Back to the Basics of Spine Surgery: Anatomy, Terminology Knowledge Can Improve Coding

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The human spine is a complex unit that combines the structures of both the nervous and musculoskeletal systems. Understanding the anatomy, terms and definitions, and procedure concepts associated with spinal surgery can make for a considerably smoother coding process.

Anatomy of the Spine

Anatomy involved in spinal surgery includes the spinal cord and peripheral nerves, the spinal meninges, the spinal canal, and the spinal column. The spinal column is made up of sections of vertebra known as the cervical, thoracic, lumbar, and sacral coccygeal sections. When stacked on top of one another, the intervertebral foramen of each vertebra line up to form a canal that holds the spinal cord.[1]

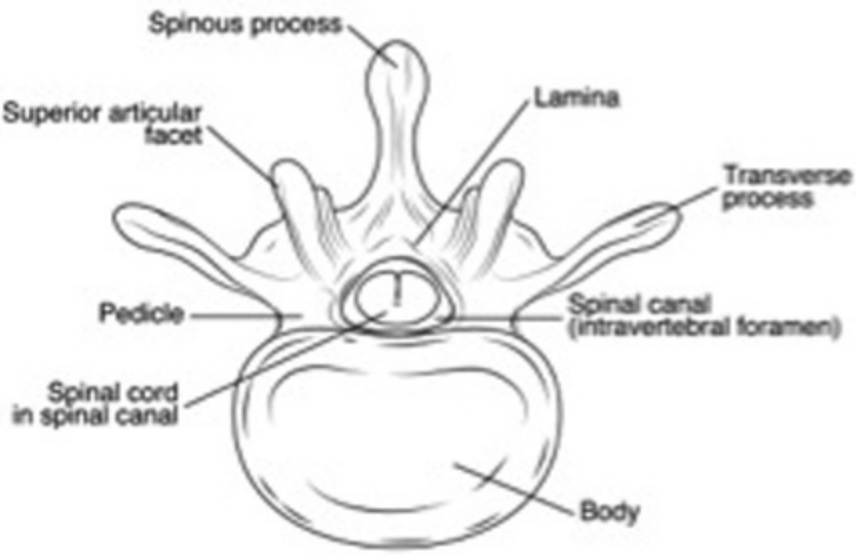
The spinal cord is a continuation of the medulla oblongata of the brainstem. There are 31 pairs of spinal (peripheral) nerves that branch off of the spinal cord. The spinal cord is covered by spinal meninges, which do not attach directly to the vertebra of the spinal column. They are separated by the epidural space, which acts as a cushion around the spinal cord.[2]

C1, also known as the atlas, is the first vertebra. Together, C1 and C2-also known as the axis-form a pivot joint that allows the head to rotate from side-to-side and move up and down. The vertebrae from C3 through L5 are all shaped in a similar manner, with a body (corpus) on the anterior side and processes extending to the lateral and posterior sides. These processes interlock and form the movable joints of the spine. They also provide the surfaces necessary for the insertion of the back muscles that create the movement.

The space between two vertebral bodies is called the intervertebral space, or interspace, and contains an intervertebral disc. These discs are made of an outer fibrocartilage ring that surrounds the nucleus pulposus, a gelatinous substance. The disc acts as a shock absorber between the vertebrae as they move. The intersection of two vertebrae also forms lateral openings, known as the neuroforamen, through which the spinal nerves exit the spinal cord.

Figure 1

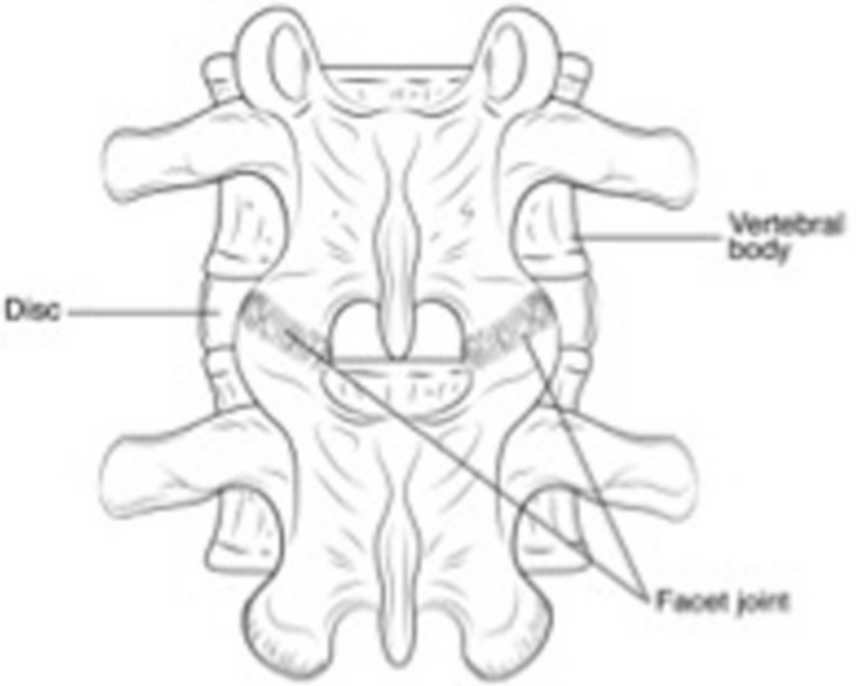
This example of a lumbar vertebra shows the anterior body of the vertebra and the posterior spinous processes.



Source: *ICD-10-PCS: An Applied Approach,* Kuehn, L. and Jorwic, T. 2012, AHIMA.

Figure 2

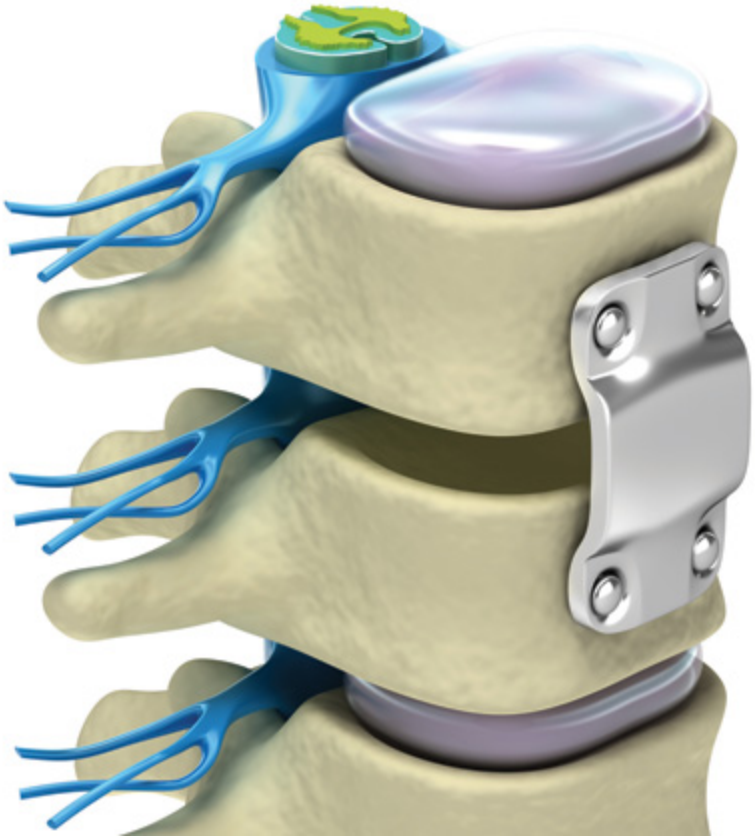
Individual vertebrae are also known as vertebral segments, as seen in this depiction of a vertebral joint.



Source: *ICD-10-PCS: An Applied Approach,* Kuehn, L. and Jorwic, T. 2012, AHIMA.

Figure 3

A cervical spinal fusion is often stabilized with an anterior metal plate that spans the vertebrae in order to maintain the appropriate height.



Source: *ICD-10-PCS: An Applied Approach,* Kuehn, L. and Jorwic, T. 2012, AHIMA.

Additional Terms and Definitions

In addition to understanding the anatomy of the spine, knowledge of other terms and definitions is important for effective interpretation of medical documentation and the correct assignment of procedural codes.

Arthrodesis (CPT Codes 22532-22819)

Arthrodesis, commonly known as fusion, is the process of combining parts of a joint, creating a non-movable structure. The intervertebral joints can be fused in a variety of ways. After structural problems with the spine are repaired, such as decompression of the nerve roots and spinal cord or removal of a herniated intervertebral disc (see CPT codes 63001-63013), the area of the spinal column that was repaired is fused using interbody fusion devices or bone grafts.

Interbody fusion devices are structural devices-bone dowels and synthetic or metal cages-that take the place of the removed intervertebral discs. They are shaped to fit the intervertebral space into which they will be placed, with many being tapered from a larger anterior edge to a smaller posterior edge. These devices are filled with crushed, or "morsellized," bone matter to encourage bone growth into the device.

During spinal surgery using a posterior approach, the surgeon typically removes the posterior portions of the vertebrae (lamina and other spinous processes) to gain access to the spinal column and the anterior portion (body) of the vertebrae. At the completion of the procedure, the spine is frequently not strong enough to support the weight of the body above the region. Therefore, structural bone grafts may be used to fill the remaining gaps left after the excision of vertebral material.

Spinal Stabilization (CPT Codes 22840-22955)

To maintain correct curvature of the spine and to provide immediate stabilization, spinal instrumentation is often placed along the spine. The type of instrumentation depends upon the type of procedure that was performed, the location within the spine, and the approach that was used to gain access to the spinal column.

For example, procedures performed on the anterior portion of the cervical spine often require anterior placement of a metal plate that spans the vertebrae to maintain the height and hold it stable. This method is displayed in Figure 3.

In contrast, procedures performed on the posterior portion of the lumbar vertebrae are typically stabilized with segmental or non-segmental spinal instrumentation that involves rods and screws. Review the anatomical drawings found with this code series in the *CPT 2012 Professional Edition*.

Segmental instrumentation stabilizes the spine by attaching to each individual segment that was fused. Screws attach the curved rod at each segment. In contrast, non-segmental instrumentation does not attach at each level. The curved rod is attached at the top by placing a hook over a spinous process and at the bottom with a pedicle screw. In both segmental and non-segmental instrumentation, rods are typically placed on both sides of the spinous process to provide stability.

Defining Spinal Appro aches

Definitions of the various spinal approaches are also important for coding purposes. There are approaches to the spinal column itself as well as surgical approaches to the body as a whole. The anterior surgical approach is used to gain access to the anterior portion of the spine. This approach takes place from the front of the body (CPT codes 22548-22558 and 22808-22812). For cervical vertebrae, this approach is through the neck. For thoracic vertebrae, this approach is called transthoracic. For lumbosacral vertebrae, this approach is transabdominal.

The posterior surgical approach is used to gain access to the spine from the back of the patient's body (CPT codes 22590–22804). This surgical approach can be used to gain access to either the posterior spine (lamina, pedicles, or spinous processes) or the anterior spine (the body of the vertebra). These same terms can be used to describe the placement of the fusion devices used to fuse the spine. Therefore, both clear procedure documentation and correct CPT or HCPCS code interpretation are vital for correct code assignment.

In an anterior lumbar interbody fusion (ALIF), the disc is accessed from an anterior abdominal incision. In a posterior lumbar interbody fusion, the disc is accessed from a posterior incision and working around the sides of the spine to place the device between the vertebral bodies. Documentation that states a 360 degree procedure was performed indicates that either both anterior and posterior portions of the spine were fused during the same operative session, or an ALIF and a fusion of the posterior elements were done in the same session.

It is possible that two surgeons will perform the 360 degree procedures together. Spinal surgeons typically do not perform the transthoracic or transabdominal approaches alone, working instead with a co-surgeon. Each physician would apply modifier 62 to the fusion procedure code to indicate their role as a co-surgeon.

Other Spine Procedures

Other common procedures on the spine are the laminectomy, laminotomy, and laminoplasty. A laminectomy is the removal of the lamina from the vertebra to relieve pressure on the spinal cord. A laminotomy is the partial removal of the lamina to relieve pressure on a nerve root and is a unilateral procedure. Older terminology for this procedure is sometimes seen as a hemilaminectomy, meaning a half laminectomy.

A laminoplasty is a procedure that involves cutting through the lamina on one side of the vertebra and cutting only a groove on the other side. This creates a "swinging" flap of free bone, relieving pressure on the spinal cord. The freed bone can then be fused in a semi-open position. Open-door laminoplasty creates a flap on one side, and a French-door laminoplasty creates flaps from both sides.

Procedures on the lamina typically require fusion of that spinal level at the completion of the procedure. In this case, the intervertebral joint is the joint being fused. Fusion can take place through the use of a structural bone graft or other hardware.

Fusion procedures are coded based on the surgical approach used to gain access to the spine and the area of the spine being fused.

Spine Anatomy Knowledge Essential

The spine is an intricate part of the human anatomy, often requiring complex medical procedures and approaches. Correct code assignment for spinal surgery procedures is best achieved with the development of an understanding of related anatomy, surgical terminology, and procedure descriptions.

Notes

1. Applegate, Edith J. *The Anatomy and Physiology Learning System,* 4th Edition. St. Louis, MO: Saunders Elsevier, 2011.
2. Rizzo, Donald C. *Fundamentals of Anatomy and Physiology,* 3rd Edition. Clifton Park, NY: Delmar, Cengage Learning, 2010.

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American Medical Association. *CPT 2012 Professional Edition.* Chicago: AMA, 2011.

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