Title: Lumbar Spinal Fusion

See Also: Interspinous Fixation (Fusion) Devices
http://www.bcbsks.com/CustomerService/Providers/MedicalPolicies/policies.shtml

### Populations

<table>
<thead>
<tr>
<th>Individuals:</th>
<th>Interventions of interest are:</th>
<th>Comparators of interest are:</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>With spinal stenosis undergoing decompression surgery</td>
<td>Lumbar spinal fusion</td>
<td>Decompression surgery alone</td>
<td>Relevant outcomes include:</td>
</tr>
<tr>
<td>With juvenile idiopathic scoliosis</td>
<td>Lumbar spinal fusion</td>
<td>Conservative, nonsurgical therapy</td>
<td>Symptoms</td>
</tr>
</tbody>
</table>

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<th>Interventions</th>
<th>Comparators</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
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<td>Interventions of interest are: • Lumbar spinal fusion</td>
<td>Comparators of interest are: • Conservative, nonsurgical therapy</td>
<td>Relevant outcomes include: • Symptoms • Functional outcomes • Quality of life • Resource utilization • Treatment-related morbidity</td>
</tr>
<tr>
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<td>Interventions of interest are: • Lumbar spinal fusion</td>
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</tr>
<tr>
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<td>Interventions of interest are: • Lumbar spinal fusion</td>
<td>Comparators of interest are: • Conservative, nonsurgical therapy</td>
<td>Relevant outcomes include: • Symptoms • Functional outcomes • Quality of life • Resource utilization • Treatment-related morbidity</td>
</tr>
<tr>
<td>Individuals: • With lumbar disc herniation with radiculopathy undergoing discectomy</td>
<td>Interventions of interest are: • Lumbar spinal fusion</td>
<td>Comparators of interest are: • Discectomy alone</td>
<td>Relevant outcomes include: • Symptoms • Functional outcomes • Quality of life • Resource utilization • Treatment-related morbidity</td>
</tr>
<tr>
<td>Individuals: • With chronic low back pain without radiculopathy</td>
<td>Interventions of interest are: • Lumbar spinal fusion</td>
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</tr>
</tbody>
</table>

**DESCRIPTION**

Lumbar spinal fusion (arthrodesis) is a surgical technique that involves fusion of 2 or more lumbar vertebrae using local bone, autologous bone taken from the iliac crest of the patient, allogeneic donor bone, or bone graft substitutes. There are numerous potential indications for lumbar spinal fusion. Spinal fusion can be performed as a single procedure, or can be performed in conjunction with other spinal surgeries. For example, lumbar spinal fusion can be performed in combination with discectomy for either herniated discs or degenerative disc disease, or in combination with decompressive surgery of the spinal canal for spinal stenosis.

**OBJECTIVE**

The objective of this policy is to assess whether lumbar spinal fusion improves health outcomes in individuals with spinal stenosis, scoliosis, spondylolisthesis, spinal fracture, or chronic low back pain.

**BACKGROUND**

Fusion of the lumbar spine can be approached from an anterior, lateral, or posterior direction. Anterior or posterior lumbar interbody fusion (ALIF/PLIF) are traditionally performed with an open approach (long incision with wide retraction of the
musculature), but can also be performed through minimally invasive/minimal access procedures. Minimally invasive approaches that use specialized retractors include lateral transpsoas interbody fusion/lateral interbody fusion (eg, LTIF, XLIF, DLIF), and transfominal interbody fusion (TLIF). Posterolateral fusion (PLF) fuses the transverse processes alone and should be differentiated from the interbody procedures (eg, PLIF) just described. Interbody cages, instrumentation such as plates, pedicle screws, or rods, and osteoinductive agents such as recombinant human bone morphogenetic protein (rhBMP) may be used to stabilize the spine during the months that fusion is taking place and to improve fusion success rates.

The objective of interbody fusion is to permanently immobilize the functional spinal unit (2 adjacent vertebrae and the disc between them) that is believed to be causing pain and/or neurologic impingement. An alternative or supplemental approach is fusion of the transverse processes. Lumbar fusion is most commonly accepted when it is used to stabilize an unstable spine or to correct deformity. For example, lumbar spondylolisthesis is an acquired anterior displacement (slip) of 1 vertebra over the subjacent vertebra that is associated with degenerative changes. Patients who do not have neurologic deficits will typically do well with conservative care. However, patients who present with sensory changes, muscle weakness or cauda equina syndrome are more likely to develop progressive functional decline without surgery. Scoliosis, an abnormal lateral and rotational curvature of the vertebral column, can result in severe deformity that is associated with back pain in adulthood and may lead to compromised respiratory function if it is not corrected. Scoliosis with severe deformity is also an accepted indication for spinal fusion.

Lumbar spinal fusion is more controversial when the conditions previously described are not present. Spinal stenosis is 1 such condition. A 2011 consensus statement from the North American Spine Society (NASS) defines degenerative lumbar spinal stenosis as a condition in which there is diminished space available for the neural and vascular elements in the lumbar spine secondary to degenerative changes in the spinal canal. When symptomatic, this causes a variable clinical syndrome of gluteal and/or lower-extremity pain and/or muscle fatigue which may occur with or without back pain. Decompressive surgery is indicated for patients with persistent symptoms despite conservative treatment, and spinal fusion is frequently performed in combination with decompressive surgery for this purpose, with the intent decreasing instability of the spine. One potential marker of instability is spondylolisthesis, and many surgeons target patients with spinal stenosis and spondylolisthesis for the combined decompression/fusion procedure. NASS defines lumbar degenerative spondylolisthesis as an acquired anterior displacement of 1 vertebra over the subjacent vertebra, associated with degenerative changes, but without an associated disruption or defect in the vertebral ring. Most patients with symptomatic degenerative lumbar spondylolisthesis and an absence of neurologic deficits do well with conservative care. Patients who present with sensory changes, muscle weakness, or cauda equina syndrome are more likely to develop progressive functional decline without surgery.
Fusion has also been performed for degenerative disc disease (DDD). DDD is a universal age-related condition consisting of morphologic changes in the lumbar motion segment. Because many degenerative changes seen on imaging are asymptomatic, and invasive provocative discography has variable accuracy in the ability to localize the pain generator, identifying the source of low back pain can be difficult. A large number of fusion operations are also performed for nonspecific low back pain not responsive to nonsurgical measures (eg, nonsteroidal anti-inflammatory drugs, analgesics, physical therapy), when definite indications for fusion are not present. Across the United States, there is wide variation in the rates of lumbar spinal fusion, and many experts consider lumbar fusion to be overused, indicating a need for better standardization and uniformity in the application of this procedure.

**REGULATORY STATUS**
Lumbar spinal fusion is a surgical procedure and, as such, is not subject to regulation by the U.S. Food and Drug Administration (FDA). Various instruments used in lumbar spinal fusion have been cleared for marketing by FDA (eg, Infuse [rhBMP-2] and OP-1 [rhBMP-7]) for specified indications.

**POLICY**
A. Lumbar spinal fusion may be considered medically necessary for any one of the following conditions:

1. Spinal stenosis with both of the following:  
   a. Any one of the following:  
      1) Associated spondylolisthesis demonstrated on plain x-rays  
      OR
      2) Spinal instability demonstrated on imaging studies  
      OR
      3) Spinal instability is anticipated due to need for bilateral or wide decompression with facetectomy or resection of pars interarticularis  
   AND
   b. Either of the following:  
      1) Neurogenic claudication or radicular pain that results in significant functional impairment in a patient who has failed at least 3 months of conservative care and has documentation of central/lateral recess/or foraminal stenosis on MRI or other imaging  
      OR
      2) Severely restricted functional ability or rapidly progressive symptoms of motor loss, neurogenic claudication, or cauda equina syndrome
2. Severe, progressive idiopathic scoliosis with either of the following:
   a. Cobb angle greater than 40°
      OR
   b. Spinal cord compression with neurogenic claudication or radicular pain that results in significant functional impairment in a patient who has failed at least 3 months of conservative care

3. Severe degenerative scoliosis (ie, lumbar or thoracolumbar) with a minimum Cobb angle of 30°, or significant sagittal imbalance (eg, sagittal vertical axis >5 cm), and with any one of the following:
   a. Documented progression of deformity with persistent axial (nonradiating) pain and impairment or loss of function unresponsive to at least 1 year of conservative therapy
      OR
   b. Persistent and significant neurogenic symptoms (claudication or radicular pain) with impairment or loss of function, unresponsive to at least 1 year of conservative nonsurgical care
      OR
   c. Severe or rapidly progressive symptoms of motor loss, neurogenic claudication, or cauda equina syndrome

4. Isthmic spondylolisthesis, when all of the following are present:
   a. Congenital (Wiltse type I) or acquired pars defect (Wiltse II), documented on x-ray
      AND
   b. Persistent back pain (with or without neurogenic symptoms), with impairment or loss of function
      AND
   c. Either unresponsive to at least 3 months of conservative nonsurgical care or with severe or rapidly progressive symptoms of motor loss, neurogenic claudication, or cauda equina syndrome

5. Recurrent, same level, disc herniation, at least 3 months after previous disc surgery, when all of the following are present:
   a. Recurrent neurogenic symptoms (radicular pain or claudication) or evidence of nerve root irritation, as demonstrated by a positive nerve-root tension sign or positive femoral tension sign or a corresponding neurologic deficit
      AND
   b. Impairment or loss of function
      AND
   c. Unresponsive to at least 3 months of conservative nonsurgical care or with severe or rapidly progressive symptoms of motor loss, neurogenic claudication, or cauda equina syndrome
Neural structure compression and instability documented by imaging at a level and side corresponding to the clinical symptoms

6. Pseudarthrosis, documented radiologically (by the presence of hardware failure after solid fusion), when all of the following are present:
   a. No less than 6 months after initial fusion
      AND
   b. With persistent axial back pain, with or without neurogenic symptoms, or with severe or rapidly progressive symptoms of motor loss, neurogenic claudication, or cauda equina syndrome
      AND
   c. Impairment or loss of function, in a patient who had experienced significant interval relief of prior symptoms

7. Instability due to fracture, dislocation, infection, abscess, or tumor when extensive surgery is required that could create an unstable spine

8. Iatrogenic or degenerative flatback syndrome with significant sagittal imbalance; when fusion is performed with spinal osteotomy or interbody spacers

9. Adjacent level disease when all of the following are present:
   a. Persistent back pain (with or without neurogenic symptoms) with impairment or loss of function that is unresponsive to at least 3 months of conservative therapy
      AND
   b. Eccentric disc space collapse, spondylolisthesis, acute single level scoliosis, lateral listhesis on imaging, or severe stenosis at that level requiring decompression
      AND
   c. Symptoms and functional measures correlate with imaging findings
      AND
   d. The previous fusion resulted in significant relief for at least 6 months

10. Discogenic low back pain secondary to a degenerated disc that meet all of the following criteria:
    a. Advanced single level disease noted on an MRI and plain radiographs of the lumbar spine, characterized by moderate to severe degeneration of the disc with Modic changes (defined as peridiscal bone signal above and below disc space in question) as compared to other normal or mildly degenerative levels (characterized by normal plain radiographic appearance and no or mild degeneration on MRI)
       AND
b. Presence of symptoms for at least one year AND that are not responsive to multi-modal therapy / rehabilitation program but may also include (but not limited to) pain management, injections, cognitive behavioral therapy, and active exercise programs.

**AND**

c. Absence of active, significant psychiatric disorders, such as major depression, requiring pharmaceutical treatment

**AND**

d. Absence of tobacco use or nicotine replacement products for 6 weeks prior to surgery date

**AND**

e. Primary complaint of axial pain, with a possible secondary complaint of lower extremity pain

B. Lumbar spinal fusion is considered **experimental / investigational** if the sole indication is any one of the following conditions:

1. Disc herniation
   a. As an adjunct to primary excision of a central or posterolateral disc herniation at any level in the absence of instability or spondylolisthesis

2. Chronic nonspecific low back pain without radiculopathy

3. Discogenic low back pain
   a. Any case that does not fulfill ALL of the above criteria
   b. Presence of advanced multi-level degeneration (2 or more levels) on a preoperative MRI and plain radiographs
   c. Significant psychiatric disorder
   d. Tobacco use or nicotine replacement products

4. Stenosis
   a. As an adjunct to primary decompression of central and/or lateral recess stenosis in the absence of instability, foraminal stenosis, spondylolisthesis

5. Facet syndrome

6. Initial discectomy/laminectomy for neural structure decompression

C. Lumbar spinal fusion is considered **not medically necessary** for any indication not addressed above.

D. Multiple level lumbar spinal fusion is considered **not medically necessary** when the criteria listed above are not met for all levels.

**Policy Guidelines**

1. Tobacco use or nicotine replacement products within the previous 6 weeks is a contraindication for lumbar spinal fusion.

2. Conservative nonsurgical therapy for the duration specified should include the following:
a. Use of prescription strength analgesics for several weeks at a dose sufficient to induce a therapeutic response
   • Analgesics should include anti-inflammatory medications with or without adjunctive medications such as nerve membrane stabilizers or muscle relaxants, AND
b. Participation in at least 6 weeks of physical therapy (including active exercise) or documentation of why the patient could not tolerate physical therapy, AND
c. Evaluation and appropriate management of associated cognitive, behavioral, or addiction issues
d. Documentation of patient compliance with the preceding criteria.

3. “Severely restricted functional ability” should generally include loss of function and/or documentation of inability or significantly decreased ability to perform normal daily activities of work, school or at-home duties.

4. Persistent debilitating pain is defined as:
   a. Significant level of pain on a daily basis defined on a visual analog scale (VAS) as greater than 4; AND
   b. Pain on a daily basis that has a documented impact on activities of daily living in spite of optimal conservative nonsurgical therapy as outlined above and appropriate for the patient.

RATIONALE
This policy was created with a literature review of the MEDLINE database. The most recent literature update was performed through February 23, 2017. Key studies are described next.

Assessment of the efficacy of a therapeutic intervention involves a determination of whether an intervention improves health outcomes. The optimal study design for this purpose is a randomized controlled trial (RCT) that includes clinically relevant measures of health outcomes. Nonrandomized comparative studies and uncontrolled studies can sometimes provide useful information on health outcomes, but are prone to biases such as noncomparability of treatment groups, placebo effect, and variable natural history of the condition. Below is a summary of key studies to date.

Spinal Stenosis
The primary surgical intervention for spinal stenosis is decompressive surgery (ie, laminectomy or related procedures). Spinal fusion is not a primary treatment for spinal stenosis, but rather can be performed in addition to decompressive surgery with the intent of decreasing spinal instability. Therefore, the most relevant comparison for patients with spinal stenosis is decompressive surgery alone compared to decompressive surgery plus fusion.

There are 2 published RCTs that assessed the benefit of adding fusion to laminectomy, ie decompressive surgery alone compared to decompressive surgery plus fusion, both of these were published in 2016. These trials reported somewhat different results concerning benefit for the combined procedure.3,4
In the Swedish Spinal Stenosis Study (SSS), 247 patients between 50 and 80 years of age who had lumbar spinal stenosis at 1 or 2 levels were randomized to undergo decompression plus fusion surgery or decompression surgery alone. The specific surgical method for decompression and fusion was determined by the surgeon. Randomization was stratified by the presence of degenerative spondylolisthesis, which was present in about half of the patients. The addition of fusion to laminectomy resulted in longer operating time, more bleeding, higher surgical costs, and longer hospitalization. The primary outcome measure, the Oswestry Disability Index (ODI) score, did not differ significantly between groups at the 2- or 5-year follow-ups. Mean scores were also analyzed separately for patients with or without spondylolisthesis. In patients with degenerative spondylolisthesis (range, 7.4-14.3 mm), the mean ODI score at 2 years was 25 in the fusion group and 21 in the decompression-alone group. The distance walked in 6 minutes (6-minute walk test) did not differ significantly between groups. Additional lumbar spine surgery during 6.5 years of follow-up was performed in a similar percentage of patients in the fusion group (22%) and the decompression-alone group (21%). Of the 153 patients who had enrolled early enough to have 5 years of follow-up, there were no significant differences in ODI results.

In the Spinal Laminectomy versus Instrumented Pedicle Screw (SLIP) trial, all 66 patients randomized to decompression plus fusion or decompression alone had stable degenerative spondylolisthesis (grade I, 3-14 mm) and symptomatic lumbar spinal stenosis. Decompression was performed by laminectomy with partial removal of the medial facet joint. The fusion group, which underwent posterolateral instrumented fusion (PLF), had more blood loss and longer hospital stays. The primary outcome measure, change in 36-Item Short-Form Health Survey (SF-36) Physical Component Summary score at 2 years, was significantly greater in the fusion group (15.2) than in the decompression-alone group (9.5; p=0.046). The minimally important difference (MID) for SF-36 score was prespecified at 5 points, and was achieved in 86% of the fusion group and 69% of the decompression group. At 2 years, ODI scores had improved by 26.3 points in the fusion group and by 17.9 points in the decompression-alone group (p=0.06). The MID for ODI score was prespecified as a 10-point improvement, but the percentages of patients who achieved the MID were not reported. The rate of reoperation in the fusion group was 14% compared with 34% in the decompression-alone group (p=0.05), although only 68% of patients were available for follow-up at 4 years. All reoperations in the fusion group were for adjacent-level degeneration, while reoperations in the decompression-alone group were performed for instability at the index level. In addition to the low follow-up rate, there are questions about risk of surgeon bias in the recommendation for additional fusion surgery in patients who had undergone decompression alone.

A 1991 quasi-randomized study by Herkowitz et al evaluated decompression, with or without fusion, in 50 patients with spondylolisthesis and spinal stenosis. All patients had failed a trial of nonoperative treatment. This study used alternating assignment to the 2 treatment groups. At a mean follow-up of 3 years (range, 2.4-4.0 years), patients who had posterolateral lumbar fusion (PLF) together with limited decompression had significantly improved outcomes, as measured by overall outcomes and numeric rating scales, compared with the patients who underwent decompression alone. An increase in postoperative olisthesis was also observed in the decompression-alone group.

In 2007 and 2009, Weinstein et al reported findings from the widely cited multicenter controlled trial (Spine Patient Outcomes Research Trial [SPORT]). The primary comparison in this study was decompressive surgery plus fusion compared to nonsurgical treatment for patients with lumbar
spinal stenosis and degenerative spondylolisthesis.\textsuperscript{6,7} All patients had neurogenic claudication or radicular leg pain associated with neurologic signs, spinal stenosis shown on cross-sectional imaging, and degenerative spondylolisthesis shown on lateral radiographs with symptoms persisting for at least 12 weeks. There were 304 patients in a randomized cohort and 303 patients in an observational cohort. About 40\% of the randomized cohort crossed over in each direction by 2 years of follow-up. At the 4-year follow-up, 54\% of patients randomized to nonoperative care had undergone surgery. Five percent of the surgically treated patients received decompression only and 95\% underwent decompression with fusion. Analysis by treatment received was used due to the high percentage of crossovers. This analysis, controlled for baseline factors, showed a significant advantage for surgery at up to 4 years of follow-up for all primary and secondary outcome measures.

Section Summary: Spinal Stenosis
Two RCTs that specifically assessed the benefit of adding fusion to decompression in patients with grade I spondylolisthesis reached different conclusions. Both trials reported more frequent operative and perioperative adverse outcomes with the addition of fusion. The SSS trial found no benefit of surgery on clinical outcomes measured by ODI score, while the SLIP trial reported a small benefit measured by SF-36 score, a difference in the ODI score that was not statistically significant, and a reduction in subsequent surgeries when fusion was added to decompression. In the SPORT trial, 95\% of patients in the surgical group underwent decompression with fusion and had improved outcomes compared to nonoperative therapy. Although this is an important trial of surgical therapy in patients with spinal stenosis, it evaluates whether the combination of decompressive surgery plus fusion is superior to nonsurgical therapy. It does not isolate the effect of fusion, therefore it is not possible to determine whether the benefit of surgery derived from decompression, fusion, or both. An earlier quasi-randomized study (Herkowitz et al) reported that lumbar spinal fusion improved outcomes in patients with spinal stenosis associated with spondylolisthesis. Methodologic limitations of this evidence base include high loss to follow-up in the SLIP and SPORT trials, the lack of information on the surgical procedures in the SSS trial, and the variation in outcome measures used. The current evidence base does not permit conclusions whether the addition of fusion to decompressive surgery for patients with spinal stenosis improves outcomes.

Juvenile Idiopathic Scoliosis
Scoliosis is an abnormal lateral and rotational curvature of the vertebral column. Treatment of scoliosis currently depends on 3 factors: the cause of the condition (idiopathic, congenital, secondary), severity of the condition (degrees of curve), and the remaining growth expected for the patient at the time of presentation. Children who have vertebral curves measuring between 25\° and 40\° with at least 2 years of growth remaining are considered to be at high risk of curve progression. Because severe deformity may lead to compromised respiratory function and is associated with back pain in adulthood, in the U.S., surgical intervention with spinal fusion is typically recommended for curves that progress to 45\° or more.\textsuperscript{8}

In 2001, Danielsson and Nachemson reported long-term follow-up on 283 consecutive patients who had been treated with a brace or with surgical treatment for adolescent idiopathic scoliosis in Sweden.\textsuperscript{9} Lumbar curves of less than 60\° were treated with a brace worn for an average of 2.7 years. Curves of 60\° or more were treated with fusion using bone grafts from the iliac crest. An average of 9.5 vertebrae were fused. Clinical and radiologic follow-up was obtained in 89\% of patients at a mean of 22 years (range, 20-28). Curve progression was 3.5\° for surgically-
treated curves and 7.9° for brace-treated curves. Five patients (4%) treated surgically and 39 (36%) treated with bracing had an increase in the Cobb angle of more than 10°.

Section Summary: Juvenile Idiopathic Scoliosis
Long-term follow-up of a large case series supports guidelines from the Scoliosis Research Society that fusion can reduce curve progression in patients with curves greater than 40°. This is likely to result in reduced morbidity for treated patients.

Adult Degenerative Scoliosis
In 2009, Bridwell et al reported a prospective multicenter cohort study that compared operative versus nonoperative treatment of adult symptomatic lumbar scoliosis (defined as a minimum Cobb angle of 30°) in 160 consecutively enrolled patients. Operative versus nonoperative treatment was decided by the patient and medical team. Nonoperative treatment included observation (21%), medications (26%), medications plus physical therapy and/or injections (40%), and other treatment without medications (13%). For analysis, the patients were matched using propensity scores that included baseline Cobb angle, Oswestry Disability Index (ODI), Scoliosis Research Society subscore, and a numerical rating scale for back and leg pain. The percentage of patients who returned for follow-up at 2 years was higher for operative than nonoperative patients (95% vs 45%), though the baseline measures for patients who were lost to follow-up was similar to those who were followed for 2 years. At the 2-year follow-up, nonoperative treatment had not improved quality of life or any other outcome measures, while the operative group showed significant improvement in all outcomes.

Section Summary: Adult Degenerative Scoliosis
Evidence includes a prospective comparative cohort study, which evaluated outcomes in adults with symptomatic scoliosis who received spinal fusion surgery or nonoperative treatment. Using propensity matching, the study found that nonoperative treatment did not improve outcomes whereas surgical treatment improved all outcome measures. The surgical outcomes in this study must be considered in light of the potential for bias due to the self-selection of treatment and high loss to follow-up in the conservatively managed group.

Isthmic Spondylolisthesis
In 2000, Moller and Hedlund reported a study of 111 patients with adult isthmic spondylolisthesis who were randomly assigned to posterolateral fusion (with or without instrumentation, n=77) or to an exercise program (n=34). Inclusion criteria for the study were lumbar isthmic spondylolisthesis of any grade, at least 1 year of low back pain or sciatica, and a severely restricted functional ability. The mean age of patients was 39 years, with a mean age at onset of symptoms of 26 years. At 1- and 2-year follow-up, functional outcome (assessed by the Disability Rating Index) had improved in the surgery group but not in the exercise group. Pain scores improved in both groups, but were significantly better in the surgically treated group compared with the exercise group.

Section Summary: Isthmic Spondylolisthesis
One RCT was identified; it compared fusion to an exercise program for adults with symptomatic isthmic spondylolisthesis. Functional outcomes and pain relief were significantly better following fusion surgery. Results of this trial support the use of fusion for this condition, but should be corroborated in a larger number of patients.
Spinal Fracture
A 2006 qualitative systematic review identified 2 RCTs that compared operative and nonoperative treatment for thoracolumbar burst fractures in patients without neurologic deficit. Two RCTs were identified, one by Wood et al in 2003 (described next) and a second small study by Alany et al with 20 patients.

The 2003 study by Wood et al randomized 53 consecutive patients with a stable burst fracture and no neurologic deficit or loss of structural integrity to fusion with instrumentation or to nonoperative treatment with application of a body cast or orthosis for approximately 16 weeks. At an average follow-up of 44 months (24 month minimum) the patients completed assessments of pain and function. At follow-up, the 2 groups were similar in the average fracture kyphosis, canal compromise, and return to work. Patients treated nonoperatively reported less disability on the ODI and Short Form-36 physical function, lower pain scores, and had fewer complications.

Section Summary: Spinal Fracture
Results of this small randomized trial indicate that spinal fusion may be associated with worse outcomes compared with conservative care in patients with spinal fracture without instability or neural compression.

Lumbar Disc Herniation with Radiculopathy
Spinal fusion can be performed in addition to discectomy for herniated disc. Therefore, the most relevant comparison is discectomy plus fusion compared to discectomy alone. No RCTs were identified with that specific comparison.

The largest trial on surgery for herniated disc is the SPORT discectomy trial, which reported on randomized (n=501) and observational (n=743) cohorts of patients with lumbar disc herniation and radiculopathy who received either discectomy or nonoperative care. There was no mention of any patient undergoing fusion following discectomy. Intention-to-treat analysis for the randomized cohort found a small advantage for patients assigned to discectomy with no significant differences between groups for the primary outcome measures (bodily pain, physical function, ODI score). Analysis by treatment received found significant advantages for discectomy on the primary outcome measures.

Section Summary: Lumbar Disc Herniation with Radiculopathy
Current evidence is lacking on whether the addition of fusion to discectomy improves outcomes compared to discectomy alone. One large RCT, indicates that surgical treatment with discectomy improves outcomes for lumbar disc herniation with radiculopathy compared to nonsurgical care. However, there is no evidence that the addition of spinal fusion to discectomy improves outcomes in patients with lumbar disc herniation undergoing discectomy.

Chronic Low Back Pain Without Radiculopathy
Nonspecific chronic low back pain (CLBP) is persistent low back pain that is not attributable to a recognizable, known specific pathology such as infection, tumor, osteoporosis, fracture, structural deformity (eg, spondylolisthesis, scoliosis), inflammatory disorder, radiculitis, or cauda equine syndrome. Surgical interventions, including fusion and disc arthroplasty, have been applied with the belief that abnormal intersegmental movement or degenerative pathology may be the cause of CLBP.
A 2013 systematic review assessed studies on surgical fusion for CLBP. As of September 2012, 4 RCTs (total N=981 patients) had compared surgical and nonsurgical approaches for CLBP. In contrast, 33 RCTs (total N=3790 patients) had compared variations of surgical techniques. A 2015 systematic review identified many of the same RCTs that evaluated fusion for CLBP attributed to degenerative disc disease (DDD); a number of the included studies compared fusion with total disc replacement for presumed DDD.

A 2014 meta-analysis compared lumbar fusion to conservative treatment in patients with CLBP. Meta-analysis of 4 trials (total N=666 patients) reported a reduction in the ODI score that was -2.91 in favor of lumbar fusion. However, this improvement was not statistically significant nor reached the minimal clinically significant 10-point difference in ODI score. There was evidence of publication bias that favored placebo. The meta-analysis concluded that there is strong evidence that lumbar fusion does not lead to a clinically significant reduction in perceived disability compared with conservative treatment in patients with CLBP and degenerative spinal disease. The meta-analysis also noted it is unlikely that further research on the subject would alter this conclusion.

One of the studies that compared surgical and nonsurgical treatment for CLBP was a 2001 multicenter trial by the Swedish Lumbar Spine Study Group. In this trial, 294 patients with CLBP for at least 2 years, sick leave or disability for at least 1 year (mean, 3 years), and radiologic evidence of disc degeneration were randomized into 1 of 3 types of spinal fusion or to physical therapy supplemented by other nonsurgical treatment. Patients were excluded if they had specific radiologic findings such as spondylolisthesis, new or old fractures, infection, inflammatory process, or neoplasm. With intention-to-treat analysis, the surgical group showed greater reductions than the nonsurgical group in back pain (33% vs 7%), disability according to ODI score (25% reduction vs 6% reduction), Million visual analog scale (VAS) score (28% vs 8%), and General Function Score (31% vs 4%). Significantly more surgical patients were also back to work (36% vs 13%) and more reported their outcome as better or much better (63% vs 29%).

A 2005 pragmatic multicenter randomized trial from the Spine Stabilization Trial Group compared spinal fusion with an intensive (≈75 hours) physical and cognitive-behavioral rehabilitation program. Patients (N=349) who had back pain for at least 1 year and were considered candidates for surgical stabilization by the treating physician were randomized if the clinician and patient were uncertain which study treatment strategies were best. Radiologic findings were not part of the inclusion criteria. By the 2-year follow-up, 48 (28%) of patients randomized to rehabilitation had undergone surgery. Results for 1 of the 2 primary outcome measures (ODI score) showed a modest but significantly greater improvement (4.1 points) in the surgery group. There were no significant differences between groups for the walking test or any of the secondary outcome measures.

**Section Summary: Chronic Low Back Pain Without Radiculopathy**

The results of trials comparing fusion with nonsurgical management in this population are mixed. A meta-analysis of results from 4 RCTs found no clinically significant advantage of lumbar fusion over conservative therapy in patients with CLBP that is not attributable to a recognizable, known specific pathology such as, infection, tumor, osteoporosis, fracture, structural deformity (eg, spondylolisthesis, scoliosis), inflammatory disorder, radiculitis, or cauda equine syndrome. The strongest benefits of surgery were reported in a study of patients who had been on sick leave or disability for more than 1 year, while no advantage of surgery was
found when the patients or surgeon were unsure of whether surgery or conservative therapy would be the best treatment strategy. Interpretation of these studies is limited by the high percentage of patients who cross over to surgery, variances in the type of spinal fusion (eg, posterolateral vs interbody), and uncertainty in establishing whether the source of CLBP is from degenerative disc disease.

**Effect of Smoking on Spinal Fusion Rates**

A systematic review on the effects of smoking on spine surgery was published by Jackson and Devine in 2016.22 Four large retrospective comparative studies were included; they evaluated fusion rates in smokers and nonsmokers. The greatest difference in fusion rates was observed in a study of 100 patients by Brown et al (1986), with a 32% difference in fusion rates between smokers and nonsmokers (p=0.001).23 Bydon et al (2014) found no significant difference in fusion rates between smokers and nonsmokers for single-level fusion, but an 18% lower fusion rate in smokers for 2-level fusions (p=0.019).24 A retrospective analysis by Andersen et al (2001) of 232 smokers and 194 nonsmokers found that patients who smoked more than 10 cigarettes per day within 3 months of surgery had a 9% decrease in fusion rates25 and a fourth study (Glassman et al, 2000) of 188 nonsmokers and 169 smokers found that smokers had a 7% reduction in fusion rates (p=0.05), and that fusion success improved with postoperative smoking cessation.26

**SUMMARY OF EVIDENCE**

For individuals who have spinal stenosis undergoing decompression surgery who receive lumbar spinal fusion, the evidence includes randomized controlled trials (RCTs) with mixed results. Relevant outcomes are symptoms, functional outcomes, quality of life, resource utilization, and treatment-related morbidity. Two RCTs published in 2016 compared decompression surgery plus fusion to decompression surgery alone. These trials reached different conclusions about the benefit of adding fusion to decompression, one specifically in patients with low-grade (0%-25% slippage) spondylolisthesis and one in patients with lumbar stenosis with or without spondylolisthesis. Both trials reported a larger number of operative and perioperative adverse outcomes with the addition of fusion. The Swedish Spinal Stenosis Study found no benefit of surgery related to clinical outcomes, while the Spinal Laminectomy versus Instrumented Pedicle Screw trial reported a small benefit in clinical outcomes and a reduction in the number of subsequent surgeries when fusion was added to decompression. In the earlier Spine Patient Outcomes Research Trial (SPORT), decompression surgery plus fusion was compared to conservative, nonsurgical treatment. Ninety-five percent of patients in the surgical group underwent decompression with fusion and had better outcomes than patients receiving nonoperative therapy. This trial, however, did not isolate the impact of fusion from that of decompression surgery. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have juvenile idiopathic scoliosis who receive lumbar spinal fusion, the evidence includes a large comparative cohort study. Relevant outcomes are symptoms, functional outcomes, quality of life, resource utilization, and treatment-related morbidity. Long-term follow-up of a large comparative cohort has indicated that spinal fusion can reduce curve progression compared to bracing in patients with large Cobb angles. In this study, the populations were not comparable, because curves less than 60° were treated with a brace and curves 60° or greater were treated with spinal fusion. Although supportive of the use of spinal fusion in juveniles with large Cobb angles and remaining growth, studies are needed that compare curve progression...
after fusion or bracing in comparable populations. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have adult degenerative scoliosis who receive lumbar spinal fusion, the evidence includes a nonrandomized comparative study. Relevant outcomes are symptoms, functional outcomes, quality of life, resource utilization, and treatment-related morbidity. No RCTs were identified on the treatment of adult symptomatic lumbar scoliosis with fusion. Evidence includes a prospective comparative cohort study, which evaluated outcomes in adults with symptomatic scoliosis who were treated with spinal fusion surgery or nonoperatively. Although the surgically treated group had better outcomes than the conservatively managed group, there is potential bias in this study due to the self-selection of treatment and high loss to follow-up in the conservatively managed group. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have isthmic spondylolisthesis who receive lumbar spinal fusion, the evidence includes 1 RCT. Relevant outcomes are symptoms, functional outcomes, quality of life, resource utilization, and treatment-related morbidity. One RCT identified compared fusion to an exercise program for patients with symptomatic isthmic spondylolisthesis. Functional outcomes and pain relief were significantly better after fusion surgery. Results of this trial support the use of fusion for this condition, but should be corroborated in a larger number of patients. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have spinal fracture who receive lumbar spinal fusion, the evidence includes RCTs and meta-analyses of RCTs. Relevant outcomes are symptoms, functional outcomes, quality of life, resource utilization, and treatment-related morbidity. Results of 1 small randomized trial have indicated that spinal fusion for patients with spinal fracture without instability or neural compression might result in worse outcomes than nonsurgical management. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have lumbar disc herniation with radiculopathy who are undergoing discectomy who receive lumbar spinal fusion, the evidence includes an RCT and a nonrandomized comparative study. Relevant outcomes are symptoms, functional outcomes, quality of life, resource utilization, and treatment-related morbidity. Current evidence, which includes the large SPORT RCT, supports surgical treatment with discectomy for lumbar disc herniation. The evidence does not support a conclusion that the addition of fusion to discectomy improves outcomes in patients with lumbar disc herniation without instability. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have chronic low back pain without radiculopathy who receive lumbar spinal fusion, the evidence includes RCTs and meta-analyses of RCTs. Relevant outcomes are symptoms, functional outcomes, quality of life, resource utilization, and treatment-related morbidity. Meta-analysis of results from 4 RCTs found no clinically significant advantage of lumbar fusion over conservative therapy in patients with nonspecific chronic low back pain unresponsive to conservative management. While some trials have reported a benefit, others have not. The evidence is insufficient to determine the effects of the technology on health outcomes.
CLINICAL INPUT FROM PHYSICIAN SPECIALTY SOCIETIES AND ACADEMIC MEDICAL CENTERS

While the various physician specialty societies and academic medical centers may collaborate with and make recommendations during this process, through the provision of appropriate reviewers, input received does not represent an endorsement or position statement by the physician specialty societies or academic medical centers, unless otherwise noted.

2014 Input

In response to requests, input was received from the North American Spine Society, American Association of Neurological Surgeons, and Congress of Neurological Surgeons, with 3 additional reviewers identified through a third physician specialty society, as well as 2 academic medical centers when this policy was created in 2014. The input addressed specific criteria to determine the medical necessity of lumbar spinal fusion.

PRACTICE GUIDELINES AND POSITION STATEMENTS

North American Spine Society

In 2014, North American Spine Society (NASS) published coverage policy recommendations for lumbar fusion. Specific criteria were described for infection, tumor, traumatic injuries, deformity (eg, scoliosis), stenosis, disc herniations, synovial facet cysts, discogenic low back pain, and pseudoarthrosis. NASS isolated situations where lumbar fusion would not be indicated: disc herniation in the absence of instability or spondylolisthesis; stenosis in the absence of instability; foraminal stenosis or spondylolisthesis; and discogenic low back pain not meeting the recommended criteria.

Other 2014 guidelines from NASS addressed the diagnosis and treatment of degenerative lumbar spondylolisthesis. NASS gave a grade B recommendation to surgical decompression with fusion for the treatment of patients with symptomatic spinal stenosis and degenerative lumbar spondylolisthesis to improve clinical outcomes compared with decompression alone. A grade C recommendation was given to decompression and fusion as a means to provide satisfactory long-term results for the treatment of patients with symptomatic spinal stenosis and degenerative lumbar spondylolisthesis.

The 2011 NASS guidelines (updated in 2013) addressed multidisciplinary spine care for adults with a chief complaint of degenerative lumbar spinal stenosis. The guidelines indicated that the nature of the pain and associated patient characteristics should be more typical of a diagnosis of spinal stenosis than herniated disc. NASS addressed whether the addition of lumbar fusion to surgical decompression improved surgical outcomes in the treatment of spinal stenosis compared with treatment by decompression alone. NASS gave a grade B recommendation (fair evidence) to decompression alone for patients with leg predominant symptoms without instability.

The 2012 NASS guidelines (updated in 2014) addressed multidisciplinary spine care for the diagnosis and treatment of lumbar disc herniation with radiculopathy. The guidelines indicated that “there is insufficient evidence to make a recommendation for or against fusion for specific patient populations with lumbar disc herniation with radiculopathy whose symptoms warrant surgery. Recommendation: I (Insufficient Evidence).”
American Association of Neurological Surgeons and Congress of Neurological Surgeons
The 2014 guidelines from American Association of Neurological Surgeons (AANS) and Congress of Neurological Surgeons (CNS) addressed fusion procedures for the lumbar spine. These guidelines indicated that there was no evidence that conflicted with the recommendations formulated in the 2005 guidelines for fusion procedures for the lumbar spine (see Table 1).

**Table 1. AANS and CNS 2014 Guidelines on Fusion Procedures for the Lumbar Spine**

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Grade</th>
<th>LOE</th>
</tr>
</thead>
</table>
| **One- or 2-level degenerative disease without stenosis or spondylolisthesis (part 7)**
| Lumbar fusion should be performed for patients whose low back pain refractory to conservative treatment (physical therapy or other nonoperative measures) and is due to 1- or 2-level DDD without stenosis or spondylolisthesis | B     | Multiple level II studies |
| **Discography degenerative disease of the lumbar spine (part 6)**
| Discography degenerative disease of the lumbar spine (part 6) | C     | Single level II study |
| Discography degenerative disease of the lumbar spine (part 6) | C     | Single level II study |
| Discography degenerative disease of the lumbar spine (part 6) | C     | Single level II study |
| Discography degenerative disease of the lumbar spine (part 6) | C     | Single level II study |
| Discography degenerative disease of the lumbar spine (part 6) | C     | Single level II study |
| **Disc herniation and radiculopathy (part 8)**
| Lumbar spinal fusion is not recommended as routine treatment following primary disc excision in patients with a herniated lumbar disc causing radiculopathy. | C     | IV           |
| Lumbar spinal fusion is recommended as a potential option in patients with herniated discs who have evidence of significant chronic axial back pain, work as manual laborers, have severe degenerative changes, or have instability associated with radiculopathy caused by herniated lumbar discs. | C     | IV           |
| Lumbar spinal fusion is recommended as a potential option in patients with herniated discs who have evidence of significant chronic axial back pain, work as manual laborers, have severe degenerative changes, or have instability associated with radiculopathy caused by herniated lumbar discs. | C     | IV           |
| Lumbar spinal fusion is recommended as a potential option in patients with herniated discs who have evidence of significant chronic axial back pain, work as manual laborers, have severe degenerative changes, or have instability associated with radiculopathy caused by herniated lumbar discs. | C     | IV           |
| Lumbar spinal fusion is recommended as a potential option in patients with herniated discs who have evidence of significant chronic axial back pain, work as manual laborers, have severe degenerative changes, or have instability associated with radiculopathy caused by herniated lumbar discs. | C     | IV           |
| Lumbar spinal fusion is recommended as a potential option in patients with herniated discs who have evidence of significant chronic axial back pain, work as manual laborers, have severe degenerative changes, or have instability associated with radiculopathy caused by herniated lumbar discs. | C     | IV           |
| **Stenosis and spondylolisthesis (part 9)**
| Surgical decompression and fusion is recommended as an effective treatment alternative for symptomatic stenosis associated with degenerative spondylolisthesis in patients who desire surgical treatment. | B     | II           |
| There was insufficient evidence to recommend a standard fusion technique. | Insufficient |
| **Stenosis without spondylolisthesis (part 10)**
| Surgical decompression is recommended for patients with symptomatic neurogenic claudication due to lumbar stenosis without spondylolisthesis who undergo surgical intervention. | B     | II/III       |
| In the absence of deformity or instability, lumbar fusion is not recommended because it has not been shown to improve outcomes in patients with isolated stenosis. | C     | IV           |

AANS: American Association of Neurological Surgeons; CNS: Congress of Neurological Surgeons; DDD: degenerative disc disease; LOE: level of evidence.

AANS and CNS has also provided recommendations on:
- Assessment of functional outcome following lumbar fusion (part 2),
- Assessment of economic outcome (part 3),
- Radiographic assessment of fusion status (part 4),
- Correlation between radiographic outcome and function (part 5),
- Interbody techniques for lumbar fusion (part 11),
- Pedicle screw fixation as an adjunct to posterolateral fusion (part 12),
- Injection therapies (part 13),
- Brace therapy (part 14),
- Electrophysiologic monitoring (part 15),
- Bone growth extenders and substitutes (part 16), and
- Bone growth stimulators (part 17).
American Pain Society
The 2009 clinical practice guidelines from the American Pain Society on low back pain offered the following recommendations (see Table 2).\textsuperscript{38}

**Table 2. American Pain Society 2009 Guidelines on Low Back Pain**

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Strength</th>
<th>LOE</th>
</tr>
</thead>
<tbody>
<tr>
<td>In patients with <em>nonradicular low back pain</em> who do not respond to usual, noninterdisciplinary interventions, it is recommended that clinicians consider intensive interdisciplinary rehabilitation with a cognitive/behavioral emphasis</td>
<td>Strong</td>
<td>High</td>
</tr>
<tr>
<td>In patients with nonradicular low back pain, common <em>degenerative spinal changes</em>, and persistent and disabling symptoms, it is recommended that clinicians discuss risks and benefits of surgery as an option</td>
<td>Weak</td>
<td>Moderate</td>
</tr>
<tr>
<td>It is recommended that shared decision making regarding surgery for <em>nonspecific low back pain</em> include a specific discussion about intensive interdisciplinary rehabilitation as a similarly effective option, the small to moderate average benefit from surgery versus noninterdisciplinary nonsurgical therapy, and the fact that the majority of such patients who undergo surgery do not experience an optimal outcome. This recommendation is based on evidence that fusion surgery is superior to nonsurgical therapy without interdisciplinary rehabilitation, but no more effective than intensive interdisciplinary rehabilitation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>There is insufficient evidence to determine if laminectomy with fusion is more effective than laminectomy without fusion</td>
<td>Insufficient</td>
<td></td>
</tr>
</tbody>
</table>

LOE: level of evidence.

Scoliosis Research Society
The Scoliosis Research Society has stated that the treatment of adolescent idiopathic scoliosis falls into 3 main categories (observation, bracing, surgery) and is based on the risk of curve progression.\textsuperscript{39} In general, adolescent idiopathic scoliosis curves progress in 2 ways: (1) during the rapid growth period of the patient and (2) into adulthood if the curves are relatively large. Because scoliotic curves increase during rapid growth, the potential for growth is evaluated taking into consideration patient age, whether females have had their first menstrual period, as well as radiographic parameters. The Risser grading system rates a child's skeletal maturity on a scale of 0 to 5. Patients who are Risser 0 and 1 are growing rapidly, while patients who are 4 and 5 have stopped growing.

- “Observation is generally for patients whose curves are less than 25° who are still growing, or for curves less than 50° in patients who have completed their growth.”
- “Bracing is for patients with curves that measure between 25° and 40° during their growth phase. The goal of the brace is to prevent the curve from getting bigger.”
- “Surgical treatment is used for patients whose curves are greater than 45° while still growing or greater than 50° when growth has stopped. The goal of surgical treatment is two-fold: First, to prevent curve progression and secondly to obtain some curve correction…. Implants are used to correct the spine and hold it in the corrected position until the spine segments which have been operated on are fused as one bone.”
- “Alternative treatments to prevent curve progression or prevent further curve progression such as chiropractic medicine, physical therapy, yoga, etc. have not demonstrated any scientific value in the treatment of scoliosis.”

American Academy of Orthopaedic Surgeons
Information updated in 2015 from the American Academy of Orthopaedic Surgeons has indicated that the type of treatment required for idiopathic scoliosis in children and adolescents depends on
the kind and degree of the curve, child's age, and number of remaining growth years until the child reaches skeletal maturity.40

- Observation is appropriate when the curve is mild (<25°) or if the child is near skeletal maturity.
- The goal of bracing is to prevent scoliotic curves from worsening. Bracing can be effective if the child is still growing and has a spinal curvature between 25° and 45°. There are several types of braces, most being the underarm type.
- Surgery may be recommended if the curve is greater than 45° and the child is still growing. If the patient has reached skeletal maturity, surgery may still be recommended for scoliotic curves that exceed 50° to 55°. An implant made up of rods, hooks, screws, and/or wires is used to straighten the spine. Bone graft from the bone bank, or from the patient's hip region, is also used to help the operated portion of the spine heal solid.
- At present, the main research focus in idiopathic scoliosis is investigation into genetic factors as a cause of scoliosis.

National Institute of Arthritis and Musculoskeletal and Skin Diseases

The National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS) in 2015 indicated that many children who are sent to a physician by a school scoliosis screening program "have very mild spinal curves that do not need treatment."41 When treatment is needed, an orthopedic spine specialist will suggest the best treatment for each patient based on the "patient's age, how much more he or she is likely to grow, degree and pattern of the curve, and the type of scoliosis."

- Observation may be advised if the patient "is still growing (is skeletally immature) and the curve is mild."
- Doctors may advise patients "to wear a brace to stop a curve from getting any worse in patients who are still growing with moderate spinal curvature. As a child nears the end of growth, the indications for bracing will depend on how the curve affects the child's appearance, whether the curve is getting worse, and the size of the curve."
- Surgery may be advised "to correct a curve or stop it from worsening when the patient is still growing, has a curve that is severe [>45°], and has a curve that is worsening."

NIAMS also stated that studies of the following treatments have not demonstrated prevention of curve progression or worsening:

- Chiropractic manipulation
- Electrical stimulation
- Dietary supplements
- Exercise.

National Institute for Health and Care Excellence

In 2017, the U.K.'s National Institute for Health and Care Excellence (NICE) provided clinical guidelines on lateral interbody fusion for lumbar spine low back pain.42 NICE states that lumbar fusion may be appropriate for "people with severe, life-limiting, chronic low back pain that does not respond to conservative treatments." The evidence on lateral interbody fusion was considered “adequate in quality and quantity.”

U.S. PREVENTIVE SERVICES TASK FORCE RECOMMENDATIONS

Not applicable.
ONGOING AND UNPUBLISHED CLINICAL TRIALS

A search of ClinicalTrials.gov in March 2017 did not identify any ongoing or unpublished trials that would likely influence this review.

CODING

The following codes for treatment and procedures applicable to this policy are included below for informational purposes. Inclusion or exclusion of a procedure, diagnosis or device code(s) does not constitute or imply member coverage or provider reimbursement. Please refer to the member's contract benefits in effect at the time of service to determine coverage or non-coverage of these services as it applies to an individual member.

<table>
<thead>
<tr>
<th>CPT/HCPCS</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>20930</td>
<td>Allograft, morselized, or placement of osteopromotive material, for spine surgery only (List separately in addition to code for primary procedure)</td>
</tr>
<tr>
<td>20931</td>
<td>Allograft, structural, for spine surgery only (List separately in addition to code for primary procedure)</td>
</tr>
<tr>
<td>20936</td>
<td>Autograft for spine surgery only (includes harvesting the graft); local (eg, ribs, spinous process, or laminar fragments) obtained from same incision (List separately in addition to code for primary procedure)</td>
</tr>
<tr>
<td>20937</td>
<td>Autograft for spine surgery only (includes harvesting the graft); morselized (through separate skin or fascial incision) (List separately in addition to code for primary procedure)</td>
</tr>
<tr>
<td>20938</td>
<td>Autograft for spine surgery only (includes harvesting the graft); structural, bicortical or tricortical (through separate skin or fascial incision) (List separately in addition to code for primary procedure)</td>
</tr>
<tr>
<td>22533</td>
<td>Arthrodesis, lateral extracavitary technique, including minimal discectomy to prepare interspace (other than for decompression); lumbar</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 (List separately in addition to code for primary procedure)</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 (List separately in addition to code for primary procedure)</td>
</tr>
<tr>
<td>22586</td>
<td>Arthrodesis, pre-sacral interbody technique, including disc space preparation, discectomy, with posterior instrumentation, with image guidance, includes bone graft when performed, L5-S1 interspace</td>
</tr>
<tr>
<td>22612</td>
<td>Arthrodesis, posterior or posterolateral technique, single level; lumbar (with lateral transverse technique, when performed)</td>
</tr>
<tr>
<td>22614</td>
<td>Arthrodesis, posterior or posterolateral technique, single level; each additional vertebral segment (List separately in addition to code for primary procedure)</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 (List separately in addition to code for primary procedure)</td>
</tr>
<tr>
<td>Code</td>
<td>Description</td>
</tr>
<tr>
<td>--------</td>
<td>-----------------------------------------------------------------------------</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 for decompression), single interspace and segment; lumbar</td>
</tr>
<tr>
<td>22634</td>
<td>Arthrodesis, combined posterior or posterolateral technique with posterior interbody technique including laminectomy and/or discectomy sufficient to prepare interspace (other than for decompression), single interspace and segment; each additional interspace and segment (List separately in addition to code for primary procedure)</td>
</tr>
<tr>
<td>22800</td>
<td>Arthrodesis, posterior, for spinal deformity, with or without cast; up to 6 vertebral segments</td>
</tr>
<tr>
<td>22802</td>
<td>Arthrodesis, posterior, for spinal deformity, with or without cast; 7 to 12 vertebral segments</td>
</tr>
<tr>
<td>22804</td>
<td>Arthrodesis, posterior, for spinal deformity, with or without cast; 13 or more vertebral segments</td>
</tr>
<tr>
<td>22808</td>
<td>Arthrodesis, anterior, for spinal deformity, with or without cast; 2 to 3 vertebral segments</td>
</tr>
<tr>
<td>22810</td>
<td>Arthrodesis, anterior, for spinal deformity, with or without cast; 4 to 7 vertebral segments</td>
</tr>
<tr>
<td>22812</td>
<td>Arthrodesis, anterior, for spinal deformity, with or without cast; 8 or more vertebral segments</td>
</tr>
<tr>
<td>22818</td>
<td>Kyphectomy, circumferential exposure of spine and resection of vertebral segment(s) (including body and posterior elements); single or 2 segments</td>
</tr>
<tr>
<td>22819</td>
<td>Kyphectomy, circumferential exposure of spine and resection of vertebral segment(s) (including body and posterior elements); 3 or more segments</td>
</tr>
<tr>
<td>22840</td>
<td>Posterior non-segmental instrumentation (eg, Harrington rod technique, pedicle fixation across 1 interspace, atlantoaxial transarticular screw fixation, sublaminar wiring at C1, facet screw fixation) (List separately in addition to code for primary procedure)</td>
</tr>
<tr>
<td>22841</td>
<td>Internal spinal fixation by wiring of spinous processes (List separately in addition to code for primary procedure)</td>
</tr>
<tr>
<td>22842</td>
<td>Posterior segmental instrumentation (eg, pedicle fixation, dual rods with multiple hooks and sublaminar wires); 3 to 6 vertebral segments (List separately in addition to code for primary procedure)</td>
</tr>
<tr>
<td>22843</td>
<td>Posterior segmental instrumentation (eg, pedicle fixation, dual rods with multiple hooks and sublaminar wires); 7 to 12 vertebral segments (List separately in addition to code for primary procedure)</td>
</tr>
<tr>
<td>22844</td>
<td>Posterior segmental instrumentation (eg, pedicle fixation, dual rods with multiple hooks and sublaminar wires); 13 or more vertebral segments (List separately in addition to code for primary procedure)</td>
</tr>
<tr>
<td>22845</td>
<td>Anterior instrumentation; 2 to 3 vertebral segments (List separately in addition to code for primary procedure)</td>
</tr>
<tr>
<td>22846</td>
<td>Anterior instrumentation; 4 to 7 vertebral segments (List separately in addition to code for primary procedure)</td>
</tr>
<tr>
<td>22847</td>
<td>Anterior instrumentation; 8 or more vertebral segments (List separately in addition to code for primary procedure)</td>
</tr>
<tr>
<td>22848</td>
<td>Pelvic fixation (attachment of caudal end of instrumentation to pelvic bony structures) other than sacrum (List separately in addition to code for primary procedure)</td>
</tr>
<tr>
<td>22849</td>
<td>Reinsertion of spinal fixation device</td>
</tr>
</tbody>
</table>
22853 Insertion of interbody biomechanical device(s) (eg, synthetic cage, mesh) with integral anterior instrumentation for device anchoring (eg, screws, flanges), when performed, to intervertebral disc space in conjunction with interbody arthrodesis, each interspace (List separately in addition to code for primary procedure)

22854 Insertion of intervertebral biomechanical device(s) (eg, synthetic cage, mesh) with integral anterior instrumentation for device anchoring (eg, screws, flanges), when performed, to vertebral corpectomy(ies) (vertebral body resection, partial or complete) defect, in conjunction with interbody arthrodesis, each contiguous defect (List separately in addition to code for primary procedure)

22859 Insertion of intervertebral biomechanical device(s) (eg, synthetic cage, mesh, methylmethacrylate) to intervertebral disc space or vertebral body defect without interbody arthrodesis, each contiguous defect (List separately in addition to code for primary procedure)

ICD-9 Diagnoses

170.2 Malignant neoplasm of vertebral column, excluding sacrum and coccyx
192.3 Malignant neoplasm of spinal meninges
198.3 Secondary malignant neoplasm of brain and spinal cord
198.4 Secondary malignant neoplasm of other parts of nervous system
198.5 Secondary malignant neoplasm of bone and bone marrow
225.3 Benign neoplasm of spinal cord
225.4 Benign neoplasm of spinal meninges
237.5 Neoplasm of uncertain behavior of brain and spinal cord
237.6 Neoplasm of uncertain behavior of meninges
238.0 Neoplasm of uncertain behavior of bone and articular cartilage
324.1 Intraspinal abscess
722.73 Intervertebral disc disorder with myelopathy; lumbar region
722.83 Postlaminectomy syndrome; lumbar region
724.02 Spinal stenosis, lumbar region
724.03 Spinal stenosis, other than cervical; lumbar region, with neurogenic claudication
724.6 Other and unspecified disorders of back; disorders of sacrum - Instability - lumbosacral
730.08 Acute osteomyelitis, other specified sites [spinal]
730.18 Chronic osteomyelitis, other specified sites [spinal]
730.28 Unspecified osteomyelitis, other specified sites [spinal]
730.78 Osteopathy resulting from poliomyelitis, other specified sites [spinal]
730.88 Other infections involving bone in disease classified elsewhere, other specified sites [spinal]
730.98 Unspecified infection of bone of other specified sites [spinal]
733.13 Pathologic fracture of vertebrae
733.82 Nonunion of fracture
737.30-737.39 Kyphoscoliosis and scoliosis
737.42 Lordosis, curvature of spine associated with other conditions
738.4 Acquired spondylolisthesis
756.12 Spondylolisthesis
805.4-805.5 Fracture of vertebral column without mention of spinal cord injury, lumbar
806.4-806.5 Fracture of vertebral column with spinal cord injury, lumbar
839.20 Dislocation of lumbar vertebra, closed

Contains Public Information
839.30 Dislocation of lumbar vertebra, open
V45.4 Arthrodesis status

**ICD-10 Diagnoses (Effective October 1, 2015)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M41.06</td>
<td>Infantile idiopathic scoliosis, lumbar region</td>
</tr>
<tr>
<td>M41.07</td>
<td>Infantile idiopathic scoliosis, lumbosacral region</td>
</tr>
<tr>
<td>M41.116</td>
<td>Juvenile idiopathic scoliosis, lumbar region</td>
</tr>
<tr>
<td>M41.117</td>
<td>Juvenile idiopathic scoliosis, lumbosacral region</td>
</tr>
<tr>
<td>M41.126</td>
<td>Adolescent idiopathic scoliosis, lumbar region</td>
</tr>
<tr>
<td>M41.127</td>
<td>Adolescent idiopathic scoliosis, lumbosacral region</td>
</tr>
<tr>
<td>M41.26</td>
<td>Other idiopathic scoliosis, lumbar region</td>
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<td>M41.27</td>
<td>Other idiopathic scoliosis, lumbosacral region</td>
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<td>M41.46</td>
<td>Neuromuscular scoliosis, lumbar region</td>
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<td>Neuromuscular scoliosis, lumbosacral region</td>
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<td>M41.56</td>
<td>Other secondary scoliosis, lumbar region</td>
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<td>M41.57</td>
<td>Other secondary scoliosis, lumbosacral region</td>
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<tr>
<td>M41.86</td>
<td>Other forms of scoliosis, lumbar region</td>
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<td>M41.87</td>
<td>Other forms of scoliosis, lumbosacral region</td>
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<td>M41.9</td>
<td>Scoliosis, unspecified</td>
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<td>M43.13</td>
<td>Spondylolisthesis, cervicothoracic region</td>
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<td>M43.14</td>
<td>Spondylolisthesis, thoracic region</td>
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<td>M43.15</td>
<td>Spondylolisthesis, thoracolumbar region</td>
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<td>M48.05</td>
<td>Spinal stenosis, thoracolumbar region</td>
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<td>M48.061</td>
<td>Spinal stenosis, lumbar region without neurogenic claudication</td>
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<tr>
<td>M48.062</td>
<td>Spinal stenosis, lumbar region with neurogenic claudication</td>
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<td>M48.07</td>
<td>Spinal stenosis, lumbosacral region</td>
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<td>M53.2X5</td>
<td>Spinal instabilities, thoracolumbar region</td>
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<td>M53.2X7</td>
<td>Spinal instabilities, lumbosacral region</td>
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**REVISIONS**

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<th>Date</th>
<th>Description</th>
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<td>07-08-2013</td>
<td>Policy added to the bcbsks.com web site on 06-07-2013. Effective on 07-08-2013, 30 days after posting.</td>
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Description section updated

In Policy section:

- Updated to current language from previous language of:
- "A. Lumbar spine fusion surgery is considered medically necessary for any one of the following conditions:
  1. Spinal fracture with instability or neural compression
  2. Tumor or infection (including abscess, osteomyelitis, or discitis) when debridement or resection is necessary to the extent that the spine becomes unstable
  3. Spinal stenosis with ALL of the following:
     a. Associated spondylolisthesis demonstrated on imaging and
     b. Any one of the following:
        1) Documented detailed history of neurogenic claudication or
radicular pain that results in significant functional impairment with documented exam and corroborating documentation of central / lateral recess / or foraminal stenosis on imaging with documentation of failure of at least 3 months of conservative care or

2) Detailed history and exam documenting signs and symptoms of Severe or rapidly progressive motor loss, neurogenic claudication or cauda equina syndrome

4. Severe, progressive idiopathic scoliosis (ie, lumbar or thoracolumbar) with Cobb angle > 40 degrees

5. Severe degenerative scoliosis with any one of the following:
   a. Documented progression of deformity with persistent axial (non-radiating) pain and impairment or loss of function unresponsive to at least 3 months of conservative therapy or
   b. Persistent and significant neurogenic symptoms (claudication or radicular pain) with impairment or loss of function, documented by detailed history and exam, unresponsive to at least 3 months of conservative care.

6. Isthmic spondylolisthesis, either congenital or acquired pars defect, documented on imaging, and with persistent back pain (with or without neurogenic symptoms), and with impairment of function unresponsive to no less than 6 months of conservative nonsurgical care

7. Recurrent disc herniation, ie at same level and same side, no less than 6 months after previous disc surgery; with documented detailed history of radicular pain or claudication, documented exam and impairment of function unresponsive to at least 3 months of conservative care and with neural compression documented with appropriate imaging in a patient who had experienced significant interval relief of prior symptoms

(Original policy was mis-numbered with no #8)

9. Pseudarthrosis, documented radiographically, no less than 6 months after initial fusion, with persistent axial back pain, with or without neurogenic symptoms, with impairment of function, in a patient who has experienced significant interval relief of prior symptoms

10. Documented clinically symptomatic iatrogenic or degenerative flatback syndrome with significant sagittal imbalance; when fusion is performed with spinal osteotomy

B. Lumbar spine fusion surgery is considered not medically necessary unless one of the above conditions is met.

C. Lumbar spinal fusion is also considered not medically necessary if the sole indication is any one or more of the following conditions:
   ▪ Disc herniation
   ▪ Degenerative disc disease
   ▪ Initial disectomy/laminectomy for neural structure decompression
   ▪ Facet syndrome

Policy Guidelines

1. Conservative nonsurgical therapy must include the following:
   a. Use of prescription strength analgesics (including anti-inflammatory medications if not contraindicated), and
   b. Participation in physical therapy (including active exercise), and
   c. Evaluation and appropriate management of associated cognitive, behavioral or addiction issues when present.

2. Significant functional impairment may include documentation of the following:
   ▪ Inability or significantly decreased ability to perform normal daily activities of work,
3. Persistent debilitating pain is defined as:
   a. Significant level of pain on a daily basis defined on a Visual Analog Scale (VAS) as greater than 4; and
   b. Pain on a daily basis that has a documented impact on activities of daily living in spite of optimal conservative non-surgical therapy as outlined above and appropriate for the patient.

In Coding section:
- Added CPT Codes: 22586, 22818, 22819, 22841
- Added ICD-9 Codes: 722.73, 722.83, 724.03, 724.6
- Added ICD-10 Codes

Rationale section updated
References updated

02-05-2015 In Title section:
- Added "See Also: Interspinous Fixation (Fusion) Devices" and link to website.

07-07-2016 Updated Description section.

In Policy section:
- In Item A 1 b 2, added "ly restricted functional ability" to read "Severely restricted functional ability or rapidly progressive symptoms of motor loss, neurogenic claudication, or cauda equine syndrome"
- In Item A 6, added "(by the presence of hardware failure after solid fusion)" to read "Pseudoarthrosis, documented radiologically (by the presence of hardware failure after solid fusion), when all of the following are present:"
- In Item A 9 b, removed "or" and added ", or severe stenosis at that level requiring decompression" to read "Eccentric disc space collapse, spondylolisthesis, acute single level scoliosis, lateral listhesis on imaging, or severe stenosis at that level requiring decompression"
- In Item 10 d, removed "smoking" and "at least 3 months" and added "tobacco use or nicotine replacement products" and "6 weeks" to read "Absence of tobacco use or nicotine replacement products for 6 weeks prior to surgery date"
- In Item B 3 d, removed "Smoking" and added "Tobacco use or nicotine replacement products"
- In Policy Guidelines, Item 1, removed "Smoking" and "3 months" and added "Tobacco use or nicotine replacement products" and "6 weeks" to read "Tobacco use or nicotine replacement products within the previous 6 weeks is a contraindication for lumbar spinal fusion."

Updated Rationale section.
Updated References section.

10-12-2016 Corrections made to Rationale section.

01-01-2017 In Coding section:
- Added CPT codes: 22853, 22854, 22859 (New codes, effective January 1, 2017).
- Removed CPT code: 22851 (Termed code, effective December 31, 2016).

05-24-2017 Updated Description section.
Updated Rationale section.
Updated References section.

10-01-2017 In Coding section:
- Added ICD-10 codes: M48.061, M48.062.
- Removed ICD-10 code: M48.06.
REFERENCES

Other References
1. Blue Cross and Blue Shield of Kansas Orthopedic Liaison Committee, February 2014; February 2015.
2. Blue Cross and Blue Shield of Kansas Orthopedic Liaison Committee CB, July 2014.
3. Blue Cross and Blue Shield of Kansas Orthopedic Liaison Committee Spine Surgeons CB, September 2014.