Treatment Guideline for Lumbar Spine Surgery

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I. Review Criteria for Lumbar Spine Surgery

Note: Not all surgical procedures that require prior authorization appear in this criteria table.

Coverage Decisions affecting this Guideline HTCC indicates the coverage is based on a decision of the WA State Health Technology Clinical Committee.[a] Please check the HTCC webpage for the most recent information. L&I indicates the coverage is based on an L&I coverage decision.[b]	
Artificial Disc Replacement HTCC	**Not covered** for lumbar spine (Decision date March 2017).
Sacroiliac Joint Fusion, open or minimally invasive procedures HTCC	**Not covered** for adults ≥ 18 years old with chronic sacroiliac joint pain related to degenerative sacroiliitis and/or sacroiliac joint disruption (Decision date May 2019).
Lumbar Fusion for Uncomplicated Degenerative Disc Disease (UDDD) HTCC	**Not covered** for UDDD UDDD is defined as chronic low back pain of discogenic origin **without** any evidence of the following conditions: • Radiculopathy, • Functional neurologic deficits. • Spondylolisthesis (greater than grade 1). • Isthmic spondylolysis. • Primary neurogenic claudication associated with stenosis., • Fracture, tumor, infection, inflammatory disease., • Degenerative disease associated with significant deformity.
Bone Morphogenic Protein for Use in Lumbar Fusion HTCC	**Covered**: Bone morphogenetic protein-2 (rhBMP-2) for use in the lumbar spine in adults ≥ 18 years old for: Primary anterior open or laparoscopic fusion at one level between L4 and S1 **OR** Revision lumbar fusion on a compromised patient for whom autologous bone and bone marrow harvest are not feasible or not expected to result in fusion. **Not covered**: Bone morphogenetic protein-7 (rhBMP-7) for use in the lumbar spine.

[a] https://www.hca.wa.gov/about-hca/health-technology-assessment/health-technology-reviews
[b] https://lni.wa.gov/patient-care/treating-patients/conditions-and-treatments/

Single Lumbar Nerve Root Entrapment HTCC	**Covered with conditions**: Lumbar Decompression including: Lumbar laminectomy, laminotomy, discectomy, microdiscectomy, foraminotomy, far lateral decompression. **Not covered**: Minimally invasive procedures that do not include laminectomy, laminotomy, or foraminotomy including but not limited to energy ablation techniques, Automated Percutaneous Lumbar Discectomy (APLD), percutaneous laser, nucleoplasty, etc.
Discography HTCC	**Not covered**: Discography in the assessment of chronic low back pain or lumbar degenerative disc disease.
Vertebroplasty, kyphoplasty, sacroplasty HTCC	**Not covered.**
Percutaneous Discectomy, including automated percutaneous lumbar discectomy, laser discectomy, and nucleoplasty L&I	**Not covered** for disc herniation.
Staged Lumbar Fusion Procedures L&I	**Not covered**: There is no compelling surgical reason to perform a staged surgery for 1- or 2-level fusions. As such, L&I will not approve or reimburse for staged surgeries for elective procedures, unless medically necessary (e.g. complex surgery, significant spinal trauma).
Interspinous Process Devices (e.g. X-Stop, Coflex) L&I	**Not covered**: Interspinous Process Devices are not covered (2019 re-review).

A request may be appropriate for	If the patient has	AND the diagnosis is supported by these clinical findings:		AND this has been done	
Surgical Procedure	Condition or Diagnosis	Subjective	Objective	Imaging	Non-operative care
Surgical Review Criteria for Lumbar Decompression Procedures					
Lumbar Decompression including: Lumbar laminectomy, laminotomy, discectomy, microdiscectomy, foraminotomy, far lateral decompression	Nerve Root Entrapment due to central/paracentral /foraminal/extra-foraminal herniated nucleus propulsus.	Sensory symptoms in dermatomal distribution including: Radiating pain, burning, numbness, tingling or paresthesia.	Objective findings **must include 2 or more** of the following: • Dermatomal sensory deficit on exam. • Motor deficit (e.g., foot drop or quadriceps weakness). • Positive dural tension signs* (e.g., straight leg test, contralateral straight leg. test/crossover sign) • Asymmetric reflex changes. • Positive EMG demonstrates acute denervation (fibrillation and sharp waves) corresponding with the level of intended surgery. *Reproduction of back pain alone is not a positive finding.	CT-Myelogram or MRI (within 6 months of requested surgery) must corroborate subjective and objective findings with substantial disc herniation, resulting in one or more of the following on the nerve root: • Effacement • Abutment • Displacement • Compression • Stenosis Mild to moderate disc protrusion not associated with the above terms is **not** considered a positive objective imaging sign. ***In the case of discordant reading between surgeon and radiologist that is unresolvable following review, another independent radiologist review is required.***	At least six weeks of non-operative care from the date of injury, unless substantial or progressive motor weakness is documented. Care may include: • Active rehabilitation • Manual medicine • Pharmacologic therapy • Epidural steroid injection

A request may be appropriate for	**If the patient has**	**AND the diagnosis is supported by these clinical findings:**		**AND this has been done**	
Surgical Procedure	Condition or Diagnosis	Subjective	Objective	Imaging	Non-operative care
Lumbar Decompression including: Lumbar laminectomy, laminotomy, or discectomy	Central spinal stenosis—moderate or severe	Neurogenic claudication, defined as: •Radiating leg pain that is exacerbated while standing up and walking. • Immediate relief of neurogenic symptoms when seated. • Improvement of symptoms when bending forward.	Bilateral* lower extremity pain or weakness with standing and walking. *If unilateral pain is present, hip or vascular pathology should be ruled out by exam.	MRI or CT-Myelogram (within 6 months of requested surgery) confirms subjective and objective findings of moderate or severe central spinal stenosis. ***In the case of discordant reading between surgeon and radiologist that is unresolvable following review, another independent radiologist review is required.***	At least six weeks of non-operative care from the date of injury, unless substantial or progressive motor weakness is documented. Care may include: • Active rehabilitation • Manual medicine • Pharmacologic therapy • Epidural steroid injection

A request may be appropriate for	If the patient has	AND the diagnosis is supported by these clinical findings:		AND this has been done	
Surgical Procedure	Condition or Diagnosis	Subjective	Objective	Imaging	Non-operative care
Lumbar Decompression including: Lumbar laminectomy, laminotomy, discectomy, microdiscectomy, foraminotomy, far lateral decompression	Recurrent disc herniation of equal or larger size following previous lumbar decompression surgery, **in a patient who has not experienced a discrete event, new symptoms, or returned to work.**	Sensory symptoms in dermatomal distribution may include: Radiating pain, burning, numbness, tingling or paresthesia.	Objective findings must include **2 or more** of the following: • Dermatomal sensory deficit on exam. • Motor deficit (e.g., foot drop or quadriceps weakness). • Positive dural tension signs* (e.g., straight leg test, contralateral straight leg. test/crossover sign) • Asymmetric reflex changes. • Positive EMG demonstrates acute denervation (fibrillation and sharp waves) corresponding with the level of intended surgery. *Reproduction of back pain alone is not a positive finding.	Post-operative MRI **with contrast*** within 6 months of requested surgery confirms equal or larger disc herniation at the same location as previously operated disc herniation. *Non-contrast MRI or CT Myelogram would be acceptable if there is a contraindication to Gadolinium. ***In the case of discordant reading between surgeon and radiologist that is unresolvable following review, another independent radiologist review is required.***	At least six weeks of non-operative care from the date of injury, unless: • Substantial or progressive motor weakness is documented. • Larger disc herniation is confirmed at previously operated location. Care may include: • Active rehabilitation • Manual medicine • Pharmacologic therapy • Epidural steroid injection

A request may be appropriate for	If the patient has	AND the diagnosis is supported by these clinical findings:		AND this has been done	
Surgical Procedure	Condition or Diagnosis	Subjective	Objective	Imaging	Non-operative care
Lumbar laminectomy or laminotomy with excision of intraspinal/extradural benign mass	Synovial Cyst	Sensory symptoms in dermatomal distribution may include: Radiating pain, burning, numbness, tingling or paresthesia.	Objective findings must include **2 or more** of the following: • Dermatomal sensory deficit on exam. • Motor deficit (e.g., foot drop or quadriceps weakness). • Positive dural tension signs* (e.g., straight leg test, contralateral straight leg test/crossover sign). • Asymmetric reflex changes. • Positive EMG demonstrates acute denervation (fibrillation and sharp waves) corresponding with the level of intended surgery. *Reproduction of back pain alone is not a positive finding	CT-Myelogram or MRI (within 6 months of requested surgery) must corroborate subjective and objective findings of a synovial cyst, resulting in one or more of the following on the nerve root: • Effacement • Abutment • Displacement • Compression • Stenosis ***In the case of discordant reading between surgeon and radiologist that is unresolvable following review, another independent radiologist review is required.***	At least six weeks of non-operative care from the date of injury, unless substantial or progressive motor weakness is documented. Care may include: • Active rehabilitation • Manual medicine • Pharmacologic therapy • Epidural steroid injection

A request may be appropriate for	If the patient has	AND the diagnosis is supported by these clinical findings:		AND this has been done	
Surgical Procedure	Condition or Diagnosis	Subjective	Objective	Imaging	Non-operative care
Lumbar Decompression including: Lumbar laminectomy, laminotomy, discectomy, microdiscectomy, foraminotomy, far lateral decompression	Lateral Recess/Foraminal Stenosis	Sensory symptoms in dermatomal distribution may include: Radiating pain, burning, numbness, tingling or paresthesia.	Objective findings must include **2 or more** of the following: • Dermatomal sensory deficit on exam. • Motor deficit (e.g., foot drop or quadriceps weakness). • Positive dural tension signs* (e.g., straight leg test, contralateral straight leg test/crossover sign). • Asymmetric reflex changes. • Positive EMG demonstrates acute denervation (fibrillation and sharp waves) corresponding with the level of intended surgery. *Reproduction of back pain alone is not a positive finding.	CT-Myelogram or MRI (within 6 months of requested surgery) must corroborate subjective and objective findings with substantial disc herniation*, resulting in one or more of the following on the nerve root: • Effacement • Abutment • Displacement • Compression • Stenosis *Mild to moderate disc protrusion not associated with the above terms is **not** considered a positive objective imaging sign. ***In the case of discordant reading between surgeon and radiologist that is unresolvable following review, another independent radiologist review is required.***	At least six weeks of non-operative care from the date of injury, unless substantial or progressive motor weakness is documented. Care may include: • Active rehabilitation • Manual medicine • Pharmacologic therapy • Epidural steroid injection

A request may be appropriate for	If the patient has	AND the diagnosis is supported by these clinical findings:		AND this has been done	
Surgical Procedure	Condition or Diagnosis	Subjective	Objective	Imaging	Non-operative care
Lumbar Decompression including*: Lumbar laminectomy, laminotomy, discectomy, microdiscectomy, foraminotomy, far lateral decompression ***Surgery should not be delayed for prior authorization. It can be reviewed retrospectively.**	Acute Cauda Equina Syndrome	Partial or complete loss of bladder and/or bowel function (incontinence or retention not otherwise explained) **AND/OR** Acute low back pain **AND/OR** Bilateral/unilateral sciatica **AND/OR** Sexual dysfunction.	Diminished or absent anal sphincter tone **AND/OR** Saddle anesthesia **AND/OR** Numbness and/or weakness involving both legs or multiple nerve roots in one leg is present **AND/OR** Urinary retention, incontinence, and/or patulous anus **AND/OR** Reduced or absent bulbo cavernosus reflex **AND/OR** Gait disturbances.	A lesion with mass effect on the cauda equina is present in the spinal canal, compressing multiple lumbo-sacral nerve roots (usually large mass effect) as documented by: Lumbar MRI (the diagnostic procedure of choice) **OR** CT or CT myelography may provide useful information, especially when MRI cannot be done or is limited by hardware artifact.	**Conservative care alone is rarely indicated.**

A request may be appropriate for	If the patient has	AND the diagnosis is supported by these clinical findings:		AND this has been done	
Surgical Procedure	Condition or Diagnosis	Subjective	Objective	Imaging	Non-operative care
Surgical Review Criteria for Lumbar Fusion Procedures					
Lumbar Fusion* – *no prior surgery* ***If an adjacent level is being considered for fusion all subjective, objective, and imaging criteria must be met at that level**	Spondylolisthesis	Neurogenic claudication, defined as: • Radiating leg pain that is exacerbated while standing up and walking. • Immediate relief of neurogenic symptoms when seated. • Improvement of symptoms when bending forward. **OR** Radiculopathy, defined as sensory symptoms in dermatomal distribution including: Radiating pain, burning, numbness, tingling or paresthesia.	Documentation of examination including at least: • Peripheral pulses • Detail focused neurologic examination* **OR** **2 or more** of the following: • Dermatomal sensory deficit on exam. • Motor deficit (e.g., foot drop or quadriceps weakness). • Positive dural tension signs** (e.g., straight leg test, contralateral straight leg test/crossover sign). • Asymmetric reflex changes. • Positive EMG demonstrates acute denervation (fibrillation and sharp waves) corresponding with the level of intended surgery.	X-ray flexion and extension views **read by a radiologist** **AND** MRI or CT-Myelogram (within 6 months of requested surgery) reveals moderate to severe central, lateral recess, or foraminal stenosis **AND** Identification of lumbar segment instability defined as: • Spondylolisthesis ≥ Grade 2. ***In the case of discordant reading between surgeon and radiologist that is unresolvable following review, another independent radiologist review is required.***	At least three months* of conservative therapy for low back pain, which may include: • Manual therapy • General fitness • Strengthening • Cognitive Behavioral Therapy/Self-management • Epidural steroid injection • Pharmacologic therapy *Conservative therapy is not required in the presence of documented substantial or progressive motor weakness.

A request may be appropriate for	If the patient has	AND the diagnosis is supported by these clinical findings:		AND this has been done	
Surgical Procedure	Condition or Diagnosis	Subjective	Objective	Imaging	Non-operative care
			AND Proof of absolute nicotine cessation, demonstrated by two tests conducted at least one month apart within 3 months prior to surgery. *Please refer to narrative section for description of appropriate neurologic examination. **Reproduction of back pain alone is not a positive finding.		

A request may be appropriate for	If the patient has	AND the diagnosis is supported by these clinical findings:		AND this has been done	
Surgical Procedure	Condition or Diagnosis	Subjective	Objective	Imaging	Non-operative care
Lumbar Fusion* – *with prior attempted arthodesis at the same level* ***If an adjacent level is being considered for fusion all subjective, objective, and imaging criteria must be met at that level.**	Pseudarthrosis with or without hardware failure	Axial back pain with or without radicular symptoms **AND** New or worsening pain ≥12 months following surgery.	As there are no objective physical findings on exam for pseudarthrosis, other sources of pain generation (e.g. hip) should be ruled out **AND** Proof of absolute nicotine cessation, demonstrated by two tests conducted at least one month apart, within 3 months prior to surgery. L&I offers coverage of nicotine cessation products[c] in certain cases.	CT scan or CT bone scan/nucleotide scan (within 6 months of requested surgery) confirms objective evidence of pseudarthrosis ≥18* months following previous surgery, such as: No evidence of bony union across the fusion site with documented motion between flexion/extension views **OR** Fractured screws **OR** Haloed screws. *18 month timeframe is not required for catastrophic hardware failure and/or documented substantial or progressive motor weakness.	At least three months* of conservative therapy for low back pain, which may include: • Manual therapy • General fitness • Strengthening • Cognitive Behavioral Therapy/Self-management • Epidural steroid injection • Pharmacologic therapy *Conservative therapy is not required in the presence of documented substantial or progressive motor weakness.

[c] https://www.lni.wa.gov/patient-care/treating-patients/conditions-and-treatments/?query=Tobacco+Cessation+Treatment+for+Surgical+Care

A request may be appropriate for	If the patient has	AND the diagnosis is supported by these clinical findings:		AND this has been done	
Surgical Procedure	Condition or Diagnosis	Subjective	Objective	Imaging	Non-operative care
Lumbar Fusion – *with prior* laminectomy/hemi-laminectomy, laminotomy, foraminotamy, or facetectomy at the same level ***If an adjacent level is being considered for fusion all subjective, objective, and imaging criteria must be met at that level.** ****please see other section for previous discectomy at same level.**	New onset: instability, symptomatic central stenosis, or severe radiculopathy following a decompression at the same level.	Neurogenic claudication, defined as: • Radiating leg pain that is exacerbated while standing up and walking. • Immediate relief of neurogenic symptoms when seated. • Improvement of symptoms when bending forward. **OR** Radiculopathy, defined as sensory symptoms in dermatomal or motor distributions including: Radiating pain, weakness, burning, numbness, tingling or paresthesia.	≥ 4mm of anterior / posterior translation at L3-4 and L4-5 **OR** ≥ 5mm of translation at L5-S1 **OR** ≥ 11^{o} end plate angular change at a single level, compared to an adjacent level. **OR** Lumbar segment instability at the same level **OR** Rotational deformity or other condition leading to a progressive measurable deformity **OR** Objective signs and symptoms compatible with neurogenic claudication or lumbar radiculopathy, confirmed by a detailed neurological examination **OR** Positive EMG demonstrates	MRI **<u>with contrast</u>*** (within 6 months of requested surgery) confirms moderate to severe central, lateral recess, or foraminal stenosis at the same location as previous decompressive procedure. *Non-contrast MRI or CT Myelogram would be acceptable if there is a contraindication to Gadolinium.	At least three months* of conservative therapy for low back pain, which may include: • Manual therapy • General fitness • Strengthening • Cognitive Behavioral Therapy/Self-management • Epidural steroid injection • Pharmacologic therapy *Conservative therapy is not required in the presence of documented substantial or progressive motor weakness.

A request may be appropriate for	If the patient has	AND the diagnosis is supported by these clinical findings:		AND this has been done	
Surgical Procedure	Condition or Diagnosis	Subjective	Objective	Imaging	Non-operative care
			acutedenervation (fibrillation and sharp waves) corresponding with the level of intended surgery.		
Lumbar Fusion ***If an adjacent level is being considered for fusion all subjective, objective, and imaging criteria must be met at that level.**	≥2 previous discectomies at the same level.	Sensory symptoms in dermatomal distribution including: Radiating pain, burning, numbness, tingling or paresthesia.	Objective findings must include **2 or more** of the following: • Dermatomal sensory deficit on exam. • Motor deficit (e.g., foot drop or quadriceps weakness). • Positive dural tension signs* (e.g., straight leg test, contralateral straight leg test/crossover sign). • Asymmetric reflex changes. • Positive EMG demonstrates acute denervation (fibrillation and sharp waves) corresponding with the level of intended surgery.	MRI or CT Myelogram **with contrast*** (within 6 months of requested surgery) confirms equal or larger disc herniation at the same location as previously operated disc herniation. *Non-contrast MRI or CT Myelogram would be acceptable if there is a contraindication to Gadolinium. **OR** Instability[#] [#]If instability is present, please refer to "spondylolisthesis" surgical criteria.	At least three months* of conservative therapy for low back pain, which may include: • Manual therapy • General fitness • Strengthening • Cognitive Behavioral Therapy/Self-management • Epidural steroid injection • Pharmacologic therapy *Conservative therapy is not required in the presence of documented substantial or progressive motor weakness.

A request may be appropriate for	If the patient has	AND the diagnosis is supported by these clinical findings:		AND this has been done	
Surgical Procedure	Condition or Diagnosis	Subjective	Objective	Imaging	Non-operative care
			*Reproduction of back pain alone is not a positive finding.		
Lumbar Fusion* ***A request for fusion of more than one level will automatically trigger a physician review. If an adjacent level is being considered for fusion all subjective, objective, and imaging criteria must be met at that level.**	Foraminal Stenosis (moderate or severe) with radiculopathy, demonstrated by: • Severe facet arthropathy. • Disc height loss collapsing the pedicle(s), where decompression alone would not adequately decompress the nerve root.	Sensory symptoms in dermatomal distribution including: Radiating pain, burning, numbness, tingling or paresthesia.	Objective findings **must include:** • Motor deficit (e.g., foot drop or quadriceps weakness) **OR** • Positive EMG demonstrates acute denervation (fibrillation and sharp waves) corresponding with the level of intended surgery. **OR 2 or more** of the following: • Dermatomal sensory deficit on exam corresponding with radicular pain/weakness. • Asymmetric reflex changes at the appropriate dermatomal level. • Positive response to Selective Nerve Root	Abnormal imaging (CT Myelogram or MRI) read by radiologist shows: Severe disc height loss **AND** Moderate or severe foraminal stenosis that correlates nerve root involvement with subjective and objective findings at the level of proposed surgical intervention.	At least three months* of conservative therapy for low back pain, which may include: • Manual therapy • General fitness • Strengthening • Cognitive Behavioral Therapy/Self-management • Epidural steroid injection • Pharmacologic therapy *Conservative therapy is not required in the presence of documented substantial or progressive motor weakness.

A request may be appropriate for	If the patient has	AND the diagnosis is supported by these clinical findings:		AND this has been done	
Surgical Procedure	Condition or Diagnosis	Subjective	Objective	Imaging	Non-operative care
			Block (SNRB)* as determined and documented by the interventionist. • Chronic denervation on EMG corresponding with the level of intended surgery. *Criteria for selective nerve root blocks: • Use low-volume(≤2.0 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 request may be appropriate for	If the patient has	AND the diagnosis is supported by these clinical findings:		AND this has been done	
Surgical Procedure	Condition or Diagnosis	Subjective	Objective	Imaging	Non-operative care
Lumbar Fusion* ***A request for fusion of an adjacent segment will automatically trigger a physician review. If an adjacent level is being considered for fusion all subjective, objective, and imaging criteria must be met at that level.**	Adjacent Segment Pathology	If the subjective and objective criteria for Foraminal Stenosis or Dynamic Instability are met, fusion for Adjacent Segment Pathology may be appropriate. A request for fusion of an adjacent segment will automatically trigger a physician review. Decompression alone is appropriate when the subjective, objective, and imaging criteria are consistent with the criteria for decompression alone, as outlined in the above criteria (e.g., when there is no foraminal stenosis or spondylolisthesis).		X-ray flexion and extension views **read by a radiologist** **AND** MRI or CT-Myelogram (within 6 months of requested surgery) reveals moderate to severe central stenosis **AND** Identification of lumbar segment instability defined as the following: ≥ 4mm of anterior / posterior translation at L3-4 and L4-5 **OR** ≥ 5mm of translation at L5-S1 **OR** ≥ 11^{o} end plate angular change at a single level, compared to an adjacent level. ***In the case of discordant reading between surgeon and radiologist that is unresolvable following re-review, an independent radiologist opinion is required.***	At least three months* of conservative therapy for low back pain, which may include: • Manual therapy • General fitness • Strengthening • Cognitive Behavioral Therapy/Self-management • Epidural steroid injection • Pharmacologic therapy *Conservative therapy is not required in the presence of documented substantial or progressive motor weakness.

A request may be appropriate for	If the patient has	AND the diagnosis is supported by these clinical findings:		AND this has been done	
Surgical Procedure	Condition or Diagnosis	Subjective	Objective	Imaging	Non-operative care
Sacroiliac Joint Fusion **Note:** A stepped approach to surgery and recovery **must be in place prior to surgical approval**, and *must include <u>all of</u> the following components*: 1. Post-surgical activation/reconditioning plan documented in the claim file by the surgeon. 2. Return to work/vocational rehabilitation plan documented by AP after review of surgeon's activation plan. 3. Worker agreement to surgeon and AP plans.	A single documented traumatic inciting work related event that creates a force sufficient to cause Sacroiliac (SI) joint disruption or instability. *SI joint fusion for chronic SI pain due to degenerative sacroiliitis and/or SI joint disruption is NOT covered.	Pain referrable to a Sacroiliac joint.		Diastasis of the pubis symphysis of at least 2.5 cm **OR** Asymmetric widening of the injured SI joint.	Failure of six or more months of non-operative care directed at successfully treating SI joint ligamentous instability.

II. Introduction

A. Background and Prevalence

Low back injuries and low back pain (LBP) are some of the most common and costly occupational injury claims.[1-5] L&I data for fiscal year 2020 alone identified 11,358 claims costing over $115 million in lifetime incurred costs. LBP has been ranked as the fourth leading cause of disability worldwide behind heart disease, cerebrovascular disease, and lower respiratory infection.[6] In the United States, LBP is the leading cause of years lived with disability, ahead of depression, chronic obstructive pulmonary disease (COPD), and other musculoskeletal disorders.[7] Past estimates of work-related injuries in the U.S. found that spine and back injuries accounted for 17% of all work-related injuries.[1]

Conditions addressed in this guideline related to or experienced as low back pain, including stenosis and spondylolisthesis, are highly prevalent in the general population and often seen in asymptomatic individuals.[8-10] It is important to note that LBP is common and increases with age, and as such is not always directly related to an injury or specific diagnosis.

B. Establishing Work-relatedness

An injury sustained during the course of employment is defined in Washington State statute as "a sudden and tangible happening, of a traumatic nature, producing an immediate or prompt result, and occurring from without, and such physical conditions as result therefrom."[d] A legal test for whether the department or self-insured employer is liable for the care that a worker receives for an injury is whether the workplace injury is "a proximate cause" of the accepted condition being treated. An injury may be a proximate cause of a condition being treated only if "but for" the injury, the treatment would not be necessary and proper. One approach to determining whether an injury meets this test is to determine whether the worker's need for treatment is any different than it would have been had, the work-related injury never occurred. In the case of degenerative conditions, consider whether the duties and tasks of the job significantly contributed to aggravation of the condition beyond what would normally be expected for the worker's age and genetics. If the answer is no, then it is likely not work related. If a proposed treatment would have been needed regardless of the industrial injury, the injury would not be a proximate cause of the need for treatment.

Occupational disease is defined in Revised Code of Washington (RCW) 51.08.140 as a "disease or infection that arises naturally and proximately out of employment."[e] Establishing an occupational disease diagnosis requires that all of the following criteria be met:

1. Exposure**:** Workplace activities that contribute to or cause the specific lumbar condition, **and**
2. Outcome**:** Diagnosis of a condition that meets the diagnostic criteria in this guideline, **and**

[d] http://app.leg.wa.gov/RCW/default.aspx?cite=51.08.100
[e] http://app.leg.wa.gov/RCW/default.aspx?cite=51.08.140

3. Relationship**:** Documentation 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.

A thorough occupational and non-occupational exposure history is essential for determining whether a condition is work-related and whether it is due to an acute or chronic exposure. For chronic exposures, it is important to document where, when, and for how long they occurred, as they could span multiple employers who would then share liability for an occupational disease. Providers should submit the Occupational Disease and Employment History[f] form to the department or self-insurer as soon as possible (a second form must be used for continuation of the occupational disease history).

C. Pre-existing or Non-work-related Conditions

1. Nicotine Use

Current nicotine usage has been associated with poor surgical outcomes in patients undergoing lumbar spinal surgery, including increased risk of non-union/pseudarthrosis, worse clinical outcome scores, lower return to work rates, and increased wound complications and risk of infection.[11-16]

In one study, non-smokers demonstrated significantly greater improvement in Oswestry Disability Index (ODI) scores after decompression surgery than smokers, and non-smokers were also more likely to have clinically meaningful improvement in their ODI scores at one year.[17] Smoking has also been shown to be associated with recurrent disc herniation (OR 1.99, 95% CI 1.53-2.58) in a recent systematic review.[18] Another study, Sanden et al., found similar results at 2 years, showing active smokers who underwent decompression with or without fusion were more likely to be dissatisfied with the results of their surgery, more likely to report increased analgesic use, and showed less improvement in walking ability.[19] Further results as part of the larger Spine Patients Outcome Research Trial (SPORT) found that smokers being treated for lumbar spinal stenosis were the only group in which operative treatment did not perform better than non-operative care.[20]

In light of the negative outcomes related to smoking and nicotine usage in patients undergoing decompression procedures, the department considers it best practice to abstain from nicotine for at least 4 weeks prior to surgery, as demonstrated by two negative urine cotinine tests during this time period. Abstinence from nicotine *is required for all fusion and repeat fusion procedures*. This does not apply to progressive myelopathy or motor radiculopathy. Smoking cessation products may be covered in some instances, for more information, review L&I's tobacco cessation program.[g]

Continued post-operative smoking cessation is also highly recommended to reduce the potential for complications such as infection or delayed fracture healing. While emphasis may be placed on

[f] https://lni.wa.gov/forms-publications/F242-071-000.pdf
[g] https://www.lni.wa.gov/patient-care/treating-patients/conditions-and-treatments/?query=Tobacco+Cessation+Treatment+for+Surgical+Care

maintaining post-operative cessation, evidence demonstrates a recidivism rate greater than 60% at one year in patients who underwent smoking cessation prior to lumbar fusion.[21]

III. Assessment

A. History and Clinical Exam

A thorough history and clinical examination are important in the proper diagnosis of any suspected lumbar condition. Taking a history allows for proper differential diagnosis, as low back pain can be caused by any number of mechanical or nonmechanical mechanisms. Further, proper clinical assessment can help to identify where pain is originating from.

A clinical assessment may include:

- Examination of peripheral pulses to differentiate between neurogenic and vascular claudication.
- Hip range of motion testing to rule out hip pathology.
- Detail-focused neurologic examinations including at least the following:
    - Deep tendon reflexes (DTRs) of the upper and lower extremities.
    - Strength testing of the major muscle groups of the upper and lower extremities.
    - Testing of light touch and pain/temperature in the lower extremities—looking for dermatomal sensory loss or distal symmetrical sensory loss.
- Dural tension signs (e.g., straight leg test, contralateral straight leg test/crossover sign).
    - Reproduction of back pain alone is not considered to be a positive finding.
- Examination of potential reflex changes.
- Electromyography.

B. Imaging

The recommended and required imaging procedures for lumbar spine surgeries are specified in the criteria table, with further detail in individual sections below if necessary. Imaging studies such as radiographs and advanced imaging such as magnetic resonance imaging (MRI) or computed tomography (CT), can be used to aid in the diagnosis and clinical workup of lumbar conditions.

When considering imaging for low back pain, care should be taken to ensure that imaging is undertaken only when a clear clinical indication exists. Generators of low back pain are often hard to pinpoint, and MR imaging studies also tend to identify asymptomatic issues such as disc degeneration, annular tears, or disc protrusion that may lead to unnecessary procedures.[22-24] Established guidelines suggest only performing imaging studies in the presence of specific symptoms or neurologic deficits.[25-27]

Recent imaging studies should be used when making care-related decisions. L&I considers imaging within 6 months prior to surgical requests as necessary to determine appropriate surgical decision-making. In the case of a discordant reading between surgeon and radiologist that is unresolvable following re-

review, an independent radiologist opinion is required. L&I requires prior authorization for all MRIs; please visit the Advanced Imaging Guidelines[h] web page for complete information.

In considering imaging following previous surgeries, a contrast medium may be indicated. Use of Gadolinium enhanced imaging has been successfully used to aid in differentiation of disc herniation and peridural scarring.[28, 29] As such, contrast mediums may be required in certain imaging studies unless otherwise contraindicated. Relative and absolute contraindications include[30]:

- Relative contraindications:
  - Certain medications, such as β-blockers, nonsteroidal anti-inflammatories (NSAIDs), and interleukin-2.
- Absolute Contraindications:
  - Prior adverse reaction to contrast medium(s).
  - History of asthma, allergies, heart disease, or underlying renal disease.

C. Opioids

Managing pain in workers who are undergoing surgery, especially those on chronic opioid therapy, can be challenging and requires a coordinated treatment plan prior to surgery. Brat et al., examining a nationwide insurance database of more than a million opioid naïve surgical patients, identified the duration of initial opioid prescription after surgery as a risk factor for later opioid misuse (dependence, abuse, or overdose) diagnoses.[31] Although only 0.6% of postoperative patients subsequently had such diagnoses, each additional week of opioid therapy prescribed was associated with an adjusted 20% increase in hazard for opioid misuse, with a total 44% increase in hazard if a refill was also prescribed. In addition, recent studies have shown that patients are typically prescribed far more opioid pills than is necessary across a broad variety of surgeries.[32-34] This overabundance of pills may result in diversion and other undesired outcomes.

Although the majority of patients being considered for spine surgery have not been on opioids chronically (≥3 months of opioids), those that have constitute a special class of patients because preoperative opioid use is associated with worse outcomes following spine surgery. O'Donnell et al. reported that in a cohort of lumbar discectomy patients from the Ohio workers' compensation system, such preoperative opioid use was negatively associated with return to work, and positively associated with failed back surgery syndrome and much more frequent and prolonged post-operative opioid use.[35] In a prospective study in Washington state among all payers, only opioid use, tobacco use, and being a workers' compensation patient were predictive of worse outcome from lumbar spine surgery.[36]

The Washington state Dr. Robert Bree Collaborative, after extensive review of relevant medical and scientific literature, published specific recommendations regarding postoperative opioid use[i] across

[h] https://lni.wa.gov/patient-care/treating-patients/treatment-guidelines-and-resources/#advanced-imaging-guidelines
[i] https://www.qualityhealth.org/bree/wp-content/uploads/sites/8/2018/09/Final-Supplemental-Bree-AMDG-Postop-pain-091318-wcover.pdf

several levels of surgical invasiveness.[37] If opioids are anticipated to be part of the postoperative pain management plan, the goal for prescribing should be at the lowest effective dose for the shortest duration.

Preoperatively, the surgeon must:

- Check the Prescription Drug Monitoring Program (PDMP) pre-operatively[j], and document in the medical record all sources of ongoing prescriptions of all controlled substances, including daily morphine equivalent doses of opioids. Care coordination is required[k] when the patient is on combinations of opioids and sedatives, including benzodiazepines, carisoprodol, and nonbenzodiazepine sedative-hypnotics ("Z drugs").
- Document a coordinated plan for managing surgical pain, including identifying the post-operative prescriber, setting appropriate expectations for pain management, and evaluating for potential risk for over-sedation/respiratory depression and difficult pain control.[38]
- Refer for preoperative anesthesia or pain management consult for those patients who are diagnosed with opioid use disorder/substance use disorder, on buprenorphine or chronic opioid dose of 90 mg/day MED or more).
- Document a recent, or conduct of, urine drug testing to identify undisclosed drug use and/or abuse and verify compliance with treatment.

Postoperatively, the surgeon must:

- Follow the Bree Collaborative recommendations for Prescribing Opioids for Postoperative Pain – Supplemental Guidance[l] :
    - Procedures with expected rapid recovery, such as meniscectomy, may be treated with either a non-steroidal anti-inflammatory drug (NSAID) or a combination of NSAID and acetaminophen. If opioids are warranted, prescribe 3 days or less (no more than 8-12 pills) of short acting opioids.
    - For procedures with expected medium term recovery, such as discectomy or laminectomy, use non-opioid analgesics and non-pharmacologic therapies as first line therapy. If opioids are warranted, prescribe 7 days or less (no more than 42 pills) of short acting opioids.
    - For procedures with expected longer recovery times, such as lumbar fusion, use non-opioid analgesics and non-pharmacologic therapies as first line therapy. If opioids are warranted, prescribe 14 days or less of short acting opioids at the lowest effective dose.
    - For patients on chronic opioid therapy, use non-opioid analgesics and non-pharmacologic therapies as first line therapy and follow the above recommended opioid prescribing durations, based on expected recovery time. Resume chronic opioid regimen if patient is expected to continue postoperatively.
- For the exceptional case that may warrant more opioids than the expected recovery period, re-evaluate the patient to determine what is the delaying the normal course of recovery. Post-surgical opioids should be tapered in all cases by no later than 6 weeks after surgery.

[j] WAC 296-20-03035, 246-919-985, 246-918-935, 246-853-790
[k] WAC 246-919-970, 246-918-920, 246-853-775
[l] https://www.qualityhealth.org/bree/wp-content/uploads/sites/8/2018/09/Final-Supplemental-Bree-AMDG-Postop-pain-091318-wcover.pdf

D. Screening and Addressing of Behavioral or Mental Health

While the presence of behavioral or mental health issues do not preclude a worker from surgery, evidence has shown that the presence of such conditions may be associated with significantly poorer spinal intervention outcomes postoperatively. Identified issues include lower satisfaction and worse outcomes, increased perioperative complications, and continuance of narcotic use post-surgery.[39, 40]

The workers' compensation population often demonstrates poor outcomes compared to other populations undergoing similar interventions for spinal conditions, and it is especially important to address underlying behavioral or mental health factors that may lead to worse surgical outcomes.[41] In one study of workers' compensation patients undergoing lumbar fusion, a pre-operative diagnosis of depression was a negative predictor of return to work, and at 3 years the depression group had an average excess work absence of 184 days compared to controls.[42] Another study, Wang et al., found that significant risk factors for sick leave >90 days or disability pension following lumbar decompression included common mental disorders, somatic comorbidity, and prescribed psychiatric medication.[43]

If comorbid behavioral or mental health issues are present, the surgeon should be aware of, work to counsel, and manage patient expectations preoperatively. When properly identified, preoperative treatment of depression may improve outcomes of operative intervention.[39] In addition, proper identification and addressing of pre-operative pain expectations and psychosocial barriers can be important in improving clinical outcomes.[44] Mancuso et al. identified that expectations about pain are an independent variable in predicting pain improvement at 2-years post-lumbar surgery, patients who had greater expectation of pain improvement following surgery had increased odds of reporting less pain improvement (OR 1.4).[45] With these defined issues, screening tools for depression should be considered for all fusion candidates, as studies show only a 28% sensitivity for surgeons to identify depression from subjective rating alone.[39]

L&I has resources available for addressing behavioral health or mental health prior to surgery. Please refer to lni.wa.gov/MLT or lni.wa.gov/mentalhealth for details.

E. Preventing Complications

Within workers' compensation, the ultimate goal of any intervention is to enable the worker to recover and return to work. When considering surgery, it is critical to conduct a thorough assessment of risk factors and fitness for surgical intervention to evaluate the potential risks and benefits. In identifying appropriate candidates for lumbar spine surgery, L&I recommends consideration of the following, based in part on the work of the Robert Bree Collaborative, to increase the likelihood of positive outcomes[46]:

1. Avoidance of smoking for a minimum of 4 weeks preoperatively with 6 to 8 weeks preferred.
2. Pre-operative plan for management of opioids, if patient has taken opioids for more than 3 months.
3. Screen for substance abuse; manage if screen is positive.
4. Hemoglobin A1c less than 8% in patients with diabetes.

5. Absence of an active, life-limiting condition that would likely cause death before recovery from surgery.
6. Absence of severe disability from an unrelated condition that would severely limit the benefits of surgery such as severe osteoporosis.
7. Absence of dementia that would interfere with recovery.
8. Screen for untreated depression or psychiatric disorders; manage if screen is positive.
9. Adequate nutritional status to ensure healing.
10. Sufficient liver function to ensure healing.
11. Body Mass Index less than 40.
12. Complete a preoperative plan for postoperative return to function.

F. Measuring Functional Improvement

Consistent use of validated functional instruments can be imperative to providing proper care in the treatment of lumbar spine conditions. Not only do these measures help guide appropriate interventions, proper usage of functional instruments can have significant impact through identification of risk factors, symptoms, and risk of developing ongoing comorbidities or disability.

The authors of this guideline recommend using the following validated tools for measuring pain and functional improvement:

- 2-item Graded Chronic Pain Scale (GCPS)
- Oswestry Disability Index (ODI)
- Short Form 36 (SF-36)
- Patient-Reported Outcomes Measurement Information System (PROMIS)

In general, a 30% or greater improvement in pain and/or function on validated functional scales is considered meaningful improvement.[47] L&I has also produced a guideline on documenting functional improvement[m], including validated functional scales and information on proper application and interpretation.

IV. Non-Operative Care

Non-operative care is the first line treatment for low back pain without the presence of substantial or progressive motor weakness. The natural history of low back pain suggests the potential for recovery without surgical intervention, and non-operative care has demonstrated effectiveness when compared to surgery across multiple conditions. A recent Cochrane review comparing surgical and conservative care for lumbar stenosis found no clear benefits of surgery compared to non-operative care, and data from the SPORT study have also demonstrated significant and sustained improvement in patients undergoing non-operative care.[48-50]

[m] https://lni.wa.gov/patient-care/advisory-committees/_docs/2018DocFuncImprovfunctionalscales.pdf

There are no specific non-operative protocols or interventions that demonstrate superiority, with many studies utilizing a combination of interventions such as manual therapy, manipulation, neuromobilization, flexion/distraction, general fitness/strengthening, and Cognitive Behavioral Therapy or self-management.[51, 52] L&I considers at least 6 weeks of non-operative care necessary prior to requests for decompression, and depending on the condition or diagnosis 3-6 months of care prior to fusion procedures.

V. Surgical Procedures

A. Lumbar Decompression Procedures

Lumbar decompression includes procedures such as lumbar laminectomy, laminotomy, discectomy, microdiscectomy, foraminotomy, and far lateral decompression. These procedures are meant to increase the amount of space in the spinal canal through removal of spinal elements irritating or compressing neurovascular structures, thereby "decompressing" them, with the goal of reducing or relieving pain. Significant evidence exists for the safety and efficacy of decompressive procedures in appropriately selected patients. Lumbar decompression procedures may be covered for the following conditions when appropriate subjective, objective, and imaging criteria have been met.

Care should be taken in consideration of surgery, as the natural history of acute low back pain is generally positive, with symptom resolution often seen in the first month.[53, 54] Disc herniation, stenosis, and other abnormal findings seen on imaging are often present in asymptomatic patients [26, 55-58], and other studies have shown disc herniations may naturally resorb over time.[59-64] Additionally, receiving care under workers' compensation has been shown to be associated with increased risk of unsatisfactory surgical outcomes.[41, 65]

1. Decompression for Nerve Root Entrapment due to Central/paracentral/foraminal/extra-foraminal herniated nucleus propulsus

Lumbar nerve root entrapment, also called radiculopathy, is the compression or injury of nerves within the spinal column, and often presents as sensory symptoms (e.g. radiating pain, weakness, numbness) in a dermatomal distribution. Nerve root entrapment is often caused by lumbar disc herniation, identified by the displacement (protrusion or extrusion) of disc material (e.g. nucleus, cartilage, anular tissue) beyond the margins of the intervertebral disc space.[66, 67] Other conditions, such as cancer, fracture, or infection, are less common causes.[53]

In cases without severe or substantially progressive motor weakness, a course of non-operative care of at least six weeks including active rehabilitation, manual medicine, NSAIDs, or epidural steroid injections, has been shown to be effective in treating low back pain.[54, 68, 69]

When considering moving to surgery, there is significant evidence of the long-term effectiveness of decompression for the treatment of disc herniation and stenosis. SPORT (Spine Patient Outcomes Research Trial), a long-term prospective study including both randomized and observational cohorts of

patients with lumbar disc herniation or stenosis, examined the long-term effectiveness of decompression in relieving pain and improving outcomes. Results demonstrated significant and sustained improvement at up to 8 years post surgery in both conditions, with superiority of surgical outcomes compared to non-operative care, but findings were less positive in patients receiving workers' compensation.[49, 50, 70-72]

Surgical decompression of lumbar nerve root entrapment is a covered procedure when MRI or CT-Myelogram corroborates substantial disc herniation resulting in effacement, abutment, displacement, or compression of the nerve root [27, 54, 73], *and* when *two or more* of the following objective symptoms are present:

- Dermatomal sensory deficit on exam.[74]
- Motor deficit (e.g., foot drop or quadriceps weakness)[74, 75]
- Positive dural tension signs (e.g., straight leg test, contralateral straight leg test/crossover sign).[54, 76, 77]
- Asymmetric reflex changes.
- Positive EMG demonstrates acute denervation (fibrillation and sharp waves).[78, 79].

2. Decompression for Recurrent Disc Herniation

While surgery is successful in treating most lumbar disc herniations, around 10% of operated patients may experience symptomatic reherniation requiring repeat surgery.[18, 80-82] Though no specific timeline can predict reherniation, numerous studies have demonstrated up to 50% of reherniations that require reoperation occur within the first year following initial surgery.[80, 81, 83-85]

Available literature to identify risk factors for reherniation are somewhat limited; however, some recent studies have identified lack of sensory or motor deficits, younger age, and higher baseline disability as significant risk factors for reherniation.[80] Other significant risk factors for recurrent herniation identified by a recent meta-analysis include diabetes, smoking status, and disc protrusion.[18]

When considering surgery for a recurrent disc herniation in a patient who has not experienced a discrete event, new symptoms, or returned to work[n], MRI or CT-Myelogram *with a contrast medium* must demonstrate a disc herniation of equal or larger size at the same location following previous lumbar decompression surgery.

It is extremely important to determine the etiology of persistent pain after spinal surgery, as residual pain following surgical intervention can be multifactorial, and repeat surgeries in the absence of new or worsened pathology do occur. Repeat surgery should only be considered if recurrent or residual herniation exists. Patients who undergo multiple spinal surgeries have a lower chance of successful pain resolution, and are less likely to return to normal function following surgery.[86]

[n] If a patient has been back to work for a minimum of 6 months and/or has experienced sustained improvement in pain and function, refer to "Nerve Root Entrapment" for required information and surgical criteria.

A correlation between residual low back pain after surgery and the presence of peridural scarring has been established.[87] This scarring is considered normal following surgery, and is also common in asymptomatic patients.[88, 89] Patients undergoing reoperation presenting with *only* scar tissue have demonstrated poor outcomes.

To improve the identification of appropriate candidates for repeat surgical interventions, use of an imaging contrast medium is required when requesting approval of a repeat decompression surgery, unless otherwise contraindicated*. Studies have demonstrated the ability of Gadolinium enhanced imaging to aid in differentiation of disc herniation and peridural scarring.[28, 29] L&I considers this distinction especially important, as long-term studies have shown worse outcomes for workers' compensation patients undergoing surgery compared to patients with other forms of coverage.[41, 65]

In addition to imaging, two or more of the following objective symptoms must be present:

- Dermatomal sensory deficit on exam.[74]
- Motor deficit (e.g., foot drop or quadriceps weakness).[74, 75]
- Positive dural tension signs (e.g., straight leg test, contralateral straight leg test/crossover sign).[54, 76, 77]
- Asymmetric reflex changes.
- Positive EMG demonstrates acute denervation (fibrillation and sharp waves).[28, 29, 78, 79]

*Identified relative and absolute contraindications to use of a contrast/Gadolinium medium include[30]:

- Relative contraindications:
  - Certain medications, such as β-blockers, nonsteroidal anti-inflammatories (NSAIDs), and interleukin-2.
- Absolute contraindications:
  - Prior adverse reaction to contrast medium(s).
  - History of asthma, allergies, heart disease, or underlying renal disease.

3. Decompression for Central Spinal Stenosis

Stenosis, or a narrowing of the spinal canal due to degeneration or growth of biological elements in the spine, can also lead to nerve root entrapment or compression.[90] It is thought to be a normal process of aging and generally prevalent in normal populations, with one study of 938 participants aged 40-93 finding moderate spinal stenosis among 78% of the population, and severe spinal stenosis in 30%.[91] While the prevalence of stenosis is high it is often asymptomatic and not requiring treatment, with the same study finding only 17.5% of patients with severe spinal stenosis reporting any clinical symptoms.

As stenosis is thought to be highly prevalent without symptoms, non-operative care is considered an appropriate first step. In cases without severe or substantially progressive motor weakness, a course of non-operative care of at least 6 weeks including active rehabilitation, manual medicine, NSAIDs, or epidural steroid injections, has been shown to be effective in treating low back pain.[54, 68, 69]

If non-operative care does not provide relief, surgical decompression of stenosis has been shown to be a safe and effective procedure. In a large scale, long-term, multi-center trial, patients who underwent decompression for stenosis had greater improvement on the Oswestry Disability Index than similar patients undergoing only non-operative care.[20, 92] Patients in this study were considered to have stenosis based on the presence of neurogenic claudication or radicular pain for at least twelve weeks, and a confirmatory cross-sectional imaging study demonstrating stenosis at one or more levels. Other systematic reviews have also highlighted the effectiveness of decompression in treating lumbar stenosis, showing its effectiveness to be comparable to, and less invasive than, lumbar fusion.[93-95]

As always, care should be taken when setting expectations for surgery. Results from the SPORT study found an 18% reoperation rate in patients who underwent surgical treatment for lumbar stenosis (N=417).[96] Of this population, 52% of reoperations were for persistent stenosis or progressive spondylolisthesis.

Based on the demonstrated effectiveness, decompression for central spinal stenosis is a covered procedure when neurogenic claudication is present (if neurogenic claudication is suspected, at minimum the pulse of the patient should be checked), the patient experiences bilateral lower extremity pain or weakness when standing or walking, and when MRI or CT-Myelogram confirms subjective and objective findings of moderate or severe central spinal stenosis.

4. Decompression for Synovial Cyst

Lumbar synovial cysts are generally rare, often benign in nature, and their pathogenesis is thought to be associated with disruption or degeneration of facet joints in the lumbar spine.[97] Their presence has been shown to contribute to painful spondylolisthesis and radiculopathy.[98, 99]

There is limited evidence for conservative treatment of synovial cysts. One smaller study found durable symptom relief at 6 months in 10 of 30 patients who received steroid injections in the facet joints.[100] Surgical excision of lumbar synovial cysts has been shown to be effective, with several studies demonstrating resolution of symptoms and sustained improvement at short to long-term follow-up.[98, 101, 102]

Decompression of a synovial cyst is a covered procedure when CT-Myelogram or MRI corroborate subjective and objective findings of a synovial cyst that results in one or more of the following on the nerve root: effacement, abutment, displacement, or compression (stenosis). In addition to imaging, *two or more* of the following objective symptoms must be present:

- Dermatomal sensory deficit on exam.[74]
- Motor deficit (e.g., foot drop or quadriceps weakness).[74, 75]
- Positive dural tension signs (e.g., straight leg test, contralateral straight leg test/crossover sign).[54, 76, 77]
- Asymmetric reflex changes.

- Positive EMG demonstrates acute denervation (fibrillation and sharp waves).[28, 29, 78, 79]

5. Decompression for Lateral Recess/Foraminal Stenosis

Lumbar foraminal stenosis, also referred to as lateral recess or lateral canal stenosis, is a common cause of symptomatic lumbar radiculopathy that can often be overlooked due to the location of the narrowing at the bony exit of the nerve root.[103]

Non-operative treatment is recommended initially for the treatment of foraminal stenosis, with studies demonstrating the effectiveness of active rehabilitation, manual medicine, NSAIDs, and epidural steroid injections.[104] Various surgical techniques have shown benefit in treating foraminal stenosis.[105-109]

Decompression for lateral recess/foraminal stenosis is a covered procedure when CT-Myelogram or MRI corroborate subjective and objective findings with substantial disc herniation that results in one or more of the following on the nerve root: effacement, abutment, displacement, or compression (stenosis). Mild to moderate disc protrusion not associated with the previous terms is not considered a positive objective imaging sign.

In addition to imaging, two or more of the following objective symptoms must be present:

- Dermatomal sensory deficit on exam.[74]
- Motor deficit (e.g., foot drop or quadriceps weakness).[74, 75]
- Positive dural tension signs (e.g., straight leg test, contralateral straight leg test/crossover sign).[54, 76, 77]
- Asymmetric reflex changes.
- Positive EMG demonstrates acute denervation (fibrillation and sharp waves)[28, 29, 78, 79].

6. Decompression for Acute Cauda Equina Syndrome

Acute cauda equina syndrome (CES) is a rare, compressive disorder of the lumbosacral nerve roots below the tip of the conus medullaris. Only a small number of patients who present with low back pain will have CES, with an estimated prevalence of 0.04%.[110] It is characterized by multiple lumbo-sacral sensory-motor deficits which may have disabling long term consequences, and it requires immediate surgical attention.[111] Due to the emergent nature of CES, controlled studies are not feasible and the literature is limited to case series, case studies and narrative reviews.

CES has been reported to result from the following work- and non-work-related conditions:[112, 113]

- Disc herniation (most common cause; most often central herniation).
- Trauma (e.g. gunshot wound, vertebral fracture).
- Infection (e.g. discitis, vertebral osteomyelitis, epidural abscess).
- Degenerative conditions (e.g. degenerative spondylolisthesis, spinal stenosis).
- Metastatic or primary tumor (with or without pathologic fracture).
- Post-surgical complications (e.g. epidural hematoma, fat graft, durotomy, use of Gelfoam).
- Vascular malformations (e.g. bleeding arteriovenous malformations).
- Intradiscal electrothermal annuloplasty.
- Spinal manipulation.

Symptoms and Signs of Cauda Equina Syndrome

The hallmark symptoms of CES include:[111, 114-118]

- Acute low back pain with unilateral or bilateral sciatica.
- Weakness of both legs and/or weakness involving multiple nerve roots in one leg.
- Partial or complete loss of bladder function (incontinence or retention not otherwise explained) and/or bowel function, accompanied by impaired perineal sensation, especially saddle anesthesia.
- Diminished or absent anal sphincter tone.
- Reduced or absent bulbo-cavernosus reflex.
- Gait disturbances.
- Impaired sensation in the lower extremities.
- Hyporeflexia or areflexia in the legs.
- Sexual dysfunction.

Diagnostic Tests for Cauda Equina Syndrome

Magnetic Resonance Imaging (MRI) is the preferred imaging test for charactering and localizing spinal lesions. Other diagnostic and imaging modalities include:

- CT and/or CT Myelography, utilized to locate narrowing of the spinal canal. These tests provide useful information when MRI cannot be done or is limited by hardware artifact.
- Plain x-rays, utilized to identify fractures, tumors, infection, and degenerative changes.
- Ultrasound, utilized to scan the bladder and identify urinary retention.
- Urodynamic tests, utilized to evaluate bladder function. These tests should be considered only in light of the patient's clinical condition after emergent care has been given.

Treatment of Cauda Equina Syndrome

Conservative treatment alone is rarely indicated, as CES is an emergent condition and surgical decompression is the treatment of choice. To prevent further neurological deterioration, urgent surgical decompression should be performed. Decompression for rapidly progressing CES may prevent sphincter paralysis. The best surgical outcomes were reported in patients with the least neurological deficit prior to surgery.[111, 113, 119-122] Decompression surgery may range between microdiscectomy and wide laminectomy with discectomy to limit the manipulation of potentially damaged neural tissue.[113]

B. Lumbar Fusion Procedures

Lumbar fusion procedures involve stabilization of the lumbar spine by fusing one or more vertebrae. In most cases, fusion can be considered a procedure of last resort due to significant potential for poor outcomes and disability, as well as the potential benefit of non-operative care and less invasive procedures.[48, 123, 124] Decompression alone is considered an appropriate first-line procedure for single-level stenosis or spondylolisthesis, with studies showing comparable results between decompression and fusion procedures for treating these conditions.[125-128] Of particular interest, patients undergoing fusion procedures had significantly lower RTW rates compared to decompression alone in a large-scale cohort study of Ohio workers' compensation patients.[129]

When non-operative care is inappropriate or has proved insufficient, and decompression alone is not indicated, lumbar fusion procedures may be covered for the following conditions when appropriate subjective, objective, and imaging criteria have been met. In all cases, the department requires that the requesting surgeon must submit a report verifying the positive findings on physical exam.

1. Spondylolisthesis

Spondylolisthesis, the shifting or slipping forward of spinal vertebrae, is a common condition shown to be incident in at least 6% of the general population at adulthood; this can cause significant pain and disability due to compression of neurologic structures.[130, 131]

Lumbar fusion for spondylolisthesis is supported in appropriately selected patients, with results from numerous studies demonstrating significant improvement in patients undergoing fusion for degenerative spondylolisthesis, though results are often equivalent to decompression.[126-128, 132, 133] Long-term results from the SPORT study showed significantly better results compared to non-operative care in patients treated with lumbar fusion at up to 8 years, demonstrating significant improvement in ODI scores (average decrease of 10.3 points) and sustained outcomes at 8 years.[134] When results are pooled in systematic reviews and meta-analyses, significant improvement in outcome measures are sustained.[93]

Particular caution should be taken in L&I patients, as long-term studies have demonstrated worse outcomes among the workers' compensation (WC) population. A study of Ohio WC patients undergoing lumbar fusion for degenerative stenosis found a lower return to work rate than patients undergoing decompression at 2-years, with an overall higher cost of care.[129] Another study of Ohio WC patients undergoing fusion found that, when excluding patients who had a significant pre-operative risk factor such as depression or long term-opioid use, only 60% of patients had returned to work at two years post-fusion.[135]

In the absence of documented substantial or progressive motor weakness, L&I requires at least three months of non-operative care for low back pain which may include manual therapy, manipulation, neuromobilization, flexion/distraction, general fitness, strengthening, or Cognitive Behavioral Therapy/Self-management.

Surgery may be considered appropriate if proper subjective, objective, and imaging criteria are met. Imaging must include both X-ray flexion and extension views, MRI or CT-Myelogram that demonstrates moderate to severe central spinal stenosis and lumbar instability, defined as one or more of the following: Spondylolisthesis ≥ Grade 2, ≥ 4mm of anterior / posterior translation at L3-4 and L4-5, ≥ 5mm of translation at L5-S1, or ≥ 11º end plate angular change at a single level, compared to an adjacent level.

The patient should also have findings of 1) neurogenic claudication, defined as radiating leg pain that is exacerbated while standing up and walking, immediate relief of neurogenic symptoms when seated, and improvement of symptoms when bending forward, or 2) radiculopathy, defined as sensory symptoms in dermatomal distribution including radiating pain, burning, numbness, tingling or paresthesia.

2. Prior Decompression at the Same Level

While decompression can be an appropriate first line procedure for treating many conditions in the lumbar spine, some patients may experience new onset of significant pain and disability in the months following surgery.[136, 137] In many cases, this can be adequately addressed through non-operative care including physical therapy, pharmacologic therapy, epidural injections, behavioral modifications, and other appropriate measures.[136, 138]

In some situations, lumbar fusion is considered for treating new onset of symptoms. Evidence for the effectiveness of lumbar fusion in this scenario is weak, with studies finding no significant difference between surgical care and conservative care in Oswestry Disability Index scores following surgery, and showing less than 50% of patients reporting significant symptom relief following surgery.[136, 139]

When non-operative care has failed, lumbar fusion may be considered an appropriate procedure in patients who have previously undergone a decompressive procedure and demonstrate new onset of lumbar segment instability, symptomatic central stenosis, or severe radiculopathy at the same level of previous decompression.

Clinical findings should include spondylolisthesis ≥ Grade 2, lumbar segment instability at the same level, rotational deformity or other conditions leading to a progressive measurable deformity, objective signs and symptoms compatible with neurogenic claudication or lumbar radiculopathy confirmed by a detailed neurological examination, or positive EMG demonstrating acute denervation (fibrillation and sharp waves). MRI or CT with contrast (with or without myelography) must confirm findings of moderate to severe central, lateral recess, or foraminal stenosis at the same location as previous decompressive procedure.

3. Pseudarthrosis, with or without hardware failure

Failure of fusion, or pseudarthrosis, can be a common complication following lumbar fusion, with occurrence following up to 35% of procedures, and incidence is thought to increase with the number of levels fused.[15, 140] General definitions of this non-union point to a failure to achieve solid fusion at least one year following surgery.[141]

Repeat fusion for pseudarthrosis has demonstrated success across multiple smaller scale studies. One study of patients undergoing reoperation following fusion for pseudarthrosis found all available patients (N=64) experienced successful fusion on radiograph at follow-up, and a subjective survey of improvement following surgery found 64% of spondylolisthesis cases felt their wellbeing had improved.[142] A separate study (N=47) found at 2 year follow-up function scales for back pain (VAS), ODI, and the SF-12 physical health component were all significantly improved from pre-operative scores following revision arthrodesis.[143]

Following non-operative care, fusion for pseudarthrosis may be appropriate when the following subjective and imaging findings are present. Pseudarthrosis can present as axial back pain with or without radicular symptoms, though there are no specific, objective physical findings on exam for pseudarthrosis, and as with all conditions it is important to rule out other sources of pain generation. Emphasis must be

placed on identifying if significant improvement followed the initial or previous surgery, but new or worsening pain has arisen ≥12 months following surgery. Imaging for pseudarthrosis, either CT scan or CT bone scan/nucleotide scan, should demonstrate objective evidence of pseudarthrosis such as no evidence of bony union across the fusion site, fractured screws, or haloed screws.

4. Recurrent Disc Herniation

Recurrent disc herniation addressed by fusion is not uncommon, as removal of spinal elements can lead to lasting instability. Around 10% of operated patients may experience symptomatic reherniation requiring repeat surgery.[18, 80-82] Though no specific timeline can predict reherniation, numerous studies have demonstrated up to 50% of reherniations that require reoperation occur within the first year following initial surgery.[80, 81, 83-85]

While L&I considers repeat decompression the treatment of choice following the index procedure, lumbar fusion may be appropriate to address lasting instability if there have been multiple failed decompression attempts. A recent systematic review have found similar efficacy of fusion compared to decompression for treating recurrent disc herniation, with both procedures leading to significant improvement in functional outcome scores (e.g. ODI, JOA) and satisfaction with surgical results.[144] Particular caution should be taken in L&I patients, as long-term studies have demonstrated worse outcomes among the workers' compensation (WC) population. A study of Ohio WC patients undergoing lumbar fusion for recurrent disc herniation found a lower return to work rate than patients undergoing decompression alone at 2-years, along with increased opioids supplied, and an overall higher cost of care.[145]

Prior to lumbar fusion surgical consideration, and in the absence of documented substantial or progressive motor weakness, at least six months of non-operative therapy with a non-operative spine specialist is required. Following ≥2 previous discectomies at the same level, lumbar fusion may be appropriate in the following situation: Recent (within 6 months) MRI with contrast* confirms an equal or larger disc herniation at the same location as the previously operated disc herniation, or indicates instability defined as one or more of the following: Spondylolisthesis ≥ Grade 2, ≥ 4mm of anterior / posterior translation at L3-4 and L4-5, ≥ 5mm of translation at L5-S1, or ≥ 11º end plate angular change at a single level, compared to an adjacent level. And findings of <u>two or more</u> of the following:

- Dermatomal sensory deficit on exam.[74]
- Motor deficit (e.g., foot drop or quadriceps weakness).[74, 75]
- Positive dural tension signs (e.g., straight leg test, contralateral straight leg test/crossover sign).[54, 76, 77]
- Asymmetric reflex changes.
- Positive EMG demonstrates acute denervation (fibrillation and sharp waves).[78, 79]

To improve the identification of appropriate candidates for repeat surgical interventions, use of an imaging contrast medium is required when requesting approval of a repeat decompression surgery, unless otherwise contraindicated*. Studies have demonstrated the ability of Gadolinium enhanced imaging to aid in differentiation of disc herniation and peridural scarring.[28, 29] L&I considers this distinction especially

important, as long-term studies have shown worse outcomes for workers' compensation patients undergoing surgery compared to patients with other forms of coverage.[41, 65]

*Non-contrast MRI or CT Myelogram would be acceptable if there is a contraindication to Gadolinium. Identified relative and absolute contraindications to use of a contrast/Gadolinium medium include[30]:

- Relative contraindications:
  - Certain medications, such as β-blockers, nonsteroidal anti-inflammatories (NSAIDs), and interleukin-2.
- Absolute contraindications:
  - Prior adverse reaction to contrast medium(s).
  - History of asthma, allergies, heart disease, or underlying renal disease.

5. Foraminal Stenosis

Lumbar foraminal stenosis is a common cause of symptomatic lumbar radiculopathy that can often be overlooked due to the location of the narrowing at the bony exit of the nerve root.[103] Non-operative treatment is recommended initially for the treatment of foraminal stenosis, with studies demonstrating the effectiveness of active rehabilitation, manual medicine, NSAIDs, and epidural steroid injections.[104]

Fusion for foraminal stenosis is not considered superior to decompression, but studies have noted that some patients do benefit from the addition of fusion when decompression is inadequate or significant instability exists.[103, 104, 109] Foraminal stenosis alone should not be the cause of the patient's pain behavior, and surgery should address the radicular component of pain. In selecting appropriate candidates for lumbar fusion for foraminal stenosis, the following subjective and objective criteria must be met: Objective findings must include presence of motor deficit (e.g., foot drop or quadriceps weakness), or a positive EMG demonstrates acute denervation (fibrillation and sharp waves). Two or more of the following objective symptoms may also be acceptable clinical findings: Dermatomal sensory deficit on exam corresponding with radicular pain/weakness, asymmetric reflex changes at the appropriate dermatomal level, positive response to Selective Nerve Root Block (SNRB) as determined and documented by the interventionist, or chronic denervation on EMG.

Criteria for selective nerve root blocks include:

- Use of low-volume(≤2.0 cc) local anesthetic, with fluoroscopy or CT scan.
- No sedation should be given with SNRB, except in extreme cases of anxiety.
- Documentation of baseline level of pain.
- Meaningful improvement in pain of 80%, or a 5-pt change on Visual Analog Scale (VAS).

Along with clinical findings, abnormal imaging on MRI or CT Myelogram read by a radiologist should demonstrate moderate or severe foraminal stenosis that correlates nerve root involvement with subjective and objective findings at the level of the proposed surgical intervention, and must demonstrate severe disc height loss. Oblique MRI may also be beneficial in proper diagnosis and surgical planning. One study demonstrated in patients (N=162) with suspected nerve root anomalies and entrapments who underwent

oblique MRI, two clinicians assessing images comparing the symptomatic side to asymptomatic side had high agreement (kappa=0.88) in identifying conditions including nerve root entrapment due to foraminal stenosis.[146]

6. Adjacent Segment Pathology

Adjacent segment pathology (ASP) is an encompassing term used to describe symptomatic and radiographic changes seen at the level adjacent to a previously operated or fused segment. While there is a lack of consensus on a "true" definition of ASP, there are numerous proposed mechanisms for its development including aging, genetics, BMI, and instability following previous surgical treatment.[147, 148]

Adjacent segment pathology has been noted following fusion procedures, as well as decompression alone procedures. Recent studies reported a 10% reoperation rate for ASP over 4 years following first time single or two-level laminectomy, and a 4% reoperation rate for ASP over 3 years for first time single level discectomy.[149, 150] Following fusion procedures, a systematic review found the prevalence of radiographic ASP to be 26.6% (95%CI 21.3%-31.9%), and prevalence of symptomatic ASP was found to be 8.5% (95% CI 6.4%-10.7%).[151]

Careful consideration may be placed on the surgical technique used, as one recent study demonstrated an association of ASP with degree of decompression. In Liu et al., a study of 120 patients randomized to facet joint resection and fusion, semilaminectomy and fusion, or complete laminectomy and fusion, at 6 year follow-up significantly more patients in the complete laminectomy group had significantly worse JOA scores, and significantly decreased lumbar lordosis and disc height compared to the other groups.[152] Decompression alone is appropriate when the subjective, objective, and imaging criteria are consistent with the guideline criteria for decompression alone (e.g., when there is no foraminal stenosis or dynamic instability).

If the subjective and objective criteria for Foraminal Stenosis or Dynamic Instability are met, fusion for Adjacent Segment Pathology may be appropriate. Any request for fusion of an adjacent segment will automatically trigger a physician review.

C. Sacroiliac (SI) Joint Fusion

The Sacroiliac (SI) joint is thought to be a non-trivial source of mechanical low back pain, most often related to a specific inciting event or trauma.[153] However, there is little reliable objective evidence with which SI joint specific pain has been identified. Testing has included provocative tests, which are are not considered reliable, and selective injections of anesthetic agents.

Requests for fusion of the SI joint have increased over time in the Washington L&I system. As such, the Department has developed criteria to allow for the exceptional claim where the worker has experienced a severe enough injury (e.g., fall from a significant height) to disrupt the SI joint. This type of severe injury and its demonstrated SI joint disruption can be easily identified with advanced imaging.

For all other requests, this procedure is non-covered on the basis of a decision by the WA State Health Technology Clinical Committee (HTCC), as the procedure demonstrates insubstantial evidence for efficacy but substantial evidence for harm. A review of a sample of cases reported to the FDA Manufacturer and User Facility Device Experience (MAUDE) reporting system revealed severe adverse effects, including displacement of implanted devices, nerve damage, and infection. Subsequent revision and removal is difficult if not impossible because the implanted device becomes fused with bone.

Therefore, SI joint pain due to degenerative sacroiliitis or SI joint disruption in the absence of an inciting traumatic event alone is not considered an appropriate indication for surgery, but SI joint pain due to recent major trauma or fracture may be considered appropriate if there is corresponding anatomic abnormalities such as a widened SI joint or pubic symphysis diastasis >2.5cm seen on CT.

D. Multidisciplinary Team Review of Lumbar Fusion Requests

The Lumbar Spine Surgical Subcommittee raised the potential for and requested L&I explore the feasibility of implementing a multidisciplinary team in the evaluation of lumbar fusion requests as a way to facilitate multidisciplinary assessment and collaboration, offer alternative treatment recommendations, and prevent risk of harm. In Washington state, Virginia Mason has two regular multidisciplinary conferences to review patients with lumbar spine conditions (a simple and complex) consisting of surgical and nonsurgical providers. Evidence provides support for this approach: researchers reviewed the records of 100 patients recommended for spinal fusion surgery by a spine surgeon at an outside institution that were presented at the multidisciplinary conference between November 2015 and August 2016 and found that the multidisciplinary team recommended 58 for nonoperative management ($p< 0.01$).[154] The Department will continue the explore the feasibility of implementing this innovative concept into our system.

VI. Rehabilitation and Return to Work

Return to work (RTW) is expected after most occupational injuries. Duration of disability or time off work depend on many factors such as the severity of the injury, type of treatment, comorbid conditions, and job class type. Multiple resources are available through L&I's RTW program to help providers in their interactions with workers, employers, and claim managers to discuss and coordinate the best ways to help with return to work.[o] There is a particularly useful "Return to Work Desk Reference" for attending providers with guidance on how to talk with workers and their employers (and get paid for it), online publications to inform the patient how returning to work can reduce disability, descriptions of best practices, checklists, algorithms, vignettes, and a list of ways L&I staff can assist.[p]

[o] https://lni.wa.gov/patient-care/workshops-training/attending-provider-resource-center/helping-workers-return-to-work
[p] https://lni.wa.gov/forms-publications/F200-002-000.pdf

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