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Clinical coding guidelines: Spinal fusion and fixation

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WA Clinical Coding Authority

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Contents

Anatomy	1
Types of Spinal Fusion	1
Interbody Fusion (IF)	2
Examples of lumbar interbody fusions	2
Anterior approach	2
Posterior approach	2
Posterolateral fusion (PLF)	3
Spinal fixation	3
Simple internal fixation	3
Nonsegmental internal fixation	3
Segmental internal fixation	4
Acknowledgement	4
References	4

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Introduction

For a general clinical overview on the spine and spinal surgery, see https://www.iHPA.gov.au/sites/default/files/clinical_update_-_spine_-_parts_a_and_b.pdf

Spinal fusion surgery is intended to alleviate pain by stopping the motion at a painful vertebral segment. To stop the motion, a bone graft is used to create a fusion.

Anatomy

An intervertebral disc is the “cushion” between each vertebrae and acts as a shock absorber during movement. Each spinal level comprises a disc space at the front and paired facet joints at the back, which when working together define a motion segment (Ullrich 2012). For example, the lumbar spine has six spinal levels (motion segments), surrounding and in between the five lumbar vertebrae. **Two** vertebrae need to be fused together to stop the motion at **one** segment.

A spinal level carries the name of the disc at that level (named by the vertebra above and below the disc). For example, the disc space between the L4 and L5 vertebrae is known as the L4-5 disc, or the L4-5 level. Therefore an L4-L5 spinal fusion is actually a one level spinal fusion and, an L3-4, L4-5 spinal fusion is a two level spinal fusion. The same nomenclature is applied to the usually associated spinal fixation procedure.

Spinal fusion may be done in the cervical, thoracic or (most commonly) lumbar areas of the spine.

Examples of conditions treated by spinal fusion are: degenerative disc disease; spondylolisthesis; weak or unstable spine caused by infections, tumors; fractures; scoliosis or deformity.

Types of Spinal Fusion

The main types of fusion are:

- interbody fusion
- posterolateral fusion

Spinal fusion is traditionally performed as an open procedure which involves muscle dissection. There have been advancements in surgical techniques with the development of minimally invasive techniques, which involve special instruments, nerve monitoring and radiographic/computer assisted navigation (Cleaver 2013). These techniques involve smaller incisions with use of retractors to dilate/spread (rather than cut) muscles to gain access to the spine. Many spinal procedures can be done using minimally invasive techniques. The surgeon decides the type of fusion procedure/surgical approach needed based on the nature and location of the spinal pathology.

Interbody Fusion (IF)

Interbody fusion involves removal of the intervertebral disc (discectomy) and replacement with a bone graft and/or a device (spacer or cage) to maintain alignment and disc height. The devices usually contain bone graft material which facilitates fusion (OrthoInfo 2010).

Interbody fusions are categorised in ACHI by their surgical approach i.e. anterior or posterior.

Examples of lumbar interbody fusions

Anterior approach

- **Anterior lumbar interbody fusion (ALIF):** the disc is approached from an **anterior** (abdominal) incision. The advantage of this approach is avoidance of cutting muscles of the back. The disadvantage is the risk of injury to structures in the abdomen.
- **Transpsoas lumbar interbody fusion (DLIF/direct or XLIF/eXtreme):** the disc is approached through the psoas muscle, from an extreme **lateral** incision (retroperitoneal) on the patient's side. The advantage is the avoidance of back muscles and abdominal structures required in traditional fusion procedures. The disadvantage is that L5-S1 is not accessible with this procedure (Kleeman 2011).
- **Oblique lumbar interbody fusion (OLIF):** the disc is approached from a **lateral** incision on the patient's side. The procedure is done "obliquely" (in front of the iliac crest) which gives access to L5-S1 (Kleeman 2011).

Anterior approach ACHI codes

48660-00 [1389] Anterior spinal fusion, 1 level

48669-00 [1389] Anterior spinal fusion, >= 2 levels

Posterior approach

- **Posterior lumbar interbody fusion (PLIF):** the disc is approached from a **posterior** (back) incision.
- **Midline LIF (MidLIF or MLIF):** the disc is approached from a **posterior** (back) incision, however the approach is medial to lateral, rather than lateral to medial (P. Bannan, personal communication October 30, 2013).
- **Transforaminal lumbar interbody fusion (TLIF):** the disc is approached from a **posterior** (back) incision on one side of the spine. This can be done as a traditional "open" TLIF or using minimally invasive techniques (**MasTLIF or MisTLIF**) where multiple small posterior incisions are made further to the side, rather than cutting the muscles near the centre of the back.

Posterior approach ACHI codes

48642-00 [1389] *Posterior spinal fusion, 1 or 2 levels*

48645-00 [1389] *Posterior spinal fusion, >= 3 levels*

48654-00 [1389] *Posterior spinal fusion with laminectomy, 1 level*

48657-00 [1389] *Posterior spinal fusion with laminectomy, >= 2 levels*

Posterolateral fusion (PLF)

Posterolateral fusion places the bone graft **between the transverse processes** (the bony protuberances on the vertebrae) rather than the intervertebral disc space, which is left intact. The approach is through a posterior (back) incision, and a laminectomy is typically required to gain access. PLF is usually accompanied by fixation.

Posterolateral fusion ACHI codes

48648-00 [1389] *Posterolateral spinal fusion, 1 or 2 levels*

48651-00 [1389] *Posterolateral spinal fusion, >= 3 levels*

48654-01 [1389] *Posterolateral spinal fusion with laminectomy, 1 level*

48657-01 [1389] *Posterolateral spinal fusion with laminectomy, >= 2 levels*

Spinal fixation

In most cases, spinal fusion is augmented by a process of internal fixation of the spine known as spinal fixation. This involves the placement of metallic screws, wire loops, hooks, rods, plates or cages to stabilise the vertebrae and facilitate bone fusion. The surgical procedure usually consists of posterior (posterior elements) and anterior (vertebral body) fixation. The fixation is not removed. The fusion process typically takes 6-12 months after surgery.

There are three main types of internal fixation of the spine:

- simple internal fixation
- nonsegmental internal fixation
- segmental internal fixation.

Simple internal fixation

Fixation of any part of **one vertebra** (not a spinal/motion segment) and includes pars interarticularis, spinous process/pedicle or simple interspinous wiring.

Nonsegmental internal fixation

Rods or plates are used to bridge a length of spine at the upper and lower extremity of a **multi-level** spinal fusion. A multilevel spinal fusion involves three or more vertebrae., The fixation is at two points only without any intermediate attachment to vertebrae between those two points. The

attachment to vertebrae at either end is by wire hook or screw fixation. The fixation immobilises the spine so that the spinal fusion consolidates.

The Harrington rod is an example of nonsegmental internal fixation and was commonly used in Scoliosis, for which it was invented.

Example

A rod spanning from the first to fifth lumbar levels is attached to the spine at vertebrae L1 and L5 but not attached to L2, L3, or L4.

Segmental internal fixation

Fixation of a **spinal/motion segment** with fixation instrumentation, e.g. vertebral body screw, pedicle screw/rod system or hook instrumentation including sublaminar tapes or wires. A spinal/motion segment includes all anatomical structures **between** and including the pedicles of two adjacent **vertebrae**. A spinal fixation is segmental when the fixation involves two or more vertebrae attached by the fixation instrumentation, i.e. one or more levels or one or more spinal/motion segments.

Examples

Segmental internal fixation of the spine at one level

A rod attached to second and third thoracic vertebrae and spanning the intervertebral disc between these.

Segmental internal fixation of spine at greater than one level

A rod spanning from the third cervical vertebra to third thoracic vertebra attached at C3 and T3 and also attached to at least one other vertebra between these two points (e.g. C6).

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