Policy Number	**SUR712.041**
Policy Effective Date	**03/15/2025**

Cervical Spinal Fusion

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Related Policies (if applicable)
None

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Coverage

Cervical fusion **may be considered medically necessary** when the following criteria are met, as confirmed by imaging studies:

- Cervical nerve root compression when imaging studies demonstrate nerve root compression due to herniated disc or spondylotic osteophyte correlating with the distribution of signs and symptoms, and **ANY** of the following criteria apply:
  - Objective neurologic findings which correlate with a cervical nerve root impingement; or
  - Progressive or severe neurologic deficits secondary to spinal cord or foraminal compression; or
  - Unremitting radicular pain which has not responded to at least 6 weeks of appropriate conservative management (physical therapy optional) (See **NOTE #2**); **OR**
- Degenerative cervical kyphosis when **ANY** of the following criteria are met:
  - Clinical signs and symptoms of myelopathy which may include loss of dexterity, urinary urgency, new-onset bowel or bladder incontinence, frequent falls, hyperreflexia, Hoffmann sign, increased tone or spasticity, gait abnormality, or pathologic Babinski sign, **AND** imaging studies which demonstrate cervical cord compression; or

    - Debilitating neck pain with documented functional limitations (e.g., Neck Disability Index [NDI]>35); or
    - Clinically significant problems with horizontal gaze, swallowing, or breathing; **OR**
- Symptomatic pseudarthrosis (non-union of prior fusion) associated with mechanical instability or deformity of the cervical spine; **OR**
- Spinal fracture, dislocation (associated with mechanical instability), locked facets, or displaced fracture fragment; **OR**
- Spinal infection; **OR**
- Spinal tumor, primary or metastatic to spine; **OR**
- Atlantoaxial (C1-C2) subluxation (e.g., associated with congenital anomaly, os odontoideum, or rheumatoid arthritis) noted as widening of the atlantodens interval greater than 3 mm; **OR**
- Basilar invagination of the odontoid process into the foramen magnum; **OR**
- Subaxial (C2-T1) instability when both of the following are met:
    - Significant instability (sagittal plane translation of at least 3 mm on flexion and extension views or relative sagittal plane angulation greater than 11 degrees); and
    - Symptomatic unremitting pain that has failed 6 weeks of conservative management; **OR**
- Adjunct to excision of synovial cysts causing spinal cord or nerve root compression with unremitting pain, and with corresponding neurological deficit, where symptoms have failed to respond to 6 weeks of conservative therapy (unless there is evidence of cord compression, or progressive neurological deficit, which requires urgent intervention); **OR**
- Implant/Instrumentation failure demonstrated on imaging showing malposition or other evidence of failure (e.g., surrounding radiolucency, dislocation/subluxation, vertebral body fracture, or hardware breakage).

Cervical decompression and/or fusion **is considered medically necessary** at the index level after a prior cervical disc arthroplasty when EITHER of the following criteria are met:

- Evidence of implant/device failure is demonstrated on standard or advanced imaging showing malposition or other evidence of failure (e.g., subsidence, surrounding radiolucency, dislocation/subluxation, vertebral body fracture, or hardware breakage); **AND** symptoms can be attributed to implant failure or other implant related mechanical complications.
- Clinical symptoms persist or recur in the absence of implant failure; **AND** there is clinical evidence of cervical radiculopathy or myelopathy.

Unless one of the above conditions is met, cervical spinal fusion surgical procedures **are considered not medically necessary.**

NOTE #1: Persistent debilitating pain is defined as significant level of pain on a daily basis defined on a Visual Analog Scale (VAS) as greater than 4, and that has a documented impact on activities of daily living.

NOTE #2: Conservative non-surgical therapy of cervical radiculopathy typically consists of, but is not limited to the following modalities:

- Use of oral analgesics (including anti-inflammatory medications, if not contraindicated); **AND**
- A short course of oral corticosteroids, if not contraindicated; **AND**
- Participation in a physical therapy program with active exercise and gradual mobilization; **AND**
- Evaluation and appropriate management of associated cognitive, behavioral or addiction issues if and when present.

NOTE #3: The requirement for a period of conservative therapy may be waived when there is evidence of progressive nerve or spinal cord compression resulting in severe or rapidly progressive symptoms (e.g., motor loss, neurogenic claudication, or cauda equina syndrome) and urgent intervention is indicated.

Policy Guidelines

None.

Description

Spinal Fusion

Spinal fusion (arthrodesis) is a surgical technique to stabilize the spinal bones or vertebrae. The goal of fusion is to create a solid bridge of bone between two or more vertebrae so that motion no longer occurs between them. Bone grafts are placed around the spine during surgery. The body then heals the grafts over several months similar to healing a fracture, which joins the vertebrae together. Spinal fusion may be recommended for many reasons including but not limited to treatment of a fractured (broken) vertebra; correction of deformity (spinal curves or slippages); elimination of pain from painful motion; treatment of instability; and treatment of some cervical disc herniations.

There are many surgical approaches and methods available to fuse the spine, and they all involve placement of a bone graft between the vertebrae. The spine may be approached, and the graft placed from the back (posterior approach), from the front (anterior approach), or by a combination of both. In the neck, the anterior approach is more common; lumbar and thoracic fusion is more commonly performed posteriorly.

Fusion may or may not involve use of supplemental hardware (instrumentation) such as plates, screws, and cages. Instrumentation is sometimes used to correct a deformity, but usually is used as an internal splint to hold the vertebrae together while the bone grafts heal. Whether or not hardware is used, it is important that bone or bone substitutes be used to get the vertebrae to fuse together. The bone may be taken either from another bone in the patient (autograft) or from a bone bank (allograft). (1)

Cervical Spinal Fusion

There are seven cervical vertebrae. They are stacked one on top of another and are separated by discs, which act as elastic cushions or shock absorbers. The first two vertebrae are an exception; there is no disc between C1 vertebra and C2 vertebra. Discs have a soft center, the nucleus, surrounded by a tough outer ring, the annulus. Discs allow motion between the vertebrae. The interbody space is the disc space that is located between the vertebral body bones. Each vertebral segment creates a bony circle, called the spinal canal that protects the spinal cord and spinal nerves.

Approximately 10% to 20% of adults report experiencing neck pain in any given time. (2) A common cause of neck pain is degenerative disc disease (DDD), the discs in the neck lose elasticity and cause settling of the spinal column structure and abnormal spinal motions. DDD is a consequence of aging and may lead to the development of bone spurs (spondylosis), osteoarthritis, and/or a herniation of a cervical disc. These processes can result in peripheral nerve root impingements or radiculopathy. Common symptoms of radiculopathy include neck and arm pain and weakness, tingling, or numbness in the upper extremities. Symptomatic patients often improve with conservative treatment, including nonsteroidal anti-inflammatory drugs, steroids, epidural steroids, and physical therapy. If these conservative approaches fail, surgery may be indicated.

One common surgical technique is anterior cervical discectomy with fusion (ACDF), which is performed under general anesthesia. The surgery is performed through a small incision on the front of the neck, usually in the neck's natural crease. The trachea (windpipe), esophagus (stomach tube), and blood vessels lie in front of the spine and are carefully moved aside. Once the surgeon safely creates a window to see the spine, the damaged disc is partially removed with surgical tools. This is called a discectomy. Some of the disc wall is intentionally left behind to help contain bone graft material. Once the disc space has been cleared out, the surgeon prepares the bony surfaces for a fusion. The bones are slightly spread apart to make more room for the bone graft. This distracts the bones to realign proper curvature and enlarges the openings to relieve pressure off any pinched nerves.

A cage implant that may be filled with bone graft is placed in the now empty disc space between the two vertebral bodies. The spacer or fusion cage may be made of bone, titanium, or plastic. Bone graft inside the disc space will go on to fuse, healing the two bones together in this area. If the fusion is successful, the vertebrae will only move as one unit. This reduces future problems at this spinal segment. If the bones do not fuse as planned this is called a nonunion, or pseudarthrosis.

Rationale

Cervical Radiculopathy

In a prospective randomized study (2013) conducted by Peolsson et al., the objective was to investigate differences in physical functional outcome in patients with radiculopathy due to cervical disc disease, after structured physiotherapy alone (consisting of neck-specific exercises with a cognitive-behavioral approach) versus after anterior cervical decompression and fusion (ACDF) followed by the same structured physiotherapy program. (3) No earlier studies have evaluated the effectiveness of a structured physiotherapy program or postoperative physical rehabilitation after ACDF for patients with magnetic resonance imaging-verified nerve compression due to cervical disc disease. Sixty-three patients with radiculopathy and magnetic resonance imaging-verified nerve root compression, which were randomized to receive either ACDF in combination with physiotherapy or physiotherapy alone. For 49 of these patients, an independent examiner measured functional outcomes, including active range of neck motion, neck muscle endurance, and hand-related functioning before treatment and at 3-, 6-, 12-, and 24-month follow-ups. There were no significant differences between the 2 treatment alternatives in any of the measurements performed (P = 0.17-0.91). Both groups showed improvements over time in neck muscle endurance (P≤0.01), manual dexterity (P≤0.03), and right-handgrip strength (P = 0.01). Compared with a structured physiotherapy program alone, ACDF followed by physiotherapy did not result in additional improvements in neck active range of motion, neck muscle endurance, or hand-related function in patients with radiculopathy. The authors suggest that a structured physiotherapy program should precede a decision for ACDF intervention in patients with radiculopathy, to reduce the need for surgery.

A meta-analysis by Gao et al. (2013) compared the results of cervical disc arthroplasty with anterior cervical discectomy and fusion for the treatment of symptomatic cervical disc disease. (4) Only randomized clinical trials were included in this meta-analysis, and the search strategy followed the requirements of the Cochrane Library Handbook. Two reviewers independently assessed the methodological quality of each included study and extracted the relevant data. Twenty-seven randomized clinical trials were included; twelve studies were Level I and fifteen were Level II. The results of the meta-analysis indicated longer operative times, more blood loss, lower neck and arm pain scores reported on a visual analog scale, better neurological success, greater motion at the operated level, fewer secondary surgical procedures, and fewer such procedures that involved supplemental fixation or revision in the arthroplasty group compared with the anterior cervical discectomy and fusion group. These differences were significant ($p<0.05$). The two groups had similar lengths of hospital stay, Neck disability index scores, and rates of adverse events, removals, and reoperations ($p>0.05$). The meta-analysis revealed that anterior cervical discectomy and fusion was associated with shorter operative times and less blood loss compared with arthroplasty. Other outcomes after arthroplasty (length of hospital stay, clinical indices, range of motion at the operated level, adverse events, and secondary surgical procedures) were superior or equivalent to the outcomes after anterior cervical discectomy and fusion.

<u>UpToDate: Treatment of Cervical Radiculopathy (5)</u>

UpToDate noted the following information regarding initial conservative therapy for most patients, the role of surgical therapy, and prognosis under their Summary and Recommendations:

- *Initial conservative therapy for most patients* - They suggest conservative therapy as initial treatment for most patients with compressive cervical radiculopathy who have clear radicular pain with paresthesia or numbness. In addition, they suggest conservative therapy as initial treatment for patients with cervical radiculopathy who have weakness that is nonprogressive, as long as myelopathy is not suspected (Grade 2C).

They typically start treatment with oral analgesics (e.g., nonsteroidal anti-inflammatory drugs [NSAIDs]) and avoidance of provocative activities and add a short course of oral Prednisone if pain is severe. Once the pain is tolerable, initiate physical therapy with exercise and gradual mobilization.

- *The role of surgical therapy* - The benefit of surgery for the treatment of cervical radiculopathy has not been clearly established, and data from controlled trials are sparse. For patients with cervical radiculopathy who have all of the following conditions, they suggest surgery rather than nonsurgical therapy (Grade 2C).
    - Symptoms and signs of cervical radiculopathy.
    - Cervical nerve root compression by magnetic resonance imaging (MRI) or computed tomography (CT) myelography at the appropriate side and level(s).
    - Progressive motor weakness.

Several procedures are used for patients undergoing surgery for cervical radiculopathy without myelopathy. These include anterior cervical discectomy and fusion, posterior laminoforaminotomy, and artificial disc replacement. Outcomes and safety profiles among available techniques are similar.

- *Prognosis* – Limited data suggest that most patients with compressive cervical radiculopathy improve without specific treatment. However, symptoms may recur in up to one-third of patients after initial improvement. Conservative management should be re-employed if symptoms of cervical radiculopathy recur unless a significant motor deficit or myelopathy is present.

Other Conditions (Cervical Fracture, Instability, Kyphosis, Spondylolysis and Disc Herniations)
The North American Spine Society (NASS) notes the following as potential reasons for a surgeon to consider fusing the vertebrae. (1) These include:

- Treatment of a fractured (broken) vertebra; correction of deformity (spinal curves or slippages); elimination of pain from painful motion; treatment of instability; and treatment of some cervical disc herniations.
- One of the less controversial reasons to do spinal fusion is a vertebral fracture. Although not all spinal fractures need surgery, some fractures - particularly those associated with spinal cord or nerve injury - generally require fusion as part of the surgical treatment. Sometimes a hairline fracture allows one vertebra to slip forward on another. This condition is called spondylolisthesis and can be treated by fusion surgery.

- Another condition that is treated by fusion surgery is actual or potential instability. Instability refers to abnormal or excessive motion between two or more vertebrae. It is commonly believed that instability can either be a source of back or neck pain or cause potential irritation or damage to adjacent nerves. Although there is some disagreement on the precise definition of instability, many surgeons agree that definite instability of one or more segments of the spine is an indication for fusion.
- Cervical disc herniations that require surgery usually need not only removal of the herniated disc (discectomy), but also fusion. With this procedure, the disc is removed through an incision in the front of the neck (anteriorly) and a small piece of bone is inserted in place of the disc. Although disc removal for a disc herniation is commonly combined with fusion in the neck, this is not generally true in lumbar disc herniations.
- Spinal fusion is sometimes considered in the treatment of a painful spinal condition without clear instability. A major obstacle to the successful treatment of spine pain by fusion is the difficulty in accurately identifying the source of a patient's pain. The theory is that pain can originate from painful spinal motion and fusing the vertebrae together to eliminate the motion will get rid of the pain. Unfortunately, current techniques to precisely identify which of the many structures in the spine could be the source of a patient's back or neck pain are not perfect. Because it can be so hard to locate the source of pain, treatment of back or neck pain alone by spinal fusion is somewhat controversial. Fusion under these conditions is usually viewed as a last resort and should be considered only after other conservative (nonsurgical) measures have failed.

<u>Other Causes of Cervical Spinal Instability</u>

In an effort to provide a theoretical basis for clinical decision-making, Han et al. noted in a 2023 review article, that the alignment, fusion, and structure of the cervical spine can change for various reasons, leading to cervical deformity, mainly kyphosis. (6) Approximately 5%-20% of spinal infections in the cervical spine cause cervical deformity. Common and rare postinfectious cervical kyphosis were addressed. The diagnosis of cervical kyphosis secondary to infection is based on clinical features, imaging, bacteriology, and pathology. The authors note that x-ray examination is the most common screening method for cervical spine infection. In the early stage of infection, narrow intervertebral space and damaged vertebral endplate can be seen in x-ray. In the late stage of infection, x-ray can reveal vertebral collapse, segmental kyphosis, and bony ankylosis of the affected part. The authors concluded that due to its possible injury to the spinal cord and neurological function, the method and timing of surgery for postinfectious cervical kyphosis are still controversial and that further exploration of personalized treatment for patients is still needed in future clinical work.

Bydon et al. (2014) presented a series of 17 cases involving patients treated at a single institution and reported the surgical outcomes. (7) Due to the rarity of cervical synovial cysts (CSCs), a meta-analysis was conducted, and results of the literature search were combined with the case series to enhance the power of the study. Seventeen patients underwent surgical treatment for CSCs at the authors institution: 3 patients (17.6%) had atlantoaxial cysts and 14 (82.3%) had subaxial cysts. Of the 17 patients, 16 underwent a decompression and fusion; most patients experienced symptom resolution at last follow-up, and there were no cyst recurrences.

A total of 54 articles (including the current series) and 101 patients were included in the meta-analysis. The mean age at presentation was 64 ± 13.9 years, and the most common symptoms were motor and sensory deficits. Forty-one patients (40.6%) presented with atlantoaxial cysts, and 60 (59.4%) with subaxial cysts. There were no significant differences between groups in terms presenting symptoms, Nurick scores, surgical treatment, or surgical outcomes. Fifty-two patients (51.4%) underwent surgical decompression without fusion, while 49 patients (48.6%) underwent fusion. The preoperative Nurick scores were significantly lower in the fused group ($p = 0.001$), with an average score of 1.32 compared with 2.75 in the nonfused group. After a mean follow-up of 16.5 months, a difference of means analysis between final and preoperative Nurick scores revealed that patients who received a decompression alone improved on average 1.66 points (95% CI 1.03-2.29) compared with 0.8 points (95% CI 0.23-1.39) in the fused group ($p = 0.004$). However, there was no statistically significant difference in symptom resolution between the groups, and the rate of cyst recurrence was found to be 0%. The authors' concluded that in this study, patients with CSCs had similar outcomes regardless of cyst location and regardless of whether they underwent decompression only or fusion. In the authors' institutional experience, 16 of 17 patients underwent fusion due to underlying spinal instability. While there were no reports of cyst recurrence in their series or in the literature in patients who only received decompression, this is likely due to the limited follow-up time available for the study population. Prospective and biomechanical studies with longer follow-up and are needed to corroborate these findings.

Surgical Approaches

Techniques and surgical approaches have also been addressed in scientific literature and professional society documents. Joaquim et al. (2016) (8) notes the following in the literature review addressing management of degenerative cervical myelopathy: The choice of one approach over the other depends on patient characteristics (such as number of involved levels, site of compression, cervical alignment, previous surgeries, bone quality, presence of instability, among others) as well as surgeon preference and experience. The author concluded that further comparative studies are necessary to establish the superiority of one approach over the other when multiple options are available.

Complications and Revision Surgery

Alonso et al. (2017) preformed a retrospective case series of patients treated at a single tertiary care institution between March 2014 and March 2015. (9) Inclusion criteria were aged 18-100 years, 1- or 2- level anterior cervical discectomy and fusion with a standalone cervical cage. Descriptive statistics were performed for risk of readmission, implant failure, revision, and other complications. The authors identified 211 patients who met the study criteria. Average surgical time was 107 ± 43 minutes, with an estimated blood loss of 84.6 ± 32.4 mL. There were 11 (5.2%) readmissions. There were 10 (4.74%) implant failures (5 involving single-level surgery and 5 involving 2-level surgery), with 7 cases of pseudoarthrosis. Mechanisms of failure included a C5 body fracture, fusion in a kyphotic alignment after graft subsidence, and acute spondylolisthesis. The authors concluded that revision surgery after standalone anterior cervical implants can be complex. Posterior cervical fusion remains a valuable approach to

avoid possible vertebral body fracture and loss of fusion area associated with the removal of implants secured through the endplates of adjacent vertebral bodies.

Park et al. (2019) assessed the effect of screw migration and fracture associated with anterior cervical plating on long-term radiographic and clinical outcomes in a retrospective cohort study. (10) Two hundred forty-eight consecutive patients who underwent anterior cervical discectomy and fusion or anterior cervical corpectomy and fusion with a dynamic plating system and were followed up for ≥2 years. Patients who experienced screw migration or breakage were classified as screw failure group (SF group, n=25). Patients without screw loosening or fracture until the last follow-up were defined as the nonfailure group (NF group, n=223). Visual analogue scales for neck pain, arm pain, and neck disability index were assessed. Radiologic measurements were performed to analyze solid fusion. The solid union was defined as interspinous motion ≤1 mm on flexion/extension lateral x-rays. Results revealed number of levels fused was significantly associated with increased risk of screw failure ($P<0.01$). A total of 13 patients in the SF group achieved solid fusion at final follow-up, although fusion rates at all postoperative time points were significantly lower in the SF group than in the NF group, including at final follow-up ($P<0.01$). Failures in 23 (92%) screw failure patients developed at the lowermost instrumented vertebra. The SF and NF groups experienced similar degrees of neck pain, arm pain, and neck disturbance index scores. There were no cases of complete screw extrusion or related complications requiring revision surgery. Conclusions noted by the authors included although screw failure increased the incidence of pseudarthrosis, it did not aggravate postoperative arm pain, neck pain, or neck disability. As failed implants rarely migrate to an extent that endangers tracheoesophageal structures, immediate removal is rarely necessary.

In 2015, Skovrlj et al. (11) reported rates of surgical interventions following failed cervical disc replacement were low (mean, 2.4%; range, 0%–4.1%). Additionally, the authors note that the majority of complications are related to poor patient selection and surgical techniques. They also noted that there were, however, a small percentage also attributed to the device failure itself.

In 2016, Park et al. (12) further investigated causes and results of revision surgeries after artificial disc replacement of the cervical spine (C-ADR). In a retrospective study the authors reviewed medical records and imaging studies of 21 consecutive patients who underwent revision surgeries after C-ADR. Thirteen patients were male, and 8 patients were female. The mean age was 52.8 years (range, 43-63 years) and mean time to revision surgeries was 21 months (range, 4-84 months). All patients had a minimum 2-year follow-up after revision surgeries. During their primary C-ADR surgeries, 14 patients underwent single-level C-ADR (3 C4-5, 8 C5-6, and 3 C6-7), 2 patients had two-level C-ADR (C5-6 and C6-7), and 5 patients had two-level hybrid surgery (3 C6-7 ADR + C5-6 anterior cervical discectomy fusion [ACDF] and 2 C5-6 ADR + C4-5 ACDF). The indications for the primary C-ADR surgeries were 16 cervical radiculopathy, 3 myelopathy, and 2 adjacent segment disease with radiculopathy. Failure of primary C-ADR surgeries was defined as persistence or recurrence of clinical symptoms, such as radiculopathy or myelopathy, due to remained or new pathologies at the same operated level(s). Among 21 patients, 14 temporarily recovered symptoms after primary C-ADR surgeries

but had recurrence of symptoms. The remaining 7 patients did not obtain symptom relief immediately after primary C-ADR surgery. Twenty-one patients had additional conservative treatments at least for 3 months but symptoms were not resolved. Therefore, all patients were transferred to the authors' tertiary hospitals and underwent revision surgeries. Results reported included: Sixteen patients underwent anterior removal of C-ADR, one-level discectomy and fusion (N = 11), two-level discectomy (N = 3) or one-level corpectomy (N = 2) and fusion. Three patients of keel type C-ADR with heterotopic ossification underwent posterior laminoforaminotomy and fusion. Two patients underwent combined procedures due to infection or severe subsidence and osteolysis. At the 2-year follow-up, neck (7.3 vs 1.6) and arm (7.0 vs 1.3) visual analog scales and Neck Disability Index score (46.7 vs 16.32) were improved (all, $p < 0.05$). According to Odom's criteria, 86% of the patients were satisfied and 91% achieved solid fusion. No major complications developed except for transient dysphagia in 6 patients (29%). The authors concluded that in this small case series, revision surgeries provided successful outcomes in failed C-ADR without major complications. Careful patient selection and meticulous surgical techniques are important to avoid disappointing clinical outcome or even failure of C-ADR.

In 2021, Kim et al. (13) retrospectively examined 13 patients' records who underwent revision surgery due to the failure of a total disc replacement of the cervical spine (C-TDR). Failure of primary C-TDR was defined as persistence or recurrence of radiculopathy and/or myelopathy due to lingering or new pathology at the same level as the operation. Radiographically, problems with implants, such as broken polyurethane sheath or any movement of the devices from their initial location, were noted. The main complaints of patients were posterior neck pain (77%), radiculopathy (62%), and/or myelopathy (62%). The causes of failure of C-TDR were improper indications for the procedure, osteolysis and mobile implant use, inappropriate techniques, and postoperative infection. The patients were divided into early and late reoperation groups based on a cutoff of 6 months after initial surgery. There were two patients in the early reoperation group; one of them was technically a failure, and the other showed improper indication of severe spondylosis. Both of these early group patients underwent reoperation with artificial disc removal and ACDF. The most common surgical level was C5–6, followed by C4–5. After revision surgery, the neck and arm pain visual analogue scale (VAS) (preoperative vs. postoperative: 5.46 vs. 1.31; 4.86 vs. 1.08), a modified Japanese Orthopedic Association (JOA) scale (14.46 vs. 16.69), and the Neck Disability Index (NDI) (29.77 vs. 9.31) scores were much improved. The authors concluded that C-TDR is good surgical option. However, it is very important to adhere to strict surgical indications and contraindications to avoid failure of C-TDR. The results of reoperations were good regardless of the approach. Therefore, various reoperation options could be considered in patients with failed C-TDR.

Practice Guidelines and Position Statements

North American Spine Society (NASS) (14)

Based on evidence for degenerative cervical radiculopathy, the NASS in 2010 indicated that:

- Both anterior cervical discectomy (ACD) and anterior cervical discectomy/decompression and fusion (ACDF) are suggested as comparable treatment strategies, producing similar

clinical outcomes, in the treatment of single level cervical radiculopathy from degenerative disorders. (Grade of Recommendation: B)

- The addition of an interbody graft for fusion is suggested to improve sagittal alignment following ACD [anterior cervical discectomy]. (Grade of Recommendation: B)
- Both ACDF with and without a plate are suggested as comparable treatment strategies, producing similar clinical outcomes and fusion rates, in the treatment of single level cervical radiculopathy from degenerative disorders. (Grade of Recommendation: B)
- The addition of a cervical plate is suggested to improve sagittal alignment following ACDF. (Grade of Recommendation: B)
- Either ACDF or posterior laminoforaminotomy (PLF) are suggested for the treatment of single level degenerative cervical radiculopathy secondary to foraminal soft disc herniation to achieve comparably successful clinical outcomes. (Grade of Recommendation: B)
- ACDF and total disc arthroplasty (TDA) are suggested as comparable treatments, resulting in similarly successful short-term outcomes, for single level degenerative cervical radiculopathy. (Grade of Recommendation: B)
- While plate stabilization may be indicated in some patients undergoing multilevel ACDF, there is insufficient evidence that this practice results in significant improvement in clinical outcomes for degenerative cervical radiculopathy. (Work Group Consensus Statement)
- Compared to PLF, ACDF is suggested for the treatment of single level degenerative cervical radiculopathy from central and paracentral nerve root compression and spondylotic disease. (Work Group Consensus Statement)

In addition, the NASS released the following document:
Appropriate Use Criteria for Cervical Fusion (15):
The objective of NASS Appropriate Use Criteria is to define appropriate (meaning reasonable) care of spinal disorders. This document is intended to reflect contemporary treatment concepts and to assist in the delivery of optimum, efficacious treatment and functional recovery. The criteria do not represent a “standard of care,” nor are they intended as a fixed treatment protocol.

However, it does provide an evidence-based review to help guide decision-making for patients, providers, payers and policy makers. The 2013 summary noted the following:

“Regarding the variables examined, fusion for degenerative conditions that resulted in axial pain tended to be less appropriate than those resulting in radiculopathy. These in turn tended to be slightly less appropriate than in the setting of myelopathy unless severe neurological deficit was present, in which case there was approximate equivalence. Along the same lines, fusion for degenerative conditions with central stenosis was most consistently rated as appropriate followed by those with foraminal stenosis followed by conditions with no radiographic stenosis. The presence of signal changes in the spinal cord on MRI with central stenosis tended to be associated with stronger support for fusion in some select scenarios, but the ratings were mostly equivalent to similar scenarios without cord signal changes. In the presence of neurological problems, either myelopathy or radiculopathy, both short and long

fusions were often considered appropriate. In contrast, for conditions without stenosis or causing axial pain only, one level (versus multilevel disease) was more likely to be considered appropriate for fusion, if at all.

In general, anterior fusion was appropriate regardless of sagittal alignment. Posterior fusion was more often appropriate with kyphosis than lordosis, although this was felt to be appropriate for several scenarios with lordosis, as well. Trends for anterior and posterior surgery were rare except for patients undergoing corpectomy, and, to improve fusion rates. The longer the fusion, the more likely combined anterior and posterior surgery was felt to be appropriate. There was consistent support for revision fusion for pseudarthrosis if it was symptomatic and just as consistent lack of support for fusion for asymptomatic pseudarthroses. The exceptions to the latter were patients with some element of central stenosis and persistent neurological problems, particularly myelopathy.

Finally, comorbidities definitely affected appropriateness of cervical fusion, including smoking, medical and psychosocial problems. The more severe the comorbidities, the more caution there was to support fusion. These variables resulted in stronger opposition for conditions with axial complaints and for conditions without stenosis than for conditions with radiculopathy and with foraminal stenosis. They had the least effect on conditions with central stenosis and cervical myelopathy."

Summary of Evidence

Professional society documents as well as evidence in scientific literature address cervical spinal fusion as a potentially effective treatment for specific clinical indications including but not limited to spinal instability, correction of deformity, degenerative conditions and disc herniation when specific criteria are met. Techniques and surgical approaches have also been addressed in scientific literature and professional society documents, although additional comparative studies are necessary to establish the superiority of one approach over the other.

Coding

Procedure codes on Medical Policy documents are included **only** as a general reference tool for each policy. **They may not be all-inclusive.**

The presence or absence of procedure, service, supply, or device codes in a Medical Policy document has no relevance for determination of benefit coverage for members or reimbursement for providers. **Only the written coverage position in a Medical Policy should be used for such determinations.**

Benefit coverage determinations based on written Medical Policy coverage positions must include review of the member's benefit contract or Summary Plan Description (SPD) for defined coverage vs. non-coverage, benefit exclusions, and benefit limitations such as dollar or duration caps.

CPT Codes	20930, 20936, 22548, 22551, 22552, 22554, 22590, 22595, 22600, 22840, 22841, 22842, 22843, 22844, 22845, 22846, 22847, 22853, 22854, 22859
HCPCS Codes	None

*Current Procedural Terminology (CPT®) ©2023 American Medical Association: Chicago, IL.

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Centers for Medicare and Medicaid Services (CMS)

The information contained in this section is for informational purposes only. HCSC makes no representation as to the accuracy of this information. It is not to be used for claims adjudication for HCSC Plans.

The Centers for Medicare and Medicaid Services (CMS) does not have a national Medicare coverage position. Coverage may be subject to local carrier discretion.

A national coverage position for Medicare may have been developed since this medical policy document was written. See Medicare's National Coverage at <https://www.cms.hhs.gov>.

Policy History/Revision	
Date	**Description of Change**
03/15/2025	Document updated with literature review. The following changes were made to Coverage: 1) Modified coverage for cervical nerve root compression; 2) Modified coverage for cervical kyphosis and renamed to "degenerative cervical kyphosis"; 3) Removed the following indication: Clinically significant deformity of the spine (kyphosis, head-drop syndrome, post-laminectomy deformity) 4) Replaced "radiographic evidence" with "imaging studies" in the following sentence: Cervical fusion may be considered medically necessary when the following criteria are met, as confirmed by imaging studies. References 6 and 7 were added.
05/01/2023	Document updated with literature review. The following changes were made to Coverage: 1) Added Cervical decompression and/or fusion is considered medically necessary at the index level after a prior cervical disc arthroplasty when criteria is met; 2) Removed from NOTE #2 "Prescription strength" from the following statement: Use of prescription strength oral analgesics (including anti-inflammatory medications, if not contraindicated). Added references 8-10 and updated others.
01/15/2023	Reviewed. No changes.
09/15/2021	Document updated with literature review. The following changes were made to Coverage: 1) Added the following phrase to the first statement for clarity: following criteria are met, as confirmed by radiographic evidence; 2) Added an indication for Implant/Instrumentation failure when criteria is met; 3) Added NOTE #3; 4) Changed conservative therapy length of time from 3 months to 6 weeks; 5) Removed the word thoracic from NOTE #2 for clarity. References 2, 7 and 8 were added.
04/01/2020	Document updated with literature review. The following change was made to Coverage: Criteria for thoracic fusion was removed. Rationale was significantly changed. Title changed from Cervical and Thoracic Spinal Fusion. Reference 6 and 8 were added.
10/15/2017	Reviewed. No changes.
02/01/2017	New medical document. Significant coverage criteria regarding cervical and thoracic fusion. See coverage section.