

DEPARTMENT OF LABOR AND EMPLOYMENT

Division of Workers' Compensation

WORKERS' COMPENSATION RULES OF PROCEDURE WITH TREATMENT GUIDELINES

RULE 17, EXHIBIT 6 LOWER EXTREMITY INJURY MEDICAL TREATMENT GUIDELINES

7 CCR 1101-3 Rule 17 - Exhibit 6

[Editor's Notes follow the text of the rules at the end of this CCR Document.]

A. INTRODUCTION

This document has been prepared by the Colorado Department of Labor and Employment, Division of Workers' Compensation (Division) and should be interpreted within the context of guidelines for physicians/providers treating individuals qualifying under Colorado Workers' Compensation Act as injured workers with lower extremity injuries.

Although the primary purpose of this document is advisory and educational, these guidelines are enforceable under the Workers' Compensation Rules of Procedure, 7 CCR 1101-3. The Division 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.

To properly utilize this document, the reader should not skip nor overlook any sections.

B. GENERAL GUIDELINES 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.

- 1. APPLICATION OF THE GUIDELINES** The Division provides procedures to implement medical treatment guidelines and to foster communication to resolve disputes among the provider, payer, and patient through the Workers' Compensation Rules of Procedure. In lieu of more costly litigation, parties may wish to seek administrative dispute resolution services through the Division or the Office of Administrative Courts.
- 2. 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.
- 3. 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.

4. **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.
5. **ACTIVE THERAPEUTIC EXERCISE PROGRAM** goals should incorporate patient strength, endurance, flexibility, coordination, and education. This includes functional application in vocational or community settings.
6. **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.
7. **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.
8. **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 condition(s).
9. **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.
10. **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 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, 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. Clarification should be obtained from the employer or, if necessary, including, but not limited to, an occupational health nurse, occupational therapist, vocational rehabilitation specialist, or an industrial hygienist.
11. **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.

- 12. GUIDELINES RECOMMENDATIONS AND INCLUSION OF MEDICAL EVIDENCE** Guidelines are recommendations based on available evidence and/or consensus recommendations. When possible, guideline recommendations will note the level of evidence supporting the treatment recommendation. When interpreting medical evidence statements in the guideline, the following apply:

Consensus means the opinion of experienced professionals based on general medical principles. Consensus recommendations are designated in the guideline as “generally well accepted,” “generally accepted,” “acceptable/accepted,” or “well-established.”

“Some” means the recommendation considered at least one adequate scientific study, which reported that a treatment was effective.

“Good” means the recommendation considered the availability of multiple adequate scientific studies or at least one relevant high-quality scientific study, which reported that a treatment was effective.

“Strong” means the recommendation considered the availability of multiple relevant and high quality scientific studies, which arrived at similar conclusions about the effectiveness of a treatment.

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 “not recommended.”

- 13. CARE BEYOND MAXIMUM MEDICAL IMPROVEMENT (MMI)** should be declared when a patient’s condition has plateaued to the point where the authorized treating physician no longer believes further medical intervention is likely to result in improved function. However, some patients may require treatment after MMI has been declared in order to maintain their functional state. The recommendations in this guideline are for pre-MMI care and are not intended to limit post-MMI treatment.

The remainder of this document should be interpreted within the parameters of these guidelines principles that may lead to more optimal medical and functional outcomes for injured workers.

C. 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 lower extremity complaint are listed below.

- 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:

a. History of Present Injury:

- i. 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.
- ii. Relationship to work. This includes a statement of the probability that the illness or injury is work-related.
- iii. 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.
- iv. 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.
- v. Ability to perform job duties and activities of daily living; and
- vi. Exacerbating and alleviating factors of the reported symptoms. The physician should explore and report on non-work related as well as, work related activities.
- vii. Prior occupational and non-occupational injuries to the same area including specific prior treatment and any prior bracing devices.
- viii. Discussion of any symptoms present in the uninjured extremity.
- ix. Lower extremity injuries are frequently not isolated, but are accompanied by other injuries. In the setting of a traumatic brain injury (TBI), long bone fracture management must consider the effect of TBI on bone metabolism and may require more aggressive treatment. Refer to the Traumatic Brain Injury Medical Treatment Guidelines, Section G. 3. f, Musculoskeletal Complications.

b. Past History:

- i. Past medical history includes neoplasm, gout, arthritis, previous musculoskeletal injuries, and diabetes;
- ii. Review of systems includes symptoms of rheumatologic, neurological, endocrine, neoplastic, and other systemic diseases;
- iii. History of smoking, alcohol use, and substance abuse;
- iv. History of corticosteroid use; and
- v. Vocational and recreational pursuits.

c. 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:

i. Visual inspection;

Swelling: may indicate joint effusion from trauma, infection or arthritis. Swelling or bruising over ligaments or bones can indicate possible fractures or ligament damage;

ii. Palpation: for joint line tenderness, effusion, and bone or ligament pain. 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;

iii. Assessment of activities of daily living including gait abnormalities, especially after ambulating a distance and difficulties ascending/descending stairs;

Assessment of activities such as the inability to crouch or stoop, may give important indications of the patient's pathology and restrictions;

iv. Range-of-motion/quality-of-motion; should be assessed actively and passively;

v. Strength;

vi. Joint stability;

vii. Hip exam: 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 is a list of commonly performed tests;

A) Flexion-Abduction-External Rotation (FABER-aka Patrick's) test - is frequently used as a test for sacral pathology;

B) Log roll test - may be used to assess iliofemoral joint laxity;

C) Ober's is used to test the iliotibial band;

D) Greater trochanter bursitis is aggravated by external rotation and adduction and resisted hip abduction or external rotation;

E) Iliopectineal bursitis may be aggravated by stretching the tendon in hip extension;

F) Internal and external rotation is usually painful in osteoarthritis;

G) The maneuvers of flexion, adduction and internal rotation (FADIR) will generally reproduce pain in cases of labral tears and with piriformis strain/irritation.

viii. Knee exam: 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 is a partial list of commonly performed tests.

- A) 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.

- B) Anterior Cruciate Ligament tests:
 - Lachman's test;
 - Anterior drawer test;
 - Lateral pivot shift test.

- C) 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.
 - McMurray test;
 - Apley compression test;
 - Medial lateral grind test;
 - Weight-bearing tests - include Thessaly and Ege's test.

- D) Posterior Cruciate Ligament tests:
 - Posterior drawer test;
 - Extension lag may also be measured passively by documenting the heel height difference with the patient prone.

- E) Collateral Ligaments tests:
 - Medial stress test – A positive test in full extension may include both medial collateral ligament and cruciate ligament pathology;
 - Lateral stress test.

- F) Patellar Instability tests:
 - Apprehension test;
 - J sign;
 - Q angle.

ix. Foot and ankle exam:

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.

- x. If applicable, full neurological exam including muscle atrophy and gait abnormality.
- xi. If applicable to injury, integrity of distal circulation, sensory, and motor function.

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 E, "Specific Lower Extremity Injury Diagnosis, Testing and Treatment." Indications for initial imaging include any of the following:

- a. 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;
- b. 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;
- c. History of significant trauma, especially blunt trauma or fall from a height;
- d. Age over 55 years;
- e. History or exam suggestive of intravenous drug abuse or osteomyelitis;
- f. Pain with swelling and/or range of motion (ROM) limitation localizing to an area of prior fracture, internal fixation, or joint prosthesis; or
- g. Unexplained or persistent lower extremity pain over two weeks.

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.

Weight-bearing radiographs are used to assess osteoarthritis and alignment prior to some surgical procedures.

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. The Division recommends 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:

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

- b. 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;
- c. Serum calcium, phosphorous, uric acid, alkaline phosphatase, and acid phosphatase can detect metabolic bone disease;
- d. Liver and kidney function may be performed for prolonged anti-inflammatory use or other medications requiring monitoring; and
- e. Analysis of joint aspiration for bacteria, white cell count, red cell count, fat globules, crystalline birefringence and chemistry to evaluate joint effusion.

4. OTHER PROCEDURES

- a. **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.

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.

D. 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.

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 E, Specific Lower Extremity Injury Diagnosis, Testing, and Treatment. The studies below are listed in frequency of use, not importance.

- a. **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.

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.

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%).

MRIs have not been shown to be reliable for diagnosing symptomatic hip bursitis.

- b. **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.
- c. **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.
- d. **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. It may also be useful for post-operative pain after total knee arthroplasty (TKA), and for dynamic testing especially of the foot or ankle.
- e. **Lineal Tomography:** is infrequently used, yet may be helpful in the evaluation of joint surfaces and bone healing.
- f. **Bone Scan (Radioisotope Bone Scanning):** is generally accepted, well-established and widely used. ^{99m}Tc Technecium 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.

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.

- g. **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. ⁶⁷Ga Gallium citrate scans are used to localize tumor, infection, and abscesses. ¹¹¹In Indium-labeled leukocyte scanning is utilized for localization of infection or inflammation.

- h. **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.

2. **OTHER DIAGNOSTIC TESTS** The following diagnostic procedures listed in this subsection are listed in alphabetical order.

- a. **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.
- b. **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 E, Specific Lower Extremity Injury Diagnosis, Testing, and Treatment, and meet criteria for arthroscopic repair.

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 those cases, it is appropriate to proceed directly with the interventional arthroscopy.

- c. **Doppler Ultrasonography/Plethysmography:** 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.
- d. **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.

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.

- e. **Personality/Psychological/Psychosocial Evaluations:** 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.

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 to 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:

- i. Employment history;
- ii. Interpersonal relationships — both social and work;
- iii. Leisure activities;
- iv. Current perception of the medical system;
- v. Results of current treatment;
- vi. Perceived locus of control;
- vii. History of smoking, alcohol use, and substance abuse; and
- viii. Childhood history, including abuse and family history of disability.

This information 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 (DSM) of Mental Disorders diagnosis should be determined and documented. An individual with a PhD, PsyD, or Psychiatric MD/DO credentials should 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.

- f. **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.

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.

- a. **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.

- Frequency: One time for evaluation. Can monitor improvements in strength every 3 to 4 weeks up to a total of 6 evaluations.

- b. 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.

When an FCE is being used to determine return to a specific jobsite, the provider is responsible for fully understanding the job duties. A jobsite evaluation is frequently necessary. FCEs cannot be used in isolation to determine work restrictions. The authorized treating physician must interpret the FCE in light of the individual patient's presentation and medical and personal perceptions. FCEs should not be used as the sole criteria to diagnose malingering. Full FCEs are rarely necessary. In many cases, a work tolerance screening will identify the ability to perform the necessary job tasks. FCEs are not necessary to assign permanent impairment ratings in the Colorado workers' compensation system.

- Frequency: Can be used 1) initially to determine baseline status; and 2) for case closure when patient is unable to return to pre-injury position and further information is desired to determine permanent work restrictions. Prior authorization is required for FCEs performed during treatment.

- c. Jobsite Evaluation:** 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 evaluation may include observation and instruction of how work is done, what material changes (desk, chair) should be made, and determination of readiness to return to work.

Requests for a jobsite evaluation should describe the expected goals for the evaluation. Goals may include, but are not limited to the following:

- To determine if there are potential contributing factors to the person's condition and/or for the physician to assess causality;
- To make recommendations for, and to assess the potential for ergonomic changes;
- To provide a detailed description of the physical and cognitive job requirements;
- To assist the patient in their return to work by educating them on how they may be

able to do their job more safely in a bio-mechanically appropriate manner; and/or

v. To give detailed work/activity restrictions.

- Frequency: One time with additional visits as needed for follow-up visits per jobsite.

d. **Vocational Assessment:** Once an authorized practitioner has reasonably determined and objectively documented that a patient will not be able to return to her/her former employment and can reasonably prognosticate final restrictions, implementation of a timely vocational assessment can be performed. The vocational assessment should provide valuable guidance in the determination of future rehabilitation program goals. It should clarify rehabilitation goals, which optimize both patient motivation and utilization of rehabilitation resources. The effectiveness of vocational rehabilitation may be enhanced when performed in combination with work hardening or work conditioning. If prognosis for return to former occupation is determined to be poor, except in the most extenuating circumstances, vocational assessment should be implemented within 3 to 12 months post-injury. Declaration of Maximum Medical Improvement should not be delayed solely due to lack of attainment of a vocational assessment.

- Frequency: One time with additional visits as needed for follow-up.

e. **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. It may include a test or procedure to specifically identify and quantify work-relevant cardiovascular, physical fitness and postural tolerance. It may also address ergonomic issues affecting the patient's return-to-work potential. May be used when a full FCE is not indicated.

- Frequency: One time for initial screen. May monitor improvements in strength every 3 to 4 weeks up to a total of 6 visits.

E. SPECIFIC LOWER EXTREMITY INJURY DIAGNOSIS, TESTING, AND TREATMENT

Section E (71 pages) to be inserted separately

F. THERAPEUTIC PROCEDURES - NON-OPERATIVE

Treating providers, as well as employers and insurers are highly encouraged to reference the General Guidelines Principles (Section B) 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 F. 13, 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.

Lastly, 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.

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.

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 licensed practitioners.

a. **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.

b. **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.

c. **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.
- Optimum Duration: 1 to 2 months.
- Maximum 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 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.

- d. **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.

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 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.

- Time to Produce Effect: 3 to 4 sessions.
- Frequency: 1 to 2 times per week.
- Optimum Duration: 5 to 6 sessions.
- Maximum Duration: 10 to 12 sessions. Treatment beyond 12 sessions must be documented with respect to need, expectation, and ability to facilitate functional gains.

3. **BONE-GROWTH STIMULATORS**

- a. **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.

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.

There is insufficient evidence to conclude a benefit of electrical stimulation for delayed union, non-union, long bone fracture healing, fresh fractures, or tibial stress fractures.

- b. **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.

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. Due to lack of supporting scientific evidence, stimulators require prior authorization.

4. EXTRACORPOREAL SHOCK WAVE THERAPY (ESWT)

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.

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.

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 E, 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.

- Time to Effect: 2 sessions.
- Optimum Duration: 3 sessions one week or more apart.
- 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.

5. INJECTIONS-THERAPEUTIC

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.

Indications – Diagnostic injections are procedures which may be used to identify pain generators or pathology. For additional specific clinical indications, see Section E, Specific Lower Extremity Injury Diagnosis, Testing and Treatment.

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.

Contraindications – General contraindications include local or systemic infection, bleeding disorders, allergy to medications used, and patient refusal. Specific contraindications may apply to individual injections.

a. **Joint Injections:** are generally accepted, well-established procedures that can be performed as analgesic or anti-inflammatory procedures.

- Time to Produce Effect: Immediate with local anesthesia, or within 3 days if no anesthesia.
- Optimum Duration: Usually one to two injections is adequate.
- Maximum Duration: Not more than three to four times annually.

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.

b. **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 under 30 years of age.

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

- Time to Produce Effect: Immediate with local anesthesia, or within 3 days if no anesthesia.
- Optimum Duration: Usually one to two injections is adequate.
- Maximum Duration: Not more than three to four times annually.

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.

c. **Trigger Point Injections:** although generally accepted, have only rare indications in the

treatment of lower extremity disorders. Therefore, the Division does not recommend their routine use in the treatment of lower extremity injuries.

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.

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.

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 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.

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.

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.

- Time to Produce Effect: Local anesthetic 30 minutes; no anesthesia 24 to 48 hours.
- Frequency: Weekly, suggest no more than 4 injection sites per session per week to avoid significant post-injection soreness.
- Optimum Duration: 4 Weeks.
- Maximum Duration: 8 weeks. Occasional patients may require 2 to 4 repetitions of trigger point injection series over a 1 to 2 year period.

d. 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.

One injection of 6 ml of Hylan G-F 20 may be effective and is an option for knee injections.

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.

- 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.
- Frequency: One injection or 1 series (3 to 5 injections generally spaced 1 week apart).
- Optimum/Maximum Duration: Varies. Efficacy beyond 6 months is not well-established.

- e. **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.

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. **JOB SITE ALTERATION** 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.

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.

- a. **Ergonomic Changes:** may be made to modify the hazards identified. In addition, workers should be counseled to vary tasks throughout the day. When possible, employees performing repetitive tasks should take 15 to 30 second breaks every 10 to 20 minutes, or 5-minute breaks every hour. Mini-breaks should include stretching exercises.
- b. **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).

7. **MEDICATIONS AND MEDICAL MANAGEMENT** 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.

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.

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.

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.

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.

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.

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.

The following are listed in alphabetical order.

a. **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.

- Optimal Duration: 7 to 10 days.

- 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.

b. **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.

c. **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.

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.

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.

Hip and knee arthroplasties and hip fracture repair are standard risk factors requiring thromboprophylaxis. Commonly used agents are low molecular weight heparin, low dose un-fractionated heparin (LDUH), synthetic pentasaccharide fondaparinux, or warfarin. If aspirin is used, it should be accompanied by aggressive mechanical prophylaxis.

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.

d. **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.

- Optimal Duration: 1 week.
- Maximum Duration: 4 weeks.

e. 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.

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. Any use beyond the maximum duration should be documented and justified based on the diagnosis and/or invasive procedures.

- Optimal Duration: 3 to 7 days.
- Maximum Duration: 2 weeks. Use beyond two weeks is acceptable in appropriate cases. Refer to Chronic Pain Guidelines which gives a detailed discussion regarding medication use in chronic pain management. When prescribing beyond the maximum duration, it is recommended physicians access the Colorado PDMP (Prescription Drug Monitoring Program). This system allows the prescribing physician to see all controlled substances prescribed by other physicians for an individual patient.

f. 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. 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 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.

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.

i. **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.

- Optimal Duration: 1 week.
- Maximum Duration: 1 year. Use of these substances long-term (3 days per week or greater) is associated with rebound pain upon cessation.

ii. **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 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.

- Optimal Duration: 7 to 10 days.
- 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.

g. **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.

- Optimal Duration: 3 to 7 days.
- Maximum Duration: 7 days.

h. **Osteoporosis Management:**

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.

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.

- i. **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.

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.

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.

- Optimal Duration: 1 to 6 months.
- Maximum Duration: 6 to 12 months, with monitoring.

- j. **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 the F. 15. Passive Therapy of this section for information regarding topical iontophoretic agents.

- i. **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.

There is no evidence that topical agents are more or less effective than oral medications.

- Optimal Duration: 1 week.
- Maximal Duration: 2 weeks per episode.

ii. **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.

- Optimal Duration: 1 week.
- Maximal Duration: 2 weeks per episode.

iii. **Iontophoretic Agents:** Refer to “Iontophoresis,” in F. 15 under Passive Therapy of this section.

k. **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.

- Optimal Duration: 3 to 7 days.
- Maximum Duration: 2 weeks. Use beyond 2 weeks is acceptable in appropriate cases.

8. **OCCUPATIONAL REHABILITATION PROGRAMS**

a. **Interdisciplinary:** These generally accepted programs are characterized by a variety of disciplines that participate in the assessment, planning, and/or implementation of an injured workers program with the goal for patients to gain full or optimal function and return-to-work. There should be close interaction and integration among the disciplines to ensure that all members of the team interact to achieve team goals. These programs are for patients with greater levels of disability, dysfunction, de-conditioning and

psychological involvement. For patients with chronic pain, refer to the Division's Chronic Pain Disorder Medical Treatment Guidelines.

- i. **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 each day.
- Frequency: 2 to 5 visits per week.
- Optimum Duration: 2 to 4 weeks.
- 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.

- b. **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.

- i. **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.

- Length of visit: 1 to 2 hours per day.
- Frequency: 2 to 5 visits per week.
- Optimum Duration: 2 to 4 weeks.
- 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.

- ii. **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.

- Length of visit: 2 to 6 hours per day.
- Frequency: 2 to 5 visits per week.
- Optimum Duration: 2 to 4 weeks.
- 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.

9. ORTHOTICS AND PROSTHETICS

- 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 E, "Specific Lower Extremity Injury Diagnosis, Testing and Treatment."
 - Time to Produce Effect: 1 to 3 sessions (includes wearing schedule and evaluation).
 - Frequency: 1 to 2 times per week.
 - Optimum/Maximum Duration: Over a period of approximately 4 to 6 weeks for casting, fitting, and re-evaluation.
- 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.
 - Time to Produce Effect: 2 to 6 sessions.
 - Frequency: 3 times per week.
 - Optimum/Maximum Duration: 2 to 4 months.
- 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.
 - Time to Produce Effect: Immediate.
 - Frequency: 1 to 3 sessions or as indicated to establish independent use.
 - Optimum/Maximum Duration: 1 to 3 sessions.

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.
- Time to Produce Effect: Varies with individual patient.
 - Frequency: Should occur at each visit.
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 Division's Chronic Pain Disorder Medical Treatment Guidelines.
- Time to Produce Effect: 2 to 4 weeks.
 - 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.
 - Optimum Duration: 6 weeks to 3 months.
 - 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.
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.
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.

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.

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. Therefore, the Division recommends the following:

- a. **Compliance with Activity Restrictions:** In some cases, compliance with restriction of activity levels may require a complete jobsite evaluation, a functional capacity evaluation (FCE), or other special testing. Refer to the "Special Tests" section of these guidelines.
 - b. **Establishment of a Return-to-Work Status:** Ascertaining a return-to-work status is part of medical care, should be included in the treatment and rehabilitation plan, and addressed at every visit. A description of daily activity limitations is part of any treatment plan and should be the basis for restriction of work activities. In most cases non-surgical the patient should be able to return to work in some capacity or in an alternate position consistent with medical treatment within several days unless there are extenuating circumstances. Injuries requiring more than two weeks off work should be thoroughly documented (Some of these diagnoses are listed in Section E, Specific Lower Extremity Injury Diagnosis, Testing and Treatment).
 - c. **Establishment of Activity Level Restrictions:** Communication is essential between the patient, employer and provider to determine appropriate restrictions and return-to-work dates. It is the responsibility of the physician to provide clear concise restrictions, and it the employer's responsibility to determine if temporary duties can be provided within the restrictions. For lower extremity injuries, the following should be addressed when describing the patient's activity level:
 - i. Lower body postures such as squatting, kneeling, crawling, stooping, or climbing, including duration and frequency.
 - ii. Ambulatory level for distance, frequency and terrain.
 - iii. Static and dynamic standing including duration and frequency.
 - iv. Ability to maintain balance.
 - v. Use of adaptive devices, including cane and walker, to accomplish basic job duties.
14. **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:

- a. **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.
 - Frequency: 3 to 5 times per week.
 - Optimum Duration: 4 to 6 weeks.
 - Maximum Duration: 6 weeks.
- b. **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 surgeons 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. Indications include:
- Post-operative therapy as ordered by the surgeon; or
 - Intolerance for active land-based or full-weight-bearing therapeutic procedures; or
 - Symptoms that are exacerbated in a dry environment; and
 - Willingness to follow through with the therapy on a regular basis.

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.

- Time to Produce Effect: 4 to 5 treatments.
- Frequency: 3 to 5 times per week.
- Optimum Duration: 4 to 6 weeks.
- Maximum Duration: 8 weeks.

A 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.

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.

- c. **Functional Activities:** are 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.
 - Optimum Duration: 4 to 6 weeks.
 - Maximum Duration: 6 weeks
- d. **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.
- Time to Produce Effect: 2 to 6 treatments.
 - Frequency: 3 times per week.
 - Optimum Duration: 8 weeks.
 - Maximum Duration: 8 weeks. If beneficial, provide with home unit. Home use is not recommended for neuromuscularly intact patients.
- e. **Gait Training:** is crutch walking, cane or walker instruction to a person with lower extremity injury or surgery. Indications include the need to promote normal gait pattern with 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.
- Time to Produce Effect: 2 to 6 treatments.
 - Frequency: 2 to 3 times per week.
 - Optimum Duration: 2 weeks.
 - Maximum Duration: 2 weeks.
- f. **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 times per week.

- Optimum Duration: 4 to 8 weeks.
- Maximum Duration: 8 weeks.

g. 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.

- Time to Produce Effect: 2 to 6 treatments.
- Frequency: 3 to 5 times per week.
- Optimum Duration: 4 to 8 weeks.
- Maximum Duration: 8 weeks.

h. 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.

- Time to Produce Effect: 2 to 6 treatments.
- Frequency: 2 to 3 times per week.
- Optimum Duration: 2 weeks.
- Maximum Duration: 2 weeks.

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 used adjunctively 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.

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.

- a. **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.
- Time to Produce Effect: Immediate.
 - Frequency: Up to 4 times a day.
 - Optimum Duration: Up to 3 weeks post surgical.
 - Maximum Duration: 3 weeks.
- b. **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.
- Time to Produce Effect: 3 treatments.
 - Frequency: 3 times per week.
 - Optimum Duration: 4 weeks.
 - Maximum Duration: 1 month.
- c. **Electrical Stimulation (Unattended):** 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.
- Time to Produce Effect: 2 to 4 treatments.
 - Frequency: Varies, depending upon indication, between 2 to 3 times per day to 1 time a week. Provide home unit if treatment is effective and frequent use is recommended.
 - Optimum Duration: 1 to 3 months.
 - Maximum Duration: 3 months.
- d. **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.
- Time to Produce Effect: 1 to 4 treatments.
 - Frequency: 1 to 3 times per week.
 - Optimum Duration: 4 weeks.

- Maximum Duration: 1 month.

e. **Hyperbaric Oxygen Therapy:** There is no evidence to support long-term benefit of hyperbaric oxygen therapy for non-union lower extremity fractures. It is not recommended.

f. **Infrared Therapy:** is a radiant form of heat application. Indications include the need to elevate the pain threshold before exercise and to alleviate muscle spasm to promote increased movement.

- Time to Produce Effect: 2 to 4 treatments.

- Frequency: 3 to 5 times per week.

- Optimum Duration: 3 weeks as primary, or up to 2 months if used intermittently as an adjunct to other therapeutic procedures.

- Maximum Duration: 2 months.

g. **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 (mecholyll, hyaluronidase, and salicylate), ischemia (magnesium, mecholyll, and iodine), muscle spasm (magnesium, calcium); calcific deposits (acetate), scars, and keloids (chlorine, iodine, acetate).

- Time to Produce Effect: 1 to 4 treatments.

- Frequency: 3 times per week with at least 48 hours between treatments.

- Optimum Duration: 8 to 10 treatments.

- Maximum Duration: 10 treatments.

h. **Manipulation:** is a generally accepted, well-established and widely used therapeutic intervention for lower extremity injuries. 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 therapists (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.

- Time to Produce Effect (for all types of manipulative treatment): 1 to 6 treatments.
- Frequency: Up to 3 times per week for the first 3 weeks as indicated by the severity of involvement and the desired effect.
- Optimum Duration: 10 treatments.
- Maximum Duration: 12 treatments. Additional visits may be necessary in cases of re-injury, interrupted continuity of care, exacerbation of symptoms, and in those patients with co-morbidities. Functional gains including increased ROM must be demonstrated to justify continuing treatment.

i. **Manual Electrical Stimulation:** is used for peripheral nerve injuries or pain reduction that requires continuous application, supervision, or involves extensive teaching. Indications include muscle spasm (including TENS), atrophy, decreased circulation, osteogenic stimulation, inflammation, and the need to facilitate muscle hypertrophy, muscle strengthening, muscle responsiveness in Spinal Cord Injury/Brain Injury (SCI/BI), and peripheral neuropathies.

- Time to Produce Effect: Variable, depending upon use.
- Frequency: 3 to 7 times per week.
- Optimum Duration: 8 weeks.
- Maximum Duration: 2 months.

j. **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 (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 cases with edema, deep vein thrombosis should be ruled out prior to treatment.

- Time to Produce Effect: Immediate.
- Frequency: 1 to 2 times per week.
- Optimum Duration: 6 weeks.
- Maximum Duration: 2 months.

k. **Mobilization (Joint):** Mobilization is passive movement, which may include passive range of motion performed in such a manner (particularly in relation to the speed of the movement) that it is, at all times, within the ability of the patient to prevent the movement if they so choose. 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: 6 to 9 treatments.
- Frequency: 3 times per week.

- Optimum Duration: 6 weeks.
- Maximum Duration: 2 months.

i. 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.

- Time to Produce Effect: 2 to 3 weeks.
- Frequency: 2 to 3 times per week.
- Optimum Duration: 4 to 6 weeks.
- Maximum Duration: 6 weeks.

m. 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.

- Time to Produce Effect: 1 to 4 treatments.
- Frequency: 1 to 3 times per week.
- Optimum Duration: 4 weeks.
- Maximum Duration: 1 month. If beneficial, provide with home unit or purchase if effective.

n. Superficial Heat and Cold Therapy: Superficial heat and cold therapies 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. It may be used acutely with compression and elevation. Indications include acute pain, edema and hemorrhage, need to increase pain threshold, reduce muscle spasm and promote stretching/flexibility. It includes portable cryotherapy units and application of heat just above the surface of the skin at acupuncture points.

- Time to Produce Effect: Immediate.
- Frequency: 2 to 5 times per week.
- Optimum Duration: 3 weeks as primary, or up to 2 months if used intermittently as an adjunct to other therapeutic procedures.
- Maximum Duration: 2 months.

o. Short-wave Diathermy: 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.

- Time to Produce Effect: 2 to 4 treatments.
- Frequency: 2 to 3 times per week up to 3 weeks.
- Optimum Duration: 3 to 5 weeks.
- Maximum Duration: 5 weeks.

p. Traction: Manual traction is 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.

- Time to Produce Effect: 1 to 3 sessions.
- Frequency: 2 to 3 times per week.
- Optimum Duration: 30 days.
- Maximum Duration: 1 month.

q. 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.

- Time to Produce Effect: Immediate.
- Frequency: Variable.
- Optimum Duration: 3 sessions.
- Maximum Duration: 3 sessions. If beneficial, provide with home unit or purchase if effective. Due to variations in costs and in models, prior authorization for home units is required.

r. 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.

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.

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.
- Optimum Duration: 4 to 8 weeks.
- Maximum Duration: 2 months.

s. **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.

- Time to Produce Effect: 1 to 3 treatments.
- Frequency: 3 to 5 times per week.
- Optimum Duration: 1 month.
- Maximum Duration: 1 month. If beneficial, provide with home unit.

t. **Whirlpool/Hubbard Tank:** 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.

- Time to Produce Effect: 2 to 4 treatments.
- Frequency: 3 to 5 times per week.
- Optimum Duration: 3 weeks as primary, or up to 2 months if used intermittently as an adjunct to other therapeutic procedures.
- Maximum Duration: 2 months.

16. **VOCATIONAL REHABILITATION** is a generally accepted intervention, but Colorado limits its use as a result of Senate Bill 87-79. Initiation of vocational rehabilitation requires adequate evaluation of patients for quantification of highest functional level, motivation and achievement of maximum medical improvement (MMI). 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.

It may also be beneficial for full vocational rehabilitation to be started before MMI 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.

G. 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 F. 13, Therapeutic Procedures, Non-operative.

1. ANKLE AND SUBTALAR FUSION

- a. **Description/Definition:** Surgical fusion of the ankle or subtalar joint.
- b. **Occupational Relationship:** Usually post-traumatic arthritis or residual deformity.
- c. **Specific Physical Exam Findings:** Painful, limited range of motion of the joint(s). Possible fixed deformity.
- d. **Diagnostic Testing Procedures:** Radiographs. Diagnostic injections, MRI, CT scan, and/or bone scan.
- e. **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.

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.

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.

- f. **Operative Procedures:** Open reduction internal fixation (ORIF) with possible bone grafting. External fixation may be used in some cases.
- g. **Post-operative Treatment:**
 - i. An individualized rehabilitation program based upon communication between the surgeon and the therapist and using therapies as outlined in Section F. Therapeutic Procedures, Non-operative. In all cases, communication between the physician and therapist is important to the timing of weight-bearing, and

exercise progressions.

- ii. When bony union is achieved, treatment usually includes active therapy with or without passive therapy, including gait training and ADLs.
- iii. Rocker 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.
- iv. Return to work and restrictions after surgery may be made by an attending physician experienced in occupational medicine in consultation with the surgeon or by the surgeon.

2. **KNEE FUSION**

- a. **Description/Definition:** Surgical fusion of femur to the tibia at the knee joint.
- b. **Occupational Relationship:** Usually from post-traumatic arthritis or deformity.
- c. **Specific Physical Exam Findings:** Stiff, painful, sometime deformed limb at the knee joint.
- d. **Diagnostic Testing Procedures:** Radiographs. MRI, CT, diagnostic injections or bone scan.
- e. **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.

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.

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.

- f. **Operative Procedures:** Open reduction internal fixation (ORIF) with possible bone grafting. External fixation or intramedullary rodding may also be used.
- g. **Post-operative Treatment:**
 - i. An individualized rehabilitation program based upon communication between the surgeon and the therapist and using therapies as outlined in Section F. Therapeutic Procedures, Non-operative. In all cases, communication between the physician and therapist is important to the timing of weight-bearing, and exercise progressions.

- ii. When bony 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.
- iii. Return to work and restrictions after surgery may be made by an attending physician experienced in occupational medicine in consultation with the surgeon or by the surgeon.

3. **ANKLE ARTHROPLASTY**

- a. **Description/Definition:** Prosthetic replacement of the articulating surfaces of the ankle joint.
- b. **Occupational Relationship:** Usually from post-traumatic arthritis.
- c. **Specific Physical Exam Findings:** Stiff, painful ankle. Limited range-of-motion of the ankle joint.
- d. **Diagnostic Testing Procedures:** Radiographs, MRI, diagnostic injections, CT scan, bone scan.
- e. **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 are appropriate for ankle arthroplasty.

Requirements include:

- Good bone quality;
- BMI less than 35;
- Non-smoker currently;
- Patient is 60 or older;
- No lower extremity neuropathy;
- Patient does not pursue physically demanding work or recreational activities.

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.

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.

Contraindications - severe osteoporosis, significant general disability due to other

medical conditions, psychiatric issues.

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.

Prior to surgery, patients may be assessed for any associated mental health or low back pain issues that may affect rehabilitation.

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.

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.

- f. **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.

Complications – include pulmonary embolism, infection, bony lysis, polyethylene wear, tibial loosening, instability, malalignment, stiffness, nerve-vessel injury, and peri-prosthetic fracture.

g. **Post-operative Treatment:**

- i. An individualized rehabilitation program based upon communication between the surgeon and the therapist while using therapies as outlined in Section F. Therapeutic Procedures, Non-operative. In all cases, communication between the physician and therapist is important to the timing of weight-bearing, and exercise progressions.
- ii. 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.
- iii. 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.
- iv. In some cases aquatic therapy may be used. Refer to Section F, 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.

- v. Prior to revision surgery there should be an evaluation to rule out infection.
- vi. Return to work and restrictions after surgery may be made by a treating physician experienced in occupational medicine 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.
- vii. Patients are usually seen annually after initial recovery to check plain x-rays for signs of loosening.

4. **KNEE ARTHROPLASTY**

- a. **Description/Definition:** Prosthetic replacement of the articulating surfaces of the knee joint.
- b. **Occupational Relationship:** Usually from post-traumatic osteoarthritis.
- c. **Specific Physical Exam Findings:** Stiff, painful knee, and possible effusion.
- d. **Diagnostic Testing Procedures:** Radiographs.
- e. **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 subsection E.2. a, Aggravated Osteoarthritis.

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.

Contraindications - severe osteoporosis, significant general disability due to other medical conditions, psychiatric issues.

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.

Prior to surgery, patients may be assessed for any associated mental health or low back pain issues that may affect rehabilitation.

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.

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.

- f. **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.

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.

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.

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.

g. **Post-operative Treatment:**

- i. Anti coagulant therapy to prevent deep vein thrombosis. Refer to Section F., Therapeutic Procedures, Non-operative.
- ii. 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.
- iii. An individualized rehabilitation program based upon communication between the surgeon and the therapist and using therapies as outlined in Section F. Therapeutic Procedures, Non-operative. In all cases, communication between the physician and therapist is important to the timing of weight-bearing, and exercise progressions.
- iv. 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.
- v. In some cases aquatic therapy may be used. Refer to Section F, 14. b. Therapeutic Procedures, Non-operative, Aquatic Therapy. Pool exercises may be done initially under therapist's or surgeon's direction then progressed to an independent pool program.
- vi. 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.

- vii. Consider need for manipulation under anesthesia if there is less than 90 degrees of knee flexion after 6 weeks.
- viii. Prior to revision surgery there should be an evaluation to rule out infection.
- ix. Return to work and restrictions after surgery may be made by an attending physician experienced in occupational medicine 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.
- x. Patients are usually seen annually after initial recovery to check plain x-rays for signs of loosening.

5. HIP ARTHROPLASTY

- a. **Description/Definition:** Prosthetic replacement of the articulating surfaces of the hip joint. In some cases, hip resurfacing may be performed.
- b. **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.
- c. **Specific Physical Exam Findings:** Stiff, painful hip.
- d. **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.
- e. **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 subsection E. 3. b. Aggravated Osteoarthritis.

Possible contraindications - inadequate bone density, prior hip surgery, and obesity.

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.

Prior to surgery, patients may be assessed for any associated mental health or low back pain issues that may affect rehabilitation.

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.

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.

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.

- f. **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.

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.

The long-term benefit for computer assisted hip replacements is unknown. It may be useful in younger patients. Prior authorization is required.

Robotic assisted surgery is considered experimental and not recommended due to technical difficulties.

g. **Post-operative Treatment:**

- i. Anti coagulant therapy is used to prevent deep vein thrombosis. Refer to Section F, Therapeutic Procedures, Non-operative.
- ii. 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.
- iii. An individualized rehabilitation program based upon communication between the surgeon and the therapist and using the therapies as outlined in Section F. Therapeutic Procedures Non-operative. In all cases, communication between the physician and therapist is important to the timing of weight-bearing and exercise progressions.
- iv. 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.

There is good evidence for the use of aquatic therapy. Refer to Section F., 14. b. Therapeutic Procedures, Non-operative. Pool exercises may be done initially under a therapist's or surgeon's direction then progressed to an independent pool program.

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.

- v. 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.

- vi. 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.
- vii. Return to work and restrictions after surgery may be made by an attending physician experienced in occupational medicine in consultation with the surgeon or by the surgeon.
- viii. Patients are usually seen annually after the initial recovery to check plain x-rays for signs of loosening.

6. **AMPUTATION**

- a. **Description/Definition:** Surgical removal of a portion of the lower extremity.
- b. **Occupational Relationship:** Usually secondary to post-traumatic bone, soft tissue, vascular or neurologic compromise of part of the extremity.
- c. **Specific Physical Exam Findings:** Non-useful or non-viable portion of the lower extremity.
- d. **Diagnostic Testing Procedures:** Radiographs, vascular studies, MRI, bone scan.
- e. **Surgical Indications/Considerations:** Non-useful or non-viable portion of the extremity.

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.

- f. **Operative Procedures:** Amputation.
- g. **Post-operative Treatment:**
 - i. An individualized rehabilitation program based upon communication between the surgeon and the therapist and using therapies as outlined in Section F. Therapeutic Procedures, Non-operative.
 - ii. Rigid removable dressings are used initially.
 - iii. 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.
 - iv. 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.

- v. Return to work and restrictions after surgery may be made by an attending physician experienced in occupational medicine in consultation with the surgeon or by the surgeon.

7. **MANIPULATION UNDER ANESTHESIA**

- a. **Description/Definition:** Passive range of motion of a joint under anesthesia.
- b. **Occupational Relationship:** Joint stiffness that usually results from a traumatic injury, compensation related surgery, or other treatment.
- c. **Specific Physical Exam Findings:** Joint stiffness in both active and passive modes.
- d. **Diagnostic Testing Procedures:** Radiographs. CT, MRI, diagnostic injections.
- e. **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.
- f. **Operative Treatment:** Not applicable.
- g. **Post-operative Treatment:**
 - i. An individualized rehabilitation program based upon communication between the surgeon and the therapist and using therapies as outlined in Section F. 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.
 - ii. Continuous passive motion is frequently used post-operatively.
 - iii. Return to work and restrictions after surgery may be made by an attending physician experienced in occupational medicine in consultation with the surgeon or by the surgeon.

8. **OSTEOTOMY**

- a. **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.
- b. **Occupational Relationship:** Post-traumatic arthritis or deformity.
- c. **Specific Physical Exam Findings:** Painful decreased range of motion and/or deformity.
- d. **Diagnostic Testing Procedures:** Radiographs, MRI scan, CT scan.
- e. **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.

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.

- f. **Operative Procedures:** Peri-articular opening or closing wedge of bone, usually with grafting and internal or external fixation.

Complications - new fractures, lateral peroneal nerve palsy, infection, delayed unions, compartment syndrome, or pulmonary embolism.

g. **Post-operative Treatment:**

- i. An individualized rehabilitation program based upon communication between the surgeon and the therapist and using therapies as outlined in Section F. Therapeutic Procedures, Non-operative. In all cases, communication between the physician and therapist is important to the timing of weight-bearing, and exercise progressions.
- ii. 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.
- iii. If femoral intertrochanteric osteotomy has been performed, there is some evidence that electrical bone growth stimulation may improve bone density. Refer to Section F., 3. Therapeutic Procedures, Non-operative, Bone Growth Stimulators for description.
- iv. Return to work and restrictions after surgery may be made by an attending physician experienced in occupational medicine in consultation with the surgeon or by the surgeon.

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.

- a. **Description/Definition:** Surgical removal of internal or external fixation device, commonly related to fracture repairs.
- b. **Occupational Relationship:** Usually following healing of a post-traumatic injury that required fixation or reconstruction using instrumentation.
- c. **Specific Physical Exam Findings:** Local pain to palpation, swelling, erythema.
- d. **Diagnostic Testing Procedures:** Radiographs, tomography, CT scan, MRI.
- e. **Surgical Indications/Considerations:** Persistent local pain, irritation around hardware.
- f. **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.

g. Post-Operative Treatment:

- i. An individualized rehabilitation program based upon communication between the surgeon and the therapist and using therapies as outlined in Section F. Therapeutic Procedures, Non-operative.
- ii. Treatment may include therapy with or without passive therapy for progressive weight-bearing, range of motion.
- iii. Return to work and restrictions after surgery may be made by an attending physician experienced in occupational medicine in consultation with the surgeon or by the surgeon.

10. RELEASE OF CONTRACTURE

- a. **Description/Definition:** Surgical incision or lengthening of contracted tendon or peri-articular soft tissue.
- b. **Occupational Relationship:** Usually following a post-traumatic complication.
- c. **Specific Physical Exam Findings:** Shortened tendon or stiff joint.
- d. **Diagnostic Testing Procedures:** Radiographs, CT scan, MRI scan.
- e. **Surgical Indications/Considerations:** Persistent shortening or stiffness associated with pain and/or altered function.

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.

- f. **Operative Procedures:** Surgical incision or lengthening of involved soft tissue.

g. Post-operative Treatment:

- i. An individualized rehabilitation program based upon communication between the surgeon and the therapist and using therapies as outlined in Section F. Therapeutic Procedures, Non-operative.
- ii. Treatments may include active therapy with or without passive therapy for stretching, range of motion exercises.
- iii. Return to work and restrictions after surgery may be made by an attending physician experienced in occupational medicine in consultation with the surgeon or by the surgeon.

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. Due to the lack of information on the incidence of complications and overall success rate in these situations, its use requires prior authorization. Refer to Section E 3. k, Tibial Fracture.

Editor's Notes

7 CCR 1101-3 has been divided into smaller sections for ease of use. Versions prior to 01/01/2011, and rule history, are located in the first section, 7 CCR 1101-3. Prior versions can be accessed from the History link that appears above the text in 7 CCR 1101-3. To view versions effective after 01/01/2011, select the desired part of the rule, for example 7 CCR 1101-3 Rules 1-17, or 7 CCR 1101-3 Rule 18: Exhibit 1.

History

[For history of this section, see Editor's Notes in the first section, 7 CCR 1101-3]