COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF INDUSTRIAL ACCIDENTS

Neck and Back Injury Treatment Guideline
APRIL 2022

A. INTRODUCTION

This clinical guideline has been created to improve health care services for injured workers by outlining the appropriate evaluation and treatment processes for the management of work-related neck and back injuries. The guideline should be used as a tool to guide health care providers of different professional disciplines to provide quality care to injured workers. The guideline is not intended to be a substitute for appropriate medical judgment, and is written to be broad enough to allow for a wide range of diagnostic and treatment modalities, and to purposely allow for philosophical and practice differences among professional disciplines of health care practitioners who provide care to injured workers. It is expected that approximately 10% of cases may fall outside of this guideline and may be reviewed and approved on a case-by-case basis. If objective clinical improvement is delayed or slower than expected, the treating provider must justify the necessity of continued care with a valid clinical rationale and supporting, objective clinical findings. Sample tools referenced in this Guideline are intended to promote all types of physical and psychological treatment to injured workers. These tools are not meant to be used as a means to deny treatment.

B. GENERAL GUIDELINE PRINCIPLES

B.1 HISTORY TAKING AND PHYSICAL EXAMINATIONS

Medical records should document History of Present Illness, Mechanism of Injury, Past History, and Physical Examination including detailed neurologic exam. History should incorporate red flags or possible indicators of serious spinal pathology (e.g., fever and unexplained weight loss, bladder or bowel dysfunction, history of cancer, ill health or presence of other medical illness, progressive neurologic deficits, disturbed gait, saddle anesthesia) and yellow flags or psychological factors associated with higher risk of delayed recovery (e.g., fear avoidance behavior, catastrophizing or belief that back pain is harmful or severely disabling, prior trauma and delayed recovery/prolonged disability, tendency towards depression, major stressors). History should include past treatment for similar problems and the outcome of that treatment - whether there were any persistent/chronic symptoms and how these symptoms or the outcome affected the patient's function, including his/her occupation and quality of life. Risk factors for disability and predictors of prolonged disability should be assessed. **See Appendix for sample assessment tools.**

A safe and healthy work environment including a positive work organization and organizational programs and policies designed to aid return to work are the responsibility of the employer. They can result in reduced injuries, better recovery from an injury, and improved long-term health status. An employer's specific attention to providing a safe and supportive work environment assists in reducing risk of injury and promoting a more rapid recovery when a work injury occurs.

Past history should also include medical history, history of other chronic painful conditions (i.e., fibromyalgia, headache, IBS), family history of chronic pain, surgical history, smoking history, alcohol use, drug use, medication use, previous disabilities, vocational and recreational pursuits, and history of depression, anxiety, or other psychiatric illness. **See also section B.8 "OCCUPATIONAL EXPOSURES, INDIVIDUAL RISK FACTORS AND STRUCTURAL DETERMINANTS ASSOCIATED WITH DELAYED RECOVERY".**

B.2 EDUCATION AND COMMUNICATION

Education of and communication with stakeholders should be a primary emphasis in treatment of work-related injury or illness. Stakeholders include but are not limited to the patient, the patient's family, designated employer and employee representatives, and insurance representative(s). Education for the injured worker should include identification of workplace hazards that could cause or contribute to re-injury and what employers should do to eliminate, reduce or prevent these hazards. Management of symptoms and awareness of any related symptoms that might necessitate a call or visit to the treating health care provider should also be discussed. Education for the employer could include identifying and addressing workplace hazards that could cause or contribute to future injury for this and/or other workers. Depending upon the patient's presentations, modified work options should be discussed. This information should be documented in the treatment plan. Initial assessment of function and updates during recovery should be included in communications with stakeholders, specifically referencing functional level as it relates to the activities of the job. (S**ee section B.6 as well**). Practitioners should develop and consistently implement effective verbal and/or written communication strategies that educate stakeholders as well as facilitates timely referrals (e.g., for physical medicine) when indicated.

B.3 IMAGING/ANATOMICAL TESTS

Back and Neck – Imaging is not routinely recommended and should only be done if clinically indicated. When obtained, imaging studies may reveal findings that do not correlate with the patient's symptoms or clinical presentation. Thus, health care providers should take a careful history and conduct a thorough physical examination in order to correlate historical, clinical, and imaging findings. Imaging studies should not typically be the sole basis for diagnosis or attribution of a patient's complaints. The focus of treatment should be improving symptoms and function, and not the correction of abnormalities on imaging studies.

B.4 LABORATORY TESTING

Rarely indicated at the time of the initial evaluation unless suspicions of systemic illness, infection, neoplasia, rheumatologic disorder, or connective tissue disorder based on history and/or physical examination.

B.5 FOLLOW-UP DIAGNOSTIC IMAGING AND TESTING PROCEDURES

Clinical information obtained by history taking and physical examination should form the basis for selecting an imaging procedure and interpreting its results. When an imaging procedure, in conjunction with clinical information, provides sufficient information to establish an accurate diagnosis, the second diagnostic procedure will be redundant if it is performed only for diagnostic purposes. However, a subsequent diagnostic procedure (that may be a repeat of the same procedure, when the physician documents that the study was of inadequate quality to make a diagnosis) can be a complementary diagnostic procedure if the first or preceding procedures, in conjunction with clinical information, cannot provide an accurate diagnosis, e.g., inadequate spine MRI augmented by CT/Myelography. Repeat imaging studies require a clearly articulated clinical rationale.

B.6 STAY AT WORK/RETURN TO WORK

Ascertaining work status is part of medical care and should be included in the treatment and rehabilitation plan. It is recommended that documentation of function and any change in status be included with each assessment. For purposes of these guidelines, "return to work" is defined as any work or duty that the patient is able to perform safely. Return to work may not be to the patient's regular work. A description of the patient's status, work abilities and task limitations is part of any treatment plan and should provide the basis for restriction of work activities when warranted. Timely return to safe and meaningful work should be a prime goal in treating occupational injuries. The emphasis within these guidelines is to move patients along a continuum of functional recovery and return to work. Return to work decisions should be individualized based on the biomechanical exposures (physical demands) and the work organization of a specific job. Return to work can occur earlier when organizational programs and policies, such as modified duty, are available or may be delayed by strenuous job demands like heavy lifting or in work with vibrating equipment. While returning to work can be therapeutic to the recovery of an injured worker, care should be taken not to return workers into unsafe working conditions. Occupational medicine and pain specialists, surgeons, chiropractors, physical and occupational therapists, ergonomists, behavioral health specialists, the recovering employee and employers may all contribute to workplace safety.

B.7 RE-EVALUATION OF TREATMENT

If a given treatment or modality is not producing positive results, including functional improvement within three to four weeks, the provider should evaluate the effectiveness of the treatment and the treatment should be modified. Patients should be re-evaluated on an ongoing basis to assess progress. Before discontinuing the treatment, the provider should have a detailed discussion with the patient to determine the reason why treatment did not produce the expected positive result(s). Reconsideration of diagnosis should also occur in the event of a poor response to a seemingly rational intervention.

B.8 OCCUPATIONAL EXPOSURES, INDIVIDUAL RISK FACTORS AND STRUCTURAL DETERMINANTS ASSOCIATED WITH DELAYED RECOVERY

Based on initial history **(See section B.1 comments on yellow flags)** and response, further screening of the injured worker at higher risk for delayed recovery may be indicated. **Table 1** is intended to identify barriers to improvement, often referred to as "flags". They may be patient based, jobsite based, or external factors over which the patient has little or no control. Identifying and early intervention with these factors maximizes the likelihood that the patient can be effectively treated and successfully returned to work where possible. **See Table 1 for common Work-Related Disability Flags and Appendix for sample tools to assess risk factors for disability and predictors of prolonged disability.** For those patients who do not make expected progress within a minimum of 6 weeks after injury or at any time when screenings find the worker to be at elevated risk for delayed recovery, then additional assessment as to accuracy of the diagnosis and re-evaluation of the treatment program should be performed.

- Assessment should include potential facilitators and barriers to recovery, such as work organization and physical workplace exposures, organizational programs and policies, psychosocial, and individual risk factors (e.g., substance use, psychological factors). Job dissatisfaction is a predictor of poor outcome. However, job related dissatisfaction may be due to factors beyond the worker's control, i.e., factors related to the work structure or environment that may require addressing at the employer level.
- If such facilitators and barriers to recovery are identified, the treating provider should provide or facilitate access to appropriate additional resources, usually via referral. Such resources may include consulting with those with expertise in delayed recovery, which will likely include mental health providers. The treating provider may also need to discuss organizational programs and policies, and work organization and physical workplace exposures, with the employer.
- It may be valuable to have an assessment performed by a health care practitioner who has training and experience in diagnosing and treating pain disorders in injured workers.
- Assessment should include brief, standardized screening instruments that address the facilitators and barriers to achieving effective pain management and return to work, as well as focused treatment recommendations that can be integrated into the patient's overall care.

C. DIAGNOSTIC STUDIES

C.1 IMAGING STUDIES

Radiographs (X-Rays)

X-rays should be taken only if clinically indicated. Routine x-rays are not recommended for acute non-specific neck or back pain. Imaging usually is not appropriate until conservative therapy has been tried and failed. However, the clinician should use judgment in this regard. In the absence of red flags, imaging tests are not recommended in the first 4 to 6 weeks of pain symptoms. X-rays and CT scans are recommended for acute pain with red flags for:

- Suspicion of fracture, dislocation, instability, or neurologic deficit.
- History of significant/major trauma.
- Age over 65 years.
- Unexplained or persistent pain for at least 4 weeks or pain that is worse with rest.
- Localized pain, fever, constitutional symptoms, suspected tumor, history of cancer, suspicion of intravenous drug abuse, suspected systemic illness, or potentially serious disease.
- As an option to rule out other possible conditions.

CT scans have a greater sensitivity, especially for cervical spine, than radiograph films and may be appropriate in lieu of x-rays depending upon the patient's condition, especially in cases of acute head and neck trauma to rule out fracture. For patients with non-acute pain, it may be reasonable to obtain repeat imaging months or years subsequently to re-evaluate the patient's condition, particularly if symptoms change.

Magnetic Resonance Imaging (MRI)

Back – In the absence of red flags, MRI is not recommended for acute back pain or acute radicular pain syndromes in the first 6 weeks.

MRI is recommended:

- for patients with acute back pain during the first 6 weeks if they have demonstrated progressive neurologic deficit, signs/symptoms suggestive of cauda equina, significant trauma with no improvement in atypical symptoms, a history of neoplasia (cancer), or atypical presentation (e.g., clinical picture suggests multiple nerve root involvement);
- for patients with acute radicular pain syndromes in the first 6 weeks if the symptoms are severe and not trending towards improvement, and both the patient and the physician are willing to consider surgical treatment or interventional spine care;
- as an option for the evaluation of select non-acute back pain patients in order to rule out concurrent pathology unrelated to injury. This should rarely be considered before 3 months and failure of several treatment modalities (including NSAIDs, aerobic exercise, other exercise, and considerations for manipulation, and/or acupuncture);
- in cases where an epidural corticosteroid injection is being considered for temporary relief of acute or subacute radiculopathy, MRI at 3 to 4 weeks (before the steroid injection) may be reasonable (**see Section D.4 INJECTIONS**).

Neck - MRI is useful in suspected nerve root compression, in myelopathy to evaluate the spinal cord and/or differentiate or rule out masses, infections such as epidural abscesses or disc space infection, bone marrow involvement by metastatic disease, and/or suspected disc herniation or cord contusion following severe neck injury. MRI should be performed immediately if there is a question of infection or metastatic disease with cord compression.

In general, repeat MRI imaging of the back or neck without significant clinical deterioration in symptoms and/or signs is not recommended.

Computerized Tomography (CT)

Back - CT remains a good test to evaluate bony or calcified structures of the spine and is most useful to evaluate the spine in patients with contraindications for MRI. Routine CT is not recommended for acute or non-acute non-specific back pain or for radicular pain syndromes. CT (or MRI) is recommended for those with radicular pain syndrome that has failed to improve within 4 to 6 weeks and epidural steroid injection (ESI) or surgical discectomy are being considered. (**see Section D.4 INJECTIONS**).

Neck – CT provides excellent visualization of bone and is used to further evaluate bony masses and suspected fractures. It may sometimes be done as a complement to MRI scanning to better delineate bony osteophyte formation in the neural foramen. CT is usually utilized for suspected cervical spine fracture. When ferrous/metallic materials are present in the soft tissues, CT should be ordered rather than an MRI. CT examinations, it should be remembered, deliver a considerable radiation dose and carry with them associated radiation-related risks.

Myelography (Including CT Myelography and MRI Myelography)

Back – Myelography has almost entirely been replaced by MRI and other imaging procedures. Myelography is not recommended as the first diagnostic study for the diagnosis of lumbar root compromise. Myelography, including CT myelography, is recommended only in uncommon specific situations (e.g., implanted metal that precludes MRI, equivocal findings of disc herniation on MRI suspected of being falsely positive, spinal stenosis, and/or a post-surgical situation that requires myelography). Flexion and extension views should be considered while dye is in place as a means to identify dynamic nerve compression.

Neck - Myelography may be used as a pre-surgical diagnostic procedure to obtain accurate information of characteristics, location, and spatial relationships among soft tissue and bony structures. Myelography is an invasive procedure with complications and therefore, should only be considered when CT and MRI are unavailable, for morbidly obese patients or for those who have undergone multiple operations, and when other tests prove non-diagnostic in the surgical candidate. CT Myelogram provides more detailed information about relationships between neural elements and surrounding anatomy.

Bone Scans

Back - Bone scanning is not recommended for routine use in back pain patients. Bone scanning is a good diagnostic test for specific situations which involve a minority of patients and may be useful in diagnosing suspected metastases, infection (osteomyelitis), inflammatory arthropathies and fractures. This technology is generally not used for evaluation of most occupational back pain situations.

Neck – Radioisotope bone scanning may be useful in diagnosing metastatic/primary bone tumors, stress fractures, osteomyelitis, and inflammatory lesions, but cannot distinguish between these entities. In the cervical spine, the usual indication is to evaluate for neoplastic conditions. Chiefly indicated with persistent symptoms with otherwise normal diagnostic tests or to differentiate old vs. new lesions.

C.2 OTHER TESTS/PROCEDURES:

Electrodiagnostic Studies (EDX)

EDX include needle electromyography (EMG), peripheral nerve conduction velocity studies (NCV), and motor and sensory evoked potentials. Needle EMG can substantiate the diagnosis of radiculopathy or spinal stenosis in patients with neck pain, back pain, and/or radiculopathy problems and can help determine if radiculopathy is acute or chronic. NCV are done in addition to needle EMG to rule out other potential causes for a patient's symptoms (e.g., other co-morbidity or alternate diagnosis involving peripheral nerves) and to confirm radiculopathy. EMG/NCV can also help to elucidate the level of radiculopathy for targeted treatment/interventions.

Back –

- EDX are generally not needed when patients' radicular symptoms are consistent with history, physical examination, and imaging.
- EDX are not recommended for patients with acute or non-acute back pain who do not have significant lower extremity pain, numbness, or weakness.
- EDX (must include needle EMG and NCV) are recommended when a CT or MRI is equivocal and there are ongoing complaints of peripheral (non-axial) pain, weakness, and/or numbness/paresthesia that raise questions about whether there may be a neurological compromise that may be identifiable. This means lower extremity symptoms consistent with radiculopathy, spinal stenosis, peripheral neuropathy, etc. Nerve conduction studies are done in addition to the needle EMG both to rule out other potential causes for the symptoms (co-morbidity or alternate diagnosis involving peripheral nerves, e.g., compression neuropathies) and to confirm radiculopathy.
- EDX are recommended when there is failure of suspected radicular pain to resolve or plateau after waiting 4 to 6 weeks, which provides sufficient time to develop EMG abnormalities or for conservative treatment to resolve the symptoms. Other situations in which EDX may be needed include equivocal imaging findings on prior CT or MRI studies, or suspicion by history and physical examination that another neurologic condition (other than radiculopathy) may be present.
- It should be noted that EDX may be falsely negative when one is assessing a sensory-only radiculopathy.
- EDX are generally not recommended prior to obtaining high quality imaging tests.

Neck - Electrodiagnostic studies may be indicated if significant radiating upper extremity symptoms are present or greater than 4-6 weeks after the onset of injury and no obvious level of nerve root dysfunction is evident on examination. Electrodiagnostic studies may also be useful to determine the extent of injury in patients with an established level of injury.

Surface EMG (Back and Neck): Not recommended.

Discography (Back and Neck): Not recommended.

D. THERAPEUTIC PROCEDURES: NON-OPERATIVE

For those patients who fail to make expected progress 6-12 weeks after an injury and whose subjective symptoms do not correlate with objective signs and tests, re-examination in order to confirm the accuracy of the diagnosis should be performed. Formal psychological or psychosocial evaluation may be considered.

D.1 MEDICATIONS

Please refer to the Massachusetts Opioid/Controlled Substance Protocol. In general, current standards of care emphasize non-pharmacologic means of addressing discomfort. Over the counter (OTC) ibuprofen combined with acetaminophen has shown to be as effective in relieving acute pain when compared to opioids prescribed at initial, low dosage. Advantages of trying OTC ibuprofen and acetaminophen include avoiding potential addiction issues as well as the risks associated with sedation while performing safety sensitive job tasks and driving. How a patient is actually taking OTC medications should be reviewed at time of follow-up to ensure appropriateness and absence of side effects.

D.2 PHYSICAL MEDICINE TREATMENT

Starting with the initial health care visit, the worker should be provided with instruction and encouragement for normalizing activity as tolerated. Physical activity should generally begin as soon as possible. Patients should be instructed in self-care and receive a home exercise program that is progressed as their functional status improves. Indications for referral to a structured physical medicine program may include: poor body awareness, difficulty learning/performing trial home program, failure to progress, worker articulates preference perhaps based on prior success during similar injury recovery episode, or other clinical findings that suggest physical medicine would have a high likelihood of benefit. The patient must have demonstrated evidence of functional improvement to justify additional visits. Initial passive or modality based physical medicine should be transitioned towards active functional recovery efforts and instruction. Upon discharge, the patient should be independent in the performance of a home exercise program and educated as to the importance of continuing such a program.

For patients treated by more than one discipline (chiropractic treatment, physical therapy, occupational therapy, and allopathic medicine), similar services should not be duplicated.

Continuance of treatment will depend upon functional improvement. Extended durations of care beyond what is considered "maximum" may be necessary in cases of re-injury, interrupted continuity of care, exacerbation of symptoms, and in those patients with comorbidities.

1. Chiropractic treatment sessions
   Maximum: 16 visits in first 6 weeks; 10 visits between weeks 7 and 12. Patients should be evaluated every 4 weeks and functional improvement documented.
2. Physical therapy treatment sessions
   Maximum: 16 visits in first 6 weeks; 10 visits between weeks 7 and 12.
   Patients should be evaluated every 4 weeks and functional improvement documented.
3. Physical agents and modalities (e.g., heat/cold, electrical stimulation, ultrasound, fluori-methane)
   Maximum: 2 allowed per treatment session in first 6 weeks; 1 allowed per treatment session between weeks 7 and 12. Not allowed as a stand-alone treatment, but may be a component of a comprehensive treatment plan.
4. Acupuncture
   Acupuncture must be ordered by a licensed MD, DC, DO, PA, NP, or PT and performed by a health care practitioner licensed to perform acupuncture in the state where the acupuncture service is provided. Eight (8) visits allowed in first 6 weeks of acupuncture treatment. Thereafter, the ordering practitioner may request additional visits if there is documentation of objective improvement in functional activity or when the symptomatic benefit facilitates progression in the patient's treatment program.
   Maximum visits are not to exceed 16 visits in 12 weeks. The ordering/treating practitioner cannot be the provider of the acupuncture service.
5. Massage Therapy
   Massage which is not performed in conjunction with a covered procedure is not considered a medical service subject to the MA utilization review regulations. MA Guidelines do not recognize massage therapy as a stand-alone treatment for injured workers.

D.3 PSYCHOLOGICAL TREATMENTS

When psychological barriers impact care and additional resources are to be considered, short term behavioral treatment is indicated for acute back and neck pain, including skills that address maladaptive coping strategies such as fear avoidance, catastrophizing and anxiety. Psychological barriers are not psychiatric diagnoses. Stigma on the part of the patient, provider, or employer associated with mental health diagnosis and referral is well established and should not prevent access to effective treatment.

- Evidence based treatments such as cognitive behavioral therapy (CBT), and related acceptance and mindfulness therapies may be used to improve patient coping skills and improve outcome with the work-related injury.
- Specific treatments have been shown to be effective in individual or group format. Treatments should be individualized and targeted to specific patient problem areas, with integration into physical rehabilitation, exercise therapies, and medical treatments.
- Specific treatment goals should be established with the patient before undertaking care, with outcomes assessed throughout the treatment sessions and progress communicated back to the referring provider. Treatment goals should be objective and measurable, and include patient self-report of improvement.
- Treatment should address specific barriers to attaining expected functional recovery progression.
- Treatment frequency may require 1 to 2 visits weekly for the first 6 weeks. Additional visits of lowered frequency may be required for exceptional cases or exacerbations in chronic cases.
- When indicated for longstanding mental health or substance use issues, a referral should be initiated for appropriate care.
- Providers should document suspected determinants of delayed recovery which may be specific to work (e.g., not provided modified duty as agreed upon) or specific to home (e.g., family obligations that require lifting). Determinants may also be unique to that individual.

See Table 1 for common Work-Related Disability Flags.

D.4 INJECTIONS: DIAGNOSTIC/THERAPEUTIC

Injection therapy should not begin before 6 weeks post-injury in order to prevent the exclusion of effective conservative treatment. These injections are seldom meant to be “curative” and when used for therapeutic purposes, they are employed in conjunction with functionally based physical medicine for maximum benefit.

Epidural Steroid Injections (ESI)

ESI may be appropriate when patients have objective evidence of radiculopathy on physical exam or there is clear correlation between the injured worker's symptom pattern and the MRI or CT myelogram findings, conservative care has failed, and the worker desires a non-surgical option. There is a lack of clear evidence that ESI results in improved function or avoidance of surgery. Repeated ESI presents risk due to potential excessive steroid use. When ESIs are performed, fluoroscopic guidance is strongly recommended barring contraindications, and the following limitations apply:

1. MRI is recommended prior to the initial ESI. CT scan may be used for those patients in which an MRI is contraindicated.
2. No more than 2 level transforaminal lumbar ESIs per date of service are allowed. Cervical and thoracic interlaminar ESIs: No more than 1 spinal level per treatment session. Cervical and thoracic transforaminal injections are not recommended.
3. No trigger point or facet injections on the same date of service in order to permit assessment of ESI efficacy.
4. No more than 1 ESI using the same technique should be given without clinically meaningful improvement of radicular pain lasting at least 4 weeks and improvement in function of at least 50% compared to the baseline pain and function prior to the first ESI. All changes in pain and function should be documented. Changes in pain should be documented using a validated scale. If there is no such improvement, no further ESIs should be allowed.
5. No more than 3 ESIs within 6 months.
6. No more than 4 ESIs within a 365-day period unless there is clinically meaningful improvement of pain and function of at least 50%, as measured and documented by a validated scale.

Caudal injections are similar to epidural injections except that the location (tip of the sacrum/tailbone) and approach are different. Therapeutic caudal injections are subject to the same criteria as epidural injections.

Cervical/Thoracic/Lumbar Diagnostic and Therapeutic Medial Branch Blocks/Intra-articular Facet (Zygapophyseal) Joint Injections

Recommendations:

1. Intra-articular facet joint injections or medial branch blocks are not indicated for acute neck or back pain (<6 weeks). They may be considered when there is continuing axial, non-radicular neck or back pain after an injury that has not responded to conservative management. Intra-articular facet joint injections may reduce pain and may be useful in facilitating progress in a rehabilitation program.

2. Medial branch blocks or intra-articular facet joint injections are recommended for:
   - Patients with non-acute neck or back pain in order to determine whether radiofrequency ablation targeting the facet joint should be performed. Medial branch blocks may aid in identifying pain generators to determine if radiofrequency ablation is indicated.
   - Patients with pain suspected to be largely facet-mediated based on exam findings (i.e., non-radicular pain that is reproduced with extension and ipsilateral rotation of the spine) -and-
   - Patients who have completed a documented course of conservative management as defined in the Massachusetts Neck and Back Medical Treatment Guideline, including but not limited to medication and physical medicine treatments.

3. Medial branch blocks and intra-articular facet joint injections must be fluoroscopically guided or ultrasound guided.

A positive response to the diagnostic component of a medial branch block consists of an initial temporary improvement, defined as pain relief of greater than 80% within 60 minutes following the procedure.
Recommended Frequency for Facet Joint Injections/Medial Branch Blocks: 2 injections per joint may be done in one 12-month period, not to exceed 3 joint levels (4 medial branch nerves), depending upon patient's documented response.

Trigger Point Injections

Because the efficacy of trigger point injections is low, they are not recommended for treatment of acute neck pain or acute back pain. Trigger point injections may be reasonable secondary or tertiary options for non-acute neck and back pain that is not resolving with more conservative means (e.g., NSAIDs, progressive aerobic exercises, other exercises) within a 6-week time frame.
Trigger point injections should be utilized primarily for facilitating functional progress. Trigger point injections theoretically may be used to relieve pain and facilitate active therapy and stretching of the affected areas. The use of therapeutic injections without participation in an active therapy program is not recommended.

Recommended Frequency: Not more than 4 visits per 12-month period. Visits should be at least 3-4 weeks apart. A minimum of 50% pain reduction as measured by acceptable pain scales, such as the Numerical Pain Intensity Scale (NPIS), and significant documented functional improvement is required in order to repeat the procedure. Functional improvement should last at least 1 month and must include measurable improvement in physical activity goals.

Sacroiliac Joint Injections

Evidence regarding the efficacy of sacroiliac (SI) joint injections is controversial. SI joint injections should be considered for lower back or gluteal pain, or pain with sitting, with marked tenderness to palpation at the SI joint, typically caudal to the Posterior Superior Iliac Spine. A positive Patrick's test/FABER's maneuver is suggestive, but not required, to diagnose SI joint-mediated pain. SI joint injections must be done with fluoroscopic or ultrasound guidance. Patients should continue to engage in an active physical medicine program or assigned independent home exercise program after the SI joint injection is done. Two injections per joint per year are allowed with a documented therapeutic response. If the first injection does not provide a therapeutic response of sustained pain relief, substantiated by a minimum of 50% pain reduction as measured by acceptable pain scales such as NPIS, and significant documented functional improvement, similar injections should not be repeated.

Facet Joint Hyaluronic Acid Injections (Back and Neck): Not recommended

Intradiscal Steroid Therapy (Back and Neck): Not recommended

Platelet Rich Plasma (Back and Neck): Not recommended

Prolotherapy Injections (Back and Neck): Not recommended

Epiduroscopy and Epidural Lysis of Adhesions (Back and Neck): Not recommended

Stem Cell Injections (Back and Neck): Not Recommended

D.5 RADIOFREQUENCY ABLATION, NEUROTOMY, FACET RHIZOTOMY

Continuous percutaneous radiofrequency is the method generally used. Fluoroscopic guidance is required for precise positioning of the probe. Permanent images should be recorded to verify placement of the cannula.
Recommendations:

- If there is a positive response to the diagnostic component of one set of medial branch blocks, the patient is considered a candidate for radiofrequency ablation.
- Radiofrequency ablation is not recommended for involvement of more than 3 facet joints (4 medial branch nerves).

Post-Procedure: Barring complications, active therapy is recommended. This may include instruction and participation in a health club, home-based program, or supervised physical medicine treatment program for up to 12 visits.

Requirements for repeat radiofrequency neurotomy (or additional level radiofrequency neurotomies):

- Successful radiofrequency ablation usually provides at least six months of relief, defined by 50% or greater reduction of pain, and significant improvement in function.
- Before a repeat radiofrequency neurotomy is done, a confirmatory medial branch injection may be performed if the patient's pain pattern presents differently than in the initial evaluation.

Maximum Frequency: Twice a year, at least 4 months apart, as indicated by improvement in pain and function.

Rhizotomy for Sacroiliac Joint Pain

Continuous percutaneous radiofrequency is the method generally used. Fluoroscopic guidance is required for precise positioning of the probe and avoidance of the sacral foramen. Permanent images should be recorded to verify placement of the cannula.

Indications: If there is a positive diagnostic response of at least 80% reduction in pain as measured by the NPIS within 60 minutes of the lateral branch blocks for sacroiliac joint pain, the patient is considered a candidate for radiofrequency ablation.

Post-Procedure: Barring complications, active therapy is recommended. This may include instruction and participation in a health club, home-based program, or supervised physical medicine treatment for up to 12 visits.

Requirements for repeat radiofrequency rhizotomy (or additional level radiofrequency rhizotomies):

- Successful radiofrequency ablation usually provides at least six months of relief, defined by 50% or greater reduction of pain and significant improvement in function.

Maximum Frequency: Twice a year, at least 4 months apart, as indicated by improvement in pain and function.

Dorsal Root Ganglia Radiofrequency Lesioning: Not recommended.

Intradiscal Electrothermal Therapy (IDET): Not recommended.

Percutaneous Intradiscal Radiofrequency Thermocoagulation: Not recommended.

E. THERAPEUTIC BACK OPERATIVE PROCEDURES

Operative interventions should be based on a positive correlation with clinical findings, the natural history of the condition, mechanism of injury, the clinical course, and diagnostic tests which led to a specific diagnosis. It may be beneficial to check Vitamin D levels and optimize if below normal. A bone density study is recommended for patients over age 65 prior to undergoing a fusion. If surgical intervention is being considered, it is recommended that the patient refrain from smoking for at least six weeks prior to surgery and six months post-surgery. Because smokers have a higher risk of non-union and higher post-operative costs, it is recommended that a smoking cessation program be implemented peri-operatively. Smoking and weight loss programs may be an important component of the treatment plan.

Optimization of surgical candidates is recommended. Relative contraindications that should be considered or factors associated with a higher risk of a poor outcome include:

- Current Smoker.
- Severe physical deconditioning or morbid obesity.
- History or current substance use disorder/high dose opioid therapy (see MA Chronic Pain Treatment Guideline; efforts should be made to reduce morphine milligram equivalents (MME) before surgery, e.g., less than 90).
- Severe cardiopulmonary disease, anemia, malnutrition, soft-tissue infection near the spine that poses a risk spreading to the spine, systemic infection, poorly controlled diabetes, and/or severe osteoporosis.
- Psychosocial factors correlated with poor outcome, such as history of drug or alcohol abuse, high degree of somatization, personality disorder or major psychiatric illness, current evidence of factitious disorder, and/or chronic pain syndromes.
- Multi-level spinal degenerative disease.
- Greater than 12 months of disability prior to consideration of surgery.

Post-Operative Treatment: Patients should be involved in an active treatment program after clearance by the surgeon. Interdisciplinary interventions should be strongly considered post-operatively in patients not making functional progress within expected time frames or patients with risk factors for prolonged disability. **See Appendix for sample disability assessment questionnaires.**

E.1 DISCECTOMY, MICRODISCECTOMY, ENDOSCOPIC DECOMPRESSION

Discectomy is a surgical procedure generally used to remove part of a damaged spinal disc when the disc herniates into spinal canal or neuroforamen and compresses the nerve roots. It is used as treatment in cases of persistent radiculopathy (described as pain in the lower extremities that is greater than the low back) that interferes with function/work; is accompanied by corresponding physical exam findings (such as abnormal reflexes, motor weakness, or radicular sensation deficits); and is supported by imaging that indicates impingement of nerve roots or the spinal cord, consistent with the documented physical exam findings. Open discectomy, microdiscectomy, and endoscopic discectomy are all potentially appropriate options to perform discectomy.
Until quality evidence becomes available to inform evidence-based guidance, the decisions as to which of these procedures should be performed should be left to the surgeon and the patient.

Lumbar discectomy recommendations:

1. Lumbar discectomy is an option to speed recovery in patients with lumbar disc herniation who have persistent radiculopathy due to ongoing nerve root compression which causes significant pain and functional limitation after 6 weeks of appropriate conservative therapy. All of the following should be present prior to surgical evaluation for discectomy:
    a. Primary sensory symptoms with current dermatomal distribution of radiating pain, burning, numbness, tingling or paresthesia of the lower extremity, or myotomal muscle weakness that is consistent with a herniated disc at the corresponding level.
    b. Specific diagnosis of nerve root compression consistent with findings by MRI, CT, or positive electrodiagnostic study with/without myelography, predicted by history and correlated to documented clinical exam findings. Providers should rule out non-disc related pain prior to surgical referral. It is critical that providers ensure accurate and detailed history and physical exam findings are consistent with CT/MRI imaging and that such findings are diagnostic of radiculopathy due to lumbar disc herniation.
    c. Continued significant pain and functional limitation after a minimum of 6 weeks of directed conservative active therapy during which time the patient experienced no progressive neurological deficits. Conservative therapy should include:
        i. Structured program of chiropractic/physical therapy.
        ii. Structured home exercise program prescribed by a physical therapist, chiropractic provider or physician.

Epidural injections may provide some temporary pain relief and facilitate participation in active therapy.

2. Evidence of the following conditions may indicate need for expedited surgical evaluation earlier than the 6-week conservative treatment recommendation:
    a. Cauda equina syndrome demonstrated by loss of bowel or bladder control.
    b. Evidence of progressive nerve root compression or cauda equina syndrome demonstrated by significant and worsening motor/functional deficits.
    c. Intractable pain, consistent with objective findings, so severe and debilitating that non-operative management is not possible. In some cases, surgery may need to occur sooner due to an individual's inability to participate in active therapy.

Considerations for surgical referral:

- Based on studies, the evidence supports a short-term benefit of discectomy intervention over conservative management, demonstrated by the acute reduction of symptoms in the first 3 months following surgery; however, this benefit declines in long-term outcomes.
- Non-operative management is effective for acute radicular pain in approximately 70-85% of the cases after an average of 4-6 weeks. Surgery should be reserved for patients with clear indications as less than 40% of patients with questionable symptoms that receive surgical treatment have improvement of pain.
- Studies evaluating treatment with discectomy in workers' compensation populations have found limited or no benefit compared to non-surgical treatment. Additionally, when compared to the non-compensation population workers' compensation patients were found to be at greater risk for poor discectomy outcomes. Due to these risks for poor outcome, when evaluating workers' compensation patients, providers should consider conducting presurgical psychosocial screening, as they are important predictors of discectomy outcomes. A patient's answers on a self-report questionnaire may substantiate the need for a pre-surgical referral to a psychologist or a mental health provider specializing in pain and disability. **See Table 1 for Work Related Disability Flags and Appendix for sample disability assessment questionnaires.**

For patients who are candidates for discectomy, informed consent should include counseling that:

- There is evidence that there is no need to rush surgical decisions in the absence of degradation in nerve function, since long-term outcomes of surgery versus conservative care have near similar outcomes, with slight advantage for the surgical group.
- Surgery may be considered for patients with severe and limiting radicular pain who wish to improve their symptoms in the short-term.
- Potential complications include, but are not limited to, nerve damage, spinal fluid leakage, infection and hemorrhage.

Lumbar discectomy is not recommended in the following cases:

- As treatment of acute or non-acute back pain without radiculopathy.
- When surgical procedure for back or radicular pain syndrome includes percutaneous discectomy (nucleoplasty), laser discectomy, and disc coblation therapy.
- For back pain patients with evidence of significant spine instability at the level of the expected surgery.
- When clinical exam and symptoms do not correlate with MRI/CT findings.

Preoperative screening recommendations include:

- Straight leg raise testing prior to surgery, as a positive test correlates with better surgical outcomes.

- Consideration for psychological assessment to improve surgical outcomes. A self-report questionnaire may be informative and facilitate a referral to a psychologist. **See Appendix for sample disability assessment questionnaires.**

Post-operative management recommendations include:

1. A formal chiropractic/physical therapy program, including:
   a. Graduated reconditioning and back education initiated within the first week of surgery following uncomplicated cases.
   b. Reinstatement of active therapy (similar to presurgical conservative treatment) should be implemented 3-12 weeks postoperatively, and should include range-of-motion exercises, core stabilization, strengthening and endurance. Medium or heavy lifting should not be initiated prior to 10-12 weeks in most cases. The program should include patient instruction on a long-term home-based exercise program.
   c. Some patients may benefit from occupational therapy to improve performance of activities of daily living (ADL).
   d. Interdisciplinary interventions should be strongly considered post-operatively in any patient not making functional progress within expected time frames.

2. Appropriate postsurgical management including timelines for symptom resolution and return to work duties.
   - If patient has resolution of previous symptoms after lumbar discectomy, the patient may be able to resume previous duties by 6 weeks following surgery, depending upon job demands and after clearance by the treating physician. Only a small minority of appropriately selected workers should be expected to remain out of work beyond 6-12 months following uncomplicated surgery with normal healing. These cases may require further evaluation or more intense rehabilitation to improve the recovery of function and return to work.

E.2 ADHESIOLYSIS

Not recommended for acute or non-acute back pain, spinal stenosis, or radicular pain syndromes.

E.3 DECOMPRESSIVE SURGERY (LAMINOTOMY/FACETECTOMY LAMINECTOMY)

Decompression surgery may be recommended as an effective treatment for patients with symptomatic spinal stenosis (neurogenic claudication or radiculopathy) that is moderate to severe, progressive, and/or not responsive to conservative management.

E.4 SPINAL FUSION

Lumbar fusion may be considered if, after 8 weeks of non-operative care, there are persistent symptoms that correlate to physical exam findings and imaging, as per the following:

Lumbar Fusion Recommendations:

1. Single level or two level with or without decompression may be recommended as a treatment for spinal stenosis when concomitant instability has been demonstrated by imaging (e.g. flexion and extension x-rays minimizing contribution from hip motion). Lumbar fusion is not recommended for spinal stenosis without instability, including static listhesis. Radiographic and clinical symptoms should be concordant to proceed with surgery. It is preferable for input to be provided by a radiologist in addition to the treating surgeon.

Indications: All of the following should be present:

   a. Objective evidence of radiculopathy on physical exam with spinal stenosis and/or neurogenic claudication (lower extremity pain and/or numbness with standing or walking);
   b. Concordant imaging findings by MRI or CT/myelogram that confirm the nerve roots compressed are consistent with the neurological symptoms;
   c. Lack of responsiveness or unsatisfactory response(s) to non-operative treatment over an 8 consecutive week period that may or may not include an epidural steroid injection.

2. Treatment for isthmic spondylolisthesis and degenerative spondylolisthesis involving greater that 25% (grade I) slippage and one or more of the following:
   a. Objective signs/symptoms of neurogenic claudication such as lower extremity pain, numbness with standing or walking, or acute/progressive motor deficit;
   b. Objective signs/symptoms of unilateral or bilateral radiculopathy, which are concordant between neurologic examination and MRI or CT (with or without myelography); or
   c. Instability.

3. Foraminal disc herniation with nerve compression and intractable symptoms despite conservative care.

4. Spondylolysis, without a slip, when all of the following are met:
   a. Worker has meaningful levels of pain in the back and lower extremities;
   b. Concordance between neurologic examination and radiographically documented abnormality (lysis blocks may be useful to correlate symptoms with the imaging); and
   c. The patient has failed to improve from a minimum of six months of non-operative medical management.

Consensus is that if a patient is having the third lumbar discectomy on the same disc, that spine fusion at the time of discectomy is an option. There are situations in which iatrogenic instability is expected even with a 2nd discectomy, particularly when a large portion of the facet joint was removed during the first discectomy.

Emergency surgical referral is appropriate prior to 8 weeks of conservative care in cases of:

- progressive functional neurological deficit
- unstable fracture
- dislocation
- acute spinal cord injury (SCI)
- tumor, metastasis to the spine, or other growths creating a mass effect that damages or displaces the spine and/or the neural tissues

- infection or abscess
- trauma care and/or
- other spinal pathology that risks permanent neurological or functional deficit if not operated on emergently

Secondary Revisions:

Spinal fusion may be appropriate for workers with prior lumbar surgery who meet the following criteria:

1. If conservative care has failed to relieve symptoms and the patient has had a prior laminectomy, discectomy, or other decompressive procedure at the SAME level, lumbar fusion should be considered only if the patient has one or more of the following:
   a. Mechanical (non-radicular) low back pain with instability at the same or adjacent levels;
   b. Mechanical (non-radicular) low back pain with pseudo-spondylolisthesis, rotational deformity or other condition leading to progressive (measurable) deformity;
   c. Objective signs/symptoms compatible with neurogenic claudication or lumbar radiculopathy that is concordant with a detailed clinical neurological examination and supported by EMG/NCS, MRI or CT (with or without myelography); or
   d. Evidence from a post-laminectomy structural study of either 100% loss of facet surface area unilaterally; or 50% combined loss of facet surface area bilaterally.
   e. Documented pseudarthrosis or nonunion, with or without failed hardware in the absence of other neural compressive lesion when all of the following conditions are met:
      1. One year of time has passed since the previous lumbar fusion surgery;
      2. Radiographic fusion has not been achieved, as demonstrated on dynamic radiographs or CT scans; and
      3. The patient presents with clinically meaningful symptoms of pain or neurological symptoms from that spinal level.
   f. A third lumbar discectomy on the same disc makes spine fusion at the time of discectomy a reasonable option.
   g. Flat-Back Syndrome in conjunction with osteotomies if the patient presents with clinical symptoms or has sagittal imbalance that is progressive.

2. If conservative care has failed to relieve symptoms and the patient has had a prior fusion at the SAME level, lumbar fusion should be considered only if the patient has one or more of the following:
   a. Pseudarthrosis with or without hardware failure, confirmed by objective evidence of pseudarthrosis (e.g. abnormal thin slice CT scan).
   b. Neurogenic claudication supported by either MRI, CT, or myelography.
   c. Lumbar radiculopathy that is concordant with a detailed clinical neurological examination and MRI or CT (with or without myelography).

3. If conservative care has failed to relieve symptoms and the patient has had a prior fusion at the level ADJACENT to the level being considered, lumbar fusion should be considered only if the patient meets the same criteria as described for patients with no prior lumbar surgery (see above) and all of the following:
   a. At some point, the worker experienced substantial clinical improvement for a period of at least 6 months;

b. Imaging shows clear signs of disc degeneration, instability, and/or stenosis, at a level immediately adjacent to the fusion, which either were not present at the time of the original operation or have worsened from their initial state an amount that is clinically substantial;
-and-
c. The patient presents with clinically meaningful pain or neurological symptoms, which have been unresponsive to a minimum of 3 consecutive months of structured non-operative medical management (including at least pain medication, activity modification, and daily exercise).

Lumbar fusion is not recommended in the following cases:

- As a treatment for patients with radiculopathy from a first-time herniated nucleus pulposus (disc herniation) or for patients with non-acute back pain after lumbar discectomy.
- Initial disc herniation or pure stenosis in the absence of instability.
- Chronic low back pain without any clear cause on imaging.
- Isolated unilateral compression of a lumbar nerve root (laminectomy or discectomy alone, without fusion are appropriate treatment).
- Facet syndrome.
- No evidence of functional recovery (e.g. return to work) for at least six months following the most recent spine surgery.
- Greater than 2 levels of fusion. However, if deemed necessary:
  - A second surgical opinion with patient consultation is recommended.
  - A peer-to-peer review by claims is suggested**.**
  - Documentation must support the need for fusion at each level.
  - Is generally reserved for cases of deformity, trauma, infection, tumor, multi-level instability, revision situations and other complex conditions.
  - Multi-level fusions have less supporting literature and carry greater risks for poor outcomes such as pseudarthrosis.

E.5 ELECTRICAL BONE GROWTH STIMULATORS

Non-invasive Electrical Bone Growth Stimulators may be considered as an adjunct to spinal fusion surgery for those at high risk for pseudarthrosis, including one or more of the following fusion failure risk factors:

1. One or more previous failed spinal fusion(s).
2. Fusion to be performed at more than one level.
3. Presence of other risk factors that may contribute to non-healing: current smoking, diabetes, renal disease, other metabolic diseases where bone healing is likely to be compromised (e.g., significant osteoporosis), active alcoholism, morbid obesity BMI>40.

Non-invasive Electrical Bone Growth Stimulators may be considered as treatment for individuals with failed spinal fusion. Failed spinal fusion is defined as a spinal fusion that has not healed at a minimum of 6 months after original surgery, as evidenced by serial x-rays or CT scan.

E.6 DISC REPLACEMENT

Artificial disc replacement may be recommended for carefully selected patients as treatment for painful lumbar degenerative disc disease at one level that is unresponsive to non-operative management. Any confounding psychosocial issues should be addressed prior to surgery.

Surgical indications include:

- Symptomatic one-level degenerative disc disease established by objective testing.
- Symptoms unrelieved after six months of active non-surgical treatment.
- All pain generators are adequately defined and treated.
- All physical medicine and manual therapy interventions are completed.

Artificial disc replacement is NOT recommended under the following conditions as the safety and effectiveness of the replacement discs has not been established for patients with:

- Previous surgical fusion intervention at the involved level.
- Spinal instability at the pathologic or adjacent level requiring fusion.
- More than one lumbar level requiring artificial disc replacement.
- Clinically compromised vertebral bodies at the affected level due to current or past trauma (including, but not limited to the radiographic appearance of fracture callus, malunion or nonunion after 3 months).
- Active systemic infection or infection at the operating site.
- Allergy to titanium, polyurethane, or ethylene oxide residues.
- Osteoporosis defined as a DEXA bone mineral density T score equal to or worse than -2.5.
- Facet mediated pain.
- Multi-level degenerative disc disease or at levels with significant facet degenerative joint disease (DJD).

E.7 VERTEBROPLASTY AND KYPHOPLASTY

Vertebroplasty and Kyphoplasty may be considered for treatment of select patients with vertebral body compression fractures with associated subacute (4-12 weeks) or severe pain up to 3 months post-fracture. The patient must have failed conservative management for 4 weeks. After 3 months, if the patient continues to experience pain impacting activities of daily living, re-imaging is recommended with an MRI, or CT scan and Bone scan if an MRI is contraindicated.

E.8 SACROILIAC SURGERY

Sacroiliac (SI) joint fusion surgery is not recommended.

F. THERAPEUTIC NECK OPERATIVE PROCEDURES

The overall goals of treatment are to preserve or improve neurologic function, provide stability, and decrease pain. If these goals can be accomplished without surgery using bracing (orthotics) and medications, this approach is generally preferred. Operative interventions should be based on a positive correlation with clinical findings, the natural history of the condition, mechanism of injury, the clinical course, and diagnostic tests which led to a specific diagnosis. It may be beneficial to check Vitamin D levels and optimize if below normal.

If cervical operative intervention is being considered, it is recommended that the patient refrain from smoking for a least six weeks prior to surgery and six months post-surgery. Because smokers have a higher risk of non-union and higher resource utilization, it is recommended that a smoking cessation program be implemented peri-operatively. Smoking and weight loss programs may be an important component of the treatment plan.

Optimization of surgical candidates is recommended. Relative contraindications that should be considered or factors associated with a higher risk of a poor outcome include:

- Current smoker.
- Severe physical deconditioning or morbid obesity.
- History or current substance use disorder/high dose opioid therapy (see MA Chronic Pain Treatment Guideline; efforts should be made to reduce morphine milligram equivalents (MME) before surgery, e.g. less than 90).
- Severe cardiopulmonary disease, anemia, malnutrition, infection of soft tissue adjacent to spine (and may be at risk for spreading to the spine), systemic infection, poorly controlled diabetes, history of prior failure to fuse or severe osteoporosis.
- Psychosocial factors correlated with poor outcome (history of drug or alcohol abuse, high degree of somatization, personality disorder or major psychiatric illness, current evidence of factitious disorder, chronic pain syndromes).
- Multi-level spinal degenerative disease.
- Greater than 12 months of disability prior to consideration of surgery.

Post-Operative Treatment: Patients should be involved in an active treatment program after clearance by the surgeon. Interdisciplinary interventions should be strongly considered post-operatively in patients not making functional progress within expected time frames or patients with risk factors for prolonged disability. **See Appendix for sample disability questionnaires.**

F.1 ACUTE FRACTURES AND DISLOCATIONS

Decisions regarding the need for surgery in acute traumatic injury will depend on the specific injury type and possibility of long-term neurologic damage. Acute disc herniations may occur in the presence of traumatic injury.

Halo Immobilization

Halo may be warranted in certain upper cervical fractures (i.e., select occiput, C1, and C2 fractures) in non-elderly patients.
Surgical Indications:

- Cervical fractures or dislocations requiring the need for nearly complete restriction of rotational control to prevent graft dislodgment, spine mal-alignment, or pseudarthrosis. Decision for use of halo is at the discretion of the surgeon, based upon the patient's specific injury and possibility of long-term neurologic damage.

Post-operative therapy may include traction for realignment and/or fracture reduction (amount to be determined by surgeon), active and/or passive therapy, and pin care.

Halo Immobilization is not recommended for:

- Unstable skull fractures.
- Severe soft-tissue injury or infection overlying the proposed pin sites.

Anterior or Posterior Decompression with Fusion

Decisions regarding the need for surgery in acute traumatic injury will depend on the specific injury type and possibility of long-term neurologic damage. Decompression may be necessary to maximize a patient's chance for neurologic recovery by relieving pressure on the cervical spinal cord or nerve roots. Cervical fusion routinely uses bone grafts and metal devices to stabilize fractures by producing a rigid connection between two or more adjacent vertebrae.

Preoperative Evaluation and Treatment: Ongoing symptoms, corroborating physical findings, clinical course, diagnostic tests, and imaging should all support a reasonable likelihood that undergoing surgery will result in measurable and meaningful functional and symptomatic improvement. While it is imperative to rule out non-physiologic modifiers of pain presentation or non-operative conditions mimicking radiculopathy or instability (e.g., psychological conditions, peripheral neuropathy, myofascial pain, rheumatologic, or other pain syndromes, etc.) prior to surgical intervention, surgery for traumatic cord compression should generally be performed within 24 hours of the injury.

*High-dose steroids are generally not recommended.

Operative Treatment: Approaching anteriorly, posteriorly, or using a combined approach are widely accepted. The surgical approach should be guided by the anatomic location of the pathology, presence of instability, number of involved levels, prior surgical procedures, and any other concomitant injuries or patient-specific factors.

- The safety and efficacy of using recombinant human Bone Morphogenetic Protein (rhBMP) in the cervical spine has not been approved by the U.S. Food and Drug Administration. Additionally, there are case reports of life-threatening complications, especially with anterior surgical approaches; therefore, rhBMP is not recommended for cervical fusion.

Surgical Indications: anterior cervical disc fusion (ACDF) and decompression with or without instrumentation or posterior cervical disc fusion (PCDF) and instrumentation are indicated for:

- Significant or progressive neurological deficit(s) in the presence of a compromised cervical spinal cord or nerve root(s);
- Instability, without neurological deficit or compromise of the cervical spinal or nerve root(s);
- Severely unstable fractures often require both ACDF and PCDF.

Post-operative treatment may include:

- Cervical bracing may be used for bone healing after a fusion.
- Home programs with instruction in activities of daily living (ADLs), limitations in range of motion, posture, and a daily walking program should be an early part of the rehabilitation process.
- Referral to a formal physical medicine program, with emphasis on cervical, scapular, and thoracic strengthening, and restoration of range of motion (ROM), is appropriate once the fusion is solid and without complication.

- Active treatment is associated with substantially better outcomes and should be prioritized over passive modalities. This will frequently require repeating sessions previously ordered prior to surgery. The goals of the therapy program should include instruction in a long-term, home-based exercise program.

  *For fractures of vertebral column without spinal cord injury, 34 visits over 16 weeks are reasonable. For fractures of vertebral column with spinal cord injury, 48 visits over 18 weeks are reasonable.

F.2 DISC HERNIATION AND OTHER CERVICAL CONDITIONS

All patients being considered for surgical intervention should undergo a comprehensive neuromuscular examination to identify pain generators that may respond to nonsurgical techniques or may be refractory to surgical intervention. Timely decision making for operative intervention is critical to avoid deconditioning and increased disability of the cervical spine.

Surgical indications include:
Improvement of symptoms has plateaued and residual symptoms of pain and functional disability are unacceptable at the end of six weeks of treatment, or at the end of longer duration of non-operative intervention for debilitated patients with complex problems.

Choice of hardware instrumentation is based on anatomy, the patient's pathology, and the surgeon's experience and preference.

Specific Indications

- For patients with progressive myelopathy, immediate surgical evaluation and treatment is indicated.

For patients with cervical radiculopathy:

- Persistent or recurrent upper extremity pain with functional limitations, unresponsive to conservative treatment after six weeks -or-
- Progressive functional neurological deficit -or-
- Static neurological deficit associated with significant radicular pain -and-
- Confirmatory imaging studies consistent with clinical findings.
- Early intervention may be required for acute incapacitating pain or in the presence of severe or progressive neurological deficits.

Mere passage time with poorly guided treatment is not considered an active treatment program. In general, if the program of non-operative treatment fails, operative treatment is indicated when:

- Improvement of the symptoms has plateaued, and the residual symptoms of pain and functional disability are unacceptable at the end of 6 to 12 weeks of active treatment, or at the end of longer duration non-operative programs for debilitated patients with complex problems; and/or
- Frequent exacerbations cause serious functional limitations, even if a non-operative active treatment program provides satisfactory relief of symptoms, and restoration of function on each recurrence.
- All pain generators are adequately defined and treated -and-
- All physical medicine and manual therapy interventions are completed -and-
- X-ray, MRI or CT demonstrate disc pathology or spinal instability -and-

- There is clear documentation of spine pathology, especially when operating on more than one level.
- Psychological evaluation where flags for delayed recovery or chronic work-related disability are present. **See Table 1 for Work Related Disability Flags and Appendix for sample disability assessment questionnaires.**

Surgical Procedures

1. Cervical Discectomy with or without Fusion:

Surgical Indications:

- Radiculopathy from ruptured disc or spondylosis
- Spinal instability
- Non-radicular neck pain meeting fusion criteria

Posterior decompression is generally for soft disc herniation that is able to be accessed laterally. ACDF is generally for hard disc disease (spondylosis, spurring, central disc, OPLL, kyphosis etc.). Failure rates increase with disease at more than two levels. The decision for the approach should be based on patient's anatomy and the surgeon's discretion.

Operative Treatment: Cervical plating may be used to prevent graft dislodgement (especially for multi-level disease) and provide mechanical stability to the spine. Some cases with laterally situated disc fragments can be approached posteriorly and fusion is not required. Most discectomies are only accessible from an anterior approach. Indications for an anterior discectomy without fusion are exceedingly rare.

Post-Operative Therapy: Cervical bracing may be appropriate (usually 6-12 weeks with fusion). Home programs with instruction in ADLs, sitting, posture, and a daily walking program should be an early part of the rehabilitation process. Referral to a formal rehabilitation program, with emphasis on cervical, scapular, and thoracic strengthening and restoration of ROM is appropriate once fusion is solid and without complication. Active treatment, which patients should have had prior to surgery, will frequently require a repeat of the sessions previously ordered.

2. Cervical Corpectomy:

Surgical Indications: Single or multi-level spinal stenosis/myelopathy due to spondylosis or calcification of the posterior longitudinal ligament, spondylolisthesis, or severe kyphosis, with cord compression.

Operative treatment may include: Neural decompression, fusion with instrumentation, or halo vest placement to maintain cervical position. Hemi-corpectomy may be done when only a portion of the vertebral body needs to be resected. Autograft is considered the gold standard bone graft choice for fusion, though allografts may be used as well.

Post-operative therapy: Depending upon number of vertebral bodies involved, healing time may be longer than discectomy. Halo vest care has traditionally been required, but new techniques in cervical fusion with instrumentation may permit more rapid mobilization. Home programs with instruction in ADLs, sitting, posture, and a daily walking program should be an early part of the rehabilitation process. Referral to a formal rehabilitation program with emphasis on cervical, scapular, and thoracic strengthening is appropriate for most patients once the cervical spine is deemed stable and without complication. Active treatment, which patients should have had prior to surgery, will frequently require a repeat of the sessions previously ordered.

3. Cervical Laminotomy/Laminectomy with or without Fusion:
Surgical Indications: Cervical spinal stenosis/myelopathy, posterolateral or foraminal disc herniation with neural compression.

Operative treatment may include: Laminotomy, partial discectomy, and nerve root decompression. Laminectomy with fusion is more routinely performed due to the risk of post-laminectomy kyphosis.

Post-operative therapy may include: Cervical bracing may be appropriate (usually 6 to 12 weeks with fusion), although newer surgical techniques may not require prolonged immobilization. Home programs with instruction in ADLs, sitting, posture, and a daily walking program should be an early part of the rehabilitation process. Referral to a formal rehabilitation program with emphasis on cervical, scapular, and thoracic strengthening and restoration of range of motion is appropriate for most patients once the cervical spine is deemed stable and without complication. Active treatment, which patients should have had prior to surgery, will frequently require a repeat of the sessions previously ordered.

F.3 ELECTRICAL BONE GROWTH STIMULATORS

Non-invasive Electrical Bone Growth Stimulators may be considered as an adjunct to spinal fusion surgery for those at high risk for pseudarthrosis, including one or more of the following fusion failure risk factors:

- One or more previous failed spinal fusion(s).
- Fusion to be performed at more than one level.
- Presence of other risk factors that may contribute to non-healing, such as current smoking, diabetes, renal disease, other metabolic diseases where bone healing is likely to be compromised (e.g. significant osteoporosis), active alcoholism, and morbid obesity (BMI>40).

Non-invasive Electrical Bone Growth Stimulators may be considered as treatment for individuals with failed spinal fusion. Failed spinal fusion is defined as a spinal fusion that has not healed at a minimum of 6 months after original surgery, as evidenced by serial x-rays over the latter 3 months of the 6-month period.

F.4 ARTIFICIAL CERVICAL DISC REPLACEMENT

If cervical disc replacement is to be used, the most current FDA guidelines must be followed. The following criteria must be met:

1. Skeletally mature patient without renal failure, severe diabetes, osteoporosis, severe spondylosis, severe facet pathology, cervical instability, localized fracture, or localized or systemic infections.
   -and-
2. Up to two levels of disc degeneration of C3 to C7 confirmed by imaging studies such as CT or MRI, with one of the following diagnoses:
   - Herniated disc -or-
   - Osteophyte formation -or-
   - Loss of disc height
   -and-
3. The patient must present with the following symptoms, which must correspond with the planned level of disc replacement:
   - Intractable radiculopathy (nerve root compression) and/or myelopathy (functional disturbance or pathological change in the spinal cord) causing radicular pain in the upper extremity - or-
   - Functional and/or neurological deficit
   -and-

4. Six weeks of non-operative alternative treatments have failed. These treatments may include chiropractic care, physical therapy, medications, braces, bed rest, spinal injections or exercise programs. Documentation of treatments and failure to improve is required.

The disc replacement device must be approved by the U.S. Food and Drug Administration (FDA). All other artificial disc systems are considered experimental and investigational. All other indications, including multi-level degenerative disc disease, are considered experimental and investigational.

Artificial disc replacement is NOT recommended under the following conditions, as the safety and effectiveness of the replacement discs has not been established for patients with:

- Axial pain syndromes.
- Previous surgical intervention at the involved level.
- Prior or proposed fusion at an adjacent cervical level.
- More than two cervical levels requiring artificial disc replacement.
- Clinically compromised vertebral bodies at the affected level due to current or past trauma (including but not limited to the radiographic appearance of fracture callus, malunion or nonunion).
- Active systemic infection or infection at the operating site.
- Allergy to titanium, polyurethane, or ethylene oxide residues.
- Osteoporosis defined as a DEXA bone mineral density T-score equal to or worse than -2.5.
- Moderate to advanced spondylosis characterized by bridging osteophytes, marked reduction or absence of motion, or collapse of the intervertebral disc space of greater than 50% of its normal height.
- Marked cervical instability on radiographs (e.g., radiographic signs of subluxation greater than 3.5 mm or angulation of the disc space more than 11 degrees greater than adjacent segments).
- Significant cervical anatomical deformity and significant facet DJD or compromised vertebral bodies at the index level (e.g., ankylosing spondylitis, rheumatoid arthritis, or compromise due to current or past trauma).
- Significant kyphotic deformity or significant reversal of lordosis.
- Symptoms necessitating surgical treatment at more than one cervical level.

F.5 PERCUTANEOUS RADIOFREQUENCY DISC DECOMPRESSION
Not recommended.

F.6 EPIDUROSCOPY AND EPIDURAL LYSIS OF ADHESIONS
Refer to Therapeutic Injection section.

Oswestry Low Back Pain Disability Questionnaire

Sources: Fairbank JCT & Pynsent, PB (2000) The Oswestry Disability Index. *Spine*, 25(22):2940-2953.

Davidson M & Keating J (2001) A comparison of five low back disability questionnaires: reliability and responsiveness. *Physical Therapy* 2002;82:8-24.

The Oswestry Disability Index (also known as the Oswestry Low Back Pain Disability Questionnaire) is an extremely important tool that researchers and disability evaluators use to measure a patient's permanent functional disability. The test is considered the 'gold standard' of low back functional outcome tools [1].

Scoring instructions

For each section the total possible score is 5: if the first statement is marked the section score = 0; if the last statement is marked, it = 5. If all 10 sections are completed the score is calculated as follows:

Example: 16 (total scored)

50 (total possible score) x 100 = 32%

If one section is missed or not applicable the score is calculated:

16 (total scored)

45 (total possible score) x 100 = 35.5%

Minimum detectable change (90% confidence): 10% points (change of less than this may be attributable to error in the measurement)

Interpretation of scores

0% to 20%: minimal disability:	The patient can cope with most living activities. Usually no treatment is indicated apart from advice on lifting sitting and exercise.
21%-40%: moderate disability:	The patient experiences more pain and difficulty with sitting, lifting and standing. Travel and social life are more difficult and they may be disabled from work. Personal care, sexual activity and sleeping are not grossly affected and the patient can usually be managed by conservative means.
41%-60%: severe disability:	Pain remains the main problem in this group but activities of daily living are affected. These patients require a detailed investigation.
61%-80%: crippled:	Back pain impinges on all aspects of the patient's life. Positive intervention is required.
81%-100%:	These patients are either bed-bound or exaggerating their symptoms.

Oswestry Low Back Pain Disability Questionnaire

Instructions

This questionnaire has been designed to give us information as to how your back or leg pain is affecting your ability to manage in everyday life. Please answer by checking ONE box in each section for the statement which best applies to you. We realise you may consider that two or more statements in any one section apply but please just shade out the spot that indicates the statement which most clearly describes your problem.

Section 1 – Pain intensity

- ☐ I have no pain at the moment
- ☐ The pain is very mild at the moment
- ☐ The pain is moderate at the moment
- ☐ The pain is fairly severe at the moment
- ☐ The pain is very severe at the moment
- ☐ The pain is the worst imaginable at the moment

Section 2 – Personal care (washing, dressing etc)

- ☐ I can look after myself normally without causing extra pain
- ☐ I can look after myself normally but it causes extra pain
- ☐ It is painful to look after myself and I am slow and careful
- ☐ I need some help but manage most of my personal care
- ☐ I need help every day in most aspects of self-care
- ☐ I do not get dressed, I wash with difficulty and stay in bed

Section 3 – Lifting

- ☐ I can lift heavy weights without extra pain
- ☐ I can lift heavy weights but it gives extra pain
- ☐ Pain prevents me from lifting heavy weights off the floor, but I can manage if they are conveniently placed eg. on a table
- ☐ Pain prevents me from lifting heavy weights, but I can manage light to medium weights if they are conveniently positioned
- ☐ I can lift very light weights
- ☐ I cannot lift or carry anything at all

Section 4 – Walking*

- ☐ Pain does not prevent me walking any distance
- ☐ Pain prevents me from walking more than 1 mile
- ☐ Pain prevents me from walking more than 1/2 mile
- ☐ Pain prevents me from walking more than 100 yards
- ☐ I can only walk using a stick or crutches
- ☐ I am in bed most of the time

Section 5 – Sitting

- ☐ I can sit in any chair as long as I like
- ☐ I can only sit in my favourite chair as long as I like
- ☐ Pain prevents me sitting more than one hour
- ☐ Pain prevents me from sitting more than 30 minutes
- ☐ Pain prevents me from sitting more than 10 minutes
- ☐ Pain prevents me from sitting at all

Section 6 – Standing

- ☐ I can stand as long as I want without extra pain
- ☐ I can stand as long as I want but it gives me extra pain
- ☐ Pain prevents me from standing for more than 1 hour
- ☐ Pain prevents me from standing for more than 30 minutes
- ☐ Pain prevents me from standing for more than 10 minutes
- ☐ Pain prevents me from standing at all

Section 7 – Sleeping

- ☐ My sleep is never disturbed by pain
- ☐ My sleep is occasionally disturbed by pain
- ☐ Because of pain I have less than 6 hours sleep
- ☐ Because of pain I have less than 4 hours sleep
- ☐ Because of pain I have less than 2 hours sleep
- ☐ Pain prevents me from sleeping at all

Section 8 – Sex life (if applicable)

- ☐ My sex life is normal and causes no extra pain
- ☐ My sex life is normal but causes some extra pain
- ☐ My sex life is nearly normal but is very painful
- ☐ My sex life is severely restricted by pain
- ☐ My sex life is nearly absent because of pain
- ☐ Pain prevents any sex life at all

Section 9 – Social life

- ☐ My social life is normal and gives me no extra pain
- ☐ My social life is normal but increases the degree of pain
- ☐ Pain has no significant effect on my social life apart from limiting my more energetic interests eg, sport
- ☐ Pain has restricted my social life and I do not go out as often
- ☐ Pain has restricted my social life to my home
- ☐ I have no social life because of pain

Section 10 – Travelling

- ☐ I can travel anywhere without pain
- ☐ I can travel anywhere but it gives me extra pain
- ☐ Pain is bad but I manage journeys over two hours
- ☐ Pain restricts me to journeys of less than one hour
- ☐ Pain restricts me to short necessary journeys under 30 minutes
- ☐ Pain prevents me from travelling except to receive treatment

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References

1. Fairbank JC, Pynsent PB. The Oswestry Disability Index. Spine 2000 Nov 15;25(22):2940-52; discussion 52.

WHODAS 2.0

WORLD **H**EALTH **O**RGANIZATION
DISABILITY **A**SSESSMENT **S**CHEDULE 2.0

36-item version, self-administered

This questionnaire asks about difficulties due to health conditions. Health conditions include diseases or illnesses, other health problems that may be short or long lasting, injuries, mental or emotional problems, and problems with alcohol or drugs.

Think back over the past 30 days and answer these questions, thinking about how much difficulty you had doing the following activities. For each question, please circle only one response.

In the past 30 days, how much difficulty did you have in:						
Understanding and communicating						
D1.1	Concentrating on doing something for ten minutes?	None	Mild	Moderate	Severe	Extreme or cannot do
D1.2	Remembering to do important things?	None	Mild	Moderate	Severe	Extreme or cannot do
D1.3	Analysing and finding solutions to problems in day-to-day life?	None	Mild	Moderate	Severe	Extreme or cannot do
D1.4	Learning a new task, for example, learning how to get to a new place?	None	Mild	Moderate	Severe	Extreme or cannot do
D1.5	Generally understanding what people say?	None	Mild	Moderate	Severe	Extreme or cannot do
D1.6	Starting and maintaining a conversation?	None	Mild	Moderate	Severe	Extreme or cannot do
Getting around						
D2.1	Standing for long periods such as 30 minutes?	None	Mild	Moderate	Severe	Extreme or cannot do
D2.2	Standing up from sitting down?	None	Mild	Moderate	Severe	Extreme or cannot do
D2.3	Moving around inside your home?	None	Mild	Moderate	Severe	Extreme or cannot do
D2.4	Getting out of your home?	None	Mild	Moderate	Severe	Extreme or cannot do
D2.5	Walking a long distance such as a kilometre [or equivalent]?	None	Mild	Moderate	Severe	Extreme or cannot do

Please continue to next page …

In the past 30 days, how much difficulty did you have in:						
Self-care						
D3.1	Washing your whole body?	None	Mild	Moderate	Severe	Extreme or cannot do
D3.2	Getting dressed?	None	Mild	Moderate	Severe	Extreme or cannot do
D3.3	Eating?	None	Mild	Moderate	Severe	Extreme or cannot do
D3.4	Staying by yourself for a few days?	None	Mild	Moderate	Severe	Extreme or cannot do
Getting along with people						
D4.1	Dealing with people you do not know?	None	Mild	Moderate	Severe	Extreme or cannot do
D4.2	Maintaining a friendship?	None	Mild	Moderate	Severe	Extreme or cannot do
D4.3	Getting along with people who are close to you?	None	Mild	Moderate	Severe	Extreme or cannot do
D4.4	Making new friends?	None	Mild	Moderate	Severe	Extreme or cannot do
D4.5	Sexual activities?	None	Mild	Moderate	Severe	Extreme or cannot do
Life activities						
D5.1	Taking care of your household responsibilities?	None	Mild	Moderate	Severe	Extreme or cannot do
D5.2	Doing most important household tasks well?	None	Mild	Moderate	Severe	Extreme or cannot do
D5.3	Getting all the household work done that you needed to do?	None	Mild	Moderate	Severe	Extreme or cannot do
D5.4	Getting your household work done as quickly as needed?	None	Mild	Moderate	Severe	Extreme or cannot do

Please continue to next page …

If you work (paid, non-paid, self-employed) or go to school, complete questions D5.5–D5.8, below. Otherwise, skip to D6.1.

Because of your health condition, in the past 30 days, how much difficulty did you have in:						
D5.5	Your day-to-day work/school?	None	Mild	Moderate	Severe	Extreme or cannot do
D5.6	Doing your most important work/school tasks well?	None	Mild	Moderate	Severe	Extreme or cannot do
D5.7	Getting all the work done that you need to do?	None	Mild	Moderate	Severe	Extreme or cannot do
D5.8	Getting your work done as quickly as needed?	None	Mild	Moderate	Severe	Extreme or cannot do

Participation in society						
In the past 30 days:						
D6.1	How much of a problem did you have in joining in community activities (for example, festivities, religious or other activities) in the same way as anyone else can?	None	Mild	Moderate	Severe	Extreme or cannot do
D6.2	How much of a problem did you have because of barriers or hindrances in the world around you?	None	Mild	Moderate	Severe	Extreme or cannot do
D6.3	How much of a problem did you have living with dignity because of the attitudes and actions of others?	None	Mild	Moderate	Severe	Extreme or cannot do
D6.4	How much time did you spend on your health condition, or its consequences?	None	Mild	Moderate	Severe	Extreme or cannot do
D6.5	How much have you been emotionally affected by your health condition?	None	Mild	Moderate	Severe	Extreme or cannot do
D6.6	How much has your health been a drain on the financial resources of you or your family?	None	Mild	Moderate	Severe	Extreme or cannot do
D6.7	How much of a problem did your family have because of your health problems?	None	Mild	Moderate	Severe	Extreme or cannot do
D6.8	How much of a problem did you have in doing things by yourself for relaxation or pleasure?	None	Mild	Moderate	Severe	Extreme or cannot do

Please continue to next page …

H1	Overall, in the past 30 days, how many days were these difficulties present?	***Record number of days*** ____
H2	In the past 30 days, for how many days were you totally unable to carry out your usual activities or work because of any health condition?	***Record number of days*** ____
H3	In the past 30 days, not counting the days that you were totally unable, for how many days did you cut back or reduce your usual activities or work because of any health condition?	***Record number of days*** ____

This completes the questionnaire. Thank you.

Table 1: Work-Related Disability Flags

Individual Risk Factors

- Serious Pathology
- Other Severe Medical / Psychiatric Conditions
- Depression
- Post-Traumatic Stress Disorder
- Somatic Symptom Disorders
- Avoidant Coping Strategies
- Emotional Distress
- Passive Role
- Fear of re-injury
- Substance Use

Occupational Psychosocial Factor

- Low Job Satisfaction

Work Organization Exposures

- Low Social Support at Work
- Shift Work or Unsociable Work Hours
- Excessive Demands, Overtime Hours, Time Pressure
- Work-From-Home Demands
- Low Job Control
- Piece-work
- Job Insecurity
- Low Financial and Social Reward

Occupational BioMechanical Exposures

- Biomechanical demands: heavy lifting, high loads (force), whole body and segmental vibration, constrained/extreme postures, high numbers of repetitive motions and stereotyped movements, inadequate work breaks/insufficient recovery, static postures

Organizational Programs and Policies

- Inability to modify work (lack of “light-duty” programs)
- Discouraging injury reporting
- Punitive response from supervisors/managers if worker injured
- Lack of support for effective health and safety program from management

Social, Economic, Legal, Structural Factors

- Legislative Criteria for Compensation
- Threats to Financial Security
- Work environment discrimination and harassment (e.g. racism, sexism)
- Ongoing/Delayed Workers’ Compensation Litigation

Note: Occupational exposures begin at the organizational level, not at the employee level. These exposures should not be considered “disability flags” at the individual level. Work organization and occupational biomechanical exposures and lack of supportive organizational policies and programs should be termed “Employer red flags for reintegration of an employee into the workplace.” Specifically, these exposures are the domain of the employer and it is the employer’s responsibility, rather than the employee’s responsibility, to address them.

Adapted from

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