for example, spinal tuberculosis, vertebral osteomyelitis, discitis).

Independent medical review determines medical necessity based on medical policy and published clinical criteria. These high-quality, defensible determinations not only control over-utilization of procedures and therapies but also facilitate safe and effective treatment of patients. Independent reviews are designed to meet a variety of needs, including pre-authorizations, internal and external appeals, state and federal appeals, concurrent review of inpatient stay and provider quality of care, and fraud reviews.

As an independent review organization (IRO), AllMed provides access to more than 400 peer review specialists covering more than 80 specialties and subspecialties of the American Board of Medical Specialties. These specialists are on the cutting edge of the latest medical research and standards of care. Working with an IRO like AllMed allows faster turn-around time for determinations and removes bias from the review process by eliminating conflicts of interest, which can relate to economics, lack of specialists to review cases, or having the same doctor who denied a case review an appeal.

Conclusions

There has been a dramatic increase in the use of lumbar fusion in recent years, as well as an increase in off-label use of the procedure. Although a number of conditions of the spine benefit from lumbar fusion, some off-label uses are associated with inconsistent outcomes and significant potential risks and complications. Continual technological developments complicate the process of establishing evidence-based criteria for practice guidelines and reimbursement policies. External independent medical review facilitates safe and effective use of lumbar fusion, which requires an in-depth understanding of the evaluation and treatment of spine conditions so that treatment can be individualized for each patient.
Bibliography


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