

**DEPARTMENT OF LABOR
DIVISION OF INDUSTRIAL AFFAIRS
Office of Workers' Compensation**

Statutory Authority: 19 Delaware Code, Section 105 (19 Del.C. §105)
19 DE Admin. Code 1342

PROPOSED

PUBLIC NOTICE

1342 Health Care Practice Guidelines

In compliance with the State's Administrative Procedures Act (Title 29, Chapter 101 of the Delaware Code) and under the authority of 19 Del.C. §105, the Delaware Department of Labor, Office of Workers' Compensation ("Office"), proposes to repeal 19 DE Admin. Code 1342 regarding Health Care Practice Guidelines, specifically Parts A through G.

In accordance with 29 Del.C. §10116, persons wishing to submit written comments, suggestions, briefs, and compilations of data or other written materials concerning the proposed modifications should direct them to the following address:

Tammy Boyd
Delaware Department of Labor
Division of Industrial Affairs / Office of Workers' Compensation
4425 North Market Street, 3rd Floor
Wilmington, DE 19802

Comments may also be directed via electronic mail to tammy.boyd@Delaware.gov. Any written submission in response to this notice and relevant to the proposed changes must be received by the above contact at the Delaware Department of Labor no later than 4 p.m. EST, June 3, 2024.

The action concerning determination of whether to delete the regulation and guidelines from the Delaware Administrative Code will be based upon the Office's consideration of the written comments and any other written materials filed by the public.

Statutory Authority 19 Del.C. §105.

19 Del.C. §105 enables the Delaware Department of Labor to adopt and promulgate rules and regulations not inconsistent with Title 19 of the Delaware Code; provided, that no such rule or regulation shall extend, modify or conflict with any law of the State of Delaware or the reasonable implications thereof.

1342 Health Care Practice Guidelines

PART A Carpal Tunnel Syndrome Guidelines

4.0 Introduction

~~Pursuant to 19 Del.C. §2322C, health care practice guidelines have been adopted and recommended by the Health Care Advisory Panel to guide utilization of health care treatments in workers' compensation including, but not limited to, care provided for the treatment of employees by or under the supervision of a licensed health care provider, prescription drug utilization, inpatient hospitalization and length of stay, diagnostic testing, physical therapy, chiropractic care and palliative care. The health care practice guidelines apply to all treatments provided after the effective date of the regulation adopted by the Department of Labor, May 23, 2008, and regardless of the date of injury.~~

~~The guidelines are, to the extent permitted by the most current medical science or applicable science, based on well-documented scientific research concerning efficacious treatment for injuries and occupational disease. To the extent that well-documented scientific research regarding the above is not available at the time of adoption of the guidelines, or is not available at the time of any revision to the guidelines, the guidelines have been and will be based upon the best available information concerning national consensus regarding best health care practices in the relevant health care community.~~

~~The guidelines, to the extent practical and consistent with the Act, address treatment of those physical conditions which occur with the greatest frequency, or which require the most expensive treatments, for work-related injuries based upon currently available Delaware data.~~

~~Services rendered by any health care provider certified pursuant to 19 Del.C. §2322D(a) to provide treatment or services for injured employees shall be presumed, in the absence of contrary evidence, to be reasonable and necessary if such treatment and/or services conform to the most current version of the Delaware health care practice guidelines.~~

~~Services rendered outside the Guidelines and/or variation in treatment recommendations from the Guidelines may represent acceptable medical care, be considered reasonable and necessary treatment and, therefore, determined to be compensable, absent evidence to the contrary, and may be payable in accordance with the Fee Schedule and Statute, accordingly.~~

~~Services provided by any health care provider that is not certified pursuant to 19 Del.C. §2322D(a) shall not be presumed reasonable and necessary unless such services are pre-authorized by the employer or insurance carrier, subject to the exception set forth in 19 Del.C. §2322D(b).~~

~~Treatment of conditions unrelated to the injuries sustained in an industrial accident may be denied as unauthorized if the treatment is directed toward the non-industrial condition, unless the treatment of the unrelated injury is rendered necessary as a result of the industrial accident.~~

~~The Health Care Advisory Panel and Department of Labor recognized that acceptable medical practice may include deviations from these Guidelines, as individual cases dictate. Therefore, these Guidelines are not relevant as evidence of a provider's legal standard of professional care.~~

~~In accordance with the requirements of the Act, the development of the health care guidelines has been directed by a predominantly medical or other health professional panel, with recommendations then made to the Health Care Advisory Panel.~~

2.0 General Guideline Principles

The principles summarized in this section are key to the intended implementation of all Division of Workers' Compensation guidelines and critical to the reader's application of the guidelines in this document.

2.1 **EDUCATION** of the patient and family, as well as the employer, insurer, policy makers and the community should be the primary emphasis in the treatment of CTS and disability. Currently, practitioners often think of education last, after medications, manual therapy and surgery. Practitioners must develop and implement an effective strategy and skills to educate patients, employers, insurance systems, policy makers and the community as a whole. An education-based paradigm should always start with inexpensive communication providing reassuring information to the patient. More in-depth education currently exists within a treatment regime employing functional restorative and innovative programs of prevention and rehabilitation. No treatment plan is complete without addressing issues of individual and/or group patient education as a means of facilitating self-management of symptoms and prevention.

2.2 **TREATMENT PARAMETER** time frames for specific interventions commence once treatments have been initiated, not on the date of injury. Obviously, duration will be impacted by patient compliance, as well as comorbidities and availability of services. Clinical judgment may substantiate the need to accelerate or decelerate modify the time frames total number of visits discussed in this document. The majority of injured workers with Carpal Tunnel Syndrome often will achieve resolution of their condition within 12 to 56 visits (Guide To Physical Therapy Practice — Second Edition). It is anticipated that most injured workers will not require the maximum number of visits described in these guidelines. They are designed to be a ceiling and care extending beyond the maximum allowed visits may warrant utilization review.

2.3 **ACTIVE INTERVENTIONS** emphasizing patient responsibility, such as therapeutic exercise and/or functional treatment, are generally emphasized over passive modalities, especially as treatment progresses. Generally, passive interventions are viewed as a means to facilitate progress in an active rehabilitation program with concomitant attainment of objective functional gains. All rehabilitation programs must incorporate "Active Interventions" no later than three weeks after the onset of treatment. Reimbursement for passive modalities only after the first three weeks of treatment without clear evidence of Active Interventions will require supportive documentation.

2.4 **ACTIVE THERAPEUTIC EXERCISE PROGRAM** Exercise program goals should incorporate patient strength, endurance, flexibility, coordination, and education. This includes functional application in vocational or community settings.

2.5 **POSITIVE PATIENT RESPONSE** Positive results are defined primarily as functional gains that can be objectively measured. Objective functional gains include, but are not limited to, positional tolerances, range-of-motion, strength, endurance, activities of daily living, cognition, behavior, and efficiency/velocity measures that

can be quantified. Subjective reports of pain and function should be considered and given relative weight when the pain has anatomic and physiologic correlation. Anatomic correlation must be based on objective findings.

- 2.6 ~~**RE-EVALUATE TREATMENT EVERY 3 TO 4 WEEKS**~~ If a given treatment or modality is not producing positive results within 3 to 4 weeks, the treatment should be either modified or discontinued. Reconsideration of diagnosis should also occur in the event of poor response to a seemingly rational intervention.
- 2.7 ~~**SURGICAL INTERVENTIONS**~~ Surgery should be contemplated within the context of expected functional outcome and not purely for the purpose of pain relief. The concept of “cure” with respect to surgical treatment by itself is generally a misnomer. All operative interventions must be based upon positive correlation of clinical findings, clinical course and diagnostic tests. A comprehensive assimilation of these factors must lead to a specific diagnosis with positive identification of pathologic conditions.
- 2.8 ~~**SIX-MONTH TIME FRAME**~~ The prognosis drops precipitously for returning an injured worker to work once he/she has been temporarily totally disabled for more than six months. The emphasis within these guidelines is to move patients along a continuum of care and return to work within a six-month time frame, whenever possible. It is important to note that time frames may not be pertinent to injuries that do not involve work-time loss or are not occupationally related.
- 2.9 ~~**RETURN TO WORK**~~ is therapeutic, assuming the work is not likely to aggravate the basic problem or increase long-term pain. The practitioner must provide specific physical limitations per the Physician’s Form. The following physical limitations should be considered and modified as recommended: lifting, pushing, pulling, crouching, walking, using stairs, bending at the waist, awkward and/or sustained postures, tolerance for sitting or standing, hot and cold environments, data entry and other repetitive motion tasks, sustained grip, tool usage and vibration factors. Even if there is residual chronic pain, return-to-work is not necessarily contraindicated. The practitioner should understand all of the physical demands of the patient’s job position before returning the patient to full duty and should receive clarification of the patient’s job duties.
- 2.10 ~~**DELAYED RECOVERY**~~ Strongly consider a psychological evaluation, if not previously provided, as well as initiating interdisciplinary rehabilitation treatment and vocational goal setting, for those patients who are failing to make expected progress 6 to 12 weeks after an injury. The Division recognizes that 3 to 10% of all industrially injured patients will not recover within the timelines outlined in this document despite optimal care. Such individuals may require treatments beyond the limits discussed within this document, but such treatment will require clear documentation by the authorized treating practitioner focusing on objective functional gains afforded by further treatment and impact upon prognosis.
- 2.11 ~~**GUIDELINE RECOMMENDATIONS AND INCLUSION OF MEDICAL EVIDENCE**~~ Guidelines are recommendations based on available evidence and/or consensus recommendations. These procedures considered inappropriate, unreasonable, or unnecessary are designated in the guideline as being “not recommended.”

17-DE-Reg-322 (09/04/13)

3.0 Definition

Carpal tunnel syndrome (CTS) is one of the most common mononeuropathies (a disorder involving only a single nerve). The median nerve is extremely vulnerable to compression and injury in the region of the wrist and palm. In this area, the nerve is bounded by the wrist bones and the transverse carpal ligament. The most common site of compression is at the proximal edge of the flexor retinaculum (an area near the crease of the wrist). There is often a myofascial component in the patient’s presentation. This should be considered when proceeding with the diagnostic workup and therapeutic intervention.

Studies have repeatedly confirmed that the diagnosis cannot be made based on any single historical factor or physical examination finding. Electrodiagnostic tests may be negative in surgically confirmed cases. Conversely, electrodiagnostic testing may be positive in asymptomatic individuals. The diagnosis of CTS, therefore, remains a clinical diagnosis based on a preponderance of supportive findings.

Classic findings of CTS include subjective numbness or dysesthesias confined to the median nerve distribution, worsening of symptoms at night, and positive exam findings. Please refer to other appropriate upper extremity guidelines as necessary.

4.0 Initial Diagnostic Procedures

- 4.1 ~~**INTRODUCTION**~~ The two standard procedures that are to be utilized when initially evaluating a work-related carpal tunnel complaint are History Taking, and Physical Examination.
- History taking and Physical Examination are generally accepted, well-established, and widely used procedures which establish the foundation/basis for and dictate all ensuing stages of diagnostic and therapeutic

procedures. When findings of clinical evaluation and those of other diagnostic procedures do not complement each other, the objective clinical findings should have preference.

4.2 HISTORY

4.2.1 Description of symptoms—should address at least the following:

- 4.2.1.1 Numbness, tingling, and/or burning of the hand involving the distal median nerve distribution; however, distribution of the sensory symptoms may vary considerably between individuals. Although the classic median nerve distribution is to the palmar aspect of the thumb, the index finger, the middle finger and radial half of the ring finger, patients may report symptoms in any or all of the fingers. The Katz Hand diagram (see Fig. 1) may be useful in documenting the distribution of symptoms; the classic pattern of carpal tunnel affects at least two of the first three digits and does not involve dorsal and palmar aspects of the hand. A probable pattern involves the palmar but not dorsal aspect of the hand (excluding digits).
- 4.2.1.2 Nocturnal symptoms frequently disrupt sleep and consist of paresthesias and/or pain in the hand and/or arm.
- 4.2.1.3 Pain in the wrist occurs frequently and may even occur in the forearm, elbow or shoulder. While proximal pain is not uncommon, its presence warrants evaluation for other pathology in the cervical spine, shoulder and upper extremity.
- 4.2.1.4 Shaking the symptomatic hand to relieve symptoms may be reported.
- 4.2.1.5 Clumsiness of the hand or dropping objects is often reported, but may not be present early in the course.

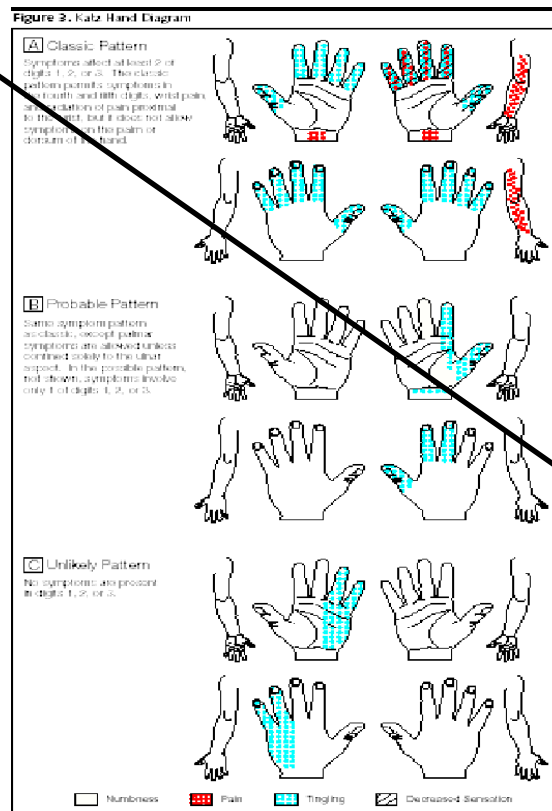


Figure adapted with permission.¹¹

Figure 1—Katz Hand Diagram Used with permission. JAMA 2000; 283 (23): 3110-17. Copyrighted 2000, American Medical Association.

- 4.2.2 **Identification of Occupational Risk Factors:** Job title alone is not sufficient information. The clinician is responsible for documenting specific information regarding repetition, force and other risk factors, as listed in the table entitled, 'Risk Factors Associated with CTS' Table 2. A job-site evaluation may be required.
- 4.2.3 **Demographics:** Age, hand dominance, gender, etc.
- 4.2.4 **Past Medical History and Review of Systems:** A study of CTS patients showed a 33% prevalence of related disease. Risk factors for CTS include female gender; obesity; Native American, Hispanic, or Black heritage, and certain medical conditions:
 - 4.2.4.1 Pregnancy

- 4.2.4.2 Arthropathies including connective tissue disorders, rheumatoid arthritis, systemic lupus erythematosus, gout, osteoarthritis and spondyloarthritis
- 4.2.4.3 Colles' fracture or other acute trauma
- 4.2.4.4 Amyloidosis
- 4.2.4.5 Hypothyroidism, especially in older females
- 4.2.4.6 Diabetes mellitus, including family history or gestational diabetes
- 4.2.4.7 Acromegaly
- 4.2.4.8 Use of corticosteroids or estrogens
- 4.2.4.9 Vitamin B6 deficiency
- 4.2.5 **Activities of Daily Living (ADLs):** include such activities as self care and personal hygiene, communication, ambulation, attaining all normal living postures, travel, non-specialized hand activities, sexual function, sleep, and social and recreational activities. Specific movements in this category include pinching or grasping keys/pens/other small objects, grasping telephone receivers or cups or other similar-sized objects, and opening jars. The quality of these activities is judged by their independence, appropriateness, and effectiveness. Assess not simply the number of restricted activities but the overall degree of restriction or combination of restrictions.
- 4.2.6 **Avocational Activities:** Information must be obtained regarding sports, recreational, and other avocational activities that might contribute to or be impacted by CTD development. Activities such as hand-operated video games, crocheting/needlepoint, home computer operation, golf, racquet sports, bowling, and gardening are included in this category.
- 4.2.7 **Social History:** Exercise habits, alcohol consumption, and psychosocial factors.
- 4.3 **PHYSICAL EXAMINATION** Please refer to Table 1 for respective sensitivities and specificities for findings used to diagnose CTS (a-f).
 - 4.3.1 Sensory loss to pinprick, light touch, two-point discrimination or Semmes-Weinstein Monofilament tests in a median nerve distribution may occur
 - 4.3.2 Thenar atrophy may appear, but usually late in the course
 - 4.3.3 Weakness of the abductor pollicis brevis may be present
 - 4.3.4 Phalen's / Reverse Phalen's signs may be positive
 - 4.3.5 Tinel's sign over the carpal tunnel may be positive
 - 4.3.6 Closed Fist test – holding fist closed for 60 seconds reproduces median nerve paresthesia
 - 4.3.7 Evaluation of the contralateral wrist is recommended due to the frequency of bilateral involvement
 - 4.3.8 Evaluation of the proximal upper extremity and cervical spine for other disorders including cervical radiculopathy, thoracic outlet syndrome, other peripheral neuropathies, and other musculoskeletal disorders
 - 4.3.9 Signs of underlying medical disorders associated with CTS, e.g., diabetes mellitus, arthropathy, and hypothyroidism
 - 4.3.10 Myofascial findings requiring treatment may present in soft tissue areas near other CTD pathology, and should be documented. Refer to the Division's Cumulative Trauma Disorder Medical Treatment Guidelines.

Table 1: Sensitivities and Specificities and Evidence Level for Physical Examination findings

Procedure	Sensitivity (%)	Specificity (%)	Validity
1. Sensory testing			
—Hypesthesia	15-51	85-93	Good
—Katz Hand Diagram	62-89	73-88	Good
—Two-point discrimination	22-33	81-100	Some
—Semmes-Weinstein	52-91	59-80	Some
—Vibration	20-61	71-81	None
2. Phalen's	51-88	32-86	Some
3. Tinel's	25-73	55-94	Some

4. Carpal tunnel compression	28-87	33-95	Some
5. Thenar atrophy	3-28	82-100	Good
— Abductor pollicis brevis weakness	63-66	62-66	Good
6. Closed fist test	64	92	Some
7. Tourniquet test	46-65	36-87	None

4.4 **RISK FACTORS** A critical review of epidemiologic literature identified a number of physical exposures associated with CTS. For example, trauma and fractures of the hand and wrist may result in CTS. Other physical exposures considered risk factors include: repetition, force, vibration, pinching and gripping, and cold environment. When workers are exposed to several risk factors simultaneously, there is an increased likelihood of CTS. Not all risk factors have been extensively studied. Exposure to cold environment, for example, was not examined independently; however, there is good evidence that combined with other risk factors cold environment increases the likelihood of a CTS. Table 2 at the end of this section entitled, "Risk Factors Associated CTS," summarizes the results of currently available literature.

No single epidemiologic study will fulfill all criteria for causality. The clinician must recognize that currently available epidemiologic data is based on population results, and that individual variability lies outside the scope of these studies. Many published studies are limited in design and methodology, and, thus, preclude conclusive results. Most studies' limitations tend to attenuate, rather than inflate, associations between workplace exposures and CTS.

These guidelines are based on current epidemiologic knowledge. As with any scientific work, the guidelines are expected to change with advancing knowledge. The clinician should remain flexible and incorporate new information revealed in future studies.

Table 2: Risk Factors Associated with Carpal Tunnel Syndrome

Diagnosis	Strong Evidence	Good evidence	Some evidence	Insufficient or conflicting evidence
Carpal Tunnel Syndrome	Combination of high exertional force (Varied from greater than 6 kg) and high repetition (work cycles less than 30 sec or greater than 50% of cycle time performing same task, length of shortest task less than 10 sec).	Repetition or force independentl y, use of vibration hand tools.	Wrist ulnar deviation and extension.	Pinch/grip, keyboarding.

4.5 **LABORATORY TESTS** Laboratory tests are generally accepted, well-established, and widely used procedures. Patients should be carefully screened at the initial exam for signs or symptoms of diabetes, hypothyroidism, arthritis, and related inflammatory diseases. The presence of concurrent disease does not negate work-relatedness of any specific case. When a patient's history and physical examination suggest infection, metabolic or endocrinologic disorders, tumorous conditions, systemic musculoskeletal disorders (e.g., rheumatoid arthritis), or potential problems related to prescription of medication (e.g., renal disease and nonsteroidal anti-inflammatory medications), then laboratory tests, including, but not limited to, the following can provide useful diagnostic information:

- 4.5.1 Serum rheumatoid factor and Antinuclear Antigen (ANA) for rheumatoid work-up;
- 4.5.2 Thyroid Stimulating Hormone (TSH) for hypothyroidism;
- 4.5.3 Fasting glucose—recommended for obese men and women over 40 years of age, patients with a history of family diabetes, those from high-risk ethnic groups, and with a previous history of impaired glucose tolerance. A fasting blood glucose greater than 125mg/dl is diagnostic for diabetes. Urine dipstick positive for glucose is a specific but not sensitive screening test. Quantitative urine glucose is sensitive and specific in high-risk populations;
- 4.5.4 Serum protein electrophoresis;
- 4.5.5 Sedimentation rate, nonspecific, but elevated in infection, neoplastic conditions and rheumatoid arthritis;

- 4.5.6 Serum calcium, phosphorus, uric acid, alkaline and acid phosphatase for metabolic, endocrine and neoplastic conditions;
- 4.5.7 Complete Blood Count (CBC), liver and kidney function profiles for metabolic or endocrine disorders or for adverse effects of various medications;
- 4.5.8 Bacteriological (microorganism) work-up for wound, blood and tissue;
- 4.5.9 Serum B6—routine screening is not recommended due to the fact that vitamin B6 supplementation has not been proven to affect the course of carpal tunnel syndrome. However, it may be appropriate for patients on medications that interfere with the effects of vitamin B6, or for those with significant nutritional problems. The Department recommends the above diagnostic procedures be considered, at least initially, the responsibility of the workers' compensation carrier to ensure that an accurate diagnosis and treatment plan can be established.

5.0 Follow-Up Diagnostic Testing Procedures

- 5.1 ~~ELECTRODIAGNOSTIC (EDX) STUDIES~~ are well established and widely accepted for evaluation of patients suspected of having CTS. The results are highly sensitive and specific for the diagnosis. Studies may confirm the diagnosis or direct the examiner to alternative disorders. Studies require clinical correlation due to the occurrence of false positive and false negative results. Symptoms of CTS may occur with normal EDX studies, especially early in the clinical course.
 - EDX findings in CTS reflect slowing of median motor and sensory conduction across the carpal tunnel region due to demyelination. Axonal loss, when present, is demonstrated by needle electromyography in median nerve-supplied thenar muscles. Findings include fibrillations, fasciculations, neurogenic recruitment and polyphasic units (reinnervation).
 - 5.1.1 Needle electromyography of a sample of muscles innervated by the C5 to T1 spinal roots, including a thenar muscle innervated by the median nerve of the symptomatic limb, is frequently required.
 - 5.1.2 The following EDX studies are not recommended to confirm a clinical diagnosis of CTS:
 - 5.1.2.1 Low sensitivity and specificity compared to other EDX studies: multiple median F wave parameters, median motor nerve residual latency, and sympathetic skin response
 - 5.1.2.2 Investigational studies: evaluation of the effect on median NCS of limb ischemia, dynamic hand exercises, and brief or sustained wrist positioning
 - 5.1.3 To assure accurate testing, temperature should be maintained at 30-34C preferably recorded from the hand/digits. For temperature below 30C the hand should be warmed.
 - 5.1.4 All studies must include normative values for their laboratories.
 - 5.1.5 Positive Findings—Any of these nerve conduction study findings must be accompanied by median nerve symptoms to establish the diagnosis.
 - 5.1.5.1 Slowing of median distal sensory and/or motor conduction through the carpal tunnel region
 - 5.1.5.2 Electromyographic changes in the median thenar muscles in the absence of proximal abnormalities
 - 5.1.6 Because laboratories establish their own norms, a degree of variability from the suggested guideline values is acceptable.
 - 5.1.7 In all cases, normative values are to be provided with the neurodiagnostic evaluation.
 - 5.1.8 Suggested grading scheme by electrodiagnostic criteria for writing a consultation or report may be:
 - 5.1.8.1 Mild CTS—prolonged (relative or absolute) median sensory or mixed action potential distal latency (orthodromic, antidromic, or palmar).
 - 5.1.8.2 Moderate CTS—abnormal median sensory latencies as above, and prolongation (relative or absolute) of median motor distal latency.
 - 5.1.8.3 Severe CTS—prolonged median motor and sensory distal latencies, with either absent sensory or palmar potential, or low amplitude or absent thenar motor action potential. Needle examination reveals evidence of acute and chronic denervation with axonal loss.
 - 5.1.9 Frequency of Studies/Maximum Number of Studies:
 - 5.1.9.1 Indications for Initial Testing:
 - 5.1.9.1.1 Patients who do not improve symptomatically or functionally with conservative measures for carpal tunnel syndrome over a 3-4 week period
 - 5.1.9.1.2 Patients in whom the diagnosis is in question
 - 5.1.9.1.3 Patients for whom surgery is contemplated

- 5.1.9.1.4 To rule out other nerve entrapments or a radiculopathy
- 5.1.9.2 Repeated studies may be performed:
 - 5.1.9.2.1 To determine disease progression. 8-12 weeks is most useful when the initial studies were normal and CTS is still suspected
 - 5.1.9.2.2 For inadequate improvement with non-surgical treatment for 8-12 weeks
 - 5.1.9.2.3 For persistent or recurrent symptoms following carpal tunnel release, post-op 3-6 months, unless an earlier evaluation is required by the surgeon

5.2 IMAGING STUDIES

- 5.2.1 **Radiographic Imaging:** Not generally required for most CTS diagnoses. However, it may be necessary to rule out other pathology in the cervical spine, shoulder, elbow, wrist or hand. Wrist and elbow radiographs would detect degenerative joint disease, particularly scapholunate dissociation and thumb carpometacarpal abnormalities which occasionally occur with CTS.
- 5.2.2 **Magnetic Resonance Imaging (MRI):** Considered experimental and not recommended for diagnosis of Carpal Tunnel Syndrome. Trained neuroradiologists have not identified a single MRI parameter that is highly sensitive and specific. MRI is less accurate than standard electrodiagnostic testing, and its use as a diagnostic tool is not recommended.
- 5.2.3 **Sonography:** This tool has not been sufficiently studied to define its diagnostic performance relative to electrodiagnostic studies. It is not a widely applied test. Sonography may detect synovial thickening in CTS caused by rheumatoid arthritis. It may be useful if space-occupying lesions, such as, lipomas, hemangiomas, fibromas, and ganglion cysts, are suspected. Its routine use in CTS is not recommended.

5.3 ADJUNCTIVE TESTING

Clinical indications for the use of tests and measurements are predicated on the history and systems review findings, signs observed on physical examination, and information derived from other sources and records. They are not designed to be the definitive indicator of dysfunction.

- 5.3.1 **Electromyography:** is a generally accepted, well-established procedure. It is indicated when acute and/or chronic neurogenic changes in the thenar eminence are associated with the conduction abnormalities discussed above.
- 5.3.2 **Electroneurometer:** May serve as a diagnostic tool as it helps to detect early distal sensorineural impairment.
- 5.3.3 **Portable Automated Electrodiagnostic Device:** Measures distal median nerve motor latency and F-wave latency at the wrist and has been tested in one research setting. It performed well in this setting following extensive calibration of the device. Motor nerve latency compared favorably with conventional electrodiagnostic testing, but F-wave latency added little to diagnostic accuracy. It remains an investigational instrument whose performance in a primary care setting is as yet not established, and is not recommended as a substitute for conventional electrodiagnostic testing in clinical decision-making.
- 5.3.4 **Quantitative Sensory Testing (QST):** May be used as a screening tool in clinical settings pre- and post-operatively. Results of tests and measurements of sensory integrity are integrated with the history and systems review findings and the results of other tests and measures. QST has been divided into two types of testing:
 - 5.3.4.1 Threshold tests measure topognosis, the ability to exactly localize a cutaneous sensation, and pallesthesia, the ability to sense mechanical using vibration discrimination testing (quickly adapting fibers); Semmes-Wienstein monofilament testing (slowly adapting fibers);
 - 5.3.4.2 Density Tests also measure topognosis and pallesthesia using static two-point discrimination (slowly adapting fibers); moving two-point discrimination (quickly adapting fibers).
- 5.3.5 **Pinch and Grip Strength Measurements:** May be accepted as a diagnostic tool for CTS. Strength is defined as the muscle force exerted by a muscle or group of muscles to overcome a resistance under a specific set of circumstances. Pain, the perception of pain secondary to abnormal sensory feedback, and/or the presence of abnormal sensory feedback affecting the sensation of the power used in grip/pinch may cause a decrease in the force. When all five handle settings of the dynamometer are used, a bell-shaped curve, reflecting maximum strength at the most comfortable handle setting, should be present. These measures provide a method for quantifying strength that can be used to follow a patient's progress and to assess response to therapy. In the absence of a bell-shaped curve, clinical reassessment is indicated.
- 5.3.6 **Laboratory Tests** In one study of carpal tunnel patients seen by specialists, 9% of patients were diagnosed with diabetes, 7% with hypothyroidism, and 15% with chronic inflammatory disease including spondyloarthropathy, arthritis, and systemic lupus erythematosus. Up to two thirds of the patients were not aware of their concurrent disease. Estimates of the prevalence of hypothyroidism in the general population vary widely, but data collected from the Colorado Thyroid Disease Prevalence Study revealed subclinical

hypothyroidism in 8.5% of participants not taking thyroid medication. The prevalence of chronic joint symptoms in the Behavioral Risk Factor Surveillance System (BRFSS) from the Centers for Disease Control (CDC) was 12.3%. If after 2-3 weeks, the patient is not improving the physician should strongly consider the following laboratory studies: thyroid function studies, rheumatoid screens, chemical panels, and others, if clinically indicated.

Laboratory testing may be required periodically to monitor patients on chronic medications.

6.0 Therapeutic Procedures – Non-Operative

Before initiation of any therapeutic procedure, the authorized treating provider, employer, and insurer must consider these important issues in the care of the injured worker.

First, patients undergoing therapeutic procedure(s) should be released or returned to modified or restricted duty during their rehabilitation at the earliest appropriate time. Refer to “Return-to-Work” in this section for detailed information.

Second, cessation and/or review of treatment modalities should be undertaken when no further significant subjective or objective improvement in the patient’s condition is noted. If patients are not responding within the recommended duration periods, alternative treatment interventions, further diagnostic studies or consultations should be pursued.

Third, providers should provide and document education to the patient. No treatment plan is complete without addressing issues of individual and/or group patient education as a means of facilitating self-management of symptoms.

In cases where a patient is unable to attend an outpatient center, home therapy may be necessary. Home therapy may include active and passive therapeutic procedures as well as other modalities to assist in alleviating pain, swelling, and abnormal muscle tone. Home therapy is usually of short duration and continues until the patient is able to tolerate coming to an outpatient center.

Non-operative treatment procedures for CTS can be divided into two groups: conservative care and rehabilitation. Conservative care is treatment applied to a problem in which spontaneous improvement is expected in 90% of the cases within three months. It is usually provided during the tissue healing phase and lasts no more than six months, and often considerably less. Rehabilitation is treatment applied to a more chronic and complex problem in a patient with de-conditioning and disability. It is provided during the period after tissue healing to obtain maximal medical recovery. Treatment modalities may be utilized sequentially or concomitantly depending on chronicity and complexity of the problem, and treatment plans should always be based on a diagnosis utilizing appropriate diagnostic procedures.

The following procedures are listed in alphabetical order.

6.1 **ACUPUNCTURE** is an accepted and widely used procedure for the relief of pain and inflammation. The exact mode of action is only partially understood. Western medicine studies suggest that acupuncture stimulates the nervous system at the level of the brain, promotes deep relaxation, and affects the release of neurotransmitters. Acupuncture is commonly used as an alternative or in addition to traditional Western pharmaceuticals. While it is commonly used when pain medication is reduced or not tolerated, it may be used as an adjunct to physical rehabilitation and/or surgical intervention to hasten the return of functional activity. Acupuncture should be performed by MD, DO, DC with appropriate training; or a licensed acupuncturist.

6.1.1 **Definition:** Acupuncture is the insertion and removal of filiform needles to stimulate acupoints (acupuncture points). Needles may be inserted, manipulated, and retained for a period of time. Acupuncture can be used to reduce pain, reduce inflammation, increase blood flow, increase range of motion, decrease the side effect of medication-induced nausea, promote relaxation in an anxious patient, and reduce muscle spasm.

Indications include joint pain, joint stiffness, soft tissue pain and inflammation, paresthesia, post-surgical pain relief, muscle spasm, and scar tissue pain.

- Time to produce effect: 3 to 6 treatments
- Frequency: 1 to 3 times per week
- Course duration: 14 treatments

6.1.2 **Acupuncture with Electrical Stimulation:** is the use of electrical current (micro-ampere or milli-ampere) on the needles at the acupuncture site. It is used to increase effectiveness of the needles by continuous stimulation of the acupoint. Physiological effects (depending on location and settings) can include endorphin release for pain relief, reduction of inflammation, increased blood circulation, analgesia through interruption of pain stimulus, and muscle relaxation.

It is indicated to treat chronic pain conditions, radiating pain along a nerve pathway, muscle spasm, inflammation, scar tissue pain, and pain located in multiple sites.

- Time to produce effect: 3 to 6 treatments
- Frequency: 1 to 3 times per week
- Course duration: 14 treatments

6.1.3 **Other Acupuncture Modalities:** Acupuncture treatment is based on individual patient needs and therefore treatment may include a combination of procedures to enhance treatment effect. Other procedures may include the use of heat, soft tissue manipulation/massage, and exercise. Refer to sections F 12 and 13 Active Therapy and Passive Therapy for a description of these adjunctive acupuncture modalities.

- Time to produce effect: 3 to 6 treatments
- Frequency: 1 to 3 times per week
- Course duration: 14 treatments

Any of the above acupuncture treatments may extend longer if objective functional gains can be documented or when symptomatic benefits facilitate progression in the patient's treatment program. Treatment beyond 14 treatments may be documented with respect to need and ability to facilitate positive symptomatic or functional gains. Such care should be re-evaluated and documented with each series of treatments.

6.2 **BIOFEEDBACK** is a form of behavioral medicine that helps patients learn self-awareness and self-regulation skills for the purpose of gaining greater control of their physiology, such as muscle activity, brain waves, and measures of autonomic nervous system activity. Electronic instrumentation is used to monitor the targeted physiology and then displayed or fed back to the patient visually, auditorially or tactilely, with coaching by a biofeedback specialist. Biofeedback is provided by clinicians certified in biofeedback and/or who have documented specialized education, advanced training, or direct or supervised experience qualifying them to provide the specialized treatment needed (e.g., surface EMG, EEG, or other).

Treatment is individualized to the patient's work-related diagnosis and needs. Home practice of skills is required for mastery and may be facilitated by the use of home training tapes. The ultimate goal in biofeedback treatment is normalizing the physiology to the pre-injury status to the extent possible and involves transfer of learned skills to the workplace and daily life. Candidates for biofeedback therapy or training must be motivated to learn and practice biofeedback and self-regulation techniques.

Indications for biofeedback include individuals who are suffering from musculoskeletal injury where muscle dysfunction or other physiological indicators of excessive or prolonged stress response affects and/or delays recovery. Other applications include training to improve self-management of emotional stress/pain responses such as anxiety, depression, anger, sleep disturbance, and other central and autonomic nervous system imbalances. Biofeedback is often utilized along with other treatment modalities.

- Time to produce effect: 3 to 4 sessions
- Frequency: 1 to 2 times per week
- Maximum duration: 10 to 12 sessions. Treatment beyond 12 sessions must be documented with respect to need, expectation, and ability to facilitate positive symptomatic or functional gains.

6.3 **INJECTIONS THERAPEUTIC** Steroids Injections – Beneficial effects of injections are well established, but generally considered to be temporary. Recurrence of symptoms is frequent. It is not clear whether or not injections slow progression of electrodiagnostic changes. Therefore, although symptoms may be temporarily improved, nerve damage may be progressing. When motor changes are present, surgery is preferred over injections.

- Time to produce effect: 2-5 days
- Frequency: every 6-8 weeks
- Optimum number: 2 injections
- Maximum number: 3 injections in 6 months

If following the first injection, symptomatic relief is followed by recurrent symptoms, the decision to perform a second injection must be weighed against alternative treatments such as surgery. Surgery may give more definitive relief of symptoms.

6.4 **JOB SITE ALTERATION** Early evaluation and training of body mechanics and other ergonomic factors are essential for every injured worker and should be done by a qualified individual. In some cases, this requires a job site evaluation. Some evidence supports alteration of the job site in the early treatment of Carpal Tunnel Syndrome (CTS). There is no single factor or combination of factors that is proven to prevent or ameliorate CTS, but a combination of ergonomic and psychosocial factors is generally considered to be important. Physical factors that may be considered include use of force, repetition, awkward positions, upper extremity vibration, cold environment, and contact pressure on the carpal tunnel. Psychosocial factors to be considered include pacing, degree of control over job duties, perception of job stress, and supervisory support.

The job analysis and modification should include input from the employee, employer, and ergonomist or other professional familiar with work place evaluation. The employee must be observed performing all job functions in order for the job site analysis to be valid. Periodic follow-up is recommended to evaluate effectiveness of the intervention and need for additional ergonomic changes.

- 6.4.1 **Ergonomic changes:** should be made to modify the hazards identified. In addition workers should be counseled to vary tasks throughout the day whenever possible. Occupational Safety and Health Administration (OSHA) suggests that workers who perform repetitive tasks, including keyboarding, take 15-30 second breaks every 10 to 20 minutes, or 5-minute breaks every hour. Mini-breaks should include stretching exercises.
- 6.4.2 **Interventions:** should consider engineering controls, e.g., mechanizing the task, changing the tool used, or adjusting the work site, or administrative controls, e.g., adjusting the time an individual performs the task.
- 6.4.3 **Seating Description:** The following description may aid in evaluating seated work positions: The head should incline only slightly forward, and if a monitor is used, there should be 18-24 inches of viewing distance with no glare. Arms should rest naturally, with forearms parallel to the floor, elbows at the sides, and wrists straight or minimally extended. The back must be properly supported by a chair, which allows change in position and backrest adjustment. There must be good knee and legroom, with the feet resting comfortably on the floor or footrest. Tools should be within easy reach, and twisting or bending should be avoided.
- 6.4.4 **Job Hazard Checklist:** The following Table 3 is adopted from Washington State's job hazard checklist, and may be used as a generally accepted guide for identifying job duties which may pose ergonomic hazards. The fact that an ergonomic hazard exists at a specific job, or is suggested in the table, does not establish a causal relationship between the job and the individual with a musculoskeletal injury. However, when an individual has a work-related injury and ergonomic hazards exist that affect the injury, appropriate job modifications should be made. Proper correction of hazards may prevent future injuries to others, as well as aid in the recovery of the injured worker.

Table 3: Identifying Job Duties Which May Pose Ergonomic Hazards

Type of Job Duty	Hours per Day
Pinching an unsupported object(s) weighing 2 lbs or more per hand, or pinching with a force of 4 lbs or more per hand (comparable to pinching a half a ream of paper): 1. Highly repetitive motion 2. Palmar flexion greater than 30 degrees, dorsiflexion greater than 45 degrees, or radial deviation greater than 30 degrees <hr/> 3. No other risk factors	More than 3 hours total/day <hr/> More than 4 hours total/day
Gripping an unsupported object(s) weighing 10 lbs or more/hand, or gripping with a force of 10 lbs or more/hand (comparable to clamping light duty automotive jumper cables onto a battery): *Handles should be rounded and soft, with at least 1-2.5" in diameter grips at least 5" long. 1. Highly repetitive motion 2. Palmar flexion greater than 30 degrees, dorsiflexion greater than 45 degrees, or radial deviation greater than 30 degrees <hr/> 3. No other risk factors	More than 3 hours total/day <hr/> More than 4 hours total/day
Repetitive Motion (using the same motion with little or no variation every few seconds), excluding keying activities: 1. High, forceful exertions with the hands, with palmar flexion greater than 30 degrees, dorsiflexion greater than 45 degrees, or radial deviation greater than 30 degrees <hr/> 2. No other risk factors	More than 2 hours total/day <hr/> More than 6 hours total/day

<p>Intensive Keying:</p> <p>1. Palmar flexion greater than 30 degrees, dorsiflexion greater than 45 degrees, or radial deviation greater than 30 degrees</p> <hr/> <p>2. No other risk factors</p>	<p>More than 4 hours total/day</p> <hr/> <p>More than 7 hours total/day</p>
<p>Repeated Impact:</p> <p>1. Using the hand (heel/base of palm) as a hammer more than once/minute</p>	<p>More than 2 hours total/day</p>
<p>Vibration:-</p> <p>Two determinants of the tolerability of segmental vibration of the hand are the frequency and the acceleration of the motion of the vibrating tool, with lower frequencies being more poorly tolerated at a given level of imposed acceleration, expressed below in multiples of the acceleration due to gravity (10m/sec/sec).</p> <p>1. Frequency range 8-15 Hz and acceleration 6 g</p> <p>2. Frequency range 80 Hz and acceleration 40 g</p> <p>3. Frequency range 250 Hz and acceleration 250 g</p> <hr/> <p>4. Frequency range 8-15 Hz and acceleration 1.5 g</p> <p>5. Frequency range 80 Hz and acceleration 6 g</p> <p>6. Frequency range 250 Hz and acceleration 20 g</p>	<p>More than 30 minutes at a time</p> <hr/> <p>More than 4 hours at a time</p>

6.5 **MEDICATIONS** including nonsteroidal anti-inflammatory medications (NSAIDs), oral steroids, diuretics, and pyridoxine (Vitamin B6) have not been shown to have significant long-term beneficial effect in treating Carpal Tunnel Syndrome. Although NSAIDs are not curative, they and other analgesics may provide symptomatic relief. All narcotics and habituating medications should be prescribed with strict time, quantity, and duration guidelines with a definite cessation parameter.

6.5.1 **Vitamin B6:** Randomized trials have demonstrated conflicting results. Higher doses may result in development of a toxic peripheral neuropathy. In the absence of definitive literature showing a beneficial effect, use of Vitamin B6 cannot be recommended.

6.5.2 **Oral Steroids:** have been shown to have short-term symptomatic benefit but no long-term functional benefit and are only rarely recommended due to possible side effects.

6.6 **OCCUPATIONAL REHABILITATION PROGRAMS**

6.6.1 **Non-Interdisciplinary:** These programs are work-related, outcome-focused, individualized treatment programs. Objectives of the program include, but are not limited to, improvement of cardiopulmonary and neuromusculoskeletal functions (strength, endurance, movement, flexibility, stability, and motor control functions), patient education, and symptom relief. The goal is for patients to gain full or optimal function and return to work. The service may include the time-limited use of passive modalities with progression to achieve treatment and/or simulated/real work.

6.6.1.1 **Work Conditioning/Simulation**

This program may begin once a patient is out of the acute phase of injury and will be able to tolerate this program.

These programs are usually initiated after the acute phase has been completed and offered at any time throughout the recovery phase. Work conditioning should be initiated when imminent return of a patient to modified or full duty is not an option, but the prognosis for returning the patient to work at completion of the program is at least fair to good.

The need for work place simulation should be based upon the results of a Functional Capacity Evaluation and/or Jobsite Analysis.

- Length of visit: 1 to 4 hours per day.
- Frequency: 2 to 5 visits per week
- Maximum duration: 8 weeks. Participation in a program beyond six weeks must be documented with respect to need and the ability to facilitate positive symptomatic or functional gains.

6.6.1.2 **Work Hardening**

Work Hardening is an interdisciplinary program addressing a patient's employability and return to work. It includes a progressive increase in the number of hours per day that a patient completes

work simulation tasks until the patient can tolerate a full workday. This is accomplished by addressing the medical, behavioral, physical, functional, and vocational components of employability and return-to-work.

This can include a highly structured program involving a team approach or can involve any of the components thereof. The interdisciplinary team should, at a minimum, be comprised of a qualified medical director who is board certified with documented training in occupational rehabilitation; team physicians having experience in occupational rehabilitation; occupational therapist; physical therapist; case manager; and psychologist. As appropriate, the team may also include: chiropractor, RN, vocational specialist or Certified Biofeedback Therapist.

- Length of visit: Up to 8 hours/day
- Frequency: 2 to 5 visits per week
- Maximum duration: 8 weeks. Participation in a program beyond six weeks must be documented with respect to need and the ability to facilitate positive symptomatic or functional gains.

6.7 **ORTHOTICS/IMMOBILIZATION WITH SPLINTING** is a generally accepted, well-established and widely used therapeutic procedure. There is some evidence that splinting leads to more improvement in symptoms and hand function than watchful waiting alone. Because of limited patient compliance with day and night splinting in published studies, evidence of effectiveness is limited to nocturnal splinting alone. Splints should be loose and soft enough to maintain comfort while supporting the wrist in a relatively neutral position. This can be accomplished using a soft or rigid splint with a metal or plastic support. Splint comfort is critical and may affect compliance. Although off-the-shelf splints are usually sufficient, custom thermoplastic splints may provide better fit for certain patients.

Splints may be effective when worn at night or during portions of the day, depending on activities. Most studies show that full time night splinting for a total of 4 to 6 weeks is the most effective protocol. Depending on job activities, intermittent daytime splinting can also be helpful. Splint use is rarely mandatory. Providers should be aware that over-usage is counterproductive, and should counsel patients to minimize daytime splint use in order avoid detrimental effects such as stiffness and dependency over time.

Splinting is generally effective for milder cases of CTS. Long term benefit has not been established. An effect should be seen in 2-4 weeks.

- Time to produce effect: 1-4 weeks. If, after 4 weeks, the patient has partial improvement, continue to follow since neuropathy may worsen, even in the face of diminished symptoms.
- Frequency: Nightly. Daytime intermittent, depending on symptoms and activities
- Maximum duration: 2 to 4 months. If symptoms persist, consideration should be given to either repeating electrodiagnostic studies or to more aggressive treatment.

6.8 **PATIENT EDUCATION** No treatment plan is complete without addressing issues of individual and/or group patient education as a means of prolonging the beneficial effects of treatment, as well as facilitating self-management of symptoms and injury prevention. The patient should be encouraged to take an active role in the establishment of functional outcome goals. They should be educated on their specific injury, assessment findings, and plan of treatment. Instruction on proper body mechanics and posture, positions to avoid, self-care for exacerbation of symptoms, and home exercise should also be addressed.

- Time to produce effect: Varies with individual patient
- Frequency: Should occur at every visit

6.9 **RESTRICTION OF ACTIVITIES** Continuation of normal daily activities is the recommendation for acute and chronic pain without neurologic symptoms. There is good evidence against the use of bed rest in cases without neurologic symptoms. Bed rest may lead to de-conditioning and impair rehabilitation. Complete work cessation should be avoided, if possible, since it often further aggravates the pain presentation. Modified return-to-work is almost always more efficacious and rarely contraindicated in the vast majority of injured workers with Carpal Tunnel Syndrome.

Medication use in the treatment of Carpal Tunnel Syndrome is appropriate for controlling acute and chronic pain and inflammation. Use of medications will vary widely due to the spectrum of injuries from simple strains to post-surgical healing. All drugs should be used according to patient needs. A thorough medication history, including use of alternative and over the counter medications, should be performed at the time of the initial visit and updated periodically.

6.10 **RETURN TO WORK** Early return-to-work should be a prime goal in treating Carpal Tunnel Syndrome given the poor prognosis for the injured employee who is out of work for more than six months. The employee and employer should be educated in the benefits of early return-to-work. When attempting to return an employee with CTS to the workplace, clear, objective physical restrictions that apply to both work and non-work related

activities should be specified by the provider. Good communication between the provider, employee, and employer is essential.

Return-to-work is any work or duty that the employee can safely perform, which may not be the worker's regular job activities. Due to the large variety of jobs and the spectrum of severity of CTS, it is not possible for the Division to make specific return-to-work guidelines, but the following general approach is recommended:

6.10.1 **Establishment of Return-To-Work:** Ascertainment of return-to-work status is part of the medical treatment and rehabilitation plan, and should be addressed at every visit. Limitations in ADLs should also be reviewed at every encounter, and help to provide the basis for work restrictions provided they are consistent with objective findings. The Division recognizes that employers vary in their ability to accommodate restricted duty, but encourages employers to be active participants and advocates for early return-to-work. In most cases, the patient can be returned to work in some capacity, either at a modified job or alternate position, immediately unless there are extenuating circumstances, which should be thoroughly documented and communicated to the employer. Return-to-work status should be periodically reevaluated, at intervals generally not to exceed three weeks, and should show steady progression towards full activities and full duty.

6.10.2 **Establishment of Activity Level Restrictions:** It is the responsibility of the physician/provider to provide both the employee and employer clear, concise, and specific restrictions that apply to both work and non-work related activities. The employer is responsible to determine whether modified duty can be provided within the medically determined restrictions.

6.10.3 **Compliance with Activity Level Restrictions:** The employee's compliance with the activity level restrictions is an important part of the treatment plan and should be reviewed at each visit. In some cases, a job-site analysis, a functional capacity evaluation, or other special testing may be required to facilitate return-to-work and document compliance. Refer to the "Job Site Alteration" and "Work Tolerance Screening" sections.

6.11 **TERAPY PASSIVE** Passive therapy includes those treatment modalities that do not require energy expenditure on the part of the patient. They are principally effective during the early phases of treatment and are directed at controlling symptoms such as pain, inflammation and swelling and to improve the rate of healing soft tissue injuries. They should be used in adjunct with active therapies. They may be used intermittently as a therapist deems appropriate or regularly if there are specific goals with objectively measured functional improvements during treatment. Diathermies have not been shown to be beneficial to patients with CTS and may interfere with nerve conduction.

6.11.1 **Manual Therapy Techniques:** are passive interventions in which the providers use his or her hands to administer skilled movements designed to modulate pain; increase joint range of motion; reduce/eliminate soft tissue swelling, inflammation, or restriction; induce relaxation; and improve contractile and non-contractile tissue extensibility. These techniques are applied only after a thorough examination is performed to identify those for whom manual therapy would be contraindicated or for whom manual therapy must be applied with caution.

6.11.1.1 Mobilization (Soft Tissue)

Mobilization of soft tissue is the skilled application of manual techniques designed to normalize movement patterns through the reduction of soft tissue pain and restrictions. Indications include muscle spasm around a joint, trigger points, adhesions, and neural compression.

Nerve Gliding: consist of a series of flexion and extension movements of the hand, wrist, elbow, shoulder, and neck that produce tension and longitudinal movement along the length of the median and other nerves of the upper extremity. These exercises are based on the principle that the tissues of the peripheral nervous system are designed for movement, and that tension and glide (excursion) of nerves may have an effect on neurophysiology through alterations in vascular and axoplasmic flow. Biomechanical principles have been more thoroughly studied than clinical outcomes. Nerve gliding performed on a patient by the clinician should be reinforced by patient performance of similar techniques as part of a home exercise program at least twice per day.

- Time to produce effect: 4 to 6 treatments
- Frequency: 2 to 3 times per week
- Maximum duration: 30 visits (CPT codes 97124 and 97140 cannot exceed 30 visits in combination).

6.11.1.2 **Massage: Manual or Mechanical** – Massage is manipulation of soft tissue with broad ranging relaxation and circulatory benefits. This may include stimulation of acupuncture points and acupuncture channels (acupressure), application of suction cups and techniques that include pressing, lifting, rubbing, pinching of soft tissues by or with the practitioner's hands. Indications

include edema, muscle spasm, adhesions, the need to improve peripheral circulation and range of motion, or to increase muscle relaxation and flexibility prior to exercise.

- Time to produce effect: Immediate.
- Frequency: 1 to 3 times per week
- Maximum duration: 12 visits

6.11.2 **Ultrasound:** There is some evidence that ultrasound may be effective in symptom relief and in improving nerve conduction in mild to moderate cases of CTS. No studies have demonstrated long-term functional benefit. It may be used in conjunction with an active therapy program for non-surgical patients who do not improve with splinting and activity modification. It is not known if there are any long-term deleterious neurological effects from ultrasound.

6.11.3 **Microcurrent TENS and LASER:** There is some evidence that concurrent application of microamperage TENS applied to distinct acupuncture points and low-level laser treatment may be useful in treatment of mild to moderate CTS. This treatment may be useful for patients not responding to initial conservative treatment or who wish to avoid surgery. Patient selection criteria should include absence of denervation on EMG and motor latencies not exceeding 7 ms. The effects of microamperage TENS and low-level laser have not been differentiated; there is no evidence to suggest whether only one component is effective or the combination of both is required.

- Time to produce effect: 1 week
- Frequency: 3 sessions per week
- Maximum duration: 4 weeks

6.11.4 **Other Passive Therapy:** For associated myofascial symptoms, please refer to the Cumulative Trauma Disorder guideline.

6.12 **TERAPY ACTIVE** Active therapies are based on the philosophy that therapeutic exercises and/or activities are beneficial for restoring flexibility, strength, endurance, function, range of motion, and alleviating discomfort. Active therapy requires an internal effort by the individual to complete a specific exercise or task, and thus assists in developing skills promoting independence to allow self care to continue after discharge. This form of therapy requires supervision from a therapist or medical provider such as verbal, visual, and/or tactile instructions(s). At times a provider may help stabilize the patient or guide the movement pattern, but the energy required to complete the task is predominately executed by the patient.

Patients should be instructed to continue active therapies at home as an extension of the treatment process in order to maintain improvement levels. Home exercise can include exercise with or without mechanical assistance or resistance and functional activities with assistance devices.

Interventions are selected based on the complexity of the presenting dysfunction with ongoing examination, evaluation and modification of the plan of care as improvement or lack thereof occurs. Change and/or discontinuation of an intervention should occur if there is attainment of expected goals/outcome, lack of progress, lack of tolerance and/or lack of motivation. Passive interventions/ modalities may only be used as adjuncts to the active program.

6.12.1 **Activities of Daily Living:** Supervised instruction, active-assisted training, and/or adaptation of activities or equipment to improve a person's capacity in normal daily living activities such as self-care, work re-integration training, homemaking, and driving.

- Time to produce effect: 4 to 5 treatments
- Maximum of 10 sessions

6.12.2 **Functional Activities:** are the use of therapeutic activity to enhance mobility, body mechanics, employability, coordination, and sensory motor integration.

- Time to produce effect: 4 to 5 treatments
- Frequency: 3 to 5 times per week
- Maximum duration: 24 visits

Total number of visit 97110 and 97530 should not exceed 36 visits without pre-authorization

6.12.3 **Neuromuscular Re-education:** is the skilled application of exercise with manual, mechanical, or electrical facilitation to enhance strength, movement patterns, neuromuscular response, proprioception, kinesthetic sense, coordination education of movement, balance, and posture. Indications include the need to promote neuromuscular responses through carefully timed proprioceptive stimuli, to elicit and improve motor activity in patterns similar to normal neurologically developed sequences, and improve neuromotor response with independent control.

- Time to produce effect: 2 to 6 treatments
- Frequency: 3-5 times per week
- Maximum duration: 24 visits

6.12.4 **Proper Work Techniques:** Please refer to the “Job Site Evaluation” and “Job Site Alteration” sections of these guidelines.

6.12.5 **Therapeutic Exercise:** with or without mechanical assistance or resistance may include isoinertial, isotonic, isometric and isokinetic types of exercises. Indications include the need for cardiovascular fitness, reduced edema, improved muscle strength, improved connective tissue strength and integrity, increased bone density, promotion of circulation to enhance soft tissue healing, improvement of muscle recruitment, increased range of motion, and are used to promote normal movement patterns. Can also include complementary/alternative exercise movement therapy.

- Time to produce effect: 2 to 6 treatments
- Frequency: 3 to 5 times per week
- Maximum duration: 36 visits

Total number of visit 97110 and 97530 should not exceed 36 visits without pre-authorization

17 DE Reg. 322 (09/01/13)

7.0 Therapeutic Procedures – Operative

7.1 **SURGICAL DECOMPRESSION** is well established, generally accepted, and widely used and includes open and endoscopic techniques. There is good evidence that surgery is more effective than splinting in producing long term symptom relief and normalization of median nerve conduction velocity.

7.1.1 **Endoscopic Techniques:** have had a higher incidence of serious complications (up to 5%) compared to open techniques (less than 1%). The most commonly seen serious complications are incomplete transection of the transverse carpal ligament and inadvertent nerve or vessel injuries. The incidence of complications may be lower for surgeons who have extensive experience and familiarity with certain endoscopic techniques. Choice of technique should be left to the discretion of the surgeon.

7.1.2 **Indications for Surgery:** include positive history, abnormal electrodiagnostic studies, and/or failure of conservative management. Job modification should be considered prior to surgery. Please refer to the “Job Site Alteration” section for additional information on job modification.

7.1.3 **Surgery as an Initial Therapy:** Surgery should be considered as an initial therapy in situations where:

7.1.3.1 Median nerve trauma has occurred; “acute carpal tunnel syndrome”, or

7.1.3.2 Electrodiagnostic evidence of moderate to severe neuropathy. EMG findings showing evidence of acute or chronic motor denervation suggest the possibility that irreversible damage may be occurring.

7.1.4 **Surgery When Electrodiagnostic Testing is Normal:** Surgery may be considered in cases where electrodiagnostic testing is normal. An opinion from a hand surgeon may be considered. The following criteria should be considered in deciding whether to proceed with surgery:

7.1.4.1 The patient experiences significant temporary relief following steroid injection into the carpal tunnel; or

7.1.4.2 The patient has failed 3-6 months of conservative treatment including work site change, if such changes are available; and

7.1.4.3 The patient's signs and symptoms are specific for carpal tunnel syndrome

7.1.5 **Suggested parameters for return-to-work are:**

Time Frame	Activity Level
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2 Days	Return to Work with Restrictions on utilizing the affected extremity
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2-3 Weeks	Sedentary and non-repetitive work
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4-6 Weeks	Case-by-case basis
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6-12 Weeks	Heavy Labor, forceful and repetitive
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Note: All return-to-work decisions are based upon clinical outcome.

7.2 **NEUROLYSIS** has not been proven advantageous for carpal tunnel syndrome. Internal neurolysis should never be done. Very few indications exist for external neurolysis.

7.3 **TENOSYNOVECTOMY** has not proven to be of benefit in primary carpal tunnel syndrome but occasionally can be beneficial in certain patients with co-existing or systemic disorders.

7.4 **CONSIDERATIONS FOR REPEAT SURGERY** The single most important factor in predicting symptomatic improvement following carpal tunnel release is the severity of preoperative neuropathy. Patients with moderate electrodiagnostic abnormalities have better results than those with either very severe or no abnormalities. Incomplete cutting of the transverse carpal ligament or iatrogenic injury to the median nerve are rare.

If median nerve symptoms do not improve following initial surgery or symptoms improve initially and then recur, but are unresponsive to non-operative therapy (see Section.F, Therapeutic Procedures, Non-Operative) consider the following:

- 7.4.1 Recurrent synovitis;
- 7.4.2 Repetitive work activities may be causing “dynamic” CTS;
- 7.4.3 Scarring;
- 7.4.4 Work-up of systemic diseases

A second opinion by a hand surgeon and new electrodiagnostic studies required if repeat surgery is contemplated. The decision to undertake repeat surgery must factor in all of the above possibilities. Results of surgery for recurrent carpal tunnel syndrome vary widely depending on the etiology of recurrent symptoms.

7.5 **POST-OPERATIVE TREATMENT** Considerations for post-operative therapy are:

- 7.5.1 Immobilization: There is some evidence showing that immediate mobilization of the wrist following surgery is associated with less scar pain and faster return to work. Final decisions regarding the need for splinting post-operatively should be left to the discretion of the treating physician based upon his/her understanding of the surgical technique used and the specific conditions of the patient.
- 7.5.2 Home Program: It is generally accepted that all patients should receive a home therapy protocol involving stretching, ROM, scar care, and resistive exercises. Patients should be encouraged to use the hand as much as possible for daily activities, allowing pain to guide their activities.
- 7.5.3 Supervised Therapy Program: may be helpful in patients who do not show functional improvements post-operatively, in patients with heavy or repetitive job activities and certain high risk patients. The therapy program may include some of the generally accepted elements of soft tissue healing and return to function:
 - 7.5.3.1 Soft tissue healing/remodeling: May be used after the incision has healed. It may include all of the following: evaluation, whirlpool, electrical stimulation, soft tissue mobilization, scar desensitivation, heat/cold application, splinting or edema control may be used as indicated. Following wound healing, ultrasound and iontophoresis with Sodium Chloride (NaCl) may be considered for soft tissue remodeling. Diathermy is a non-acceptable adjunct.
 - 7.5.3.2 Return to function: Range of motion and stretching exercises, strengthening, activity of daily living adaptations, joint protection instruction, posture/body mechanics education; worksite modifications may be indicated.
 - Time to produce effect: 2-4 weeks
 - Frequency: 2-5 times/week
 - Maximum duration: 36 visits

~~11 DE Reg. 1661 (06/01/08)~~

~~12 DE Reg. 67 (07/01/08)~~

PART B Chronic Pain Treatment Guidelines

4.0 Introduction

Pursuant to 19 ~~Del.C.~~ §2322C, health care practice guidelines have been adopted and recommended by the Health Care Advisory Panel to guide utilization of health care treatments in workers' compensation including, but not limited to, care provided for the treatment of employees by or under the supervision of a licensed health care provider, prescription drug utilization, inpatient hospitalization and length of stay, diagnostic testing, physical therapy, chiropractic care and palliative care. The health care practice guidelines apply to all treatments provided after the effective date of the regulation adopted by the Department of Labor, May 23, 2008, and regardless of the date of injury.

The guidelines are, to the extent permitted by the most current medical science or applicable science, based on well-documented scientific research concerning efficacious treatment for injuries and occupational disease. To the extent that well-documented scientific research regarding the above is not available at the time of adoption of the guidelines, or is not available at the time of any revision to the guidelines, the guidelines have been and will be based upon the best available information concerning national consensus regarding best health care practices in the relevant health care community.

The guidelines, to the extent practical and consistent with the Act, address treatment of those physical conditions which occur with the greatest frequency, or which require the most expensive treatments, for work-related injuries based upon currently available Delaware data.

~~Services rendered by any health care provider certified pursuant to 19 Del.C. §2322D(a) to provide treatment or services for injured employees shall be presumed, in the absence of contrary evidence, to be reasonable and necessary if such treatment and/or services conform to the most current version of the Delaware health care practice guidelines.~~

~~Services rendered outside the Guidelines and/or variation in treatment recommendations from the Guidelines may represent acceptable medical care, be considered reasonable and necessary treatment and, therefore, determined to be compensable, absent evidence to the contrary, and may be payable in accordance with the Fee Schedule and Statute, accordingly.~~

~~Services provided by any health care provider that is not certified pursuant to 19 Del.C. §2322D(a) shall not be presumed reasonable and necessary unless such services are pre-authorized by the employer or insurance carrier, subject to the exception set forth in 19 Del.C. §2322D(b).~~

~~Treatment of conditions unrelated to the injuries sustained in an industrial accident may be denied as unauthorized if the treatment is directed toward the non-industrial condition, unless the treatment of the unrelated injury is rendered necessary as a result of the industrial accident.~~

~~The Health Care Advisory Panel and Department of Labor recognized that acceptable medical practice may include deviations from these Guidelines, as individual cases dictate. Therefore, these Guidelines are not relevant as evidence of a provider's legal standard of professional care.~~

~~In accordance with the requirements of the Act, the development of the health care guidelines has been directed by a predominantly medical or other health professional panel, with recommendations then made to the Health Care Advisory Panel.~~

2.0 General Guideline Principles

- The principles summarized in this section are key to the intended implementation of all Office of Workers' Compensation guidelines and critical to the reader's application of the guidelines in this document.
- 2.1 **TREATMENT PARAMETER DURATION** Time frames for specific interventions commence once treatments have been initiated, not on the date of injury. Obviously, duration will be impacted by patient compliance, as well as availability of services. Clinical judgment may substantiate the need to accelerate or decelerate the time frames discussed in this document.
- 2.2 **ACTIVE INTERVENTIONS** emphasizing patient responsibility, such as therapeutic exercise and/or functional treatment, are generally emphasized over passive modalities, especially as treatment progresses. Generally, passive interventions are viewed as a means to facilitate progress in an active rehabilitation program with concomitant attainment of objective functional gains.
- 2.3 **ACTIVE THERAPEUTIC EXERCISE PROGRAM** Exercise program goals should incorporate patient strength, endurance, flexibility, coordination, and education. This includes functional application in vocational or community settings.
- 2.4 **POSITIVE PATIENT RESPONSE** Positive results are defined primarily as functional gains that can be objectively measured. Objective functional gains include, but are not limited to, positional tolerances, range of motion (ROM), strength, endurance activities of daily living cognition, psychological behavior, and efficiency/velocity measures that can be quantified. Subjective reports of pain and function should be considered and given relative weight when the pain has anatomic and physiologic correlation.
- 2.5 **RE-EVALUATION OF TREATMENT EVERY 3 TO 4 WEEKS** With respect to Therapy (Active or Passive), if a given treatment or modality is not producing positive results within 3 to 4 weeks, the treatment should be either modified or discontinued. Reconsideration of diagnosis should also occur in the event of poor response to a seemingly rational intervention.
- 2.6 **SURGICAL INTERVENTIONS** Surgery should be contemplated within the context of expected functional outcome and not purely for the purpose of pain relief. The concept of "cure" with respect to surgical treatment by itself is generally a misnomer. All operative interventions must be based upon positive correlation of clinical findings, clinical course, and diagnostic tests. A comprehensive assimilation of these factors must lead to a specific diagnosis with identification of pathologic conditions.
- 2.7 **RETURN TO WORK** is therapeutic, assuming the work is not likely to aggravate the basic problem or increase long-term pain. The practitioner must provide specific written physical limitations and the patient should never be released to "sedentary" or "light duty." The following physical limitations should be considered and modified

as recommended: lifting, pushing, pulling, crouching, walking, using stairs, overhead work, bending at the waist, awkward and/or sustained postures, tolerance for sitting or standing, hot and cold environments, data entry and other repetitive motion tasks, sustained grip, tool usage and vibration factors. Even if there is residual chronic pain, return to work is not necessarily contraindicated.

The practitioner should understand all of the physical demands of the patient's job position before returning the patient to full duty and should request clarification of the patient's job duties.

- 2.8 **DELAYED RECOVERY** Strongly consider a psychological evaluation, if not previously provided, as well as initiating interdisciplinary rehabilitation treatment and vocational goal setting, for those patients who are failing to make expected progress 6 to 12 weeks after an injury. The Office of Workers' Compensation recognizes that 3 to 10% of all industrially injured patients will not recover within the time lines outlined in this document despite optimal care. Such individuals may require treatments beyond the limits discussed within this document, but such treatment will require clear documentation by the authorized treating practitioner focusing on objective functional gains afforded by further treatment and impact upon prognosis.
- 2.9 **GUIDELINE RECOMMENDATIONS AND INCLUSION OF MEDICAL EVIDENCE** recommendations are based on available evidence and/or consensus recommendations of the standard of care within Delaware. Those procedures considered inappropriate, unreasonable, or unnecessary are designated in the guideline as being "not recommended."
- 2.10 **TREATMENT OF PRE-EXISTING CONDITIONS** that preexisted the work injury/disease will need to be managed under two circumstances: (a) A pre-existing condition exacerbated by a work injury/disease should be treated until the patient has returned to their prior level of functioning; and (b) A pre-existing condition not directly caused by a work injury/disease but which may prevent recovery from that injury should be treated until its negative impact has been controlled. The focus of treatment should remain on the work injury/disease.

17-DE Reg. 322 (09/01/13)

3.0 Introduction to Chronic Pain

The International Association for the Study of Pain (IASP) defines pain as "an unpleasant sensory and emotional experience with actual or potential tissue damage." Pain is a complex experience embracing physical, mental, social, and behavioral processes that often compromises the quality of life of many individuals. Pain is an unpleasant subjective perception usually in the context of tissue damage. Pain is subjective and cannot be measured or indicated objectively. Pain evokes negative emotional reactions such as fear, anxiety, anger, and depression. People usually regard pain as an indicator of physical harm, despite the fact that pain can exist without tissue damage and tissue damage can exist without pain. Many people report pain in the absence of tissue damage or any likely pathophysiologic cause. There is no way to distinguish their experience from that due to actual tissue damage. If they regard their experience as pain and they report it the same way as pain caused by tissue damage, it should be accepted as pain. Pain can generally be classified as:

Nociceptive which includes pain from visceral origins or damage to other tissues. Myofascial pain is a nociceptive type of pain characterized by myofascial trigger points limited to a specific muscle or muscles. Neuropathic including that originating from brain, peripheral nerves or both; and Psychogenic that originates in mood, characterological, social, or psychophysiological processes.

Recent advances in the neurosciences reveal additional mechanisms involved in chronic pain. In the past, pain was seen as a sensation arising from the stimulation of pain receptors by damaged tissue, initiating a sequence of nerve signals ending in the brain and there recognized as pain. A consequence of this model was that ongoing pain following resolution of tissue damage was seen as less physiological and more psychological than acute pain with identifiable tissue injury. Current research indicates that chronic pain involves additional mechanisms that cause: 1) neural remodeling at the level of the spinal cord and higher levels of the central nervous system; 2) changes in membrane responsiveness and connectivity leading to activation of larger pain pathways; and 3) recruitment of distinct neurotransmitters. Changes in gene function and expression may occur, with lasting functional consequences. These physiologic functional changes cause chronic pain to be experienced in body regions beyond the original injury and to be exacerbated by little or no stimulation. The chronic pain experience clearly represents both psychologic and complex physiologic mechanisms, many of which are just beginning to be understood. Chronic Pain is defined as "pain that persists for at least 30 days beyond the usual course of an acute disease or a reasonable time for an injury to heal or that is associated

with a chronic pathological process that causes continuous pain (e.g., reflex sympathetic dystrophy)." The very definition of chronic pain describes a delay or outright failure to relieve pain associated with some specific illness or accident. Delayed recovery should prompt a clinical review of the case and a psychological evaluation by the health care provider. Referral to a recognized pain specialist for further evaluation is recommended. Consideration may be given to new diagnostic testing or a change in treatment plan.

Chronic pain is a phenomenon not specifically relegated to anatomical or physiologic parameters. The prevailing biomedical model (which focuses on identified disease pathology as the sole cause of pain) cannot capture all of the important variables in pain behavior. While diagnostic labels may pinpoint contributory physical and/or psychological factors and lead to specific treatment interventions that are helpful, a large number of patients defy precise taxonomic classification. Furthermore, such diagnostic labeling often overlooks important social contributions to the chronic pain experience. Failure to address these operational parameters of the chronic pain experience may lead to incomplete or faulty treatment plans. The term "pain disorder" is perhaps the most useful term in the medical literature today, in that it captures the multi-factorial nature of the chronic pain experience.

It is recognized that some health care practitioners, by virtue of their experience, additional training, and/or accreditation by pain specialty organizations, have much greater expertise in the area of chronic pain evaluation and treatment than others. Referrals for the treatment of chronic pain should be to such recognized specialists. Chronic pain treatment plans should be monitored and coordinated by pain medicine physicians with such specialty training, in conjunction with other health care specialists.

Most acute and some chronic pain problems are adequately addressed in other Office of Workers' Compensation treatment guidelines, and are generally beyond the scope of these guidelines. However, because chronic pain is more often than not multi-factorial, involving more than one pathophysiologic or mental disorder, some overlap with other guidelines is inevitable. These guidelines are meant to apply to any patient who fits the operational definition of chronic pain discussed at the beginning of this section.

17 DE Reg. 322 (09/01/13)

4.0 Definitions

After-sensation Refers to the abnormal persistence of a sensory perception, provoked by a stimulus even though the stimulus has ceased.

Allodynia Pain due to a non-noxious stimulus that does not normally provoke pain.

Dynamic Mechanical Allodynia — Obtained by moving the stimulus such as a brush or cotton tip across the abnormal hypersensitive area.

Mechanical Allodynia — Refers to the abnormal perception of pain from usually non-painful mechanical stimulation.

Static Mechanical Allodynia — Refers to pain obtained by applying a single stimulus such as light pressure to a defined area.

Thermal Allodynia — Refers to the abnormal sensation of pain from usually non-painful thermal stimulation such as cold or warmth.

Analgesia Absence of pain in response to stimulation that would normally be painful.

Biopsychosocial A term that reflects the multiple facets of any clinical situation; namely, the biological, psychological, and social situation of the patient.

Central Pain Pain initiated or caused by a primary lesion or dysfunction in the central nervous system.

Central Sensitization The experience of pain evoked by the excitation of non-nociceptive neurons or of nerve fibers that normally relay non-painful sensations to the spinal cord. This results when non-nociceptive afferent neurons act on a sensitized central nervous system (CNS).

Dysesthesia An abnormal sensation described by the patient as unpleasant. As with paresthesia, dysesthesia may be spontaneous or evoked by maneuvers on physical examination.

Hyperalgesia Refers to an exaggerated pain response from a usually painful stimulation.

Hyperesthesia (Positive Sensory Phenomena) Includes allodynia, hyperalgesia, and hyperpathia. Elicited by light touch, pin prick, cold, warm, vibration, joint position sensation or two-point discrimination, which is perceived as increased or more.

Hyperpathia Refers to an abnormally painful and exaggerated reaction to stimulus, especially to a repetitive stimulus.

Hypoalgesia Diminished pain perception in response to a normally painful stimulus.

Hypoesthesia (Negative Sensory Phenomena) Refers to a stimulus such as light touch, pin prick, cold, point position sensation, two-point discrimination, or sensory neglect which is perceived as decreased.

Malingering Intentional feigning of illness or disability in order to escape work or gain compensation.

Myofascial Pain A regional pain characterized by tender points in taut bands of muscle that produce pain in a characteristic reference zone.

Myofascial Trigger Point A physical sign in a muscle which includes a) exquisite tenderness in a taut muscle band; and b) referred pain elicited by mechanical stimulation of the trigger point. The following findings may be associated with myofascial trigger points: 1) Local twitch or contraction of the taut band when the trigger point is mechanically stimulated; 2) Reproduction of the patient's spontaneous pain pattern when the trigger point is mechanically stimulated; 3) Weakness without muscle atrophy; 4) Restricted range of motion of the affected muscle; and 5) Autonomic dysfunction associated with the trigger point such as changes in skin or limb temperature.

Neuralgia Pain in the distribution of a nerve or nerves.

Neuritis Inflammation of a nerve or nerves.

Neurogenic Pain Pain initiated or caused by a primary lesion, dysfunction, or transitory perturbation in the peripheral or central nervous system.

Neuropathic Pain Pain due to an injured or dysfunctional central or peripheral nervous system.

Neuropathy A disturbance of function or pathological change in a nerve: in one nerve, mononeuropathy; in several nerves, mononeuropathy multiplex; if diffuse and bilateral, polyneuropathy.

Nociceptor A receptor preferentially sensitive to a noxious stimulus or to a stimulus which would become noxious if prolonged.

Pain Behavior The non-verbal actions (such as grimacing, groaning, limping, using visible pain relieving or support devices and requisition of pain medications, among others) that are outward manifestations of pain, and through which a person may communicate that pain is being experienced.

Pain Threshold The smallest stimulus perceived by a subject as painful.

Paresthesia An abnormal sensation that is not described as pain. It can be either a spontaneous sensation (such as pins and needles) or a sensation evoked from non-painful or painful stimulation, such as light touch, thermal, or pinprick stimulus on physical examination.

Peripheral Neurogenic Pain Pain initiated or caused by a primary lesion or dysfunction or transitory perturbation in the peripheral nervous system.

Peripheral Neuropathic Pain Pain initiated or caused by a primary lesion or dysfunction in the peripheral nervous system.

Summation Refers to abnormally painful sensation to a repeated stimulus although the actual stimulus remains constant. The patient describes the pain as growing and growing as the same intensity stimulus continues.

Sympathetically Maintained Pain (SMP) A pain that is maintained by sympathetic efferent innervations or by circulating catecholamines.

Tender Points Tenderness on palpation at a tendon insertion, muscle belly or over bone. Palpation should be done with the thumb or forefinger, applying pressure approximately equal to a force of 4 kilograms (blanching of the entire nail bed).

5.0 Initial Evaluation and Diagnostic Procedures

The Department recommends the following diagnostic procedures be considered, at least initially, the responsibility of the workers' compensation carrier to ensure that an accurate diagnosis and treatment plan can be established. Standard procedures that should be utilized when initially diagnosing a work-related chronic pain complaint are listed below.

5.1 HISTORY AND PHYSICAL EXAMINATION (HX & PE)

- 5.1.1 Medical History: As in other fields of medicine, a thorough patient history is an important part of the evaluation of chronic pain. In taking such a history, factors influencing a patient's current status can be made clear and taken into account when planning diagnostic evaluation and treatment. One efficient

manner in which to obtain historical information is by using a questionnaire. The questionnaire may be sent to the patient prior to the initial visit or administered at the time of the office visit.

5.1.2 Pain History: Characterization of the patient's pain and of the patient's response to pain is one of the key elements in treatment.

5.1.3 Medical Management History

5.1.4 Substance Use/Abuse

5.1.5 Other Factors Affecting Treatment Outcome

5.1.6 Physical Examination

5.2 **DIAGNOSTIC STUDIES** Imaging of the spine and/or extremities is a generally accepted, well established, and widely used diagnostic procedure when specific indications, based on history and physical examination, are present.

5.2.1 Radiographic Imaging, MRI, CT, bone scan, radiography, and other special imaging studies may provide useful information for many musculoskeletal disorders causing chronic pain.

5.2.2 Electrodiagnostic studies may be useful in the evaluation of patients with suspected myopathic or neuropathic disease and may include Nerve Conduction Studies (NCS), Standard Needle Electromyography, or Somatosensory Evoked Potential (SSEP). The evaluation of electrical studies is difficult and should be relegated to specialists who are well trained in the use of this diagnostic procedure.

5.2.3 Special Testing Procedures may be considered when attempting to confirm the current diagnosis or reveal alternative diagnosis. In doing so, other special tests may be performed at the discretion of the physician.

5.3 **LABORATORY TESTING** is generally accepted well established and widely used procedures and can provide useful diagnostic and monitoring information. They may be used when there is suspicion of systemic illness, infection, neoplasia, or underlying rheumatologic disorder, connective tissue disorder, or based on history and/or physical examination. Tests include, but are not limited to:

5.3.1 Complete Blood Count (CBC) with differential can detect infection, blood dyscrasias, and medication side effects;

5.3.2 Erythrocyte sedimentation rate, rheumatoid factor, antinuclear antigen (ANA), human leukocyte antigen (HLA), and C-reactive protein can be used to detect evidence of a rheumatologic, infection, or connective tissue disorder;

5.3.3 Thyroid, glucose and other tests to detect endocrine disorders;

5.3.4 Serum calcium, phosphorous, uric acid, alkaline phosphatase, and acid phosphatase can detect metabolic bone disease;

5.3.5 Urinalysis to detect bacteria (usually with culture and sensitivity), calcium, phosphorus, hydroxyproline, or hematuria;

5.3.6 Liver and kidney function may be performed for baseline testing and monitoring of medications; and

5.3.7 Toxicology Screen and/or Blood Alcohol Level if suspected drug or alcohol abuse.

5.4 **INJECTIONS—DIAGNOSTIC**

5.4.1 **Spinal Diagnostic Injections:**

Description — generally accepted, well established procedures. These injections may be useful for localizing the source of pain, and may have added therapeutic value when combined with injection of therapeutic medication(s). Selection of patients, choice of procedure, and localization of the level for injection should be determined by clinical information indicating strong suspicion for pathologic condition(s) and the source of pain symptoms.

The interpretation of the test results are primarily based on functional change, symptom report, and pain response (via a recognized pain scale before and at an appropriate time after the injection). The diagnostic significance of the test result should be evaluated in conjunction with clinical information and the results of other diagnostic procedures. Injections with local anesthetics of differing duration may be used to support a diagnosis. In some cases, injections at multiple levels may be required to accurately diagnose conditions. Regarding diagnostic injections, it is obligatory that sufficient data be accumulated by the examiner performing this procedure such that the diagnostic value of the procedure is evident to other reviewers. A log must be recorded as part of the medical record which documents response, if any, on an

hourly basis for, at a minimum, the expected duration of the local anesthetic phase of the procedure. Responses should be identified as to specific body part (e.g., low back, neck, leg, or arm pain).

~~Special Requirements for Diagnostic Injections— Since multi-planar, fluoroscopy during procedures is required to document technique and needle placement, an experienced physician should perform the procedure. Permanent images are required to verify needle placement for all spinal procedures. The subspecialty disciplines of the physicians performing injections may be varied, including, but not limited to: anesthesiology, radiology, surgery, or physiatry. The practitioner who performs spinal injections should document hands-on training through workshops of the type offered by organizations such as the International Spine Intervention Society (ISIS) and/or completed fellowship training with interventional training. Practitioners performing spinal injections for low back and cervical pain must also be knowledgeable in radiation safety.~~

~~**Specific Diagnostic Injections**— In general, relief should last for at least the duration of the local anesthetic used and/or should significantly relieve pain and result in functional improvement. The following injections are used primarily for diagnosis:~~

~~5.4.1.1 Medial Branch Blocks:~~

~~Medial Branch Blocks are primarily diagnostic injections, used to determine whether a patient is a candidate for radiofrequency medial branch neurotomy (also known as facet rhizotomy). To be a positive diagnostic block, the patient should report a reduction of pain of 50% or greater relief from baseline for the length of time appropriate for the local anesthetic used. It is suggested that this be reported on a form.~~

~~A separate block on a different date should be performed to confirm the level of involvement. Frequency and Maximum Duration: May be repeated once for comparative blocks. Limited to 4 levels.~~

~~5.4.1.2 Transforaminal Injections are useful in identifying spinal pathology. When performed for diagnosis, small amounts of local anesthetic up to a total volume of 1.0 cc should be used to determine the level of nerve root irritation. A positive diagnostic block should result in a 50% reduction in nerve-root generated pain appropriate for the anesthetic used as measured by accepted pain scales (such as a VAS).~~

~~Frequency and Maximum Duration: Once per suspected level. Limited to three levels, may be repeated for confirmation.~~

~~5.4.1.3 Zygapophyseal (facet) blocks: Facet blocks are generally.~~

~~They may be used diagnostically to direct functional rehabilitation programs. A positive diagnostic block should result in a positive diagnostic functional benefit and/or a 50% reduction in pain appropriate for the anesthetic used as measured by accepted pain scales (such as a Visual Analog Scale). They then may be repeated per the therapeutic guidelines.~~

~~Frequency and Maximum Duration: Once per suspected level, limited to three levels, may be repeated for confirmation.~~

~~5.4.1.4 Atlanto-Axial and Atlanto-Occipital Injections: are generally accepted for diagnosis and treatment but do not lend themselves to denervation techniques owing to variable neuroanatomy.~~

~~Frequency and Maximum Duration: Once per side~~

~~5.4.1.5 Sacroiliac Joint Injection:~~

~~Description— a generally accepted injection of local anesthetic in an intra-articular fashion into the sacroiliac joint under fluoroscopic guidance.~~

~~Indications— Primarily diagnostic to rule out sacroiliac joint dysfunction versus other pain generators. Intra-articular injection can be of value in diagnosing the pain generator. There should be at least 50% pain relief.—~~

~~Frequency and Maximum Duration: 1 may be repeated for confirmation.~~

6.0 Therapeutic Procedures – Non-Operative

Non-operative therapeutic rehabilitation is applied to patients with chronic and complex problems of de-conditioning and functional disability. Treatment modalities may be utilized sequentially or concomitantly depending on chronicity and complexity of the problem, and treatment plans should always be based on a diagnosis utilizing appropriate diagnostic procedures.

Before initiation of any therapeutic procedure, the authorized treating physician, employer, and insurer must consider these important issues in the care of the injured worker:

- 6.1 Patients undergoing therapeutic procedure(s) should be released or returned to modified or restricted duty during their rehabilitation at the earliest appropriate time. Refer to Return-to-Work in this section for detailed information.
- 6.2 Reassessment of the patient's status in terms of functional improvement should be documented after each treatment. If patients are not responding within the recommended time periods, alternative treatment interventions, further diagnostic studies or consultations should be pursued. Continued treatment should be monitored using objective measures such as:
Return-to-work or maintaining work status
Fewer restrictions at work or performing activities of daily living.
Decrease in usage of medications
Measurable functional gains, such as increased range of motion or documented increase in strength.
- 6.3 Clinicians should provide and document education to the patient. No treatment plan is complete without addressing issues of individual and/or group patient education as a means of facilitating self-management of symptoms.
- 6.4 Psychological or psychosocial screening should be performed on all chronic pain patients.

The following procedures are listed in alphabetical order.

- 6.4.1 **ACUPUNCTURE** is an accepted and widely used procedure for the relief of pain and inflammation, and there is some scientific evidence to support its use. The exact mode of action is only partially understood. Western medicine studies suggest that acupuncture stimulates the nervous system at the level of the brain, promotes deep relaxation, and affects the release of neurotransmitters. Acupuncture is commonly used as an alternative or in addition to traditional Western pharmaceuticals. While it is commonly used when pain medication is reduced or not tolerated, it may be used as an adjunct to physical rehabilitation and/or surgical intervention to hasten the return of functional activity. Acupuncture should be performed by MD, DO, DC with appropriate training; or a licensed acupuncturist.

- 6.4.1.1 **Acupuncture:** is the insertion and removal of filiform needles to stimulate acupoints (acupuncture points). Needles may be inserted, manipulated, and retained for a period of time. Acupuncture can be used to reduce pain, reduce inflammation, increase blood flow, increase range of motion, decrease the side effect of medication-induced nausea, promote relaxation in an anxious patient, and reduce muscle spasm.

Indications include joint pain, joint stiffness, soft tissue pain and inflammation, paresthesia, post-surgical pain relief, muscle spasm, and scar tissue pain.

- 6.4.1.2 **Acupuncture with Electrical Stimulation:** is the use of electrical current (micro-amperage or milli-amperage) on the needles at the acupuncture site. It is used to increase effectiveness of the needles by continuous stimulation of the acupoint. Physiological effects (depending on location and settings) can include endorphin release for pain relief, reduction of inflammation, increased blood circulation, analgesia through interruption of pain stimulus, and muscle relaxation.

It is indicated to treat chronic pain conditions, radiating pain along a nerve pathway, muscle spasm, inflammation, scar tissue pain, and pain located in multiple sites.

- 6.4.1.3 **Total Time Frames For Acupuncture and Acupuncture with Electrical Stimulation:** Time frames are not meant to be applied to each of the above sections separately. The time frames are to be applied to all acupuncture treatments regardless of the type or combination of therapies being provided.

Time to produce effect: 3 to 6 treatments

Frequency: 1 to 3 times per week

Maximum course duration: 14 treatments (one course)

Any of the above acupuncture treatments may extend longer if objective functional gains can be documented or when symptomatic benefits facilitate progression in the patient's treatment program. An additional course of treatment beyond 14 treatments may be documented with respect to need and ability to facilitate positive symptomatic or functional gains. Such care should be re-evaluated and documented with each series of treatments.

- 6.4.1.4 **Other Acupuncture Modalities:** Acupuncture treatment is based on individual patient needs and therefore treatment may include a combination of procedures to enhance treatment effect. Other procedures may include the use of heat, soft tissue manipulation/massage, and exercise. Refer to

Active Therapy (Therapeutic Exercise) and Passive Therapy sections (Massage and Superficial Heat and Cold Therapy) for a description of these adjunctive acupuncture modalities and time frames.

6.4.2 **BIOFEEDBACK** is a generally well-accepted form of behavioral medicine that helps patients learn self-awareness and self-regulation skills for the purpose of gaining greater control of their physiology. Stress-related psycho-physiological reactions may arise as a reaction to organic pain and in some cases may cause pain. Electronic instrumentation is used to monitor the targeted physiology and then displayed or fed back to the patient visually, auditorially, or tactilely with coaching by a biofeedback specialist.

Indications for biofeedback include individuals who are suffering from musculoskeletal injury where muscle dysfunction or other physiological indicators of excessive or prolonged stress response affects and/or delays recovery. Other applications include training to improve self-management of pain, anxiety, panic, anger or emotional distress, narcotic withdrawal, insomnia/ sleep disturbance, and other central and autonomic nervous system imbalances. Biofeedback is often utilized for relaxation training. Mental health professionals may also utilize it as a component of psychotherapy, where biofeedback and other behavioral techniques are integrated with psychotherapeutic interventions. Biofeedback is often used in conjunction with physical therapy or medical treatment. Recognized types of biofeedback include the following:

6.4.2.1 **Electromyogram (EMG):** Used for self-management of pain and stress reactions involving muscle tension.

6.4.2.2 **Skin Temperature:** Used for self-management of pain and stress reactions, especially vascular headaches.

6.4.2.3 **Respiration Feedback (RFB):** Used for self-management of pain and stress reactions via breathing control.

6.4.2.4 **Respiratory Sinus Arrhythmia (RSA):** Used for self-management of pain and stress reactions via synchronous control of heart rate and respiration. Respiratory sinus arrhythmia is a benign phenomena which consists of a small rise in heart rate during inhalation, and a corresponding decrease during exhalation. This phenomenon has been observed in meditators and athletes, and is thought to be a psycho-physiological indicator of health.

6.4.2.5 **Heart Rate Variability (HRV):** Used for self-management of stress via managing cardiac reactivity.

6.4.2.6 **Electrodermal Response (EDR):** Used for self-management of stress involving palmar sweating or galvanic skin response.

6.4.2.7 **Electroencephalograph (EEG, QEEG):** Used for self-management of various psychological states by controlling brainwaves.

The goal in biofeedback treatment is normalizing the physiology to the pre-injury status to the extent possible and involves transfer of learned skills to the workplace and daily life. Candidates for biofeedback therapy or training must be motivated to learn and practice biofeedback and self-regulation techniques. In the course of biofeedback treatment, patient stressors are discussed and self-management strategies are devised. If the patient has not been previously evaluated, a psychological evaluation should be performed prior to beginning biofeedback treatment for chronic pain. The psychological evaluation may reveal cognitive difficulties, belief system conflicts, somatic delusions, secondary gain issues, hypochondriasis, and possible biases in patient self-reports, which can affect biofeedback. Home practice of skills is often helpful for mastery and may be facilitated by the use of home training tapes. Psychologists or psychiatrists, who provide psychophysiological therapy which integrates biofeedback with psychotherapy, should be either Biofeedback Certification Institute of America (BCIA) certified or practicing within the scope of their training. All other providers of Biofeedback for chronic pain patients must be BCIA certified and shall have their biofeedback treatment plan approved by the authorized treating psychologist or psychiatrist. Biofeedback treatment must be done in conjunction with the patient's psychosocial intervention. Biofeedback may also be provided by unlicensed health care providers, who follow a set treatment and educational protocol. Such treatment may utilize standardized material or relaxation tapes.

Time to produce effect: 3 to 4 sessions

Frequency: 1 to 2 times per week

Optimum duration: 6 to 8 sessions

Maximum duration: 10 to 12 sessions.

Treatment beyond 12 sessions must be documented with respect to need, expectation, and ability to facilitate positive symptomatic or functional gains.

6.4.3 **COMPLEMENTARY ALTERNATIVE MEDICINE (CAM)** is a term used to describe a broad range of treatment modalities, a number of which are generally accepted and supported by some scientific evidence, and others which still remain outside the generally accepted practice of conventional Western Medicine. In many of these approaches, there is attention given to the relationship between physical, emotional, and spiritual well being. While CAM may be performed by a myriad of both licensed and non-licensed health practitioners with training in one or more forms of therapy, credentialed practitioners should be used when available or applicable.

Although CAM practices are diverse and too numerous to list, they can be generally classified into five domains:

6.4.3.1 **Alternative Medical Systems:** These are defined as medical practices that have developed their own systems of theory, diagnosis and treatment and have evolved independent of and usually prior to conventional Western Medicine. Some examples are Traditional Chinese Medicine, Ayurvedic Medicine, Homeopathy, and Naturopathy.

6.4.3.2 **Mind-Body Interventions:** These include practices such as hypnosis, meditation, bioenergetics, and prayer.

6.4.3.3 **Biological-based Practices:** These include herbal and dietary therapy as well as the use of nutritional supplements. To avoid potential drug interactions, supplements should be used in consultation with the authorized treating physician.

6.4.3.4 **Body-Based Therapy:** Included in this category are the practices of Yoga and Rolfing bodywork.

6.4.3.5 **Energy-Based Practices:** Energy-based practices include a wide range of modalities that support physical as well as spiritual and/or emotional healing. Some of the more well-known energy practices include Qi Gong, Tai Chi, Healing Touch and Reiki. Practices such as Qi Gong and Tai Chi are taught to the patient and are based on exercises the patient can practice independently at home. Other energy-based practices such as Healing Touch and Reiki involve a practitioner/patient relationship.

6.4.3.6 Methods used to evaluate chronic pain patients for participation in CAM will differ with various approaches and with the training and experience of individual practitioners. A patient may be referred for CAM therapy when the patient's cultural background, religious beliefs, or personal concepts of health suggest that an unconventional medical approach might assist in the patient's recovery or when the physician's experience and clinical judgment support a CAM approach. The patient must demonstrate a high degree of motivation to return to work and improve their functional activity level while participating in therapy. Other more traditional conservative treatments should generally be attempted before referral to CAM. Treatment with CAM requires prior authorization.

Frequency: Per CAM therapy selected

Optimum duration: Should be based upon the physician's clinical judgment and demonstration by the patient of positive symptomatic and functional gains. Practitioner provided CAM therapy is generally not recommended on a maintenance basis.

6.4.4 **DISTURBANCES OF SLEEP** are common in chronic pain. Although primary insomnia may accompany pain as an independent co-morbid condition, it more commonly occurs secondary to the pain condition itself. Exacerbations of pain often are accompanied by exacerbations of insomnia; the reverse can also occur. Sleep laboratory studies have shown disturbances of sleep architecture in pain patients. Loss of deep slow wave sleep and increase in light sleep occur and sleep efficiency, the proportion of time in bed spent asleep, is decreased. These changes are associated with patient reports of non-restorative sleep.

Many chronic pain patients develop behavioral habits that exacerbate and maintain sleep disturbances. Excessive time in bed, irregular sleep routine, napping, low activity, and worrying in bed are all maladaptive responses that can arise in the absence of any psychopathology. There is some evidence that behavioral modification, such as patient education and group or individual counseling, can be effective in reversing the effects of insomnia. Behavioral modifications are easily implemented and can include:

6.4.4.1 Maintaining a regular sleep schedule, retiring and rising at approximately the same time on weekdays and weekends.

6.4.4.2 Avoiding daytime napping.

6.4.4.3 Avoiding caffeinated beverages after lunchtime

- 6.4.4.4 Making the bedroom quiet and comfortable, eliminating disruptive lights, sounds, television sets, and keeping a bedroom temperature of about 65°F.
 - 6.4.4.5 Avoiding alcohol or nicotine within two hours of bedtime.
 - 6.4.4.6 Avoiding large meals within two hours of bedtime.
 - 6.4.4.7 Exercising vigorously during the day, but not within two hours of bedtime, since this may raise core temperature and activate the nervous system.
 - 6.4.4.8 Associating the bed with sleep and sexual activity only, using other parts of the home for television, reading and talking on the telephone.
 - 6.4.4.9 Leaving the bedroom when unable to sleep for more than 20 minutes, retuning to the bedroom when ready to sleep again.
- These modifications should be undertaken before sleeping medication is prescribed for long term use.

6.4.5 **INJECTIONS—THERAPEUTIC**

When considering the use of injections in chronic pain management, the treating physician must carefully consider the inherent risks and benefits. Any continued use of injections should be monitored using objective measures such as:

- Return to work or maintaining work status.
- Fewer restrictions at work or performing activities of daily living
- Decrease in usage of medications

Measurable functional gains, such as increased range of motion for documented increase in strength.

Reduction of reported pain scores

6.4.5.1 **Spinal Therapeutic Injections**

General Description—The following injections are considered to be reasonable treatment for patients with chronic pain. Other injections not listed may be beneficial. Therapeutic spinal injections typically may be used after initial conservative treatments, such as physical and occupational therapy, medication, manual therapy, exercise, acupuncture, etc., have been undertaken.

Special Considerations—For all spinal injections (excluding trigger point, botox and occipital or peripheral nerve blocks) multi-planar fluoroscopy, during procedures is required to document technique and needle placement, and should be performed by a physician experienced in the procedure. Permanent images are required to verify needle placement. The subspecialty disciplines of the physicians may be varied, including, but not limited to: anesthesiology, radiology, surgery, or physiatry. The practitioner who performs injections for low back pain should document hands on training through workshops of the type offered by organizations such as the International Spine Intervention Society (ISIS) and/or completed fellowship training with interventional training. Practitioners who perform spinal injections must also be knowledgeable of radiation safety.

6.4.5.1.1 **Epidural Steroid Spinal Injections:**

Description—Epidural steroid injections (ESI) deliver corticosteroid into the epidural space. The purpose of ESI is to reduce pain and inflammation, restoring range of motion and thereby facilitating progress in more active treatment programs. ESI uses three approaches: transforaminal, translaminar (midline), and caudal. For ESI in the low back, the transforaminal approach is the preferred method for unilateral, single-level pathology and for post-surgical patients. Also for the low back, there is good evidence that the transforaminal approach can deliver medication to the target tissue with few complications and can be used to identify the specific site of pathology.

Needle Placement—Multi-planar fluoroscopic imaging is required for all transforaminal epidural steroid injections. Contrast epidurograms allow one to verify the flow of medication into the epidural space. Permanent images are required to verify needle placement. **Indications**—There is some evidence that epidural steroid injections are effective for patients with radicular pain or radiculopathy (sensory or motor loss in a specific dermatome or myotome). Although there is no evidence regarding the effectiveness of ESI for non-radicular pain, it is a generally accepted intervention.

Frequency: Up to 3 treatments (a treatment may be a one or two level injection) over a period of six months, depending upon each patient's response.

Maximum: Two sessions (consisting of up to three injections each) may be done in one year based upon the patient's response.

6.4.5.1.2 **Zygapophyseal (Facet) Injection:**

Description — A generally accepted intra-articular or pericapsular injection of local anesthetic and corticosteroid. There is conflicting evidence to support a long-term therapeutic effect using facet injections. Indications patients with pain suspected to be of facet origin — Patients with recurrent pain should be evaluated, to determine the need for a rhizotomy.

Facet injections may be repeated if they result in documented functional benefit and/or at least an 50% initial improvement in pain as measured by accepted pain scales (such as VAS). Maximum Duration: 4 per level per year. Prior authorization must be obtained for injections beyond three levels.

6.4.5.1.3 **Sacro-iliac Joint Injection:**

Description — A generally accepted injection of local anesthetic in an intra-articular fashion into the sacro-iliac joint under radiographic guidance. May include the use of corticosteroids. Long-term therapeutic effect has not yet been established.

Indications — Primarily diagnostic to rule out sacroiliac joint dysfunction vs. other pain generators. Intra-articular injection can be of value in diagnosing the pain generator. These injections may be repeated if they result in increased documented functional benefit and/or at least an 50% initial improvement in pain scales as measured by accepted pain scales (such as VAS).

Maximum Duration: 3 injections per year.

6.4.5.2 **Trigger Point Injections:-**

Description — Trigger point injection consists of dry needling or injection of local anesthetic with or without corticosteroid into highly localized, extremely sensitive bands of skeletal muscle fibers that produce local and referred pain when activated. Medication is injected in the area of maximum tenderness. Injection efficacy can be enhanced if injections are immediately followed by myofascial therapeutic interventions, such as vapo-coolant spray and stretch, ischemic pressure massage (myotherapy), specific soft-tissue mobilization and physical modalities.

The effectiveness of trigger point injection is uncertain, in part due to the difficulty of demonstrating advantages of active medication over injection of saline. Needling alone may be responsible for some of the therapeutic response.

Indications — Trigger point injections may be used to relieve myofascial pain and facilitate active therapy and stretching of the affected areas. They are to be used as an adjunctive treatment in combination with other active treatment modalities. Trigger point injections should be utilized primarily for the purpose of facilitating functional progress. Trigger point injections are indicated in those patients where well-circumscribed trigger points have been consistently observed. Generally, these injections are not necessary unless consistently observed trigger points are not responding to specific, noninvasive, myofascial interventions within approximately a 4-week time frame.

Frequency: Weekly. Suggest no more than 4 injection sites per session per week to avoid significant post-injection soreness.

Optimum duration: 4 sessions.

Maximum duration: 8 weeks. Some patients may require 2 to 4 repetitions of trigger point injection series over a 1 to 2 year period.

6.4.5.3 **Botulinum Toxin (Botox) Injection:**

Description — Used to temporarily weaken or paralyze muscles. May reduce muscle pain in conditions associated with spasticity, dystonia, or other types of painful muscle spasm. Neutralizing antibodies develop in at least 4% of patients treated with botulinum toxin type A, rendering it ineffective. Several antigenic types of botulinum toxin have been described. Botulinum toxin type B, first approved by the Food and Drug Administration (FDA) in 2001, is similar pharmacologically to botulinum toxin type A, and there is good evidence of its efficacy in improving function in cervical dystonia (torticollis). It appears to be effective in patients who have become resistant to the type A toxin. The immune responses to botulinum toxins type A and B are not cross-reactive, allowing type B toxin to be used when type A action is blocked by antibody. Experimental work with healthy human volunteers suggests that muscle paralysis from type B

toxin is not as complete or as long-lasting as that resulting from type A. The duration of treatment effect of botulinum toxin type B for cervical dystonia has been estimated to be 12 to 16 weeks. EMG needle guidance may permit more precise delivery of botulinum toxin to the target area.

~~Indications—To improve range of motion and reduce painful muscle spasm. May be useful in musculoskeletal conditions associated with muscle spasm or headaches. There should be evidence of limited range of motion prior to the injection. May be useful in central neurologic conditions that produce spasticity or dystonia (e.g., brain injury, spinal cord injury, or stroke). Use is recommended according to current FDA guidelines.~~

~~Frequency: No less than 3 months between re-administration.~~

~~Optimum duration: 3 to 4 months.~~

~~Maximum duration: Currently unknown. Repeat injections should be based upon functional improvement and therefore used sparingly in order to avoid development of antibodies that might render future injections ineffective.~~

6.4.6 **MEDICATIONS**

There is no single formula for pharmacological treatment of patients with chronic nonmalignant pain.

Control of chronic non-malignant pain is expected to involve the use of medication. Strategies for pharmacological control of pain cannot be precisely specified in advance. Rather, drug treatment requires close monitoring of the patient's response to therapy, flexibility on the part of the prescriber and a willingness to change treatment when circumstances change. Many of the drugs discussed in the medication section were licensed for indications other than analgesia, but are effective in the control of many types of chronic pain. Consensus regarding the use of opioids has generally been reached in the field of cancer pain, where nociceptive mechanisms are generally identifiable, expected survival may be short, and symptomatic relief is emphasized more than functional outcomes. In injured workers, by contrast, central and neuropathic mechanisms frequently overshadow nociceptive processes, expected survival is relatively long, and return to a high level of function is a major goal of treatment. Approaches to pain, which were developed in the context of malignant pain, therefore may not be transferable to chronic non-malignant pain.

All medications should be given an appropriate trial in order to test for therapeutic effect. Trials of medication requiring specific therapeutic drug levels may take several months to achieve, depending upon the half-life of the drug. It is recommended that patients with chronic nonmalignant pain be maintained on drugs that have the least serious side effects. For the clinician to interpret the following material, it should be noted that: (1) drug profiles listed are not complete; (2) dosing of drugs will depend upon the specific drug, especially for off-label use; and (3) not all drugs within each class are listed, and other drugs within the class may be appropriate. Clinicians should refer to informational texts or consult a pharmacist before prescribing unfamiliar medications or when there is a concern for drug interactions. The following drug classes are listed in alphabetical order, not in order of suggested use. The following list is not all-inclusive. It is acknowledged that medications not on this list may be appropriate choices for the care of injured workers.

6.4.6.1 **Alpha-Acting Agents:** Noradrenergic pain-modulating systems are present in the central nervous system, and the alpha-2 adrenergic receptor may be involved in the functioning of these pathways. Alpha-2 agonists may act by stimulating receptors in the substantia gelatinosa of the dorsal horn of the spinal cord, inhibiting the transmission of nociceptive signals. Spasticity may be reduced by presynaptic inhibition of motor neurons. Given limited experience with their use, they cannot be considered first-line analgesics, but a trial of their use may be warranted in many cases of refractory pain.

6.4.6.1.1 Clonidine (Catapres)

6.4.6.1.1.1 Description—Central alpha-2 agonist

6.4.6.1.1.2 Indications—Sympathetically mediated pain, treatment of withdrawal from opioids.

6.4.6.1.1.3 Dosing and Time to Therapeutic Effect—Increase dosage weekly to therapeutic effect.

6.4.6.1.1.4 Recommended Laboratory Monitoring—Renal function.

6.4.6.1.2 Tizanidine (Zanaflex)

6.4.6.1.2.1 Description—Alpha-2 adrenergic agonist.

6.4.6.1.2.2 Indications—Spasticity, musculoskeletal disorders.

- 6.4.6.1.2.3 ~~Dosing and Time to Therapeutic Effect — As needed (PRN) or titrate to effective dose.~~
- 6.4.6.1.2.4 ~~Recommended Laboratory Monitoring — Hepatic and renal function.~~
- 6.4.6.2 **Anticonvulsants:** Although the mechanism of action of anticonvulsant drugs in neuropathic pain states remains to be fully defined, they appear to act as nonselective sodium channel blocking agents. A large variety of sodium channels are present in nervous tissue, and some of these are important mediators of nociception, as they are found primarily in unmyelinated fibers and their density increases following nerve injury. While the pharmacodynamic effects of the various anticonvulsant drugs are similar, the pharmacokinetic effects differ significantly. Carbamazepine has important effects as an inducer of hepatic enzymes and may influence the metabolism of other drugs enough to present problems in patients taking more than one drug. Gabapentin and oxcarbazepine, by contrast, are relatively non-significant enzyme inducers, creating fewer drug interactions.
 - 6.4.6.2.1 **Gabapentin (Neurontin)**
 - 6.4.6.2.1.1 ~~Description — Structurally related to gamma-aminobutyric acid (GABA) but does not interact with GABA receptors.~~
 - 6.4.6.2.1.2 ~~Indications — Neuropathic pain.~~
 - 6.4.6.2.1.3 ~~Dosing and Time to Therapeutic Effect — Dosage may be increased over several days.~~
 - 6.4.6.2.1.4 ~~Recommended Laboratory Monitoring — Renal function.~~
 - 6.4.6.2.2 **Oxcarbazepine (Trileptal)**
 - 6.4.6.2.2.1 ~~Description — The mechanism of action resembles that of carbamazepine, but has an advantage in being a less potent inducer of hepatic enzymes.~~
~~Controlled trials of its effectiveness in chronic pain are lacking.~~
 - 6.4.6.2.2.2 ~~Indications — Neuropathic pain.~~
 - 6.4.6.2.2.3 ~~Dosing and Time to Therapeutic Effect — Dosage may be increased weekly.~~
 - 6.4.6.2.2.4 ~~Recommended Laboratory Monitoring — Drug levels, renal and hepatic function.~~
 - 6.4.6.2.3 **Carbamazepine (Tegretol)**
 - 6.4.6.2.3.1 ~~Description — Anticonvulsant structurally related to tricyclic antidepressants.~~
 - 6.4.6.2.3.2 ~~Indications — Trigeminal neuralgia and other neuropathic pain.~~
 - 6.4.6.2.3.3 ~~Dosing and Time to Therapeutic Effect — Dosage levels typically exceed those utilized for seizure prophylaxis. Titrate to desired effect.~~
 - 6.4.6.2.3.4 ~~Recommended Laboratory Monitoring — Drug levels, renal and hepatic function, complete blood count.~~
- 6.4.6.3 **Antidepressants:** are classified into a number of categories based on their chemical structure and their effects on neurotransmitter systems. Their effects on depression are attributed to their actions on disposition of norepinephrine and serotonin at the level of the synapse; although these synaptic actions are immediate, the symptomatic response in depression is delayed by several weeks. When used for chronic pain, the effects may in part arise from treatment of underlying depression, but may also involve additional neuromodulatory effects on endogenous opioid systems, raising pain thresholds at the level of the spinal cord.

Pain responses may occur at lower drug doses with shorter times to symptomatic response than are observed when the same compounds are used in the treatment of mood disorders. Neuropathic pain, diabetic neuropathy, post-herpetic neuralgia, and cancer-related pain may respond to antidepressant doses low enough to avoid adverse effects that often complicate the treatment of depression.

 - 6.4.6.3.1 **Tricyclics (e.g., amitriptyline [Elavil], nortriptyline [Pamelor, Aventyl], doxepin [Sinequan, Adapin])**
 - 6.4.6.3.1.1 ~~Description — Serotonergics, typically tricyclic antidepressants (TCAs), are utilized for their serotonergic properties as increasing CNS serotonergic tone can help decrease pain perception in non-antidepressant dosages. Amitriptyline is known for its ability to repair Stage 4 sleep architecture, a frequent problem found in chronic pain patients and to treat depression, frequently associated with chronic pain.~~

- 6.4.6.3.1.2 Indications — ~~Chronic musculoskeletal and/or neuropathic pain, insomnia. Second-line drug treatment for depression.~~
- 6.4.6.3.1.3 Dosing and Time to Therapeutic Effect — ~~Varies by specific tricyclic. Low dosages are commonly used for chronic pain and/or insomnia.~~
- 6.4.6.3.1.4 Recommended Laboratory Monitoring — ~~Renal and hepatic function. EKG for those on high dosages or with cardiac risk.~~
- 6.4.6.3.2 ~~Selective serotonin reuptake inhibitors (SSRIs) (e.g., citalopram [Celexa], fluoxetine [Prozac], paroxetine [Paxil], sertraline [Zoloft]).~~
 - 6.4.6.3.2.1 Description — ~~SSRIs are characterized by the predominance of inhibition of serotonin reuptake at the pre-synaptic nerve terminal.~~
 - 6.4.6.3.2.2 Indications — ~~Depression, chronic pain with depression and/or anxiety.~~
 - 6.4.6.3.2.3 Time to Produce Therapeutic Effect — ~~3 to 4 weeks.~~
 - 6.4.6.3.2.4 Recommended Laboratory Monitoring — ~~Renal and hepatic function.~~
- 6.4.6.3.3 ~~Atypical Antidepressants/Other Agents~~
 - 6.4.6.3.3.1 Description — ~~Venlafaxine, (Effexor), nefazadone (Serzone), trazodone (Deseryl), and mirtazapine (Remeron) share adjuvant analgesic effects with tricyclic antidepressants. They differ in their side effect and drug interaction profiles.~~
 - 6.4.6.3.3.2 Indications — ~~Venlafaxine is approved for generalized anxiety disorder, bupropion for smoking cessation.~~
 - 6.4.6.3.3.3 Recommended Laboratory Monitoring — ~~Drug specific.~~
- 6.4.6.4 ~~**Hypnotics and Sedatives:** Sedative and hypnotic drugs decrease activity, induce drowsiness, and moderate agitation. Many drugs produce these effects incidental to their usual intended effects, similar to the side effects of many antihistamines and antidepressants.~~
 - 6.4.6.4.1 ~~Zaleplon (Sonata)~~
 - 6.4.6.4.1.1 Description — ~~A nonbenzodiazepine hypnotic.~~
 - 6.4.6.4.1.2 Indications — ~~Insomnia.~~
 - 6.4.6.4.1.3 Dosing and Time to Therapeutic Effect — ~~Time of onset is 30 to 60 minutes. Due to rapid elimination, may be taken as little as 4 hours before awakening.~~
 - 6.4.6.4.1.4 Recommended Laboratory Monitoring — ~~Hepatic function.~~
 - 6.4.6.4.2 ~~Zolpidem (Ambien)~~
 - 6.4.6.4.2.1 Description — ~~A nonbenzodiazepine hypnotic, which does not appear to cause rebound insomnia. It has little respiratory depression and insignificant anxiolytic or muscle relaxant activity.~~
 - 6.4.6.4.2.2 Indications — ~~Short-term use for insomnia~~
 - 6.4.6.4.2.3 Time to Therapeutic Effect — ~~Onset of action is 30 to 60 minutes~~
 - 6.4.6.4.2.4 Recommended Laboratory Monitoring — ~~Hepatic function.~~
- 6.4.6.5 ~~**Skeletal Muscle Relaxants:** are most useful for acute musculoskeletal injury or exacerbation of injury.~~
 - 6.4.6.5.1 ~~Cyclobenzaprine (Flexeril)~~
 - 6.4.6.5.1.1 Description — ~~Structurally related to tricyclics.~~
 - 6.4.6.5.1.2 Indications — ~~Chronic pain associated with muscle spasm.~~
 - 6.4.6.5.1.3 Dosing and Time to Therapeutic Effect — ~~Variable, onset of action is 1 hour.~~
 - 6.4.6.5.1.4 Recommended Laboratory Monitoring — ~~Hepatic and renal function.~~
 - 6.4.6.5.2 ~~Carisoprodol (Soma)~~
 - 6.4.6.5.2.1 Description — ~~Mode of action may be central; meprobamate is an active metabolite.~~
 - 6.4.6.5.2.2 Indications — ~~Chronic pain associated with muscle spasm.~~
 - 6.4.6.5.2.3 Recommended Laboratory Monitoring — ~~Renal and hepatic function.~~
 - 6.4.6.5.3 ~~Metaxalone (Skelaxin)~~
 - 6.4.6.5.3.1 Description — ~~Central acting muscle relaxant.~~

6.4.6.5.3.2 Indications—Muscle spasm.

6.4.6.5.3.3 Dosing and Time to Therapeutic Effect—Onset of action 1 hour.

6.4.6.5.3.4 Recommended Laboratory Monitoring—Hepatic function.

6.4.6.6 **Opioids:** are the most powerful analgesics.

Opioids include some of the oldest and most effective drugs used in the control of severe pain. The discovery of opioid receptors and their endogenous peptide ligands has led to an understanding of effects at the binding sites of these naturally occurring substances. Most of their analgesic effects have been attributed to their modification of activity in pain pathways within the central nervous system; however, it has become evident that they also are active in the peripheral nervous system. Activation of receptors on the peripheral terminals of primary afferent nerves can mediate antinociceptive effects, including inhibition of neuronal excitability and release of inflammatory peptides. Some of their undesirable effects on inhibiting gastrointestinal motility are peripherally mediated by receptors in the bowel wall. The central nervous system actions of these drugs account for much of their analgesic effect. Consultation or referral to a pain specialist should be considered when the pain persists but the underlying tissue pathology is minimal or absent and correlation between the original injury and the severity of impairment is not clear. Consider consultation if suffering and pain behaviors are present and the patient continues to request medication, or when standard treatment measures have not been successful or are not indicated.

6.4.6.6.1 On-Going, Long-Term Management—Actions may include:

6.4.6.6.1.1 Prescriptions from a single practitioner,

6.4.6.6.1.2 Ongoing review and documentation of pain relief, functional status, appropriate medication use, and side effects,

6.4.6.6.1.3 Ongoing effort to gain improvement of social and physical function as a result of pain relief,

6.4.6.6.1.4 Contract detailing reasons for termination of supply, with appropriate tapering of dose,

6.4.6.6.1.5 Use of random drug screening as deemed appropriate by the prescribing physician,

6.4.6.6.1.6 Use of more than two opioids: a long-acting opioid for maintenance of pain relief and a short-acting opioid for limited rescue use when pain exceeds the routine level. If more than two opioids are prescribed for long-term use, a second opinion from specialist who is Board Certified in Neurology, Physical Medicine and Rehabilitation, or Anesthesiology with recognized training and/or certification in pharmacological pain management is strongly recommended.

6.4.6.6.1.7 Use of acetaminophen-containing medications in patients with liver disease should be limited; and

6.4.6.6.1.8 Continuing review of overall situation with regard to nonopioid means of pain control.

6.4.6.7 **Nonsteroidal Anti-Inflammatory Drugs:**

Nonsteroidal Anti-Inflammatory Drugs (NSAIDs) are useful for pain and inflammation. In mild cases, they may be the only drugs required for analgesia. There are several classes of NSAIDs and the response of the individual injured worker to a specific medication is unpredictable. For this reason a range of NSAIDs may be tried in each case with the most effective preparation being continued.

6.4.6.7.1 Non-selective Nonsteroidal Anti-Inflammatory Drugs

6.4.6.7.2 Selective Cyclo-oxygenase-2 (COX-2) Inhibitors

COX-2 inhibitors are more recent NSAIDs and differ in adverse side effect profiles from the traditional NSAIDs. The major advantages of selective COX-2 inhibitors over traditional NSAIDs are that they have less gastrointestinal toxicity and no platelet effects. COX-2 inhibitors can worsen renal function in patients with renal insufficiency; thus, renal function may need monitoring.

6.4.6.8 **Topical Drug Delivery:**

6.4.6.8.1 Description—Topical medications may be an alternative treatment for localized musculoskeletal disorders and is an acceptable form of treatment in selected.

6.4.6.8.2 Indications—Generalized musculoskeletal or joint pain. Patient selection must be rigorous to select those patients with the highest probability of compliance.

6.4.6.8.3 ~~Dosing and Time to Therapeutic Effect~~— It is necessary that all topical agents be used with strict instructions for application as well as maximum number of applications per day to obtain the desired benefit and avoid potential toxicity.

6.4.6.9 **Other Agents:**

6.4.6.9.1 ~~Tramadol (Ultram)~~

6.4.6.9.1.1 ~~Description~~— An opioid partial agonist that is generally well tolerated, does not cause GI ulceration, or exacerbate hypertension or congestive heart failure.

6.4.6.9.1.2 ~~Indications~~— Mild to moderate pain relief. This drug has been shown to provide pain relief equivalent to that of commonly prescribed NSAIDs.

6.4.6.9.2 ~~Baclofen (Lioresal)~~

6.4.6.9.2.1 ~~Description~~— May be effective due to stimulation of Gamma Aminobutyric Acid (GABA) receptors.

6.4.6.9.2.2 ~~Indications~~— Pain from muscle rigidity.

6.4.6.9.2.3 ~~Recommended Laboratory Monitoring~~— Renal function.

6.4.6.9.3 ~~Mexilitene (Mexitil)~~

6.4.6.9.3.1 ~~Description~~— An antiarrhythmic drug, which, like some anticonvulsive agents, may act on ion channels in neuronal tissue and reduce its pathological activity to a more stable level. Low concentrations may suffice to abolish impulses in damaged nerves, and mexilitene has been used successfully to treat neuropathic pain.

6.4.6.9.3.2 ~~Indications~~— Neuropathic pain.

6.4.6.9.3.3 ~~Recommended Laboratory Monitoring~~— Hepatic function, CBC. Plasma levels may also be necessary.

6.4.7 **ORTHOTICS/PROSTHETICS/EQUIPMENT** ~~Devices and adaptive equipment may be necessary in order to reduce impairment and disability, to facilitate medical recovery, to avoid re-aggravation of the injury, and to maintain maximum medical improvement. Indications would be to provide relief of the industrial injury or prevent further injury and include the need to control neurological and orthopedic injuries for reduced stress during functional activities. In addition, they may be used to modify tasks through instruction in the use of a device or physical modification of a device. Equipment needs may need to be reassessed periodically.~~

~~Equipment may include high and low technology assistive devices, computer interface or seating, crutch or walker training, and self-care aids. It should improve safety and reduce risk of re-injury. Standard equipment to alleviate the effects of the injury on the performance of activities of daily living may vary from simple to complex adaptive devices to enhance independence and safety. Certain equipment related to cognitive impairments may also be required.~~

~~Ergonomic modifications may be necessary to facilitate medical recovery, to avoid re-aggravation of the injury, and to maintain maximum medical improvement. Ergonomic evaluations with subsequent recommendations may assist with the patients' return to work.~~

~~For chronic pain disorders, equipment such as foot orthoses or lumbar support devices may be helpful. The injured worker should be educated as to the potential harm from using a lumbar support for a period of time greater than which is prescribed. Special cervical orthosis and/or equipment may have a role in the rehabilitation of a cervical injury such as those injuries to a cervical nerve root resulting in upper extremity weakness or a spinal cord injury with some degree of paraparesis or tetraparesis. Fabrication/modification of orthotics, including splints, would be used when there is need to normalize weight bearing, facilitate better motion response, stabilize a joint with insufficient muscle or proprioceptive/reflex competencies, to protect subacute conditions as needed during movement, and correct biomechanical problems.~~

~~Orthotic/prosthetic training is the skilled instruction (preferably by qualified providers) in the proper use of orthotic devices and/or prosthetic limbs.~~

~~For information regarding specific types of orthotics/prosthetics/equipment, refer to individual medical treatment guidelines.~~

6.4.8 **PERSONALITY/PSYCHOLOGICAL/PSYCHOSOCIAL INTERVENTION** ~~Psychosocial treatment is a generally accepted, well-established therapeutic and diagnostic procedure with selected use in acute pain problems, but with more widespread use in sub-acute and chronic pain populations. Psychosocial~~

treatment may be important component in the total management of a patient with chronic pain and should be implemented as soon as the problem is identified.

Once a diagnosis consistent with the standards of the American Psychiatric Association Diagnostic Statistical Manual of Mental Disorders has been determined, the patient should be evaluated for the potential need for psychiatric medications. Use of any medication to treat a diagnosed condition may be ordered by the authorized treating physician or by the consulting psychiatrist. Visits for management of psychiatric medications are medical in nature and are not a component of psychosocial treatment. Therefore, separate visits for medication management may be necessary, depending upon the patient and medications selected.

The screening or diagnostic workup should have clarified and distinguished between pre-existing, aggravated, and/or purely causative psychological conditions. Therapeutic and diagnostic modalities include, but are not limited to, individual counseling, and group therapy. Treatment can occur within an individualized model, a multi-disciplinary model, or within a structured pain management program.

A psychologist with a Ph.D., PsyD, EdD credentials, or a Psychiatric MD/DO may perform psychosocial treatments. Other licensed mental health providers working in consultation with a Ph.D., PsyD, EdD, or Psychiatric MD/DO, and with experience in treating chronic pain disorders in injured workers may also perform treatment.

Frequency: 1 to 5 times weekly for the first 4 weeks (excluding hospitalization, if required), decreasing to 1 to 2 times per week for the second month. Thereafter, 2 to 4 times monthly with the exception of exacerbations which may require increased frequency of visits. Not to include visits for medication management.

Maximum duration: 6 to 12 months, not to include visits for medication management. For select patients, longer supervised treatment may be required.

6.4.9 **RESTRICTION OF ACTIVITIES** Continuation of normal daily activities is the goal for chronic pain patients since immobility will negatively affect rehabilitation. Prolonged immobility results in a wide range of deleterious effects, such as a reduction in aerobic capacity and conditioning, loss of muscle strength and flexibility, increased segmental stiffness, promotion of bone demineralization, impaired disc nutrition, and the facilitation of the illness role.

6.4.10 **RETURN TO WORK** is one of the major components in chronic pain management.

REHABILITATION — It is understood Individuals with Chronic Pain may require additional visits due to acute exacerbations. The practitioner is required to document the rationale for care and may be subject to Utilization Review. All visit limits pertain to an annual amount. It is also understood that practitioners should only provide treatment that is consistent with impairments and dysfunctions identified by a comprehensive physical assessment.

6.4.11 **THERAPY—ACTIVE** therapies are based on the philosophy that therapeutic exercise and/or activity are beneficial for restoring flexibility, strength, endurance, function, range of motion, and alleviating discomfort. Active therapy requires an internal effort by the individual to complete a specific exercise or task, and thus assists in developing skills promoting independence to allow self-care after discharge. This form of therapy requires supervision from a therapist or medical provider such as verbal, visual, and/or tactile instructions. At times a provider may help stabilize the patient or guide the movement pattern but the energy required to complete the task is predominately executed by the patient.

Patients should be instructed to continue active therapies at home as an extension of the treatment process in order to maintain improvement levels. Home exercise can include exercise with or without mechanical assistance or resistance and functional activities with assistive devices. Interventions are selected based on the complexity of the presenting dysfunction with ongoing examination, evaluation and modification of the plan of care as improvement or lack thereof occurs. Change and/or discontinuation of an intervention should occur if there is attainment of expected goals/outcome, lack of progress, lack of tolerance and/or lack of motivation. Passive interventions/modalities may only be used as adjuncts to the active program.

6.4.11.1 **Activities of Daily Living:** Supervised instruction, active-assisted training, and/or adaptation of activities or equipment to improve a person's capacity in normal daily living activities such as self-care, work re-integration training, homemaking, and driving.

- 6.4.11.2 **Functional Activities:** are the use of therapeutic activity to enhance mobility, body mechanics, employability, coordination, and sensory motor integration.
- 6.4.11.3 **Nerve Gliding:** exercises consist of a series of flexion and extension movements of the hand, wrist, elbow, shoulder, and neck that produce tension and longitudinal movement along the length of the median and other nerves of the upper extremity. These exercises are based on the principle that the tissues of the peripheral nervous system are designed for movement, and that tension and glide (excursion) of nerves may have an effect on neurophysiology through alterations in vascular and axoplasmic flow. Biomechanical principles have been more thoroughly studied than clinical outcomes.
- 6.4.11.4 **Neuromuscular Re-education:** is the skilled application of exercise with manual, mechanical, or electrical facilitation to enhance strength, movement patterns, neuromuscular response, proprioception, kinesthetic sense, coordination education of movement, balance, and posture. Indications include the need to promote neuromuscular responses through carefully timed proprioceptive stimuli, to elicit and improve motor activity in patterns similar to normal neurologically developed sequences, and improve neuromotor response with independent control.
Maximum number of visits 24
- 6.4.11.5 **Proper Work Techniques:** Please refer to the "Job Site Evaluation" and "Job Site Alteration" sections of these guidelines.
- 6.4.11.6 **Therapeutic Exercise:** with or without mechanical assistance or resistance may include isoinertial, isotonic, isometric and isokinetic types of exercises. Indications include the need for cardiovascular fitness, reduced edema, improved muscle strength, improved connective tissue strength and integrity, increased bone density, promotion of circulation to enhance soft tissue healing, improvement of muscle recruitment, increased range of motion, and are used to promote normal movement patterns. Can also include complementary/alternative exercise movement therapy.
Time to produce effect: 2 to 6 treatments
Frequency: 3 to 5 times per week
Optimum duration: 4 to 8 weeks
Maximum duration: 24 visits, and maximum of 24 in combination with functional activities

6.4.12 **THERAPY — PASSIVE** Most of the following passive therapies and modalities are generally accepted methods of care for a variety of work related injuries. Passive therapy includes those treatment modalities that do not require energy expenditure on the part of the patient. They are principally effective during the early phases of treatment and are directed at controlling symptoms such as pain, inflammation and swelling and to improve the rate of healing soft tissue injuries. They should be used adjunctively with active therapies such as postural stabilization and exercise programs to help control swelling, pain, and inflammation during the active rehabilitation process. Please refer to Section B. 4. General Guideline Principles, Active Interventions. Passive therapies may be used intermittently as a provider deems appropriate or regularly if there are specific goals with objectively measured functional improvements during treatment.

On occasion, specific diagnoses and post-surgical conditions may warrant durations of treatment beyond those listed as "maximum." factors such as exacerbation of symptoms, re-injury, interrupted continuity of care, and comorbidities may also extend durations of care. Specific goals with objectively measured functional improvement during treatment must be cited to justify extended durations of care. It is recommended that, if no functional gain is observed after the number of treatments under "time to produce effect" have been completed, alternative treatment interventions, further diagnostic studies, or further consultations should be pursued.

The following passive therapies are listed below:

- 6.4.12.1 **Electrical Stimulation (Unattended and Attended):** is an accepted treatment. Once applied, unattended electrical stimulation requires minimal on-site supervision by the provider. Indications include pain, inflammation, muscle spasm, atrophy, decreased circulation, and the need for osteogenic stimulation. A home unit should be purchased if treatment is effective and frequent use is recommended.
Time to produce effect: 2 to 4 treatments Maximum duration: 14 visits
- 6.4.12.2 **Iontophoresis:** is an accepted treatment which consists of the transfer of medication, including, but not limited to, steroidal anti-inflammatories and anesthetics, through the use of electrical

stimulation. Indications include pain (Lidocaine), inflammation (hydrocortisone, salicylate), edema (mecholy, hyaluronidase, salicylate), ischemia (magnesium, mecholy, iodine), muscle spasm (magnesium, calcium), calcific deposits (acetate), scars, and keloids (sodium chloride, iodine, acetate). There is no proven benefit for this therapy in the low back

Time to produce effect: 1 to 4 treatments Frequency: 3 times per week with at least 48 hours between treatments-

Maximum duration: 8 visits per body region

6.4.12.3

Manipulation: is generally accepted, well-established and widely used therapeutic intervention for low back pain. Manipulative Treatment (not therapy) is defined as the therapeutic application of manually guided forces by an operator to improve physiologic function and/or support homeostasis that has been altered by the injury or occupational disease, and has associated clinical significance.

High velocity, low amplitude (HVLA) technique, chiropractic manipulation, osteopathic manipulation, muscle energy techniques, counter strain, and non-force techniques are all types of manipulative treatment. This may be applied by osteopathic physicians (D.O.), chiropractors (D.C.), properly trained physical therapists (P.T.), or properly trained medical physicians. Under these different types of manipulation exist many subsets of different techniques that can be described as a) direct—a forceful engagement of a restrictive/pathologic barrier, b) indirect—a gentle/non-forceful disengagement of a restrictive/pathologic barrier, c) the patient actively assists in the treatment and d) the patient relaxing, allowing the practitioner to move the body tissues. When the proper diagnosis is made and coupled with the appropriate technique, manipulation has no contraindications and can be applied to all tissues of the body. Pre-treatment assessment should be performed as part of each manipulative treatment visit to ensure that the correct diagnosis and correct treatment is employed.

High velocity, low amplitude (HVLA) manipulation is performed by taking a joint to its end range of motion and moving the articulation into the zone of accessory joint movement, well within the limits of anatomical integrity. There is good scientific evidence to suggest that HVLA manipulation can be helpful for patients with acute low back pain problems without radiculopathy when used within the first 4 to 6 weeks of symptoms. Although the evidence for sub-acute and chronic low back pain and low back pain with radiculopathy is less convincing, it is a generally accepted and well-established intervention for these conditions. Indications for manipulation include joint pain, decreased joint motion, and joint adhesions. Contraindications to HVLA manipulation include joint instability, fractures, severe osteoporosis, infection, metastatic cancer, active inflammatory arthritides, aortic aneurysm, and signs of progressive neurologic deficits.

Time to produce effect for all types of manipulative treatment: 1 to 6 treatments.

Frequency: Up to 3 times per week for the first 4 weeks as indicated by the severity of involvement and the desired effect, then up to 2 treatments per week for the next 4 weeks. For further treatments, twice per week or less to maintain function.

Maximum duration: 26 visits.

The combination of 97140 plus either CMT or OMT code is equal to one visit when performed on the same day. Any combination of manual therapeutic intervention exceeding 26 visits (not units) need to go to UR.

6.4.12.4

Massage — Manual or Mechanical: Massage is manipulation of soft tissue with broad ranging relaxation and circulatory benefits. This may include techniques that include pressing, lifting, rubbing, pinching of soft tissues by, or with, the practitioner's hands. Indications include edema (peripheral or hard and non-pliable edema), muscle spasm, adhesions, the need to improve peripheral circulation and range of motion, or to increase muscle relaxation and flexibility prior to exercise.

In sub-acute low back pain populations there is good evidence that massage can increase function when combined with exercise and patient education. Some studies have demonstrated a decrease in provider visits and pain medication use with combined therapy. One study indicated improved results with acupressure massage. It is recommended that all massage be performed by trained, experienced therapists and be accompanied by an active exercise program and patient education. In contrast to the sub-acute population, massage is a generally accepted treatment for the acute low back pain population, although no studies have demonstrated its efficacy for this set of patients.

Time to produce effect: Immediate

Frequency: 1 to 3 times per week

Maximum duration: 12 visits (CPT codes 97124 and 97140 can not exceed 26 visits in combination).

6.4.12.5 **Mobilization (Joint):** is a generally well-accepted treatment. Mobilization is passive movement involving oscillatory motions to the vertebral segment(s). The passive mobility is performed in a graded manner (I, II, III, IV, or V), which depicts the speed and depth of joint motion during the maneuver. For further discussion on Level V joint mobilization please see section on HVLA manipulation [Refer to section 12. d.]. It may include skilled manual joint tissue stretching. Indications include the need to improve joint play, segmental alignment, improve intracapsular arthrokinematics, or reduce pain associated with tissue impingement. Mobilization should be accompanied by active therapy. For Level V mobilization contraindications include joint instability, fractures, severe osteoporosis, infection, metastatic cancer, active inflammatory arthritides, aortic aneurysm, and signs of progressive neurologic deficits.

Time to produce effect for all types of manipulative treatment: 1 to 6 treatments.

Frequency: Up to 3 times per week for the first 4 weeks as indicated by the severity of involvement and the desired effect, then up to 2 treatments per week for the next 4 weeks. For further treatments, twice per week or less to maintain function.

Maximum duration: 26 visits. CPT codes 97124 and 97140 can not exceed 48 visits in combination

6.4.12.6 **Mobilization (Soft Tissue):** is a generally well-accepted treatment. Mobilization of soft tissue is the skilled application of muscle energy, strain/counter strain, myofascial release, manual trigger point release, and manual therapy techniques designed to improve or normalize movement patterns through the reduction of soft tissue pain and restrictions. These can be interactive with the patient participating or can be with the patient relaxing and letting the practitioner move the body tissues. Indications include muscle spasm around a joint, trigger points, adhesions, and neural compression. Mobilization should be accompanied by active therapy.

Maximum duration: 26 visits CPT codes 97124 and 97140 can not exceed 48 visits in combination.

6.4.12.7 **Short-Wave Diathermy:** is an accepted treatment which involves the use of equipment that exposes soft tissue to a magnetic or electrical field. Indications include enhanced collagen extensibility before stretching, reduced muscle guarding, reduced inflammatory response, and enhanced re-absorption of hemorrhage/hematoma or edema. It is an accepted modality as an adjunct to acupuncture or situation where other forms of contact superficial heat is contraindicated.

6.4.12.8 **Superficial Heat and Cold Therapy (excluding Infrared Therapy):** is a generally accepted treatment. Superficial heat and cold are thermal agents applied in various manners that lower or raise the body tissue temperature for the reduction of pain, inflammation, and/or effusion resulting from injury or induced by exercise. Includes application of heat just above the surface of the skin at acupuncture points. Indications include acute pain, edema and hemorrhage, need to increase pain threshold, reduce muscle spasm, and promote stretching/flexibility. Cold and heat packs can be used at home as an extension of therapy in the clinic setting.

Time to produce effect: Immediate

Frequency: 2 to 5 times per week

Maximum duration: 12 visits, with a maximum of 1 unit per day

6.4.12.9 **Traction—Mechanical:** Traction modalities are contraindicated in patients with tumor, infections, fracture, or fracture dislocation. Non-oscillating inversion traction methods are contraindicated in patients with glaucoma or hypertension. Motorized traction devices are included (i.e. VAX-D, DRX9000, etc.)

Time to produce effect: 1 to 3 sessions up to 30 minutes. If response is negative after 3 treatments, discontinue this modality.

Frequency: 2 to 3 times per week. A home traction unit can be purchased if therapy proves effective. Maximum duration: 16 visits

6.4.12.10 **Transcutaneous Electrical Nerve Stimulation (TENS):** is a generally accepted treatment. TENS should include at least one instructional session for proper application and use. Indications include muscle spasm, atrophy, and decreased circulation and pain control. Minimal TENS unit parameters should include pulse rate, pulse width and amplitude modulation. Consistent, measurable functional improvement should be documented prior to the purchase of a home unit.

Time to produce effect: Immediate Frequency: Variable Duration: 3 visits

6.4.12.11 **Ultrasound (Including Phonophoresis):** is an accepted treatment. Ultrasound uses sonic generators to deliver acoustic energy for therapeutic thermal and/or non-thermal soft tissue effects. Indications include scar tissue, adhesions, collagen fiber and muscle spasm, and the need to extend muscle tissue or accelerate the soft tissue healing. Ultrasound with electrical stimulation is concurrent delivery of electrical energy that involves dispersive electrode placement. Indications include muscle spasm, scar tissue, pain modulation, and muscle facilitation.

Phonophoresis is the transfer of medication to the target tissue to control inflammation and pain through the use of sonic generators. These topical medications include, but are not limited to, steroidal anti-inflammatory and anesthetics. Phonophoresis is not recommended for Low Back Pain.

Time to produce effect: 6 to 15 treatments

Frequency: 3 times per week

Maximum duration: 18 visits

6.4.13 **THERAPY—ACTIVE** The following active therapies are widely used and accepted methods of care for a variety of work-related injuries. They are based on the philosophy that therapeutic exercise and/or activity are beneficial for restoring flexibility, strength, endurance, function, range of motion, and can alleviate discomfort. Active therapy requires an internal effort by the individual to complete a specific exercise or task. This form of therapy requires supervision from a provider such as verbal, visual, and/or tactile instruction(s). At times, the provider may help stabilize the patient or guide the movement pattern but the energy required to complete the task is predominately executed by the patient.

Patients should be instructed to continue active therapies at home as an extension of the treatment process in order to maintain improvement levels. Follow up visits to reinforce and monitor progress and proper technique are recommended. Home exercise can include exercise with or without mechanical assistance or resistance and functional activities with assistive devices. The following active therapies are listed in alphabetical order:

6.4.13.1 **Activities of Daily Living (ADL)** are well-established interventions which involve instruction, active-assisted training, and/or adaptation of activities or equipment to improve a person's capacity in normal daily activities such as self-care, work re-integration training, homemaking, and driving.

Time to produce effect: 4 to 5 treatments Maximum duration: 10 visits

6.4.13.2 **Aquatic Therapy:** is a well-accepted treatment which consists of the therapeutic use of aquatic immersion for therapeutic exercise to promote strengthening, core stabilization, endurance, range of motion, flexibility, body mechanics, and pain management. Aquatic therapy includes the implementation of active therapeutic procedures in a swimming or therapeutic pool. The water provides a buoyancy force that lessens the amount of force gravity applies to the body. The decreased gravity effect allows the patient to have a mechanical advantage and more likely have a successful trial of therapeutic exercise. The therapy may be indicated for individuals who:

Cannot tolerate active land-based or full-weight bearing therapeutic procedures require increased support in the presence of proprioceptive deficit;

Are at risk of compression fracture due to decreased bone density; have symptoms that are exacerbated in a dry environment;

Would have a higher probability of meeting active therapeutic goals than in a land-based environment.

The pool should be large enough to allow full extremity range of motion and fully erect posture. Aquatic vests, belts and other devices can be used to provide stability, balance, buoyancy, and resistance.

Time to produce effect: 4 to 5 treatments Frequency: 3 to 5 times per week Maximum duration: 16 visits

A self-directed program is recommended after the supervised aquatics program has been established, or, alternatively a transition to a land-based environment exercise program.

6.4.13.3 **Functional Activities:** are well-established interventions which involve the use of therapeutic activity to enhance mobility, body mechanics, employability, coordination, balance, and sensory motor integration.

Time to produce effect: 4 to 5 treatments

Frequency: 3 to 5 times per week

Maximum duration: 26 visits

Total number of visit 97110 and 97530 should not exceed 40 visits without pre-authorization.

6.4.13.4 ~~Functional Electrical Stimulation: is an accepted treatment in which the application of electrical current to elicit involuntary or assisted contractions of atrophied and/or impaired muscles. It may be indicated for impaired muscle function to radiculopathy. (Foot drop)~~

~~Time to produce effect: 2 to 6 treatments~~

~~Frequency: 3 times per week~~

~~Maximum duration: 14 visits inclusive of electrical stimulation codes. If beneficial, provide with home unit.~~

6.4.13.5 ~~Neuromuscular Re-education: is a generally accepted treatment. It is the skilled application of exercise with manual, mechanical, or electrical facilitation to enhance strength; movement patterns; neuromuscular response; proprioception, kinesthetic sense, coordination; education of movement, balance, and posture. Indications include the need to promote neuromuscular responses through carefully timed proprioceptive stimuli, to elicit and improve motor activity in patterns similar to normal neurologically developed sequences, and improve neuromotor response with independent control.~~

~~Time to produce effect: 2 to 6 treatments~~

~~Frequency: 3-5 times per week~~

~~Maximum duration: 24 visits~~

6.4.13.6 ~~Therapeutic Exercise: is a generally well-accepted treatment. Therapeutic exercise, with or without mechanical assistance or resistance, may include isoinertial, isotonic, isometric and isokinetic types of exercises. Indications include the need for cardiovascular fitness, reduced edema, improved muscle strength, improved connective tissue strength and integrity, increased bone density, promotion of circulation to enhance soft tissue healing, improvement of muscle recruitment, improved proprioception, and coordination, increased range of motion. Therapeutic exercises are used to promote normal movement patterns, and can also include complementary/alternative exercise movement therapy (with oversight of a physician or appropriate healthcare professional).~~

6.4.13.7 ~~Spinal Stabilization: is a generally well-accepted treatment. The goal of this therapeutic program is to strengthen the spine in its neural and anatomic position. The stabilization is dynamic which allows whole body movements while maintaining a stabilized spine. It is the ability to move and function normally through postures and activities without creating undue vertebral stress~~

~~Time to produce effect: 2 to 6 treatments~~

~~Frequency: 3 to 5 times per week~~

~~Maximum duration: 26 visits~~

~~Total number of visits of 97110 & 97530 may not exceed 40 visits without pre-authorization.~~

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7.0 Therapeutic Procedures – Operative

~~When considering operative intervention in chronic pain management, the treating physician must carefully consider the inherent risk and benefit of the procedure. All operative intervention should be based on a positive correlation with clinical findings, the clinical course, and diagnostic tests. A comprehensive assessment of these factors should have led to a specific diagnosis with positive identification of the pathologic condition. Surgical procedures are seldom meant to be curative and would be employed in conjunction with other treatment modalities for maximum functional benefit. Functional benefit should be objectively measured and includes the following:~~

- ~~▪ Return to work or maintaining work status.~~
- ~~▪ Fewer restrictions at work or performing activities of daily living.~~
- ~~▪ Decrease in usage of medications.~~
- ~~▪ Measurable functional gains, such as increased range of motion or documented increase in strength.~~
- ~~▪ Education of the patient should include the proposed goals of the surgery, expected gains, risks or complications, and alternative treatment.~~

7.1 NEUROSTIMULATION

7.1.1 ~~Description — Neurostimulation is the delivery of low-voltage electrical stimulation to the spinal cord or peripheral nerves to inhibit or block the sensation of pain. This is a generally accepted procedure that has limited use. May be most effective in patients with chronic, intractable limb pain who have not achieved relief with oral medications, rehabilitation therapy, or therapeutic nerve blocks, and in whom the pain has persisted for longer than 6 months.~~

~~Particular technical expertise is required to perform this procedure and is available in some neurosurgical, rehabilitation, and anesthesiology training programs and fellowships. Physicians performing this procedure must be experienced in neurostimulation implantation and participate in ongoing injection training workshops, such as those sponsored by the Internal Society for Injection Studies or as sponsored by implant manufacturers.~~

7.1.2 ~~Indications — Failure of conservative therapy including active and/or passive therapy, medication management, or therapeutic injections. Habituation to narcotic analgesics in the absence of a history of addictive behavior does not preclude the use of neurostimulation. Only patients who meet the following criteria should be considered candidates for neurostimulation:~~

7.1.2.1 ~~A diagnosis of a specific physical condition known to be chronically painful has been made on the basis of objective findings; and~~

7.1.2.2 ~~All reasonable non-surgical treatment has been exhausted; and~~

7.1.2.3 ~~Pre-surgical psychiatric or psychological evaluation has been performed and has demonstrated motivation and long-term commitment without issues of secondary gain; and~~

7.1.2.4 ~~There is no evidence of addictive behavior. (Tolerance and dependence to narcotic analgesics are not addictive behaviors and do not preclude implantation.); and~~

7.1.2.5 ~~The topography of pain and its underlying pathophysiology are amenable to stimulation coverage; and~~

7.1.2.6 ~~A successful neurostimulation screening test of 2-3 days. A screening test is considered successful if the patient (a) experiences a 50% decrease in pain, which may be confirmed by visual analogue scale (VAS).~~

7.1.2.7 ~~For spinal cord stimulation, a temporary lead is implanted and attached to an external source to validate therapy effectiveness.~~

7.1.3 ~~Operative Treatment — Implantation of stimulating leads connected by extensions to either an implanted neurostimulator or an implanted receiver powered by an external transmitter. The procedure may be performed either as an open or a percutaneous procedure, depending on the presence of epidural fibrosis and the anatomical placement required for optimal efficacy.~~

7.1.4 ~~Post-Operative Considerations — MRI is contraindicated after placement of neurostimulator.~~

7.1.5 ~~A mandatory second opinion is required to confirm the rationale for the procedure for non-malignant pain.~~

7.2 **INTRATHECAL DRUG DELIVERY**

7.2.1 ~~Description — This mode of therapy delivers small doses of medications directly into the cerebrospinal fluid. Clinical studies are conflicting regarding long-term, effective pain relief in patients with non-malignant pain. As with other routes of drug administration, escalation of dose may be required. Typically, pump refills are needed every 2-3 months.~~

7.2.2 ~~General Indications — It may be considered only in rare cases where all other commonly used methods to control pain have failed and must be based on the recommendation of at least one physician experienced in chronic pain management in consultation with the primary treating physician. Patients should only be selected for intrathecal drug delivery if they have opioid-responsive pain but cannot tolerate the effects of systemic administration. The patient must have good to excellent pain relief with a test dose prior to pump implantation. The patient must be motivated for the procedure, and must understand the potential for complications and requirements of treatment maintenance.~~

7.2.3 ~~Surgical Indications — Failure of conservative therapy including active and/or passive therapy, medication management, or therapeutic injections. Only patients who meet the following criteria should be considered candidates for intraspinal analgesic infusions:~~

7.2.3.1 ~~A diagnosis of a specific physical condition known to be chronically painful has been made on the basis of objective findings; and~~

7.2.3.2 ~~All reasonable non-surgical treatment has been exhausted; and~~

- 7.2.3.3 ~~Pre-surgical psychiatric or psychological evaluation has been performed and has demonstrated motivation and long-term commitment without issues of secondary gain;~~
- 7.2.3.4 ~~There is no evidence of addictive behavior. (Tolerance and dependence to narcotic analgesics are not addictive behaviors and do not preclude implantation.); and~~
- 7.2.3.5 ~~A successful trial. A screening test is considered successful if the patient (a) experiences a 50% decrease in pain, which may be confirmed by VAS.~~
- 7.2.3.6 ~~A mandatory second opinion is required to confirm the rationale for the procedure in non malignant pain.~~

7.3 **FACET RHIZOTOMY**

- 7.3.1 ~~Description — A procedure designed to denervate the facet joint by ablating the periarticular facet nerve branches. There is good evidence to support this procedure for the cervical spine and some evidence in lumbar spine.~~
- 7.3.2 ~~Indications — Pain of facet origin, unresponsive to active and/or passive therapy. All patients must have a successful response to diagnostic medial nerve branch blocks. A successful response is considered to be a 50% or greater relief of pain for the length of time appropriate to the local anesthetic.~~
- 7.3.3 ~~Operative Treatment — Percutaneous radio-frequency rhizotomy is the procedure of choice over alcohol, phenol, or cryoablation. Position of the probe using fluoroscopic guidance is required.~~

8.0 **Maintenance Management**

~~Successful management of chronic pain conditions results in fewer relapses requiring intense medical care. Failure to address long term management as part of the overall treatment program may lead to higher costs and greater dependence on the health care system.~~

~~Maintenance care in CRPS and CPD requires a close working relationship between the carrier, the providers, and the patient. Providers and patients have an obligation to design a cost-effective, medically appropriate program that is predictable and allows the carrier to set aside appropriate reserves. Carriers and adjusters have an obligation to assure that medical providers can design medically appropriate programs. A designated primary physician for maintenance team management is recommended.~~

~~Maintenance care will be based on principles of patient self-management. When developing a maintenance plan of care, the patient, physician and insurer should attempt to meet the following goals:-~~

- 8.1 ~~Maximal independence will be achieved through the use of home exercise programs or exercise programs requiring special facilities (e.g., pool, health club) and educational programs; b. modalities will emphasize self-management and self-applied treatment;~~
- 8.2 ~~Management of pain or injury exacerbations will emphasize initiation of active therapy techniques and may require anesthetic injection blocks.~~
- 8.3 ~~Dependence on treatment provided by practitioners other than the authorized treating physician will be minimized;~~
- 8.4 ~~Periodic reassessment of the patient's condition will occur as appropriate.~~
- 8.5 ~~Patients will understand that failure to comply with the elements of the self-management program or therapeutic plan of care may affect consideration of other interventions.~~

~~The following are Specific Maintenance Interventions and Parameters:~~

- 8.5.1 **HOME EXERCISE PROGRAMS AND EXERCISE EQUIPMENT** ~~Most patients have the ability to participate in a home exercise program after completion of a supervised exercise rehabilitation program. Programs should incorporate an exercise prescription including the continuation of an age-adjusted and diagnosis-specific program for aerobic conditioning, flexibility, stabilization, and strength. Some patients may benefit from the purchase or rental of equipment to maintain a home exercise program. Determination for the need of home equipment should be based on medical necessity, compliance with an independent exercise program, and reasonable cost. Before the purchase or long-term rental of equipment, the patient should be able to demonstrate the proper use and effectiveness of the equipment. Effectiveness of equipment should be evaluated on its ability to improve or maintain functional areas related to activities of daily living or work activity. Occasionally, compliance evaluations may be made through a 4-week membership at a facility offering similar equipment. Home exercise programs are most effective when done 3 to 5 times a week.~~

- 8.5.2 EXERCISE PROGRAMS REQUIRING SPECIAL FACILITIES** Some patients may have higher compliance with an independent exercise program at a health club versus participation in a home program. All exercise programs completed through a health club facility should focus on the same parameters of an age-adjusted and diagnosis-specific program for aerobic conditioning, flexibility, stabilization, and strength. Selection of health club facilities should be limited to those able to track attendance and utilization, and provide records available for physician and insurer review. Prior to purchasing a membership, a therapist and/or exercise specialist who has treated the patient may visit the facility with the patient to assure proper use of the equipment.
- Frequency: 2 to 3 times per week.
- Optimal duration: 1 to 3 months.
- Maximum maintenance duration: 3 months.
- Continuation beyond 3 months should be based on functional benefit and patient compliance.
- Health club membership should not extend beyond 3 months if attendance drops below 2 times per week on a regular basis.
- 8.5.3 PATIENT EDUCATION MANAGEMENT** Educational classes, sessions, or programs may be necessary to reinforce self-management techniques. This may be performed as formal or informal programs, either group or individual.
- Maintenance duration: 2 to 6 educational sessions during one 12-month period.
- 8.5.4 PSYCHOLOGICAL MANAGEMENT** An ideal maintenance program will emphasize management options implemented in the following order: (a) individual self-management (pain control, relaxation and stress management, etc.), (b) group counseling, (c) individual counseling, by a psychologist or psychiatrist, and (d) in-patient treatment. Aggravation of the injury may require psychological treatment to restore the patient to baseline.
- Maintenance duration: 6 to 10 visits during one 12-month period.
- 8.5.5 NON-NARCOTIC MEDICATION MANAGEMENT** In some cases, self-management of pain and injury exacerbations can be handled with medications, such as those listed in the Medication section. Physicians must follow patients who are on any chronic medication or prescription regimen for efficacy and side effects. Laboratory or other testing may be appropriate to monitor medication effects on organ function.
- Maintenance duration: Usually, four medication reviews within a 12-month period.
- Frequency depends on the medications prescribed. Laboratory and other monitoring as appropriate.
- 8.5.6 NARCOTIC MEDICATION MANAGEMENT** As compared with other pain syndromes, there may be a role for chronic augmentation of the maintenance program with narcotic medications. In selected cases, scheduled medications may prove to be the most cost effective means of insuring the highest function and quality of life. A patient should have met the criteria in the opioids section of these guidelines before beginning maintenance narcotics. Laboratory or other testing may be appropriate to monitor medication effects on organ function. The following management is suggested for maintenance narcotics:
- 8.5.6.1** A narcotic medication regimen should be defined, which may increase or decrease over time. Dosages will need to be adjusted based on side effects of the medication and objective function of the patient. A patient may frequently be maintained on additional non-narcotic medications to control side effects, treat mood disorders, or control neuropathic pain; however, only one long-acting narcotic and one short acting narcotic for rescue use should be prescribed in most cases.
- 8.5.6.2** All patients on chronic narcotic medication dosages need to sign an appropriate narcotic contract with their physician for prescribing the narcotics.
- 8.5.6.3** The patient must understand that continuation of the medication is contingent on their cooperation with the maintenance program. Use of non-prescribed drugs may result in tapering of the medication. The clinician may order random drug testing when deemed appropriate to monitor medication compliance.
- 8.5.6.4** Patients on chronic narcotic medication dosages must receive them through one prescribing physician or physician group.
- Maintenance: Up to 12 visits within a 12-month period to review the narcotic plan. Laboratory and other monitoring as appropriate.
- 8.5.7 THERAPY MANAGEMENT** Some treatment may be helpful on a continued basis during maintenance care if the therapy maintains objective function and decreases medication use. Aggravation the injury may

~~require intensive treatment to get the patient back to baseline. In those cases, treatments and time frame parameters listed in the Active and Passive Therapy sections apply.~~

~~Active Therapy, Acupuncture, and Manipulation maintenance duration: 10 visits in a 12-month period.~~

8.5.8 INJECTION THERAPY

~~8.5.8.1 Sympathetic Blocks—These injections are considered appropriate if they maintain or increase function. Maintenance blocks are usually combined with and enhanced by the appropriate neuropharmacological medication(s) and other care. It is anticipated that the frequency of the maintenance blocks may increase in the cold winter months or with stress.~~

~~Maintenance duration: Not to exceed 6 to 8 blocks in a 12-month period for a single. Increased frequency may need to be considered for multiple extremity involvement or for acute recurrences of pain and symptoms. For treatment of acute exacerbations, consider 2 to 6 blocks with a short time interval between blocks.~~

~~8.5.8.2 Trigger Point Injections—These injections may occasionally be necessary to maintain function in those with myofascial problems.~~

~~Maintenance duration: Not more than 4 injections per session not to exceed 6 sessions per 12-month period.~~

~~8.5.8.3 Epidural and Selective Nerve Root Injections—Patients who have experienced functional benefits from these injections in the past may require injection for exacerbations of the condition.~~

~~Maintenance duration: 6 treatments per 12-month period (a treatment may involve injection at one or two levels.)~~

~~8.5.9 **PURCHASE OR RENTAL OF DURABLE MEDICAL EQUIPMENT** It is recognized that some patients may require ongoing use of self-directed modalities for the purpose of maintaining function and/or analgesic effect. Purchase or rental of modality based equipment should be done only if the assessment by the physician and/or therapist has determined the effectiveness, compliance, and improved or maintained function by its application. It is generally felt that large expense purchases such as spas, whirlpools, and special mattresses are not necessary to maintain function beyond the areas listed above.~~

~~Maintenance duration: Not to exceed 3 months for rental equipment. Purchase if effective.~~

~~12-DE Reg. 67-0(7/01/08)~~

~~17-DE Reg. 322 (09/01/13)~~

PART C Cumulative Trauma Disorder Medical Treatment Guidelines

4.0 Introduction

~~Pursuant to 19 **Del.C.** §2322C, health care practice guidelines have been adopted and recommended by the Health Care Advisory Panel to guide utilization of health care treatments in workers' compensation including, but not limited to, care provided for the treatment of employees by or under the supervision of a licensed health care provider, prescription drug utilization, inpatient hospitalization and length of stay, diagnostic testing, physical therapy, chiropractic care and palliative care. The health care practice guidelines apply to all treatments provided after the effective date of the regulation adopted by the Department of Labor, May 23, 2008, and regardless of the date of injury.~~

~~The guidelines are, to the extent permitted by the most current medical science or applicable science, based on well-documented scientific research concerning efficacious treatment for injuries and occupational disease. To the extent that well-documented scientific research regarding the above is not available at the time of adoption of the guidelines, or is not available at the time of any revision to the guidelines, the guidelines have been and will be based upon the best available information concerning national consensus regarding best health care practices in the relevant health care community.~~

~~The guidelines, to the extent practical and consistent with the Act, address treatment of those physical conditions which occur with the greatest frequency, or which require the most expensive treatments, for work-related injuries based upon currently available Delaware data.~~

~~Services rendered by any health care provider certified pursuant to 19 **Del.C.** §2322D(a) to provide treatment or services for injured employees shall be presumed, in the absence of contrary evidence, to be reasonable and necessary if such treatment and/or services conform to the most current version of the Delaware health care practice guidelines.~~

~~Services rendered outside the Guidelines and/or variation in treatment recommendations from the Guidelines may represent acceptable medical care, be considered reasonable and necessary treatment and, therefore,~~

determined to be compensable, absent evidence to the contrary, and may be payable in accordance with the Fee Schedule and Statute, accordingly.

~~Services provided by any health care provider that is not certified pursuant to 19 Del.C. §2322D(a) shall not be presumed reasonable and necessary unless such services are pre-authorized by the employer or insurance carrier, subject to the exception set forth in 19 Del.C. §2322D(b).~~

~~Treatment of conditions unrelated to the injuries sustained in an industrial accident may be denied as unauthorized if the treatment is directed toward the non-industrial condition, unless the treatment of the unrelated injury is rendered necessary as a result of the industrial accident.~~

~~The Health Care Advisory Panel and Department of Labor recognized that acceptable medical practice may include deviations from these Guidelines, as individual cases dictate. Therefore, these Guidelines are not relevant as evidence of a provider's legal standard of professional care.~~

~~In accordance with the requirements of the Act, the development of the health care guidelines has been directed by a predominantly medical or other health professional panel, with recommendations then made to the Health Care Advisory Panel.~~

2.0 General Guideline Principles

~~The principles summarized in this section are key to the intended implementation of all Division of Workers' Compensation guidelines and critical to the reader's application of the guidelines in this document.~~

- ~~2.1 **EDUCATION** of the patient and family, as well as the employer, insurer, policy makers and the community should be emphasized in the treatment of CTD and disability. Practitioners may develop and implement an effective strategy and skills to educate patients, employers, insurance systems, policy makers and the community as a whole.~~
- ~~2.2 **TREATMENT PARAMATER** Time frames for specific interventions commence once treatments have been initiated, not on the date of injury. Obviously, duration will be impacted by patient compliance, comorbidities and availability of services. Clinical judgment may substantiate the need to modify the total number of visits discussed in this document. The majority of injured workers with Cumulative Trauma Disorders often will achieve resolution of their condition within 6 to 36 visits (Guide To Physical Therapy Practice — Second Edition). It is anticipated that most injured workers will not require the maximum number of visits described in these guidelines. They are designed to be a ceiling and care extending beyond the maximum allowed visits may warrant utilization review.~~
- ~~2.3 **ACTIVE INTERVENTIONS** emphasizing patient responsibility, such as therapeutic exercise and/or functional treatment, are generally emphasized over passive modalities, especially as treatment progresses. Generally, passive interventions are viewed as a means to facilitate progress in an active rehabilitation program with concomitant attainment of objective functional gains. All rehabilitation programs must incorporate "Active Interventions" no later than three weeks after the onset of treatment. Reimbursement for passive modalities only after the first three weeks of treatment without clear evidence of Active Interventions will require supportive documentation.~~
- ~~2.4 **ACTIVE THERAPEUTIC EXERCISE PROGRAM** Exercise program goals should incorporate patient strength, endurance, flexibility, coordination, and education. This includes functional application in vocational or community settings~~
- ~~2.5 **POSITIVE PATIENT RESPONSE** results are defined primarily as functional gains that can be objectively measured. Objective functional gains include, but are not limited to, positional tolerances, range of motion, strength, endurance, activities of daily living, cognition, psychological behavior, and efficiency/velocity measures that can be quantified. Subjective reports of pain and function should be considered and given relative weight when the pain has anatomic and physiologic correlation. Anatomic correlation must be based on objective findings.~~
- ~~2.6 **RE-EVALUATE TREATMENT EVERY 3 TO 4 WEEKS** If a given treatment or modality is not producing positive results within 3 to 4 weeks, the treatment should be either modified or discontinued. Reconsideration of diagnosis should also occur in the event of poor response to a seemingly rational intervention.~~
- ~~2.7 **SURGICAL INTERVENTIONS** Surgery should be contemplated within the context of expected functional outcome and not purely for the purpose of pain relief. All operative interventions must be based upon positive correlation of clinical findings, clinical course, and diagnostic tests. A comprehensive assimilation of these factors must lead to a specific diagnosis with positive identification of pathologic conditions.~~
- ~~2.8 **SIX-MONTH TIME FRAME** The prognosis drops precipitously for returning an injured worker to work once he/she has been temporarily totally disabled for more than six months. The emphasis within these guidelines is to move patients along a continuum of care and return to work within a six-month time frame, whenever possible.~~

It is important to note that time frames may not be pertinent to injuries that do not involve work time loss or are not occupationally related.

2.9 ~~**RETURN TO WORK** is therapeutic, assuming the work is not likely to aggravate the basic problem or increase long-term pain. The practitioner must provide specific physical limitations per the Physician's Report form. The following physical limitations should be considered and modified as recommended: lifting, pushing, pulling, crouching, walking, using stairs, bending at the waist, awkward and/or sustained postures, tolerance for sitting or standing, hot and cold environments, data entry and other repetitive motion tasks, sustained grip, tool usage and vibration factors. Even if there is residual chronic pain, return to work is not necessarily contraindicated.~~

~~The practitioner should understand all of the physical demands of the patient's job position before returning the patient to full duty and should receive clarification of the patient's job duties.~~

2.10 ~~**DELAYED RECOVERY** Strongly consider a psychological evaluation, if not previously provided, as well as initiating interdisciplinary rehabilitation treatment and vocational goal setting, for those patients who are failing to make expected progress 6 to 12 weeks after an injury. The Division recognizes that 3 to 10% of all industrially injured patients will not recover within the time lines outlined in this document despite optimal care. Such individuals may require treatments beyond the limits discussed within this document, but such treatment will require clear documentation by the authorized treating practitioner focusing on objective functional gains afforded by further treatment and impact upon prognosis.~~

2.11 ~~**GUIDELINE RECOMMENDATIONS AND INCLUSION OF MEDICAL EVIDENCE** are recommendations based on available evidence and/or consensus recommendations. When possible, guideline recommendations will note the level of evidence supporting the treatment recommendation.~~

~~All recommendations in the guideline are considered to represent reasonable care in appropriately selected cases, regardless of the level of evidence or consensus statement attached to it. Those procedures considered inappropriate, unreasonable, or unnecessary are designated in the guideline as being "not recommended."~~

17-DE Reg. 322 (09/04/13)

3.0 Definitions and Mechanism of Injury

Cumulative Trauma Disorders (CTDs) of the upper extremity comprise a heterogeneous group of diagnoses which include numerous specific clinical entities, including disorders of the muscles, tendons and tendon sheaths, nerve entrapment syndromes, joint disorders, and neurovascular disorders.

The terms "~~**cumulative trauma disorder**~~", "~~**repetitive motion syndrome**~~", "~~**repetitive strain injury**~~" and other similar nomenclatures are umbrella terms that are not acceptable diagnoses. The health care provider must provide specific diagnoses in order to appropriately educate, evaluate, and treat the patient. Examples include DeQuervain's tendonitis, cubital tunnel syndrome, lateral/medial epicondylitis, olecranon bursitis, and hand-arm vibration syndrome. Many patients present with more than one diagnosis, which requires thorough upper extremity and cervical evaluation by the health care provider. Furthermore, there must be a causal relationship between work activities and the diagnosis (see Initial Diagnostic Procedures). The mere presence of a diagnosis that may be associated with cumulative trauma does not presume work-relatedness unless the appropriate work exposure is present.

Mechanisms of injury for the development of CTDs remain controversial. Posture, repetition, force, vibration, cold exposure, and combinations thereof are postulated and generally accepted as risk factors for the development of CTDs. Evaluation of a CTD requires an integrated approach that incorporates ergonomics, clinical assessment, and psychosocial evaluation on a case-by-case basis.

4.0 Initial Diagnostic Procedures

History and physical examination (Hx & PE) are generally accepted, well-established and widely used procedures which establish the foundation/basis for and dictate all other diagnostic and therapeutic procedures. When findings of clinical evaluations and those of other diagnostic procedures do not complement each other, the objective clinical findings should have preference.

4.1 ~~**HISTORY** Should inquire about the following issues, where relevant, and document pertinent positives and negatives where appropriate. In evaluating potential CTDs, the following actions should be taken:~~

~~4.1.1 **Description of Symptoms:**~~

~~4.1.1.1 Onset: date of onset, sudden vs. gradual;~~

~~4.1.1.2 Nature of Symptoms: pain, numbness, weakness, swelling, stiffness, temperature change, color change;~~

~~4.1.1.3 Intensity: pain scale (0 = no pain, and 10 = worst imaginable pain) may be used.~~

- 4.1.1.4 ~~Location and Radiation: use of a pain diagram is encouraged for characterizing sensory symptoms; use comprehensive diagrams and do not use limited diagrams depicting only the hand or arm, as it is important to solicit the reporting of more proximal symptoms;~~
 - 4.1.1.5 ~~Provocative and Alleviating Factors (occupational and non-occupational): Attempt to identify the specific physical factors that are aggravating or alleviating the problem;~~
 - 4.1.1.6 ~~Sleep disturbances;~~
 - 4.1.1.7 ~~Other associated signs and symptoms noted by the injured worker;~~
 - 4.1.2 **Identification of Occupational Risk Factors:** Job title alone is not sufficient information. The clinician is responsible for documenting specific information regarding repetition, force and other risk factors, as listed in the Risk Factors Associated with Cumulative Trauma Table. A job site evaluation may be required.
 - 4.1.3 **Demographics: age, hand dominance, gender, etc.**
 - 4.1.4 **Past Medical History and Review of Systems:**
 - 4.1.4.1 ~~Past injury/symptoms involving the upper extremities, trunk and cervical spine;~~
 - 4.1.4.2 ~~Past work related injury or occupational disease;~~
 - 4.1.4.3 ~~Past personal injury or disease that resulted in temporary or permanent job limitation;~~
 - 4.1.4.4 ~~Medical conditions associated with CTD – A study of work-related upper extremity disorder patients showed a 30% prevalence of co-existing disease. Medical conditions commonly occurring with CTD include:~~
 - 4.1.4.4.1 ~~Pregnancy,~~
 - 4.1.4.4.2 ~~Arthropathies including connective tissue disorders, rheumatoid arthritis, systemic lupus erythematosus, gout, osteoarthritis and spondyloarthropathy,~~
 - 4.1.4.4.3 ~~Amyloidosis,~~
 - 4.1.4.4.4 ~~Hypothyroidism, especially in older females,~~
 - 4.1.4.4.5 ~~Diabetes mellitus, including family history or gestational diabetes,~~
 - 4.1.4.4.6 ~~Acromegaly,~~
 - 4.1.4.4.7 ~~Use of corticosteroids.~~
 - 4.1.5 **Activities of Daily Living (ADLs):** ~~ADLs include such activities as self care and personal hygiene, communication, ambulation, attaining all normal living postures, travel, non-specialized hand activities, sexual function, sleep, and social and recreational activities. Specific movements in this category include pinching or grasping keys/pens/other small objects, grasping telephone receivers or cups or other similar-sized objects, and opening jars. The quality of these activities is judged by their independence, appropriateness, and effectiveness. Assess not simply the number of restricted activities but the overall degree of restriction or combination of restrictions.~~
 - 4.1.6 ~~other avocational activities that might contribute to or be impacted by CTD development. Activities such as hand-operated video games, crocheting/needlepoint, home computer operation, golf, tennis, and gardening are included in this category.~~
 - 4.1.7 **Social History:** Exercise habits, alcohol consumption, and psychosocial factors.
- 4.2 **PHYSICAL EXAMINATION** ~~The evaluation of any upper extremity complaint should begin at the neck and upper back and then proceed down to the fingers and include the contralateral region. It should include evaluation of vascular and neurologic status, and describe any dystrophic changes or variation in skin color or turgor.~~

Table 1: Physical Examination Findings Reference Table

DIAGNOSIS	SYMPTOMS	SIGNS
DeQuervain's Tenosynovitis	Pain and swelling in the anatomical snuffbox; pain radiating into the hand and forearm; pain worsened by thumb abduction and/or extension.	Pain worsened by active thumb abduction and/or extension; crepitus along the radial forearm; positive Finkelstein's.
Extensor Tendinous Disorders	Pain localized to the affected tendon(s); pain worsened by active and/or resisted wrist or finger extension.	Swelling along the dorsal aspects of the hand/wrist/ forearm, and pain with active and/or resisted wrist/ digit extension, or creaking/crepitus with wrist extension.

Flexor Tendinous Disorders	Pain localized to the affected tendons; pain in the affected tendons associated with wrist flexion and ulnar deviation, especially against resistance.	Pain with wrist/digit flexion and ulnar deviation, or crepitus with active motion of the flexor tendons.
Lateral Epicondylitis	Lateral elbow pain exacerbated by repetitive wrist motions; pain emanating from the lateral aspect of the elbow.	Pain localized to lateral epicondyle with resisted wrist extension and/or resisted supination.
Medial Epicondylitis	Pain emanating from the medial elbow; mild grip weakness; medial elbow pain exacerbated by repetitive wrist motions.	Pain localized to the medial epicondyle with resisted wrist flexion and resisted pronation.
Cubital tunnel syndrome	Activity-related pain/paresthesias involving the 4th and 5th fingers coupled with pain in the medial aspect of the elbow; pain/paresthesias worse at night; decreased sensation of the 5th finger and ulnar half of the ring finger (including dorsum 5th finger); progressive inability to separate fingers; loss of power grip and dexterity; atrophy/weakness of the ulnar intrinsic hand muscles (late sign).	Diminished sensation of the fifth and ulnar half of the ring fingers; elbow flexion/ulnar compression test; Tinel's sign between olecranon process and medial epicondyle; Later stages manifested by intrinsic atrophy and ulnar innervated intrinsic weakness. Specific physical signs include clawing of the ulnar 2 digits (Benediction posture), ulnar drift of the 5th finger (Wartenberg's sign), or flexion at the thumb-IP joint during pinch (Froment's sign).
Hand-Arm Vibration Syndrome	Pain/paresthesias in the digits; blanching of the digits; cold intolerance; tenderness/swelling of the digits/hand/forearm; muscle weakness of the hand; joint pains in hand/wrist/elbow/neck/shoulders; trophic skin changes and cyanotic color in hand/digits.	Sensory deficits in the digits/hand; blanching of digits; swelling of the digits/hand/forearm; muscle weakness of the hand; arthropathy at the hand/wrist/elbow; trophic skin changes and cyanotic color in hand/digits.
Guyon Canal (Tunnel) Syndrome	Numbness/tingling in ulnar nerve distribution distal to wrist.	Positive Tinel's at hook of hamate. Numbness or paresthesias of the palmar surface of the ring and small fingers. Later stages may affect ulnar innervated intrinsic muscle strength.
Pronator Syndrome	Pain/numbness/tingling in median nerve distribution distal to elbow.	Tingling in median nerve distribution on resisted pronation with elbow flexed at 90° Tenderness or Tinel's at the proximal edge of the pronator teres muscle over the median nerve.
Radial Tunnel Syndrome	Numbness/tingling or pain in the lateral posterior forearm.	Tenderness over the radial nerve near the proximal edge of the supinator muscle. Rarely, paresthesias in the radial nerve distribution or weakness of thumb or finger extension.

4.3 PAIN BEHAVIOR EVALUATION

- 4.3.1 Evaluate the patient's overall pain behavior. The behavior should be consistent with the current pain levels reported by the patient.

4.3.2 Use a measurement tool to quantify and/or qualify pain. Reference the pain scale (0-10) with the worst pain imaginable being the top end of the scale (10) and/or other pain scales such as the Visual Analog Scale, Pain Drawing, Neck Disability Index, or McGill Pain Questionnaire.

4.4 **RISK FACTORS** A critical review of epidemiologic literature identifies a number of physical exposures associated with CTDs. Physical exposures considered risk factors include: repetition, force, vibration, pinching and gripping, and cold environment. When workers are exposed to several risk factors simultaneously, there is an increased likelihood of a CTD. Not all risk factors have been extensively studied. Exposure to cold environment, for example, was not examined independently; however, there is good evidence that combined with other risk factors, cold environment increases the likelihood of a CTD. The table at the end of this section entitled, "Risk Factors Associated CTDs," summarizes the results of currently available literature.

No single epidemiologic study will fulfill all criteria for causality. The clinician must recognize that currently available epidemiologic data is based on population results, and that individual variability lies outside the scope of these studies. Many published studies are limited in design and methodology, and, thus, preclude conclusive results. Most studies' limitations tend to attenuate, rather than inflate, associations between workplace exposures and CTDs.

Many specific disorders, such as ulnar neuropathy (at the elbow and wrist) and pronator teres syndrome, have not been studied sufficiently to formulate evidence statements regarding causality. Based on the present understanding of mechanism of injury and utilizing the rationale of analogy, it is generally accepted that these disorders are similar to other CTDs at the elbow and wrist and are susceptible to the same risk factors. No studies examined the relationship between the development of ganglion cysts and work activities; however, work activities may aggravate existing ganglion cysts. It is generally accepted that keyboarding less than four hours per day is unlikely to be associated with a CTD when no other risk factors are present. It remains unclear how computer mouse use affects CTDs. The posture involved in mouse use should always be evaluated when assessing risk factors.

Studies measured posture, repetition, and force in variable manners. In general, jobs that require less than 50% of maximum voluntary contractile strength for the individual are not considered "high force." Likewise, jobs with wrist postures less than or equal to 25° flexion or extension, or ulnar deviation less than or equal to 10° are not likely to cause posture problems.

These guidelines are based on current epidemiologic knowledge. As with any scientific work, the guidelines are expected to change with advancing knowledge. The clinician should remain flexible and consider new information revealed in future studies.

Table 2: Risk Factors Associated with Cumulative Trauma

Diagnosis	Strong evidence	Good evidence	Some evidence	Insufficient or conflicting evidence
Elbow Musculoskeletal Disorders (Epicondylitis)	Combination high force and high repetition (Exposures were based on EMG data, observation or video analysis of job tasks, or categorization by job title. Observed movements include repeated extension, flexion, pronation and supination. Repetition work cycles less than 30 sec. or greater than 50% of cycle time performing same task, and number of items assembled in one hour).	High force alone		Repetition alone, extreme wrist posture.

Wrist Tendonitis, including DeQuervain's Tenosynovitis	Combination of risk factors: High repetition, forceful hand/wrist exertions, extreme wrist postures (Assessed by direct observation, EMG, and video analysis. One study measured time spent in deviated wrist posture).	Repetition, (as previously defined), not including keyboarding or force independently	Posture	
Trigger Finger			Forceful grip (Holding tools, knives. Assessed by direct observation and video analysis).	

5.0 Follow-Up Diagnostic Imaging and Testing Procedures

5.1 ELECTRODIAGNOSTIC (EDX) STUDIES

- 5.1.1 Electrodiagnostic (EDX) studies are well-established and widely accepted for evaluation of patients suspected of having peripheral nerve pathology. Studies may confirm the diagnosis or direct the examiner to alternative disorders. Studies may require clinical correlation due to the occurrence of false positive and false negative results. Symptoms of peripheral nerve pathology may occur with normal EDX studies, especially early in the clinical course. Findings include fibrillations, fasciculations, neurogenic recruitment, and polyphasic units (reinnervation).
- 5.1.2 To assure accurate testing, temperature should be maintained at 30-34C preferably recorded from the hand/digits. For temperature below 30C the hand should be warmed.
- 5.1.3 All studies must include normative values for their laboratories.

5.2 IMAGING STUDIES

- 5.2.1 **Radiographic Imaging:** Not generally required for most CTD diagnoses. However, it may be necessary to rule out other pathology in the cervical spine, shoulder, elbow, wrist, or hand. Wrist and elbow radiographs would detect degenerative joint disease, particularly scapholunate dissociation and thumb carpometacarpal abnormalities which occasionally occur with CTD.
- 5.2.2 **MRI:** May show increased T2-weighted signal intensity of the common extensor tendon in lateral epicondylitis, but this finding has commonly been found in the asymptomatic contralateral elbow and may not be sufficiently specific to warrant the use of MRI as a diagnostic test for epicondylitis. Its routine use for CTD is not recommended.

5.3 ADJUNCTIVE TESTING

- 5.3.1 **Personality/Psychological/Psychosocial Evaluations:** are generally accepted and well-established diagnostic procedures with selective use in the CTD population, but have more widespread use in sub-acute and chronic pain populations.

Diagnostic testing procedures may be useful for patients with symptoms of depression, delayed recovery, chronic pain, recurrent painful conditions, disability problems, and for pre-operative evaluation as well as a possible predictive value for post-operative response. Psychological testing should provide differentiation between pre-existing depression versus injury-caused depression, as well as post-traumatic stress disorder.

Formal psychological or psychosocial evaluation should be performed on patients not making expected progress within 6-12 weeks following injury and whose subjective symptoms do not correlate with objective signs and tests. In addition to the customary initial exam, the evaluation of the injured worker should specifically address the following areas:

- 5.3.1.1 Employment history;
- 5.3.1.2 Interpersonal relationships — both social and work;
- 5.3.1.3 Leisure activities;
- 5.3.1.4 Current perception of the medical system;
- 5.3.1.5 Results of current treatment;
- 5.3.1.6 Perceived locus of control; and

5.3.1.7 Childhood history, including abuse and family history of disability.

Results should provide clinicians with a better understanding of the patient, thus allowing for more effective rehabilitation. The evaluation will determine the need for further psychosocial interventions, and in those cases, a Diagnostic Statistical Manual for Mental Disorders (DSM) diagnosis should be determined and documented. An individual with a Ph.D., PsyD, or Psychiatric MD/DO credentials may perform initial evaluations, which are generally completed within one to two hours. When issues of chronic pain are identified, the evaluation should be more extensive and follow testing procedures as outlined in the Division's Chronic Pain Disorder Medical Treatment Guidelines.

- Frequency: One time visit for evaluation. If psychometric testing is indicated as a portion of the initial evaluation, time for such testing should not exceed an additional two hours of professional time.

5.3.2 **Laboratory Tests:** Generally accepted, well-established and widely used procedures. Patients should be carefully screened at the initial exam for signs or symptoms of diabetes, hypothyroidism, arthritis, and related inflammatory diseases. The presence of concurrent disease does not negate work-relatedness of any specific case. In one study of patients with cumulative trauma disorder other than Carpal Tunnel Syndrome, seen by specialists, 3% of patients were diagnosed with diabetes, 6% with hypothyroidism, and 9% with chronic inflammatory disease including spondyloarthropathy, arthritis, and systemic lupus erythematosus. Up to two thirds of the patients were not aware of their concurrent disease. When a patient's history and physical examination suggest infection, metabolic or endocrinologic disorders, tumorous conditions, systemic musculoskeletal disorders (e.g., rheumatoid arthritis or ankylosing spondylitis), or problems potentially related to medication (e.g., renal disease and nonsteroidal anti-inflammatory medications), then laboratory tests, including, but not limited to, the following can provide useful diagnostic information:

5.3.2.1 Serum rheumatoid factor, Antinuclear Antigen (ANA), Human Leukocyte Antigen (HLA)-B27 titre for rheumatoid work-up;

5.3.2.2 Thyroid stimulating hormone (TSH) for hypothyroidism;

5.3.2.3 Fasting glucose – recommended for obese men and women over 40 years of age, patients with a history of family diabetes, those from high risk ethnic groups, and with a previous history of impaired glucose tolerance. A fasting blood glucose greater than 125mg/dl is diagnostic for diabetes. Urine dipstick positive for glucose is a specific but not sensitive screening test. Quantitative urine glucose is sensitive and specific in high risk populations;

5.3.2.4 Serum protein electrophoresis;

5.3.2.5 Sedimentation rate and C-Reactive Protein are nonspecific, but elevated in infection, neoplastic conditions and rheumatoid arthritis;

5.3.2.6 Serum calcium, phosphorus, uric acid, alkaline and acid phosphatase for metabolic, endocrine and neo-plastic conditions;

5.3.2.7 complete blood count (CBC), liver and kidney function profiles for metabolic or endocrine disorders or for adverse effects of various medications;

5.3.2.8 Bacteriological (microorganism) work-up for wound, blood and tissue.

The Division recommends the above diagnostic procedures be considered, at least initially, the responsibility of the workers' compensation carrier to ensure that an accurate diagnosis and treatment plan can be established. Laboratory testing may be required periodically to monitor patients on chronic medications.

5.3.3 **Pinch and Grip Strength Measurements:** May be accepted as a diagnostic tool for CTD. Strength is defined as the muscle force exerted by a muscle or group of muscles to overcome a resistance under a specific set of circumstances. Pain, the perception of pain secondary to abnormal sensory feedback, and/or the presence of abnormal sensory feedback affecting the sensation of the power used in grip/pinch may cause a decrease in the force exerted. When a bell-shaped curve is present, these measures provide a method for quantifying strength that can be used to follow a patient's progress and to assess response to therapy. In the absence of a bell-shaped curve, clinical reassessment is indicated.

5.3.4 **Quantitative Sensory Testing (QST):** May be used as a screening tool in clinical settings pre and post-operatively. Results of tests and measurements of sensory integrity are integrated with the history and review of systems findings and the results of other tests and measures. QST tests the entire sensory pathway, limiting its ability to localize a deficit precisely. It depends on the patient's report of perception and may not be objective. Cutaneous conditions may alter sensory thresholds.

- 5.3.4.1 ~~Threshold tests measure topognosis, the ability to exactly localize a cutaneous sensation, and pallesthesia, the ability to detect mechanical sensation using vibration discrimination testing (quickly adapting fibers); and/or Semmes-Wienstein monofilament testing (slowly adapting fibers);~~
- 5.3.4.2 ~~Density Tests also measure topognosis and pallesthesia using static two-point discrimination (slowly adapting fibers); and/or moving two-point discrimination (quickly adapting fibers).~~

6.0 Therapeutic Procedures – Non-Operative

~~Before initiation of any therapeutic procedure, the authorized treating provider, employer and insurer must consider these important issues in the care of the injured worker.~~

~~First, patients undergoing therapeutic procedure(s) should be released or returned to modified or restricted duty during their rehabilitation at the earliest appropriate time. Refer to “Return-to-Work” in this section for detailed information.~~

~~Second, cessation and/or review of treatment modalities should be undertaken when no further significant subjective or objective improvement in the patient’s condition is noted. If patients are not responding within the recommended duration periods, alternative treatment interventions, further diagnostic studies or consultations should be pursued.~~

~~Third, providers should provide and document education to the patient. No treatment plan is complete without addressing issues of individual and/or group patient education as a means of facilitating self-management of symptoms.~~

~~Last, formal psychological or psychosocial screening should be performed on patients not making expected progress within 6 to 12 weeks following injury and whose subjective symptoms do not correlate with objective signs and tests.~~

~~In cases where a patient is unable to attend an outpatient center, home therapy may be necessary. Home therapy may include active and passive therapeutic procedures as well as other modalities to assist in alleviating pain, swelling, and abnormal muscle tone. Home therapy is usually of short duration and continues until the patient is able to tolerate coming to an outpatient center.~~

~~The following procedures are listed in alphabetical order.~~

6.1 ~~**ACUPUNCTURE** is an accepted and widely used procedure for the relief of pain and inflammation. There is some scientific evidence to support its use. The exact mode of action is only partially understood. Western medicine studies suggest that acupuncture stimulates the nervous system at the level of the brain, promotes deep relaxation, and affects the release of neurotransmitters. Acupuncture is commonly used as an alternative or in addition to traditional Western pharmaceuticals. While it is commonly used when pain medication is reduced or not tolerated, it may be used as an adjunct to physical rehabilitation and/or surgical intervention to hasten the return of functional activity. Acupuncture should be performed by MD, DO, DC with appropriate training; or a licensed acupuncturist.~~

6.1.1 ~~**Acupuncture:** is the insertion and removal of filiform needles to stimulate acupoints (acupuncture points). Needles may be inserted, manipulated and retained for a period of time. Acupuncture can be used to reduce pain and inflammation, and to increase blood flow to an area and increase range of motion. Indications include joint pain, joint stiffness, soft tissue pain and inflammation, paresthesia, post-surgical pain relief, muscle spasm, and scar tissue pain.~~

- ~~• Time to produce effect: 3 to 6 treatments~~
- ~~• Frequency: 1 to 3 times per week~~
- ~~• Course duration: 14 treatments~~

6.1.2 ~~**Acupuncture with Electrical Stimulation:** is the use of electrical current (micro amperage or milli-amperage) on the needles at the acupuncture site. It is used to increase effectiveness of the needles by continuous stimulation of the acupoint. Physiological effects (depending on location and settings) can include endorphin release for pain relief, reduction of inflammation, increased blood circulation, analgesia through interruption of pain stimulus, and muscle relaxation.~~

~~It is indicated to treat chronic pain conditions, radiating pain along a nerve pathway, muscle spasm, inflammation, scar tissue pain, and pain located in multiple sites.~~

- ~~• Time to produce effect: 3 to 6 treatments~~
- ~~• Frequency: 1 to 3 times per week~~
- ~~• Course duration: 14 treatments~~

6.1.3 ~~**Other Acupuncture Modalities:** Acupuncture treatment is based on individual patient needs and therefore treatment may include a combination of procedures to enhance treatment effect. Other procedures may include the use of heat, soft tissue manipulation/massage, and exercise.~~

- ~~• Time to produce effect: 3 to 6 treatments~~

- Frequency: 1 to 3 times per week
- Course duration: 14 treatments

Any of the above acupuncture treatments may extend longer if objective functional gains can be documented or when symptomatic benefits facilitate progression in the patient's treatment program. Treatment beyond 14 sessions (1 course) may be documented with respect to need and ability to facilitate positive symptomatic or functional gains.

6.2 **BIOFEEDBACK** is a form of behavioral medicine that helps patients learn self-awareness and self-regulation skills for the purpose of gaining greater control of their physiology, such as muscle activity, brain waves, and measures of autonomic nervous system activity. Electronic instrumentation is used to monitor the targeted physiology and then displayed or fed back to the patient visually, auditorially, or tactilely, with coaching by a biofeedback specialist. Biofeedback is provided by clinicians certified in biofeedback and/or who have documented specialized education, advanced training, or direct or supervised experience qualifying them to provide the specialized treatment needed (e.g., surface EMG, EEG, or other).

Treatment is individualized to the patient's work-related diagnosis and needs. Home practice of skills is required for mastery and may be facilitated by the use of home training tapes. The ultimate goal in biofeedback treatment is normalizing the physiology to the pre-injury status to the extent possible and involves transfer of learned skills to the workplace and daily life. Candidates for biofeedback therapy or training must be motivated to learn and practice biofeedback and self-regulation techniques.

Indications for biofeedback include individuals who are suffering from musculoskeletal injury where muscle dysfunction or other physiological indicators of excessive or prolonged stress response affects and/or delays recovery. Other applications include training to improve self-management of emotional stress/pain responses such as anxiety, depression, anger, sleep disturbance, and other central and autonomic nervous system imbalances. Biofeedback is often utilized along with other treatment modalities.

- Time to produce effect: 3 to 4 sessions
- Frequency: 1 to 2 times per week
- Maximum duration: 10 to 12 sessions. Treatment beyond 12 sessions must be documented with respect to need, expectation, and ability to facilitate positive symptomatic or functional gains.

6.3 **INJECTIONS — THERAPEUTIC** are generally accepted, well-established procedures that may play a significant role in the treatment of patients with upper extremity pain or pathology. Therapeutic injections involve the delivery of anesthetic and/or anti-inflammatory medications to the painful structure. Therapeutic injections have many potential benefits. Ideally, a therapeutic injection will: (a) reduce inflammation in a specific target area; (b) relieve secondary muscle spasm; and (c) diminish pain and support therapy directed to functional recovery. Diagnostic and therapeutic injections should be used early and selectively to establish a diagnosis and support rehabilitation. If injections are overused or used outside the context of a monitored rehabilitation program, they may be of significantly less value.

6.3.1 **Steroid Injections:** may provide both diagnostic and therapeutic value in treating a variety of upper extremity cumulative trauma disorders. These include neuropathies, tendonitis or bursitis about the elbow, wrist, or hand. In contrast, there is no evidence to support their therapeutic use in other upper extremity compressive neuropathies; however, it is a widely accepted procedure.

Steroid injections provide a potent anti-inflammatory effect, which is usually short term in duration, lasting weeks or months. Injections should always be used as an adjunctive treatment in the context of a physical exercise and rehabilitation program.

For epicondylitis, there is good evidence that although steroid injections with physical therapy may provide short-term symptomatic relief, there is no benefit over placebo injections at 6 months. A program of physical rehabilitation in combination with judicious use of anti-inflammatory medications should be the core treatment for epicondylitis.

When performing tendon injections, the risk of tendon rupture should be discussed with the patient and the need for temporary restricted duty emphasized.

Contraindications: General contraindications include local or systemic infection, bleeding disorders, and allergy to medications used.

Local Steroid Injections:

- Time to produce effect: 3 days
- Frequency: monthly
- Maximum duration: 3 injections

6.3.2 **Trigger Point Injections:** are generally accepted, although used infrequently in uncomplicated cases. They may, however, be used to relieve myofascial pain and facilitate active therapy and stretching of the affected areas, and as an adjunctive treatment in combination with other treatment modalities, such as

functional restoration programs, including stretching therapeutic exercise. Trigger point injections should be utilized primarily for the purpose of facilitating functional progress. The Division does not recommend their routine use in the treatment of upper extremity injuries.

- Time to produce effect: Local anesthetic 30 minutes; 24 to 48 hours for no anesthesia.
- Frequency: Weekly. Suggest no more than 4 injection sites per session per week to avoid significant post-injection soreness.
- Maximum duration: 8 weeks. Occasional patients may require 2 to 4 repetitions of trigger point injection series over a 1 to 2-year period.

6.3.3 Other Injections: Some early evidence exists to support Autologous Blood Injection may be used for medial/lateral epicondylitis. This can be repeated for a total of 2-3 injections given roughly 6 weeks apart.

6.4 **JOB SITE ALTERATION** Early evaluation and training of body mechanics and other ergonomic factors are essential for every injured worker and should be done by a qualified individual. In some cases, this requires a job site evaluation. Some evidence supports alteration of the work site in the early treatment of Cumulative Trauma Disorder. There is no single factor or combination of factors that is proven to prevent or ameliorate CTD, but a combination of ergonomic and psychosocial factors are generally considered to be important. Physical factors that may be considered include use of force, repetition, awkward positions, upper extremity vibration, cold environment, and contact pressure on the nerve. Psychosocial factors to be considered include pacing, degree of control over job duties, perception of job stress, and supervisory support.

The job analysis and modification should include input from the employee, employer, and ergonomist or other professional familiar with work place evaluation. The employee must be observed performing all job functions in order for the job site analysis to be valid. Periodic follow-up is recommended to evaluate effectiveness of the intervention and need for additional ergonomic changes.

6.4.1 **Ergonomic changes:** should be made to modify the hazards identified. In addition, workers should be counseled to vary tasks throughout the day whenever possible. OSHA suggests that workers who perform repetitive tasks, including keyboarding, take 15-30 second breaks every 10 to 20 minutes, or 5-minute breaks every hour. Mini breaks should include stretching exercises.

6.4.2 **Interventions:** should consider engineering controls, e.g., mechanizing the task, changing the tool used, or adjusting the job site; or administrative controls, e.g., adjusting the time an individual performs the task.

6.4.3 **Seating** Description: The following description may aid in evaluating seated work positions: The head should incline only slightly forward, and if a monitor is used, there should be 18-24 inches of viewing distance with no glare. Arms should rest naturally, with forearms parallel to the floor, elbows at the sides, and wrists straight or minimally extended. The back must be properly supported by a chair, which allows change in position and backrest adjustment. There must be good knee and legroom, with the feet resting comfortably on the floor or footrest. Tools should be within easy reach, and twisting or bending should be avoided.

6.4.4 **Job Hazard Checklist:** The following Table 4 is adopted from Washington State's job hazard checklist, and may be used as a generally accepted guide for identifying job duties which may pose ergonomic hazards. The fact that an ergonomic hazard exists at a specific job, or is suggested in the table, does not establish a causal relationship between the job and the individual with a musculoskeletal injury. However, when an individual has a work-related injury and ergonomic hazards exist that affect the injury, appropriate job modifications should be made. Proper correction of hazards may prevent future injuries to others, as well as aid in the recovery of the injured worker.

Table 4: Identifying Job Duties Which May Pose Ergonomic Hazards

Type of Job Duty	Hours per Day
Pinching an unsupported object(s) weighing 2 lbs or more per hand, or pinching with a force of 4 lbs or more per hand (comparable to pinching a half a ream of paper):	
1. Highly repetitive motion 2. Palmar flexion greater than 30 degrees, dorsiflexion greater than 45 degrees, or radial deviation greater than 30 degrees	More than 3 hours total/day
3. No other risk factors	More than 4 hours total/day

<p>Gripping an unsupported object(s) weighing 10 lbs or more/hand, or gripping with a force of 10 lbs or more/hand (comparable to clamping light duty automotive jumper cables onto a battery): *Handles should be rounded and soft, with at least 1-2.5" in diameter grips at least 5" long.</p> <p>1. Highly repetitive motion</p> <p>2. Palmar flexion greater than 30 degrees, dorsiflexion greater than 45 degrees, or radial deviation greater than 30 degrees</p> <hr/> <p>3. No other risk factors</p>	<p>More than 3 hours total/day</p> <p>More than 4 hours total/day</p>
<p>Repetitive Motion (using the same motion with little or no variation every few seconds) excluding keying activities:</p> <p>1. High, forceful exertions with the hands, with palmar flexion greater than 30 degrees, dorsiflexion greater than 45 degrees, or radial deviation greater than 30 degrees</p> <hr/> <p>2. No other risk factors</p>	<p>More than 2 hours total/day</p> <p>More than 6 hours total/day</p>
<p>Intensive Keying:</p> <p>1. Palmar flexion greater than 30 degrees, dorsiflexion greater than 45 degrees, or radial deviation greater than 30 degrees</p> <hr/> <p>2. No other risk factors</p>	<p>More than 4 hours total/day</p> <p>More than 7 hours total/day</p>
<p>Repeated Impact:</p> <p>1. Using the hand (heel/base of palm) as a hammer more than once/minute</p>	<p>More than 2 hours total/day</p>
<p>Vibration:-</p> <p>Two determinants of the tolerability of segmental vibration of the hand are the frequency and the acceleration of the motion of the vibrating tool, with lower frequencies being more poorly tolerated at a given level of imposed acceleration, expressed below in multiples of the acceleration due to gravity (10m/sec./sec.)-</p> <p>1. Frequency range 8-15 Hz and acceleration 6 g</p> <p>2. Frequency range 80 Hz and acceleration 40 g</p> <p>3. Frequency range 250 Hz and acceleration 250 g</p> <hr/> <p>4. Frequency range 8-15 Hz and acceleration 1.5 g</p> <p>5. Frequency range 80 Hz and acceleration 6 g</p> <p>6. Frequency range 250 Hz and acceleration 20 g.</p>	<p>More than 30 minutes at a time</p> <hr/> <p>More than 4 hours at a time</p>

6.5 **MEDICATIONS** Medication use in the treatment of CTD is appropriate for controlling acute and chronic pain and inflammation. Use of medications will vary widely due to the spectrum of injuries from simple strains to post-surgical analgesia. A thorough medication history, including use of alternative and over the counter medications, should be performed at the time of the initial visit and updated periodically.

Acetaminophen is an effective and safe initial analgesic. Nonsteroidal anti-inflammatory drugs (NSAIDs) are useful in the treatment of inflammation, and for pain control. Pain is subjective in nature and should be evaluated using a scale to rate effectiveness of the analgesic in terms of functional gain. Other medications, including antidepressants, may be useful in selected patients with chronic pain (Refer to the Division's Chronic Pain Guidelines). Narcotics are rarely indicated for treatment of upper extremity CTDs, and they should be primarily reserved for the treatment of acute severe pain for a limited time on a case-by-case basis. Topical agents may be beneficial in the management of localized upper extremity pain.

The following are listed in alphabetical order:

6.5.1 **Acetaminophen:** is an effective analgesic with antipyretic but not anti-inflammatory activity. Acetaminophen is generally well tolerated, causes little or no gastrointestinal irritation and is not associated with ulcer formation. Acetaminophen has been associated with liver toxicity in doses over 10 gm/day or in chronic alcohol use.

6.5.2 **Minor Tranquilizer/Muscle Relaxants:** are appropriate for muscle spasm, mild pain and sleep disorders.

- 6.5.3 **Narcotics:** medications should be prescribed with strict time, quantity and duration guidelines, and with definitive cessation parameters. Adverse effects include respiratory depression, impaired alertness, and the development of physical and psychological dependence.
- treatment.
- 6.5.4 **Nonsteroidal Anti-Inflammatory Drugs (NSAIDs):** are useful for pain and inflammation. In mild cases, they may be the only drugs required for analgesia. There are several classes of NSAIDs, and the response of the individual injured worker to a specific medication is unpredictable. For this reason, a range of NSAIDs may be tried in each case with the most effective preparation being continued. Patients should be closely monitored for adverse reactions. The US Food and Drug Administration advises that many NSAIDs may cause an increased risk of serious cardiovascular thrombotic events, myocardial infarction, and stroke, which can be fatal. Naproxen sodium does not appear to be associated with increased risk of vascular events. Administration of proton pump inhibitors, histamine 2 blockers, or prostaglandin analog misoprostol along with these NSAIDs may reduce the risk of duodenal and gastric ulceration but do not impact possible cardiovascular complications. Due to the cross-reactivity between aspirin and NSAIDs, NSAIDs should not be used in aspirin-sensitive patients, and should be used with caution in all asthma patients. NSAIDs may be associated with abnormal renal function, including renal failure, as well as, abnormal liver function. Certain NSAIDs may have interactions with various other medications. Individuals may have adverse events not listed above. Intervals for metabolic screening are dependent upon the patient's age, general health status and should be within parameters listed for each specific medication. Complete Blood Count (CBC) and liver and renal function should be monitored at least every six months in patients on chronic NSAIDs and initially when indicated.
- 6.5.4.1 **Non-selective Nonsteroidal Anti-Inflammatory Drugs —**
Includes NSAIDs and acetylsalicylic acid (aspirin). Serious GI toxicity, such as bleeding, perforation, and ulceration can occur at any time, with or without warning symptoms in patients treated with traditional NSAIDs. Physicians should inform patients about the signs and/or symptoms of serious gastrointestinal toxicity and what steps to take if they occur. Anaphylactoid reactions may occur in patients taking NSAIDs. NSAIDs may interfere with platelet function. Fluid retention and edema have been observed in some patients taking NSAIDs.
- 6.5.4.2 **Selective Cyclo-oxygenase-2 (COX-2) Inhibitors —**
COX-2 inhibitors are more recent NSAIDs and differ in adverse side effect profiles from the traditional NSAIDs. The major advantages of selective COX-2 inhibitors over traditional NSAIDs are that they have less gastrointestinal toxicity and no platelet effects. COX-2 inhibitors can worsen renal function in patients with renal insufficiency, thus renal function may need monitoring. COX-2 inhibitors should not be first-line for low risk patients who will be using an NSAID short-term but are indicated in select patients for whom traditional NSAIDs are not tolerated. Serious upper GI adverse events can occur even in asymptomatic patients. Patients at high risk for GI bleed include those who use alcohol, smoke, are older than 65, take corticosteroids or anti-coagulants, or have a longer duration of therapy. Celecoxib is contraindicated in sulfanilamide allergic patients.
- 6.5.5 **Psychotropic/Anti-anxiety/Hypnotic Agents:** may be useful for treatment of mild and chronic pain, dysesthesias, sleep disorders, and depression. Antidepressant medications, such as tricyclics and Selective Serotonin Reuptake Inhibitors (SSRIs), are useful for affective disorders and chronic pain management. Tricyclic antidepressant agents, in low dose, are useful for chronic pain but have more frequent side effects.
- Anti-anxiety medications are best used for short-term treatment (i.e., less than 6 months). Accompanying sleep disorders are best treated with sedating antidepressants prior to bedtime. Frequently, combinations of the above agents are useful. As a general rule, physicians should assess the patient for a prior history of substance abuse or depression prior to prescribing any of these agents.
- 6.5.6 **Tramadol:** is useful in relief of upper extremity pain and has been shown to provide pain relief equivalent to that of commonly prescribed narcotics. Although Tramadol may cause impaired alertness, it is generally well tolerated, does not cause gastrointestinal ulceration, or exacerbate hypertension or congestive heart failure. Tramadol should be used cautiously in patients who have a history of seizures or who are taking medication that may lower the seizure threshold, such as monoamine oxidase (MAO) inhibitors, SSRIs, and tricyclic antidepressants. This medication has physically addictive properties and withdrawal may follow abrupt discontinuation. It is not recommended for those with prior opioid addiction.
- 6.5.7 **Topical Drug Delivery:** may be an alternative treatment for localized musculoskeletal disorders and is an acceptable form of treatment in selected patients although there is no scientific evidence to support its use. It is necessary that all topical agents be used with strict instructions for application as well as maximum number of applications per day to obtain the desired benefit and avoid potential toxicity. As with all

medications, patient selection must be rigorous to choose those patients with the highest probability of compliance. Refer to "Iontophoresis" in the Passive Therapy section for information regarding topical iontophoretic agents.

6.6 OCCUPATIONAL REHABILITATION PROGRAMS

6.6.1 **Non-Interdisciplinary:** These programs are work-related, outcome-focused, individualized treatment programs. Objectives of the program include, but are not limited to, improvement of cardiopulmonary and neuromusculoskeletal functions (strength, endurance, movement, flexibility, stability, and motor control functions), patient education, and symptom relief. The goal is for patients to gain full or optimal function and return to work. The service may include the time-limited use of passive modalities with progression to achieve treatment and/or simulated/real work.

6.6.1.1 Work Conditioning/Simulation

This program may begin once a patient is out of the acute phase of injury and will be able to tolerate this program.

These programs are usually initiated after the acute phase has been completed and offered at any time throughout the recovery phase. Work conditioning should be initiated when imminent return of a patient to modified or full duty is not an option, but the prognosis for returning the patient to work at completion of the program is at least fair to good.

The need for work place simulation should be based upon the results of a Functional Capacity Evaluation and/or Jobsite Analysis.

- Length of visit: 1 to 4 hours per day.
- Frequency: 2 to 5 visits per week
- Maximum duration: 8 weeks. Participation in a program beyond six weeks must be documented with respect to need and the ability to facilitate positive symptomatic or functional gains.

6.6.1.2 Work Hardening

Work Hardening is an interdisciplinary program addressing a patient's employability and return to work. It includes a progressive increase in the number of hours per day that a patient completes work simulation tasks until the patient can tolerate a full workday. This is accomplished by addressing the medical, psychological, behavioral, physical, functional, and vocational components of employability and return to work.

This can include a highly structured program involving a team approach or can involve any of the components thereof. The interdisciplinary team should, at a minimum, be comprised of a qualified medical director who is board certified with documented training in occupational rehabilitation; team physicians having experience in occupational rehabilitation; occupational therapist; physical therapist; case manager; and psychologist. As appropriate, the team may also include: chiropractor, RN, vocational specialist or Certified Biofeedback Therapist.

- Length of visit: Up to 8 hours/day
- Frequency: 2 to 5 visits per week
- Maximum duration: 8 weeks. Participation in a program beyond six weeks must be documented with respect to need and the ability to facilitate positive symptomatic or functional gains.

6.7 **PATIENT EDUCATION** No treatment plan is complete without addressing issues of individual patient and/or group education as a means of prolonging the beneficial effects of treatment, as well as facilitating self-management of symptoms and injury prevention. The patient should take an active role in the establishment of functional outcome goals, and should be educated on his or her specific injury, assessment findings, and plan of treatment. Education and instruction in proper body mechanics and posture, positions to avoid task/tool adaptation, self-care for exacerbation of symptoms, and home exercise/task adaptation should also be addressed.

6.8 **RETURN TO WORK** is therapeutic, assuming the work is not likely to aggravate the basic problem or increase long-term pain. The practitioner must provide specific physical limitations per the Physician's Form. The following physical limitations should be considered and modified as recommended: lifting, pushing, pulling, crouching, walking, using stairs, bending at the waist, awkward and/or sustained postures, tolerance for sitting or standing, hot and cold environments, data entry and other repetitive motion tasks, sustained grip, tool usage and vibration factors. Even if there is residual chronic pain, return to work is not necessarily contraindicated. The practitioner should understand all of the physical demands of the patient's job position before returning the patient to full duty and should receive clarification of the patient's job duties. Clarification must be provided by

the employer or, if necessary, including, but not limited to, an occupational health nurse, occupational therapist, vocational rehabilitation specialist, or an industrial hygienist.

6.9 **SLEEP DISTURBANCES** are a common secondary symptom of CTD. Although primary insomnia may accompany pain as an independent co-morbid condition, it more commonly occurs, secondary to the pain condition itself. Exacerbations of pain often are accompanied by exacerbations of insomnia; the reverse can also occur. Sleep laboratory studies have shown disturbances of sleep architecture in pain patients. Loss of deep slow wave sleep and increase in light sleep occur and sleep efficiency, the proportion of time in bed spent asleep, is decreased. These changes are associated with patient reports of non-restorative sleep.

Many affected patients develop behavioral habits that exacerbate and maintain sleep disturbances. Excessive time in bed, irregular sleep routine, napping, low activity, and worrying in bed are all maladaptive responses that can arise in the absence of any psychopathology. There is some evidence that behavioral modification, such as patient education and group or individual counseling, can be effective in reversing the effects of insomnia. Behavioral modifications are easily implemented and can include:

- 6.9.1 Maintaining a regular sleep schedule, retiring and rising at approximately the same time on weekdays and weekends.
- 6.9.2 Avoiding daytime napping.
- 6.9.3 Avoiding caffeinated beverages after lunchtime
- 6.9.4 Making the bedroom quiet and comfortable, eliminating disruptive lights, sounds, television sets, and keeping a bedroom temperature of about 65°F.
- 6.9.5 Avoiding alcohol or nicotine within two hours of bedtime.
- 6.9.6 Avoiding large meals within two hours of bedtime.
- 6.9.7 Exercising vigorously during the day, but not within two hours of bedtime, since this may raise core temperature and activate the nervous system.
- 6.9.8 Associating the bed with sleep and sexual activity only, using other parts of the home for television, reading and talking on the telephone.
- 6.9.9 Leaving the bedroom when unable to sleep for more than 20 minutes, returning to the bedroom when ready to sleep again.

These modifications should be undertaken before sleeping medication is prescribed for long term use.

6.10 **THERAPY-PASSIVE** includes those treatment modalities that do not require energy expenditure on the part of the patient. They are principally effective during the early phases of treatment and are directed at controlling symptoms such as pain, inflammation and swelling and to improve the rate of healing soft tissue injuries. They should be used in adjunct with active therapies to help control swelling, pain and inflammation during the rehabilitation process. They may be used intermittently as a therapist deems appropriate or regularly if there are specific goals with objectively measured functional improvements during treatment.

- 6.10.1 **Electrical Stimulation (Unattended and Attended):** once applied, requires minimal on-site supervision by the physician or non-physician provider. Indications include pain, inflammation, muscle spasm, atrophy, and decreased circulation.
- 6.10.2 **Extracorporeal shock wave treatment:** Consists of the application of pulses of high pressure sound to soft tissues, similar to lithotriptors. It has been investigated for its effectiveness in the treatment of lateral epicondylitis. It has not been shown to have an advantage over other conservative treatments and remains investigational. It is not recommended.
- 6.10.3 **Iontophoresis:** is the transfer of medication, including, but not limited to, steroidal anti-inflammatories and anesthetics, through the use of electrical stimulation. Indications include pain (Lidocaine), inflammation (hydrocortisone, salicylate), edema (mecholyt, hyaluronidase, salicylate), ischemia (magnesium, mecholyt, iodine), muscle spasm (magnesium, calcium), calcific deposits (acetate), scars and keloids (chlorine, iodine, acetate).
- 6.10.4 **Laser irradiation:** Consists of the external application of an array of visible and infrared wavelengths to soft tissues. Time and frequency dependent on severity and chronicity of problem.
- 6.10.5 **Manual Therapy Techniques:** are passive interventions in which the providers use his or her hands to administer skilled movements designed to modulate pain; increase joint range of motion; reduce/eliminate soft tissue swelling, inflammation, or restriction; induce relaxation; and improve contractile and non-contractile tissue extensibility. These techniques are applied only after a thorough examination is performed to identify those for whom manual therapy would be contraindicated or for whom manual therapy must be applied with caution.
 - 6.10.5.1 **Manipulation:** is generally accepted, well-established and widely used therapeutic intervention for low back pain. Manipulative Treatment (not therapy) is defined as the therapeutic application of manually guided forces by an operator to improve physiologic function and/or support

homeostasis that has been altered by the injury or occupational disease, and has associated clinical significance.

High velocity, low amplitude (HVLA) technique, chiropractic manipulation, osteopathic manipulation, muscle energy techniques, counter strain, and non-force techniques are all types of manipulative treatment. This may be applied by osteopathic physicians (D.O.), chiropractors (D.C.), properly trained physical therapists (P.T.), or properly trained medical physicians. Under these different types of manipulation exist many subsets of different techniques that can be described as-

- 6.10.5.1.1 direct—a forceful engagement of a restrictive/pathologic barrier,-
- 6.10.5.1.2 indirect—a gentle/non-forceful disengagement of a restrictive/pathologic barrier,-
- 6.10.5.1.3 the patient actively assists in the treatment and-
- 6.10.5.1.4 the patient relaxing, allowing the practitioner to move the body tissues.-

When the proper diagnosis is made and coupled with the appropriate technique, manipulation has no contraindications and can be applied to all tissues of the body. Pre-treatment assessment should be performed as part of each manipulative treatment visit to ensure that the correct diagnosis and correct treatment is employed.

High velocity, low amplitude (HVLA) manipulation is performed by taking a joint to its end range of motion and moving the articulation into the zone of accessory joint movement, well within the limits of anatomical integrity. Indications for manipulation include joint pain, decreased joint motion, and joint adhesions. Contraindications to HVLA manipulation include joint instability, fractures, severe osteoporosis, infection, metastatic cancer, active inflammatory arthritides, aortic aneurysm, and signs of progressive neurologic deficits.

- Time to produce effect for all types of manipulative treatment: 1 to 6 treatments.
- Frequency: Up to 3 times per week for the first 4 weeks as indicated by the severity of involvement and the desired effect, then up to 2 treatments per week for the next 4 weeks. For further treatments, twice per week or less to maintain function.
- Maximum duration: 30 visits. 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. Refer to the Chronic Pain Guidelines for care beyond 6 months.-

The combination of 97140 plus either CMT or OMT code is equal to one visit when performed on the same day. Any combination of manual therapeutic intervention exceeding 30 visits (not units) need to go to UR.

6.10.5.2 **Mobilization (Joint) /Manipulation**

Mobilization is passive movement involving oscillatory motions to the involved joints. The passive mobility is performed in a graded manner (I, II, III, IV, or V), which depicts the speed of the maneuver. It may include skilled manual joint tissue stretching. Indications include the need to improve joint play, improve intracapsular arthrokinematics, or reduce pain associated with tissue impingement.

- Time to produce effect: 4 to 6 treatments-
- Frequency: 2 to 3 times per week
- Maximum duration: 30 visits (CPT codes 97124 and 97140 can not exceed 30 visits in combination).

6.10.5.3 **Mobilization (Soft Tissue)-**

Mobilization of soft tissue is the skilled application of manual techniques designed to normalize movement patterns through the reduction of soft tissue pain and restrictions. Indications include muscle spasm around a joint, trigger points, adhesions, and neural compression.

Nerve Gliding: consist of a series of flexion and extension movements of the hand, wrist, elbow, shoulder, and neck that produce tension and longitudinal movement along the length of the median and other nerves of the upper extremity. These exercises are based on the principle that the tissues of the peripheral nervous system are designed for movement, and that tension and glide (excursion) of nerves may have an effect on neurophysiology through alterations in vascular and axoplasmic flow. Biomechanical principles have been more thoroughly studied than clinical outcomes. Nerve gliding performed on a patient by the clinician should be reinforced by patient performance of similar techniques as part of a home exercise program at least twice per day.

- Time to produce effect: 4 to 6 treatments-
- Frequency: 2 to 3 times per week

- Maximum duration: 30 visits (CPT codes 97124 and 97140 cannot exceed 30 visits in combination).

6.10.6 **Massage:** Manual or Mechanical— Massage is manipulation of soft tissue with broad ranging relaxation and circulatory benefits. This may include stimulation of acupuncture points and acupuncture channels (acupressure), application of suction cups and techniques that include pressing, lifting, rubbing, pinching of soft tissues by or with the practitioners' hands. Indications include edema, muscle spasm, adhesions, the need to improve peripheral circulation and range of motion, or to increase muscle relaxation and flexibility prior to exercise.

- Time to produce effect: Immediate.
- Frequency: 1 to 3 times per week
- Maximum duration: 12 visits (CPT codes 97124 and 97140 cannot exceed 30 visits in combination).

6.10.7 **Orthotics/Immobilization with Splinting:** is a generally accepted, well-established and widely used therapeutic procedure. Splints may be effective when worn at night or during portions of the day, depending on activities. Splints should be loose and soft enough to maintain comfort while supporting the involved joint in a relatively neutral position. Splint comfort is critical and may affect compliance. Although off-the-shelf splints are usually sufficient, custom thermoplastic splints may provide better fit for certain patients.

Splints may be effective when worn at night or during portions of the day, depending on activities; however, splint use is rarely mandatory. Providers should be aware that over-usage is counterproductive, and counsel patients to minimize daytime splint use in order avoid detrimental effects, such as, stiffness and dependency over time.

- Time to produce effect: 1-4 weeks
- Frequency: Daytime intermittent or night use, depending on symptoms and activities.
- Maximum duration: 2 to 4 months. If symptoms persist, consideration should be given to further diagnostic studies or to other treatment options.

6.10.8 **Superficial Heat and Cold Therapy:** are thermal agents applied in various manners that lowers or raises the body tissue temperature for the reduction of pain, inflammation, and/or effusion resulting from injury or induced by exercise. Includes application of heat just above the surface of the skin at acupuncture points. Indications include acute pain, edema and hemorrhage, need to increase pain threshold, reduce muscle spasm and promote stretching/flexibility. Cold and heat packs can be used at home as an extension of therapy in the clinic setting.

- Time to produce effect: Immediate
- Frequency: 2 to 5 times per week (clinic). Home treatment as needed.
- Maximum duration: 12 visits with maximum visit 1 per day. If symptoms persist, consideration should be given to further diagnostic studies or other treatment options.

6.10.9 **Ultrasound:** uses sonic generators to deliver acoustic energy for therapeutic thermal and/or nonthermal soft tissue effects. Indications include scar tissue, adhesions, collagen fiber and muscle spasm, and to improve muscle tissue extensibility and soft tissue healing. Ultrasound with electrical stimulation is concurrent delivery of electrical energy that involves dispersive electrode placement. Indications include muscle spasm, scar tissue, pain modulation and muscle facilitation. Phonophoresis is the transfer of medication to the target tissue to control inflammation and pain through the use of sonic generators. These topical medications include, but are not limited to, steroidal anti-inflammatory and anesthetics.

- Time to produce effect: 4 to 8 treatments
- Frequency: 2-3 times per week
- Maximum duration: 18 visits

6.11 **THERAPY—ACTIVE** therapies are based on the philosophy that therapeutic exercise and/or activity are beneficial for restoring flexibility, strength, endurance, function, range of motion, and alleviating discomfort. Active therapy requires an internal effort by the individual to complete a specific exercise or task, and thus assists in developing skills promoting independence to allow self-care after discharge. This form of therapy requires supervision from a therapist or medical provider such as verbal, visual, and/or tactile instructions. At times a provider may help stabilize the patient or guide the movement pattern but the energy required to complete the task is predominately executed by the patient.

Patients should be instructed to continue active therapies at home as an extension of the treatment process in order to maintain improvement levels. Home exercise can include exercise with or without mechanical assistance or resistance and functional activities with assistive devices.

Interventions are selected based on the complexity of the presenting dysfunction with ongoing examination, evaluation and modification of the plan of care as improvement or lack thereof occurs. Change and/or

discontinuation of an intervention should occur if there is attainment of expected goals/outcome, lack of progress, lack of tolerance and/or lack of motivation. Passive interventions/modalities may only be used as adjuncts to the active program.

6.11.1 **Activities of Daily Living:** Supervised instruction, active-assisted training, and/or adaptation of activities or equipment to improve a person's capacity in normal daily living activities such as self-care, work re-integration training, homemaking, and driving.

- Time to produce effect: 4 to 5 treatments
- Maximum of 10 sessions

6.11.2 **Aquatic Therapy:** is a well-accepted treatment which consists of the therapeutic use of aquatic immersion for therapeutic exercise to promote strengthening, core stabilization, endurance, range of motion, flexibility, body mechanics, and pain management. Aquatic therapy includes the implementation of active therapeutic procedures in a swimming or therapeutic pool. The water provides a buoyancy force that lessens the amount of force gravity applies to the body. The decreased gravity effect allows the patient to have a mechanical advantage and more likely have a successful trial of therapeutic exercise. The therapy may be indicated for individuals who:

- cannot tolerate active land-based or full-weight bearing therapeutic procedures
- require increased support in the presence of proprioceptive deficit;
- are at risk of compression fracture due to decreased bone density;
- have symptoms that are exacerbated in a dry environment;
- would have a higher probability of meeting active therapeutic goals than in a land-based environment.

The pool should be large enough to allow full extremity range of motion and fully erect posture. Aquatic vests, belts and other devices can be used to provide stability, balance, buoyancy, and resistance.

- Time to produce effect: 4 to 5 treatments
- Frequency: 3 to 5 times per week
- Maximum duration: 24 visits

A self-directed program is recommended after the supervised aquatics program has been established, or, alternatively a transition to a land-based environment exercise program.

6.11.3 **Functional Activities:** are the use of therapeutic activity to enhance mobility, body mechanics, employability, coordination, and sensory motor integration.

- Time to produce effect: 4 to 5 treatments
- Frequency: 3 to 5 times per week
- Maximum duration: 24 visits

Total number of visit 97110 and 97530 should not exceed 36 visits without pre-authorization

6.11.4 **Neuromuscular Re-education:** is the skilled application of exercise with manual, mechanical, or electrical facilitation to enhance strength, movement patterns, neuromuscular response, proprioception, kinesthetic sense, coordination education of movement, balance, and posture. Indications include the need to promote neuromuscular responses through carefully timed proprioceptive stimuli, to elicit and improve motor activity in patterns similar to normal neurologically developed sequences, and improve neuromotor response with independent control.

- Time to produce effect: 2 to 6 treatments
- Frequency: 3-5 times per week
- Maximum duration: 24 visits

6.11.5 **Proper Work Techniques:** Please refer to the "Job Site Evaluation" and "Job Site Alteration" sections of these guidelines.

6.11.6 **Therapeutic Exercise:** with or without mechanical assistance or resistance may include isoinertial, isotonic, isometric and isokinetic types of exercises. Indications include the need for cardiovascular fitness, reduced edema, improved muscle strength, improved connective tissue strength and integrity, increased bone density, promotion of circulation to enhance soft tissue healing, improvement of muscle recruitment, increased range of motion, and are used to promote normal movement patterns. Can also include complementary/alternative exercise movement therapy.

- Time to produce effect: 2 to 6 treatments
- Frequency: 3 to 5 times per week
- Maximum duration: 36 visits

Total number of visit 97110 and 97530 should not exceed 36 visits without pre-authorization

6.12 **RESTRICTION OF ACTIVITIES** Continuation of normal daily activities is the recommendation for Cumulative Trauma Disorders with or without neurologic symptoms. Complete work cessation should be avoided, if

possible, since it often further aggravates the pain presentation. Modified return to work is almost always more efficacious and rarely contraindicated in the vast majority of injured workers with CTD.

- 6.13 **VOCATIONAL REHABILITATION** is a generally accepted intervention. Initiation of vocational rehabilitation requires adequate evaluation of patients for quantification of highest functional level, motivation, and achievement of maximum medical improvement. Vocational rehabilitation may be as simple as returning to the original job or as complicated as being retrained for a new occupation.

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7.0 Operative Treatment

THE FOLLOWING SURGICAL GUIDELINES ARE NOT INTENDED TO REPLACE THE SURGEON'S JUDGMENT.

Operative treatment may be indicated when the individual component diagnoses that make up CTD prove unresponsive to the full complement of non-operative options, including job site analysis and modification. Physical exam findings should be well localized and consistent with the diagnosis. Severe neurologic findings are an exception to these indications, and may suggest earlier surgical intervention. Surgical results must anticipate objective functional gains and improved activities of daily living.

Surgery in CTD usually falls into two broad categories: peripheral nerve decompression and muscle or tendon sheath release or debridement. The treating surgeon must determine the appropriate procedure and timing for the individual case. The most common surgical procedures that are performed in CTD patients are listed below; other procedures may be indicated in certain cases.

Since CTD often involves several areas in an upper extremity, surgical treatment of one problem should be performed in conjunction with conservative treatment of other problems in the upper extremity.

- 7.1 **PERIPHERAL NERVE DECOMPRESSION** Surgery may be considered when findings on history and physical exam correlate specifically with the diagnosis being considered. Subjective complaints should be localized and appropriate to the diagnosis, neurologic complaints should be consistent with the nerve distribution in question, and physical exam findings should correlate with the history. Surgery may be considered as an initial therapy in situations where there is clinical and/or electrodiagnostic evidence of severe or progressive neuropathy. Objective evidence should be present in all cases in which surgery is contemplated. Objective evidence may include: electrodiagnostic (EDX) studies, diagnostic peripheral nerve block which eradicates the majority of the patient's symptoms, or a motor deficit commensurate with the suspected neurologic lesion. Refer to Physical Examination Findings (section D.2, physical examination) for objective diagnostic findings. Job modification should be considered prior to surgery. Refer to the "Job Site Alteration" section for additional information on job modification.

When no objective evidence is present and the patient continues to have signs and symptoms consistent with the diagnosis after six months of conservative treatment including a psychological evaluation, a second opinion should be obtained before operative treatment is considered.

Specific procedures and their indications are outlined below:

- 7.1.1 **Median Nerve Decompression at the Wrist (carpal tunnel release):** Please refer to the Division's, Carpal Tunnel Syndrome Medical Treatment Guidelines.
- 7.1.2 **Median Nerve Decompression in the Forearm (pronator teres or flexor digitorum superficialis release):** Please refer to Physical Examination Findings Table (section D.2, physical examination) Electrodiagnostic (EDX) studies may show delayed median nerve conduction in the forearm. If nerve conduction velocity is normal with suggestive clinical findings, the study may be repeated after a 3-6 month period of continued conservative treatment. If the study is still normal, the decision on treatment is made on the consistency of clinical findings and the factors noted above.
- 7.1.3 **Ulnar Nerve Decompression at the Wrist (ulnar tunnel release or Guyon's canal release)** Please refer to Physical Examination Findings Reference Table (section D.2, physical examination) Electrodiagnostic testing may confirm the diagnosis and differentiate from ulnar entrapment neuropathy at the elbow.
- 7.1.4 **Ulnar Nerve Decompression/Transposition at the Elbow:** Please refer to Physical Examination Findings Reference Table (section D.2, physical examination) Electrodiagnostic studies (EDX) may indicate an ulnar neuropathy at the elbow. In general, patients with minimal symptoms or without objective findings of weakness tend to respond better to conservative treatment than patients with measurable pinch or grip strength weakness. If objective findings persist despite conservative treatment, surgical options include: simple decompression, medial epicondylectomy with decompression, anterior subcutaneous transfer, and submuscular or intramuscular transfer.

- 7.1.5 **Sensory Nerve Decompression at the Wrist:** Please refer to Physical Examination Findings Reference Table (section D.2, physical examination) of these guidelines. Electrodiagnostic (EDX) studies can be useful in establishing a diagnosis but negative studies do not exclude the diagnosis
- 7.1.6 **Radial Nerve Decompression at the Elbow:** Please refer to Physical Examination Findings Reference Table (section D.2, physical examination) Electrodiagnostic (EDX) studies are helpful when positive, but negative studies do not exclude the diagnosis.
- 7.1.7 **Thoracic Outlet Syndrome:** Please refer to the Division's Thoracic Outlet Syndrome Medical Treatment Guidelines.
- 7.2 **TENDON DECOMPRESSION OR DEBRIDEMENT** Surgery may be considered when several months of appropriate treatment have failed, and findings on history and physical exam correlate specifically with the diagnosis being considered. Subjective complaints should be localized and appropriate to the diagnosis, and physical exam findings should correlate with the history. Refer to the Physical Examination Findings Table (section D.2, physical examination). Job modification should be considered prior to surgery. Refer to Job Site Alteration (Section F.4) for additional information on job modification.
- Specific procedures and their indications are outlined below:
- 7.2.1 **Subacromial Decompression:** Please refer to the Division's Shoulder Injury Medical Treatment Guidelines.
- 7.2.2 **Medial or Lateral Epicondyle Release/Debridement:** Please refer to Physical Examination Findings Reference Table (section D.2, physical examination). It is generally accepted that 80% of cases improve with conservative therapy. Intermittent discomfort may recur over six months to one year after initial conservative treatment. Surgery should only be performed to achieve functional gains on those with significant ongoing impaired activities of daily living. X-rays may be normal or demonstrate spur formation over the involved epicondyle.
- 7.2.3 **First Extensor Compartment Release (de Quervain's Tenosynovitis):** Please refer to Physical Examination Findings Reference Table (section D.2, physical examination). Surgery should be performed to achieve functional gains on those with significant ongoing impaired activities of daily living.
- 7.2.4 **Trigger Finger/Thumb Release:** Please refer to Physical Examination Findings Reference Table (section D.2, physical examination). Surgery should be performed to achieve functional gains on those with significant ongoing impaired activities of daily living.
- 7.3 **CONSIDERATIONS FOR POST-OPERATIVE THERAPY**
- 7.3.1 **Immobilization:** Controlled mobilization, and/or formal physical/occupational therapy should begin as soon as possible following surgery at the discretion of the treating surgeon. Final decisions regarding the need for splinting post-operatively should be left to the discretion of the treating physician based upon his/her understanding of the surgical technique used and the specific conditions of the patient.
- 7.3.2 **Home Program:** It is generally accepted that all patients should receive a home therapy protocol involving stretching, ROM, scar care, and resistive exercises. Once they have been cleared for increased activity by the surgeon, patients should be encouraged to use the hand as much as possible for daily activities, allowing pain to guide their level of activity.
- 7.3.3 **Supervised Therapy Program:** may be helpful in patients who do not show functional improvements post-operatively or in patients with heavy or repetitive job activities. The therapy program may include some of the generally accepted elements of soft tissue healing and return to function:
- 7.3.3.1 **Soft tissue healing/remodeling:**
May be used after the incision has healed. It may include any of the following: evaluation, whirlpool, electrical stimulation, soft tissue mobilization, scar compression pad, heat/cold application, splinting or edema control may be used as indicated. Following wound healing, ultrasound and iontophoresis with sodium chloride (NaCl) may be considered for soft tissue remodeling. Diathermy is not an acceptable adjunct.
- 7.3.3.2 **Return to function:**
Range of motion and stretching exercises, strengthening, activity of daily living adaptations, joint protection instruction, posture/body mechanics education. Job site modifications may be indicated.
- Time to produce effect: 2-4 weeks
 - Frequency: 2-5 times/week
 - Maximum duration: 36 visits

PART D Low Back Treatment Guidelines

1.0 Introduction

Pursuant to 19 ~~Del.C.~~ §2322C, health care practice guidelines have been adopted and recommended by the Health Care Advisory Panel to guide utilization of health care treatments in workers' compensation including, but not limited to, care provided for the treatment of employees by or under the supervision of a licensed health care provider, prescription drug utilization, inpatient hospitalization and length of stay, diagnostic testing, physical therapy, chiropractic care and palliative care. The health care practice guidelines apply to all treatments provided after the effective date of the regulation adopted by the Department of Labor, May 23, 2008, and regardless of the date of injury.

The guidelines are, to the extent permitted by the most current medical science or applicable science, based on well-documented scientific research concerning efficacious treatment for injuries and occupational disease. To the extent that well-documented scientific research regarding the above is not available at the time of adoption of the guidelines, or is not available at the time of any revision to the guidelines, the guidelines have been and will be based upon the best available information concerning national consensus regarding best health care practices in the relevant health care community.

The guidelines, to the extent practical and consistent with the Act, address treatment of those physical conditions which occur with the greatest frequency, or which require the most expensive treatments, for work-related injuries based upon currently available Delaware data.

Services rendered by any health care provider certified pursuant to 19 ~~Del.C.~~ §2322D(a) to provide treatment or services for injured employees shall be presumed, in the absence of contrary evidence, to be reasonable and necessary if such treatment and/or services conform to the most current version of the Delaware health care practice guidelines.

Services rendered outside the Guidelines and/or variation in treatment recommendations from the Guidelines may represent acceptable medical care, be considered reasonable and necessary treatment and, therefore, determined to be compensable, absent evidence to the contrary, and may be payable in accordance with the Fee Schedule and Statute, accordingly.

Services provided by any health care provider that is not certified pursuant to 19 ~~Del.C.~~ §2322D(a) shall not be presumed reasonable and necessary unless such services are pre-authorized by the employer or insurance carrier, subject to the exception set forth in 19 ~~Del.C.~~ §2322D(b).

Treatment of conditions unrelated to the injuries sustained in an industrial accident may be denied as unauthorized if the treatment is directed toward the non-industrial condition, unless the treatment of the unrelated injury is rendered necessary as a result of the industrial accident.

The Health Care Advisory Panel and Department of Labor recognized that acceptable medical practice may include deviations from these Guidelines, as individual cases dictate. Therefore, these Guidelines are not relevant as evidence of a provider's legal standard of professional care.

In accordance with the requirements of the Act, the development of the health care guidelines has been directed by a predominantly medical or other health professional panel, with recommendations then made to the Health Care Advisory Panel.

2.0 General Guideline Principles

2.1 **TREATMENT PARAMETER** With respect to Therapy (Active or Passive), time frames/visits for specific interventions commence once treatments have been initiated, not on the date of injury. Obviously, duration will be impacted by patient compliance, as well as comorbidities and availability of services. Clinical judgment may substantiate the need to accelerate or decelerate modify the time frames total number of visits discussed in this document. The majority of injured workers with low back pain often will achieve resolution of their condition within 8 to 24 visits (Guide to Physical Therapy Practice — Second Edition). It is anticipated that most injured workers will not require the maximum number of visits described in these guidelines. They are designed to be a ceiling and care extending beyond the maximum allowed visits may warrant utilization review.

2.2 **ACTIVE INTERVENTIONS** emphasizing patient responsibility, such as therapeutic exercise and/or functional treatment, are generally emphasized over passive modalities, especially as treatment progresses. Generally, passive interventions are viewed as a means to facilitate progress in an active rehabilitation program with concomitant attainment of objective functional gains. All rehabilitation programs must incorporate "Active

Interventions” no later than twelve visits three weeks after the onset of treatment. Reimbursement for passive modalities only after the first twelve visits three weeks of treatment without clear evidence of Active Interventions will require supportive documentation.

- 2.3 ~~**ACTIVE THERAPEUTIC EXERCISE PROGRAM**~~ goals should incorporate patient strength, endurance, flexibility, coordination, and education. This includes functional application in vocational or community settings.
- 2.4 ~~**POSITIVE PATIENT RESPONSE**~~ results are defined primarily as functional gains that can be objectively measured. Objective functional gains include, but are not limited to, positional tolerances, range of motion (ROM), strength, endurance, activities of daily living, cognition, behavior, and efficiency/velocity measures that can be quantified. Subjective reports of pain and function should be considered and given relative weight when the pain has anatomic and physiologic correlation.
- 2.5 ~~**RE-EVALUATE TREATMENT EVERY 3 TO 4 WEEKS**~~ With respect to Therapy (Active or Passive), if a given treatment or modality is not producing positive results within 3 to 4 weeks, the treatment may be either modified or discontinued. Reconsideration of diagnosis should also occur in the event of poor response to a seemingly rational intervention.
- 2.6 ~~**SURGICAL INTERVENTIONS**~~ should be contemplated within the context of expected functional outcome and not purely for the purpose of pain relief. The concept of “cure” with respect to surgical treatment by itself is generally a misnomer. All operative interventions must be based upon positive correlation of clinical findings, clinical course, and diagnostic tests. A comprehensive assimilation of these factors must lead to a specific diagnosis with positive identification of pathologic conditions.
- 2.7 ~~**SIX-MONTH TIME FRAME**~~ The prognosis drops precipitously for returning an injured worker to work once he/she has been temporarily totally disabled for more than six months. The emphasis within these guidelines is to move patients along a continuum of care and return to work within a six-month time frame, whenever possible. It is important to note that time frames may not be pertinent to injuries that do not involve work-time loss or are not occupationally related.
- 2.8 ~~**RETURN TO WORK**~~ Is therapeutic, assuming the work is not likely to aggravate the basic problem or increase long-term pain. The following physical limitations should be considered and modified as recommended: lifting, pushing, pulling, crouching, walking, using stairs, bending at the waist, awkward and/or sustained postures, tolerance for sitting or standing, hot and cold environments, data entry and other repetitive motion tasks, sustained grip, tool usage and vibration factors. Even if there is residual chronic pain, return to work is not necessarily contraindicated.
- The practitioner should understand all of the physical demands of the patient's job position before returning the patient to full duty and should receive clarification of the patient's job duties.
- 2.9 ~~**GUIDELINE RECOMMENDATIONS AND INCLUSION OF MEDICAL EVIDENCE**~~ Recommendations are based on available evidence and/or consensus recommendations of the standard of care within Delaware. Those procedures considered inappropriate, unreasonable, or unnecessary are designated in the guideline as being “not recommended.”
- 2.10 ~~**DELAYED RECOVERY**~~ The Department recognizes that not all of industrially injured patients will recover within the time lines outlined in this document despite optimal care. Such individuals may require treatments beyond the limits discussed within this document, but such treatment will require clear documentation by the authorized treating practitioner focusing on objective functional gains afforded by further treatment and impact upon prognosis.

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3.0 Initial Diagnostic Procedures

The Division recommends the following diagnostic procedures be considered, at least initially, the responsibility of the workers' compensation carrier to ensure that an accurate diagnosis and treatment plan can be established. Standard procedures, that should be utilized when initially diagnosing a work-related low back pain complaint, are listed below.

- 3.1 ~~**HISTORY TAKING AND PHYSICAL EXAMINATION (Hx & PE)**~~ are generally accepted, well-established and widely used procedures that establish the foundation/basis for and dictates subsequent stages of diagnostic and therapeutic procedures. When findings of clinical evaluations and those of other diagnostic procedures are

not complementing each other, the objective clinical findings should have preference. The medical records should reasonably document the following.

3.1.1 **History of Present Injury** A detailed history, taken in temporal proximity to the time of injury should primarily guide evaluation and treatment.

3.1.2 **Past History:**

3.1.3 **Physical Examination:** Should include accepted tests and exam techniques applicable to the area being examined.

3.2 **RADIOGRAPHIC IMAGING** of the lumbosacral spine is a generally accepted, well-established and widely used diagnostic procedure when specific indications based on history and/or physical examination are present. There is some evidence that early radiographic imaging without clear indications is associated with prolonged care, but no difference in functional outcomes. Therefore, it should not be routinely performed without indications. The mechanism of injury and specific indications for the radiograph should be listed on the request form to aid the radiologist and x-ray technician. Suggested indications may include:

3.2.1 History of significant trauma, especially blunt trauma or fall from a height;

3.2.2 Age over 55 years;

3.2.3 Unexplained or persistent low back pain for at least 6 weeks or pain that is worse with rest;

3.2.4 Localized pain, fever, constitutional symptoms, or history or exam suggestive of intravenous drug abuse, prolonged steroid use, or osteomyelitis;

3.2.5 Suspected lesion in the lumbosacral spine due to systemic illness such as a rheumatic/rheumatoid disorder or endocrinopathy. Suspected lesions may require special views;

3.2.6 Past medical history suggestive of pre-existing spinal disease, osteoporosis, spinal instrumentation, or cancer; and

3.2.7 Prior to high-velocity/low-amplitude manipulation or Grade IV to V mobilization.

3.3 **LABORATORY TESTING** Laboratory tests are generally accepted, well-established and widely used procedures. They are, however, rarely indicated at the time of initial evaluation, unless there is suspicion of systemic illness, infection, neoplasia, or underlying rheumatologic disorder, connective tissue disorder, or based on history and/or physical examination. Laboratory tests can provide useful diagnostic information. Tests include, but are not limited to:

3.3.1 Complete blood count (CBC) with differential can detect infection, blood dyscrasias, and medication side effects;

3.3.2 Erythrocyte sedimentation rate (ESR), rheumatoid factor (RF), antinuclear antigen (ANA), human leukocyte antigen (HLA), and C-reactive protein (CRP), can be used to detect evidence of a rheumatologic, infectious, or connective tissue disorder;

3.3.3 Serum calcium, phosphorous, uric acid, alkaline phosphatase, and acid phosphatase can detect metabolic bone disease;

3.3.4 Urinalysis for bacteria (usually with culture and sensitivity), calcium, phosphorus, hydroxyproline, or hematuria; and

3.3.5 Liver and kidney function may be performed for prolonged anti-inflammatory use or other medications requiring monitoring.

4.0 Follow-Up Diagnostic Imaging and Testing Procedures

One diagnostic imaging procedure may provide the same or distinctive information as does another procedure. Therefore, the prudent choice of a single diagnostic procedure, a complement of procedures or a sequence of procedures will optimize diagnostic accuracy; maximize cost effectiveness (by avoiding redundancy), and minimize potential adverse effects to patients.

All imaging procedures have a degree of specificity and sensitivity for various diagnoses. No isolated imaging test can assure a correct diagnosis. Clinical information obtained by history taking and physical examination should form the basis for selecting an imaging procedure and interpreting its results.

Magnetic resonance imaging (MRI), myelography, or Computed Axial Tomography (CT) scanning following myelography may provide useful information for many spinal disorders. When a diagnostic procedure, in conjunction with clinical information, can provide sufficient information to establish an accurate diagnosis, the

second diagnostic procedure will become a redundant procedure. At the same time, a subsequent diagnostic procedure can be a complementary diagnostic procedure if the first or preceding procedures, in conjunction with clinical information, cannot provide an accurate diagnosis. Usually, preference of a procedure over others depends upon availability, a patient's tolerance, and/or the treating practitioner's familiarity with the procedure.

4.1 **IMAGING STUDIES** are generally accepted, well-established and widely used diagnostic procedures. In the absence of myelopathy, or progressive neurological changes, or neurologic deficit, or history of cancer, imaging usually is not appropriate until conservative therapy has been tried and failed. Four to six weeks of treatment are usually an adequate period of time before an imaging procedure is in order, but the clinician should use judgment in this regard. When indicated, imaging studies can be utilized for further evaluation of the low back, based upon the mechanism of injury, symptoms, and patient history. Prudent choice of a single diagnostic procedure, a complementary combination of procedures, or a proper sequential order of complementary procedures will help ensure maximum diagnostic accuracy and minimize adverse effect to the patient. When the findings of the diagnostic imaging and testing procedures are not consistent with the clinical examination, the clinical findings should have preference.

The studies below are listed in frequency of use, not importance:

4.1.1 **Magnetic Resonance Imaging (MRI):** is rarely indicated in patients with non-traumatic acute low back pain with no neuropathic signs or symptoms. It is generally the first follow-up imaging study in individuals who respond poorly to proper initial conservative care. MRI is useful in suspected nerve root compression, myelopathy, masses, infections, metastatic disease, disc herniation, annular tear, and cord contusion. MRI is contraindicated in patients with certain implants.

In general, the high field, conventional, MRI provides better resolution. A lower field scan may be indicated when a patient cannot fit into a high field scanner or who is too claustrophobic despite sedation. Inadequate resolution on the first scan may require a second MRI using a different technique.

4.1.2 **Computed Axial Tomography (CT)** provides excellent visualization of bone and is used to further evaluate bony masses and suspected fractures and joints not clearly identified on radiographic evaluation. It may sometimes be done as a complement to MRI scanning to better delineate bony osteophyte formation in the neural foramen. Instrument-scatter reduction software provides better resolution when metallic artifact is of concern.

4.1.3 **Myelography** is the injection of radiopaque material into the spinal subarachnoid space, with x-rays then taken to define anatomy. It 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. The use of small needles and a less toxic, water-soluble, nonionic contrast is recommended.

4.1.4 **CT Myelogram** provides more detailed information about relationships between neural elements and surrounding anatomy.

4.1.5 **Lineal Tomography** is infrequently used, yet may be helpful in the evaluation of bone surfaces, bony fusion, or pseudoarthrosis.

4.1.6 **Bone Scan (Radioisotope Bone Scanning)** is generally accepted, well-established, and widely used. Bone scanning is more sensitive but less specific than MRI. ^{99m}Techetium diphosphonate uptake reflects osteoblastic activity and may be useful in diagnosing metastatic/primary bone tumors, stress fractures, osteomyelitis, and inflammatory lesions, but cannot distinguish between these entities.

4.1.7 **Other Radioisotope Scanning:** Indium and gallium scans are generally accepted, well-established, and widely used procedures usually to help diagnose lesions seen on other diagnostic imaging studies. ⁶⁷Gallium citrate scans are used to localize tumor, infection, and abscesses. ¹¹¹Indium-labeled leukocyte scanning is utilized for localizing infection or inflammation.

4.1.8 **Dynamic [Digital] Fluoroscopy:** Dynamic [Digital] Fluoroscopy of the lumbar spine measures the motion of intervertebral segments using a videofluoroscopy unit to capture images as the subject performs lumbar flexion and extension, storing the anatomic motion of the spine in a computer. Currently it is not recommended for use in the diagnosis of lumbar instability, since there is limited information on normal segmental motion for the age groups commonly presenting with low back pain, and diagnostic criteria for specific spinal conditions are not yet defined. No studies have yet demonstrated predictive value in terms of standard operative and non-operative therapeutic outcomes.

4.2 **OTHER TESTS** The following diagnostic procedures in this subsection are listed in alphabetical order, not by importance:

4.2.1 Electrodiagnostic Testing:

4.2.1.1 Electromyography (EMG), Nerve Conduction Studies (NCS) These are generally accepted, well-established and widely used diagnostic procedures. EMG and NCS, when performed and interpreted by a trained physician/electrophysiologist, may be useful for patients with suspected neural involvement whose symptoms are persistent or unresponsive to initial conservative treatments. They are used to differentiate peripheral neural deficits from radicular and spinal cord neural deficits and to rule out concomitant myopathy. However, F-Wave Latencies are not diagnostic for radiculopathy.

In general, EMG and NCS are complementary to imaging procedures such as CT, MRI, and/or myelography or diagnostic injection procedures. Electrodiagnostic studies may provide useful, correlative neuropathophysiological information that would be otherwise unobtainable from the radiologic studies discussed above.

4.2.1.2 Portable Automated Electrodiagnostic Device (also known as Surface EMG) is not a substitute for conventional diagnostic testing in clinical decision-making, and therefore, is not recommended.

4.2.1.3 Somatosensory Evoked Potential (SSEP) is not recommended to identify radiculopathy. It may be used to evaluate myelopathy and other rare neurological disorders such as neurogenic bladder and sexual dysfunction.

4.2.1.4 Current Perception Threshold (CPT) Evaluation may be useful as a screening tool, but its diagnostic efficacy in the evaluation of industrial low back pain has not been determined. Therefore, CPT is not recommended as a diagnostic tool.

4.2.1.5 Large Array Surface Electromyography measures low back muscle activity using a fixed array of 63 electrodes arranged in 9 rows and 7 columns between the seventh thoracic spinous process and the iliac crest. The array simultaneously collects myoelectric data from multifidus, iliocostalis, quadratus lumborum, and other lumbar muscles, which is analyzed for patterns of activity in these muscle groups. It is used in researching physiologic changes and adaptations to back pain, but is not recommended as a diagnostic procedure for individuals with back pain due to a lack of interpretive standards.

4.2.1.6 Surface EMG in combination with Range of Motion and/or Functional Capacity Evaluation

This is designed to detect differences between persons with and without low back pain, measuring signals in lumbar flexion which show that painful paraspinal muscles fail to relax fully. It may show aspects of the pathophysiology of muscle activity which advance the scientific understanding of low back pain. The test also purports to determine the significance of disc pathology and the age of an injury. It has not been evaluated in a setting which tests a spectrum of patients commonly seen in clinical practice, using an interpretation which is tested against a diagnostic reference standard. Therefore, it is not suitable as a diagnostic test for low back pain and its use for this purpose is not recommended.

4.2.2 Injections—Diagnostic

4.2.2.1 Description—Diagnostic spinal injections are generally accepted, well-established procedures. These injections may be useful for localizing the source of pain, and may have added therapeutic value when combined with injection of therapeutic medication(s).

4.2.2.2 Indications—Since these procedures are invasive, less invasive or non-invasive procedures should be considered first. Selection of patients, choice of procedure, and localization of the level for injection should be determined by clinical information.

4.2.2.3 The interpretation of the test results are primarily based on functional change, symptom report, and pain response (via a recognized pain scale), before and at an appropriate time period after the injection. The diagnostic significance of the test result should be evaluated in conjunction with clinical information and the results of other diagnostic procedures. Injections with local anesthetics of differing duration may be used to support a diagnosis. In some cases, injections at multiple levels may be required to accurately diagnose low back pain.

Multiple injections provided at the same session without staging may seriously dilute the diagnostic value of these procedures. Practitioners must carefully weigh the diagnostic value of the procedure against the possible therapeutic value.

4.2.2.4 ~~Special Requirements for Diagnostic Injections~~ Since multi-planar fluoroscopy during procedures is required to document technique and needle placement, an experienced physician should perform the procedure. Permanent images are required to verify needle placement. The subspecialty disciplines of the physicians performing the injections may be varied, including, but not limited to: anesthesiology, radiology, surgery, or physiatry. The practitioner should document hands-on training through workshops of the type offered by organizations such as the International Spine Intervention Society (ISIS) and/or completed fellowship training with interventional training. They must also be knowledgeable in radiation safety.

4.2.2.5 ~~Specific Diagnostic Injections~~ In general, relief should last for at least the duration of the local anesthetic used and should significantly relieve pain and result in functional improvement. Refer to “Injections – Therapeutic” for information on specific therapeutic injections.

4.2.2.5.1 ~~Medial Branch Blocks~~ are generally accepted diagnostic injections, used to determine whether a patient is a candidate for radiofrequency medial branch neurotomy (also known as facet rhizotomy). To be a positive diagnostic block, the patient should report a reduction of pain of 50% or greater relief from baseline or the length of time appropriate for the local anesthetic used. A separate comparative block on a different date may be performed to confirm the level of involvement. A comparative block uses anesthetics of varying lengths of activity.
Frequency and Maximum Duration: May be repeated once for comparative blocks. Limited to 4 levels

4.2.2.5.2 ~~Transforaminal injections~~ are generally accepted and useful in identifying spinal pathology. When performed for diagnosis, small amounts of local anesthetic up to a total volume of 1.0 cc should be used to determine the level of nerve root irritation. A positive diagnostic block should result in a positive diagnostic functional benefit and an 50% reduction in nerve root generated pain appropriate for the anesthetic used as measured by accepted pain scales (such as a VAS).
Frequency and Maximum Duration: Once per suspected level. Limited to three levels. May be repeated once for confirmation.

4.2.2.5.3 ~~Zygapophyseal (Facet) Blocks:~~
Facet blocks are generally accepted. They may be used diagnostically to direct functional rehabilitation programs. A positive diagnostic block should result in a positive diagnostic functional benefit and an 50% reduction in pain appropriate for the anesthetic used as measured by accepted pain scales (such as a VAS). They then may be repeated per the therapeutic guidelines. Frequency and maximum Duration: Once per suspected level, limited to three levels. May be repeated for confirmation.

4.2.2.5.4 ~~Sacroiliac Joint Injection:~~

4.2.2.5.4.1 ~~Description~~ – A generally accepted Injection of local anesthetic in an intra-articular fashion into the sacroiliac joint under fluoroscopic guidance. Long term therapeutic effect has not yet been established.

4.2.2.5.4.2 ~~Indications~~ – Primarily diagnostic to rule out sacroiliac joint dysfunction versus other pain generators. Intra-articular injection can be of value in diagnosing the pain generator. There should be documented at least 50% pain relief (as measured by accepted pain scales such as a VAS).

~~Frequency and Maximum Duration:~~
May be repeated for confirmation.

4.2.3 ~~Provocation Discography:~~

4.2.3.1 ~~Description~~ – Discography is an accepted diagnostic procedure to identify or refute a discogenic source of pain for patients who are surgical candidates. Discography should only be performed by physicians who are experienced and have been proctored in the technique. It is essential that all indications, pre-conditions, special considerations, procedures, reporting requirements, and results are carefully and specifically followed. Results should be interpreted judiciously.

4.2.3.2 ~~Indications~~ – Discography may be indicated when a patient has a history of functionally limiting, unremitting low back pain of greater than four months duration, with or without leg pain, which has

~~been unresponsive to all conservative interventions. A patient who would not consider operative therapeutic intervention is not a candidate for an invasive non-therapeutic intervention, such as provocation discography.~~

~~Discography may prove useful for the evaluation of the pre-surgical spine, such as pseudarthrosis, discogenic pain at levels above or below a prior spinal fusion, annular tear, or internal disc disruption.~~

~~Discography may show disc degeneration and annular disruption in the absence of low back pain. Discography may also elicit concordant pain in patients with mild and functionally inconsequential back pain. Because patients with mild back pain should not be considered for invasive treatment, discography should not be performed on these patients. In symptomatic patients with annular tears on discography, the side of the tear does not necessarily correlate with the side on which the symptoms occur. The presence of an annular tear does not necessarily identify the tear as the pain generator.~~

~~Discography may have a limited place in the work-up of pseudarthrosis. Discography may prove useful in evaluating the number of lumbar spine levels that might require fusion. CT Discography provides further detailed information about morphological abnormalities of the disc and possible lateral disc herniations.~~

~~4.2.3.3 Pre-conditions for provocation discography include all of the following:~~

~~4.2.3.3.1 A patient with functionally limiting, unremitting back and/or leg pain of greater than four months duration in whom conservative treatment has been unsuccessful and in whom the specific diagnosis of the pain generator has not been made apparent on the basis of other noninvasive imaging studies (e.g., MRI, CT, plain films, etc.). It is recommended that discography be reserved for use in patients with equivocal MRI findings, especially at levels adjacent to clearly pathological levels. Discography may be more sensitive than MRI or CT in detecting radial annular tears. However, radial tears must always be correlated with clinical presentation.~~

~~4.2.3.3.2 Patients who are considered surgical candidates (e.g., symptoms are of sufficient magnitude and the patient has been informed of the possible surgical options that may be available based upon the results of discography).~~

~~4.2.3.3.3 Informed consent regarding the risks and potential diagnostic benefits of discography has been obtained.~~

~~4.2.3.4 Special Considerations:~~

~~4.2.3.4.1 Discography should not be performed by the physician expected to perform the therapeutic procedure. The procedure should be carried out by an experienced individual who has received specialized training in the technique of provocation discography.~~

~~4.2.3.4.2 Discography should be performed in a blinded format that avoids leading the patient with anticipated responses. The procedure should include one or more disc levels thought to be normal or non-painful in order to serve as an internal control. The patient should not know what level is being injected in order to avoid spurious results. Abnormal disc levels may be repeated to confirm concordance.~~

~~4.2.3.4.3 Sterile technique must be utilized.~~

~~4.2.3.4.4 Judicious use of light sedation during the procedure is acceptable, represents the most common practice nationally at the current time, and is recommended by most experts in the field. The patient must be awake and able to accurately report pain levels during the provocation portion of the procedure.~~

~~4.2.3.4.5 The discography should be performed using a manometer to record pressure.~~

~~4.2.3.4.6 Intradiscal injection of local anesthetic may be carried out after the provocation portion of the examination and the patient's response.~~

~~4.2.3.4.7 It is recommended that a post-discogram CT be considered as it frequently provides additional useful information about disc morphology or other pathology.~~

~~4.2.3.5 Reporting of Discography—In addition to a narrative report, the discography report should contain a standardized classification of (a) disc morphology (b) the pain response, and (c) the pressure at which pain is produced. All results should be clearly separated in the report from the narrative~~

~~portion. Asymptomatic annular tears are common and the concordant pain response is an essential finding for a positive discogram.~~

~~When discography is performed to identify the source of a patient's low back pain, both a concordant pain response and morphological abnormalities must be present at the pathological level prior to initiating any treatment directed at that level. The patient must be awake during the provocation phase of the procedure; therefore, sedative medication must be carefully titrated.~~

~~4.2.3.5.1 Reporting disc morphology as visualized by the post-injection CT scan (when available) should follow the Modified Dallas Discogram Scale where:~~

- ~~• Grade 0 = Normal Nucleus~~
- ~~• Grade 1 = Annular tear confined to inner one-third of annulus fibrosis.~~
- ~~• Grade 2 = Annular tear extending to the middle third of the annulus fibrosis.~~
- ~~• Grade 3 = Annular tear extending to the outer one-third of the annulus fibrosis.~~
- ~~• Grade 4 = A grade 3 tear plus dissection within the outer annulus to involve more than 30° of the disc circumference.~~
- ~~• Grade 5 = Full thickness tear with extra-annular leakage of contrast, either focal or diffuse.~~

~~4.2.3.5.2 Reporting of pain response should be consistent with the operational criteria of the International Spine Intervention Society (ISIS) Guidelines. The report must include the level of concordance for back pain and leg pain separately using a 10-point VAS, or similar quantitative assessment. It should be noted that change in the VAS scale before and after provocation is more important than the number reported.~~

~~4.2.3.5.2.1 Unequivocal Discogenic Pain~~

- ~~• Stimulation of the target disc reproduces concordant pain~~
- ~~• The pain is registered as at least 6 on a 10-point VAS.~~
- ~~• The pain is reproduced at a pressure of less than 15 psi above opening pressure; and~~
- ~~• Stimulation of two adjacent discs does not produce pain at all~~

~~4.2.3.5.2.2 Definite Discogenic Pain~~

- ~~• Stimulation of the target disc reproduces concordant pain~~
- ~~• The pain is registered as at least 6 on a 10-point VAS.~~
- ~~• The pain is reproduced at a pressure of less than 15 psi above opening pressure; and~~
- ~~• Stimulation of at least one adjacent disc does not produce pain at all~~

~~4.2.3.5.2.3 Highly Probable Discogenic Pain~~

- ~~• Stimulation of the target disc reproduces concordant pain~~
- ~~• That pain is registered as at least 6 on a 10-point VAS.~~
- ~~• That the pain is reproduced at a pressure of less than 50 psi above opening pressure; and~~
- ~~• Stimulation of two adjacent discs does not produce pain at all~~

~~4.2.3.5.2.4 Probable Discogenic Pain~~

- ~~• Stimulation of the target disc reproduces concordant pain~~
- ~~• That pain is registered as at least 6 on a 10-point VAS.~~
- ~~• The pain is reproduced at a pressure of less than 50 psi above opening pressure; and~~
- ~~• Stimulation of one adjacent disc does not produce pain at all, and stimulation of another adjacent discs at greater than 50 psi, produces pain, but the pain is not concordant.~~

~~Multiple combinations of factors are possible. However, if the patient does not qualify for at least a 'Probable Discogenic Pain' level, then the discogram should probably be considered negative. The VAS score prior to the discogram should be taken into account when interpreting the VAS score reported by the patient during the discogram.~~

4.2.4 Thermography: is an accepted and established procedure, but has no use as a diagnostic test for low back pain and is not recommended.

5.0 Therapeutic Procedures—Non-Operative

Patients undergoing therapeutic procedure(s) are encouraged to return to modified or restricted duty during their rehabilitation at the earliest appropriate time. Refer to “Return-to-Work” in this section for detailed information.

Cessation and/or review of treatment modalities should be undertaken when no further significant subjective or objective improvement in the patient's condition is noted. If patients are not responding within the recommended duration periods, alternative treatment interventions, further diagnostic studies or consultations should be pursued. Providers should provide and document education to the patient. No treatment plan is complete without addressing issues of individual and/or group patient education as a means of facilitating self-management of symptoms.

Home therapy is an important component of therapy and may include active and passive therapeutic procedures, as well as, other modalities to assist in alleviating pain, swelling, and abnormal muscle tone.

The following procedures are listed in alphabetical order.

5.1 **ACUPUNCTURE** is an accepted and widely used procedure for the relief of pain and inflammation, and there is some scientific evidence to support its use. The exact mode of action is only partially understood. Western medicine studies suggest that acupuncture stimulates the nervous system at the level of the brain, promotes deep relaxation, and affects the release of neurotransmitters. Acupuncture is commonly used as an alternative or in addition to traditional Western pharmaceuticals. While it is commonly used when pain medication is reduced or not tolerated, it may be used as an adjunct to physical rehabilitation and/or surgical intervention to hasten the return of functional activity. Acupuncture should be performed by MD, DO, DC with appropriate training; or a licensed acupuncturist.

5.1.1 **Acupuncture:** is the insertion and removal of filiform needles to stimulate acupoints (acupuncture points). Needles may be inserted, manipulated, and retained for a period of time. Acupuncture can be used to reduce pain, reduce inflammation, increase blood flow, increase range of motion, decrease the side effect of medication-induced nausea, promote relaxation in an anxious patient, and reduce muscle spasm.

Indications include joint pain, joint stiffness, soft tissue pain and inflammation, paresthesia, post-surgical pain relief, muscle spasm, and scar tissue pain.

5.1.2 **Acupuncture with Electrical Stimulation:** is the use of electrical current (micro-amperage or milli-amperage) on the needles at the acupuncture site. It is used to increase effectiveness of the needles by continuous stimulation of the acupoint. Physiological effects (depending on location and settings) can include endorphin release for pain relief, reduction of inflammation, increased blood circulation, analgesia through interruption of pain stimulus, and muscle relaxation.

It is indicated to treat chronic pain conditions, radiating pain along a nerve pathway, muscle spasm, inflammation, scar tissue pain, and pain located in multiple sites.

5.1.3 **Total Time Frames For Acupuncture and Acupuncture with Electrical Stimulation:** Time frames are not meant to be applied to each of the above sections separately. The time frames are to be applied to all acupuncture treatments regardless of the type or combination of therapies being provided.

Time to produce effect: 3 to 6 treatments Frequency: 1 to 3 times per week Maximum course duration: 14 treatments (one course)

Any of the above acupuncture treatment(s) may extend longer if objective functional gains can be documented or when symptomatic benefits facilitate progression in the patient's treatment program. An additional course of treatment beyond 14 treatments may be documented with respect to need and ability to facilitate positive symptomatic or functional gains. Such care should be re-evaluated and documented with each series of treatments.

5.1.4 **Other Acupuncture Modalities:** Acupuncture treatment is based on individual patient needs and therefore treatment may include a combination of procedures to enhance treatment effect. Other procedures may include the use of heat, soft tissue manipulation/massage, and exercise. Refer to Active Therapy (Therapeutic Exercise) and Passive Therapy sections (Massage and Superficial Heat and Cold Therapy) for a description of these adjunctive acupuncture modalities and time frames.

5.2 **BIOFEEDBACK** is a form of behavioral medicine that helps patients learn self-awareness and self-regulation skills for the purpose of gaining greater control of their physiology, such as muscle activity, brain waves, and measures of autonomic nervous system activity. Electronic instrumentation is used to monitor the targeted physiology and then displayed or fed back to the patient visually, auditorially, or tactilely, with coaching by a biofeedback specialist. Biofeedback is provided by clinicians certified in biofeedback and/or who have documented specialized education, advanced training, or direct or supervised experience qualifying them to provide the specialized treatment needed (e.g., surface EMG, EEG, or other).

Treatment is individualized to the patient's work-related diagnosis and needs. Home practice of skills is required for mastery and may be facilitated by the use of home training tapes. The ultimate goal of biofeedback treatment is to normalize physiology to the pre-injury status to the extent possible, and involves transfer of learned skills to the workplace and daily life. Candidates for biofeedback therapy or training must be motivated to learn and practice biofeedback and self-regulation techniques. Indications for biofeedback include individuals who are suffering from musculoskeletal injury in which muscle dysfunction or other physiological indicators of excessive or prolonged stress response affects and/or delays recovery. Other applications include training to improve self-management of emotional stress/pain responses such as anxiety, depression, anger, sleep disturbance, and other central and autonomic nervous system imbalances. Biofeedback is often used in conjunction with other treatment modalities.

Time to produce effect: 3 to 4 visits

Frequency: 1 to 2 times per week

Maximum duration: 10 to 12 visits. Treatment beyond 12 visits must be documented with respect to need, expectation, and ability to facilitate positive functional gains.

5.3 **INJECTIONS — THERAPEUTIC**

5.3.1 **Therapeutic Spinal Injections:**

Description — Therapeutic spinal injections may be used after initial conservative treatments have been undertaken. Therapeutic injections should be used only after imaging studies and/or diagnostic injections have established pathology.

Special Considerations — For all injections (excluding trigger point), multi-planar fluoroscopic guidance during procedures is required to document technique and needle placement, and should be performed by a physician experienced in the procedure. Permanent images are required to verify needle placement. The subspecialty disciplines of the physicians performing injections may be varied, including, but not limited to: anesthesiology, radiology, surgery, or physiatry. The practitioner should document hands-on training through workshops of the type offered by organizations such as the International Spine Intervention Society (ISIS) and/or completed fellowship training in pain medicine with interventional training. They must also be knowledgeable in radiation safety.

5.3.1.1 Epidural Steroid Injection (ESI)

5.3.1.1.1 Description — Epidural steroid injections are injections of corticosteroid into the epidural space. The purpose of ESI is to reduce pain and inflammation in the acute or sub-acute phases of injury. ESI uses three approaches: transforaminal, interlaminar (midline), and caudal.

5.3.1.1.2 Needle Placement — Multi-planar fluoroscopic imaging is required for all epidural steroid injections. Contrast epidurograms allow one to verify the flow of medication into the epidural space. Permanent images are required to verify needle placement.

5.3.1.1.3 Indications — There is some evidence that epidural steroid injections are effective for patients with radicular pain or radiculopathy (sensory or motor loss in a specific dermatome or myotome). Up to 80% of patients with radicular pain may have initial relief. However, only 25-57% are likely to have excellent long-term relief. Although there is no evidence regarding the effectiveness of ESI for non-radicular disc herniation, it is an accepted intervention.

Frequency: One or more levels can be injected in one session. Whether injections are repeated depends upon the patient's response to the previous injection. Subsequent injections may occur. Injections can be repeated if the patient has demonstrated functional gain and/or pain returns or worsens.

Maximum duration: Six treatments (a treatment may include injections at one or two levels) may be done in one year, as per the patient's response to pain and function. Patients should

~~be reassessed for improvement in pain (as measured by accepted pain scales) and/or evidence of functional improvement.~~

5.3.1.2 Zygapophyseal (Facet) Injection

5.3.1.2.1 Description – ~~A generally accepted intra-articular or pericapsular injection of local anesthetic and corticosteroid.~~

5.3.1.2.2 Indications – ~~Patients with pain suspected to be facet mediated in origin. In these patients, facet injections may be occasionally useful in facilitating rehabilitation~~

~~Facet injections may be repeated if they result in increased documented functional benefit for at least 4 to 6 weeks and/or at least an 50% initial improvement in pain scales as measured by accepted pain scales (such as VAS).~~

~~Maximum Duration: 4 per level per year. Maximum three levels~~

5.3.1.2.3 Sacroiliac Joint Injection:

5.3.1.2.3.1 Description – ~~A generally accepted injection of local anesthetic in an intra-articular fashion into the sacroiliac joint under radiographic guidance. May include the use of corticosteroids. Long term therapeutic effect has not yet been established.~~

5.3.1.2.3.2 Indications – ~~Primarily diagnostic to rule out sacroiliac joint dysfunction vs. other pain generators. Intra-articular injection can be of value in diagnosing the pain generator. These injections may be repeated if they result in increased documented functional benefit for at least 6 weeks and/or at least an 50% initial improvement in pain scales as measured by accepted pain scales (such as VAS).~~

~~Maximum duration: 4 injections per year.~~

5.3.1.2.4 Intradiscal Steroid Therapy: ~~Intradiscal Steroid Therapy consists of injection of a steroid preparation into the intervertebral disc under fluoroscopic guidance at the time of discography. There is good evidence that it is not effective in the treatment of suspected discogenic back pain and its use is not recommended.~~

5.3.2 Radio Frequency Medial Branch Neurotomy/facet rhizotomy:

5.3.2.1 Description – ~~A procedure designed to denervate the facet joint by ablating the corresponding sensory medial branches. Continuous percutaneous radiofrequency is the method generally used. There is good evidence to support Radio Frequency Medial Branch Neurotomy in the cervical spine but benefits beyond one year are not yet established. Evidence in the lumbar spine is conflicting; however, the procedure is generally accepted. In one study, 60% of patients maintained at least 90% pain relief at 12 months. Radio frequency Medial Branch Neurotomy is the procedure of choice over alcohol, phenol, or cryoablation. Precise positioning of the probe using fluoroscopic guidance is required. Permanent images should be recorded to verify placement of the device.~~

5.3.2.2 Indications – ~~These patients with significant, facetogenic pain.~~

~~Individuals should have met all of the following indications: Pain of well-documented facet origin, unresponsive to active and/or passive therapy. It is generally recommended that this procedure not be performed until three months of conservative therapy have been completed. All patients should continue appropriate exercise with functionally directed rehabilitation. Active treatment, which patients will have had prior to the procedure, will frequently require a repeat of the sessions previously ordered. All patients should have a successful response to a diagnostic medial nerve branch block and a separate comparative block. To be a positive diagnostic block the patient should report a reduction of pain of 50% or greater from baseline for the length of time appropriate for the local anesthetic used. It is suggested that this be recorded on a form. A separate comparative block on a different date may be performed to confirm the level of involvement. A comparative block uses anesthetics with varying lengths of activity.~~

5.3.2.3 Requirements for Repeat Radiofrequency Medial Branch Neurotomy (or additional level RF Neurotomy): ~~In some cases pain may recur. Successful RF Neurotomy usually provides from six to eighteen months of relief.~~

~~Before a repeat RF Neurotomy is done, a confirmatory medial branch injection should be performed if the patient's pain pattern presents differently than the initial evaluation. In occasional~~

patients, additional levels of RF neurotomy may be necessary. The same indications and limitations apply.

5.3.3 **Sacro-iliac (SI) Joint Radiofrequency Denervation:** is a denervation of the SI joint. This procedure is not recommended.

5.3.4 **Trigger Point Injections and Dry Needling Treatment:**

5.3.4.1 **Description**—Trigger point injections are a generally accepted treatment. Trigger point treatment can consist of dry needling or injection of local anesthetic, with or without corticosteroid, into highly localized, extremely sensitive bands of skeletal muscle fibers that produce local and referred pain when activated. Injection efficacy may be enhanced if injections are immediately followed by myofascial therapeutic interventions, such as vapo-coolant spray and stretch, ischemic pressure massage (myotherapy), specific soft tissue mobilization and physical modalities. A truly blinded study comparing dry needle treatment of trigger points is not feasible. There is no evidence that injection of medications improves the results of trigger point injections. Needling alone may account for some of the therapeutic response.

There is no indication for conscious sedation for patients receiving trigger point injections. The patient must be alert to help identify the site of the injection.

5.3.4.2 **Indications**—Trigger point injections may be used to relieve myofascial pain and facilitate active therapy and stretching of the affected areas. They are to be used as an adjunctive treatment in combination with other treatment modalities such as functional restoration programs. Trigger point injections should be utilized primarily for the purpose of facilitating functional progress. Patients should continue in therapeutic exercise program as tolerated throughout the time period they are undergoing intensive myofascial interventions. Myofascial pain is often associated with other underlying structural problems and any abnormalities need to be ruled out prior to injection.

Trigger point injections are indicated in those patients where well circumscribed trigger points have been consistently observed. Generally, these injections are not necessary unless consistently observed trigger points are not responding to specific, noninvasive, myofascial interventions within approximately a 6-week time frame. However, trigger point injections may be occasionally effective when utilized in the patient with immediate, acute onset of low back pain.

Frequency: Weekly. Suggest no more than 4 injection sites per session per week to avoid significant post-injection soreness.

Maximum duration: 8 weeks. Occasional patients may require 2 to 4 repetitions over a 1 to 2 year period.

5.3.5 **Prolotherapy:** also known as sclerotherapy consists of a series of injections of hypertonic dextrose, with or without glycerine and phenol, into the ligamentous structures of the low back. Its proponents claim that the inflammatory response to the injections will recruit cytokine growth factors involved in the proliferation of connective tissue, stabilizing the ligaments of the low back when these structures have been damaged by mechanical insults.

There are conflicting studies concerning the effectiveness of Prolotherapy in the low back. Lasting functional improvement has not been shown. The injections are invasive, may be painful to the patient, and are not generally accepted or widely used. Therefore, the use of Prolotherapy for low back pain is not recommended.

5.3.6 **Epiduroscopy and Epidural Lysis of Adhesions:** is an investigational treatment of low back pain. It involves the introduction of a fiberoptic endoscope into the epidural space via the sacral hiatus. With cephalad advancement of the endoscope under direct visualization, the epidural space is irrigated with saline. Adhesiolysis may be done mechanically with a fiberoptic endoscope. The saline irrigation is performed with or without epiduroscopy and is intended to distend the epidural space in order to obtain an adequate visual field. It is designed to produce lysis of adhesions, which are conjectured to produce symptoms due to traction on painful nerve roots. Saline irrigation is associated with risks of elevated pressures which may impede blood flow and venous return, possibly causing ischemia of the cauda equina and retinal hemorrhage.

Other complications associated with instrumented lysis include catheter shearing, need for catheter surgical removal, infection (including meningitis), hematoma, and possible severe hemodynamic instability during application. Although epidural adhesions have been postulated to cause chronic low back pain,

studies have failed to find a significant correlation between the level of fibrosis and pain or difficulty functioning. Studies of epidural lysis demonstrate no transient pain relief from the procedure. Given the low likelihood of a positive response, the additional costs and time requirement, and the possible complications from the procedure, epidural injection, or mechanical lysis, is not recommended.

Epiduroscopy directed steroid injections are also not recommended as there is no evidence to support an advantage for using an epiduroscope with steroid injections.

5.4 **MEDICATIONS** use in the treatment of low back injuries is appropriate for controlling acute and chronic pain and inflammation. Use of medications will vary widely due to the spectrum of injuries from simple strains to post-surgical healing. All drugs should be used according to patient needs. A thorough medication history, including use of alternative and over the counter medications, should be performed at the time of the initial visit and updated periodically. The patient should be educated regarding the interaction with prescription and over-the-counter medications as well as the contents of over-the-counter herbal products.

The use of generic medications is encouraged. The list below is not all inclusive. It is accepted that medications not on this list may be appropriate for use in the care of the injured worker.

The following are listed in alphabetical order:

5.4.1 **Acetaminophen:** is an effective analgesic with antipyretic but not anti-inflammatory activity. Acetaminophen is generally well tolerated, causes little or no gastrointestinal irritation, and is not associated with ulcer formation. Acetaminophen has been associated with liver toxicity in overdose situations or in chronic alcohol use. Patients may not realize that many over-the-counter preparations may contain acetaminophen. The total daily dose of acetaminophen is recommended not to exceed 4 grams per 24-hour period, from all sources, including narcotic-acetaminophen combination preparations.

5.4.2 **Muscle Relaxants:** are appropriate for muscle spasm with pain. There is strong evidence that muscle relaxants are more effective than placebo for providing short-term pain relief in acute low back pain. When prescribing these agents, physicians must seriously consider side effects of drowsiness or dizziness and the fact that benzodiazepines may be habit-forming.

5.4.3 **Narcotics:** should be primarily reserved for the treatment of severe low back pain. In mild to moderate cases of low back pain, narcotic medication should be used cautiously on a case-by-case basis. Adverse effects include respiratory depression, the development of physical, and impaired alertness.

Narcotic medications should be prescribed with strict time, quantity, and duration guidelines, and with definitive cessation parameters. Pain is subjective in nature and should be evaluated using a scale to rate effectiveness of the narcotic prescribed.

5.4.4 **Nonsteroidal Anti-Inflammatory Drugs (NSAIDs):** are useful for pain and inflammation. In mild cases, they may be the only drugs required for analgesia. There are several classes of NSAIDs, and the response of the individual injured worker to a specific medication is unpredictable. For this reason, a range of NSAIDs may be tried in each case with the most effective preparation being continued. Patients should be closely monitored for adverse reactions. Naproxen sodium does not appear to be associated with increased risk of vascular events. Administration of proton pump inhibitors, Histamine 2 Blockers or prostaglandin analog misoprostol along with these NSAIDs may reduce the risk of duodenal and gastric ulceration. Intervals for metabolic screening are dependent upon the patient's age, general health status and should be within parameters listed for each specific medication. Complete Blood Count (CBC), and liver and renal function should be monitored in patients on chronic NSAIDs and initially when indicated.

5.4.4.1 **Selective Cyclo-oxygenase-2 (COX-2) Inhibitors**

COX-2 inhibitors are more recent NSAIDs and differ in adverse side effect profiles from the traditional NSAIDs. The major advantages of selective COX-2 inhibitors over traditional NSAIDs are that they have less gastrointestinal toxicity and no platelet effects.

COX-2 inhibitors should not be first-line for low risk patients who will be using an NSAID short term but are indicated in select patients for whom traditional NSAIDs are not tolerated. Serious upper GI adverse events can occur even in asymptomatic patients. Patients at high risk for GI bleed include those who use alcohol, smoke, are older than 65, take corticosteroids or anti-coagulants, or have a longer duration of therapy.

5.4.5 **Psychotropic/Anti-anxiety/Hypnotic Agents:** may be useful for treatment of mild and chronic pain, dysesthesias, sleep disorders, and depression. Antidepressant medications, such as tricyclics and

~~Selective Serotonin Reuptake Inhibitors (SSRIs), are useful for affective disorder and chronic pain management. Tricyclic antidepressant agents, in low dose, are useful for chronic pain.~~

~~Anti-anxiety medications should generally be limited to short-term use. Combinations of the above agents may be useful.~~

~~As a general rule, physicians should assess the patient's prior history of substance abuse or depression prior to prescribing any of these agents. Due to the habit-forming potential of the benzodiazepines and other drugs found in this class, they are not routinely recommended.~~

- 5.4.6 ~~**Tramadol:** is useful in relief of low back pain and has been shown to provide pain relief equivalent to that of commonly prescribed NSAIDs. Although Tramadol may cause impaired alertness, it is generally well tolerated, does not cause gastrointestinal ulceration, or exacerbate hypertension or congestive heart failure.~~

5.5 **OCCUPATIONAL REHABILITATION PROGRAMS**

- 5.5.1 ~~**Non-Interdisciplinary:** These generally accepted programs are work related, outcome-focused, individualized treatment programs. Objectives of the program include, but are not limited to, improvement of cardiopulmonary and neuromusculoskeletal functions (strength, endurance, movement, flexibility, stability, and motor control functions), patient education, and symptom relief. The goal is for patients to gain full or optimal function and return to work. The service may include the time-limited use of passive modalities with progression to active treatment and/or simulated/real work.~~

- 5.5.1.1 ~~Work Conditioning/Simulation This program may begin once a patient is out of the acute phase of injury and will be able to tolerate this program.~~

~~These programs are usually initiated after the acute phase has been completed and offered at any time throughout the recovery phase. Work conditioning should be initiated when imminent return of a patient to modified or full duty is not an option, but the prognosis for returning the patient to work at completion of the program is at least fair to good. The need for work place simulation should be based upon the results of a Functional Capacity Evaluation and/or Jobsite Analysis.~~

~~Length of visit: 1 to 4 hours per day.~~

~~Frequency: 2 to 5 visits per week~~

~~Maximum duration: 8 weeks. Participation in a program beyond six weeks must be documented with respect to need and the ability to facilitate positive symptomatic or functional gains.~~

- 5.5.1.2 ~~Work Hardening~~

~~Work Hardening is an interdisciplinary program addressing a patient's employability and return to work. It includes a progressive increase in the number of hours per day that a patient completes work simulation tasks until the patient can tolerate a full workday. This is accomplished by addressing the medical, behavioral, physical, functional, and vocational components of employability and return to work.~~

~~This can include a highly structured program involving a team approach or can involve any of the components thereof. The interdisciplinary team should, at a minimum, be comprised of a qualified medical director who is board certified with documented training in occupational rehabilitation; team physicians having experience in occupational rehabilitation; occupational therapist; physical therapist; case manager; and psychologist. As appropriate, the team may also include: chiropractor, RN, vocational specialist or Certified Biofeedback Therapist.~~

~~Length of visit: Up to 8 hours/day~~

~~Frequency: 2 to 5 visits per week~~

~~Maximum duration: 8 weeks. Participation in a program beyond six weeks must be documented with respect to need and the ability to facilitate positive symptomatic or functional gains.~~

- 5.5.1.3 ~~Spinal Cord Programs~~

~~Spinal Cord Systems of Care provide coordinated, case-managed, and integrated service for people with spinal cord dysfunction, whether due to trauma or disease. The system includes an inpatient component in an organization licensed as a hospital and an outpatient component. Each component endorses the active participation and choice of the persons served throughout the entire program. The Spinal Cord System of Care also provides or formally links with key components of care that address the lifelong needs of the persons served.~~

This can include a highly structured program involving a team approach or can involve any of the components thereof. The interdisciplinary team should, at a minimum, be comprised of a qualified medical director who is board certified and trained in rehabilitation, a case manager, occupational therapy, physical therapy, psychologist, rehabilitation RN and MD, and therapeutic recreation specialist. As appropriate, the team may also include: rehabilitation counselor, respiratory therapist, social worker, or speech language pathologist.

Time frame durations for any spinal cord program should be determined based upon the extent of the patient's injury and at the discretion of the rehabilitation physician in charge.

5.6 **ORTHOTICS**

5.6.1 **Foot Orthoses and Inserts:** are accepted interventions for spinal disorders that are due to aggravated mechanical abnormalities, such as leg length discrepancy, scoliosis, or lower extremity misalignment. Shoe insoles or inserts may be effective for patients with acute low back problems who stand for prolonged periods of time.

5.6.2 **Lumbar Support Devices:** include backrests for chairs and car seats. Lumbar supports may provide symptomatic relief of pain and movement reduction in cases of chronic low back problems.

5.6.3 **Lumbar Corsets and Back Belts:** The injured worker should be advised of the potential harm from using a lumbar support for a period of time greater than that which is prescribed. Harmful effects include de-conditioning of the trunk musculature, skin irritation, and general discomfort.

5.6.4 **Lumbosacral Bracing:** Rigid bracing devices are well accepted and commonly used for post fusion, scoliosis, and vertebral fractures.

5.7 **PATIENT EDUCATION** No treatment plan is complete without addressing issues of individual and/or group patient education as a means of prolonging the beneficial effects of treatment, as well as facilitating self-management of symptoms and injury prevention. The patient should be encouraged to take an active role in the establishment of functional outcome goals. They should be educated on their specific injury, assessment findings, and plan of treatment. Instruction on proper body mechanics and posture, positions to avoid, self-care for exacerbation of symptoms, and home exercise should also be addressed.

Time to produce effect: Varies with individual patient

Frequency: Should occur at every visit.

5.8 **RESTRICTION OF ACTIVITIES** Continuation of normal daily activities is the recommendation for acute and chronic low back pain without neurologic symptoms. There is good evidence against the use of bed rest in cases without neurologic symptoms. Bed rest may lead to de-conditioning and impair rehabilitation. Modified return to work is almost always more efficacious and rarely contraindicated in the vast majority of injured workers with low back pain.

5.9 **RETURN TO WORK** Early return to work should be a prime goal in treating occupational injuries given the poor return to work prognosis for an injured worker who has been out of work for more than six months. It is imperative that the patient be educated regarding the benefits of return to work, work restrictions, and follow-up if problems arise. When attempting to return a patient to work after a specific injury, clear objective physical capabilities of the injured worker should be outline on the appropriate form. An accurate job description with detailed physical duty requirements is often necessary to assist the physician in making return to work recommendations.

Employers should be prepared to offer transitional work. This may consist of temporary work in a less demanding position, return to the regular job with restrictions, or gradual return to the regular job. Company policies which encourage return to work with positive communication are most likely to have decreased worker disability. This may require a job site evaluation. When an appropriate a Jobsite Analysis may be necessary.

Return to work is defined as any work or duty that the patient is able to perform safely. It may not be the patient's regular work. Due to the large spectrum of injuries of varying severity and varying physical demands in the work place, it is not possible to make specific return to work guidelines for each injury.

Compliance with Activity Restrictions: In some cases, compliance with restriction of activity levels may require a complete job site evaluation, a functional capacity evaluation (FCE) or other special testing.

5.10 **THERAPY — PASSIVE** Most of the following passive therapies and modalities are generally accepted methods of care for a variety of work related injuries. Passive therapy includes those treatment modalities that do not require energy expenditure on the part of the patient. They are principally effective during the early

phases of treatment and are directed at controlling symptoms such as pain, inflammation and swelling and to improve the rate of healing soft tissue injuries. They should be used adjunctively with active therapies such as postural stabilization and exercise programs to help control swelling, pain, and inflammation during the active rehabilitation process. Please refer to General Guideline Principles, Active Interventions. Passive therapies may be used intermittently as a therapist deems appropriate or regularly if there are specific goals with objectively measured functional improvements during treatment.

Generally, passive interventions are viewed as a means to facilitate progress in an active rehabilitation program with concomitant attainment of objective functional gains. All rehabilitation programs must incorporate "Active Interventions" no later than twelve visits or three weeks after the onset of treatment. Reimbursement for passive modalities only after the first twelve visits or three weeks of treatment without clear evidence of Active Interventions will require supportive documentation.

On occasion, specific diagnoses and post-surgical conditions may warrant durations of treatment beyond those listed as "maximum." factors such as exacerbation of symptoms, re-injury, interrupted continuity of care, and comorbidities may also extend durations of care. Specific goals with objectively measured functional improvement during treatment must be cited to justify extended durations of care. It is recommended that, if no functional gain is observed after the number of treatments under "time to produce effect" have been completed; alternative treatment interventions, further diagnostic studies, or further consultations should be pursued.

The following passive therapies are listed in alphabetical order:

5.10.1 **Electrical Stimulation (Unattended and Attended):** is an accepted treatment. Once applied, unattended electrical stimulation requires minimal on-site supervision by the provider. Indications include pain, inflammation, muscle spasm, atrophy, decreased circulation, and the need for osteogenic stimulation. A home unit should be purchased if treatment is effective and frequent use is recommended.

Time to produce effect: 2 to 4 treatments

Maximum duration: 14 visits

5.10.2 **Iontophoresis:** is an accepted treatment which consists of the transfer of medication, including, but not limited to, steroidal anti-inflammatories and anesthetics, through the use of electrical stimulation. Indications include pain (Lidocaine), inflammation (hydrocortisone, salicylate), edema (mecholyt, hyaluronidase, salicylate), ischemia (magnesium, mecholyt, iodine), muscle spasm (magnesium, calcium), calcific deposits (acetate), scars, and keloids (sodium chloride, iodine, acetate). There is no proven benefit for this therapy in the low back.

Time to produce effect: 1 to 4 treatments

- Frequency: 3 times per week with at least 48 hours between treatments

Maximum duration: 8 visits per body region

5.10.3 **Manipulation:** Is generally accepted, well-established and widely used therapeutic intervention for low back pain. Manipulative Treatment (not therapy) is defined as the therapeutic application of manually guided forces by an operator to improve physiologic function and/or support homeostasis that has been altered by the injury or occupational disease, and has associated clinical significance.

High velocity, low amplitude (HVLA) technique, chiropractic manipulation, osteopathic manipulation, muscle energy techniques, counter strain, and non force techniques are all types of manipulative treatment. This may be applied by osteopathic physicians (D.O.), chiropractors (D.C.), properly trained physical therapists (P.T.), or properly trained medical physicians. Under these different types of manipulation exist many subsets of different techniques that can be described as a) direct a forceful engagement of a restrictive/pathologic barrier, b) indirect a gentle/non forceful disengagement of a restrictive/pathologic barrier, c) the patient actively assists in the treatment and d) the patient relaxing, allowing the practitioner to move the body tissues. When the proper diagnosis is made and coupled with the appropriate technique, manipulation has no contraindications and can be applied to all tissues of the body. Pre-treatment assessment should be performed as part of each manipulative treatment visit to ensure that the correct diagnosis and correct treatment is employed.

High velocity, low amplitude (HVLA) manipulation is performed by taking a joint to its end range of motion and moving the articulation into the zone of accessory joint movement, well within the limits of anatomical integrity. Indications for manipulation include joint pain, decreased joint motion, and joint adhesions.

Contraindications to HVLA manipulation include joint instability, fractures, severe osteoporosis, infection, metastatic cancer, active inflammatory arthritides, aortic aneurysm, and signs of progressive neurologic deficits.

Time to produce effect for all types of manipulative treatment: 1 to 6 treatments.

Frequency: Up to 3 times per week for the first 4 weeks as indicated by the severity of involvement and the desired effect, then up to 2 treatments per week for the next 4 weeks. For further treatments, twice per week or less to maintain function.

Maximum duration: 36 visits. 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. Refer to the Chronic Pain Guidelines for care beyond 6 months.

The combination of 97140 plus either CMT or OMT code is equal to one visit when performed on the same day. Any combination of manual therapeutic intervention exceeding 36 visits (not units) need to go to UR.

5.10.3.1 Mobilization (Joint)/Manipulation

Mobilization is passive movement involving oscillatory motions to the involved joints. The passive mobility is performed in a graded manner (I, II, III, IV, or V), which depicts the speed of the maneuver. It may include skilled manual joint tissue stretching. Indications include the need to improve joint play, improve intracapsular arthrokinematics, or reduce pain associated with tissue impingement.

Time to produce effect: 4 to 6 treatments

Frequency: 2 to 3 times per week

Maximum duration: 36 visits (CPT codes 97124 and 97140 cannot exceed 36 visits in combination).

5.10.4 **Massage — Manual or Mechanical:** Massage is manipulation of soft tissue with broad ranging relaxation and circulatory benefits. This may include techniques that include pressing, lifting, rubbing, pinching of soft tissues by, or with, the practitioner's hands. Indications include edema (peripheral or hard and non-pliable edema), muscle spasm, adhesions, the need to improve peripheral circulation and range of motion, or to increase muscle relaxation and flexibility prior to exercise.

In sub-acute low back pain populations there is good evidence that massage can increase function when combined with exercise and patient education. Some studies have demonstrated a decrease in provider visits and pain medication use with combined therapy. One study indicated improved results with acupressure massage. It is recommended that all massage be performed by trained, experienced therapists and be accompanied by an active exercise program and patient education. In contrast to the sub-acute population, massage is a generally accepted treatment for the acute low back pain population, although no studies have demonstrated its efficacy for this set of patients.

Time to produce effect: Immediate

Frequency: 1 to 3 times per week

Maximum duration: 12 visits (CPT codes 97124 and 97140 cannot exceed 36 visits in combination).

5.10.5 **Mobilization (Joint):** is a generally well-accepted treatment. Mobilization is passive movement involving oscillatory motions to the vertebral segment(s). The passive mobility is performed in a graded manner (I, II, III, IV, or V), which depicts the speed and depth of joint motion during the maneuver. For further discussion on Level V joint mobilization please see section on HVLA manipulation [Refer to section 12. d.]. It may include skilled manual joint tissue stretching. Indications include the need to improve joint play, segmental alignment, improve intracapsular arthrokinematics, or reduce pain associated with tissue impingement. Mobilization should be accompanied by active therapy. For Level V mobilization contraindications include joint instability, fractures, severe osteoporosis, infection, metastatic cancer, active inflammatory arthritides, aortic aneurysm, and signs of progressive neurologic deficits.

Time to produce effect for all types of manipulative treatment: 1 to 6 treatments.

Frequency: Up to 3 times per week for the first 4 weeks as indicated by the severity of involvement and the desired effect, then up to 2 treatments per week for the next 4 weeks. For further treatments, twice per week or less to maintain function.

Maximum duration: 36 visits. 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. Refer to the Chronic Pain Guidelines for care beyond 6 months.

RE-EVALUATE TREATMENT EVERY 3 TO 4 WEEKS If a given treatment or modality is not producing positive results within 3 to 4 weeks, the treatment may be either modified or discontinued. Reconsideration of diagnosis should also occur in the event of poor response to a seemingly rational intervention.

CPT codes 97124 and 97140 cannot exceed 36 visits in combination

- 5.10.6 **Mobilization (Soft Tissue):** is a generally well-accepted treatment. Mobilization of soft tissue is the skilled application of muscle energy, strain/counter strain, myofascial release, manual trigger point release, and manual therapy techniques designed to improve or normalize movement patterns through the reduction of soft tissue pain and restrictions. These can be interactive with the patient participating or can be with the patient relaxing and letting the practitioner move the body tissues. Indications include muscle spasm around a joint, trigger points, adhesions, and neural compression. Mobilization should be accompanied by active therapy.

Maximum duration: 36 visits

RE-EVALUATE TREATMENT EVERY 3 TO 4 WEEKS If a given treatment or modality is not producing positive results within 3 to 4 weeks, the treatment may be either modified or discontinued. Reconsideration of diagnosis should also occur in the event of poor response to a seemingly rational intervention.

CPT codes 97124 and 97140 cannot exceed 36 visits in combination.

- 5.10.7 **Short-Wave Diathermy:** is an accepted treatment which involves the use of equipment that exposes soft tissue to a magnetic or electrical field. Indications include enhanced collagen extensibility before stretching, reduced muscle guarding, reduced inflammatory response, and enhanced re-absorption of hemorrhage/hematoma or edema. It is an accepted modality as an adjunct to acupuncture or situation where other forms of contact superficial heat are contraindicated.

- 5.10.8 **Superficial Heat and Cold Therapy (excluding Infrared Therapy):** is a generally accepted treatment. Superficial heat and cold are thermal agents applied in various manners that lower or raise the body tissue temperature for the reduction of pain, inflammation, and/or effusion resulting from injury or induced by exercise. Includes application of heat just above the surface of the skin at acupuncture points. Indications include acute pain, edema and hemorrhage, need to increase pain threshold, reduce muscle spasm, and promote stretching/flexibility. Cold and heat packs can be used at home as an extension of therapy in the clinic setting.

Time to produce effect:-

Immediate

Frequency: 2 to 5 times per week

Maximum duration: 12 visits with a maximum of 1 unit per day.

- 5.10.9 **Traction—Manual:** is an accepted treatment and an integral part of manual manipulation or joint mobilization. Indications include decreased joint space, muscle spasm around joints, and the need for increased synovial nutrition and response. Manual traction is contraindicated in patients with tumor, infection, fracture, or fracture dislocation.

- 5.10.10 **Traction—Mechanical:** Traction modalities are contraindicated in patients with tumor, infections, fracture, or fracture dislocation. Non-oscillating inversion traction methods are contraindicated in patients with glaucoma or hypertension. Motorized traction/decompression devices are included (i.e. VAX-D, DRX9000, etc.) A home lumbar traction unit can be purchased if therapy proves effective.

Time to produce effect: 1 to 3 sessions up to 30 minutes. If response is negative after 3 treatments, discontinue this modality. Frequency: 2 to 3 times per week. A home lumbar traction unit can be purchased if therapy proves effective. Maximum duration: 24 visits

- 5.10.11 **Transcutaneous Electrical Nerve Stimulation (TENS):** is a generally accepted treatment. TENS should include at least one instructional session for proper application and use. Indications include muscle spasm, atrophy, and decreased circulation and pain control. Minimal TENS unit parameters should include pulse rate, pulse width and amplitude modulation. Consistent, measurable functional improvement should be documented prior to the purchase of a home unit.

Time to produce effect: Immediate

Frequency: Variable

5.10.12 **Ultrasound (Including Phonophoresis):** is an accepted treatment. Ultrasound uses sonic generators to deliver acoustic energy for therapeutic thermal and/or non-thermal soft tissue effects. Indications include scar tissue, adhesions, collagen fiber and muscle spasm, and the need to extend muscle tissue or accelerate the soft tissue healing. Ultrasound with electrical stimulation is concurrent delivery of electrical energy that involves dispersive electrode placement. Indications include muscle spasm, scar tissue, pain modulation, and muscle facilitation.

Phonophoresis is the transfer of medication to the target tissue to control inflammation and pain through the use of sonic generators. These topical medications include, but are not limited to, steroidal anti-inflammatory and anesthetics. Phonophoresis is not recommended for Low Back Pain.

Time to produce effect: 6 to 15 treatments

- Frequency: 3 times per week

Maximum duration: 18 visits

5.10.13 **Whirlpool/Hubbard Tank:** is a generally accepted treatment in which conductive exposure to water at varied temperatures that best elicits the desired effect. It generally includes massage by water propelled by a turbine or Jacuzzi jet system and has the same thermal effects as hot packs, if water temperature exceeds tissue temperature. It has the same thermal effects as cold application, if comparable temperature water is used. Indications include the need for analgesia, relaxing muscle spasm, reducing joint stiffness, and facilitating and preparing for exercise. **This is not recommended for Low Back Pain.**

5.11 **THERAPY—ACTIVE** The following active therapies are widely used and accepted methods of care for a variety of work-related injuries. They are based on the philosophy that therapeutic exercise and/or activity are beneficial for restoring flexibility, strength, endurance, function, range of motion, and can alleviate discomfort. Active therapy requires an internal effort by the individual to complete a specific exercise or task. This form of therapy requires supervision from a therapist or medical provider such as verbal, visual, and/or tactile instruction(s). At times, the provider may help stabilize the patient or guide the movement pattern but the energy required to complete the task is predominately executed by the patient.

Patients should be instructed to continue active therapies at home as an extension of the treatment process in order to maintain improvement levels. Follow-up visits to reinforce and monitor progress and proper technique are recommended. Home exercise can include exercise with or without mechanical assistance or resistance and functional activities with assistive devices. The following active therapies are listed in alphabetical order:

5.11.1 **Activities of Daily Living (ADL)** are well-established interventions which involve instruction, active-assisted training, and/or adaptation of activities or equipment to improve a person's capacity in normal daily activities such as self-care, work re-integration training, homemaking, and driving.

Time to produce effect: 4 to 5 treatments

Maximum duration: 10 visits

5.11.2 **Aquatic Therapy:** is a well-accepted treatment which consists of the therapeutic use of aquatic immersion for therapeutic exercise to promote strengthening, core stabilization, endurance, range of motion, flexibility, body mechanics, and pain management. Aquatic therapy includes the implementation of active therapeutic procedures in a swimming or therapeutic pool. The water provides a buoyancy force that lessens the amount of force gravity applies to the body. The decreased gravity effect allows the patient to have a mechanical advantage and more likely have a successful trial of therapeutic exercise. The therapy may be indicated for individuals who:

Cannot tolerate active land-based or full weight bearing therapeutic procedures
Require increased support in the presence of proprioceptive deficit;
Are at risk of compression fracture due to decreased bone density;
Have symptoms that are exacerbated in a dry environment;
Would have a higher probability of meeting active therapeutic goals than in a land-based environment.

The pool should be large enough to allow full extremity range of motion and fully erect posture. Aquatic vests, belts and other devices can be used to provide stability, balance, buoyancy, and resistance.

Time to produce effect: 4 to 5 treatments

Frequency: 3 to 5 times per week

Maximum duration: 20 visits

~~A self-directed program is recommended after the supervised aquatics program has been established, or, alternatively a transition to a land-based environment exercise program.~~

~~5.11.3 **Functional Activities:** are well-established interventions which involve the use of therapeutic activity to enhance mobility, body mechanics, employability, coordination, balance, and sensory motor integration.~~

~~Time to produce effect: 4 to 5 treatments~~

~~Frequency: 3 to 5 times per week~~

~~Maximum duration: 24 visits~~

~~Total number of visit 97110 and 97530 should not exceed 36 visits without pre-authorization.~~

~~5.11.4 **Functional Electrical Stimulation:** is an accepted treatment in which the application of electrical current to elicit involuntary or assisted contractions of atrophied and/or impaired muscles. It may be indicated for **impaired** muscle function to radiculopathy. (Foot drop)~~

~~Time to produce effect: 2 to 6 treatments~~

~~Frequency: 3 times per week~~

~~Maximum duration: 14 visits inclusive of electrical muscle stimulation codes if beneficial provide with home unit.~~

~~5.11.5 **Neuromuscular Re-education:** is a generally accepted treatment. It is the skilled application of exercise with manual, mechanical, or electrical facilitation to enhance strength; movement patterns; neuromuscular response; proprioception, kinesthetic sense, coordination; education of movement, balance, and posture. Indications include the need to promote neuromuscular responses through carefully timed proprioceptive stimuli, to elicit and improve motor activity in patterns similar to normal neurologically developed sequences, and improve neuromotor response with independent control.~~

~~Time to produce effect: 2 to 6 treatments~~

~~Frequency: 3-5 times per week~~

~~Maximum duration: 30 visits~~

~~5.11.6 **Therapeutic Exercise:** is a generally well-accepted treatment. Therapeutic exercise, with or without mechanical assistance or resistance, may include isoinertial, isotonic, isometric and isokinetic types of exercises. Indications include the need for cardiovascular fitness, reduced edema, improved muscle strength, improved connective tissue strength and integrity, increased bone density, promotion of circulation to enhance soft tissue healing, improvement of muscle recruitment, improved proprioception, and coordination, increased range of motion. Therapeutic exercises are used to promote normal movement patterns, and can also include complementary/alternative exercise movement therapy (with oversight of a physician or appropriate healthcare professional).—~~

~~Spinal Stabilization: is a generally well-accepted treatment. The goal of this therapeutic program is to strengthen the spine in its neural and anatomic position. The stabilization is dynamic which allows whole body movements while maintaining a stabilized spine. It is the ability to move and function normally through postures and activities without creating undue vertebral stress~~

~~Time to produce effect: 2 to 6 treatments~~

~~Frequency: 3 to 5 times per week~~

~~Maximum duration: 30 visits~~

~~Total number of visits of 97110 & 97530 may not exceed 36 visits without pre-authorization.~~

~~5.12 **VOCATIONAL REHABILITATION** is a generally accepted intervention. Initiation of vocational rehabilitation requires adequate evaluation of patients for quantification of highest functional level, motivation, and achievement of maximum medical improvement. Vocational rehabilitation may be as simple as returning to the original job or as complicated as being retrained for a new occupation.~~

~~It may also be beneficial for full vocational rehabilitation to be started, if it is evident that the injured worker will be unable to return to his/her previous occupation. A positive goal and direction may aid the patient in decreasing stress and depression, and promote optimum rehabilitation.~~

~~17 DE Reg. 322 (09/01/13)~~

6.0 Therapeutic Procedures – Operative

All operative interventions must be based upon positive correlation of clinical findings, clinical course, and diagnostic tests. A comprehensive assimilation of these factors must lead to a specific diagnosis with positive identification of pathologic condition(s). It is important to consider non-physiologic modifiers of pain presentation or non-operative conditions mimicking radiculopathy or instability prior to consideration of elective surgical intervention.

While sufficient time allowances for non-operative treatment are required to determine the natural cause and response to non-operative treatment of low back pain disorders, timely decision making for operative intervention is critical to avoid de-conditioning and increased disability (exclusive of "emergent" or urgent pathology such as cauda equina syndrome or associated rapidly progressive neurologic loss).

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 active treatment, or at the end of longer duration of non-operative programs for debilitated patients with complex problems; and/or Frequent recurrences of symptoms cause serious functional limitations even if a non-operative active treatment program provides satisfactory relief of symptoms, and restoration of function on each recurrence. Mere passage of time with poorly guided treatment is not considered an active treatment program.

Surgical evaluation for simple decompression of patients with herniated nucleus pulposus and sciatica should occur within 6 to 12 weeks after injury at the latest, within the above stated contingencies. For patients with true, refractory mechanical low back pain in whom fusion is being considered, it is recommended that a surgical evaluation or interventions occur within 4 months following injury.

Spinal decompression surgeries and fusion have re-operation rates of approximately 10% or more over the following five years. Re-operation is indicated only when the outcome following the re-operation is expected to be better, within a reasonable degree of certainty, than the outcome of other non-invasive or less-invasive treatment procedures. "Outcomes" refer to the patient's ability to improve functional tolerances such as sitting, standing, walking, strength, endurance, and/or vocational status and pain level. While timely surgical decision-making is critical to avoid de-conditioning and increased disability, a time limited trial of reconditioning may be tried prior to re-operation.

Every post-operative patient should be involved in an active treatment program. The non-surgical rehab guidelines listed above do not apply to post-operative rehabilitation and work conditioning. Interdisciplinary interventions should be strongly considered post-operatively in any patient not making functional progress within expected time frames.

6.1 **DISCECTOMY AND NERVE ROOT DECOMPRESSION**

6.1.1 **Description:** To enter into and partially remove the disc and/or Decompress Nerve Root.

6.1.2 **Surgical Indications:** May include any of the following: Primary radicular symptoms, radiculopathy on exam, correlating imaging study, and failure of non-surgical care.

6.1.3 **Post-Operative Therapy:** A formal physical therapy program should be implemented post-operatively. Active treatment, which patients should have had prior to surgery, will frequently require a repeat of the visits previously ordered. The non-surgical rehab guidelines listed above do not apply to post-operative rehabilitation and work conditioning.

6.2 **PERCUTANEOUS DISCECTOMY**

6.2.1 **Description:** An invasive operative procedure to accomplish partial removal of the disc through a needle which allows aspiration of a portion of the disc trocar under imaging control.

6.2.2 **Surgical Indications:** Percutaneous discectomy is indicated only in cases of suspected septic discitis in order to obtain diagnostic tissue. The procedure is not recommended for contained disc herniations or bulges with associated radiculopathy due to lack of evidence to support long-term improvement.

6.3 **LAMINOTOMY/LAMINECTOMY/FORAMENOTOMY/FACETECTOMY**

6.3.1 **Description:** These procedures provide access to produce neural decompression by partial or total removal of various parts of vertebral bone.

6.3.2 **Surgical Indications:** May include all of the following: Primary radicular symptoms, radiculopathy on exam, correlating imaging study, and failure of non-surgical care.

6.3.3 **Post-Operative Therapy:** A formal rehab program should be implemented post-operatively. Active treatment, which patients should have had prior to surgery, will frequently require a repeat of the visits

previously ordered. The implementation of a gentle aerobic reconditioning program (e.g., walking) and back education within the first post-operative week is appropriate in uncomplicated post-surgical cases. Some patients may benefit from several occupational therapy visits to improve performance of ADLs. Participation in an active therapy program which includes restoration of ROM, core stabilization, strengthening, and endurance is recommended. The goals of the therapy program should include instruction in a long-term home-based exercise program. The non-surgical physical therapy guidelines listed above do not apply to post-operative rehabilitation and work conditioning.

6.4 SPINAL FUSION

6.4.1 **Description:** Production of a rigid connection between two or more adjacent vertebrae.

6.4.2 **Surgical Indications:** A timely decision-making process is recommended when considering patients for possible fusion. For chronic low back problems, fusion should not be considered within the first 4 months of symptoms, except for fracture, dislocation, recurrent herniation, or gross instability

Indications for spinal fusion may include:

6.4.2.1 **Neural arch defect**—Spondylolytic spondylolisthesis, congenital unilateral neural arch hypoplasia.

6.4.2.2 **Segmental Instability**—Excessive motion, as in degenerative spondylolisthesis, surgically induced segmental instability.

6.4.2.3 **Primary Mechanical Back Pain/Functional Spinal Unit Failure**—Multiple pain generators objectively involving two or more of the following: (a) internal disc disruption (poor success rate if more than two disc involved), (b) painful motion segment, as in annular tears, (c) disc resorption, (d) facet syndrome, and or (e) ligamentous tear. (f) Degenerative disc disease.

6.4.2.4 **Revision surgery for failed previous operation(s)** if significant functional gains are anticipated.

6.4.2.5 **History of multiple recurrent herniated discs.**

6.4.3 **Pre-operative Surgical Indications:** Required pre-operative clinical surgical indications for spinal fusion include all of the following:

6.4.3.1 **Planned fusion to exceed two levels** requires confirmatory second opinion.

6.4.3.2 **For any potential fusion surgery,** it is recommended that the injured worker be encouraged to refrain from smoking for at least six weeks prior to surgery and during the period of fusion healing. Because smokers have a higher risk of non-union and higher post-operative costs, it is recommended that insurers cover a smoking cessation program peri-operatively.

6.4.4 **Post-operative Therapy:** A formal rehab program should be implemented post-operatively. Active treatment, which patients should have had prior to surgery, will frequently require a repeat of the visits previously ordered. The implementation of a gentle aerobic reconditioning program (e.g., walking), and back education within the first post-operative week is appropriate in uncomplicated post-surgical cases. Some patients may benefit from several occupational therapy visits to improve performance of ADLs. Participation in an active therapy program which includes core stabilization, strengthening, and endurance is recommended the goals of the therapy program should include instruction in a long-term home-based exercise program. The non-surgical physical therapy guidelines listed above do not apply to post-operative rehabilitation and work conditioning

6.4.5 **Return-to-Work:** Barring complications, patients responding favorably to spinal fusion may be able to return to sedentary to light work within 6 to 12 weeks post-operatively, light to medium work within 6 to 9 months post-operatively and medium to medium/heavy work within 6 to 12 months post-operatively. Patients requiring fusion whose previous occupation involved heavy to very-heavy labor should be considered for vocational assessment as soon as reasonable restrictions can be predicted. The practitioner should release the patient with specific physical restrictions and should obtain a clear job description from the employer, if necessary. Once an injured worker is off work greater than 6 months, the functional prognosis with or without fusion becomes guarded for that individual.

6.5 SACROILIAC JOINT FUSION

6.5.1 **Description:** Use of bone grafts, sometimes combined with metal devices, to produce a rigid connection between two or more adjacent vertebrae providing symptomatic instability as a part of major pelvic ring disruption.

6.5.2 **Surgical Indications:** Sacroiliac (SI) joint fusion may be indicated for stabilization of a traumatic severe disruption of the pelvic ring. This procedure has limited use in minor trauma and would be considered only

~~on an individual case-by-case basis. In patients with typical mechanical low back pain, this procedure is considered to be investigational. Until the efficacy of this procedure for mechanical low back pain is determined by an independent valid prospective outcome study, this procedure is not recommended for mechanical low back pain.~~

~~6.6 **IMPLANTABLE SPINAL CORD STIMULATORS** are reserved for those low back pain patients with pain of greater than 6 months duration who have not responded to the standard non-operative or operative interventions previously discussed within this document. Refer to Division's Chronic Pain Disorder Medical Treatment Guidelines.~~

~~6.7 **INTRADISCAL ELECTROTHERMAL ANNULOPLASTY (IDEA) (more commonly called IDET, or Intradiscal Electrothermal therapy)**~~

~~6.7.1 **Description:** An outpatient non-operative procedure. A wire is guided into the identified painful disc using fluoroscopy. The wire is then heated at the nuclear annular junction within the disc. Physicians performing this procedure must have been trained in the procedure and should have performed at least 25 prior discograms. Prior authorization is required for IDET.~~

~~6.7.2 **Surgical Indications:** Failure of conservative therapy including physical therapy, medication management, or therapeutic injections. Indications may include those with chronic low back pain, disc related back pain, or pain lasting greater than 6 months. There is conflicting evidence regarding its effectiveness. In one of the most recent studies only approximately 40% of patients had greater than 50% relief of pain. Patients should be aware of these percentages. Strict adherence to the indications is recommended~~

~~The candidate should meet the following criteria:~~

~~6.7.2.1 Age not above 60 or under 18; and~~

~~6.7.2.2 Normal neurological exam; and~~

~~6.7.2.3 No evidence of nerve root compression on MRI; and~~

~~6.7.2.4 Concordant pain reproduced with provocation discography (low pressure); and~~

~~6.7.2.5 Functionally limiting low back pain far in excess of leg pain for at least 6 months; and~~

~~6.7.2.6 No evidence of inflammatory arthritis, spinal conditions mimicking low back pain, moderate to severe spinal stenosis, spinal instability, disc herniation, or medical or metabolic diseases precluding follow-up rehabilitation; and~~

~~6.7.2.7 Disc height greater than 50% of adjacent normal disc; and~~

~~6.7.2.8 No previous IDET procedure at the same level.~~

~~6.7.3 **Post-Procedure Therapy:** Some cases may require epidural injection after the IDET procedure has been performed. A corset should be used for the first 6 weeks. Sitting upright is limited to 30 to 45 minutes for the first two weeks. A formal physical therapy program should be implemented post-operatively. Some patients may benefit from several occupational therapy visits to improve performance of ADLs. Rehabilitation may take as long as 6 months and include stretching during the first month, floor exercises in the second month, 3 to 5 consecutive months of progressive exercise program, and sport activities in the 5th and 6th months as tolerated. The goals of the therapy program should include instruction in a long-term home-based exercise program. The non-surgical physical therapy guidelines listed above do not apply to post-operative rehabilitation and work conditioning~~

~~**Return to Work:** Barring complications, may be able to return to limited duty after one to two weeks. A corset should be used for the first six weeks. Sitting upright is limited to 30 to 45 minutes for the first two weeks. Zero to 10 pounds lifting limits for first 6 weeks post-procedure. If successful, patients may return to medium work category (20 to 50 pounds per DOT standards) at 4 to 6 months.~~

~~6.8 **LASER DISCECTOMY** involves the delivery of laser energy into the center of the nucleus pulposus using a fluoroscopically guided laser fiber under local anesthesia. The energy denatures protein in the nucleus, causing a structural change which is intended to reduce intradiscal pressure. Its effectiveness has not been shown. Laser discectomy is not recommended.~~

~~6.9 **ARTIFICIAL LUMBAR DISC REPLACEMENT**~~

~~6.9.1 **Description:** involves the insertion of a prosthetic device into an intervertebral space from which a degenerated disc has been removed, sparing only the peripheral annulus. The endplates are positioned under intraoperative fluoroscopic guidance for optimal placement in the sagittal and frontal planes. The~~

~~prosthetic device is designed to distribute the mechanical load of the vertebrae in a physiologic manner and maintain range of motion.~~

~~General selection criteria for lumbar disc replacement includes symptomatic one-level degenerative disc disease. The patient must also meet fusion surgery criteria, and if the patient is not a candidate for fusion, a disc replacement procedure should not be considered. Additionally, the patient should be able to comply with pre and post surgery protocol.~~

~~The theoretical advantage of total disc arthroplasty is that it preserves range of motion and physiologic loading of the disc. This could be an advantage for adults who are physically active. Studies do not demonstrate a long term advantage of measured function or pain over comparison groups undergoing fusion. The longevity of this prosthetic device has not yet been determined. Significant technical training and experience is required to perform this procedure successfully. Surgeons must be well versed in anterior spinal techniques and should have attended appropriate training courses, or have undergone training during a fellowship. Mentoring and proctoring of procedures is highly recommended. Reasonable pre-operative evaluation may include an angiogram to identify great vessel location. The angiogram may be either with contrast or with magnetic resonance imaging. An assistant surgeon with anterior access experience is required.~~

6.9.2 **Surgical Indications:**

~~Symptomatic one-level degenerative disc disease established by objective testing (CT or MRI scan followed by positive provocation discogram, if necessary).~~

~~Symptoms unrelieved after six months of active non-surgical treatment, including physical medicine and manual therapy interventions.~~

6.9.3 **Contraindications:**

~~Significant spinal deformity/scoliosis Facet joint arthrosis Spinal instability Deficient posterior elements Infection Any contraindications to an anterior abdominal approach (including multiple prior abdominal procedures) Previous compression or burst fracture at the surgical level Spinal canal stenosis Spondylolysis Spondylolisthesis greater than 3 mm Osteoporosis or any metabolic bone disease Chronic steroid use or use of other medication known to interfere with bone or soft tissue healing Autoimmune disorder Allergy to device components/materials Morbid obesity (e.g., body/mass index [BMI] of greater than 40, over 100 pounds overweight) Active malignancy~~

6.9.4 **Post-operative Therapy:** ~~Bracing may be appropriate. A formal therapy program should be implemented post-operatively. Active treatment, which patients may have had prior to surgery, will frequently require a repeat of the visits previously ordered. The implementation of a gentle aerobic reconditioning program (e.g., walking) and back education within the first post-operative week is appropriate in uncomplicated post-surgical cases. Some patients may benefit from several occupational therapy visits to improve performance of ADLs. Participation in an active therapy program which includes restoration of ROM, core stabilization, strengthening, and endurance is recommended to be initiated at the discretion of the surgeon. Lifting and bending are usually limited for several months at least. Sedentary duty may be able to begin within six weeks in uncomplicated cases. The goals of the therapy program should include instruction in a long-term home-based exercise program. The non-surgical therapy guidelines listed above do not apply to post-operative rehabilitation and work-conditioning.~~

6.10 **KYPHOPLASTY**

6.10.1 **Description:** ~~A surgical procedure for the treatment of symptomatic thoracic or lumbar vertebral compression fractures, most commonly due to osteoporosis or other metabolic bone disease, and occasionally with post-traumatic compression fractures and minor burst fractures that do not significantly compromise the posterior cortex of the vertebral body. Pain relief can be expected in approximately 90% of patients. Vertebral height correction is inconsistent, with approximately 35% to 40% of procedures failing to restore height or kyphotic angle.~~

6.10.2 **Operative Treatment:** ~~Kyphoplasty involves the percutaneous insertion of a trocar and inflatable balloon or expanding polymer into the vertebral body, which re-expands the body, elevating the endplates and reducing the compression deformity. Polymethylmethacrylate (PMMA) bone cement is injected under low pressure into the cavity created by the balloon inflation. In contrast to vertebroplasty, which introduces PMMA cement under high pressure, the space created by balloon inflation allows a higher viscosity PMMA to be injected under lower pressure, which may reduce the risks associated with extravertebral~~

extravasation of the material. There may be an advantage to performing the procedure within one month of the fracture, since the elevation of the endplates may be more readily achieved than when the procedure is delayed.

6.10.3 **Surgical Indications:** Kyphoplasty is an accepted treatment for the following indications:-

Compression fracture vertebral height loss between 20% and 85% Vertebral height restoration.

Kyphoplasty is more likely to increase vertebral height if performed within 30 days of fracture occurrence

6.10.4 **Contraindications:**

The presence of neurologic compromise related to fracture

High velocity fractures with a significant burst component

Significant posterior vertebral body wall fracture

Severe vertebral collapse (vertebra plana)

Infection, and

Coagulopathy

6.11 VERTEBROPLASTY

6.11.1 **Description:** a procedure for the treatment of painful thoracic and lumbar vertebral compression fractures caused by osteoporosis or other metabolic bone disease. Polymethylmethacrylate (PMMA) bone cement is injected with high pressure into the vertebral body via an 11 to 13 gauge needle, with the goal of stabilizing the spine and relieving pain. The procedure does not correct spinal deformity. Pain relief can be expected in approximately 90% of patients. Vertebral height correction is inconsistent, with approximately 35% to 40% of procedures failing to restore height or kyphotic angle.

6.11.2 **Indications:**

Compression fracture of preferably less than 30 days Vertebral height loss between 20% and 85% Intact posterior wall

6.11.3 **Contraindications:**

The presence of neurologic compromise related to the fracture; High velocity fractures with a significant burst component. Posterior vertebral body wall fracture; Severe vertebral collapse (vertebra plana); and Infection; and Coagulopathy

6.12 **PERCUTANEOUS RADIOFREQUENCY DISC DECOMPRESSION** is an investigational procedure which introduces a 17 gauge cannula under local anesthesia and fluoroscopic guidance into the nucleus pulposus of the contained herniated disc, using radiofrequency energy to dissolve and remove disc material. Pressure inside the disc is lowered as a result. There have been no randomized clinical trials of this procedure at this time. Percutaneous radiofrequency disc decompression is not recommended.

6.13 **NUCLEUS PULPOSUS REPLACEMENT** involves the introduction of a prosthetic implant into the intervertebral disc, replacing the nucleus while preserving the annulus fibrosus. It is limited to investigational use in the United States at this time. It is not recommended.

6.14 **EPIDUROSCOPY AND EPIDURAL LYSIS OF ADHESIONS** (Refer to Injections-Therapeutic).

6.15 **INTRAOPERATIVE MONITORING** is a common intraoperative electrodiagnostic technique that may include somatosensory evoked potentials (SSEP), motor evoked potentials (MEP), or pedicle screw monitoring. The monitoring procedure may be used to evaluate spinal cord integrity and screw placement during the operative procedure. The use of intraoperative monitoring can be anticipated to become more common as percutaneous spinal procedures gain greater acceptance.

13-DE Reg. 1558 (06/01/10)

17-DE Reg. 322 (09/01/13)

7.0 General Guidelines

7.1 Global Reimbursement

The reimbursement allowances for surgical procedures are based on a global reimbursement concept that covers performing the basic service and the normal range of care required after surgery.

- Global reimbursement includes:

7.1.1 The operation per se

7.1.2 Local infiltration, metacarpal/metatarsal/digital block or topical anesthesia

- 7.1.3 ~~Subsequent to the decision and/or authorization for surgery, one related E/M encounter on the date immediately prior to or on the date of the procedure (including history and physical), but does not include the initial consultation~~
- 7.1.4 ~~Immediate postoperative care, including dictating operative notes, talking with the family and other physicians~~
- 7.1.5 ~~Writing orders~~
- 7.1.6 ~~Evaluating the patient in the post anesthesia recovery area~~
- 7.1.7 ~~Normal, uncomplicated follow-up care for the time periods indicated in the follow-up days (FUD) column to the right of each procedure code. The number in that column establishes the days during which no additional reimbursement is allowed for the usual care provided following surgery, absent complications or unusual circumstances.~~
- 7.1.8 ~~The maximum reimbursement allowances cover all normal postoperative care, including the removal of sutures by the surgeon or associate. Follow-up days are specified by procedure.~~
~~Follow-up days listed are for 0, 10, or 90 days and are listed in the Fee Schedule as 000, 010, or 090.~~

7.2 **Implants**

~~Bone morphogenetic protein is an FDA approved biologic fusion and fracture healing aid. Its use in spine and fracture surgery represents the standard of care in our community, and in both on-label and off-label applications is accepted and to be reimbursed to the facility providing the implant, at rates consistent with implant payment rates determined under the respective ASC and hospital reimbursement guidelines~~

7.3 **Surgical Assistant**

- 7.3.1 ~~Physician surgical assistant — For the purpose of reimbursement, a physician who assists at surgery is reimbursed as a surgical assistant. Assistant surgeons should use modifier 80 and are allowed twenty percent (20%) of the maximum reimbursement allowance (MRA) for the procedure(s).~~
- 7.3.2 ~~Registered Nurse Surgical Assistant or Physician Assistant~~
 - 7.3.2.1 ~~A physician assistant, or registered nurses who have completed an approved first assistant training course, may be allowed a fee when assisting a surgeon in the operating room (O.R.).~~
 - 7.3.2.2 ~~The maximum reimbursement allowance for the physician assistant or the registered nurse first assistant (RNFA) is twenty percent (20%) of the surgeon's fee for the procedure(s) performed.~~
 - 7.3.2.3 ~~Under no circumstances will a fee be allowed for an assistant surgeon and a physician assistant or RNFA at the same surgical encounter.~~
 - 7.3.2.4 ~~Registered nurses on staff in the O.R. of a hospital, clinic, or outpatient surgery center do not qualify for reimbursement as an RNFA.~~

7.4 **Therapeutic Procedures**

~~Therapeutic procedures (injecting into cavities, nerve blocks, etc.) (CPT codes 20526–20610, 64400, 64450) may be billed in addition to the medical care for a new patient. (Use appropriate level of service plus injection.) In follow-up cases for additional therapeutic injections and/or aspirations, an office visit is only indicated if it is necessary to re-evaluate the patient. In this case, a minimal visit may be listed in addition to the injection. Documentation supporting the office visit charge must be submitted with the bill to the payer. This is clarified in the treatment guidelines in a more specific manner. Trigger point injection is considered one procedure and reimbursed as such regardless of the number of injection sites. Two codes are available for reporting trigger point injections. Use 20552 for injection(s) of single or multiple trigger point(s) in one or two muscles or 20553 when three or more muscles are involved.~~

7.5 **Intervertebral Biomechanical Device(s) and Use of Code 22851**

~~Code 22851 describes the application of an intervertebral biomechanical device to a vertebral defect or interspace. Code 22851 should be listed in conjunction with a primary procedure without the use of modifier 51. The use of 22851 is limited to one instance per single interspace or single vertebral defect regardless of the number of devices applied and infers additional qualifying training, experience, sizing, and/or use of special surgical appliances to insert the biomechanical device. Qualifying devices include manufactured synthetic or allograft biomechanical devices, or methyl methacrylate constructs, and are not dependant on a specific manufacturer, shape, or material of which it is constructed. Qualifying devices are machine cut to specific dimensions for precise application to an intervertebral defect. (For example, the use of code 22851 would be~~

appropriate during a cervical arthrodesis (22554) when applying a synthetic alloy cage, a threaded bone dowel, or a machine cut hexahedron cortical, cancellous, or cortico cancellous allograft biomechanical device. Surgeons utilizing generic non-machined bony allografts or autografts are referred to code sets 20930–20931, 20936–20938 respectively.)

7.6 Spinal and Cranial Services Require Additional Surgeon

Certain spinal and cranial procedures require the services of an additional surgeon of a different specialty to gain exposure to the spine and brain. These typically are vascular, thoracic and ENT. The surgical exposure portion of these procedures will be billed, dictated and followed separately by the exposure surgeon for their portion of the procedure.

7.7 Multiple Procedure Reimbursement Rule

Multiple procedures performed during the same operative session at the same operative site are reimbursed at 100% of the allowable fee for the primary and all subsequent procedures.

7.8 External Spinal Stimulators Post Fusion

7.8.1 The following criteria are established for the medically accepted standard of care when determining applicability for the use of an external spinal stimulator. However, the medical necessity should be determined on a case-by-case basis.

7.8.1.1 Patient has had a previously failed spinal fusion, and/or

7.8.1.2 Patient is scheduled for revision or repair of pseudoarthrosis, and/or

7.8.1.3 The patient smokes greater than a pack of cigarettes per day and is scheduled for spinal fusion

7.8.2 The external spinal stimulator is approved for use in primary spinal fusions, if medical co-morbidities increase the likelihood of non-union

7.8.3 The external spinal stimulator will be reimbursed by report (BR).

7.8.4 The patient is metabolically in poor health, with other medical co-morbidities such as diabetes, Rheumatoid arthritis, lupus or other illnesses requiring oral steroids or cytotoxic medications.

7.8.5 Precertification is required for use of the external spinal stimulator if the planned use falls outside the above indications.

11 DE Reg. 1661 (06/01/08)

12 DE Reg. 67 (07/01/08)

PART E Shoulder Treatment Guidelines

1.0 Introduction

Pursuant to 19 **Del.C.** §2322C, health care practice guidelines have been adopted and recommended by the Health Care Advisory Panel to guide utilization of health care treatments in workers' compensation including, but not limited to, care provided for the treatment of employees by or under the supervision of a licensed health care provider, prescription drug utilization, inpatient hospitalization and length of stay, diagnostic testing, physical therapy, chiropractic care and palliative care. The health care practice guidelines apply to all treatments provided after the effective date of the regulation adopted by the Department of Labor, May 23, 2008, and regardless of the date of injury.

The guidelines are, to the extent permitted by the most current medical science or applicable science, based on well-documented scientific research concerning efficacious treatment for injuries and occupational disease. To the extent that well-documented scientific research regarding the above is not available at the time of adoption of the guidelines, or is not available at the time of any revision to the guidelines, the guidelines have been and will be based upon the best available information concerning national consensus regarding best health care practices in the relevant health care community.

The guidelines, to the extent practical and consistent with the Act, address treatment of those physical conditions which occur with the greatest frequency, or which require the most expensive treatments, for work-related injuries based upon currently available Delaware data.

Services rendered by any health care provider certified pursuant to 19 **Del.C.** §2322D(a) to provide treatment or services for injured employees shall be presumed, in the absence of contrary evidence, to be reasonable and necessary if such treatment and/or services conform to the most current version of the Delaware health care practice guidelines.

Services rendered outside the Guidelines and/or variation in treatment recommendations from the Guidelines may represent acceptable medical care, be considered reasonable and necessary treatment and, therefore,

determined to be compensable, absent evidence to the contrary, and may be payable in accordance with the Fee Schedule and Statute, accordingly.

~~Services provided by any health care provider that is not certified pursuant to 19 Del.C. §2322D(a) shall not be presumed reasonable and necessary unless such services are pre-authorized by the employer or insurance carrier, subject to the exception set forth in 19 Del.C. §2322D(b).~~

~~Treatment of conditions unrelated to the injuries sustained in an industrial accident may be denied as unauthorized if the treatment is directed toward the non-industrial condition, unless the treatment of the unrelated injury is rendered necessary as a result of the industrial accident.~~

~~The Health Care Advisory Panel and Department of Labor recognized that acceptable medical practice may include deviations from these Guidelines, as individual cases dictate. Therefore, these Guidelines are not relevant as evidence of a provider's legal standard of professional care.~~

~~In accordance with the requirements of the Act, the development of the health care guidelines has been directed by a predominantly medical or other health professional panel, with recommendations then made to the Health Care Advisory Panel.~~

2.0 General Guideline Principles

~~The principles summarized in this section are key to the intended implementation of these guidelines and critical to the reader's application of the guidelines in this document.~~

- ~~2.1 **EDUCATION** of the patient and family, as well as the employer, insurer, policy makers and the community should be the primary emphasis in the treatment of upper extremity pain and disability. Currently, practitioners often think of education last, after medications, manual therapy and surgery. Practitioners must develop and implement an effective strategy and skills to educate patients, employers, insurance systems, policy makers and the community as a whole. An education-based paradigm should always start with inexpensive communication providing reassuring information to the patient. More in-depth education currently exists within a treatment regime employing functional restorative and innovative programs of prevention and rehabilitation. No treatment plan is complete without addressing issues of individual and/or group patient education as a means of facilitating self-management of symptoms and prevention.~~
- ~~2.2 **TREATMENT PARAMETER DURATION** Time frames for specific interventions commence once treatments have been initiated, not on the date of injury. Obviously, duration will be impacted by patient compliance, comorbidities and availability of services. Clinical judgment may substantiate the need to modify the total number of visits discussed in this document. The majority of injured workers with Shoulder Disorders often will achieve resolution of their condition within 6 to 36 visits (Guide to Physical Therapy Practice—Second Edition). It is anticipated that most injured workers will not require the maximum number of visits described in these guidelines. They are designed to be a ceiling and care extending beyond the maximum allowed visits may warrant utilization review.~~
- ~~2.3 **ACTIVE INTERVENTIONS** emphasizing patient responsibility, such as therapeutic exercise and/or functional treatment, are generally emphasized over passive modalities, especially as treatment progresses. Generally, passive interventions are viewed as a means to facilitate progress in an active rehabilitation program with concomitant attainment of objective functional gains. All rehabilitation programs must incorporate "Active Interventions" no later than three weeks after the onset of treatment. Reimbursement for passive modalities only after the first three weeks of treatment without clear evidence of Active Interventions will require supportive documentation.~~
- ~~2.4 **ACTIVE THERAPEUTIC EXERCISE PROGRAM** Exercise program goals should incorporate patient strength, endurance, flexibility, coordination, and education. This includes functional application in vocational or community settings.~~
- ~~2.5 **POSITIVE PATIENT RESPONSE** Positive results are defined primarily as functional gains which can be objectively measured. Objective functional gains include, but are not limited to, positional tolerances, range of motion, strength, endurance, activities of daily living, cognition, and efficiency/velocity measures which can be quantified. Subjective reports of pain and function should be considered and given relative weight when the pain has anatomic and physiologic correlation. Anatomic correlation must be based on objective findings.~~
- ~~2.6 **RE-EVALUATE TREATMENT EVERY 3-4 WEEKS** If a given treatment or modality is not producing positive results within 3-4 weeks, the treatment should be either modified or discontinued. Reconsideration of diagnosis should also occur in the event of poor response to a seemingly rational intervention.~~
- ~~2.7 **SURGICAL INTERVENTIONS** Surgery should be contemplated within the context of expected functional outcome and not purely for the purpose of pain relief. The concept of "cure" with respect to surgical treatment by itself is generally a misnomer. All operative interventions must be based upon positive correlation of clinical~~

findings, clinical course and diagnostic tests. A comprehensive assimilation of these factors must lead to a specific diagnosis with positive identification of pathologic condition(s).

2.8 ~~**SIX-MONTH TIME FRAME** Since the prognosis drops precipitously for returning an injured worker to work once he/she has been temporarily totally disabled for more than six months, the emphasis within these guidelines is to move patients along a continuum of care and return to work within a six-month time frame, whenever possible. It is important to note that time frames may not be pertinent to injuries which do not involve work-time loss or are not occupationally related.~~

2.9 ~~**RETURN TO WORK** Even if there is residual chronic pain, return to work is not necessarily contraindicated. Return to work may be therapeutic, assuming the work is not likely to aggravate the basic problem or increase long-term pain. The practitioner must write detailed restrictions when returning a patient to limited duty. The following functions should be considered and modified as recommended: lifting, pushing, pulling, crouching, walking, using stairs, bending at the waist, awkward and/or sustained postures, tolerance for sitting or standing, hot and cold environments, data entry and other repetitive motion tasks, sustained grip, tool usage and vibration factors. The patient should never be released to "sedentary or light duty" without specific physical limitations. The practitioner must understand all of the physical demands of the patient's job position before returning the patient to full duty and should request clarification of the patient's job duties.~~

2.10 ~~**DELAYED RECOVERY** The Department recognizes that not all industrially injured patients will not recover within the time lines outlined in this document despite optimal care. Such individuals may require treatments beyond the limits discussed within this document, but such treatment will require clear documentation by the authorized treating practitioner focusing on objective functional gains afforded by further treatment and impact upon prognosis.~~

~~The remainder of this document should be interpreted within the parameters of these guideline principles which will hopefully lead to more optimal medical and functional outcomes for injured workers.~~

3.0 Introduction to Shoulder Injury

This section addresses the shoulder and the ten most common work-related injuries/syndromes/disorders to or involving the shoulder complex. The following format was developed to reduce repetitive text:

3.1 ~~**HISTORY TAKING AND PHYSICAL EXAMINATION** provides information common to all injuries through a discussion of provider procedures which should be applied to each patient, regardless of the injury and diagnosis (this subsection is standard to all Division medical treatment guidelines).~~

3.2 ~~**SPECIFIC DIAGNOSIS, TESTING AND TREATMENT PROCEDURES** provides information unique to each of the following work-related injuries/syndromes/disorders:~~

3.2.1 Acromioclavicular (AC) Joint Sprains/Dislocations

3.2.2 Adhesive Capsulitis/Frozen Shoulder Disorders

3.2.3 Bicipital Tendon Disorders

3.2.4 Brachial Plexus Injuries

3.2.4.1 Brachial Plexus

3.2.4.2 Axillary Nerve

3.2.4.3 Long Thoracic Nerve

3.2.4.4 Musculocutaneous Nerve

3.2.4.5 Spinal Accessory Nerve

3.2.4.6 Suprascapular Nerve

3.2.5 Bursitis of the Shoulder

3.2.6 Impingement Syndrome

3.2.7 Rotator Cuff Tears

3.2.8 Rotator Cuff Tendinitis

3.2.9 Shoulder Fractures

3.2.9.1 Clavicular Fracture

3.2.9.2 Proximal Humeral Fracture

3.2.9.3 Humeral Shaft Fracture

3.2.9.4 Scapular Fracture

3.2.9.5 Sternoclavicular Dislocation/Fracture

3.2.10 Shoulder Instability

Each diagnosis is presented in the following format:

- 3.2.10.1 A definition of the injury/disorder/syndrome;
- 3.2.10.2 Discussion of relevant physical findings;
- 3.2.10.3 Applicable testing and diagnostic procedures;
- 3.2.10.4 Diagnosis-based, non-operative therapeutic treatment procedures;
- 3.2.10.5 Options for operative/surgical treatment; and
- 3.2.10.6 Options for post-operative rehabilitation/treatment procedures.

3.3 **MEDICATION** provides information common to all injuries through detailed discussions of referenced medications with indications for expected time to produce effect, frequency, and optimum and maximum durations.

3.4 **NON-OPERATIVE TREATMENT PROCEDURES** provides information common to all injuries through detailed discussions of referenced therapeutic procedures with indications for expected time to produce effect, frequency, and optimum and maximum durations.

As shoulder injuries frequently involve a complex of problems, it is always necessary to consider the possible interaction of the various parts of the shoulder mechanism when proceeding with a diagnostic workup and a therapeutic treatment plan. Injuries to the shoulder may require the provider to reference and/or use the other Division medical treatment guidelines (i.e., Thoracic Outlet Syndrome Cumulative Trauma Disorder, and/or Complex Regional Pain Syndrome/Reflex Sympathetic Dystrophy).

4.0 History Taking and Physical Examination (HX & PE)

There are two standard procedures that should be utilized when initially diagnosing work-related shoulder instability. These procedures are generally accepted, well-established and widely used procedures that establish the foundation/basis for and dictate all other following stages of diagnostic and therapeutic procedures. When findings of clinical evaluations and those of other diagnostic procedures are not complementing each other, the objective clinical findings should have preference.

4.1 **HISTORY TAKING** should address at least the following for each shoulder injury diagnosis:

4.1.1 Occupational relationship, and

4.1.2 History of non-occupational injury and avocational pursuits need to be specifically documented.

4.2 **PHYSICAL FINDINGS** are specific to and addressed within each shoulder injury diagnosis noted in this section. Given the complexity of the shoulder mechanism, an evaluation for concomitant injury should be considered.

5.0 Specific Diagnosis, Testing and Treatment Procedures

5.1 **ACROMIOCLAVICULAR JOINT SPRAINS/DISLOCATIONS** An acute acromioclavicular (AC) joint injury is frequently referred to as a shoulder separation. There are six classifications of an AC joint separation which are based upon the extent of ligament damage and bony displacement:

- Type I Partial disruption of the AC ligament and capsule.
- Type II Sprains consisting of a ruptured AC ligament and capsule with incomplete injury to the coracoclavicular (CC) ligament, resulting in minimal AC joint subluxation.
- Type III Separation or complete tearing of the AC ligament and/or CC ligaments, possible deltoid trapezius fascial injury, and dislocation of the AC joint.
- Type IV Dislocation consisting of a displaced clavicle that penetrates posteriorly through or into the trapezius muscle.
- Type V Dislocation consisting of complete separation of the AC and CC ligaments and dislocation of the acromioclavicular joint with a large coracoclavicular interval.
- Type VI Dislocation consisting of a displaced clavicle that penetrates inferior to the coracoid.

Types I-III are common, while Types IV-VI are not and, when found, require surgical consultation. For AC joint degeneration from repetitive motion that is found to be work-related, see section 5.4.8, Impingement Syndrome.

5.1.1 **History and Initial Diagnostic Procedures (AC Joint Sprains/Dislocations):**

- Occupational Relationship – generally, workers sustain an AC joint injury when they land on the point of the shoulder, driving the acromion downward, or fall on an outstretched hand or elbow, creating a backward and outward force on the shoulder. It is important to rule out other sources of shoulder pain from an acute injury, including rotator cuff tear, fracture and nerve injury.

5.1.2 **Physical Findings (AC Joint Sprains/Dislocations) may include:**

5.1.2.1 Tenderness at the AC joint with, at times, contusions and/or abrasions at the joint area; prominence/asymmetry of the shoulder can be seen; and/or

5.1.2.2 One finds decreased shoulder motion and with palpation, the distal end of the clavicle is painful; there may be increased clavicular translation; cross-body adduction can cause exquisite pain.

5.1.3 **Laboratory Tests (AC Joint Sprains/Dislocations):** are not indicated unless a systemic illness or disease is suspected.

5.1.4 **Testing Procedures (AC Joint Sprains/Dislocations):**

5.1.4.1 Plain x-rays may include:

5.1.4.1.1 AP view;

5.1.4.1.2 AP radiograph of the shoulder with the beam angled 10 cephalad (Zanca view);

5.1.4.1.3 Axillary lateral views; and

5.1.4.1.4 Y-view also called a Stryker notch view;

5.1.4.1.5 Stress view; side-to-side comparison with 10-15 lbs. of weight in each hand.

5.1.4.2 Adjunctive testing, such as standard radiographic techniques (sonography, arthrography or MRI), should be considered when shoulder pain is refractory to 4-6 weeks of non-operative conservative treatment and the diagnosis is not readily identified by a good history and clinical examination.

5.1.5 **Non-operative Treatment Procedures (AC Joint Sprains/Dislocations):** may include:

5.1.5.1 Procedures outlined in this Section 5.3.5 such as thermal treatment and immobilization (up to 6 weeks for Type I-III AC joint separations). Immobilization treatments for Type III injuries are controversial and may range from a sling to surgery.

5.1.5.2 Medication, such as nonsteroidal anti-inflammatories and analgesics, would be indicated; narcotics are not normally indicated but may be needed after an acute injury. In the face of chronic acromioclavicular joint pain, a series of injections with or without cortisone, may be injected 6-8 times per year.

5.1.5.3 Physical medicine interventions, as outlined in Section 5.3.5, should emphasize a progressive increase in range of motion without exacerbation of the AC joint injury. With increasing motion and pain control, a strengthening program should be instituted and return to modified/limited duty would be considered at this time. By 8-11 weeks, with restoration of full motion, return to full duty should be anticipated.

5.1.6 **Operative Procedures (AC Joint Sprains/Dislocations):**

5.1.6.1 With a Type III AC joint injury, an appropriate orthopedic consultation should be considered initially, but must be considered when conservative care fails to increase function.

5.1.6.2 With a Type IV-VI AC joint injury, an orthopedic surgical consultation is recommended initially.

5.1.7 **Post-Operative Procedures (AC Joint Sprains/Dislocations):** should be coordinated by the orthopedic physician working with the interdisciplinary team. Keeping with the therapeutic and rehabilitation procedures found in this Section 5.3.5. Non-operative Treatment Procedures, the patient could be immobilized for 2-3 weeks, restricted in activities, both work related and avocational for 8-12 weeks while undergoing rehabilitation, and be expected to progress to return to full duty based upon the his/her response to rehabilitation and the demands of the job.

5.2 **ADHESIVE CAPSULITIS/FROZEN SHOULDER DISORDERS** Adhesive capsulitis of the shoulder, also known as frozen shoulder disorder, is a soft tissue lesion of the glenohumeral joint resulting in restrictions of passive and active range of motion. Occupational adhesive capsulitis arises secondarily to any chest or upper extremity trauma. Primary adhesive capsulitis is rarely occupational in origin. The disorder goes through stages, specifically:

- Stage 1 Consists of acute pain with some limitation in range of motion; generally lasting 2-9 months.
- Stage 2 Characterized by progressive stiffness, loss of range of motion, and muscular atrophy; it may last an additional 4-12 months beyond Stage 1.
- Stage 3 Characterized by partial or complete resolution of symptoms and restoration of range of motion and strength; it usually takes an additional 6-9 months beyond Stage 2.

5.2.1 **History and Initial Diagnostic Procedures (Adhesive Capsulitis/Frozen Shoulder Disorder):**

5.2.1.1 Occupational Relationship—There should be some history of work related injury. Often adhesive capsulitis is seen with impingement syndrome or other shoulder disorders; refer to appropriate subsection of this guideline.

- 5.2.1.2 Patient will usually complain of pain in the sub-deltoid region, but occasionally over the long head of the biceps or radiating down the lateral aspect of the arm to the forearm. Pain is often worse at night with difficulty sleeping on the involved side. Motion is restricted and painful.
- 5.2.2 **Physical Findings (Adhesive Capsulitis/Frozen Shoulder Disorder):** Restricted active and passive glenohumeral range of motion is the primary physical finding. It may be useful for the examiner to inject the glenohumeral joint with lidocaine and then repeat range of motion to rule out other shoulder pathology; lack of range of motion confirms the diagnosis. Postural changes and secondary trigger points along with atrophy of the deltoid and supraspinatus muscles may be seen.
- 5.2.3 **Laboratory Tests (Adhesive Capsulitis/Frozen Shoulder Disorder):** are not indicated unless systemic illness or disease is suspected.
- 5.2.4 **Testing Procedures (Adhesive Capsulitis/Frozen Shoulder Disorder):**
- 5.2.4.1 Plain x-rays are generally not helpful except to rule out concomitant pathology.
- 5.2.4.2 Adjunctive testing, such as standard radiographic techniques (sonography, arthrography or MRI), to rule out concomitant pathology should be considered when shoulder pain is refractory to 4-6 weeks of non-operative conservative treatment and the diagnosis is not readily identified by a good history and clinical examination.
- 5.2.4.3 Arthrography may be helpful in ruling out other pathology. Arthrography can also be therapeutic as steroids and/or anesthetics may be injected and a brisement or distension arthrogram can be done at the same time (refer to the next subsection on non-operative treatment procedures for further discussion).
- 5.2.5 **Non-operative Treatment (Adhesive Capsulitis/Frozen Shoulder Disorder):** address the goal to restore and maintain function and may include:
- 5.2.5.1 A home exercise program either alone or in conjunction with a supervised rehabilitation program is the mainstay of treatment. Additional interventions may include thermal treatment, ultrasound, TENS, manual therapy, and passive and active range of motion exercises; as the patient progresses, strengthening exercises should be included in the exercise regimen; refer to Section 5.3.5, Non-operative Treatment Procedures.
- 5.2.5.2 Medications, such as NSAIDs and analgesics, may be helpful. Rarely, the use of oral steroids is indicated to decrease acute inflammation. Narcotics can be used for short-term pain control; narcotics are indicated for post-manipulation or post-operative cases; refer to this Section 6.0, Medications.
- 5.2.5.3 Occasionally, subacromial bursal and/or glenohumeral steroid injections can decrease inflammation and allow the therapist to progress functional exercise and range of motion. Injections should be limited to two injections to any one site, given at least one month apart.
- 5.2.5.4 In cases that are refractory to conservative therapy lasting at least 3-6 months and in whom range of motion remains significantly restricted (abduction less than 90°), the following more aggressive treatment may be considered:
- 5.2.5.4.1 Distension arthrography or "brisement" in which saline, an anesthetic and usually a steroid are forcefully injected into the shoulder joint causing disruption of the capsule. Early and aggressive physical medicine to maintain range of motion and restore strength and function should follow distension arthrography or manipulation under anesthesia; return to work with restrictions should be expected within one week of the procedure; return to full duty is expected within 4-6 weeks.
- 5.2.6 **Operative Procedures (Adhesive Capsulitis/Frozen Shoulder Disorder):** For cases failing conservative therapy of at least 3-6 months duration and which are significantly limited in range of motion (abduction less than 90°), the following operative procedures may be considered:
- 5.2.6.1 Manipulation under anesthesia which may be done in combination with steroid injection(s) or distension arthrography; and
- 5.2.6.2 In rare cases, refractory to conservative treatment and in which manipulation under anesthesia is contraindicated, an open capsular release or arthroscopy with resection of the coracohumeral and/or coracoacromial ligaments may be done; other disorders, such as impingement syndrome, may also be treated at the same time.
- 5.2.7 **Post-Operative Procedures (Adhesive Capsulitis/Frozen Shoulder Disorder):** would include an individualized rehabilitation program based upon communication between the surgeon and the therapist.
- Early, aggressive and frequent physical medicine interventions are recommended to maintain range of motion and progress strengthening; return to work with restrictions after surgery

should be discussed with the treating provider; patient should be approaching MMI within 8-12 weeks post-operative, however, coexistence of other pathology should be taken into consideration.

5.3 **BICIPITAL TENDON DISORDERS** Disorders may include 1) primary bicipital tendinitis which is exceedingly rare; 2) secondary bicipital tendinitis which is generally associated with rotator cuff tendinitis or impingement syndrome (see appropriate diagnosis subsections); 3) subluxation of the biceps tendon which occurs with dysfunction of the transverse intertubercular ligament and massive rotator cuff tears; and 4) acute disruption of the tendon which can result from an acute distractive force or transection of the tendon from direct trauma.

5.3.1 **History and Initial Diagnostic Procedures (Bicipital Tendon Disorders):**

5.3.1.1 Occupational Relationship — bicipital tendon disorders may include symptoms of pain and/or achiness that occur after repetitive use of the shoulder and/or blunt trauma to the shoulder. Secondary bicipital tendinitis may be associated with prolonged above the shoulder activities, and/or repeated shoulder flexion, external rotation and abduction. Acute trauma to the biceps tendon of the shoulder girdle may also give rise to occupational injury of the biceps tendon.

5.3.1.2 Occupational disorders of the biceps tendon may accompany scapulothoracic dyskinesia, rotator cuff injury, AC joint separation, subdeltoid bursitis, shoulder instability or other shoulder pathology. Symptoms should be exacerbated or provoked by work that activated the biceps muscle. Symptoms may be exacerbated by other activities that are not necessarily work related.

5.3.1.3 Symptoms may include aching, burning and/or stabbing pain in the shoulder, usually involving the anterior medial portion of the shoulder girdle. The symptoms are exacerbated with above the shoulder activities and those specifically engaging the biceps (flexion at the shoulder, flexion at the elbow and supination of the forearm). Relief occurs with rest. Patients may report nocturnal symptoms which interfere with sleep during the acute stages of inflammation; pain and weakness in shoulder during activities; repeated snapping phenomenon with a subluxing tendon; immediate sharp pain and tenderness along the course of the long head of the biceps following a sudden trauma which would raise suspicions of acute disruption of the tendon; and/or with predominant pain at the shoulder referral patterns which may extend pain into the cervical or distal structures, including the arm, elbow, forearm and wrist.

5.3.2 **Physical Findings (Bicipital Tendon Disorders): may include:**

5.3.2.1 If continuity of the tendon has been lost (biceps tendon rupture), inspection of the shoulder would reveal deformity (biceps bunching);

5.3.2.2 Palpation demonstrates tenderness along the course of the bicipital tendon;

5.3.2.3 Pain at end range of flexion and abduction as well as biceps tendon activation; and/or

5.3.2.4 Provocative testing may include:

5.3.2.4.1 Yergason's sign — pain with resisted supination of forearm;

5.3.2.4.2 Speed's Test — pain with resisted flexion of the shoulder (elbow extended and forearm supinated); or

5.3.2.4.3 Ludington's Test — pain with contraction of the biceps (hands are placed behind the head placing the shoulders in abduction and external rotation).

5.3.3 **Laboratory Tests (Bicipital Tendon Disorders):** are not indicated unless a systemic illness or disease is suspected.

5.3.4 **Testing Procedures (Bicipital Tendon Disorders):**

5.3.4.1 Plain x-rays include:

5.3.4.1.1 Anterior/Posterior (AP) view visualizes elevation of the humeral head, indicative of absence of the rotator cuff due to a tear;

5.3.4.1.2 Lateral view in the plane of the scapula and/or an axillary view determine if there is anterior or posterior dislocation or the presence of a defect in the humeral head (a Hill-Sachs lesion);

5.3.4.1.3 30° caudally angulated AP view determines if there is a spur on the anterior/inferior surface of the acromion and/or the far end of the clavicle; and

5.3.4.1.4 Outlet view determines if there is a downwardly tipped acromion.

5.3.4.2 Adjunctive testing, such as sonography, MRI or arthrography, should be considered when shoulder pain is refractory to 4-6 weeks of nonoperative conservative treatment and the diagnosis is not readily identified by standard radiographic techniques. These tests may be occasionally performed immediately after an injury if tendon injury is suspected based on history and physical examination.

5.3.5 **Non-operative Treatment Procedures (Bicipital Tendon Disorders):**

- 5.3.5.1 Benefit may be achieved through procedures outlined in Section 5.3.5. Non-operative Treatment Procedures, such as thermal therapy, immobilization, alteration of occupation and/or work station, manual therapy and biofeedback.
- 5.3.5.2 Medication, such as nonsteroidal anti-inflammatories and analgesics, would be indicated; narcotics are not normally indicated but may be needed in the acute phase. Refer to Section 5.3.5. Non-operative Treatment Procedures for further discussions.
- 5.3.5.3 Physical medicine and rehabilitation interventions, as outlined in Section 5.3.5. Non-operative Treatment Procedures, should emphasize a progressive increase in range of motion. With increasing motion and pain control, a strengthening program should be instituted and return to modified/limited duty would be considered at this time. By 8-11 weeks, with restoration of full motion, return to full duty should be anticipated.
- 5.3.5.4 Biceps tendon injections may be therapeutic if the patient responds positively to an injection of an anesthetic. Injection of the corticosteroids directly into the tendon should be avoided due to possible tendon breakdown and degeneration, limited to 3 injections per year at the same site, and avoided in patients under 30 years of age.

5.3.6 **Operative Procedures (Bicipital Tendon Disorders):**

- 5.3.6.1 Bicipital Tendinitis: Conservative care prior to potential surgery must address flexibility and strength imbalances. Surgical remedies would be considered after 12 weeks of appropriate conservative care has failed. Since impingement of the biceps tendon could cause continued irritation, an acromioplasty may be necessary, especially when the presence of an obstructing osteophyte is demonstrated on plain x-rays.
- 5.3.6.2 Subluxing Bicipital Tendon: The decision to surgically stabilize the bicipital tendon is not commonly indicated. In the vast majority of cases, optimal outcome is achieved through successful rehabilitation procedures and appropriate conservative measures should be maximized prior to surgical intervention.
- 5.3.6.3 Acute Disruption of the Bicipital Tendon: Surgical treatment shows variable responses. Conservative care should be the mainstay of treatment with particular attention given to the patient's age, work description and motivation. Rarely surgery is needed to address chronic mechanical symptoms which can occur from the intra articular residual biceps tendon stump or to stabilize severe biceps bunching.

5.3.7 **Post-Operative Procedures (Bicipital Tendon Disorders):** would include an individualized rehabilitation program either self-directed or in a supervised setting. Rehabilitation, lasting 6-12 weeks, is often necessary. Rehabilitation procedures discussed in Section 5.3.5, Non-operative Treatment Procedures should be referenced and used.

5.4 **BRACHIAL PLEXUS INJURIES** to the nerves and shoulder girdle region resulting in loss of motor and sensory function, pain and instability of the shoulder. Signs and symptoms vary with the degree of mechanism of injury. The two modes of injury are: 1) acute direct trauma, and 2) repetitive motion or overuse. Transient compression, stretch or traction (neuropraxia) causes sensory and motor signs lasting days to weeks. Damage to the axon (axonemesis) without disruption of the nerve framework may cause similar symptoms. The recovery time is delayed and depends upon axon regrowth distally from the site of injury. Laceration or disruption of the entire nerve with complete loss of framework (neuromesis) is the most severe form of nerve injury. Return of function is dependent upon regrowth of the nerve distal to the injury site.

Electromyography (EMG) is the most commonly used diagnostic modality to analyze nerve injuries. Electrophysiologic studies, such as electromyography and nerve conduction studies, are generally accepted, well-established and widely used for localizing the source of neurological symptoms. These studies should be utilized as an extension of the history and clinical examination.

Slowing of motor nerve conduction velocities due to demyelination localizes regions of entrapment and injury. Denervation demonstrated on the electromyographic portion is indicative of motor axonal or anterior horn cell loss. Studies should be performed 3-4 weeks following injury or description of symptoms. If the symptoms have been present for longer than 3-4 weeks, studies may be performed immediately after the initial evaluation. Serial studies may be indicated if initial studies are negative and may also be useful for gauging prognosis. Limb temperature should be controlled at 30-40° centigrade. There are six relatively common nerve injuries to the shoulder girdle; each type will be addressed separately.

5.4.1 **Brachial Plexus:** is formed by the nerve roots of C5-C8 and T1; these nerve roots exit the cervical spine and pass through the scalene musculature; after leaving the scalene musculature, at the level of the clavicle, they form trunks, divisions and chords which ultimately form the peripheral nerves of the arm.

5.4.1.1 History and Initial Diagnostic Procedures (Brachial Plexus)

- 5.4.1.1.1 Occupational Relationship—direct injury to brachial plexus results in widespread sensory and motor loss. Direct trauma, subluxation to shoulder, clavicular fractures, shoulder depression, head deviation away to the arm may result in variable brachial plexus lesions. It is important to differentiate injuries to the brachial plexus from the acquired (nonwork-related) syndrome of brachial plexus neuritis, Parsonage-Turner Syndrome and/or neuralgia demyotrophy.
- 5.4.1.2 Physical Findings (Brachial Plexus) may include:
 - 5.4.1.1.2 Inspection for evidence of trauma or deformity;
 - 5.4.1.1.3 Identification of sensory loss and demonstration of weakness which relates to the severity and anatomy of the injury to the brachial plexus; and/or
 - 5.4.1.1.4 Pain with recreation of the motions during the mechanism of injury.
- 5.4.1.3 Laboratory Tests (Brachial Plexus) are not indicated unless a systemic illness or disease is suspected.
- 5.4.1.4 Testing Procedures (Brachial Plexus) would include EMG and Nerve Conduction Studies. If they do not localize and give sufficient information, then additional information may be obtained from MRI and/or myelography. These studies are employed to differentiate root avulsion from severe brachial plexus injuries.
- 5.4.1.5 Non-operative Treatment Procedures (Brachial Plexus)
 - 5.4.1.5.1 In closed injuries, observation is favored; repeat electro-physiologic studies may be helpful to follow recovery.
 - 5.4.1.5.2 Rehabilitation can be utilized using procedures set forth in this Section 5.3.5, Non-operative Treatment Procedures. However, utilization of ultrasound, cold and heat should be discussed with the Physician since these modalities can aggravate nerve injury.
 - 5.4.1.5.3 Medications, such as analgesics, nonsteroidal anti-inflammatories and anti-convulsants, are indicated; steroids may be prescribed to help diminish the inflammatory response, and narcotics may be indicated acutely; all medications should be prescribed as seen in this Section 6.0, Medications.
- 5.4.1.6 Operative Procedures (Brachial Plexus): In open injuries, exploration may be worthwhile if there is poor progression of recovery from a conservative approach; in closed injuries, if progressive weakness and loss of function is documented after 4-6 months of conservative care, then exploration is also warranted.
- 5.4.1.7 Post-Operative Procedures (Brachial Plexus) would include an individualized rehabilitation program based upon communication between the surgeon and the therapist. This program would begin with 4-6 weeks of rest followed by progressive increase in motion and strength.
- 5.4.2 **Axillary Nerve:** is derived from the 5th and 6th cervical roots; it passes around the shoulder and supplies motor branches to the teres minor and the three heads of the deltoid; it gives sensation to the top of the shoulder at the level of the deltoid.
 - 5.4.2.1 History and Initial Diagnostic Procedures (Axillary Nerve):

Occupational Relationship—direct injury and penetrating wounds to the shoulder and upward pressure on the axilla can cause injury to the axillary nerve; abnormalities of the nerve can also be seen with fractures of the surgical neck of the humerus and dislocation of the shoulder; finally, axillary nerve injury can be seen with shoulder surgery in and of itself.
 - 5.4.2.2 Physical Findings (Axillary Nerve) may include:
 - 5.4.2.2.1 Weakness and atrophy of the deltoid muscle;
 - 5.4.2.2.2 Strength is lost in abduction, flexion and extension of the shoulder; and/or
 - 5.4.2.2.3 Sensory loss can be seen over the upper arm.
 - 5.4.2.3 Laboratory Tests (Axillary Nerve) are not indicated unless a systemic illness or disease is suspected.
 - 5.4.2.4 Testing Procedures (Axillary Nerve) would include EMG and Nerve Conduction Studies.
 - 5.4.2.5 Nonoperative Treatment Procedures (Axillary Nerve)
 - 5.4.2.5.1 Rehabilitation can be utilized using procedures set forth in this Section 5.3.5. Non-operative Treatment Procedures. Utilization of ultrasound, cold and heat should be discussed with the Physician since these modalities can aggravate the nerve injury.
 - 5.4.2.5.2 Medications such as analgesics, nonsteroidal anti-inflammatories and anti-convulsants are indicated and narcotics may be indicated acutely; all medications should be prescribed as seen in this Section 6.0. Medications.

- 5.4.2.6 Operative Procedures (Axillary Nerve) are usually not necessary, since most injuries to the axillary nerve are due to stretch and/or traction. One may consider surgery after 4-6 months with EMG/NCV documentation of ongoing denervation and loss of function.
- 5.4.2.7 Post-Operative Procedures (Axillary Nerve) would include an individualized rehabilitation program based upon communication between the surgeon and the therapist. This program would begin with 4-6 weeks of rest followed by progressive increase in motion and strength.
- 5.4.3 **Long Thoracic Nerve:** is formed by the cervical fifth, sixth, and seventh roots; it crosses the border of the first rib and descends along the posterior surface of the thoracic wall to the serratus anterior.
- 5.4.3.1 History and Initial Diagnostic Procedures (Long Thoracic Nerve)
- 5.4.3.1.1 Occupational Relationship— injury can occur by direct trauma to the posterior triangle of the neck or trauma may be the result of chronically repeated or forceful shoulder depression. Repeated forward motion of the arms as well as stretch or compression of the nerve with the arms abducted can lead to long thoracic nerve dysfunction.
- 5.4.3.2 Physical Findings (Long Thoracic Nerve) may include:
- 5.4.3.2.1 Dull ache in the region of the shoulder without sensory loss;
- 5.4.3.2.2 Scapular deformity and/or winging may be described by patient or family; and/or
- 5.4.3.2.3 Serratus Anterior (scapular winging) may be demonstrated by asking the patient to extend and lean on his arms, such as against a wall and/or the examiner resisting protraction.
- 5.4.3.3 Laboratory Tests (Long Thoracic Nerve) are not indicated unless a systemic illness or disease is suspected
- 5.4.3.4 Testing Procedures (Long Thoracic Nerve) EMG and Nerve Conduction Studies are used to define the anatomy and severity of the injury; side-to-side comparisons of the nerve can be helpful to confirm the diagnosis; studies may also exclude more widespread brachial plexus involvement.
- 5.4.3.5 Non-operative Treatment (Long Thoracic Nerve)
- 5.4.3.5.1 Rehabilitation can be utilized using procedures set forth in Section 5.3.5 Non-operative Treatment Procedures. Utilization of ultrasound, cold, and heat should be discussed with the Physician since these modalities can aggravate nerve injury.
- 5.4.3.5.2 Medications, such as analgesics, nonsteroidal anti-inflammatories and anti-convulsants, are indicated and narcotics may be indicated acutely; all medications should be prescribed as seen in this Section 6.0 Medications.
- 5.4.3.6 Operative Procedures (Long Thoracic Nerve) such as scapular fixation, may be recommended but only in the most severe cases where there is documented significant loss of function.
- 5.4.3.7 Post-Operative Procedures (Long Thoracic Nerve) should include an individualized rehabilitation program based upon communication between the surgeon and the therapist. This program would begin with 8-10 weeks of rest followed by progressive increase in motion and strength.
- 5.4.4 **Musculocutaneous Nerve:** is derived from the fifth and sixth cervical roots; it innervates the coracobrachialis, biceps and brachioradialis muscles and also provides sensation to the lateral aspect of the forearm; trauma (including surgery) or penetrating wound to the brachial plexus, coracobrachialis, and shoulder often can cause nerve injury.
- 5.4.4.1 History and Initial Diagnostic Procedures (Musculocutaneous Nerve)
- 5.4.4.1.1 Occupational Relationship— most commonly a stretch/traction injury due to forceful extension of the elbow induces nerve dysfunction; trauma can be seen to the sensory component (lateral antebrachial cutaneous nerve) which delineates loss of sensation to the forearm.
- 5.4.4.2 Physical Findings (Musculocutaneous Nerve) may include:
- Pain in the arm;
 - Weakness and atrophy in the biceps and brachialis; and/or
 - Sensory loss over the lateral aspect of the forearm; however, is not always seen.
- 5.4.4.3 Laboratory Tests (Musculocutaneous Nerve) are not indicated unless a systemic illness or disease is suspected.
- 5.4.4.4 Testing Procedures (Musculocutaneous Nerve) include EMG and nerve conduction studies; side-to-side comparisons of the motor and sensory components of the nerve may be useful since standard norms are not always reliable.
- 5.4.4.5 Non-operative Treatment Procedures (Musculocutaneous Nerve)
- 5.4.4.5.1 Rehabilitation can be utilized using procedures set forth in this Section 5.3.5. Non-operative Treatment Procedures. Utilization of ultrasound, cold, and heat should be discussed with the Physician, since these modalities can aggravate nerve injury.

- 5.4.4.5.2 Medications, such as analgesics, nonsteroidal anti-inflammatories and anticonvulsants, are indicated and narcotics may be indicated; all medications should be prescribed as seen in this Section 6.5 Medications.
- 5.4.4.6 Operative Procedures (Musculocutaneous Nerve) are usually not necessary unless there has been increasing loss of function over 4-6 months and/or a laceration to the nerve has been identified.
- 5.4.4.7 Post-Operative Procedures (Musculocutaneous Nerve) would include an individualized rehabilitation program based upon communication between the surgeon and the therapist. This program would begin with 8-10 weeks of rest followed by progressive increase in motion and strength.
- 5.4.5 **Spinal Accessory Nerve:** is the eleventh cranial nerve; the nerve innervates the ipsilateral sternocleidomastoid and trapezius muscles which are extremely important for scapular control and ultimately shoulder function.
 - 5.4.5.1 History and Initial Diagnostic Procedures (Spinal Accessory Nerve)
 - 5.4.5.1.1 Occupational Relationship – direct trauma to the posterior neck, forceful compression of the shoulder downward and/or deviation of the head away from the traumatized shoulder can lead to injury to this nerve; surgical resection of the posterior neck can disrupt the nerve.
 - 5.4.5.2 Physical Findings (Spinal Accessory Nerve) may include:
 - Pain in the shoulder;
 - Weakness or paralysis of the trapezius which is seen as winging with the arms out to the side (abduction); and/or
 - Drooping of the shoulder.
 - 5.4.5.3 Laboratory Tests (Spinal Accessory Nerve) are not indicated unless a systemic illness or disease is suspected.
 - 5.4.5.4 Testing Procedures (Spinal Accessory Nerve) include EMG and Nerve Conduction Studies are used to define the anatomy and severity of the injury; side to side comparisons of the nerve can be helpful to confirm the diagnosis; radiographic procedures may be necessary to exclude lesion at the base of the brain or upper cervical spine.
 - 5.4.5.5 Non-operative Treatment Procedures (Spinal Accessory Nerve)
 - 5.4.5.5.1 Rehabilitation can be utilized using procedures set forth in Section 5.3.5. Non-operative Treatment Procedures. Utilization of ultrasound, cold, and heat should be discussed with the Physician, since these modalities can aggravate nerve injury.
 - 5.4.5.5.2 Medications, such as analgesics, nonsteroidal anti-inflammatories and anticonvulsants, are indicated and narcotics may be indicated acutely; all medications should be prescribed as seen in Section 6.5 Medications.
 - 5.4.5.6 Operative Procedures (Spinal Accessory Nerve) are usually not necessary unless increased loss of function over 4-6 months has been documented and/or a laceration to the nerve has been identified.
 - 5.4.5.7 Post-Operative Procedures (Spinal Accessory Nerve) would include an individualized rehabilitation program based upon communications between the surgeon and the therapist. This program would begin with 8-10 weeks of rest followed by progressive increase in motion and strength.
- 5.4.6 **Suprascapular Nerve:** is derived from the fifth and sixth cervical root, superior trunk of the brachial plexus, and it innervates the supraspinatus and infraspinatus muscles of the rotator cuff.
 - 5.4.6.1 History and Initial Diagnostic Procedures (Suprascapular Nerve)
 - 5.4.6.1.1 Occupational Relationship – supraclavicular trauma, stretch, and friction through the suprascapular notch or against the transverse ligament at the notch can cause injury to the nerve; repetitive use of the arm has been shown on occasion to cause traction to the nerve.
 - 5.4.6.2 Physical Findings (Suprascapular Nerve) may include:
 - Pain at the shoulder;
 - Wasting at the supraspinatus and/or infraspinatus muscles with weakness; and/or
 - Tinel's can help to elicit a provocative pain response.
 - 5.4.6.3 Laboratory Tests (Suprascapular Nerve) are not indicated unless a systemic illness or disease is suspected.

5.4.6.4 ~~Testing Procedures (Suprascapular Nerve) include EMG and nerve conduction studies; side-to-side comparisons may be useful since standard norms are not always reliable. If one suspects a mass lesion at the suprascapular notch, then an MRI may be indicated.~~

5.4.6.5 ~~Non-operative Treatment Procedures (Suprascapular Nerve)~~

5.4.6.5.1 ~~Rehabilitation can be utilized using procedures set forth in Section 5.3.5. Non-operative Treatment Procedures. Utilization of ultrasound, cold, and heat should be discussed with the Physician, since these modalities can aggravate nerve injury.~~

5.4.6.5.2 ~~Medications, such as analgesics, nonsteroidal anti-inflammatories and anti-convulsants, are indicated and narcotics may be indicated acutely; all medications should be prescribed as seen in this Section 6.5 Medications.~~

5.4.6.6 ~~Operative Treatment Procedures (Suprascapular Nerve) involving surgical release at the suprascapular notch or spinoglenoid region is warranted depending upon the results of the electrophysiologic studies and/or absence of improvement with conservative management.~~

5.4.6.7 ~~Post-Operative Procedures (Suprascapular Nerve) would include an individualized rehabilitation program based upon communication between the surgeon and the therapist. This program would begin with 8-10 weeks of rest followed by progressive increase in motion and strength.~~

5.5 **BURSITIS OF THE SHOULDER** Acute or chronic inflammation of the bursa (a potential fluid filled sac) that may be caused by trauma, chronic overuse, inflammatory arthritis, and acute or chronic infection that generally presents with localized pain and tenderness of the shoulder.

5.5.1 **History and Initial Diagnostic Procedures (Bursitis of the Shoulder):**

- ~~Occupational Relationship – onset of symptoms, date, mechanism of onset, and occupational history and current requirements should be correlated with the intensity, character, duration and frequency of associated pain and discomfort.~~
- ~~History may include nocturnal pain, pain with over-the-shoulder activities, feeling of shoulder weakness, prior treatment for presenting complaint(s), specific limitations of movement and pertinent familial history.~~

5.5.2 **Physical Findings (Bursitis of the Shoulder):** may include:

- ~~Palpation elicits localized tenderness over the particular bursa or inflamed tendon; loss of motion during activity;~~
- ~~Painful arc may be seen between 40-120° and/or~~
- ~~Bursitis may be associated with other shoulder injury diagnoses such as impingement, rotator cuff instability, tendonitis, etc.; refer to applicable diagnosis subsections for additional guidelines.~~

5.5.3 **Laboratory Tests (Bursitis of the Shoulder):** may be used to rule out systemic illness or disease when proper clinical presentation indicates the necessity for such testing. Testing could include sedimentation rate, rheumatoid profile, complete blood count (CBC) with differential, serum uric acid level, routine screening of other medical disorders may be necessary, as well as bursal aspiration with fluid analysis.

5.5.4 **Testing Procedures (Bursitis of the Shoulder):**

5.5.4.1 Plain x-rays include:

5.5.4.1.1 AP view visualizes elevation of the humeral head, indicative of absence of the rotator cuff due to a tear;

5.5.4.1.2 Lateral view in the plane of the scapula or an axillary view determines if there is anterior or posterior dislocation or the presence of a defect in the humeral head (a Hill-Sachs lesion);

5.5.4.1.3 30° caudally angulated AP view determines if there is a spur on the anterior/interior surface of the acromion and/or the far end of the clavicle; and

5.5.4.1.4 Outlet view determines if there is a downwardly tipped acromion.

5.5.4.2 Adjunctive testing, such as standard radiographic techniques (sonography, arthrography or MRI), should be considered when shoulder pain is refractory to 4-6 weeks of non-operative conservative treatment and the diagnosis is not readily identified by a good history and clinical examination.

5.5.5 **Non-operative Treatment Procedures (Bursitis of the Shoulder):**

5.5.5.1 Benefits may be achieved through procedures outlined in Section 5.3.5. Non-operative Treatment Procedures, such as immobilization, therapeutic exercise, alteration of occupation and work station, thermal therapy, TENS unit, and ultrasound.

5.5.5.2 May return to work without overhead activities and lifting with involved arm until cleared by physician for those and heavier activities.

5.5.5.3 Additional modalities/treatment procedures may include biofeedback; physical medicine and rehabilitation including instruction in therapeutic exercise, proper work technique and manual therapy; vocational rehabilitation, vocational assessment and interdisciplinary team approach.

5.5.5.4 Medications such as nonsteroidal anti-inflammatories and analgesics. Subacromial space injection may be therapeutic but should be limited to 3 injections per year in the same location. Injection of the corticosteroids directly into the tendons should be avoided due to possible tendon breakdown and degeneration. There are rare occasions where intratendinous injections may be cautiously considered if calcific tendonitis is present.

Rarely are injections used in patients under 30 years of age.

5.5.6 **Operative Procedures (Bursitis of the Shoulder):** are not commonly indicated for pure bursitis; refer to other appropriate diagnoses in Section 5.0. Specific Diagnosis, Testing and Treatment Procedures.

5.6 **IMPINGEMENT SYNDROME** A collection of symptoms, not a pathologic diagnosis. The symptoms result from the encroachment of the acromion, coracoacromial ligament, coracoid process, and/or the AC joint of the rotator cuff mechanism that passes beneath them as the shoulder is moved. The cuff mechanism is intimately related to the coracoacromial arch. Separated only by the thin lubricating surfaces of the bursa, compression and friction can be minimized by several factors, such as-

- Shape of the coracoacromial arch that allows passage of the subjacent rotator cuff;
- Normal undersurface of the AC Joint;
- Normal bursa;
- Normal capsular laxity; and
- Coordinated scapulothoracic function.

The impingement syndrome may be associated with AC joint arthritis, both partial and full thickness rotator cuff tears, adhesive capsulitis/frozen shoulder and bursitis. Normal function of the rotator cuff mechanism and biceps tendon assist to diminish impingement syndrome.

5.6.1 **History and Initial Diagnostic Procedures (Impingement Syndrome):**

5.6.1.1 Occupational Relationship—established repetitive overuse of the upper extremity; many times this is seen with constant overhead motion.

5.6.1.2 History may include:

5.6.1.2.1 Delayed presentation; since the syndrome is usually not an acute problem; patients will access care if their symptoms have not resolved with rest, time and "trying to work it out";

5.6.1.2.2 Complaints of functional losses due to pain, stiffness, weakness and catching when the arm is flexed and internally rotated; and

5.6.1.2.3 Poor sleep is common and pain is often felt down the lateral aspect of the upper arm near the deltoid insertion or over the anterior proximal humerus.

5.6.2 **Physical Findings (Impingement Syndrome):** may include:

5.6.2.1 Inspection of the shoulder may reveal deltoid and rotator cuff atrophy;

5.6.2.2 Range of motion is limited particularly in internal rotation and in cross-body adduction;

5.6.2.3 Passive motion through the 60-90° arc of flexion may be accompanied by pain and crepitus; this is accentuated as the shoulder is moved in-and-out of internal rotation;

5.6.2.4 Active elevation of the shoulder is usually more uncomfortable than passive elevation;

5.6.2.5 Pain on maximum active forward flexion is frequently seen with impingement syndrome, but is not specific for diagnosis;

5.6.2.6 Strength testing may reveal weakness of flexion and external rotation in the scapular plane; this weakness may be the result of disuse, tendon damage, or poor scapulothoracic mechanics;

5.6.2.7 Pain on resisted abduction or external rotation may also indicate that the integrity of the rotator cuff tendons may be compromised; and/or

5.6.2.8 Weakness of the posterior scapular stabilizers can also be seen as a contributing factor to impingement syndrome by altering the mechanics of the glenohumeral joint.

5.6.3 **Laboratory Tests (Impingement Syndrome):** are not indicated unless a systemic illness or disease is suspected.

5.6.4 **Testing Procedures (Impingement Syndrome):**

5.6.4.1 Plain x rays include:

5.6.4.1.1 AP view visualizes elevation of the humeral head, indicative of rotator cuff fiber failure with diminished space at the subacromial area;

- 5.6.4.1.2 Lateral view in the plane of the scapula or an axillary view can help to determine aspects of instability which can give symptoms similar to impingement syndrome;
- 5.6.4.1.3 30° caudally angulated AP view can assess for a spur on the anterior/inferior surface of the acromion and/or the distal end of the clavicle which can lead to encroachment on the rotator cuff mechanism with motion; and
- 5.6.4.1.4 Outlet view determines if there is a downwardly tipped acromion.
- 5.6.4.2 Adjunctive testing, such as standard radiographic techniques (sonography, arthrography or MRI), should be considered when shoulder pain is refractory to 4-6 weeks of non-operative conservative treatment and the diagnosis is not readily identified by a good history and clinical examination.
- 5.6.5 **Non-operative Treatment Procedures (Impingement Syndrome)** may include:
 - 5.6.5.1 Medications, such as nonsteroidal anti-inflammatories and analgesics, should be prescribed as seen in Section 6.5 Medications. Subacromial space injection may be therapeutic. Injections of corticosteroids into the subacromial space should be limited to 3 injections per year at the same site, and rarely used in patients less than 30 years.
 - 5.6.5.2 In order to have the most favorable outcome from a conservative approach, an aggressive attempt should be made to define the contributing factors which are driving the syndrome, such as shoulder stiffness, humeral head depressor weakness (rotator cuff fiber failure), and subacromial crowding AC Joint arthritis.
 - 5.6.5.3 Procedures outlined in Section 5.3.5. Non-operative Treatment Procedures should be considered, such as relative rest, immobilization, thermal treatment, ultrasound, therapeutic exercise and physical medicine and rehabilitation.
- 5.6.6 **Operative Procedures (Impingement Syndrome):** should restore functional anatomy by reducing the potential for repeated impingement; procedures might include distal clavicular resection, coracoacromial ligament release, and/or acromioplasty.
- 5.6.7 **Post-Operative Procedures (Impingement Syndrome):** would include an individualized rehabilitation program based upon communication between the surgeon and the therapist.
 - 5.6.7.1 Individualized rehabilitation programs might include:
 - 5.6.7.1.1 Sling or abduction splint;
 - 5.6.7.1.2 Gentle pendulum exercise, passive glenohumeral range of motion and aggressive posterior scapular stabilizing training can be instituted;
 - 5.6.7.1.3 At 4 weeks post-operative, begin isometrics and ADL involvement; and/or
 - 5.6.7.1.4 Depending upon the patient's functional response, at 4 weeks post-operative consider beginning light resistive exercise; concomitantly, return to a light modified duty may be plausible given the ability to accommodate "no repetitive overhead activities."
 - 5.6.7.2 Progressive resistive exercise from 2 months with gradual returning to full activity at 5-7 months; all active non-operative procedures listed in this Section 5.3.5. Non-operative Treatment Procedures should be considered.
 - 5.6.7.3 Work restrictions should be evaluated every 4-6 weeks during post-operative recovery and rehabilitation with appropriate written communications to both the patient and the employer. Should progress plateau, the provider should reevaluate the patient's condition and make appropriate adjustments to the treatment plan.
- 5.7 **ROTATOR CUFF TEAR** Partial or full-thickness tears of the rotator cuff tendons, most often the supraspinatus can be caused by vascular, traumatic or degenerative factors or a combination. Further tear classification includes: a small tear is less than 1cm; medium tear is 1-3cm; large tear is 3-5cm; and massive tear is greater than 5cm, usually with retraction.
 - 5.7.1 **History and Initial Diagnostic Procedures (Rotator Cuff Tear):**
 - 5.7.1.1 Occupational Relationship—established with sudden trauma to the shoulder or chronic over-use with repetitive overhead motion with internal or external rotation.
 - 5.7.1.2 History may include:
 - 5.7.1.2.1 Partial-thickness cuff tears usually occur in age groups older than 30. Full-thickness tears can occur in younger age groups.
 - 5.7.1.2.2 Complaints of pain along anterior, lateral or posterior glenohumeral joint.
 - 5.7.2 **Physical Findings (Rotator Cuff Tear)** may include:
 - 5.7.2.1 Partial-Thickness Tear
 - 5.7.2.1.1 There will be pain at the end of range of motion with full passive range-of-motion for abduction, elevation, external rotation; internal rotation is attainable;

- 5.7.2.1.2 Active range of motion will be limited and painful for abduction and external rotation, as well as internal rotation and forward flexion;
- 5.7.2.1.3 A painful arc may be present with active elevation;
- 5.7.2.1.4 Pain will be positive for resisted tests (abduction, flexion, external rotation, internal rotation, abduction/internal rotation at 90°, and abduction/external rotation at 45°; and/or
- 5.7.2.1.5 If there are positive impingement signs, see this Section 5.4.8, Impingement Syndrome.
- 5.7.2.2 Full-Thickness Tears
 - 5.7.2.2.1 Passive and resisted findings are similar to those for partial thickness tears; and/or
 - 5.7.2.2.2 Active elevation will be severely limited with substitution of scapular rotation being evident.
- 5.7.3 ~~Laboratory Tests (Rotator Cuff Tear):~~ are not indicated unless a systemic illness or disease is suspected.
- 5.7.4 ~~Testing Procedures (Rotator Cuff Tear):~~
 - 5.7.4.1 Plain x-rays include:
 - 5.7.4.1.1 AP view visualizes elevation of the humeral head, indicative of absence of the rotator cuff due to a tear;
 - 5.7.4.1.2 Lateral view in the plane of the scapula and/or an axillary view determines if there is anterior or posterior dislocation or the presence of a defect in the humeral head (a Hill-Sachs lesion);
 - 5.7.4.1.3 30° caudally angulated AP view determines if there is a spur on the anterior inferior surface of the acromion and/or the far end of the clavicle; and
 - 5.7.4.1.4 Outlet view determines if there is a downwardly tipped acromion.
 - 5.7.4.2 Adjunctive testing should be considered when shoulder pain is refractory to 4-6 weeks of non-operative conservative treatment and the diagnosis is not readily identified by standard radiographic techniques, then sonography, arthrography or MRI may be indicated. These tests may be occasionally performed immediately after an injury if rotator cuff tear is suspected based on history and physical exam.
- 5.7.5 ~~Non-operative Treatment Procedures (Rotator Cuff Tear):~~
 - 5.7.5.1 Medications, such as nonsteroidal anti-inflammatories and analgesics, would be indicated; acute rotator cuff tear could indicate the need for limited narcotics use.
 - 5.7.5.2 Relative rest and procedures outlined in Section 5.3.5. Non-operative Treatment Procedures, such as immobilization, therapeutic exercise, alteration of occupation/work station, thermal treatment, TENS unit, therapeutic ultrasound, return-to-work, biofeedback and physical medicine and rehabilitation. If no increase in function for a partial or full-thickness tear is observed after 6-8 weeks, a surgical consultation is indicated. Early surgical intervention produces better surgical outcome due to healthier tissues and often less limitation of movement prior to and after surgery.
- 5.7.6 ~~Operative Procedures (Rotator Cuff Tear):~~ options would include arthroscopic repair or an open debridement and repair. Goals of surgical intervention are to restore functional anatomy by reestablishing continuity of the rotator cuff, and to reduce the potential for repeated impingement by the performance of procedures such as distal clavicular resection, coracoacromial ligament release, and/or anterior acromioplasty (subacromial decompression).
- 5.7.7 ~~Post-Operative Procedures (Rotator Cuff Tear):~~ would include an individualized rehabilitation program either home based or in conjunction with supervised therapy.
 - 5.7.7.1 Individualized rehabilitation program might include:
 - Sling or abduction splint;
 - Gentle pendulum exercise, passive glenohumeral range of motion in flexion and external rotation to prevent adhesions and maintain mobilization with or without the assistance of a pulley;
 - At 4 to 6 weeks post-operative begin isometrics and ADL involvement;
 - Active assisted range of motion in supine with progression to sitting;
 - At 6-8 weeks, depending on quality of tissue, begin light resistive exercise;
 - Pool exercise, manual resistive exercise to 90°, scapula mobilization exercise with glenohumeral stabilization; and
 - Scapular plane exercise.
 - 5.7.7.2 Progressive resistive exercise from 3-6 months, with gradual returning to full activity at 6-9 months. All active non-operative procedures listed in this Section 5.3.5. Non-operative Treatment Procedures should be considered.
 - 5.7.7.3 Work restrictions should be evaluated every 4-6 weeks during post-operative recovery and rehabilitation with appropriate written communications to both the patient and employer. Should

progress plateau, the provider should reevaluate the patient's condition and make appropriate adjustments to the treatment plan.

5.8 **ROTATOR CUFF TENDINITIS** Inflammation of one or more of the four musculotendinous structures which arise from the scapula and insert on the lesser or greater tuberosity of the humerus. These structures include one internal rotator (subscapularis), and two external rotators (infraspinatus and teres minor), and the supraspinatus which assists in abduction.

5.8.1 **History and Initial Diagnostic Procedures (Rotator Cuff Tendinitis):**

- Occupational Relationship – may include symptoms of pain and/or achiness that occur after repetitive use of the shoulder and/or blunt trauma to the shoulder.

5.8.2 **Physical Findings (Rotator Cuff Tendinitis)** may include:

- 5.8.2.1 Pain with palpation to the shoulder with active or passive abduction and external rotation of the shoulder (painful arc);
- 5.8.2.2 Pain with impingement signs; and/or
- 5.8.2.3 Pain with specific activation of the involved muscles.

5.8.3 **Laboratory Tests (Rotator Cuff Tendinitis):** are not indicated unless a systemic illness or disease is suspected.

5.8.4 **Testing Procedures (Rotator Cuff Tendinitis)** may include:

- 5.8.4.1 Plain x-ray films including AP lateral, axillary, 30° caudally angulated AP, and Outlet view.
- 5.8.4.2 If shoulder pain is refractory to 4-6 weeks of non-operative care and the diagnosis is not readily identified by standard radiographic techniques, then adjunctive testing, such as MRI, sonography or arthrography, may be indicated.
- 5.8.4.3 Subacromial space injection can be used as a diagnostic procedure by injecting an anesthesia, such as sensorcaine or xylocaine solutions, into the space. If the pain is alleviated with the injection the diagnosis is confirmed.

5.8.5 **Non-operative Treatment Procedures (Rotator Cuff Tendinitis)** may include:

- 5.8.5.1 Medications, such as nonsteroidal anti-inflammatories and analgesics: Subacromial space injection may be therapeutic. Injections of corticosteroids into the subacromial space should be limited to 3 injections per year, rarely used in patients less than 30 years, and generally not injected into the tendon. Autologous blood product injections into areas of tendinopathy are an evolving treatment and may rarely be considered.
- 5.8.5.2 Procedures outlined in Section 5.3.5. Non-operative Treatment Procedures such as relative rest, immobilization, thermal treatment, ultrasound, therapeutic exercise, physical medicine and rehabilitation.

5.8.6 **Operative Procedures (Rotator Cuff Tendinitis):** are indicated after failure of conservative care. Surgical treatment and post-operative care are similar to the surgical treatment of shoulder bursitis and impingement syndrome. See Sections 5.4.7 and 5.4.8.

5.9 **SHOULDER FRACTURES** There are five common types of shoulder fractures; each type will be addressed separately and in the order of most frequent occurrence.

5.9.1 **Clavicular Fracture:**

5.9.1.1 **History and Initial Diagnostic Procedures (Clavicular Fracture)**

- Occupational Relationship – can result from direct blows or axial loads applied to the upper limb; commonly associated injuries include rib fractures, long-bone fractures of the ipsilateral limb and scapulothoracic dislocations.

5.9.1.2 **Physical Findings (Clavicular Fracture)** may include:

- 5.9.1.2.1 Pain in the clavicle;
- 5.9.1.2.2 Abrasions on the chest wall, clavicle and shoulder can be seen;
- 5.9.1.2.3 Deformities can be seen in the above regions; and/or
- 5.9.1.2.4 Pain with palpation and motion at the shoulder joint area.

5.9.1.3 **Laboratory Tests (Clavicular Fracture)** are not indicated unless a systemic illness or disease is suspected.

5.9.1.4 **Testing Procedures (Clavicular Fracture)** could include routine chest x-rays. Alternatively x-rays centered on the clavicle, both straight AP and 20 degree cephalad AP views, would be indicated. Serial x-rays should be performed to document healing.

5.9.1.5 **Non-operative Treatment Procedures (Clavicular Fracture)**

5.9.1.5.1 Most are adequately managed by closed techniques and do not require surgery. The arm is immobilized in a sling (figure 8 bracing shows limited success and should be used rarely). Shoulder rehabilitation is begun with pendulum exercises 10-14 days after injury. Subsequently, with pain control, the therapy program can be progressed with therapeutic approaches as seen in this Section 5.3.5. Non-operative Treatment Procedures.

5.9.1.5.2 Medication, such as analgesics and nonsteroidal anti-inflammatories, would be indicated; narcotics may be indicated acutely for fracture and should be prescribed as indicated use is indicated in Section 6.5 Medications.

5.9.1.6 Operative Procedures (Clavicular Fracture) would be indicated for open fractures, significantly displaced fractures, vascular or neural injuries requiring repair, bilateral fractures, ipsilateral scapular or glenoid neck fractures, scapulothoracic dislocations, flail chest and nonunion displaced-closed fractures that show no evidence of union after 4-6 months. Also a Type II fracture/dislocation at the AC joint where the distal clavicular fragment remains with the acromion and the coracoid, and the large proximal fragment is displaced upwards.

5.9.1.7 Post-Operative Procedures (Clavicular Fracture) would include an individualized rehabilitation program. This program would begin with 2-4 weeks of rest with a shoulder immobilizer or sling while encouraging isometric deltoid strengthening; pendulum exercises with progression to assisted forward flexion and external rotation would follow; strengthening exercises should be started at 10-12 weeks as seen in Section 5.3.5. Non-operative Treatment Procedures.

5.9.2 Proximal Humeral Fractures:

5.9.2.1 History and Initial Diagnostic Procedures (Proximal Humeral Fractures)

5.9.2.1.1 Occupational Relationship may be caused by a fall onto an abducted arm; may also be caused by high-energy (velocity or crush) trauma with an abducted or non-abducted arm; associated injuries are common, such as glenohumeral dislocation, stretch injuries to the axillary, musculocutaneous, and radial nerves; axillary artery injuries with high energy accident.

5.9.2.1.2 Physical Findings (Proximal Humeral Fractures) may include:

5.9.2.1.2.1 Pain in the upper arm;

5.9.2.1.2.2 Swelling and bruising in the upper arm, shoulder and chest wall;

5.9.2.1.2.3 Abrasions about the shoulder; and/or

5.9.2.1.2.4 Pain with any attempted passive or active shoulder motion.

5.9.2.1.3 Laboratory Tests (Proximal Humeral Fractures) are not indicated unless a systemic illness or disease is suspected.

5.9.2.1.4 Testing Procedures (Proximal Humeral Fracture)

5.9.2.1.4.1 X-ray trauma series (3 views) are needed; AP view, axillary view and a lateral view in the plane of the scapula. Additionally, AP view may be done in externally rotation and also internal rotation

5.9.2.1.4.2 Vascular studies are obtained emergently if the radial and brachial pulses are absent.

5.9.2.1.4.3 Diagnostic testing including CT Scan or MRI to further evaluate the fracture and surrounding structures may be appropriate depending on the fracture configuration and need for pre-operative planning.

5.9.2.1.5 Non-operative Treatment Procedures (Proximal Humeral Fractures)

5.9.2.1.5.1 Impacted or minimally displaced fractures of the humeral neck or greater tuberosity are generally managed non-operatively.

5.9.2.1.5.2 Isolated and minimally displaced (less than 1cm) fractures are treated non-operatively.

5.9.2.1.5.3 Anterior or posterior dislocation associated with minimally displaced fractures can usually be reduced by closed means, but an anesthetic is needed.

5.9.2.1.5.4 Immobilization is provided with a sling, to support the elbow, and/or an abduction immobilizer if appropriate for the fracture configuration.

5.9.2.1.5.5 Immobilization is continued for 4-6 weeks

5.9.2.1.5.6 Shoulder rehabilitation is begun with pendulum exercises 10-14 days after injury. Subsequently, with pain control, the therapy program can be progressed with therapeutic approaches as seen in Section 5.3.5. Non-operative Treatment Procedures.

5.9.2.1.6 Operative Procedures (Proximal Humeral Fractures)

5.9.2.1.6.1 Indications for operative treatment would include:

- 5.9.2.1.6.1.1 Unstable surgical neck fractures (no contact between the fracture fragments).
- 5.9.2.1.6.1.2 Partially unstable fractures (only partial contact) with associated same upper extremity injuries.
- 5.9.2.1.6.1.3 Displaced 3- and 4-part fractures may be managed by internal fixation or a prosthetic hemiarthroplasty and reattachment of the tuberosities.

5.9.2.1.7 Post-Operative Procedures (Proximal Humeral Fractures) would include an individualized rehabilitation program.

5.9.2.1.7.1 See this Section 5.4.11, Shoulder Fracture, Non-operative Treatment Procedures.

5.9.3 Humeral Shaft Fractures:

5.9.3.1 History and Initial Diagnostic Procedures (Humeral Shaft Fractures)

- Occupational Relationship—a direct blow can fracture the humeral shaft at the junction of its middle and distal thirds; twisting injuries to the arm will cause a spiral humeral shaft fracture; high energy (velocity or crush) will cause a comminuted humeral shaft fracture.

5.9.3.2 Physical Findings (Humeral Shaft Fractures) may include:

- 5.9.3.2.1 Deformity of the arm;
- 5.9.3.2.2 Bruising and swelling; and/or
- 5.9.3.2.3 Possible sensory and/or motor dysfunction of the radial nerve.

5.9.3.3 Laboratory Tests (Humeral Shaft Fractures) are not indicated unless a systemic illness or disease is suspected.

5.9.3.4 Testing Procedures (Humeral Shaft Fractures)

- 5.9.3.4.1 Plain x-rays including AP view and lateral of the entire humeral shaft.
- 5.9.3.4.2 Vascular studies if the radial pulse is absent.
- 5.9.3.4.3 Compartment pressure measurements if the surrounding muscles are swollen, tense and painful and particularly if the fracture resulted from a crush injury.

5.9.3.5 Non-operative Treatment Procedures (Humeral Shaft Fractures)

- 5.9.3.5.1 Most isolated humeral shaft fractures can be managed non-operatively.
- 5.9.3.5.2 A coaptation splint may be applied. The splint is started in the axilla, extended around the elbow and brought up to the level of the acromion. It is held in place with large elastic bandages.
- 5.9.3.5.3 At 2-3 weeks after injury, a humeral fracture orthosis may be used to allow for full elbow motion.

5.9.3.6 Operative Treatment (Humeral Shaft Fractures)

5.9.3.6.1 Indications for operative care would include:

- Open fracture;
- Associated forearm or elbow fracture (i.e., the floating elbow injury);
- Burned upper extremity;
- Associated paraplegia;
- Multiple injuries (polytrauma);
- A radial nerve palsy which came on after closed reduction; and/or
- Pathologic fracture related to an occupational injury.
- Some instable or significantly displaced fractures

5.9.3.6.2 Accepted methods of internal fixation include:

- 5.9.3.6.2.1 A broad plate and screws; and/or
- 5.9.3.6.2.2 Intramedullary rodding with or without cross-locking screws.

5.9.3.7 Post-Operative Procedures (Humeral Shaft Fractures) would include an individualized rehabilitation program. Following rigid internal fixation, therapy may be started to obtain passive and later active shoulder motion using appropriate therapeutic approaches as seen in Section 5.3.5. Non-operative Treatment Procedures. Active elbow and wrist motion may be started immediately.

5.9.4 Scapular Fractures:

5.9.4.1 History and Initial Diagnostic Procedures (Scapular Fractures)

- Occupational Relationship—these are the least common of the fractures about the shoulder and include acromial, glenoid, glenoid neck and scapular body fractures. With the exception of anterior glenoid lip fractures caused by an anterior shoulder dislocation, all other scapular fractures are due to a high energy injury.

- 5.9.4.2 **Physical Findings (Scapular Fractures)** may include:
- 5.9.4.2.1 Pain about the shoulder and thorax;
 - 5.9.4.2.2 Bruising and abrasions;
 - 5.9.4.2.3 Possibility of associated humeral or rib fractures; and/or
 - 5.9.4.2.4 Vascular problems (pulse evaluation and Doppler examination).
- 5.9.4.3 **Laboratory Tests (Scapular Fractures)**, because of the association of high energy trauma, may include a complete blood count, urinalysis and chest x-ray are warranted.
- 5.9.4.4 **Testing Procedures (Scapular Fractures)**
- 5.9.4.4.1 Trauma x-ray series – AP view, axillary view and a lateral view in the plane of the scapula.
 - 5.9.4.4.2 Arteriography if a vascular injury is suspected.
 - 5.9.4.4.3 Electromyographic exam if nerve injuries are noted.
 - 5.9.4.4.4 Diagnostic testing including CT Scan or MRI to evaluate fracture and surrounding structures.
- 5.9.4.5 **Non-operative Treatment Procedures (Scapular Fractures)**
- 5.9.4.5.1 Non-displaced acromial, coracoid, glenoid, glenoid neck and scapular body fractures may all be treated with the use of a shoulder immobilizer.
 - 5.9.4.5.2 Pendulum exercises may be started within the first week.
 - 5.9.4.5.3 Progress to assisted range of motion exercises at 3-4 weeks using appropriate therapeutic procedures as seen in this Section 5.3.5. Non-operative Treatment Procedures.
- 5.9.4.6 **Operative Treatment (Scapular Fractures)**
- 5.9.4.6.1 Acromial fractures which are displaced should be internally fixed to prevent a nonunion. These fractures may be fixed with lag screws and/or a superiorly placed plate to neutralize the muscular forces.
 - 5.9.4.6.2 Glenoid fractures which are displaced greater than 2-3 mm should be fixed internally. The approach is determined by studying the results of a CT scan.
 - 5.9.4.6.3 Scapular body fractures require internal fixation if the lateral or medial borders are displaced to such a degree as to interfere with scapulothoracic motion.
 - 5.9.4.6.4 Displaced fractures of the scapular neck and the ipsilateral clavicle require internal fixation of the clavicle to reduce the scapular neck fracture.
- 5.9.4.7 **Post-Operative Treatment (Scapular Fractures)** would include an individualized rehabilitation program. Non-operative Treatment Procedures, a shoulder immobilizer is utilized, pendulum exercises at one week, deltoid isometric exercises are started early, and, at 4-6 weeks, active range of motion is commenced.

5.9.5 **Sternoclavicular Dislocation/Fracture:**

- 5.9.5.1 **History and Initial Diagnostic Procedures (Sternoclavicular Dislocation/Fracture)**
- Occupational Relationship – established with sudden trauma to the shoulder/ anterior chest wall; anterior dislocations of the sternoclavicular joint usually do not require active treatment; however, symptomatic posterior dislocations will require reduction.
- 5.9.5.2 **Physical Findings (Sternoclavicular Dislocation/Fracture)** may include:
- 5.9.5.2.1 Pain at the sternoclavicular area;
 - 5.9.5.2.2 Abrasions on the chest wall, clavicle and shoulder can be seen;
 - 5.9.5.2.3 Deformities can be seen in the above regions; and/or
 - 5.9.5.2.4 Pain with palpation and motion at the sternoclavicular joint area.
- 5.9.5.3 **Laboratory Tests (Sternoclavicular Dislocation/Fracture)** are not indicated unless a systemic illness or disease is suspected.
- 5.9.5.4 **Testing Procedures (Sternoclavicular Dislocation/Fracture)**
- 5.9.5.4.1 Plain x-rays of the sternoclavicular joint are routinely done. When indicated, comparative views of the contralateral limb may be necessary.
 - 5.9.5.4.2 X-rays of other shoulder areas and chest wall may be done if clinically indicated.
 - 5.9.5.4.3 Vascular studies should be considered if the history and clinical examination indicate extensive injury.
 - 5.9.5.4.4 Diagnostic tests such as CT Scan or MRI may be required to fully delineate the nature of injury and assist in treatment plan.
- 5.9.5.5 **Non-operative Treatment Procedures (Sternoclavicular Dislocation /Fracture)**

- 5.9.5.5.1 Symptomatic posterior dislocations should be reduced in the operating room under general anesthesia.
- 5.9.5.5.2 Immobilize with a sling for 3-4 weeks. Subsequently, further rehabilitation may be utilized using procedures set forth in Section 5.3.5. Non-operative Treatment Procedures.
- 5.9.5.5.3 Medications, such as analgesics and nonsteroidal anti-inflammatories, would be indicated; narcotics may be indicated acutely for fracture and should be prescribed as indicated use is indicated in this Section 6.5 Medications.
- 5.9.5.6 Operative Procedures (Sternoclavicular Dislocation/Fracture) would be warranted following failure of reduction by manipulation with pointed reduction forceps. Caution should be utilized when pins or screws are used for stabilization secondary to migration.
- 5.9.5.7 Post-Operative Procedures (Sternoclavicular Dislocation/Fracture) would include an individualized rehabilitation program. This program would begin with 4-6 weeks of rest with a shoulder immobilizer and be followed by pendulum exercises with progression to assisted forward flexion and external rotation. Strengthening exercises should be started at 8-10 weeks.

5.10 **SHOULDER INSTABILITY** Subluxation (partial dislocation) or dislocation of the glenohumeral joint in either an anterior, interior, posterior or multidirectional position.

5.10.1 **History and Initial Diagnostic Procedures (Shoulder Instability):**

- 5.10.1.1 Occupational Relationship—instability should be apparent following a direct traumatic blow to the shoulder, or indirectly by falling on an outstretched arm, or while applying significant traction to the arm, or may also develop with a cumulative trauma to the shoulder. Symptoms should be exacerbated or provoked by work and initially alleviated with a period of rest. Symptoms may be exacerbated by other activities that are not necessarily work related (e.g., driving a car).
- 5.10.1.2 History may include:
 - 5.10.1.2.1 A slipping sensation in the arm;
 - 5.10.1.2.2 Severe pain with inability to move the arm;
 - 5.10.1.2.3 Abduction and external rotation produce a feeling that the shoulder might "come out"; or
 - 5.10.1.2.4 Feeling of shoulder weakness.
- 5.10.1.3 In subacute and/or chronic instabilities, age of onset of instability is important in the history. Older age group (over age 40) has a propensity not to re-dislocate. Younger age groups (under age 30) need a more aggressive treatment plan.
- 5.10.1.4 Avoid any aggressive treatment in patients with history of voluntary subluxation or dislocation. These patients may need a psychiatric evaluation.

5.10.2 **Physical Findings (Shoulder Instability)** may include:

- 5.10.2.1 Anterior dislocations would likely include loss of normal shoulder contour; a fullness in the axilla; pain over the shoulder with any motion and often the patient holding the extremity in a very still position;
- 5.10.2.2 Posterior dislocations usually occur with a direct fall on the shoulder or outstretched arm resulting in posteriorly directed forces to the humeral head. These patients present with inability to externally rotate the shoulder;
- 5.10.2.3 Neurologic examination could reveal most commonly axillary nerve injuries, but occasionally musculocutaneous nerve injuries are seen; and/or
- 5.10.2.4 Abduction and external rotation positioning will produce pain in those who have anterior instability. Direct posterior stress in a supine position will produce pain in those with posterior instability. Longitudinal traction will produce a "sulcus sign" (a large dimple on the lateral side of the shoulder) when there is inferior instability.

5.10.3 **Laboratory Tests (Shoulder Instability):** are not indicated unless a systemic illness or disease is suspected.

5.10.4 **Testing Procedures (Shoulder Instability):**

- 5.10.4.1 Plain x-rays to rule out bony deficit on the glenoid, including AP, axillary view, lateral in the plane of the scapula and possibly the West Point view. Axillary view to identify larger Hill-Sachs lesion of humeral head.
- 5.10.4.2 On more difficult diagnostic cases with subtle history and physical findings suggesting instability, MRI, or a CT assisted arthrogram or MRI assisted arthrogram may be ordered for lateral detachment after 4-8 weeks of therapy. (This is done only after other conservative therapies have failed.)

5.10.4.3 An MRI is indicated to rule out acute rotator cuff injury after shoulder dislocation in patients over age 45.

5.10.5 ~~Non-operative Treatment Procedures (Shoulder Instability):~~

~~5.10.5.1 First-Time Acute Involvement:~~

~~5.10.5.1.1 Therapeutic Procedures~~

~~5.10.5.1.1.1 Immobilization~~

~~5.10.5.1.1.2 Therapeutic Exercise~~

~~5.10.5.1.1.3 Alteration of Occupation & Work Station~~

~~5.10.5.1.1.4 Thermal Treatment~~

~~5.10.5.1.1.5 TENS Unit~~

~~5.10.5.1.1.6 Ultrasound~~

~~5.10.5.1.2 May not return to work with overhead activity or lifting with involved arm until cleared by physician for heavier activities.~~

~~5.10.5.1.3 Additional modalities may include:~~

~~5.10.5.1.3.1 Biofeedback~~

~~5.10.5.1.3.2 Physical Medicine and Rehabilitation~~

~~5.10.5.1.3.2.1 Instruction in Therapeutic Exercise and Proper Work Techniques~~

~~5.10.5.1.3.2.2 Manual Therapy Techniques~~

~~5.10.5.1.3.2.3 Work Conditioning~~

~~5.10.5.1.3.2.3.1 Vocational Rehabilitation~~

~~5.10.5.1.3.2.3.2 Vocational Assessment~~

~~5.10.5.1.3.2.3.3 Interdisciplinary Team Approach~~

~~5.10.5.1.3.2.3.3.1 Work Hardening~~

~~5.10.5.1.3.2.3.3.2 Functional Restoration Programs~~

~~5.10.5.1.3.2.3.3.3 Pain Clinics~~

~~5.10.5.1.4 Medications – medication discussions are in Section 6.5 Medications~~

~~5.10.5.1.4.1 Analgesics~~

~~5.10.5.1.4.2 Anti-inflammatories~~

~~5.10.5.2 Acute or chronic dislocations with large fracture fragments contributing to instability;~~

~~5.10.5.2.1 Attempt to treat with immobilization if in acceptable position, otherwise repair surgically~~

~~5.10.5.2.2 Return to work may be directly related to time it takes for the fracture to heal~~

~~5.10.5.3 Subacute and/or chronic instability:~~

~~5.10.5.3.1 Provocative dislocation should first be treated similarly to acute dislocation.~~

~~5.10.5.3.2 If acute treatment is unsuccessful, and still having findings of instability, would consider operative repair.~~

5.10.6 ~~Operative Procedures (Shoulder Instability):~~

~~5.10.6.1 Identify causative agent for the instability (i.e., labral detachment, bony lesion, or multidirectional instability), then proceed with:~~

~~5.10.6.1.1 Bony block transfer;~~

~~5.10.6.1.2 Capsular tightening; or~~

~~5.10.6.1.3 Bankart lesion repair.~~

~~5.10.7 **Post-Operative Procedures (Shoulder Instability):** would include an individualized rehabilitation program. Depending upon the type of surgery, the patient will be immobilized for 3-6 weeks. As soon as it is safe to proceed without damaging the repair, progressive therapy, either home based or with consultation involving an occupational and/or physical therapist should begin with therapeutic exercise, physical medicine and rehabilitation (refer to Section 5.3.5. Non-operative Treatment Procedures). During this period of time, the patient could resume working when:~~

~~5.10.7.1 A job assessment results in the treating physician's identification of needed modifications and restrictions;~~

~~5.10.7.2 The patient has attained a general level of comfort;~~

~~5.10.7.3 Medications which would predispose to injury are no longer being prescribed or used; and~~

~~5.10.7.4 The treating physician has cleared the patient for the specific vocational activities.~~

MMI can be expected 6-9 months after operative intervention. Further job assessment and adjusted work restrictions may be needed prior to the patient's return to full duty.

6.0 Therapeutic Procedures – Non-Operative

Before initiation of any therapeutic procedure, the authorized treating provider, employer and insurer must consider these important issues in the care of the injured worker.

First, patients undergoing therapeutic procedure(s) should be released or returned to modified or restricted duty during their rehabilitation at the earliest appropriate time. Refer to "Return to Work" in this section for detailed information.

Second, cessation and/or review of treatment modalities should be undertaken when no further significant subjective or objective improvement in the patient's condition is noted. If patients are not responding within the recommended duration periods, alternative treatment interventions, further diagnostic studies or consultations should be pursued.

Third, providers should provide and document education to the patient. No treatment plan is complete without addressing issues of individual and/or group patient education as a means of facilitating self-management of symptoms.

In cases where a patient is unable to attend an outpatient center, home therapy may be necessary. Home therapy may include active and passive therapeutic procedures as well as other modalities to assist in alleviating pain, swelling, and abnormal muscle tone. Home therapy is usually of short duration and continues until the patient is able to tolerate coming to an outpatient center.

The following procedures are listed in alphabetical order.

6.1 **ACUPUNCTURE** is an accepted and widely used procedure for the relief of pain and inflammation. There is some scientific evidence to support its use. The exact mode of action is only partially understood. Western medicine studies suggest that acupuncture stimulates the nervous system at the level of the brain, promotes deep relaxation, and affects the release of neurotransmitters. Acupuncture is commonly used as an alternative or in addition to traditional Western pharmaceuticals. While it is commonly used when pain medication is reduced or not tolerated, it may be used as an adjunct to physical rehabilitation and/or surgical intervention to hasten the return of functional activity. Acupuncture should be performed by MD, DO, DC with appropriate training; or a licensed acupuncturist.

6.1.1 **Acupuncture:** is the insertion and removal of filiform needles to stimulate acupoints (acupuncture points). Needles may be inserted, manipulated and retained for a period of time. Acupuncture can be used to reduce pain and inflammation, and to increase blood flow to an area and increase range of motion. Indications include joint pain, joint stiffness, soft tissue pain and inflammation, paresthesia, post-surgical pain relief, muscle spasm, and scar tissue pain.

- Time to produce effect: 3 to 6 treatments
- Frequency: 1 to 3 times per week
- Course duration: 14 treatments

6.1.2 **Acupuncture with Electrical Stimulation:** is the use of electrical current (micro amperage or milli-amperage) on the needles at the acupuncture site. It is used to increase effectiveness of the needles by continuous stimulation of the acupoint. Physiological effects (depending on location and settings) can include endorphin release for pain relief, reduction of inflammation, increased blood circulation, analgesia through interruption of pain stimulus, and muscle relaxation.

It is indicated to treat chronic pain conditions, radiating pain along a nerve pathway, muscle spasm, inflammation, scar tissue pain, and pain located in multiple sites.

- Time to produce effect: 3 to 6 treatments
- Frequency: 1 to 3 times per week
- Course duration: 14 treatments

6.1.3 **Other Acupuncture Modalities:** Acupuncture treatment is based on individual patient needs and therefore treatment may include a combination of procedures to enhance treatment effect. Other procedures may include the use of heat, soft tissue manipulation/massage, and exercise.

- Time to produce effect: 3 to 6 treatments
- Frequency: 1 to 3 times per week
- Course duration: 14 treatments

Any of the above acupuncture treatments may extend longer if objective functional gains can be documented or when symptomatic benefits facilitate progression in the patient's treatment program. Treatment beyond 14 sessions (1 course) may be documented with respect to need and ability to facilitate positive symptomatic or functional gains.

6.2 **BIOFEEDBACK** is a form of behavioral medicine that helps patients learn self-awareness and self-regulation skills for the purpose of gaining greater control of their physiology, such as muscle activity, brain waves, and measures of autonomic nervous system activity. Electronic instrumentation is used to monitor the targeted physiology and then displayed or fed back to the patient visually, auditorially, or tactilely, with coaching by a biofeedback specialist. Biofeedback is provided by clinicians certified in biofeedback and/or who have documented specialized education, advanced training, or direct or supervised experience qualifying them to provide the specialized treatment needed (e.g., surface EMG, EEG, or other).

Treatment is individualized to the patient's work-related diagnosis and needs. Home practice of skills is required for mastery and may be facilitated by the use of home training tapes. The ultimate goal in biofeedback treatment is normalizing the physiology to the pre-injury status to the extent possible and involves transfer of learned skills to the workplace and daily life. Candidates for biofeedback therapy or training must be motivated to learn and practice biofeedback and self-regulation techniques.

Indications for biofeedback include individuals who are suffering from musculoskeletal injury where muscle dysfunction or other physiological indicators of excessive or prolonged stress response affects and/or delays recovery. Other applications include training to improve self-management of emotional stress/pain responses such as anxiety, depression, anger, sleep disturbance, and other central and autonomic nervous system imbalances. Biofeedback is often utilized along with other treatment modalities.

- Time to produce effect: 3 to 4 sessions
- Frequency: 1 to 2 times per week
- Maximum duration: 10 to 12 sessions. Treatment beyond 12 sessions must be documented with respect to need, expectation, and ability to facilitate positive symptomatic or functional gains.

6.3 **INJECTIONS — THERAPEUTIC** are generally accepted, well-established procedures that may play a significant role in the treatment of patients with upper extremity pain or pathology. Therapeutic injections involve the delivery of anesthetic and/or anti-inflammatory medications to the painful structure. Therapeutic injections have many potential benefits. Ideally, a therapeutic injection will: (a) reduce inflammation in a specific target area; (b) relieve secondary muscle spasm; and (c) diminish pain and support therapy directed to functional recovery. Diagnostic and therapeutic injections should be used early and selectively to establish a diagnosis and support rehabilitation. If injections are overused or used outside the context of a monitored rehabilitation program, they may be of significantly less value.

6.3.1 **Steroid Injections:** may provide both diagnostic and therapeutic value in treating a variety of shoulder disorders. These include biceps tendonitis, bursitis, rotator cuff tendonitis and impingement syndrome.

Steroid injections provide a potent anti-inflammatory effect, which is usually short term in duration, lasting weeks or months. Injections should always be used as an adjunctive treatment in the context of a physical exercise and rehabilitation program.

When performing tendon injections, the risk of tendon rupture should be discussed with the patient and the need for temporary restricted duty emphasized.*

Contraindications: General contraindications include local or systemic infection, bleeding disorders, and allergy to medications used.

Local Steroid Injections:

- Time to produce effect: 3 days
- Frequency: monthly
- Maximum duration: 3 injections

6.3.2 **Trigger Point Injections:** are generally accepted, although used infrequently in uncomplicated cases. They may, however, be used to relieve myofascial pain and facilitate active therapy and stretching of the affected areas, and as an adjunctive treatment in combination with other treatment modalities, such as functional restoration programs, including stretching therapeutic exercise. Trigger point injections should be utilized primarily for the purpose of facilitating functional progress. The Division does not recommend their routine use in the treatment of upper extremity injuries.

- Time to produce effect: Local anesthetic 30 minutes; 24 to 48 hours for no anesthesia.
- Frequency: Weekly. Suggest no more than 4 injection sites per session per week to avoid significant post-injection soreness.
- Maximum duration: 8 weeks. Occasional patients may require 2 to 4 repetitions of trigger point injection series over a 1 to 2 year period.

6.4 **JOB SITE ALTERATION** Early evaluation and training of body mechanics and other ergonomic factors are essential for every injured worker and should be done by a qualified individual. In some cases, this requires a job site evaluation. Some evidence supports alteration of the work site in the early treatment of non-traumatic Shoulder Disorders. There is no single factor or combination of factors that is proven to prevent or ameliorate Shoulder Disorders, but a combination of ergonomic are generally considered to be important. Physical factors

that may be considered include use of force, repetition, awkward positions, upper extremity vibration, cold environment, and contact pressure on the nerve.

The job analysis and modification should include input from the employee, employer, and ergonomist or other professional familiar with work place evaluation. The employee must be observed performing all job functions in order for the job site analysis to be valid. Periodic follow-up is recommended to evaluate effectiveness of the intervention and need for additional ergonomic changes.

6.5 **MEDICATIONS**

For shoulder disorders, medications play a secondary role and should never be the sole modality of treatment. If a patient's symptoms resolve quickly with medications or any other passive modality, the practitioner should still consider prescribing a brief course in shoulder and upper extremity education and safety. When required, a wide range of medication is available. Modalities in this group are generally accepted, established and widely used. All narcotics and habituating medications should be prescribed with strict time, quantity and duration guidelines with a definite cessation parameter. Prescribing these drugs on an as-needed basis (PRN) should almost always be avoided.

- 6.5.1 **NONSTEROIDAL ANTI-INFLAMMATORY DRUGS (NSAIDs)** are probably the most useful medications in acute and chronic shoulder injury. In mild cases, they may be the only drug required for analgesia. There are several classes of NSAIDs and the response of the individual patient to a specific medication is unpredictable. For this reason, a range of anti-inflammatory medications may be tried in each case with the most effective preparation being continued.

For prolonged use of NSAIDs greater than 1-3 months, patients should be monitored for adverse reactions. Appropriate intervals for metabolic screening are dependent upon the patient's age, general health status and should be within parameters listed for each specific medication.

- 6.5.2 **ANALGESICS** (acetaminophen and aspirin are the common choice for non-narcotic analgesia.

- 6.5.3 **PSYCHOTROPIC MEDICATION** may be used in patients with a high level of anxiety or depression. A variety of psychotropic drugs may be used. In acute or subacute shoulder injury, these medications are generally unnecessary except for the use of tricyclic antidepressants as substitutes for hypnotics and/or analgesics. In most cases, major tranquilizers, anxiolytics and antidepressants are reserved for chronic pain disorders. Patients, whose chief complaint is shoulder injury, but require use of major tranquilizers or anxiolytics for greater than two weeks. In particular, benzodiazepams are almost always contraindicated in patients with shoulder injury unless a severe anxiety state exist requiring psychiatric supervision or in cases of extremely severe, objectively visualized acute muscle spasm. In this type of acute scenario, the maximum duration for benzodiazepam administration should be limited to less than five days.

- 6.5.4 **HYPNOTICS** may be given to shoulder injury sufferers because of a chief complaint of "inability to sleep." Such medication must be used with caution because of their dependence-producing capabilities. The Division recommends consideration of sedating tricyclic antidepressants as an alternative when necessary. Physical methods of restoring a normal sleep pattern can usually be employed as an alternative to medication.

- 6.5.5 **NARCOTICS** should be primarily reserved for the treatment of acute shoulder injury or the treatment of patients with objectively documented acute exacerbations. The action of these drugs is central, affecting the patient's perception of pain rather than the pain process itself.

Narcotics are rarely indicated in the treatment of patients with pure shoulder injury without fracture. In mild to moderate cases of upper extremity pain, narcotic medication should not be used at all. Adverse effects include respiratory depression and the development of physical and psychological dependence.

- 6.5.6 **MINOR TRANQUILIZERS/MUSCLE RELAXANTS** should be primarily reserved for the treatment of acute shoulder with muscle spasm or the treatment of patients with objectively documented acute exacerbations. Muscle relaxants may have a significant effect on the early phases of acute shoulder disorders. Their action is central and with no effect on the neuromuscular junction of the muscles themselves. Purported peripheral effects are difficult to separate from the anxiolytic central action.

6.6 **OCCUPATIONAL REHABILITATION PROGRAMS**

- 6.6.1 **Non-Interdisciplinary:** These programs are work-related, outcome-focused, individualized treatment programs. Objectives of the program include, but are not limited to, improvement of cardiopulmonary and neuromusculoskeletal functions (strength, endurance, movement, flexibility, stability, and motor control functions), patient education, and symptom relief. The goal is for patients to gain full or optimal function and return to work. The service may include the time-limited use of passive modalities with progression to achieve treatment and/or simulated/real work.

6.6.1.1 **WORK CONDITIONING/SIMULATION**

This program may begin once a patient is out of the acute phase of injury and will be able to tolerate this program.

These programs are usually initiated after the acute phase has been completed and offered at any time throughout the recovery phase. Work conditioning should be initiated when imminent return of a patient to modified or full duty is not an option, but the prognosis for returning the patient to work at completion of the program is at least fair to good.

The need for work place simulation should be based upon the results of a Functional Capacity Evaluation and/or Jobsite Analysis.

- Length of visit: 1 to 4 hours per day.
- Frequency: 2 to 5 visits per week
- Maximum Duration: 8 WEEKS. Participation in a program beyond six weeks must be documented with respect to need and the ability to facilitate positive symptomatic or functional gains.

6.6.2 **WORK HARDENING**

Work Hardening is an interdisciplinary program addressing a patient's employability and return to work. It includes a progressive increase in the number of hours per day that a patient completes work simulation tasks until the patient can tolerate a full workday. This is accomplished by addressing the medical, behavioral, physical, functional, and vocational components of employability and return to work.

This can include a highly structured program involving a team approach or can involve any of the components thereof. The interdisciplinary team should, at a minimum, be comprised of a qualified medical director who is board certified with documented training in occupational rehabilitation; team physicians having experience in occupational rehabilitation; occupational therapist; physical therapist; case manager; and psychologist. As appropriate, the team may also include: chiropractor, RN, vocational specialist or Certified Biofeedback Therapist.

- Length of visit: up to 8 hours/day
- Frequency: 2 to 5 visits per week
- Maximum duration: 8 weeks. Participation in a program beyond six weeks must be documented with respect to need and the ability to facilitate positive symptomatic or functional gains.

6.7 **PATIENT EDUCATION** No treatment plan is complete without addressing issues of individual patient and/or group education as a means of prolonging the beneficial effects of treatment, as well as facilitating self-management of symptoms and injury prevention. The patient should take an active role in the establishment of functional outcome goals, and should be educated on his or her specific injury, assessment findings, and plan of treatment. Education and instruction in proper body mechanics and posture, positions to avoid task/tool adaptation, self-care for exacerbation of symptoms, and home exercise/task adaptation should also be addressed.

- Time to produce effect: Varies with individual patient.
- Frequency: Should occur at every visit.

6.8 **RETURN TO WORK** is therapeutic, assuming the work is not likely to aggravate the basic problem or increase long-term pain. The practitioner must provide specific physical limitations per the Physician's Form. The following physical limitations should be considered and modified as recommended: lifting, pushing, pulling, crouching, walking, using stairs, bending at the waist, awkward and/or sustained postures, tolerance for sitting or standing, hot and cold environments, data entry and other repetitive motion tasks, sustained grip, tool usage and vibration factors. Even if there is residual chronic pain, return-to-work is not necessarily contraindicated.

The practitioner should understand all of the physical demands of the patient's job position before returning the patient to full duty and should receive clarification of the patient's job duties.

6.9 **SLEEP DISTURBANCES** are a common secondary symptom of CTD. Although primary insomnia may accompany pain as an independent co-morbid condition, it more commonly occurs, secondary to the pain condition itself. Exacerbations of pain often are accompanied by exacerbations of insomnia; the reverse can also occur. Sleep laboratory studies have shown disturbances of sleep architecture in pain patients. Loss of deep slow-wave sleep and increase in light sleep occur and sleep efficiency, the proportion of time in bed spent asleep, is decreased. These changes are associated with patient reports of non-restorative sleep.

Many affected patients develop behavioral habits that exacerbate and maintain sleep disturbances. Excessive time in bed, irregular sleep routine, napping, low activity, and worrying in bed are all maladaptive responses that can arise in the absence of any psychopathology. There is some evidence that behavioral modification, such as patient education and group or individual counseling, can be effective in reversing the effects of insomnia. Behavioral modifications are easily implemented and can include:

- 6.9.1 Maintaining a regular sleep schedule, retiring and rising at approximately the same time on weekdays and weekends.
- 6.9.2 Avoiding daytime napping.
- 6.9.3 Avoiding caffeinated beverages after lunchtime
- 6.9.4 Making the bedroom quiet and comfortable, eliminating disruptive lights, sounds, television sets, and keeping a bedroom temperature of about 65°F.
- 6.9.5 Avoiding alcohol or nicotine within two hours of bedtime.
- 6.9.6 Avoiding large meals within two hours of bedtime.
- 6.9.7 Exercising vigorously during the day, but not within two hours of bedtime, since this may raise core temperature and activate the nervous system.
- 6.9.8 Associating the bed with sleep and sexual activity only, using other parts of the home for television, reading and talking on the telephone.
- 6.9.9 Leaving the bedroom when unable to sleep for more than 20 minutes, returning to the bedroom when ready to sleep again.

These modifications should be undertaken before sleeping medication is prescribed for long term use.

6.10 **TERAPY PASSIVE** includes those treatment modalities that do not require energy expenditure on the part of the patient. They are principally effective during the early phases of treatment and are directed at controlling symptoms such as pain, inflammation and swelling and to improve the rate of healing soft tissue injuries. They should be used in adjunct with active therapies to help control swelling, pain and inflammation during the rehabilitation process. They may be used intermittently as a therapist deems appropriate or regularly if there are specific goals with objectively measured functional improvements during treatment.

6.10.1 **Electrical Stimulation (Unattended and Attended):** once applied, requires minimal on-site supervision by the physician or non-physician provider. Indications include pain, inflammation, muscle spasm, atrophy, and decreased circulation.

- Time to produce effect: 2 to 4 treatments
- Frequency: Varies, depending upon indication, between 2 to 3 times/day to 1 time/week. Provide home unit if frequent use.
- Maximum duration: 24 visits

6.10.2 **Extracorporeal shock wave treatment:** Consists of the application of pulses of high pressure sound to soft tissues, similar to lithotriptors. It has been investigated for its effectiveness in the treatment of Calcific Tendonitis. It has not been shown to have an advantage over other conservative treatments and remains investigational. It is not recommended.

6.10.3 **Iontophoresis:** is the transfer of medication, including, but not limited to, steroidal anti-inflammatories and anesthetics, through the use of electrical stimulation. Indications include pain (Lidocaine), inflammation (hydrocortisone, salicylate), edema (mecholyt, hyaluronidase, salicylate), ischemia (magnesium, mecholyt, iodine), muscle spasm (magnesium, calcium), calcific deposits (acetate), scars and keloids (chlorine, iodine, acetate).

- Time to produce effect: 1 to 4 treatments
- Frequency: 2-3 times per week with at least 48 hours between treatments.
- Maximum duration: 8 treatments per region

6.10.4 **Laser irradiation:** Consists of the external application of an array of visible and infrared wavelengths to soft tissues. Frequency and duration are dependent on severity and chronicity of problem.

6.10.5 **Manual Therapy Techniques:** are passive interventions in which the providers use his or her hands to administer skilled movements designed to modulate pain; increase joint range of motion; reduce/eliminate soft tissue swelling, inflammation, or restriction; induce relaxation; and improve contractile and non-contractile tissue extensibility. These techniques are applied only after a thorough examination is performed to identify those for whom manual therapy would be contraindicated or for whom manual therapy must be applied with caution.

6.10.5.1 **MANIPULATION:** is generally accepted, well-established and widely used therapeutic intervention for low back pain. Manipulative Treatment (not therapy) is defined as the therapeutic application of manually guided forces by an operator to improve physiologic function and/or support homeostasis that has been altered by the injury or occupational disease, and has associated clinical significance.

High velocity, low amplitude (HVLA) technique, chiropractic manipulation, osteopathic manipulation, muscle energy techniques, counter strain, and non-force techniques are all types of manipulative treatment. This may be applied by osteopathic physicians (D.O.), chiropractors (D.C.), properly trained physical therapists (P.T.), or properly trained medical physicians. Under

these different types of manipulation exist many subsets of different techniques that can be described as a) direct—a forceful engagement of a restrictive/pathologic barrier, b) indirect—a gentle/non-forceful disengagement of a restrictive/pathologic barrier, c) the patient actively assists in the treatment and d) the patient relaxing, allowing the practitioner to move the body tissues. When the proper diagnosis is made and coupled with the appropriate technique, manipulation has no contraindications and can be applied to all tissues of the body. Pre-treatment assessment should be performed as part of each manipulative treatment visit to ensure that the correct diagnosis and correct treatment is employed.

High velocity, low amplitude (HVLA) manipulation is performed by taking a joint to its end range of motion and moving the articulation into the zone of accessory joint movement, well within the limits of anatomical integrity. Indications for manipulation include joint pain, decreased joint motion, and joint adhesions. Contraindications to HVLA manipulation include joint instability, fractures, severe osteoporosis, infection, metastatic cancer, active inflammatory arthritides, aortic aneurysm, and signs of progressive neurologic deficits.

Time to produce effect for all types of manipulative treatment: 1 to 6 treatments.

- Frequency: Up to 3 times per week for the first 4 weeks as indicated by the severity of involvement and the desired effect, then up to 2 treatments per week for the next 4 weeks. For further treatments, twice per week or less to maintain function.
- Maximum duration: 30 visits. 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. Refer to the Chronic Pain Guidelines for care beyond 6 months.

The combination of 97140 plus either CMT or OMT code is equal to one visit when performed on the same day. Any combination of manual therapeutic intervention exceeding 30 visits (not units) needs to go to UR.

6.10.5.2 **MOBILIZATION (Joint) /Manipulation**

Mobilization is passive movement involving oscillatory motions to the involved joints. The passive mobility is performed in a graded manner (I, II, III, IV, or V), which depicts the speed of the maneuver. It may include skilled manual joint tissue stretching. Indications include the need to improve joint play, improve intracapsular arthrokinematics, or reduce pain associated with tissue impingement.

- Time to produce effect: 4 to 6 treatments
- Frequency: 2 to 3 times per week
- Maximum duration: 30 visits (CPT codes 97124 and 97140 cannot exceed 30 visits in combination).

6.10.5.3 **MOBILIZATION (Soft Tissue)**

Mobilization of soft tissue is the skilled application of manual techniques designed to normalize movement patterns through the reduction of soft tissue pain and restrictions. Indications include muscle spasm around a joint, trigger points, adhesions, and neural compression.

Nerve Gliding: consist of a series of flexion and extension movements of the hand, wrist, elbow, shoulder, and neck that produce tension and longitudinal movement along the length of the median and other nerves of the upper extremity. These exercises are based on the principle that the tissues of the peripheral nervous system are designed for movement, and that tension and glide (excursion) of nerves may have an effect on neurophysiology through alterations in vascular and axoplasmic flow. Biomechanical principles have been more thoroughly studied than clinical outcomes. Nerve gliding performed on a patient by the clinician should be reinforced by patient performance of similar techniques as part of a home exercise program at least twice per day.

- Time to produce effect: 4 to 6 treatments
- Frequency: 2 to 3 times per week
- Maximum duration: 30 visits (CPT codes 97124 and 97140 cannot exceed 30 visits in combination).

6.10.6 **Massage: Manual or Mechanical**—Massage is manipulation of soft tissue with broad ranging relaxation and circulatory benefits. This may include stimulation of acupuncture points and acupuncture channels (acupressure), application of suction cups and techniques that include pressing, lifting, rubbing, pinching of soft tissues by or with the practitioner's hands. Indications include edema, muscle spasm, adhesions, the need to improve peripheral circulation and range of motion, or to increase muscle relaxation and flexibility prior to exercise.

- Time to produce effect: Immediate.

- Frequency: 1 to 3 times per week
- Maximum duration: 12 visits (CPT codes 97124 and 97140 cannot exceed 30 visits in combination).

6.10.7 **Orthotics/Immobilization with Splinting:** is a generally accepted, well-established and widely used therapeutic procedure. Splints may be effective when worn at night or during portions of the day, depending on activities. Splints should be loose and soft enough to maintain comfort while supporting the involved joint in a relatively neutral position. Splint comfort is critical and may affect compliance. Although off-the-shelf splints are usually sufficient, custom thermoplastic splints may provide better fit for certain patients.

Splints may be effective when worn at night or during portions of the day, depending on activities; however, splint use is rarely mandatory. Providers should be aware that over-usage is counterproductive, and counsel patients to minimize daytime splint use in order avoid detrimental effects, such as, stiffness and dependency over time.

- Time to produce effect: 1-4 weeks
- Frequency: Daytime intermittent or night use, depending on symptoms and activities.
- Maximum duration: 2 to 4 months. If symptoms persist, consideration should be given to further diagnostic studies or to other treatment options.

6.10.8 **Superficial Heat and Cold Therapy:** are thermal agents applied in various manners that lowers or raises the body tissue temperature for the reduction of pain, inflammation, and/or effusion resulting from injury or induced by exercise. Includes application of heat just above the surface of the skin at acupuncture points. Indications include acute pain, edema and hemorrhage, need to increase pain threshold, reduce muscle spasm and promote stretching/flexibility. Cold and heat packs can be used at home as an extension of therapy in the clinic setting.

- Time to produce effect: Immediate
- Frequency: 2 to 5 times per week (clinic). Home treatment as needed.
- Maximum duration: 12 visits, with maximum visits 1 per day. If symptoms persist, consideration should be given to further diagnostic studies or other treatment options.

6.10.9 **Ultrasound:** uses sonic generators to deliver acoustic energy for therapeutic thermal and/or nonthermal soft tissue effects. Indications include scar tissue, adhesions, collagen fiber and muscle spasm, and to improve muscle tissue extensibility and soft tissue healing. Ultrasound with electrical stimulation is concurrent delivery of electrical energy that involves dispersive electrode placement. Indications include muscle spasm, scar tissue, pain modulation and muscle facilitation. Phonophoresis is the transfer of medication to the target tissue to control inflammation and pain through the use of sonic generators. These topical medications include, but are not limited to, steroidal anti-inflammatory and anesthetics.

- Time to produce effect: 4 to 8 treatments
- Frequency: 2-3 times per week
- Maximum duration: 18 visits

6.11 **THErapy-Active** therapies are based on the philosophy that therapeutic exercise and/or activity are beneficial for restoring flexibility, strength, endurance, function, range of motion, and alleviating discomfort. Active therapy requires an internal effort by the individual to complete a specific exercise or task, and thus assists in developing skills promoting independence to allow self-care after discharge. This form of therapy requires supervision from a therapist or medical provider such as verbal, visual, and/or tactile instructions. At times a provider may help stabilize the patient or guide the movement pattern but the energy required to complete the task is predominately executed by the patient.

Patients should be instructed to continue active therapies at home as an extension of the treatment process in order to maintain improvement levels. Home exercise can include exercise with or without mechanical assistance or resistance and functional activities with assistive devices.

Interventions are selected based on the complexity of the presenting dysfunction with ongoing examination, evaluation and modification of the plan of care as improvement or lack thereof occurs. Change and/or discontinuation of an intervention should occur if there is attainment of expected goals/outcome, lack of progress, lack of tolerance and/or lack of motivation. Passive interventions/modalities may only be used as adjuncts to the active program.

6.11.1 **Activities of Daily Living:** Supervised instruction, active-assisted training, and/or adaptation of activities or equipment to improve a person's capacity in normal daily living activities such as self-care, work re-integration training, homemaking, and driving.

- Time to produce effect: 4 to 5 treatments
- Maximum of 10 sessions

6.11.2 **Aquatic Therapy:** is a well-accepted treatment which consists of the therapeutic use of aquatic immersion for therapeutic exercise to promote strengthening, core stabilization, endurance, range of motion, flexibility, body mechanics, and pain management. Aquatic therapy includes the implementation of active therapeutic procedures in a swimming or therapeutic pool. The water provides a buoyancy force that lessens the amount of force gravity applies to the body. The decreased gravity effect allows the patient to have a mechanical advantage and more likely have a successful trial of therapeutic exercise. The therapy may be indicated for individuals who:

- cannot tolerate active land-based or full-weight bearing therapeutic procedures
- require increased support in the presence of proprioceptive deficit;
- are at risk of compression fracture due to decreased bone density;
- have symptoms that are exacerbated in a dry environment;
- would have a higher probability of meeting active therapeutic goals than in a land-based environment.

The pool should be large enough to allow full extremity range of motion and fully erect posture. Aquatic vests, belts and other devices can be used to provide stability, balance, buoyancy, and resistance.

- Time to produce effect: 4 to 5 treatments
- Frequency: 3 to 5 times per week
- Maximum duration: 24 visits

A self-directed program is recommended after the supervised aquatics program has been established, or, alternatively a transition to a land-based environment exercise program.

6.11.3 **Functional Activities:** are the use of therapeutic activity to enhance mobility, body mechanics, employability, coordination, and sensory motor integration.

- Time to produce effect: 4 to 5 treatments
- Frequency: 3 to 5 times per week
- Maximum duration: 24 visits

Total number of visit 97110 and 97530 should not exceed 36 visits without pre-authorization

6.11.4 **Neuromuscular Re-education:** is the skilled application of exercise with manual, mechanical, or electrical facilitation to enhance strength, movement patterns, neuromuscular response, proprioception, kinesthetic sense, coordination education of movement, balance, and posture. Indications include the need to promote neuromuscular responses through carefully timed proprioceptive stimuli, to elicit and improve motor activity in patterns similar to normal neurologically developed sequences, and improve neuromotor response with independent control.

- Time to produce effect: 2 to 6 treatments
- Frequency: 3-5 times per week
- Maximum duration: 24 visits

6.11.5 **Proper Work Techniques:** Please refer to the "Job Site Evaluation" and "Job Site Alteration" sections of these guidelines.

6.11.6 **Therapeutic Exercise:** with or without mechanical assistance or resistance may include isoinertial, isotonic, isometric and isokinetic types of exercises. Indications include the need for cardiovascular fitness, reduced edema, improved muscle strength, improved connective tissue strength and integrity, increased bone density, promotion of circulation to enhance soft tissue healing, improvement of muscle recruitment, increased range of motion, and are used to promote normal movement patterns. Can also include complimentary/alternative exercise movement therapy.

- Time to produce effect: 2 to 6 treatments
- Frequency: 3 to 5 times per week
- Maximum duration: 36 visits

Total number of visit 97110 and 97530 should not exceed 36 visits without pre authorization

6.12 **RESTRICTION OF ACTIVITIES** Continuation of normal daily activities is the recommendation for most Shoulder Disorders with or without neurologic symptoms. Complete work cessation should be avoided, if possible, since it often further aggravates the pain presentation. Modified return to work is almost always more efficacious and rarely contraindicated in the vast majority of injured workers with Shoulder Disorders.

6.13 **VOCATIONAL REHABILITATION** is a generally accepted intervention. Initiation of vocational rehabilitation requires adequate evaluation of patients for quantification of highest functional level, motivation, and achievement of maximum medical improvement. Vocational rehabilitation may be as simple as returning to the original job or as complicated as being retrained for a new occupation.

11 DE Reg. 1661 (06/01/08)

12 DE Reg. 67 (07/01/08)

PART F Cervical Treatment Guidelines

4.0 Introduction

~~Pursuant to 19 Del.C. §2322C, health care practice guidelines have been adopted and recommended by the Health Care Advisory Panel to guide utilization of health care treatments in workers' compensation including, but not limited to, care provided for the treatment of employees by or under the supervision of a licensed health care provider, prescription drug utilization, inpatient hospitalization and length of stay, diagnostic testing, physical therapy, chiropractic care and palliative care. The health care practice guidelines apply to all treatments provided after the effective date of the regulation adopted by the Department of Labor, May 23, 2008, and regardless of the date of injury. The cervical treatment guidelines were added to the list of treatment guidelines, effective June 1, 2009. The guidelines are, to the extent permitted by the most current medical science or applicable science, based on well-documented scientific research concerning efficacious treatment for injuries and occupational disease. To the extent that well-documented scientific research regarding the above is not available at the time of, adoption of the guidelines, or is not available at the time of any revision to the guidelines, the guidelines have been and will be based upon the best available information concerning national consensus regarding best health care practices in the relevant health care community.~~

~~The guidelines, to the extent practical and consistent with the Act, address treatment of those physical conditions which occur with the greatest frequency, or which require the most expensive treatments, for work-related injuries based upon currently available Delaware data.~~

~~Services rendered by any health care provider certified pursuant to 19 Del.C. §2322D(a) to provide treatment or services for injured employees shall be presumed, in the absence of contrary evidence, to be reasonable and necessary if such treatment and/or services conform to the most current version of the Delaware health care practice guidelines.~~

~~Services rendered outside the Guidelines and/or variation in treatment recommendations from the Guidelines may represent acceptable medical care, be considered reasonable and necessary treatment and, therefore, determined to be compensable, absent evidence to the contrary, and may be payable in accordance with the Fee Schedule and Statute, accordingly.~~

~~Services provided by any health care provider that is not certified pursuant to 19 Del.C. §2322D(a) shall not be presumed reasonable and necessary unless such services are preauthorized by the employer or insurance carrier, subject to the exception set forth in 19 Del.C. §2322D(b).~~

~~Treatment of conditions unrelated to the injuries sustained in an industrial accident may be denied as unauthorized if the treatment is directed toward the non-industrial condition, unless the treatment of the unrelated injury is rendered necessary as a result of the industrial accident.~~

~~The Health Care Advisory Panel and Department of Labor recognized that acceptable medical practice may include deviations from these Guidelines, as individual cases dictate. Therefore, these Guidelines are not relevant as evidence of a provider's legal standard of professional care.~~

~~In accordance with the requirements of the Act, the development of the health care guidelines has been directed by a predominantly medical or other health professional panel, with recommendations then made to the Health Care Advisory Panel.~~

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2.0 General Guideline Principles

2.1 ~~**TREATMENT PARAMETER** With respect to Therapy (Active or Passive), time frames/visits for specific interventions commence once treatments have been initiated, not on the date of injury. Obviously, duration will be impacted by patient compliance, as well as comorbidities and availability of services. Clinical judgment may substantiate the need to accelerate or decelerate modify the time frames total number of visits discussed in this document. The majority of injured workers with Cervical pain often will achieve resolution of their condition within 8 to 24 visits (Guide to Physical Therapy Practice – Second Edition). It is anticipated that most injured workers will not require the maximum number of visits described in these guidelines. They are designed to be a ceiling and care extending beyond the maximum allowed visits may warrant utilization review.~~

2.2 ~~**ACTIVE INTERVENTIONS** emphasizing patient responsibility, such as therapeutic exercise and/or functional treatment, are generally emphasized over passive modalities, especially as treatment progresses. Generally, passive interventions are viewed as a means to facilitate progress in an active rehabilitation program with concomitant attainment of objective functional gains. All rehabilitation programs must incorporate "Active Interventions" no later than twelve visits or three weeks after the onset of treatment. Reimbursement for~~

passive modalities only after the first twelve visits three weeks of treatment without clear evidence of Active Interventions will require supportive documentation.

- 2.3 ~~**ACTIVE THERAPEUTIC EXERCISE PROGRAM**~~ goals should incorporate patient strength, endurance, flexibility, coordination, and education. This includes functional application in vocational or community settings.
- 2.4 ~~**POSITIVE PATIENT RESPONSE**~~ results are defined primarily as functional gains that can be objectively measured. Objective functional gains include, but are not limited to, positional tolerances, range of motion (ROM), strength, endurance, activities of daily living, cognition, behavior, and efficiency/velocity measures that can be quantified. Subjective reports of pain and function should be considered and given relative weight when the pain has anatomic and physiologic correlation.
- 2.5 ~~**RE-EVALUATE TREATMENT EVERY 3 TO 4 WEEKS**~~ With respect to Therapy (Active or Passive), if a given treatment or modality is not producing positive results within 3 to 4 weeks, the treatment may be either modified or discontinued. Reconsideration of diagnosis should also occur in the event of poor response to a seemingly rational intervention.
- 2.6 ~~**SURGICAL INTERVENTIONS**~~ should be contemplated within the context of expected functional outcome and not purely for the purpose of pain relief. All operative interventions must be based upon positive correlation of clinical findings, clinical course, and diagnostic tests. A comprehensive assimilation of these factors must lead to a specific diagnosis with positive identification of pathologic conditions.
- 2.7 ~~**SIX-MONTH TIME FRAME**~~ The prognosis drops precipitously for returning an injured worker to work once he/she has been temporarily totally disabled for more than six months. The emphasis within these guidelines is to move patients along a continuum of care and return to work within a six-month time frame, whenever possible. It is important to note that time frames may not be pertinent to injuries that do not involve work-time loss or are not occupationally related.
- 2.8 ~~**RETURN TO WORK**~~ is therapeutic, assuming the work is not likely to aggravate the basic problem or increase long-term pain. The following physical limitations should be considered and modified as recommended: lifting, pushing, pulling, crouching, walking, using stairs, bending at the waist, awkward and/or sustained postures, tolerance for sitting or standing, hot and cold environments, data entry and other repetitive motion tasks, sustained grip, tool usage and vibration factors. Even if there is residual chronic pain, return to work is not necessarily contraindicated. The practitioner should understand all of the physical demands of the patient's job position before returning the patient to full duty and should receive clarification of the patient's job duties.
- 2.9 ~~**GUIDELINE RECOMMENDATIONS AND INCLUSION OF MEDICAL EVIDENCE**~~ Recommendations are based on available evidence and/or consensus recommendations of the standard of care within Delaware. Those procedures considered inappropriate, unreasonable, or unnecessary are designated in the guideline as being "not recommended."
- 2.10 ~~**DELAYED RECOVERY**~~. The Department recognizes that not all industrially injured patients will recover within the time lines outlined in this document despite optimal care. Such individuals may require treatments beyond the limits discussed within this document, but such treatment will require clear documentation by the authorized treating practitioner focusing on objective functional gains afforded by further treatment and impact upon prognosis.

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3.0 Initial Diagnostic Procedures

The Division recommends the following diagnostic procedures be considered, at least initially, the responsibility of the workers' compensation carrier to ensure that an accurate diagnosis and treatment plan can be established. Standard procedures, that should be utilized when initially diagnosing a work-related Cervical pain complaint, are listed below.

- 3.1 ~~**HISTORY-TAKING AND PHYSICAL EXAMINATION (Hx & PE)**~~ are generally accepted, well established and widely used procedures that establish the foundation/basis for and dictates subsequent stages of diagnostic and therapeutic procedures. When findings of clinical evaluations and those of other diagnostic procedures are not complementing each other, the objective clinical findings should have preference. The medical records should reasonably document the following.
 - 3.1.1 ~~**History of Present Injury**~~ A detailed history, taken in temporal proximity to the time of injury should primarily guide evaluation and treatment.
 - 3.1.2 ~~**Physical Examination**~~: may include accepted tests and exam techniques applicable to the area being examined:
 - 3.1.2.1 Visual inspection, including posture;
 - 3.1.2.2 Cervical range of motion, quality of motion, and presence of muscle spasm. Motion evaluation of specific joints may be indicated. Range of motion should not be checked in acute trauma cases

- until fracture and instability have been ruled out on clinical examination, with or without radiographic evaluation;
- 3.1.2.3 Examination of thoracic spine-
 - 3.1.2.4 Palpation of spinous processes, facets, and muscles noting myofascial tightness, tenderness, and trigger points;
 - 3.1.2.5 Motor and sensory examination of the upper muscle groups with specific nerve root focus, as well as sensation to light touch, pin prick, temperature, position and vibration. More than 2 cm difference in the circumferential measurements of the two upper extremities may indicate chronic muscle wasting; and
 - 3.1.2.6 Deep tendon reflexes. Asymmetry may indicate pathology. Inverted reflexes (e.g. arm flexion or triceps tap) may indicate nerve root or spinal cord pathology at the tested level. Pathologic reflexes include wrist, clonus, grasp reflex, and Hoffman's sign.
- 3.1.3 **Spinal Cord Evaluation:** In cases where the mechanism of injury, history, or clinical presentation suggests a possible severe injury, additional evaluation is indicated. A full neurological examination for possible spinal cord injury may include:
- 3.1.3.1 Sharp and light touch, deep pressure, temperature, and proprioceptive sensory function;
 - 3.1.3.2 Strength testing;
 - 3.1.3.3 Anal sphincter tone and/or perianal sensation;
 - 3.1.3.4 Presence of pathological reflexes of the upper and lower extremities; or
 - 3.1.3.5 Evidence of an Incomplete Spinal Cord Injury Syndrome-
 - 3.1.3.5.1 Anterior Cord Syndrome is characterized by the loss of motor function and perception of pain and temperature below the level of the lesion with preservation of touch, vibration, and proprioception. This is typically seen after a significant compressive or flexion injury. Emergent CT or MRI is necessary to look for a possible reversible compressive lesion requiring immediate surgical intervention. The prognosis for recovery is the worst of the incomplete syndromes.
 - 3.1.3.5.2 Brown-Sequard Syndrome is characterized by ipsilateral motor weakness and proprioceptive disturbance with contralateral alteration in pain and temperature perception below the level of the lesion. This is usually seen in cases of penetrating trauma or lateral mass fracture. Surgery is not specifically required, although debridement of the open wound may be.
 - 3.1.3.5.3 Central Cord Syndrome is characterized by sensory and motor disturbance of all limbs, often upper extremity more than lower, and loss of bowel and bladder function with preservation of perianal sensation. This is typically seen in elderly patients with a rigid spine following hyperextension injuries. Surgery is not usually required.
 - 3.1.3.5.4 Posterior Cord Syndrome, a rare condition, is characterized by loss of sensation below the level of the injury, but intact motor function.
 - 3.1.3.6 Spinal cord lesions may be classified according to the American Spine Injury Association (ASIA) impairment scale-

ASIA IMPAIRMENT SCALE
A – Complete: No motor or sensory function is preserved in the sacral segments S4-S5
B – Incomplete: Sensory but not motor function is preserved below the neurological level and includes the sacral segments S4-S5
C – Incomplete: Motor function is preserved below the neurological level, and more than half of key muscles below the neurological level have a muscle grade less than 3
D – Incomplete: Motor function is preserved below the neurological level, and at least half of key muscles below the neurological level have a grade of 3 or more
E – Normal: motor and sensory function are normal

A worksheet which details dermatomes and muscle testing required is available from ASIA.

- 3.1.4 **Soft Tissue Injury Evaluation:** Soft tissue injuries are traumatic injuries to the muscles, ligaments, tendons, and/or connective tissue. The most common mechanism is sudden hyperextension and/or hyperflexion of the neck. Acceleration/deceleration on the lateral plane may also result in one of these syndromes. A true isolated cervical strain is not associated with focal neurological symptoms. The signs and pathophysiology of these injuries are not well understood. Soft tissue injuries may include cervical strain, myofascial syndromes, somatic dysfunction, and fractures.
- 3.2 **RADIOGRAPHIC IMAGING** of the Cervical spine is a generally accepted, well-established and widely used diagnostic procedure when specific indications based on history and/or physical examination are present. The mechanism of injury and specific indications for the radiograph should be listed on the request form to aid the radiologist and x-ray technician. Suggested indications may include:
- 3.2.1 History of trauma;
 - 3.2.2 Age over 55 years;
 - 3.2.3 Unexplained or persistent Cervical pain for at least 6 weeks or pain that is worse with rest;
 - 3.2.4 Localized pain, fever, constitutional symptoms, or history or exam suggestive of intravenous drug abuse, prolonged steroid use, or osteomyelitis;
 - 3.2.5 Suspected lesion in the Cervical spine due to systemic illness such as a rheumatic/rheumatoid disorder or endocrinopathy. Suspected lesions may require special views;
 - 3.2.6 Past medical history suggestive of pre-existing spinal disease, osteoporosis, spinal instrumentation, or cancer; and
 - 3.2.7 Prior to high-velocity/low amplitude manipulation or Grade IV to V mobilization.
- 3.3 **LABORATORY TESTING** Laboratory tests are generally accepted, well-established and widely used procedures. They are, however, rarely indicated at the time of initial evaluation, unless there is suspicion of systemic illness, infection, neoplasia, or underlying rheumatologic disorder, connective tissue disorder, or based on history and/or physical examination. Laboratory tests can provide useful diagnostic information. Tests include, but are not limited to:
- 3.3.1 Complete blood count (CBC) with differential can detect infection, blood dyscrasias, and medication side effects;
 - 3.3.2 Erythrocyte sedimentation rate (ESR), rheumatoid factor (RF), antinuclear antigen (ANA), human leukocyte antigen (HLA), and C-reactive protein (CRP), can be used to detect evidence of a rheumatologic, infectious, or connective tissue disorder;
 - 3.3.3 Serum calcium, phosphorous, uric acid, alkaline phosphatase, and acid phosphatase can detect metabolic bone disease;
 - 3.3.4 Urinalysis for bacteria (usually with culture and sensitivity), calcium, phosphorus, hydroxyproline, or hematuria; and
 - 3.3.5 Liver and kidney function may be performed for prolonged anti-inflammatory use or other medications requiring monitoring.

4.0 Diagnostic Imaging and Testing Procedures

One diagnostic imaging procedure may provide the same or distinctive information as does another procedure. Therefore, the prudent choice of a single diagnostic procedure, a complement of procedures or a sequence of procedures will optimize diagnostic accuracy; maximize cost effectiveness (by avoiding redundancy), and minimize potential adverse effects to patients. All imaging procedures have a degree of specificity and sensitivity for various diagnoses. No isolated imaging test can assure a correct diagnosis. Clinical information obtained by history taking and physical examination should form the basis for selecting an imaging procedure and interpreting its results. Magnetic resonance imaging (MRI), myelography, or Computed Axial Tomography (CT) scanning following myelography may provide useful information for many spinal disorders. When a diagnostic procedure, in conjunction with clinical information, can provide sufficient information to establish an accurate diagnosis, the second diagnostic procedure will become a redundant procedure. At the same time, a subsequent diagnostic procedure can be a complementary diagnostic procedure if the first or preceding procedures, in conjunction with clinical information, cannot provide an accurate diagnosis. Usually, preference of a procedure over others depends upon availability, a patient's tolerance, and/or the treating practitioner's familiarity with the procedure.

- 4.1 **IMAGING STUDIES** are generally accepted, well-established and widely used diagnostic procedures. When indicated, imaging studies can be utilized for further evaluation of the Cervical spine, based upon the mechanism of injury, symptoms, and patient history. Prudent choice of a single diagnostic study, a complementary combination of studies, or a proper sequential order of complementary studies will help ensure maximum diagnostic accuracy and minimize adverse effect to the patient. When the findings of the diagnostic

imaging and testing procedures are not consistent with the clinical examination, the clinical findings should have preference.

The studies below are listed in frequency of use, not importance:

- 4.1.1 **Magnetic Resonance Imaging (MRI):** is the imaging study of choice for most abnormalities of the cervical spine. MRI is useful in suspected nerve root compression, in myelopathy to evaluate the spinal cord and/or 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. MRI is contraindicated in patients with certain implanted devices. In general, the high field, conventional, MRI provides better resolution. A lower field scan may be indicated when a patient cannot fit into a high field scanner or is too claustrophobic despite sedation. Inadequate resolution on the first scan may require a second MRI using a different technique. All questions in this regard should be discussed with the MRI center and/or radiologist.
 - 4.1.2 **Computed Axial Tomography (CT)** provides excellent visualization of bone and is used to further evaluate bony masses and suspected fractures and joints not clearly identified on radiographic evaluation. It may sometimes be done as a complement to MRI scanning to better delineate bony osteophyte formation in the neural foramen. Instrument scatter reduction software provides better resolution when metallic artifact is of concern.
 - 4.1.3 **Myelography** is the injection of radiopaque material into the spinal subarachnoid space, with x-rays then taken to define anatomy. It 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. The use of small needles and a less toxic, water-soluble, nonionic contrast is recommended.
 - 4.1.4 **CT Myelogram** provides more detailed information about relationships between neural elements and surrounding anatomy.
 - 4.1.5 **Bone Scan (Radioisotope Bone Scanning)** is generally accepted, well established, and widely used. Bone scanning is more sensitive but less specific than MRI. ^{99m}Techetium diphosphonate uptake reflects osteoblastic activity and may be useful in diagnosing metastatic/primary bone tumors, stress fractures, osteomyelitis, and inflammatory lesions, but cannot distinguish between these entities.
 - 4.1.6 **Other Radioisotope Scanning:** Indium and gallium scans are generally accepted, well established, and widely used procedures usually to help diagnose lesions seen on other diagnostic imaging studies. ⁶⁷Gallium citrate scans are used to localize tumor, infection, and abscesses. ¹¹¹Indium-labeled leukocyte scanning is utilized for localizing infection or inflammation.
 - 4.1.7 **Dynamic [Digital] Fluoroscopy:** Dynamic [Digital] Fluoroscopy of the Cervical spine measures the motion of intervertebral segments using a videofluoroscopy unit to capture images as the subject performs Cervical flexion and extension, storing the anatomic motion of the spine in a computer. Currently it is not recommended for use in the diagnosis of Cervical instability, since there is limited information on normal segmental motion for the age groups commonly presenting with Cervical pain, and diagnostic criteria for specific spinal conditions are not yet defined. No studies have yet demonstrated predictive value in terms of standard operative and non-operative therapeutic outcomes.
 - 4.1.8 **Diagnostic Spinal Ultrasound** is not recommended in the Cervical, Thoracic and Lumbar Spine
- 4.2 **OTHER TESTS** The following diagnostic procedures in this subsection are listed in alphabetical order, not by importance:
- 4.2.1 **Electrodiagnostic Testing:**
 - 4.2.1.1 **Electromyography (EMG), Nerve Conduction Studies (NCS)** are generally accepted, well established and widely used diagnostic procedures. EMG and NCS, when performed and interpreted by a trained physician/electrophysiologist, may be useful for patients with suspected neural involvement whose symptoms are persistent or unresponsive to initial conservative treatments. They are used to differentiate peripheral neural deficits from radicular and spinal cord neural deficits and to rule out concomitant myopathy. However, F-Wave Latencies are not diagnostic for radiculopathy. NCS without needle EMG is not diagnostic for radiculopathy and therefore is not recommended.

In general, EMG and NCS are complementary to imaging procedures such as CT, MRI, and/or myelography or diagnostic injection procedures. Electrodiagnostic studies may provide useful, correlative neuropathophysiological information that would be otherwise unobtainable from the radiologic studies discussed above.
 - 4.2.1.2 **Portable Automated Electrodiagnostic Device (also known as Surface EMG)** is not a substitute for conventional diagnostic testing in clinical decision-making, and therefore, is not recommended.

- 4.2.1.3 Somatosensory Evoked Potential (SSEP) is not recommended to identify radiculopathy. It may be used to evaluate myelopathy and other rare neurological disorders such as neurogenic bladder and sexual dysfunction.
- 4.2.1.4 Current Perception Threshold (CPT) Evaluation may be useful as a screening tool, but its diagnostic efficacy in the evaluation of industrial Cervical pain has not been determined. Therefore, CPT is not recommended as a diagnostic tool.

4.2.2 Injections – Diagnostic

- 4.2.2.1 Description – Diagnostic spinal injections are generally accepted, well-established procedures. These injections may be useful for localizing the source of pain, and may have added therapeutic value when combined with injection of therapeutic medication(s).
- 4.2.2.2 Indications – Since these procedures are invasive, less invasive or non-invasive procedures should be considered first. Selection of patients, choice of procedure, and localization of the level for injection should be determined by clinical information.
- 4.2.2.3 The interpretation of the test results are primarily based on functional change, symptom report, and pain response (via a recognized pain scale), before and at an appropriate time period after the injection. The diagnostic significance of the test result should be evaluated in conjunction with clinical information and the results of other diagnostic procedures. Injections with local anesthetics of differing duration may be used to support a diagnosis. In some cases, injections at multiple levels may be required to accurately diagnose neck pain.
Multiple injections provided at the same session without staging may seriously dilute the diagnostic value of these procedures. Practitioners must carefully weigh the diagnostic value of the procedure against the possible therapeutic value.
- 4.2.2.4 Special Requirements for Diagnostic Injections Since multi-planar fluoroscopy during procedures is required to document technique and needle placement, an experienced physician should perform the procedure. Permanent images are required to verify needle placement. The subspecialty disciplines of the physicians performing the injections may be varied, including, but not limited to: anesthesiology, radiology, surgery, or physiatry. The practitioner should document hands-on training through workshops of the type offered by organizations such as the International Spine Intervention Society (ISIS) and/or completed fellowship training with interventional training. They must also be knowledgeable in radiation safety.
- 4.2.2.5 Specific Diagnostic Injections In general, relief should last for at least the duration of the local anesthetic used and should significantly relieve pain and result in functional improvement. Refer to "Injections – Therapeutic" for information on specific therapeutic injections.
 - 4.2.2.5.1 Medial Branch Blocks are generally accepted diagnostic injections, used to determine whether a patient is a candidate for radiofrequency medial branch neurotomy (also known as facet rhizotomy). To be a positive diagnostic block, the patient should report a reduction of pain of 50% or greater relief from baseline or the length of time appropriate for the local anesthetic used. A separate comparative block on a different date may be performed to confirm the level of involvement. A comparative block uses anesthetics of varying lengths of activity.
Frequency and Maximum Duration: May be repeated once for comparative blocks. Limited to 4 levels
 - 4.2.2.5.2 Transforaminal injections are generally accepted and useful in identifying spinal pathology. When performed for diagnosis, small amounts of local anesthetic up to a total volume of 1.0 cc should be used to determine the level of nerve root irritation. A positive diagnostic block should result in a positive diagnostic functional benefit and an 50% reduction in nerve root generated pain appropriate for the anesthetic used as measured by accepted pain scales (such as a VAS). The use of a non-particulate steroid is recommended.
Frequency and Maximum Duration: Once per suspected level. Limited to three levels. May be repeated once for confirmation.
 - 4.2.2.5.3 Zygapophyseal (Facet) Blocks: Facet blocks are generally accepted. They may be used diagnostically to direct functional rehabilitation programs. A positive diagnostic block should result in a positive diagnostic functional benefit and an 50% reduction in pain appropriate for the anesthetic used as measured by accepted pain scales (such as a VAS). They then may be repeated per the therapeutic guidelines.
Frequency and maximum Duration: Once per suspected level, limited to three levels. May be repeated for confirmation.

Atlanto-Axial and Atlanto-Occipital injections are generally accepted for diagnosis and treatment but do not lend themselves to denervation techniques owing to variable neuroanatomy. Injection of this articulation is complicated by the proximity of the vertebral artery, which may be tortuous at the level of the C1 joint. Inadvertent injection of the vertebral artery may cause respiratory arrest, seizure, stroke, or permanent neurological sequelae. Only practitioners skilled in these injections should perform them.

Frequency and Maximum Duration: Once per side

4.2.3 Provocation Discography

4.2.3.1 Description—Discography is an accepted diagnostic procedure to identify or refute a discogenic source of pain for patients who are surgical candidates. Discography should only be performed by physicians who are experienced and have been proctored in the technique. It is essential that all indications, pre-conditions, special considerations, procedures, reporting requirements, and results are carefully and specifically followed. Results should be interpreted judiciously.

4.2.3.2 Indications—Discography may be indicated when a patient has a history of functionally limiting, unremitting Cervical pain of greater than four months duration, with or without arm pain, which has been unresponsive to all conservative interventions. A patient who would not consider operative therapeutic intervention is not a candidate for an invasive nontherapeutic intervention, such as provocation discography.

Discography may prove useful for the evaluation of the pre-surgical spine, such as pseudarthrosis, discogenic pain at levels above or below a prior spinal fusion, annular tear, or internal disc disruption.

Discography may show disc degeneration and annular disruption in the absence of low neck pain. Discography may also elicit concordant pain in patients with mild and functionally inconsequential neck pain. Because patients with mild neck pain should not be considered for invasive treatment, discography should not be performed on these patients. In symptomatic patients with annular tears on discography, the side of the tear does not necessarily correlate with the side on which the symptoms occur. The presence of an annular tear does not necessarily identify the tear as the pain generator.

Discography may have a limited place in the work-up of pseudarthrosis. Discography may prove useful in evaluating the number of Cervical spine levels that might require fusion. CT Discography provides further detailed information about morphological abnormalities of the disc and possible lateral disc herniations.

4.2.3.3 Pre-conditions for provocation discography include all of the following:

4.2.3.3.1 A patient with functionally limiting, unremitting neck and/or leg pain of greater than four months duration in whom conservative treatment has been unsuccessful and in whom the specific diagnosis of the pain generator has not been made apparent on the basis of other noninvasive imaging studies (e.g., MRI, CT, plain films, etc.). It is recommended that discography be reserved for use in patients with equivocal MRI findings, especially at levels adjacent to clearly pathological levels. Discography may be more sensitive than MRI or CT in detecting radial annular tears. However, radial tears must always be correlated with clinical presentation.

4.2.3.3.2 Patients who are considered surgical candidates (e.g., symptoms are of sufficient magnitude and the patient has been informed of the possible surgical options that may be available based upon the results of discography).

4.2.3.3.3 Informed consent regarding the risks and potential diagnostic benefits of discography has been obtained.

4.2.3.4 Special Considerations:

4.2.3.4.1 Discography should not be performed by the physician expected to perform the therapeutic procedure. The procedure should be carried out by an experienced individual who has received specialized training in the technique of provocation discography.

4.2.3.4.2 Discography should be performed in a blinded format that avoids leading the patient with anticipated responses. The procedure should include one or more disc levels thought to be normal or non-painful in order to serve as an internal control. The patient should not know what level is being injected in order to avoid spurious results. Abnormal disc levels may be repeated to confirm concordance.

4.2.3.4.3 Sterile technique must be utilized.

4.2.3.4.4 Judicious use of light sedation during the procedure is acceptable, represents the most common practice nationally at the current time, and is recommended by most experts in the

field. The patient must be awake and able to accurately report pain levels during the provocation portion of the procedure.

4.2.3.4.5 The discography may be performed using a manometer to record pressure.

4.2.3.4.6 Intradiscal injection of local anesthetic may be carried out after the provocation portion of the examination and the patient's response.

4.2.3.4.7 It is recommended that a post-discogram CT be considered as it frequently provides additional useful information about disc morphology or other pathology.

4.2.3.5 **Reporting of Discography**—In addition to a narrative report, the discography report should contain a standardized classification of (a) disc morphology (b) the pain response, and (c) the pressure at which pain is produced. All results should be clearly separated in the report from the narrative portion. Asymptomatic annular tears are common and the concordant pain response is an essential finding for a positive discogram.

4.2.3.5.1 When discography is performed to identify the source of a patient's neck pain, both a concordant pain response and morphological abnormalities must be present at the pathological level prior to initiating any treatment directed at that level. The patient must be awake during the provocation phase of the procedure; therefore, sedative medication must be carefully titrated.

4.2.3.5.2 Reporting of pain response should be consistent with the operational criteria of the International Spine Intervention Society (ISIS) Guidelines. The report must include the level of concordance for neck pain using a 10-point VAS, or similar quantitative assessment. It should be noted that change in the VAS scale before and after provocation is more important than the number reported.

4.2.4 **Thermography** is an accepted and established procedure, but has no use as a diagnostic test for Cervical pain and is not recommended.

5.0 Therapeutic Procedures—Non-Operative

Patients undergoing therapeutic procedure(s) are encouraged to return to modified or restricted duty during their rehabilitation at the earliest appropriate time. Refer to "Return-to-Work" in this section for detailed information.

Cessation and/or review of treatment modalities should be undertaken when no further significant subjective or objective improvement in the patient's condition is noted. If patients are not responding within the recommended duration periods, alternative treatment interventions, further diagnostic studies or consultations should be pursued. Providers should provide and document education to the patient. No treatment plan is complete without addressing issues of individual and/or group patient education as a means of facilitating self-management of symptoms.

Home therapy is an important component of therapy and may include active and passive therapeutic procedures, as well as, other modalities to assist in alleviating pain, swelling, and abnormal muscle tone.

The following procedures are listed in alphabetical order.

5.1 **ACUPUNCTURE** is an accepted and widely used procedure for the relief of pain and inflammation, and there is some scientific evidence to support its use. The exact mode of action is only partially understood. Western medicine studies suggest that acupuncture stimulates the nervous system at the level of the brain, promotes deep relaxation, and affects the release of neurotransmitters. Acupuncture is commonly used as an alternative or in addition to traditional Western pharmaceuticals. While it is commonly used when pain medication is reduced or not tolerated, it may be used as an adjunct to physical rehabilitation and/or surgical intervention to hasten the return of functional activity. Acupuncture should be performed by MD, DO, DC with appropriate training; or a licensed acupuncturist.

5.1.1 **Acupuncture:** is the insertion and removal of filiform needles to stimulate acupoints (acupuncture points). Needles may be inserted, manipulated, and retained for a period of time.

Acupuncture can be used to reduce pain, reduce inflammation, increase blood flow, increase range of motion, decrease the side effect of medication-induced nausea, promote relaxation in an anxious patient, and reduce muscle spasm.

Indications include joint pain, joint stiffness, soft tissue pain and inflammation, paresthesia, postsurgical pain relief, muscle spasm, and scar tissue pain.

5.1.2 **Acupuncture with Electrical Stimulation:** is the use of electrical current (micro amperage or milli-amperage) on the needles at the acupuncture site. It is used to increase effectiveness of the needles by continuous stimulation of the acupoint. Physiological effects (depending on location and settings) can

include endorphin release for pain relief, reduction of inflammation, increased blood circulation, analgesia through interruption of pain stimulus, and muscle relaxation.

It is indicated to treat chronic pain conditions, radiating pain along a nerve pathway, muscle spasm, inflammation, scar tissue pain, and pain located in multiple sites.

- 5.1.3 **Total Time Frames For Acupuncture and Acupuncture with Electrical Stimulation:** Time frames are not meant to be applied to each of the above sections separately. The time frames are to be applied to all acupuncture treatments regardless of the type or combination of therapies being provided.

Time to produce effect: 3 to 6 treatments

Frequency: 1 to 3 times per week Maximum course duration: 14 treatments (one course). Any of the above acupuncture treatments may extend longer if objective functional gains can be documented or when symptomatic benefits facilitate progression in the patient's treatment program. An additional course of treatment beyond 14 treatments may be documented with respect to need and ability to facilitate positive symptomatic or functional gains. Such care should be re-evaluated and documented with each series of treatments.

- 5.1.4 **Other Acupuncture Modalities:** Acupuncture treatment is based on individual patient needs and therefore treatment may include a combination of procedures to enhance treatment effect. Other procedures may include the use of heat, soft tissue manipulation/massage, and exercise. Refer to Active Therapy (Therapeutic Exercise) and Passive Therapy sections (Massage and Superficial Heat and Cold Therapy) for a description of these adjunctive acupuncture modalities and time frames.

- 5.2 **BIOFEEDBACK** is a form of behavioral medicine that helps patients learn self awareness and self regulation skills for the purpose of gaining greater control of their physiology, such as muscle activity, brain waves, and measures of autonomic nervous system activity. Electronic instrumentation is used to monitor the targeted physiology and then displayed or fed back to the patient visually, auditorially, or tactilely, with coaching by a biofeedback specialist. Biofeedback is provided by clinicians certified in biofeedback and/or who have documented specialized education, advanced training, or direct or supervised experience qualifying them to provide the specialized treatment needed (e.g., surface EMG, EEG, or other).

Treatment is individualized to the patient's work-related diagnosis and needs. Home practice of skills is required for mastery and may be facilitated by the use of home training tapes. The ultimate goal of biofeedback treatment is to normalize physiology to the pre-injury status to the extent possible, and involves transfer of learned skills to the workplace and daily life. Candidates for biofeedback therapy or training must be motivated to learn and practice biofeedback and self-regulation techniques. Indications for biofeedback include individuals who are suffering from musculoskeletal injury in which muscle dysfunction or other physiological indicators of excessive or prolonged stress response affects and/or delays recovery. Other applications include training to improve self-management of emotional stress/pain responses such as anxiety, depression, anger, sleep disturbance, and other central and autonomic nervous system imbalances. Biofeedback is often used in conjunction with other treatment modalities.

Time to produce effect: 3 to 4 visits

Frequency: 1 to 2 times per week

Maximum duration: 10 to 12 visits. Treatment beyond 12 visits must be documented with respect to need, expectation, and ability to facilitate positive functional gains.

5.3 **INJECTIONS – THERAPEUTIC**

- 5.3.1 **Therapeutic Spinal Injections:** Description — Therapeutic spinal injections may be used after initial conservative treatments have been undertaken. Therapeutic injections should, with rare exceptions, be used only after imaging studies and/or diagnostic injections have established pathology. Special Considerations — For all injections (excluding trigger point), multi-planar fluoroscopic guidance during procedures is required to document technique and needle placement, and should be performed by a physician experienced in the procedure. Permanent images are required to verify needle replacement. The subspecialty disciplines of the physicians performing injections may be varied, including, but not limited to: anesthesiology, radiology, surgery, or physiatry. The practitioner should document hands on training through workshops of the type offered by organizations such as the International Spine Intervention Society (ISIS) and/or completed fellowship training in pain medicine with interventional training. They must also be knowledgeable in radiation safety.

5.3.1.1 Epidural Steroid Injection (ESI)

- 5.3.1.1.1 **Description** — Epidural steroid injections are injections of corticosteroid into the epidural space. The purpose of ESI is to reduce pain and inflammation in the acute or sub-acute phases of injury. ESI uses two approaches: transforaminal, interlaminar (midline).

5.3.1.1.2 ~~Needle Placement—Multi-planar fluoroscopic imaging is required for all epidural steroid injections. Contrast epidurograms allow one to verify the flow of medication into the epidural space. Permanent images are required to verify needle replacement.~~

5.3.1.1.3 ~~Indications—There is some evidence that epidural steroid injections are effective for patients with radicular pain or radiculopathy (sensory or motor loss in a specific dermatome or myotome). Up to 80% of patients with radicular pain may have initial relief. However, only 25-57% are likely to have excellent long-term relief. Although there is no evidence regarding the effectiveness of ESI for nonradicular disc herniation, it is an accepted intervention.~~

~~Frequency: One or more levels can be injected in one session. Whether injections are repeated depends upon the patient's response to the previous injection. Subsequent injections may occur. Injections can be repeated if the patient has demonstrated functional gain and/or pain returns or worsens.~~

~~Maximum duration: Six treatments (a treatment may include injections at one or two levels) may be done in one year, as per the patient's response to pain and function. Patients should be reassessed for improvement in pain (as measured by accepted pain scales) and/or evidence of functional improvement.~~

5.3.1.2 ~~Zygapophyseal (Facet) Injection~~

5.3.1.2.1 ~~Description—A generally accepted intra-articular or pericapsular injection of local anesthetic and corticosteroid.~~

5.3.1.2.2 ~~Indications—Patients with pain suspected to be facet mediated in origin. Facet injections may be repeated if they result in increased documented functional benefit for at least 4 to 6 weeks and/or at least an 50% initial improvement in pain scales as measured by accepted pain scales (such as VAS).~~

~~Maximum Duration: 4 per level per year. Maximum three levels~~

5.3.1.3 ~~Intradiscal Steroid Therapy: Intradiscal Steroid Therapy consists of injection of a steroid preparation into the intervertebral disc under fluoroscopic guidance at the time of discography. There is good evidence that it is not effective in the treatment of suspected discogenic neck pain and its use is not recommended.~~

5.3.2 **Radio-Frequency Medial Branch Neurotomy/facet rhizotomy:**

5.3.2.1 ~~Description—A procedure designed to denervate the facet joint by ablating the corresponding sensory medial branches. Continuous percutaneous radiofrequency is the method generally used. There is good evidence to support Radio Frequency Medial Branch Neurotomy in the cervical spine but benefits beyond one year are not yet established. Evidence in the Cervical spine is conflicting; however, the procedure is generally accepted. In one study, 60% of patients maintained at least 90% pain relief at 12 months. Radio-frequency Medial Branch Neurotomy is the procedure of choice over alcohol, phenol, or cryoablation. Precise positioning of the probe using fluoroscopic guidance is required. Permanent images should be recorded to verify placement of the device.~~

5.3.2.2 ~~Indications—These patients with significant, facetogenic pain. Individuals should have met all of the following indications: Pain of well-documented facet origin, unresponsive to active and/or passive therapy. It is generally recommended that this procedure not be performed until three months of conservative therapy have been completed. All patients should have a successful response to a diagnostic medial nerve branch block and a separate comparative block. To be a positive diagnostic block the patient should report a reduction of pain of 50% or greater from baseline for the length of time appropriate for the local anesthetic used. It is suggested that this be recorded on a form. A separate comparative block on a different date may be performed to confirm the level of involvement.~~

5.3.2.3 ~~Requirements for Repeat Radiofrequency Medial Branch Neurotomy (or additional-level RF Neurotomy): In some cases pain may recur. Successful RF Neurotomy usually provides from six to eighteen months of relief.~~

~~Before a repeat RF Neurotomy is done, a confirmatory medial branch injection should be performed if the patient's pain pattern presents differently than the initial evaluation. In occasional patients, additional levels of RF neurotomy may be necessary. The same indications and limitations apply.~~

5.3.3 **Trigger Point Injections and Dry Needling Treatment:**

5.3.3.1 ~~Description—Trigger point injections are a generally accepted treatment. Trigger point treatment can consist of dry needling or injection of local anesthetic, with or without corticosteroid, into highly~~

localized, extremely sensitive bands of skeletal muscle fibers that produce local and referred pain when activated. There is no indication for conscious sedation for patients receiving trigger point injections. The patient must be alert to help identify the site of the injection.

5.3.3.2 **Indications**—Trigger point injections may be used to relieve myofascial pain and facilitate active therapy and stretching of the affected areas.

Trigger point injections are indicated in those patients where well-circumscribed trigger points have been consistently observed. Generally, these injections are not necessary unless consistently observed trigger points are not responding to specific, noninvasive, myofascial interventions within approximately a 6-week time frame. However, trigger point injections may be occasionally effective when utilized in the patient with immediate, acute-onset of Cervical pain.

Frequency: Weekly. Suggest no more than 4 injection sites per session per week to avoid significant post-injection soreness.

Maximum duration: 8 weeks. Occasional patients may require 2 to 4 repetitions over a 1 to 2-year period.

5.3.4 **Prolotherapy:** also known as sclerotherapy consists of a series of injections of hypertonic dextrose, with or without glycerine and phenol, into the ligamentous structures of the Cervical Spine. Its proponents claim that the inflammatory response to the injections will recruit cytokine growth factors involved in the proliferation of connective tissue, stabilizing the ligaments of the Cervical when these structures have been damaged by mechanical insults.

There are conflicting studies concerning the effectiveness of Prolotherapy in the Cervical. Lasting functional improvement has not been shown. The injections are invasive, may be painful to the patient, and are not generally accepted or widely used. Therefore, the use of Prolotherapy for neck pain is not recommended.

5.3.5 **Epiduroscopy and Epidural Lysis of Adhesions:** is an investigational treatment of Cervical pain. It involves the introduction of a fiberoptic endoscope into the epidural space via the sacral hiatus. With cephalad advancement of the endoscope under direct visualization, the epidural space is irrigated with saline. Adhesiolysis may be done mechanically with a fiberoptic endoscope. The saline irrigation is performed with or without epiduroscopy and is intended to distend the epidural space in order to obtain an adequate visual field. It is designed to produce lysis of adhesions, which are conjectured to produce symptoms due to traction on painful nerve roots. Saline irrigation is associated with risks of elevated pressures which may impede blood flow and venous return, possibly causing ischemia of the cauda equina and retinal hemorrhage.

Other complications associated with instrumented lysis include catheter shearing, need for catheter surgical removal, infection (including meningitis), hematoma, and possible severe hemodynamic instability during application. Although epidural adhesions have been postulated to cause chronic Cervical pain, studies have failed to find a significant correlation between the level of fibrosis and pain or difficulty functioning. Studies of epidural lysis demonstrate no transient pain relief from the procedure. Given the low likelihood of a positive response, the additional costs and time requirement, and the possible complications from the procedure, epidural injection, or mechanical lysis, is not recommended.

Epiduroscopy directed steroid injections are also not recommended as there is no evidence to support an advantage for using an epiduroscope with steroid injections.

5.4 **MEDICATIONS** use in the treatment of Cervical injuries is appropriate for controlling acute and chronic pain and inflammation. Use of medications will vary widely due to the spectrum of injuries from simple strains to post-surgical healing. All drugs should be used according to patient needs. A thorough medication history, including use of alternative and over the counter medications, should be performed at the time of the initial visit and updated periodically. The patient should be educated regarding the interaction with prescription and over-the-counter medications as well as the contents of over-the-counter herbal products.

The use of generic medications is encouraged. The list below is not all inclusive. It is accepted that medications not on this list may be appropriate for use in the care of the injured worker.

The following are listed in alphabetical order:

5.4.1 **Acetaminophen:** is an effective analgesic with antipyretic but not anti-inflammatory activity. Acetaminophen is generally well tolerated, causes little or no gastrointestinal irritation, and is not associated with ulcer formation. Acetaminophen has been associated with liver toxicity in overdose situations or in chronic alcohol use. Patients may not realize that many over-the-counter preparations may contain acetaminophen. The total daily dose of acetaminophen is recommended not to exceed 4 grams per 24-hour period, from all sources, including narcotic/acetaminophen combination preparations.

- 5.4.2 **Muscle Relaxants:** are appropriate for muscle spasm with pain. There is strong evidence that muscle relaxants are more effective than placebo for providing short-term pain relief in acute Cervical pain. When prescribing these agents, physicians must seriously consider side effects of drowsiness or dizziness and the fact that benzodiazepines may be habit-forming
- 5.4.3 **Narcotics:** should be primarily reserved for the treatment of severe Cervical pain. In mild to moderate cases of Cervical pain, narcotic medication should be used cautiously on a case-by-case basis. Adverse effects include respiratory depression, the development of physical and impaired alertness. Narcotic medications should be prescribed with strict time, quantity, and duration guidelines, and with definitive cessation parameters. Pain is subjective in nature and should be evaluated using a scale to rate effectiveness of the narcotic prescribed.
- 5.4.4 **Nonsteroidal Anti-Inflammatory Drugs (NSAIDs):** are useful for pain and inflammation. In mild cases, they may be the only drugs required for analgesia. There are several classes of NSAIDs, and the response of the individual injured worker to a specific medication is unpredictable. For this reason, a range of NSAIDs may be tried in each case with the most effective preparation being continued. Patients should be closely monitored for adverse reactions. Administration of proton pump inhibitors, Histamine 2 Blockers or prostaglandin analog misoprostol along with these NSAIDs may reduce the risk of duodenal and gastric ulceration. Intervals for metabolic screening are dependent upon the patient's age, general health status and should be within parameters listed for each specific medication.
- 5.4.4.1 **Selective Cyclo-oxygenase-2 (COX-2) Inhibitors** COX-2 inhibitors are more recent NSAIDs and differ in adverse side effect profiles from the traditional NSAIDs. The major advantages of selective COX-2 inhibitors over traditional NSAIDs are that they have less gastrointestinal toxicity and no platelet effects. COX-2 inhibitors should not be first-line for low-risk patients who will be using an NSAID short term but are indicated in select patients for whom traditional NSAIDs are not tolerated. Serious upper GI adverse events can occur even in asymptomatic patients. Patients at high risk for GI bleed include those who use alcohol, smoke, are older than 65, take corticosteroids or anti-coagulants, or have a longer duration of therapy.
- 5.4.5 **Psychotropic/Anti-anxiety/Hypnotic Agents:** may be useful for treatment of mild and chronic pain, dysesthesias, sleep disorders, and depression. Antidepressant medications, such as tricyclics and Selective Serotonin Reuptake Inhibitors (SSRIs), are useful for affective disorder and chronic pain management. Tricyclic antidepressant agents, in low dose, are useful for chronic pain. Anti-anxiety medications should generally be limited to short-term use. Combinations of the above agents may be useful. As a general rule, physicians should assess the patient's prior history of substance abuse or depression prior to prescribing any of these agents. Due to the habit-forming potential of the benzodiazepines and other drugs found in this class, they are not routinely recommended.
- 5.4.6 **Tramadol:** is useful in relief of Cervical pain and has been shown to provide pain relief equivalent to that of commonly prescribed NSAIDs. Although Tramadol may cause impaired alertness, it is generally well tolerated, does not cause gastrointestinal ulceration, or exacerbate hypertension or congestive heart failure.

5.5 OCCUPATIONAL REHABILITATION PROGRAMS

- 5.5.1 **Non-Interdisciplinary:** These generally accepted programs are work-related, outcome focused, individualized treatment programs. Objectives of the program include, but are not limited to, improvement of cardiopulmonary and neuromusculoskeletal functions (strength, endurance, movement, flexibility, stability, and motor control functions), patient education, and symptom relief. The goal is for patients to gain full or optimal function and return to work. The service may include the time-limited use of passive modalities with progression to active treatment and/or simulated/ real work.
- 5.5.1.1 **Work Conditioning/Simulation:** This program may begin once a patient is out of the acute phase of injury and will be able to tolerate this program. These programs are usually initiated after the acute phase has been completed and offered at any time throughout the recovery phase. Work conditioning should be initiated when imminent return of a patient to modified or full duty is not an option, but the prognosis for returning the patient to work at completion of the program is at least fair to good. The need for work place simulation should be based upon the results of a Functional Capacity Evaluation and/or Jobsite Analysis.
- Length of visit: 1 to 4 hours per day
Frequency: 2 to 5 visits per week
Maximum duration: 8 weeks. Participation in a program beyond six weeks must be documented with respect to need and the ability to facilitate positive symptomatic or functional gains.
- 5.5.1.2 **Work Hardening:** Work Hardening is an interdisciplinary program addressing a patient's employability and return to work. It includes a progressive increase in the number of hours per day

that a patient completes work simulation tasks until the patient can tolerate a full workday. This is accomplished by addressing the medical, behavioral, physical, functional, and vocational components of employability and return-to-work. This can include a highly structured program involving a team approach or can involve any of the components thereof. The interdisciplinary team should, at a minimum, be comprised of a qualified medical director who is board certified with documented training in occupational rehabilitation; team physicians having experience in occupational rehabilitation; occupational therapist; physical therapist; case manager; and psychologist. As appropriate, the team may also include: Chiropractor, RN, Vocational Specialist or Certified Biofeedback Therapist.

Length of visit: Up to 8 hours/day

Frequency: 2 to 5 visits per week

Maximum duration: 8 weeks. Participation in a program beyond six weeks must be documented with respect to need and the ability to facilitate positive symptomatic or functional gains.

5.5.1.3 **Spinal Cord Programs:** Spinal Cord Systems of Care provide coordinated, casemanaged, and integrated service for people with spinal cord dysfunction, whether due to trauma or disease. The system includes an inpatient component in an organization licensed as a hospital and an outpatient component. Each component endorses the active participation and choice of the persons served throughout the entire program.

The Spinal Cord System of Care also provides or formally links with key components of care that address the lifelong needs of the persons served. This can include a highly structured program involving a team approach or can involve any of the components thereof. The interdisciplinary team should, at a minimum, be comprised of a qualified medical director who is board certified and trained in rehabilitation, a case manager, occupational therapy, physical therapy, psychologist, rehabilitation RN and MD, and therapeutic recreation specialist. As appropriate, the team may also include: rehabilitation counselor, respiratory therapist, social worker, or speech-language pathologist.

Time frame durations for any spinal cord program should be determined based upon the extent of the patient's injury and at the discretion of the rehabilitation physician in charge.

5.6 **Cervical ORTHOTICS** Primary principles and objectives of the application of cervical orthosis include:

- aid in spinal stability when soft tissues or osteoligamentous structures cannot sufficiently perform their role as spinal stabilizers; and
- restrict spinal segment movement after acute trauma or surgical procedure.
- control of the position through the use of control forces;
- application of corrective forces to abnormal curvatures;

In cases of traumatic cervical injury, the most important objective is the protection of the spinal cord and nerve root.

5.6.1 **Cervical Supports:**

5.6.1.1 **Soft Collars** are well-tolerated by most patients cervical supports may provide symptomatic relief of pain and movement reduction in cases of acute cervical conditions. The injured worker should be advised of the potential harm from using a cervical support for a period of time greater than that which is prescribed. Harmful effects include de-conditioning of the musculature, skin irritation, and general discomfort.

5.6.1.2 **Rigid Collars**, such as a Philadelphia or Miami Orthosis, are useful post-operative or in emergency situations. These collars restrict flexion and extension motion, and to a lesser degree, lateral bending and rotation. Duration of wear is dependent upon the physician and degree of cervical healing but is generally not used beyond 8 weeks.

5.6.1.3 **Cervicothoracic Orthosis:** such as Yale and sternal occipital mandibular immobilization (SOMI) type braces, restrict flexion and extension motion to a fuller degree than the Philadelphia collar and to a better degree lateral bending and rotation. Not recommended in sprain or strain type injuries.

5.6.1.4 **Halo Devices:** are used in the treatment of cervical fracture, dislocation, and instability at the discretion of the treating surgeon. Refer to Halo Devices in the Operative Treatment section.

5.6.1.5 **Other Orthosis Devices and Equipment:** Special orthosis or equipment may have a role in the rehabilitation of a cervical injury such as those injuries to a cervical nerve root resulting in upper extremity weakness or a spinal cord injury with some degree of paraparesis or tetraparesis. Use of such devices would be in a structured rehabilitation setting as part of a comprehensive rehabilitation program.

5.7 **PATIENT EDUCATION** No treatment plan is complete without addressing issues of individual and/or group patient education as a means of prolonging the beneficial effects of treatment, as well as facilitating self-management of symptoms and injury prevention. The patient should be encouraged to take an active role in the establishment of functional outcome goals. They should be educated on their specific injury, assessment findings, and plan of treatment. Instruction on proper body mechanics and posture, positions to avoid, self-care for exacerbation of symptoms, and home exercise should also be addressed.

Time to produce effect: Varies with individual patient

Frequency: Should occur at every visit.

5.8 **RESTRICTION OF ACTIVITIES** There is some evidence to support the continuation of normal daily activities as the recommended treatment for acute and chronic cervical injuries without neurologic symptoms. Complete work cessation should be avoided, if possible, since it often further aggravates the pain presentation. Modified return to work is almost always more efficacious and rarely contraindicated in the vast majority of injured workers with cervical spine injuries.

5.9 **RETURN TO WORK** Early return to work should be a prime goal in treating occupational injuries given the poor return to work prognosis for an injured worker who has been out of work for more than six months. It is imperative that the patient be educated regarding the benefits of return to work, work restrictions, and follow-up if problems arise. When attempting to return a patient to work after a specific injury, clear objective physical capabilities of the injured worker should be outlined on the appropriate form. An accurate job description with detailed physical duty requirements is often necessary to assist the physician in making return to work recommendations.

Employers should be prepared to offer transitional work. This may consist of temporary work in a less demanding position, return to the regular job with restrictions, or gradual return to the regular job. Company policies which encourage return to work with positive communication are most likely to have decreased worker disability. When appropriate a Jobsite Analysis may be necessary. Return to work is defined as any work or duty that the patient is able to perform safely. It may not be the patient's regular work. Due to the large spectrum of injuries of varying severity and varying physical demands in the work place, it is not possible to make specific return to work guidelines for each injury.

5.9.1 **Compliance with Activity Restrictions:** In some cases, compliance with restriction of activity levels may require a complete job site evaluation, a functional capacity evaluation (FCE) or other special testing.

5.10 **THERAPY - PASSIVE** Most of the following passive therapies and modalities are generally accepted methods of care for a variety of work-related injuries. Passive therapy includes those treatment modalities that do not require energy expenditure on the part of the patient. They are principally effective during the early phases of treatment and are directed at controlling symptoms such as pain, inflammation and swelling and to improve the rate of healing soft tissue injuries. They should be used adjunctively with active therapies such as postural stabilization and exercise programs to help control swelling, pain, and inflammation during the active rehabilitation process.

Please refer to General Guideline Principles, Active Interventions. Passive therapies may be used intermittently as a therapist deems appropriate or regularly if there are specific goals with objectively measured functional improvements during treatment.

Generally, passive interventions are viewed as a means to facilitate progress in an active rehabilitation program with concomitant attainment of objective functional gains. All rehabilitation programs must incorporate "Active Interventions" no later than twelve visits or three weeks after the onset of treatment. Reimbursement for passive modalities only after the first twelve visits or three weeks of treatment without clear evidence of Active Interventions will require supportive documentation.

On occasion, specific diagnoses and post-surgical conditions may warrant durations of treatment beyond those listed as "maximum." Factors such as exacerbation of symptoms, re-injury, interrupted continuity of care, and co-morbidities may also extend durations of care. Specific goals with objectively measured functional improvement during treatment must be cited to justify extended durations of care. It is recommended that, if no functional gain is observed after the number of treatments under "time to produce effect" have been completed; alternative treatment interventions, further diagnostic studies, or further consultations should be pursued.

The following passive therapies are listed in alphabetical order:

5.10.1 **Electrical Stimulation (Unattended and Attended):** is an accepted treatment. Once applied, unattended electrical stimulation requires minimal on-site supervision by the provider. Indications include pain, inflammation, muscle spasm, atrophy, decreased circulation, and the need for osteogenic stimulation. A home unit should be purchased if treatment is effective and frequent use is recommended.

Time to produce effect: 2 to 4 treatments

Maximum duration: 24 visits

5.10.2 **Iontophoresis:** is an accepted treatment which consists of the transfer of medication, including, but not limited to, steroidal anti-inflammatories and anesthetics, through the use of electrical stimulation. Indications include pain (Lidocaine), inflammation (hydrocortisone, salicylate), edema (mecholyt, hyaluronidase, salicylate), ischemia (magnesium, mecholyt, iodine), muscle spasm (magnesium, calcium), calcific deposits (acetate), scars, and keloids (sodium chloride, iodine, acetate).

Time to produce effect: 1 to 4 treatments

Frequency: 3 times per week with at least 48 hours between treatments

Maximum duration: 8 visits per body region

5.10.3 **Manipulation:** Is generally accepted, well-established and widely used therapeutic intervention for Cervical pain. Manipulative Treatment (not therapy) is defined as the therapeutic application of manually guided forces by an operator to improve physiologic function and/or support homeostasis that has been altered by the injury or occupational disease, and has associated clinical significance.

High velocity, low amplitude (HVLA) technique, chiropractic manipulation, osteopathic manipulation, muscle energy techniques, counter strain, and non-force techniques are all types of manipulative treatment. This may be applied by osteopathic physicians (D.O.), chiropractors (D.C.), properly trained physical therapists (P.T.), properly trained occupational therapist (O.T.), or properly trained medical physicians.

Under these different types of manipulation exist many subsets of different techniques that can be described as a) direct—a forceful engagement of a restrictive/pathologic barrier, b) indirect—a gentle/non-forceful disengagement of a restrictive/pathologic barrier, c) the patient actively assists in the treatment and d) the patient relaxing, allowing the practitioner to move the body tissues. When the proper diagnosis is made and coupled with the appropriate technique, manipulation has no contraindications and can be applied to all tissues of the body. Pre-treatment assessment should be performed as part of each manipulative treatment visit to ensure that the correct diagnosis and correct treatment is employed.

High velocity, low amplitude (HVLA) manipulation is performed by taking a joint to its end range of motion and moving the articulation into the zone of accessory joint movement, well within the limits of anatomical integrity. Indications for manipulation include joint pain, decreased joint motion, and joint adhesions. Contraindications to HVLA manipulation include joint instability, fractures, severe osteoporosis, infection, metastatic cancer, active inflammatory arthritides, aortic aneurysm, and signs of progressive neurologic deficits.

Time to produce effect for all types of manipulative treatment: 1 to 6 treatments.

Frequency: Up to 3 times per week for the first 4 weeks as indicated by the severity of involvement and the desired effect, then up to 2 treatments per week for the next 4 weeks. For further treatments, twice per week or less to maintain function.

Maximum duration: 30 visits. 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 co-morbidities. Refer to the Chronic Pain Guidelines for care beyond 6 months.

The combination of 97140 plus either CMT or OMT code is equal to one visit when performed on the same day. Any combination of manual therapeutic intervention exceeding 36 visits (not units) need to go to UR.

5.10.3.1 **Mobilization (Joint) / Manipulation:** Mobilization is passive movement involving oscillatory motions to the involved joints. The passive mobility is performed in a graded manner (I, II, III, IV, or V), which depicts the speed of the maneuver. It may include skilled manual joint tissue stretching. Indications include the need to improve joint play, improve intracapsular arthrokinematics, or reduce pain associated with tissue impingement.

Time to produce effect: 4 to 6 treatments

Frequency: 2 to 3 times per week

Maximum duration: 36 visits (CPT codes 97124 and 97140 cannot exceed 36 visits in combination).

5.10.4 **Massage—Manual or Mechanical:** Massage is manipulation of soft tissue with broad ranging relaxation and circulatory benefits. This may include techniques that include pressing, lifting, rubbing, pinching of soft tissues by, or with, the practitioner's hands. Indications include edema (peripheral or hard and non-pliable edema), muscle spasm, adhesions, the need to improve peripheral circulation and range of motion, or to increase muscle relaxation and flexibility prior to exercise.

In sub-acute Cervical pain populations there is good evidence that massage can increase function when combined with exercise and patient education. Some studies have demonstrated a decrease in provider visits and pain medication use with combined therapy. One study indicated improved results with

acupressure massage. It is recommended that all massage be performed by trained, experienced therapists and be accompanied by an active exercise program and patient education. In contrast to the sub-acute population, massage is a generally accepted treatment for the acute Cervical pain population, although no studies have demonstrated its efficacy for this set of patients.

Time to produce effect: Immediate

Frequency: 1 to 3 times per week

Maximum duration: 12 visits (CPT codes 97124 and 97140 cannot exceed 36 visits in combination).

5.10.5 **Mobilization (Joint):** is a generally well-accepted treatment. Mobilization is passive movement involving oscillatory motions to the vertebral segment(s). The passive mobility is performed in a graded manner (I, II, III, IV, or V), which depicts the speed and depth of joint motion during the maneuver. For further discussion on Level V joint mobilization please see section on HVLA manipulation [Refer to section 12. d.]. It may include skilled manual joint tissue stretching.

Indications include the need to improve joint play, segmental alignment, improve intracapsular arthrokinematics, or reduce pain associated with tissue impingement. Mobilization should be accompanied by active therapy. For Level V mobilization contraindications include joint instability, fractures, severe osteoporosis, infection, metastatic cancer, active inflammatory arthritides, aortic aneurysm, and signs of progressive neurologic deficits.

Time to produce effect for all types of manipulative treatment: 1 to 6 treatments.

Frequency: Up to 3 times per week for the first 4 weeks as indicated by the severity of involvement and the desired effect, then up to 2 treatments per week for the next 4 weeks. For further treatments, twice per week or less to maintain function.

Maximum duration: 36 visits. 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. Refer to the Chronic Pain Guidelines for care beyond 6 months.

RE-EVALUATE TREATMENT EVERY 3 TO 4 WEEKS If a given treatment or modality is not producing positive results within 3 to 4 weeks, the treatment may be either modified or discontinued. Reconsideration of diagnosis should also occur in the event of poor response to a seemingly rational intervention.

CPT codes 97124 and 97140 cannot exceed 36 visits in combination.

5.10.6 **Mobilization (Soft Tissue):** is a generally well-accepted treatment. Mobilization of soft tissue is the skilled application of muscle energy, strain/counter strain, myofascial release, manual trigger point release, and manual therapy techniques designed to improve or normalize movement patterns through the reduction of soft tissue pain and restrictions. These can be interactive with the patient participating or can be with the patient relaxing and letting the practitioner move the body tissues.

Indications include muscle spasm around a joint, trigger points, adhesions, and neural compression.

Mobilization should be accompanied by active therapy.

Maximum duration: 36 visits re-evaluate treatment every 3 to 4 weeks if a given treatment or modality is not producing positive results within 3 to 4 weeks, the treatment may be either modified or discontinued. Reconsideration of diagnosis should also occur in the event of poor response to a seemingly rational intervention.

CPT codes 97124 and 97140 cannot exceed 36 visits in combination.

5.10.7 **Short-Wave Diathermy:** is an accepted treatment which involves the use of equipment that exposes soft tissue to a magnetic or electrical field. Indications include enhanced collagen extensibility before stretching, reduced muscle guarding, reduced inflammatory response, and enhanced re-absorption of hemorrhage/hematoma or edema. It is an accepted modality as an adjunct to acupuncture or situation where other forms of contact superficial heat are contraindicated.

5.10.8 **Superficial Heat and Cold Therapy (excluding Infrared Therapy):** is a generally accepted treatment. Superficial heat and cold are thermal agents applied in various manners that lower or raise the body tissue temperature for the reduction of pain, inflammation, and/or effusion resulting from injury or induced by exercise. Includes application of heat just above the surface of the skin at acupuncture points. Indications include acute pain, edema and hemorrhage, need to increase pain threshold, reduce muscle spasm, and promote stretching/flexibility. Cold and heat packs can be used at home as an extension of therapy in the clinic setting.

Time to produce effect: Immediate

Frequency: 2 to 5 times per week

Maximum duration: 12 visits with maximum visits 1 per day.

5.10.9 **Traction Manual:** is an accepted treatment and an integral part of manual manipulation or joint mobilization. Indications include decreased joint space, muscle spasm around joints, and the need for increased synovial nutrition and response. Manual traction is contraindicated in patients with tumor, infection, fracture, or fracture dislocation.

5.10.10 **Traction Mechanical:** Traction modalities are contraindicated in patients with tumor, infections, fracture, or fracture dislocation. Non-oscillating inversion traction methods are contraindicated in patients with glaucoma or hypertension. Motorized traction/decompression devices are included and billed as mechanical traction (i.e. VAX-D, DRX9000, etc.). A home Cervical traction unit can be purchased if proves effective and the home unit can provide a similar treatment.

Time to produce effect: 1 to 3 sessions up to 30 minutes. If response is negative after 3 treatments, discontinue this modality.

Frequency: 2 to 3 times per week. A home Cervical traction unit can be purchased if therapy proves effective.

Maximum duration: 24 visits

5.10.11 **Transcutaneous Electrical Nerve Stimulation (TENS):** is a generally accepted treatment. TENS should include at least one instructional session for proper application and use. Indications include muscle spasm, atrophy, and decreased circulation and pain control. Minimal TENS unit parameters should include pulse rate, pulse width and amplitude modulation. Consistent, measurable functional improvement should be documented prior to the purchase of a home unit.

Time to produce effect: Immediate

Frequency: Variable

5.10.12 **Ultrasound (Including Phonophoresis):** is an accepted treatment. Ultrasound uses sonic generators to deliver acoustic energy for therapeutic thermal and/or non-thermal soft tissue effects. Indications include scar tissue, adhesions, collagen fiber and muscle spasm, and the need to extend muscle tissue or accelerate the soft tissue healing. Ultrasound with electrical stimulation is concurrent delivery of electrical energy that involves dispersive electrode placement. Indications include muscle spasm, scar tissue, pain modulation, and muscle facilitation. Phonophoresis is the transfer of medication to the target tissue to control inflammation and pain through the use of sonic generators. These topical medications include, but are not limited to, steroidal anti-inflammatory and anesthetics. Time to produce effect: 6 to 15 treatments.

Frequency: 3 times per week

Maximum duration: 24 visits

5.11 **THERAPY ACTIVE** The following active therapies are widely used and accepted methods of care for a variety of work-related injuries. They are based on the philosophy that therapeutic exercise and/or activity are beneficial for restoring flexibility, strength, endurance, function, range of motion, and can alleviate discomfort. Active therapy requires an internal effort by the individual to complete a specific exercise or task. This form of therapy requires supervision from a therapist or medical provider such as verbal, visual, and/or tactile instruction(s). At times, the provider may help stabilize the patient or guide the movement pattern but the energy required to complete the task is predominately executed by the patient.

Patients should be instructed to continue active therapies at home as an extension of the treatment process in order to maintain improvement levels. Follow up visits to reinforce and monitor progress and proper technique are recommended. Home exercise can include exercise with or without mechanical assistance or resistance and functional activities with assistive devices.

The following active therapies are listed in alphabetical order:

5.11.1 **Activities of Daily Living (ADL)** are well-established interventions which involve instruction, active-assisted training, and/or adaptation of activities or equipment to improve a person's capacity in normal daily activities such as self-care, work re-integration training, homemaking, and driving.

Time to produce effect: 4 to 5 treatments

Maximum duration: 10 visits

5.11.2 **Aquatic Therapy:** is a well-accepted treatment which consists of the therapeutic use of aquatic immersion for therapeutic exercise to promote strengthening, core stabilization, endurance, range of motion, flexibility, body mechanics, and pain management. Aquatic therapy includes the implementation of active therapeutic procedures in a swimming or therapeutic pool. The water provides a buoyancy force that lessens the amount of force gravity applies to the body. The decreased gravity effect allows the patient to have a mechanical advantage and more likely have a successful trial of therapeutic exercise. The therapy may be indicated for individuals who:

- Cannot tolerate active land-based or full-weight bearing therapeutic procedures;
- Require increased support in the presence of proprioceptive deficit;

- Are at risk of compression fracture due to decreased bone density;
- Have symptoms that are exacerbated in a dry environment;
- Would have a higher probability of meeting active therapeutic goals than in a land-based environment.

The pool should be large enough to allow full extremity range of motion and fully erect posture. Aquatic vests, belts and other devices can be used to provide stability, balance, buoyancy, and resistance.

Time to produce effect: 4 to 5 treatments

Frequency: 3 to 5 times per week

Maximum duration: 18 visits. A self-directed program is recommended after the supervised aquatics program has been established, or, alternatively a transition to a land-based environment exercise program.

5.11.3 **Functional Activities:** are well-established interventions which involve the use of therapeutic activity to enhance mobility, body mechanics, employability, coordination, balance, and sensory motor integration.

Time to produce effect: 4 to 5 treatments

Frequency: 3 to 5 times per week

Maximum duration: 24 visits Total number of visit 97110 and 97530 should not exceed 40 visits without preauthorization.

5.11.4 **Functional Electrical Stimulation:** is an accepted treatment in which the application of electrical current to elicit involuntary or assisted contractions of atrophied and/or impaired muscles. It may be indicated for impaired muscle function due to radiculopathy.

Time to produce effect: 2 to 6 treatments

Frequency: 3 times per week

Maximum duration: 24 visits inclusive of electrical muscle stimulation codes if beneficial provide with home unit.

5.11.5 **Neuromuscular Re-education:** is a generally accepted treatment. It is the skilled application of exercise with manual, mechanical, or electrical facilitation to enhance strength; movement patterns; neuromuscular response; proprioception, kinesthetic sense and coordination; education of movement, balance, and posture. Indications include the need to promote neuromuscular responses through carefully timed proprioceptive stimuli, to elicit and improve motor activity in patterns similar to normal neurologically developed sequences, and improve Neuromotor response with independent control.

Time to produce effect: 2 to 6 treatments

Frequency: 3-5 times per week

Maximum duration: 36 visits

5.11.6 **Therapeutic Exercise:** is a generally well-accepted treatment. Therapeutic exercise, with or without mechanical assistance or resistance, may include isoinertial, isotonic, isometric and isokinetic types of exercises. Indications include the need for cardiovascular fitness, reduced edema, improved muscle strength, improved connective tissue strength and integrity, increased bone density, promotion of circulation to enhance soft tissue healing, improvement of muscle recruitment, improved proprioception, and coordination, and increased range of motion. Therapeutic exercises are used to promote normal movement patterns, and can also include complementary/ alternative exercise movement therapy (with oversight of a physician or appropriate healthcare professional).

5.11.7 **Spinal Stabilization:** is a generally well-accepted treatment. The goal of this therapeutic program is to strengthen the spine in its neural and anatomic position. The stabilization is dynamic which allows whole body movements while maintaining a stabilized spine. It is the ability to move and function normally through postures and activities without creating undue vertebral stress

Time to produce effect: 2 to 6 treatments

Frequency: 3 to 5 times per week

Maximum duration: 36 visits Total number of visits of 97110 & 97530 may not exceed 40 visits without preauthorization.

5.12 **VOCATIONAL REHABILITATION** is a generally accepted intervention. Initiation of vocational rehabilitation requires adequate evaluation of patients for quantification of highest functional level, motivation, and achievement of maximum medical improvement. Vocational rehabilitation may be as simple as returning to the original job or as complicated as being retrained for a new occupation. It may also be beneficial for full vocational rehabilitation to be started, if it is evident that the injured worker will be unable to return to his/her previous occupation. A positive goal and direction may aid the patient in decreasing stress and depression, and promote optimum rehabilitation.

6.0 THERAPEUTIC PROCEDURES—OPERATIVE

All operative interventions should be based on a positive correlation with clinical findings, the natural history of the disease, the clinical course, and diagnostic tests. A comprehensive assimilation of these factors should have led to a specific diagnosis with positive identification of the pathologic condition(s). It is imperative for the clinician to rule out non-physiologic modifiers of pain presentation, or non-operative conditions mimicking radiculopathy or instability (peripheral compressive neuropathy, chronic soft tissue injuries, and psychological conditions), prior to consideration of elective surgical intervention. Early intervention may be required in acute incapacitating pain or in the presence of severe or progressive neurological deficits. Patients who are not candidates for or refuse surgical treatment should be treated with non-operative therapy as indicated.

Operative treatment is indicated when the natural history of surgically treated lesions is better than the natural history for non-operatively treated lesions. All patients being considered for surgical intervention should first undergo a comprehensive neuromusculoskeletal examination to identify mechanical pain generators that may respond to non-surgical techniques, or may be refractory to surgical intervention.

In situations requiring the possible need for reoperation, and spinal fusions or total disc replacements over two levels, a second opinion may be necessary. Interdisciplinary interventions should be strongly considered post-operatively in patients not making functional progress within expected time.

6.1 **General Recommendations**—If cervical fusion is being considered, it is recommended that the injured worker be encouraged to quit or decrease smoking for at least two weeks prior to surgery and during the time of healing. Because smokers have a higher risk of non-union and higher post-operative costs, it is recommended that insurers cover a smoking cessation program peri-operatively.

6.2 **General Indications for Surgery**—Operative intervention should be considered and a consultation obtained when improvement of symptoms has plateaued and the 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 surgeon's experience and preference.

6.3 **Specific Indications include:**

6.3.1 **For Patients with Myelopathy:** immediate surgical evaluation and treatment is indicated.

6.3.2 **For Patients with Cervical Radiculopathy:**

6.3.2.1 Early intervention may be required for acute incapacitating pain or in the presence of severe or progressive neurological deficits.

6.3.2.2 Persistent or recurrent arm pain with functional limitations, unresponsive to conservative treatment after six weeks; or

6.3.2.3 Progressive functional neurological deficit; or

6.3.2.4 Static neurological deficit associated with significant radicular pain; and

6.3.2.5 Confirmatory imaging studies consistent with clinical findings.

6.3.3 **For Patients with Persistent Non-radicular Cervical Pain:** in the absence of a radiculopathy, it is recommended that a decisive commitment to surgical or nonsurgical interventions be made by 4 months following injury. The effectiveness of three-level cervical fusion for non-radicular pain has not been established. In patients with non-radicular cervical pain for whom fusion is being considered, required pre-operative indications include all of the following:

6.3.3.1 In general, if the program of non-operative treatment fails, operative treatment is indicated when:

6.3.3.1.1 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 of non-operative programs for debilitated patients with complex problems; and/or

6.3.3.1.2 Frequent recurrences of symptoms cause functional limitations even if a non-operative active treatment program provides satisfactory relief of symptoms, and restoration of function on each recurrence.

6.3.3.2 Pain generators are adequately defined and treated; and

6.3.3.3 Physical medicine and manual therapy interventions are completed

6.3.3.4 X-ray, MRI, or CT/discography demonstrating disc pathology or spinal instability.

6.3.3.5 Spine pathology is limited to two levels.

6.4 **Surgical Procedures include:**

6.4.1 **Cervical Discectomy with or without Fusion:**

6.4.1.1 **Description** – Procedure to relieve pressure on one or more nerve roots or spinal cord. It may be performed with or without the use of a microscope.

6.4.1.2 **Surgical Indications** – Radiculopathy from ruptured disc or spondylosis, spinal instability, or patients with non-radicular neck pain meeting fusion criteria. Discectomy alone from a posterior approach may be considered in patients with pure radicular symptoms from their herniated disc and who have sufficiently large foramen that disc space collapse is unlikely to further compromise the nerve root. Failure rates increase with disease at more than two levels.

6.4.1.3 **Operative Treatment** – Cervical plating may be used to prevent graft dislodgment and facilitate fusion. It has the added advantage of eliminating the need for postoperative bracing and allowing faster functional recovery.

Recombinant Human Bone Morphogenetic Protein (rhBMP-2) is a member of a family of cytokines capable of inducing bone formation. It is produced from genetically modified cell lines using molecular cloning techniques. Use of rhBMP-2 in the cervical spine may carry a risk of swelling and ectopic bone formation which can encroach on neurovascular structures and on the esophagus. As of the date of adoption the FDA has not approved its use in the cervical spine. At the time of this guideline, cervical application of rhBMP-2 is investigational and remains outside the purview of the guidelines. Prior authorization is required.

6.4.1.4 **Post-Operative Therapy** – Cervical bracing may be used. 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 and encouraged to expedite a return to higher function. Active treatment, which patients should have had prior to surgery, will frequently require a repeat of the sessions previously ordered. The goals of the therapy program should include instruction in a long-term home-based exercise program.

6.4.1.5 **Intervertebral Biomechanical Device(s) and Use of Code 22851**

Code 22851 describes the application of an intervertebral biomechanical device to a vertebral defect or interspace. Code 22851 should be listed in conjunction with a primary procedure without the use of modifier 51. The use of 22851 is limited to one instance per single interspace or single vertebral defect regardless of the number of devices applied and infers additional qualifying training, experience, sizing, and/or use of special surgical appliances to insert the biomechanical device. Qualifying devices include manufactured synthetic or allograft biomechanical devices, or methyl methacrylate constructs, and are not dependant on a specific manufacturer, shape, or material of which it is constructed. Qualifying devices are machine cut to specific dimensions for precise application to an intervertebral defect. (For example, the use of code 22851 would be appropriate during a cervical arthrodesis (22554) when applying a synthetic alloy cage, a threaded bone dowel, or a machine cut hexahedron cortical, cancellous, or cortico-cancellous allograft biomechanical device. Surgeons utilizing generic non-machined bony allografts or autografts are referred to code sets 20930-20931, 20936-20938 respectively.)

6.4.2 **Cervical Corpectomy**

6.4.2.1 **Description** – Removal of a portion or the entire vertebral body from the front of the spine. May also include removal of the adjacent discs. Usually involves fusion.

6.4.2.2 **Surgical Indications** – Single or two-level spinal stenosis, spondylolisthesis, or severe kyphosis, with cord compression.

6.4.2.3 **Operative Treatment** – Neural decompression, fusion with instrumentation, or halo vest placement to maintain cervical position. Hemisectomy may be done when only a portion of the vertebral body needs to be resected. Allografts may be used for single bone graft fusion; however, autografts are generally preferable for multi-level fusions unless a large strut graft is required.

6.4.2.4 **Post-Operative Therapy** – Dependent upon number of vertebral bodies involved, healing time may be longer than discectomy. Halo vest care is required. 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. The goals of the therapy program should include instruction in a long-term home-based exercise program.

6.4.3 **Cervical Laminectomy with or without Foraminotomy or Fusion**

6.4.3.1 **Description** – Surgical removal of the posterior portion of a vertebrae in order to gain access to the spinal cord or nerve roots.

- 6.4.3.2 **Surgical Indications**—Neural compression.
- 6.4.3.3 **Operative Treatment**—Laminotomy, partial discectomy, and nerve root decompression.
- 6.4.3.4 **Post-Operative Therapy**—Cervical bracing may be appropriate (usually 6 to 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 for most patients once the cervical spine is deemed stable and without complication. The goals of the therapy program should include instruction in a long-term home-based exercise program.

6.4.4 **Cervical Laminoplasty**

- 6.4.4.1 **Description**—Technique that increases anterior or posterior dimensions of the spinal canal while leaving posterior elements partially intact. It may be performed with or without the use of a microscope.
- 6.4.4.2 **Surgical Indications**—Multi-level disease: cervical spinal stenosis or spondylitic myelopathy. Not indicated in cervical kyphosis.
- 6.4.4.3 **Operative Treatment**—Posterior approach, with or without instrumentation.
- 6.4.4.4 **Post-Operative Therapy**—May include 4 to 12 weeks of cervical bracing. Home programs with instruction in ADLs, sitting, posture, and 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 the cervical spine is stable and without complication. Active treatment which patients should have had prior to surgery will frequently require a repeat of the sessions previously ordered. The goals of the therapy program should include instruction in a long-term, home-based exercise program.

6.4.5 **Artificial Cervical Disc Replacement**

- 6.4.5.1 **Description**—involves the insertion of a prosthetic device into an intervertebral space from which a degenerated disc has been removed, sparing only the peripheral annulus. The endplates are positioned under intraoperative fluoroscopic guidance for optimal placement in the sagittal and frontal planes. The prosthetic device is designed to distribute the mechanical load of the vertebrae in a physiologic manner and maintain range of motion.
- 6.4.5.2 **General Selection Criteria**—for cervical disc replacement includes symptomatic degenerative disc disease. The patient must also meet fusion surgery criteria, and if the patient is not a candidate for fusion, a disc replacement procedure should not be considered. Additionally, the patient should be able to comply with pre- and post-surgery protocol.
- 6.4.5.3 **The Theoretical Advantage**—of total disc arthroplasty is that it preserves range of motion and physiologic loading of the disc. This could be an advantage for adults who are physically active. Studies do not demonstrate a long-term advantage of measured function or pain over comparison groups undergoing fusion. The longevity of this prosthetic device has not yet been determined. Significant technical training and experience is required to perform this procedure successfully. Surgeons must be well-versed in anterior spinal techniques and should have attended appropriate training courses, or have undergone training during a fellowship. Mentoring and proctoring of procedures is highly recommended.

6.5 **External Spinal Stimulators Post Fusion**

- 6.5.1 The following criteria are established for the medically accepted standard of care when determining applicability for the use of an external spinal stimulator:
 - 6.5.1.1 Patient has had a previously failed spinal fusion, and/or
 - 6.5.1.2 Patient is scheduled for revision or repair of pseudoarthrosis, and/or
 - 6.5.1.3 The patient smokes greater than a pack of cigarettes per day and is scheduled for spinal fusion
 - 6.5.1.4 The external spinal stimulator is approved for use in primary spinal fusions, if medical co morbidities increase the likelihood of non-union
 - 6.5.1.5 The patient is metabolically in poor health, with other medical co morbidities such as diabetes, Rheumatoid arthritis, lupus or other illnesses requiring oral steroids or cytotoxic medications.
- 6.5.2 Precertification is required for use of the external spinal stimulator if the planned use falls outside the above indications.

1.0 Introduction

~~Pursuant to 19 Del.C. §2322C, health care practice guidelines have been adopted and recommended by the Health Care Advisory Panel to guide utilization of health care treatments in workers' compensation including, but not limited to, care provided for the treatment of employees by or under the supervision of a licensed health care provider, prescription drug utilization, inpatient hospitalization and length of stay, diagnostic testing, physical therapy, chiropractic care and palliative care. The health care practice guidelines apply to all treatments provided after the effective date of the regulation adopted by the Department of Labor, May 23, 2008, and regardless of the date of injury. Lower Extremity was added to the list of treatment guidelines, effective 6/13/2011. The guidelines are, to the extent permitted by the most current medical science or applicable science, based on well-documented scientific research concerning efficacious treatment for injuries and occupational disease. To the extent that well-documented scientific research regarding the above is not available at the time of adoption of the guidelines, or is not available at the time of any revision to the guidelines, the guidelines have been and will be based upon the best available information concerning national consensus regarding best health care practices in the relevant health care community. The guidelines, to the extent practical and consistent with the Act, address treatment of those physical conditions which occur with the greatest frequency, or which require the most expensive treatments, for work-related injuries based upon currently available Delaware data.~~

~~Services rendered by any health care provider certified pursuant to 19 Del.C. §2322D(a) to provide treatment or services for injured employees shall be presumed, in the absence of contrary evidence, to be reasonable and necessary if such treatment or service conforms to the most current version of the Delaware health care practice guidelines.~~

~~Services rendered outside the Guidelines or variation in treatment recommendations from the Guidelines may represent acceptable medical care, be considered reasonable and necessary treatment and, therefore, determined to be compensable, absent evidence to the contrary, and may be payable in accordance with the Fee Schedule and Statute, accordingly.~~

~~Services provided by any health care provider that is not certified pursuant to 19 Del.C. §2322D(a) shall not be presumed reasonable and necessary unless such services are pre-authorized by the employer or insurance carrier, subject to the exception set forth in 19 Del.C. §2322D(b).~~

~~Treatment of conditions unrelated to the injuries sustained in an industrial accident may be denied as unauthorized if the treatment is directed toward the non-industrial condition, unless the treatment of the unrelated injury is rendered necessary as a result of the industrial accident.~~

~~The Health Care Advisory Panel and Department of Labor recognizes that acceptable medical practice may include deviations from these Guidelines, as individual cases dictate. Therefore, these Guidelines are not relevant as evidence of a provider's legal standard of professional care.~~

~~In accordance with the requirements of the Act, the development of the health care guidelines has been directed by a predominantly medical or other health professional panel, with recommendations then made to the Health Care Advisory Panel.~~

17 DE Reg. 322 (09/01/13)

2.0 General Guideline Principles

The principles summarized in this section are key to the intended implementation of all Delaware Workers' Compensation practice guidelines and critical to the reader's application of the guidelines in this document.

2.1 **EDUCATION** of the patient and family, as well as the employer, insurer, policy makers and the community should be the primary emphasis in the treatment of lower extremity pain and disability. Currently, practitioners often think of education last, after medications, manual therapy and surgery. Practitioners must develop and implement an effective strategy and skills to educate patients, employers, insurance systems, policy makers and the community as a whole. An education-based paradigm should always start with inexpensive communication providing reassuring information to the patient. More in-depth education currently exists within a treatment regime employing functional restorative and innovative programs of prevention and rehabilitation. No treatment plan is complete without addressing issues of individual and/or group patient education as a means of facilitating self-management of symptoms and prevention.

2.2 **TREATMENT PARAMETER DURATION:** Time frames for specific interventions commence once treatments have been initiated, not on the date of injury. Obviously, duration will be impacted by patient compliance, as well as co-morbidities and availability of services. Clinical judgment may substantiate the need to accelerate or decelerate the time frames discussed in this document. Causality of symptoms and dysfunction may occur in a related but different area as a result of the body compensating for the original injury. This scenario is particularly true in the case of lower extremity conditions.

- 2.2.1 Lower extremity injuries are often not isolated and frequently compensation for injury in one area may result in symptoms or dysfunction in another area. Additionally, weakness or dysfunction in an adjacent or otherwise remote body region may be a predisposing or perpetuating factor for the injured area. Therefore, treatment applied to adjacent body regions is often required for the recovery of lower extremity injuries. The provider's documentation should clearly include the rationale for treating adjacent or remote body regions, as well as include the specific interventions provided.
- 2.3 ~~**ACTIVE INTERVENTIONS**~~ emphasizing patient responsibility, such as therapeutic exercise and/or functional treatment, are generally emphasized over passive modalities, especially as treatment progresses. Generally, passive interventions are viewed as a means to facilitate progress in an active rehabilitation program with concomitant attainment of objective functional gains. All rehabilitation programs must incorporate "Active Interventions" no later than three weeks after the onset of treatment. Reimbursement for passive modalities only after the first three weeks of treatment without clear evidence of Active Interventions will require supportive documentation.
- 2.4 ~~**ACTIVE THERAPEUTIC EXERCISE PROGRAM**~~ goals should incorporate patient strength, endurance, flexibility, coordination, and education. This includes functional application in vocational or community settings.
- 2.5 ~~**POSITIVE PATIENT RESPONSE**~~ results are defined primarily as functional gains that can be objectively measured. Objective functional gains include, but are not limited to, positional tolerances, range-of-motion (ROM), strength, and endurance, activities of daily living (ADL), cognition, psychological behavior, and efficiency/velocity measures that can be quantified. Subjective reports of pain and function should be considered and given relative weight when the pain has anatomic and physiologic correlation. Anatomic correlation must be based on objective findings.
- 2.6 ~~**RE-EVALUATE TREATMENT EVERY 3 TO 4 WEEKS:**~~ If a given treatment or modality is not producing positive results within 3 to 4 weeks, the treatment should be either modified or discontinued. Reconsideration of diagnosis should also occur in the event of poor response to a seemingly rational intervention.
- 2.7 ~~**SURGICAL INTERVENTIONS:**~~ Surgery should be contemplated within the context of expected functional outcome and not purely for the purpose of pain relief. The concept of "cure" with respect to surgical treatment by itself is generally a misnomer. All operative interventions must be based upon positive correlation of clinical findings, clinical course and diagnostic tests. A comprehensive assimilation of these factors must lead to a specific diagnosis with positive identification of pathologic conditions.
- 2.8 ~~**SIX-MONTH TIME FRAME:**~~ The prognosis drops precipitously for returning an injured worker to work once he/she has been temporarily totally disabled for more than six months. The emphasis within these guidelines is to move patients along a continuum of care and return to work within a six-month time frame, whenever possible. It is important to note that time frames may not be pertinent to injuries that do not involve work-time loss or are not occupationally related.
- 2.9 ~~**RETURN TO WORK**~~ is therapeutic, assuming the work is not likely to aggravate the basic problem or increase long-term pain. The practitioner must provide specific physical limitations per the Physician's Form. The following physical limitations should be considered and modified as recommended: lifting, pushing, pulling, crouching, walking, using stairs, bending at the waist, awkward and/or sustained postures, tolerance for sitting or standing, hot and cold environments, data entry and other repetitive motion tasks, sustained grip, tool usage and vibration factors. Even if there is residual chronic pain, return-to-work is not necessarily contraindicated. The practitioner should understand all of the physical demands of the patient's job position before returning the patient to full duty and should receive clarification of the patient's job duties.
- 2.10 ~~**DELAYED RECOVERY:**~~ Strongly consider a psychological evaluation, if not previously provided, as well as initiating interdisciplinary rehabilitation treatment and vocational goal setting, for those patients who are failing to make expected progress 6 to 12 weeks after an injury. A small percentage of industrially injured patients will not recover within the timelines outlined in this document despite optimal care. Such individuals may require treatments beyond the limits discussed within this document, but such treatment will require clear documentation by the authorized treating practitioner focusing on functional gains afforded by further treatment and impact upon prognosis.
- 2.11 ~~**GUIDELINES RECOMMENDATIONS AND INCLUSION OF MEDICAL EVIDENCE:**~~ Guidelines are recommendations based on available evidence and/or consensus recommendations. Those procedures considered inappropriate, unreasonable, or unnecessary are designated in the guideline as being "not recommended."

17 DE Reg. 322 (09/01/13)

3.0 Initial Diagnostic Procedures

The guidelines recommend the following diagnostic procedures be considered, at least initially. It is the responsibility of the workers' compensation carrier to ensure that an accurate diagnosis and treatment plan can be established. Standard procedures that should be utilized when initially diagnosing a work-related lower extremity complaint are listed below.

3.1 **HISTORY-TAKING AND PHYSICAL EXAMINATION (Hx & PE)** are generally accepted, well-established and widely used procedures that establish the foundation/basis for and dictates subsequent stages of diagnostic and therapeutic procedures. When findings of clinical evaluations and those of other diagnostic procedures are not complementing each other, the objective clinical findings should have preference. The medical records can reasonably document the following:

3.1.1 **History of Present Injury:**

3.1.1.1 Mechanism of injury. This includes details of symptom onset and progression. It should include such details as: the activity at the time of the injury, patient description of the incident, and immediate and delayed symptoms. The history should elicit as much detail about these mechanisms as possible.

3.1.1.2 History of locking, clicking, popping, giving way, acute or chronic swelling, crepitation, pain while ascending or descending stairs (e.g. handrail used, 'foot by foot' instead of 'foot over foot') inability to weight bear due to pain, intolerance for standing or difficulty walking distances on varied surfaces, difficulty crouching or stooping, and wear patterns on footwear. Patients may also report instability or mechanical symptoms.

3.1.1.3 Any history of pain in back as well as joints distal and proximal to the site of injury. The use of a patient completed pain drawing, Visual Analog Scale (VAS), is highly recommended, especially during the first two weeks following injury to assure that all work related symptoms are addressed.

3.1.1.4 Ability to perform job duties and activities of daily living.

3.1.1.5 Exacerbating and alleviating factors of the reported symptoms. The physician should explore and report on non-work related as well as, work related activities.

3.1.1.6 Prior occupational and non-occupational injuries to the same area including specific prior treatment and any prior bracing devices.

3.1.1.7 Discussion of any symptoms present in the uninjured extremity.

3.1.2 **Past History:**

3.1.2.1 Past medical history includes neoplasm, gout, arthritis, previous musculoskeletal injuries, and diabetes;

3.1.2.2 Review of systems includes symptoms of rheumatologic, neurological, endocrine, neoplastic, and other systemic diseases;

3.1.2.3 History of smoking, alcohol use, and substance abuse;

3.1.2.4 History of corticosteroid use; and

3.1.2.5 Vocational and recreational pursuits.

3.1.3 **Physical Examination:** Examination of a joint should begin with examination of the uninjured limb and include assessment of the joint above and below the affected area of the injured limb. Physical examinations should include accepted tests as described in textbooks or other references and exam techniques applicable to the joint or region of the body being examined, including:

3.1.3.1 Visual inspection;

3.1.3.1.1 Swelling may indicate joint effusion from trauma, infection or arthritis. Swelling or bruising over ligaments or bones can indicate possible fractures or ligament damage;

3.1.3.2 Palpation for joint line tenderness, effusion, and bone or ligament pain;

3.1.3.2.1 Palpation may be used to assess tissue tone and contour; myofascial trigger points; and may be graded for intensity of pain. Palpation may be further divided into static and motion palpation. Static palpation consists of feeling bony landmarks and soft tissue structures and consistency. Motion palpation is commonly used to assess joint movement patterns and identify joint dysfunction;

3.1.3.3 Assessment of activities of daily living including gait abnormalities, especially after ambulating a distance and difficulties ascending/descending stairs;

3.1.3.3.1 Assessment of activities such as the inability to crouch or stoop, may give important indications of the patient's pathology and restrictions.

3.1.3.4 Range of motion and quality of motion should be assessed actively and passively;

3.1.3.5 Strength;

3.1.3.6 Joint stability;

3.1.3.7 Hip exam;

3.1.3.7.1 In general, multiple tests are needed to reliably establish a clinical diagnosis. Spinal pathology and groin problems should always be considered and ruled out as a cause of pain for patients with hip symptomatology. The following lists commonly performed tests:

- 3.1.3.7.1.1 Flexion-Abduction-External Rotation (FABER-aka Patrick's) test is frequently used as a test for sacral pathology;
- 3.1.3.7.1.2 Log roll test may be used to assess iliofemoral joint laxity;
- 3.1.3.7.1.3 Ober's is used to test the iliotibial band;
- 3.1.3.7.1.4 Greater trochanter bursitis is aggravated by external rotation and adduction and resisted hip abduction or external rotation;
- 3.1.3.7.1.5 Iliopectineal bursitis may be aggravated by stretching the tendon in hip extension;
- 3.1.3.7.1.6 Internal and external rotation is usually painful in osteoarthritis; and
- 3.1.3.7.1.7 The maneuvers of flexion, adduction and internal rotation (FADIR) will generally reproduce pain in cases of labral tears and with piriformis strain/irritation.

3.1.3.8 Knee exam;

3.1.3.8.1 In general, multiple tests are needed to reliably establish a clinical diagnosis. The expertise of the physician performing the exam influences the predictability of the exam findings. Providers should be aware that patients with osteoarthritis may have positive pain complaints with various maneuvers based on their osteoarthritis rather than ligamentous or meniscal damage. The following partial list contains commonly performed tests:

- 3.1.3.8.1.1 Bilateral thigh circumference measurement assesses for quadriceps wasting which may occur soon after a knee injury. The circumferences of both thighs should be documented approximately 15 cm above a reference point, either the joint line or patella.
- 3.1.3.8.1.2 Anterior Cruciate Ligament tests:
 - 3.1.3.8.1.2.1 Lachman's test;
 - 3.1.3.8.1.2.2 Anterior drawer test;
 - 3.1.3.8.1.2.3 Lateral pivot shift test.
- 3.1.3.8.1.3 Meniscus tests. Joint line tenderness and effusions are common with acute meniscal tears. Degenerative meniscal tears are fairly common in older patients with degenerative changes and may be asymptomatic.
 - 3.1.3.8.1.3.1 McMurray test;
 - 3.1.3.8.1.3.2 Apley compression test;
 - 3.1.3.8.1.3.3 Medial lateral grind test;
 - 3.1.3.8.1.3.4 Weight-bearing tests – include Thessaly and Ege's test.
- 3.1.3.8.1.4 Posterior Cruciate Ligament tests:
 - 3.1.3.8.1.4.1 Posterior drawer test;
 - 3.1.3.8.1.4.2 Extension lag may also be measured passively by documenting the heel height difference with the patient prone.
- 3.1.3.8.1.5 Collateral Ligaments tests:
 - 3.1.3.8.1.5.1 Medial stress test – A positive test in full extension may include both medial collateral ligament and cruciate ligament pathology;
 - 3.1.3.8.1.5.2 Lateral stress test.
- 3.1.3.8.1.6 Patellar Instability tests:
 - 3.1.3.8.1.6.1 Apprehension test;
 - 3.1.3.8.1.6.2 J-sign;
 - 3.1.3.8.1.6.3 Q angle.

3.1.3.9 Foot and ankle exam:

3.1.3.9.1 In general, multiple tests are needed to reliably establish a clinical diagnosis. The expertise of the physician performing the exam influences the predictability of the exam findings. Ankle assessments may include anterior drawer exam, talar tilt test, external rotation stress test, ankle ligament stress test and the tibia-fibula squeeze test. Achilles tendon may be assessed with the Thompson's test. Foot examinations may include, assessment of or for: subtalar, midtarsal, and metatarsal-phalangeal joints; tarsal tunnel; and posterior tibial tendon; Morton's neuroma; the piano key test and Lisfranc injury.

3.1.3.10 If applicable, full neurological exam including muscle atrophy and gait abnormality.

3.1.3.11 If applicable to injury, integrity of distal circulation, sensory, and motor function.

3.2 **RADIOGRAPHIC IMAGING** of the lower extremities is a generally accepted, well-established and widely used diagnostic procedure when specific indications based on history and/or physical examination are present. It should not be routinely performed. The mechanism of injury and specific indications for the radiograph should be listed on the request form to aid the radiologist and x-ray technician. For additional specific clinical indications, see Section 5.0, Specific Lower Extremity Injury Diagnosis, Testing and Treatment. Indications for initial imaging include any of the following:

3.2.1 The inability to flex knee to 90 degrees or to transfer weight for four steps at the time of the immediate injury and at the initial visit, regardless of limping;

3.2.2 Bony tenderness on any of the following areas: over the head of the fibula; isolated to the patella; of the lateral or medial malleolus from the tip to the distal 6 cm; at the base of the 5th metatarsal; or at the navicular;

3.2.3 History of significant trauma, especially blunt trauma or fall from a height;

3.2.4 Age over 55 years;

3.2.5 History or exam suggestive of intravenous drug abuse or osteomyelitis;

3.2.6 Pain with swelling and/or range of motion (ROM) limitation localizing to an area of prior fracture, internal fixation, or joint prosthesis; or

3.2.7 Unexplained or persistent lower extremity pain over two weeks.

3.2.7.1 Occult fractures, especially stress fractures, may not be visible on initial x-ray. A follow-up radiograph, MRI and/or bone scan may be required to make the diagnosis.

3.2.7.2 Weight bearing radiographs are used to assess osteoarthritis and alignment prior to some surgical procedures.

3.3 **LABORATORY TESTING** Laboratory tests are generally accepted, well-established and widely used procedures. They are, however, rarely indicated at the time of initial evaluation, unless there is suspicion of systemic illness, infection, neoplasia, connective tissue disorder, or underlying arthritis or rheumatologic disorder based on history and/or physical examination. Laboratory tests can provide useful diagnostic information. It is recommended that lab diagnostic procedures be initially considered the responsibility of the workers' compensation carrier to ensure that an accurate diagnosis and treatment plan can be established. Tests include, but are not limited to the following:

3.3.1 Complete blood count (CBC) with differential can detect infection, blood dyscrasias, and medication side effects;

3.3.2 Erythrocyte sedimentation rate, rheumatoid factor, antinuclear antigen (ANA), human leukocyte antigen (HLA), and C-reactive protein (CRP) can be used to detect evidence of a rheumatologic, infection, or connective tissue disorder;

3.3.3 Serum calcium, phosphorous, uric acid, alkaline phosphatase, and acid phosphatase can detect metabolic bone disease;

3.3.4 Liver and kidney function may be performed for prolonged anti-inflammatory use or other medications requiring monitoring; and

3.3.5 Analysis of joint aspiration for bacteria, white cell count, red cell count, fat globules, crystalline birefringence and chemistry to evaluate joint effusion.

3.4 **OTHER PROCEDURES**

3.4.1 **Joint Aspiration** is a generally accepted, well-established and widely used procedure when specifically indicated and performed by individuals properly trained in these techniques. This is true at the initial evaluation when history and/or physical examination are of concern for a septic joint or bursitis and for some acute injuries. Particularly at the knee, aspiration of a large effusion can help to decrease pain and speed functional recovery. Persistent or unexplained effusions may be examined for evidence of infection, rheumatologic, or inflammatory processes. The presence of fat globules in the effusion strongly suggests occult fracture.

3.4.1.1 Risk factors for septic arthritis include joint surgery, knee arthritis, joint replacement, skin infection, diabetes, age greater than 80, immunocompromised states, and rheumatoid arthritis. More than 50% of patients with septic joints have a fever greater than 37.5 degrees centigrade and joint swelling. Synovial white counts of greater than 25,000 and polymorphonuclear cells of at least 90% increase the likelihood of a septic joint.

3.4.2 **Musculoskeletal Ultrasound**. The use of diagnostic ultrasound may be beneficial for guiding injections into the pathologic areas. Ultrasound guided interventional procedure provides the ability to image soft

tissues in real time and can improve safety and accuracy of needle placement. The use of ultrasound guided procedures will be at the discretion of the health care provider.

4.0 Follow-up Diagnostic Imaging and Testing Procedures

One diagnostic imaging procedure may provide the same or distinctive information as obtained by other procedures. Therefore, prudent choice of procedure(s) for a single diagnostic procedure, a complementary procedure in combination with other procedures(s), or a proper sequential order in multiple procedures will ensure maximum diagnostic accuracy; minimize adverse effect to patients and cost effectiveness by avoiding duplication or redundancy.

All diagnostic imaging procedures have a significant percentage of specificity and sensitivity for various diagnoses. None is specifically characteristic of a certain diagnosis. Clinical information obtained by history taking and physical examination should be the basis for selection and interpretation of imaging procedure results.

When a diagnostic procedure, in conjunction with clinical information, provides sufficient information to establish an accurate diagnosis, the second diagnostic procedure will become a redundant procedure. At the same time, a subsequent diagnostic procedure can be a complementary diagnostic procedure if the first or preceding procedures, in conjunction with clinical information, cannot provide an accurate diagnosis. Usually, preference of a procedure over others depends upon availability, a patient's tolerance, and/or the treating practitioner's familiarity with the procedure.

4.1 **IMAGING STUDIES** When indicated, the following additional imaging studies can be utilized for further evaluation of the lower extremity, based upon the mechanism of injury, symptoms, and patient history. For specific clinical indications, see Section 5.0, Specific Lower Extremity Injury Diagnosis, Testing, and Treatment. The studies below are listed in frequency of use, not importance.

4.1.1 **Magnetic Resonance Imaging (MRI)** are generally accepted, well-established, and widely used diagnostic procedures. It provides a more definitive visualization of soft tissue structures, including ligaments, tendons, joint capsule, menisci and joint cartilage structures, than x-ray or Computed Axial Tomography in the evaluation of traumatic or degenerative injuries. The addition of intravenous or intra-articular contrast can enhance definition of selected pathologies.

4.1.1.1 The high field, closed MRI with 1.5 or higher tesla provides better resolution. A lower field scan may be indicated when a patient cannot fit into a high field scanner or is too claustrophobic despite sedation. Inadequate resolution on the first scan may require a second MRI using a different technique or with a reading by a musculoskeletal radiologist. All questions in this regard should be discussed with the MRI center and/or radiologist.

4.1.1.2 MRIs have high sensitivity and specificity for meniscal tears and ligamentous injuries although in some cases when physical exam findings and functional deficits indicate the need for surgery an MRI may not be necessary. MRI is less accurate for articular cartilage defects (sensitivity 76%) than for meniscal and ligamentous injury (sensitivity greater than 90%).

4.1.1.3 MRIs have not been shown to be reliable for diagnosing symptomatic hip bursitis.

4.1.2 **MR Arthrography (MRA):** This accepted investigation uses the paramagnetic properties of gadolinium to shorten T1 relaxation times and provide a more intense MRI signal. It should be used to diagnose hip labral tears. Pelvic MRIs are not sufficient for this purpose. Arthrograms are also useful to evaluate mechanical pathology in knees with prior injuries and/or surgery.

4.1.3 **Computed Axial Tomography (CT)** is generally accepted and provides excellent visualization of bone. It is used to further evaluate bony masses and suspected fractures not clearly identified on radiographic window evaluation. Instrument scatter reduction software provides better resolution when metallic artifact is of concern.

4.1.4 **Diagnostic Sonography** is an accepted diagnostic procedure. The performance of sonography is operator dependent, and is best when done by a specialist in musculoskeletal radiology or a physician appropriately trained. **o. Lineal Tomography:** is infrequently used, yet may be helpful in the evaluation of joint surfaces and bone healing.

4.1.5 **Bone Scan (Radioisotope Bone Scanning)** is generally accepted, well-established and widely used. ^{99m}Tc diphosphonate uptake reflects osteoblastic activity and may be useful in metastatic/primary bone tumors, stress fractures, osteomyelitis, and inflammatory lesions, but cannot distinguish between these entities.

4.1.5.1 Bone scanning is more sensitive but less specific than MRI. It is useful for the investigation of trauma, infection, stress fracture, occult fracture, Charcot joint, Complex Regional Pain Syndrome and suspected neoplastic conditions of the lower extremity.

- 4.1.6 **Other Radionuclide Scanning:** Indium and gallium scans are generally accepted, well established, and widely used procedures usually to help diagnose lesions seen on other diagnostic imaging studies. ⁶⁷Gallium citrate scans are used to localize tumor, infection, and abscesses. ¹¹¹Indium labeled leukocyte scanning is utilized for localization of infection or inflammation.
- 4.1.7 **Arthrogram** is an accepted diagnostic procedure. It may be useful in the evaluation of internal derangement of a joint, including when MRI or other tests are contraindicated or not available. Potential complications of this more invasive technique include pain, infection, and allergic reaction. Arthrography gains additional sensitivity when combined with CT in the evaluation of internal derangement, loose bodies, and articular cartilage surface lesions. Diagnostic arthroscopy should be considered before arthrogram when there are strong clinical indications.
- 4.2 **OTHER DIAGNOSTIC TESTS:** The following diagnostic procedures listed in this subsection are listed in alphabetical order.
- 4.2.1 **Compartment Pressure Testing and Measurement Devices** such as pressure manometer, are useful in the evaluation of patients who present symptoms consistent with a compartment syndrome.
- 4.2.2 **Diagnostic Arthroscopy (DA)** allows direct visualization of the interior of a joint, enabling the diagnosis of conditions when other diagnostic tests have failed to reveal an accurate diagnosis; however, it should generally not be employed for exploration purposes only. In order to perform a diagnostic arthroscopy, the patient must have completed at least some conservative therapy without sufficient functional recovery per Section 5.0, Specific Lower Extremity Injury Diagnosis, Testing, and Treatment, and meet criteria for arthroscopic repair.
- 4.2.2.1 DA may also be employed in the treatment of acute joint disorders. In some cases, the mechanism of injury and physical examination findings will strongly suggest the presence of a surgical lesion. In these cases, it is appropriate to proceed directly with the interventional arthroscopy.
- 4.2.3 **Doppler Ultrasonography/Pléthysmography** is useful in establishing the diagnosis of arterial and venous disease in the lower extremity and should usually be considered prior to the more invasive venogram or arteriogram study. Doppler is less sensitive in detecting deep vein thrombosis in the calf muscle area. If the test is initially negative and symptoms continue, an ultrasound should usually be repeated 7 days later to rule out popliteal thrombosis. It is also useful for the diagnosis of popliteal mass when MRI is not available or contraindicated.
- 4.2.4 **Electrodiagnostic Testing** Electrodiagnostic tests include, but are not limited to Electromyography (EMG), Nerve Conduction Studies (NCS) and Somatosensory Evoked Potentials (SSEP). These are generally accepted, well established and widely used diagnostic procedures. The SSEP study, although generally accepted, has limited use. Electrodiagnostic studies may be useful in the evaluation of patients with suspected involvement of the neuromuscular system, including disorder of the anterior horn cell, radiculopathies, peripheral nerve entrapments, peripheral neuropathies, neuromuscular junction and primary muscle disease.
- 4.2.4.1 In general, these diagnostic procedures are complementary to imaging procedures such as CT, MRI, and/or myelography or diagnostic injection procedures. Electrodiagnostic studies may provide useful, correlative neuropathophysiological information that would be otherwise unobtainable from standard radiologic studies.
- 4.2.5 **Personality/Psychological/Psychosocial Interventions** are generally accepted and well established diagnostic procedures with selective use in the acute lower extremity population, but have more widespread use in sub-acute and chronic lower extremity populations.
- 4.2.5.1 Once a diagnosis consistent with the standards of the American Psychiatric Association Diagnostic Statistical Manual of Mental Disorders has been determined, the patient should be evaluated for the potential need for psychiatric medications. Use of any medication to treat a diagnosed condition may be ordered by the authorized treating physician or by the consulting psychiatrist. Visits for management of psychiatric medications are medical in nature and are not a component of psychosocial treatment. Therefore, separate visits for medication management may be necessary, depending upon the patient and medications selected.
- 4.2.5.2 The screening or diagnostic workup should have clarified and distinguished between pre-existing, aggravated, and/or purely causative psychological conditions. Therapeutic and diagnostic modalities include, but are not limited to, individual counseling, and group therapy. Treatment can occur within an individualized model, a multi-disciplinary model, or within a structured pain management program.
- 4.2.5.3 A psychologist with a Ph.D., PsyD, EdD credentials, or a Psychiatric MD/DO may perform psychosocial treatments. Other licensed mental health providers working in consultation with a

Ph.D., PsyD, EdD, or Psychiatric MD/DO, and with experience in treating pain management in injured workers may also perform treatment.

4.2.5.4 ~~Frequency: 1 to 5 times weekly for the first 4 weeks (excluding hospitalization, if required), decreasing to 1 to 2 times per week for the second month. Thereafter, 2 to 4 times monthly with the exception of exacerbations which may require increased frequency of visits. Not to include visits for medication management.~~

4.2.5.5 ~~Maximum duration: 6 to 12 months, not to include visits for medication management. For select patients, longer supervised treatment may be required.~~

4.2.6 ~~**Venogram/Arteriogram:** is useful for investigation of vascular injuries or disease, including deep venous thrombosis. Potential complications may include pain, allergic reaction, and deep vein thrombosis.~~

4.3 ~~**SPECIAL TESTS** are generally well-accepted tests and are performed as part of a skilled assessment of the patient's capacity to return to work, his/her strength capacities, and physical work demand classifications and tolerances. The procedures in this subsection are listed in alphabetical order.~~

4.3.1 ~~**Computer-Enhanced Evaluations** may include isotonic, isometric, isokinetic and/or isoinertial measurement of movement, range of motion, balance, endurance or strength. Values obtained can include degrees of motion, torque forces, pressures or resistance. Indications include determining validity of effort, effectiveness of treatment and demonstrated motivation. These evaluations should not be used alone to determine return-to-work restrictions.~~

4.3.1.1 ~~Frequency: One time for evaluation. Can monitor improvements in strength every 3 to 4 weeks up to a total of 6 evaluations.~~

4.3.2 ~~**Functional Capacity Evaluation (FCE)** is a comprehensive or modified evaluation of the various aspects of function as they relate to the worker's ability to return to work. Areas such as endurance, lifting (dynamic and static), postural tolerance, specific range of motion, coordination and strength, worker habits, employability, as well as psychosocial aspects of competitive employment may be evaluated. Components of this evaluation may include: (a) musculoskeletal screen; (b) cardiovascular profile/aerobic capacity; (c) coordination; (d) lift/carrying analysis; (e) job-specific activity tolerance; (f) maximum voluntary effort; (g) pain assessment/psychological screening; and (h) non-material and material handling activities. An FCE may be required.~~

4.3.3 ~~**Jobsite Analysis** is a comprehensive analysis of the physical, mental and sensory components of a specific job. These components may include, but are not limited to: (a) postural tolerance (static and dynamic); (b) aerobic requirements; (c) range of motion; (d) torque/force; (e) lifting/carrying; (f) cognitive demands; (g) social interactions; (h) visual perceptual; (i) sensation; (j) coordination; (k) environmental requirements of a job; (l) repetitiveness; and (m) essential job functions including job licensing requirements. Job descriptions provided by the employer are helpful but should not be used as a substitute for direct observation. A Jobsite Analysis may be required.~~

4.3.4 ~~**Work Tolerance Screening (Fitness for Duty)** is a determination of an individual's tolerance for performing a specific job based on a job activity or task. A Work Tolerance Screening may be required. The decision for performance of a Work Tolerance Screening should be made by the therapy provider, the treating physician, and the employer.~~

5.0 Specific Lower Extremity Injury Diagnosis, Testing, and Treatment

5.1 FOOT AND ANKLE

5.1.1 ~~**Achilles Tendonopathy or Injury and Rupture (Alternate Spelling: "Tendinopathy"):**~~

5.1.1.1 ~~**Description/Definition:** Rupture or tear of Achilles tendon or insertional or non-insertional tendonopathy.~~

5.1.1.2 ~~**Occupational Relationship:** Usually, tears or ruptures are related to a fall, twisting, jumping, or sudden load on ankle with dorsiflexion. Tendonopathy may be exacerbated by continually walking on hard surfaces.~~

5.1.1.3 ~~**Specific Physical Exam Findings:** Swelling and pain at tendon, sometimes accompanied by crepitus and pain with passive motion. Rupture or partial tear may present with palpable deficit in tendon. If there is a full tear, Thompson test will usually be positive. A positive Thompson's test is lack of plantar flexion with compression of the calf when the patient is prone with the knee flexed.~~

5.1.1.4 ~~**Diagnostic Testing Procedures:** Radiography may be performed to identify Haglund's deformity; however, many Haglund's deformities are asymptomatic. MRI or ultrasound may be performed if surgery is being considered for tendonopathy or rupture.~~

5.1.1.5 ~~**Non-operative Treatment Procedures:**~~

- 5.1.1.5.1 Initial Treatment: Cast in non weight bearing for tears. Protected weight bearing for other injuries.
 - 5.1.1.5.2 Medications such as analgesics and anti-inflammatories may be helpful. Refer to medication discussions in Section 6.0 Medications and Medical Management.
 - 5.1.1.5.3 Patient education should include instruction in self-management techniques, ergonomics, body mechanics, home exercise, joint protection, and weight management.
 - 5.1.1.5.4 Benefits may be achieved through therapeutic rehabilitation and rehabilitation interventions. Eccentric training alone or with specific bracing may be used for tendonopathy. Manual therapy may also be used. Therapy will usually include range of motion (ROM), active therapies, and a home exercise program. Active therapies include, proprioception training, restoring normal joint mechanics, and clearing dysfunctions from adjacent structures. Passive as well as active therapies may be used for control of pain and swelling. Therapy should progress to strengthening and an independent home exercise program targeted to further improve ROM, strength, and normal joint mechanics influenced by distal and proximal structures. Refer to Section 6.0, Therapeutic Procedures, Non-operative.
 - 5.1.1.5.4.1 Passive modalities are most effective as adjunctive treatments to improve the results of active treatment. They may be used as found in Section 6.0, Therapeutic Procedures, Non-operative.
 - 5.1.1.5.5 Steroid injections should generally be avoided in these patients since this is a risk for later rupture.
 - 5.1.1.5.6 Return to work with appropriate restrictions should be considered early in the course of treatment. Refer to Section 6.0. 13, Return to Work.
 - 5.1.1.5.7 Other therapies in Section 6.0. Therapeutic Procedures, Non-operative may be employed in individual cases.
 - 5.1.1.5.8 The use of PRP may be beneficial in refractory chronic tendonopathies. Musculoskeletal ultrasound is recommended when performing PRP.
- 5.1.1.6 **Surgical Indications/Considerations:** Total or partial rupture.
Smoking may affect soft tissue healing through tissue hypoxia. Patients should be strongly encouraged to stop smoking and be provided with appropriate counseling and medication by the physician.
- 5.1.1.7 **Operative Procedures:** Repair of tendons open or percutaneously with or without anchors may be required. Tendon grafts are used for chronic cases or primary surgery failures when tendon tissue is poor.
- 5.1.1.8 **Post-operative Treatment:**
- 5.1.1.8.1 An individualized rehabilitation program based upon communication between the surgeon and the therapist using therapies as outlined in Section 6.0, Therapeutic Procedures, Non-Operative.
 - 5.1.1.8.2 Treatment may include the following: restricted weight bearing, bracing, active therapy with or without passive therapy.
 - 5.1.1.8.3 Range of motion may begin at 3 weeks depending on wound healing. Therapy and some restrictions will usually continue for 6 to 8 weeks.
 - 5.1.1.8.4 Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.
- 5.1.2 **Aggravated Osteoarthritis:**
- 5.1.2.1 **Description/Definition:** Internal joint pathology of ankle.
 - 5.1.2.1.1 Other causative factors to consider: Prior significant injury to the ankle may predispose the joint to osteoarthritis. In order to entertain previous trauma as a cause, the patient should have a medically documented injury with radiographs or MRI showing the level of anatomic change. The prior injury should have been at least 2 years from the presentation for the new complaints and there should be a significant increase of pathology on the affected side in comparison to the original imaging or operative reports and/or the opposite un-injured extremity.
 - 5.1.2.2 **Specific Physical Exam Findings:** Pain within joint, swelling. Crepitus, locking of the joint, reduced range of motion, pain with stress tests, angular deformities.
 - 5.1.2.3 **Diagnostic Testing Procedures:** X-ray—mechanical axis views, CT, MRI, diagnostic injection.
 - 5.1.2.4 **Non-operative Treatment Procedures:**

- 5.1.2.4.1 Initial Treatment: May include orthoses, custom shoes with rocker bottom shoe inserts, and braces. Cane may also be useful.
- 5.1.2.4.2 Medications such as analgesics and anti-inflammatories may be helpful. Refer to medication discussions in Section 6.0, Medications and Medical Management.
- 5.1.2.4.3 Patient education should include instruction in self-management techniques, ergonomics, body mechanics, home exercise, joint protection, and weight management.
- 5.1.2.4.4 Benefits may be achieved through therapeutic rehabilitation and rehabilitation interventions. They should include range of motion (ROM), active therapies, and a home exercise program. Active therapies include, proprioception training, restoring normal joint mechanics, and clearing dysfunctions from adjacent structures. Passive as well as active therapies may be used for control of pain and swelling. Therapy should progress to strengthening and an independent home exercise program targeted to further improve ROM, strength, and normal joint mechanics influenced by distal and proximal structures. Refer to Section 6.0., Therapeutic Procedures, Non-operative.
 - 5.1.2.4.4.1 Passive modalities are most effective as adjunctive treatments to improve the results of active treatment. They may be used as found in Section 6.0., Therapeutic Procedures, Non-operative.
- 5.1.2.4.5 Steroid injections may decrease inflammation and allow the therapist to progress with functional exercise and range of motion. Steroid injections under significant pressure should be avoided as the needle may be penetrating the tendon and injection into the tendon can cause possible tendon breakdown, tendon degeneration, or rupture. Injections should be minimized for patients younger than 30 years of age. Injections may be performed with or without ultrasound guidance. Ultrasound guided interventional procedure provides the ability to image soft tissues in real time and can improve safety and accuracy of needle placement. The use of ultrasound guided procedures will be at the discretion of the health care provider.
 - 5.1.2.4.5.1 Time to Produce Effect: One injection.
 - 5.1.2.4.5.2 Maximum Duration: 3 injections in one year spaced at least 4 to 8 weeks apart.
 - 5.1.2.4.5.3 Steroid injections should be used cautiously in diabetic patients. Diabetic patients should be reminded to check their blood glucose levels at least daily for 2 weeks after injections.
- 5.1.2.4.6 Return to work with appropriate restrictions should be considered early in the course of treatment. Refer to Section 6.0., the Return to Work subsection.
- 5.1.2.4.7 Other therapies in Section 6.0, Therapeutic Procedures, Non-operative may be employed in individual cases.
- 5.1.2.5 **Surgical Indications/Considerations:**
 - 5.1.2.5.1 The patient is a good surgical candidate and pain continues to interfere with ADLs after non-surgical interventions including weight control, therapy with active patient participation, and medication.
 - 5.1.2.5.2 Refer to Section 7.0 for specific indications for osteotomy, ankle fusion or arthroplasty.
 - 5.1.2.5.3 Implants are less successful than similar procedures in the knee or hip. There are no quality studies comparing arthrodesis and ankle replacement. Patients with ankle fusions generally have good return to function and fewer complications than those with joint replacements. Salvage procedures for ankle replacement include revision with stemmed implant or allograft fusion. Given these factors, an ankle arthroplasty requires prior authorization and a second opinion by a surgeon specializing in lower extremity surgery.
 - 5.1.2.5.4 Prior to surgical intervention, the patient and treating physician should identify functional operative goals and the likelihood of achieving improved ability to perform activities of daily living or work activities and the patient should agree to comply with the pre and post-operative treatment plan including home exercise. The provider should be especially careful to make sure the patient understands the amount of post-operative therapy required and the length of partial and full disability expected post-operatively.
 - 5.1.2.5.5 In cases where surgery is contraindicated due to obesity, it may be appropriate to recommend a weight loss program if the patient is unsuccessful losing weight on their own. Coverage for weight loss would continue only for motivated patients who have demonstrated continual progress with weight loss.
 - 5.1.2.5.6 Because smokers have a higher risk of non-union and post-operative costs, it is recommended that carriers cover a smoking cessation program peri-operatively.

Physicians may monitor smoking cessation with laboratory tests such as cotinine levels for long-term cessation.

5.1.2.6 **Operative Procedures:** Arthroscopy, ankle arthroplasty or fusion. Supramalleolar osteotomies can be considered for patients with deformities or pre-existing hind foot varus or valgus deformities.

5.1.2.7 **Post-operative Treatment:**

5.1.2.7.1 An individualized rehabilitation program based upon communication between the surgeon and the therapist using therapies as outlined in Section 6.0, Therapeutic Procedures, Non-Operative.

5.1.2.7.2 In all cases, communication between the physician and therapist is important to the timing of weight-bearing and exercise progressions.

5.1.2.7.3 Treatment may include the following: restricted weight-bearing, bracing, gait training and other active therapy with or without passive therapy.

5.1.2.7.4 Refer to Section 7.0 for Ankle Fusion, Osteotomy, or Arthroplasty for further specific information.

5.1.2.7.5 Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.

5.1.3 **Ankle or Subtalar Joint Dislocation:**

5.1.3.1 **Description/Definition:** Dislocation of ankle or subtalar joint.

5.1.3.2 **Occupational Relationship:** Usually occurs with falling or twisting.

5.1.3.3 **Specific Physical Exam Findings:** Disruption of articular arrangements of ankle, subtalar joint may be tested using ligamentous laxity tests.

5.1.3.4 **Diagnostic Testing Procedures:** Radiographs, CT scans. MRI may be used to assess for avascular necrosis of the talus which may occur secondary to a dislocation.

5.1.3.5 **Non-operative Treatment Procedures:**

5.1.3.5.1 Initial Treatment: Closed reduction under anesthesia with pre and post reduction neurovascular assessment followed by casting and weight-bearing limitations.

5.1.3.5.2 Medications such as analgesics and anti-inflammatories may be helpful. Refer to medication discussions in Section 6.0, Medications and Medical Management.

5.1.3.5.3 Patient education should include instruction in self-management techniques, ergonomics, body mechanics, home exercise, joint protection, and weight management.

5.1.3.5.4 Benefits may be achieved through therapeutic rehabilitation and rehabilitation interventions. They should include range of motion (ROM), active therapies, and a home exercise program. Active therapies include, proprioception training, restoring normal joint mechanics, and clearing dysfunctions from adjacent structures. Passive as well as active therapies may be used for control of pain and swelling. Therapy should progress to strengthening and an independent home exercise program targeted to further improve ROM, strength, and normal joint mechanics influenced by distal and proximal structures. Refer to Section 6.0, Therapeutic Procedures, Non-operative.

5.1.3.5.4.1 Passive modalities are most effective as adjunctive treatments to improve the results of active treatment. They may be used as found in Section 6.0, Therapeutic Procedures, Non-operative.

5.1.3.5.5 Return to work with appropriate restrictions should be considered early in the course of treatment. Refer to Section 6.0, Return to Work.

5.1.3.5.6 Other therapies in Section 6.0, Therapeutic Procedures, Non-operative may be employed in individual cases.

5.1.3.6 **Surgical Indications/Considerations:** Inability to reduce closed fracture, association with unstable fractures.

5.1.3.7 **Operative Procedures:** Open or closed reduction of dislocation.

5.1.3.8 **Post-operative Treatment:**

5.1.3.8.1 An individualized rehabilitation program based upon communication between the surgeon and the therapist using therapies as outlined in Section 6.0, Therapeutic Procedures, Non-Operative.

5.1.3.8.2 Treatment usually includes initial immobilization with restricted weight-bearing, followed by bracing and active therapy with or without passive therapy.

5.1.3.8.3 Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.

5.1.4 Ankle Sprain/Fracture:

5.1.4.1 **Description/Definition:** An injury to the ankle joint due to abnormal motion of the talus that causes a stress on the malleolus and the ligaments. Injured ligaments in order of disruption include the anterior talofibular ligament (ATFL), calcaneofibular ligament (CFL), posterior talofibular ligament (PTFL), deltoid ligaments, and syndesmotic ligaments. Instability can result from a fracture of a malleolus (malleoli), rupture of ligaments, or a combination. Circumstances surrounding the injury, including consideration of location and additional injuries are of importance. Additionally, the position of the foot at the time of injury is helpful in determining the extent and type of injury. Grading of soft tissue injuries includes:

5.1.4.1.1 Grade 1 Injury: those with overstretching or microscopic tears of the ligament, minimal swelling, normal stress testing, and the ability to bear weight.

5.1.4.1.2 Grade 2 Injury: have partial disruption of the ligament, significant swelling, indeterminate results on stress testing, and difficulty bearing weight.

5.1.4.1.3 Grade 3 Injury: have a ruptured ligament, swelling and ecchymosis, abnormal results on stress testing, and the inability to bear weight. May also include a chip avulsion fracture on x-ray.

5.1.4.2 **Occupational Relationship:** Usually occurs from sudden twisting, direct blunt trauma and falls. Inversion of the ankle with a plantar flexed foot is the most common mechanism of injury.

5.1.4.3 **Specific Physical Exam Findings:** varies with individual. With lower grade sprains the ankle may be normal appearing with minimal tenderness on examination. The ability/inability to bear weight, pain, swelling, or ecchymosis should be noted. If the patient is able to transfer weight from one foot onto the affected foot and has normal physical findings, then likelihood of fracture is reduced. Stress testing using the anterior drawer stress test, the talar tilt test and the external rotation stress test may be normal or abnormal depending on the involved ligament.

5.1.4.3.1 Syndesmotic injury can occur with external rotation injuries and requires additional treatment. Specific physical exam tests include the squeeze test and external rotation at neutral.

5.1.4.4 **Diagnostic Testing Procedures:** Radiographs. Refer to Initial Diagnostic Section which generally follows the Ottawa Ankle Rules. The Ottawa Ankle Rules are a decision aid for radiography. Commonly missed conditions include ankle syndesmosis or fractures. The instrument has a sensitivity of almost 100% and a modest specificity, and its use should reduce the number of unnecessary radiographs by 30 to 40%.

5.1.4.4.1 For an acute, unstable ankle or a repeat or chronic ankle injury, a MRI and/or diagnostic injection may be ordered. Arthroscopy can be used in unusual cases with persistent functional instability and giving way of the ankle, after conservative treatment, to directly visualize the ruptured ligament(s).

5.1.4.5 **Non-operative Treatment Procedures:**

5.1.4.5.1 Initial treatment for patients able to bear weight: NSAIDs, RICE (rest, ice, compression and elevation), and early functional bracing is used. In addition, crutches may be beneficial for comfort. Early functional treatment including range of motion and strengthening exercises along with limited weight bearing, are preferable to strict immobilization with rigid casting for improving outcome and reducing time to return to work.

5.1.4.5.2 Initial treatment for patients unable to bear weight: bracing plus NSAIDs and RICE are used. When patient becomes able to bear weight a walker boot is frequently employed. There is no clear evidence favoring ten days of casting over pneumatic bracing as initial treatment for patients who cannot bear weight three days post injury. There is good evidence that use of either device combined with functional therapy results in similar long term recovery.

5.1.4.5.2.1 There is some evidence that functional rehabilitation has results superior to six weeks of immobilization.

5.1.4.5.2.2 Small avulsion fractures of the fibula with minimal or no displacement can be treated as an ankle sprain.

5.1.4.5.2.3 For patients with a clearly unstable joint, immobilize with a short leg plaster cast or splint for 2 to 6 weeks along with early weight bearing.

5.1.4.5.3 Balance/coordination training is a well-established treatment which improves proprioception and may decrease incidence of recurrent sprains.

- 5.1.4.5.4 Medications such as analgesics and anti-inflammatories may be helpful. Refer to medication discussions in Section 6.0, Medications and Medical Management.
- 5.1.4.5.5 Patient education should include instruction in self-management techniques, ergonomics, body mechanics, home exercise, joint protection, and weight management.
- 5.1.4.5.6 Heel wedges or other orthotics may be used for rear foot varus or valgus deformities.
 - 5.1.4.5.6.1 There is good evidence that semi-rigid orthoses or pneumatic braces prevent ankle sprains during high risk physical activities and they should be used as appropriate after acute sprains.
- 5.1.4.5.7 When fractures are involved refer to comments related to osteoporosis in Section 6.0, Therapeutic Procedures, Non-operative, subsection, Osteoporosis Management.
- 5.1.4.5.8 Smoking may affect fracture healing. Patients should be strongly encouraged to stop smoking and be provided with appropriate counseling by the physician.
- 5.1.4.5.9 Return to work with appropriate restrictions should be considered early in the course of treatment. Refer to Section 6.0, Return to Work.
- 5.1.4.5.10 Other therapies in Section 6.0, Therapeutic Procedures, Non-operative, including manual therapy may be employed in individual cases.
- 5.1.4.5.11 Hyperbaric oxygen therapy is not recommended.

5.1.4.6 **Surgical Indications/Considerations:**

- 5.1.4.6.1 Acute surgical indications include sprains with displaced fractures, syndesmotic disruption or ligament sprain associated with a fracture causing instability.
- 5.1.4.6.2 There is no conclusive evidence that surgery as opposed to functional treatment for an uncomplicated Grade I-III ankle sprain improves patient outcome.
- 5.1.4.6.3 Chronic indications are functional problems, such as recurrent instability, remaining after at least 2 months of appropriate therapy including active participation in a non-operative therapy program including balance training.
- 5.1.4.6.4 Prior to surgical intervention, the patient and treating physician should identify functional operative goals and the likelihood of achieving improved ability to perform activities of daily living or work activities and the patient should agree to comply with the pre- and post-operative treatment plan including home exercise. The provider should be especially careful to make sure the patient understands the amount of post-operative therapy required and the length of partial- and full-disability expected post-operatively.
- 5.1.4.6.5 If injury is a sprain: Smoking may affect soft tissue healing through tissue hypoxia. Patients should be strongly encouraged to stop smoking and be provided with appropriate counseling by the physician.
- 5.1.4.6.6 If injury is a fracture: Because smokers have a higher risk of non-union and post-operative costs, it is recommended that carriers cover a smoking cessation program peri-operatively. Physicians may monitor smoking cessation with laboratory tests such as cotinine levels for long-term cessation.

5.1.4.7 **Operative Treatment:** Repair of fractures or other acute pathology as necessary. Primary ligament ankle reconstruction with possible tendon transplant.

5.1.4.8 **Post-operative Treatment:**

- 5.1.4.8.1 An individualized rehabilitation program based upon communication between the surgeon and the therapist using therapies as outlined in Section 6.0, Therapeutic Procedures, Non-Operative. Treatment may include short term post surgical casting. In all cases, communication between the physician and therapist is important to the timing of weight-bearing and exercise progressions.
 - 5.1.4.8.1.1 There is some evidence that more rapid recovery occurs with functional rehabilitation compared to six weeks of immobilization in a cast.
- 5.1.4.8.2 The surgical procedures and the patient's individual results dictate the amount of time a patient has non-weight-bearing restrictions. Fractures usually require 6 to 8 weeks while tendon transfers may be 6 weeks. Other soft tissue repairs, such as the Brostrom lateral ankle stabilization, may be as short as 3 weeks.
- 5.1.4.8.3 Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.

5.1.5 **Calcaneal Fracture:**

- 5.1.5.1 **Description/Definition:** Osseous fragmentation/separation confirmed by diagnostic studies.

- 5.1.5.2 **Occupational Relationship:** Usually occurs by fall or crush injury.
- 5.1.5.3 **Specific Physical Exam Findings:** Pain with range of motion and palpation of calcaneus. Inability to bear weight, mal-positioning of heel, possible impingement of sural nerve.
- 5.1.5.4 **Diagnostic Testing Procedures:** Radiographs and CT scan to assess for intra-articular involvement. Lumbar films and urinalysis are usually performed to rule out lumbar crush fractures when the mechanism of injury is a fall from a height.
- 5.1.5.5 **Non-operative Treatment Procedures:**
 - 5.1.5.5.1 Initial Treatment: Non weight-bearing 6 to 8 weeks, followed by weight-bearing cast at physician's discretion and active therapy with or without passive therapy.
 - 5.1.5.5.2 Medications such as analgesics and anti-inflammatories may be helpful. Refer to medication discussions in Section 6.0, the Medications and Medical Management subsection.
 - 5.1.5.5.3 Patient education should include instruction in self-management techniques, ergonomics, body mechanics, home exercise, joint protection, and weight management.
 - 5.1.5.5.4 Refer to comments related to osteoporosis in Section 6.0, Therapeutic Procedures, Non-operative, Osteoporosis Management.
 - 5.1.5.5.5 Smoking may affect fracture healing. Patients should be strongly encouraged to stop smoking and be provided with appropriate counseling by the physician.
 - 5.1.5.5.6 Return to work with appropriate restrictions should be considered early in the course of treatment. Refer to Section 6.0, Return to Work.
 - 5.1.5.5.7 Other therapies in Section 6.0, Therapeutic Procedures, Non-operative may be employed in individual cases.
- 5.1.5.6 **Surgical Indications/Considerations:** Displacement of fragments, joint depression, intra-articular involvement, mal-position of heel. Sanders Types II and III are generally repaired surgically. However, the need for surgery will depend on the individual case. Relative contraindications: smoking, diabetes, or immunosuppressive disease.
 - 5.1.5.6.1 Because smokers have a higher risk of non union and post operative costs, it is recommended that carriers cover a smoking cessation program peri-operatively. Physicians may monitor smoking cessation with laboratory tests such as cotinine levels for long term cessation.
- 5.1.5.7 **Operative Procedures:** Open reduction internal fixation. Subtalar fusion may be necessary in some cases when the calcaneus is extremely comminuted. External fixation has been used when the skin condition is poor.
 - 5.1.5.7.1 Complications may include wound infections requiring skin graft.
- 5.1.5.8 **Post-operative Treatment:**
 - 5.1.5.8.1 An individualized rehabilitation program based upon communication between the surgeon and the therapist using the therapies as outlined in Section 6.0, Therapeutic Procedures, Non-Operative. In all cases, communication between the physician and therapist is important to the timing of weight-bearing and exercise progressions.
 - 5.1.5.8.2 The patient is usually non weight-bearing for 6 to 8 weeks followed by weight-bearing for approximately 6 to 8 weeks at physician's discretion.
 - 5.1.5.8.3 Treatment may include the following: restricted weight-bearing, bracing, active therapy with or without passive therapy.
 - 5.1.5.8.4 Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.
- 5.1.6 **Chondral and Osteochondral Defects:**
 - 5.1.6.1 **Description/Definition:** Cartilage or cartilage and bone defect of the talar surface. May be associated with ankle sprain or other injuries.
 - 5.1.6.2 **Occupational Relationship:** Usually caused by a traumatic ankle injury.
 - 5.1.6.3 **Specific Physical Exam Findings:** Ankle effusion, pain in joint and with walking.
 - 5.1.6.4 **Diagnostic Testing Procedures:** MRI may show bone bruising, osteochondral lesion, or possibly articular cartilage injury. Radiographs, contrast radiography, CT may also be used.
 - 5.1.6.5 **Non-operative Treatment Procedures:**
 - 5.1.6.5.1 Initial Treatment: Acute injuries may require immobilization followed by active therapy with or without passive therapy.

- 5.1.6.5.2 Medications such as analgesics and anti-inflammatories may be helpful. Refer to medication discussions in Section 6.0, Medications and Medical Management.
- 5.1.6.5.3 Patient education should include instruction in self-management techniques, ergonomics, body mechanics, home exercise, joint protection, and weight management.
- 5.1.6.5.4 Benefits may be achieved through therapeutic rehabilitation and rehabilitation interventions. They should include range-of-motion (ROM), active therapies, and a home exercise program. Active therapies include, proprioception training, restoring normal joint mechanics, and clearing dysfunctions from adjacent structures. Passive as well as active therapies may be used for control of pain and swelling. Therapy should progress to strengthening and an independent home exercise program targeted to further improve ROM, strength, and normal joint mechanics influenced by distal and proximal structures. Refer to Section 6.0, Therapeutic Procedures, Non-operative.
 - 5.1.6.5.4.1 Passive modalities are most effective as adjunctive treatments to improve the results of active treatment. They may be used as found in Section 6.0, Therapeutic Procedures, Non-operative.
- 5.1.6.5.5 Return to work with appropriate restrictions should be considered early in the course of treatment. Refer to Section 6.0, Return to Work.
- 5.1.6.5.6 Other therapies in Section 6.0, Therapeutic Procedures, Non-operative may be employed in individual cases.

5.1.6.6 **Surgical Indications/Considerations:**

- 5.1.6.6.1 Functional deficits not responsive to conservative therapy. Identification of an osteochondral lesion by diagnostic testing procedures should be done to determine the size of the lesion and stability of the joint.
- 5.1.6.6.2 Microfracture is the initial treatment unless there are other anatomic variants such as a cyst under the bone.
- 5.1.6.6.3 Osteochondral Autograft Transfer System (OATS) may be effective in patients without other areas of osteoarthritis, a BMI of less than 35 and a failed microfracture. This procedure may be indicated when functional deficits interfere with activities of daily living and/or job duties 6 to 12 weeks after a failed microfracture with active patient participation in non-operative therapy. This procedure is only appropriate in a small subset of patients and requires prior authorization.
- 5.1.6.6.4 Autologous cartilage cell implant is not FDA approved for the ankle and therefore not recommended.
- 5.1.6.6.5 Prior to surgical intervention, the patient and treating physician should identify functional operative goals and the likelihood of achieving improved ability to perform activities of daily living or work activities and the patient should agree to comply with the pre- and post-operative treatment plan including home exercise. The provider should be especially careful to make sure the patient understands the amount of post-operative therapy required and the length of partial- and full-disability expected post-operatively.
- 5.1.6.6.6 Smoking may affect tissue healing through tissue hypoxia. Patients should be strongly encouraged to stop smoking and be provided with appropriate counseling by the physician.

5.1.6.7 **Operative Procedures:** Arthroscopy with debridement or shaving of cartilage, microfracture, mosaicplasty, fixation of loose osteochondral fragments.

5.1.6.8 **Post-operative Treatment:**

- 5.1.6.8.1 An individualized rehabilitation program based upon communication between the surgeon and the therapist and using therapies as outlined in Section 6.0, Therapeutic Procedures, Non-Operative. In all cases, communication between the physician and therapist is important to the timing of weight-bearing and exercise progressions.
- 5.1.6.8.2 Treatment may include the following: restricted weight-bearing, bracing, active therapy with or without passive therapy.
- 5.1.6.8.3 Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.

5.1.7 **Heel Spur Syndrome/Plantar Fasciitis:**

5.1.7.1 **Description:** Pain along the inferior aspect of the heel at the calcaneal attachment of the plantar fascia and/or along the course of the plantar fascia.

- 5.1.7.2 **Occupational Relationship:** Usually, the condition may be exacerbated by prolonged standing or walking on hard surfaces. Acute injury may be caused by trauma. This may include jumping from a height or hyperextension of the forefoot upon the rear foot.
- 5.1.7.3 **Specific Physical Exam Findings:** Pain with palpation at the inferior attachment of the plantar fascia to the os calcis may be associated with calcaneal spur. Gastrocnemius tightness may be tested with the Silfverskiöld test. The foot is dorsiflexed with the knee extended and then with the knee flexed. The test for gastrocnemius tightness is considered positive if dorsiflexion is greater with the knee flexed than with the knee extended.
- 5.1.7.4 **Diagnostic Testing Procedures:** Standard radiographs to rule out fracture, identify spur after conservative therapy. Bone scans and/or MRI may be used to rule out stress fractures in chronic cases.
- 5.1.7.5 **Non-operative Treatment Procedures:**
- 5.1.7.5.1 **Initial Treatment:** This condition usually responds to conservative management consisting of eccentric exercise of the gastrocnemius, plantar fascial stretching, taping, soft-tissue mobilization, night splints, and orthotics. Therapy may include passive therapy, taping, and injection therapy.
 - 5.1.7.5.2 Shock absorbing shoe inserts may prevent back and lower extremity problems in some work settings.
 - 5.1.7.5.3 Medications such as analgesics and anti-inflammatories may be helpful. Refer to medication discussions in Section 6.0, Medications and Medical Management.
 - 5.1.7.5.4 Patient education should include instruction in self-management techniques, ergonomics, body mechanics, home exercise, joint protection, and weight management.
 - 5.1.7.5.5 Steroid injections may decrease inflammation and allow the therapist to progress with functional exercise and range of motion. Steroid injections under significant pressure should be avoided as the needle may be penetrating the tendon and injection into the tendon can cause possible tendon breakdown, tendon degeneration, or rupture. Injections should be minimized for patients younger than 30 years of age. Injections may be performed with or without ultrasound guidance. Ultrasound guided interventional procedure provides the ability to image soft tissues in real time and can improve safety and accuracy of needle placement. The use of ultrasound guided procedures will be at the discretion of the health care provider.
 - 5.1.7.5.5.1 **Time to Produce Effect:** One injection.
 - 5.1.7.5.5.2 **Maximum Duration:** 3 injections in one year spaced at least 4 to 8 weeks apart.
 - 5.1.7.5.5.3 Steroid injections should be used cautiously in diabetic patients. Diabetic patients should be reminded to check their blood glucose levels at least daily for 2 weeks after injections.
 - 5.1.7.5.6 Return to work with appropriate restrictions should be considered early in the course of treatment. Refer to Section 6.0, Return to Work.
 - 5.1.7.5.7 After four months of failed therapy, Extracorporeal Shock Wave Therapy (ESWT) trial may be considered prior to surgery. Refer to Section 6.0, Therapeutic Procedures, Non-operative.
 - 5.1.7.5.8 Other therapies in Section 6.0, Therapeutic Procedures, Non-operative may be employed in individual cases.
- 5.1.7.6 **Surgical Indications/Considerations:**
- 5.1.7.6.1 Surgery is employed only after failure of at least 4 to 6 months of active patient participation in non-operative treatment.
 - 5.1.7.6.2 Indications for a gastrocnemius recession include a positive Silfverskiöld test. This procedure does not weaken the arch as may occur with a plantar fascial procedure, however, there is a paucity of literature on this procedure.
 - 5.1.7.6.3 Prior to surgical intervention, the patient and treating physician should identify functional operative goals and the likelihood of achieving improved ability to perform activities of daily living or work activities and the patient should agree to comply with the pre- and post-operative treatment plan including home exercise. The provider should be especially careful to make sure the patient understands the amount of post-operative therapy required and the length of partial- and full-disability expected post-operatively.
 - 5.1.7.6.4 Smoking may affect soft tissue healing through tissue hypoxia. Patients should be strongly encouraged to stop smoking and be provided with appropriate counseling by the physician.
- 5.1.7.7 **Operative Treatment Procedures:** Plantar fascial release with or without calcaneal spur removal, endoscopic or open gastrocnemius recession.

5.1.7.8 Post-operative Treatment:

- 5.1.7.8.1 ~~An individualized rehabilitation program based upon communication between the surgeon and the therapist using therapies as outlined in Section 6.0, Therapeutic Procedures, Non-Operative.~~
- 5.1.7.8.2 ~~Treatment may include the following: restricted weight-bearing, bracing, active therapy with or without passive therapy. Usually non weight-bearing for 7 to 10 days followed by weight-bearing cast or shoe for four weeks; however, depending on the procedure some patients may be restricted from weight-bearing for 4 to 6 weeks.~~
- 5.1.7.8.3 ~~Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.~~

5.1.8 Metatarsal-Phalangeal, Tarsal-Metatarsal and Interphalangeal Joint Arthropathy:

5.1.8.1 **Description/Definition:** Internal derangement of joint.

5.1.8.2 **Occupational Relationship:** Usually from jamming, contusion, crush injury, repetitive impact, or post-traumatic arthrosis.

5.1.8.3 **Specific Physical Exam Findings:** Pain with palpation and ROM of joint, effusion. The piano key test may be used, where the examiner stabilizes the heel with one hand and presses down on the distal head of the metatarsals, assessing for pain proximally.

5.1.8.4 **Diagnostic Testing Procedures:** Radiographs, diagnostic joint injection, CT, MRI.

5.1.8.5 Non-operative Treatment Procedures:

5.1.8.5.1 ~~Medications such as analgesics and anti-inflammatories may be helpful. Refer to medication discussions in Section 6.0, Medications and Medical Management.~~

5.1.8.5.2 ~~Patient education should include instruction in self-management techniques, ergonomics, body mechanics, home exercise, joint protection, and weight management.~~

5.1.8.5.3 ~~Benefits may be achieved through therapeutic rehabilitation and rehabilitation interventions. They should include range of motion (ROM), active therapies, and a home exercise program. Active therapies include, proprioception training, restoring normal joint mechanics, and clearing dysfunctions from adjacent structures. Passive as well as active therapies may be used for control of pain and swelling. Orthotics and iontophoresis are usually included. A carbon fiber Morton extension may be useful. Therapy should progress to strengthening and an independent home exercise program targeted to further improve ROM, strength, and normal joint mechanics influenced by distal and proximal structures. Refer to Section 6.0, Therapeutic Procedures, Non-operative.~~

5.1.8.5.3.1 ~~Passive modalities are most effective as adjunctive treatments to improve the results of active treatment. They may be used as found in Section 6.0, Therapeutic Procedures, Non-operative.~~

5.1.8.5.4 ~~Steroid injections may decrease inflammation and allow the therapist to progress with functional exercise and range of motion. Steroid injections under significant pressure should be avoided as the needle may be penetrating the tendon and injection into the tendon can cause possible tendon breakdown, tendon degeneration, or rupture. Injections should be minimized for patients younger than 30 years of age.~~

5.1.8.5.4.1 ~~Time to Produce Effect: One injection.~~

5.1.8.5.4.2 ~~Maximum Duration: 3 injections in one year spaced at least 4 to 8 weeks apart.~~

5.1.8.5.4.3 ~~Steroid injections should be used cautiously in diabetic patients. Diabetic patients should be reminded to check their blood glucose levels at least daily for 2 weeks after injections.~~

5.1.8.5.5 ~~Return to work with appropriate restrictions should be considered early in the course of treatment. Refer to Section 6.0, Return to Work.~~

5.1.8.5.6 ~~Other therapies in Section 6.0, Therapeutic Procedures, Non-operative may be employed in individual cases.~~

5.1.8.6 Surgical Indications/Considerations:

5.1.8.6.1 ~~Pain, unresponsive to conservative care and interfering with activities of daily living.~~

5.1.8.6.2 ~~First metatarsal arthritis or avascular necrosis can interfere with function and gait.~~

5.1.8.6.3 ~~Prior to surgical intervention, the patient and treating physician should identify functional operative goals and the likelihood of achieving improved ability to perform activities of daily living or work activities and the patient should agree to comply with the pre- and post-operative treatment plan including home exercise. The provider should be especially careful to make~~

- sure the patient understands the amount of post-operative therapy required and the length of partial and full disability expected post-operatively.
- 5.1.8.6.4 ~~Smoking may affect soft tissue healing through tissue hypoxia. Patients should be strongly encouraged to stop smoking and be provided with appropriate counseling by the physician.~~
- 5.1.8.7 **Operative Procedures:** ~~If debridement of the arthritic joint and other conservative treatment is unsuccessful in correcting gait and walking tolerance, other procedures may be considered. Other procedures include: fusion of first metatarsal-phalangeal joint, chilectomy, osteotomies, Keller arthroplasty and soft tissue procedures.~~
- 5.1.8.7.1 ~~There is some evidence that the first metatarsal-phalangeal joint arthritis is better treated with arthrodesis than arthroplasty for pain and functional improvement. Therefore, total joint arthroplasties are not recommended for any metatarsal-phalangeal joints due to less successful outcomes than fusions. There may be an exception for first and second metatarsal-phalangeal joint arthroplasties when a patient is older than 60, has low activity levels, and cannot tolerate non weight-bearing for prolonged periods or is at high risk for non-union.~~
- 5.1.8.7.2 ~~Metallic hemi-arthroplasties are still considered experimental as long-term outcomes remain unknown in comparison to arthrodesis, and there is a significant incidence of subsidence. Therefore, these are not recommended at this time.~~
- 5.1.8.8 **Post-operative Treatment:**
- 5.1.8.8.1 ~~An individualized rehabilitation program based upon communication between the surgeon and the therapist using therapies as outlined in Section 6.0, Therapeutic Procedures, Non-Operative. In all cases, communication between the physician and therapist is important to the timing of weight-bearing and exercise progressions.~~
- 5.1.8.8.2 ~~For fusions and osteotomies, reduced weight-bearing and the use of special shoes will be necessary for at least 6 weeks post operative. For other procedures early range-of-motion, bracing, and/or orthotics. Treatment usually also includes other active therapy with or without passive therapy.~~
- 5.1.8.8.3 ~~Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.~~
- 5.1.9 **Midfoot (Lisfranc) Fracture/Dislocation:**
- 5.1.9.1 **Description/Definition:** ~~Fracture/ligamentous disruption of the tarsal-metatarsal joints, i.e., metatarsal-cuneiform and metatarsal-cuboid bones.~~
- 5.1.9.2 **Occupational Relationship:** ~~Usually occurs from a fall, crush, axial load with a plantar flexed foot, or abductory force on the forefoot.~~
- 5.1.9.3 **Specific Physical Exam Findings:** ~~Pain and swelling at the Lisfranc joint, first and/or second metatarsal-cuneiform articulation, palpable dorsal dislocation, pain on forced abduction.~~
- 5.1.9.3.1 ~~Dislocation may not always be apparent. Pronation and supination of the forefoot with the calcaneus fixed in the examiners opposite hand may elicit pain in a Lisfranc injury, distinguishing it from an ankle sprain, in which this maneuver is expected to be painless. The piano key test may be used, where the examiner stabilizes the heel with one hand and presses down on the distal head of the metatarsal, assessing for pain proximally. The dorsalis pedis artery crosses the second metatarsal and may be disrupted. Therefore, the dorsalis pedis pulse and capillary filling should be assessed.~~
- 5.1.9.4 **Diagnostic Testing Procedures:** ~~X-rays, CT scans, MRI, mid-foot stress x-rays.~~
- 5.1.9.5 **Non-operative Treatment Procedures:**
- 5.1.9.5.1 ~~Initial Treatment: If minimal or no displacement then casting, non weight-bearing 6 to 8 weeks. Orthoses may be used later.~~
- 5.1.9.5.2 ~~Medications such as analgesics and anti-inflammatories may be helpful. Refer to medication discussions in Section 6.0, Medications and Medical Management.~~
- 5.1.9.5.3 ~~Patient education should include instruction in self-management techniques, ergonomics, body mechanics, home exercise, joint protection, and weight management.~~
- 5.1.9.5.4 ~~Refer to comments related to osteoporosis in Section 6.0, Therapeutic Procedures, Non-operative, Osteoporosis Management.~~
- 5.1.9.5.5 ~~Smoking may affect fracture healing. Patients should be strongly encouraged to stop smoking and be provided with appropriate counseling by the physician.~~
- 5.1.9.5.6 ~~Return to work with appropriate restrictions should be considered early in the course of treatment. Refer to Section 6.0, Return to Work.~~

- 5.1.9.5.7 ~~Other therapies in Section 6.0, Therapeutic Procedures, Non-operative may be employed in individual cases.~~
- 5.1.9.6 ~~**Surgical Indications/Considerations:** Displacement of fragments or intra-articular fracture. Most Lisfranc fracture/dislocations are treated surgically.~~
- 5.1.9.6.1 ~~Because smokers have a higher risk of non-union and post-operative costs, it is recommended that carriers cover a smoking cessation program peri-operatively. Physicians may monitor smoking cessation with laboratory tests such as cotinine levels for long-term cessation.~~
- 5.1.9.7 ~~**Operative Procedures:** Open reduction internal fixation with possible removal of hardware at approximately 3 to 6 months, pending healing status. Alternatively, arthrodesis of the medial 2 or 3 metatarsals.~~
- 5.1.9.8 ~~**Post-operative Treatment:**~~
 - 5.1.9.8.1 ~~An individualized rehabilitation program based upon communication between the surgeon and the therapist using treatments as outlined in Section 6.0, Therapeutic Procedures, Non-Operative. In all cases, communication between the physician and therapist is important to the timing of weight-bearing and exercise progressions.~~
 - 5.1.9.8.2 ~~The patient is usually in cast or fracture walker for 6 to 8 weeks non weight bearing. Orthoses may be indicated after healing.~~
 - 5.1.9.8.3 ~~Treatment may include the following: restricted weight-bearing, bracing, active therapy with or without passive therapy.~~
 - 5.1.9.8.4 ~~Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.~~
- 5.1.10 ~~**Morton's Neuroma:**~~
 - 5.1.10.1 ~~**Description:** This condition is a perineural fibrosis of the intermetatarsal nerve creating pain and/or paresthesias in the forefoot region. Symptoms appear with weight-bearing activities. Usually occurs between the third and fourth metatarsals or between the second and third metatarsals.~~
 - 5.1.10.2 ~~**Occupational Relationship:** Acute injuries may include excessive loading of the forefoot region caused from jumping or pushing down on the ball of the foot. Non-traumatic occurrences are determined at physician's discretion after review of environmental and biomechanical risk factors.~~
 - 5.1.10.3 ~~**Specific Physical Exam Findings:** Paresthesias and/or pain with palpation of the intermetatarsal nerve. Mulder's sign, a palpable click from compression of the nerve, or Tinel's sign.~~
 - 5.1.10.4 ~~**Diagnostic Testing Procedures:** Radiographs to rule out osseous involvement. Diagnostic and therapeutic injections. Diagnosis is usually based on clinical judgment; however, MRI and ultrasound imaging have also been employed in difficult cases.~~
 - 5.1.10.5 ~~**Non-operative Treatment Procedures:**~~
 - 5.1.10.5.1 ~~Initial Treatment: Nonsteroidal anti-inflammatories and foot orthoses are primary treatments.~~
 - 5.1.10.5.2 ~~Medications such as analgesics and anti-inflammatories are usually helpful. Refer to medication discussions in Section 6.0, Medications and Medical Management.~~
 - 5.1.10.5.3 ~~Patient education should include instruction in self-management techniques, ergonomics, body mechanics, home exercise, joint protection, and weight management.~~
 - 5.1.10.5.4 ~~Steroid injections may decrease inflammation and allow the therapist to progress with functional exercise and range of motion. Steroid injections under significant pressure should be avoided as the needle may be penetrating the tendon and injection into the tendon can cause possible tendon breakdown, tendon degeneration, or rupture. Injections should be minimized for patients younger than 30 years of age.~~
 - 5.1.10.5.4.1 ~~Time to Produce Effect: One injection.~~
 - 5.1.10.5.4.2 ~~Maximum Duration: 3 injections in one year spaced at least 4 to 8 weeks apart.~~
 - 5.1.10.5.4.3 ~~Steroid injections should be used cautiously in diabetic patients. Diabetic patients should be reminded to check their blood glucose levels at least daily for 2 weeks after injections.~~
 - 5.1.10.5.5 ~~Alcohol injections are thought to produce a chemical neurolysis. Alcohol injection with ultrasound guidance may be used to decrease symptoms.~~
 - 5.1.10.5.5.1 ~~Optimum Duration: 4 treatments.~~
 - 5.1.10.5.5.2 ~~Maximum Duration: 7 treatments.~~
 - 5.1.10.5.6 ~~Return to work with appropriate restrictions should be considered early in the course of treatment. Refer to Section 6.0, Return to Work.~~

- 5.1.10.5.7 ~~Other therapies in Section 6.0, Therapeutic Procedures, Non-operative may be employed in individual cases.~~
- 5.1.10.6 **Surgical Indications/Considerations:**
 - 5.1.10.6.1 ~~Functional deficits persisting after 2 to 3 months of active participation in therapy.~~
 - 5.1.10.6.2 ~~Prior to surgical intervention, the patient and treating physician should identify functional operative goals and the likelihood of achieving improved ability to perform activities of daily living or work activities and the patient should agree to comply with the pre- and post-operative treatment plan including home exercise. The provider should be especially careful to make sure the patient understands the amount of post-operative therapy required and the length of partial- and full-disability expected post-operatively.~~
 - 5.1.10.6.3 ~~Smoking may affect soft tissue healing through tissue hypoxia. Patients should be strongly encouraged to stop smoking and be provided with appropriate counseling by the physician.~~
- 5.1.10.7 **Operative Procedures:** ~~Excision of the neuroma; nerve transection or transposition.~~
- 5.1.10.8 **Post-operative Treatment:**
 - 5.1.10.8.1 ~~An individualized rehabilitation program based upon communication between the surgeon and the therapist using therapies as outlined in Section 6.0, Therapeutic Procedures, Non-Operative.~~
 - 5.1.10.8.2 ~~Treatment may involve a period of non-weight-bearing for up to two weeks, followed by gradual protected weight-bearing 4 to 6 weeks.~~
 - 5.1.10.8.3 ~~Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.~~
- 5.1.11 **Pilon Fracture:**
 - 5.1.11.1 **Description/Definition:** ~~Crush/comminution fracture of distal metaphyseal tibia that has intra-articular extensions into the weight-bearing surface of the tibio-talar joint.~~
 - 5.1.11.2 **Occupational Relationship:** ~~Usually from a fall.~~
 - 5.1.11.3 **Specific Physical Exam Findings:** ~~Swelling, pain with weight-bearing, ecchymosis, and palpable tenderness.~~
 - 5.1.11.4 **Diagnostic Testing Procedures:** ~~Radiographs, CT scans.~~
 - 5.1.11.5 **Non-operative Treatment Procedures:**
 - 5.1.11.5.1 ~~Initial Treatment: Prolonged non-weight-bearing at physician's discretion.~~
 - 5.1.11.5.2 ~~Medications such as analgesics and anti-inflammatories may be helpful. Refer to medication discussions in Section 6.0, Medications and Medical Management.~~
 - 5.1.11.5.3 ~~Patient education should include instruction in self-management techniques, ergonomics, body mechanics, home exercise, joint protection, and weight management.~~
 - 5.1.11.5.4 ~~Refer to comments related to osteoporosis in Section 6.0, Therapeutic Procedures, Non-operative, Osteoporosis Management.~~
 - 5.1.11.5.5 ~~Smoking may affect fracture healing. Patients should be strongly encouraged to stop smoking and be provided with appropriate counseling by the physician.~~
 - 5.1.11.5.6 ~~Return to work with appropriate restrictions should be considered early in the course of treatment. Refer to Section 6.0, Return to Work.~~
 - 5.1.11.5.7 ~~Other therapies in Section 6.0, Therapeutic Procedures, Non-operative may be employed in individual cases.~~
 - 5.1.11.6 **Surgical Indications/Considerations:** ~~Displacement of fracture, severe comminution necessitating primary fusion.~~
 - 5.1.11.6.1 ~~Because smokers have a higher risk of non-union and post-operative costs, it is recommended that insurers cover a smoking cessation program peri-operatively. Physicians may monitor smoking cessation with laboratory tests such as cotinine levels for long term cessation.~~
 - 5.1.11.7 **Operative Procedures:** ~~Open reduction internal fixation, fusion, external fixation. In some cases staged procedures may be necessary beginning with external fixation.~~
 - 5.1.11.8 **Post-operative Treatment:**
 - 5.1.11.8.1 ~~An individualized rehabilitation program based upon communication between the surgeon and the therapist using treatment as outlined in Section 6.0, Therapeutic Procedures, Non-Operative. In all cases, communication between the physician and therapist is important to the timing of weight-bearing and exercise progressions.~~

5.1.11.8.2 Treatment may include the following: restricted weight-bearing, bracing, active therapy with or without passive therapy.

5.1.11.8.3 Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.

5.1.12 **Posterior Tibial Tendon Dysfunction:**

5.1.12.1 **Description/Definition:** Pain in the posteromedial ankle with plantar flexion.

5.1.12.2 **Occupational Relationship:** Usually from repetitive or forced plantar flexion after an ankle sprain or athletic activity.

5.1.12.3 **Specific Physical Exam Findings:** Painful posterior tibial tendon with active and passive non-weight-bearing motion, reproduction of pain with forced plantar flexion and inversion of the ankle, difficulty performing single heel raise, pain with palpation from the posterior medial foot along the medial malleolus to the navicular greater tuberosity. The patient should also be evaluated for a possible weak gluteus medius as a contributing factor.

5.1.12.4 **Diagnostic Testing Procedures:** X-ray, MRI may be used to rule out other diagnoses.

5.1.12.5 **Non-operative Treatment Procedures:**

5.1.12.5.1 **Initial Treatment:** Short ankle articulated orthosis and therapy including low-load strengthening exercises with progression to home program. Other active and passive therapy including iontophoresis, orthotics and possible strengthening for the gluteus medius.

5.1.12.5.2 Medications such as analgesics and anti-inflammatories may be helpful. Refer to medication discussions in Section 6.0, Medications and Medical Management.

5.1.12.5.3 Patient education should include instruction in self-management techniques, ergonomics, body mechanics, home exercise, joint protection, and weight management.

5.1.12.5.4 Return to work with appropriate restrictions should be considered early in the course of treatment. Refer to Section 6.0, Return to Work.

5.1.12.5.5 Other therapies in Section 6.0, Therapeutic Procedures, Non-operative may be employed in individual cases.

5.1.12.6 **Surgical Indications/Considerations:**

5.1.12.6.1 Failure of non-operative treatment. Surgery is rarely necessary as success rate for non-operative treatment is around 90%.

5.1.12.6.2 Prior to surgical intervention, the patient and treating physician should identify functional operative goals and the likelihood of achieving improved ability to perform activities of daily living or work activities and the patient should agree to comply with the pre- and post-operative treatment plan including home exercise. The provider should be especially careful to make sure the patient understands the amount of post-operative therapy required and the length of partial- and full-disability expected post-operatively.

5.1.12.6.3 Smoking may affect soft tissue healing through tissue hypoxia. Patients should be strongly encouraged to stop smoking and be provided with appropriate counseling by the physician.

5.1.12.7 **Operative Procedures:** Resection of anomolous muscle segments or tenolysis. In severe cases, tendon transfer, osteotomies and/or arthrodesis may be necessary.

5.1.12.8 **Post-operative Treatment:**

5.1.12.8.1 An individualized rehabilitation program based upon communication between the surgeon and the therapist and using therapies as outlined in Section 6.0, Therapeutic Procedures, Non-Operative.

5.1.12.8.2 Treatment may include the following: restricted weight-bearing, bracing, active therapy with or without passive therapy.

5.1.12.8.3 Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.

5.1.13 **Puncture Wounds of the Foot:**

5.1.13.1 **Description/Definition:** Penetration of skin by foreign object.

5.1.13.2 **Occupational Relationship:** Usually by stepping on foreign object, open wound.

5.1.13.3 **Specific Physical Exam Findings:** Site penetration by foreign object consistent with history. In early onset, may show classic signs of infection.

5.1.13.4 **Diagnostic Testing Procedures:** X-ray, MRI, ultrasound.

5.1.13.5 **Non-operative Treatment Procedures:**

- 5.1.13.5.1 Initial Treatment: Appropriate antibiotic therapy, tetanus toxoid booster, non weight-bearing at physician's discretion.
- 5.1.13.5.2 Medications such as analgesics and anti-inflammatories may be helpful. Refer to medication discussions in Section 6.0, Medications and Medical Management.
- 5.1.13.5.3 Patient education should include instruction in self-management techniques, ergonomics, body mechanics, home exercise, joint protection, and weight management.
- 5.1.13.5.4 Return to work with appropriate restrictions should be considered early in the course of treatment. Refer to Section 6.0, Return to Work.
- 5.1.13.5.5 Other therapies in Section 6.0, Therapeutic Procedures, Non-operative may be employed in individual cases.
- 5.1.13.6 **Surgical Indications/Considerations:** Cellulitis, retained foreign body suspected, abscess, compartmental syndrome, and bone involvement.
 - 5.1.13.6.1 Smoking may affect soft tissue healing through tissue hypoxia. Patients should be strongly encouraged to stop smoking and be provided with appropriate counseling by the physician.
- 5.1.13.7 **Operative Procedures:** Incision and drainage with cultures.
- 5.1.13.8 **Post-operative Treatment:**
 - 5.1.13.8.1 Patient is usually non-weight bearing with antibiotic therapy based upon cultures. Follow-up x-rays and/or MRI may be needed to evaluate for osseous involvement.
 - 5.1.13.8.2 An individualized rehabilitation program based upon communication between the surgeon and the therapist using treatment as outlined in Section 6.0, Therapeutic Procedures, Non-Operative.
 - 5.1.13.8.3 Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.
- 5.1.14 **Severe Soft Tissue Crush Injuries:**
 - 5.1.14.1 **Description/Definition:** Soft tissue damage to the foot.
 - 5.1.14.2 **Occupational Relationship:** Usually from a crush injury or heavy impact to the foot or ankle.
 - 5.1.14.3 **Specific Physical Exam Findings:** Pain and swelling over the foot.
 - 5.1.14.4 **Diagnostic Testing Procedures:** X-ray and other tests as necessary to rule out other possible diagnoses such as compartment syndrome which requires emergent compartment pressure assessment.
 - 5.1.14.5 **Non-operative Treatment Procedures:**
 - 5.1.14.5.1 Initial Treatment: Usually needs initial rest from work with foot elevation and compression wraps.
 - 5.1.14.5.2 Medications such as analgesics and anti-inflammatories may be helpful. Refer to medication discussions in Section 6.0 Medications and Medical Management.
 - 5.1.14.5.3 Patient education should include instruction in self-management techniques, ergonomics, body mechanics, home exercise, joint protection, and weight management.
 - 5.1.14.5.4 Benefits may be achieved through therapeutic rehabilitation and rehabilitation interventions. They should include range of motion (ROM), active therapies, and a home exercise program. Active therapies include, proprioception training, restoring normal joint mechanics, and clearing dysfunctions from adjacent structures. Passive as well as active therapies may be used for control of pain and swelling. Therapy should progress to strengthening and an independent home exercise program targeted to further improve ROM, strength, and normal joint mechanics influenced by distal and proximal structures. Refer to Section 6.0, Therapeutic Procedures, Non-operative.
 - 5.1.14.5.4.1 Passive modalities are most effective as adjunctive treatments to improve the results of active treatment. They may be used as found in Section 6.0, Therapeutic Procedures, Non-operative.
 - 5.1.14.5.5 Return to work with appropriate restrictions should be considered early in the course of treatment. Refer to Section 6.0, Return to Work.
 - 5.1.14.5.6 Other therapies in Section 6.0, Therapeutic Procedures, Non-operative may be employed in individual cases.
 - 5.1.14.6 **Surgical Indications/Considerations:** If compartmental pressures are elevated, emergent fasciotomy is warranted.

- 5.1.14.6.1 Smoking may affect soft tissue healing through tissue hypoxia. Patients should be strongly encouraged to stop smoking and be provided with appropriate counseling by the physician.
- 5.1.14.7 **Operative Procedures:** Emergency fasciotomy. In some cases a delayed primary closure is necessary.
- 5.1.14.8 **Post-operative Treatment:**
 - 5.1.14.8.1 An individualized rehabilitation program based upon communication between the surgeon and the therapist and using therapies as outlined in Section 6.0, Therapeutic Procedures, Non-Operative.
 - 5.1.14.8.2 Treatment may include the following: elevation, restricted weight-bearing, active therapy with or without passive therapy.
 - 5.1.14.8.3 Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.
- 5.1.15 **Stress Fracture:**
 - 5.1.15.1 **Description/Definition:** Fracture without displacement usually to metatarsals, talus, navicular or calcaneus.
 - 5.1.15.2 **Occupational Relationship:** May be related to repetitive, high impact walking; running; or jumping.
 - 5.1.15.3 **Specific Physical Exam Findings:** Pain over the affected bone with palpation or weight bearing.
 - 5.1.15.4 **Diagnostic Testing Procedures:** X-ray, CT, MRI, bone scan
 - 5.1.15.5 **Non-operative Treatment Procedures:**
 - 5.1.15.5.1 Initial Treatment: Immobilization for 4 to 8 weeks with limited weight bearing may be appropriate.
 - 5.1.15.5.2 Medications such as analgesics and anti-inflammatories may be helpful. Refer to medication discussions in Section 6.0, Medications and Medical Management.
 - 5.1.15.5.3 Patient education should include instruction in self-management techniques, ergonomics, body mechanics, home exercise, joint protection, and weight management.
 - 5.1.15.5.4 Refer to comments related to osteoporosis in Section 6.0, Therapeutic Procedures, Non-operative, Osteoporosis Management.
 - 5.1.15.5.5 Smoking may affect fracture healing. Patients should be strongly encouraged to stop smoking and be provided with appropriate counseling by the physician.
 - 5.1.15.5.6 There is some evidence that shock absorbing boot inserts may decrease the incidence of stress fractures in military training. Shock absorbing boot inserts or other orthotics may be used in some cases after a stress fracture has occurred or to prevent stress fractures in appropriate work settings.
 - 5.1.15.5.7 Return to work with appropriate restrictions should be considered early in the course of treatment. Refer to Section 6.0, Return to Work.
 - 5.1.15.5.8 Other therapies in Section 6.0, Therapeutic Procedures, Non-operative may be employed in individual cases.
 - 5.1.15.6 **Surgical Indications/Considerations:** fractures that have not responded to conservative therapy.
 - 5.1.15.6.1 Because smokers have a higher risk of non-union and post-operative costs, it is recommended that insurers cover a smoking cessation program peri-operatively. Physicians may monitor smoking cessation with laboratory tests such as cotinine levels for long term cessation.
 - 5.1.15.7 **Operative Procedures:** Most commonly percutaneous screws or plate fixation.
 - 5.1.15.8 **Post-operative Treatment:**
 - 5.1.15.8.1 An individualized rehabilitation program based upon communication between the surgeon and the therapist and using therapies as outlined in Section 6.0, Therapeutic Procedures, Non-Operative. In all cases, communication between the physician and therapist is important to the timing of weight-bearing and exercise progressions.
 - 5.1.15.8.2 Treatment may include the following: restricted weight-bearing, bracing, active therapy with or without passive therapy.
 - 5.1.15.8.3 Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.
- 5.1.16 **Talar Fracture:**

- 5.1.16.1 **Description/Definition:** Osseous fragmentation of talus confirmed by radiographic, CT or MRI evaluation.
- 5.1.16.2 **Occupational Relationship:** Usually occurs from a fall or crush injury.
- 5.1.16.3 **Specific Physical Exam Findings:** Clinical findings consistent with fracture of talus: pain with range of motion, palpation, swelling, and ecchymosis. Pain with weight-bearing attempt.
- 5.1.16.4 **Diagnostic Testing Procedures:** Radiographs, CT scans, MRI. CT scans preferred for spatial alignment.
- 5.1.16.5 **Non-operative Treatment Procedures:**
 - 5.1.16.5.1 Initial Treatment: Non weight-bearing for 6 to 8 weeks for non-displaced fractures.
 - 5.1.16.5.2 Medications such as analgesics and anti-inflammatories may be helpful. Refer to medication discussions in Section 6.0, Medications and Medical Management.
 - 5.1.16.5.3 Patient education should include instruction in self-management techniques, ergonomics, body mechanics, home exercise, joint protection, and weight management.
 - 5.1.16.5.4 Refer to comments related to osteoporosis in Section 6.0, Therapeutic Procedures, Non-operative, Osteoporosis Management.
 - 5.1.16.5.5 Smoking may affect fracture healing. Patients should be strongly encouraged to stop smoking and be provided with appropriate counseling by the physician.
 - 5.1.16.5.6 Return to work with appropriate restrictions should be considered early in the course of treatment. Refer to Section 6.0, Return to Work.
 - 5.1.16.5.7 Other therapies in Section 6.0, Therapeutic Procedures, Non-operative may be employed in individual cases.
- 5.1.16.6 **Surgical Indications/Considerations:** Osseous displacement, joint involvement and instability.
 - 5.1.16.6.1 Because smokers have a higher risk of non-union and post-operative costs, it is recommended that carriers cover a smoking cessation program peri-operatively. Physicians may monitor smoking cessation with laboratory tests such as cotinine levels for long-term cessation.
- 5.1.16.7 **Operative Procedures:** Open reduction internal fixation.
- 5.1.16.8 **Post-operative Treatment:**
 - 5.1.16.8.1 An individualized rehabilitation program based upon communication between the surgeon and the therapist and using therapies as outlined in Section 6.0, Therapeutic Procedures, Non-Operative. In all cases, communication between the physician and therapist is important to the timing of weight-bearing and exercise progressions.
 - 5.1.16.8.2 Treatment may include the following: Non weight-bearing 6 to 8 weeks followed by weight-bearing cast. MRI follow-up if avascular necrosis is suspected. Active therapy with or without passive therapy.
 - 5.1.16.8.3 Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.
- 5.1.17 **Tarsal Tunnel Syndrome:**
 - 5.1.17.1 **Description:** Pain and paresthesias along the medial aspect of the ankle and foot due to nerve irritation and entrapment of the tibial nerve or its branches. These symptoms can also be caused by radiculopathy.
 - 5.1.17.2 **Occupational Relationship:** Acute injuries may occur after blunt trauma along the medial aspect of the foot. Non-traumatic occurrences are determined at physician's discretion after review of environmental and biomechanical risk factors. Non work related causes include space-occupying lesions.
 - 5.1.17.3 **Specific Physical Exam Findings:** Positive Tinel's sign. Pain with percussion of the tibial nerve radiating distally or proximally. Pain and paresthesias with weight-bearing activities.
 - 5.1.17.4 **Diagnostic Testing Procedures:** Nerve conduction velocity studies of both sides for comparison to normal side. EMGs may be needed to rule out radiculopathy. MRI to rule out space-occupying lesions. Diagnostic injections to confirm the diagnosis.
 - 5.1.17.5 **Non-operative Treatment Procedures:**
 - 5.1.17.5.1 Initial Treatment: Cast or bracing, immobilization and foot orthoses are appropriate initial management.
 - 5.1.17.5.2 Medications such as analgesics and anti-inflammatories may be helpful. Refer to medication discussions in Section 6.0, Medications and Medical Management.

- 5.1.17.5.3 Patient education should include instruction in self management techniques, ergonomics, body mechanics, home exercise, joint protection, and weight management.
- 5.1.17.5.4 Return to work with appropriate restrictions should be considered early in the course of treatment.
 - 5.1.17.5.4.1 Orthotics or accommodative footwear is usually necessary before workers can be returned to walking on hard surfaces. Refer to Section 6.0, Return to Work.
- 5.1.17.5.5 Other therapies in Section 6.0, Therapeutic Procedures, Non-operative may be employed in individual cases.

5.1.17.6 **Surgical Indications/Considerations:**

- 5.1.17.6.1 Continued functional deficits after active participation in therapy for 3 to 6 months.
- 5.1.17.6.2 Prior to surgical intervention, the patient and treating physician should identify functional operative goals and the likelihood of achieving improved ability to perform activities of daily living or work activities and the patient should agree to comply with the pre and post-operative treatment plan including home exercise. The provider should be especially careful to make sure the patient understands the amount of post-operative therapy required and the length of partial and full disability expected post-operatively.
- 5.1.17.6.3 Smoking may affect soft tissue healing through tissue hypoxia. Patients should be strongly encouraged to stop smoking and be provided with appropriate counseling by the physician.

5.1.17.7 **Operative Procedures:** Tarsal tunnel release with or without a plantar fascial release.

5.1.17.8 **Post-operative Treatment:**

- 5.1.17.8.1 An individualized rehabilitation program based upon communication between the surgeon and the therapist and using therapies as outlined in Section 6.0, Therapeutic Procedures, Non-Operative.
- 5.1.17.8.2 Treatment may include the following: restricted weight-bearing, orthotics, bracing, active therapy with or without passive therapy.
- 5.1.17.8.3 Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.

5.1.18 **Tendonopathy:**

- 5.1.18.1 For Achilles Tendonopathy, Refer to Section 5.1. For other types of tendonopathy of the foot and ankle, General recommendations can be found in Section 5.2, Tendonopathy of the Knee.

5.2 **KNEE**

5.2.1 **Aggravated Osteoarthritis:-**

- 5.2.1.1 **Description/Definition:** Swelling and/or pain in a joint due to an aggravating activity in a patient with pre-existing degenerative change in a joint. Age greater than 50 and morning stiffness lasting less than 30 minutes are frequently associated. The lifetime risk for symptomatic knee arthritis is probably around 45% and is higher among obese persons.
- 5.2.1.2 **Other causative factors to consider** – Previous meniscus or ACL damage may predispose a joint to degenerative changes. In order to entertain previous trauma as a cause, the patient should have medical documentation of the following: meniscectomy; hemarthrosis at the time of the original injury; or evidence of MRI or arthroscopic meniscus or ACL damage. The prior injury should have been at least 2 years from the presentation for the new complaints and there should be a significant increase of pathology on the affected side in comparison to the original imaging or operative reports and/or the opposite uninjured side or extremity.
 - 5.2.1.2.1 Body mass index (BMI) of 25 or greater is a significant risk factor for eventual knee replacement.
- 5.2.1.3 **Specific Physical Exam Findings:** Increased pain and/or swelling in a joint with joint line tenderness; joint crepitus; and/or joint deformity.
- 5.2.1.4 **Diagnostic Testing Procedures:-**
 - 5.2.1.4.1 Radiographs, The Kellgren-Lawrence Scale is the standard radiographic scale for knee osteoarthritis. It is based on the development of osteophytes, on bone sclerosis, and on joint space narrowing. The degree of joint space narrowing may not predict disability.
 - 5.2.1.4.1.1 Grade 1: doubtful narrowing of joint space, and possible osteophytic lipping.
 - 5.2.1.4.1.2 Grade 2: definite osteophytes, definite narrowing of joint space.
 - 5.2.1.4.1.3 Grade 3: moderate multiple osteophytes, definite narrowing of joint space, some sclerosis and possible deformity of bone contour.

- 5.2.1.4.1.4 ~~Grade 4: large osteophytes, marked narrowing of joint space, severe sclerosis and definite deformity of bone contour.~~
- 5.2.1.4.2 ~~MRI to rule out degenerative menisci tears. MRI may identify bone marrow lesions which are correlated with knee pain. These lesions may reflect increased water, blood, or other fluid inside bone and may contribute to the causal pathway of pain. These are incidental findings and should not be used to determine a final diagnosis nor make decisions regarding surgery.~~
- 5.2.1.5 **Non-operative Treatment Procedures:**
 - 5.2.1.5.1 ~~Medications such as analgesics and anti-inflammatories may be helpful. Refer to medication discussions in Section 6.0, Medications and Medical Management.~~
 - 5.2.1.5.2 ~~Patient education should include instruction in self-management techniques, ergonomics, body mechanics, home exercise, joint protection, and weight management. There is good evidence for self-management using weight loss, exercise, pacing of activities, unloading the joint with braces, insoles and possibly taping, and medications as needed. Patients should be encouraged to perform aerobic activity such as walking or biking. However, activities such as ladders, stairs and kneeling may be restricted.~~
 - 5.2.1.5.3 ~~Benefits may be achieved through therapeutic rehabilitation and rehabilitation interventions. They should include range of motion (ROM), active therapies, and a home exercise program. Active therapies include, proprioception training, restoring normal joint mechanics, and clearing dysfunctions from distal to proximal structures. Passive as well as active therapies may be used for control of pain and swelling. Therapy should progress to strengthening and an independent home exercise program targeted to further improve ROM, strength, and normal joint mechanics influenced by structures distal and proximal to the knee. Bracing may be appropriate in some instances. Refer to Section 6.0, Therapeutic Procedures, Non-operative. There is good evidence that there is a small functional advantage for patients involved in exercise with physical therapy supervision over home exercise.~~
 - 5.2.1.5.3.1 ~~There is some evidence that active physical therapy improves knee function more effectively than medication alone.~~
 - 5.2.1.5.3.2 ~~Aquatic therapy may be used as a type of active intervention when land-based therapy is not well tolerated.~~
 - 5.2.1.5.3.3 ~~Passive modalities are most effective as adjunctive treatments to improve the results of active treatment. They may be used as found in Section 6.0, Therapeutic Procedures, Non-operative. There is some evidence that ice massage can improve ROM, strengthening of the knee and function. Ice can be used with proper instruction at home or under supervision for up to 20 minute periods 3 times per week or more frequently.~~
 - 5.2.1.5.4 ~~Therapeutic Injections—Both steroids and viscosupplementation may be used.~~
 - 5.2.1.5.4.1 ~~There is good evidence that intra-articular corticosteroid injection is more effective than placebo in reducing pain from osteoarthritis. Optimum dosage is not known.~~
 - 5.2.1.5.4.2 ~~Steroid injections may decrease inflammation and allow the therapist to progress with functional exercise and ROM.~~
 - 5.2.1.5.4.2.1 ~~Time to Produce Effect: One injection.~~
 - 5.2.1.5.4.2.2 ~~Maximum Duration: 3 injections in one year at least 4 to 8 weeks apart.~~
 - 5.2.1.5.4.3 ~~Steroid injections should be used cautiously in diabetic patients. Diabetic patients should be reminded to check their blood glucose levels at least daily for 2 weeks after injections.~~
 - 5.2.1.5.4.4 ~~Viscosupplementation appears to have a longer lasting effect than intra-articular corticosteroids, however, the overall effect varies depending on the timing and the effect studied. Refer to Section 6.0, Therapeutic Procedures, Non-operative.~~
 - 5.2.1.5.5 ~~Return to work with appropriate restrictions should be considered early in the course of treatment. Refer to Section 6.0, Return to Work.~~
 - 5.2.1.5.6 ~~Other therapies in Section 6.0, Therapeutic Procedures, Non-operative may be employed in individual cases.~~
- 5.2.1.6 **Surgical Indications/Considerations:-**
 - 5.2.1.6.1 ~~Arthroscopic Debridement and/or Lavage. There is good evidence from a randomized controlled trial that arthroscopic debridement alone provides no benefit over recommended therapy for patients with uncomplicated Grade 2 or higher arthritis. The comparison recommended treatment in the study followed the American College of Rheumatology~~

guidelines which includes: patient education, and supervised therapy with a home program, instruction on ADLs, stepwise use of analgesics and hyaluronic acid injections if desired. Complicated arthritic patients excluded from the study included patients who required other forms of intervention due to the following associated conditions: large meniscal bucket handle tears, inflammatory or infectious arthritis, more than 5 degrees of varus or valgus deformity, previous major knee trauma, or Grade 4 arthritis in 2 or more compartments.

- 5.2.1.6.1.1 Therefore, arthroscopic debridement and/or lavage are not recommended for patients with arthritic findings and continual pain and functional deficits unless there is meniscal or cruciate pathology. Refer to the specific conditions in this Section 5.0, for specific diagnostic recommendations.
- 5.2.1.6.2 Osteotomy and joint replacement are indicated when conservative treatment, including active participation in non-operative treatment has failed to result insufficient functional improvement (Refer to Section 7, Subsections regarding Knee Arthroplasty and Osteotomy). Tibial osteotomy is a choice for younger patients with unicompartmental disease who have failed conservative therapy.
- 5.2.1.6.3 In cases where surgery is contraindicated due to obesity, it may be appropriate to recommend a weight loss program if the patient is unsuccessful losing weight on their own. Coverage for weight loss would continue only for motivated patients who have demonstrated continual progress with weight loss.
- 5.2.1.6.4 Prior to surgical intervention, the patient and treating physician should identify functional operative goals and the likelihood of achieving improved ability to perform activities of daily living or work activities and the patient should agree to comply with the pre- and post-operative treatment plan including home exercise. The provider should be especially careful to make sure the patient understands the amount of post-operative therapy required and the length of partial- and full-disability expected post-operatively.
- 5.2.1.6.5 Because smokers have a higher risk of non-union and post-operative costs, it is recommended that carriers cover a smoking cessation program peri-operatively. Physicians may monitor smoking cessation with laboratory tests such as cotinine levels for long-term cessation.
- 5.2.1.7 **Operative Procedures:** Total or compartmental joint replacement, and osteotomy. Free-floating interpositional unicompartmental replacement is not recommended for any patients due to high revision rate at 2 years and less than optimal pain relief.
- 5.2.1.8 **Post-operative Treatment:**
 - 5.2.1.8.1 An individualized rehabilitation program based upon communication between the surgeon and therapist and using the treatments found in Section 6.0, Therapeutic Procedures, Non-operative. In all cases, communication between the physician and therapist is important to the timing of weight-bearing and exercise progressions.
 - 5.2.1.8.2 Refer also to Section 7.0, subsections Knee Arthroplasty, or Osteotomy as appropriate.
 - 5.2.1.8.3 Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.
- 5.2.2 **Anterior Cruciate Ligament (ACL) Injury:**
 - 5.2.2.1 **Description/Definition:** Rupture or partial rupture of the anterior cruciate ligament; may be associated with other internal derangement of the knee.
 - 5.2.2.2 **Occupational Relationship:** May be caused by virtually any traumatic force to the knee but most often caused by a twisting or a hyperextension force, with a valgus stress. The foot is usually planted and the patient frequently experiences a “popping” feeling.
 - 5.2.2.3 **Specific Physical Exam Findings:** Findings on physical exam include effusion or hemarthrosis, instability, positive Lachman’s test, positive pivot shift test, and positive anterior drawer test.
 - 5.2.2.4 **Diagnostic Testing Procedures:** MRI. Radiographs may show avulsed portion of tibial spine but this is a rare finding.
 - 5.2.2.5 **Non-operative Treatment Procedures:**
 - 5.2.2.5.1 Initial Treatment: Acute injuries may require immobilization followed by active therapy with or without passive therapy.
 - 5.2.2.5.2 Medications such as analgesics and anti-inflammatories may be helpful. Refer to Section 6.0, subsection, Medications and Medical Management.

- 5.2.2.5.3 Patient education should include instruction in self-management techniques, ergonomics, body mechanics, home exercise, joint protection, and weight management.
- 5.2.2.5.4 Benefits may be achieved through therapeutic rehabilitation and rehabilitation interventions. They should include range-of-motion (ROM), active therapies, and a home exercise program. Active therapies include proprioception training, restoring normal joint mechanics, and clearing dysfunctions from distal and proximal structures bracing may be beneficial. Passive as well as active therapies may be used for control of pain and swelling. Therapy should progress to strengthening and an independent home exercise program targeted to further improve ROM, strength, and normal joint mechanics influenced by structures distal and proximal to the knee (Refer to Section 6.0, Therapeutic Procedures, Non-operative). Passive modalities are most effective as adjunctive treatments to improve the results of active treatment. They may be used as found in Section 6.0, Therapeutic Procedures, Non-operative.
 - 5.2.2.5.4.1 There is no evidence that any particular exercise regime is better for ACL injuries in combination with collateral or meniscus injuries. There is no evidence that knee bracing for non-operated ACL improves outcomes although patients may feel that they have greater stability. Non-surgical treatment may provide acceptable results in some patients.
- 5.2.2.5.5 Return to work with appropriate restrictions should be considered early in the course of treatment. Refer to Section 6.0, subsection Return to Work.
- 5.2.2.5.6 Other therapies in Section 6.0, Therapeutic Procedures, Non-operative may be employed in individual cases.
- 5.2.2.6 **Surgical Indications/Considerations:** any individual with complaints of recurrent instability interfering with function and physical findings with imaging consistent with an ACL injury.
 - 5.2.2.6.1 Prior to surgical intervention, the patient and treating physician should identify functional operative goals and the likelihood of achieving improved ability to perform activities of daily living or work activities and the patient should agree to comply with the pre- and post-operative treatment plan including home exercise. The provider should be especially careful to make sure the patient understands the amount of post-operative therapy required and the length of partial- and full-disability expected post-operatively.
 - 5.2.2.6.2 Smoking may affect soft tissue healing through tissue hypoxia. Patients should be strongly encouraged to stop smoking and be provided with appropriate counseling by the physician.
- 5.2.2.7 **Operative Procedures:**

Diagnostic/surgical arthroscopy followed by ACL reconstruction using autograft or allograft. If meniscus repair is performed, an ACL repair should be performed concurrently.

 - 5.2.2.7.1 Patients tend to have more pain associated with patellar grafts while patients with hamstring replacement seem to have an easier rehabilitation. Choice of graft is made by the surgeon and patient on an individual basis.
- 5.2.2.8 **Post-operative Treatment:**
 - 5.2.2.8.1 An individualized rehabilitation program based upon communication between the surgeon and the therapist and using therapies as outlined in Section 6.0, Therapeutic Procedures, Non-operative.
 - 5.2.2.8.2 Treatment may include the following: active therapy with or without passive therapy and bracing. Early active extension does not cause increased laxity at 2 years.
 - 5.2.2.8.3 Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.
- 5.2.3 **Bursitis of the Lower Extremity:**
 - 5.2.3.1 **Description/Definition:** Inflammation of bursa tissue. Bursitis can be precipitated by tendonitis, bone spurs, foreign bodies, gout, arthritis, muscle tears, or infection.
 - 5.2.3.2 **Occupational Relationship:** Usually from soft tissue trauma, contusion, or physical activities of the job such as sustained direct compression force, or other repetitive forceful activities affecting the knee.
 - 5.2.3.3 **Specific Physical Exam Findings:** Palpable, tender and enlarged bursa, decreased ROM, warmth. The patient may have increased pain with ROM.
 - 5.2.3.4 **Diagnostic Testing Procedures:** Lab work may be done to rule out inflammatory disease. Bursal fluid aspiration with testing for connective tissue, rheumatic disease, and infection may be necessary. Radiographs, CT, MRI are rarely indicated.
 - 5.2.3.5 **Non-operative Treatment Procedures:**

- 5.2.3.5.1 Initial Treatment: Diagnostic/therapeutic aspiration, ice, therapeutic injection, treatment of an underlying infection, if present. Aspirations may be repeated as clinically indicated.
- 5.2.3.5.2 Medications such as analgesics and anti-inflammatories may be helpful. Refer to medication discussions in Section 6.0, Medications and Medical Management.
- 5.2.3.5.3 Patient education should include instruction in self-management techniques, ergonomics, body mechanics, home exercise, joint protection, and weight management.
- 5.2.3.5.4 Benefits may be achieved through therapeutic rehabilitation and rehabilitation interventions. They should include range of motion (ROM), active therapies, including a home exercise program. Active therapies include, proprioception training, restoring normal joint mechanics, and clearing dysfunctions from distal and proximal joints. Passive as well as active therapies may be used for control of pain and swelling. Therapy should progress to strengthening and an independent home exercise program targeted to further improve ROM, strength, and normal joint mechanics influenced by structures distal and proximal to the knee. Refer to Section 6.0, Therapeutic Procedures, Non-operative.
 - 5.2.3.5.4.1 Passive modalities are most effective as adjunctive treatments to improve the results of active treatment. They may be used as found as adjunctive in Section 6.0, Therapeutic Procedures, Non-operative.
- 5.2.3.5.5 Steroid Injections: Steroid injections may decrease inflammation and allow the therapist to progress with functional exercise and ROM.
 - 5.2.3.5.5.1 Time to Produce Effect: One injection.
 - 5.2.3.5.5.2 Maximum Duration: 3 injections in one year spaced at least 4 to 8 weeks apart.
 - 5.2.3.5.5.3 Steroid injections should be used cautiously in diabetic patients. Diabetic patients should be reminded to check their blood glucose levels at least daily for 2 weeks after injections.
- 5.2.3.5.6 Return to work with appropriate restrictions should be considered early in the course of treatment. Refer to Section 6.0. subsection Return to Work.
- 5.2.3.5.7 Other therapies in Section 6.0, Therapeutic Procedures, Non-operative may be employed in individual cases.

5.2.3.6 **Surgical indications/Considerations:**

- 5.2.3.6.1 Failure of conservative therapy.
- 5.2.3.6.2 Prior to surgical intervention, the patient and treating physician should identify functional operative goals and the likelihood of achieving improved ability to perform activities of daily living or work activities and the patient should agree to comply with the pre- and post-operative treatment plan including home exercise. The provider should be especially careful to make sure the patient understands the amount of post-operative therapy required and the length of partial- and full-disability expected post-operatively.
- 5.2.3.6.3 Smoking may affect soft tissue healing through tissue hypoxia. Patients should be strongly encouraged to stop smoking and be provided with appropriate counseling by the physician.

5.2.3.7 **Operative Procedures:** Surgical excision of the bursa.

5.2.3.8 **Post-operative Treatment:**

- 5.2.3.8.1 An individualized rehabilitation program based upon communication between the surgeon and the therapist and using the therapies as outlined in Section 6.0, Therapeutic Procedures, Non-operative.
- 5.2.3.8.2 Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.

5.2.4 **Chondral and Osteochondral Defects:**

5.2.4.1 **Description/Definition:** Cartilage or cartilage and bone defect at the articular surface of a joint. Deficits may be identified in up to 60% of arthroscopies; however, only around 30% of these lesions are isolated deficits and even fewer are Grade III or IV deficits which might qualify for cartilage grafts.

5.2.4.1.1 Defects in cartilage and bone are common at the femoral condyles and patella. The Outerbridge classification grades these defects according to their size and depth.

5.2.4.1.1.1 Grade 0: normal cartilage.

5.2.4.1.1.2 Grade I: softening and swelling of cartilage.

5.2.4.1.1.3 Grade II: partial thickness defects with surface fissures that do not exceed .5 cm in diameter and do not reach subchondral bone.

- 5.2.4.1.1.4 Grade III: fissuring that reaches subchondral bone in an area with a diameter greater than 1.5 cm.
- 5.2.4.1.1.5 Grade IV: exposed subchondral bone.
- 5.2.4.2 **Occupational Relationship:** Typically caused by a traumatic knee injury. Chondral deficits can also be present secondary to osteoarthritis.
- 5.2.4.3 **Specific Physical Exam Findings:** Knee effusion, joint line tenderness.
- 5.2.4.4 **Diagnostic Testing Procedures:** MRI may show bone bruising, osteochondral lesion, or possibly articular cartilage injury. Radiographs, contrast radiography, CT may also be used. Diagnostic arthroscopy may be performed when surgical indications as stated in Section VI are met.
- 5.2.4.5 **Non-operative Treatment Procedures:**
 - 5.2.4.5.1 Initial Treatment: Non-operative treatment may be indicated for chondral lesions associated with 1) degenerative changes, refer to aggravated osteoarthritis (Section 5.0); 2) other knee lesions not requiring surgery (refer to Specific Diagnosis); and/or 3) non-displaced stable lesions. Acute injuries may require immobilization followed by active therapy with or without passive therapy.
 - 5.2.4.5.2 Medications such as analgesics and anti-inflammatories may be helpful. Refer to medication discussions in Section 6.0, Medications and Medical Management.
 - 5.2.4.5.3 Patient education should include instruction in self-management techniques, ergonomics, body mechanics, home exercise, joint protection, and weight management.
 - 5.2.4.5.4 Benefits may be achieved through therapeutic rehabilitation and rehabilitation interventions. They should include range of motion (ROM), active therapies, and a home exercise program. Active therapies include, proprioception training, restoring normal joint mechanics, and clearing dysfunctions from distal and proximal structures. Passive as well as active therapies may be used for control of pain and swelling. Therapy should progress to strengthening and an independent home exercise program targeted to further improve ROM, strength, and normal joint mechanics influenced by structures distal and proximal to the knee. Refer to Section 6.0, Therapeutic Procedures, Non-operative.
 - 5.2.4.5.4.1 Passive modalities are most effective as adjunctive treatments to improve the results of active treatment. They may be used as found in Section 6.0, Therapeutic Procedures, Non-operative.
 - 5.2.4.5.5 Return to work with appropriate restrictions should be considered early in the course of treatment. Refer to Section 6.0, Return to Work.
 - 5.2.4.5.6 Other therapies in Section 6.0, Therapeutic Procedures, Non-operative may be employed in individual cases.
- 5.2.4.6 **Surgical Indications/Considerations:** Surgery for isolated chondral defects may be indicated when functional deficits interfere with activities of daily living and/or job duties after 6 to 12 weeks of active patient participation in non-operative therapy. Identification of the lesion should have been accomplished by diagnostic testing procedures which describe the size of the lesion and stability of the joint. If a lesion is detached or has fluid underlying the bone on MRI, surgery may be necessary before a trial of conservative therapy is completed. Early surgery may consist of fixation or microfracture.
 - 5.2.4.6.1 Microfractures: Normally the first line of surgical treatment.
 - 5.2.4.6.1.1 Indications: An isolated small full thickness articular chondral defect with normal joint space, when the patient has not recovered functionally after active participation in therapy. Patients 45 or younger are likely to have better results.
 - 5.2.4.6.2 Osteochondral Autograft Transfer System (OATS)
 - 5.2.4.6.2.1 Indications: The knee must be stable with intact ligaments and menisci, normal joint space and a large full thickness defect less than 3 square cm and 1 cm depth. They should be 45 or younger, with a BMI less than 35, and engaged in athletics and/or an equally physically demanding occupation. Surgery may be indicated when functional deficits interfere with activities of daily living and/or job duties after 6 to 12 weeks of active patient participation in non-operative therapy. This procedure may be appropriate in a small subset of patients and requires prior authorization.
 - 5.2.4.6.3 Autologous chondrocyte implantation (ACI): These procedures are technically difficult and require specific physician expertise. Cartilage transplantation requires the harvesting and growth of patients' cartilage cells in a highly specialized lab and incurs significant laboratory charges. There is some evidence that transplants and microfractures do not differ on long-

term effects. There is some evidence that autologous chondrocyte implantation is not better than microfracture 5 years after surgery in patients younger than 45 presenting with Grade III–IV lesions. This procedure is controversial but may be appropriate in a small subset of patients with physically rigorous employment or recreational activities. It requires prior authorization.

- 5.2.4.6.3.1 **Indications:** The area of the lesion should be between 2 square cm and 10 square cm. The patient should have failed 4 or more months of active participation in therapy and a microfracture, abrasion, arthroplasty or drilling with sufficient healing time, which may be from 4 months to over one year. The knee must be stable with intact ligaments and meniscus, and normal joint space. Patients should be 45 or younger, with a BMI less than 35, and engaged in athletics and/or an equally physically demanding occupation.
- 5.2.4.6.4 **Contraindications:** General contraindications for grafts and transplants are individuals with obesity, inflammatory or osteoarthritis with multiple chondral defects, associated ligamentous or meniscus pathology, or who are older than 55 years of age.
- 5.2.4.6.5 Prior to either graft or implantation intervention the patient and treating physician should identify functional operative goals and the likelihood of achieving improved ability to perform activities of daily living or work activities and the patient should agree to comply with the pre- and post-operative treatment plan including home exercise. The provider should be especially careful to make sure the patient understands the amount of post-operative therapy required and the length of partial and full disability expected post-operatively.
- 5.2.4.6.6 Smoking may affect soft tissue healing through tissue hypoxia. Patients should be strongly encouraged to stop smoking and be provided with appropriate counseling by the physician.
- 5.2.4.7 **Operative Procedures:** Arthroscopy with debridement or shaving of cartilage, microfracture, drilling, abrasion arthroplasty, mosaicplasty or osteochondral autograft (OATS), fixation of loose osteochondral fragments and autologous chondrocyte implantation (ACI).
- 5.2.4.7.1 Radiofrequency treatment is not recommended.
- 5.2.4.8 **Post-operative Treatment:**
 - 5.2.4.8.1 An individualized rehabilitation program based upon communication between the surgeon and the therapist and using therapies as outlined in Section 6.0, Therapeutic Procedures, Non-operative. In all cases, communication between the physician and therapist is important to the timing of weight-bearing and exercise progressions.
 - 5.2.4.8.2 Treatment may include the following: restricted weight-bearing, bracing, active therapy with or without passive therapy. Full weight-bearing usually occurs by or before 8 weeks.
 - 5.2.4.8.3 Continuous passive motion may be used after chondral procedures.
 - 5.2.4.8.4 Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon. Return to full-duty usually occurs by between four and six months.
- 5.2.5 **Collateral Ligament Pathology:**
 - 5.2.5.1 **Description/Definition:** Strain or tear of medial or lateral collateral ligaments which provide some stabilization for the knee.
 - 5.2.5.2 **Occupational Relationship:** Typically a result of forced abduction and external rotation to an extended or slightly flexed knee.
 - 5.2.5.3 **Specific Physical Exam Findings:** Swelling or ecchymosis over the collateral ligaments and increased laxity or pain with applied stress.
 - 5.2.5.4 **Diagnostic Testing Procedures:** X-rays to rule out fracture. Imaging is more commonly ordered when internal derangement is suspected.
 - 5.2.5.5 **Non-operative Treatment Procedures:**
 - 5.2.5.5.1 Initial Treatment: braces, ice, and protected weight-bearing.
 - 5.2.5.5.2 Medications such as analgesics and anti-inflammatories may be helpful. Refer to medication discussions area in Section 6.0, Medications and Medical Management.
 - 5.2.5.5.3 Patient education should include instruction in self-management techniques, ergonomics, body mechanics, home exercise, joint protection, and weight management.
 - 5.2.5.5.4 Benefits may be achieved through therapeutic rehabilitation and rehabilitation interventions. They should include range of motion (ROM), active therapies, and a home exercise program. Active therapies include proprioception training, restoring normal joint mechanics, and clearing dysfunctions from distal and proximal structures. Bracing may be beneficial. Passive as well as active therapies may be used for control of pain and swelling. Therapy should progress to

strengthening and an independent home exercise program targeted to further improve ROM, strength, and normal joint mechanics influenced by structures distal and proximal to the knee. Refer to Section 6.0 Therapeutic Procedures, Non-operative.

- 5.2.5.5.4.1 ~~Passive modalities are most effective as adjunctive treatments to improve the results of active treatment. They may be used as found in Section 6.0 Therapeutic Procedures, Non-operative.~~
- 5.2.5.5.5 ~~Return to work with appropriate restrictions should be considered early in the course of treatment. Refer to Section 6.0, Return to Work.~~
- 5.2.5.5.6 ~~Other therapies in Section 6.0, Therapeutic Procedures, Non-operative may be employed in individual cases.~~
- 5.2.5.6 **Surgical Indications/Considerations:** ~~Surgery is rarely necessary except when functional instability persists after active participation in non-operative treatment or indications for surgery exist due to other accompanying injuries.~~
 - 5.2.5.6.1 ~~Prior to surgical intervention, the patient and treating physician should identify functional operative goals and the likelihood of achieving improved ability to perform activities of daily living or work activities and the patient should agree to comply with the pre- and post-operative treatment plan including home exercise. The provider should be especially careful to make sure the patient understands the amount of post-operative therapy required and the length of partial- and full-disability expected post-operatively.~~
 - 5.2.5.6.2 ~~Smoking may affect soft tissue healing through tissue hypoxia. Patients should be strongly encouraged to stop smoking and be provided with appropriate counseling by the physician.~~
- 5.2.5.7 **Operative Procedures:** ~~Surgical repair.~~
- 5.2.5.8 **Post-operative Treatment:**
 - 5.2.5.8.1 ~~An individualized rehabilitation program based upon communication between the surgeon and the therapist and using procedures as outlined in Section 6.0, Therapeutic Procedures, Non-operative.~~
 - 5.2.5.8.2 ~~Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.~~
- 5.2.6 **Meniscus Injury:**
 - 5.2.6.1 **Description/Definition:** ~~A tear, disruption, or avulsion of medial or lateral meniscus tissue. Locking of the knee or clicking is frequently reported. Patients may describe a popping, tearing, or catching sensation followed by stiffness.~~
 - 5.2.6.2 **Occupational Relationship:** ~~Usually, trauma to the menisci stems from rotational shearing, torsion, and/or impact injuries while in a flexed position.~~
 - 5.2.6.3 **Specific Physical Exam Findings:** ~~Joint line tenderness, Positive McMurray's test locked joint, or occasionally, effusion. The presence of joint line tenderness has a sensitivity of 85% and a specificity of 31%. The Apley's compression test is also used.~~
 - 5.2.6.4 **Diagnostic Testing Procedures:** ~~Radiographs including standing Posterior/Anterior (PA), lateral, tunnel, and skyline views. MRI is the definitive imaging test. MRI is sensitive and specific for meniscal tear. However, meniscal MRI is frequently abnormal in asymptomatic injuries. In one study of volunteers without a history of knee pain, swelling, locking, giving way, or any knee injury, 16% of the volunteers had MRI-evident meniscal tears; among volunteers older than 45, 36% had MRI-evident meniscal tears. Therefore, clinical correlation with history and physical exam findings specific for meniscus injury is critically important.~~
 - 5.2.6.4.1 ~~Providers planning treatment should therefore consider the patient's complaints and presence of arthritis on MRI carefully, knowing that not all meniscus tears in the middle-aged and older population are related to the patients' complaints of pain.~~
 - 5.2.6.4.2 ~~MRI arthrograms are used to diagnose recurrent meniscal tears particularly after previous surgery.~~
 - 5.2.6.5 **Non-operative Treatment:-**
 - 5.2.6.5.1 ~~Initial Treatment: ice, bracing, and protected weight-bearing.~~
 - 5.2.6.5.2 ~~Medications such as analgesics and anti-inflammatories may be helpful. Refer to medication discussions in Section 6.0, Medications and Medical Management.~~
 - 5.2.6.5.3 ~~Patient education should include instruction in self-management techniques, ergonomics, body mechanics, home exercise, joint protection, and weight management.~~

- 5.2.6.5.4 Benefits may be achieved through therapeutic rehabilitation and rehabilitation interventions. They should include range of motion (ROM), active therapies, and a home exercise program. Active therapies include, proprioception training, restoring normal joint mechanics, and clearing dysfunctions from distal and proximal structures. Passive as well as active therapies may be used for control of pain and swelling. Therapy should progress to strengthening and an independent home exercise program targeted to further improve ROM, strength, and normal joint mechanics influenced by structures distal and proximal to the knee. Refer to Section 6.0 Therapeutic Procedures, Non-operative.
- 5.2.6.5.4.1 Passive modalities are most effective as adjunctive treatments to improve the results of active treatment. They may be used as found as adjunctive in Section 6.0, Therapeutic Procedures, Non-operative.
- 5.2.6.5.5 Return to work with appropriate restrictions should be considered early in the course of treatment. Refer to Section 6.0, Return to Work Subsection.
- 5.2.6.5.6 Other therapies in Section 6.0, Therapeutic Procedures, Non-operative may be employed in individual cases.
- 5.2.6.6 **Surgical Indications/Considerations:** 1. Locked or blocked knee precluding active therapy; 2. Isolated acute meniscus tear with appropriate physical exam findings; 3. Meniscus pathology combined with osteoarthritis in a patient with functional deficits interfering with activities of daily living and/or job duties after 6 to 12 weeks of active patient participation in non-operative therapy.
- 5.2.6.6.1 It is not clear that partial meniscectomy for a chronic degenerative meniscal tear is beneficial. Middle aged patients may do as well without arthroscopy and with therapy.
- 5.2.6.6.2 Meniscal allograft should only be performed on patients between 20 and 45 with an otherwise stable knee, previous meniscectomy with 2/3 removed, lack of function despite active therapy, BMI less than 35, and sufficient joint surface to support repair.
- 5.2.6.6.3 Medial collagen meniscus implants are considered experimental and not generally recommended. No studies have been done to compare this procedure to medial meniscus repair. There is some evidence to support the fact that collagen meniscal implant may slightly improve function and decrease risk of reoperation in patients with previous medial meniscal surgery. It remains unclear as to the extent that the procedure may decrease future degenerative disease. The procedure can only be considered for individuals with previous medial meniscal surgery and intact meniscus rim; without lateral meniscus lesions or Grade 4 Outerbridge lesions; and who need to return to heavy physical labor employment or demanding recreational activities. A second concurring opinion from an orthopedic surgeon specializing in knee surgery and prior authorization is required. Full weight-bearing is not allowed for 6 weeks and most patients return to normal daily activity after 3 months.
- 5.2.6.6.4 Prior to surgical intervention, the patient and treating physician should identify functional operative goals and the likelihood of achieving improved ability to perform activities of daily living or work activities and the patient should agree to comply with the pre- and post-operative treatment plan including home exercise. The provider should be especially careful to make sure the patient understands the amount of post-operative therapy required and the length of partial- and full-disability expected post-operatively.
- 5.2.6.6.5 Smoking may affect soft tissue healing through tissue hypoxia. Patients should be strongly encouraged to stop smoking and be provided with appropriate counseling by the physician.
- 5.2.6.7 **Operative Treatment:** Repair of meniscus, partial or complete excision of meniscus or meniscus allograft or implant. Debridement of the meniscus is not recommended in patients with severe arthritis as it is unlikely to alleviate symptoms. Complete excision of meniscus should only be performed when clearly indicated due to the long-term risk of arthritis in these patients. Partial meniscectomy or meniscus repair is preferred to total meniscectomy due to easier recovery, less instability, and short-term functional gains.
- 5.2.6.8 **Post-operative Treatment:**
- 5.2.6.8.1 An individualized rehabilitation program based upon communication between the surgeon and the therapist using the treatments found in Section 6.0, Therapeutic Procedures, Non-operative.
- 5.2.6.8.2 Treatment may include the following: Passive therapy progressively moving toward active therapy, bracing, cryotherapy and other treatments found in Section 6.0.
- 5.2.6.8.3 Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.

5.2.7 Patellar Fracture:

- 5.2.7.1 **Description/Definition:** Fracture of the patella.
- 5.2.7.2 **Occupational Relationship:** Usually from a traumatic injury such as a fall or direct blow.
- 5.2.7.3 **Specific Physical Exam Findings:** Significant hemarthrosis/effusion usually present. Extension may be limited and may indicate disruption of the extensor mechanism. It is essential to rule out open fractures; therefore a thorough search for lacerations is important.
- 5.2.7.4 **Diagnostic Testing Procedures:** Aspiration of the joint and injection of local anesthetic may aid the diagnosis. A saline load injected in the joint can also help rule out an open joint injury. Radiographs may be performed, including tangential (sunrise) or axial views and x-ray of the opposite knee in many cases. CT or MRI is rarely needed.
- 5.2.7.5 **Non-operative Treatment Procedures:**
- 5.2.7.5.1 Initial Treatment: For non-displaced closed fractures, protected weight bearing and splinting for 4 to 6 weeks. Hinged knee braces can be used. When radiographs demonstrate consolidation, active motion and strengthening exercise may begin.
 - 5.2.7.5.2 Medications such as analgesics and anti-inflammatories may be helpful. Refer to medication discussions in Section 6.0, Medications and Medical Management.
 - 5.2.7.5.3 Patient education should include instruction in self-management techniques, ergonomics, body mechanics, home exercise, joint protection, and weight management.
 - 5.2.7.5.4 Refer to comments related to osteoporosis in Section 6.0, Therapeutic Procedures, Non-operative, Osteoporosis Management.
 - 5.2.7.5.5 Smoking may affect fracture healing. Patients should be strongly encouraged to stop smoking and be provided with appropriate counseling by the physician.
 - 5.2.7.5.6 Benefits may be achieved through therapeutic rehabilitation and rehabilitation interventions, after bony union has been achieved. They should include bracing then range-of-motion (ROM), active therapies including proprioception training, restoring normal joint mechanics, and clearing dysfunctions from adjacent structures, and a home exercise program. Passive as well as active therapies may be used for control of pain and swelling. Therapy should progress to strengthening and an independent home exercise program targeted to further improve ROM, strength, restoring normal joint mechanics, influenced by proximal and distal structures. Therapy should include training on the use of adaptive equipment and home and work site evaluations when appropriate. Bracing may be appropriate. Refer to Section 6.0, Therapeutic Procedures, Non-operative.
 - 5.2.7.5.6.1 Passive modalities are most effective as adjunctive treatments to improve the results of active treatment. They may be used as found as adjunctive in Section 6.0, Therapeutic Procedures, Non-operative.
 - 5.2.7.5.7 Return to work with appropriate restrictions should be considered early in the course of treatment. Refer to Section 6.0, Return to Work.
 - 5.2.7.5.8 Other therapies in Section 6.0, Therapeutic Procedures, Non-Operative may be employed in individual cases.
- 5.2.7.6 **Surgical Indications/Considerations:** Open fractures require immediate intervention and may need repeat debridement. Internal fixation is usually required for comminuted or displaced fractures. Non-union may also require surgery.
- 5.2.7.6.1 Because smokers have a higher risk of non-union and post-operative costs, it is recommended that insurers cover a smoking cessation program peri-operatively. Physicians may monitor smoking cessation with laboratory tests such as cotinine levels for long-term cessation.
- 5.2.7.7 **Operative Procedures:** internal fixation; partial patellectomy or total patellectomy. Total patellectomy results in instability with running or stairs and significant loss of extensor strength. Therefore, this is usually a salvage procedure.
- 5.2.7.8 **Post-operative Treatment:**
- 5.2.7.8.1 An individualized rehabilitation program based upon communication between the surgeon and the therapist and using therapies as outlined in Section 6.0, Therapeutic Procedures, Non-operative. In all cases, communication between the physician and therapist is important to the timing of weight-bearing and exercise progressions. Continuous passive motion may be used post-operatively.

- 5.2.7.8.2 Treatment may include protected weight bearing and active therapy with or without passive therapy for early range of motion if joint involvement.
- 5.2.7.8.3 Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.
- 5.2.7.8.4 Hardware removal may be necessary after 3 to 6 months.

5.2.8 **Patellar Subluxation:**

- 5.2.8.1 **Description/Definition:** Incomplete subluxation or dislocation of the patella. Recurrent episodes can lead to subluxation syndrome that can cause frank dislocation of the patella. Patient may report a buckling sensation, pain with extension, or a locking of the knee with exertion.
- 5.2.8.2 **Occupational Relationship:** Primarily associated with a direct contact lateral force. Secondary causes associated with shearing forces on the patella.
- 5.2.8.3 **Specific Physical Exam Findings:** Lateral retinacular tightness with associated medial retinacular weakness, swelling, effusion, and marked pain with patellofemoral tracking/compression and glides. In addition, other findings may include atrophy of muscles, positive patellar apprehension test, and patella alta.
- 5.2.8.4 **Diagnostic Testing Procedures:** CT or Radiographs including Merchant views, Q-angle, and MRI for loose bodies.
- 5.2.8.5 **Non-operative Treatment Procedures:**
 - 5.2.8.5.1 Initial Treatment: Reduction if necessary, ice, taping, and bracing followed by active therapy.
 - 5.2.8.5.2 Medications such as analgesics and anti-inflammatories may be helpful. Refer to medication discussions in Section 6.0, Medications and Medical Management.
 - 5.2.8.5.3 Patient education should include instruction in self-management techniques, ergonomics, body mechanics, home exercise, joint protection, and weight management.
 - 5.2.8.5.4 Benefits may be achieved through therapeutic rehabilitation and rehabilitation interventions. They should include range of motion (ROM), active therapies, and a home exercise program. Active therapies include, proprioception training, restoring normal joint mechanics, and clearing dysfunctions from distal and proximal structures. Taping the patella or bracing may be beneficial. Passive as well as active therapies can be used for control of pain and swelling. Therapy should progress to strengthening and an independent home exercise program targeted to further improve ROM, strength, and normal joint mechanics influenced by structures distal and proximal to the knee. Specific strengthening should be done to optimize patellofemoral mechanics and address distal foot mechanics that influence the patellofemoral joint. Refer to Section 6.0, Therapeutic Procedures, Non-operative.
 - 5.2.8.5.4.1 Passive modalities are most effective as adjunctive treatments to improve the results of active treatment. They may be used as found in Section 6.0, Therapeutic Procedures, Non-operative.
 - 5.2.8.5.5 Return to work with appropriate restrictions should be considered early in the course of treatment. Refer to Section 6.0, Return to Work.
 - 5.2.8.5.6 Other therapies in Section 6.0, Therapeutic Procedures, Non-operative may be employed in individual cases.
- 5.2.8.6 **Surgical Indications/Considerations:**
 - 5.2.8.6.1 Fracture, loose bodies, and recurrent dislocation. Surgical repair of first-time dislocation in young adults generally is not recommended. Retinacular release, quadriceps reefing, and patellar tendon transfer should only be considered for subluxation after 4 to 6 months of active patient participation in non-operative treatment.
 - 5.2.8.6.2 Prior to surgical intervention, the patient and treating physician should identify functional operative goals and the likelihood of achieving improved ability to perform activities of daily living or work activities and the patient should agree to comply with the pre- and post-operative treatment plan including home exercise. The provider should be especially careful to make sure the patient understands the amount of post-operative therapy required and the length of partial- and full-disability expected post-operatively.
 - 5.2.8.6.3 Smoking may affect soft tissue healing through tissue hypoxia. Patients should be strongly encouraged to stop smoking and be provided with appropriate counseling by the physician.
- 5.2.8.7 **Operative Procedures:** arthroscopy with possible arthrotomy; debridement of soft tissue and articular cartilage disruption; open reduction internal fixation with fracture; retinacular release,

quadriceps reefing, and patellar tendon or lateral release with or without medial soft tissue realignment.

5.2.8.8 Post-operative Treatment:

5.2.8.8.1 Individualized rehabilitation program based upon communication between the surgeon and the therapist using the treatments found in Section 6.0, Therapeutic Procedures, Non-operative.

5.2.8.8.2 Treatment may include active therapy with or without passive therapy, bracing.

5.2.8.8.3 Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.

5.2.9 Patellofemoral Pain Syndrome (aka Retropatellar Pain Syndrome):

5.2.9.1 **Description/Definition:** Patellofemoral pathologies are associated with resultant weakening, instability, and pain of the patellofemoral mechanism. Diagnoses can include patellofemoral chondromalacia, malalignment, persistent quadriceps tendonitis, distal patellar tendonitis, patellofemoral arthrosis, and symptomatic plica syndrome. Patient complains of pain, instability and tenderness that interfere with daily living and work functions such as sitting with bent knees, climbing stairs, squatting, running or cycling.

5.2.9.2 **Occupational Relationship:** Usually associated with contusion; repetitive patellar compressive forces; shearing articular injuries associated with subluxation or dislocation of patella, fractures, and/or infection.

5.2.9.3 **Specific Physical Exam Findings:** Findings on physical exam may include retinacular tenderness, pain with patellar compressive ranging, positive patellar glide test, atrophy of quadriceps muscles, positive patellar apprehensive test. Associated anatomical findings may include increased Q angle; ligament laxity, and effusion. Some studies suggest that the patellar tilt test (assessing the patella for medial tilt) and looking for active instability with the patient supine and knee flexed to 15 degrees and an isometric quad contraction, may be most useful for distinguishing normal from abnormal. Most patellar tests are more specific than sensitive.

5.2.9.4 **Diagnostic Testing Procedures:** Radiographs including tunnel view, axial view of patella at 30 degrees, lateral view and Merchant views. MRI rarely identifies pathology. Occasional CT or bone scans.

5.2.9.5 Non-operative Treatment Procedures:

5.2.9.5.1 Medications such as analgesics and anti-inflammatories may be helpful. Refer to medication discussions in Section 6.0, Medications and Medical Management.

5.2.9.5.2 Patient education should include instruction in self-management techniques, ergonomics, body mechanics, home exercise, joint protection, and weight management.

5.2.9.5.3 Benefits may be achieved through therapeutic rehabilitation and rehabilitation interventions. The program should include bracing and/or patellar taping, prone quad stretches, hip external rotation, balanced strengthening, range of motion (ROM), active therapies and a home exercise program. Active therapies include proprioception training, restoring normal joint mechanics, and clearing dysfunctions from distal and proximal structures. Passive as well as active therapies may be used for control of pain and swelling. Active therapeutic exercise appears to decrease pain; however, the expected functional benefits are unclear. Therapy should progress to strengthening and an independent home exercise program targeted to further improve ROM strength, and normal joint mechanics influenced by structures distal and proximal to the knee. Refer to Section 6.0, Therapeutic Procedures, Non-operative.

5.2.9.5.3.1 Passive modalities are most effective as adjunctive treatments to improve the results of active treatment. They may be used as found as adjunctive in Section 6.0, Therapeutic Procedures, Non-operative. Orthotics may be useful in some cases.

5.2.9.5.4 Knee pain, when associated with abnormal foot mechanics, may be favorably treated with appropriate orthotics.

5.2.9.5.4.1 There is some evidence that pre-fabricated commercially available foot orthotic devices are more beneficial for patients with patellofemoral pain syndrome than flat shoe inserts. They may produce mild side effects such as rubbing or blistering which can be reduced with additional empirical measures such as heat molding or addition, and removal of wedges and inserts until patient comfort is achieved. In some cases, custom semi-rigid or rigid orthotics is necessary to decrease pronation or ensure a proper fit.

- 5.2.9.5.5 Botulinum toxin injections for the relief of patellofemoral pain are considered experimental and are not recommended.
- 5.2.9.5.6 Steroid Injections:
 - 5.2.9.5.6.1 Steroid injections may decrease inflammation and allow the therapist to progress with functional exercise and ROM. Steroid injections under significant pressure should be avoided as the needle may be penetrating the tendon and injection into the tendon can cause possible tendon breakdown, tendon degeneration, or rupture. Injections near the patellar tendon should generally be avoided. Injections should be minimized for patients less than 30 years of age.
 - 5.2.9.5.6.2 Time to Produce Effect: One injection.
 - 5.2.9.5.6.3 Maximum Duration: 3 injections in one year spaced at least 4 to 8 weeks apart.
 - 5.2.9.5.6.4 Steroid injections should be used cautiously in diabetic patients. Diabetic patients should be reminded to check their blood glucose levels at least daily for 2 weeks after injections. The injection may be performed with or without ultrasound guidance. Ultrasound guided interventional procedures provides the ability to image soft tissues in real time and can improve safety and accuracy of needle placement. The use of ultrasound guided procedures will be at the discretion of the health care provider.
- 5.2.9.5.7 Extracorporeal Shock Wave Therapy (ESWT): There is no good research to support ESWT and therefore, it is not recommended.
- 5.2.9.5.8 Return to work with appropriate restrictions should be considered early in the course of treatment. Refer to Section 6.0, Return to Work.
- 5.2.9.5.9 Other therapies in Section 6.0, Therapeutic Procedures, Non-Operative may be employed in individual cases.
- 5.2.9.6 **Surgical Indications/Considerations:** patellar tendon disruption, quadriceps tendon rupture/ avulsion, fracture. There is no evidence that surgery is better than eccentric training for patellar tendonopathy of the inferior pole (jumper's knee).
 - 5.2.9.6.1 Retinacular release, quadriceps reefing, and tibial transfer procedures should only be considered after 4 to 6 months of active patient participation in non-operative treatment in young active patients. There is no evidence that arthroscopy for patellofemoral syndrome is more efficacious than exercise.
 - 5.2.9.6.2 Lateral release and reconstruction is not recommended for patellofemoral arthritis or middle aged adults.
 - 5.2.9.6.3 In cases of severe Grade III-IV isolated patellofemoral arthritis where walking, steps, and other functional activities are significantly impacted after adequate conservative treatment, prosthesis may be considered in those less than 55 years. A patellofemoral arthroplasty is generally contraindicated if there is patellofemoral instability or malalignment, tibiofemoral mechanical malalignment, fixed loss of knee motion (greater than 10 degrees extension or less than 110 degrees flexion), inflammatory arthritis, and other systemic related issues. For patellar resurfacing, refer to Section 7.0, Knee Arthroplasty.
 - 5.2.9.6.4 Prior to surgical intervention, the patient and treating physician should identify functional operative goals and the likelihood of achieving improved ability to perform activities of daily living or work activities and the patient should agree to comply with the pre- and post-operative treatment plan including home exercise. The provider should be especially careful to make sure the patient understands the amount of post-operative therapy required and the length of partial- and full-disability expected post-operatively.
 - 5.2.9.6.5 Smoking may affect soft tissue healing through tissue hypoxia. Patients should be strongly encouraged to stop smoking and be provided with appropriate counseling by the physician.
- 5.2.9.7 **Operative Procedures:** Arthroscopic debridement of articular surface, plica, synovial tissue, loose bodies; arthrotomy; open reduction internal fixation with fracture; patellar prosthesis with isolated Grade III-IV OA, and possible patellectomy for young active patients with isolated arthritis.
- 5.2.9.8 **Post-operative Treatment:**
 - 5.2.9.8.1 An individualized rehabilitation program based upon communication between the surgeon and the therapist and using therapies as outlined in Section 6.0, Therapeutic Procedures, Non-operative.
 - 5.2.9.8.2 Treatment may include active therapy with or without passive therapy; and bracing.
 - 5.2.9.8.3 Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.

5.2.10 **Posterior Cruciate Ligament (PCL) Injury:**

- 5.2.10.1 **Description/Definition:** Rupture of PCL. May be associated with concurrent ACL rupture or collateral ligament injury.
- 5.2.10.2 **Occupational Relationship:** Most often caused by a posterior force directed to flexed knee.
- 5.2.10.3 **Specific Physical Exam Findings:** Findings on physical exam include acute effusion, instability, reverse Lachman's test, reverse pivot shift, posterior drawer test.
- 5.2.10.4 **Diagnostic Testing Procedures:** MRI, radiographs including kneeling view, may reveal avulsed bone.
- 5.2.10.5 **Non-operative Treatment Procedures:**
 - 5.2.10.5.1 Initial Treatment: Ice, bracing, and protected weight-bearing followed by active therapy.
 - 5.2.10.5.2 Medications such as analgesics and anti-inflammatories may be helpful. Refer to medication discussions in Section 6.0, Medications and Medical Management.
 - 5.2.10.5.3 Patient education should include instruction in self-management techniques, ergonomics, body mechanics, home exercise, joint protection, and weight management.
 - 5.2.10.5.4 Benefits may be achieved through therapeutic rehabilitation and rehabilitation interventions. They should include bracing then range of motion (ROM), active therapies, and a home exercise program. Active therapies include proprioception training, restoring normal joint mechanics, and clearing dysfunctions from distal and proximal structures. Passive as well as active therapies may be used for control of pain and swelling. Therapy should progress to strengthening and an independent home exercise program targeted to further improve ROM, strength, and normal joint structures distal and proximal to the knee. Refer to Section 6.0, Therapeutic Procedures, Non-operative.
 - 5.2.10.5.4.1 Passive modalities are most effective as adjunctive treatments to improve the results of active treatment. They may be used as found in Section 6.0, Therapeutic Procedures, Non-operative.
 - 5.2.10.5.5 Return to work with appropriate restrictions should be considered early in the course of treatment. Refer to Section 6.0, Return to Work.
 - 5.2.10.5.6 Other therapies in Section 6.0, Therapeutic Procedures, Non-operative may be employed in individual cases.
- 5.2.10.6 **Surgical Indications/Considerations:**
 - 5.2.10.6.1 Carefully consider the patients' normal daily activity level before initiation of surgical intervention. Isolated Grade 1 instability does not require surgical intervention. Grades 2 or 3 may have surgical intervention if there remains demonstrable instability which interferes with athletic or work pursuits of the patient. In a second degree sprain there is significant posterior motion of the tibia on the femur in active testing. A third degree sprain demonstrates rotary instability due to medial or lateral structural damage. Surgery is most commonly done when the PCL rupture is accompanied by multi-ligament injury. Not recommended as an isolated procedure in patients over 50 with Grade 3 or 4 osteoarthritis.
 - 5.2.10.6.2 Prior to surgical intervention, the patient and treating physician should identify functional operative goals and the likelihood of achieving improved ability to perform activities of daily living or work activities and the patient should agree to comply with the pre- and post-operative treatment plan including home exercise. The provider should be especially careful to make sure the patient understands the amount of post-operative therapy required and the length of partial- and full-disability expected post-operatively.
 - 5.2.10.6.3 Smoking may affect soft tissue healing through tissue hypoxia. Patients should be strongly encouraged to stop smoking and be provided with appropriate counseling by the physician.
- 5.2.10.7 **Operative Procedures:** Autograft or allograft reconstruction.
- 5.2.10.8 **Post-operative Treatment:**
 - 5.2.10.8.1 An individualized rehabilitation program based upon communication between the surgeon/physician and the therapy provider and using therapies as outlined in Section 6.0, Therapeutic Procedures, Non-operative.
 - 5.2.10.8.2 Treatment may include active therapy with or without passive therapy, bracing.
 - 5.2.10.8.3 Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.

5.2.11 **Tendonopathy:**

- 5.2.11.1 **Description/Definition:** Inflammation of the lining of the tendon sheath or of the enclosed tendon. Usually occurs at the point of insertion into bone or a point of muscular origin. Can be associated with bursitis, calcium deposits, or systemic connective diseases.
- 5.2.11.2 **Occupational Relationship:** Usually from extreme or repetitive trauma, strain, or excessive unaccustomed exercise or work.
- 5.2.11.3 **Specific Physical Exam Findings:** Involved tendons may be visibly swollen with possible fluid accumulation and inflammation; popping or crepitus; and decreased ROM.
- 5.2.11.4 **Diagnostic Testing Procedures:** Lab work may be done to rule out inflammatory disease. Other tests are rarely indicated.
- 5.2.11.5 **Non-operative Treatment Procedures:**
 - 5.2.11.5.1 Initial Treatment: Ice, protected weight-bearing and/or restricted activity, possible taping and/or bracing.
 - 5.2.11.5.2 Medications such as analgesics and anti-inflammatories may be helpful. Refer to medication discussions in Section 6.0, Medications and Medical Management.
 - 5.2.11.5.3 Patient education should include instruction in self-management techniques, ergonomics, body mechanics, home exercise, joint protection, and weight management.
 - 5.2.11.5.4 Benefits may be achieved through therapeutic rehabilitation and rehabilitation interventions. They should include range-of-motion (ROM), active therapies, including a home exercise program. Active therapies include, proprioception training, restoring normal joint mechanics, and clearing dysfunctions from distal and proximal structures. Passive as well as active therapies may be used for control of pain and swelling. Therapy should progress to strengthening and an independent home exercise program targeted to further improve ROM, strength, and normal joint mechanics influenced by structures distal and proximal to the knee. Refer to Section 6.0, Therapeutic Procedures, Non-operative.
 - 5.2.11.5.4.1 Passive modalities are most effective as adjunctive treatments to improve the results of active treatment. They may be used as found as adjunctive in Section 6.0, Therapeutic Procedures, Non-operative.
 - 5.2.11.5.5 For isolated patellar tendonopathy, patellar tendon strapping or taping may be appropriate.
 - 5.2.11.5.6 Return to work with appropriate restrictions should be considered early in the course of treatment. Refer to Section 6.0, Return to Work.
 - 5.2.11.5.7 Other therapies in Section 6.0, Therapeutic Procedures, Non-operative may be employed in individual cases.
 - 5.2.11.5.8 Therapeutic Injections:-
 - 5.2.11.5.8.1 Steroid injections may decrease inflammation and allow the therapist to progress with functional exercise and ROM. Steroid injections under significant pressure should be avoided as the needle may be penetrating the tendon and injection into the tendon can cause possible tendon breakdown, tendon degeneration, or rupture. Injections should be minimized for patients less than 30 years of age.
 - 5.2.11.5.8.1.1 Time to Produce Effect: One injection.
 - 5.2.11.5.8.1.2 Maximum Duration: 3 injections in one year spaced at least 4 to 8 weeks apart.
 - 5.2.11.5.8.1.3 Steroid injections should be used cautiously in diabetic patients. Diabetic patients should be reminded to check their blood glucose levels at least daily for 2 weeks after injections. All injections may be performed with or without ultrasound guidance. Ultrasound guided interventional procedures provides the ability to image soft tissues in real time and can improve safety and accuracy of needle placement. The use of ultrasound guided procedures will be at the discretion of the health care provider.
- 5.2.11.6 **Surgical Indications/Considerations:-**
 - 5.2.11.6.1 Suspected avulsion fracture, or severe functional impairment unresponsive to a minimum of 4 months of active patient participation in non-operative treatment.
 - 5.2.11.6.2 Prior to surgical intervention, the patient and treating physician should identify functional operative goals and the likelihood of achieving improved ability to perform activities of daily living or work activities and the patient should agree to comply with the pre- and post-operative treatment plan including home exercise. The provider should be especially careful to make sure the patient understands the amount of post-operative therapy required and the length of partial- and full-disability expected post-operatively.

- 5.2.11.6.3 Smoking may affect soft tissue healing through tissue hypoxia. Patients should be strongly encouraged to stop smoking and be provided with appropriate counseling by the physician.
- 5.2.11.7 **Operative Procedures:** Tendon repair. Rarely indicated and only after extensive conservative therapy.
- 5.2.11.8 **Post-operative Treatment:**
 - 5.2.11.8.1 An individualized rehabilitation program based upon communication between the surgeon and the therapist and using therapies as outlined in Section 6.0, Therapeutic Procedures, Non-operative.
 - 5.2.11.8.2 Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.

5.3 HIP AND LEG

5.3.1 Acetabular Fracture:

- 5.3.1.1 **Description/Definition:** Subgroup of pelvic fractures with involvement of the hip articulation.
- 5.3.1.2 **Occupational Relationship:** Usually from a traumatic injury such as a fall or crush.
- 5.3.1.3 **Specific Physical Exam Findings:** Displaced fractures may have short and/or abnormally rotated lower extremity.
- 5.3.1.4 **Diagnostic Testing Procedures:** Radiographs, CT scanning.
- 5.3.1.5 **Non-operative Treatment Procedures:**
 - 5.3.1.5.1 Initial Treatment: Although surgery is frequently required, protected weight bearing may be considered for un-displaced fractures or minimally displaced fractures that do not involve the weight-bearing surface of the acetabular dome.
 - 5.3.1.5.2 Medications such as analgesics and anti-inflammatories may be helpful. Refer to medication discussions in Section 6.0, Medications and Medical Management.
 - 5.3.1.5.3 Patient education should include instruction in self-management techniques, ergonomics, body mechanics, home exercise, joint protection, and weight management.
 - 5.3.1.5.4 Refer to comments on osteoporosis in Section 5.0, Ankle Sprain/Fracture.
 - 5.3.1.5.5 Smoking may affect fracture healing. Patients should be strongly encouraged to stop smoking and be provided with appropriate counseling by the physician.
 - 5.3.1.5.6 Benefits may be achieved through therapeutic rehabilitation and rehabilitation interventions, after boney union has been achieved. They should include bracing then range-of-motion (ROM), active therapies, and a home exercise program. Active therapies include ambulation with appropriate assistive device, proprioception training, restoring normal joint mechanics, and clearing dysfunctions from adjacent structures. Passive as well as active therapies may be used for control of pain and swelling. Therapy should progress to strengthening and an independent home exercise program targeted to further improve ROM, strength, and normal joint mechanics influenced by proximal and distal structures. Therapy should include training on the use of adaptive equipment and home and work site evaluations when appropriate. Bracing may be appropriate. Refer to Section 6.0, Therapeutic Procedures, Non-operative.
 - 5.3.1.5.6.1 Passive modalities are most effective as adjunctive treatments to improve the results of active treatment. They may be used as found as adjunctive in Section 6.0, Therapeutic Procedures, Non-operative.
 - 5.3.1.5.7 Return to work with appropriate restrictions should be considered early in the course of treatment. Refer to Section 6.0, Return to Work.
 - 5.3.1.5.8 Other therapies in Section 6.0, Therapeutic Procedures, Non-operative may be employed in individual cases.
- 5.3.1.6 **Surgical Indications/Considerations:** Displaced or unstable fracture.
 - 5.3.1.6.1 Because smokers have a higher risk of non-union and post-operative costs, it is recommended that insurers cover a smoking cessation program peri-operatively. Physicians may monitor smoking cessation with laboratory tests such as cotinine levels for long-term cessation.
- 5.3.1.7 **Operative Procedures:** Usually open reduction and internal fixation or total hip replacement.
- 5.3.1.8 **Post-operative Treatment:**
 - 5.3.1.8.1 An individualized rehabilitation program based upon communication between the surgeon and the therapist, and using therapies as outlined in Section 6.0, Therapeutic Procedures, Non-operative. In all cases, communication between the physician and therapist is important to the timing of weight-bearing, and exercise progressions.

5.3.1.8.2 Treatment usually includes active therapy with or without passive therapy for early range of motion and weight bearing then progression to, strengthening, flexibility, neuromuscular training, and gait training with appropriate assistive devices.

5.3.1.8.3 Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.

5.3.2 **Aggravated Osteoarthritis:**

5.3.2.1 **Description/Definition:** hip pain with radiographic evidence of joint space narrowing or femoral acetabular osteophytes, and sedimentation rate less than 20mm/hr with symptoms. Patients usually have gradual onset of pain increasing with use and relieved with rest, progressing to morning stiffness and then to night pain.

5.3.2.2 **Other causative factors to consider:** Prior significant injury to the hip may predispose the joint to osteoarthritis. In order to entertain previous trauma as a cause, the patient should have a medically documented injury with radiographs or MRI showing the level of anatomic change. The prior injury should have been at least 2 years from the presentation for the new complaints and there should be a significant increase of pathology on the affected side in comparison to the original imaging or operative reports and/or the opposite un-injured side or extremity.

5.3.2.3 **Specific Physical Exam Findings:** Bilateral exam including knees and low back is necessary to rule out other diagnoses. Pain with the hip in external and/or internal hip rotation with the knee in extension is the strongest indicator.

5.3.2.4 **Diagnostic Testing Procedures:** standing pelvic radiographs demonstrating joint space narrowing to 2 mm or less, osteophytes or sclerosis at the joint. MRI may be ordered to rule out other more serious disease.

5.3.2.5 **Non-operative Treatment Procedures:**

5.3.2.5.1 Medications such as analgesics and anti-inflammatories may be helpful. Refer to medication discussions in Section 6.0, Medications and Medical Management.

5.3.2.5.2 Patient education should include instruction in self management techniques, ergonomics, body mechanics, home exercise, joint protection, and weight management. Patient education may also include videos, telephone, follow up, and pamphlets.

5.3.2.5.3 Benefits may be achieved through therapeutic rehabilitation and rehabilitation interventions. They should include range-of-motion (ROM), active therapies and a home exercise program. Active therapies include gait training with appropriate assistive devices, proprioception training restoring normal joint mechanics, and clearing dysfunctions from adjacent structures. Passive as well as active therapies may be used for control of pain and swelling. Therapy should progress to strengthening and an independent home exercise program targeted to further improve ROM, strength, and normal joint mechanics influenced by proximal and distal structures. Therapy should include training on the use of adaptive equipment and home and work site evaluations when appropriate. Refer to Section 6.0, Therapeutic Procedures, Non-operative. There is good evidence that a supervised therapeutic exercise program with an element of strengthening is an effective treatment for hip osteoarthritis.

5.3.2.5.3.1 Passive modalities are most effective as adjunctive treatments to improve the results of active treatment. They may be used as found as adjunctive in Section 6.0, Therapeutic Procedures, Non-operative. There is some evidence that manual therapy, including stretching and traction manipulation by a trained provider, produces functional improvement in hip osteoarthritis and may be a suitable treatment option.

5.3.2.5.3.1.1 Aquatic therapy may be used as a type of active intervention to improve muscle strength and range of motion when land-based therapy is not well tolerated.

5.3.2.5.3.1.2 The use of insoles, adaptive equipment, cane, may be beneficial.

5.3.2.5.3.1.3 There is some evidence that acupuncture may produce improvement in hip pain and function, making it a suitable treatment option for patients. Refer to Section 6.0, Therapeutic Procedures, Non-operative.

5.3.2.5.4 Steroid Injections—Steroid injections may decrease inflammation and allow the therapist to progress with functional exercise and ROM.

5.3.2.5.4.1 Time to Produce Effect: One injection.

5.3.2.5.4.2 Maximum Duration: 3 injections in one year spaced at least 4 to 8 weeks apart.

5.3.2.5.4.3 Steroid injections should be used cautiously in diabetic patients. Diabetic patients should be reminded to check their blood glucose levels at least daily for 2 weeks after injections. Injections may be performed with or without ultrasound guidance. Ultrasound guided

interventional procedure provides the ability to image soft tissues in real time and can improve safety and accuracy of needle placement. The use of ultrasound-guided procedures will be at the discretion of the health care provider.

5.3.2.5.5 Return to work with appropriate restrictions should be considered early in the course of treatment. Refer to Section 6.0, Return to Work.

5.3.2.5.6 Other therapies in Section 6.0, Therapeutic Procedures, Non-operative may be employed in individual cases.

5.3.2.6 **Surgical Indications/Considerations:**

5.3.2.6.1 When pain interferes with ADLs and the patient meets the following: 1) low surgical risk, 2) adequate bone quality, and 3) failure of previous non-surgical interventions including weight control, therapy with active patient participation, and medication. Refer to Section 7.0, Therapeutic Procedures-operative, Hip Arthroplasty, for indications specific to the procedure.

5.3.2.6.2 Prior to surgical intervention, the patient and treating physician should identify functional operative goals and the likelihood of achieving improved ability to perform activities of daily living or work activities and the patient should agree to comply with the pre- and post-operative treatment plan including home exercise. The provider should be especially careful to make sure the patient understands the amount of post-operative therapy required and the length of partial- and full-disability expected post-operatively.

5.3.2.6.3 In cases where surgery is contraindicated due to obesity, it may be appropriate to recommend a weight loss program if the patient is unsuccessful losing weight on their own. Coverage for weight loss would continue only for motivated patients who have demonstrated continual progress with weight loss.

5.3.2.6.4 Because smokers have a higher risk of non-union and post-operative costs, it is recommended that carriers cover a smoking cessation program peri-operatively. Physicians may monitor smoking cessation with laboratory tests such as cotinine levels for long-term cessation.

5.3.2.7 **Operative Procedures:** Prosthetic replacement (traditional or minimally invasive), or resurfacing.

5.3.2.8 **Post-operative Treatment:**

5.3.2.8.1 In all cases, communication between the physician and therapist is important to the timing of weight-bearing and exercise progressions.

5.3.2.8.2 For prosthetic replacement, refer to Section 7.0, Hip Arthroplasty.

5.3.2.8.3 Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.

5.3.3 **Femoral Osteonecrosis (Avascular Necrosis (AVN) of the Femoral Head):**

5.3.3.1 **Description/Definition:** Death of the bone tissue of the femoral head following loss of blood supply to the area. Destruction of the articular surfaces of the hip joint may lead to arthritis.

5.3.3.2 **Occupational Relationship:** Usually, from trauma resulting in displaced subcapital fracture of the hip or hip dislocation may cause AVN. Previous surgical procedures and systemic steroids may lead to AVN. In the general population risk factors include, but are not limited to alcohol abuse, smoking, Caisson disease (also known as the bends), sickle cell anemia, autoimmune disease, and hypercoagulable states. Often, the cause cannot be identified. Involvement of the opposite hip may occur in more than half of cases not caused by trauma.

5.3.3.3 **Specific Physical Exam Findings:** Hip or groin pain made worse by motion or weight-bearing and alleviated by rest is the classical presentation. Symptoms may begin gradually, often months after the vascular compromise of blood flow. A limp may result from the limited toleration of weight-bearing.

5.3.3.4 **Diagnostic Testing Procedures:** X-ray abnormalities include sclerotic changes, cystic lesions, joint space narrowing, and degeneration of the acetabulum. The x-ray may be normal in the first several months of the disease process. AVN should be suspected when hip pain occurs and risk factors are present. X-rays should be done first, but may be followed by an MRI. When AVN is not due to trauma, both hips should be imaged.

5.3.3.5 **Non-operative Treatment Procedures:**

5.3.3.5.1 Initial Treatment: protected weight-bearing and bracing followed by active therapy with or without passive therapy. Conservative approaches may suffice when the lesion is small, but larger lesions are expected to require surgical intervention when symptoms are disabling.

- 5.3.3.5.2 Medications such as analgesics and anti-inflammatories may be helpful. Refer to medication discussions in Section 6.0, Medications and Medical Management.
- 5.3.3.5.3 Patient education should include instruction in self-management techniques, ergonomics, body mechanics, home exercise, joint protection, and weight management. Weight-bearing restrictions may be appropriate.
- 5.3.3.5.4 Smoking may affect bone healing. Patients should be strongly encouraged to stop smoking and be provided with appropriate counseling by the physician.
- 5.3.3.5.5 Return to work with appropriate restrictions should be considered early in the course of treatment. Refer to Section 6.0, Return to Work.
- 5.3.3.5.6 Other therapies in Section 6.0, Therapeutic Procedures, Non-operative, may be employed in individual cases.
- 5.3.3.6 **Surgical Indications/Considerations:** Core decompression may appropriate for some patients with early disease (Stages 1 and 2A) who have functionally disabling symptoms. Femoral head osteotomies or resurfacing hemiarthroplasties may also be appropriate for younger patients when disease is limited to the femoral head. Those 50 or older and patients with total joint collapse or severely limiting disease will usually require an implant arthroplasty.
 - 5.3.3.6.1 Prior to surgical intervention, the patient and treating physician should identify functional operative goals and the likelihood of achieving improved ability to perform activities of daily living or work activities and the patient should agree to comply with the pre- and post-operative treatment plan including home exercise. The provider should be especially careful to make sure the patient understands the amount of post-operative therapy required and the length of partial- and full-disability expected post-operatively.
 - 5.3.3.6.2 Because smokers have a higher risk of non-union and post-operative costs, it is recommended that insurers cover a smoking cessation program peri-operatively. Physicians may monitor smoking cessation with laboratory tests such as cotinine levels for long-term cessation.
- 5.3.3.7 **Operative Procedures:** Osteotomy, core decompression with or without bone graft, prosthetic replacement. Refer to Section 7.0, Therapeutic Procedures-operative for details.
- 5.3.3.8 **Post-operative Treatment:-**
 - 5.3.3.8.1 Anticoagulant therapy to prevent deep venous thrombosis for most procedures. Refer Section 6.0, Therapeutic Procedures, Non-operative.
 - 5.3.3.8.2 Treatment usually includes active therapy with or without passive therapy. Refer to Section 7.0 and specific procedures for further details.
 - 5.3.3.8.3 An individualized rehabilitation program based upon communication between the surgeon and the therapist using the treatments found in Section 6.0, Therapeutic Procedures, Non-operative.
 - 5.3.3.8.4 Treatment should include gait training with appropriate assistive devices.
 - 5.3.3.8.5 Therapy should include training on the use of adaptive equipment and home and work site evaluation when appropriate.
 - 5.3.3.8.6 Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon
- 5.3.4 **Femur Fracture:**
 - 5.3.4.1 **Description/Definition:** Fracture of the femur distal to the lesser trochanter.
 - 5.3.4.2 **Occupational Relationship:** Usually from a traumatic injury such as a fall or crush.
 - 5.3.4.3 **Specific Physical Exam Findings:** May have a short, abnormally rotated extremity. Effusion if the knee joint is involved.
 - 5.3.4.4 **Diagnostic Testing Procedures:** Radiographs. Occasionally CT scan or MRI, particularly if the knee joint is involved.
 - 5.3.4.5 **Non-operative Treatment Procedures:**
 - 5.3.4.5.1 Initial Treatment: Although surgery is usually required, non-operative procedures may be considered in stable, non-displaced fractures and will require protected weight-bearing.
 - 5.3.4.5.2 Medications such as analgesics and anti-inflammatories may be helpful. Refer to medication discussions in Section 6.0, Medications and Medical Management.
 - 5.3.4.5.3 Back pain may occur after femur fracture and should be addressed and treated as necessary.

- 5.3.4.5.4 Patient education should include instruction in self-management techniques, ergonomics, body mechanics, home exercise, joint protection, weight management. Weight-bearing restrictions may be appropriate.
- 5.3.4.5.5 Refer to comments related to osteoporosis in Section 6.0, Therapeutic Procedures, Non-operative, under the subsection for Osteoporosis Management.
- 5.3.4.5.6 Smoking may affect fracture healing. Patients should be strongly encouraged to stop smoking and be provided with appropriate counseling by the physician.
- 5.3.4.5.7 Orthotics such as heel lifts and custom shoe build-ups may be required when leg-length discrepancy persists.
- 5.3.4.5.8 Return to work with appropriate restrictions should be considered early in the course of treatment. Refer to Section 6.0, under the subsection for Return to Work.
- 5.3.4.5.9 Other therapies in Section 6.0, Therapeutic Procedures, Non-Operative may be employed in individual cases.
- 5.3.4.6 **Surgical Indications/Considerations:** Femoral neck fracture or supracondylar femur fracture with joint incongruity.
 - 5.3.4.6.1 Because smokers have a higher risk of non-union and post-operative costs, it is recommended that insurers cover a smoking cessation program peri-operatively. Physicians may monitor smoking cessation with laboratory tests such as cotinine levels for long-term cessation.
- 5.3.4.7 **Operative Procedures:** Rod placement or open internal fixation.
- 5.3.4.8 **Post-operative Treatment:**
 - 5.3.4.8.1 An individualized rehabilitation program based upon communication between the surgeon and the therapist, using therapies as outlined in Section 6.0, Therapeutic Procedures, Non-operative. In all cases, communication between the physician and the therapist is important to the timing of weight bearing and exercise progression.
 - 5.3.4.8.2 Treatment usually includes active therapy with or without passive therapy for protected weight-bearing, early range of motion if joint involvement.
 - 5.3.4.8.3 Refer to bone growth stimulators in Section 6.0, Therapeutic Procedures, Non-operative.
 - 5.3.4.8.4 Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.
- 5.3.5 **Hamstring Tendon Rupture:**
 - 5.3.5.1 **Description/Definition:** Most commonly, a disruption of the muscular portion of the hamstring. Extent of the tear is variable. Occasionally a proximal tear or avulsion. Rarely a distal injury.
 - 5.3.5.2 **Occupational Relationship:** Usually from excessive tension on the hamstring either from an injury or from a rapid, forceful contraction of the muscle.
 - 5.3.5.3 **Specific Physical Exam Findings:** Local tenderness, swelling, ecchymosis.
 - 5.3.5.4 **Diagnostic Testing Procedures:** Occasionally radiographs, musculoskeletal ultrasound, or MRI for proximal tears/possible avulsion.
 - 5.3.5.5 **Non-operative Treatment Procedures:**
 - 5.3.5.5.1 Initial Treatment: Protected weight-bearing and ice.
 - 5.3.5.5.2 Medications such as analgesics and anti-inflammatories may be helpful. Refer to medication discussions in Section 6.0, in the Medications and Medical Management subsection.
 - 5.3.5.5.3 Patient education should include instruction in self-management techniques, ergonomics, body mechanics, home exercise, and weight management.
 - 5.3.5.5.4 Benefits may be achieved through therapeutic rehabilitation and rehabilitation interventions. They may include range of motion (ROM), active therapies, and a home exercise program. Active therapies include proprioception training, restoring normal joint mechanics, and clearing dysfunctions from adjacent structures. Passive as well as active therapies may be used for control of pain and swelling. Therapy should progress to strengthening and an independent home exercise program targeted to further improve ROM, strength, and normal joint mechanics influenced by proximal and distal structures. Bracing may be appropriate. Refer to Section 6.0, Therapeutic Procedures, Non-operative.
 - 5.3.5.5.4.1 Passive modalities are most effective as adjunctive treatments to improve the results of active treatment. They may be used as found as adjunctive in Section 6.0, Therapeutic Procedures, Non-operative.

5.3.5.5.5 Return to work with appropriate restrictions should be considered early in the course of treatment. Refer to Section 6.0, Return to Work.

5.3.5.5.6 Other therapies in Section 6.0, Therapeutic Procedures, Non-operative may be employed in individual cases.

5.3.5.6 Surgical Indications/Considerations:

5.3.5.6.1 Surgery is indicated for proximal or distal injuries only when significant functional impairment is expected without repair. If surgery is indicated, it is preferably performed within three months.

5.3.5.6.2 Prior to surgical intervention, the patient and treating physician should identify functional operative goals and the likelihood of achieving improved ability to perform activities of daily living or work activities and the patient should agree to comply with the pre- and post-operative treatment plan including home exercise. The provider should be especially careful to make sure the patient understands the amount of post-operative therapy required and the length of partial- and full-disability expected post-operatively.

5.3.5.6.3 Smoking may affect soft tissue healing through tissue hypoxia. Patients should be strongly encouraged to stop smoking and be provided with appropriate counseling by the physician.

5.3.5.7 **Operative Procedures:** Re-attachment of proximal avulsions and repair of distal tendon disruption.

5.3.5.8 Post-operative Treatment:

5.3.5.8.1 An individualized rehabilitation program based upon communication between the surgeon/physician and the therapy provider using therapies as outlined in Section 6.0, Therapeutic Procedures, Non-operative. In all cases, communication between the physician and therapist is important to the timing of weight-bearing and exercise progressions.

5.3.5.8.2 Treatment may include protected weight-bearing and active therapy with or without passive therapy. Splinting in a functional brace may reduce time off work.

5.3.5.8.3 Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.

5.3.6 Hip Dislocation:

5.3.6.1 **Description/Definition:** Disengagement of the femoral head from the acetabulum.

5.3.6.2 **Occupational Relationship:** Usually from a traumatic injury such as a fall or crush.

5.3.6.3 **Specific Physical Exam Findings:** Most commonly a short, internally rotated, adducted lower extremity with a posterior dislocation and a short externally rotated extremity with an anterior dislocation.

5.3.6.4 **Diagnostic Testing Procedures:** Radiographs, CT scanning.

5.3.6.5 Non-operative Treatment Procedures:

5.3.6.5.1 Initial Treatment: Urgent closed reduction with sedation or general anesthesia.

5.3.6.5.2 Medications such as analgesics and anti-inflammatories may be helpful. Refer to medication discussions in Section 6.0, the Medications and Medical Management subsection.

5.3.6.5.3 Patient education should include instruction in self-management techniques, ergonomics, body mechanics, home exercise, joint protection, and weight management.

5.3.6.5.4 Benefits may be achieved through therapeutic rehabilitation and rehabilitation interventions. They should include bracing then range-of-motion (ROM), active therapies, and a home exercise program. Active therapies include proprioception training, gait training with appropriate assistive devices, restoring normal joint mechanics, and clearing dysfunctions from adjacent structures. Passive as well as active therapies may be used for control of pain and swelling. Therapy should progress to strengthening and an independent home exercise program targeted to further improve ROM, strength, and normal joint mechanics influenced by proximal and distal structures. Therapy should include training on the use of adaptive equipment and home and work site evaluations when appropriate. Bracing may be appropriate. Refer to Section 6.0, Therapeutic Procedures, Non-operative.

5.3.6.5.4.1 Passive modalities are most effective as adjunctive treatments to improve the results of active treatment. They may be used as found as adjunctive in Section 6.0, Therapeutic Procedures, Non-operative.

5.3.6.5.5 Return to work with appropriate restrictions should be considered early in the course of treatment. Refer to Section 6.0, Return to Work.

- 5.3.6.5.6 ~~Other therapies in Section 6.0, Therapeutic Procedures, Non-operative may be employed in individual cases.~~
- 5.3.6.6 ~~**Surgical Indications/Considerations:** Failure of closed reduction. Associated fracture of the acetabulum or femoral head, loose fragments in joint or open fracture.~~
- 5.3.6.6.1 ~~Because smokers have a higher risk of non-union and post-operative costs, when a fracture is involved it is recommended that insurers cover a smoking cessation program peri-operatively. Physicians may monitor smoking cessation with laboratory tests such as cotinine levels for long-term cessation.~~
- 5.3.6.7 ~~**Operative Procedures:** Open reduction of the femoral head or acetabulum and possible internal fixation.~~
- 5.3.6.8 ~~**Post-operative Treatment Procedures:**~~
 - 5.3.6.8.1 ~~An individualized rehabilitation program based upon communication between the surgeon and the therapist using therapies as outlined in Section 6.0, Therapeutic Procedures, Non-operative. In all cases, communication between the physician and therapist is important to the timing of weight-bearing and exercise progressions.~~
 - 5.3.6.8.2 ~~Treatment should include gait training with appropriate assistive devices.~~
 - 5.3.6.8.3 ~~Treatment may include protected weight-bearing and active therapy with or without passive therapy for early range of motion.~~
 - 5.3.6.8.4 ~~Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.~~
- 5.3.7 ~~**Hip Fracture:**~~
 - 5.3.7.1 ~~**Description/Definition:** Fractures of the neck and peri-trochanteric regions of the proximal femur.~~
 - 5.3.7.2 ~~**Occupational Relationship:** Usually from a traumatic injury such as a fall or crush. Patients with intracapsular femoral fractures have a risk of developing avascular necrosis of the femoral head requiring treatment months to years after the initial injury.~~
 - 5.3.7.3 ~~**Specific Physical Exam Findings:** Often a short and externally rotated lower extremity.~~
 - 5.3.7.4 ~~**Diagnostic Testing Procedures:** Radiographs. Occasional use of CT scan or MRI.~~
 - 5.3.7.5 ~~**Non-operative Treatment Procedures:**~~
 - 5.3.7.5.1 ~~Initial Treatment: protected weight-bearing and bracing followed by active therapy with or without passive therapy. Although surgery is usually required, non-operative procedures may be considered in stable, non-displaced fractures.~~
 - 5.3.7.5.2 ~~Medications such as analgesics and anti-inflammatories may be helpful. Refer to medication discussions in Section 6.0, the Medications and Medical Management subsection.~~
 - 5.3.7.5.3 ~~Back pain may occur after hip fracture and should be addressed and treated as necessary.~~
 - 5.3.7.5.4 ~~Patient education should include instruction in self-management techniques, ergonomics, body mechanics, home exercise, joint protection, and weight management. Weight-bearing restrictions may be appropriate.~~
 - 5.3.7.5.5 ~~Refer to comments on osteoporosis in Section 5.0, Ankle Sprain/Fracture.~~
 - 5.3.7.5.6 ~~Smoking may affect fracture healing. Patients should be strongly encouraged to stop smoking and be provided with appropriate counseling by the physician.~~
 - 5.3.7.5.7 ~~Return to work with appropriate restrictions should be considered early in the course of treatment. Refer to Section 6.0, Return to Work.~~
 - 5.3.7.5.8 ~~Other therapies in Section 6.0, Therapeutic Procedures, Non-operative, may be employed in individual cases.~~
 - 5.3.7.6 ~~**Surgical Indications/Considerations:** Surgery is indicated for unstable peritrochanteric fractures and femoral neck fractures.~~
 - 5.3.7.6.1 ~~Because smokers have a higher risk of non-union and post-operative costs, it is recommended that insurers cover a smoking cessation program peri-operatively. Physicians may monitor smoking cessation with laboratory tests such as cotinine levels for long-term cessation.~~
 - 5.3.7.7 ~~**Operative Procedures:** Prosthetic replacement for displaced femoral neck fractures. Reduction and internal fixation for peritrochanteric fractures, and un-displaced, or minimally-displaced neck fractures.~~
 - 5.3.7.8 ~~**Post-operative Treatment:**~~

- 5.3.7.8.1 Anti-coagulant therapy to prevent deep venous thrombosis. Refer Section 6.0, Therapeutic Procedures, Non-operative.
- 5.3.7.8.2 Treatment usually includes active therapy with or without passive therapy.
- 5.3.7.8.3 An individualized rehabilitation program based upon communication between the surgeon and the therapist using the treatments found in Section 6.0, Therapeutic Procedures, Non-operative.
- 5.3.7.8.4 Treatment should include gait training with appropriate assistive devices.
- 5.3.7.8.5 Therapy should include training on the use of adaptive equipment and home and work site evaluation when appropriate.
- 5.3.7.8.6 Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.

5.3.8 Impingement/Labral Tears:

- 5.3.8.1 **Description/Definition:** Two types of impingement are described pincer; resulting from over coverage of the acetabulum and/or cam; resulting from aspherical portion of the head and neck junction. Persistence of these abnormalities can cause early arthritis or labral tears. Labral tears can also be isolated; however, they are frequently accompanied by bony abnormalities. Patients usually complain of catching or painful clicking which should be distinguished from a snapping iliopsoas tibial tendon. A pinch while sitting may be reported and hip or groin pain.
- 5.3.8.2 **Occupational Relationship:** Impingement abnormalities are usually congenital; however, they may be aggravated by repetitive rotational force or trauma. Labral tears may accompany impingement or result from high energy trauma.
- 5.3.8.3 **Specific Physical Exam Findings:** Positive labral tests.
- 5.3.8.4 **Diagnostic Testing Procedures:** Cross table laterals, standing AP pelvis and frog leg lateral x-rays. MRI may reveal abnormality; however, false positives and false negatives are also possible. MRI arthrogram with gadolinium should be performed to diagnose labral tears, not a pelvic MRI. Intra-articular injection should help rule out extra-articular pain generators. To confirm the diagnosis, the patient should demonstrate changes on a pain scale accompanied by recorded functional improvement post-injection. This is important, as labral tears do not always cause pain and over diagnosis is possible using imaging alone. Injections may be performed with or without ultrasound guidance. Ultrasound guided interventional procedure provides the ability to image soft tissues in real time and can improve safety and accuracy of needle placement. The use of ultrasound guided procedures will be at the discretion of the health care provider.
- 5.3.8.5 **Non-operative Treatment Procedures:**
 - 5.3.8.5.1 Medications such as analgesics and anti-inflammatories may be helpful. Refer to medication discussions in Section 6.0, Medications and Medical Management.
 - 5.3.8.5.2 Patient education should include instruction in self-management techniques, ergonomics, body mechanics, reducing hip adduction and internal rotation home exercise, joint protection, and weight management.
 - 5.3.8.5.3 Benefits may be achieved through therapeutic rehabilitation and rehabilitation interventions. They should include range of motion (ROM), active therapies and a home exercise program. Active therapies include proprioception training, restoring normal joint mechanics, and clearing dysfunctions from adjacent structures. Passive as well as active therapies may be used for control of pain and swelling. Therapy should progress to strengthening and an independent home exercise program targeted to further improve ROM, strength, and normal joint mechanics influenced by proximal and distal structures. Refer to Section 6.0, Therapeutic Procedures, Non-operative.
 - 5.3.8.5.3.1 Passive modalities are most effective as adjunctive treatments to improve the results of active treatment. They may be used as found as adjunctive in Section 6.0, Therapeutic Procedures, Non-operative.
 - 5.3.8.5.4 Steroid Injections—Steroid injections may decrease inflammation and allow the therapist to progress with functional exercise and ROM.
 - 5.3.8.5.4.1 Time to Produce Effect: One injection.
 - 5.3.8.5.4.2 Maximum Duration: 3 injections in one year spaced at least 4 to 8 weeks apart.
 - 5.3.8.5.4.3 Steroid injections should be used cautiously in diabetic patients. Diabetic patients should be reminded to check their blood glucose levels at least daily for 2 weeks after injections. Injections may be performed with or without ultrasound guidance. Ultrasound guided interventional procedure provides the ability to image soft tissues in real time and can improve

safety and accuracy of needle placement. The use of ultrasound-guided procedures will be at the discretion of the health care provider.

5.3.8.5.5 Return to work with appropriate restrictions should be considered early in the course of treatment. Refer to Section 6.0, Return to Work.

5.3.8.5.6 Other therapies in Section 6.0, Therapeutic Procedures, Non-operative may be employed in individual cases.

5.3.8.6 **Surgical Indications/Considerations:**

5.3.8.6.1 Surgery is indicated when 1) functional limitations persist after 8 weeks of active patient participation in treatment, 2) there are clinical signs and symptoms suggestive of the diagnosis and 3) other diagnoses have been ruled out.

5.3.8.6.2 Prior to surgical intervention, the patient and treating physician should identify functional operative goals and the likelihood of achieving improved ability to perform activities of daily living or work activities and the patient should agree to comply with the pre- and post-operative treatment plan including home exercise. The provider should be especially careful to make sure the patient understands the amount of post-operative therapy required and the length of partial- and full-disability expected post-operatively.

5.3.8.6.3 In cases where surgery is contraindicated due to obesity, it may be appropriate to recommend a weight loss program if the patient is unsuccessful losing weight on their own. Coverage for weight loss would continue only for motivated patients who have demonstrated continual progress with weight loss.

5.3.8.6.4 Smoking may affect soft tissue healing through tissue hypoxia. Patients should be strongly encouraged to stop smoking and be provided with appropriate counseling by the physician.

5.3.8.7 **Operative Procedures:** Debridement or repair of labrum and removal of excessive bone.

5.3.8.8 **Post-operative Treatment:**

5.3.8.8.1 When bone is removed and/or the labrum is repaired, weight-bearing restrictions usually apply.

5.3.8.8.2 An individualized rehabilitation program based upon communication between the surgeon and the therapist that should include gait training with appropriate assistive devices. Refer to Section 6.0, Therapeutic Procedures Non-operative.

5.3.8.8.3 Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.

5.3.9 **Pelvic Fracture:**

5.3.9.1 **Description/Definition:** Fracture of one or more components of the pelvic ring (sacrum and iliac wings).

5.3.9.2 **Occupational Relationship:** Usually from a traumatic injury such as a fall or crush.

5.3.9.3 **Specific Physical Exam Findings:** Displaced fractures may cause pelvic deformity and shortening, or rotation of the lower extremities.

5.3.9.4 **Diagnostic Testing Procedures:** Radiographs, CT scanning. Occasionally MRI, angiogram, urethrogram, emergent sonogram.

5.3.9.5 **Non-operative Treatment Procedures:**

5.3.9.5.1 Initial Treatment: Protected weight bearing. Although surgery is usually required, non-operative procedures may be considered in a stable, non-displaced fracture.

5.3.9.5.2 Medications such as analgesics and anti-inflammatories may be helpful. Refer to medication discussions in Section 6.0, the Medications and Medical Management subsection.

5.3.9.5.3 Patient education should include instruction in self-management techniques, ergonomics, body mechanics, home exercise, joint protection, and weight management.

5.3.9.5.4 Refer to comments related to osteoporosis in Section 6.0, Therapeutic Procedures, Non-operative, Osteoporosis Management.

5.3.9.5.5 Smoking may affect fracture healing. Patients should be strongly encouraged to stop smoking and be provided with appropriate counseling by the physician.

5.3.9.5.6 Benefits may be achieved through therapeutic rehabilitation and rehabilitation interventions, after boney union has been achieved. They should include bracing then range-of-motion (ROM), active therapies, and a home exercise program. Active therapies include, proprioception training, gait training with appropriate assistive devices, restoring normal joint mechanics, and clearing dysfunctions from adjacent structures. Passive as well as active therapies may be used for control of pain and swelling. Therapy should progress to

strengthening and an independent home exercise program targeted to further improve ROM, strength, and normal joint mechanics influenced by proximal and distal structures. Therapy should include training on the use of adaptive equipment and home and work site evaluations when appropriate. Refer to Section 6.0, Therapeutic Procedures, Non-operative.

~~5.3.9.5.6.1 Passive modalities are most effective as adjunctive treatments to improve the results of active treatment. They may be used as found as adjunctive in Section 6.0, Therapeutic Procedures, Non-operative.~~

~~5.3.9.5.7 Return to work with appropriate restrictions should be considered early in the course of treatment. Refer to Section 6.0, the Return to Work subsection.~~

~~5.3.9.5.8 Other therapies in Section 6.0, Therapeutic Procedures, Non-operative may be employed in individual cases.~~

~~5.3.9.6 **Surgical Indications/Considerations:** Unstable fracture pattern, or open fracture.~~

~~5.3.9.6.1 Because smokers have a higher risk of non-union and post-operative costs, it is recommended that insurers cover a smoking cessation program peri-operatively. Physicians may monitor smoking cessation with laboratory tests such as cotinine levels for long-term cessation.~~

~~5.3.9.7 **Operative Procedures:** External or internal fixation dictated by fracture pattern.~~

~~5.3.9.8 **Post-operative Treatment:**~~

~~5.3.9.8.1 An individualized rehabilitation program based upon communication between the surgeon and the therapist using therapies as outlined in Section 6.0, Therapeutic Procedures, Non-operative. In all cases, communication between the physician and therapist is important to the timing of weight-bearing and exercise progressions.~~

~~5.3.9.8.2 Treatment usually includes active therapy with or without passive therapy for gait, pelvic stability, strengthening, and restoration of joint and extremity function. Treatment should include gait training with appropriate assistive devices.~~

~~5.3.9.8.3 Graduated weight-bearing according to fracture healing.~~

~~5.3.9.8.4 Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.~~

~~5.3.10 **Tendonopathy:** Refer to Tendonopathy in Section 5.0 for general recommendations.~~

~~5.3.11 **Tibial Fracture:**~~

~~5.3.11.1 **Description/Definition:** Fracture of the tibia proximal to the malleoli.~~

~~Open tibial fractures are graded in severity according to the Gustilo-Anderson Classification:~~

~~5.3.11.1.1 **Type I:** Less than 1 cm (puncture wounds).~~

~~5.3.11.1.2 **Type II:** 1 to 10 cm.~~

~~5.3.11.1.3 **Type III-A:** Greater than 10 cm, sufficient soft tissue preserved to cover the wound (includes gunshot wounds and any injury in a contaminated environment).~~

~~5.3.11.1.4 **TYPE III-B:** Greater than 10 cm, requiring a soft tissue coverage procedure.~~

~~5.3.11.1.5 **TYPE III-C:** With vascular injury requiring repair.~~

~~5.3.11.2 **Occupational Relationship:** Usually from a traumatic injury such as a fall or crush.~~

~~5.3.11.3 **Specific Physical Exam Findings:** May have a short, abnormally rotated extremity. Effusion if the knee joint involved.~~

~~5.3.11.4 **Diagnostic Testing Procedures:** Radiographs. CT scanning or MRI.~~

~~5.3.11.5 **Non-operative Treatment Procedures:**~~

~~5.3.11.5.1 Initial Treatment: Protected weight-bearing; functional bracing. There is some evidence for use of pneumatic braces with stress fractures.~~

~~5.3.11.5.2 Medications such as analgesics and anti-inflammatories may be helpful. Refer to medication discussions in Section 6.0, Medications and Medical Management.~~

~~5.3.11.5.3 Patient education should include instruction in self-management techniques, ergonomics, body mechanics, home exercise, joint protection, and weight management.~~

~~5.3.11.5.4 Refer to comments related to osteoporosis in Section 6.0, Therapeutic Procedures, Non-operative, Osteoporosis Management.~~

~~5.3.11.5.5 Smoking may affect fracture healing. Patients should be strongly encouraged to stop smoking and be provided with appropriate counseling by the physician.~~

~~5.3.11.5.6 Benefits may be achieved through therapeutic rehabilitation and rehabilitation interventions, after boney union has been achieved. They should include bracing then range-of-motion~~

(ROM), active therapies including proprioception training, restoring normal joint mechanics, and clearing dysfunctions from adjacent structures, and a home exercise program. Passive as well as active therapies may be used for control of pain and swelling. Therapy should progress to strengthening and an independent home exercise program targeted to further improve ROM, strength, restoring normal joint mechanics, influenced by proximal and distal structures. Therapy should include training on the use of adaptive equipment and home and work site evaluations when appropriate. Bracing may be appropriate. Refer to Section 6.0, Therapeutic Procedures, Non-operative.

- 5.3.11.5.6.1 ~~Passive modalities are most effective as adjunctive treatments to improve the results of active treatment. They may be used as found as adjunctive in Section 6.0, Therapeutic Procedures, Non-operative.~~
- 5.3.11.5.7 ~~Orthotics such as heel lifts and custom shoe build-ups may be required when leg-length discrepancy persists.~~
- 5.3.11.5.8 ~~Return to work with appropriate restrictions should be considered early in the course of treatment. Refer to Section 6.0, the Return to Work subsection.~~
- 5.3.11.5.9 ~~Other therapies in Section 6.0, Therapeutic Procedures, Non-Operative may be employed in individual cases.~~
- 5.3.11.6 **Surgical Indications/Considerations:** ~~Unstable fracture pattern, displaced fracture (especially if the knee joint is involved), open fracture, and non-union.~~
 - 5.3.11.6.1 ~~Because smokers have a higher risk of non-union and post-operative costs, it is recommended that insurers cover a smoking cessation program peri-operatively. Physicians may monitor smoking cessation with laboratory tests such as cotinine levels for long term cessation.~~
- 5.3.11.7 **Operative Procedures:** ~~Often closed rodding for shaft fractures. Open reduction and internal fixation more common for fractures involving the knee joint or pilon fractures of the distal tibia.~~
 - 5.3.11.7.1 ~~Human bone morphogenetic protein (RhBMP): this material is used for surgical repair of open tibial fractures. Refer to Section 7.0, Therapeutic Procedures, Operative for further specific information.~~
 - 5.3.11.7.2 ~~Stem cell use—stem cells have been added to allograft to increase fracture union. Their use is considered experimental and is not recommended at this time.~~
- 5.3.11.8 **Post-operative Treatment:**
 - 5.3.11.8.1 ~~An individualized rehabilitation program based upon communication between the surgeon and the therapist and using therapies as outlined in Section 6.0, Therapeutic Procedures, Non-operative. In all cases, communication between the physician and therapist is important to the timing of weight-bearing and exercise progressions.~~
 - 5.3.11.8.2 ~~Treatment may include protected weight bearing and active therapy with or without passive therapy for early range of motion if joint involvement.~~
 - 5.3.11.8.3 ~~Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.~~
- 5.3.12 **Trochanteric Fracture:**
 - 5.3.12.1 **Description/Definition:** ~~Fracture of the greater trochanter of the proximal femur.~~
 - 5.3.12.2 **Occupational Relationship:** ~~Usually from a traumatic injury such as a fall or crush.~~
 - 5.3.12.3 **Specific Physical Exam Findings:** ~~Local tenderness over the greater trochanter. Sometimes associated swelling, ecchymosis.~~
 - 5.3.12.4 **Diagnostic Testing Procedures:** ~~Radiographs, CT scans or MRI.~~
 - 5.3.12.5 **Non-operative Treatment Procedures:**
 - 5.3.12.5.1 ~~Initial Treatment: protected weight bearing.~~
 - 5.3.12.5.2 ~~Medications such as analgesics and anti-inflammatories may be helpful. Refer to medication discussions in Section 6.0, Medications and Medical Management.~~
 - 5.3.12.5.3 ~~Patient education should include instruction in self-management techniques, ergonomics, body mechanics, home exercise, joint protection, and weight management.~~
 - 5.3.12.5.4 ~~Refer to comments related to osteoporosis in Section 6.0, Therapeutic Procedures, Non-operative, Osteoporosis Management.~~
 - 5.3.12.5.5 ~~Smoking may affect fracture healing. Patients should be strongly encouraged to stop smoking and be provided with appropriate counseling by the physician.~~

5.3.12.5.6 Benefits may be achieved through therapeutic rehabilitation and rehabilitation interventions, after boney union has been achieved. They should include bracing then range-of-motion (ROM), active therapies, and a home exercise program. Active therapies include proprioception training, restoring normal joint mechanics, and clearing dysfunctions from adjacent structures, and a home exercise program. Passive as well as active therapies may be used for control of pain and swelling. Therapy should progress to strengthening and an independent home exercise program targeted to further improve ROM, strength, and normal joint mechanics influenced by proximal and distal structures. Bracing may be appropriate. Refer to Section 6.0, Therapeutic Procedures, Non-operative.

5.3.12.5.6.1 Passive modalities are most effective as adjunctive treatments to improve the results of active treatment. They may be used as found as adjunctive in Section 6.0, Therapeutic Procedures, Non-operative.

5.3.12.5.7 Return to work with appropriate restrictions should be considered early in the course of treatment. Refer to Section 6.0, Return to Work.

5.3.12.5.8 Other therapies in Section 6.0, Therapeutic Procedures, Non-operative may be employed in individual cases.

5.3.12.6 **Surgical Indications/Considerations:** Large, displaced fragment, open fracture.

5.3.12.6.1 Because smokers have a higher risk of non-union and post-operative costs, it is recommended that insurers cover a smoking cessation program peri-operatively. Physicians may monitor smoking cessation with laboratory tests such as cotinine levels for long-term cessation.

5.3.12.7 **Operative Procedures:** Open reduction, internal fixation.

5.3.12.8 **Post-operative Treatment:**

5.3.12.8.1 An individualized rehabilitation program based upon communication between the surgeon and the therapist using therapies as outlined in Section 6.0, Therapeutic Procedures, Non-operative. In all cases, communication between the physician and therapist is important to the timing of weight-bearing and exercise progressions.

5.3.12.8.2 Protected weight bearing is usually needed. Full weight bearing with radiographic and clinical signs of healing.

5.3.12.8.3 Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.

6.0 Therapeutic Procedures – Non-Operative

Treating providers, as well as employers and insurers are highly encouraged to reference the General Guidelines Principles (Section 2.0) prior to initiation of any therapeutic procedure. Before initiation of any therapeutic procedure, the authorized treating provider, employer and insurer must consider these important issues in the care of the injured worker.

First, patients undergoing therapeutic procedure(s) should be released or returned to modified, restricted duty during their rehabilitation at the earliest appropriate time. Refer to Return to Work in this section for detailed information.

Second, cessation and/or review of treatment modalities should be undertaken when no further significant subjective or objective improvement in the patient's condition is noted. If patients are not responding within the recommended duration periods, alternative treatment interventions, further diagnostic studies or consultations should be pursued.

Third, providers should provide and document education to the patient. No treatment plan is complete without addressing issues of individual and/or group patient education as a means of facilitating self-management of symptoms.

Last, formal psychological or psychosocial evaluation should be performed on patients not making expected progress within 6 to 12 weeks following injury and whose subjective symptoms do not correlate with objective signs and tests. Earlier psychological intervention may be necessary and will be dependent on the treating physician's assessment of psychological or psychosocial issues that may interfere with the patient's recovery.

In cases where a patient is unable to attend an outpatient center, home therapy may be necessary. Home therapy may include active and passive therapeutic procedures as well as other modalities to assist in alleviating pain, swelling, and abnormal muscle tone. Home therapy is usually of short duration and continues until the patient is able to tolerate coming to an outpatient center.

The following procedures are listed in alphabetical order.

- 6.1 **ACUPUNCTURE** is an accepted and widely used procedure for the relief of pain and inflammation in the lower extremity. There is some scientific evidence to support its use for hip and knee osteoarthritis. The exact mode of action is only partially understood. Western medicine studies suggest that acupuncture stimulates the nervous system at the level of the brain, promotes deep relaxation, and affects the release of neurotransmitters. Acupuncture is commonly used as an alternative or in addition to traditional Western pharmaceuticals. While it is commonly used when pain medication is reduced or not tolerated, it may be used as an adjunct to physical rehabilitation and/or surgical intervention to hasten the return of functional activity. Acupuncture should be performed by MD, DC, DO with appropriate training; or a licensed acupuncturist.
- 6.1.1 **Acupuncture:** is the insertion and removal of filiform needles to stimulate acupoints (acupuncture points). Needles may be inserted, manipulated and retained for a period of time. Acupuncture can be used to reduce pain, reduce inflammation, increase blood flow, increase range of motion, decrease the side effect of medication-induced nausea, promote relaxation in an anxious patient, and reduce muscle spasm.
- 6.1.1.1 Indications include joint pain, joint stiffness, soft tissue pain and inflammation, paresthesia, post-surgical pain relief, muscle spasm, and scar tissue pain.
- 6.1.2 **Acupuncture with Electrical Stimulation:** is the use of electrical current (micro amperage or milli-amperage) on the needles at the acupuncture site. It is used to increase effectiveness of the needles by continuous stimulation of the acupoint. Physiological effects (depending on location and settings) can include endorphin release for pain relief, reduction of inflammation, increased blood circulation, analgesia through interruption of pain stimulus, and muscle relaxation.
- 6.1.2.1 It is indicated to treat chronic pain conditions, radiating pain along a nerve pathway, muscle spasm, inflammation, scar tissue pain, and pain located in multiple sites.
- 6.1.3 **Total Time Frames for Acupuncture and Acupuncture with Electrical Stimulation:** Time frames are not meant to be applied to each of the above sections separately. The time frames are to be applied to all acupuncture treatments regardless of the type or combination of therapies being provided.
- 6.1.3.1 Time to Produce Effect: 3 to 6 treatments.
- 6.1.3.2 Frequency: 1 to 3 times per week.
- 6.1.3.3 Optimum Duration: 1 to 2 months.
- 6.1.3.4 Maximum Duration: 14 treatments.
- 6.1.3.5 Any of the above acupuncture treatments may extend longer if objective functional gains can be documented or when symptomatic benefits facilitate progression in the patient's treatment program. Treatment beyond 14 treatments must be documented with respect to need and ability to facilitate positive symptomatic or functional gains. Such care should be re-evaluated and documented with each series of treatments.
- 6.1.4 **Other Acupuncture Modalities:** Acupuncture treatment is based on individual patient needs and therefore treatment may include a combination of procedures to enhance treatment effect. Other procedures may include the use of heat, soft tissue manipulation/massage, and exercise. Refer to Active Therapy (Therapeutic Exercise) and Passive Therapy sections (Massage and Superficial Heat and Cold Therapy) for a description of these adjunctive acupuncture modalities and time frames.
- 6.2 **BIOFEEDBACK** is a form of behavioral medicine that helps patients learn self-awareness and self-regulation skills for the purpose of gaining greater control of their physiology, such as muscle activity, brain waves, and measures of autonomic nervous system activity. Electronic instrumentation is used to monitor the targeted physiology and then displayed or fed back to the patient visually, auditorially, or tactilely, with coaching by a biofeedback specialist. Biofeedback is provided by clinicians certified in biofeedback and/or who have documented specialized education, advanced training, or direct or supervised experience qualifying them to provide the specialized treatment needed (e.g., surface EMG, EEG, or other).
- 6.2.1 Treatment is individualized to the patient's work-related diagnosis and needs. Home practice of skills is required for mastery and may be facilitated by the use of home training tapes. The ultimate goal in biofeedback treatment is normalizing the physiology to the pre-injury status to the extent possible and involves transfer of learned skills to the workplace and daily life. Candidates for biofeedback therapy or training must be motivated to learn and practice biofeedback and self-regulation techniques.
- 6.2.2 Indications for biofeedback include individuals who are suffering from musculoskeletal injury in which muscle dysfunction or other physiological indicators of excessive or prolonged stress response affects and/or delays recovery. Other applications include training to improve self-management of emotional stress/pain responses such as anxiety, depression, anger, sleep disturbance, and other central and autonomic nervous system imbalances. Biofeedback is often utilized along with other treatment modalities.
- 6.2.3 Time to Produce Effect: 3 to 4 sessions.

- 6.2.4 Frequency: 1 to 2 times per week.
- 6.2.5 Optimum Duration: 5 to 6 sessions.
- 6.2.6 Maximum Duration: 10 to 12 sessions. Treatment beyond 12 sessions must be documented with respect to need, expectation, and ability to facilitate functional gains.

6.3 BONE-GROWTH STIMULATORS

6.3.1 **Electrical:** Pre-clinical and experimental literature has shown a stimulatory effect of externally applied electrical fields on the proliferation and calcification of osteoblasts and periosteal cells. All of the studies on bone growth stimulators, however, have some methodological deficiencies and high-quality literature of electrical bone growth stimulation is lacking for lower extremity injuries.

6.3.1.1 These acceptable nonsurgical techniques include Capacitive Coupling (CC), which places skin electrodes on opposite sides of the bone being treated and Pulsed Electromagnetic Field (PEMF) which uses a current-carrying coil which induces a secondary electrical field in bone.

6.3.2 **Low-intensity Pulsed Ultrasound:** There is some evidence that low-intensity pulsed ultrasound, applied by the patient at home and administered as initial treatment of the fracture, reduces the time required for cortical bridging in tibial fractures. Non union and delayed unions were not included in these clinical trials. Possible indications for Low-Intensity Pulsed Ultrasound are non-unions or fractures that are expected to require longer healing time.

6.3.2.1 FDA approved bone-growth stimulators of any type may be appropriate for patients with non-union after initial fracture care or for patients with acute fractures or osteotomies who are at high risk for delayed union or non-union. Patients at high risk include, but are not limited to, smokers, diabetics, and those on chemotherapeutic agents or other long-term medication affecting bone growth.

6.4 EXTRACORPOREAL SHOCK WAVE THERAPY (ESWT)

6.4.1 Extracorporeal shock wave therapy (ESWT) delivers an externally applied acoustic pulse to the plantar fascia. It has been hypothesized that ESWT causes microtrauma to the fascia, inducing a repair process involving the formation of new blood vessels and delivery of nutrients to the affected area. High energy ESWT is delivered in one session and may be painful requiring some form of anesthesia. It is not generally recommended for the treatment of plantar heel pain due to increased cost when it is performed with conscious sedation. It may also be performed with local blocks. Low energy ESWT does not require anesthetics. It is given in a series of treatments, generally three sessions.

6.4.2 There is conflicting evidence concerning low energy ESWT for plantar heel pain. Focused ESWT concentrates the acoustic pulse on a single point in the heel, while radial ESWT distributes the pulse along the entire plantar fascia. Focused low energy ESWT has not been shown to produce clinically important reductions in plantar heel pain. There is some evidence that radial ESWT may reduce plantar pain more effectively than placebo, but a successful response may occur in only 60% of patients. There is some evidence supporting high-energy ESWT.

6.4.3 Low energy radial or high energy ESWT with local blocks are accepted treatments. It should only be used on patients who have had plantar pain for 4 months or more; have tried NSAIDs, ice, stretching exercises, shoe inserts; and have significant functional deficits. These patients should meet the indications for surgery found in Section 5.0, heel spurs, plantar fascia pain. Tarsal tunnel syndrome should be ruled out. Peripheral vascular disease, lower extremity neuropathy and diabetes are all relative contraindications. Diagnostic testing may be needed to rule out these conditions.

6.4.4 Time to Effect: 2 sessions.

6.4.5 Optimum Duration: 3 sessions one week or more apart.

6.4.6 Maximum Duration: Treatment may be continued for up to 5 total sessions if functional improvement has been demonstrated after three treatment sessions. Functional improvement is preferably demonstrated using direct testing or functional scales validated in clinical research settings.

6.5 INJECTIONS-THERAPEUTIC

6.5.1 **General Description:** Therapeutic injection procedures may play a significant role in the treatment of patients with lower extremity pain or pathology. Therapeutic injections involve the delivery of anesthetic and/or anti-inflammatory medications to the painful structure. Therapeutic injections have many potential benefits. Ideally, a therapeutic injection will: (a) reduce inflammation in a specific target area; (b) relieve secondary muscle spasm; (c) allow a break from pain; and (d) support therapy directed to functional recovery. Diagnostic and therapeutic injections should be used early and selectively to establish a diagnosis and support rehabilitation. If injections are overused or used outside the context of a monitored rehabilitation program, they may be of significantly less value. All injections may be performed with or without ultrasound guidance. Ultrasound guided interventional procedures provides the ability to image

- soft tissues in real time and can improve safety and accuracy of needle placement. The use of ultrasound guided procedures will be at the discretion of the health care provider.
- 6.5.2 **General Indications:** Diagnostic injections are procedures which may be used to identify pain generators or pathology. For additional specific clinical indications, see Section 5.0, Specific Lower Extremity Injury Diagnosis, Testing and Treatment.
- 6.5.3 **Special Considerations:** The use of injections has become progressively sophisticated. Each procedure considered has an inherent risk, and risk versus benefit should be evaluated when considering injection therapy. In addition, all injections must include sterile technique.
- 6.5.4 **General Contraindications:** General contraindications include local or systemic infection, bleeding disorders, allergy to medications used, and patient refusal. Specific contraindications may apply to individual injections.
- 6.5.5 **Joint Injections:** are generally accepted, well-established procedures that can be performed as analgesic or anti-inflammatory procedures.
- 6.5.5.1 Time to Produce Effect: Immediate with local anesthesia, or within 3 days if no anesthesia.
- 6.5.5.2 Optimum Duration: Usually one to two injections is adequate.
- 6.5.5.3 Maximum Duration: Not more than three to four times annually.
- 6.5.5.4 Steroid injections should be used cautiously in diabetic patients. Diabetic patients should be reminded to check their blood-glucose level at least twice daily for two weeks post-injections. Injections may be performed with or without ultrasound guidance. Ultrasound-guided interventional procedure provides the ability to image soft tissues in real time and can improve safety and accuracy of needle placement. The use of ultrasound guided procedures will be at the discretion of the health care provider.
- 6.5.6 **Soft Tissue Injections:** include bursa and tendon insertions. Injections under significant pressure should be avoided as the needle may be penetrating the tendon. Injection into the tendon can cause tendon degeneration, tendon breakdown, or rupture. Injections should be minimized for patients younger than 30 years of age.
- 6.5.6.1 When performing tendon insertion injections, the risk of tendon rupture should be discussed with the patient and the need for restricted duty emphasized.
- 6.5.6.2 Time to Produce Effect: Immediate with local anesthesia, or within 3 days if no anesthesia.
- 6.5.6.3 Optimum Duration: Usually one to two injections is adequate.
- 6.5.6.4 Maximum Duration: Not more than three to four times annually.
- 6.5.6.5 Steroid injections should be used cautiously in diabetic patients. Diabetic patients should be reminded to check their blood-glucose level at least twice daily for two weeks post-injections. Injections may be performed with or without ultrasound guidance. Ultrasound-guided interventional procedure provides the ability to image soft tissues in real time and can improve safety and accuracy of needle placement. The use of ultrasound guided procedures will be at the discretion of the health care provider.
- 6.5.7 **Trigger Point Injections:** although generally accepted, have only rare indications in the treatment of lower extremity disorders. Therefore, their routine use is not recommended in the treatment of lower extremity injuries.
- 6.5.7.1 Description: Trigger point treatment can consist of dry needling or injection of local anesthetic with or without corticosteroid into highly localized, extremely sensitive bands of skeletal muscle fibers that produce local and referred pain when activated. Medication is injected in a four-quadrant manner in the area of maximum tenderness. Injection efficacy can be enhanced if injections are immediately followed by myofascial therapeutic interventions, such as vapo-coolant spray and stretch, ischemic pressure massage (myotherapy), specific soft tissue mobilization and physical modalities. There is conflicting evidence regarding the benefit of trigger point injections. A truly blinded study comparing dry needle treatment of trigger points is not feasible. There is no evidence that injection of medications improves the results of trigger point injections. Needling alone may account for some of the therapeutic response.
- 6.5.7.2 There is no indication for conscious sedation for patients receiving trigger point injections. The patient must be alert to help identify the site of the injection.
- 6.5.7.3 Indications:
- 6.5.7.3.1 Trigger point injections may be used to relieve myofascial pain and facilitate active therapy and stretching of the affected areas. They are to be used as an adjunctive treatment in combination with other treatment modalities such as functional restoration programs. Trigger point injections should be utilized primarily for the purpose of facilitating functional progress.

Patients should continue with a therapeutic exercise program as tolerated throughout the time period they are undergoing intensive myofascial interventions. Myofascial pain is often associated with other underlying structural problems, and any abnormalities need to be ruled out prior to injection.

- 6.5.7.3.2 Trigger point injections are indicated in those patients where well-circumscribed trigger points have been consistently observed, demonstrating a local twitch response, characteristic radiation of pain pattern and local autonomic reaction, such as persistent hyperemia following palpation. Generally, these injections are not necessary unless consistently observed trigger points are not responding to specific, noninvasive, myofascial interventions within approximately a 6-week time frame.
 - 6.5.7.4 Complications: Potential but rare complications of trigger point injections include infection, anaphylaxis, neurapraxia, and neuropathy. If corticosteroids are injected in addition to local anesthetic, there is a risk of developing local myopathy. Severe pain on injection suggests the possibility of an intraneural injection, and the needle should be immediately repositioned.
 - 6.5.7.5 Time to Produce Effect: Local anesthetic 30 minutes; no anesthesia 24 to 48 hours.
 - 6.5.7.6 Frequency: Weekly, suggest no more than 4 injection sites per session per week to avoid significant post-injection soreness.
 - 6.5.7.7 Optimum Duration: 4 Weeks.
 - 6.5.7.8 Maximum Duration: 8 weeks. Occasional patients may require 2 to 4 repetitions of trigger point injection series over a 1 to 2-year period.
- 6.5.8 **Viscosupplementation/Intracapsular Acid Salts:** is an accepted form of treatment for osteoarthritis or degenerative changes in the knee joint. There is good evidence that intra-articular hyaluronic acid injections have only a small effect on knee pain and function. Therefore, the patient and treating physician should identify functional goals and the likelihood of achieving improved ability to perform activities of daily living or work activities with injections versus other treatments. The patient should agree to comply with the treatment plan including home exercise. These injections may be considered an alternative in patients who have failed non-operative treatment and surgery is not an option, particularly, if non-steroidal anti-inflammatory drug treatment is contraindicated or has been unsuccessful. Viscosupplementation is not recommended for patients with severe osteoarthritis who are surgical candidates. Its efficacy beyond 6 months is not well-established. There is no evidence that one product significantly outperforms another, prior authorization is required to approve product choice and for repeat series of injections.
- 6.5.8.1 One injection of 6 ml of Hylan G-F 20 may be effective and is an option for knee injections.
 - 6.5.8.2 Viscosupplementation is not recommended for ankle osteoarthritis due to the small effect size documented in knee conditions and the lack of evidence supporting its use in the ankle. Viscosupplementation is not recommended for hip arthritis given the probable superiority of corticosteroid injections. In rare cases a patient with significant hip osteoarthritis who does not qualify for surgical intervention may try viscosupplementation. It should be done with ultrasound or fluoroscopic guidance and will not necessarily require a series of three injections. The patient may choose to have repeat injections when the first injection was successful.
 - 6.5.8.3 Time to Produce Effect: After 1 series or one injection as discussed above, there must be a functional gain lasting three months to justify repeat injections.
 - 6.5.8.4 Frequency: One injection or 1 series (3 to 5 injections generally spaced 1 week apart).
 - 6.5.8.5 Optimum/Maximum Duration: Varies. Efficacy beyond 6 months is not well-established.
- 6.5.9 **Prolotherapy:** (also known as sclerotherapy) consists of peri-articular injections of hypertonic dextrose with or without phenol with the goal of inducing an inflammatory response that will recruit cytokine growth factors involved in the proliferation of connective tissue. Advocates of prolotherapy propose that these injections will alleviate complaints related to joint laxity by promoting the growth of connective tissue and stabilizing the involved joint.
- 6.5.9.1 Laboratory studies may lend some biological plausibility to claims of connective tissue growth, but high quality published clinical studies are lacking. The dependence of the therapeutic effect on the inflammatory response is poorly defined, raising concerns about the use of conventional anti-inflammatory drugs when proliferant injections are given. The evidence in support of prolotherapy is insufficient and therefore, its use is not recommended in lower extremity injuries.

6.6 JOBSITE ALTERATION

- 6.6.1 Early evaluation and training of body mechanics are essential for every injured worker. Risk factors to be addressed include: repetitive work, lifting, and forces that have an impact on the lower extremity. In some cases, this requires a jobsite evaluation. There is no single factor or combination of factors that is proven to

prevent or ameliorate lower extremity pain, but a combination of ergonomic and psychosocial factors are generally considered to be important. Physical factors that may be considered include use of force, repetitive work, squatting, climbing, kneeling, crouching, crawling, prolonged standing, walking a distance or on uneven surfaces, jumping, running, awkward positions requiring use of force, and lower extremity vibration. Psychosocial factors to be considered include pacing, degree of control over job duties, perception of job stress, and supervisory support.

- 6.6.2 The job analysis and modification should include input from the employee, employer, and a medical professional familiar with work place evaluation. An ergonomist may also provide useful information. The employee must be observed performing all job functions in order for the jobsite analysis to be valid. Periodic follow-up is recommended to evaluate effectiveness of the intervention and need for additional ergonomic changes.
- 6.6.3 Interventions: should consider engineering controls (e.g., mechanizing the task, changing the tool used, or adjusting the jobsite), or administrative controls (e.g., adjusting the time an individual performs the task).

6.7 **MEDICATIONS AND MEDICAL MANAGEMENT**

- 6.7.1 Use of medications will vary widely due to the spectrum of injuries from simple strains to complicated fractures. A thorough medication history, including use of alternative and over-the-counter medications, should be performed at the time of the initial visit and updated periodically. Treatment for pain control is initially accomplished with acetaminophen and/or NSAIDs. The patient should be educated regarding the interaction with prescription and over-the-counter medications as well as the contents of over-the-counter herbal products.
- 6.7.2 Nonsteroidal anti-inflammatory drugs (NSAIDs) and acetaminophen are useful in the treatment of injuries associated with degenerative joint disease and/or inflammation. These same medications can be used for pain control.
- 6.7.3 Topical agents can be beneficial for pain management in lower extremity injuries. This includes topical capsaicin, nonsteroidals, as well as topical iontophoresis/phonophoresis, such as steroid creams and lidocaine.
- 6.7.4 Glucosamine and chondroitin are sold in the United States as dietary supplements. Their dosage, manufacture, and purity are not regulated by the Food and Drug Administration. For moderate to severe knee osteoarthritis, there is good evidence for the effectiveness of a pharmaceutical grade combination of 500 mg glucosamine hydrochloride and 400 mg chondroitin sulfate three times per day. Effectiveness for mild disease is unknown. Recent literature suggests that chondroitin sulfate in a dose of 800 mg once daily may reduce the rate of joint degradation as demonstrated by joint space loss on serial x-rays.
- 6.7.5 For mild to moderate osteoarthritis confined to the hip, there is good evidence that a pharmaceutical grade glucosamine sulfate is unlikely to produce a clinically significant improvement in pain and joint function.
- 6.7.6 When osteoarthritis is identified as a contributing factor to a work related injury, pharmaceutical grade glucosamine and chondroitin may be tried. Long term coverage for these medications would fall under Workers' Compensation only when the arthritic condition is primarily related to the work injury.
- 6.7.7 S-adenosyl methionine (SAM-e), like glucosamine and chondroitin, is sold as a dietary supplement in the United States, with a similar lack of standard preparations of dose and manufacture. There is some evidence that a pharmaceutical grade SAM-e is as effective as celecoxib in improving pain and function in knee osteoarthritis, but its onset of action is slower. Studies using liquid chromatography have shown that it may lose its potency after several weeks of storage. In addition, SAM-e has multiple additional systemic effects. It is not currently recommended due to lack of availability of pharmaceutical quality, systemic effects, and loss of potency with storage.
- 6.7.8 The following medications and medical management items are listed in alphabetical order.
 - 6.7.8.1 **Acetaminophen** is an effective analgesic with antipyretic but not anti-inflammatory activity. Acetaminophen is generally well tolerated, causes little or no gastrointestinal irritation and is not associated with ulcer formation. Acetaminophen has been associated with liver toxicity in overdose situations or in chronic alcohol use. Patients may not realize that many over-the-counter preparations may contain acetaminophen. The total daily dose of acetaminophen is recommended not to exceed 4 grams per 24-hour period, from all sources, including narcotic-acetaminophen combination preparations.
 - 6.7.8.1.1 Optimal Duration: 7 to 10 days.
 - 6.7.8.1.2 Maximum Duration: Chronic use as indicated on a case-by-case basis. Use of this substance long term for 3 days per week or greater may be associated with rebound pain upon cessation.

- 6.7.8.2 **Bisphosphonates** may be used for those qualifying under osteoporosis guidelines. Long term use for the purpose of increasing prosthetic fixation is not recommended as long term improvement in fixation is not expected. See Section 7, h., Osteoporosis Management Section below.
- 6.7.8.3 **Deep Venous Thrombosis Prophylaxis** is a complex issue involving many variables such as individual patient characteristics, the type of surgery, anesthesia used and agent(s) used for prophylaxis. Final decisions regarding prophylaxis will depend on the surgeon's clinical judgment. The following are provided as generally accepted concepts regarding prophylaxis at the time of writing of these guidelines.
- 6.7.8.3.1 All patients undergoing lower extremity surgery or prolonged lower extremity immobilization should be evaluated for elevated risk for DVT and should receive education on prevention. Possible symptoms should be discussed. Patients at higher risk than the normal population include, but are not limited to, those with known hypercoagulable states and those with previous pulmonary embolism or DVT. Those considered at higher risk for bleeding, which may alter thromboprophylaxis protocols, include patients with a history of a bleeding disorder, recent gastrointestinal bleed, or hemorrhagic stroke.
- 6.7.8.3.2 There is no evidence to support mandatory prophylaxis for all patients who are immobilized or undergo lower extremity procedures, outside of hip or knee arthroplasties or hip fracture repair.
- 6.7.8.3.3 Hip and knee arthroplasties and hip fracture repair are standard risk factors requiring thromboprophylaxis. Commonly used agents are low molecular weight heparin, low dose unfractionated heparin (LDUH), synthetic pentasaccharide fondaparinux, or warfarin. If aspirin is used, it should be accompanied by aggressive mechanical prophylaxis.
- 6.7.8.3.4 All patients should be mobilized as soon as possible after surgery. Mechanical prophylaxis such as pneumatic devices that are thigh calf, calf only, or foot pumps may be considered immediately post-operatively and/or until the patient is discharged home. Thigh length or knee high graduated compression stockings are used for most patients. With prolonged prophylaxis, lab tests must be drawn regularly. These may be accomplished with home health care or outpatient laboratories when appropriate.
- 6.7.8.4 **Minor Tranquilizer/Muscle Relaxants** are appropriate for muscle spasm, mild pain and sleep disorders. When prescribing these agents, physicians must seriously consider side effects of drowsiness or dizziness and the fact that benzodiazepines may be habit forming.
- 6.7.8.4.1 Optimal Duration: 1 week.
- 6.7.8.4.2 Maximum Duration: 4 weeks.
- 6.7.8.5 **Narcotics** should be primarily reserved for the treatment of severe lower extremity pain. There are circumstances where prolonged use of narcotics is justified based upon specific diagnosis, and in these cases, it should be documented and justified. In mild to moderate cases of lower extremity pain, narcotic medication should be used cautiously on a case by case basis. Adverse effects include respiratory depression, the development of physical and psychological dependence, and impaired alertness.
- 6.7.8.5.1 Narcotic medications should be prescribed with strict time, quantity, and duration guidelines, and with definitive cessation parameters. Pain is subjective in nature and should be evaluated using a pain scale and assessment of function to rate effectiveness of the narcotic prescribed. The physician should refer to the chronic pain guidelines, when appropriate.
- 6.7.8.5.2 Optimal Duration: 1 week
- 6.7.8.5.3 Maximum Duration: 4 weeks.
- 6.7.8.5.4 Use beyond 4 weeks is acceptable in appropriate cases. Chronic use may be appropriate in selected individual cases.
- 6.7.8.6 **Nonsteroidal Anti-Inflammatory Drugs (NSAIDs)** are useful for pain and inflammation. In mild cases, they may be the only drugs required for analgesia. There are several classes of NSAIDs, and the response of the individual injured worker to a specific medication is unpredictable. For this reason, a range of NSAIDs may be tried in each case with the most effective preparation being continued. Patients should be closely monitored for adverse reactions. The US Food and Drug Administration advise that many NSAIDs may cause an increased risk of serious cardiovascular thrombotic events, myocardial infarction, and stroke, which can be fatal. Administration of proton pump inhibitors, histamine 2 blockers, or prostaglandin analog misoprostol along with these NSAIDs may reduce the risk of duodenal and gastric ulceration but do not impact possible

cardiovascular complications. Due to the cross-reactivity between aspirin and NSAIDs, NSAIDs should not be used in aspirin-sensitive patients, and should be used with caution in all asthma patients. NSAIDs are associated with abnormal renal function, including renal failure, as well as, abnormal liver function. Certain NSAIDs may have interactions with various other medications. Individuals may have adverse events not listed above. Intervals for metabolic screening are dependent upon the patient's age, general health status and should be within parameters listed for each specific medication. Complete Blood Count (CBC) and liver and renal function should be monitored at least every six months in patients on chronic NSAIDs and initially when indicated.

6.7.8.6.1 NSAIDs may be used for pain management after joint replacement. They have also been used to reduce heterotopic ossification after arthroplasty. NSAIDs do reduce the radiographically documented heterotopic ossification in this setting, but there is some evidence that they do not improve functional outcomes and they may increase the risk of bleeding events in the post-operative period. Their routine use for prevention of heterotopic bone formation is not recommended.

6.7.8.6.2 Non-selective Nonsteroidal Anti-Inflammatory Drugs:

6.7.8.6.2.1 Includes NSAIDs and acetylsalicylic acid (aspirin). Serious GI toxicity, such as bleeding, perforation, and ulceration can occur at any time, with or without warning symptoms in patients treated with traditional NSAIDs. Physicians should inform patients about the signs and/or symptoms of serious gastrointestinal toxicity and what steps to take if they occur. Anaphylactoid reactions may occur in patients taking NSAIDs. NSAIDs may interfere with platelet function. Fluid retention and edema have been observed in some patients taking NSAIDs.

6.7.8.6.2.2 Optimal Duration: 1 week.

6.7.8.6.2.3 Maximum Duration: 1 year. Chronic use is appropriate in individual cases. Use of these substances long-term (3 days per week or greater) is associated with rebound pain upon cessation.

6.7.8.6.3 Selective Cyclo-oxygenase-2 (COX-2) Inhibitors:-

6.7.8.6.3.1 COX-2 inhibitors are more recent NSAIDs and differ in adverse side effect profiles from the traditional NSAIDs. The major advantages of selective COX-2 inhibitors over traditional NSAIDs are that they have less gastrointestinal toxicity and no platelet effects. COX-2 inhibitors can worsen renal function in patients with renal insufficiency, thus renal function may need monitoring.

6.7.8.6.3.2 COX-2 inhibitors should not be first-line for low risk patients who will be using a NSAID short-term but are indicated in select patients for whom traditional NSAIDs are not tolerated. Serious upper GI adverse events can occur even in asymptomatic patients. Patients at high risk for GI bleed include those who use alcohol, smoke, are older than 65, take corticosteroids or anti-coagulants, or have a longer duration of therapy. Celecoxib is contraindicated in sulfonamide-allergic patients.

6.7.8.6.3.3 Optimal Duration: 7 to 10 days.

6.7.8.6.3.4 Maximum Duration: Chronic use is appropriate in individual cases. Use of these substances long-term (3 days per week or greater) is associated with rebound pain upon cessation.

6.7.8.7 **Oral Steroids** have limited use but are accepted in cases requiring potent anti-inflammatory drug effect in carefully selected patients. A one-week regime of steroids may be considered in the treatment of patients who have arthritic flare-ups with significant inflammation of the joint. The physician must be fully aware of potential contraindications for the use of all steroids such as hypertension, diabetes, glaucoma, peptic ulcer disease, etc., which should be discussed with the patient.

6.7.8.7.1 Optimal Duration: 3 to 7 days.

6.7.8.7.2 Maximum Duration: 7 days.

6.7.8.8 **Osteoporosis Management:**

6.7.8.8.1 All patients with conditions which require bone healing, especially those over 50, should be encouraged to ingest at least 1200 mg of Calcium and 800 IU of Vitamin D per day. There is some evidence that, for women in the older age group (58 to 88) with low hip bone density, greater callus forms for those who adhere to these recommendations than those who do not. Although the clinical implications of this are not known, there is greater non-union in this age group and thus, coverage for these medications during the fracture healing time period is

recommended. At this time there is no evidence that bisphosphonates increase acute fracture healing.

- 6.7.8.8.2 Female patients over 65 should be referred for an osteoporosis evaluation if one has not been completed the previous year. Patients who have been on prednisone at a dose of 5 to 7.5 mg for more than 3 months should be evaluated for glucocorticoid induced osteoporosis. An osteoporosis evaluation may be considered for males who: are over 70, are physically inactive, have previous fragility fracture, have a BMI less than 20, or have been hypogonadal for 5 years. Evaluation may also be considered for patients on medications that can cause bone loss, patients who have suffered a fracture due to a low-impact fall or with minimum to no provocation, and women under 65 with one of the following: menopause before 40, current smoker, or body mass index less than 20. Low body weight appears to be the best predictor of osteoporosis in women younger than 65. In one adequate study, all patients aged 50 to 75 referred to an orthopaedic department for treatment of wrist, vertebral, proximal humerus, or hip fractures received bone mass density testing. 97% of patients had either osteoporosis (45%) or osteopenia (42%). Referral is important to prevent future fractures in these groups. Long-term care for osteoporosis is not covered under workers compensation even though it may be discovered due to an injury-related acute fracture.
- 6.7.8.9 **Psychotropic/Anti-anxiety/Hypnotic Agents** may be useful for treatment of mild and chronic pain, dysesthesias, sleep disorders, and depression. Post-operative patients may receive medication to assure normal sleep cycles. Antidepressant medications, such as tricyclics and Selective Serotonin Reuptake Inhibitors (SSRIs), are useful for affective disorder and chronic pain management. Tricyclic antidepressant agents, in low dose, are useful for chronic pain but have more frequent side effects.
- 6.7.8.9.1 Anti-anxiety medications are best used for short-term treatment (i.e., less than 6 months). Accompanying sleep disorders are best treated with sedating antidepressants prior to bedtime. Frequently, combinations of the above agents are useful. As a general rule, physicians should assess the patient's prior history of substance abuse or depression prior to prescribing any of these agents.
- 6.7.8.9.2 Due to the habit-forming potential of the benzodiazepines and other drugs found in this class, they are not routinely recommended. Refer to the Chronic Pain Guidelines which give a detailed discussion regarding medication use in chronic pain management.
- 6.7.8.9.3 Optimal Duration: 1 to 6 months.
- 6.7.8.9.4 Maximum Duration: 6 to 12 months, with monitoring.
- 6.7.8.10 **Topical Drug Delivery:** Creams and patches may be an alternative treatment of localized musculoskeletal disorders. It is necessary that all topical agents be used with strict instructions for application as well as the maximum number of applications per day to obtain the desired benefit and avoid potential toxicity. As with all medications, patient selection must be rigorous to select those patients with the highest probability of compliance. Refer to "Iontophoresis" in "Passive Therapy" part of this section for information regarding topical iontophoretic agents.
- 6.7.8.10.1 **Topical Salicylates and Nonsalicylates** have been shown to be effective in relieving pain in acute and chronic musculoskeletal conditions. Topical salicylate and nonsalicylates achieve tissue levels that are potentially therapeutic, at least with regard to COX inhibition. Other than local skin reactions, the side effects of therapy are minimal, although not non-existent, and the usual contraindications to use of these compounds needs to be considered. Local skin reactions are rare and systemic effects were even less common. Their use in patients receiving warfarin therapy may result in alterations in bleeding time. Overall, the low level of systemic absorption can be advantageous; allowing the topical use of these medications when systemic administration is relatively contraindicated such as is the case in patients with hypertension, cardiac failure, or renal insufficiency.
- 6.7.8.10.1.1 There is no evidence that topical agents are more or less effective than oral medications.
- 6.7.8.10.1.2 Optimal Duration: 1 week.
- 6.7.8.10.1.3 Maximal Duration: 2 weeks per episode.
- 6.7.8.10.2 **Capsaicin** is another medication option for topical drug use in lower extremity injury. Capsaicin offers a safe and effective alternative to systemic NSAID therapy. Although it is quite safe, effective use of capsaicin is limited by the local stinging or burning sensation that typically dissipates with regular use, usually after the first 7 to 10 days of treatment. Patients

should be advised to apply the cream on the affected area with a plastic glove or cotton applicator and to avoid inadvertent contact with eyes and mucous membranes.

6.7.8.10.2.1 Optimal Duration: 1 week.

6.7.8.10.2.2 Maximal Duration: 2 weeks per episode.

6.7.8.10.3 **Iontophoretic Agents:** Refer to “Iontophoresis,” in this Section 6.0, under the subsection for Passive Therapy.

6.7.8.11 ~~Tramadol~~ is useful in relief of lower extremity pain and has been shown to provide pain relief equivalent to that of commonly prescribed NSAIDs. ~~Tramadol~~ is an atypical opioid with norepinephrine and serotonin reuptake inhibition. It is not considered a controlled substance in the U.S. Although ~~Tramadol~~ may cause impaired alertness, it is generally well tolerated, does not cause gastrointestinal ulceration, or exacerbate hypertension or congestive heart failure. ~~Tramadol~~ should be used cautiously in patients who have a history of seizures or who are taking medication that may lower the seizure threshold, such as MAO inhibitors, SSRIs, and tricyclic antidepressants. This medication has physically addictive properties and withdrawal may follow abrupt discontinuation and is not recommended for patients with prior opioid addiction.

6.7.8.11.1 Optimal Duration: 3 to 7 days.

6.7.8.11.2 Maximum Duration: 2 weeks. Use beyond 2 weeks is acceptable in appropriate cases.

6.8 OCCUPATIONAL REHABILITATION PROGRAMS

6.8.1 **Non-Interdisciplinary:** These generally accepted programs are work-related, outcome-focused, individualized treatment programs. Objectives of the program include, but are not limited to, improvement of cardiopulmonary and neuromusculoskeletal functions (strength, endurance, movement, flexibility, stability, and motor control functions), patient education, and symptom relief. The goal is for patients to gain full or optimal function and return to work. The service may include the time-limited use of passive modalities with progression to achieve treatment and/or simulated/real work.

6.8.1.1 **Work Conditioning:** These programs are usually initiated once reconditioning has been completed but may be offered at any time throughout the recovery phase. It should be initiated when imminent return of a patient to modified or full duty is not an option, but the prognosis for returning the patient to work at completion of the program is at least fair to good.

6.8.1.1.1 Length of visit: 1 to 2 hours per day.

6.8.1.1.2 Frequency: 2 to 5 visits per week.

6.8.1.1.3 Optimum Duration: 2 to 4 weeks.

6.8.1.1.4 Maximum Duration: 6 weeks. Participation in a program beyond six weeks must be documented with respect to need and the ability to facilitate positive symptomatic or functional gains.

6.8.1.2 **Work Simulation:** is a program where an individual completes specific work-related tasks for a particular job and return to work. Use of this program is appropriate when modified duty can only be partially accommodated in the work place, when modified duty in the work place is unavailable, or when the patient requires more structured supervision. The need for work place simulation should be based upon the results of a Functional Capacity Evaluation and/or Jobsite Analysis.

6.8.1.2.1 Length of visit: 2 to 6 hours per day.

6.8.1.2.2 Frequency: 2 to 5 visits per week.

6.8.1.2.3 Optimum Duration: 2 to 4 weeks.

6.8.1.2.4 Maximum Duration: 6 weeks. Participation in a program beyond six weeks must be documented with respect to need and the ability to facilitate positive symptomatic or functional gains.

6.9 ORTHOTICS AND PROSTHETICS

6.9.1 **Fabrication/Modification of Orthotics:** would be used when there is need to normalize weight-bearing, facilitate better motion response, stabilize a joint with insufficient muscle or proprioceptive/reflex competencies, to protect subacute conditions as needed during movement, and correct biomechanical problems. Footwear modifications may be necessary for work shoes and everyday shoes. Replacement is needed every six months to one year. For specific types of orthotics/prosthetics see Section 5.0, Specific Lower Extremity Injury Diagnosis, Testing and Treatment.

6.9.1.1 Time to Produce Effect: 1 to 3 sessions (includes wearing schedule and evaluation).

6.9.1.2 Frequency: 1 to 2 times per week.

6.9.1.3 Optimum/Maximum Duration: Over a period of approximately 4 to 6 weeks for casting, fitting, and re-evaluation.

- 6.9.2 **Orthotic/Prosthetic Training:** is the skilled instruction (by qualified providers) in the proper use of orthotic devices and/or prosthetic limbs including stump preparation, donning and doffing limbs, instruction in wearing schedule and orthotic/prosthetic maintenance training. Training can include gait, mobility, transfer and self-care techniques.
- 6.9.2.1 Time to Produce Effect: 2 to 6 sessions.
 - 6.9.2.2 Frequency: 3 times per week.
 - 6.9.2.3 Optimum/Maximum Duration: 2 to 4 months.
- 6.9.3 **Splints or Adaptive Equipment** design, fabrication and/or modification indications include the need to control neurological and orthopedic injuries for reduced stress during functional activities and modify tasks through instruction in the use of a device or physical modification of a device, which reduces stress on the injury. Equipment should improve safety and reduce risk of re-injury. This includes high and low technology assistive options such as workplace modifications, crutch or walker training, and self-care aids.
- 6.9.3.1 Time to Produce Effect: Immediate.
 - 6.9.3.2 Frequency: 1 to 3 sessions or as indicated to establish independent use.
 - 6.9.3.3 Optimum/Maximum Duration: — to 3 sessions.
- 6.10 **PATIENT EDUCATION:** No treatment plan is complete without addressing issues of individual and/or group patient education as a means of prolonging the beneficial effects of treatment, as well as facilitating self-management of symptoms and injury prevention. The patient should be encouraged to take an active role in the establishment of functional outcome goals. They should be educated on their specific injury, assessment findings, and plan of treatment. Instruction on proper body mechanics and posture, positions to avoid, self-care for exacerbation of symptoms, and home exercise should also be addressed.
- 6.10.1 Time to Produce Effect: Varies with individual patient.
 - 6.10.2 Frequency: Should occur at each visit.
- 6.11 **PERSONALITY PSYCHOSOCIAL PSYCHOLOGICAL INTERVENTION:** Psychosocial treatment is a generally accepted, widely used and well-established intervention. This group of therapeutic and diagnostic modalities includes, but is not limited to: individual counseling, group therapy, stress management, psychosocial crises intervention, hypnosis and meditation. Any screening or diagnostic workup should clarify and distinguish between pre-existing versus aggravated versus purely causative psychological conditions. Psychosocial intervention is recommended as an important component in the total management program that should be implemented as soon as the problem is identified. This can be used alone or in conjunction with other treatment modalities. Providers treating patients with chronic pain should refer to the Delaware Workers' Compensation practice guidelines for Chronic Pain. Time to Produce Effect: 2 to 4 weeks.
- 6.11.1 Frequency: 1 to 3 times weekly for the first 4 weeks (excluding hospitalization, if required), decreasing to 1 to 2 times per week for the second month. Thereafter, 2 to 4 times monthly.
 - 6.11.2 Optimum Duration: 6 weeks to 3 months.
 - 6.11.3 Maximum Duration: 3 to 12 months. Counseling is not intended to delay but to enhance functional recovery. For select patients, longer supervised treatment may be required, and if further counseling beyond 3 months is indicated, documentation addressing which pertinent issues are pre-existing versus aggravated versus causative, as well as projecting a realistic functional prognosis, should be provided by the authorized treating provider every 4 to 6 weeks during treatment.
- 6.12 **RESTRICTION OF ACTIVITIES** varies according to the specific diagnosis and the severity of the condition. Job modification/modified duty are frequently required to avoid exacerbation of the injured lower extremity. Complete work cessation should be avoided, if possible, since it often further aggravates the pain presentation. Modified return to work is almost always more efficacious and rarely contraindicated in the vast majority of injured workers with lower extremity injuries.
- 6.13 **RETURN TO WORK:** Early return to work should be a prime goal in treating occupational injuries given the poor return to work prognosis for an injured worker who has been out of work for more than six months. It is imperative that the patient be educated regarding the benefits of return to work, work restrictions, and follow-up if problems arise. When attempting to return a patient to work after a specific injury, clear objective restrictions of activity level should be made. An accurate job description with detailed physical duty restrictions is often necessary to assist the physician in making return to work recommendations. This may require a jobsite evaluation.
- 6.13.1 Employers should be prepared to offer transitional work. This may consist of temporary work in a less demanding position, return to the regular job with restrictions, or gradual return to the regular job. Company policies which encourage return to work with positive communication are most likely to have decreased worker disability.

6.13.2 Return to work is defined as any work or duty that the patient is able to perform safely. It may not be the patient's regular work. Due to the large spectrum of injuries of varying severity and varying physical demands in the work place, it is not possible to make specific return to work guidelines for each injury.

6.14 **TERAPY – ACTIVE:** The following active therapies are widely used and accepted methods of care for a variety of work-related injuries. They are based on the philosophy that therapeutic exercise and/or activity are beneficial for restoring flexibility, strength, endurance, function, range of motion, and can alleviate discomfort. Active therapy requires an internal effort by the individual to complete a specific exercise or task. This form of therapy requires supervision from a therapist or medical provider such as verbal, visual and/or tactile instruction(s). At times, the provider may help stabilize the patient or guide the movement pattern but the energy required to complete the task is predominately executed by the patient.

Patients should be instructed to continue active therapies at home as an extension of the treatment process in order to maintain improvement levels. Follow-up visits to reinforce and monitor progress and proper technique are recommended. Home exercise can include exercise with or without mechanical assistance or resistance and functional activities with assistive devices.

The following active therapies are listed in alphabetical order:

6.14.1 **Activities of Daily Living (ADL)** are well-established interventions which involve instruction, active-assisted training, and/or adaptation of activities or equipment to improve a person's capacity in normal daily activities such as self-care, work re-integration training, homemaking, and driving.

6.14.1.1 Time to Produce Effect: 4 to 5 treatments.

6.14.1.2 Maximum Duration: 6 weeks.

6.14.2 **Aquatic Therapy:** is a well-accepted treatment which consists of the therapeutic use of aquatic immersion for therapeutic exercise to promote ROM, flexibility, core stabilization, endurance, strengthening, body mechanics, and pain management. Aquatic therapy includes the implementation of active therapeutic procedures in a swimming or therapeutic pool. The water provides a buoyancy force that lessens the amount of force gravity applies to the body. The decreased gravity effect allows the patient to have a mechanical advantage and more likely to have a successful trial of therapeutic exercise. Studies have shown that the muscle recruitment for aquatic therapy versus similar non-aquatic motions is significantly less. Because there is always a risk of recurrent or additional damage to the muscle tendon unit after a surgical repair, aquatic therapy may be preferred by physicians to gain early return of ROM. In some cases the patient will be able to do the exercises unsupervised after the initial supervised session. Parks and recreation contacts may be used to locate less expensive facilities for patients.

6.14.2.1 Indications include the following:

6.14.2.1.1 Post-operative therapy as ordered by the physician; or

6.14.2.1.2 Intolerance for active land-based or full-weight-bearing therapeutic procedures; or

6.14.2.1.3 Symptoms that are exacerbated in a dry environment; and

6.14.2.1.4 Willingness to follow through with the therapy on a regular basis.

6.14.2.2 The pool should be large enough to allow full extremity ROM and fully erect posture. Aquatic vests, belts, snorkels, and other devices may be used to provide stability, balance, buoyancy, and resistance.

6.14.2.3 Time to Produce Effect: 4 to 5 treatments.

6.14.2.4 Frequency: 3 to 5 times per week.

6.14.2.5 Maximum Duration: 25 Visits

6.14.2.6 A physician prescribed self-directed program is recommended after the supervised aquatics program has been established, or alternatively a transition to a self-directed dry environment exercise program.

6.14.2.7 There is some evidence that for osteoarthritis of the hip or knee, aquatic exercise probably slightly reduces pain and slightly improves function over 3 months.

6.14.3 **Functional Activities** are the use of therapeutic activity to enhance mobility, body mechanics, employability, coordination, balance, and sensory motor integration.

6.14.3.1 Time to Produce Effect: 4 to 5 treatments

6.14.3.2 Frequency: 3 to 5 times per week.

6.14.3.3 Maximum Duration: 24 visits

6.14.3.4 Total number of visit 97110 and 97530 should not exceed 40 visits without preauthorization.

6.14.4 **Functional Electrical Stimulation** is the application of electrical current to elicit involuntary or assisted contractions of atrophied and/or impaired muscles. Indications include muscle atrophy, weakness,

sluggish muscle contraction, neuromuscular dysfunction or peripheral nerve lesion. Indications also may include an individual who is precluded from active therapy.

6.14.4.1 Time to Produce Effect: 2 to 6 treatments.

6.14.4.2 Frequency: 3 times per week.

6.14.4.3 Maximum Duration: 24 visits inclusive of electrical muscle stimulation codes. If beneficial, provide with home unit.

6.14.5 **Gait Training** is specialized training that promotes normal gait for a person with a faulty gait pattern secondary to lower extremity injury or surgery. Indications include the need to promote normal gait pattern with or without assistive devices; instruct in the safety and proper use of assistive devices; instruct in progressive use of more independent devices (i.e., platform walker, to walker, to crutches, to cane); instruct in gait on uneven surfaces and steps (with and without railings) to reduce risk of fall, or loss of balance; and/or instruct in equipment to limit weight-bearing for the protection of a healing injury or surgery.

6.14.5.1 Time to Produce Effect: 2 to 6 treatments.

6.14.5.2 Frequency: 2 to 3 times per week.

6.14.5.3 Maximum Duration: 12 Visits

6.14.6 **Neuromuscular Re-education** is the skilled application of exercise with manual, mechanical, or electrical facilitation to enhance strength; movement patterns; neuromuscular response; proprioception; kinesthetic sense; coordination; education of movement, balance and posture. Indications include the need to promote neuromuscular responses through carefully timed proprioceptive stimuli to elicit and improve motor activity in patterns similar to normal neurologically developed sequences, and improve neuromotor response with independent control.

6.14.6.1 Time to Produce Effect: 2 to 6 treatments.

6.14.6.2 Frequency: 3-5 times per week.

6.14.6.3 Maximum Duration: 36 visits.

6.14.7 **Therapeutic Exercise** is a generally accepted treatment with or without mechanical assistance or resistance, may include isoinertial, isotonic, isometric and isokinetic types of exercises. There is good evidence to support the functional benefits of manual therapy with exercise, walking programs, conditioning, and other combined therapy programs. Indications include the need for cardiovascular fitness, reduced edema, improved muscle strength, improved connective tissue strength and integrity, increased bone density, promotion of circulation to enhance soft tissue healing, improvement of muscle recruitment, increased range of motion and are used to promote normal movement patterns. May also include complementary/alternative exercise movement therapy.

6.14.7.1 Time to Produce Effect: 2 to 6 treatments.

6.14.7.2 Frequency: 3 to 5 times per week.

6.14.7.3 Maximum Duration: 36 visits.

6.14.7.4 Total number of visits of 97110 & 97530 may not exceed 40 visits without pre-authorization

6.14.8 **Wheelchair Management and Propulsion** is the instruction and training of self-propulsion and proper use of a wheelchair. This includes transferring and safety instruction. This is indicated in individuals who are not able to ambulate due to bilateral lower extremity injuries, inability to use ambulatory assistive devices, and in cases of multiple traumas.

6.14.8.1 Time to Produce Effect: 2 to 6 treatments.

6.14.8.2 Frequency: 2 to 3 times per week.

6.14.8.3 Maximum Duration: 6 visits.

6.15 **THERAPY – PASSIVE:** Most of the following passive therapies and modalities are generally well-accepted methods of care for a variety of work-related injuries. Passive therapy includes those treatment modalities that do not require energy expenditure on the part of the patient. They are principally effective during the early phases of treatment and are directed at controlling symptoms such as pain, inflammation and swelling and to improve the rate of healing soft tissue injuries. They should be use adjunctively with active therapies to help control swelling, pain, and inflammation during the rehabilitation process. They may be used intermittently as the provider deems appropriate or regularly if there are specific goals with objectively measured functional improvements during treatment.

On occasion, specific diagnoses and post-surgical conditions may warrant durations of treatment beyond those listed as "maximum." Factors such as exacerbation of symptoms, re-injury, interrupted continuity of care and comorbidities may also extend durations of care. Specific goals with objectively measured functional improvement during treatment must be cited to justify extended durations of care. It is recommended that, if no

functional gain is observed after the number of treatments under “time to produce effect” has been completed alternative treatment interventions, further diagnostic studies, or further consultations should be pursued.

The following passive therapies and modalities are listed in alphabetical order.

- 6.15.1 **Continuous Passive Motion (CPM)** is a form of passive motion using specialized machinery that acts to move a joint and may also pump blood and edema fluid away from the joint and periarticular tissues. CPM is effective in preventing the development of joint stiffness if applied immediately following surgery. It should be continued until the swelling that limits motion of the joint no longer develops. ROM for the joint begins at the level of patient tolerance and is increased twice a day as tolerated. Home use of CPM is expected after chondral defect surgery. CPM may be necessary for cases with ACL repair, manipulation, joint replacement or other knee surgery if the patient has been non-compliant with pre-operative ROM exercises. Use of this equipment may require home visits.
- 6.15.1.1 Time to Produce Effect: Immediate.
 - 6.15.1.2 Frequency: Up to 4 times a day.
 - 6.15.1.3 Optimum Duration: Up to 3 weeks post surgical.
 - 6.15.1.4 Maximum Duration: 3 weeks.
- 6.15.2 **Contrast Baths** can be used for alternating immersion of extremities in hot and cold water. Indications include edema in the sub-acute stage of healing, the need to improve peripheral circulation and decrease joint pain and stiffness.
- 6.15.2.1 Time to Produce Effect: 3 treatments.
 - 6.15.2.2 Frequency: 3 times per week.
 - 6.15.2.3 Maximum Duration: 24 visits.
- 6.15.3 **Electrical Stimulation (Attended and Unattended)**, an accepted treatment; once applied, requires minimal on-site supervision by the physician or non-physician provider. Indications include pain, inflammation, muscle spasm, atrophy, decreased circulation, and the need for osteogenic stimulation.
- 6.15.3.1 Time to Produce Effect: 2 to 4 treatments.
 - 6.15.3.2 Maximum Duration: 24 visits.
- 6.15.4 **Fluidotherapy** employs a stream of dry, heated air that passes over the injured body part. The injured body part can be exercised during the application of dry heat. Indications include the need to enhance collagen extensibility before stretching, reduce muscle guarding, or reduce inflammatory response.
- 6.15.4.1 Time to Produce Effect: 1 to 4 treatments.
 - 6.15.4.2 Frequency: 1-5 times per week
 - 6.15.4.3 Maximum Duration: 24 visits.
- 6.15.5 **Iontophoresis** is the transfer of medication, including, but not limited to, steroidal anti-inflammatory and anesthetics, through the use of electrical stimulation. Indications include pain (Lidocaine), inflammation (hydrocortisone, salicylate), edema (mecholyt, hyaluronidase, and salicylate), ischemia (magnesium, mecholyt, and iodine), muscle spasm (magnesium, calcium); calcific deposits (acetate), scars, and keloids (chlorine, iodine, acetate).
- 6.15.5.1 Time to Produce Effect: 1 to 4 treatments.
 - 6.15.5.2 Frequency: 3 times per week with at least 48 hours between treatments.
 - 6.15.5.3 Maximum Duration: 8 visits per body region
- 6.15.6 **LASER**: There is mounting evidence that low-level LASER treatment may be useful in tendonopathy, trigger points, nerve injury, and osteoarthritis of the knee. Low-level LASER treatment is therefore an accepted treatment for the above.
- 6.15.6.1 Time to produce effect: 4-8 treatments
 - 6.15.6.2 Frequency: 3 sessions per week
 - 6.15.6.3 Maximum Duration: 18 visits.
- 6.15.7 **Manual Therapy Techniques** are passive interventions in which the providers use his or her hands, with or without instruments, to administer skilled movements designed to modulate pain; increase joint range of motion; reduce/eliminate soft tissue swelling, inflammation, or restriction; induce relaxation; and improve contractile and non-contractile tissue extensibility. These techniques are applied only after a thorough examination is performed to identify those for whom manual therapy would be contraindicated or for whom manual therapy must be applied with caution.
- 6.15.7.1 **Manipulation** is generally accepted, well-established and widely used therapeutic intervention for lower extremity pain and dysfunction. Manipulative Treatment (not therapy) is defined as the therapeutic application of manually guided forces by an operator to improve physiologic function

and/or support homeostasis that has been altered by the injury or occupational disease, and has associated clinical significance.

- 6.15.7.1.1 ~~High velocity, low amplitude (HVLA) technique, chiropractic manipulation, osteopathic manipulation, muscle energy techniques, counter strain, and non-force techniques are all types of manipulative treatment. This may be applied by osteopathic physicians (D.O.), chiropractic physicians (D.C.), properly trained physical therapists (P.T.), or properly trained medical physicians. Under these different types of manipulation exist many subsets of different techniques that can be described as a) direct – a forceful engagement of a restrictive/pathologic barrier, b) indirect – a gentle/non-forceful disengagement of a restrictive/pathologic barrier, c) the patient actively assists in the treatment and d) the patient relaxing, allowing the practitioner to move the body tissues. When the proper diagnosis is made and coupled with the appropriate technique, manipulation has no contraindications and can be applied to all tissues of the body. Pre-treatment assessment should be performed as part of each manipulative treatment visit to ensure that the correct diagnosis and correct treatment is employed.~~
- 6.15.7.1.2 ~~High velocity, low amplitude (HVLA) manipulation is performed by taking a joint to its end range of motion and moving the articulation into the zone of accessory joint movement, well within the limits of anatomical integrity. Indications for manipulation include joint pain, decreased joint motion, and joint adhesions. Contraindications to HVLA manipulation include joint instability, fractures, severe osteoporosis, infection, metastatic cancer, active inflammatory arthritides, aortic aneurysm, and signs of progressive neurologic deficits.~~
- 6.15.7.1.3 ~~Time to produce effect for all types of manipulative treatment: 1 to 6 treatments.~~
- 6.15.7.1.4 ~~Frequency: Up to 3 times per week for the first 4 weeks as indicated by the severity of involvement and the desired effect, then up to 2 treatments per week for the next 4 weeks. For further treatments, twice per week or less to maintain function.~~
- 6.15.7.1.5 ~~Maximum duration: 30 visits. 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. Refer to the Chronic Pain Guidelines for care beyond 6 months.~~
- 6.15.7.1.6 ~~The combination of 97140 plus either CMT or OMT code is equal to one visit when performed on the same day. Any combination of manual therapeutic intervention exceeding 30 visits (not units) needs to go to UR. A provider may perform manual therapy and manipulation on the same day. However, the provider must include a description of the service and a rationale for why both services are needed to the same body region on the same day.~~

6.15.7.2 **Mobilization (Joint) /Manipulation**

- 6.15.7.2.1 ~~Mobilization is passive movement involving oscillatory motions to the involved joints. The passive mobility is performed in a graded manner (I, II, III, IV, or V), which depicts the speed of the maneuver. It may include skilled manual joint tissue stretching. Indications include the need to improve joint play, improve intracapsular arthrokinematics, or reduce pain associated with tissue impingement.~~
- 6.15.7.2.2 ~~Time to produce effect: 4 to 6 treatments~~
- 6.15.7.2.3 ~~Frequency: 2 to 3 times per week~~
- 6.15.7.2.4 ~~Maximum duration: 30 visits (CPT codes 97124 and 97140 cannot exceed 30 visits in combination).~~

6.15.7.3 **Mobilization (Soft Tissue)**

- 6.15.7.3.1 ~~Mobilization of soft tissue is the skilled application of manual techniques designed to normalize movement patterns through the reduction of soft tissue pain and restrictions. Indications include muscle spasm around a joint, trigger points, adhesions, and neural compression.~~
- 6.15.7.3.2 **Nerve Gliding:** consist of a series of flexion and extension movements of the toes, foot, knee, and hip that produce tension and longitudinal movement along the length of the sciatic, femoral, obturator, and other nerves of the lower extremity. These exercises are based on the principle that the tissues of the peripheral nervous system are designed for movement, and that tension and glide (excursion) of nerves may have an effect on neurophysiology through alterations in vascular and axoplasmic flow. Nerve gliding performed on a patient by the clinician should be reinforced by patient performance of similar techniques as part of a home exercise program at least twice per day.

- 6.15.7.3.3 Time to produce effect: 4 to 6 treatments
 - 6.15.7.3.4 Frequency: 2 to 3 times per week
 - 6.15.7.3.5 Maximum duration: 30 visits (CPT codes 97124 and 97140 cannot exceed 30 visits in combination).
- 6.15.8 **Massage:** Manual or Mechanical— Massage is manipulation of soft tissue with broad ranging relaxation and circulatory benefits. This may include stimulation of acupuncture points and acupuncture channels (acupressure), application of suction cups and techniques that include pressing, lifting, rubbing, pinching of soft tissues by or with the practitioner's hands. Indications include edema, muscle spasm, adhesions, the need to improve peripheral circulation and range of motion, or to increase muscle relaxation and flexibility prior to exercise.
- 6.15.8.1 Time to produce effect: Immediate.
 - 6.15.8.2 Frequency: 1 to 3 times per week
 - 6.15.8.3 Maximum duration: 12 visits (CPT codes 97124 and 97140 cannot exceed 30 visits in combination).
- 6.15.9 **Paraffin Bath** is a superficial heating modality that uses melted paraffin (candle wax) to treat irregular surfaces such as the foot or ankle. Indications include the need to enhance collagen extensibility before stretching, reduce muscle guarding, or reduce inflammatory response.
- 6.15.9.1 Time to Produce Effect: 1 to 4 treatments.
 - 6.15.9.2 Frequency: 1 to 5 times per week.
 - 6.15.9.3 Maximum Duration: 20 visits. If beneficial, provide with home unit or purchase if effective.
- 6.15.10 **Superficial Heat and Cold Therapy:** thermal agents applied in various manners that lower or raise the body tissue temperature for the reduction of pain, inflammation, and/or effusion resulting from injury or induced by exercise. Includes application of heat just above the surface of the skin at acupuncture points. Indications include acute pain, edema and hemorrhage, need to increase pain threshold, reduce muscle spasm and promote stretching/flexibility. Cold and heat packs can be used at home as an extension of therapy in the clinic setting.
- 6.15.10.1 Time to produce effect: Immediate
 - 6.15.10.2 Frequency: 2 to 5 times per week (clinic). Home treatment as needed.
 - 6.15.10.3 Maximum duration: 12 visits, with maximum visits of 1 per day. If symptoms persist, consideration should be given to further diagnostic studies or other treatment options.
- 6.15.11 **Short-wave Diathermy** is an accepted treatment which involves the use of equipment that exposes soft tissue to a magnetic or electrical field. Indications include enhanced collagen extensibility before stretching, reduced muscle guarding, reduced inflammatory response, and enhanced re-absorption of hemorrhage/hematoma or edema. It is an accepted modality as an adjunct to acupuncture or situation where other forms of contact superficial heat are contraindicated.
- 6.15.11.1 Time to produce effect: 2-4 treatments
 - 6.15.11.2 Frequency: 2-3 times per week
 - 6.15.11.3 Maximum Duration: 18 visits.
- 6.15.12 **Therapeutic Taping/Strapping:** Fabrication and application of strapping or taping (e.g. use of elastic wraps, heavy cloths, or adhesive tape) are used to enhance performance of tasks for movements, support weak or ineffective joints or muscles, reduce or correct joint limitations or deformities, and/or protect body parts from injury. Splints and strapping are also used in conjunction with therapeutic exercise, functional training and other interventions, and should be selected in the context of the patient's need. Examples include, but are not limited to, strains and sprains of joints, patello femoral syndrome, and post surgical rehabilitation.
- 6.15.12.1 Time to produce effect: 3-5 treatments
 - 6.15.12.2 Frequency: Every 1-5 days
 - 6.15.12.3 Maximum Duration: 15 visits per involved area
- 6.15.13 **Transcutaneous Electrical Nerve Stimulation (TENS)** is a generally accepted treatment. TENS should include at least one instructional session for proper application and use. Indications include muscle spasm, atrophy, and decreased circulation and pain control. Minimal TENS unit parameters should include pulse rate, pulse width and amplitude modulation. Consistent, measurable functional improvement must be documented prior to the purchase of a home unit.
- 6.15.13.1 Time to Produce Effect: Immediate.
 - 6.15.13.2 Frequency: Variable.

6.15.13.3 ~~Maximum Duration: 3 sessions. If beneficial, provide with home unit or purchase if effective.~~

6.15.14 ~~**Ultrasound** is an accepted treatment which includes ultrasound with electrical stimulation and Phonophoresis. Ultrasound uses sonic generators to deliver acoustic energy for therapeutic thermal and/or non-thermal soft tissue effects. Indications include scar tissue, adhesions, collagen fiber and muscle spasm, and the need to extend muscle tissue or accelerate the soft tissue healing.~~

6.15.14.1 ~~Ultrasound with electrical stimulation is concurrent delivery of electrical energy that involves a dispersive electrode placement. Indications include muscle spasm, scar tissue, pain modulation, and muscle facilitation.~~

6.15.14.2 ~~Phonophoresis is the transfer of medication to the target tissue to control inflammation and pain through the use of sonic generators. These topical medications include, but are not limited to, steroidal anti-inflammatory and anesthetics.~~

6.15.14.3 ~~Time to produce effect: 4 to 8 treatments~~

6.15.14.4 ~~Frequency: 2-3 times per week~~

6.15.14.5 ~~Maximum duration: 18 visits~~

6.15.15 ~~**Vasopneumatic Devices** are mechanical compressive devices used in both inpatient and outpatient settings to reduce various types of edema. Indications include pitting edema, lymphedema and venostasis. Maximum compression should not exceed minimal diastolic blood pressure. Use of a unit at home should be considered if expected treatment is greater than two weeks.~~

6.15.15.1 ~~Time to Produce Effect: 1 to 3 treatments.~~

6.15.15.2 ~~Frequency: 3 to 5 times per week.~~

6.15.15.3 ~~Maximum Duration: 24 visits~~

6.15.16 ~~**Whirlpool** is conductive exposure to water at temperatures that best elicits the desired effect (cold vs. heat). It generally includes massage by water propelled by a turbine or Jacuzzi jet system and has the same thermal effects as hot packs if higher than tissue temperature. It has the same thermal effects as cold application if comparable temperature water used. Indications include the need for analgesia, relaxing muscle spasm, reducing joint stiffness, enhancing mechanical debridement and facilitating and preparing for exercise.~~

6.15.16.1 ~~Time to Produce Effect: 2 to 4 treatments.~~

6.15.16.2 ~~Frequency: 3 to 5 times per week.~~

6.15.16.3 ~~Maximum Duration: 24 visits~~

6.16 ~~**VOCATIONAL REHABILITATION** is a generally accepted intervention. Initiation of vocational rehabilitation requires adequate evaluation of patients for quantification of highest functional level and motivation. Vocational rehabilitation may be as simple as returning to the original job or as complicated as being retrained for a new occupation. The effectiveness of vocational rehabilitation may be enhanced when performed in combination with work hardening or work conditioning.~~

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7.0 Therapeutic Procedures – Operative

~~All operative interventions must be based upon positive correlation of clinical findings, clinical course and diagnostic tests. A comprehensive assimilation of these factors must lead to a specific diagnosis with positive identification of pathologic condition(s). It is imperative to rule out non-physiologic modifiers of pain presentation or non-operative conditions mimicking radiculopathy or instability (e.g., peripheral neuropathy, piriformis syndrome, myofascial pain, complex regional pain syndrome or sympathetically mediated pain syndromes, sacroiliac dysfunction, psychological conditions, etc.) prior to consideration of elective surgical intervention.~~

~~In addition, operative treatment is indicated when the natural history of surgically treated lesions is better than the natural history for non-operatively treated lesions. All patients being considered for surgical intervention should first undergo a comprehensive neuromusculoskeletal examination to identify mechanical pain generators that may respond to non-surgical techniques or may be refractory to surgical intervention.~~

~~Structured rehabilitation interventions are necessary for all of the following procedures except in some cases of hardware removal.~~

~~Return-to-work restrictions should be specific according to the recommendation in the Section 6.0, Therapeutic Procedures, Non-operative.~~

7.1 ANKLE AND SUBTALAR FUSION

7.1.1 **Description/Definition:** Surgical fusion of the ankle or subtalar joint.

7.1.2 **Occupational Relationship:** Usually post-traumatic arthritis or residual deformity.

- 7.1.3 **Specific Physical Exam Findings:** Painful, limited range of motion of the joint(s). Possible fixed deformity.
- 7.1.4 **Diagnostic Testing Procedures:** Radiographs. Diagnostic injections, MRI, CT scan, and/or bone scan.
- 7.1.5 **Surgical Indications/Considerations:** All reasonable conservative measures have been exhausted and other reasonable surgical options have been seriously considered or implemented. Patient has disabling pain or deformity. Fusion is the procedure of choice for individuals with osteoarthritis who plan to return to physically demanding activities.
 - 7.1.5.1 Prior to surgical intervention, the patient and treating physician should identify functional operative goals, and the likelihood of achieving improved ability to perform activities of daily living or work activities and the patient should agree to comply with the pre and post-operative treatment plan including home exercise. The provider should be especially careful to make sure the patient understands the amount of post-operative therapy required and the length of partial and full-disability expected post-operatively.
 - 7.1.5.2 Because smokers have a higher risk of delayed bone healing and post-operative costs, it is recommended that insurers cover a smoking cessation program peri-operatively. Physicians may monitor smoking cessation with laboratory tests such as cotinine levels for long-term cessation.
- 7.1.6 **Operative Procedures:** Open reduction internal fixation (ORIF) with possible bone grafting. External fixation may be used in some cases.
- 7.1.7 **Post-operative Treatment:**
 - 7.1.7.1 An individualized rehabilitation program based upon communication between the surgeon/physician and the therapy provider and using therapies as outlined in Section 6.0, Therapeutic Procedures, Non-operative. In all cases, communication between the physician and therapist is important to the timing of weight-bearing, and exercise progressions.
 - 7.1.7.2 When boney union is achieved, treatment usually includes active therapy with or without passive therapy, including gait training and ADLs.
 - 7.1.7.3 Recker bottom soles or shoe lifts may be required. A cast is usually in place for 6 to 8 weeks followed by graduated weight-bearing. Modified duty may last up to 4 to 6 months.
 - 7.1.7.4 Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.

7.2 KNEE FUSION

- 7.2.1 **Description/Definition:** Surgical fusion of femur to the tibia at the knee joint.
- 7.2.2 **Occupational Relationship:** Usually from post-traumatic arthritis or deformity.
- 7.2.3 **Specific Physical Exam Findings:** Stiff, painful, sometime deformed limb at the knee joint.
- 7.2.4 **Diagnostic Testing Procedures:** Radiographs. MRI, CT, diagnostic injections or bone scan.
- 7.2.5 **Surgical Indications/Considerations:** All reasonable conservative measures have been exhausted and other reasonable surgical options have been seriously considered or implemented, e.g. failure of arthroplasty. Fusion is a consideration particularly in the young patient who desires a lifestyle that would subject the knee to high mechanical stresses. The patient should understand that the leg will be shortened and there may be difficulty with sitting in confined spaces, and climbing stairs. Although there is generally a painless knee, up to 50% of cases may have complications.
 - 7.2.5.1 Prior to surgical intervention, the patient and treating physician should identify functional operative goals and the likelihood of achieving improved ability to perform activities of daily living or work activities and the patient should agree to comply with the pre and post-operative treatment plan including home exercise. The provider should be especially careful to make sure the patient understands the amount of post-operative therapy required and the length of partial and full-disability expected post-operatively.
 - 7.2.5.2 Because smokers have a higher risk of delayed bone healing and post-operative costs, it is recommended that insurers cover a smoking cessation program peri-operatively. Physicians may monitor smoking cessation with laboratory tests such as cotinine levels for long-term cessation.
- 7.2.6 **Operative Procedures:** Open reduction internal fixation (ORIF) with possible bone grafting. External fixation or intramedullary rodding may also be used.
- 7.2.7 **Post-operative Treatment:**
 - 7.2.7.1 An individualized rehabilitation program based upon communication between the surgeon/physician and the therapy provider and using therapies as outlined in Section 6.0, Therapeutic Procedures, Non-operative. In all cases, communication between the physician and therapist is important to the timing of weight-bearing, and exercise progressions.

- 7.2.7.2 When boney union is achieved, treatment usually includes active therapy with or without passive therapy, including gait training and ADLs. Non weight bearing or limited weight bearing and modified duty may last up to 4 and 6 months.
- 7.2.7.3 Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.

7.3 **ANKLE ARTHROPLASTY**

- 7.3.1 **Description/Definition:** Prosthetic replacement of the articulating surfaces of the ankle joint.
- 7.3.2 **Occupational Relationship:** Usually from post-traumatic arthritis.
- 7.3.3 **Specific Physical Exam Findings:** Stiff, painful ankle. Limited range of motion of the ankle joint.
- 7.3.4 **Diagnostic Testing Procedures:** Radiographs, MRI, diagnostic injections, CT scan, bone scan.
- 7.3.5 **Surgical Indications/Considerations:** When pain interferes with ADLs, and all reasonable conservative measures have been exhausted and other reasonable surgical options have been considered or implemented. A very limited population of patients is appropriate for ankle arthroplasty.
 - 7.3.5.1 Requirements include:
 - 7.3.5.1.1 Good bone quality;
 - 7.3.5.1.2 BMI less than 35;
 - 7.3.5.1.3 Non-smoker currently;
 - 7.3.5.1.4 Patient is 60 or older;
 - 7.3.5.1.5 No lower extremity neuropathy;
 - 7.3.5.1.6 Patient does not pursue physically demanding work or recreational activities.
 - 7.3.5.2 The following issues should be addressed when determining appropriateness for surgery: ankle laxity, bone alignment, surrounding soft tissue quality, vascular status, presence of avascular necrosis, history of open fracture or infection, motor dysfunction, and treatment of significant knee or hip pathology.
 - 7.3.5.3 Ankle implants are less successful than similar procedures in the knee or hip. There are no good studies comparing arthrodesis and ankle replacement. Patients with ankle fusions generally have good return to function and fewer complications than those with joint replacements. Re-operation rates may be higher in ankle arthroplasty than in ankle arthrodesis. Long-term performance beyond ten years for current devices is still unclear. Salvage procedures for ankle replacement include revision with stemmed implant or allograft fusion. Given these factors, an ankle arthroplasty requires prior authorization and a second opinion by a surgeon specializing in lower extremity surgery.
 - 7.3.5.4 **Contraindications** include severe osteoporosis, significant general disability due to other medical conditions, psychiatric issues.
 - 7.3.5.4.1 In cases where surgery is contraindicated due to obesity, it may be appropriate to recommend a weight loss program if the patient is unsuccessful losing weight on their own. Coverage for weight loss would continue only for motivated patients who have demonstrated continual progress with weight loss.
 - 7.3.5.5 Prior to surgery, patients may be assessed for any associated mental health or low back pain issues that may affect rehabilitation.
 - 7.3.5.6 Prior to surgical intervention, the patient and treating physician should identify functional operative goals and the likelihood of achieving improved ability to perform activities of daily living or work activities and the patient should agree to comply with the pre and post-operative treatment plan including home exercise. The provider should be especially careful to make sure the patient understands the amount of post-operative therapy required and the length of partial and full-disability expected post-operatively.
 - 7.3.5.7 Because smokers have a higher risk of delayed bone healing and post-operative costs, it is recommended that insurers cover a smoking cessation program peri-operatively. Physicians may monitor smoking cessation with laboratory tests such as cotinine levels for long term cessation.
- 7.3.6 **Operative Procedures:** Prosthetic replacement of the articular surfaces of the ankle; DVT prophylaxis is not always required but should be considered for patients who have any risk factors for thrombosis.
 - 7.3.6.1 **Complications** — include pulmonary embolism, infection, bony lysis, polyethylene wear, tibial loosening, instability, malalignment, stiffness, nerve vessel injury, and peri-prosthetic fracture.
- 7.3.7 **Post-operative Treatment:**
 - 7.3.7.1 An individualized rehabilitation program based upon communication between the surgeon/physician and the therapy provider while using therapies as outlined in Section 6.0, Therapeutic

Procedures, Non-operative. In all cases, communication between the physician and therapist is important to the timing of weight-bearing, and exercise progressions.

7.3.7.2 NSAIDs may be used for pain management after joint replacement. They have also been used to reduce heterotopic ossification after ankle arthroplasty. NSAIDs do reduce the radiographically documented heterotopic ossification in this setting, but there is some evidence (in literature on hip arthroplasty) that they do not improve functional outcomes and they may increase the risk of bleeding events in the post-operative period. Their routine use for prevention of heterotopic bone formation is not recommended.

7.3.7.3 Treatment may include the following: bracing, active therapy with or without passive therapy, gait training, and ADLs. Rehabilitation post-operatively may need to be specifically focused based on the following problems: contracture, gastrocnemius muscle weakness, and foot and ankle malalignment. Thus, therapies may include braces, shoe lifts, orthoses, and electrical stimulation accompanied by focused therapy.

7.3.7.4 In some cases aquatic therapy may be used. Refer to Section 6.0, Therapeutic Procedures, Non-operative 14, b, Aquatic Therapy. Pool exercises may be done initially under therapist's or surgeon's direction then progressed to an independent pool program.

7.3.7.5 Prior to revision surgery there should be an evaluation to rule out infection.

7.3.7.6 Return to work and restrictions after surgery may be made by a treating physician in consultation with the surgeon or by the surgeon. Patient should be able to return to sedentary work within 4 to 6 weeks. Some patients may have permanent restrictions based on their job duties.

7.3.7.7 Patients are usually seen annually after initial recovery to check plain x-rays for signs of loosening.

7.4 **KNEE ARTHROPLASTY**

7.4.1 **Description/Definition:** Prosthetic replacement of the articulating surfaces of the knee joint.

7.4.2 **Occupational Relationship:** Usually from post-traumatic osteoarthritis.

7.4.3 **Specific Physical Exam Findings:** Stiff, painful knee, and possible effusion.

7.4.4 **Diagnostic Testing Procedures:** Radiographs.

7.4.5 **Surgical Indications/Considerations:** Severe osteoarthritis and all reasonable conservative measures have been exhausted and other reasonable surgical options have been considered or implemented. Significant changes such as advanced joint line narrowing are expected. Refer to Aggravated Osteoarthritis in Section 5.0

7.4.5.1 Younger patients, less than 50 years of age, may be considered for unicompartmental replacement if there is little or no arthritis in the lateral compartment, there is no inflammatory disease and/or deformity and BMI is less than 35. They may be considered for lateral unicompartmental disease when the patient is not a candidate for osteotomy. Outcome is better for patients with social support.

7.4.5.2 **Contraindications** – severe osteoporosis, significant general disability due to other medical conditions, psychiatric issues.

7.4.5.2.1 In cases where surgery is contraindicated due to obesity, it may be appropriate to recommend a weight loss program if the patient is unsuccessful losing weight on their own. Coverage for weight loss would continue only for motivated patients who have demonstrated continual progress with weight loss.

7.4.5.3 Prior to surgery, patients may be assessed for any associated mental health or low back pain issues that may affect rehabilitation.

7.4.5.4 Prior to surgical intervention, the patient and treating physician should identify functional activities and the patient should agree to comply with the pre- and post-operative treatment plan including home exercise. The provider should be especially careful to make sure the patient understands the amount of post-operative therapy required and the length of partial- and full-disability expected post-operatively.

7.4.5.5 Because smokers have a higher risk of delayed bone healing and post-operative costs, it is recommended that insurers cover a smoking cessation program peri-operatively. Physicians may monitor smoking cessation with laboratory tests such as cotinine levels for long term cessation.

7.4.6 **Operative Procedures:** Prosthetic replacement of the articular surfaces of the knee; total or uni-compartmental with DVT prophylaxis. May include patellar resurfacing and computer assistance.

7.4.6.1 There is currently conflicting evidence on the effectiveness of patellar resurfacing. Isolated patellofemoral resurfacing is performed on patients under 60 only after diagnostic arthroscopy does not reveal any arthritic changes in other compartments. The diagnostic arthroscopy is

generally performed at the same time as the resurfacing. Resurfacing may accompany a total knee replacement at the discretion of the surgeon.

7.4.6.2 Computer guided implants are more likely to be correctly aligned. The overall long-term functional result using computer guidance is unclear. Decisions to use computer assisted methods depend on surgeon preference and age of the patient as it is more likely to have an impact on younger patients with longer expected use and wear of the implant. Alignment is only one of many factors that may affect the implant longevity.

7.4.6.3 **Complications** occur in around 3% and include pulmonary embolism; infection, bony lysis, polyethylene wear, tibial loosening, instability, malalignment, stiffness, patellar tracking abnormality, nerve-vessel injury, and peri-prosthetic fracture.

7.4.7 **Post-operative Treatment:**

7.4.7.1 Anti-coagulant therapy to prevent deep vein thrombosis. Refer to Section 6.0, Therapeutic Procedures, Non-operative.

7.4.7.2 NSAIDs may be used for pain management after joint replacement. They have also been used to reduce heterotopic ossification after knee arthroplasty. NSAIDs do reduce the radiographically documented heterotopic ossification in this setting, but there is some evidence (in literature on total hip arthroplasty) that they do not improve functional outcomes and they may increase the risk of bleeding events in the post-operative period. Their routine use for prevention of heterotopic bone formation is not recommended.

7.4.7.3 An individualized rehabilitation program based upon communication between the surgeon/physician and the therapy provider and using therapies as outlined in Section 6.0, Therapeutic Procedures, Non-operative. In all cases, communication between the physician and therapist is important to the timing of weight-bearing, and exercise progressions.

7.4.7.4 Treatment may include the following: bracing and active therapy with or without passive therapy. Rehabilitation post-operatively may need to be specifically focused based on the following problems: knee flexion contracture, quadriceps muscle weakness, knee flexion deficit, and foot, and ankle malalignment. Thus, therapies may include, knee braces, shoe lifts, orthoses, and electrical stimulation, accompanied by focused active therapy.

7.4.7.5 In some cases aquatic therapy may be used. Refer to Section 6.0, Therapeutic Procedures, Non-operative, Aquatic Therapy. Pool exercises may be done initially under a therapy provider's or surgeon's/physician's direction then progressed to an independent pool program.

7.4.7.6 Continuous passive motion is frequently prescribed. The length of time it is used will depend on the patient and their ability to return to progressive exercise.

7.4.7.7 Consider need for manipulation under anesthesia if there is less than 90 degrees of knee flexion after 6 weeks.

7.4.7.8 Prior to revision surgery there should be an evaluation to rule out infection.

7.4.7.9 Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon. Patient should be able to return to sedentary work within 4 to 6 weeks. Some patients may have permanent restrictions based on their job duties.

7.4.7.10 Patients are usually seen annually after initial recovery to check plain x-rays for signs of loosening.

7.5 **HIP ARTHROPLASTY**

7.5.1 **Description/Definition:** Prosthetic replacement of the articulating surfaces of the hip joint. In some cases, hip resurfacing may be performed.

7.5.2 **Occupational Relationship:** Usually from post-traumatic arthritis, hip dislocations and femur or acetabular fractures. Patients with intracapsular femoral fractures have a risk of developing avascular necrosis of the femoral head requiring treatment months to years after the initial injury.

7.5.3 **Specific Physical Exam Findings:** Stiff, painful hip.

7.5.4 **Diagnostic Testing Procedures:** Standing pelvic radiographs demonstrating joint space narrowing to 2 mm or less, osteophytes or sclerosis at the joint. MRI may be ordered to rule out other more serious disease.

7.5.5 **Surgical Indications/Considerations:** Severe osteoarthritis and all reasonable conservative measures have been exhausted and other reasonable surgical options have been considered or implemented. Refer to Aggravated Osteoarthritis in Section 5.0

7.5.5.1 **Possible contraindications** – inadequate bone density, prior hip surgery, and obesity.

7.5.5.1.1 In cases where surgery is contraindicated due to obesity, it may be appropriate to recommend a weight loss program if the patient is unsuccessful losing weight on their own. Coverage for

- weight loss would continue only for motivated patients who have demonstrated continual progress with weight loss.
- 7.5.5.2 Prior to surgery, patients may be assessed for any associated mental health or low back pain issues that may affect rehabilitation.
- 7.5.5.3 For patients undergoing total hip arthroplasty, there is some evidence that a pre-operative exercise conditioning program, including aquatic and land-based exercise, results in quicker discharge to home than pre-operative education alone without an exercise program.
- 7.5.5.4 Aseptic loosening of the joint requiring revision surgery occurs in some patients. Prior to revision the joint should be checked to rule out possible infection which may require a bone scan as well as laboratory procedures, including a radiologically directed joint aspiration.
- 7.5.5.5 Because smokers have a higher risk of non-union and post-operative costs, it is recommended that carriers cover a smoking cessation program peri-operatively. Physicians may monitor smoking cessation with laboratory tests such as cotinine levels for long-term cessation.
- 7.5.6 **Operative Procedures:** Prosthetic replacement of the articular surfaces of the hip, ceramic or metal prosthesis, with DVT prophylaxis. Ceramic prosthesis is more expensive; however, it is expected to have greater longevity and may be appropriate in some younger patients. Hip resurfacing, metal on metal, is an option for younger or active patients likely to out-live traditional total hip replacements.
- 7.5.6.1 **Complications** include leg length inequality, deep venous thrombosis with possible pulmonary embolus, hip dislocation, possible renal effects, need for transfusions, future infection, need for revisions, fracture at implant site.
- 7.5.6.2 The long-term benefit for computer assisted hip replacements is unknown. It may be useful in younger patients. Prior authorization is required.
- 7.5.6.3 Robotic assisted surgery is considered experimental and not recommended due to technical difficulties.
- 7.5.7 **Post-operative Treatment:**
- 7.5.7.1 Anti-coagulant therapy is used to prevent deep vein thrombosis. Refer to Section 6.0, Therapeutic Procedures, Non-operative.
- 7.5.7.2 NSAIDs may be used for pain management after joint replacement. They have also been used to reduce heterotopic ossification after hip arthroplasty. NSAIDs do reduce the radiographically documented heterotopic ossification in this setting, but there is some evidence that they do not improve functional outcomes and they may increase the risk of bleeding events in the post-operative period. Their routine use for prevention of heterotopic bone formation is not recommended.
- 7.5.7.3 An individualized rehabilitation program based upon communication between the surgeon/physician and the therapy provider and using the therapies as outlined in Section 6.0, Therapeutic Procedures Non-operative. In all cases, communication between the physician and therapist is important to the timing of weight-bearing and exercise progressions.
- 7.5.7.4 Treatment usually includes active therapy with or without passive therapy with emphasis on gait training with appropriate assistive devices. Patients with accelerated return to therapy appear to do better. Therapy should include training on the use of adaptive equipment and home and work site evaluation when appropriate.
- 7.5.7.4.1 There is good evidence for the use of aquatic therapy. Refer to Section 6.0, Therapeutic Procedures, Non-operative. Pool exercises may be done initially under a therapy provider's or surgeon's/physician's direction then progressed to an independent pool program.
- 7.5.7.4.2 There is some evidence that, for patients older than 60, early multidisciplinary therapy may shorten hospital stay and improve activity level for those receiving hip replacement. Therefore, this may be used for selected patients.
- 7.5.7.5 Return to activities at 4 to 6 weeks with appropriate restrictions by the surgeon. Initially range of motion is usually restricted. Return to activity after full recovery depends on the surgical approach. Patients can usually lift, but jogging and other high impact activities are avoided.
- 7.5.7.6 Helical CT or MRI with artifact minimization may be used to investigate prosthetic complications. The need for implant revision is determined by age, size of osteolytic lesion, type of lesion and functional status. Revision surgery may be performed by an orthopedic surgeon in cases with chronic pain and stiffness or difficulty with activities of daily living. Prior authorization is required and a second opinion by a surgeon with special expertise in hip/knee replacement surgery should usually be performed.

- 7.5.7.7 Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.
- 7.5.7.8 Patients are usually seen annually after the initial recovery to check plain x-rays for signs of loosening.

7.6 AMPUTATION

- 7.6.1 **Description/Definition:** Surgical removal of a portion of the lower extremity.
- 7.6.2 **Occupational Relationship:** Usually secondary to post-traumatic bone, soft tissue, vascular or neurologic compromise of part of the extremity.
- 7.6.3 **Specific Physical Exam Findings:** Non-useful or non-viable portion of the lower extremity.
- 7.6.4 **Diagnostic Testing Procedures:** Radiographs, vascular studies, MRI, bone scan.
- 7.6.5 **Surgical Indications/Considerations:** Non-useful or non-viable portion of the extremity.
 - 7.6.5.1 Smoking may affect soft tissue healing through tissue hypoxia. Patients should be strongly encouraged to stop smoking and be provided with appropriate counseling by the physician.
- 7.6.6 **Operative Procedures:** Amputation.
- 7.6.7 **Post-operative Treatment:**
 - 7.6.7.1 An individualized rehabilitation program based upon communication between the surgeon/physician and the therapy provider and using therapies as outlined in Section 6.0, Therapeutic Procedures, Non-operative.
 - 7.6.7.2 Rigid removable dressings are used initially.
 - 7.6.7.3 Therapies usually include active therapy with or without passive therapy for prosthetic fitting, construction and training, protected weight bearing, training on the use of adaptive equipment, and home and jobsite evaluation. Temporary prosthetics are used initially with a final prosthesis fitted by the second year. Multiple fittings and trials may be necessary to assure the best functional result.
 - 7.6.7.4 For prosthesis with special adaptive devices, e.g. computerized prosthesis; prior authorization and a second opinion from a physician knowledgeable in prosthetic rehabilitation and who has a clear description of the patients expected job duties and daily living activities are required.
 - 7.6.7.5 Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.

7.7 MANIPULATION UNDER ANESTHESIA

- 7.7.1 **Description/Definition:** Passive range of motion of a joint under anesthesia.
- 7.7.2 **Occupational Relationship:** Typically from joint stiffness that usually results from a traumatic injury, compensation related surgery, or other treatment.
- 7.7.3 **Specific Physical Exam Findings:** Joint stiffness in both active and passive modes.
- 7.7.4 **Diagnostic Testing Procedures:** Radiographs. CT, MRI, diagnostic injections.
- 7.7.5 **Surgical Indications/Considerations:** Consider if routine therapeutic modalities, including therapy and/or dynamic bracing, do not restore the degree of motion that should be expected after a reasonable period of time, usually at least 12 weeks.
- 7.7.6 **Operative Treatment:** Not applicable.
- 7.7.7 **Post-operative Treatment:**
 - 7.7.7.1 An individualized rehabilitation program based upon communication between the physician/surgeon and the therapy provider and using therapies as outlined in Section 6.0, Therapeutic Procedures, Non-operative. Therapy includes a temporary increase in frequency of both active and passive therapy to maintain the range of motion gains from surgery.
 - 7.7.7.2 Continuous passive motion is frequently used post-operatively.
 - 7.7.7.3 Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.

7.8 OSTEOTOMY

- 7.8.1 **Description/Definition:** A reconstructive procedure involving the surgical cutting of bone for realignment. It is useful for patients that would benefit from realignment in lieu of total joint replacement.
- 7.8.2 **Occupational Relationship:** Usually, post-traumatic arthritis or deformity.
- 7.8.3 **Specific Physical Exam Findings:** Painful decreased range of motion and/or deformity.
- 7.8.4 **Diagnostic Testing Procedures:** Radiographs, MRI scan, CT scan.

- 7.8.5 **Surgical Indications/Considerations:** Failure of non-surgical treatment when avoidance of total joint arthroplasty is desirable. For the knee, joint femoral osteotomy may be desirable for young or middle age patients with varus alignment and medial arthritis or valgus alignment and lateral compartment arthritis. High tibial osteotomy is also used for medial compartment arthritis. Multi-compartmental degeneration is a contraindication. Patients should have a range of motion of at least 90 degrees of knee flexion. For the ankle supra malleolar osteotomy may be appropriate. High body mass is a relative contraindication.
- 7.8.5.1 Because smokers have a higher risk of non-union and post-operative costs, it is recommended that carriers cover a smoking cessation program peri-operatively. Physicians may monitor smoking cessation with laboratory tests such as cotinine levels for long-term cessation.
- 7.8.6 **Operative Procedures:** Peri-articular opening or closing wedge of bone, usually with grafting and internal or external fixation.
- 7.8.6.1 **Complications**— new fractures, lateral peroneal nerve palsy, infection, delayed unions, compartment syndrome, or pulmonary embolism.
- 7.8.7 **Post-operative Treatment:**
- 7.8.7.1 An individualized rehabilitation program based upon communication between the physician/surgeon and the therapy provider and using therapies as outlined in Section 6.0, Therapeutic Procedures, Non-operative. In all cases, communication between the physician and therapist is important to the timing of weight-bearing, and exercise progressions.
- 7.8.7.2 Weight bearing and range of motion exercises depend on the type of procedure performed. Partial or full weight-bearing restrictions can range from 6 weeks partial weight-bearing, to 3 months full weight-bearing. It is usually 6 months before return to sports or other rigorous physical activity.
- 7.8.7.3 If femoral intertrochanteric osteotomy has been performed, there is some evidence that electrical bone growth stimulation may improve bone density. Refer to Section 6.0, Therapeutic Procedures, Non-operative, Bone Growth Stimulators for description.
- 7.8.7.4 Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.
- 7.9 **HARDWARE REMOVAL** Hardware removal frequently occurs after initial MMI. Physicians should document the possible need for hardware removal and include this as treatment in their final report on the WC 164 form.
- 7.9.1 **Description/Definition:** Surgical removal of internal or external fixation device, commonly related to fracture repairs.
- 7.9.2 **Occupational Relationship:** Usually following healing of a post-traumatic injury that required fixation or reconstruction using instrumentation.
- 7.9.3 **Specific Physical Exam Findings:** Local pain to palpation, swelling, erythema.
- 7.9.4 **Diagnostic Testing Procedures:** Radiographs, tomography, CT scan, MRI.
- 7.9.5 **Surgical Indications/Considerations:** Persistent local pain, irritation around hardware.
- 7.9.6 **Operative Procedures:** Removal of hardware may be accompanied by scar release/resection, and/or manipulation. Some instrumentation may be removed in the course of standard treatment without symptoms of local irritation.
- 7.9.7 **Post-operative Treatment:**
- 7.9.7.1 An individualized rehabilitation program based upon communication between the physician/surgeon and the therapy provider and using therapies as outlined in Section 6.0, Therapeutic Procedures, Non-operative.
- 7.9.7.2 Treatment may include therapy with or without passive therapy for progressive weight-bearing, range of motion.
- 7.9.7.3 Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.
- 7.10 **RELEASE OF CONTRACTURE**
- 7.10.1 **Description/Definition:** Surgical incision or lengthening of contracted tendon or peri-articular soft tissue.
- 7.10.2 **Occupational Relationship:** Usually following a post-traumatic complication.
- 7.10.3 **Specific Physical Exam Findings:** Shortened tendon or stiff joint.
- 7.10.4 **Diagnostic Testing Procedures:** Radiographs, CT scan, MRI scan.
- 7.10.5 **Surgical Indications/Considerations:** Persistent shortening or stiffness associated with pain and/or altered function.
- 7.10.5.1 Smoking may affect soft tissue healing through tissue hypoxia. Patients should be strongly encouraged to stop smoking and be provided with appropriate counseling by the physician.

7.10.6 **Operative Procedures:** Surgical incision or lengthening of involved soft tissue.

7.10.7 **Post-operative Treatment:**

7.10.7.1 ~~An individualized rehabilitation program based upon communication between the physician/surgeon and the therapy provider and using therapies as outlined in Section 6.0, Therapeutic Procedures, Non-operative.~~

7.10.7.2 ~~Treatments may include active therapy with or without passive therapy for stretching, range of motion exercises.~~

7.10.7.3 ~~Return to work and restrictions after surgery may be made by an attending physician in consultation with the surgeon or by the surgeon.~~

7.11 ~~**Human Bone Morphogenetic Protein (RhBMP):** (RhBMP) is a member of a family of proteins which are involved in the growth, remodeling, and regeneration of bone tissue. It has become available as a recombinant biomaterial with osteo-inductive potential for application in long bone fracture non-union and other situations in which the promotion of bone formation is desired. RhBMP may be used with intramedullary rod treatment for open tibial fractures an open tibial Type III A and B fracture treated with an intramedullary rod. There is some evidence that it decreases the need for further procedures when used within 14 days of the injury. It should not be used in those with allergies to the preparation, or in females with the possibility of child bearing, or those without adequate neurovascular status or those less than 18 years old. Ectopic ossification into adjacent muscle has been reported to restrict motion in periarticular fractures. Other than for tibial open fractures as described above, it should be used principally for non-union of fractures that have not healed with conventional surgical management or peri-prosthetic fractures.~~

~~14 DE Reg. 1381 (06/01/11)~~

(4/12/2024) *Note: Effective April __, 2024, the Workers' Compensation Oversight Panel Health Care Practice Guidelines are located at: <https://labor.delaware.gov/divisions/industrial-affairs/workers-comp/hcps/health-care-practice-guidelines/>

~~11 DE Reg. 1661 (06/01/08)~~

~~12 DE Reg. 67 (07/01/08)~~

~~12 DE Reg. 1515 (06/01/09)~~

~~13 DE Reg. 1558 (06/01/10)~~

~~14 DE Reg. 1381 (06/01/11)~~

~~17 DE Reg. 322 (09/01/13)~~

~~27 DE Reg. 858 (05/01/24) (Prop.)~~