Medical Treatment Guidelines

Washington State Department of Labor and Industries

Diagnosis and Treatment of Cervical Radiculopathy and Myelopathy

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I. CERVICAL SURGERY REVIEW CRITERIA

A request may be appropriate for	**AND the diagnosis is supported by these clinical findings**			**And this has been done (if recommended).**
Surgical Procedure & Diagnosis	Subjective	Objective	Imaging	Conservative care
Surgery (in general) For: neck pain without subjective, objective, and imaging evidence of radiculopathy or myelopathy	**Surgery is not covered**			
ACDF or TDA **Laminotomy** **Foraminotomy** For: Radiculopathy-Single level	Sensory symptoms (radicular pain and/or paresthesias) in a dermatomal distribution that correlates with involved cervical level	Motor deficit **OR** Reflex changes **OR** Positive EMG Findings should correlate with involved cervical level.	MRI **OR** Myelogram with CT scan Abnormal imaging (moderate to severe foraminal stenosis) that correlates nerve root involvement with subjective and objective findings	At least 6 weeks* of : Physical therapy using active modalities or chiropractic **OR** anti-inflammatory medications
	AND	**AND**	**AND**	
			In the case of discordant reading between surgeon and radiologist, an independent radiology opinion is needed.	*In the case of clear motor deficit after an acute injury, the 6 weeks of conservative care is not required.
		OR		
	Sensory symptoms (radicular pain and/or paresthesias) in a dermatomal distribution	A positive response to a selective nerve root block, as determined and documented by the interventionist, in the case of complaints of radicular pain without motor, sensory, reflex or EMG changes. Criteria for selective nerve root blocks (**see page 8 for details**):		

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A request may be appropriate for	AND the diagnosis is supported by these clinical findings			And this has been done (if recommended).
Surgical Procedure & Diagnosis	Subjective	Objective	Imaging	Conservative care
	that correlates with involved cervical level	• Use low-volume(≤1.0 cc) local anesthetic, with fluoroscopy or CT scan • No sedation should be given with SNRB, except in extreme cases of anxiety • Document a baseline level of pain • Meaningful improvement in pain=80%, or 5-pt change on VAS • A positive response as noted by the interventionist performing the procedure • Only one level of surgery will be approved if SNRB is the sole basis for objective diagnosis		
ACDF or TDA **Laminotomy** **Foraminotomy** **Corpectomy** For Radiculopathy - 2 levels	**A 2-level surgery may be approved if the following criteria are met:** All of the above criteria for single-level fusion (not including SNRB) are present at the primary level, **AND** • The adjacent level has radicular pain correlating with at least moderate foraminal stenosis or lateral recess herniation, **OR** • EMG changes, muscle weakness or reflex changes that indicate involvement of the adjacent level If the first level has no findings except the response to SNRB, a second level is not allowed. **Total disc arthroplasty is contraindicated for moderate to severe facet arthropathy or measurable instability (>3.5mm) and or > 11˚ of rotational difference to either adjacent level.**			
ACDF **Laminotomy** **Foraminotomy** **Corpectomy** For Radiculopathy-more than 2 adjacent levels (all requests for more than 2 levels will be automatically peer-reviewed)	All the above objective criteria for single level radiculopathy, which does not include SNRB's, must be met for *each* level for which surgery is being requested.			
ACDF **Laminotomy** **Foraminotomy** **Corpectomy** For adjacent segment pathology	There is no clear cut evidence that fusion leads to symptomatic adjacent segment pathology.			

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A request may be appropriate for	**AND the diagnosis is supported by these clinical findings**			**And this has been done (if recommended).**
Surgical Procedure & Diagnosis	Subjective	Objective	Imaging	Conservative care
ACDF or TDA **Laminectomy ± fusion** **Corpectomy** For Myelopathy, single- level	History of: Hand clumsiness or incoordination, gait disturbance, bowel or bladder dysfunction,	A combination of abnormal lower and upper motor neuron findings in upper extremities,	Myelogram with CT scan OR MRI Abnormal imaging that correlates with subjective and objective findings:	Not required if there is evidence of myelopathy
	AND	**AND**		
		OR Upper motor neuron signs in the lower extremities. Examples: • Loss of fine motor control • Weakness • Hand clumsiness • Gait disturbance • Bowel or bladder dysfunction • Increased tone in arms and/or legs • Hyperactive reflexes including Hoffman's sign and/or clonus	Cord signal change **OR** compression with loss of circumferential CSF signal **OR** stenosis (≤8mm AP diameter) In the case of discordant reading between surgeon and radiologist, an independent radiology opinion is needed	
ACDF, laminectomy ±fusion, laminoplasty, corpectomy **For** **myelopathy,multi-level**	If the above criteria are met for **<u>single- level myelopathy</u>**, the levels of surgical intervention will be left to the surgeon's discretion.			

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A request may be appropriate for	**AND the diagnosis is supported by these clinical findings**			**And this has been done (if recommended).**
Surgical Procedure & Diagnosis	Subjective	Objective	Imaging	Conservative care
Repeat surgery For Pseudarthrosis	Axial neck pain for more than 1 year; **AND**	No definitive physical exam findings **AND**	CT finding of non-union (after 1 year or more) **OR** Hardware failure **OR** Flexion/extension x rays showing > 2 mm of interspinous motion. CT SPECT if above not definitive	
Repeat Surgeries at same level - not due to pseudarthrosis	All the above criteria for single level radiculopathy must be met. **Request for repeat surgeries will be reviewed on an individual basis. There must have been documented and substantial improvement in pain and function on a validated instrument after the first surgery before a second surgery will be approved.**			
Hybrid Surgeries	The department considers hybrid procedures to be investigational. There is insufficient evidence in medical literature to permit conclusions on its safety and efficacy.			

Abstinence from nicotine, for at least 4 weeks before surgery as shown by 2 negative urine cotinine tests, is required for all fusions and repeat fusions done for radiculopathy. This does not apply to progressive myelopathy or motor radiculopathy. Smoking cessation products may be covered in some instances, see L&I policy, at http://www.lni.wa.gov/ClaimsIns/Providers/TreatingPatients/ByCondition/Smokingcessation.asp

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II. INTRODUCTION

This guideline is intended as a community standard for health care providers who treat injured or ill workers in the Washington workers' compensation system under Title 51 RCW, and as review criteria for the department's utilization review team, to help ensure that diagnosis and treatment of cervical neck conditions are of the highest quality. The emphasis is on accurate diagnosis and curative or rehabilitative treatment (see WAC 296-20-01002 for definitions).

This guideline was developed in 2014 by a subcommittee of the statutory Industrial Insurance Medical Advisory Committee (IIMAC). Subcommittee members are actively practicing physicians specializing in rehabilitation medicine, occupational medicine, orthopedic surgery, neurology, and pain management. The subcommittee based its recommendations on the weight of the best available clinical and scientific evidence from a systematic review of the literature, and on a consensus of expert opinion when scientific evidence was insufficient.

The emphasis of this guideline is on cases that are clearly work-related and may require surgical treatment. Accurate assessment and treatment are critical to determining work-relatedness and facilitating the worker's return to health and productivity.

III. BACKGROUND AND PREVALENCE

Neck-related pain is common in both the workers' compensation and general populations. Many cases of axial neck pain are temporary and will resolve with time and non-operative treatment (Todd et al.) It can be difficult to distinguish between an acute or chronic condition related to work, and chronic pain and degeneration related to aging.

Cervical degenerative disc disease (DDD) is a common cause of pain and disability, affecting approximately two- thirds of the U.S adult population [1]. Most symptomatic cases present between the ages of 40 and 60 [2], although many individuals never develop symptoms. MRI studies have documented the presence of DDD in 60% of asymptomatic individuals aged greater than 40 years and 80% of patients over the age of 80 [3, 4]. Previous neck injuries, cervical strains, and arthritis increase the risk of developing DDD, which may result in the development of abnormal bony spurs (spondylosis). Less commonly, cervical DDD progression and its sequelae may directly compress parts of the spinal cord (myelopathy), affecting gait and balance.

Treatment options for DDD include conservative and surgical measures. In the general population, the rate of surgery for degenerative disc disease of the cervical spine increased 90% between 1990 and 2000[5]. In elderly patients in the U.S., rates of cervical fusions rose 206% between 1992 and 2005 [6]. Annual costs for anterior cervical fusions increased 3 fold ($1.62 billion to $5.63 billion) between 2000 and 2009[7].

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IV. ESTABLISHING WORK-RELATEDNESS

The etiology of radiculopathies and myelopathies can be multi-factorial or unknown. A cervical condition presenting with a history of radiating arm pain, scapular pain, diminished muscle stretch reflexes, loss of sensation, or motor weakness, may be classified as an occupational injury or occupational disease depending upon the circumstances giving rise to the condition. If there was a single inciting event resulting in objective medical findings, the condition is likely the result of an occupational injury. If there was no single inciting event, the condition may have risen as the result of an occupational disease. (To be accepted by the department additional legal requirements must be met, see RCW 51.08.100, *link*). The pain and other manifestations of both industrial injuries and occupational diseases generally become evident within 3 months of the inciting event. For this reason, a condition reported for the first time more than 3 months after a patient is first seen by a provider, may not be industrially related. Attribution of such a condition to an industrial event should be based upon careful analysis and thoroughly documented.

A. Cervical conditions as industrial injuries:

Mechanisms of injury to the cervical spine may include: distortion of the neck due to sudden movement of the head, being struck by an object, or a fall from a height [8-10]. Examples include motor vehicle crashes, high impact accidents, explosions and gunshots [11-13].

An acute injury to the cervical spine should be clinically diagnosable as work-related within 3 months of the injury. For an injury claim to the neck to be accepted beyond 3 months, the attending provider is required to present substantial evidence linking symptoms directly to the initial industrial injury. Claims with insufficient documentation linking clinical symptoms to the initial industrial injury beyond 1 year will generally not be accepted.

B. Cervical conditions as occupational diseases:

Cervical spine conditions may also develop as a natural consequence of aging, resulting in the deterioration of the cervical disc. To establish a diagnosis of an occupational disease, all of the following **are required:**

1. **Exposure:** Workplace activities that contribute to or cause cervical spine conditions, **and**
2. **Outcome:** A diagnosis of a cervical spine condition that meets the diagnostic criteria in this guideline, and
3. **Relationship:** For a cervical condition to be allowed as an occupational disease, the provider must document that, based on generally accepted scientific evidence, the work exposures created a risk of contracting or worsening the condition relative to the risks in everyday life, on a more-probable-than-not basis **(*Dennis v. Dept. of Labor and Industries*, 1987).** In epidemiological studies, this will usually translate to an odds ratio (OR) ≥ 2.

More information on filing a claim for an occupational disease, including billing information, can be found in the Attending Provider's Handbook: http://www.lni.wa.gov/FormPub/Detail.asp?DocID=1669

V. MAKING THE DIAGNOSIS

A. History and clinical exam:

The classic presentation of cervical radiculopathy includes radiating arm pain, scapular pain, diminished muscle stretch reflexes, loss of sensation, and motor weakness, with or without neck pain. Cervical myelopathy is characterized by loss of motor control, gait disturbances and bowel or bladder dysfunction.

B. Diagnostic Testing--Imaging/Myelogram/EMG's:

Requirements for diagnostic testing and imaging are specified in the criteria table. The basis for the selection of a diagnostic imaging procedure should be based on the information obtained from a thorough clinical exam.

C. Selective Nerve Root Blocks (SNRBs):

Selective nerve root blocks can be helpful in making a diagnosis in some cases. Selective nerve root blocks should be used only when:

- The worker has clear sensory symptoms indicative of radiculopathy or nerve root irritation, and
- The worker's symptoms and exam findings are consistent with injury or irritation of the nerve root that is to be blocked; and
- Injury or irritation of the nerve root to be blocked has not been shown to exist by electrodiagnostic, imaging or other studies.

The provider giving the injection has the principal responsibility to document the outcome of the selective nerve root block. The provider should:

- Perform a pre-injection exam, and document the pain intensity using a validated scale.
- Explain to the worker the use and importance of the post-injection pain diary.
- Use low-volume local anesthetic (≤ 1.0 cc) without steroid for the selective nerve root block. Conscious sedation should not be used in the administration of selective nerve root blocks, except in cases of extreme anxiety. If sedation is used, the reason(s) must be documented in the medical record, and the record must be furnished to the department or self-insurer.
- Administer the selective nerve root block using fluoroscopic or CT guidance. An archival image of the injection procedure must be produced, and a copy must be provided to the department or self-insurer.
- Onset (within 1 hr.) of pain relief should be consistent with the anesthetic used; duration generally lasting 2-4 hrs.
- Keep the worker in the office for 15-30 minutes post-injection if possible, and assist with starting the pain diary:
    - Immediately preceding the block, the worker should record the level of pain using a validated scale. Every 15 minutes thereafter, for at least 6 hours following injection, the worker should indicate his or her level of pain. For the remaining waking hours during

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the 24 hours following the administration of the block, hourly documentation of pain levels is desirable.
    - An example of a pain diary is included in this guideline. Pain must be measured and documented using validated tools such as a visual analog scale or a 10-point scale. See L&I's opioid prescribing guideline (www.opioids.LNI.WA.GOV) for a two-item graded chronic pain scale, which is a valid measure of pain and pain interference with function.
- Document the effect of the block.
    - A positive block is indicated by:
        - An overall 80% improvement in pain, pain reduction by at least 5 points on a 10-point scale or visual analog scale; AND
        - Pain relief that lasts an amount of time consistent with the duration of the anesthetic used.
    - A negative block may be indicated by:
        - No pain relief or less than 5 points on a 10-point scale or visual analog scale, and/or
        - Pain relief that is inconsistent in duration with the usual mechanism of action of the local anesthetic given.
- Ensure that the surgeon and the department or self-insurer receive the above information.

If the block is negative, surgery will not be approved. Only one level of surgery will be approved if the basis of diagnosis is the selective nerve root block.

VI. TREATMENT

A. Conservative Treatment

Conservative management of cervical radicular symptoms may include active and passive therapy, traction, NSAIDS and steroid injections.

- There is some evidence that an active treatment approach results in better outcomes [14, 15]. Physical therapy accompanied by home exercise for 6 weeks has been shown in a randomized trial to substantially reduce neck and arm pain for patients with cervical radiculopathy [16].
- Steroid injections may provide short term pain relief for patients with radiculopathy [17, 18], although they are not without risks. The injection typically includes both steroid and a long acting anesthetic. See L&I's guideline on spinal injections at http://www.lni.wa.gov/ClaimsIns/Providers/TreatingPatients/TreatGuide/spinal.asp

> **WARNING** about epidural steroid injections: On April 23rd 2014, the US FDA put out a warning that the injection of corticosteroids into the epidural space of the spine may result in rare but serious adverse events, including loss of vision, stroke, paralysis and death. (FDA Drug Safety Communications 4-23-2014)

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B. Surgical Treatment

The ideal surgical approach for radiculopathy related to herniated disc remains a matter of debate. Various studies have compared the different surgery types and found no significant difference among them. Cervical surgeries can be divided into 2 major approaches: anterior (with or without fusion) and posterior. The choice of surgical procedure is left to the discretion of the surgeon.

Anterior cervical decompression alone: Discectomy is a surgical procedure to remove part of a herniated disc to alleviate pressure on the surrounding nerve roots. Discectomy is generally a safe procedure with associated risk such as infection, bleeding, and nerve damage. Studies, albeit dated, comparing discectomy to discectomy plus fusion have found no statistically significant difference between simple discectomy and discectomy followed by fusion in the treatment of cervical radiculopathy [19-21].

Posterior Surgeries: Posterior cervical laminotomy/foraminotomy is a highly effective therapeutic procedure for both myelopathy and radiculopathy, as it maintains cervical range of motion, and minimizes adjacent segment degeneration [22-24]. Kyphosis and continued persistent neck pain have been concerns with posterior foraminotomies but studies have shown it to be comparable to ACDF's in clinical outcomes [25-27].

Anterior Cervical Discectomy with Fusion (ACDF): Anterior cervical surgery has become a standard treatment for cervical disc disease and it is a proven intervention for patients with myelopathy and radiculopathy as it affords the surgeon the ability to restore stabilization [28-30]. Various implant and graft devices have been developed for use with ACDF [19, 20].

Total Disc Arthroplasty (TDA): Total disc arthroplasty has been proposed as a viable alternative to ACDF. The theoretical basis for cervical arthroplasty is that it maintains motion and may decrease the likelihood of adjacent segment disease and therefore reduce the rate of reoperations [31, 32] Various studies have shown similar outcomes for ACDF and TDA [33-35].

Total disc arthroplasty is not indicated for multi-level disease (more than 2 levels). The FDA recently approved a device for 2-level arthroplasty. The Mobi- C cervical disc prosthesis is intended to replace two adjacent cervical discs (from C3-C7). The device is indicated for skeletally mature patients for reconstruction of disc following discectomy at two contiguous levels for radiculopathy or myelopathy. Patients should have failed 6 weeks of conservative treatment or demonstrate progressive signs and symptoms.

Multi-level surgeries: For radiculopathy, a multi-level (2 levels or more) surgery may be approved if all of the criteria for a single level, not including selective nerve root blocks, are present at each level being considered for surgery. Multi-level fusion for myelopathy is more common and may be done if indications are met.

A condition requiring two or more levels of surgery is unlikely to be a work-related injury or disease. An automatic review is required for any request of more than 2 level cervical surgeries.

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Hybrid surgeries: Hybrid surgeries combine artificial disc replacements and anterior cervical discectomy with fusion at select vertebral bodies (adjacent or non-adjacent) in a single procedure. There is insufficient evidence in medical literature to permit conclusions on its safety and efficacy. The department considers hybrid procedures to be experimental and investigational. New evidence will be examined as it becomes available.

Repeat surgeries: Request for repeat surgeries will be reviewed on an individual basis. There must have been documented and substantial improvement in pain and function on a validated instrument after the first surgery before a second surgery will be approved.

Intraoperative monitoring: Somatosensory evoked potentials (SSEP) and motor evoked potentials (MEP) are sometimes used in neurological and spinal surgeries. The use of intraoperative neurophysiologic spinal cord monitoring is increasing despite a lack of consensus regarding accuracy, appropriate indications, and overall clinical benefits [36-41].

The use of intraoperative monitoring for routine decompressive procedures (e.g., discectomy, laminectomy) with or without fusion will not be approved. Intraoperative monitoring may be recommended for treatment of spinal deformities, traumatic dislocations, myelopathy, or posterior cervical instrumentation [42].

Intraoperative monitoring, with necessity explained, must be requested at the time of surgery request.

Pseudarthrosis (Non Union): Pseudarthrosis exists when there is a complete absence of bridging bone and either hardware failure or measurable instability. Symptomatic pseudarthrosis can be diagnosed based on clinical presentation and diagnostic imaging. For a repeat surgery to be approved, CT SPECT or CT imaging showing non incorporation of bone or flexion and extension radiograph showing interspinous motion greater than or equal to 2 mm.

A contributor to pseudarthrosis is smoking, as nicotine seems to block the ability of osteoblast to form new bone, and is a vasoconstrictor [43-45]. Other patient- specific metabolic conditions such as diabetes may also contribute to non-union [46].

Smoking cessation:

Smoking/nicotine use is a strong contraindication to spine surgeries. Patients undergoing surgery are encouraged to quit smoking 4 weeks before surgery. Smoking cessation may be covered in some cases; see department policy at
http://www.lni.wa.gov/ClaimsIns/Providers/TreatingPatients/ByCondition/Smokingcessation.asp

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VII. ADJACENT SEGMENT PATHOLOGY

Adjacent segment degeneration, adjacent segment disease and adjacent segment pathology (ASP) are terms commonly used to describe a degenerative pathology of the spine. The phenomenon of ASP is not fully understood. It has been predicted that more than 25% of all patients would develop ASP during the first 10 years after anterior cervical discectomy and fusion (ACDF) [47].

It remains unclear as to whether these conditions are related to altered biomechanics or represent the natural history of the cervical spine. It has been suggested that excessive motion of given segments leads to an increased risk of disc degeneration after fusion. Fusion has been associated with ASP but various studies have failed to show that it is an isolated factor [48, 49]. Adjacent segment pathology has been seen after both anterior and posterior surgeries, suggesting other factors may accelerate pathologic changes [50, 51].

Adjacent segment pathology has been the driving force for the development new alternative treatment methods such as total disc arthroplasty (TDA). These options were theoretically designed to be ideal substitutes for ACDF because of their motion preserving benefits [30, 52]. However, short term studies comparing ACDF to TDA have failed to show any significant difference in the rate of adjacent segment disease following surgery. [35, 53-60].

There is insufficient evidence in the medical literature to support symptomatic adjacent segment pathology following fusion.

VIII. MEASURING FUNCTIONAL IMPROVEMENT

The goal of treatment is to improve pain and function. Providers should measure and document functional improvement throughout conservative and surgical treatment. Levels of pain must be documented when evaluating the results from selective nerve root blocks. Visual analog scales (VAS) or a 10 point scale have been useful for this purpose. The two-item graded chronic pain scale, as recommended in the L&I opioid prescribing guideline, (link here) is a simple way to document how much pain is interfering with function.

The Neck Disability Index (NDI), SF-36, SF-12, and VAS are tools recommended by the North American Spine Society (NASS) to assess pain and function and to measure outcome of treatment. Other validated scales and instruments may be used to document improvement, or lack thereof.

IX. POST-OPERATIVE PHASE AND RETURN TO WORK:

It is important for the attending provider and the surgeon to focus on preoperative planning for postop recovery, reactivation, and return to work activities. During the immediate postop period, (6 weeks) the surgeon should help direct these activities. It is the responsibility of the attending provider to determine if the patient can be allowed to perform temporary duties with or without restrictions.

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Pain relief will likely be a concern during recovery. Pain can be effectively managed with passive and active therapies, non-opioid pain relievers, or short-term opioids. For information and tools on how to use opioids in the perioperative period, see L&I's opioid prescribing guideline at www.LNI.opioids.wa.gov.

Evidence shows that work accommodation combined with conservative care during the early recovery period can help prevent disability. Jobsite modifications are dependent on the nature of the patient's work tasks, their injury, and their response to rehabilitation. Typically, factors such as lifting, pulling, and repetitive overhead work require modifications in position, force, repetitions, and/or duration. Those workers returning to jobs with heavy lifting or prolonged overhead work may need additional weeks of rehabilitation. To find resources on job modifications and return to work programs, visit the LNI.wa.gov and search for the Stay at Work program.

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