MEDICAL POLICY – 7.01.560

Cervical Spine Surgeries: Discectomy, Laminectomy, and Fusion in Adults

BCBSA Ref. Policies: 7.01.145 & 7.01.146

Introduction

There are several different types of neck (cervical) surgeries that can relieve pain that is caused by pressure on the spinal cord or nerves. Cervical fusion joins or fuses bones (vertebrae) in the neck. It is done through an incision either on the front or back of the neck. Laminectomy and laminotomy are two different surgeries that can be done on the lamina, which is the protective, bony covering that's at the back of the spinal canal. A laminectomy is the full removal of the lamina. A laminotomy, which is also called a hemilaminectomy, is partial removal of the lamina. Sometimes the pain is caused by a disc that's pressing on a nerve. In this case, surgery on the disc, called a discectomy, may be needed. This policy describes when cervical fusion, laminectomy, laminotomy, and discectomy may be considered medically necessary.

Note: The Introduction section is for your general knowledge and is not to be taken as policy coverage criteria. The rest of the policy uses specific words and concepts familiar to medical professionals. It is intended for providers. A provider can be a person, such as a doctor, nurse, psychologist, or dentist. A provider also can be a place where medical care is given, like a hospital, clinic, or lab. This policy informs them about when a service may be covered.
Policy Coverage Criteria

This policy only applies to the adult population age 19 and older.

Smoking within the 6 weeks just prior to scheduled surgery is a contraindication for **cervical spinal fusion** (see documentation requirements for **smoking cessation**).

This policy does not address the pre-operative cessation of smokeless/chewing/dipping/snuff tobacco or nicotine replacements such as electronic cigarettes (e-cigs), nicotine gum, nicotine lozenges and nicotine patches. No studies or literature were found that report the effect of these products on orthopedic surgical outcomes (see documentation requirements for **smoking cessation**).

See **Documentation Requirements** section for information that must be submitted for review.

**Note:** Requests for fusions of more than 2 levels must be reviewed by a medical director.

### Indications | Medical Necessity
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**Anterior Cervical Fusion** | **Anterior cervical fusion may be considered medically necessary in the following situations:**
- Degenerative cervical spondylosis
- Infection of cervical spine
- Ossification of posterior longitudinal ligament (OPLL)
- Posttraumatic cervical instability
- Tumor of cervical spine
  - Degenerative cervical spondylosis with kyphosis causing cord compression
  - Infection of cervical spine requiring decompression or debridement
  - Ossification of posterior longitudinal ligament (OPLL) at 1 to 3 levels associated with myelopathy
  - Posttraumatic cervical instability (e.g., unstable anterior column fracture)
  - Tumor of cervical spine causing pathologic fracture, cord compression, or instability

**Cervical radiculopathy** | **Anterior cervical fusion may be considered medically necessary for cervical radiculopathy and ALL of the following:**
- Patient has unremitting radicular pain or progressive weakness secondary to nerve root compression.
  
  **AND**
<table>
<thead>
<tr>
<th>Indications</th>
<th>Medical Necessity</th>
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| • Non-operative therapy for at least 6 weeks has failed, including Physical Therapy (or chiropractic care) **AND 1 or more** of the following:  
  o Medical treatment with NSAIDs, or other analgesics (non-narcotic or narcotic)  
  o Cervical collar  
  o Exercise program  
  o Oral corticosteroids  
  o Acupuncture  
**AND**  
• A cervical spine MRI or CT scan with myelogram within the past 12 months demonstrates spinal stenosis or nerve root compression at the same level as the symptoms and physical exam findings |  

*Spondylotic myelopathy*  
**Anterior cervical fusion may be considered medically necessary for spondylotic myelopathy treatment indicated by **ALL of the following:**  
• Signs or symptoms of myelopathy are present as indicated by **1 or more** of the following:  
  o Upper limb weakness in more than a single nerve root distribution  
  o Lower limb weakness  
  o Loss of dexterity (eg, clumsiness of hands)  
  o Bowel or bladder incontinence  
  o Frequent falls  
  o Hyperreflexia  
  o Hoffmann sign  
  o Increased extremity muscle tone or spasticity  
  o Gait abnormality  
  o Positive Babinski sign  
**AND**  
• A cervical spine MRI or CT scan with myelogram within the past 12 months which demonstrates spinal cord compression corresponding to symptoms and physical exam findings due to **1 or more** of the following:  
  o Herniated disk  
  o Osteophyte
<table>
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<tr>
<th>Indications</th>
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<tbody>
<tr>
<td>Ossification of the posterior longitudinal ligament</td>
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<tr>
<td>Cervical pseudarthrosis</td>
<td>Anterior cervical fusion may be considered medically necessary for cervical pseudarthrosis (failed union) and ALL of the following:</td>
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<td>• Neck pain is unresponsive to non-operative therapy of at least 6 weeks, including Physical Therapy (or chiropractic care) AND 1 or more of the following:</td>
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<td>o Medical treatment with NSAIDs or other analgesics (non-narcotic or narcotic)</td>
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<td>• Alternative etiologies of symptoms have been ruled out</td>
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<td></td>
<td>• A cervical spine MRI or CT scan with myelogram within the past 12 months demonstrates spinal stenosis or nerve root compression at the same level as the symptoms and physical exam findings</td>
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<td>Degenerative spinal segment</td>
<td>Anterior cervical fusion may be considered medically necessary for a degenerative spinal segment adjacent to a prior decompressive or fusion procedure with 1 or more of the following:</td>
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<td>• Symptomatic myelopathy corresponding clinically to an adjacent level</td>
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<td>OR</td>
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<td></td>
<td>• Symptomatic radiculopathy corresponding clinically to an adjacent level and unresponsive to non-operative therapy of at least 6 weeks, including Physical Therapy (or chiropractic care) AND 1 or more of the following:</td>
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### Indications | Medical Necessity
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**AND**  
- A cervical spine MRI or CT scan with myelogram within the past 12 months demonstrates spinal stenosis or nerve root compression at the same level as the symptoms and physical exam findings

#### Cervical spine injury  
**Anterior cervical fusion may be considered medically necessary for treatment of a cervical spine injury (eg, trauma), as indicated by ALL of the following:**  
- Acutely symptomatic cervical radiculopathy or myelopathy  
- MRI or other neuroimaging finding (eg, cord compression, root compression) done within the past 12 months demonstrates pathologic anatomy corresponding to symptoms

#### Posterior Cervical Fusion  
**As listed**  
**Posterior cervical fusion may be considered medically necessary in the following situations:**  
- Atlas and axis fractures  
- Bilateral locked facets  
- Cervical instability in Down syndrome  
- Cervical instability in skeletal dysplasia or connective tissue disorders  
- Disruption of posterior ligamentous structures  
- Facet fractures with dislocation  
- Infection of cervical spine requiring decompression or debridement  
- Klippel-Feil syndrome  
- Ossification of posterior longitudinal ligament without kyphosis with associated myelopathy  
- Part of stabilization procedure with corpectomy, laminectomy, or other procedure at cervicothoracic junction (eg, C7 and T1)  
- Part of stabilization procedure with laminectomy (eg, at C2)  
- Posttraumatic cervical instability  
- Subluxation and cord compression in rheumatoid arthritis  
- Tumor of cervical spine causing pathologic fracture, cord compression, or instability

#### Multilevel spondylotic myelopathy  
**Posterior cervical fusion may be considered medically necessary for the treatment of multilevel spondylotic**
### Indications

**myelopathy without kyphosis as indicated by ALL of the following:**

- Signs or symptoms of myelopathy are present as indicated by **1 or more** of the following:
  - Upper limb weakness in more than single nerve root distribution
  - Lower limb weakness
  - Loss of dexterity (eg, clumsiness of hands)
  - Bowel or bladder incontinence
  - Frequent falls
  - Hyperreflexia
  - Hoffman sign
  - Increased muscle tone or spasticity
  - Gait abnormality
  - Positive Babinski sign

**AND**

- MRI or other neuroimaging finding done within the past 12 months correlates with clinical signs and symptoms and demonstrates cord compression due to **1 or more** of the following:
  - Herniated disk
  - Osteophyte

### Symptomatic unstable cervical spondylosis

**Posterior cervical fusion may be considered medically necessary for symptomatic unstable cervical spondylosis with radiographic findings that include 1 or more of the following:**

- Subluxation of more than 3.5 mm on static lateral views
- Sagittal plane angulation of more than 11 degrees between adjacent segments
- More than 4 mm of motion (subluxation) on dynamic views

### Cervical pseudoarthrosis

**Posterior cervical fusion may be considered medically necessary for cervical pseudoarthrosis and ALL of the following:**

- Neck pain is unresponsive to non-operative therapy of at least 6 weeks, including Physical Therapy (or chiropractic care) and **1 or more** of the following:
  - Medical treatment with NSAIDs or other analgesics (non-narcotic or narcotic)
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>- Cervical collar</td>
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<td>- Exercise program</td>
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<td>- Oral corticosteroids</td>
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<td>- Acutely symptomatic cervical radiculopathy or myelopathy</td>
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<td>- MRI or other neuroimaging finding (eg, cord compression, root compression) done within the past 12 months demonstrates pathologic anatomy corresponding to symptoms</td>
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<tr>
<th>Cervical Discectomy</th>
<th>Cervical discectomy may be considered medically necessary for the treatment of a cervical herniated disc when All of the following criteria are met:</th>
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<tbody>
<tr>
<td>- Signs and symptoms of radiculopathy and/or myelopathy are present, such as 1 or more of the following:</td>
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<tr>
<td>o Pain that radiates into the shoulder, down the arms to the hands</td>
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<td>o Numbness and tingling in a dermatomal distribution</td>
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<td>o Muscular weakness in a pattern associated with spinal nerve root compression</td>
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<td>o Increased or abnormal reflexes corresponding to affected nerve root level</td>
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<td>o Loss of sensation in a dermatomal pattern</td>
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<td>AND</td>
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<td>- One of the following clinical presentations is present:</td>
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<td>o Rapidly progressing neurologic deficits OR</td>
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<td>o Persistent debilitating neck, back, or arm pain OR</td>
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<tr>
<td>o Persistent or progressive symptoms of myelopathy are unresponsive to non-operative therapy of at least 6 weeks, including Physical Therapy (or chiropractic care) AND 1 or more of the following:</td>
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<tr>
<td>Indications</td>
<td>Medical Necessity</td>
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</tbody>
</table>
| ▪ Medical treatment with NSAIDs or other analgesics (non-narcotic or narcotic)  
▪ Cervical Collar  
▪ Exercise Program  
▪ Epidural steroid injections  
▪ Acupuncture  
AND  
▪ Documentation of nerve root compression on imaging (MRI or CT) at a level that corresponds with the individual’s symptoms. |

**Cervical disectomy is considered not medically necessary for the treatment of a cervical herniated disc when the above criteria are not met.**

*Note:* Cervical disectomy refers to open anterior cervical disectomy (with or without fusion) or minimally invasive posterior cervical disectomy/foraminotomy

### Cervical Laminectomy

| As listed | Cervical laminectomy may be considered medically necessary for **ANY** of the following:  
▪ Spinal fracture, dislocation, locked facets, or displaced fracture fragment confirmed by imaging studies (eg, CT or MRI)  
▪ Spinal infection confirmed by imaging studies (eg, CT or MRI)  
▪ Spinal tumor confirmed by imaging studies (eg, CT or MRI) |

| Cervical laminectomy | Cervical laminectomy may be considered medically necessary for the treatment of spinal stenosis (with or without spondylolisthesis), herniated disc, or other causes of spinal cord or nerve root compression (such as ossification of the posterior longitudinal ligament or the yellow ligament or ligamentum flavum hypertrophy) when **ALL** of the following criteria are met:  
▪ Signs and symptoms that meet at least **ONE** of the following criteria:  
  o Rapidly progressing neurologic deficits **OR**  
  o Persistent debilitating pain that is unresponsive to non-operative therapy of at least 6 weeks, including Physical |
### Indications

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<tr>
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<tr>
<td>Therapy (or chiropractic care) and <strong>1 or more</strong> of the following:</td>
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<td>▪ Medical treatment with NSAIDs or other analgesics (non-narcotic or narcotic)</td>
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<td>▪ Cervical Collar</td>
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<td>▪ Acupuncture</td>
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**OR**

- Signs and symptoms of cervical myelopathy or cord compression (with or without radiculopathy) including any of the following:
  - Difficulty with fine movements of the hand and upper extremity
  - Incoordination of the hand and upper extremity
  - Atrophy of the thenar (thumb muscle) and hypothenar (little finger muscle) eminence
  - Diffuse hyperreflexia and bilateral Babinski responses
  - Decreased sensation, vibratory response, and proprioception at a level of C5 or below
  - Inability to perform tandem walk
  - Bowel and bladder incontinence

**AND**

- MRI or other neuroimaging finding (eg, cord compression, root compression or myelographic changes) done within the past 12 months demonstrates pathologic anatomy corresponding to symptoms

### Documentation Requirements

**The following information must be submitted to ensure an accurate, expeditious, and complete review for cervical spinal fusion, cervical discectomy or cervical laminectomy surgery:**

- Specific procedures requested with related procedure/diagnosis codes and identification of disc level(s) for surgery
- Office notes that include a current history and physical exam
Documentation Requirements

- Clinical notes document the individual has been evaluated at least twice by a physician(s) before submitting a request for surgery (except in cases of malignancy, trauma, infection or rapidly progressive neurologic symptoms)
- Detailed documentation of extent and response to conservative therapy, if applicable, including outcomes of any procedural interventions, medication use and physical therapy/physiatrist notes
- Documentation of current smoking status, and a written statement that the patient was non-smoking for the 6 weeks prior to scheduled (non-emergent) surgery (not applicable to emergent surgery). See smoking cessation definition.
- Copy of radiologist’s report(s) for diagnostic imaging (MRIs, CTs, etc.) completed within the past 12 months. Imaging must be performed and read by an independent radiologist. If discrepancies should arise in the interpretation of the imaging, the radiologist report will supersede

Coding

<table>
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<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>CPT</td>
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<tr>
<td>22551</td>
<td>Arthrodesis, anterior interbody, including disc space preparation, discectomy, osteophytectomy and decompression of spinal cord and/or nerve roots; cervical below C2</td>
</tr>
<tr>
<td>22552</td>
<td>Arthrodesis, anterior interbody, including disc space preparation, discectomy, osteophytectomy and decompression of spinal cord and/or nerve roots; cervical below C2, each additional interspace (List separately in addition to code for separate procedure)</td>
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<tr>
<td>22554</td>
<td>Arthrodesis, anterior interbody technique, including minimal discectomy to prepare interspace (other than for decompression); cervical below C2</td>
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<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>22600</td>
<td>Arthrodesis, posterior or posterolateral technique, single level; cervical below C2 segment</td>
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<tr>
<td>63020</td>
<td>Laminotomy (hemilaminectomy), with decompression of nerve root(s), including partial facetectomy, foraminotomy and/or excision of herniated intervertebral disc; 1 interspace, cervical</td>
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<td>Code</td>
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<tr>
<td>63045</td>
<td>Laminectomy, facetectomy and foraminotomy (unilateral or bilateral with decompression of spinal cord, cauda equina and/or nerve root[s], [eg, spinal or lateral recess stenosis]), single vertebral segment; cervical</td>
</tr>
</tbody>
</table>

Note: CPT codes, descriptions and materials are copyrighted by the American Medical Association (AMA). HCPCS codes, descriptions and materials are copyrighted by Centers for Medicare Services (CMS).

Related Information

Definition of Terms

**American Society of Anesthesiologists (ASA) Score:**

- **ASA 1** A normal healthy patient.
- **ASA 2** A patient with mild systemic disease.
- **ASA 3** A patient with severe systemic disease.
- **ASA 4** A patient with severe systemic disease that is a constant threat to life.
- **ASA 5** A moribund patient who is not expected to survive

**Positive Babinski sign:** A reflex response consisting of extension of the big toe when the sole of the foot is stroked.

**Cervical myelopathy:** The loss of function in the upper and lower extremities due to compression of the spinal cord within the neck.

**Cervical radiculopathy:** Persistent neck pain that radiates into the shoulder/arm in a dermatomal/single nerve pattern, or progressive weakness caused by irritation or injury near the root of a spinal nerve in the neck. The North American Spine Society (NASS) describes the most common clinical findings as arm pain, neck pain, scapular or periscapular pain, paresthesias, numbness and sensory changes, weakness, or abnormal deep tendon reflexes in the arm.

**Cervical spondylosis:** Abnormal wear of the cartilage and bones in the cervical vertebrae. This includes the discs or cushions between the neck vertebrae and the joints between the bones of the cervical spine. May result in bone spurs.

**Dermatome/dermatomal:** Each area of skin (dermis) has sensory nerve fibers coming from a single spinal nerve root (see Appendix).
**Hoffman’s sign/Finger Flexor reflex:** Holding the patient’s middle finger loosely and flicking the fingernail downward, causing the finger to rebound slightly into extension. If the thumb flexes and adducts in response, Hoffmann’s sign is present.

**Myotome:** A muscle of the back supplied by a nerve of the spine.

**New York Heart Association (NYHA) Classification:**

- **Class I** No symptoms and no limitation in ordinary physical activity, eg, shortness of breath when walking, climbing stairs etc.
- **Class II** Mild symptoms (mild shortness of breath and/or angina) and slight limitation during ordinary activity.
- **Class III** Marked limitation in activity due to symptoms, even during less-than-ordinary activity, eg, walking short distances (20–100 m). Comfortable only at rest.
- **Class IV** Severe limitations. Experiences symptoms even while at rest. Mostly bedbound patients.

**Ossification of the posterior longitudinal ligament:** A ligament in the spine that travels from the neck to the sacrum. It may become thickened and cause pressure on the spinal cord and lead to nerve damage.

**Persistent debilitating pain:** Significant level of pain on a daily basis as measured as a visual analog scale score of 4 or greater and pain on a daily basis that has a documented impact on activities of daily living despite optimal conservative nonsurgical therapy as outlined in the policy and appropriate for the patient.

**Place of Service (Professional Claims Codes):**

- **Off-Campus-Outpatient Hospital** A portion of an off-campus hospital provider based department which provides diagnostic, therapeutic (both surgical and nonsurgical), and rehabilitation services to sick or injured persons who do not require hospitalization or institutionalization. (Code 19)
- **Inpatient Hospital** A facility, other than psychiatric, which primarily provides diagnostic, therapeutic (both surgical and nonsurgical), and rehabilitation services by, or under, the supervision of physicians to patients admitted for a variety of medical conditions. (Code 21)
- **On Campus-Outpatient Hospital** A portion of a hospital’s main campus which provides diagnostic, therapeutic (both surgical and nonsurgical), and rehabilitation services to sick or injured persons who do not require hospitalization or institutionalization. (Code 22)
- **Ambulatory Surgical Center** A freestanding facility, other than a physician’s office, where surgical and diagnostic services are provided on an ambulatory basis. (Code 24)
**Pseudarthrosis**: When bones fail to fuse with one another after spinal fusion surgery. Lack of union at the fused location.

**Smoking cessation**: Smoking cessation for at least 6 weeks prior to scheduled (non-emergent) surgery applies to smoking cigarettes, cigars, and pipe smoking of tobacco.

Laminectomy may occasionally be performed for the sole indication of radiculopathy due to herniated disc. In these cases, discectomy alone is not sufficient to relieve compression on vital structures, and laminectomy is required for adequate decompression. Compression of the spine due to herniated disc is uncommon, and there are no standardized preoperative criteria to determine which patients may require laminectomy in addition to discectomy.

**Benefit Application**

Prior authorization review and approval is required on all indications with submission of clinical information that supports the medical necessity for cervical spine surgery such as cervical discectomy, laminectomy, or fusion.

**Consideration of Age**

This policy is intended for use in the adult population and is based on utilization in this population. Cervical spine surgeries are often performed when the cervical vertebrae become damaged due to injury or chronic degenerative changes. Degenerative disc changes are an age-related condition.

**Evidence Review**

**Description**

Cervical fusion is a surgery that joins or fuses selected bones in the neck. It is performed through an incision on the front (anterior) or back (posterior) of the neck. Cervical fusion is often performed when the cervical vertebrae become damaged due to injury or chronic degenerative changes, leading to compression of the spinal cord or the cervical nerve root. The expected outcome from cervical fusion is stabilization of the vertebrae and alleviation of pain and/or weakness resulting from vertebral instability.
Bone grafts are often used, taken from elsewhere in the body or received from a bone bank. Metal implants can be used to hold the vertebrae together until new bone grows between them. Metal plates can be screwed into adjacent vertebrae to join them. An entire vertebra can be removed, and the spine then fused. A spinal disc can be removed and the adjacent vertebrae fused.

Clinical complications of cervical fusion surgery include: infection; injury to the nerves; misplaced, broken, or loosened plates, screws or implants; injury to the spinal cord; possible need for additional surgery in the future due to adjacent segment breakdown; and/or increased pain.

An adequate course of conservative treatment may avert the need for surgical intervention.

Cervical discectomy is a surgical procedure in which one or more intervertebral discs are removed. Extrusion of an intervertebral disc beyond the intervertebral space can compress the spinal nerves and result in pain, numbness, and weakness. Discectomy is intended to treat symptoms by relieving pressure on the affected nerve root(s). Discectomy can be performed by a variety of surgical approaches, with either open surgery or minimally invasive techniques.

Laminectomy is a surgical procedure in which a portion of the vertebra (the lamina) is removed to decompress the spinal cord. Removal of the lamina creates greater space for the spinal cord and the nerve roots, thus relieving compression on these structures. Laminectomy is typically performed to alleviate compression due to spinal stenosis or a space-occupying lesion.

Background

**Disc Herniation**

Extrusion of an intervertebral disc beyond the intervertebral space can compress the spinal nerves and result in symptoms of pain, numbness, and weakness.

The natural history of untreated disc herniations is not well-characterized, but most herniations will decrease in size over time due to shrinking and/or regression of the disc. Clinical symptoms will also tend to improve over time in conjunction with shrinkage or regression of the herniation.
Treatment

Because most disc herniations improve over time, initial care is conservative, consisting of analgesics and a prescribed activity program tailored to patient considerations. Other potential nonsurgical interventions include opioid analgesics and chiropractic manipulation. Epidural steroid injections can also be used as a second-line intervention and are associated with short-term relief of symptoms.

However, some disc herniations will not improve over time with conservative care. A small proportion of patients will have rapidly progressive signs and symptoms, thus putting them at risk for irreversible neurologic deficits. These patients are considered to be surgical emergencies, and expedient surgery is intended to prevent further neurologic deterioration and allow for nerve recovery.

Other patients will not progress but will have the persistence of symptoms that require further intervention. It is estimated that up to 30% of patients with sciatica will continue to have pain for more than 1 year. For these patients, there is a high degree of morbidity and functional disability associated with chronic back pain, and there is a tendency for recurrent pain despite treatment. Therefore, treatments that have more uniform efficacy for patients with a herniated disc and chronic back pain are needed. In particular, decreased chronic pain and decreased disability are the goals of treatment of chronic low back pain due to a herniated disc.

Cervical Discectomy

Discectomy is a surgical procedure in which one or more intervertebral discs are removed. The primary indication for discectomy is herniation (extrusion) of an intervertebral disc. Discectomy is intended to treat symptoms by relieving pressure on the affected nerve(s).

The most common procedure for cervical discectomy is anterior cervical discectomy. This is an open procedure in which the cervical spine is approached through an incision in the anterior neck. Soft tissues and muscles are separated to expose the spine. The disc is removed using direct visualization. This procedure can be done with or without spinal fusion, but most commonly it is performed with fusion.

A less invasive procedure for cervical discectomy is posterior cervical discectomy and foraminotomy. They are performed through a small incision in the back of the neck. The nerves and muscles are separated using a small retractor. The spine is visualized with microscopic guidance, and a portion of the spine—the foramen—is removed to expose the spinal canal. Special instruments are used to remove a portion of the disc or the entire disc.
Adverse Events

Complications of discectomy generally include bleeding, infections, and inadvertent nerve injuries. Dural puncture occurs in a small percentage of patients, leading to leakage of cerebrospinal fluid that can be accompanied by headaches and/or neck stiffness. In a small percentage of cases, worsening of neurologic symptoms can occur postsurgery.

Cervical Laminectomy

Laminectomy is an inpatient procedure performed under general anesthesia. An incision is made in the back over the affected region, and the back muscles are dissected to expose the spinal cord. The lamina is then removed from the vertebral body, along with any inflamed or thickened ligaments that may be contributing to compression. Following resection, the muscles are reapproximated and the soft tissues sutured back into place. The extent of laminectomy varies, but most commonly extends two levels above and below the site of maximal cord compression.\(^6\)

There are numerous variations on the basic laminectomy procedure. It can be performed by minimally invasive techniques, which minimizes the extent of resection. Laminoplasty is a more limited procedure in which the lamina is cut but not removed, thus allowing expansion of the spinal cord. Foraminotomy and/or foramenectomy, which involve partial or complete removal of the facet joints, may be combined with laminectomy when the spinal nerve roots are compressed at the foramen. Spinal fusion is combined with laminectomy when the instability of the spine is present preoperatively, or if the procedure is sufficiently extensive to expect postoperative spinal instability.

Associated Disorders

The most common diagnosis treated with laminectomy is spinal stenosis. In spinal stenosis, the spinal canal (vertebral foramen) is narrowed, thus compressing the spinal cord. Narrowing of the spinal canal may be congenital or degenerative in origin. Other conditions that cause pressure on the spine and spinal nerve roots include those where a mass lesion is present (eg, tumor, abscess, other localized infection).
Surgical Variations

Hemilaminotomy and laminotomy, sometimes called laminoforaminotomy, are less invasive than a laminectomy. These procedures focus on the interlaminar space, where most of the pathologic changes are concentrated, minimizing resection of the stabilizing posterior spine. A laminotomy typically removes the inferior aspect of the cranial lamina, the superior aspect of the subjacent lamina, the ligamentum flavum, and the medial aspect of the facet joint. Unlike laminectomy, laminotomy does not disrupt the facet joints, supra- and interspinous ligaments, a major portion of the lamina, or the muscular attachments. Muscular dissection and retraction are required to achieve adequate surgical visualization.

Microendoscopic decompressive laminotomy is similar to laminotomy but uses endoscopic visualization. The position of the tubular working channel is confirmed by fluoroscopic guidance, and serial dilators (METRx™ lumbar endoscopic system, Medtronic) are used to dilate the musculature and expand the fascia. For microendoscopic decompressive laminotomy, an endoscopic curette, rongeur, and drill are used for the laminotomy, facetectomy, and foraminotomy. The working channel may be repositioned from a single incision for multilevel and bilateral dissections.

Adverse Events

Complications of laminectomy can include spinal cord and nerve root injuries, which occur at rates from 0% to 10%. Worsening myelopathy and/or radiculopathy can occur in a small percentage of patients independent of surgical injuries. Worsening of symptoms is usually temporary, but in some cases has been permanent. Infection and bleeding can occur; hematomas following surgery often require reoperation if they are close to critical structures. Leakage of spinal fluid may occur and occasionally be persistent requiring treatment. Instability of the spine can result from extensive laminectomy involving multiple levels. This is usually an indication for spinal fusion as an adjunct to laminectomy, but if fusion is not performed, the instability may lead to progressive symptoms and additional surgery. Specific complication rates depend on the indication and location treated, surgical approach, and extent of surgery.

Effect of Smoking on Spinal Fusion Rates

A systematic review of the effects of smoking on spine surgery was published by Jackson and Devine in 2016. Four large retrospective comparative studies were included; they evaluated fusion rates in smokers and nonsmokers. The authors concluded that smoking increases the risk
of nonunion in both lumbar and cervical spine procedures. A retrospective literature review by Berman et al (2017) found that smoking significantly increases the risk of pseudarthrosis for patients undergoing both cervical and lumbar fusion. Bishop et al (1996) of 132 patients requiring anterior cervical interbody fusion prospectively studied cigarette consumption adversely effected fusion especially those treated with allograft bone substrate (p.0.004).30

Summary of Evidence

Literature suggests that spinal fusion appears to provide faster relief of pain and symptoms than conservative management (ie, physical therapy or cervical collar immobilization) in the first several months after the surgery. Over time, however, these differences diminished and clinical outcomes of cervical fusion and conservative treatment were comparable at 12 months after the intervention. Additionally, spinal fusion may cause relatively rare but significant complications. Therefore, the first line of treatment for chronic cervical pain should be a comprehensive non-operative approach. A non-emergent cervical spine fusion may be a consideration only after conservative therapy has failed and a physical examination and diagnostic imaging findings indicate neural compression at the appropriate level.

For individuals who have cervical herniated disc(s) and symptoms of radiculopathy rapidly progressing or refractory to conservative care who receive cervical discectomy, the evidence includes two RCTs, a long-term observational study, and a systematic review. Relevant outcomes are symptoms, functional outcomes, health status measures, quality of life, and treatment-related mortality and morbidity. There is considerably less evidence on cervical discectomy than on lumbar discectomy. The best evidence on the efficacy of cervical discectomy consists of two small RCTs comparing discectomy with conservative care, and a systematic review of these trials. Although there is less evidence for this indication, it does not differ substantially from lumbar herniated disc, showing that patient-reported symptoms and disability favor surgery in the short-term, and that long-term outcomes do not differ. Because cervical discectomy closely parallels lumbar discectomy, with close similarities in anatomy and surgical procedure, it can be inferred that the benefit reported for lumbar discectomy supports a benefit for cervical discectomy. Based on the available evidence and extrapolation from studies of lumbar herniated disc, it is likely that use of discectomy for cervical herniated disc improves short-term symptoms and disability. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

For individuals who have cervical spinal stenosis and spinal cord or nerve root compression who receive cervical laminectomy, the evidence includes RCTs and nonrandomized comparative studies. Relevant outcomes are symptoms, functional outcomes, health status measures, quality
of life, and treatment-related mortality and morbidity. There is a lack of high-quality, comparative evidence for this indication, although what evidence there is offers outcomes similar to those for lumbar spinal stenosis. Given the parallels between cervical laminectomy and lumbar laminectomy, a chain of evidence can be developed that the benefit reported for lumbar laminectomy supports a benefit for cervical laminectomy. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

For individuals who have space-occupying lesion(s) of the spinal canal or nerve root compression who receive cervical laminectomy, the evidence includes case series. Relevant outcomes are symptoms, functional outcomes, health status measures, quality of life, and treatment-related mortality and morbidity. Most case series are small and retrospective. They have reported that most patients with myelopathy experience improvements in symptoms or abatement of symptom progression after laminectomy. However, this uncontrolled evidence does not provide a basis to determine the efficacy of the procedure compared with alternatives. The evidence is insufficient to determine the effects of the technology on health outcomes.

The current standard of care, clinical input obtained in 2015, clinical practice guidelines, and the absence of alternative treatments all support the use of laminectomy for space-occupying lesions of the spinal canal. As a result, laminectomy may be considered medically necessary for patients with space-occupying lesions of the spinal cord.

**Clinical Input Received 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.

In response to requests, input was received from 2 specialty societies and 4 academic medical centers when this policy was in development in 2015. Input informed criteria for medical necessity for the indications of mass lesions and cervical laminectomy.

**Practice Guidelines and Position Statements**

**American Association of Neurologic Surgeons (AANS) Guideline – 2009**

The AANS published guidelines in 2009 that used a systematic review of the National Library of Medicine and Cochrane database, regarding indications for anterior cervical decompression for
the treatment of cervical degenerative radiculopathy. They state: “In the acute phase, non-operative management is the mainstay, with success rates averaging 90%.” The AANS further states: “When clinical cervical radiculopathy is present with active nerve root compression visible on diagnostic imaging, the clinician often recommends surgical decompression if nonoperative measures have failed.” While they state that anterior nerve root decompression via anterior nerve root discectomy with or without fusion for radiculopathy is associated with rapid relief (3-4 months) compared with physical therapy, they acknowledge that at the 12-month point, comparable clinical improvements with PT or cervical immobilization are also present. They also acknowledge that there is insufficient data to factor in the cost of complications and any undesirable long-term effect related to the specific surgical intervention, such as adjacent segment disease.

**North American Spine Society Guideline**

The North American Spine Society published evidence-based clinical guidelines (2011) on the diagnosis and treatment of cervical radiculopathy from degenerative disorders.² The guidelines included evaluations of anterior cervical discectomy (ACD), ACD with fusion, ACD with instrumented fusion, ACD with fusion plus plate, and posterior laminoforaminotomy. Recommendations are listed in Table 1.

**Table 1. Recommendations Treating Cervical Radiculopathy From Degenerative Disorders**

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>GOR³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgical intervention is suggested for the rapid relief of symptoms when compared to medical/interventional treatment.</td>
<td>B</td>
</tr>
<tr>
<td>Surgery is an option to produce and maintain favorable long-term (&gt;4 years) outcomes.</td>
<td>C</td>
</tr>
<tr>
<td>Both ACD and ACDF are suggested as comparable treatment strategies, producing similar clinical outcomes.</td>
<td>B</td>
</tr>
<tr>
<td>ACDF and total disc arthroplasty are suggested as comparable treatments, resulting in similarly successful short-term outcomes.</td>
<td>B</td>
</tr>
<tr>
<td>Both ACDF with and without a plate are suggested as comparable treatments, resulting in similar clinical outcomes and fusion rates.</td>
<td>B</td>
</tr>
<tr>
<td>Either ACDF or PLF are suggested for treatment of single level degenerative cervical radiculopathy secondary to foraminal soft disc herniation to achieve comparably successful clinical outcomes.</td>
<td>B</td>
</tr>
</tbody>
</table>
ACD: anterior cervical discectomy; ACDF: anterior cervical discectomy with fusion; GOR: grade of recommendation; PLF: posterior laminoforaminotomy.

* Grade B: fair evidence (level II or III studies with consistent findings); grade C: poor quality evidence (level IV or V studies).

**American College of Occupational and Environmental Medicine (ACOEM) Guideline – 2011**

In 2011, the ACOEM issued guidelines on the diagnostic testing and management of cervical and thoracic spine disorders.

MRI received the strongest ACOEM testing recommendation for patients with:

- Acute cervical pain with progressive neurologic deficit
- Significant trauma with no improvement in significantly painful or debilitating symptoms
- A history of neoplasia (cancer)
- Multiple neurological abnormalities that span more than one neurological root level
- Previous neck surgery with increasing neurologic symptoms
- Fever with severe cervical pain
- Symptoms or signs of myelopathy
- Subacute or chronic radicular pain syndromes lasting at least 4 to 6 weeks in whom dermatomal and myotomal symptoms are not trending towards improvement if either injection is being considered or both the patient and surgeon are considering early surgical treatment if supportive findings on MRI are found

For acute, subacute and chronic cervicothoracic pain, ACOEM “A” (strong) or “B” (moderate) recommendations included strengthening, endurance and aerobic exercises, proton pump inhibitors, sucralfate, acetaminophen/aspirin, and manipulation/mobilization.

**Institute for Clinical and Economic Review (ICER) Evaluation – 2013**

In 2013, Washington State Health Care Authority commissioned the ICER to evaluate the comparative clinical effectiveness and comparative value of spinal fusion and its alternatives in patients with cervical degenerative disc disease (DDD).
The focus of this appraisal was on adults (>17 years of age) with cervical DDD symptoms, including neck pain, arm pain, and/or radiculopathic symptoms (eg, numbness, tingling); these symptoms could occur with or without the presence of spondylosis. In all cases, the target population was focused on patients whose symptoms have persisted despite an initial short course (ie, 4-6 weeks) of self-care and conservative management.

Evidence was sought to answer several key questions, including:

**What is the comparative clinical effectiveness of cervical fusion for DDD relative to that of conservative management approaches, minimally-invasive procedures, and other forms of surgery?**

ICER conferred a “Comparable” rating for spinal fusion vs. conservative management for radiculopathic symptoms. They stated: “For patients with clinical symptoms of radiculopathy and radiographic evidence of nerve root compression there is not a large evidence base comparing outcomes between spinal fusion and conservative management. We identified only 1 RCT and 1 comparative cohort study, neither of which stood out for their methodologic rigor, size, or generalizability. Despite variability in study design, entry criteria, and outcomes measured, findings were reasonably consistent. Specifically, spinal fusion appeared to provide faster relief of pain and symptoms than conservative management (ie, physical therapy or cervical collar immobilization) in the short term. Over time, however, these differences diminished and no material differences in outcome were observed by 12 months after intervention. ICER cited a Cochrane review by Nikolaidis and colleagues to determine whether surgical treatment of cervical radiculopathy or myelopathy was associated with improved outcome compared with conservative management. Two trials (N = 149) were included. In both trials, allocation concealment was inadequate and arrangements for blinding of outcome assessment were unclear. One trial (81 patients with cervical radiculopathy) found that surgical decompression was superior to physiotherapy or cervical collar immobilization in the short-term for pain, weakness or sensory loss; at one year, there were no significant differences between groups. One trial (68 patients with mild functional deficit associated with cervical myelopathy) found no significant differences between surgery and conservative treatment in three years following treatment. A substantial proportion of cases were lost to follow-up. The authors concluded that it was unclear whether the short-term risks of surgery are offset by long-term benefits. There was low quality evidence that surgery may provide pain relief faster than physiotherapy or hard collar immobilization in patients with cervical radiculopathy; but there is little or no difference in the long-term. There was very low quality evidence that patients with mild myelopathy felt subjectively better shortly after surgery, but there was little or no difference in the long-term.

Because of this, and because spinal fusion may cause relatively rare but significant complications, we deemed the overall comparative clinical effectiveness of fusion to
conservative management “Comparable”. In some patients, however, neck pain and related symptoms may be so severe and disabling that the faster relief potentially afforded by fusion surgery would also allow a quicker return to work and other normal activities. For such patients, fusion might in fact be considered “Incremental” in comparison to ongoing conservative management.

Another key question concerned potential harms associated with cervical fusion compared to conservative management:

**What are the adverse events and other potential harms associated with cervical fusion compared to conservative management approaches, minimally-invasive procedures, and other forms of surgery?**

In analyzing data from randomized controlled trials (RCTs) and comparative cohorts, ICER found that the rate of harm and complications from cervical fusion were significantly greater than those from conservative treatment. Some of the highest rates of potential harm from fusion were events of infection (0-13%), adjacent segment disease (7-16%), paresthesia (14%), dysphagia (3-17%), pseudoarthrosis (8%), and neurological decline (3-23%). Conservative treatment harms were relatively minor, with the exception of neurological decline (14.2%) and paresthesia (8%).

**2015 Update**

A literature search through July 2015 was performed and there were no studies which would alter the policy statement.

In a meta-analysis, Wu et al stated that the traditional surgical method of ACDF carries with it the disadvantages of motion loss at the operative level and accelerated adjacent level disc degeneration. They performed a meta-analysis comparing the long-term outcomes of cervical total disc arthroplasty (TDA) versus fusion. This review was prepared following the standard procedures set forth by the Cochrane Collaboration organization, and preferred reporting items for systematic reviews and meta-analyses (PRISMA). The only studies included were randomized controlled trials with a minimum of 4 years of follow-up data. The meta-analysis included the neck disability index (NDI), visual analog scale (VAS) of neck and arm pain, SF-36 physical component scores (SF-36 PCS), over success, neurological success, work status, implant-related complications, and secondary surgery events. Four randomized controlled trials met the inclusion criteria. The long-term improvement of NDI, VAS of neck and arm pain, SF-36 PCS, over success, and neurological success favored the TDA group. The TDA group also had a lower incidence of secondary surgery for both the index level and adjacent level. In this meta-analysis
of 4 including RCTs with a minimum 4 years of follow-ups, total disc arthroplasty showed improvements over ACDF as measured by the NDI, VAS of neck and arm pain, and SF-36 PCS.

2016 Update

A literature search through February 2016 was performed and there were no studies which would alter the policy statement.

Adjacent segment disease (ASD) development is known to occur after anterior cervical discectomy and fusion. Bydon and colleagues (2014) retrospectively evaluated 888 individuals treated at a single institution over a 20-year period who underwent ACDF for cervical spondylosis. Of these individuals, 108 had re-do surgery as a result of symptomatic adjacent segment disease (ASD). Individuals were followed for an average of 92.4 ± 52.6 months after the index ACDF. Individuals were more likely to develop ASD, known to occur after ACDF, above the index level of fusion. In agreement with previous ACDF case series, they found the highest rate of cervical spinal degenerative disease requiring surgery was at C5/C6, followed by C6/C7. However, neither the inherent location of the index ACDF nor the length of instrumented arthrodesis appeared to correlate with the propensity to develop ASD.

Medicare National Coverage

There is no national coverage determination.

Regulatory Status

Discectomy and laminectomy are surgical procedures and, as such, are not subject to regulation by the U.S. Food and Drug Administration. Some instrumentation used during discectomy or laminectomy may be subject to Food and Drug Administration approval.

References


Appendix

Image 1
Appendix Table 1. Dermatomes of the Head and Neck

<table>
<thead>
<tr>
<th>Spinal Component</th>
<th>Skin Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Divisions of the trigeminal nerve (cranial nerve [CN] V1, V2, and V3)</td>
<td>Most of the skin of the face, including anterior aspect of lower jaw (CN V3); the area of skin in front of both ears; superior part of the lateral aspect of the auricle (CN V3)</td>
</tr>
<tr>
<td>Cervical plexus (ventral rami of C2-C4)</td>
<td>Skin over the angle of the mandible, anterior to and behind the ear; the anterior neck and back of the head and neck; inferior part of the lateral aspect of the auricle and skin on medial aspect of the auricle; the lateral and anterior aspects of the neck</td>
</tr>
<tr>
<td>Greater occipital nerve (dorsal ramus of C2), third occipital nerve (dorsal ramus of C3), and the posterior divisions of C4-C6</td>
<td>The posterior aspect of the head (C2) and neck (C3) with C4-C6 innervating the back of the neck</td>
</tr>
</tbody>
</table>

Appendix Table 2. Dermatomes of the Upper Extremity

<table>
<thead>
<tr>
<th>Spinal Component</th>
<th>Skin Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Third and fourth cervical nerves</td>
<td>Limited area of skin over the root of the neck, upper aspect of the pectoral region, and shoulder</td>
</tr>
<tr>
<td>Spinal Component</td>
<td>Skin Distribution</td>
</tr>
<tr>
<td>------------------</td>
<td>-------------------------------------------</td>
</tr>
<tr>
<td>C5 dermatome</td>
<td>Lateral aspect of the upper extremities at and above the elbow</td>
</tr>
<tr>
<td>C6 dermatome</td>
<td>The forearm and the radial side of the hand</td>
</tr>
<tr>
<td>C7 dermatome</td>
<td>The middle finger</td>
</tr>
<tr>
<td>C8 dermatome</td>
<td>The skin over the small finger and the medial aspect of each hand</td>
</tr>
<tr>
<td>T1 dermatome</td>
<td>The medial side of the forearm</td>
</tr>
<tr>
<td>T2 dermatome</td>
<td>The medial and upper aspect of the arm and the axillary region</td>
</tr>
</tbody>
</table>

### History

<table>
<thead>
<tr>
<th>Date</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>9/08/14</td>
<td>New Policy. Added to UM section. May be considered medically necessary when criteria are met. Policy approved with a hold for provider notification and will be effective December 15, 2014.</td>
</tr>
<tr>
<td>11/04/14</td>
<td>Minor update. Policy title updated; order change in words only for improved clarification.</td>
</tr>
<tr>
<td>12/22/14</td>
<td>Interim Review. Policy renumbered; moved from UM section (11.01.505) to Surgery section (7.01.560). Reference #4 removed.</td>
</tr>
<tr>
<td>02/10/15</td>
<td>Interim Review. All information specific to posterior cervical removed from policy statement. Title revised to note that criteria apply to anterior cervical decompression and fusion only and to adults only. Definition of corpectomy in Policy Guidelines deleted and definition of cervical radiculopathy expanded. Codes for posterior (22600/22614) deleted.</td>
</tr>
<tr>
<td>05/12/15</td>
<td>Minor update. “With or Without Fusion” removed from title for purposes of clarification. Additional clarifications: the word “cervical” added to multi-level fusion statement and note added that decompression as a stand-alone procedure is not subject to medical review.</td>
</tr>
<tr>
<td>09/08/15</td>
<td>Annual Review. Abbreviation “OPLL” added to policy statement for ossification of posterior longitudinal ligament. Dermatome graphics added to Appendix. Rationale updated and reference added. Policy statement revised as noted.</td>
</tr>
<tr>
<td>11/10/15</td>
<td>Interim Review. Added Documentation section to Policy Guidelines stating medical necessity is established by submitting documentation of medical history, physical findings, and diagnostic imaging results that demonstrate need for cervical spine surgery. (No documentation guidance was in the policy previously). Policy statements unchanged.</td>
</tr>
<tr>
<td>Date</td>
<td>Comments</td>
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</tr>
<tr>
<td>05/01/16</td>
<td>Annual Review, approved April 12, 2016. Policy statement revised: Timeframe for completion of diagnostic imaging changed from 6 months to 12 months, consistent with documentation requirements in Policy Guidelines. Rationale updated and reference added.</td>
</tr>
<tr>
<td>05/24/16</td>
<td>Update Related Policies. Removed 7.01.146 as it was added in error. Replaced with 7.01.551.</td>
</tr>
<tr>
<td>11/01/16</td>
<td>Interim review, approved October 11, 2016. Clarified cervical radiculopathy statement to show that imaging needs to show spinal stenosis and nerve root compression, and added herniated disk and osteophytes to physical findings. Clarified spondylotic myelopathy policy statement that imaging needs to show spinal cord compression and added ossification of posterior longitudinal ligament to list of physical findings. Policy moved into new format.</td>
</tr>
<tr>
<td>01/01/17</td>
<td>Interim Review, approved December 13, 2016. Policy statement revised: Requests for fusions of more than 2 levels must be reviewed by a medical director.</td>
</tr>
<tr>
<td>10/01/17</td>
<td>Annual Review, approved September 5, 2017. No changes to policy statement, no new references.</td>
</tr>
<tr>
<td>03/01/18</td>
<td>Note added that this policy has been revised. Added link to revised policy that will become effective June 1, 2018.</td>
</tr>
<tr>
<td>04/15/18</td>
<td>Minor update, removed 11.01.524 from Related Policies as Anterior Cervical Spine Decompression and Fusion in Adults was removed from the Site of Service program. Removed link to revised policy.</td>
</tr>
<tr>
<td>06/08/18</td>
<td>Minor edit. Policy criteria bullets changed from &quot;spinal stenosis and nerve root compression&quot; to &quot;spinal stenosis or nerve root compression&quot;.</td>
</tr>
<tr>
<td>09/21/18</td>
<td>Minor update. Added Consideration of Age statement.</td>
</tr>
</tbody>
</table>

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U.S. Department of Health and Human Services
200 Independence Avenue SW, Room 509F, HHH Building
Washington, D.C. 20201, 1-800-368-1019, 800-537-7697 (TDD)

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Illoko (Ilocano):
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