*National Imaging Associates, Inc.	
Clinical guidelines: **CERVICAL SPINE SURGERY**	**Original Date: July 2008**
CPT Codes:** - **Anterior Cervical Discectomy~~ecompression~~ with Fusion (ACDF) - Single Level: 22548, 22551, 22554** - **Anterior Cervical Discectomy~~ecompression~~ with Fusion (ACDF) - Multiple Levels: +22552, +22585** - **Cervical Posterior Decompression with Fusion - Single Level: 22590, 22595, 22600** - **Cervical Posterior Decompression with Fusion - Multiple Levels: 22595, +22614** - **Cervical Artificial Disc Replacement - Single Level: 22856, 22861, 22864** - **Cervical Artificial Disc Replacement - Two Levels: +22858, +0098T, +0095T** - **Cervical Posterior Decompression (without fusion): 63001, 63015, 63020, +63035, 63040, +63043, 63045, +63048, 63050, 63051** - **Cervical Anterior Decompression (without fusion): 63075, +63076** ***See Utilization Review Matrix for allowable billed groupings and additional covered codes*	**Last Revised Date: ~~May~~ December 2023**
Guideline Number: NIA_CG_307	**Implementation Date: July~~anuary~~ 2024**

TABLE OF CONTENTS

GENERAL INFORMATION

It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.~~ted.~~

STATEMENT

Operative treatment is indicated only when the natural history of ~~an operatively treatable problem is better than the natural history of the problem without operative treatment~~surgically treated lesions is better than the natural history for non-operatively treated lesions. ~~Choice of surgical approach is based on anatomy, pathology, and the surgeon's experience and preference.~~ All operative interventions must be based on a positive correlation with clinical findings, the natural history of the disease, the clinical course, and diagnostic tests or imaging results. All individuals being considered for surgical intervention should receive a comprehensive neuromusculoskeletal examination to identify pain generators that may either respond to non-surgical techniques or may be refractory to surgical intervention.

Purpose

This guideline outlines the key surgical treatments and indications for common cervical spinal disorders and is based upon the best available evidence. Spine surgery is a complex area of medicine, and this document breaks out the clinical indications by surgical type.

This guideline does not address spinal deformity surgeries or the clinical indications for spinal deformity surgery.

Scope

Spinal surgeries should be performed only by those with extensive surgical training (neurosurgery, orthopedic surgery). Choice of surgical approach is based on anatomy, pathology, and the surgeon's experience and preference.

Instrumentation, bone formation or grafting materials, including biologics, should be used at the surgeon's discretion; however, use should be limited to FDA approved indications regarding the specific devices or biologics.

See LEGISLATIVE REQUIREMENTS for specific mandates in the State of Washington

INDICATIONS

Anterior Cervical Discectomy With Fusion (ACDF) - Single Level

When one of the two following criteria are met [1, 2, 3, 4, 5, 6, 7, 8]:

- Positive clinical findings of myelopathy with evidence of progressive neurologic deficits consistent with **spinal cord compression -** immediate surgical evaluation is indicated. Symptoms may include:
    - Upper extremity weakness
    - Unsteady gait related to myelopathy/balance or generalized lower extremity weakness
    - Disturbance with coordination
    - Hyperreflexia
    - Hoffmann sign
    - Positive Babinski sign and/or clonus;

      OR
- Progressive neurological deficit (motor deficit, bowel or bladder dysfunction) with evidence of spinal cord or nerve root compression on magnetic resonance imaging (MRI) or computed tomography (CT) imaging - immediate surgical evaluation is indicated (Tetreault, 2013)

  OR

When ALL of the following criteria are met [2, 9]

- Cervical radiculopathy or myelopathy from ruptured disc, spondylosis, spinal instability, or deformity
- ~~Persistent or recurrent symptoms/pain with functional limitations that are unresponsive to **at least 6 weeks** of appropriate~~Failure of conservative treatment* for a minimum of six (6) weeks within the last six (6) months
- ~~Documented failure of at least 6 consecutive weeks in the last 6 months of **any 2** of the following physician-directed :~~
    - ~~Analgesics, steroids, and/or NSAIDs~~
    - ~~Structured program of physical therapy~~
    - ~~Structured home exercise program prescribed by a physical therapist, chiropractic provider or physician~~
    - ~~Epidural steroid injections and or selective nerve root block~~
- Imaging studies confirm the presence of spinal cord or spinal nerve root compression (disc herniation or foraminal stenosis) at the level **corresponding with the clinical findings**. Imaging studies may include:
    - MRI (preferred study for assessing cervical spine soft tissue); **OR**
    - CT with or without myelography— indicated in individuals in whom MRI is contraindicated; preferred for examining bony structures, or in individuals presenting with clinical symptoms or signs inconsistent with MRI findings (e.g., foraminal compression not seen on MRI).

As first-line treatment without conservative care measures in the following clinical cases [3, 6, 8, 10]

- As outlined above for myelopathy or progressive neurological deficit scenarios
- Significant spinal cord or nerve root compression due to tumor, infection, or trauma
- Fracture or instability on radiographic films measuring:
    - Sagittal plane angulation of greater than 11 degrees at a single interspace or greater than 3.5mm anterior subluxation in association with radicular/cord dysfunction; **OR**
    - Subluxation at the (C1) level of the atlantodental interval of more than 3 mm in an adult and 5 mm in a child

Not recommended [9]

- In asymptomatic or mildly symptomatic cases of cervical spinal stenosis
- In cases of neck pain alone, without neurological deficits, and no evidence of significant spinal nerve root or cord compression on MRI or CT. *See Cervical Fusion for Treatment of Axial Neck Pain Criteria*

Anterior Cervical Discectomy With Fusion (ACDF) – Multiple Levels

When one of the two following criteria are met [1, 2, 3, 4, 5, 6, 7, 8]:

- Positive clinical findings of myelopathy with evidence of progressive neurologic deficits consistent with worsening **spinal cord compression –** immediate surgical evaluation is indicated. Symptoms may include:
    - Upper extremity weakness
    - Unsteady gait related to myelopathy/balance or generalized lower extremity weakness
    - Disturbance with coordination
    - Hyperreflexia
    - Hoffmann sign
    - Positive Babinski sign and/or clonus;

      OR
- Progressive neurological deficit (motor deficit, bowel or bladder dysfunction) with corresponding evidence of spinal cord or nerve root compression on an MRI or CT scan images – immediate surgical evaluation is indicated

OR

When ALL of the following criteria are met [2, 9] :

- Cervical radiculopathy or myelopathy due to ruptured disc, spondylosis, spinal instability, or deformity
- Failure of conservative treatment* for a minimum of six (6) weeks within the last six (6) months~~Persistent or recurrent pain/symptoms with functional limitations that are unresponsive to at least **6 weeks of**~~

~~Documented failure of at least 6 consecutive weeks in the last 6 months of **any 2** of the following physician-directed :~~

~~Analgesics, steroids, and/or NSAIDs~~
~~Structured program of physical therapy~~
~~Structured home exercise program prescribed by a physical therapist, chiropractic provider or physician~~
~~Epidural steroid injections and or selective nerve root block~~

-
- Imaging studies confirm the presence of spinal cord or spinal nerve root compression (disc herniation or foraminal stenosis) at multiple levels corresponding with the clinical findings. Imaging studies may include any of the following[2]:
    - MRI (preferred study for assessing cervical spine soft tissue)
      ~~;~~**OR**
    - CT with or without myelography - indicated in individuals in whom MRI is contraindicated; preferred for examining bony structures, or in individuals presenting with clinical symptoms or signs inconsistent with MRI findings (e.g., foraminal compression not seen on MRI)

As **first-line treatment without conservative care measures in the following clinical cases [3, 6, 8, 10]**

- As outlined above for myelopathy or progressive neurological deficit scenarios
- Significant spinal cord or nerve root compression due to tumor, infection, or trauma
- Fracture or instability on radiographic films measuring:
    - Sagittal plane angulation of greater than 11 degrees at a single interspace or greater than 3.5mm anterior subluxation in association with radicular/cord dysfunction; **OR**
    - Subluxation at the (C1) level of the atlantodental interval of more than 3 mm in an adult and 5 mm in a child

Not recommended [9]

- In asymptomatic or mildly symptomatic cases of cervical spinal stenosis.
- In cases of neck pain alone, without neurological deficits, and no evidence of significant spinal nerve root or cord compression on MRI or CT. *See Cervical Fusion for Treatment of Axial Neck Pain Criteria.*

Cervical Posterior Decompression With Fusion - Single Level

When one of the two following criteria are met [1, 2, 3, 4, 5, 6, 7, 8, 11]:

- Positive clinical findings of myelopathy with evidence of progressive neurologic deficits consistent with worsening **spinal cord compression -** immediate surgical evaluation is indicated**.** Symptoms may include:
    - Upper extremity weakness
    - Unsteady gait related to myelopathy/balance or generalized lower extremity weakness
    - Disturbance with coordination
    - Hyperreflexia
    - Hoffmann sign

- Positive Babinski sign and/or clonus

OR

- Progressive neurological deficit (motor deficit, bowel or bladder dysfunction) with corresponding evidence of spinal cord or nerve root compression on an MRI or CT scan images - immediate surgical evaluation is indicated

OR

When ALL of the following criteria are met [2, 9]:

- Cervical radiculopathy or myelopathy from ruptured disc, spondylosis, spinal instability, or deformity
- Failure of conservative treatment* for a minimum of six (6) weeks within the last six (6) months
- ~~Persistent or recurrent symptoms/pain with functional limitations that are unresponsive to at least **6 weeks of**~~
- ~~Documented failure of at least 6 consecutive weeks in the last 6 months of **any 2** of the following physician-directed :~~
  - ~~Analgesics, steroids, and/or NSAIDs~~
  - ~~Structured program of physical therapy~~
  - ~~Structured home exercise program prescribed by a physical therapist, chiropractic provider or physician~~
  - ~~Epidural steroid injections and or selective nerve root block~~
- Imaging studies confirm the presence of spinal cord or spinal nerve root compression (disc herniation or foraminal stenosis) at single level **corresponding with the clinical findings**. Imaging studies may include:
  - MRI (preferred study for assessing cervical spine soft tissue)

    OR
  - CT with or without myelography – indicated in individuals in whom MRI is contraindicated; preferred for examining bony structures, or in individuals presenting with clinical symptoms or signs inconsistent with MRI findings (e.g., foraminal compression not seen on MRI)

As first-line treatment without conservative care measures in the following clinical cases [3, 6, 8, 10, 11]

- As outlined above for myelopathy or progressive neurological deficit scenarios
- Significant spinal cord or nerve root compression due to tumor, infection, or trauma.
- Fracture or instability on radiographic films measuring:
  - Sagittal plane angulation of greater than 11 degrees at a single interspace or greater than 3.5 mm anterior subluxation in association with radicular/cord dysfunction; **OR**
  - Subluxation at the (C1) level of the atlantodental interval of more than 3 mm in an adult and 5 mm in a child

Not recommended [9]:

- In asymptomatic or mildly symptomatic cases of cervical spinal stenosis.
- In cases of neck pain alone, without neurological deficits, and no evidence of significant spinal nerve root or cord compression on MRI or CT. *See Cervical Fusion for Treatment of Axial Neck Pain Criteria.*

Cervical Posterior Decompression With Fusion – Multiple Levels

When one of the two following criteria are met [1, 2, 3, 4, 5, 6, 7, 8, 11]:

- Positive clinical findings of myelopathy with evidence of progressive neurologic deficits consistent with worsening **spinal cord compression –** immediate surgical evaluation is indicated. Symptoms may include:
    - Upper extremity weakness
    - Unsteady gait related to myelopathy/balance or generalized lower extremity weakness
    - Disturbance with coordination
    - Hyperreflexia
    - Hoffmann sign
    - Positive Babinski sign and/or clonus

    OR
- Progressive neurological deficit (motor deficit, bowel or bladder dysfunction) with corresponding evidence of spinal cord or nerve root compression on an MRI or CT scan images – immediate surgical evaluation is indicated

    OR

When ALL of the following criteria are met [9, 2]

- Cervical radiculopathy or myelopathy from ruptured disc, spondylosis, spinal instability, or deformity
    - Failure of conservative treatment* for a minimum of six (6) weeks within the last six (6) months
- ~~Persistent or recurrent symptoms/pain with functional limitations that are unresponsive to at **least 6 weeks of**~~
- ~~Documented failure of at least 6 consecutive weeks in the last 6 months of **any 2** of the following physician-directed :~~
    - ~~Analgesics, steroids, and/or NSAIDs~~
    - ~~Structured program of physical therapy~~
    - ~~Structured home exercise program prescribed by a physical therapist, chiropractic provider or physician~~
    - ~~Epidural steroid injections and or facet injections/selective nerve root block;~~

    AND

- Imaging studies indicate significant spinal cord or spinal nerve root compression at multiple levels **corresponding with the clinical findings**. Imaging studies may include~~2~~:
    - MRI (preferred study for assessing cervical spine soft tissue); **OR**
    - CT with or without myelography - indicated in individuals in whom MRI is contraindicated; preferred for examining bony structures, or in individuals presenting with clinical symptoms or signs inconsistent with MRI findings (e.g., foraminal compression not seen on MRI)

As first-line treatment without conservative care measures in the following clinical cases [3, 6, 8, 10, 11]

- As outlined above for myelopathy or progressive neurological deficit scenarios

- Significant spinal cord or nerve root compression due to tumor, infection, or trauma
- Fracture or instability on radiographic films measuring:
    - Sagittal plane angulation of greater than 11 degrees at a single interspace or greater than 3.5mm anterior subluxation in association with radicular/cord dysfunction; **OR**
    - Subluxation at the (C1) level of the atlantodental interval of more than 3 mm in an adult and 5 mm in a child

Not recommended [9]

- In asymptomatic or mildly symptomatic cases of cervical spinal stenosis.
- In cases of neck pain alone, without neurological deficits, and no evidence of significant spinal nerve root or cord compression on MRI or CT. *See: Cervical Fusion for Treatment of Axial Neck Pain Criteria.*

Cervical Fusion For Treatment Of Axial Neck Pain

Fusion in individuals with non-radicular cervical pain

ALL of the following criteria must be met [12]

- Improvement of the symptoms has failed or plateaued, and the residual symptoms of pain and functional disability are unacceptable at the **end of 6 to 12 consecutive months of appropriate, active treatment**, or at the end of longer duration of non-operative programs for those debilitated with complex problems

  [**NOTE:** Mere passage of time with poorly guided treatment is not considered an active treatment program]

- All pain generators are adequately defined and treated
- All physical medicine and manual therapy interventions are completed
- X-ray, MRI, or CT demonstrating disc pathology or spinal instability
- Spine pathology limited to one or two levels unless other complicating factors are involved
- Psychosocial evaluation for confounding issues addressed

NOTE: The effectiveness of three-level or greater cervical fusion for non-radicular pain has not been established.

Cervical Posterior Decompression

The following criteria must be met* [1, 2, 3, 5, 6, 7, 8, 13]

- Positive clinical findings of myelopathy with evidence of progressive neurologic deficits consistent with worsening **spinal cord compression -** immediate surgical evaluation is indicated. Symptoms may include:
    - Upper extremity weakness
    - Unsteady gait related to myelopathy/balance or generalized lower extremity weakness

    - Disturbance with coordination
    - Hyperreflexia
    - Hoffmann sign
    - Positive Babinski sign and/or clonus; **OR**
- Progressive neurological deficit (motor deficit, bowel or bladder dysfunction) with corresponding evidence of spinal cord or nerve root compression on an MRI or CT scan images - immediate surgical evaluation is indicated[10, 14, 26]; **OR**

When ALL of the following criteria are met [2]

- Cervical radiculopathy from ruptured disc, spondylosis, or deformity
- Failure of conservative treatment* for a minimum of six (6) weeks within the last six (6) months
- ~~Persistent or recurrent symptoms/pain with functional limitations that are unresponsive to at **least 6 weeks of appropriate**~~
- ~~Documented failure of at least 6 consecutive weeks in the last 6 months of **any 2** of the following physician-directed :~~
    - ~~Analgesics, steroids, and/or NSAIDs~~
    - ~~Structured program of physical therapy~~
    - ~~Structured home exercise program prescribed by a physical therapist, chiropractic provider or physician~~
    - ~~Epidural steroid injections and or facet injections/selective nerve root block~~
- Imaging studies confirm the presence of spinal cord or spinal nerve root compression at the level(s) **corresponding with the clinical findings.** Imaging studies may include **any** of the following:
    - MRI (preferred study for assessing cervical spine soft tissue); **OR**
    - CT with or without myelography— indicated in individuals in whom MRI is contraindicated; preferred for examining bony structures, or in individuals presenting with clinical symptoms or signs inconsistent with MRI findings (e.g., foraminal compression not seen on MRI)

Cervical decompression performed as first-line treatment without conservative care in the following clinical cases [3, 6, 8, 13]

- As outlined above for myelopathy or progressive neurological deficit scenarios.
- Spinal cord or nerve root compression due to tumor, infection, or trauma.

Not Recommended [9]

- In asymptomatic or mildly symptomatic cases.
- In cases of neck pain alone, without neurological deficits and abnormal imaging findings. *See Cervical Fusion for Treatment of Axial Neck Pain Criteria.*
- In individuals with kyphosis or at risk for development of postoperative kyphosis.

Cervical Artificial Disc Replacement (Single Or Two Level) [2, 14]

When all of the following criteria are met:

- Skeletally mature individual; **AND**
- Intractable radiculopathy caused by one-or-two-level disease (either herniated disc or spondolytic osteophyte) located at C3-C7;

AND

- Failure of conservative treatment* for a minimum of six (6) weeks within the last six (6) months

~~Persistent or recurrent symptoms/pain with functional limitations that are unresponsive to **at least 6 weeks** of appropriate ; **AND**~~
~~Documented failure of at least 6 consecutive weeks in the last 6 months of **any 2** of the following physician-directed :~~
~~Analgesics, steroids, and/or NSAIDs~~
~~Structured program of physical therapy~~
~~Structured home exercise program prescribed by a physical therapist, chiropractic provider or physician~~
~~Epidural steroid injections and or facet injections /selective nerve root block;~~
AND

- Imaging studies confirm the presence of compression at the level**(s) corresponding with the clinical findings** (MRI or CT); **AND**
- Use of an FDA-approved prosthetic intervertebral discs.

Contraindications

- Symptomatic multiple level disease affecting 3 or more levels
- Infection (at site of implantation or systemic)
- Osteoporosis or osteopenia
- Instability
  - Translation greater than 3mm difference between lateral flexion-extension views at the symptomatic levels
  - 11 degrees of angular difference between lateral flexion-extension views at the symptomatic levels
- Sensitivity or allergy to implant materials
- Severe spondylosis defined as:
  - > 50% disc-height loss compared to minimally or non-degenerated levels; **OR**
  - Bridging osteophytes; **OR**
  - Absence of motion on lateral flexion-extension views at the symptomatic site
- Severe facet arthropathy
- Ankylosing spondylitis
- Rheumatoid arthritis
- Previous fracture with anatomical deformity
- Ossification of the posterior longitudinal ligament (OPLL)
- Active cervical spine malignancy

Cervical Fusion Without Decompression

Cervical fusion without decompression will be reviewed on a **case-by-case basis**. Atraumatic instability due to Down Syndrome-related spinal deformity, rheumatoid arthritis, or basilar invagination are uncommon, but may require cervical fusion.

Cervical Anterior Decompression (without fusion) [15, 2]

All requests for anterior decompression without fusion will be reviewed on a **case-by-case basis**.

RISK FACTORS AND CONSIDERATIONS [16, 17, 18]

- Early intervention may be required in acute incapacitating pain or with progressive neurological deficits.
- Individuals may present with pain, numbness, extremity weakness, loss of coordination, gait issues, or bowel and bladder complaints. Non-operative treatment is an important role in the care of individuals with degenerative cervical spine disorders. If these symptoms progress to neurological deficits, from corresponding spinal cord or nerve root compression, surgical intervention may be warranted.
- Obesity is an identified risk factor for surgical site infection. For individuals undergoing posterior cervical decompression with or without fusion for a diagnosis other than myelopathy, BMI should be less than 40. These cases will be reviewed on a case-by-case basis and may be denied given the increased risk of infection.
- If operative intervention is being considered, especially procedures that require a fusion, it is required the person refrain from smoking/nicotine for **at least six weeks** prior to surgery and **during the time of healing**.
- In situations requiring possible need for an operation, a second opinion may be necessary. Psychological evaluation is strongly encouraged before surgery is performed for isolated axial pain to determine if the individual will likely benefit from the treatment.
- It is imperative for the clinician to rule out non-physiologic modifiers of pain presentation, or non-operative conditions mimicking radiculopathy, myelopathy or spinal instability (peripheral compressive neuropathy, chronic soft tissue injuries, and psychological conditions), prior to consideration of elective surgical intervention.

NOTE

Failure of conservative treatment* is defined as one of the following:

- Lack of meaningful improvement after a full course of treatment; **OR**
- Progression or worsening of symptoms during treatment; **OR**
- Documentation of a medical reason the member is unable to participate in treatment

Closure of medical or therapy offices, patient inconvenience, or noncompliance without explanation does not constitute "inability to complete" treatment.

LEGISLATIVE LANGUAGE

Washington

Washington State Health Care Authority: Health Technology Clinical Committee

20170120B – Artificial disc replacement – Re-review [19]

HTCC coverage determination:

Cervical artificial disc replacement is **a covered benefit with conditions**, consistent with the criteria identified in the reimbursement determination.

HTCC reimbursement determination:

Limitations of coverage:

Patients must meet FDA approved indications for use and not have any contraindications. FDA approval is device specific but includes:

- Skeletally mature patients
- Disc replacement following one- or two-level discectomy for intractable symptomatic radiculopathy or myelopathy confirmed by patient findings and imaging.

Patients must have advanced imaging and clinical evidence of corresponding nerve root or spinal cord compression and have failed or be inappropriate for non-operative care. For two-level procedures, objective evidence of radiculopathy, myelopathy or spinal cord compression at two consecutive levels is required.

Non-covered indicators: NA

20130322B – Cervical Spinal Fusion for Degenerative Disc Disease [20]

HTCC Coverage Determination:

Cervical Spinal Fusion for Degenerative Disc Disease is a **covered benefit with conditions.**

HTCC Reimbursement Determination:

Limitations of Coverage

Cervical Spinal Fusion is covered when the following conditions are met:

1. Patients with signs and symptoms of radiculopathy; and
2. Advanced imaging evidence of corresponding nerve root compression; and
3. Failure of conservative (non-operative) care.

Non-Covered Indicators

Cervical Spinal Fusion is not a covered benefit for neck pain without evidence of radiculopathy or myelopathy.

BACKGROUND

~~This guideline outlines the key surgical treatments and indications for common cervical spinal disorders and is based upon the best available evidence. Spine surgery is a complex area of medicine, and this document breaks out the clinical indications by surgical type. Operative treatment is indicated only when the natural history of an operatively treatable problem is better than the natural history of the problem without operative treatment. Choice of surgical approach is based on anatomy, pathology, and the surgeon's experience and preference. All operative interventions must be based on a positive correlation with clinical findings, the natural history of the disease, the clinical course, and diagnostic tests or imaging results.~~

~~OVERVIEW~~

*Conservative T**reatment**~~herapy~~

Non-operative conservative treatment should include a multimodality approach consisting of at least one (1) active and one (1) inactive component targeting the affected spinal region.

- Active components
  - physical therapy
  - a physician-supervised home exercise program (HEP)**
  - chiropractic care [21, 22]
- Inactive components
  - Medications (~~e.g.~~e.g., NSAIDs, steroids, analgesics)
  - Injections (~~e.g.~~e.g., epidural steroid injection, selective nerve root block)
  - Medical devices (~~e.g.~~e.g., TENS unit, bracing)

**Home Exercise Program (HEP)

The following two elements are required to meet conservative therapy guidelines for HEP:

- Documentation of an exercise prescription/plan provided by a physician, physical therapist, or chiropractor [21] ; **AND**
- Follow-up documentation regarding completion of HEP after the required 6-week timeframe or inability to complete HEP due to a documented medical reason (i.e., increased pain or inability to physically perform exercises).

POLICY HISTORY

Date	Summary
December 2023	• Added legislative language for WA state • Added conservative care language
May 2023	• Updated references • Moved General Information phrase to top of GL
May 2022	• Reference added • Background updated (added obesity as a risk factor)

REFERENCES

[1] D. K. Park, J. W. Jenne and K. S. Bode, "Cervical Spondylotic Myelopathy: Surgical Treatment Options," January 2022. [Online]. [Accessed 2023].

[2] North American Spine Society, "Diagnosis and Treatment of Cervical Radiculopathy from Degenerative Disorders," 2010. [Online]. [Accessed 2023].

[3] L. A. Tetreault, A. Karpova and M. G. Fehlings, "Predictors of outcome in patients with degenerative cervical spondylotic myelopathy undergoing surgical treatment: results of a systematic review," *European Spine Journal,* vol. 24, no. Suppl 2, 2015.

[4] H. Luyao, Y. Xiaoxiao, F. Tianxiao, L. Yuandong and P. Wang, "Management of Cervical Spondylotic Radiculopathy: A Systematic review," *Global Spine Journal,* vol. 12, no. 8, 2022.

[5] X. Yuan, C. Feng, W. J. Yipeng and H. Jianhua, "Surgical approaches and outcomes for cervical myelopathy with increased signal intensity on T2-weighted MRI: a meta-analysis," *Journal of Orthopaedic Surgery and Research,* vol. 14, 2019.

[6] S. Guo, T. Lin, R. Wu, Z. Wang, G. Chen and W. Liu, "The Pre-Operative Duration of Symptoms: The Most Important Predictor of Post-Operative Efficacy in Patients with Degenerative Cervical Myelopathy," *Brain Sciences,* vol. 12, 2022.

[7] R. S. Nunna, S. Khalid, R. G. Chiu, R. Parola, R. G. Fessler, O. Adogwa and A. Mehta, "Anterior vs Posterior Approach in Multilevel Cervical Spondylotic Myelopathy: A Nationwide Propensity-Matched Analysis of Complications, Outcomes, and Narcotic Use," *International Journal of Spine Surgery,* vol. 16, 2022.

[8] S. S. Kwok and J. P. Cheung, "Surgical decision-making for ossification of the posterior longitudinal ligament versus other types of degenerative cervical myelopathy: anterior versus posterior approaches," *BMC Musculoskeletal Disorders,* vol. 21, 2020.

[9] I. Nikolaidis, I. P. Fouyas, P. A. Sandercock and P. F. Statham, "Surgery for cervical radiculopathy or myelopathy (Review)," *Cochrane Database of Systematic Reviews,* 2010.

[10] M. J. Spitnale and G. Grabowski, "Classification in Brief: Subaxial Cervical Spine Injury Classification and Severity Score System," *Clinical Orthopaedic Related Research,* 2020.

[11] Z. A. Audat, M. D. Fawareh, A. M. Radyeh, M. M. Obeidat, M. A. Odat, K. M. Bashaireh, M. M. Barbarawi, M. T. Nusairat, A. B. Ibraheem and M. Z. Audat, "Anterior versus posterior approach to treat cervical spondylotic myelopathy, clinical and radiological results with long period follow-up," *SAGE Open Medicine,* vol. 6, 2018.

[12] K. D. Riew, E. Ecker and J. R. Dettori, "Anterior cervical discectomy and fusion for the management of axial neck pain in the absence of radiculopathy or myelopathy," *Evidence-Based Spine-Care Journal,* vol. 1, 2010.

[13] D. F. Revesz, A. Charalampidis and P. Gerdhem, "Effectiveness of laminectomy with fusion and laminectomy alone in degenerative cervical myelopathy," *European Spine Journal,* vol. 31, 2022.

[14] K. Eseonu, E. Laurent, H. Bishi, H. Raja, K. Ravi and Z. Dannawi, "A Retrospective Comparative Study of Long-Term Outcomes Following Cervical Total Disc Replacement Versus Anterior Cervical Discectomy and Fusion," *Cureus,* 2022.

[15] R. D. Donk, A. L. Verbeek, W. I. Verhagen, H. Groenewoud, A. J. Hosman and R. H. Bartels, "What's the best surgical treatment for patients with cervical radiculopathy due to single-level degenerative disease? A randomized controlled trial," *PLOS One,* vol. 12, no. 8, 2017.

[16] R. K. Badiee, R. Mayer, B. Pennicooke, D. Chou, P. V. Mummaneni and L. A. Tan, "Complications following posterior cervical decompression and fusion: a review of incidence, risk factors, and prevention strategies," *Journal of Spine Surgery,* vol. 6, no. 1, 2020.

[17] K. L. Jackson II and J. G. Devine, "The Effects of Smoking and Smoking Cessation on Spine Surgery: A Systematic Review of the Literature," *Global Spine Journal,* vol. 6, 2016.

[18] S. S. Rajaee, L. E. Kanim and H. W. Bae, "National trends in revision spinal fusion in the USA: Patient Characteristics and Complications," *Spine,* vol. 96, no. 6, 2014.

[19] Washington State Health Authority, "Health Technology Clinical Committee - Artifical disc replacement-Re-review," 2023. [Online]. Available: www.wa.gov. [Accessed 2023].

[20] Washington State Health Authority, "Health Technology Clinical Committee - Cervical Spinal Fusion for Degenerative Disc Disease," 2023. [Online]. Available: www.wa.gov. [Accessed 2023].

[21] Annals of Internal Medicine, "Noninvasive Treatments for Acute, Subacute, and Chronic Low Back Pain: A Clinical Practice Guideline From the American College of Physicians," 2017. [Online].

[22] The American College of Radiology, *ACR Appropriateness Criteria Low Back Pain: 2021 Update,* 2021.

~~(Musculoskeletal) includes primarily physical therapy and/or injections and a combination of modalities; rest, ice, heat, modified activities, medical devices (e.g., cervical collar), medications, diathermy, chiropractic treatments, or physician supervised home exercise program.~~

~~**Home Exercise Program (HEP)~~

~~Two elements are required to meet guidelines for completion of conservative therapy:~~

- ~~Exercise prescription/plan; **AND**~~
- ~~Follow-up with member providing documentation regarding completion of HEP, (after 4–6 weeks) or inability to complete HEP due to physical reason (i.e., increased pain, inability to physically perform exercises). Inconvenience or noncompliance without explanation does not constitute "inability to complete" HEP.~~

A comprehensive assimilation of factors should lead to a specific diagnosis with positive identification of the pathologic condition(s).

- Early intervention may be required in acute incapacitating pain or with progressive neurological deficits.
- Operative treatment is indicated when the natural history of surgically treated lesions is better than the natural history for non-operatively treated lesions.
- Individuals may present with pain, numbness, extremity weakness, loss of coordination, gait issues, or bowel and bladder complaints. Non-operative treatment is an important role in the care of individuals with degenerative cervical spine disorders. If these symptoms progress to neurological deficits, from corresponding spinal cord or nerve root compression, surgical intervention may be warranted.
- All individuals being considered for surgical intervention should receive a comprehensive neuromusculoskeletal examination to identify pain generators that may either respond to non-surgical techniques or may be refractory to surgical intervention.
- Obesity is an identified risk factor for surgical site infection. For individuals undergoing posterior cervical decompression with or without fusion for a diagnosis other than myelopathy, BMI should be less than 40. These cases will be reviewed on a case-by-case basis and may be denied given the increased risk of infection.[34]
- If operative intervention is being considered, especially procedures that require a fusion, it is required the person refrain from smoking/nicotine for **at least six weeks** prior to surgery and **during the time of healing**.[35-40]
- Situations requiring possible need for an operation, a second opinion may be necessary. Psychological evaluation is strongly encouraged before surgery is performed for isolated axial pain to determine if the individual will likely benefit from the treatment.
- It is imperative for the clinician to rule out non-physiologic modifiers of pain presentation, or non-operative conditions mimicking radiculopathy, myelopathy or spinal instability (peripheral compressive neuropathy, chronic soft tissue injuries, and psychological conditions), prior to consideration of elective surgical intervention.

Anterior Approaches:

Anterior surgical approaches to cervical spine decompression emerged in the 1950s. The first literature reports describe anterior cervical discectomy combined with a spinal fusion procedure (ACDF). Fusion was added to address concerns about potential for loss of spinal stability and disc space height, leading to late postoperative complications such as kyphosis and radicular pain.[5, 6, 20, 33, 41-43]

Anterior cervical fusion (ACF) accounted for approximately 80% of cervical spine procedures performed in the United States between 2002 and 2009, while posterior cervical fusion (PCF) accounted for 8.5% of these procedures.[44]

Anterior Cervical Discectomy and Fusion (ACDF) – removal of all or part of a herniated or ruptured disc or spondolytic bony spur to alleviate pressure on the nerve roots or on the spinal

cord in individuals with symptomatic radiculopathy. Discectomy is most often combined with fusion to stabilize the spine.

Cervical Artificial Disc Replacement - Insertion of a prosthetic device into the cervical intervertebral space with the goal of maintaining physiologic motion at the treated cervical segment. The use of artificial discs is based on the surgeon's preference and training; only FDA-approved artificial discs are appropriate.

Posterior Approaches

Laminectomy – removal of the bone between the spinal process and facet pedicle junction to expose the neural elements of the spine.

Laminoplasty – opening of the lamina to enlarge the spinal canal. There are several laminoplasty techniques to alleviate cord compression by reconstructing the spinal canal. Laminoplasty is performed to decompress the spinal cord in individuals with multilevel degenerative spinal stenosis and neutral or lordotic alignment.

Laminoforaminotomy (also known as posterior discectomy) – the creation of a small window in the lamina to facilitate removal of arthritic bone spurs and herniated disc material pressing on the nerve root as it exits through the foramen.

REFERENCES

1. Park DK, Jenne JW, Bode KS, Throckmorton TW, Fischer SJ, Jenis LG. Cervical Spondylotic Myelopathy: Surgical Treatment Options. American Academy of Orthopaedic Surgeons (AAOS). Updated January 2022. Accessed February 7, 2022.
2. Bono CM, Ghiselli G, Gilbert TJ, et al. An evidence-based clinical guideline for the diagnosis and treatment of cervical radiculopathy from degenerative disorders. *Spine J*. Jan 2011;11(1):64-72. doi:10.1016/j.spinee.2010.10.023
3. Cunningham MR, Hershman S, Bendo J. Systematic review of cohort studies comparing surgical treatments for cervical spondylotic myelopathy. *Spine (Phila Pa 1976)*. Mar 1 2010;35(5):537-43. doi:10.1097/BRS.0b013e3181b204cc
4. Holly LT, Matz PG, Anderson PA, et al. Clinical prognostic indicators of surgical outcome in cervical spondylotic myelopathy. *J Neurosurg Spine*. Aug 2009;11(2):112-8. doi:10.3171/2009.1.Spine08718
5. Matz PG, Holly LT, Groff MW, et al. Indications for anterior cervical decompression for the treatment of cervical degenerative radiculopathy. *J Neurosurg Spine*. Aug 2009;11(2):174-82. doi:10.3171/2009.3.Spine08720
6. Matz PG, Holly LT, Mummaneni PV, et al. Anterior cervical surgery for the treatment of cervical degenerative myelopathy. *J Neurosurg Spine*. Aug 2009;11(2):170-3. doi:10.3171/2009.3.Spine08724
7. Matz PG, Anderson PA, Holly LT, et al. The natural history of cervical spondylotic myelopathy. *J Neurosurg Spine*. Aug 2009;11(2):104-11. doi:10.3171/2009.1.Spine08716
8. Matz PG, Ryken TC, Groff MW, et al. Techniques for anterior cervical decompression for radiculopathy. *J Neurosurg Spine*. Aug 2009;11(2):183-97. doi:10.3171/2009.2.Spine08721
9. Mummaneni PV, Kaiser MG, Matz PG, et al. Cervical surgical techniques for the treatment of cervical spondylotic myelopathy. *J Neurosurg Spine*. Aug 2009;11(2):130-41. doi:10.3171/2009.3.Spine08728
10. Tetreault LA, Karpova A, Fehlings MG. Predictors of outcome in patients with degenerative cervical spondylotic myelopathy undergoing surgical treatment: results of a systematic review. *Eur Spine J*. Apr 2015;24 Suppl 2:236-51. doi:10.1007/s00586-013-2658-z
11. Zhu B, Xu Y, Liu X, Liu Z, Dang G. Anterior approach versus posterior approach for the treatment of multilevel cervical spondylotic myelopathy: a systemic review and meta-analysis. *Eur Spine J*. Jul 2013;22(7):1583-93. doi:10.1007/s00586-013-2817-2
12. Luyao H, Xiaoxiao Y, Tianxiao F, Yuandong L, Ping W. Management of Cervical Spondylotic Radiculopathy: A Systematic review. *Global Spine J*. Oct 2022;12(8):1912-1924. doi:10.1177/21925682221075290
13. Xu Y, Chen F, Wang Y, Zhang J, Hu J. Surgical approaches and outcomes for cervical myelopathy with increased signal intensity on T2-weighted MRI: a meta-analysis. *J Orthop Surg Res*. Jul 18 2019;14(1):224. doi:10.1186/s13018-019-1265-z
14. Guo S, Lin T, Wu R, Wang Z, Chen G, Liu W. The Pre-Operative Duration of Symptoms: The Most Important Predictor of Post-Operative Efficacy in Patients with Degenerative Cervical Myelopathy. *Brain Sci*. Aug 17 2022;12(8)doi:10.3390/brainsci12081088
15. Nunna RS, Khalid S, Chiu RG, et al. Anterior vs Posterior Approach in Multilevel Cervical Spondylotic Myelopathy: A Nationwide Propensity-Matched Analysis of Complications, Outcomes, and Narcotic Use. *Int J Spine Surg*. Feb 2022;16(1):88-94. doi:10.14444/8198

16. Kwok SSS, Cheung JPY. Surgical decision-making for ossification of the posterior longitudinal ligament versus other types of degenerative cervical myelopathy: anterior versus posterior approaches. *BMC Musculoskelet Disord*. Dec 8 2020;21(1):823. doi:10.1186/s12891-020-03830-0
17. Nikolaidis I, Fouyas IP, Sandercock PA, Statham PF. Surgery for cervical radiculopathy or myelopathy. *Cochrane Database Syst Rev*. Jan 20 2010;2010(1):Cd001466. doi:10.1002/14651858.CD001466.pub3
18. White AA, 3rd, Panjabi MM. Update on the evaluation of instability of the lower cervical spine. *Instr Course Lect*. 1987;36:513-20.
19. Spitnale MJ, Grabowski G. Classification in Brief: Subaxial Cervical Spine Injury Classification and Severity Score System. *Clin Orthop Relat Res*. Oct 2020;478(10):2390-2398. doi:10.1097/corr.0000000000001463
20. van Middelkoop M, Rubinstein SM, Ostelo R, et al. No additional value of fusion techniques on anterior discectomy for neck pain: a systematic review. *Pain*. Nov 2012;153(11):2167-2173. doi:10.1016/j.pain.2012.04.021
21. Audat ZA, Fawareh MD, Radydeh AM, et al. Anterior versus posterior approach to treat cervical spondylotic myelopathy, clinical and radiological results with long period of follow-up. *SAGE Open Med*. 2018;6:2050312118766199. doi:10.1177/2050312118766199
22. Wang SJ, Jiang SD, Jiang LS, Dai LY. Axial pain after posterior cervical spine surgery: a systematic review. *Eur Spine J*. Feb 2011;20(2):185-94. doi:10.1007/s00586-010-1600-x
23. Chan AK, Shaffrey CI, Gottfried ON, et al. Cervical spondylotic myelopathy with severe axial neck pain: is anterior or posterior approach better? *J Neurosurg Spine*. Jan 1 2023;38(1):42-55. doi:10.3171/2022.6.Spine22110
24. Riew KD, Ecker E, Dettori JR. Anterior cervical discectomy and fusion for the management of axial neck pain in the absence of radiculopathy or myelopathy. *Evid Based Spine Care J*. Dec 2010;1(3):45-50. doi:10.1055/s-0030-1267067
25. Heary RF, Ryken TC, Matz PG, et al. Cervical laminoforaminotomy for the treatment of cervical degenerative radiculopathy. *J Neurosurg Spine*. Aug 2009;11(2):198-202. doi:10.3171/2009.2.Spine08722
26. Wang TY, Lubelski D, Abdullah KG, Steinmetz MP, Benzel EC, Mroz TE. Rates of anterior cervical discectomy and fusion after initial posterior cervical foraminotomy. *Spine J*. May 1 2015;15(5):971-6. doi:10.1016/j.spinee.2013.05.042
27. Revesz DF, Charalampidis A, Gerdhem P. Effectiveness of laminectomy with fusion and laminectomy alone in degenerative cervical myelopathy. *Eur Spine J*. May 2022;31(5):1300-1308. doi:10.1007/s00586-022-07159-1
28. Sahai N, Changoor S, Dunn CJ, et al. Minimally Invasive Posterior Cervical Foraminotomy as an Alternative to Anterior Cervical Discectomy and Fusion for Unilateral Cervical Radiculopathy: A Systematic Review and Meta-analysis. *Spine (Phila Pa 1976)*. Dec 15 2019;44(24):1731-1739. doi:10.1097/brs.0000000000003156
29. Gornet MF, Lanman TH, Burkus JK, et al. Two-level cervical disc arthroplasty versus anterior cervical discectomy and fusion: 10-year outcomes of a prospective, randomized investigational device exemption clinical trial. *J Neurosurg Spine*. Jun 21 2019:1-11. doi:10.3171/2019.4.Spine19157

30. Lavelle WF, Riew KD, Levi AD, Florman JE. Ten-year Outcomes of Cervical Disc Replacement With the BRYAN Cervical Disc: Results From a Prospective, Randomized, Controlled Clinical Trial. *Spine (Phila Pa 1976)*. May 1 2019;44(9):601-608. doi:10.1097/brs.0000000000002907
31. Eseonu K, Laurent E, Bishi H, Raja H, Ravi K, Dannawi Z. A Retrospective Comparative Study of Long-Term Outcomes Following Cervical Total Disc Replacement Versus Anterior Cervical Discectomy and Fusion. *Cureus*. Dec 2022;14(12):e32399. doi:10.7759/cureus.32399
32. Truumees E, Prather H. Orthopaedic Knowledge Update: Spine 5. American Academy of Orthopaedic Surgeons; 2017:493-497.
33. Donk RD, Verbeek ALM, Verhagen WIM, Groenewoud H, Hosman AJF, Bartels R. What's the best surgical treatment for patients with cervical radiculopathy due to single-level degenerative disease? A randomized controlled trial. *PLoS One*. 2017;12(8):e0183603. doi:10.1371/journal.pone.0183603
34. Badiee RK, Mayer R, Pennicooke B, Chou D, Mummaneni PV, Tan LA. Complications following posterior cervical decompression and fusion: a review of incidence, risk factors, and prevention strategies. *J Spine Surg*. Mar 2020;6(1):323-333. doi:10.21037/jss.2019.11.01
35. Tetreault L, Kopjar B, Côté P, Arnold P, Fehlings MG. A Clinical Prediction Rule for Functional Outcomes in Patients Undergoing Surgery for Degenerative Cervical Myelopathy: Analysis of an International Prospective Multicenter Data Set of 757 Subjects. *J Bone Joint Surg Am*. Dec 16 2015;97(24):2038-46. doi:10.2106/jbjs.O.00189
36. Jackson KL, 2nd, Devine JG. The Effects of Smoking and Smoking Cessation on Spine Surgery: A Systematic Review of the Literature. *Global Spine J*. Nov 2016;6(7):695-701. doi:10.1055/s-0036-1571285
37. Kusin DJ, Ahn UM, Ahn NU. The Effect of Smoking on Spinal Cord Healing Following Surgical Treatment of Cervical Myelopathy. *Spine (Phila Pa 1976)*. Sep 15 2015;40(18):1391-6. doi:10.1097/brs.0000000000001014
38. Olsson EC, Jobson M, Lim MR. Risk factors for persistent dysphagia after anterior cervical spine surgery. *Orthopedics*. Apr 2015;38(4):e319-23. doi:10.3928/01477447-20150402-61
39. Rajaee SS, Kanim LE, Bae HW. National trends in revision spinal fusion in the USA: patient characteristics and complications. *Bone Joint J*. Jun 2014;96-b(6):807-16. doi:10.1302/0301-620x.96b6.31149
40. Yuan H, Yu H, Liu L, Zheng B, Wang L, Wang H. Risk Factors for Predicting Increased Surgical Drain Output in Patients After Anterior Cervical Decompression and Fusion. *World Neurosurg*. Aug 2022;164:e980-e991. doi:10.1016/j.wneu.2022.05.075
41. Sonntag VK, Klara P. Controversy in spine care. Is fusion necessary after anterior cervical discectomy? *Spine (Phila Pa 1976)*. May 1 1996;21(9):1111-3. doi:10.1097/00007632-199605010-00025
42. Dowd GC, Wirth FP. Anterior cervical discectomy: is fusion necessary? *J Neurosurg*. Jan 1999;90(1 Suppl):8-12. doi:10.3171/spi.1999.90.1.0008
43. Denaro V, Di Martino A. Cervical spine surgery: an historical perspective. *Clin Orthop Relat Res*. Mar 2011;469(3):639-48. doi:10.1007/s11999-010-1752-3
44. Oglesby M, Fineberg SJ, Patel AA, Pelton MA, Singh K. Epidemiological trends in cervical spine surgery for degenerative diseases between 2002 and 2009. *Spine (Phila Pa 1976)*. Jun 15 2013;38(14):1226-32. doi:10.1097/BRS.0b013e31828be75d

Reviewed / Approved by NIA Clinical Guideline Committee

Disclaimer: *National Imaging Associates, Inc. (NIA) authorization policies do not constitute medical advice and are not intended to govern or otherwise influence the practice of medicine. These policies are not meant to supplant your normal procedures, evaluation, diagnosis, treatment and/or care plans for your patients. Your professional judgement must be exercised and followed in all respects with regard to the treatment and care of your patients. These policies apply to all Evolent Health LLC subsidiaries including, but not limited to, National Imaging Associates ("NIA"). The policies constitute only the reimbursement and coverage guidelines of NIA. Coverage for services varies for individual members in accordance with the terms and conditions of applicable Certificates of Coverage, Summary Plan Descriptions, or contracts with governing regulatory agencies. NIA reserves the right to review and update the guidelines at its sole discretion. Notice of such changes, if necessary, shall be provided in accordance with the terms and conditions of provider agreements and any applicable laws or regulations.*