# 2019 LUMBAR SPINE: FUSION GUIDELINES

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LSF-1: INTRODUCTION AND GENERAL GUIDELINES

LSF-1.1: Introduction

These guidelines address lumbar spine fusion (LSF) procedures and/or devices for the adult patient population 18 years of age and older. Both spinal conditions and procedural approaches and devices are described for their appropriateness and coverage.

Accepted indications for lumbar spinal fusion procedures and/or devices based primarily on appropriate supportive medical evidence will be addressed in condition specific sections outlined below. Those procedures and/or devices described as “not indicated” are based on a lack of a significant body of medical evidence supporting their efficacy.

The indications for lumbar spinal fusion will be further examined in the following condition-specific sections, which include:

- Degenerative Disorders
- Spondylolysis & Spondylolisthesis
- Stenosis
- Prior Lumbar Spine Surgery
- Deformity
- Trauma
- Neoplastic Disease
- Infection
**LSF-1.2: Tenets of Lumbar Spine Fusion Surgery: General Requirements**

The table below represents the essential documentation of conditions and evaluations that should be received prior to any considerations for all lumbar spine fusion procedures (exceptions as noted). All subsequent guidelines and indications in this document will reference these general requirements.

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnosis and rational for fusion</td>
<td>NA</td>
</tr>
<tr>
<td>Non-operative care</td>
<td>Lifestyle modifications, weight loss, nicotine cessation, medications, nonsteroidal anti-inflammatory medications, physical therapy, medical exercise, bracing, spinal manipulation, epidural steroid injections (when indicated), behavioral therapy, etc.</td>
</tr>
</tbody>
</table>
| Relative contraindications to spine fusion, to be weighed against the risks of not performing surgery | Relative contraindications to spinal fusion include the following:  
- Osteoporosis  
- Smoking  
- Malnutrition  
- Systemic infection  
- Anemia  
- Chronic hypoxemia  
- Severe cardiopulmonary disease  
- Severe depression, psychosocial issues, and secondary gain issues |
| Recent history & examination in the preceding 6 weeks | Detailed neurological exam relevant to fusion request  
- Bowel/bladder abnormalities  
- Motor deficits defined by location |
| Grading of manual muscle testing in the preceding 6 weeks | 0= No evidence of muscle function  
1= Muscle contraction but no or very limited joint motion (“trace”)  
2=Complete range of motion with gravity eliminated (“poor”)  
3=Complete range of motion against gravity (“fair”)  
4=Complete range of motion against gravity with some resistance (“good”)  
5=Complete range of motion against gravity with full or normal resistance (“normal”) |

*Continued next page . . .*
LSF-1.2: Tenets of Lumbar Spine Fusion Surgery: General Requirements

Table continued . . .

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Details</th>
</tr>
</thead>
</table>
| All relevant imaging studies            | • Plain lumbar x-rays (as indicated)  
• Lumbar flexion/extension x-rays (as indicated)  
• Lumbar bending films (as indicated)  
• Advanced imaging (as indicated)  
  o Lumbar MRI  
  o Lumbar CT  
  o Lumbar CT/Myelography  
  o Lumbar CT/Discography  
• Other imaging studies (as indicated)   |
| Psych evaluations, including “Waddell’s Test” | The “Waddell Test” is a screening tool for to assess for psychological factors (nonorganic findings) when evaluating for back pain. |
| Nicotine cessation 4 to 8 weeks prior   | Patient attempts nicotine cessation prior to fusion, and until fusion has consolidated                                                  |

LSF-1.3: Exceptions:
Exceptions considered on a case by case basis.

LSF-1.4: References
LUMBAR SPINE: FUSION GUIDELINES

LSF-2: INSTABILITY

LSF-2.1: Background
The stable spine is recognized as having normal sagittal and coronal plane alignment without evidence of imbalance. For the stable spine, there is no evidence on imaging of abnormal segmental alignment such as intersegmental translation, angulation, or subluxation, either at rest or with motion. By contrast, there is no agreed upon definition for spine instability. Generally, instability refers to a loss of spinal integrity to withstand physiologic loads or stresses resulting in increased or abnormal motion between vertebral motion segments that result in pain, deformity and/or neurologic compromise, and/or significant angular and/or rotational and/or translational changes in the spine. Diagnostic checklists are often used to diagnose spinal instability including, White and Panjabi’s classification, Holdsworth’s two-column theory, and Denis’ three-column theory; however, documentation of these checklists is not required for consideration of fusion surgery.

Ultimately, instability may be the result of a variety of spine conditions and can result in pain, deformity and/or neurologic compromise. Despite lack of an agreed upon clinical definition, instability is generally accepted as the underlying primary indication for a lumbar spinal fusion procedure.

LSF-2.2: Indicated
✓ Instability from angular and translational changes in the spine
✓ Instability from spondylolisthesis as defined below under LSF-4
✓ Instability from deformity as defined below under LSF-7
✓ Instability from trauma as defined below under LSF-8
✓ Instability from neoplastic disorders as defined below under LSF-9
✓ Instability from infection as defined below under LSF-10
✓ Instability resulting in neuroforaminal stenosis with neurologic compression
✓ Instability created surgically:
- Unilateral facetectomy
- Bilateral partial facetectomy of 50% or greater
- Pars resection or fracture
- Corpectomy and vertebrectomy
- Any other decompressive procedures known to cause instability
- Adjacent Segment Disease (ASD) associated with clinically symptomatic spinal stenosis

**LSF-2.3: Not Indicated**
- Initial routine laminectomy without instability
- Initial routine hemilaminectomy, partial laminectomy, laminotomy or foraminotomy without instability
- Initial routine discectomy without instability, single or multiple levels

**LSF-2.4: References**
LSF-3: DEGENERATIVE DISORDERS OF THE SPINE

LSF-3.1: Background

Disc degeneration is a term used to describe the natural changes that occur in the spinal discs as a result of the aging process. These changes involve disc desiccation as well as loss of disc height among other changes. Disc degeneration is most commonly asymptomatic. In some cases degeneration of the spinal elements can cause pain and be clinically relevant. These changes can cause disorders of the disc and facet joints, as well as the spinal motion segments. Painful degenerative clinical syndromes include lumbar spondylosis, facet syndrome and Degenerative disc disease (also called internal disc derangement in discographic positive patients). Degenerative disc disease is believed to occur in patients who have variable degrees of degeneration of the disc in association with intervertebral disc mediated pain. A concordantly painful discogram is believed by some surgeons and clinicians to be the gold standard method of diagnosis.

LSF-3.2: Indicated

✓ Lumbar spinal fusion surgery is indicated in the setting of Degenerative Disc Disease (DDD) at a maximum of two identifiable motion segments or facet syndrome joints levels, when all of the following conditions are met:

- **LSF-1.2: General Requirements**
  - Significant degeneration is confined to two or less identifiable levels and is reasonably expected to be the source of pain based on clinical evaluation and advanced imaging (MRI or CT or discography)
  - Has failed six consecutive months of physician guided non-operative care, including exercise based/spine stabilization physical therapy and cognitive behavioral therapy (if available in the community)
**LSF-3.3: Not Indicated**

- 3 or greater levels of spinal degeneration with diffuse, non-radicular pain
- Chronic low back pain without a clear cause demonstrated by imaging or other studies

**LSF-3.4: References**


LSF-4: SPONDYLOLYSIS & SPONDYLOLISTHESIS

LSF-4.1: Background

Spondylolysis is a defect or fracture of part of the vertebral bones called the pars interarticularis. It usually occurs in the fifth and, less often, in the fourth lumbar vertebra. It is the most common cause of spondylolisthesis in which one vertebral body is slipped forward over another.

There are also several subtypes of spondylolisthesis (isthmic, dysplastic, degenerative, traumatic, pathologic and iatrogenic) but in general the most common subtypes for which lumbar fusion is performed in adults are isthmic and degenerative.

LSF-4.2: Indicated

✓ Single-level or multi-level spondylolysis and spondylolisthesis may be eligible for lumbar fusion when all of the following are met:

  ○ **LSF-1.2: General Requirements**
    ○ For adult patients, 6 months of non-operative care without improvement

✓ Two level fusions may be covered, following the above criteria, for certain cases of high grade slips and/or sacral inclination where a one level fusion would not reasonably be expected to achieve a successful outcome

✓ Degenerative spondylolisthesis with significant stenosis requiring a laminectomy is covered for lumbar fusion if all of the following criteria are met:

  ○ **LSF-1.2: General Requirements**
    ○ 3 months of non-operative care without improvement
LSF-4.3: References


LUMBAR SPINE: FUSION GUIDELINES

LSF-5: STENOSIS

LSF-5.1: Background

Spinal stenosis refers to the narrowing of the spinal canal and/or the neuroforamina. It can be asymptomatic or can impair nerve function resulting in radicular pain, neurogenic claudication, loss of sensation, altered reflexes, loss of motor control and rarely cauda equine syndrome.

Lumbar fusion is not generally necessary as an adjunct to decompressive procedures carried out for most cases of routine spinal stenosis with exceptions as outlined below.

LSF-5.2: Indicated

✓ Established instability: see required criteria under LSF-2.2

✓ Spondylolisthesis: see required criteria under LSF-4.2

✓ Surgically created instability:
  o Unilateral facetectomy
  o Bilateral partial facetectomy of 50% or greater
  o Pars resection or fracture
  o Corpectomy and vertebrectomy
  o Any other decompressive procedures known to cause instability

LSF-5.3: Not Indicated

✓ Routine lumbar decompressive procedures that do not have pre-existing instability or do not cause expectation of iatrogenic instability as a result of the procedure itself.
LSF-5.4: References


LSF-6: PRIOR LUMBAR SPINE SURGERY

LSF-6.1: Background

Prior lumbar spine surgery includes such procedures as discectomy, laminectomy, partial laminectomy, laminotomy, foraminotomy, percutaneous or minimally invasive procedures and various types of spinal fusion procedures (anterior, posterior, lateral combined 360 degree fusions, etc.) with or without internal fixation and/or interbody devices. Under certain circumstances, revision or additional surgery may be indicated and a lumbar spinal fusion procedure may be considered as outlined below.

LSF-6.2: Indicated

   LSF-6.2.1: Instrumentation Removal

✓ Instrumentation (internal fixation device) removal may be considered for the following indications:

   o Painful instrumentation e.g. insufficient soft tissue coverage
     
     o This does not occur often. Diagnostic intervention should be used to determine if instrumentation is the cause of pain.

   o Instrumentation that poses a risk to a patient, e.g. loose or malpositioned devices that pose a threat to the anterior great vessels or neurological structures

   o Instrumentation removal or reimplantation as part of a subsequent surgery

   LSF-6.2.2: Pseudarthrosis

✓ Pseudarthrosis is the failure of bone graft to consolidate or fuse solidly to the spine, i.e. non-union. Revision fusion of the same level may be considered if all of the following criteria are met:

   o LSF-1.2: General Requirements

      o It has been at least 12 months from the prior fusion procedure OR identified failure of implant instrumentation has occurred at any time (e.g. broken rod )

      o 3 months of non-operative care without improvement
If 3 months of non-operative care occur less than 12 months after the first procedure, the patient must still wait the full 12 months before being considered for follow-up surgery.

Except when failure of identified implant instrumentation:

- Low back pain improvement for at least 3 months following the prior surgery.
- Imaging studies confirm a pseudarthrosis (x-rays and/or CT) or presence of failed instrumentation demonstrated on plain x-ray and/or CT.

LSF-6.23: Adjacent Segment Disease

- Other terms for Adjacent Segment Disease (ASD) include Adjacent Level Disease and Transitional Syndrome. Adjacent Segment Disease is defined as the degenerative changes that take place over time above and/or below a spinal fusion as a result of transferred stress. An additional fusion procedure directed at the involved single level may be considered if all of the following criteria are met:
  - **LSF-1.2: General Requirements**
    - It has been greater than 12 months from the prior fusion procedure and the prior fusion procedure was successful (solid fusion with significantly decreased pain and increased function).
    - 6 months of ongoing non-operative care without improvement.
      - If 6 months of ongoing non-operative care occur less than 12 months after the first procedure, the patient must still wait the full 12 months before being considered for follow-up surgery.
      - Significant degeneration is confined to one identifiable level and is reasonably expected to be the source of pain based on clinical evaluation and advanced imaging (MRI or CT or discography).

LSF-6.24: Recurrent Herniated Disc

- The surgical treatment for most cases of recurrent herniated discs (involving neurological compression) does not require adjunctive spinal fusion. However, an adjunctive fusion procedure directed at the involved single level may be
considered if all of the following criteria are met:

- **LSF-1.2: General Requirements**
  - The patient has had prior discectomy at the same level
  - It has been greater than 3 months from the prior procedure and the prior procedure was initially successful for radicular pain relief
  - Recurrent symptoms and pathology with neurological compression confined to one identifiable level which is reasonably expected to be the source of pain based on clinical evaluation and advanced imaging (MRI or CT or myelography)
  - The patient has new pain or neurological symptoms consistent with the level of recurrence.
  - There is associated foraminal stenosis, concomitant segmental instability, or spondylolisthesis or resultant instability from the procedure itself
  - 3 months of non-operative care without improvement

**LSF-6.3: Not Indicated**

- Prior lumbar laminectomy without instability, or where the currently proposed surgery would not be expected to result in instability
- Prior hemilaminectomy, partial laminectomy, laminotomy or foramintomy without instability, or where the currently proposed surgery would not be expected to result in instability
- Prior routine discectomy without instability or where the currently proposed surgery would not be expected to result in instability, single or multiple levels
- Routine instrumentation removal without cause
LSF-6.4: References


LSF-7: DEFORMITY

LSF-7.1: Background

This particular section refers to spinal deformities that result from scoliosis and kyphosis, not deformities that are caused by one or two motion segments that have become unstable.

Scoliosis is a lateral (sideways) spinal curvature in the frontal plane. Kyphosis is a forward curvature (rounding or ‘humpback’) of the spine in the sagittal plane. Progressive deformities are documented with sequential radiographs.

Pain associated with scoliosis will be due to facet/disc degenerative changes from asymmetric forces on the deformed segment of the spine or from compression or stretching of neural elements and/or other soft tissue structures.

The goal and primary indication of arthrodesis in these types of spinal deformities is to stop progression of the deformity. Conditions in which deformity progression may occur include the following:

✓ Progression of idiopathic scoliosis

✓ Degenerative scoliosis in association with neurological compromise (spinal stenosis-central, lateral recess, or foraminal in association with scoliosis)

✓ Acquired progressive spinal deformity in the face of a neurologic deficit or disease (e.g. traumatic neurological deficit, neuromuscular scoliosis) with or without progression of neurological or functional deficit:

✓ Iatrogenic flat back syndrome, acquired loss of lumbar lordosis, and loss of sagittal plane balance secondary to a pre-existing spinal fusion where initial balance was not achieved or maintained over time.

LSF-7.2: Indicated

✓ Instrumented arthrodesis: anterior, posterior or combined

LSF-7.3: Not Indicated

✓ As indicated under LSF-11 and LSF-12 below
LSF-7.4: References


LSF-8: TRAUMA

LSF-8.1: Background
Disruption of the bony and/or ligamentous structures of the spine may lead to instability, either acute or chronic. Neurological compromise may necessitate decompression of neural elements which may cause additional potential for instability. This often requires reduction and arthrodesis to restore stability and spinal balance. The most common fracture patterns are at the level of the thoracolumbar junction: acute compression fractures, burst fractures, fractures of the posterior elements, and Chance fractures. These fractures also occur below L2.

LSF-8.2: Indicated

- Three spinal column injuries Burst fractures (burst fractures by definition involve two of the three spinal columns)
- Compression fractures with severe posterior ligamentous disruption and/or kyphotic deformity with likelihood of chronic instability with further segmental angulation
- Chance fractures with primarily soft tissue disruption and/or significant angular deformity with potential for further chronic progression of deformity
- In conjunction with neurologic decompression when iatrogenic instability is necessary

Techniques include:

- Fracture reduction and/or instrumented arthrodesis: posterior, anterior or combined
- Decompression (as indicated) combined with arthrodesis but not as an isolated procedure
- PMMA (polymethylmethacrylate) supplementation for pedicle screws in osteopenic bone
LSF-8.3: Not Indicated

- Dynamic Spine Stabilization Devices (e.g., Dynesys®, Stabilimax NZ®)
- Interlaminar/Interspinous Internal Fixation Devices (e.g., ILIF™)
- Axial Lumbar Interbody Fusion (AxiaLIF)
- Dynamic Spine Stabilization Device Systems (e.g., Dynesys®, Stabilimax NZ®)

LSF-8.4: References

LSF-9: NEOPLASTIC DISORDERS

LSF-9.1: Background

Neoplastic disorders frequently involve the spine and usually are metastatic, although primary bone tumors can also affect the spine.

Tumors of the spinal column may destroy vertebrae and associated bony structures or result in epidural compression and/or spinal instability. When surgery is indicated, the procedure may result in instability requiring stabilization and fusion. This may be known prior to surgical intervention (based on structures destroyed by the tumor) or determined intraoperatively.

LSF-9.2: Indicated

✓ Established instability
  o See LSF-2 above
  o Spondylolisthesis
  o Certain cases with associated spinal deformity: see LSF-7 above
  o Certain cases with associated fracture: see LSF-8

✓ Surgically created instability:
  o Unilateral facetectomy
  o Bilateral partial facetectomy of 50% or greater
  o Pars resection or fracture
  o Corpectomy and vertebrectomy
  o Any other decompression procedures known to cause instability

LSF-9.3: Not Indicated

✓ See LSF 2.3 above

LSF-9.4: References

LSF-10: INFECTION

LSF-10.1: Background
Infections involving the spine such as discitis and/or osteomyelitis may be bacterial or fungal in origin and primary or secondary. They may be a result of invasive procedures (e.g. epidural steroid injections) or prior surgery. Surgery is considered when medical management dictates tissue culture for diagnosis and/or drainage of associated abscess loss of structural integrity of the spine, progressive deformity, and/or neurologic compression.

LSF-10.2: Indicated

✔ Established instability
  o See LSF-2 above
  o Spondylolisthesis
  o Certain cases with associated spinal deformity: see LSF-7 above
  o Certain cases with associated fracture: see LSF-8

✔ Surgically created instability:
  o Unilateral facetectomy
  o Bilateral partial facetectomy of 50% or greater
  o Pars resection or fracture
  o Corpectomy and vertebrectomy
  o Any other decompressive procedures known to cause instability

LSF-10.3: Not Indicated

✔ Initial routine laminectomy without instability

✔ Initial routine hemilaminectomy, partial laminectomy, laminotomy or foraminotomy without instability

✔ Initial routine discectomy without instability, single or multiple levels
LSF-10.4: References


LSF-11: APPENDIX - DEVICES

LSF-11.1: Background

A broad variety of internal fixation devices and interbody devices exists that is beyond the scope of these guidelines. However, some of the general and specific fusion devices that are covered and non-covered are mentioned below.

LSF-11.2: Indicated

LSF-11.21: Standard Pedicle Screw Rod/Plate Internal Fixation Devices

LSF-11.22: Standard Interbody Fusion Devices

LSF-11.3: Not Indicated

LSF-11.31: Dynamic Spine Stabilization Devices
(e.g., Dynesys®, Stabilimax NZ®)

LSF-11.32: Interlaminar/Interspinous Internal Fixation Devices
(e.g., ILIF™)

LSF-11.33: Axial Lumbar Interbody Fusion (AxiaLIF)

LSF-11.34: Dynamic Spine Stabilization Device Systems (e.g., Dynesys®, Stabilimax NZ®)

LSF-11.4: References

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAOS</td>
<td>American Academy of Orthopaedic Surgeons</td>
</tr>
<tr>
<td>ACP</td>
<td>American College of Physicians</td>
</tr>
<tr>
<td>ALIF</td>
<td>Anterior lumbar interbody fusion</td>
</tr>
<tr>
<td>ASF</td>
<td>Anterior spinal fusion</td>
</tr>
<tr>
<td>APS</td>
<td>American Pain Society</td>
</tr>
<tr>
<td>AANS</td>
<td>American Association of Neurological Surgeons</td>
</tr>
<tr>
<td>CNS</td>
<td>Congress of Neurological Surgeons</td>
</tr>
<tr>
<td>DDD</td>
<td>Degenerative disc disease</td>
</tr>
<tr>
<td>HWR</td>
<td>Instrumentation removal</td>
</tr>
<tr>
<td>IF</td>
<td>Internal fixation</td>
</tr>
<tr>
<td>LADR</td>
<td>Lumbar Artificial Disc Replacement</td>
</tr>
<tr>
<td>NASS</td>
<td>North American Spine Society</td>
</tr>
<tr>
<td>PLIF</td>
<td>Posterior lumbar interbody fusion</td>
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<tr>
<td>PSF</td>
<td>Posterior or posterolateral fusion</td>
</tr>
<tr>
<td>TLIF</td>
<td>Transforaminal lumbar interbody fusion</td>
</tr>
</tbody>
</table>
## LSF-13: APPENDIX - GLOSSARY

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjacent Segment Disease</td>
<td>Degenerative changes that take place over time above and/or below a spinal fusion as a result of transferred stress and/or natural progression of spinal degeneration, also called “Transition Syndrome” or “Adjacent Level Disease.”</td>
</tr>
<tr>
<td>Advance Imaging</td>
<td>MRI, CT, CT/myelography, CT/discography, PET scans, etc.</td>
</tr>
<tr>
<td>Arthrodesis</td>
<td>Bony fusion of a motion segment. In the spine, this means fusion of a vertebral motion segment which is two adjacent vertebrae and the associated intervertebral disc and facet joints. This may be accomplished by fusing one vertebral body to another and/or fusion of the facet joints and/or fusion of one transverse processes to another, as in a posterolateral fusion.</td>
</tr>
<tr>
<td>Arthroplasty</td>
<td>Joint repair or replacement</td>
</tr>
<tr>
<td>Non-Operative Care</td>
<td>Non-surgical treatment that may include activity modifications, weight loss, nicotine cessation, medications, physical therapy, medical exercise, bracing, spinal manipulation, injections, behavioral therapy, etc.</td>
</tr>
<tr>
<td>Degenerative Disc Disease (DDD)</td>
<td>Degenerative disc disease refers to the degenerative changes that take place in a disc over time or as a result of trauma or altered stresses on the spine such as a transition syndrome.</td>
</tr>
<tr>
<td>Instability</td>
<td>Instability refers to a loss of spinal integrity to withstand physiologic loads or stresses resulting in increased or abnormal motion between vertebral motion segments that result in pain, deformity and/or neurologic compromise, and/or significant angular and/or rotational and/or translational changes in the spine.</td>
</tr>
<tr>
<td>Kyphosis</td>
<td>Convex posterior curvature in the sagittal plane</td>
</tr>
<tr>
<td>Pseudarthrosis</td>
<td>Failure of bone graft to consolidate or fuse solidly between two vertebrae in the spine (non-union)</td>
</tr>
<tr>
<td>Spinal Stenosis</td>
<td>Narrowing of the spinal canal and/or neuroforamina</td>
</tr>
<tr>
<td>Spondylolysis</td>
<td>A defect of the pars intraarticularis</td>
</tr>
<tr>
<td>Spondylolisthesis</td>
<td>Translation of one vertebral body relative to the vertebral body below (anterolisthesis=anterior translation; retrolisthesis=posterior translation)</td>
</tr>
<tr>
<td>Scoliosis</td>
<td>Lateral curvature in the coronal plane greater than 10 degrees</td>
</tr>
<tr>
<td>Transition Syndrome</td>
<td>Degenerative changes that take place over time above and/or below a spinal fusion as a result of transferred stress and/or natural progression of spinal degeneration, also called “Adjacent Level Disease” or “Adjacent Segment Disease.”</td>
</tr>
</tbody>
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### LSF-14: APPENDIX – CPT® CODES

<table>
<thead>
<tr>
<th>Code</th>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>22533</td>
<td>Arthrodesis, lateral extracavitary technique, including minimal discectomy to prepare interspace (other than for decompression); thoracic.</td>
</tr>
<tr>
<td>22534</td>
<td>Arthrodesis, lateral extracavitary technique, including minimal discectomy to prepare interspace (other than for decompression); thoracic or lumbar, each additional vertebral segment.</td>
</tr>
<tr>
<td>22558</td>
<td>Arthrodesis, anterior interbody technique, including minimal discectomy to prepare interspace (other than for decompression); lumbar.</td>
</tr>
<tr>
<td>22585</td>
<td>Arthrodesis, anterior interbody technique, including minimal discectomy to prepare interspace (other than for decompression); each additional interspace.</td>
</tr>
<tr>
<td>22612</td>
<td>Arthrodesis, posterior or posterolateral technique, single level; lumbar (with or without lateral transverse technique).</td>
</tr>
<tr>
<td>22614</td>
<td>Arthrodesis, posterior or posterolateral technique, single level; each additional vertebral segment.</td>
</tr>
<tr>
<td>22630</td>
<td>Arthrodesis, posterior interbody technique, including laminectomy and/or discectomy to prepare interspace (other than for decompression), single interspace; lumbar.</td>
</tr>
<tr>
<td>22632</td>
<td>Arthrodesis, posterior interbody technique, including laminectomy and/or discectomy to prepare interspace (other than for decompression), single interspace; each additional interspace.</td>
</tr>
<tr>
<td>0195T</td>
<td>Arthrodesis, pre-sacral interbody technique, including instrumentation, imaging (when performed), and discectomy to prepare interspace, lumbar; single interspace</td>
</tr>
<tr>
<td>0196T</td>
<td>Arthrodesis, each additional interspace (List separately in addition to code for primary procedure)</td>
</tr>
<tr>
<td>22633</td>
<td>Arthrodesis, combined posterior or posterolateral technique with posterior interbody technique including laminectomy and/or discectomy sufficient to prepare interspace (other than decompression), single interspace and segment; lumbar.</td>
</tr>
<tr>
<td>22634</td>
<td>Each additional interspace and segment (List separately in addition to code for primary procedure)</td>
</tr>
</tbody>
</table>

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LSF-15: APPENDIX – SUPPORTING LITERATURE

LSF-1: INTRODUCTION & GENERAL GUIDELINES

LSF-2: INSTABILITY

LSF-3: DEGENERATIVE DISC DISEASE

**LSF-4: SPONDYLOLYSIS & SPONDYLOLISTHESIS**

NASS Clinical Practice Guidelines, Diagnosis and Treatment of Degenerative Lumbar Spondylolisthesis


**LSF-5: STENOSIS**


NASS Clinical Practice Guidelines. Diagnosis and treatment of degenerative lumbar spinal stenosis. 2007 Jun
2011


**LSF-6: PRIOR LUMBAR SPINE SURGERY**


**LSF-7: DEFORMITY**


**LSF-8: TRAUMA**


**LSF-9: NEOPLASTIC DISEASE**


**LSF-10: INFECTION**

Arnold PM, Baek PN, Bernardi RJ, et al. (1997). Surgical management of nontuberculous thoracic and lumbar vertebral osteomyelitis: report of 33

**LSF-11: DEVICES**
LSF-16: APPENDIX – PROCEDURE DEFINITIONS

LSF 12.5: Appendix - Procedure Definitions

This section provides terminology and context for procedures that are often used in lumbar spinal fusion surgery. This is intended for informational purposes only, and should not be used when adjudicating spine fusion surgery requests.

A number of procedures have been devised, with and without internal fixation devices and/or interbody devices, to accomplish the goal of a solid arthrodesis.

Basic Lumbar Procedures

- Anterior Spinal Fusion (ASF)
- Anterior Lumbar Interbody Fusion (ALIF)
- Posterior or Posterolateral Spine Fusion (PSF)
- Transforaminal Lumbar Interbody Fusion (TLIF)
- Lateral Interbody Fusion
- Direct Lateral Interbody Fusion (DLIF)
- Extreme Lateral Interbody Fusion (XLIF)
- Combined, Anterior/Posterior Fusion (also called a 360° Fusion)
- Interlaminar/ Interspinous Lumbar Instrumented Fusion (e.g., ILIF™)
- Isolated Facet Fusions: Includes allograft bone graft substitutes used exclusively as stand-alone stabilization devices (e.g., TruFuse®, NuFix™)

A bone graft and/or bone graft substitute is the material that forms a bridge between vertebral segments, which facilitates the fusion of spinal segments. Bone graft types are generally categorized as autograft (harvested from the patient), allograft (harvested from a human cadaver) or synthetic (artificial, manufactured). They are further subcategorized as structural and non-structural. Autograft is generally recognized as the gold standard for spinal fusions because it possesses the key elements of fusion biology, including osteoconductivity, osteoinductivity and osteogenicity. Some of the shortcomings of autograft (such as availability and donor site morbidity) are addressed by the use of allografts and synthetic grafts.

Biological bone graft adjuvants such as rhBMP (e.g. INFUSE® Bone Graft) can also serve as fusion adjuncts. However, recent data analysis has revealed that rhBMP-2 provides little benefit to patients compared to other graft procedures, and
that there was an increased risk of at 24 months post procedure (although the overall cancer risk was low).

**Additional Bone Graft Terms**
- Cell-based substitutes (e.g., mesenchymal stem cell therapy)
- Human growth factors (e.g., fibroblast growth factor, insulin-like growth factor)
- Platelet rich plasma (e.g., autologous platelet derived growth factor)
- Allograft bone graft substitutes (e.g., TruFuse® for isolated facet fusion, NuFix™ for isolated facet fusion, BacFast® HD for isolated facet fusion)
- Bone graft substitutes used to reduce donor site morbidity (e.g., iliac crest donor site reconstruction)