STATE OF RHODE ISLAND
WORKERS' COMPENSATION COURT
MEDICAL ADVISORY BOARD

PROTOCOLS

Approved by the Medical Advisory Board
Rhode Island Workers' Compensation Court

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TABLE OF CONTENTS

YEAR PROTCOL WAS LAST REVIEWED 3
PREFACE. 4
CARPAL TUNNEL SYNDROME 5
CERVICAL MUSCULOLIGAMENTOUS INJURY (Sprain/Strain) 8
HERNIATED CERVICAL DISC 11
PROTOCOLS FOR INJURIES TO THE EYE 15
PROTOCOL FOR THE EVALUATION AND MANAGEMENT OF
ACUTE SHOULDER INJURIES 26
PROTOCOL FOR THE MANAGEMENT OF ACUTE INJURIES TO THE KNEE 29
LOW BACK MUSCULOLIGAMENTOUS INJURY (SPRAIN/STRAIN). 33
HERNIATED LUMBAR DISC. 36
LUMBAR FUSION.. 40
TRAUMATIC BRAIN INJURY.(formerly Post Traumatic Headache) 41
CHRONIC REGIONAL PAIN SYNDROME (formerly Symp. Dyst.). 46
THORACIC OUTLET SYNDROME 50
PROTOCOLS FOR INJURIES TO THE FOOT AND ANKLE. 53
WORKERS COMP. PROTOCOLS WHEN PRIMARY INJURY IS
PSYCHIATRIC/PSYCHOLOGICAL. 68
OUTPATIENT PHYSICAL AND OCCUPATIONAL THERAPY PROTOCOL GUIDELINES. 83
ACOUSTIC TRAUMA. 90
INTERVENTIONAL PAIN MANAGEMENT TREATMENT PROTOCOL 94
WORK HARDENING PROTOCOLS 112
PROTOCOL FOR THE MANAGEMENT OF GROIN HERNIAS 116
ACUPUNCTURE.. 119
DIAGNOSTIC TESTING PROTOCOLS. 122
TEMPOROMANDIBULAR JOINT DISORDERS.. 126
ACUTE HAND INJURY PROTOCOLS.. 131
PHARMACEUTICAL PROTOCOLS 144
CONTACT DERMATITIS PROTOCOL. 145
PROTOCOL CONCERNS REGARDING PERFORMANCE OF
RADIOGRAPHIC EVALUATION IN WORKERS' COMPENSATION CASES. 147
CUBITAL TUNNEL SYNDROME.. 150
RADIAL TUNNEL SYNDROME 153
SPINAL COLUMN STIMULATORS 156
ANTERIOR CRUCIATE RUPTURES 158
HEARING LOSS PROTOCOL 160
INITIAL VOCATIONAL ASSESSMENT PROTOCOL GUIDELINES. 162
HIERARCHY OF VOCATIONAL REHABILITATION. 164
OCCUPATIONAL HEARING IMPAIRMENT TREATMENT PROTOCOL 165
DIAGNOSIS AND INITIAL TREATMENT OF OCCUPATIONAL ASTHMA 169
CHRONIC NONINTERVENTIONAL, NONCANCER PAIN PROTOCOL 177

YEAR PROTOCOL WAS LAST REVIEWED

PREFACE
CARPAL TUNNEL SYNDROME 2017
CERVICAL MUSCULOLIGAMENTOUS INJURY (Sprain/Strain) 2007
HERNIATED CERVICAL DISC 2007
PROTOCOLS FOR INJURIES TO THE EYE 2016
PROTOCOL FOR THE EVALUATION AND MANAGEMENT OF
ACUTE SHOULDER INJURIES 2006
PROTOCOL FOR THE MANAGEMENT OF ACUTE INJURIES TO THE KNEE 2007
LOW BACK MUSCULOLIGAMENTOUS INJURY (SPRAIN/STRAIN). 2009
HERNIATED LUMBAR DISC. 2009
LUMBAR FUSION 2007
TRAUMATIC BRAIN INJURY – (formerly Post Traumatic Headache) 2016
CHRONIC REGIONAL PAIN SYNDROME (formerly Symp. Dyst.). 2010
THORACIC OUTLET SYNDROME 2009
PROTOCOLS FOR INJURIES TO THE FOOT AND ANKLE. 2009
WORKERS COMP. PROTOCOLS WHEN PRIMARY INJURY IS
PSYCHIATRIC/PSYCHOLOGICAL. 2013
OUTPATIENT PHYSICAL AND OCCUPATIONAL THERAPY PROTOCOL GUIDELINES. 2009
ACOUSTIC TRAUMA. 2008
INTERVENTIONAL PAIN MANAGEMENT TREATMENT PROTOCOL. 2016
WORK HARDENING PROTOCOLS 2009
PROTOCOL FOR THE MANAGEMENT OF GROIN HERNIAS. 2002
ACUPUNCTURE 2009
DIAGNOSTIC TESTING PROTOCOLS. 2002
TEMPOROMANDIBULAR JOINT DISORDERS 2011
ACUTE HAND INJURY PROTOCOLS 2010
PHARMACEUTICAL PROTOCOLS 2016
CONTACT DERMATITIS PROTOCOL. 2002
PROTOCOL CONCERNS REGARDING PERFORMANCE OF RADIOGRAPHIC
EVALUATION IN WORKERS' COMPENSATION CASES 2002
CUBITAL TUNNEL SYNDROME 2002
RADIAL TUNNEL SYNDROME 2012
SPINAL COLUMN STIMULATORS 2010
ANTERIOR CRUCIATE RUPTURES. 2002
HEARING LOSS PROTOCOL 2011
INITIAL VOCATIONAL ASSESSMENT PROTOCOL GUIDELINES. 2015
HIERARCHY OF VOCATIONAL REHABILITATION. 2015
OCCUPATIONAL HEARING IMPAIRMENT TREATMENT PROTOCOL 2011
DIAGNOSIS AND INITIAL TREATMENT OF OCCUPATIONAL ASTHMA 2012
CHRONIC NONINTERVENTIONAL, NONCANCER PAIN PROTOCOL 2013

PREFACE

The Medical Advisory Board of the Workers' Compensation Court has developed treatment protocols for some of the most frequent work-related injuries seen in Rhode Island. It is important that the medical community understand the purpose of establishing these protocols, that is, to ensure the provision of quality medical care for all injured workers, while limiting costly, inappropriate intervention and unnecessary delay in returning workers to gainful employment.

The medical protocols were not designed as "cookbooks" of care, rather, they outline options of appropriate methods and types of intervention from which physicians and other providers are to choose. Limitation by practice or procedure is not, however, intended to reflect the opinion of the Medical Advisory Board that a particular area of practice or individual physician within an area of practice is not competent to perform a procedure, conduct a diagnostic test, or perform other services. Rather, any such limitations set forth in these protocols have been developed, and will be reviewed, to address issues within the Workers' Compensation system. Although primarily geared toward the entry-level physician, i.e, the first treating physician, these protocols offer important information for all physicians and health care providers.

These multidisciplinary protocols note anticipated time for the resolution of the injury and the time-frame for further medical interventions. The Medical Advisory Board is well aware that resolution of the injury may be affected by many factors, such as patient age, co-morbidity, etc. All treating medical providers are expected to follow the spirit of these guidelines. All cases which exceed the anticipated time frames will be reviewed by the Board.

In particular, rehabilitation intervention is geared toward the same time-frames for treatment. However, these time guidelines are based on the early referral of appropriate patients into therapy. The time guidelines may need to be extended when the onset of rehabilitation is delayed. Still important, though, is the health care provider's understanding that intervention should be as time-limited as is safe and feasible and that all treatments are geared toward improving objectively measured physical and work skill deficits.

A particular treatment option, not specifically mentioned in most of the protocols, is that of early referral for psychiatric or psychological evaluation. If the treating physician is concerned that psychosocial issues, such as marital problems, alcohol, or drug abuse, etc., are delaying the worker's return to work, a referral to treatment resources is an appropriate action. Referral may also be indicated for individuals with history of prior psychiatric treatment or those reporting anxiety or depression as a major symptom of the work injury.

Lastly, the effort to establish these protocols has been shared by many dedicated professionals. The Medical Advisory Board welcomes and appreciates feedback from all of the medical community of Rhode Island.

CARPAL TUNNEL SYNDROME

I. Background:

Carpal tunnel syndrome is a symptomatic compression neuropathy of the median nerve at the level of the wrist, characterized physiologically by evidence of increased pressure within the carpal tunnel and decreased function of the nerve at that level. Carpal tunnel syndrome can be caused by many different diseases, conditions and events. It is characterized by patients as producing numbness, tingling, hand and arm pain, and/or muscle dysfunction.

Although pressure on the median nerve is clearly the pathophysiologic basis for the symptoms observed clinically, the etiology of the elevated pressure has varied causes, including space occupying lesions, tenosynovitis, tumors, anomalous muscles, constriction of the wrist from external causes (posture, constricting bandages, fractures, arthritis) and systemic causes such as diabetes mellitus, pregnancy, thyroid dysfunction, amyloidosis, obesity, or it can be idiopathic. It can be seen at any age but is characteristically in patients over age 30 with increasing incidence as age increases and is 3-5 times more frequently seen in women than men. In this era of evidence based medicine there is strong evidence that BMI and repetitive hand and wrist motion with a high rate of repetition and associated with high to moderate hand force is associated with carpal tunnel syndrome. There are a number of other factors that are associated with this, but with lesser strength of evidence.[1]

II. Diagnostic Criteria:

A. Pertinent Historical and Physical Findings:

Patients typically complain of numbness in the sensory distribution of the median nerve. Burning pain or swelling can be associated with numbness occasionally radiating proximally up the arm to the elbow or shoulder. Nocturnal paresthesias or postural paresthesias (prolonged wrist flexion or extension) can be improved by shaking the wrist, or changing position of the wrist. Weakness, loss of dexterity, dropping items, and hypohidrosis in the median nerve distribution are also common complaints.

Symptoms can be reproduced by provocative maneuvers that increase the pressure in the wrist (Phalen's test, Durkin's compression test), may be evoked with percussion on the nerve at the wrist on the volar side (Tinel's) and may be seen with thenar muscle atrophy, fasciculations, dryness in the median nerve distribution, decreased grip, decreased light touch to two-point discrimination or monofilament sensation.

Evidence based analysis would indicate that any single complaint listed above or physical finding listed above is not strongly associated with ruling in or ruling out carpal tunnel syndrome but may need to be synthesized into the overall evaluation.

B. Appropriate Diagnostic Tests:

1. Radiographs of the wrist.
2. Electromyography and nerve conduction studies.
3. Response to steroid injection into the area of the carpal tunnel.

[1] J Bone Joint Surgery Am. 2016 Oct 16; 98-A (20: 1750-1754)

4. Hematologic, serologic and endocrine testing if symptoms suggest an underlying disease process.

5. Cervical spine radiographs if symptoms support C-spine origin of the complaints or if a double crush situation is suspected.

6. Chest x-ray if there is concern over possible pressure on the brachial plexus by a lung lesion or mass in the thoracic outlet area.

7. Advanced imaging studies such as MRI are felt to be insensitive to diagnosis of carpal tunnel syndrome unless there is severe flexor tenosynovitis or severe change in signal which is not seen in the majority of patients. Ultrasound evaluation has limited evidence so far to indicate that this is helpful.

III. Treatment:

A. Non-operative Treatment:

Non-operative treatment is indicated when there are mild symptoms, possibility of pregnancy, if constricting bindings or positional abnormalities are causative or other modifiable use parameters are present. These treatment options include neutral wrist splinting especially at nighttime, steroid injections, activity modification, treatment of underlying systemic disease and/or the removal of constricting bindings or bandages.
The efficacy of non-steroidal anti-inflammatory drugs is in question.
Physical therapy may have a limited role. Hand and wrist tendon gliding exercises, grip strengthening exercises and modification of activities of daily living and/or job tasks can cause temporary improvement in symptoms.
These non-operative treatment modalities can generally be tried for a time-limited period of up to 6 weeks.

B. Operative Treatment:

Surgical intervention is indicated when there has been a failure to respond to the non-operative treatments. It is also indicated if there is presence of thenar atrophy or weakness or significant dysesthesia, progressive symptoms, or indication of a space occupying lesion in the carpal canal. A history of having a favorable response to steroid injections or use of a wrist splint during the non-operative treatment phase is good evidence that surgical indication may be helpful.
The surgical release of the transverse carpal ligament is the generally recommended treatment option and may be performed on an outpatient basis under local or regional block.

C. Rehabilitation:

In the postoperative period there is the immediate healing phase where hand elevation and gentle exercise of the fingers, elbow and shoulder are encouraged.
In general, post-operative immobilization is not required and gradual progression of use as symptoms allow over the next 3-6 weeks is the standard course.
Following surgical intervention there is generally 3-6 weeks of limited use with a gradual progression of normal use for ADLs. Returning to work is quite dependent upon the requirements of the job.

IV. Evidence Based Recommendations:

Evidence-based guidelines on management for carpal tunnel syndrome have been endorsed by the American Society for Surgery of the Hand, the American College of Radiology, the American College of Surgeons and the American Society of Plastic Surgeons. This document can be found at www.AAOS.org\guidelines. It is important to note that this chronicles the strength of current evidence for support of using or not using various modalities and criteria for both diagnosis and treatment. It is important to realize that this is a changing situation and in many cases there is not substantial evidence to either rule in or rule out the use of a specific criterion.

PROTOCOL HISTORY:

Passed:	9/01/1992
Amended:	6/06/2006
Amended:	1/10/2017

CERVICAL MUSCULOLIGAMENTOUS INJURY (Sprain/Strain)

I. BACKGROUND

These injuries may occur on the job, including operation of a motor vehicle as it relates to the patient's employment. Symptoms are believed to be related to a partial stretching or tearing of the soft tissues (muscles, fascia, ligaments, facet joint capsule, etc.). This may be associated, in addition to the neck pain, with vague upper extremity complaints. The recovery period is of variable duration, but generally is less than three or four weeks.

II. DIAGNOSTIC CRITERIA

A. Pertinent Historical and Physical Findings

The onset of neck pain and paraspinal muscle spasm begins either suddenly after the injury occurs or develops gradually over the next 24 hours. This pain is usually aggravated by motion of the neck and/or shoulder and frequently relieved by rest. The pain usually does not radiate below the shoulder. It can be accompanied by paresthesia or a sense of weakness in the upper extremities related to the muscle spasm in the neck. Physical findings include tenderness to palpation, spasm of the paravertebral muscles and aggravation of the pain with motion. Neurological examination and nerve root stretch tests are usually negative.

B. Appropriate Diagnostic Tests and Examinations

In general, anteroposterior, lateral, oblique, flexion and extension x-rays of the cervical spine and open mouth view to visualize the odontoid process are appropriate. Other x-rays may be added to the roentgenographic series as indicated. Straightening of the cervical spine is frequently observed on the lateral x-ray.

C. Inappropriate Diagnostic Tests and Examinations during the acute phase of the first 4 weeks

1. CT Scan
2. MRI
3. Bone Scan
4. Myelography
5. EMG in the absence of abnormal neurologic findings
6. Thermogram *
7. Evoked Potentials

* Never appropriate

III. TREATMENT

A. Outpatient Treatment

1. Non-operative Treatment

a. Indications: Almost all patients with cervical musculoligamentous (sprain/strain) can be treated satisfactorily. No indications exist for the use of surgery in the treatment of cervical musculoligamentous injury.

b. Treatment Options

1) Pain medication, non-narcotic
2) Muscle relaxants
3) Anti-inflammatory drugs, non-steroidal
4) Physical therapy and/or rehabilitive services*
5) Occasional trigger point injections may be helpful
6) Spinal manipulative therapy

c. Rehabilitation Procedures

1) Therapy may be initiated as early as the day of injury; indications for and focus of (early) intervention include:
   a) acute management of pain/spasms;
   b) limited use of passive modalities, except unlimited ice;
   c) instruction in ROM/stretching exercises for neck/shoulder muscles;
   d) assessment of return to work readiness and identifying necessary work modifications;
   e) patient education in healing process and body mechanics.

   Time Frame: May range from one visit only to ½ to 2 hours per day.

2) Inappropriate Treatments: Exclusive use of passive (palliative) modalities; TENS is not indicated.
3) For the (smaller) portion of workers, some may have unique job requirements necessitating a change in work duties or work skills retraining.

* Never appropriate

B. Inappropriate Treatment

1. Operative treatment is inappropriate for a cervical strain
2. Narcotic medication for a prolonged period of time
3. Inpatient treatment

C. Estimated Duration of Care: 1 to 4 weeks

D. Anticipated Outcome

1. Resumption of normal activity without residual symptoms in most cases

E. Modifiers (age, sex, and co-morbidity)

Co-morbidity (e.g. degenerative disc disease, spondylolisthesis, segmental instability, osteoporosis, spine deformity) may be associated with a higher incidence of persistent symptoms.

IV. If the patient has not responded to the above-outlined treatments in four weeks time, the patient must be referred to a Neurologist, Neurosurgeon, Orthopedic Surgeon, or Physiatrist. The specialist referred to above may order further diagnostic procedures, since the failure to respond to conservative treatment brings with it the distinct possibility of a different diagnosis such as a cervical disc.

NOTE: Cervical Musculoligamentous Injury (Sprain/Strain) will also include BACK SPASM, BACK SPRAIN, SUBLUXATIONS, FACET ARTHROPATHY, SPONDYLOLISTHESIS WITH NO NEUROLOGICAL INVOLVEMENT, HERNIATED INTERVERTEBRAL DISC WITH NO NEUROLOGICAL INVOLVEMENT, ANNULAR TEARS, MYOFASCIAL PAIN, SPINAL STENOSIS.

PROTOCOL HISTORY:

Passed: 9/1/1992
Amended: 5/17/1993
Amended: 11/19/2002
Amended: 6/12/2007

HERNIATED CERVICAL DISC

I. BACKGROUND

A herniated cervical disc is a condition in which there is a protrusion of the intervertebral disc past the posterior longitudinal ligament. Herniations occur most commonly through a posterolateral defect, but may also occur in the midline. The resulting compression of a spinal nerve root may result in cervical radiculopathy, a condition with an annual incidence of approximately 8 per 1,000 persons and a prevalence of 3.5 per thousand persons, with a peak incidence between 50-54 years of age. Cervical disc herniations cause radiculopathy most frequently at the C6 and C7 levels; multiple etiologies including mechanical compression, nerve root hypoxia and/or release of inflammatory mediators in the vicinity of the nerve root have been implicated. Patients will often experience pain, paresthesias, numbness and/or upper extremity weakness. Infrequently, a disc herniation may cause compression of the cervical spinal cord with associated myelopathy manifested as motor dysfunction in the lower extremities and bowel and/or bladder symptoms.

II. DIAGNOSTIC CRITERIA

A. Historical and Physical Examination Findings

Neck pain is often the first symptom of cervical disc herniation with radiculopathy, and may be associated with interscapular or upper extremity pain. Paresthesias and/or numbness may also develop. Pain is often described as sharp, shooting, or burning with radiation along the anatomic course of the nerve from proximal to distal. The onset may be sudden or insidious. Cervical range of motion is often limited, and neck motion may cause an exacerbation of pain.

The neurological examination may be normal if the compressed nerve is functional, or there may be objective evidence of nerve dysfunction including atrophy, weakness, sensory dysfunction and/or altered reflex depending upon the anatomic nerve root affected.

B. Diagnostic Testing and Examination

If the symptoms and/or signs of a cervical disc herniation noted above manifest themselves and/or persist beyond four weeks, referral to a specialist physician (neurologist, neurological surgeon, orthopedic surgeon, physiatrist) is indicated.

Diagnostic Tests:

- Laboratory Studies
- Imaging Studies
- Electrodiagnostic Testing

Laboratory Studies

Laboratory studies include *white blood cell count, ESR, and C-reactive protein* can be increased with spinal infection or cancer, but do not have sufficient sensitivity or specificity to direct further testing.

Imaging Studies

Magnetic Resonance Imaging is a non-invasive means of evaluating the status of the cervical spine and its components. MRI is appropriate in the presence of objectives and/or progressive neurologic deficits. Indications include:

1. Symptoms or signs of myelopathy
2. Diagnostic suspicion of tumor or infection
3. Presence of progressive neurologic deficit

For most of patients, it is appropriate to limit the use of MRI to those individuals who remain symptomatic after 30 days of non-surgical management. Gadolinium contrast may be used in cases where previous surgery was performed in order to differentiate between epidural fibrosis and a recurrent disc herniation.

Conventional radiographs of the cervical spine are often obtained but are of limited value in detecting a cervical disc herniation, infection, or neoplasm.

Computer tomography (CT) can be useful in assessing the extent of bone spurs, canal encroachment, and/or ossification of the posterior longitudinal ligament.

Myelography has largely been supplanted by MRI, but in combination with CT (i.e., CT-myelography) may be useful in selected cases.

Electrodiagnostic studies

Needle electromyography and nerve conduction studies can help distinguish between cervical radiculopathy and other causes of neck pain. Involvement of muscles within the affected myotome can occur as soon as three weeks post-injury.

C. Inappropriate diagnostic tests and examinations

1. Myeloscopy
2. Thermography
3. Spinoscopy

III. MANAGEMENT

A. Non-surgical treatment

The main objectives of treatment are to relieve pain, improve neurologic function and prevent recurrence. None of the commonly recommended non-surgical therapies have been tested in a randomized, controlled trial, and recommendations derive largely from case series and/or anecdotal experience. Patient preference should be taken into account in the decision-making process.

Treatment options include:

1. Physical rehabilitation procedures including modalities, traction and exercise
2. Cervical collar or pillow
3. Home cervical traction preceded by the application of moist heat
4. Medications
    - Analgesics (narcotic and/or non-narcotic)
    - Muscle relaxants
    - NSAIDS
    - Steroids
5. Limited period of bed rest
6. Epidural steroid injections in selected cases

B. Surgical Management

Surgical intervention may be recommended when all of the following are present:

1. Definite cervical root compression on diagnostic imaging studies
2. Concordance symptoms and signs of cervical root-related dysfunction, pain, or both
3. Persistence of pain despite non-surgical treatment for a minimum of six weeks, or
4. The presence of a progressive, functionally important motor deficit, or
5. Cervical cord compression with clinical evidence of moderate to severe myelopathy

Discharge from the hospital should be obtained within 72 hours after most cervical spine procedures, unless complicated by wound infection, thrombophlebitis, spinal fluid leak or other significant morbidity. Post-operatively, rehabilitation procedures will be initiated in many cases and can be completed within 12 weeks of initiation of therapy.

The estimated duration of care for non-surgical patients is up to 6 weeks, and for surgical patients is at a point of maximum improvement, not to exceed 12 months after surgery.

PROTOCOL HISTORY:

Passed:	9/01/1992
Amended:	5/17/1993
Amended:	11/19/2002
Amended:	6/12/2007

PROTOCOLS FOR INJURIES TO THE EYE

CORNEAL ABRASION

I. BACKGROUND

A corneal abrasion is usually caused by a foreign body or other object striking the eye. This results in a disruption of the corneal epithelium.

II. DIAGNOSTIC CRITERIA

A. Pertinent History and Physical Findings

Patients complain of pain and blurred vision. Photophobia may also be present. Symptoms may not occur for several hours following an injury.

B. Appropriate Diagnostic Tests and Examinations

Comprehensive examination by an ophthalmologist to rule out a foreign body under the lids, embedded in the cornea or sclera, or penetrating into the eye. The comprehensive examination should include a determination of visual acuity, a slit lamp examination and a dilated fundus examination when indicated.

III. TREATMENT

A. Outpatient Treatment

Topical antibiotics, cycloplegics, and pressure patch at the discretion of the physician. Analgesics may be indicated for severe pain.

B. Duration of Treatment

May require daily visits until cornea sufficiently healed, usually within twenty-four to seventy-two hours but may be longer with more extensive injuries. In uncomplicated cases, return to work anticipated within one to two days. The duration of disability may be longer if significant iritis is present.

IV. ANTICIPATED OUTCOME

Full recovery.

CORNEAL FOREIGN BODY

I. BACKGROUND

A corneal foreign body most often occurs when striking metal on metal or striking stone. Auto body workers and machinists are the greatest risk for a corneal foreign body. Hot metal may perforate the cornea and enter the eye. Foreign bodies may be contaminated and pose a risk for corneal ulcers.

II. DIAGNOSTIC CRITERIA

A. Pertinent History and Physical Findings

The onset of pain occurs either immediately after the injury or within the first twenty-four hours. Typically there is a sensation of something in the eye, pain, and photophobia. The pain is aggravated by blinking or moving the eye. Vision may be affected if the foreign body is in the visual axis.

B. Appropriate Diagnostic Tests and Examinations

A comprehensive examination by an ophthalmologist is necessary, including determination of visual acuity, slit lamp and dilated fundus examination to rule out intraocular foreign bodies. An orbital x-ray or CT scan may be indicated if there is a suspicion of ocular or orbital penetration.

III. TREATMENT

A. Outpatient Treatment

Superficial or embedded corneal foreign bodies are usually removed at the slit lamp in the emergency room or ophthalmologist's office. Topical antibiotics, cycloplegics, and pressure patch are used at the discretion of the physician. Analgesics, including narcotics may be necessary for the first several days. Daily visits may be necessary until the cornea is healed.

B. Estimated Duration of Care

Return to work anticipated within one to two days in uncomplicated cases.

C. Anticipated Outcome

Full recovery unless the foreign body leaves a significant scar in the visual axis. This may result in diminished visual acuity or may require spectacles, a contact lens, or corneal surgery to improve the vision.

HYPHEMA

I. BACKGROUND

Hyphema is bleeding within the anterior chamber of the eye. It is typically caused by severe blunt trauma to the eye rupturing intraocular blood vessels. Hyphema may be associated with disruption of the trabecular meshwork and lead to angle recession glaucoma. Elevated intraocular pressure with hyphema may cause blood staining of the cornea. Hyphema in patients with sickle cell anemia also poses significant risk to vision. The most significant risk with hyphema is rebleeding which will occur in up to 30% of cases within the third to fifth day. Rebleeding may cause marked elevation of intraocular pressure, as well as corneal blood staining and visual loss. Late complications may include angle-recession glaucoma and cataract.

II. DIAGNOSTIC CRITERIA

A. Pertinent History and Physical Findings

Hyphema generally occurs after severe blunt trauma to the eye. It can range from red blood cells visible within the anterior chamber to a layered clot filling the entire anterior chamber. Intraocular pressure is often elevated.

B. Appropriate Diagnostic Tests and Examinations

This is an ocular emergency and requires immediate referral to an ophthalmologist. Appropriate diagnostic tests include a comprehensive exam by an ophthalmologist including a slit lamp exam, determination of the intraocular pressure, and dilated fundus examination if possible. Orbital x-rays may be indicated to rule out other orbital injuries depending on the mechanism of injury. A platelet count and coagulation studies may be indicated, and a sickle prep or hemoglobin electrophoresis should be performed if there is a question of sickle cell anemia.

III. TREATMENT

A. Outpatient Treatment

If the individual is reliable and the hyphema is not severe and there are no other complicating factors, this condition can be managed as an outpatient. All patients require strict bed rest for five days except for daily examinations. Topical cycloplegics, steroids, and ocular hypotensive agents are indicated at the discretion of the physician. Oral prednisone and/or aminocaproic acid may also be used at the discretion of the physician. A hard shield is typically worn throughout the day and night. After several weeks a gonioscopy is indicated to evaluate the trabecular meshwork.

B. Inpatient Treatment

If there is a significant hyphema, marked elevation of intraocular pressure, other complicating factors (e.g. sickle cell anemia, hyphema in a monocular patient, other ocular injuries) or if the individual does not seem reliable, hospital admission may be indicated to insure strict bed rest and regular follow-up. Oral prednisone and/or aminocaproic acid may also be used at the discretion of the physician. Hospitalization should last five days. Persistent elevated intraocular pressure, corneal blood staining, or persistence of the hyphema in the setting of sickle cell anemia may require surgical evacuation of the clot.

C. Estimated Duration of Care

Return to work anticipated in three weeks for uncomplicated cases. If there is evidence of disruption of intraocular structures, they will require lifetime monitoring for glaucoma and cataracts.

D. Anticipated Outcome

Resolution of the hyphema with return of visual acuity. These individuals should wear polycarbonate safety glasses if involved in an occupation where there is continued risk of ocular injury.

EYELID LACERATION

I. BACKGROUND

Eyelid lacerations may occur from blunt injuries or from laceration by a sharp object. The lacerations may only involve skin but may involve the eyelid muscles, eyelid margin, the lacrimal drainage system, and may be associated with an orbital foreign body.

II. DIAGNOSTIC CRITERIA

A. Pertinent History and Physical Findings

There is often profuse bleeding. Lacerations through the eyelid margin, in the medial canthus, or resulting in exposure of orbital fat indicate severe injuries and require immediate evaluation. Retained orbital foreign bodies must also be suspected, especially if the injury is caused by an explosion or fragmented object. With severe injuries to the lids, injury to the eye must be ruled out.

B. Appropriate Diagnostic Tests and Examinations

A comprehensive examination by an ophthalmologist including determination of visual acuity, slit lamp and dilated fundus examination is necessary to rule out ocular or orbital injury or foreign body.

III. TREATMENT

A. Outpatient Treatment

Superficial lacerations or lacerations not involving the lacrimal system or entering the orbit may be repaired in the emergency room or office. Sutures are removed over one to two weeks. Topical and oral antibiotics are usually prescribed. Analgesics may be necessary for pain.

B. Inpatient treatment

Injuries involving the lacrimal drainage system or penetrating the orbit should be repaired in the operating room. These repairs may require general anesthesia. Intravenous antibiotics are often indicated. Depending on the severity of the injury and overall condition of the patient, these individuals may be discharged from the recovery room or may require a one to two day hospital stay.

C. Estimated Duration of Care

Return to work anticipated within two weeks in uncomplicated cases. Medical follow-up four weeks if uncomplicated. Damage to the eyelid muscles resulting in traumatic ptosis may require six to twelve months to resolve, or may ultimately require surgical repair.

D. Anticipated Outcome

Resumption of normal eyelid function.

CANALICULAR LACERATION

I. BACKGROUND

Laceration in the medial eyelid may injure the upper or lower canaliculus or lacrimal sac. Disruption of the lacrimal drainage system may result in constant tearing or the development of an abscess within the lacrimal sac (dacryocystitis). Constant tearing may be no more than a nuisance, but it may also obstruct vision and the presence of an infection within the lacrimal system usually requires surgical repair.

II. DIAGNOSTIC CRITERIA

A. Pertinent History and Physical Findings

There is usually a laceration in the medial eyelid. The laceration may at first glance seem trivial, but any laceration medial to the punctum should raise the suspicion of a canalicular laceration. There may be tearing or bloody tears. The punctum may be displaced laterally.

B. Appropriate Diagnostic Tests and Examinations

A comprehensive examination by an ophthalmologist including determination of visual acuity, slit lamp and dilated fundus examination to rule out other orbital or ocular injuries is necessary. Probing of the canaliculus is indicated to determine if the canaliculus is lacerated and the extent of the injuries. Orbital x-rays or CT scan may be indicated if a fracture or foreign body is suspected.

III. TREATMENT

A. Outpatient Treatment

Repair of canalicular lacerations requires the operating room, frequently using the operating microscope. The lacerated canaliculi are intubated either with a silicone tube or other stent and the cut ends reapproximated. Depending on the severity of the injury, other complicating factors, and general condition of the patient, these individuals can be discharged from the recovery room. Topical drops and oral antibiotics may be indicated.

B. Inpatient Treatment

If the individual has eaten recently, it may be necessary to delay the surgery for twenty-four to forty-eight hours. Hospital admission may be required if the wound is contaminated and intravenous antibiotics are needed. Admission is also indicated in the presence of other complicating injuries. Complex reconstruction requiring prolonged general anesthesia would also require admission.

C. Estimated Duration of Care

Return to work anticipated in two weeks in uncomplicated cases. Medical follow-up three to six months. Occasionally the repair is unsuccessful, and lacrimal bypass surgery is indicated.

D. Anticipated Outcome

Return of normal eyelid function and elimination of tearing.

ORBITAL CONTUSION

I. BACKGROUND

An orbital contusion is usually a result of blunt trauma causing swelling and ecchymosis of the orbit. A pure orbital contusion is not associated with any fractures or significant lacerations. There may be significant swelling and initial double vision, but visual acuity is not usually affected, and ocular motility and diplopia return towards normal within several days.

II. DIAGNOSTIC CRITERIA

A. Pertinent History and Physical Findings

If there is a history of blunt trauma to the ocular area, there may be progressive swelling of the lids with ptosis, proptosis of the eye, and diplopia. The swelling and diplopia should improve over several days. Visual acuity is usually normal.

B. Appropriate Diagnostic Tests and Examinations

Orbital x-rays are indicated to rule out a fracture. A CT scan is indicated if the diplopia persists or if there is suspicion of an orbital fracture in spite of normal plain films. A comprehensive examination by an ophthalmologist, including assessment of visual acuity, slit lamp examination, and dilated fundus examination are necessary to rule out concomitant intraocular injury.

III. TREATMENT

A. Outpatient Treatment

If there are no complicating injuries, an orbital contusion is treated as an outpatient. Analgesics, ice packs, and systemic antibiotics may be indicated.

B. Inpatient Treatment

Diminished visual acuity or severe pain may indicate more extensive injury and may warrant hospital admission for further evaluation and treatment.

C. Estimated Duration of Care

Return to work in one to two days in uncomplicated cases. Disability may be longer if diplopia or ptosis persist.

D. Anticipated Outcome

Resolution of the swelling and diplopia with return of normal ocular motility.

ORBITAL FRACTURE

I. BACKGROUND

Fractures of the orbit may be indirect, resulting in “blowout” of the orbital floor or medial wall, or direct involving fractures of the orbital rims. Fractures of the orbit open communication between the orbit and the sinuses. Significant fractures may cause ocular motility disturbance from entrapment of orbital content, enophthalmos due to prolapse of the orbital contents into the sinus, and dystopia of the eye.

II. DIAGNOSTIC CRITERIA

A. Pertinent History and Physical findings

There is a history of blunt trauma to the eye, usually by an object larger than the bony orbital opening. The eye may appear proptotic or enophthalmic. Ocular motility is usually diminished. The intraocular pressure may elevate when the eye is turned away from an entrapped muscle. There is usually numbness over the cheek due to injury to the infraorbital nerve. There may be a palpable fracture of the orbital rim. There may also be a fracture of the zygomatic arch. This causes flattening of the cheek and may interfere with opening the mouth.

B. Appropriate Diagnostic Tests and Examinations

A comprehensive examination by an ophthalmologist is necessary, including a determination of visual acuity, slit lamp examination, and dilated fundus examination to rule out intraocular injury. X-ray of the orbits may miss up to 20% of orbital fractures. A coronal CT scan is indicated, especially if surgery is contemplated.

III. TREATMENT

A. Outpatient Treatment

Not all orbital fractures require repair. If there is no enophthalmos or diplopia, repair may not be necessary. It is appropriate to follow the patient on an outpatient basis for the first one to two weeks to determine if the diplopia is resolving. Oral antibiotics are usually given prophylactically. Analgesics may be required.

B. Inpatient Treatment

Severe facial fractures require hospital admission. Other complicating injuries may also make hospital admission necessary. Surgical repair of the fractures is usually undertaken within the first three weeks. This usually requires a one to three day hospital stay postoperatively.

C. Estimated Duration of Care

Disability from orbital fracture is usually due to diplopia. Double vision while looking straight ahead or down makes driving, operating machinery, reading, typing, and close work difficult. Double vision within the central 20 degrees of the visual field is considered a 100% loss of ocular motility according to the American Medical Association's Guide to Evaluation of Permanent Impairment.

Diplopia may resolve spontaneously within one to two weeks with small fractures not requiring repair. More severe fractures may have more persistent diplopia. Generally, double vision resolves within two to three weeks after surgical repair unless there is intrinsic damage to the extraocular muscles. It is rarely necessary that eye muscle surgery or further orbital surgery is necessary.

Light work may be done when diplopia is resolved. Heavy work can generally be resumed three weeks after injury if surgery is not required, or three weeks after surgical repair.

Individuals with diplopia in primary gaze, down gaze, or within the central 20 degrees should not drive, operate machinery, or work in a dangerous environment where good peripheral vision is necessary.

D. Anticipated Outcome

Resolution of diplopia and normal functioning of the eye. Numbness over the cheek may persist for one year or longer and is not affected by surgical repair.

CORNEOSCLERAL LACERATIONS

I. BACKGROUND

Corneoscleral lacerations are potentially severe injuries resulting from sharp objects making forceful contact with the globe. The severity of such injuries is quite variable and is dependent on the sharpness of the object and its velocity at the time of impact.

II. DIAGNOSTIC CRITERIA

A detailed examination by an ophthalmologist, including visual acuity, slit lamp exam, intraocular pressure, and dilated fundus exam is necessary to determine the extent of injury. If retained foreign body is anticipated, localizing radiologic studies (e.g., CAT scan of orbits) may be required.

III. TREATMENT

Small partial thickness lacerations may require only follow-up and/or patching. More severe ones may respond to bandage contact lens application and follow-up.

Virtually all full-thickness corneal lacerations require very careful follow-up. Very small ones may respond to bandage lens application with or without cyanoacrylate tissue adhesive and protective shield. Larger ones require surgical repair under general anesthesia and hospitalization.

The goal of management is to restore the eye to its normal anatomic configuration and create a water-tight closure. If the lens is involved in the injury, it often must be removed at the time of surgery. Prolapsing uveal tissue must be replaced. Vitreous must be meticulously removed from the anterior chamber if it is present. Involvement of retinal tissue in the injury can make the prognosis much more guarded, and a vetreoretinal surgeon would then be required at the time of initial repair.

Postoperative management usually consists of forms of cycloplegic, steroid, and antibiotic drops.

IV. ESTIMATED DURATION OF CARE AND ANTICIPATED OUTCOME

Partial thickness laceration patients may be managed as outpatients. The patient should wear a protective shield for three to six weeks. Light work may be done after several days. Usually recovery is quite good with normal visual function after six weeks.

Full thickness simple corneal lacerations require two to four months to heal and remove sutures. Protective shield should be worn for six weeks. Light work could be done after two weeks. Return to full work after suture removal in three to four months if vision is adequate for tasks. Sometimes, corneal scar is extensive, and corneal transplant for visual recovery would be necessary at a later date.

Lacerations involving lens, uveal tissue, and retina may require a week's hospitalization and perhaps six months to achieve stability. At that time, contact lens correction of the aphakic condition may allow good visual recovery. Many patients with these severe injuries may never recover full vision, either with later cornea transplant and intraocular lens placement.

CHEMICAL OCULAR INJURIES

I. BACKGROUND

Chemical injuries may result from an almost infinite variety of agents contacting the ocular surface. The extent of the injury is largely a function of the nature of the substance involved, how much of the ocular surface is involved, and the duration of exposure. In general, alkali injuries (e.g., ammonia, lye, potassium hydroxide, calcium hydroxide (lime) are the most serious because these agents readily penetrate into the ocular tissue. Acid burns (e.g., sulfuric acid, hydrofluoric acid, nitric acid, acetic acid) may be serious but have less penetration than alkalis.

II. DIAGNOSTIC CRITERIA

A detailed examination by an ophthalmologist is performed after copious irrigation (see Treatment). It is vitally important to know the chemical causing the injury, its concentration, and amount of exposure.

In alkali burns, the Hughes classification (grading of corneal haziness and loss of blood vessels at limbus) is helpful in assessing long-term prognosis.

III. TREATMENT

Acute phase (0 to 7 days). Immediate copious irrigation using any nontoxic irrigating solution is the most important treatment of any chemical injury. It should be continued for at least 30 minutes. Checking the pH until it returns to normal is a good way to determine if enough irrigation is done.

After the irrigation, management by the ophthalmologist may include topical steroids and the use of prophylactic antibiotic drops. Other agents, such as topical ascorbate, cycloplegic agents, etc., may be warranted.

Severe chemical injuries should be hospitalized for treatment for several days. For milder cases, outpatient care with frequent follow-up (every several days for first three weeks) is appropriate.

IV. ESTIMATED DURATION OF CARE AND ANTICIPATED OUTCOME

Quite dependent on extent of initial injury. Milder injuries may return to work after several days. Moderate chemical injuries (if bilateral) may need several weeks to recover. Severe burns (if bilateral) may be blinding. In many cases, corneal transplants, performed months after the initial injury, may be able to restore vision.

PROTOCOL HISTORY:
Passed: 12/15/1992

PROTOCOL FOR THE EVALUATION AND MANAGEMENT OF ACUTE SHOULDER INJURIES

INTRODUCTION:

This protocol is designed to aid the practitioner in the appropriate evaluation and management of acute shoulder girdle injuries. The goal of early evaluation is to establish a precise diagnosis in order to initiate effective management.

The vast majority of shoulder injuries result from soft tissue rather than bony injury. Injuries can result from direct or indirect trauma, or overuse. The affected soft tissues include muscles, ligaments, and tendons. These problems fall into major categories; instability and dislocations (acromioclavicular and glenohumeral), rotator cuff tendon and subacromial disorders, and periscapular muscle injuries.

Shoulder pain as a result of cervical spine pathology should always be considered and excluded before definitively determining a diagnosis for shoulder pain.

Overuse injuries can present with acute or chronic symptoms and may be the result of acute tendonitis and bursitis or chronic degenerative conditions. Overuse injuries of the shoulder include scapular muscle strain, rotator cuff tendonitis (impingement) and tearing, and arthritic conditions of the glenohumeral joint and acromioclavicular joint.

In general, patients with shoulder injuries should be referred for orthopaedic, physiatric, neurologic, or rheumatologic consultation or treatment under the following circumstances:

1. History of radiographic evidence of joint instability such as acromioclavicular, sternoclavicular, or genohumeral joint subluxation or dislocation.
2. Significant lack of active motion and/or weakness.
3. Evidence of neurologic injury.
4. Shoulder fracture.
5. Significant obvious soft tissue swelling or ecchymosis.
6. Failure of shoulder sprain or strain to demonstrate progressive resolution of symptoms and respond to appropriate conservative management within 4 weeks.

EVALUATION:

Evaluation of shoulder injuries includes detailed history, physical examination, and plain radiographs. Details of prior related conditions, co-morbid medical conditions, work history, mechanism of injury, and current symptoms should be obtained. A careful physical examination includes observation, palpation, and assessment of active and passive motion, strength, and stability. Significant acute shoulder injuries should be evaluated with x-rays to assess acute injury and signs of chronic pathology. Specific

attempts should be made to diagnose injuries such as extensive acute rotator cuff tearing that may be best treated with early surgery.

INITIAL TREATMENT:

Initial management of most shoulder injuries includes a combination of the following:

1. Non-narcotic analgesics and non-steroidal anti-inflammatory drugs, and ice for symptomatic relief.
2. Short-term sling immobilization.
3. Physical therapy for range of motion, progressive resistive exercises, and symptom control. Appropriate modalities include, but are not limited to, ice, ultrasound, phonophoresis, heat.

Customary and usual therapy documentation requirements prevail. Therapy treatments may be indicated beyond the initial 9 visits, as the expected healing time is 4 to 6 weeks. Reauthorization for continued treatments should follow the normal requested procedures and be based on improvement in objective measures. Prolonged therapy is not indicated if a patient's status is not improving.

4. Corticosteroid injection for overuse injuries.
5. Activity modification.

Initial management should continue for 4 to 6 weeks. Resolution of symptoms and resumption of normal activities is anticipated.

FURTHER EVALUATION:

If symptoms persist despite a trial of initial treatment, further evaluation can be pursued in order to determine a diagnosis. Additional testing includes:

1. CT scan or radionuclide bone scan to evaluate bone and joint pathology.
2. Arthrogram to evaluate for rotator cuff tearing.
3. MRI to evaluate periarticular soft tissues, including the rotator cuff, capsule, and labrum.
4. Electrodiagnostic studies (EMG/NCV) to evaluate for neurologic pathology.

FURTHER TREATMENT:

Further treatment should be based upon the results of additional evaluation. Surgically treatable pathology can be addressed with arthroscopy and/or open surgery.

Arthroscopy permits minimally invasive surgery both to confirm a diagnosis and perform debridement, excision, or repair. The outcome of arthroscopic and open surgical treatment of specific diagnostic entities should be the same.

Postoperative rehabilitation duration will vary with arthroscopic and open surgeries. In general, arthroscopic debridement/acromioplasty should resolve within 6 weeks of therapy. Open repairs require more prolonged therapy, but should be completed within 12 weeks of rehabilitation.

Therapy following arthroscopic repairs should focus on regaining full range of motion, with progression to strength and endurance exercises as soon as tolerated. Use of strength and isokinetic equipment is appropriate; use of modalities other than ice is not generally indicated.

Therapy following open repairs requires a number of weeks with passive range of motion only (per individual orthopedist protocol). A slower progression to regain active range of motion and strength is then followed. Use of equipment and job simulated tasks are appropriate in the later phase of treatment. Short-term modalities may be indicated when initially regaining range of motion.

Customary and usual therapy documentation requirements would still prevail.

PROTOCOL HISTORY:
Passed: 9/1/1992
Amended: 6/9/1998

PROTOCOL FOR THE MANAGEMENT OF ACUTE INJURIES TO THE KNEE

INTRODUCTION

The vast majority of knee injuries result from direct trauma to the joint or are caused by torsional or angulatory forces. These injuries vary in severity from simple ligamentous strains to complex injuries involving ligamentous disruption with meniscal damage and associated fractures.

The Protocol is designed to guide the practitioner in the appropriate management of these injuries and to establish a logical sequence for the diagnostic evaluation and treatment of the more complex injuries.

In general, knee injuries should be referred for orthopedic consultation and/or treatment under the following circumstances:

1. Failure of a presumed knee sprain to show progressive resolution and respond to appropriate conservative treatment in a period of three (3) weeks.
2. Radiographic evidence of an associated fracture.
3. The initial presence of a tense hemarthrosis or the development of a recurrent hemarthrosis.
4. An acutely locked, or an acutely dislocated knee.
5. Clinical evidence of gross ligamentous instability.
6. A presumed diagnosis of a meniscal injury.

ACUTE KNEE SPRAINS – MILD VS. MAJOR

I. MILD KNEE SPRAINS

These are common injuries usually resulting from the application of a torsional or angulatory force to the knee and are characterized by pain, swelling, localized tenderness, increased discomfort on weight bearing, negative x-rays, and no clinical evidence of instability.

A. APPROPRIATE DIAGNOSTIC TESTS

1) Plain x-rays
2) MRI of knee by Orthopedic Specialist, Rheumatologist, or Physiatrist
3) Bone Scan
4) CT Scan of knee
5) Arthrogram of knee (if MRI contraindicated)

B. OUTPATIENT/OPERATIVE TREATMENT

1) Medications to include analgesics and non-steroidal anti-inflammatory drugs
2) Application of ice, compression dressings, and temporary partial restriction of weight bearing
3) Physical modalities and/or rehabilitative procedures (up to 6 weeks)
4) Surgical treatment and inpatient treatment are generally not indicated for this level of injury.

C. DURATION OF TREATMENT

Should not exceed three (3) weeks

D. ANTICIPATED RESULTS

Resolution of symptoms and resumption of normal activities

II. MAJOR KNEE SPRAINS

Cases with positive clinical evidence of instability

A. APPROPRIATE DIAGNOSTIC TESTS

1) Plain x-rays
2) MRI of knee by Orthopaedic Specialist, Rheumatologist, or Physiatrist
3) Bone Scan
4) CT Scan of knee
5) Arthrogram of knee (if MRI is contraindicated)

B. OUTPATIENT/NON-OPERATIVE TREATMENT

Includes bracing and physical therapy up to 6 weeks

C. ANTICIPATED RESULTS

1) Variable permanent limitation of activities
2) Surgical treatment is frequently indicated and may require inpatient hospital stay.

III. MENISCAL INJURIES

The mechanism of injury is similar to that for knee sprains, but symptoms of pain and swelling fail to resolve in the anticipated period of time, and the symptoms frequently include a sensation of "catching or giving away" of the joint, and a history of locking of the joint may be elicited.

Clinical findings may include joint space tenderness, a mild effusion restricted range of motion, or a positive McMurry's sign.

A. DIAGNOSTIC STUDIES

1) Plain x-rays
2) Arthrocentesis
3) MRI
4) Arthrogram, especially when an MRI is contraindicated
5) Bone Scan
6) Diagnostic Arthroscopy

B. TREATMENT

1) OUTPATIENT/NON-OPERATIVE TREATMENT

a) Short-term use of non-steroidal anti-inflammatory drugs in conjunction with an Arthrocentesis and short-term immobilization with a period of limited weight bearing

b) Physical modalities and/or rehabilitative procedures

2) OUTPATIENT/OPERATIVE TREATMENT

a) Options include arthroscopic menisectomy and/or arthroscopic meniscal repair.

b) Physical Therapy/Rehabilitation

3) INPATIENT/NON-OPERATIVE TREATMENT

Admission for non-operative treatment is not indicated.

4) INPATIENT/OPERATIVE TREATMENT

The reason for admission for surgical treatment may include the presence of associated medical conditions, a concomitant knee injury such as a fracture of the tibial plateau or a major ligamentous disruption, or the presence of other injuries which require inpatient treatment.

a) Treatment options include:
   1) Arthroscopic menisectomy or meniscal repair
   2) Open arthrotomy for menisectomy or meniscal repair
b) Physical modalities and/or rehabilitative procedures

C) DURATION OF TREATMENT

Duration of treatment generally may vary up to three (3) months or to a point of maximum medical improvement. The patient's age and pre-existence of arthritic changes within the joint influence the duration of treatment.

D) ANTICIPATED RESULTS

1) Improved knee function with minimal residual symptoms
2) Possible predisposition to the development of traumatic arthritis of the knee

PROTOCOL HISTORY:
Passed: 9/1/1992
Amended: 11/19/2002
Amended: 6/12/2007

LOW BACK MUSCULOLIGAMENTOUS INJURY
(Sprain/Strain)

I. INTRODUCTION

Low back injuries including muscular strains and/or ligament sprains are exceedingly common in the general population. These injuries may be the result of mechanical stresses and/or functional demands placed on the low back by everyday activities, or may be related to an acute injury. Symptoms are believed to be caused by a partial stretching or tearing of the soft tissues (muscles, fascia, ligaments, facet joint capsule, etc.). For the vast majority of patients, these conditions are of short duration with a complete recovery as a general rule. Most individuals with a musculoligamentous injury of the lower back recover rapidly, with 50 to 60% of patients recovering within one week and 90% of patients recovering within six weeks.

II. DIAGNOSTIC CRITERIA

A. Historical and Physical Examination Findings

Low back pain, with or without paraspinal muscle spasm, may begin suddenly or develop gradually over the first 24 hours following an injury. Pain is usually relieved by rest and exacerbated by motion. Pain due to a musculoligamentous injury does not radiate below the knee, and a lumbar strain is not accompanied by paresthesias or weakness in the legs or feet. Physical findings may include tenderness to palpation in the lower back, loss of normal lumber lordosis, and/or spasm of the paraspinal muscles. Straight leg raising and other tests that cause spinal motion may increase low back pain. The subject may stand in a flexed position or tilted to one side. Neurologic examination and nerve root stress tests are commonly negative.

III. DIAGNOSTIC TESTING AND EXAMINATION

A. Laboratory Studies

Laboratory studies including *white blood cell count, ESR and C-reactive protein* can be increased with spinal infection or cancer, but do not have sufficient sensitivity or specificity to direct further testing in most cases. Serologic testing including rheumatoid factor, antinuclear antibody and/or Lyme titer are rarely necessary or appropriate in the case of a work-related injury.

B. Imaging Studies

Conventional radiographs of the lumbar spine are often obtained, but are of limited value in detecting a lumbar disc herniation, infection or neoplasm. The diagnosis of a musculoligamentous injury is not based on radiographic criteria, but x-rays may be indicated in certain cases. Criteria developed by the Agency for Healthcare Research and Quality (AHRQ) suggests that lumbar spine x-rays may be appropriate in a patient with any of the following risk factors:

* age over 50 years
* high velocity trauma
* history of cancer
* history of osteoporosis or fracture

Magnetic resonance imaging is a non-invasive means of evaluating the status of the lumbar spine and its components. MRI is appropriate in the presence of objective and/or progressive neurologic deficits. Indications for early MRI examination include:

1. Symptoms or signs of acute neurologic bowel or bladder dysfunction or saddle anesthesia.
2. Diagnostic suspicion of tumor, hemorrhage, or infection.
3. Presence of progressive weakness (neurologic motor deficit).

For most patients, it is appropriate to limit the use of MRI to those individuals who remain symptomatic after 30 days of non-surgical management. Gadolinium contrast may be used in cases where previous surgery was performed in order to differentiate between epidural fibrosis and a recurrent disc herniation.

Computed tomography (CT) can be useful in assessing the extent of bone spurs, canal encroachment and/or ossification of the posterior longitudinal ligament.

Myelography has largely been supplanted by MRI, but in combination with CT (i.e., CT-myelography) may be useful in selected cases.

C. Electrodiagnostic Studies

Needle electromyography and nerve conduction studies can help distinguish between lumbar radiculopathy and other causes of back pain. Involvement of muscles within the affected myotome may occur as soon as three weeks post-injury, but EMG testing is of limited value in the absence of neurologic findings and is generally reserved until after 30 days post-injury.

D. Inappropriate Diagnostic Tests and Examinations

1. Myeloscopy
2. Thermography
3. Spinoscopy

IV. MANAGEMENT

A. Appropriate Treatment Strategies

Almost all patients with low back musculoligamentous injuries can be treated satisfactorily. No indications exist for the use of surgery in the treatment of low back

musculoligamentous injuries. The main objectives of treatment are to relieve pain, improve function and prevent recurrence. Few of the commonly recommended non-surgical therapies have been tested via a randomized, controlled trial, and treatment recommendations derive largely from case series and/or anecdotal experience. The AHRQ has established guidelines for treatment based upon the recommendations of a consensus panel formed from specialists in many disciplines including orthopedics, neurology, neurosurgery, physiatry, rheumatology, chiropractic, physical therapy, etc.

Appropriate treatment recommendations include:

1. Limited period of bed rest, generally not to exceed 48 hours after injury.
2. Physical modalities and procedures including therapeutic cold or heat, instruction in proper body mechanics, and exercise. A physical therapy program may be initiated as early as the day of injury, but can often be reserved until > 4 days post-injury.
3. Spinal manipulation therapy.
4. Medications
   - muscle relaxants
   - NSAIDS
   - analgesics (narcotic and/or non-narcotic)
   - steroids
5. Epidural steroid injections in selected cases.
6. Psychological evaluation and treatment, functional capacity evaluation and/or work conditioning or work hardening programs may be indicated for individuals with prolonged symptoms and/or disability status.

Consultation with an appropriate specialist (neurologist, orthopedic surgeon, physiatrist, or neurosurgeon) should be obtained if conservative treatment has not led to significant clinical improvement within four weeks of the reported injury.

B. Inappropriate Treatment Strategies

1. Operative treatment is inappropriate for a lumbar musculoligamentous injury
2. Prolonged bed rest > 5 days
3. Narcotic medications for a prolonged period
4. Prolonged home traction

PROTOCOL HISTORY:
Passed: 9/1/1992
Amended: 5/17/1993
Amended: 6/9/1998
Amended: 11/19/2002
Amended: 5/5/2009

HERNIATED LUMBAR DISC

Patients with sciatic nerve pain under treatment by their own physician who fail to improve after four weeks – refer to a Neurologist, Orthopedic Surgeon, Physiatrist, or Neurosurgeon for consultation and/or treatment.

I. BACKGROUND

A herniated lumbar disc is a condition in which there is protrusion of the intervertebral disc. Herniations occur most commonly through a posterolateral defect, but midline herniations may occur. Resulting compression of the spinal nerve root causes inflammation and pain, often along the anatomic course of the nerve. In the lumbar spine, this most often occurs at the L4-L5 and L5-S1 disc levels, causing involvement of the corresponding L5 and S1 nerve roots. As a result of both mechanical and biochemical changes around the nerve root, the patient will experience pain, paresthesia, and possibly weakness in one or both lower extremities, usually below the knee. The rare herniations at the L1, L2, and L3 levels are usually associated with vague pain, paresthesia, and weakness above the knee. Back pain may or may not be a presenting complaint with any herniated lumbar disc.

Most acute lumbar disc herniations occur in patients between 35 and 55 years of age, whereas spinal stenosis usually occurs in patients over 50 years of age. Spinal stenosis may mimic a herniated disc. Patients with spinal stenosis in addition to low back pain will give a history suggestive of neurogenic claudication (pain on walking) and will present radicular signs and symptoms caused by degenerative changes involving the intervertebral discs and the facet joints.

II. DIAGNOSTIC CRITERIA

A. Pertinent Historical and Physical Findings

Back pain is usually the first symptom and may or may not abate as the pain and paresthesia begins to radiate down the lower extremity. Motion of the spine is limited due to pain and muscle spasm. The neurological examination may be normal if the compressed nerve is still functional, or it may yield objective evidence of impaired nerve conduction (e.g. atrophy, weakness, sensory alteration or diminished reflex) depending upon the anatomic nerve root affected. Signs of nerve root tension (e.g. positive straight leg raising, bow-string test, Lasgue's test) may also be present.

When the L4 disc herniates, it usually causes pressure on the L5 nerve root resulting in weakness of the great toe extensor or other dorsiflexor muscles of the foot and sensory loss along the medial aspect of the foot to the great toe, but it may be associated with a knee reflex abnormality. When the L5 disc herniates, it usually causes pressure on the S1 nerve root, resulting in weakness of the plantar flexors of the foot and

a sensory deficit in the posterior calf area and lateral aspect of the foot in addition to a diminished Achilles' reflex.

B. Appropriate Diagnostic Tests and Examinations

1. Clinical examination by Neurologist, Neurosurgeon, Physiatrist, Orthopedic Surgeon.
2. Plain radiographs of the lumbosacral spine may be indicated.
3. MRI Imaging is the prime diagnostic test in evaluating a herniated disc suspect, which in addition to the disc would evaluate tumor, infection, fracture and congenital abnormalities.
4. CT Scan may be ordered if there is a specific bone problem that may be better delineated by that test, or when MRI imaging is contraindicated (e.g., metal imbedment or severe claustrophobia).
5. Electrodiagnostic studies may be done three or four weeks following the onset of symptoms to diagnose and assess the extent of nerve dysfunction and may be necessary to correlate the affected level by the findings on the above testing. This should include both needle EMG and nerve conduction studies.
6. Myelography is rarely indicated and is done as an outpatient procedure. It may be performed with a CT Scan in an instance where the above studies leave some question.

C. Inappropriate Diagnostic Tests and Examinations

1. Myeloscopy
2. Thermography
3. Spinoscopy
4. Dermatomal Somatosensory Evoked Potential

III. TREATMENT

A. Outpatient Treatment

1. Non-operative Treatment

a. Short period of bed rest, up to 2 days, with analgesics, mild relaxants, and nonsteroidal anti-inflammatory drugs. Complete bed rest for long periods may be deleterious to the body and should be closely monitored.

b. Physical therapy and/or rehabilitation

c. Injection of trigger points, spinal nerve blocks

Outpatient Procedure

d. Finite course of chiropractic spinal manipulation

e. Epidural steroid injections

Outpatient Procedure

f. Pain clinic – chronic phase
g. Orthotics

B. Inpatient Treatment

1. Non-operative Treatment

Rarely is there indication for admission but in some cases inability to control pain may require a short period of hospitalization.

2. Operative Treatment

a. Indications

1. Failure of non-operative treatment to improve function
2. Quality of patient's life significantly impaired
3. Presence of significant or progressive neurological deficit

b. Procedure Options

1. Laminectomy with discectomy
2. Laminotomy with discectomy
3. Microdiscectomy
4. Percutaneous discectomy (in developmental phase)
5. Interbody fusion
6. Posterior or lateral bony fusion
7. Transpedicular fixation

c. Indications for Discharge

1. Uncomplicated
   a. One day following microdiscectomy or percutaneous discectomy
   b. One to two days after open discectomy

2. Complicated
   c. After wound infection, thrombophlebitis, spinal fluid leak, or other significant complications have been controlled
   d. Home health care may be required for a short period.

e. Physical modalities and/or rehabilitative procedures

1. Some monitoring of the patient's activities may be necessary.
2. Patient should be instructed in walking program with a gradual increase in their physical activities.
3. Strengthening exercises or work simulation activities may be indicated for some patients.

C. Estimated Duration of Care

In both non-operative and operative treatment, it would depend on the degree of improvement and the length of time his physical impairment will enable him to return to his pre-operative occupation or the availability of a transfer to a less demanding physical position.

D. Modifiers (age, sex, and co-morbidity)

Patients with symptoms suggestive of cauda equina syndrome will require a different approach to treatment. Cauda equina syndrome is usually caused by a central herniated disc. Symptoms include low back pain, unilateral or bilateral leg pain and weakness, saddle anesthesia, and paralysis with loss of bladder and bowel control. Once this diagnosis is suspected, the patient should undergo prompt neurodiagnostic evaluation. Early surgery is recommended; however, there is no evidence that neurologic recovery will be effected.

PROTOCOL HISTORY:
Passed: 9/1/1992
Amended: 5/17/1993
Amended: 11/19/2002
Amended: 5/5/2009

LUMBAR FUSION

A. Indications for Lumbar Fusion

1. Unstable vertebral fracture

2. Fusion may be indicated after second or third surgery with documented MRI, CT Scan, or myelogram showing re-extrusion of previously unsuccessfully operated disc at the same level, with or without intractable back pain and clear clinical evidence of new lumbar radiculopathy with EMG evidence, if felt needed.

3. Traumatic (acquired or congenital) spinal deformity, history of compression wedge fractures with demonstrated acquired kyphosis-scoliosis.

4. Intractable low back pain for longer than three months and six-week trial with a rigid back brace or body cast producing significant pain relief associated with one of the following conditions involving the lower lumbar segments below L3.

a. For first surgery only, degenerative disc disease with pre-operative documentation of instability (motion on flexion/extension or fixed spondylolisthesis)
b. Pseudoarthrosis
c. For second or third time disc surgery

B. Contraindications for Lumbar Fusion

1. Primary surgery for a new, acute disc herniation with unilateral radiation leg pain

C. Surgical Procedures

1. Posterior or lateral bony fusion
2. Transpedicular fixation
3. Interbody fusion

PROTOCOL HISTORY:
Passed: 9/1/1992
Amended: 6/12/2007

TRAUMATIC BRAIN INJURY

Introduction:
Traumatic Brain Injury (TBI) is defined as a traumatically induced structural injury and/or physiologic disruption of brain functions as a result of an external force. The force may be caused by a bump, blow, or jolt to the head, or a penetrating head injury that disrupts normal functions of the brain.

Classifications:
TBI can be classified as mild, moderate or severe. The degree of impairment has diagnostic and therapeutic implications. The majority of patients with mild TBI will improve significantly within 90 days, while patients with moderate or severe TBI may develop chronic and/or permanent handicap or disability.

1. Mild Traumatic Brain Injury: A traumatically induced physiological disruption of brain function manifested by at least one of the following:

Any alteration of mental status at the time of the injury, e.g. disorientation or confusion

Any loss of consciousness < 30 minutes

A history of retrograde or antegrade amnesia

A Glascow Coma Scale (GCS) score of 13-15

Some patients with mild TBI may be described as having a concussion, i.e. an alteration of mental status at the time of injury resulting in disorientation or confusion. A post-concussion syndrome may include headache, photophobia, dizziness, decreased concentration, short-term memory dysfunction, word finding difficulty, irritability, mood swings, and/or changes in normal activities of daily living. 80-90% of individuals with mild TBI will recover fully in < 90 days. However, some symptoms may persist for up to 1 year post-injury.

2. Moderate TBI: A traumatically induced physiological disruption of brain function manifested by at least one of the following:

Memory loss of 24 hours to 7 days

Any loss of consciousness > 30 minutes and up to 24 hours

A Glascow Coma Scale (GCS) score < 9-12

3. Severe TBI: A traumatically induced physiological disruption of brain function manifested by at least one of the following:

Memory loss lasting more than 7 days

Any loss of consciousness > 24 hours

A Glascow Coma Scale (GCS) score of 8 or less

Persons with a moderate to severe TBI frequently require significant medical and surgical interventions and will often require inpatient care on a long-term or chronic basis. The types of medications and physical interventions used in the acute phase, and the long-term rehabilitation needs such as splinting, nerve block procedures, etc., are beyond the scope of this protocol.

Diagnostic Evaluation:

1. Imaging Studies:

a. X-rays. X-rays have generally been replaced by CT scanning, which has a higher accuracy and sensitivity for detecting fractures. X-rays may be helpful if the CT scan is unavailable and if a fracture is possible but very unlikely.

b. CT scan is the imaging study of choice in the acute period. CT scanning is sensitive to the detective of blood, fractures, and structural abnormalities.

c. MRI scanning. Usually not performed in the acute setting since CT scanning is preferable for the detection of acute intracranial bleeding. MRI scans are very sensitive and are more commonly used in the subacute or chronic phase.

d. Vascular imaging. Vascular studies are performed in the acute setting when venous or arterial abnormalities as expected from the patient's history symptoms and clinical examination. CT angiography (CTA) may be used when abnormalities of the carotid or vertebral system are suspected. MRA and carotid ultrasound are not generally indicated in the acute setting.

Advanced imaging studies are most likely to be indicated in the following cases:

- initial GCS score of 13 or less, and/or < 15 by 4 hours post-injury
- age > 55 years
- exam is unreliable due to intoxication or drugs
- retrograde amnesia of > 30 minutes
- witnessed loss of consciousness > 15 minutes
- repeated vomiting
- evidence of basilar skull fracture

2. Lumbar Puncture. A lumbar puncture may be used to examine the cerebrospinal fluid in neurological disease and/or injury. When indicated, a qualified and trained physician may perform a lumbar puncture under sterile conditions. Contraindications to a lumbar puncture may include acute trauma to the spinal column, infection, increased intracranial pressure and/or coagulation disorders.

3. Laboratory testing. Laboratory tests may be necessary to evaluate a patient with mild TBI when there is a suspicion of systemic illness, electrolyte disorder, drug use, alcohol intoxication or an underlying medical disease. Hypopituitarism occurs in up to 17% of patients with a mild traumatic brain injury and laboratory testing for this disorder may be indicated. Patients who require medication for treatment of their mild traumatic brain injury may require periodic laboratory testing to measure drug levels and/or assess drug effects on organ function.

4. Neurophysiology Studies. Electroencephalography (EEG) measures brainwave function and may be performed in the subacute or chronic phase of the illness, or in the acute phase, when seizure activity is suspected. A normal EEG does not rule out a seizure disorder. Techniques such as sleep deprivation and photic stimulation may enhance accuracy. Brain Stem Auditory Evoked Responses (BAER) are helpful in assessing mid brain and brainstem abnormalities. Somatosensory Evoked Potentials (SEPs) are not usually indicated in mild traumatic brain injury. Visual Evoked Potentials (VEPs) can be used to assess abnormalities from the anterior to posterior visual pathways, i.e., from the retina to the occipital cortex.

5. Cognitive/neuropsychology testing. Neuropsychological testing is helpful in defining the extent of cognitive and behavioral deficits, severity, and determining the relationship of these abnormalities to the patient's vocational responsibilities and/or activities of daily living. Neuropsychological testing may help establish rehabilitative strategies and realistic outcomes. These studies provide a baseline to assess improvement - or lack thereof - over time. The efficacy of rehabilitative interventions can be assessed and either modified or terminated as indicated. The assessment may be important in determining MMI and degree of impairment. Initial referral for neuropsychological testing at 30 days after injury is reasonable if the patient does not show significant improvement in the first month. Other factors that determine the time of testing and may compel earlier testing include stressful and demanding occupations, age, or pre-existing factors that may influence outcome. Periodic neuropsychological testing may be necessary depending upon the patient's progress.

6. Vestibular testing. Vestibular dysfunction, including hearing loss, vertigo, and balance problems, may occur. In the majority of patients these symptoms are self-limited and resolve within 3 months. If the patient shows no improvement at 4 weeks or if the initial symptoms are severe, impairing activities of daily living such as driving a car, referral for neuro-otology evaluation is indicated. The most common type of vertigo following MTBI is benign positional vertigo which does not usually require additional extensive testing since it is diagnosed with clinical maneuvers and treated with a variety of canalith-repositioning maneuvers, e.g. Epley Maneuvers. If the diagnosis of vertigo is unclear or concomitant vestibular abnormalities are suspected, further evaluation should be pursued. Frequently utilized and generally accepted testing includes tympanometry, vestibular function studies such as electro- or video-nystagmography (ENG/VNG), and Rotary Chair Testing.

Treatment:

a. Cognitive rehabilitation refers to therapy programs that aid in the management of specific problems such as perception, memory, thinking, and problem solving. Skills are practiced and strategies are taught to help improve function and compensate for remaining deficits. Cognitive rehabilitation is indicated in individuals who have experienced mild TBI resulting in cognitive symptoms that impair activities of daily living or vocational function. Rehabilitation must be prescribed by the attending physician and carried out by a qualified individual such as a psychologist, speech

therapist, or occupational therapist. Individuals who receive cognitive rehabilitation are expected to show measurable functional improvement within a pre-determined timeframe from the side of cognitive rehabilitation therapy. Goals and expected timeframes should be assessed prior to therapy and updated every 3-4 weeks. Objective changes should be documented, and the patient should demonstrate measurable improvement. Lack of objective improvement questions the efficacy, and therefore the need, for further therapy.

b. Post-traumatic headaches (PTH) have an incidence of > 50% in cases of mild TBI, are usually self-limited and resolve spontaneously in 80-90% of patients within 3 months. The treatment and prognosis of PTH may be diagnosis-dependent and can occur as a result of injury due to extracranial structures such as cervico-occipito-cranial muscles, temporomandibular joint, or sinuses. Pre-existing migraine headache may be exacerbated by a mild TBI. Treatment of PTH should be matched with the underlying or causative etiology.

c. Vestibular Rehabilitation: This form of rehabilitation is performed by qualified clinicians including audiologists, nurses, and physical therapists. Vestibular rehabilitation is indicated for abnormalities such as balance disorders, postural control, and vertigo.

d. Post-traumatic Psychiatric Disorders are common following mild TBI, are usually mild and self-limited with resolution within 90 days. Mood swings, irritability, anxiety, and depression are most common. Interpersonal relationships often suffer. Mild problems can be treated with reassurance or counseling. Anti-depressants and anti-anxiety medications are often helpful. In more severe cases where there is significant impairment of activities of daily living or issues affecting return back to work, psychiatric referral is indicated.

e. Sleep Disorders: Insomnia is common, is usually self-limited and will spontaneously resolve within a period of weeks. Environmental and behavioral modifications are frequently helpful. Short-term medication usage can be used. If sleeplessness causes significant impairment in activities of daily living or interferes with return to work, sleep lab evaluation may be helpful.

Table 1. The Glasgow Coma Scale
And The Glasgow Outcome Scale.

Glasgow Coma Scale	
Eye opening	
Spontaneous	4
To speech	3
To pain	2
No response	1
Verbal response	
Alert and oriented	5
Disoriented	4
Speaking but nonsensical	3
Moans	2
No response	1
Motor response	
Follows commands	6
Localizes pain	5
Withdraws to pain	4
Decorticate flexion	3
Decerebrate extension	2
No response	1
Grading of TBI:*	
Mild†	13-15
Moderate	9-12
Severe	3-8

* A single GCS score is neither diagnostic of TBI nor predictive of outcome.
† Because of the 10% or greater incidence of craniotomy in these patients, many authorities now consider a GCS of 13 to represent moderate brain injury.

Glasgow Outcome Score

D	=	Dead
PVS	=	Persistent vegetative state
SD	=	Severe disability
MD	=	Moderate disability
GR	=	Good recovery

TRAUMATIC BRAIN INJURY
PROTOCOL HISTORY:

Passed:	9/1/1992 (as Post-Concussion Syndrome)
Amended:	11/19/2002
Amended:	5/5/2009 (as Post-Traumatic Headache)
Amended:	10/25/2016 (as Traumatic Brain Injury)

CHRONIC REGIONAL PAIN SYNDROME (CRPS)
(also referred to as Sympathetic Dystrophy or Causalgia)

I. BACKGROUND

Complex regional pain syndrome is a descriptive term encompassing a variety of painful conditions following injury, which appear regionally and have a distal predominance of abnormal physical examination findings. This painful condition typically follows a traumatic injury or noxious event to an extremity, with a disproportionate response respective to the original insult. Medical conditions including stroke and myocardial infarction may also be precipitating factors. The pain pattern is not limited to the distribution of a single peripheral nerve, and physical findings include edema, alterations in skin blood flow, abnormal sudomotor activity in the region of pain, allodynia, or hyperalgesia.

CRPS Type I (Reflex Sympathetic Dystrophy)

1. Type 1 CRPS is a syndrome that develops after an initiating noxious event.
2. Spontaneous pain or allodynia/hyperalgesia occurs, is not limited to the territory of a single peripheral nerve and is disproportionate to the inciting event.
3. There is or has been evidence of edema, skin blood flow abnormality, or abnormal sudomotor activity in the region of the pain since the inciting event.
4. The diagnosis is excluded by the existence of conditions that would otherwise account for the degree of pain and dysfunction.

CRPS Type II (Causalgia)

1. Type II CRPS is a syndrome that develops after a nerve injury. Spontaneous pain or allodynia/hyperalgesia occurs and is not necessarily limited to the territory of the injured nerve.
2. There is or has been evidence of edema, skin blood flow abnormality or abnormal sudomotor activity in the region of the pain since the inciting event.
3. The diagnosis is excluded by the existence of conditions that would otherwise account for the degree of pain and dysfunction.

II. DIAGNOSTIC CRITERIA

1. History of noxious event or cause of immobilization.
2. Continued pain, allodynia or hyperalgesia out of proportion to the injury.
3. Physical evidence of edema, trophic skin changes, hair loss, alterations in skin blood flow or abnormal sudomotor activity in the region of pain.
4. The diagnosis is excluded by the existence of conditions that otherwise account for the degree of pain and dysfunction.

III. DIAGNOSTIC STUDIES

1. Surface temperature measurements indicating at least 1 degree Celsius asymmetry between the normal and injured sides. The existence of a skin temperature differential may vary, and repeated measurements are helpful. The injured side may be warmer or cooler.
2. A three-phase radionuclide bone scan may assist in diagnosis. A normal study does not exclude this diagnosis, however.
3. Radiographic studies of the injured extremity may show patchy demineralization in chronic or severe cases.

IV. TREATMENT

Treatment for complex regional pain syndrome type 1 (reflex sympathetic dystrophy) should be directed at providing pain control, in conjunction with an effort to promote participation in a directed physical and/or occupational therapy program to restore use and function of the injured extremity. Treatment options include:

1. Pharmacologic Agents

    a. Nonsteroidal anti-inflammatory drugs
    b. Tricyclic antidepressants
    c. Membrane stabilizers (anticonvulsants)
    d. Oral opioids
    e. Oral corticosteroids
    f. Capsaicin

2. Physical Modalities

    a. Desensitization (contrast baths or fluidotherapy)
    b. Range of motion exercises (passive, active assisted, active)
    c. Edema control garments (stocking or glove)
    d. Stress-loading via weight-bearing exercises
    e. Functional training/work conditioning/work hardening

3. Injection Techniques

Somatic and sympathetic nerve blocks may be effective for patients displaying allodynia who are unable to tolerate manipulation of the injured extremity. Occasionally, continuous nerve blocks employing brachial plexus or epidural catheter is/may be necessary for patients with severe pain and stiffness from prolonged immobility.

General guidelines for the use of neural blockade are as follows:

a. Evidence of a successful block, either an increase in skin temperature by 4 degrees Fahrenheit with sympathetic blocks, or evidence of motor block in the appropriate nerve distribution should be documented.

b. Unless a continuous catheter is used, nerve blocks should be utilized at most two or three times per week in conjunction with therapy.

c. Repeated neural blockade should only be considered if a clear benefit is evident following each block, as indicated by substantial improvement in pain persisting for prolonged time periods following the block, or marked improvement in range of motion and swelling can be documented.

d. Nerve blocks performed in a series should be conducted based on a positive benefit from the initial blocks and should not exceed three blocks in a series. The response to the block series should then be reassessed following a period of continued physical therapy, not to exceed 6 weeks of treatment between physician reassessments. Failure to continue to improve, or diminished function, should be considered an indication for additional nerve blocks, assuming a positive response was documented with the first series.

e. If a substantial improvement cannot be demonstrated, excluding the transient pain relief that accompanies any somatic nerve block, further use of neural blockage is unwarranted.

4. Surgical Sympathectomy and Neuromodulation

Surgical sympathectomy is rarely considered effective in resolution of complex regional pain syndromes. These syndromes, including causalgia and reflex sympathetic dystrophy, are related to receptor supersensitivity and are not caused by over-activity of the sympathetic nervous system. Most patients undergoing a surgical sympathectomy obtain only transient improvement in pain levels and may suffer serious or disabling complications from the surgery. Neuromodulation techniques such as spinal column stimulator implantation use are governed by the Spinal Column Stimulators Protocol.

5. The assistance of a pain management psychologist or psychiatrist may be helpful in cases where symptoms persist for 2 months or more. Psychology and/or psychiatry intervention can provide motivational support, assess and treat co-existing conditions such as depression, and may aid in the establishment of realistic treatment goals and objectives. This condition may be appropriate for treatment in a multidisciplinary program if pain persists for 2 months or more.

PROTOCOL HISTORY:

Passed:	9/1/1992 (As “Sympathetic Dystrophy”)
Amended:	11/19/2002 (As “Chronic Regional Pain Syndrome”)
Amended:	6/3/2008
Amended:	5/5/2009
Amended:	4/27/2010

THORACIC OUTLET SYNDROME

I. BACKGROUND

The thoracic outlet syndrome (TOS) is a potential cause of neck, arm, and/or hand pain. TOS is more common among women than men, and occurs most frequently in the 2nd and 4th decades. The thoracic outlet is located at the superior aspect of the thorax; neural and/or vascular compression attributed to the thoracic outlet syndrome has been described as occurring at up to 9 anatomic locations, with the three most common being (a) the interscalene triangle, (b) between the first rib and the clavicle, and (c) between the pectoralis minor and thoracic cage. Risk factors include anatomic anomalies (cervical rib, long transverse process at the cervical spine, clavicle fracture or anomaly, bifid first rib or fusion of the 1st and 2nd ribs, tumor, subclavian artery aneurysm, etc.), trauma, or occupations requiring prolonged, static shoulder protraction postures and/or frequent shoulder abduction activity such as reaching or lifting over shoulder height.

This diagnosis often requires consultation by a specialist (neurologist, neurosurgeon, orthopedist, physiatrist, or vascular surgeon). Treatment is non-surgical in the majority of cases, but surgical decompression of the brachial plexus and/or vascular structures may be required in some instances.

II. DIAGNOSTIC CRITERIA

A. History and Physical Examination

Patients most commonly complain of supraclavicular shoulder pain with radiation to the medial arm and forearm, often with numbness and/or coolness in the 4th and 5th digits of the hand. Hand weakness or difficulty with fine manipulation may be reported, as well as cold intolerance. Cervical motion may increase symptoms, and headaches may develop. A cool, pale hand or swollen upper extremity may be reported. Symptom duration ranges from weeks to years, with an average of 18 months. Ten percent of patients have bilateral hand symptoms. Differential diagnosis includes carpal tunnel syndrome, ulnar neuropathy, cervical radiculopathy, medial epicondylitis, fibromyalgia, CRPS-1, axillary vein thrombosis, subclavian steal syndrome and/or apical lung tumor.

Physical examination should include a complete orthopedic and neurovascular examination, with attention to: sensation, reflexes, strength, range of motion, muscle atrophy and pulses. Specific diagnostic tests include:

1. Adson's maneuver, in which the shoulder is abducted and externally rotated with the neck extended, and the radial pulse is palpated. A positive test includes a decrease in the radial pulse pressure.

2. Wright's maneuver, in which the shoulders are abducted and externally rotated as the patient inhales deeply and holds his/her breath. A positive test includes a reproduction of paresthesias in the symptomatic distribution.

3. Roos test, in which the shoulders are fully flexed, and repetitive, rapid finger flexion and extension are performed. A positive test includes a reproduction of paresthesias in the symptomatic distribution.

B. Diagnostic Test Procedures Include:

1. X-rays of the cervical spine, to rule out cervical rib and/or apical tumor.

2. Electrodiagnostic studies including nerve conduction testing and electromyography. A prolongation of the ulnar F wave and/or a decrease in the ulnar sensory nerve action potential (SNAP) may be seen.

3. MRI of the cervical spine and/or brachial plexus may rule out cervical disc herniation or a space-occupying lesion (tumor, cyst, abscess, etc.).

4. MRA or arteriography with the arm in abduction may demonstrate compression of the supraclavicular vasculature.

III. TREATMENT

A. Non-operative

1. Application of a specific exercise protocol, as may be provided under the direction of a physical therapist or occupational therapist. Scapular retraction (passive and active) and cervical active range of motion exercises are generally included.

2. Avoidance of carrying heavy objects; avoidance of persistent and/or repetitive activities with the shoulders flexed and/or abducted; avoidance of carrying a heavy backpack.

3. Medication: Analgesics, NSAIDS, tricyclics, SSRIs, muscle relaxants, and/or anticonvulsants.

B. Operative

1. Surgical resection of a segment of the first rib.

2. Scalenectomy or removal of cervical rib or rudimentary rib via a supraclavicular approach.

IV. ESTIMATED DURATION OF CARE

Non-operative care options are indicated prior to consideration of operative treatment. Non-operative care may be provided for at least 8 weeks prior to considering surgery, and may be continued until the point of maximum medical improvement.

Operative treatment, followed by a post-operative treatment phase of up to six months' duration, should lead to a point of maximum medical improvement in most cases.

PROTOCOL HISTORY:

Passed:	9/1/1992
Amended:	9/16/2003
Amended:	5/5/2009

PROTOCOLS FOR INJURIES TO THE FOOT AND ANKLE

I. DIGITAL FRACTURES

A. Background

Digital fractures commonly occur in the workplace and are usually the result of a crush injury from a falling object, or from striking one's foot against an immobile object (stubbing one's toe).

There is a wide range of digital fractures, from simple non-displaced fractures requiring stiff soled shoe wear, to comminuted compound intra-articular fractures requiring emergent surgical debridement and stabilization.

Minimizing digital fracture occurrence should be the primary goal in the workplace, and the steel toe "safety shoes" have significantly reduced the incidence of these injuries.

B. Diagnostic Criteria

1. History and Physical Examination:

i. Typically the patient presents with a painful, swollen toe. The patient often complains of difficulty with shoe wear and ambulation.

ii. Physical exam reveals swelling, erythema and ecchymosis at the injured digit, which can often extend into the forefoot. Palpating the injured digit reproduces pain.

2. Diagnostic Imaging:

i. Plain Radiography: Standard anteroposterior (AP), oblique, and lateral radiographs of the entire foot should be obtained to not only include the toe, but the entire foot as injuries more proximal are common.

ii. Bone Scan: Not indicated.

iii. CT Scan: Not indicated.

iv. MRI: Not indicated.

C. Treatment Based on Fracture Type:

1. Lesser Digit Fractures – 2nd and 5th toe fractures

i. Extra-articular fractures

1. Non-displaced: Buddy splint with post op shoe or short CAM walker depending on patient comfort level for 2-4 weeks.

2. Displaced: Closed reduction under digital anesthetic block followed by buddy splint, post-op shoe, or short CAM walker boot for 4-6 weeks.

ii. Intra-articular fractures

1. Non-displaced: Buddy splint with post op shoe or short CAM walker depending on patient comfort level for 2-4 weeks.

2. Displaced: Closed reduction under digital anesthetic block followed by buddy splint, post-op shoe, or short CAM walker boot for 4-6 weeks.

iii. Open Fractures

1. Tetanus prophylaxis should be administered as soon as possible, with appropriate antibiotics.

2. Simple wounds can be irrigated and closed in the Emergency Department.

3. More complex wounds and crush injuries should be evaluated by an available Orthopaedic Surgeon or Podiatrist, and often require operative intervention.

iv. Return to Work

1. With all types, patient may return to modified duty when comfortable, with appropriate foot orthosis (buddy splint, post-op shoe, or CAM walker).

2. Physical therapy can be used to expedite return to function when appropriate.

2. Great Toe Fractures

i. Extra-articular fractures

1. Non-displaced proximal or distal phalanx fracture

a. Subungal hematoma should be decompressed if present via nail puncture or nail avulsion.

b. Post-op shoe or Short CAM walker for 2-4 weeks

2. Comminuted distal tuft fracture

a. Subungal hematoma should be decompressed if present via nail puncture or nail avulsion.

b. Post-op shoe or Short CAM walker for 2-4 weeks

ii. Intra-articular fractures

1. Distal phalanx dorsal avulsion fracture (Great toe mallet)

a. Displaced: Open reduction and internal fixation followed by immobilization with post-op shoe, short leg cast, or Short CAM walker for 4-6 weeks

b. Non-Displaced: Fracture shoe, or Short CAM walker for 4-6 weeks

2. Intra-articular distal or proximal phalanx fractures

a. Non-Displaced: Fracture shoe or Short CAM walker for 4-6 weeks

b. Displaced: Attempt closed reduction, but often unsuccessful, under digital anesthetic block. If necessary open reduction and internal fixation (ORIF) followed by short leg cast immobilization or short CAM walker for 4-6 weeks.

iii. Open Fractures

1. Tetanus prophylaxis should be administered as soon as possible, with appropriate antibiotics.

2. Simple wounds can be irrigated and closed in the Emergency Department.

3. More complex wounds and crush injuries should be evaluated by an available Orthopaedic Surgeon or Podiatrist and often require operative intervention.

iv. Return to Work

1. With non-operative fractures, patient may return to modified duty when comfortable, with appropriate foot orthosis (buddy splint, post-op shoe, or CAM walker).

2. Operative injuries typically require two weeks of strict elevation at home followed by return to modified duty when comfortable, with appropriate foot orthosis (buddy splint, post-op shoe, or CAM walker) for 4-6 weeks.

3. Physical therapy can be used to expedite return to function when appropriate.

D. Summary

Digital fractures are common in the workplace and often result from blunt trauma caused by a falling object, or stubbing of the toe. Injuries range from simple non-displaced fractures to open intra-articular injuries which require surgical treatment.

The nature of the workers' occupation will often dictate when return to function will occur. It is to be determined by the treating physician when return to work will either delay healing or put the worker at risk for re-injury.

Digital fractures usually do not preclude a worker returning to modified duty or sedentary desk work when soft tissue swelling and patient's comfort level allows.

II. METATARSAL FRACTURES AND DISLOCATIONS

A. Background

Metatarsal fractures are typically the result of blunt trauma or a crush injury to the foot from a falling object, a fall from height or misstep, or from a worker striking their foot against an immobile structure. Metatarsal stress fractures can occur from repetitive overuse of the foot (such as frequent pedal use, excessive walking, or jack-hammer use) and are of insidious onset.

Metatarsal fractures are typically separated into three areas, 1st metatarsal fractures, central metatarsal fractures (2-4 metatarsal), and 5th metatarsal fractures. They can be open or closed, intra-articular or extra-articular, and follow fracture classification patterns of long bones where fractures can occur at the base, midshaft, neck, or head of the metatarsal. Metatarsal dislocations can often occur in work-related injuries and represent another subcategory of metatarsal injuries.

Occurrence is common and not related to gender or age. Protective industrial work boots and varied terrain floor surfaces offer protection from these injuries.

B. Diagnostic Criteria

1. History and Physical Examination:

i. The patient typically presents acutely after an accident or fall with immediate pain and swelling at the fracture site, with often the inability to ambulate. The exception to this is with stress fractures where the onset is insidious but the patient often points directly to the level of stress fracture. Obtaining an accurate history is important, in particular the mechanism of injury.

ii. Physical examination reveals progressive **edema in the forefoot with tenderness to palpation in** the fracture site and surrounding radial tissue. Patients often will be highly guarded, particularly in comminuted, displaced, and intra-articular fractures. Careful neurovascular exam is critical, particularly in crush injuries where foot compartment syndromes can occur and are surgical emergencies. In cases where compartment syndrome is suspicious, frequent neurovascular exams and elevation at or just above the level of the heart is important. The orthopaedic surgeon should have a low threshold to perform foot fasciotomies if excessive swelling and pain out of proportion to the injury suggests a compartment syndrome. Open injuries are not common, but the foot should be carefully examined in its entirety for open wounds, and these should be addressed in the operating room.

2. Diagnostic Imaging:

i. Plain Radiography: Three view x-rays (AP, Oblique, and Lateral) should be obtained of the entire foot to evaluate for injury. Contralateral films are not necessary, but stress views and weight bearing views can often be helpful to evaluate for ligamentous injuries (Lisfranc injuries). Repeat x-rays at 2-3 weeks after onset of pain can be helpful in identifying stress fractures.

ii. Bone Scan: Not routine. Can be helpful in cases of suspected stress fractures, but often require 7-10 days after stress fracture occurrence to be positive.

iii. CT Scan: Not routine. Can be helpful and necessary when intra-articular extension exists and is used to aid operative decision making and planning. Also important tool in diagnosing metatarsal base dislocations (Lisfranc injuries).

iv. MRI: Not routine. Can be helpful when history suggests a stress fracture and can detect a stress fracture within days of their occurrence. Can also be helpful tools when patient fails to improve post 4-6 weeks of conservative management.

C. Treatment Based on Fracture Type

1. 1st Metatarsal Fractures.

i. Non-Displaced: These can be treated in a non-weight bearing cast or CAM walker for 4-6 weeks, followed by progressive weight bearing for

another 4-6 weeks. Close radiographic follow-up is required at 1-2 week intervals in those fractures at risk for displacing.

ii. Displaced: Since the 1st metatarsal bears the majority of the weight during the gait cycle, reduction of the displaced 1st metatarsal is important to minimize the long-term complication of lesser metatarsal overload secondary to a shortened or elevated 1st metatarsal head. ORIF is usually required to stabilize the fracture. The foot is typically immobilized in a short leg cast or CAM walker for 4-6 weeks, followed by another 4-6 weeks of progressive weight bearing and physical therapy. Return to sedentary desk work can occur as early as 2-3 weeks after surgery in some patients.

iii. Intra-articular. Anatomic reduction of intra-articular fractures is essential to prevent long-term post-traumatic arthritis of the 1st metatarsal phalangeal joint, or 1st tarsal metatarsal joint. ORIF is usually required to stabilize the fracture. The foot is typically immobilized in a short leg cast or CAM walker for 4-6 weeks, followed by another 4-6 weeks of progressive weight bearing and physical therapy.

2. Central Metatarsal Fractures

i. Non-Displaced: These can be treated in a non-weight bearing cast or CAM walker for 4-6 weeks, followed by progressive weight bearing for another 4-6 weeks. Close radiographic follow-up is required at 1-2 week intervals in those fractures at risk for displacing.

ii. Displaced: When evaluating displaced central metatarsal fractures, it is important to evaluate the relationship of the metatarsal heads with respect to the 1st metatarsal. Displaced fractures with a normal metatarsal head relationship with respect to the surrounding metatarsal heads can be treated nonoperatively in a short leg cast or CAM walker for 4-6 weeks. These are relatively stable injuries, as the distal intermetatarsal ligaments are usually intact. In displaced fractures where there is significant shortening of the metatarsal head, or where neurovascular or skin compromise is present, reduction is necessary. Those fractures that cannot be maintained by closed means are treated with ORIF. The foot is typically immobilized in a short leg cast or CAM walker for 4-6 weeks, followed by another 4-6 weeks of progressive weight bearing and physical therapy. Return to sedentary desk work can occur as early as 2-3 weeks after surgery in some patients.

iii. Intra-articular: Fortunately, these injuries are rare. When they occur they usually occur along with associated dislocations of the metatarsal bases, and represent Lisfranc joint fracture dislocations. These are usually treated with ORIF. Postoperatively, the patient is immobilized for 4-6 weeks in a short leg splint or short leg cast, and then requires another 4-6 weeks of progressive weight bearing and physical therapy until full weight bearing with a regular shoe is possible. Return to sedentary desk work can occur as early as 2-4 weeks after initial surgery.

3. 5th Metatarsal Fractures

i. Non-displaced: These can be treated in a post-operative shoe or CAM walker, for 4-6 weeks, and the patient is allowed to weight bear as

tolerated. Typically symptoms subside by 2-4 weeks and return to modified duty if possible.

ii. Displaced: Follow the guidelines for displaced central metatarsal fractures above. (C-2-ii)

iii. Jones Fractures: These represent fractures at the metaphyseal-diaphyseal junction, and have the propensity to become non-unions. The blood supply in this area of the 5th metatarsal is tenuous and represents a watershed area. As such, nonunions of Jones fractures can occur. There are some proponents that suggest immediate ORIF, which is often advocated in high performance athletes. Jones fractures, however, can be managed by closed mean with a short leg non-weight bearing cast for 6 weeks followed by another 4-6 weeks of progressive weight bearing. If during serial radiographic follow-up there are no visible signs of bony healing by about 6 weeks, AND the patient has persistent pain in the fractured site, then ORIF is recommended. Postoperatively, the patient is immobilized for 4-6 weeks in a short leg splint or short leg cast, and then requires another 4-6 weeks of progressive weight bearing and physical therapy until full weight bearing with a regular shoe is possible. Return to sedentary desk work can occur as early as 2-4 weeks after initial surgery.

iv. Base of the 5th Avulsion Fractures:

These represent an avulsion fracture from the lateral tarsal metatarsal ligament pulling on the base of the 5th metatarsal. Most often these are stable injuries and can be treated in a weight bearing short leg cast, CAM walker, or postoperative shoe for 4-6 weeks with return to modified duty once the patients comfort allowed. Significantly displaced and rotated fractures represent significant intra-articular injuries and should be reduced. If the reduction is not stable via closed means, then ORIF should be performed. Postoperatively, the patient is immobilized for 4-6 weeks in a short leg splint or short leg cast, and then requires another 4-6 weeks of progressive weight bearing and physical therapy until full weight bearing with a regular shoe is possible. Return to sedentary desk work can occur as early as 2-4 weeks after initial surgery.

4. Stress Fractures

i. Stress fractures are typically non displaced and treated with a CAM walker, short leg cast, or post op shoe for a period of 4-6 weeks, with return to modified duty once the patient is comfortable. Return to full activity is possible after fracture healing.

5. Metatarsal Dislocations (Lisfranc Joint Injuries)

i. Metatarsal dislocations often require surgical treatment, as closed management typically does not allow for anatomic reduction.

ii. Lisfranc dislocations represent dislocations at the bases of the metatarsals with respect to the tarsal bones. Missed Lisfranc injuries go on to develop often debilitating midfoot arthritis. The standard of care is to treat them with ORIF. Postoperatively, the patient is immobilized for 4-6 weeks in a short leg splint or short leg cast, and then requires another 4-6 weeks of progressive weight bearing and physical therapy until full weight bearing with a regular shoe is possible. Return to sedentary desk work can occur as early as 2-4 weeks after initial surgery.

6. Open Fractures and Crush Injuries

i. Crush injuries should be monitored in the hospital with frequent neurovascular checks to rule out compartment syndrome of the foot.

ii. When open fractures are identified, tetanus prophylaxis should be administered as soon as possible, with appropriate antibiotics.

iii. Patient is taken emergently to the operating room by an orthopaedic surgeon for surgical debridement, open reduction, and internal fixation.

iv. Severe crush injuries with concomitant compartment syndrome are treated with foot fasciotomies, and delayed closure, either primarily or with skin grafts.

v. Post-operatively, the foot is immobilized for approximately 4-6 weeks, and the patient is then started in a physical therapy program with progressive weight bearing for another 4-6 weeks until able to return to modified duty work.

D Summary

Metatarsal fractures represent a higher level of injury to the foot and ankle, and as such, proper identification, treatment, and rehabilitation is paramount to the successful outcome and expedient return to function of the injured worker. These injuries can occur as the result of direct blunt trauma, such as an object falling on a foot or a worker striking his foot against another object, via indirect means, such as twisting mechanism or misstep, or from repetitive microtrauma leading to a stress fracture.

Most often these injuries can be treated non-operatively, however, when the mechanics of the foot are significantly affected because of displaced fractures, reduction is necessary and this is usually via ORIF.

The nature of the worker's occupation will often dictate when return to function will occur. The treating physician determines when return to work will no longer interfere with healing or put the worker at risk for re-injury. Often though the patient is allowed to return to sedentary desk work when soft tissue swelling and patient's comfort level allows. This occurs typically 2-3 weeks after surgery, or 1-2 weeks with closed management of minimally displaced fractures.

III. MIDFOOT AND HINDFOOT INJURIES

A. Background

The midfoot is comprised of five tarsal bones (navicular, cuboid, medial cuneiform, middle cuneiform, and lateral cuneiform), and the hindfoot is comprised of two bones (calcaneus and talus). The intricate relationship of the tarsal bones with the hindfoot make up the apex of both the longitudinal and traverse arches of the foot, and their stability is important to the normal function of the foot.

Variations in normal anatomy of the foot can lead to a wide variety of foot shapes which range from the high arched cavo-varus foot shape, to the adult acquired or flexible flat foot. Having an underlying high arched or flat foot does not preclude a worker from performing the normal duties of most jobs as evidenced by the Royal Canadian Army study of the 1940s which showed no demonstrable functional difference between asymptomatic flat feet and normal feet of army recruits.

Injuries to the mid and hind foot typically represent a higher level of injury often a result from a fall from height or a crush injury. Emergent evaluation of the foot in an emergency room by experienced orthopaedic surgeons is often necessary to evaluate for serious soft tissue injuries, compartment syndromes, and fractures which often need surgical stabilization.

B. Diagnostic Criteria

1. History and Physical Examination:

i. The patient typically presents acutely after an accident or fall with immediate pain and swelling at the injury site, with often the inability to ambulate. Obtaining an accurate history is important, in particular the mechanism of injury. Sprains of the midfoot present much more innocuously, and the worker is usually able to ambulate but complains of a pain and a limp.

ii. Physical examination reveals progressive edema in the mid and hindfoot with tenderness to palpation at the fracture site and surrounding radial tissue. Patients often will be highly guarded, particularly in comminuted, displaced, and intra-articular fractures. Careful neurovascular exam is critical, particularly in crush injuries where foot compartment syndromes can occur and are surgical emergencies. In cases where compartment syndrome is suspicious, frequent neurovascular exams and elevation at or just above the level of the heart is important. The orthopaedic surgeon should have a low threshold to perform foot fasciotomies if excessive swelling and pain out of proportion to the injury suggests a compartment syndrome. Open injuries are not common, but the foot should be carefully examined in its entirety for open wounds, and these should be addressed in the operating room.

2. Diagnostic Imaging:

i. Plain Radiography: Three view x-rays (AP, Obligue, and Lateral) should be obtained of the entire foot to evaluate for injury. Contralateral films are not necessary, but stress views and weight bearing views can often be helpful to evaluate for ligamentous injuries (Lisfranc injuries). Repeat x-rays 2-3 weeks after injury can be helpful in identifying stress fractures or unstable midfoot ligamentous injuries.

ii. Bone Scan: Not routine. Can be helpful in cases of suspected stress fractures, but often require 7-10 days after stress fracture occurrence to be positive.

iii. CT Scan: Not routine. Can be helpful and necessary when intra-articular extension exists and is used to aid operative decision making and planning. Also important tool in diagnosing tarsal-metatarsal injuries (Lisfranc injuries) as well as talus and Calcaneus fractures. Useful tool also to delineate osteochondral injuries to the talus.

iv. MRI: Not routine. Can be helpful when history suggests a stress fracture, and can detect a stress fracture within days of their occurrence. Can also be helpful tools when patient fails to improve post 4-6 weeks of conservative management and can pick up avulsion fractures that are easily missed with plain radiography. Useful tool also to delineate osteochondral injuries of the talus.

C. Treatment Based on Injury Type

1. Midfoot Sprains

i. Midfoot sprains represent a continuum of injury to the midfoot and can often be debilitating injuries. If the plain x-rays are initially normal, treatment begins with activity modification in a stiff sneaker, post-op shoe or CAM walker for 1-2 weeks while the swelling and pain resolves, and gradual return to activity. Referral to orthopaedic surgeons is indicated when patient fails to improve after 2-3 weeks. This often suggests a more significant injury, and repeat x-rays should be obtained to evaluate for unstable midfoot injuries and/or fractures not recognized at initial workup; MRI and CT scan may be indicated at this point of the history, physical exam, and plain films warrant. Physical therapy is often initialized to maximize functional recovery.

2. Tarsal Fractures

i. Non-displaced: Treatment often consists of short leg cast or CAM walker for 4-6 weeks with a progressive weight bearing program with physical therapy. Return to sedentary work can occur as early as 1-2 weeks, and return to normal function by 6-8 weeks is typical.

ii. Displaced: Treatment often consists of ORIF, short leg cast or CAM walker for 4-6 weeks, followed by a progressive weight bearing with physical therapy for another 4-6 weeks. Return to sedentary desk work is dictated by the soft tissues but can occur as early as 2-4 weeks after surgery. Return to normal function can occur as early as 3-4 months, but in significant injuries can be upwards of 12 months for full recovery.

3. Talus and Calcaneus Fractures

i. Non-displaced: Treatment often consists of short leg cast or CAM walker for 4-6 weeks with a progressive weight bearing program with physical therapy. Return to sedentary work can occur as early as 1-2 weeks, and return to normal function by 6-8 weeks is typical.

ii. Displaced: Treatment often consists of ORIF, short leg cast or CAM walker for 4-6 weeks, followed by a non weight bearing physical therapy program for another 4-6 weeks. Return to sedentary desk work is dictated by the soft tissues but can occur as early as 2-4 weeks after surgery. Return to normal function can occur as early as 3-4 months, but in significant injuries can be upwards of 12-24 months for full recovery.

4. Open Fractures and Crush Injuries

i. Crush injuries should be monitored in the hospital with frequent neurovascular checks to rule out compartment syndrome of the foot.

ii. When open fractures are identified, tetanus prophylaxis should be administered as soon as possible, with appropriate antibiotics.

iii. Patient is taken emergently to the operating room by an orthopaedic surgeon for surgical debridement, open or closed reduction, and internal or external fixation.

iv. Severe crush injuries with concomitant compartment syndrome are treated with foot fasciotomies, and delayed closure, either directly or with skin grafts.

v. Post-operatively, the foot is immobilized for approximately 4-6 weeks, and the patient is then started in a physical therapy program with progressive weight bearing for another 4-6 weeks until able to return to modified duty work.

D. Summary

Mid and hind foot injuries are typically the result of higher energy mechanisms and fortunately do not occur frequently. Prompt involvement by orthopaedic surgeons is essential to both maximize functional outcome of patients, as well as expedite return to work.

Sprains of the midfoot often resolve within 2-3 weeks, and symptoms persisting beyond this should prompt referral to orthopaedic surgeons for further work up. Physical therapy early on can maximize return to function and expedite return to work. Return to sedentary work within 1-2 weeks is typical with return to full function by 2-4 weeks.

Severe injuries to the mid and hindfoot can be significantly debilitating and often are the result of falls from heights or crush injuries. Open reduction and internal fixation of indicated fractures can maximize overall long term function. Despite prompt evaluation, treatment, and fixation, however, the long-term functional outcome of these injuries is typically poor and is usually related to the development of significant post-traumatic arthritis.

IV ANKLE INJURIES

A. Background

Ankle injuries are amongst one of the most common injuries sustained at work. They represent approximately 30% of all complaints of patients reporting to the emergency department. More common reasons to sustain an ankle injury include poor shoe wear choice, uneven or irregular surfaces, missteps, and falls from heights.

There is a wide spectrum of injuries comprising ankle injuries. They range from the common grade 1 ankle sprain which typically resolves within 1-3 days, to the severe open ankle fracture dislocation which can take upwards of 1-2 years to obtain maximal medical improvement.

Preventing ankle injuries is the primary goal in protecting workers. Appropriate shoe wear, textured surfaces to prevent slippage, and awareness of surroundings when operating machinery and when working at heights are important measures which workers and employees should be aware of in order to minimize the risk of ankle injuries.

B. Diagnostic Criteria

1. History and Physical Examination

i. The patient typically presents acutely after an accident or fall with immediate pain and swelling at the injury site, with often the inability to ambulate. Obtaining an accurate history is important, in particular the mechanism of injury. Ankle sprains typically occur after an inversion of the foot (“rolling in”, “rolled over”). The patient complains of pain and inability to ambulate.

ii. Physical examination reveals progressive edema at the level of the ankle with tenderness to palpation usually over the lateral side of the ankle (area of anterior talo-fibular ligament rupture and fibular fractures). Patients often will be highly guarded, particularly in comminuted, displaced, and intra-articular fractures. Careful neurovascular exam is critical, particularly in crush injuries where leg and foot compartment syndromes can occur and are surgical emergencies. In cases where compartment syndrome is suspicious, frequent neurovascular exams and elevation at or just above the level of the heart is important. The orthopaedic surgeon should have a low threshold to perform foot and leg fasciotomies if excessive swelling and pain out of proportion to the injury suggests a compartment syndrome. Open injuries are not common, but the foot and ankle should be carefully examined in its entirety for open wounds, and these should be addressed emergently in the operating room.

2. Diagnostic Imaging:

i. Plain Radiography: Three view x-rays (AP, Mortise, and Lateral) should be obtained of the ankle to evaluate for injury. Contralateral films are not necessary, but stress views and weight bearing views can often be helpful to evaluate for gross ligamentous instability. Repeat x-rays 2-3 weeks after injury can be helpful in identifying stress fractures or unstable ligamentous injuries in those patients who fail to improve after a period of activity modification.

ii. Bone Scan: Not routine. Can be helpful in cases of suspected stress fractures, but often require 7-10 days after stress fracture occurrence to be positive.

iii. CT Scan: Not routine. Can be helpful and necessary when intra-articular fracture extension exists or if an osteochondral defect or intra-articular loose body is suspected.

iv. MRI: Not routine. Can be helpful when history suggests a stress fracture, and can detect a stress fracture within days of their occurrence. Can also be a helpful tool when patient fails to improve post 4-6 weeks of physical therapy and can pick up a multitude of foot and ankle injuries masquerading as an ankle sprain (See "Persistent Pain After an Ankle Sprain" below).

C. Treatment Based on Injury Type

1. Anatomy

i. Stability of the ankle is made possible by both bony congruence (the fit of the talus within the distal tibia and fibula) as well as by the integrity of the ligaments, muscles, and tendons which surround the ankle. The ligaments and bones represent the static stabilizers (as they are fixed) and the muscles and tendons represent the dynamic stabilizers (as they move). The lateral side of the ankle is stabilized by the lateral collateral ligament (LCL) complex, the fibula and syndesmosis, and the peroneal tendons. The LCL complex consists of the anterior talo-fibular ligament, the calcaneo-fibular ligament, and the posterior talo-fibular ligament. The medial side of the ankle is stabilized by the deltoid ligament, the medial malleolus, the posterior tibial tendon, flexor digitorum longus tendon, and the flexor hallucis longus tendon. The deltoid ligament consists of superficial and deep layers which work in concert to stabilize the medial side of the ankle.

2. Ankle Sprains

i. The most common ligament injured in the typical inversion ankle sprain is the anterior talo-fibular ligament, followed by the calcaneo-fibular ligament, the posterior talo-fibular ligament, and finally the deltoid ligament. Ankle sprains are graded 1-3. Acute surgical repair is NOT indicated, even with MRI confirmed complete ligament rupture. Patients with clinical ankle instability after months of rehabilitation MAY warrant surgical reconstruction.

1. Grade 1 Sprain: Microtearing of the collateral ligaments about the ankle, without any appreciable ankle joint laxity on exam. Treated with RICE protocol (Rest, Ice, Compressive Dressing (splint), Elevation). Typically resolves within 1-2 weeks.

2. Grade 2 Sprain: Complete tearing of some of the collateral ligaments of the ankle, with some laxity noted on physical exam. Treated with RICE protocol, immobilization with an ankle brace or CAM walker boot, and early mobilization with Physical Therapy. Typically resolved in 2-4 weeks.

3. Grade 3 Sprain: Complete rupture of the collateral ligaments of the ankle (usually medial or lateral side), with gross instability on examination. Acute surgical repair is NOT indicated. Treatment requires immobilization in a short leg cast or CAM walker boot for 2-3 weeks, followed by 3-6 weeks of Physical Therapy. Grade 3 sprains can potentially go on to gross instability that requires long-term bracing, rehabilitation, or surgical reconstruction.

4. Chronic Ankle Instability: Ankles which are chronically unstable after 2-3 months of rehabilitation and bracing warrant further workup with stress x-rays and/or MRI to evaluate for intra-articular Osteochondral defects. Based on functional complaints, physical exam, and diagnostic tests, reconstructive surgery may be required for functional recovery. Post-operatively, patients are typically immobilized with a cast or CAM walker for 4-6 weeks, followed by a functional rehabilitation and Proprioceptive training program for another 4-6 weeks.

5. Return to work: For all of the above, return to sedentary work is possible as early as 1-2 weeks after injury or reconstructive surgery. Return to full function is based on completion of a functional rehabilitation and Proprioceptive training program.

3. Ankle Dislocations

i. Ankle dislocations are the result of a higher mechanism of injury and represent complete rupture of the lateral and medial collateral ligaments. They are usually associated with a fracture, but not always. Treatment is emergent closed reduction under conscious sedation or anesthetic ankle block. The patient is typically immobilized in a short leg cast or splint for 2-3 weeks followed by progressive weight bearing in a CAM walker or weight bearing short leg cast over 4-6 weeks. Patient is then initiated in a functional rehabilitation and Proprioceptive training program for approximately 4-6 weeks, and then allowed to return to full function. Surgery is rarely indicated, unless chronic instability develops after several months of rehabilitation.

4. Ankle Fractures

i. Stable fractures: Fractures involving the tips of the medial or lateral malleolus, and do not involve the ankle mortise represent stable ankle fractures. These injuries typically represent an indirect avulsion fracture from the collateral ligament origins on the medial and/or lateral malleolus. Oblique fractures involving the lateral malleolus (typical supination-external rotation pattern of injury), without any widening of the medial ankle clear space (space must be less than 4mm), are also considered stable. Rarely minimally displaced fractures of the posterior malleolus can occur, and typically represent extra-articular injuries and have no evidence of displacement of the tibio-talar joint on AP, lateral or mortise x-rays. Stable ankle fractures are treated with an air splint, ankle brace, CAM walker, or short leg cast for a period of 2-4 weeks, followed by rehabilitation program for another 4-6 weeks. Return to sedentary work can occur as early as 1-2 weeks (depending on the injury), and return to full duty is typical after completion of a functional rehabilitation program. Surgical treatment is rarely indicated, unless the fracture goes on to a painful non-union, in which case surgery is indicated.

ii. Unstable Fractures: These fractures indicate the loss of bony stability to the ankle joint and represent intra-articular fractures. Displacement of the medial clear space (space between the medial malleolus and the medial side of the talus) greater than 4mm indicates an unstable ankle fracture. Initial treatment begins in the emergency department with a closed reduction under conscious sedation or ankle block followed by splinting or short leg casting. Depending on the conditions of the soft tissues, surgery can be delayed as long as 2-3 weeks to minimize the risk of wound healing problems. Fractures involving the weight bearing portion of the distal tibia (pilon fractures) represent high energy injuries of the ankle, and usually require 1-3 weeks for soft tissue swelling to resolve prior to surgery. Pilon fractures are typically treated in an external fixator initially, as splint and casts are inadequate, and surgical ORIF is delayed. Post-operative course for most ankle fractures requires immobilization for 2-4 weeks in a splint or short leg cast, followed by 4-8 weeks of progressive weight bearing in a CAM walker, short leg cast, or ankle brace with physical therapy. Pilon fractures are typically immobilized longer and kept non-weight bearing for 3 months prior to the initialization of weight bearing. Maximal medical improvement after surgical repair of an unstable ankle fracture typically occurs 3-6 months after surgery, but can be upwards of 1-2 years in more severe injuries.

5. Open Fractures and Crush Injuries

i. Crush injuries should be monitored in the hospital with frequent neurovascular checks to rule out compartment syndrome of the foot and leg.

ii. When open fractures are identified, tetanus prophylaxis should be administered as soon as possible, with appropriate antibiotics.

iii. Patient is taken emergently to the operating room by an orthopaedic surgeon for surgical debridement, open or closed reduction, and internal or external fixation.

iv. Severe crush injuries with concomitant compartment syndrome are treated with leg fasciotomies, and delayed closure. Often the application of vacuum assisted closure devices (VAC dressings) and implanted antibiotic cement beads

are utilized to minimize wound infections. In severe injuries, involvement with a plastic surgeon and/or vascular surgeon is necessary to re-establish neurovascular supply to the foot, as well as closure of the soft tissue envelope.

v. Post-operatively, the foot is immobilized for approximately 6-8 weeks. Physical Therapy is delayed until the soft tissue envelope of the ankle is restored and the patient's neurovascular status has stabilized. This often can take several months and typically takes 1-2 years for patient to be at maximal medical improvement.

6. Persistent Pain After an Ankle Sprain

i. Persistent pain 2-3 months after an ankle sprain is NOT typical, and when it exists usually indicates a concomitant ankle disability. Careful history and physical examination usually directs the physician to the reason for persistent pain. If this is not easily apparent further workup with an MRI and/or stress ankle radiographs is indicated to evaluate the ankle further. The differential diagnosis is long and includes:

1. Anterolateral impingement syndrome
2. Anteromedial impingement syndrome
3. Anterior joint line impingement
4. Osteochondral defects of the tibial plafond
5. Osteochondral defects of the talus
6. Loose bodies within the ankle
7. Peroneal tendonitis
8. Peroneal tendon tear
9. Perondeal tendon dislocation
10. Symptomatic os sub-fibulare
11. Nonunion medial maleolar avulsion fracture
12. Nonunion lateral maleolar avulsion fracture
13. Anterior process fracture of the calcaneus
14. Lateral process fracture of the talus
15. Chronic ankle instability
16. Sinus tarsi syndrome
17. Posterior tibial tendonitis
18. Posterial tibial tendon tear
19. Posterior process of talus fracture
20. Symptomatic os trigonum of the talus
21. Posterior ankle impingement syndrome
22. Flexor hallucis longus tendonitis
23. Avascular necrosis of the talus
24. Tarsal tunnel syndrome
25. Peripheral neuropathy

ii. Treatment: Treatment is dictated by the pathology, but usually begins with a period of rest, immobilization, physical therapy guided specifically towards the pathology, and possibly diagnostic and therapeutic injections of cortisone with a local anesthetic. Failure to improve after non-surgical treatment for about 4-6 weeks warrants surgical treatment. Recovery is dictated by the surgical intervention, but

the patient is typically at maximal medical improvement by 6-12 months after surgical reconstruction.

D. Summary

Ankle injuries are amongst the most commonly sustained injuries in the workplace. Approximately 25,000 ankle injuries occur every day in the United States. There is a wide range of ankle injuries, but fortunately, most only require a short period of disability before return to full functional.

Acute surgical repair of ankle sprains or dislocations is not indicated, and only rarely after completing a functional rehabilitation and proprioceptive training program is surgery warranted.

Physical therapy is a useful adjunct in treating patients with ankle injuries as often their proprioception and static ankle stabilizers are disrupted. Physical therapy focusing on functional rehabilitation and proprioceptive training can expedite return to function and minimize the development of chronic ankle instability.

As with all foot and ankle injuries, prevention is the key to worker safety. Efforts should be made by employers to provide employees with education regarding proper shoe wear and fall prevention, as well as providing a work environment free of hazards which could cause serious injury.

PROTOCOL HISTORY:

Passed:	12/15/1992
Amended	5/5/2009

WORKERS' COMPENSATION PROTOCOLS
WHEN PRIMARY INJURY IS PSYCHIATRIC/PSYCHOLOGICAL

General Guidelines for Treatment of Compensable Injuries

Patient must have a diagnosed mental illness as defined by DSM-5 that, by accepted medical standards, can be expected to improve significantly through medically necessary and appropriate therapy. The emotional impairment must be of such a degree to severely interfere with social, familial, or occupational functioning.

For the purpose of determining medical necessity of care, medical necessity is defined as "Services and supplies by a provider to identify or treat an illness that has been diagnosed." They are:

A. consistent with the efficient diagnosis and treatment of a condition, and standards of good medical practice.
B. required for other than convenience.
C. the most appropriate supply or level of service.
D. unable to be provided in a more cost effective and efficient manner; and
E. unable to be provided elsewhere by a less intensive level of care.

The evaluation and assignment of mental illness diagnosis must take place in a face-to-face evaluation of the patient performed by a psychiatrist or doctoral level clinical psychologist.

Presence of the illness(es) must be documented through the assignment of appropriate DSM-5 codes using published criteria.

Whenever feasible and appropriate, psychiatric care and treatment should take place in an outpatient setting or the less intensive treatment setting able to meet the patient's needs. Structured outpatient programs are considered the treatment of first choice. Inpatient treatment is considered medically necessary when all less intensive levels of treatment have been determined to be unsafe or have been unsuccessful.

The initial evaluation should include not only documentation of the diagnosis (DSM-5), but also an initial treatment plan, individualized goals for treatment, treatment modalities to be used, and discharge planning.

A progress note documenting the provider's treatment, the patient's response to treatment, and the persistence of the problems that necessitate continued care despite treatment efforts, with the emergence of additional problems consistent with the initial diagnosis, must be written for each session of treatment. Documentation of disposition planning should be an integral part of each session note. Response, non-response or severe reactions to medications given must be recorded.

Continued

Conditions That May Be Related to Work Injuries or Traumas

A. Depressive disorders
   Except pre-menstrual dysphoric disorder
B. Anxiety disorders
   1. Except separation anxiety disorder
   2. Except selective mutism
   3. Except social anxiety disorder
C. Trauma- and stressor-related disorders
   1. Except reactive attachment disorder
   2. Except disinhibited social engagement disorder
D. Medication-induced movement disorders and other adverse effects of medication

Conditions That May Not Be Related to Work Injuries or Traumas

A. Neurodevelopmental disorders
   Except stereotypic movement disorder associated with environmental factors
B. Schizophrenia spectrum and other psychotic disorders
   1. Except brief psychotic disorder with marked stressor(s)
   2. Except medication-induced psychotic disorder (if iatrogenic)
C. Bipolar and related disorders
   Except medication-induced bipolar and related disorders (if iatrogenic)
D. Obsessive-compulsive and related disorders
E. Dissociative disorders
F. Somatic symptom and related disorders
   Except conversion disorder
G. Feeding and eating disorders
H. Elimination disorders
I. Sleep-wake disorders
   Except shift work type
J. Sexual dysfunctions
   Except medication-induced sexual dysfunction
K. Gender dysphoria
L. Disruptive, impulse-control, and conduct disorders
M. Substance-related and addictive disorders
   Unless iatrogenic in origin
N. Neurocognitive disorders
   1. Except medication-induced delirium

Continued

2. Except medication-induced major or minor neurocognitive disorder
3. Except major or mild neurocognitive disorder due to traumatic brain injury
4. Except major or mild neurocognitive disorder due to Prion Disease

O. Personality disorders
P. Paraphilic disorders
Q. Other mental disorders
R. Other conditions that may be a focus of clinical attention

ADULT PSYCHIATRIC HOSPITALIZATION CRITERIA

Medical necessity of psychiatric inpatient admission must be documented based on conditions defined under either Section I or Section II.

I. Criteria for Admission Based on Severity of Illness.

A. Patient makes direct threats or a reasonable inference of serious harm to self or to the body or property of others.

B. Violent, unpredictable or uncontrolled behavior, including patients with organic brain impairment and/or functional illness.

C. Lack of insight, unwillingness or inability to adequately care for one's physical needs. Acute cases may include starvation or failure to take essential medications accurately and safely.

D. Lack of response to previously attempted partial hospitalization management of medication and/or psychotherapy.

II. Criteria for Admission Based on Intensity of Service.

A. Need for daily skilled observation by both MD and RN staff (such as, but not limited to):

1. to confirm diagnosis;
2. to initiate medication regime;
3. to regulate dosage of potent medication; or
4. to withdraw potent medication.

B. Need for electroconvulsive shock therapy.

III. Criteria for Continued Stay.

The treatment plan should include documentation of diagnosis, individualized goals of treatment and therapeutic modalities. The medical record must include daily progress notes by the psychiatrist or psychologist.

While documentation may justify the need for continued hospitalization, the Medical Advisory Board expects that each service rendered by a physician or other provider of care and reported for payment be documented in the medical record. Documentation should include:

A. the persistence of the problems that necessitated the admission, despite therapeutic efforts, or the emergence of additional problems consistent with the admission criteria.

B. severe reaction to the medication or need for further monitoring and adjustment of dosage.

C. attempts at therapeutic re-entry into the community have resulted in exacerbation of the psychiatric illness.

D. psychiatric evidence or rationale indicating the need for stabilization of patient's condition to a point where stress of community re-entry does not substantially risk an exacerbation of the psychiatric illness.

HOSPITALIZATION CRITERIA FOR SUBSTANCE DEPENDENCY

(Applies to Psychiatric Hospitals and General Hospital Psychiatric Units)

Admission to a psychiatric hospital is appropriate for alcohol and/or drug dependency of a severity which requires intensive intervention by a multi-disciplinary health care team including physicians, nurses, counselors, social workers, and other therapists. Evidence should be present that outpatient care or treatment in an intermediate care facility has been attempted recently, but has been unsuccessful.

The patient also must have, in additional to substance dependency of a severity described above, a psychiatric disorder which inhibits his/her ability to be treated in a less intensive setting. There must be documented evidence of a present and acute psychiatric disorder of a severity which would require hospitalization in and of itself in accordance with the Adult Psychiatric criteria.

I. SUBSTANCE DEPENDENCY CRITERIA FOR REHABILITATION SERVICES FOR ADMISSION

Patient needs to meet the Adult Psychiatric Admission Criteria and both of the admission criteria given below.

A. Patient has alcohol and/or drug dependency of a severity which requires intensive intervention, and at hospital level of care, by a multi-disciplinary health care team including physicians, nurses, counselors, social workers, and other therapists. Evidence that the patient cannot be treated in a residential center for substance abuse must be documented.

B. Patient has, in addition to substance dependency of a severity described above, a psychiatric disorder which inhibits his/her ability to be treated in a less intensive setting. Evidence of a present and acute psychiatric disorder of a severity which would require hospitalization in accordance with the adult psychiatric criteria must be documented.

II. CRITERIA FOR CONTINUED STAY

The patient needs to meet the Adult Psychiatric Continued Stay Criteria, as well as (all of) A through D below.

A. The treatment plan should include documentation for both the substance dependency and psychiatric disorders of individualized goals of treatment and therapeutic modalities.

B. The medical record should include daily patient's progress notes by the psychiatrist, psychologist, or primary therapist. Evidence should be presented as to whether or not the problems necessitating admission have changed in response to specific treatment modalities being utilized.

C. Documentation of all therapeutic modalities being provided to the patient on a daily basis should be present and should specify the plan of treatment and patient's progress.

D. Post-hospital treatment planning and referral efforts that have been conducted as soon as the initial evaluation is complete must be documented in the treatment plan and progress notes.

RESIDENTIAL TREATMENT CRITERIA FOR SUBSTANCE ABUSE

I. CRITERIA FOR ADMISSION.

Medical necessity for admission to a residential substance abuse treatment facility must be documented by the presence of all of the criteria below in Section A and Section B.

In addition, it is noted that structured professional outpatient treatment is the treatment of first choice. Residential treatment, when indicated, should (a) be individualized and not consist of a standard, pre-established number of days, and (b) should follow recent outpatient treatment in a structured professional program of significant duration and intensity during the course of which the patient has not been able to maintain abstinence for a significant period of time.

A. Severity of Need.

1. The provider must be able to document that the individual has a history of alcohol/substance dependence but is mentally competent and cognitively stable enough to benefit from admission to the inpatient program at this point in time. Individual days during any part of the stay where the patient does not meet this criterion cannot be certified as medically necessary.
2. Individual exhibits a pattern of severe alcohol and/or drug abuse as evidenced by continued inability to maintain abstinence despite recent professional outpatient intervention.

   If the patient has not been in a recent outpatient program (i.e., the past 3 months), then the following conditions must be met: 1) patient must be residing in a severely dysfunctional living environment; or 2) there must be actual evidence for, or clear and reasonable inference of serious imminent physical harm to self or others directly attributable to the continued abuse of substances which would prohibit treatment in an outpatient setting.
3. For individuals with a history of repeated relapses and a treatment history involving multiple treatment attempts, there must be documentation of the restorative potential for the proposed admission.

B. Intensity of Service.

Due to significant impairment in social, familial, scholastic or occupational functioning, the individual requires intensive individual, group, and family education and therapy in an inpatient rehabilitative setting.

II. CRITERIA FOR CONTINUED STAY

In addition to meeting all of the admission criteria on a daily, continued basis, there must be daily documentation supporting the need for continued inpatient treatment. All of A through C below need to be met.

A. Progress Notes – Daily documenting of the providers' treatment, the patient's response to treatment, and the persistence of the problems that necessitated the admission, despite treatment efforts, or the emergence of additional problems consistent with the admission criteria.

B. The persistence of the problems that caused the admission to the degree that would necessitate continued inpatient care, despite therapeutic efforts, or the emergence of additional problems consistent with the admission criteria and to the degree that would necessitate continued inpatient care.

C. Clear and reasonable evidence that re-entry into the community would result in exacerbation of the illness to the degree that would require an inpatient level of care.

CRITERIA FOR ADMISSION AND LENGTH OF STAY FOR ALCOHOL/DRUG DETOXIFICATION AND AN INPATIENT SETTING

Patient must meet both of the criteria under the appropriate section.

I. CRITERIA FOR ADMISSION

A. Patient has a history of heavy and continuous alcohol/drug use requiring detoxification services where (a) there is the potential for serious physical harm from the side effects of withdrawal and (b) these services cannot be provided on an outpatient basis. Services that cannot be provided on an outpatient basis must require intensive nursing and medical treatment intervention on a 24-hour basis in order to be medically necessary on an inpatient basis.

B. Patient presents signs and symptoms of impending withdrawal and/or history of seizures of delirium tremens and requires intensive nursing and medical treatment intervention on a 24-hour basis.

II. CRITERIA FOR CONTINUED STAY

A. Documentation of the need for skilled observation and medical treatment consistent with AEP criteria.

B. Documentation of physical signs and symptoms of acute withdrawal which requires intensive nursing and medical treatment intervention on a 24-hour basis. This documentation must be noted three times daily, of which one such notation must be made by a physician.

Outpatient Treatment, Psychiatric and Substance Use Disorders, Rehabilitation

Criteria for Treatment Status Review

The specified requirements for severity of need and intensity and quality of service must be met to satisfy the criteria for the treatment review.

I. SEVERITY OF NEED

Criteria A, B, C, D and E must be met to satisfy the criteria for severity of need.

A. The patient has a DSM-5 diagnosis.

B. The presenting behavioral, psychological, and/or biological dysfunctions and functional impairment (occupational, academic, social) are consistent and associated with the DSM-5 psychiatric/substance-related disorder(s).

C. One of the following:

1. The patient has symptomatic distress and demonstrates impaired functioning due to psychiatric symptoms and/or behavior in at least one of the three spheres of functioning (occupational, scholastic, or social), that are the direct result of a DSM-5 diagnosis. This is evidenced by specific clinical description of the symptom(s) and specific measurable behavioral impairment(s) in occupational, academic or social areas, *or*

2. The patient has a persistent illness described in DSM-5 with a history of repeated admissions to 24-hour treatment programs for which maintenance treatment is required to maintain community tenure, *or*

3. There is clinical evidence that a limited number of additional treatment sessions are required to support termination of therapy, although the patient no longer has at least mild symptomatic distress or impairment in functioning. The factors considered in making a determination about the continued medical necessity of treatment in this termination phase are the frequency and severity of previous relapse, level of current stressors, and other relevant clinical indicators. Additionally, the treatment plan should include clear goals needing to be achieved and methods to achieve them in order to support successful termination (such as increasing time between appointments, use of community resources, and supporting personal success).

D. The patient does not require a higher level of care.

E. The patient appears to be motivated and capable of developing skills to manage symptoms or make behavioral change.

II. INTENSITY AND QUALITY OF SERVICE

Criteria A, B, C, D, E, F, G, H, I, and J must be met to satisfy the criteria for intensity and quality of service. In addition, K must also be met for substance use disorders.

A. There is documentation of a DSM-5 diagnosis. The assessment also includes the precipitating event/presenting issues, specific symptoms and functional impairments, community and natural resources, personal strengths, and the focus of treatment.

B. There is a medically necessary and appropriate treatment plan, or its update, specific to the patient's behavioral, psychological, and/or biological dysfunctions associated with the DSM-5 psychiatric/substance related disorder(s). The treatment plan is expected to be effective in reducing the patient's occupational, academic or social functional impairments and:

1. alleviating the patient's distress and/or dysfunction in a timely manner, *or*
2. achieving appropriate maintenance goals for a persistent illness, *or*
3. supporting termination.

C. The treatment plan must identify all of the following:

1. treatment modality, treatment frequency and estimated duration;
2. specific interventions that address the patient's presenting symptoms and issues;
3. coordination of care with other health care services, e.g., PCP or other behavioral health practitioners;
4. the status of active involvement and/or ongoing contact with patient's family and/or support system, unless there is an identified, valid reason why such contact is not clinically appropriate or feasible;
5. the status of inclusion and coordination, whenever possible, with appropriate community resources;
6. consideration/referral/utilization of psychopharmalogical interventions for diagnoses that are known to be responsive to medication;
7. documentation of objective progress toward goals for occupational, academic or social functional impairments, target-specific behavioral, psychological, and/or biological dysfunctions associated with the DSM-5 psychiatric/substance-related disorder(s) being treated. Additionally, specific measurable interim treatment goals and specific measurable end of treatment goals, or specific measurable maintenance treatment goals (if this is maintenance treatment), are identified. Appropriate changes in the treatment plan are made to address any difficulties in making measurable progress;
8. the description of an alternative plan to be implemented if the patient does not make substantial progress toward the given goals in a specified period of time. Examples of an alternative plan are psychiatric evaluation if not yet obtained, a second opinion, or introduction of adjunctive or different therapies; and
9. the current or revised treatment plan can be reasonably expected to bring about significant improvement in the problems meeting Severity of Need Criteria (I above). This evolving clinical status is documented by written contact progress notes.

D. The patient has the capability of developing skills to manage symptoms or make behavioral change and demonstrates motivation for change, as evidenced by attending treatment sessions, completing therapeutic tasks, and adhering to a medication regimen or other requirements of treatment.

E. Patient is adhering to treatment recommendations, or non-adherence is addressed with the patient, and barriers are identified, interventions are modified, and/or treatment plan is revised as appropriate.

F. Although the patient has not yet obtained the treatment goals, progress as relevant to presenting symptoms and functional impairment is clearly evident and is documented in objective terms.

G. Treatment is effective as evidenced by improvement in GAF, SF-BH, CHI, and/or other valid outcome measures.

H. Requested services do not duplicate other provided services.

I. Visits for this treatment modality are recommended to be no greater than one session per week, except for acute crisis stabilization (lasting no longer than four weeks).

J. As the patient exhibits sustained improvement or stabilization of a persistent illness, frequency of visits should be decreased over time (e.g., once every two weeks or once per month) to reinforce and encourage self-efficacy, autonomy, and reliance on community and natural supports.

K. For substance use disorders, treatment considers the use of medication-assisted treatment to address cravings and relapse prevention unless medically contra-indicated.

Psychological Testing

Criteria for Authorization

Prior to psychological testing, the individual must be assessed by a qualified behavioral health care provider. The diagnostic interview determines the need for and extent of the psychological testing. Testing may be completed at the onset of treatment to assist with necessary differential diagnosis issues and/or to help resolve specific treatment planning questions. It also may occur later in treatment if the individual's condition has not progressed since the institution of the initial treatment plan and there is no clear explanation for the lack of improvement.

I. SEVERITY OF NEED

Criteria A, B and C must be met:

A. The reason for testing must be based on a specific referral question or questions from the treating provider and related directly to the psychiatric or psychological treatment of the individual.

B. The specific referral question(s) cannot be answered adequately by means of clinical interview and/or behavioral observations.

C. The testing results based on the referral question(s) must be reasonably anticipated to provide information that will effectively guide the course of appropriate treatment.

II. INTENSITY AND QUALITY OF CARE

Criteria A and B must be met:

A. A licensed doctoral-level psychologist (Ph.D., Psy.D. or Ed.D.), medical psychologist (M.P.), or other qualified provider as permitted by applicable state law, administers the tests.

B. Requested tests must be valid and reliable in order to answer the specific clinical question for the specific population under consideration.

III. EXCLUSION CRITERIA

Psychological testing will not be authorized under any of the following conditions:

A. The testing is primarily for educational purposes.

B. The testing is primarily for the purpose of determining if an individual is a candidate for a specific medication or dosage.

C. The testing is primarily for the purpose of determining if an individual is a candidate for a medical or surgical procedure.

D. The testing results could be invalid due to the influence of a substance, substance abuse, substance withdrawal, or any situation that would preclude valid psychological testing results from being obtained (e.g., an individual who is

uncooperative or lacks the ability to comprehend the necessary directions for having psychological testing administered).

E. The testing is primarily for diagnosing attention-deficit hyperactive disorder (ADHD), unless the diagnostic interview, clinical observations, and results of appropriate behavioral rating scales are inconclusive.

F. Two or more tests are requested that measure the same functional domain.

G. Testing is primarily for forensic purposes, including custody evaluations, parenting assessments, for criminal charges or other court or government ordered or requested testing.

H. Requested tests are experimental, antiquated, or not validated.

I. The number of hours requested for the administration, scoring, interpretation and reporting exceeds the generally accepted standard for the specific testing instrument(s).

PROTOCOL HISTORY:
Passed: 9/01/1992
Amended: 11/19/2002
Amended: 6/12/2007
Amended: 12/17/2013

OUTPATIENT PHYSICAL AND OCCUPATIONAL THERAPY PROTOCOL GUIDELINES

General Therapy Guidelines

1. Therapy evaluations must be provided by licensed physical and/or occupational therapists. Therapy evaluations may not be performed by therapy assistants or other medical providers.

2. For workers' compensation patients, physicians may not provide or bill for physical therapy services without employing a licensed therapist to evaluate and supervise treatments.

3. Therapy treatments may be provided by licensed therapy assistants ** as directed by the licensed therapist or by therapy aides under supervision of the licensed therapist.

A facility may not employ more than two licensed assistants per therapist. Physical therapists shall maintain the following documentation regarding the supervision of physical therapy assistants:

1. ON-SITE SUPERVISION OF THE ASSISTANTS PERFORMANCE
2. A REVIEW OF THE ASSISTANTS DOCUMENTATION
3. A REASSESSMENT AND UPDATE OF THE PATIENTS PROGRAM AND GOALS.

** Certified Occupational Therapy Assistants are nationally certified to provide care under the direction of licensed occupational therapists.

4. A course of physical and/or occupational therapy treatment will consist of nine (9) treatments or less. In those few instances where further treatments need to be given, the following format will be followed:

a. The therapist will provide the rationale for continuation of treatment to the employer/insurer.

b. The employer/insurer, usually in correlation with a medical specialist, will make a judgment concerning the medical necessity for further treatment. The employer/insurer will inform the therapist within ten (10) days of receipt of the written or verbal request for continued treatment whether therapy treatment will be reauthorized.

5. Therapy evaluations must identify patient problems and objective measurements of physical or work-skills deficits. These objective measures should be as specific as is possible for the diagnosis or patient problem. Example: Patient diagnosis of rotator cuff strain.

Appropriate

ROM flexion 160, abduction 90, int rotation 45, ext rotation 60.

Unable to reach or lift above shoulder height; able to lift up to 25 lbs from floor to waist.

Inappropriate

ROM limited in all planes.

Unable to lift secondary to pain.

6. Therapy treatment plans must be problem oriented.

7. Therapy evaluations should identify subjective complaints of pain or paresthesias, however, therapy treatments cannot be based solely on pain reduction. Evaluations must identify specific treatment plans and relate treatments to improving objective deficits and patient problems.

8. Frequent reassessment of progress towards improving objective deficits must be done and documented. Timing of reassessment is based on frequency of treatment, but should occur no less than every nine (9) sessions. Revision of problem lists, goals, and treatment plans must be documented at this time.

9. Continuation of treatments cannot be based solely on presence of continued pain symptoms. If objective measures have failed to improve, or have plateaued, the rehabilitation professional will confer with the referring physician to determine if the treatment should be modified or changed.

10. All treatment sessions and tests must be documented in writing. Daily treatment notes must:

a) identify type of treatment PROVIDED.

b) note patient response to treatment in subjective and objective terms.

c) identify any change in treatment plan and reasoning for change; e.g., stopping ultrasound treatment because of diminished tendonitis symptoms and increased ROM.

d) all assisting personnel notations must be co-signed by the supervising therapist.

11. Most of the treatment protocols anticipate healing and return to work will occur during the first four weeks after injury. There are some patients whose rehabilitation will take longer than the anticipated time frame because of the severity of their injury or the occupational demands of their job. Continuance of the therapy program will be according to the guidelines noted above.

THERAPY PROTOCOLS

LOW BACK MUSCULAR INJURY

… as delineated in the Low Back Musculoligamentous Injury (Sprain/Strain) Medical Advisory Board Protocols.

CERVICAL MUSCULAR NECK INJURY

… as delineated in the Cervical Musculoligamentous Injury (Sprain/Strain) Medical Advisory Board Protocols.

CARPAL TUNNEL SYNDROME

… as delineated in the Carpal Tunnel Syndrome Medical Advisory Board Protocols.

Non-operative Intervention

1. Appropriate Interventions:
   a) ROM and strengthening exercises
   b) splint fabrication
   c) assessment of job skill levels for RTW
   d) instruction in work activities modifications or simulation of work activities
   e) patient education
2. Inappropriate Intervention:
   a) exclusive use of passive modalities
3. Extenuating Services:
   a) prolonged onset of symptoms prior to referral

Post-Operative Intervention

1. Extenuating Circumstances
   a) post-operative complications
   b) delayed referral into therapy

2. Appropriate Interventions:
   a) ROM, simple strengthening exercises
   b) splint fabrication
   c) scar tissue/swelling management
   d) assessment of job skill levels needed for RTW
   e) instruction in work activities modifications or simulation
   f) patient education

CERVICAL HERNIATED DISC

. . . as delineated in the Herniated Cervical Disc Medical Advisory Board Protocols.

Non-operative Intervention

1. Appropriate Interventions:
   a) ROM exercises for neck and upper extremity
   b) strengthening/endurance exercises for upper extremity
   c) trial of cervical traction; if beneficial, a prescription for a home unit is sought
   d) short-term use of modalities for pain relief
   e) patient education
   f) assessment of work skill levels for return-to-work
   g) modification/simulation of work activities

2. Extenuating Circumstances:
   a) profound muscle weakness
   b) delayed referral into therapy

Post-Operative Intervention

1. Extenuating Circumstances:
   a) profound muscle weakness
   b) delayed referral into therapy

2. Appropriate Interventions:
   a) ROM exercises for neck and upper extremity
   b) strengthening/endurance exercises for upper extremity
   c) patient education
   d) modification/simulation of work activities

3) Inappropriate Interventions:
   a) cervical traction
   b) exclusive and/or prolonged use of passive modalities

LUMBAR HERNIATED DISC

. . . as delineated in the Herniated Lumbar Disc Medical Advisory Board Protocols.

Non-operative

1. Appropriate Interventions:
   a) ROM exercises for trunk and extremities
   b) strengthening/endurance exercises for trunk and extremities
   c) short-term use of modalities for pain relief, in conjunction with active exercises
   d) patient education
   e) assessment of work skill levels for return-to-work
   f) work simulation activities (when acute symptoms have subsided) or work-site modifications
   g) short-term trial TENS for chronic pain; if found to relieve symptoms, a referral for a home unit should be sought

2) Inappropriate Interventions:
   a) prolonged and/or exclusive use of modalities

3) Extenuating Circumstances:
   a) delayed referral into therapy
   b) profound muscle weakness (non-operative and post-operative)

Post-operative

1) Appropriate Interventions:
   As above, exceptions noted below.

2) Inappropriate Interventions:
   a) use of passive modalities, including traction

NON-OPERATIVE SOFT TISSUE INJURIES:

SHOULDER SPRAINS, OVERUSE INJURIES, KNEE STRAINS, ANKLE SPRAINS
(Refer to appropriate Medical Advisory Board Protocols.)

1. Appropriate Interventions:
   a) acute management of muscle spasms, pain, and/or swelling
   b) ROM exercises
   c) gait training w/assistive devices, as needed
   d) (as tissue healing progresses) strengthening and endurance exercises
   e) proprioception and balance activities
   f) assessment of job skill levels; job simulation activities if significant deficits noted
   g) isokinetic tests and rehab if deficits noted

2) Inappropriate Interventions:
   a) exclusive and/or prolonged use of passive modalities
   b) multiple computerized tests in any one week

3) Extenuating Circumstances:
   a) further medical evaluation that changes diagnosis
   b) surgery
   c) delayed referral into therapy

MENISCAL INJURIES

Refer to appropriate Medical Advisory Board Protocols.

Non-operative

1. Appropriate Interventions:
   a) ROM and strengthening exercises
   b) acute management of swelling and pain
   c) gait training with assistive devices, as needed
   d) isokinetic testing and rehab.
   e) assessment of work skill levels for return-to-work
   f) work skills simulation

2. Inappropriate Interventions:
   a) prolonged and/or exclusive use of passive modalities

3. Extenuating Circumstances:
   a) delayed referral into therapy
   b) surgery

Post-Operative

As noted above.

SYMPATHETIC DYSTROPHY

. . . as delineated in the Chronic Regional Pain Syndrome (formerly Sympathetic Dystrophy) Medical Advisory Board Protocols.

1. Appropriate Interventions:

   a) ROM exercises (aggressive if done after nerve block)
   b) strengthening and endurance exercises
   c) short-term use of modalities
   d) patient education

e) short-term trial of TENS; if beneficial, a home unit should be sought

f) assessment of work skills levels; simulation of work activities if deficits are found

2. Inappropriate Interventions:
   a) prolonged or exclusive use of modalities

3. Extenuating Circumstances
   a) development of adhesive capsulitis
   b) delayed referral into therapy
   c) repeated nerve blocks with therapy after each procedure

THORACIC OUTLET SYNDROME

1. Appropriate Interventions:
   a) postural exercises and correction
   b) ROM exercises
   c) strengthening and endurance exercises
   d) patient education
   e) assessment of work skills; simulation if deficits are noted

2. Inappropriate Interventions:
   a) prolonged or excessive use of modalities
   b) traction

PROTOCOL HISTORY:
Passed: 3/30/1993
Amended: 5/5/2009

ACOUSTIC TRAUMA

TRAUMA TO THE EXTERNAL EAR

I. BACKGROUND

The common types of trauma to the external ear usually result from thermal, blunt or penetrating trauma causing damage to the auricle, external auditory canal, or tympanic membrane.

II. DIAGNOSTIC CRITERIA

A. Pertinent History and Physical Findings

Direct examination of the external ear and tympanic membrane and evaluation of hearing with an audiogram.

III. TREATMENT

1. Hematoma of the external ear, usually due to a direct blow, is treated by drainage of the hematoma which may be done with an 18 gauge needle and syringe or a small incision under local anesthesia followed by application of Vaseline gauze and fluffs between the external ear and mastoid, and a soft gauze bandage is wrapped around the head. The patient should be re-examined in 24 hours for reaccumulation. Time loss from work, 0 to 2 days.
2. Simple lacerations present no difficulty in management and may be sutured, and a bulky pressure dressing is applied. They are anticipated to heal. Time loss from work, none.
3. Exposed cartilage presents a special problem. Debridement and complete coverage of all cartilage are key principles, and torn cartilage should be repaired. These usually heal readily. Maximum time lost from work, only with the most serious injuries, five days.
4. Large auricular avulsions may need to be reanastomosed by an otolaryngologist or plastic surgeon. This will require follow-up visits. Loss of work may be minimal depending on the type of work, but maximum time lost from work, two weeks.
5. Large circumferential lacerations to the external auditory canal may lead to stenosis of the canal and these mandate referral to an otolaryngologist. Loss of time from work, 1 to 2 days.
6. Burns to the auricle require removal of devitalized tissue and antibiotic ointments to protect the underlying cartilage. Time lost from work, none.
7. Chemical burns may follow exposure to acids or alkali. Primary treatment consists of immediate irrigation with several liters of water, identification of

the toxic chemical and should be treated primarily as a burn. No loss of work anticipated. No time lost from work.

8. Simple perforation of the tympanic membrane generally heals in four to six weeks, some use of antibiotics if there are definite signs of contamination. Failure to heal will require an ENT referral. Patient to be instructed to keep water out of ear until perforation has healed. No loss of time from work anticipated.

IV. ANTICIPATED OUTCOME

Full recovery.

INJURY TO THE MIDDLE EAR

I. BACKGROUND

The middle ear cavity is connected with the nasal pharynx by the eustachian tube and is intimately related to injury or diseases of both structures.

The primary trauma to the middle ear is barotrauma due to changes in barometric pressure and blunt trauma. Severe injury can disrupt the ossicular chain with conductive hearing loss or cause a perilymphatic fistula resulting in vertigo and sensorineural hearing loss.

Tympanic membrane perforations secondary to thermal burns as well as slag-bur injury and perforations from direct trauma to the ear drum from foreign body.

II. DIAGNOSTIC CRITERIA

Examination of the ear looking for retraction, or perforation of the tympanic membrane as well as evidence of effusion or hemotympanum. A neurological examination should be performed looking for evidence of vestibular disfunction (nystagmus). Patient should have an audiogram and if clinically indicated (vertigo) a fistula test can be performed by an audiologist, but only after examination by otorhinolaryngologist.

III. TREATMENT

1. Antibiotic if URI is present, oral steroids may reduce eustachian tube edema. No loss of time from work.

2. Patient with vestibular findings requires an emergency ENT referral. There may be no time lost from work, but this would depend on the ENT referral, including the severity of the vertigo and the type of work the patient is involved with.

IV. ANTICIPATED OUTCOME

This depends on how much damage has occurred.

TRAUMA TO THE INNER EAR

I. BACKGROUND

Trauma may result from blunt injury causing temporal bone fracture, blast injury, noise exposure or toxic injury. Vestibular, cochlear or facial nerve function may be affected.

II. DIAGNOSTIC CRITERIA

Radiologic evaluation with blunt trauma is of limited value. An MRI or CT Scan may show the fracture. The physical examination may reveal the discolored tympanic membrane and may show the fracture through the external canal. The neurological examination may reveal facial paralysis, perforation of the tympanic membrane with CSF leak. The patient should be examined for evidence of hearing loss (Hearing Test) or vestibular dysfunction (ENG) by an otolaryngologist.

III. TREATMENT

1. CSF Leak. One should watch for a cerebral spinal fluid leak and if this persists may require a neurosurgical consultation and repair, usually a combined procedure performed by an otolaryngologist and neurosurgeon. The use of antibiotics is controversial, more recently it is felt that they are not useful in this situation.

2. Hearing Loss.
   a. Nerve hearing loss, there is no surgical treatment although amplification devices may be required.
   b. Conductive hearing loss.
      1. Repair of tympanic membrane perforation. Time lost from work with surgery, maximum one week.
      2. Repair of disrupted ossicles. Time lost from work with surgery, maximum two weeks.

3. Facial paralysis may require nerve repair or a form of re-animation procedures of the facial muscles. Time lost from work would be variable in this case, but not more than three days.

4. Vestibular Injury.
   a. Vestibular suppression medications such as Antivert, Valium or Klonopin.
   b. If the vertigo becomes disabling and persists after six months of treatment with the above medications, then vestibular destructive surgery

either with labyrinthine destruction or vestibular nerve section may be required. Loss of time from work would be two weeks following surgery.

IV. ANTICIPATED OUTCOME

This depends on how much damage has occurred.

WORK-RELATED HEARING IMPAIRMENT DUE TO NOISE

I. BACKGROUND

Hearing impairment due to noise may occur in the workplace. An effort has been made by the American Academy of Otolaryngology Committee on Hearing and Equilibrium and the American Council of Otolaryngology Committee on the medical aspects of noise.

II. DIAGNOSTIC CRITERIA

A. Pertinent Historical and Physical Findings.

The history consists of impairment of hearing. The Hearing Conservation Program requires employers to monitor noise exposure levels in a manner that will accurately identify employees who are exposed to noise at or above 85 decibels (dB) averaged over eight working hours. The exposure measurement must include all noise within an 80 dB to 130 dB range and must be taken during a typical work situation. Audiometric testing must be made available to all employees who have average exposure levels over an eight-hour period of 85 decibels.

III. TREATMENT

Hearing protectors must adequately reduce the severity of noise in each employees' work environment.

The percentage loss is to be evaluated by an Otolaryngologist and Audiologist.

PROTOCOL HISTORY:
Passed: 3/30/1993
Amended: 11/19/2002
Amended: 6/3/2008

INTERVENTIONAL PAIN MANAGEMENT TREATMENT PROTOCOL

EPIDURAL STEROID INJECTIONS IN THE MANAGEMENT OF SPINAL PAIN

A. BACKGROUND

Epidural glucocorticoid and local anesthetic injections can be considered as part of a treatment program for radicular pain syndromes secondary to a herniated disc, degenerative disc disease, or spinal stenosis. The purpose of spinal injections is to facilitate active therapy by providing short-term relief through pain and inflammation reduction. The goal of such injections is to deliver the active medication with minimal systemic effects (vs. oral steroids) as close as possible to the target tissue.

There are three most frequently used approaches: caudal, interlaminar, and transforaminal. Of these three, the most common is the use of transforaminal epidural injection, performed by injection immediately adjacent to the dural sac in the posterior spinal column, with subsequent diffusion to the herniated disc or other inflamed, irritated or impinged neural structures. Fluoroscopic guidance of needle placement has been shown to improve the accuracy of the placement of the injection; however, whether the clinical outcome is improved with this remains somewhat unclear.

The subspecialty disciplines of the physicians performing the injections may be varied, including, but not limited to: anesthesiology, radiology, surgery, or physiatry. The practitioner should document hands-on training through workshops of the type offered by organizations such as the International Spine Intervention Society, North American Spine Society, American Society of Interventional Pain Physicians, and others, with post course proctoring and/or fellowship training with interventional training. Also essential is being knowledgeable in radiation safety and credentialed by a hospital or surgery center.

Epidural injections may be performed in the cervical, thoracic, lumbar, as well as sacral (caudal) regions. Caudal epidural steroid injections may be used for patients with leg pain of sacral origin or in whom direct access to the lumbar region is difficult, or not possible due to previous surgery.

Epidural injections are invasive, have a low risk of adverse effects, and are relatively costly. They are most commonly offered as an option in acute radiculopathy as a second line treatment after prior treatment with NSAIDS, possibly a short course of an oral steroid (with equivocal evidence of effectiveness), and a waiting period of at least 3 weeks with/without other adjunctive treatment measures (exercise, spinal manipulation, etc.).

Lumbar injections have been shown to reduce radicular pain, and their use may have the effect of decreasing surgical rates for specific spinal disorders. The effect of the injections on pain is not intended to be curative, but more palliative in nature. Repeat

injections may be beneficial in the management of patients who have a favorable response to an initial injection.

The use of lumbar epidural steroid injections (ESI) in the treatment of nonradicular, axial back pain is not strongly supported by the data at present. Therefore, these should not be considered as part of the routine management of these conditions. Prognostic indicators that often predict which patients are likely to benefit from lumbar transforaminal ESI include:

- Presence of a "contained" disc herniation with abutment, but not displacement of the nerve root.
- Presence of symptoms for less than 3 months.
- Presence of confirmatory EMG positive findings.
- Presence of radicular pain from a herniated intervertebral disc and central stenosis and/or lateral recess stenosis at the supra-adjacent intervertebral disc.
- Presence of disc herniation that does not extend through the posterior longitudinal ligament.

Therapeutic spinal injections have not been proven to change the long-term course of most patients with spinal pain. They have a limited role in treatment and should be only used in a small patient subset where the criteria outlined in this protocol have been clearly met. Pain relief for at least one month in greater than 50% of patients, with half of these patients continuing to benefit from treatment for a year or more, is anticipated. As such, there is some evidence that adding steroids to a bupivicaine solution may reduce the frequency of surgery in the first year year after treatment. Some studies have shown benefits for the non-surgical group persisting for at least 5 years, regardless of the type of block provided. Injections may be used for patients who are having significant pain that is interfering with daily functions and the active therapy necessary for recovery, despite medical pain management and active therapy. An MRI or CT scan is often indicated before injection to localize pathology and rule out injection contraindications. There is strong evidence that ESI has no short or long term benefit for non-radicular low back pain.

As noted above, the purpose of spinal injections, as well as surgery, is to facilitate active therapy by providing short-term relief through reduction of pain. Patients should be encouraged to express their personal goals, outcome expectations and desires from treatment as well as any personal habits or traits that may be impacted by procedures or their possible side effects. All patients must commit to continuing appropriate exercise with functionally directed rehabilitation usually beginning within 7 days, at the discretion of the interventionist. Since most patients with these conditions will improve significantly over time, without invasive interventions, patients must be able to make well-informed decisions regarding their treatment.

B. OUTPATIENT TREATMENT

Since the pain relief from epidural steroid injections is usually brief and, by Definition, chronic non-specific back pain and chronic radicular pain (with or without prior back surgery) are chronic problems, injections are not recommended as a transient treatment for these long-term problems, unless there is specific exacerbation that indicates their use. The concurrent use of injections during participation in a rehabilitation program may be beneficial.

Injections are commonly performed on an outpatient basis. As noted above, fluoroscopic guidance provides the most accurate method for ensuring injection of the steroid into the desired location. If local anesthetics are also used, proper vital sign monitoring is required, including electrocardiography, blood pressure monitoring, as well as pulse oximetry. Conscious sedation may be required for some anxious patients, but is not usually necessary. Emergency equipment, including but not limited to oxygen, ventilatory tools, laryngoscope, endotracheal tubes, intravenous access supplies and vasopressors must be available, as well as appropriately trained individuals, as per State of R.I. Board of Health requirements, as well as any other applicable regulatory medical agencies or groups. Commonly, long acting steroids (dexamethasone) are used, with the most common anesthetics being lidocaine and/or bupivicaine. Corticosteroid dosing is most often based on one third (1/3) the dose
associated with adrenal suppression, per injection.

Epidural steroid injections are primarily intended for reducing inflammation around the nerve root for primarily radicular pain. Due to the long acting nature of the steroid preparations used, they should not be performed at less than two (2) week intervals. Optimally, injections should occur at 2-6 week intervals. No more than two injections should be used to attempt to achieve a beneficial response in the first instance, and thereafter, up to three injections in a six month period, and not more than six (6) in a twelve (12) month interval should be used to reinstate and maintain benefit once it has been achieved at a specific nerve root level. In order to justify repeat treatment, benefit should be evident in the form of reduced pain and/or improved function, along with reduced need for other health care. If a lack of response is seen after two epidural steroid injections, no further injections should be performed at the same level.

Epidural injections should be scheduled separately, and effects of each evaluated, rather than scheduling a series of three. A third epidural injection is not recommended if, following the first two injections, there has not been a significant reduction of targeted symptoms, symptoms have resolved, or if no documented increase in physical activities/function occurs.

In patients who respond to an injection with 3-6 weeks of temporary, partial radicular pain relief, but then develop worsening pain and functional loss, but do not wish to proceed to surgery, a repeat epidural injection may be an option. If measurable improvement is noted, repeat injections at 3, 6, or 12 month intervals may be used, until stabilization of symptoms occurs.

C. MEASURABLE PARAMETERS ASSOCIATED WITH INJECTIONS

By themselves, injections are not likely to provide long-term relief. Active rehabilitation with concurrent modified work best achieves long-term relief by increasing active range of motion, strength, and stability. Documentation of patient response regarding the type and degree of response to specific symptoms should be provided by the interventionalist. Three or four measurable physical functions that are restricted at the time of the injection should be objectively assessed shortly after the injection (range of motion, walking, standing, lifting), in addition to validated patient reported outcome measures. Patients pursuing injections should commit to continuing appropriate exercise with functionally directed rehabilitation, usually beginning within 7 days of injection. Active treatment, which patients should have prior to injections, usually up to a total of 6 sessions of physical therapy, will frequently require a repeat of the sessions previously ordered.

Functional change is the most important criteria supporting the use of interventional techniques, not the patient's report of pain (as this is too subjective and widely varies from patient to patient). Increased range of motion, increased job task accomplishment, increase in physical therapy progress, and decreased pain medication use can all act as appropriate barometers of success, and should be documented in post-injection evaluation reports. In addition, validated patient reported outcome measures (ODI, RMDQ, or FOTO, for example), are useful in determining successful injection outcomes.

If the first injection does not provide a documented improvement in function, and a diagnostic response with temporary and sustained pain relief substantiated by accepted pain scales (i.e., approximating 50% pain reduction on a visual analog scale), a second injection can be pursued; however, if two injections show no benefit in outcomes, a third injection is unlikely to be successful.

Electromyography may be helpful in predicting the likelihood of improvement after lumbar epidural steroid injections. A retrospective review of 39 subjects demonstrated that patients with EMGs that were considered positive for radiculopathy were significantly more likely to have functional improvement using the Oswestry Disability Index (ODI) after an epidural steroid injection than patients with a negative or normal EMG examination.

D. PATIENT SELECTION: PRIOR TO FIRST INJECTION

Therapeutic injections should be used after previous evaluation, treatment, and imaging studies have established pathology which has not clinically improved after active

engagement (6-8 weeks) of physical therapy, and in patients who otherwise qualify for more invasive procedures and may need injections due to their inability not to undergo surgery, or their wish not to undergo surgery. The goal of injection(s) in this group is to afford a few weeks of partial pain relief while spontaneous recovery occurs, or allowing for the patient to tolerate other treatments, and therefore facilitate more active and aggressive pursuit of rehabilitative goals and restoration of function.

The following patient sets may have epidural injections, when diagnostic epidural injections are positive:

1. When radicular findings secondary to a herniated disc is present, and the patient meets all of the surgical indications at approximately 6-8 weeks post active therapy.

2. An acute disc herniation if, after approximately 6 weeks of initial oral analgesic and conservative, the patient has continued pain interfering with most ADL function, and is unable to tolerate therapy, has pain greater than 7/10 in severity and has dermatomal pain distribution, with a corresponding herniated disc on MRI/CT consistent with the clinical presentation.

3. Patients with spinal stenosis, who has completed 6-8 weeks of active therapy, with persistent radicular findings and difficulty with activities, thus meeting surgical intervention criteria (includes diagnostic injection). If this instance, if the patient does not wish to pursue surgery after the first injection, two more injections may be provided if the original diagnostic intervention was successful.

- **DIAGNOSTIC CRITERIA**

    1. Pertinent History and Physical Findings

        a. A pattern of pain in the upper extremity, thoracic region, or lower extremity with the characteristics as well as specific distribution of a known nerve root, known as a radiculitis or radiculopathy. Radiculopathy refers to a sensory and/or motor dysfunction in the discrete distribution of an affected nerve root. Most cases result from either compression of, or inflammation to the nerve root as it exits the spinal canal, most commonly secondary to a disc protrusion/herniation. Such pain may be seen in the absence of previous surgery, but can also be seen following failed post-operative disc surgery. Physical findings strongly suggestive of a radiculitis/radiculopathy (positive straight leg raise testing, reflex diminishment in the affected limb, motor weakness and/or sensory dysesthesias or hypoesthesias, particularly in a pattern consistent with specific nerve root(s)) may accompany subjective complaints.

        b. For epidural steroid injections throughout the spine, pain may be distributed in a specific nerve root pattern (dermatome), and/or myotomal distribution. In addition, for thoracic epidural injections, pain may be

distributed in a "barrel stave" fashion, from the mid back, then extending anteriorly to the side and chest, in accordance with the underlying thoracic nerve root inflammation. Anatomic variation can exist in these nerve root distributions.

c. Particularly in the early stages, entire nerve root distribution may not be affected. The duration of symptoms may play a role in decision making regarding timing of injections. Subacute radicular pain (pain lasting 3 weeks or longer) that has not responded to more conservative measures (particularly when the presumed etiology of this pain is well identified and potentially reversible with a steroid injection) may form a historical foundation for proceding with injection. Patients with chronic back pain with exacerbations also fall into this group. As stated previously, the goal of injection(s) in this group is to afford a few weeks of partial pain relief while spontaneous recovery occurs, or allowing for the patient to tolerate other treatments, and therefore facilitate more active and aggressive pursuit of rehabilitative goals and restoration of function.

d. Evidence supporting the efficacy of ESI in the treatment of lumbar radicular pain in the setting of foraminal and central stenosis is inconclusive at present.

- **APPROPRIATE DIAGNOSTIC TESTS AND EXAMINATIONS**

The current practice in the U.S. is to obtain either a CT or MRI scan prior to the performance of an epidural injection. There are, however, studies of good quality showing effectiveness of injections based on clinical examination to address the target level for injection. Benefits of pre-procedural imaging include a greater safety margin in the determination of the entry level, the ability to rule out/in other pathology, as well as determining the presence of a surgical condition (thereby contraindicating the use of the epidural injection). Studies are ongoing, however, regarding whether imaging is required or not, as well as the benefit magnitude obtained from imaging.

The use of an EMG/NCVS can be considered, particularly in cases where the symptoms/physical findings and, possibly, imaging studies are ambiguous, or do not provide a clear guide as to the underlying pathology attributable to the presenting complaints. In some instances (e.g., presence of a medical condition contraindicating a specific imaging study, etc.) other studies (CT myelogram, discography) may be considered to confirm the diagnosis prior to proceeding to epidural injection.

- **INJECTION COMPLICATIONS AND CONTRAINDICATIONS**

  - **CONTRAINDICATIONS TO THERAPEUTIC INJECTIONS**

Informed decision making should also be documented for injections and all invasive procedures. This must include a thorough discussion of the pros and cons of the procedure and the possible complications as well as the natural history of the identified diagnosis.

Absolute contraindications to therapeutic injections include: (a) bacterial infection (systemic or at injection site); (b) bleeding diatheses; (c) hematological conditions; (d) pain of three points or less on a 10-point visual analog scale measurement at the time of injection; (e) possible pregnancy (excepting the use of LESI in late pregnancy, without fluoroscopy); and (f) poorly controlled diabetes mellitus for steroid injections.

Relative contraindications to therapeutic injections include: (a) allergy to contrast; (b) somatization disorders; (c) poorly controlled congestive heart failure for steroid injections; (d) risk factors for osteoporosis and uncontrolled hypertension, as well as concurrent use of drugs affecting coagulation; (e) poorly controlled congestive heart failure.

SACROILIAC JOINT INJECTIONS

A. Background: The sacroiliac joint (SIJ) is an established source of pain, with documented innervations. However, the prevalence of SI joint or posterior SI ligament pain in the general population is unknown. In addition to the joint, other structures, such as the posterior sacroiliac ligaments, are innervated and are, therefore, potential pain sources. Posterior sacroiliac complex pain refers to pain as a result of inflammation of these ligamentous structures. Local anesthetic blocks of the lateral branches of the sacral dorsal rami have been shown to diminish inflammation of the interosseous and dorsal sacroiliac ligaments, but not the sacroiliac joints.

B. Description: In general, this involves the injection of local anesthetic in an intra-articular fashion into the sacroiliac joint under fluoroscopic guidance. The injection may include the use of corticosteroids. Sacroiliac (SI) injections have been used to diagnose and treat pain from this area. Lateral branch blocks and radiofrequency ablation have also been used to diagnose and treat pain from the SI joint/SI joint complex. Certain conditions, such as older patient age, history of prior lumbar fusion, and trauma are associated with SI related pain. Unfortunately, there is a high false-positive rate with injections into the SI joint. This stresses the importance of documentation of at least three exam maneuvers (Gaenslen's, FABER, thigh thrust, distraction, sacral thrust and/or compression tests) prior to an injection. SI injections are commonly used either to facilitate the diagnose of SI inflammation, or for therapeutic gains.

C. CLINICAL INDICATIONS AND IMAGING:

- Are organized by primary location of pain:

    - Pain over the SIJ
    - Pain over the SIJ and referred into the leg
    - Pain over the SIJ with referral into the groin
    - Maximal ipsilateral pain above the L5 vertebrae
    - Suspected spondyloarthritis has a negative correlation with success

- Physical examination findings are a significant indicator of appropriateness of intervention:

    - Three or more positive provocation SIJ tests

        - Can be effective, though, in presence of one or two positive provocation tests, depending on the other scenario variables.

- Not appropriate to perform injections in the absence of a clinical exam, or in those patients with no positive provocation maneuvers.

- Since these procedures are invasive, less invasive or non-invasive procedures should be considered first.

- Considered when pain present for more than one month, has an intensitiy of greater than 4/10, and is causing functional limitation, regardless of whether or not conservative therapy had been provided.

- Appropriate for pain of lesser intensity and duration if pain is causing functional limitation and conservative treatment had been provided, with continued symptomatology.

D. DIAGNOSTIC SI INJECTIONS.

- **INDICATIONS:** to aid in the diagnostic work-up of low back pain when all of the following criteria are met:

    - The presence of nonradicular, usually unilateral pain distal to the L5 vertebrae, over the area of the posterior SI joint.

    - A full physical examination demonstrating very focal, localized tenderness to the sacral sulcus (at the insertion of the long

dorsal ligament inferior to the posterior superior iliac spine (PSIS)), without tenderness elsewhere.

- The absence of any other significant sources of pain.

    - A positive response to at least three of the diagnostic physical tests listed above (Gaenslen's, etc.).

- Imaging guidance: fluoroscopy or CT guidance should be utilized in the performance of this procedure.

- Injectate volume: no more than 2 mls. of anesthetic should be injected, without addition of steroid.

- Interpretation of results: a diagnosis of SI joint pain is confirmed with at least a 75% reduction of pain lasting the anticipated duration of time based on the type of anesthetic agent injected, with results repeated with a subsequent repeat confirmatory injection.

E. THERAPEUTIC SI INJECTIONS.

- **INDICATIONS**: Identical to those criteria, listed above, for the use of diagnostic SI injections.

- **ASSOCIATED DIAGNOSTIC TESTING:** imaging such as radiographs, MRI, or CT scans can be useful in the exclusion of other potential sources of nonradicular back pain, as well as the determination of SI inflammatory conditions or lesions/pathologic conditions or "red flags", as well as to exclude conditions that would contraindicate or limit the effectiveness of the injection. The medical record must support the necessity of advanced imaging, when recommended.

- As with epidural injections, any improvement in physical functions that are impaired and can be objectively reassessed should be measured, using identical criteria to those outlined in the epidural section of this protocol. Significant positive responses, both in pain measurement and physical function, support successful treatment outcomes.

- Injections of steroid with local anesthetic, injections of steroid alone, or lateral branch blocks are appropriate options.

- Can consider therapeutic injection if initial diagnostic injection provided greater than 75% relief, regardless of duration of relief.

Further injections are generally not recommended if pain relief is less than 50%. Injection of steroid alone only appropriate if at least 75% relief for 2 months with first injection.

- Frequency and optimum duration: 2 to 3 injections per year. Injections may be repeated if they result in increased documented functional benefit for at least 3 months and significant improvement in pain scales (as measured by accepted pain scales (such as VAS), as well as documentation of improved parameters of physical functioning. At least 6 weeks or 3 months of functional benefit should be obtained.

- **LATERAL BRANCH RADIOFREQUENCY NEUROTOMY (LBRFN).**

  - Two key factors: symptom duration and degree of pain relief realized during blocks.
    - Patients should have symptoms for a minimum duration of 2-3 months.
    - Less than 50% pain relief from diagnostic injection is insufficient justification to proceed with LBRFN.

  - Higher levels of pain relief and symptom duration correlates with higher appropriateness of indication.

    - The intent of RF is to cauterize the medial branches (L5 dorsal branch or S1-S4 lateral branches). Successful RF Neurotomy usually provides from six to eighteen months of relief. Repeat neurotomy should only be performed if the initial procedure resulted in improved function for 6 months;

    - Repeat LBRFN not appropriate if the first LBRFN results in less than 50% pain relief, or if less than 3 months duration of effect.

    - Type and sequence of block performed (intra-articular vs. lateral branch block) has minimal impact of outcome; is most relevant in patients with 50%-75% pain relief and in those with 2-3 months of symptoms.

ZYGAPOPHYSEAL (FACET) INJECTIONS

- **BACKGROUND**: The facet, or zygapophysial, joints are paired diarthrodial articulations between posterior elements of adjacent vertebrae. Spinal facet joints have been implicated as responsible for spinal pain in up to 40% of patients with low back pain, up to 67% of patients with neck

pain, and up to 50% of patients with thoracic pain. Paravertebral facet joint/nerve blocks are utilized as a diagnostic, as well as therapeutic tool to determine whether a specific facet joint is responsible for spinal pain. The patient with this condition usually has moderate-to-severe back pain that does not have a strong radicular component, there is no associated neurologic deficit, the pain is typically aggravated by hyperextension of the spine, and there is typically tenderness to palpation of the spine at the level of the suspected joint. Back or neck pain is typically worse than leg or arm pain, respectively, e.g., pain is primarily axial, not radicular.

Neural blockade is one technique used in chronic pain management. Neural blockade is the interruption of neural transmission by the injection of a local anesthetic agent or other drug. Nerve block therapy can be used to answer specific questions resulting from a careful evaluation of the patient's pain problem and to gain insight into the underlying problem causing the pain. Success of the nerve block is determined by the adequacy of interruption of nerve function, and the effect of that blockade on the patient's pain. The goal of pain management is to achieve optimal pain control, recognizing that a pain-free state may not be achievable; minimize adverse outcomes; enhance functional abilities and physical and psychological well-being; and enhance the quality of life.

Facet joint arthropathy (joint disease) is diagnosed through a double comparative local anesthetic blockade of a joint, either by intra-articular injection of a small volume of local anesthetic (0.5 to 1.0 ml), or blockade of the medial branch nerves of the dorsal rami innervating the joint with a small volume of local anesthetic (0.5 to 1.0 ml). The diagnosis can be made by a positive but differential response to local anesthetics of different durations of action injected on separate occasions.

After a needle is placed into the facet joint or adjacent to the target medial branch nerve under imaging guidance, a small volume (0.5 to 1.0 ml) of a short or longacting local anesthetic agent with or without steroid is injected. The patient is then asked to engage in activities that typically elicit or aggravate the pain. Relief of pain for a significant period of time suggests that facet joints were the source of the pain. Pre-procedural and post-procedural pain scores (numeric or Visual Analogue) should be documented, and then compared. If significant pain relief occurs after the injection (a positive response), the patient’s response should be monitored and documented with regards to the degree of pain relief, duration of pain relief, and improvement in functional status. A repeat block may be performed only if the patient’s pain returns and functional status starts to deteriorate. If significant relief is noted with improvement in functional status, but the pain returns after a period of relief, a second block may be performed at a later date with local anesthetic of a different duration of action in order to rule out a false positive response.

If double-comparative paravertebral facet joint /nerve blocks provide significant pain relief lasting several weeks to months, therapeutic facet joint/nerve blocks may be considered. If double-comparative paravertebral facet joint/nerve blocks provide significant pain relief that is not long-lasting, facet joint denervation may be considered.
For the purposes of this policy, a facet joint level refers to the zygapophyseal joint or the two medial branch nerves innervating that zygapophyseal join

- Facet joint procedures are only appropriate if the patient is suspected of having back pain secondary to facet inflammation, and/or is eligible for increased therapy, such as a rhizotomy, based on the results of the block. The purpose of spinal injections, as well as surgery, is to facilitate active therapy by providing short-term relief through reduction of pain. Patients should be encouraged to express their personal goals, outcome expectations and desires from treatment as well as any personal habits or traits that may be impacted by procedures or their possible side effects. All patients must commit to continuing appropriate exercise with functionally directed rehabilitation usually beginning within 7 days, at the injectionist's discretion.

- Since most patients with these conditions will improve significantly over time without invasive interventions, patients must be able to make well-informed decisions regarding their treatment. All injections must be accompanied by active therapy. It is obligatory that sufficient data be accumulated by the examiner performing this procedure such that the value of the procedure is evident to other reviewers. This entails documentation of patient response regarding the degree and type of response to specific symptoms.

- Imaging accompanying the procedure: Multi-planar fluoroscopic imaging or CT-guided imaging is required for all procedures targeting the facet joints.

- **<u>INDICATIONS:</u>**

  - Patients who are suspected to have back pain that is facet in origin, based on exam findings and affecting activity; OR

  - Patients who have facet findings with documented findings which consist of pain with extension and lateral bending, with referral patterns consistent with the expected pathologic level. In these patients, facet injections may be occasionally useful in facilitating a

functionally-directed rehabilitation program and to aid in identifying pain generators.

- Back or neck pain following whiplash/post-traumatic injury;
- Back pain greater than leg pain;
- Neck pain greater than arm pain;
- Thoracic pain greater than chest wall pain;
- Back or neck pain associated with suspected motion segment instability/hypermobility or pseudoarthrosis following fusion
- Patients with recurrent pain should be evaluated with more definitive diagnostic injections, such as medial nerve branch injections, to determine the need for a rhizotomy.

- Because facet injections are not likely to produce long-term benefit by themselves and are not the most accurate diagnostic tool, they should not be performed at more than three levels unilaterally, or two levels bilaterally. A CT or MRI scan usually precedes referral for injections.

- Informed decision making should also be documented for injections and all invasive procedures. This must include a thorough discussion of the pros and cons of the procedure and the possible complications as well as the natural history of the identified diagnosis.

- A successful intraarticular facet joint injection requires documentation of positive functional changes by trained medical personnel experienced in measuring range of motion or assessing activity performance. Ideally, the evaluator should be acquainted with the patient, in order to determine pre and post values, and preferably unaffiliated with the injectionist's office. Qualified evaluators include nurses, physician assistants, medical assistants, therapists, or non-injectionist physicians.

  Pertaining to radiofrequency ablation neurotomy, to be successful, the results should occur within the expected time frame and there should be pain relief of approximately 50% (demonstrated by pre and post Visual Analog Scale, as well as supporting documentation of functional gains), persisting for a six to eighteen month time period.

  - Therapeutic Paravertebral Facet Joint/Nerve Block
    - Considered if a patient has relief of pain with controlled diagnostic blocks with a combined response from two blocks of several weeks to months.

- If the patient has relief of pain (positive response), but an insufficient duration of symptom relief, with controlled diagnostic blocks, he/she should be considered for a more definitive procedure such as denervation, after ensuring that the underlying diagnosis is accurate.

- Frequency of injections: injections should not exceed a frequency of more than once every two months for a specific region (cervical/thoracic, lumbosacral);
    - initial pain relief of greater than or equal to 80%-90% with the ability to perform previously painful maneuvers and persistent pain relief for a minimum of six weeks of at least 50%, with the continued ability to perform previously painful maneuvers.

    - Only paravertebral facet joint/nerves for which there has been a positive response should be injected for therapeutic reasons. No more than two, and occasionally three unilateral or bilateral joint/nerve injections per region would be anticipated per date of service.

    - Only paravertebral facet joints for which there has been a positive response to at least two double-comparative local anesthetic injections should be denervated.

PARAVERTEBRAL JOINT/NERVE DENERVATION.

- the destruction of a paravertebral facet joint nerve by neurolytic agent (chemical, thermal, electrical, or radiofrequency), it involves placing a needle or radiofrequency cannula adjacent to each of the two, or more, medial branch nerves innervating the target joint(s).

- may be considered if double-comparative paravertebral facet joint/nerve blocks do provide significant pain relief, but the pain relief is not long-lasting.
    - Indications: Facet joint arthropathy (joint disease) is diagnosed through a double comparative local anesthetic blockade.
        - failure of conservative therapy
        - All appropriate diagnostic paravertebral facet joint/nerve block studies have been performed.

- Significant pain relief in this instance is defined as greater than or equal to 80%-90% initially, with the ability to perform previously painful maneuvers.

- The effects of denervation should last from six months to one year, or longer.

OTHER PROCEDURES:

There are several other procedures that have been incorporated in the treatment of recalcitrant back pain. As with all of the procedures discussed previously in this protocol, implementation of an appropriate exercise program, with functionally directed rehabilitation, should occur. Patients who are unwilling to engage in this therapy should not receive this procedure.

1. **TRANSFORAMINAL INJECTION WITH ETANERCEPT**

   - Description - Transforaminal injection with a tumor necrosis factor alpha inhibitor is thought to decrease the inflammatory agents which may be associated with the pathophysiology of lumbar radicular pain from a herniated disc. It is *not recommended* due to the results of a study which showed no advantage over steroids or saline injections.

TRANSDISCAL BIACUPLASTY, INTRADISCAL ELECTROTHERMAL THERAPY (IDET), AND OTHER INTRADISCAL ELECTRICAL PROCEDURES.

- Description – Various technologies generally using electrically generated heat or cooled radiofrequency energy to coagulate fissures in the disc and surrounding nerves which could be pain generators. These procedures *are not recommended* due to lack of high quality published data demonstrating effectiveness.

INTRADISCAL REGENERATIVE THERAPY.

- While promising, studies concerning the introduction of various substances, including fibrin, platelet rich plasma, and gene therapies injected into degenerated discs with the intent of the restoration of healthy disc matrix and healing disc disruption are not yet supported by adequate published data to support use.
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TRIGGER POINT INJECTIONS AND DRY NEEDLING TREATMENT.

- **DESCRIPTION:** Trigger point injections are a generally accepted treatment. Trigger point treatment can consist of dry needling or injection of local anesthetic, with or without corticosteroid, into highly localized, extremely sensitive bands of skeletal muscle fibers that produce local and referred pain when activated. 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.

- **CURRENT EVIDENCE SUPPORTING USE:** 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. Needling must be performed by practitioners with the appropriate credentials in accordance with state and other applicable regulations. 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:**

  - Dry needling should only be considered appropriate for use after other, less invasive modalities (physical therapy, heat/ice, electrical stimulation) have been tried and failed.

  - 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 active therapy programs. Trigger point injections should be utilized primarily for the purpose of facilitating functional progress.

  - As with all interventions, appropriate documentation of improved pain scales, as well as functional gains, need accompany injections/dry needling.

- Patients should continue in an aggressive aerobic and stretching 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. However, trigger point injections may be occasionally effective when utilized in the patient with immediate, acute onset of low back pain.

- Complications: Potential but rare complications of trigger point injections include infection, pneumothorax, anaphylaxis, penetration of viscera, neurapraxia, and neuropathy. If corticosteroids are injected in addition to local anesthetic, there is a risk of 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; 24 to 48 hours for no anesthesia.

  - Frequency: Weekly. Suggest no more than 4 injection sites per session per week to avoid significant post-injection soreness. Increasing duration of benefit during the three initial treatments should be documented prior to consideration of further treatments.

  - Optimum duration: 4 Weeks. However, an initial trial of three injections, with objective improvement documented, must precede ongoing treatment. If no significant objectifiable improvement is seen after three injections, no further injections should be pursued.

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

GENERAL CONSIDERATIONS WITH INTERVENTIONAL THERAPY

- It is usually not appropriate to provide an interlaminar epidural/intrathecal injection, a transforaminal selective epidural (or selective nerve root injection), facet joint/nerve block, sacroiliac joint injection, lumbar sympathetic block, or other nerve block on the same day. Therefore, only one of these procedures is allowed on a given day, unless conditions are met as described immediately above for paravertebral and sacroiliac joints or one of the following conditions occur and are documented in the medical record:

  - If more than one type of diagnostic injection is performed on the same day, the anesthetic response to the first injection must be assessed and demonstrate incomplete pain relief prior to proceeding with the additional injection. Otherwise it would be impossible to determine which injection resulted in pain relief.
  - Multiple pain generators are present and are clearly documented in a patient on anticoagulants, requiring the anticoagulants to be stopped for the injection(s).
- General anesthesia is contraindicated for diagnostic blocks. Further, monitored anesthesia care or heavy sedation may provide false-positive results.

- Once a structure is proven to be negative, no repeat interventions should be directed at that structure unless there is a new clinical presentation with

symptoms, signs, and diagnostic studies of known reliability and validity that implicate the structure.

PROTOCOL HISTORY:

Passed: 4/27/1993 as "Caudal Epidural Blocks in the Management of Lower Extremity Pain"

Amended: 6/9/1998 as "Epidural Nerve Blocks and Epidural Steroid Injections in the Management of Spinal Pain"

Amended: 11/19/2002

Amended: 4/27/2010

Amended: 4/26/2016 as "Interventional Pain Management Treatment Protocol"

WORK HARDENING PROTOCOLS

I. INTRODUCTION

Guidelines have been established that define the nature, character, time duration, and cost of physical/occupational therapy treatments. In order to return an injured worker back to work, the therapy provider can provide one or both of the following therapy programs: "work hardening and/or work conditioning." The provider should indicate that their treatment services will be in the form of work conditioning with job simulated activities for a true work hardening program.

II. DEFINITION

Work conditioning is an intensive work-related, goal-oriented conditioning program designed specifically to restore systemic neuromuscular functions, including joint integrity, mobility, and muscular performance (including strength, power, and endurance), motor function (motor control and motor learning), ROM and cardiovascular/pulmonary functions. The objective of a work conditioning program is to restore physical capacity and function to enable the patient/client to return to work.

A work hardening program is an interdisciplinary, individualized and goal oriented, job specific program designed to return the patient/client to work. Work hardening programs use real or simulated work activities and progressively graded conditioning exercises that are based on the individual's measured tolerances, to restore physical, behavioral, and vocational functions. Work hardening programs address the issues of productivity, safety, physical tolerance, and work behaviors.

III. THE PROTOCOL COMPONENTS

1. Determination of the strength and endurance goals of the client in relation to the return to work goal should be established using equipment that quantifies and measures strength and conditioning levels; i.e., ergometers, dynamometers, treadmills, free weights, and circuit training. Goals for each worker are dependent on the demands of their respective jobs.

2. Simulation of the client's work demands job simulations that provide for progressions in frequency, load, and duration of work are essential. These should directly relate to the work goal and offer the client opportunity to practice work-related positions and motions.

3. The program should include education in body mechanics, work safety and injury prevention. This should include direct therapist interaction and may be

combined with video presentations that cover anatomy, back care, posture and the role of exercise and the worker's responsibility in self-treatment.

4. Assessment of the worker's need for job modifications. Documentation of job modifications is needed; i.e., adaptations in equipment, work station ergonomics. Adaptations should be made and practiced to insure success.

5. A written plan that includes measurable goals, the strategies used to meet these goals and the projected time necessary to accomplish the goals and expected outcomes. This plan may be supported by a functional capacity evaluation to establish a base-line that can be compared to the demands of the job. A re-evaluation may be performed to determine success of the program and the worker's readiness to return to work. These evaluations are considered part of the work hardening program.

6. The work hardening facility should be a safe work environment that is appropriate for the vocational goals and the worker. The amount of space should be determined by the number of workers, or approximately 100 square feet per client.

7. A total of nine (9) to twenty (20) physical/occupational therapy treatments will be paid for by the insurer for services given to the injured worker. The total number of treatments should be dependent upon the severity of the condition and intervention necessary.

IV. DOCUMENTATION

The following represents the general outline for the evaluation of candidates for work hardening and for implementation of treatment.

1. A request for work hardening may be made by the treating physician, insurer/case manager, acute care therapy provider, physician's assistant, nurse practitioner, osteopathic physician, and/or chiropractor.

2. All requests for work hardening will be forwarded from the generating source of the referral to the physician and then to the industrial health provider. They must include prior approval from the physician as well as the claims manager before the program begins.

3. Work hardening facility will submit a copy of the evaluation to the referring physician and the insurer within three (3) business days of the evaluation. The evaluation should include the initial plan as well as the following:

a. the medical status
b. the musculoskeletal exam
c. the current functional work capacity testing
d. the projected work capacity to return to work
e. the cognitive/perceptual status
f. the behavioral/attitudinal status

g. the vocational status.

The evaluation should document a benchmark from which to establish the initial treatment plan and/or the physical/functional/vocational disposition.

Information will include:

a. the name of the case manager
b. the estimated time frame for treatment
c. the worker must demonstrate physical recovery sufficient to allow for progressive participation for a minimum of 4 hours a day for three to five days per week. Some exceptions may be made for hand injuries as well as other specialized diagnoses that may begin at 2-3 hours per day.

4. It is anticipated that work hardening programs will include:

a. the practice, modification, and instruction of component work tasks through real or simulated work
b. the development of strength and endurance of the person related to the performance of work tasks
c. the education to teach safe job performance to prevent re-injury
d. the assessment of specific job requirements in relation to program goals through work site evaluation and/or job analysis
e. the provision of ergonomic recommendations to the employer which would facilitate and optimize the successful and safe return to employability
f. communication with the employer as to the person's present functional level
g. the development of behaviors and attitudes that will improve the person's ability to return to work or to benefit from other rehabilitation efforts.

5. A brief, weekly report should identify progress or lack of progress to date towards goals of treatment. Any changes in objective measures should be noted; e.g., amount of weight that cannot be lifted. This report should be sent to the employer/insurer.

6. Work hardening programs may be conducted three to five days per week for a period of up to four weeks or less. Prior authorization will be required to continue treatment beyond four weeks with a maximum of two additional weeks allowed. These exceptions must be justified by diagnosis, and must be accompanied by documentation of good participation and the necessity to reach the vocational goal.

7. A full reassessment of all objective measures must be completed at the end of the program or at the end of four weeks. If approval for continued treatment beyond the initial four weeks is requested, this reassessment must be forwarded to the insurer/employer. The rationale for continued treatment, proposed treatment extensions, and cost of services must also be identified.

8. An exit/discharge summary shall be submitted to the referring physician and insurer/employer within seven working days of the exit/discharge date. This summary shall include:

a. The reason for program termination
   1. The client has reached initially stated goals.
   2. The client has not participated according to program plan and absences exceed that allowed by program.
   3. The worker is not adhering to schedule.
   4. The worker has not reached interim goals (2, 3, and 4 must be reported to the claims staff to determine future planning).
b. clinical and functional status
c. recommendations for return to work
d. recommendations for follow-up services.

The final assessment may be used in lieu of a separate summary if all of the information above is contained therein.

PROTOCOL HISTORY:
Passed: 7/27/1993
Amended: 6/20/1995
Amended: 5/5/2009

PROTOCOL FOR THE MANAGEMENT OF GROIN HERNIAS

I. BACKGROUND

Hernia is defined as a weakness in the supporting structures through which a contained organ may protrude. A hernia may be described in terms of a weakness or actual opening or defect in an enclosing layer. However, the organ need not be present within the weakness for the hernia to exist.

Groin hernias can be sub-classified into:

1. Inguinal
2. Femoral

Hernias may further be classified into:

1. Reducible
2. Non-reducible – incarcerated
3. Strangulated – where there is compromise to the blood supply to the protruding organ

Other abdominal wall or ventral hernias include:

1. Incisional/Ventral – through a prior surgical incision in the abdominal wall
2. Umbilical – through a defect at the umbilicus or belly button
3. Epigastric – defect through the linea alba above the umbilicus
4. Spigelian – through a defect at the lateral border of the rectus muscle
5. Lumbar – defect through the lateral abdominal wall

Hernias may be congenital or secondary, that is, they develop later in life. The etiology of a hernia that develops secondarily in later life is usually trauma. However, the traumatic explanation may not be entirely clear. In some instance, the patient may be able to pinpoint the precise event, such as lifting a heavy object, and suddenly feeling a tear or severe pain in the groin. In other cases, the patient may only recognize a gradual bulge over years of hard work.

II. SYMPTOMS OF HERNIAS

1. Asymptomatic
   a. Many hernias are discovered only on routine physical examination, and patients have no symptoms referable to them.
2. Symptomatic
   a. Noticeable, painless bulge in the groin which may or may not be intermittent.
   b. Noticeable, painful bulge in the groin which may or may not be intermittent.
      1. Pain may be quite severe initially, but usually subsides to a dull ache unless incarceration or strangulation occurs.

c. Severe, generalized abdominal pain often associated with nausea and vomiting, abdominal distention, and a non-reducible bulge in the groin – which suggests incarceration and/or strangulation, causing bowel obstruction.

d. In the obese patient, actual bulge can be missed on examination, but the patient may present with symptoms and signs of bowel obstruction with no other etiology.

III. PHYSICAL SIGNS

1. Hernia may not be detectable on physical examination. This is frequently the case with baby hernias, or in obese patients.
2. The defect and/or bulge can be felt in the inguinal canal. For a reducible hernia, often the patient must be in the upright position and strain, to increase the intra-abdominal pressure for the hernia to be detected. A dilated external ring does not, in and of itself, constitute the diagnosis of a hernia.
3. Signs of bowel obstruction, such as abdominal distention and tenderness, suggests incarcerated and/or strangulated hernia, in the absence of another cause.

IV. DIFFERENTIAL DIAGNOSIS OF GROIN MASSES

1. Testicular torsion
2. Acute femoral lymphadenitis
3. Soft tissue mass, such as lipoma

V. TREATMENT

1. Non-operative

a. External device or truss to maintain reduction of the hernia to prevent incarceration and/or strangulation. This is most helpful for large ventral hernias or incisional hernias and of little help in groin hernias. It does not treat the hernia, it only helps to prevent complications resulting from the hernia.

2. Operative Repair

a. This should be scheduled in a timely fashion after diagnosis.

b. If there are signs or symptoms of incarceration and/or strangulation, surgery should be scheduled more urgently or emergently (usually within 24 hours).

c. Outpatient

1. Conventional surgical treatment is performed under local, neuroleptic (IV) sedation and local anesthesia), general anesthesia, spinal or epidural anesthesia.
2. Laparoscopic repair usually requires general anesthesia
3. If strangulation has occurred, the patient may require conversion to a general anesthetic with full laparotomy with resection of the involved organ. The patient may need admission to the hospital following this procedure.

Most surgeons performing hernia repairs today use a tension free technique which reduces pain, reduces the risk of recurrence, and enables the patient to return to work much quicker. A tension free repair can be performed either using an open technique or a laparoscopic technique. The type of repair is usually based on the patient's anatomy, as well as the surgeons preference and expertise.

Most groin hernias can be repaired on an outpatient basis. If incarceration and/or strangulation occurs, and conversion to a laparotomy is required or a bowel resection is required, admission to the hospital is usually required, and recovery is usually longer.

IV. COMPLICATIONS RESULTING FROM REPAIR OF THE HERNIA

1. Infection – rare
2. Wound Hematoma/Seroma
3. Nerve entrapment with hypesthesias or numbness
4. Recurrence – early or late
5. Testicular ischemia/infarction – rare

VII. FOLLOW-UP

1. Patients are usually treated as outpatients with initial postoperative visit one to two weeks following the surgery. Patients may return to work at 2 weeks. For individuals who routinely lift greater than 100 lbs., 3 weeks recovery is generally required. Follow-up visits beyond 2-3 weeks are generally needed if complications have occurred. Patients who undergo bilateral hernia repair, in general, should not require longer recuperative time.

VIII. PRECAUTIONS TO PREVENT RECURRENCE FROM WORK-RELATED HERNIAS

1. Cessation of smoking
2. Weight reduction
3. Muscle strengthening exercises, which usually do not require physical therapy
4. Learning proper techniques in lifting and bending

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ACUPUNCTURE

INTRODUCTION

The indications and uses of acupuncture in injury/illness treatment continue to be defined and refined over time. Acupuncture is used as an option when pain medication is reduced or not tolerated, or it may be used as an adjunct to physical rehabilitation and/or surgical intervention to hasten functional recovery. As noted in the American College of Occupational and Environmental Medicine's "Occupational Medicine Practice Guidelines" (2nd Edition, with revisions; 2008), acupuncture is based largely on the theory that many diseases are manifestations of a yin/yang imbalance, reflected in disruption of "Qi" (normal vital energy flow) in specific locations referred to as "meridians". Restoring balance occurs via placement of needles in one or several classical acupuncture points on these meridians. Typically thin, solid, metallic needles are used, either manually manipulated, or stimulated electrically (electroacupuncture). Needles may be inserted, manipulated, and retained for a period of time. Physiological effects (depending on location and settings) may include endorphin release for pain relief, reduction of inflammation, increased blood circulation, analgesia through interruption of pain stimulus, and muscle relaxation. Additionally, other techniques such as moxibustion and cupping are occasionally used as part of the treatment.

In addition to Chinese acupuncture, many other types of acupuncture have developed, with use on non-traditional acupuncture points. Different techniques are also used, including more standard acupuncture, superficial dry needling, and deep dry needling. Acupuncture is minimally invasive, carries minimal risk for adverse effects, and is moderately costly.

Acupuncture has been utilized to treat many musculoskeletal disorders, as well as non-musculoskeletal conditions (chronic pain, headaches, etc.). Acupuncture has been claimed 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. A major challenge in assessing the effectiveness and efficacy of this methodology in the treatment of various disorders has been the quality of study design and exclusion of study bias. There remain significant reservations regarding acupuncture's true mechanism(s) of action. Several states, however, have incorporated limited and defined clinical situations in which acupuncture has been possibly shown to be of benefit. The ACOEM's Guidelines provide the most comprehensive, evidence-based assessment and recommendations regarding the use of acupuncture to date and, therefore, form the foundation of this protocol.

RECOMMENDATIONS

A. Current studies do not differentiate between the different acupuncture methodologies and effectiveness of treatment.

B. Referral to an acupuncturist will only be made to an individual who has successfully met all qualifications and licensure requirements as set forth by the State of Rhode Island Department of Health.

C. Acupuncture should be considered only after failure of prior treatment (NSAIDs, exercise, physical therapy, chiropractic, and weight loss (in the case of knee/hip arthrosis) to effectively limit or resolve symptoms.

D. Acupuncture may be recommended for select use for treatment of chronic moderate to severe low back pain, neck pain, chronic trigger points/myofascial pain, and osteoarthrosis of the knee and hip, as an adjunct to more efficacious treatments.

1. Chronic pain, for purposes of acupuncture, is defined as pain that persists for at least 30 days beyond the usual course of an acute disease, or a reasonable time for an injury to heal, or that is associated with a chronic pathological process that causes continuous pain.

2. The role of acupuncture in these conditions is to assist in increasing functional activity levels and, therefore, should be incorporated only in those cases where a conditioning program is in progress.

3. In cases where an injured worker is not involved in a conditioning program, or where evidence exists of noncompliance with a conditioning program (consisting of graded increases in activity levels is documented), such intervention is not appropriate.

4. Based on current studies, the use of acupuncture in the treatment of other entities, such as acute tender/trigger points, chronic lateral epicondylitis, adhesive capsulitis of the shoulder, chronic regional pain syndrome (CRPS), and migraine headaches can be considered in select cases as a secondary or tertiary treatment where other, more standard therapies (see appropriate protocol) have failed, or to assist in increasing functional activity levels more rapidly.

5. Referral to an acupuncturist will be made by the treating/referring health care professional, in writing, after well documented lack of acceptable response/return of acceptable function, disability or incapacity, despite use of more standard medical care (as outlined in the appropriate protocol for that condition) over a period of time usually and reasonably associated with functional recovery from that condition.

6. Initial treatment will be limited to six (6) acupuncture sessions, as an adjunct to a conditioning program (with both graded aerobic exercise and strengthening exercises).

a. During this time, clear objective and functional goals are to be documented, with achievement of the goals documented as well.

b. The conditioning program is not required to be provided by the acupuncturist, but can be provided by an appropriate rehabilitation facility equipped and capable of the performance of a well-defined, systematic conditioning program.

7. Resolution of symptoms and functional limitations, treatment intolerance, non-compliance (with either acupuncture and/or conditioning program), or failure to improve are indications for discontinuance of treatment.

8. Ongoing acupuncture treatment extending beyond the initial 6 visits should be based on objectifiable measures of improvement, with an initial extension of 6 additional visits, if justified, for a total of 12 visits/sessions.

a. Ongoing authorization for continuing acupuncture treatment may require independent, objective evidence of the efficacy of treatment(s) and may, at the direction of the Workers' Compensation Court, require a supportive opinion rendered by an impartial medical examiner.

b. At the completion of the initial 6 sessions, the treating acupuncturist should submit a written report with clinical assessment, response to treatment, as well as recommendations to either terminate or extend treatment. Objective parameters, in addition to the patient's subjective reports of pain/limitations will be provided as part of this report. These objective parameters will also be provided by the provider of the conditioning program, in accordance with an acceptable reporting methodology, in accordance with the appropriate treatment protocol providing guidance in that regard.

c. If ongoing treatment is recommended and supported by objectifiable parameters, similar reports will be submitted at the completion of each subsequent 6 session interval, until the patient has recovered, realized maximal functional benefit, or displayed noncompliance with treatment recommendations, at which point treatment will be terminated.

PROTOCOL HISTORY:
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Amended: 5/5/2009

DIAGNOSTIC TESTING PROTOCOLS

Guidelines for the Ordering of CT Scans, MRI Scans, EMG, Bone Scans, Myelograms & Angiograms

I. CT Scans

A. A CT scan is appropriate for an acute head injury when there is need to rule out an associated acute cerebral condition.

B. A CT scan is appropriate for low back injuries with appropriate neurologic deficits which have not responded to conservative treatment after a period of 4 to 6 weeks.

C. In the event of an eye injury, orbital CT scans may be ordered by an ophthalmologist in the presence of foreign body or orbital injury.

D. Shoulder injuries may require a CT scan, but this should be ordered by an Orthopedic Surgeon.

E. A CT scan may be ordered by an Orthopedic or Neurosurgeon in a case where a patient has undergone a 2nd or 3rd surgical procedure and in which a lumbar fusion is being considered.

F. A repeat CT scan may be ordered if there has been a marked progression of signs and symptoms but should not be ordered just for routine follow-up purposes.

G. CT scans may not be ordered for routine follow-up purposes. In addition, any follow-up CT scan may only be done with the permission of the employer/insurer.

II. MRI Scans With or Without Contrast

Indications

A. Cervical injuries in which a cervical disc is suspected, generally performed without contrast (to be ordered generally by Orthopedic Surgeon, Neurologist, Neurosurgeon, Physiatrist, or Rheumatologist).

B. Acute knee injuries with suspected (1) meniscal injuries or (2) collateral ligament injuries (to be ordered only by an Orthopedic Surgeon, Physiatrist, or Rheumatologist).

C. In lumbar disc injuries, a CT scan may be a reasonable alternative. Generally both studies should not be performed (to be ordered generally by Orthopedic Surgeon, Neurologist, Neurosurgeon, Physiatrist, or Rheumatologist).

D. In metatarsal fractures, an MRI is rarely indicated (can be ordered only by an Orthopedic Surgeon/Hand Surgeon, Physiatrist, or Rheumatologist).

E. Thoracic spine injuries with any indication of damage within the canal (to be ordered generally by Orthopedic Surgeon, Neurologist, Neurosurgeon, Physiatrist, or Rheumatologist).

A repeat MRI study is indicated only if:

1) There are clear clinical or radiographic signs of significant progression.

2) A repeat study may be useful after surgery if a patient's condition fails to improve. In this situation, contrast material should be used to differentiate between further disc material and scar tissue.

F. Waters view is frequently done to determine if there is a suspicion of a metallic foreign body of the orbit. In the infrequent occasion in which there is a high level of suspicion of metallic foreign body in the orbit, a CT scan of the orbit can be done.

G. MRI can be utilized for shoulder injuries (to be ordered only by an Orthopedic Surgeon, Physiatrist, or Rheumatologist).

H. An MRI of a peripheral nerve disorder may only be ordered by a specialist (Orthopedic Surgeon, Neurologist, Neurosurgeon, Physiatrist, or Rheumatologist) and only with the express consent of the insurer.

MRI scans may not be ordered for routine follow-up purposes. In addition, any follow-up MRI study may only be done with the permission of the employer/insurer.

III. Bone Scans

A Bone Scan may be ordered for the following reasons:

A. Suspected tumor involvement of the bony part injured.

B. Suspected infection of the bony part injured.

C. Occasionally, where x-rays have failed to show a fracture.

D. In some cases of acute knee injuries (should be ordered by an Orthopedic Surgeon).

IV. Myelograms

A Myelogram may be ordered for the following reasons:

A. When there are true signs of cervical disc and one has been demonstrated by MRI Scan and the patient is a surgical candidate.

B. In a low back injury where a disc has previously been demonstrated by CT Scan or MRI Scan and who has not responded to conservative treatment and the patient is a surgical candidate.

C. Thoracic injury would follow the same as above.

D. Any spinal fracture or subluxation in which there is suspected cord compression.

V. Angiograms

A. In traumatic cervical injuries in which there is a suspicion of damage to the vertebral or carotid arteries.

B. In thoracic outlet syndrome, if vascular compression is suspected.

VI. Electromyogram and Nerve Conduction Studies

Neurophysiological studies (EMG and CV studies) are frequently utilized diagnostic techniques for the identification and assessment of disorders affecting the nerve roots (radiculopathy), peripheral nerves, neuromuscular junction and for the diagnoses of diseases of the muscles. These techniques are generally not useful for the diagnosis of disorders of the central nervous system.

The aforementioned electrophysiological techniques can be utilized for the diagnosis or evaluation of several conditions that are associated with an injury at work. These include (I) radiculopathy in association with disc disease, with spondylitic disease, or with other nerve root conditions, (II) peripheral nerve injury.

A. Radiculopathy – EMG studies are employed to detect the presence of nerve root injury. This study is most useful after a period of four weeks and is generally not indicated prior to that time.

1. If the initial study is negative for nerve root irritation and/or damage, a repeat study may be indicated after a six-month time interval. However, a repeat study can be performed prior to six months if surgery is under consideration or if requested by an attending physician.

Follow-up EMG studies may be required (on not less than a yearly basis), for the purpose of re-evaluation of an active problem requiring ongoing treatment (prior to MMI).

2. If the study is abnormal, a repeat study may be indicated (after six months) if:

a. There is a significant change in the patient's clinical status.

b. If surgical treatment has been performed and the desired clinical result has not been achieved.

c. If repeat surgical treatment is being contemplated or if the study is requested by the attending physician (radiculopathy).

3. Conduction velocity studies can be useful in evaluating for the presence of radiculopathy as well.

a. In testing for radiculopathy, study of a motor nerve, a sensory nerve and study of a "late response" (usually F wave in the upper extremity and the H response in the lower extremity) may be of significant value in the diagnosis of a radiculopathic disorder. H response may be performed in the opposite extremity as well.

b. In addition, studies may need to be performed to rule out an associated peripheral nerve lesion, and the appropriate format for study is described below (see "II. Peripheral Nerve Injury").

B. Peripheral Nerve Injury

1. Studies can include EMG and CV studies to evaluate for the presence of a peripheral nerve injury.

a. Acute injury – EMG and nerve conduction studies are the most useful after four weeks (approximately) and are generally not indicated prior to that time. However, EMG and nerve conduction studies can be performed prior to that time if

(1) surgical treatment is under consideration

or

(2) if requested by an attending physician.

b. Chronic dysfunction – In general, a single study (EMG and CV) is sufficient to evaluate for a chronic nerve disorder (carpal tunnel, ulnar nerve disorder or other nerve entrapment condition). A repeat study may be performed after three or four months if specific treatment (for example, surgical release procedure) is contemplated or if requested by the attending physician. Follow-up studies may be performed after this time but not more frequently than yearly for purpose of re-evaluation of an active problem requiring ongoing treatment (prior to MMI).

2. Concerning the issue of nerve conduction studies and the appropriate nerve(s).

a. Conduction velocity studies are useful for the study of one or more nerves that are clinically suspect in the affected extremity.

b. Testing of an uninvolved nerve in the same limb such as the ulnar nerve in a patient with, for example, a median nerve disorder (carpal tunnel) is useful. Studies of the contralateral and presumably normal nerve may also be of diagnostic importance.

c. On occasion, the testing of a motor nerve, a sensory nerve, and a “late response” study may be performed in a non-affected extremity to evaluate for the presence of a coexistent systemic peripheral nerve disorder (e.g. Diabetic Peripheral Neuropathy).

VII. Evoked potential studies are not useful for diagnosis and management of peripheral nerve disorders.

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TEMPOROMANDIBULAR JOINT DISORDERS

I. BACKGROUND

Temporomandibular Joint Disorders (TMD) has been defined as a collective term embracing a number of clinical problems that involve the musculature and/or the temporomandibular joint itself. Temporomandibular Joint Disorder (TMD) has been used to refer to a group of conditions that are often called TMJ by the public. Unfortunately, this imprecise term, TMJ, has been used by physicians and dentists as well to describe all of the myriad of pain problems that patients experience in association with the head, neck, jaws, and muscles in this anatomical region of the body. This imprecision in the use of terms has led to a great deal of confusion. In an attempt to clarify this situation, the following definitions are presented:

There are two distinct categories of TMD:

1. Masticatory and cervical muscle fatigue/spasm/pain and dysfunction.

This is a specific term used to describe painful and debilitating extra-articular maladies of the head, neck, and jaws. These problems result from the abuse of the masticatory and cervical musculature secondary to abnormal parafunctional habits such as bruxism and clenching of the teeth in response to stress and/or myofascial pain. However, if not controlled or eliminated, these problems could, in some cases, cause intra-articular pathology.

2. Intra-articular biomechanical dysfunction.

This is a specific term used to describe the consequences of the pathologic entities that occur to the intra-articular structures of the TMJ.

The important distinction is that masticatory and cervical muscle pain and dysfunction is not primarily centered in the joint itself, whereas biomechanical dysfunction of the TMJ is directly related to the anatomy and associated pathology of the joint.

The health consequences of TMD can be devastating. Dependence on pain medications, decreased productivity, and disability are common. Most patients who have extra-articular TMD, fortunately, can be successfully treated and rehabilitated with a combination of rest, medication, change in habits, and an orthotic appliance. However, those patients whose cause of TMD is intra-articular pathology often cannot be treated successfully without surgical intervention.

II. DIAGNOSTIC CRITERIA

Masticatory and Cervical Muscle Pain and Dysfunction

A. Pertinent Historical and Physical Findings

Intermittent, generalized unilateral or bilateral dull, aching preauricular or auricular pain is usually the first symptom. Often this leads the patient to their physician or an otolaryngologist. This pain will frequently migrate to the temporal, cervical, and occipital regions.

Masticatory and cervical muscle origin pain (extra-articular) differs from the pain associated with intra-articular biomechanical dysfunction in that with intra-articular pain the pain is directly localized to the affected joint, rather than generalized to

an area as is the pain associated with the extra-articular conditions. Also, with the intra-articular conditions, the pain is constant each time the patient functions the mandible.

The extra-articular patient will complain of decreased range of motion of the mandible. Often, this is worse in the morning upon awaking, particularly if the patient clenches and/or grinds (bruxism) their teeth while sleeping. Many times the patient will describe a sensation of their jaw feeling locked. This sensation usually goes away as they go about their daily activities.

These patients will also complain that their jaw feels tired and/or tight after functional motions associated with eating, chewing, or prolonged talking.

Often, joint noises such as clicking with function are described. Patients describe a feeling in their ipsilateral ear of a stuffiness as when going up in an airplane.

All of these symptoms in the extra-articular patient are intermittent daily, weekly, or monthly.

Physical examination is remarkable for tenderness to palpation over the muscles of mastication, particularly the deep masseter, anterior temporalis and its tendon and the cervical and occipital muscles to which the pain migrates.

There is usually no intrameatal tenderness to palpation, and there may or may not be evidence of joint noise on palpation or auscultation of the affected joint(s).

The patients will have a decreased range of mandibular function as demonstrated by measuring the opening pattern between the maxillary and mandibular incisor teeth on maximum opening. The patients will describe a tight sensation as they attempt this maneuver. Lateral excursion are decreased to the contralateral side, and protrusive excursion deviates the mandible to the affected side in unilateral cases.

B. Appropriate Diagnostic Tests and Examinations Suggested Sequence

1. Clinical Diagnosis is supported by these studies:

a. Imaging – plain or panoramic radiograph to determine that there is no gross articular bony pathology

b. Differential diagnostic local analgesia blocks to determine extra- vs. intra-articular etiology of pain

c. Trial dosage of medication such as NSAID or muscle relaxant

C. Inappropriate Diagnostic Tests and Examinations

1. Masticatory or cervical muscle evoked potentials

2. Trial doses of narcotic analgesics

D. Supporting Evidence

Imaging is essential to the initial work-up of these patients to rule out the presence of incipient intra-articular biomechanical dysfunction pathology. Differential diagnostic blocks are helpful in complex cases in determining the primary site of the etiology of the problem as extra-articular or intra-articular so the treatment can be appropriately directed. Trial dosages of NSAIDS and/or muscle relaxants can be useful in determining etiology and thus dictate treatment.

III. TREATMENT

All treatment directly associated with masticatory and cervical muscle pain and dysfunction is done on an outpatient basis. There are occasions when the patient has such

a tremendous psychological overlay that inpatient behavioral modification therapy is needed.

A. Appropriate Forms of Therapy
   1. Medications
      a. NSAIDS
      b. Muscle relaxants
      c. Sedatives
      d. Antidepressants
      e. Local analgesic trigger point injections
   2. Orthotics
   3. Physical therapy
      a. Exercises
      b. Ultrasound
      c. Galvanic stimulation
      d. Heat and cold packs
      e. TENS
      f. Iontophoresis
   4. Diet modifications
   5. Psychological counseling
   6. Relaxation therapy
   7. Family therapy

B. Supporting Evidence

With the proper early diagnosis of masticatory and cervical muscle pain and dysfunction with identification of the etiology and its removal or treatment, the vast majority of these patients can be taught to manage this problem. Progression of this problem untreated can lead to biomechanical dysfunction in a small percentage of cases (5%).

C. Estimated Duration of Care

Extra-articular TMD is a management problem because there is no anatomical or pathological entity that can be repaired or removed. The basis of the problem is stress relieving patterns that lead to abnormal parafunctional oral habits that result in fatigue, spasm, and muscle pain.

D. Modifiers

Modifying factors are defined as factors that precipitate, aggravate, or alleviate the individual episodes of pain and dysfunction. Frequent precipitating factors include stressful situations, weather changes, and trauma. Frequent aggravating factors include tooth clenching and grinding and tension. Frequent alleviating factors include heat or ice, rest, medications, massage, stretching exercises and relaxation.

IV. DIAGNOSTIC CRITERIA – Intra-articular Biomechanical Dysfunction

Biomechanical dysfunction of the TMJ can occur as the result of the following pathologic conditions:

1. Trauma
   A. Persistent Historical and Physical Findings

1. History of trauma
2. Physical evidence of fracture
3. Malocclusion
4. Mandibular dysfunction
5. Abnormal relationship of the jaw
6. Presence of a foreign body
7. Hemorrhage in external auditory canal
8. Laceration of external auditory canal
9. CSF in external auditory canal

B. Appropriate Diagnostic Tests and Examinations

Suggested Sequence

1. Clinical Diagnosis is supported by these studies:
   a. Imaging – Plain or panoramic radiograph to determine the nature and extent of the fracture and any displacement
      - CT Scan
      - Tomogram

C. Inappropriate Diagnostic Tests and Examinations

a. Arthrogram
b. MRI
c. Arthroscopy

D. Treatment

Outpatient or Inpatient

1. Closed reduction in cases of:
   a. Nondisplaced fracture of the mandibular condyle
   b. Displaced fracture of the mandibular condyle
   c. Medical contraindication for open reduction
2. Open reduction in cases of:
   a. Fracture dislocation of the mandibular condyle
   b. Mechanical interference with function by a condyle
   c. Condyle fracture with loss of anterior – posterior and vertical dimension which cannot be managed by closed reduction
   d. Compound fracture
   e. Displacement of a mandibular condyle into the middle cranial fossa

E. Supportive Evidence

It has been well documented that with proper treatment, fractures of the mandibular condyle heal well.

F. Estimated Duration of Care

Early mobilization (2 - 3 weeks) is important to prevent ankylosis.

H. Estimated Return to Work

6 – 8 weeks

2. Internal Derangement

A. Pertinent Historical and Physical Findings

1. Earaches, headaches, masticatory or cervical myalgias
2. Clicking or popping of the joint

3. Locking of the joint
4. Restricted masticatory function
5. Restricted range of jaw motion
6. Imaging evidence of disc displacement and/or perforation
7. Arthroscopic evidence of internal derangement

B. Appropriate Diagnostic Tests and Examinations

Suggested Sequence

1. Clinical Diagnosis is supported by these studies:
   a. Imaging – MRI
   b. Arthrogram
   c. Arthroscopy

C. Inappropriate Diagnostic Tests and Examinations

1. Imaging – any imaging that professes to show disc displacement by condylar position
   - CT Scan

D. Treatment: Outpatient or Inpatient

1. Arthrocentesis and/or manipulation of mandible
2. Arthroscopic surgery
3. Arthroplasty
   a. Discoplasty with or without arthroplasty or discorrhaphy
   b. Discectomy
   c. Discectomy with insertion of autogenous graft
   d. Discectomy with recontouring of the articular surface and placement of autogenous graft
   e. Repair of perforated posterior attachment
4. Mandibular condylotomy
5. Orthognathic surgery
6. Orthotics
7. Physical therapy

E. Supporting Evidence

It has been well documented that with proper treatment, internal derangements of the TMJ do well.

F. Estimated Duration of Care:

With surgery and post-operative physical therapy, 4 – 6 months

G. Estimated Return to Work:

6 – 8 weeks

PROTOCOL HISTORY:
Passed: 5/24/1994

ACUTE HAND INJURY PROTOCOLS

I. FRACTURES OF THE HAND AND DIGITS

A. Background

Digital and hand fractures are seen in workers who use their hands, due to the exposed nature of the hand (in most functions) at work. Most fractures are due to local trauma caused by an applied force. The energy of applied force determined the severity of the fracture. Digital fractures are much more common than hand fractures, and may present as open fractures with soft tissue loss.

B. Medical History

1. Pain, swelling, and discomfort to the injured digit, thumb, or hand
2. Age, occupation, activities, hand dominance, history of previous hand injury/impairment important to document
3. Date of injury, as well as time interval between injury and treatment
4. Conditions surrounding injury (physical environment)
   - Assists in determination of dirty vs. clean wound
5. Mechanism of injury

C. Physical Examination

1. Swelling and tenderness of the affected part
2. Digital range of motion
3. Vascular changes (ischemic, congestion, or cyanosis)
4. Neurologic changes (including two-point discrimination)
5. In digital fractures, notation of the soft tissue "envelope" and the presence of any skin interruption, consistent with an open fracture, should be sought.

D. Appropriate Diagnostic Tests and Examinations

1. X-rays, including true lateral views of the involved digit/metacarpal bone
2. Occasionally, noninvasive/invasive vascular studies may be useful and appropriate, when there is suspicion of circulatory compromise. Such studies include:
   a. Doppler
   b. Ultrasound
   c. Angiogram
   d. MRA

E. Outpatient Treatment: Uncomplicated Fractures

1. Uncomplicated digital fractures are expected to heal within four to six weeks.
2. Indications for Treatment
   a. Pain

b. Limited Motion
c. Swelling

3. Treatment Options: Closed Reduction With/Without Anesthesia
a. Digital finger splints
b. Intrinsic plus splints
c. Buddy taping
d. Intrinsic plus casting
e. Casting

4. Rehabilitation
a. After initial healing (confirmed by exam/x-ray), active and passive range of motion exercises of the digits, hand and wrist
b. Grip strengthening exercises, when indicated
c. Activities of daily living modification, with job task limitations may be necessary, based on the nature of the injury.

5. Duration of Care
a. Generally extends over 6-12 weeks
b. Duration depends on severity of wound, complications, and complexity of care required for healing and optimization of functional restoration.

6. Return to Work Status
a. Based on extent and severity of wound
b. Two to four weeks of no use of injured hand
c. Usual return to full hand use within 8 weeks

F. Closed Reduction, Internal Fixation/Open Reduction, Internal Fixation/Surgically Treated Injuries
1. Indications
a. Failure to respond to conservative measures
b. Failure to correct digital deformity/displacement (seen in AP, lateral, or rotatory x-ray views)
c. Intra-articular joint fracture that cannot be adequately treated by closed measures
d. Open fractures requiring irrigation and debridement
e. Amputations
2. Treatment Options
a. Closed reduction with/without internal fixation
b. Open reduction with/without internal fixation
c. Irrigation and debridement
d. Closed reduction or external fixation
3. Rehabilitation
a. Following initial healing, active and passive range of motion exercises of the digits, hand and wrist
b. When indicated, grip strengthening exercises

c. Activities of daily living modification
d. Job task limitations
e. Range of motion exercises (after fracture healing)
f. Splinting/casting

4. Duration of Care
a. Operative treatment: 3-6 months
b. Follows surgery

5. Return to Work Status
a. Generally, no use of injured hand for 3-6 weeks
b. Full use of injured hand generally within 6-12 weeks

II. DIGIT AND HAND DISLOCATIONS

A. Background

Dislocations require tearing of some of the structures surrounding the joints of the digits, hand, and/or wrist. All injuries of this sort must be reduced to allow for adequate post-injury function. Unduly lengthy immobilization following these injuries can lead to stiffness in the affected part. Often accompanying these injuries is cartilaginous disruption, resulting in eventual joint (traumatic) arthritis.

B. Diagnostic Criteria

1. Precipitating Injury History/Mechanism of Injury
a. Usually involves a hyperextension type injury (digits)
b. Metacarpal dislocations often involve a direct blow to the "knuckles"
c. Usually presents with severe pain, swelling, and deformity of the hand or digit

2. Physical findings
a. Swelling
b. Pain
c. Limited motion

C. Appropriate Diagnostic Tests and Examinations

1. Digital X-rays: true lateral views of the digits, including AP, lateral, and oblique pre and post-reduction views.

2. Hand X-rays: true lateral radiographs, including metacarpals, with AP, lateral, and oblique pre and post-reduction views

D. Outpatient Treatment

1. Nonoperative Treatment
a. Varies according to injury severity
b. Ranges from 6-24 weeks
c. Can include closed reduction of digital joints under local anesthesia
d. Immobilization after reduction, including digital splints, intrinsic-plus splints of the hand or wrist, and casting

2. Rehabilitation
   a. Can include active/passive range of motion exercises, beginning 2-6 weeks after injury
   b. Grip strength exercises, when indicated
   c. Activities of daily living modification
   d. Job task modification
3. Return to Work Status
   a. Simple digital dislocation: no hand use for 1-2 weeks
   b. Full use of injured hand: 2-6 weeks
4. Surgery
   a. Indications
      - Inability to reduce a dislocation under closed conservative treatment
      - Open digital dislocation
      - Irreducible joint dislocations with extensor and/or flexor tendon involvement
      - Fractures associated with dislocations
   b. Surgical Options
      - Closed reduction under anesthesia
      - Closed reduction, internal fixation
      - Open reduction
      - Open reduction, internal fixation, with ligament or tendon repair
   c. Post-operative rehabilitation
      - Although this group may require extended periods of rehabilitation, generally required rehabilitation components approximates that of the nonoperative group
5. Estimated Duration of Care
   a. Usually requires 10-24 weeks after surgery
   b. Varies depending on severity of tissue damage, complication occurrence, etc.
6. Return to Work Status
   a. No use of injured hand for 3-6 weeks
   b. Full use of injured hand within 6-12 weeks

III. WRIST FRACTURES AND DISLOCATIONS

A. Background

Fractures and dislocations of the wrist are frequently missed emergent musculoskeletal injuries. The intricate anatomy of the carpal bones, along with multiple overlapping shadows on x-rays, make this type of injury difficult to diagnose. Many injuries, therefore, are missed on initial examination. Careful evaluation, therefore, is paramount in recognition of these injuries.

B. Diagnostic Criteria

1. Medical History

a. Mechanism of injury

- Direct blow to wrist or hand
- Fall onto wrist or hand
- Hypertension or hyperflexion injury

2. Physical Examination

a. Swelling, as well as tenderness, are localized to the location of the injury

b. Tenderness to the anatomic snuff box, consistent with scaphoid fracture

c. Swelling, with restricted range of motion, suggestive of serious ligamentous disruption

d. Potential scaphoid or carpal fracture, as well as ligament injury, should be ruled out prior to assigning diagnosis of wrist pain.

e. Difficulty with performance of wrist flexion and extension

f. Occasional numbness and/or dysesthesias, consistent with median and/or ulnar nerve involvement

When present, further nerve testing (see below) is critical.

3. Diagnostic Tests and Examination

a. X-rays: true, AP, lateral, and oblique views, in addition to scaphoid views (when clinically indicated)

b. CT or MRI scan indicated for detection of suspected nonunion

c. Arthrogram, fluoroscopic (CT and MRI arthrogram) may be indicated when physical examination indicates wrist instability

d. EMG/NCVS may be indicated to verify presence and of nerve involvement, if clinically suspected

C. Nonsurgical Treatment

1. Outpatient/nonoperative treatment

a. Treatment is specified and fracture-based

b. Variable, diagnosis-specific healing times

- Triquetral fractures: 4-6 weeks
- Scaphoid fractures: 3-6 *months*

2. Treatment Options

a. Neutral position wrist splint

b. Thumb spica splint/short arm cast

c. Thumb spica long arm cast

d. Wrist neutral cast

3. Estimated Duration of Care/Return to Work Status

a. Care duration usually from 6 weeks to 6 months

b. Use of injured hand: 6-12 weeks

D. Neurosurgical Rehabilitation
1. Begins after fracture/injury healed
2. Digital, hand and wrist exercises
3. Active and passive range of motion exercises
4. Grip strengthening exercises, as indicated
5. Activities of daily living and job task modifications

E. Surgical Treatment
1. Indicated for failure to heal with nonoperative measures
2. Treatment options
a. Open reduction, internal fixation of fracture
b. Open reduction and operative repair of ligamentous injury
c. Intercarpal fusion
d. Radiocarpal fusion
e. Wrist arthroscopy
f. Wrist arthroplasty

F. Surgical Rehabilitation
1. Digital, hand and/or wrist active and passive range of motion exercises
2. Grip strengthening exercises
3. Wrist splinting in extension

G. Estimated Care Duration/Return to Work
1. Usually from 3-6 months following surgery
2. No use of injured hand: 12-24 weeks

IV. TENDON INJURIES

A. Background

The flexor and extensor tendons of the digits lie superficially under the skin and, therefore, are commonly injured. Appropriate care at the point of initial treatment is imperative for a positive outcome. However, due largely to the complexity of the extensor and flexor tendon systems in the upper extremity, accurate diagnosis of injury is often problematic. For example, every hand laceration (regardless of the size) carries with it the potential for tendon tear(s). Anticipating a tendon tear, based on the location of the laceration, therefore, is paramount in the provision of appropriate care of these injuries.

B. Medical History
1. Open Tendon Injuries
a. Most are secondary to sharp objects that cause wounds to skin and soft tissue(s)
b. Hand position at time of injury determines location of tendon injury

c. Usually, patients cannot fully bend or extend the affected finger or hand, as well as noted alteration in function

d. Pain in affected digit

e. Numbness/dysesthesias suggestive of accompanying nerve injury

2. Closed Tendon Injuries

a. Complete extensor/flexor tendon rupture can occur without a visible wound

b. Spontaneous ruptures can occur secondary to other medical conditions

C. Physical Examination

1. Includes subtle evaluation of normal stance of the digits in both flexion and extension
2. Active motion tests indicate lack of motion in affected digit
3. Partial lacerations can be present with pain with resisted motion
4. Sensibility should be assessed via light touch, two-point discrimination, etc.

D. Diagnostic Tests and Examinations

1. Radiograph of digit
2. Sensibility tests

E. Outpatient, Nonsurgical Treatment (Closed Extensor Tendon Injuries)

1. Neutral position using intrinsic plus splint
2. Digital splint
3. Buddy taping

F. Nonsurgical Rehabilitation

1. Begins after tendon heals
2. Active and passive range of motion of digits, hand, and wrist
3. Grip strengthening exercises as appropriate

G. Surgical Treatment

1. Indications

a. All open flexor or extensor tendon injuries with open wounds and limited motion

b. Open injuries with pain with motion

c. All expectant tendon injuries (flexor/extensor)

d. Closed flexor tendon injuries

e. Failure to respond to nonoperative treatment and rehabilitation after appropriate time to heal (including active/passive range of motion digital exercises)

H. Estimated Duration of Care

1. Nonoperative treatment: 8-12 weeks after injury
2. Operative treatment: 3-6 *months* after injury

I. Return to Work Status

1. Nonoperative treatment: 6 weeks
2. Operative treatment: no use of hand for 3-6 weeks
3. Operative treatment: full use of injured hand in 6-12 weeks

V. DIGITAL NERVE INJURIES

A. Background

Most significant digital nerve injuries result in sensation loss distal to the injury level. Most are the result of lacerations that frequently also involve the flexor tendons. Contusions or crush injuries may disrupt nerve function without an actual physical disruption of the nerve.

B. Diagnostic Criteria

1. Medical History and Physical Examination
   a. History of trauma
   b. Laceration over the volar digital surface (palm for the common digital nerves)
   c. Absent sensibility in the distribution of the affected nerve

C. Diagnostic Tests

1. Light touch: diagnostic if deficit is in anatomic distribution consistent with the location of laceration
2. Two-point discrimination (Semmes-Weinstein)
3. Monofilament testing
4. Digital vibration
5. Sensory nerve conduction studies

D. Surgical Treatment

1. Laceration with probable nerve division: operative exploration and repair with magnification
   - Healthy nerve: end-to-end repair
   - Other: interposition nerve graft
   a. Immediate repair if suitable operative candidate
   b. Urgent repair if skin wound closed and repair delayed up to 7 days, then repaired primarily
   c. Delayed repair after 7 days if patient is unstable or graft needed
   d. After 7 days, neuroma at divided nerve ends just be resected, with additional nerve length required for closure without tension

2. Laceration With Equivocal Nerve Division

a. Exploratory surgery

- If patient at surgery for other injuries
- If wound does not need enlargement

b. Observation

- With closure of wound and reassessment in 1-3 days

3. No Laceration

a. Observe for functional return (Tinel's sign) or increase of sensibility

b. Explore if progression of Tinel's sign is not seen

E. Rehabilitation

1. Splint three weeks to maintain tension on the nerve repair, with elevation to minimize swelling

2. Range of motion exercise after 3 weeks, avoiding stretching or trauma to the nerve repair for additional 3 weeks

F. Duration of Care/Return to Work

1. Work/activities not requiring stretch or trauma to nerve repair, or sensibility to affected nerve distribution: 6-12 weeks

2. Work not requiring use of the injured digit: 6 weeks

3. Work requiring sensibility in the affected nerve distribution:

- Gross sensibility (1mm. / day, or 1 inch/month)
- Nerve regeneration beyond injury level as indicated by advancing Tinel's sign and return of sensibility
- Maximum sensibility return occurs at an approximate rate of time equal to twice that required for gross sensibility to return
  - Never returns to 100%
  - Range is zero to near 100% return
  - Maximal medical improvement at 6 months
  - If function is unsatisfactory, neuroma resection and nerve grafting may be appropriate

VI. DISTAL PHALANX/FINGER TIP INJURIES

A. Background

Injuries to the tips of digits are very common in industry, especially in the manufacturing and construction sectors. Injuries of this type include full thickness soft tissue injuries with soft tissue loss, compound fractures of the distal phalanx of an upper extremity, as well as nail bed injuries requiring repair. Injuries extending proximally to the distal interphalangeal (DIP) joint are considered elsewhere.

B. Medical History
   1. Usually result from crush type injury

C. Physical Examination and Diagnostic Testing
   1. X-rays of affected digit are usually sufficient

D. Outpatient Treatment: Nonoperative
   1. Most often provided in an emergency room setting
   2. Debridement and laceration(s) repair
   3. Fracture reduction
   4. Skin grafting (full/partial thickness)
   5. Local Flap
   6. Amputation

E. Outpatient Operative Treatment
   1. May require overnight stay
   2. Fixation of complex or intra-articular fractures
   3. Pedicle flaps

F. Inpatient Operative Treatment
   1. Sensory neurovascular island flap (rare)
   2. Replantation

G. Rehabilitation and Return to Work
   1. Elevation and protection of fracture(s)
   2. Gradual mobilization and desensitization
   3. Estimated duration of care:
      - Return to light, non-forceful, non-dexterous, nondiscriminating use of injured digit: 3-6 weeks
      - Return to forceful use of injured digit(s): 6-12 weeks
      - Grafts/flaps with decreased sensibility
   4. No use of injured hand at work: 2-6 weeks
   5. MMI at 3-6 months (longer in older patients)

VII. ULNAR COLLATERAL LIGAMENT INJURY (THUMB): SPRAIN/TEAR

A. Background

Injuries to the ulnar collateral ligament (UCL) of the thumb occur in a variety of ways, including a fall from a height, resulting in a radial deviation force to the metacarpophalangeal (MCP) joint, placing the ligament under tension. Partial or complete tear may occur, as well as avulsion of the ligament from its bony attachment (with or without fracture). Skiing and contact sports are frequently associated with this type of injury.

B. Medical History and Physical Examination
   1. Pain, swelling, and weakness are frequent complaints

2. History of a blow or fall involving the thumb (MCP joint)
3. Palpable lump at site of avulsed ligament
4. Ulnar stress instability should be documented

C. Diagnostic Tests and Examination
1. X-rays of the injured thumb are sufficient
2. MRI may be appropriate if exam equivocal

D. Outpatient Treatment
1. Nonoperative
   a. Indications
      - Incomplete ligamentous injury; not disrupted either within its substance, nor at its attachments
      - Nondisplaced fracture at the attachment of the ulnar collateral ligament
   b. Treatment options
      - Immobilization for 4-6 weeks
      - Elevation and range of motion of all uninvolved joints
      - Home health care unnecessary
   c. Rehabilitation
      - Active range of motion after cast/splint removal
      - Begin rehabilitation after exam documents healing
2. Ambulatory (outpatient) Surgery
   a. Indications
      - Significantly displaced or avulsed fracture with ligament attachment
      - Complete ligamentous disruption
      - Stenner's lesion (displacement of the UCL superficial to the adductor tendon)
      - Joint instability or subluxation
   b. Treatment options
      - Exploration with ligament reapproximation, or fracture reduction and/or fixation, with attached ligament, followed by immobilization for 4-8 weeks
      - Primary or secondary reconstruction, including joint subluxation
      - Postoperative elevation and range of motion of all uninvolved joints
   c. Rehabilitation/Return to Work
      - Operative treatment: no use of injured hand for 4-6 weeks
      - Operative treatment: full use of injured hand within 8-12 weeks
      - Nonoperative treatment: no use for 4-6 weeks

- Nonoperative treatment: full use within 8-12 weeks

VIII. DIGITAL STENOSING TENOSYNOVITIS (TRIGGER THUMB AND TRIGGER FINGER)

A. Background

Arising from irritation and inflammation of the flexor tenosynovium at the A-1 pulley of the digital flexor tendon sheath, this injury can be due to trauma during a single event, or secondary to repetitive "microtrauma" (repetitive motion), or an inflammatory process. It is frequently seen in conjunction with other upper extremity tendonopathies or inflammatory conditions, such as carpal tunnel syndrome or DeQuervain's tenosynovitis.

B. Medical History and Physical Examination

1. Most often caused by repetitive and/or forceful gripping, or use of vibrational tools
2. Gradual onset of pain and limitation of full digital flexion, with "triggering" or clicking of the digit
3. Can follow a single episode of pain accompanying forceful gripping or digit hyperextension
4. Exam shows point-specific pain/tenderness at the A-1 pulley (distal palmar crease) with/without crepitance with active motion
5. Passive arc of motion exceeds active arc
6. Palpable, sometimes audible click with flexion/extension
7. Finger swelling; morning stiffness/triggering, often diminishing during the day
8. Retinacular (ganglion) cysts may be present

C. Diagnostic Tests and Examinations

1. Hand x-rays, primarily to rule out associated arthritis or bony lesions
2. Laboratory studies to rule out/in connective tissue disease, if clinically suspected
3. MRI only if cyst or mass is clinically suspected

D. Nonoperative Treatment

1. Indications
    - Pain
    - Triggering
    - Functional limitations/disability
2. Treatment options
    - Nonsteroidal anti-inflammatory medications (NSAIDS)
    - Intermittent splinting
    - Tendon sheath steroid injections
    - Activity modification

E. Operative Treatment

1. Outpatient surgery indications
   - Lack of response to nonoperative measures after 4-10 weeks, dependent on symptom complex
2. Options
   - Release of the A-1 pulley, partial excision and partial release of A-2 pulley (proximal margin) under local, regional, or general anesthesia
   - Limited tenosynovectomy and tenolysis of flexor tendon(s)
3. Rehabilitation
   a. Progressive active range of motion, strengthening
   b. Splinting
   c. Hand therapy may be useful for scar tenderness and/or post surgical stiffness
   d. In the case of long term symptoms, postoperative splinting may be indicated to regain full extension
4. Duration of Care
   a. Nonoperative treatment: 2-4 weeks, depending on symptom complex
   b. Operative treatment: 4-8 weeks, may need postoperative splinting
5. Return to Work
   a. Nonoperative: 2-4 weeks
   b. Operative
      - No use of injured finger: 2-4 weeks
      - Use of injured finger: 4-8 weeks

PROTOCOL HISTORY:
Passed: 5/24/1994
Amended: 4/27/2010

PHARMACEUTICAL PROTOCOL

The Medical Advisory Board establishes this protocol with the intent to:

1: Raise awareness of the risk of injured workers being addicted to opiate medication
2: Reduce the dispensing of ineffective or poorly tolerated medication
3: Establish medication/dispensing guidelines for physicians, insurers and pharmacy benefit managers.

The protocol is established as follows:
1: Generic substitutes should be used as first choice.
2: If the prescribing physician is seeking the use of brand name medication after therapeutic failure of the generic equivalent, the insurer must provide a physician-physician review process. If the prescribing physician is seeking authorization for an off-label use of a medication, the insurer must offer a specialty-specific, physician to physician review process.
3: Over-the-counter medications will not be paid for unless prescribed by the prescribing physician.
4: If additional non-opiate medications are needed after three (3) months of treatment, the prescribing physician must provide a statement to the insurer substantiating the need.
5: With the exception of opiate/narcotic medications, ninety (90) day prescriptions should be utilized if the medication will more than likely be used for extended periods (i.e. permanently injured workers).
6: Injured workers may use the pharmacy of their choice.
7: Prescriptions must initially be filled as written by the prescribing physician. If the insurer contests the necessity of a prescription, a 14 day supply of the original medication must be dispensed to cover the appeals process, unless the covered substitution is immediately approved by the prescribing physician.
8: If the insurer's plan requires the use of mail-order pharmacies, the insurer must have a system in place allowing the worker to be provided with enough medication to cover them until the full prescription arrives via mail.
9: Opiate/narcotic medications, regardless of Schedule, should be prescribed for a maximum of thirty (30) days of total therapy. The physician must consider the risks of addiction and abuse regardless of the length of therapy.
10: Topical compounded prescriptions are not recommended by the Board unless the finished product (not the ingredients, either individually or collectively) has FDA approval for the indication.

PROTOCOL HISTORY
Passed: 3/21/1995
Amended: 1/9/2001
Amended: 5/21/2013
Amended: 1/26/2016

CONTACT DERMATITIS PROTOCOL

. Contact dermatitis is a broad term used to describe various abnormal reactions of the skin to the external environment. Contact dermatitis is of two types – allergic and irritant. Allergic contact dermatitis represents an immunologic response of the skin to an external allergen. Irritant refers to a reaction to a chemical substance seen in certain susceptible individuals at lower concentration than would be expected in "normal" people. Either condition can be induced by or aggravated by photic exposure.

I. DIAGNOSIS: Appropriate evaluation and diagnostic measures include the following:

a. Extensive and comprehensive history and complete examination of the skin is necessary to diagnose the nature and cause of the patient's condition.

b. Skin biopsy may be necessary if the diagnosis is unclear or if there is a question of an underlying (coincident) skin disease.

c. Bacterial and fungal cultures and limited blood evaluation may also be required.

d. Patch testing is frequently necessary to identify the offending agent.

e. On rare occasion, intradermal scratch tests to the suspected allergens may be necessary, particularly in dealing with an urticarial form of dermatitis.

II. THERAPY:

a. Removal of the patient from contact with the suspected allergen is necessary. The acute process generally persists for a period of two to four weeks.

b. Local therapy to include wet dressings, steroids, and/or emollient creams, tars, etc., are usually required.

c. Systemic therapy may be required as well (antibiotics, antifungals, steroids, etc.). A chronic disorder may require use of tar, tar baths, or local PUVA.

d. If the process persists, referral for dermatologic specialist care should be made after one month of therapeutic treatment.

III. PROGNOSIS:

a. Assuming that the patient is removed from the offending agent, the acute contact reaction usually resolves with appropriate treatment over a two to four week period, depending upon the severity and location of the condition. A chronic dermatitis may require treatment over a three to six month interval, particularly if an underlying skin disease is contributing to the problem. On rare occasion, the condition is persistent and non-responsive to the usual treatments.

IV. DISPENSATION:

a. <u>With contact allergen</u> – If the patient is found to be allergic to a specific material (at work) he-she cannot return to work requiring further contact with a specific

agent. However, the previous difficulty does not preclude work in a similar field where the specific allergen is not present.

b. With contact irritant – The patient may be able to return to his-her present job with exposure to a more dilute concentration of the offending substance or with a more protected situation (gloves, creams, hardening, etc.)

PROTOCOL HISTORY:
Passed: 3/21/1995

PROTOCOL CONCERNS REGARDING PERFORMANCE OF RADIOGRAPHIC EVALUATION IN WORKERS' COMPENSATION CASES

1. Repetition of X-rays:

A repeat examination for fracture would be considered reasonable in 7-10 days of initial radiographic examination, assuming that initial films fail to demonstrate fracture and that symptoms persisted, which suggested the possibility of occult fracture.

Alternatively, bone scan evaluation, magnetic resonance imaging, or CT imaging of the symptomatic bone could be done, which would preclude the necessity of repeating x-ray examination.

Repeat examination of a known fracture might be considered in order to assess fracture healing, angulation, or displacement which might have occurred since the initial fracture.

Repetition of radiographic examinations would not be considered within reason if done for convenience (either patient or physician convenience) or because of failure to obtain adequate history revealing that radiographs had been obtained.

2. Comparison X-Rays:

Comparison x-rays would be considered reasonable if there is, on initial radiographic examination of the affected area, a finding which may or may not represent a variation of normal.

The observed finding for which comparison views are deemed necessary must be well described in the initial report and given as a reason for obtaining comparison x-rays.

3. Contiguous Parts:

Radiographic examination for workers' compensation injury should be preceded by examination of physician, chiropractor or nurse practitioner and the examination specified by that examiner, and that examination should be limited to only those areas which are symptomatic or felt to be significant in the evaluation of patient injury.

For example: If injury has occurred to the metacarpal region of the hand, only a right hand radiographic evaluation would be considered as necessary, and right hand radiographs would be requested by the medical personnel. Interpretation and billing of right hand and right wrist radiographs, in this instance, would be considered unnecessary, as the site of suspected injury is the hand and not the wrist, and considering that the wrist is usually included in hand radiographs.

An additional example would consist of injury to the right thigh. X-rays requested for evaluation of the right femur should include both the knee and hip, but billing for right hip, right femur, and right knee would be considered improper, as only the right femur x-ray examination was requested. Continuing this example, if there was concern of right femur fracture and abnormality of the right hip, then both the right femur and right hip radiographs should be obtained, and these examinations would be considered medically necessary.

4. Regarding Health Care Professionals or Extenders
<u>Examination of Patient Prior to X-ray:</u>

It is felt that a physical examination and a history would be necessary before a proper radiographic evaluation could be requested and performed.

With regard to protocols for specific injuries:

a. Low back musculoligamentous injury –
Appropriate diagnostic tests –
If the acute injury involves trauma, radiographic examination following the traumatic event would be considered appropriate.
If the injury is not precipitated by a single traumatic event but of chronic origin, x-ray examination should be considered if pain persists for more than four weeks. If pain persists for a period of greater than four weeks, with negative plain radiograph examination, magnetic resonance imaging should be considered for further evaluation, as this imaging modality will evaluate both disc and bone.
Alternatively, CT examination will provide evaluation of disc and, to some degree, bone with nuclear medicine bone scan imaging being limited to the evaluation of metabolically active bone lesions.

b. Neck, muscular injury –
If the injury is not precipitated by a single traumatic event but of chronic origin, x-ray examination should be considered if pain persists for more than four weeks. If pain persists for a period of greater than four weeks, with negative plain radiograph examination, magnetic resonance imaging should be considered for further evaluation, as this imaging modality will evaluate both disc and bone.
Alternatively, CT examination will provide evaluation of disc and, to some degree, bone with nuclear medicine bone scan imaging being limited to the evaluation of metabolically active bone lesions.

c. Acute hand injuries –
Radiographic evaluation immediately following hand injury. Follow-up radiographic evaluation in 7-10 days, if pain persists, suggesting fracture with initial plain radiographs failing to demonstrate fracture.
With penetrating injuries that might result in tendon or ligament damage, magnetic resonance imaging might be helpful in the assessment of fracture extent.

d. Injuries to the foot –

Radiographic evaluation immediately following foot injury. Follow-up radiographic evaluation in 7-10 days, if pain persists, suggesting fracture with initial plain radiographs failing to demonstrate fracture.

With penetrating injuries that might result in tendon or ligament damage, magnetic resonance imaging might be helpful in the assessment of fracture extent.

e. Herniated lumbar disc –

See State of Rhode Island Workers' Compensation Court Medical Advisory Board Protocols for Herniated Lumbar Disc.

f. Herniated cervical disc –

See State of Rhode Island Workers' Compensation Court Medical Advisory Board Protocols for Herniated Cervical Disc.

g. Acute injuries to the shoulder –

See State of Rhode Island Workers' Compensation Court Medical Advisory Board Protocols for Acute Injuries to the Shoulder.

h. Acute injuries to the knee –

See State of Rhode Island Workers' Compensation Court Medical Advisory Board Protocols for Acute Injuries to the Knee.

PROTOCOL HISTORY:
Passed: 6/18/1996

CUBITAL TUNNEL SYNDROME

I. Background

The ulnar nerve originates from the C8 and T1 spinal nerve roots and is the terminal branch of the medial cord of the brachial plexus. The ulnar nerve travels posterior to the medial epicondyle of the humerus at the elbow and enters the cubital tunnel. After exiting the cubital tunnel, the ulnar nerve passes between the humeral and ulnar heads of the flexor carpi ulnaris muscle and continues distally to innervate the intrinsic hand musculature.

Ulnar nerve compression occurs most commonly at the elbow. At the elbow, ulnar nerve compression has been reported at five sites: the arcade of Struthers, medial intermuscular septum, medial epicondyle/post-condylar groove, cubital tunnel and deep flexor pronator aponeurosis. The most common site of entrapment is at the cubital tunnel.

Ulnar nerve compression at the elbow may have multiple causes, including:

A. chronic compression
B. local edema or inflammation
C. space-occupying lesion such as a tumor or bone spur
D. repetitive elbow flexion and extension
E. prolonged flexion of the elbow, as an habitual sleeping in the fetal position
F. in association with a metabolic disorder including diabetes mellitus.

Ulnar neuropathy at the elbow can occur at any demographic but is generally seen between 25 and 45 years of age and occurs slightly more often in women than in men.

II. Diagnostic Criteria

A. Pertinent History and Physical Findings

Patients often present with intermittent paresthesias, numbness and/or tingling in the small finger and ulnar half of the ring finger (i.e. ulnar nerve distribution). These symptoms may be more prominent after prolonged periods of elbow flexion, such as sleeping in the “fetal position”, sleeping with the arm tucked under the pillow or head, or with repetitive elbow flexion-extension activities. Subjects may progress to develop atrophy or weakness of the intrinsic hand musculature manifested as hand weakness or impaired dexterity.

Several provocative exam techniques have been validated to aid in the diagnosis of these patients. The elbow flexion test, in which the elbow is held in maximal flexion for one minute, may reproduce symptoms. Tinel’s test, in which the post-condylar groove is tapped by the examiner, may also reproduce symptoms. Patients may develop weak finger abduction secondary to interosseus muscle atrophy; weak small finger adduction may be noted (Wartenberg sign) and some patients may note that the

small finger gets caught when placing the hand inside of a pocket. Patients may also be unable to grasp with a lateral pinch grip and instead compensate with a fingertip grip (Froment sign). Severe clawing of the ring and small fingers (i.e. flexion of the interphalangeal joints with extension of the metacarpophalangeal joints) may be noted secondary to interosseus and lumbrical muscle atrophy.

Other potential causes of medial hand numbness or weakness include nerve root compression at the cervical spine, brachial plexopathy, thoracic outlet syndrome and/or ulnar nerve compression at the wrist (Shea neuropathy, including entrapment of the ulnar nerve at Guyon's canal).

B. Appropriate Diagnostic Tests and Examinations

1. Electromyographic and nerve conduction studies
2. Radiographs of the elbow
3. Magnetic resonance imaging of the elbow
4. Clinical laboratory tests to assess for potential causes of peripheral neuropathy

C. Supporting Evidence

1. Electromyographic and nerve conduction studies are particularly helpful in localizing the site of nerve compression, quantifying the degree of demyelination, evaluating patients with atypical symptoms, and/or assessing for alternative diagnoses. These studies may also aid in determining the prognosis for nerve and muscle recovery. Performing these studies with the elbow in flexion may increase sensitivity. Elbow radiographs may be helpful to identify osteophytes or bone fragments in patients with arthritis or prior trauma. MRI may be helpful if a space-occupying lesion is suspected, but otherwise is not routinely used. Clinical laboratory tests may help assess for potential causes of peripheral neuropathy including such as diabetes, pernicious anemia, chronic alcoholism or hypothyroidism.

III. Treatment

A. Outpatient Treatment

1. Conservative Management

i. **Indications**

1. In the absence of intrinsic muscle atrophy, four to eight weeks of conservative treatment should be attempted.

ii. **Treatment options**

1. Activity modification to avoid elbow flexion and/or reduce cubital tunnel compression, such as use of an elbow extension splint, adjusting posture at work to reduce elbow flexion, using a hands-free headset for the phone and/or padding the elbow.
2. Non-steroidal anti-inflammatory drugs may be used for analgesia.

iii. **Rehabilitation**

Exercise therapy may be utilized to improve strength, dexterity and hand function.

iv. **Supporting Evidence**

Most cases of mild or moderate cubital tunnel syndrome will improve and/or resolve with conservative management.

2. Ambulatory Surgery

i. **Indications**

1. Failure to respond to conservative treatment
2. Intrinsic muscle atrophy or weakness
3. Severe, persistent symptoms

ii. **Treatment Options –** requiring referral to an orthopedic surgeon, neurosurgeon or hand surgeon

1. Ulnar nerve release at the cubital tunnel (i.e. in situ decompression)
2. Ulnar nerve release at the cubital tunnel with subcutaneous, intramuscular or submuscular transposition of the ulnar nerve
3. Ulnar nerve release at the cubital tunnel with medial epicondylectomy
4. Endoscopic ulnar nerve release at the cubital tunnel

iii. **Rehabilitation**

Post-operative rehabilitation is often directed by the surgeon.

iv. **Supporting Evidence**

Given the similarity in outcomes reported between the surgical treatments for cubital tunnel syndrome, the choice of procedure is based largely on surgeon experience, as well as underlying etiology. Two recent meta-analyses have demonstrated similar outcomes between in situ decompression and anterior transposition (subcutaneous, intramuscular or submuscular) of the ulnar nerve with a 65% to 96% patient satisfaction rate. Patients with recurrent disease following in situ decompression may benefit from subsequent anterior transposition of the ulnar nerve. However, revision surgery outcomes are often disappointing.

B. Estimated Duration of Care

1. Non-operative treatment – maximum medical improvement should be achieved by eight weeks after diagnosis.
2. Operative treatment – eight to twelve weeks post-operatively.

PROTOCOL HISTORY:
Passed: 6/18/1996
Amended: 3/22/2011

RADIAL TUNNEL SYNDROME

I. BACKGROUND

Radial Tunnel Syndrome involves compression of the radial nerve in the proximal forearm. It is also sometimes known colloquially as "persistent tennis elbow". In the region of the proximal forearm, the radial nerve splits into the posterior interosseous nerve branch (the main trunk) and the sensory branch of the radial nerve (the minor trunk) in the proximal forearm. Compression can occur either before or after this split off of the sensory branch of the radial nerve has occurred. Multiple sites of potential entrapment of the radial nerve include: the origin of the extensor carpi radialis brevis origin; the fibrous bands overlying the radial head; the radial recurrent arterial fan; and the arcades of Frohse, at the entrance to the supinator muscle. The condition has multiple causes, including: space-occupying lesions, such as tumors; local edema or inflammation; overuse of the hand and wrist through repetitive movements; blunt trauma to the proximal forearm with secondary bleeding; and idiopathic onset. The condition can occur at any age, but is generally seen in younger individuals.

This is a rare condition, estimated to be 30-100 fold less common than carpal tunnel syndrome. As a result, it is infrequently encountered by most practitioners. With failure to respond to non-operative treatment, the patient should be referred to a surgeon who has had experience in the treatment of radial tunnel syndrome.

II. DIAGNOSTIC CRITERIA

A. Pertinent Historical and Physical Findings

Patients generally complain of a deep-seated aching or tightness in the proximal forearm, over the mobile wad of Henry muscle mass. Patients can occasionally experience paresthesias and numbness and tingling in the distribution of the sensory branch of the radial nerve (the dorsal first web space of the hand including the back of the thumb and back of index finger).

Patients frequently have symptoms after significant repetitive or power grip use of the involved upper extremity. Burning or pain can also be associated with the condition, and should be related to the proximal forearm, specifically over the mobile wad of Henry muscle mass. Strength in the hand is generally not reduced. Patients can have pain with resisted wrist extension or resisted extension of the middle finger, with pain being noted in the proximal forearm during these maneuvers. A Tinel's sign is rarely seen over the nerve itself.

Patients most commonly have a positive radial tunnel compression test (involving the examiner rolling the fingers over the radial nerve region in the proximal forearm, eliciting pain and tenderness in the area palpated). Occasionally, distal radiation of symptoms along the sensory branch of the radial nerve distribution will occur during this test.

B. Appropriate Diagnostic Tests and Examinations

1. Radiographs of the forearm
2. Electromyogram and nerve conduction studies.
3. Trial injection of Xylocaine around the radial nerve to see if symptoms resolve.
4. MRI scan of the forearm

C. Supporting Evidence

EMG/nerve conduction tests can be helpful if positive, but are most frequently negative in this particular condition, and can be difficult to obtain. The nerve conduction velocity component is rarely positive, and diagnosis is generally made on the electromyographic component, showing changes in the muscle innervated by the posterior interosseous nerve.

MRI may show denervation, edema, or atrophy in muscles innervated by the posterior interosseous nerve, but sensitivity is approximately 50% for these findings.

III. TREATMENT

A. Outpatient Treatment

1. Nonoperative treatment – treatment time is generally limited to three to six weeks, provided all appropriate conservative measures have been assessed.
   a. Indications
      1) Mild to moderate symptoms
      2) Persistent symptoms after significant repetitive activities (supination of the forearm with/without wrist extension) of the affected upper extremity
   b. Treatment Options
      1) Neutral position wrist splint for periodic daytime use
      2) Steroid injection
      3) Nonsteroidal anti-inflammatory medications
      4) Activity modification
   c. Rehabilitation
      1) Modification of activities of daily living and/or job tasks
      2) Ultrasound over the mobile wad of Henry
2. Ambulatory Surgery
   a. Indications
      1) Failure to respond to nonoperative treatment
      2) Loss of wrist or finger extensors, or significant weakness in this distribution
      3) Progressive or unchanged symptoms
   b. Treatment Options
      1) Neurolysis of the radial and posterior interosseous nerves under regional or general anesthesia

c. Rehabilitation

1) Range of motion and strengthening exercises of the fingers, wrist, and elbow

B. Estimated Duration of Care

1. Nonoperative treatment – maximum medical improvement
2. Operative treatment – six to eight weeks following surgery

PROTOCOL HISTORY:
Passed: 6/18/1996
Amended: 1/31/2012

SPINAL COLUMN STIMULATORS

I. BACKGROUND

The Spinal Column Stimulator (SCS) is a device that allows for electrical stimulation of the dorsal aspect of the spinal cord in an effort to relieve pain. Stimulation in this area interferes with the conduction of pain impulses through adjacent sensory pathways. The technique does not alter the underlying pathological process. However, in carefully selective patients with persistent, intractable pain of nerve origin, roughly half realize pain relief, thereby decreasing the need for analgesic medication and, at times, obviating the need for further procedures.

II. PROCEDURE

The SCS system consists of stimulation lead(s) (which deliver(s) electrical stimulation to the spinal cord); an extension wire (which conducts electrical pulses from the power source to the lead); and a power source (which generates electrical pulses). One or more epidural electrodes are inserted into the spinal canal over the dorsal aspect of the spinal cord. The locus of the electrode placement – cervical, thoracic or lumbar – is dependent on the location of the patient's pain. The electrode is usually placed by a percutaneous technique but, on occasion (usually in a post-surgical patient), surgical placement (laminotomy) is required.

SCS is a reversible therapy that can be tested for pain relief effectiveness before the patient receives a permanent implant. The procedure is performed in two stages. First, during the trial stage, the electrode is implanted, with a wire located outside of the body. The trial usually lasts from three to five days and, if successful in relieving pain, permanent placement of the SCS is performed. The procedures are generally safe but, on occasion, local or epidural infection occurs.

III. APPROPRIATE CONDITIONS FOR SCS PLACEMENT

A. In approximately 75% of cases, the "failed back syndrome", with persistent, intractable disabling pain of neural origin (perineural fibrosis, arachnoiditis, etc.) despite medical, surgical, or other appropriate therapies.

B. In five to ten percent of cases, chronic and intractable pain following spinal cord surgery.

C. The remainder of cases consists of nerve disorders/injuries, such as chronic regional pain syndrome (CRPS, formerly known as reflex sympathetic dystrophy), post-amputation (phantom limb) pain, and post-herpetic neuralgia; wherein there has been a failure to respond to generally acceptable alternative therapeutic modalities.

IV. SCS PATIENT SELECTION CRITERIA

A. SCS stimulation shall be provided after an assessment by a multidisciplinary team experienced in chronic pain assessment and management of people with spinal cord stimulation devices, including experience in the provision of ongoing monitoring and support of the assessed patient. At a minimum, implantation treatment is limited to physicians with training and experience in the field of pain management, as well as in SCS use.

B. SCS implantation is restricted to those patients with an organic basis for neurogenic pain, for whom conventional medical, surgical or other therapeutic as well as behavioral modalities and therapies have been unsuccessful in providing adequate pain relief. The patient's condition must have been previously evaluated by two prior consultants (neurosurgeon, neurologist, physiatrist, or orthopedic surgeon).

C. Patients must have been evaluated by a psychiatrist/psychologist with specific experience in the evaluation of chronic pain problems.

D. A satisfactory response to a trial of SCS, with the temporary insertion of an electrode, is required prior to permanent SCS placement.

V. SCS IMPLANTATION CONTRAINDICATIONS

A. Patients with significant drug-seeking behavior, including substantial drug and alcohol abuse.

B. Patients with substantial psychological instability, psychosis, etc., need to be carefully evaluated and, if appropriate, excluded.

C. Patients in whom the possibility of secondary gain (compensation, litigation, etc.) plays a significant role, need to be carefully evaluated and, if appropriate, excluded.

D. Patients requiring chronic anticoagulant treatment.

PROTOCOL HISTORY:
Passed: 6/9/1998
Amended: 4/27/2010

ANTERIOR CRUCIATE RUPTURES

I. Acute Ruptures of the Anterior Cruciate Ligament

There is a history of direct trauma to the knee of the patient or of an injury involving torsional or angular forces.

The Protocol for the management of acute injuries to the knee notes two separate sets of circumstances which require orthopaedic referral and, namely, these are "clinical evidence of gross ligamentous instability" and "the initial presence of a tense hemarthrosis or the development of a recurrent hemarthrosis." These are diagnostic features of acute ruptures of the anterior cruciate ligament.

A. Diagnostic Tests

1. Plain x-rays to rule out associated fractures.
2. MRI – to confirm the diagnosis and/or to determine associated meniscal or ligamentous pathology.
3. Diagnostic/Therapeutic arthroscopy – to confirm the diagnosis and/or to provide initial or definitive treatment.

B. Outpatient Nonoperative Treatment

1. Aspirate knee
2. Analgesics
3. Compression dressing, ice application, immobilizer splint
4. Partial to full weight-bearing as tolerated
5. Physical therapy – initially a period of range of motion exercises followed by a progressive resistive exercise program
6. Question long-term bracing

Duration of this treatment program is 4 to 6 months

Probable outcome – clinical recovery with residual permanent partial impairment of function which may be mild (3%, 7%), moderate (7%, 17%), or severe (10%, 25%)

C. Outpatient Operative Treatment

1. One to four as above with an operative arthroscopy and debridement followed by five and six

Duration of treatment – 6-month minimum

Probably outcome – probably clinical recovery with residual impairment which may be mild (3%, 7%), moderate (7%, 17%) or severe (10%, 25%)

D. Inpatient Operative Treatment

1. Treatment measures as above followed by an open arthrotomy or arthroscopy with reconstruction of the anterior cruciate ligament
2. Surgical procedure followed by a period of total and then partial immobilization followed by a rehabilitative physical therapy program
3 Duration of treatment – 6-month minimum from the date of the surgical procedure

Anticipated outcome – clinical recovery with residual permanent partial impairment which may be mild (3%, 7%), or moderate (7%, 17%), or severe (10%, 25%).

II. Chronic Rupture of the Anterior Cruciate Ligament

Clinical features include a history of remote injury from which full recovery never occurred for which surgical treatment was either not done or was not successful. History of recurrent effusions and/or demonstrable instability with likelihood of secondary traumatic arthritic changes.

Nonoperative and operative options similar to those outlined for acute ruptures.

PROTOCOL HISTORY:
Passed: 6/9/1998
Amended: 3/22/2011

HEARING LOSS PROTOCOL

I. INTRODUCTION

Hearing loss related to injury sustained in the workplace is of two general types:

1) Acuity hearing loss related to a single event – usually trauma (ex: in association with a basal skull fracture) or by other mechanism.

2) Occupational hearing disorder, generally related to chronic exposure to excessive noise in the workplace, resulting in nerve(s) injury. This condition is usually bilateral and is almost always less than total. Occupational hearing loss is generally a loss in the 4,000-6,000 Hz range; however, it can, at times, affect the lower frequencies.

II. DETERMINATION OF THE EXTENT OF AND THE CAUSE(S) OF HEARING LOSS FOR THE PURPOSE OF COMPENSATION FOR THE INJURY(IES) SUSTAINED

1) The patient will be examined by a Board Certified Otolaryngologist to determine the cause(s) of the hearing loss and the extent of that loss. The physician will determine if hearing loss has occurred as well as the extent of the loss in each ear. The physician will determine the relationship of the hearing loss to the workplace injury and will determine, if possible, the coexistence of other processes that may have antedated the injury(ies) in the workplace.

2) An Audiometric Study will be performed after maximum rehabilitation has been achieved and when the impairment is judged to be stable (neither improvement nor progression). Audiometric Testing for the purpose of determining the degree of hearing impairment will not be performed before 4 to 6 weeks following acoustic injury.

3) Testing will be performed without the use of prosthetic devices (Hearing Aids).

4) Audiometric Testing will be performed by a Certified Audiologist or Board Certified Otolaryngologist. Decibels of hearing loss will be determined (for each ear) as frequencies (measured in cycles/sec-Hz) of 500, 1,000, 2,000, 3,000, 4,000, and 6,000 Hz.

III. HEARING LOSS AT A LEVEL 3,000 Hz. OR LESS

a) Evaluation of Monaural Hearing Impairment: If the average of the hearing levels at 500, 1,000, 2,000 and 3,000 Hz. is 25 decibels or less, according to ANSI Standards, no impairment is considered to exist in the ability to hear everyday sounds under everyday listening conditions (See Table I).

At the other extreme, if the average of the hearing levels at 500, 1,000, 2,000 and 3,000 Hz is over 91.7 decibels, the impairment of hearing everyday speech is considered to be "total" – that is 100%. Variable degress of monaural hearing loss will be determined by computation (see Table I – in JAMA – "Guides to the Evaluation of Permanent Impairment"). **

b) Evaluation of Binaural Hearing Impairment: The evaluation of Binaural Hearing Impairment in adults is also derived from the pure tone audiogram and is always based on the function of both ears.

Binaural impairment is determined by the following formula (See "Guides"). Percent of hearing impairment equals five times the percent of hearing impairment in the better ear "+" percent of hearing impairment in the poorer ear divided by six (See Table 2 of the "Guides"). To convert binaural hearing impairment to impairment of the whole person, one would utilize Table 3 of the "Guides".

IV. HEARING LOSS AT A LEVEL GREATER THAN 3,000 Hz

Hearing loss at a level greater than 3,000 Hz generally does not affect the workers' ability to function in the workplace (speech, telephone, etc.). Therefore, hearing loss at this level is not addressed in the AMA Guides to the Evaluation of Permanent Impairment. These losses should be classified by a Board Certified Otolaryngologist or Certified Audiologist as mild, moderate, severe or profound.

** Information concerning the mechanism of determination of extent of hearing loss in relationship to workplace injury has been derived from information provided by the JAMA Guides to the Evaluation of Permanent Impairment of Hearing (Pages 922-925 in section labeled Ear, Nose, and Throat and related structures).

PROTOCOL HISTORY:
Passed: 6/29/2000

INITIAL VOCATIONAL ASSESSMENT PROTOCOL GUIDELINES

The purpose of the Initial Vocational Assessment Protocol is to establish standard practices for a vocational assessment through the application of consistent procedures including the Hierarchy of Vocational Rehabilitation as defined in Appendix A. The goal of a vocational assessment is to objectively measure an injured worker's employability to identify realistic return to work opportunities and to develop appropriate vocational recommendations based on the individual's functional status, education, and vocational background and transferable skills. Progression in the Hierarchy of Vocational Rehabilitation is a sequential process based on the injured worker's functional status, transferable skills, and established average weekly wage. It is presumed that each level of the hierarchy will be addressed when establishing vocational recommendations.

1. An Initial Vocational Assessment must be provided by a Qualified Rehabilitation Counselor (QRC) certified by the RI Department of Labor and Training per Section 28-33-41(h) of the Rhode Island Workers' Compensation Act.

2. The initial interview may be conducted at a mutually agreeable meeting place.

3. The referral source will provide claimant-identifying data, medical records, including functional capacities, if available, as they pertain to the work-related injury, purpose of referral and special instructions, if any.

4. During the initial interview, the rehabilitation counselor should gather all relevant information to include, but not be limited to; current medical status, educational history, specialized training, military experience, vocational history, including job duties and wages, interests, and hobbies. The Hierarchy of Vocational Rehabilitation will be explained to the injured worker at the time of the initial interview. One meeting with the claimant will be allowed to complete the Initial Vocational Assessment.

5. A Transferable Skills Analysis should be completed provided that defined functional capacities are identified in the medical records and a return to work with the employer, to the original job (with or without modifications) has been ruled out. The Transferable Skills Analysis will be based on the following U.S. Department of Labor publications: Dictionary of Occupational Titles (DOT), Guide for Occupational Exploration (GOE), Selected Characteristics of Occupations defined in the dictionary of Occupational Titles (SOC), 6th Edition of the Transitional Classification of Jobs (TCOJ), Occupational Information System (OIS), and the Occupational Information Network (O*NET). Software programs based on these publications/references (SkillTran; OASYS) will be considered acceptable resources for completing the analysis.

6. Testing is not considered part of the Initial Vocational Assessment, but may be included as a recommendation.

7. The initial Vocational Assessment Report will address the following:

a. Purpose of the referral.

b. Brief summary of claimant's medical history and current status, description of functional limitations and abilities, and any pending medical treatment.

c. Claimant's education, specialized training and military experience.

d. Claimant's vocational history, including wages and length of employment. DOT, OIS and/or O*NET numbers should accompany job titles held.

e. Results of the Transferable Skills Analysis, if completed.

f. Identification of assets and barriers as they relate to continued vocational rehabilitation services.

g. The Hierarchy of Vocational Rehabilitation will be considered in establishing recommendations.

h. Impressions and Recommendations section(s) will conclude report.

8. The Initial Vocational Assessment report will be submitted within two (2) weeks of the initial interview.

PROTOCOL HISTORY:
Passed: 5/29/2001
Amended: 11/3/2015

APPENDIX A

HIERARCHY OF VOCATIONAL REHABILITATION

Vocational rehabilitation is provided in a hierarchy of services, in the following order.

1. **Return to work, same employer, same job –**
vocational services may include a job analysis and coordination to return to work with the employer, but usually no vocational services provided.

2. **Return to work, same employer, different job –**
work with the employer to identify a new position that would fit the restrictions or modifications needed by the injured worker.

3. **Return to work, different employer, same job –**
vocational services would assist in job development and placement.

4. **Return to work, different employer, different job –**
vocational services may consist of performing a transferable skills analysis, interest testing, aptitude testing, job development and job placement.

5. **On-the-job training –**
identify a new employer that can train the injured worker on the job. This program can last between 3 months and 6 months.

6. **Skills enhancement –**
vocational services may identify a course to develop a skill prior to a job search. This does not consist of a full retraining program.

7. **Retraining –**
vocational assessment identifies that the above options are not feasible and then identifies a retraining program. The training program can range from a short-term certificate program to an associate's degree program. A vocational rehabilitation plan that proposes retraining must include aptitude testing, interest testing, educational-achievement testing, a transferable skills analysis, labor market research and evidence of vocational exploration to support a training program.

PROTOCOL HISTORY:
Passed: 5/29/2001
Amended: 6/16/2015

OCCUPATIONAL HEARING IMPAIRMENT TREATMENT PROTOCOL

This Protocol addresses the treatment of hearing impairment that has been established as "work-related" by a Board Certified Otorhinolaryngologist. Hearing impairment may be related to a single event, such as trauma or a basal skull fracture, or it may be related to exposure to excessive noise in the workplace.

DEGREES OF HEARING LOSS

0 to 25 dB	-	Normal
25 to 45 dB	-	Mild
45 to 60 dB	-	Moderate
60 to 75 dB	-	Moderately Severe
75 to 90 dB	-	Severe
Over 90 dB	-	Profound

Reference should be made to the OSHA table for age-related hearing loss, data from which is attached hereto and made a part of this Protocol.

I. TREATMENT OPTIONS

A. A trial of aural rehabilitation, if indicated, usually in cases of mild loss if recommended by the otorhinolaryngologist.

B. A hearing aid may be prescribed for occupational hearing impairment related to exposure to excessive noise in the workplace as determined by an otorhinolaryngologist. The need for such will be determined by an otorhinolaryngologist, who has provided the testing and indicated that the loss is work-related and sufficient to require the use of a hearing aid. This hearing aid may be provided by an otolaryngologist.

C. A hearing aid may be prescribed for a monaural hearing loss, if recommended by an otorhinolaryngologist.

II. TYPES OF HEARING AIDS TO BE CONSIDERED

A. BTE (Behind the ear)

B. CIC (Completely in ear canal) This is only helpful in mild to moderate hearing loss and not in smaller angular canals.

C. ITC (In the canal) This is stronger than the CIC.

D. ITE (Inside the ear) This device is easier to adjust the volume.

III. HEARING AID CIRCUITRY

A. Analog, is basic and the oldest type.
B. Programmable
C. Digital, which is state of the art
D. Disposable hearing aids are not acceptable treatment
E. Average life expectancy of a hearing aid is five (5) years.

IV. SURGERY

A. Cochlear implants; used in patients with hearing loss so extreme that the best hearing aid would have no effect
B. Reconstructive surgery, for either traumatic abnormalities to the external ear canal, tympanic membrane, or middle ear
C. A second opinion is required before surgical intervention may be performed.

Example of Age Correction; Text From:

9782 Federal Register / Vol. 48, No. 46 / Tuesday, March 8, 1983 / Rules and Regulations

	Frequency (Hz)				
	1000	2000	3000	4000	5000
Age 32	6	5	7	10	14
Age 27	5	4	6	7	11
Difference	1	1	1	3	3

The difference represents the amount of hearing loss that may be attributed to aging in the time period between the baseline audiogram and the most recent audiogram. In this example, the difference at 4000 Hz is 3 dB. This value is subtracted from the hearing level at 4000 Hz, which in the most recent audiogram is 25, yielding 22 after adjustment. Then the hearing threshold in the baseline audiogram at 4000 Hz (5) is subtracted from the adjusted annual audiogram hearing threshold at 4000 Hz (22). Thus the age-corrected threshold shift would be 17 dB (as opposed to a threshold shift of 20 dB without age correction.)

Table F-1 – Age Correction Values In Decibels for Males

Years	Audiometric Test Frequencies (Hz) 1000	2000	3000	4000	6000
20 or younger	5	3	4	5	8
21	5	3	4	5	8
22	5	3	4	5	8
23	5	3	4	6	9
24	5	3	5	6	9
25	5	3	5	7	10
26	5	4	5	7	10
27	5	4	6	7	11
28	6	4	6	8	11
29	6	4	6	8	12
30	6	4	6	9	12
31	6	4	7	9	13
32	6	5	7	10	14
33	6	5	7	10	14
34	6	5	8	11	15
35	7	5	8	11	15
36	7	5	9	12	16
37	7	6	9	12	17
38	7	6	9	13	17
39	7	6	10	14	18
40	7	6	10	14	19
41	7	6	10	14	20
42	8	7	11	16	20
43	8	7	12	16	21
44	8	7	12	17	22
45	8	7	13	18	23
46	8	8	13	19	24
47	8	8	14	19	24
48	9	8	14	20	25
49	9	9	15	21	26
50	9	9	16	22	27
51	9	9	16	23	28
52	9	10	17	24	29
53	9	10	18	25	30
54	10	10	18	26	31
55	10	11	19	27	32
56	10	11	20	28	34
57	10	11	21	29	35
58	10	12	22	31	36
59	11	12	22	32	37
60 or older	11	13	23	33	38

Table F-2 – Age Correction Values in Decibels for Females

Years	Audiometric Test Frequencies (Hz) 1000	2000	3000	4000	6000
20 or younger	7	4	3	3	6
21	7	4	4	3	6
22	7	4	4	4	6
23	7	5	4	4	7
24	7	5	4	4	7
25	8	5	4	4	7
26	8	5	5	4	8
27	8	5	5	5	8
28	8	5	5	5	8
29	8	5	5	5	9
30	8	6	5	5	9
31	8	6	6	5	9
32	9	6	6	6	10
33	9	6	6	6	10
34	9	6	6	6	10
35	9	6	7	7	11
36	9	7	7	7	11
37	9	7	7	7	12
38	10	7	7	7	12
39	10	7	8	8	12
40	10	7	8	8	13
41	10	8	8	8	13
42	10	8	9	9	13
43	11	8	9	9	14
44	11	8	9	9	14
45	11	8	10	10	15
46	11	9	10	10	15
47	11	9	10	11	16
48	12	9	11	11	16
49	12	9	11	11	16
50	12	10	11	12	17
51	12	10	12	12	17
52	12	10	12	13	18
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9782 Federal Register / Vol. 48, No. 46 / Tuesday, March 8, 1983 / Rules and Regulations

PROTOCOL HISTORY:
Passed: 5/29/2001

DIAGNOSIS AND INITIAL TREATMENT OF OCCUPATIONAL ASTHMA

I. BACKGROUND

A. Asthma is an airways disease of the lungs characterized by the following:

1. Airway inflammation
2. Increased airway responsiveness to a variety of stimuli; and
3. Airway obstruction that is partially or completely reversible, either spontaneously or with treatment.

The two essential *clinical* elements for the diagnosis of asthma are airways obstruction which is partially or totally reversible with treatment, and/or airways hyperreactivity. *Occupational asthma* is asthma that has its onset in association with workplace exposure(s). *Occupationally-aggravated asthma* is asthma that is aggravated by workplace exposure(s).

B. Causative agents are classified as sensitizers (including but not limited to the appended list) or irritants. Sensitizers cause inflammation through one or more immunologic mechanisms, whereas irritants directly inflame the airway. Occupational environments are often complex, and it may be difficult to identify a single specific causal agent.

C. A delay in diagnosis resulting in continued exposure of the worker to even minute amounts of sensitizers can lead to permanent and irreversible airways disease or *death*.

D. An acute high level inhalation exposure to an irritant may result in a permanent asthmatic condition known as Reactive Airways Dysfunction Syndrome (RADS).

E. This guideline is meant to cover the majority of tests and treatments that may be used to diagnose and initially stabilize occupational and occupationally-aggravated asthma. This guideline does not include parameters of care for long term management of either occupational or occupationally-aggravated asthma. It is expected that approximately 10% of cases will fall outside this guideline and require review on a case-by-case basis.

II. Criteria for Diagnosis:

A. Diagnosis of Occupational Asthma

1. Diagnosis of asthma within these guidelines by a medical doctor, using the appended algorithm
2. Historical association between the onset of asthma and work,

AND

3. At least one of the following criteria:

a. Documentation (see Occupational History, Section III.B) of workplace exposure to a category of agents or processes associated with asthma;

b. Work-related change in FEV1 or in peak expiratory flow (PEF);

c. Onset of respiratory signs and/or symptoms within hours after an acute high level occupational inhalation exposure to an irritant (RADS)

B. Diagnosis of Occupationally-Aggravated Asthma: There must be a history of asthma prior to the occupational exposure in question. Other diagnostic criteria are the same as for new onset occupational asthma.

III. Medical Diagnosis and Initial Stabilization:

Physician Visits Allowed. The number of physician visits needed to diagnose and stabilize cases of occupational and occupationally-aggravated asthma is likely to vary from patient to patient. Physicans must use their judgment to determine the number of physician visits necessary for diagnosis and initial stabilization.

IV. Establishing the Diagnosis:

A. Medical History:

1. Characteristic symptoms: wheeze, cough, chest tightness, shortness of breath
2. Past respiratory history: prior diagnosis of asthma, allergies, eczema, rhinitis, bronchitis, sinusitis, hayfever, chest colds, and respiratory symptoms upon exertion, exposure to minor irritants, or exposure to cold air
3. Review of systems: history of other diseases with symptoms that could mimic or precipitate asthma; e.g., cardiovascular disease with left ventricular dysfunction; gastroesophageal reflux
4. Family history: asthma, atopy
5. Smoking history: average # packs of cigarettes per day x # years smoked (pack years of smoking)
6. List of current medications
7. Home, hobby, and environmental exposure history to exclude other causal or contributing factors

B. Occupational History:

1. Description of the patient's work tasks, exposures and related processes, both past and present
2. Effect(s) of workplace exposures on respiratory symptoms, with emphasis on temporal associations. Note whether symptoms change on weekends and/or vacation.

3. Documentation of workplace exposures where possible: e.g., Material Safety Data Sheets (MSDS); employer records; industrial hygiene monitoring data from government agencies or private consultants

4. Where data for characterizing exposures is inadequate, worksite evaluation by an appropriate health care provider or industrial hygienist may be necessary and is encouraged.

C. Physical Examination:

1. Examination of head for rhinitis, nasal polyps, conjunctivitis, and sinusitis

2. Chest percussion and auscultation

3. Cardiovascular exam to rule out cardiogenic explanation for respiratory symptoms

4. Skin exam for atopic dermatitis

D. Diagnostic Tests Allowed:

1. A total of 11 spirometry *studies* is allowed. For purposes of this guideline, each *study* shall consist of a minimum of 3 and a maximum of 8 *maneuvers*, with at least the initial study pre- and post-inhaled bronchodilator.

a. Up to 2 follow-up spirometry studies will be allowed to establish a diagnosis of asthma.

b. Up to 8 pre- and post-shift spirometry studies will be allowed at the beginning and end of each work week for 2 weeks.

c. When PEF diary and spirometric monitoring are equivocal, a longer absence from work may be needed to establish or rule out the diagnosis, with

(i) 1 repeat spirometry study allowed at the beginning of the absence from work and 1 repeat spirometry study allowed at the end of the absence from work, and

(ii) the PEF diary monitoring repeated.

2. One Non-Specific Inhalation Challenge Test Allowed:

If there is no significant improvement in FEV1 in response to inhaled bronchodilator, and *if* the existence of airways hyperreactivity remains in question (see appended algorithm), but *only* when:

a. Consistent with this guideline's Appended Algorithm, and

b. Under supervision of a medical doctor experienced in this type of procedure.

3. Ten Specific Skin Tests with relevant antigens allowed, but *only* when:

a. Performed by a medical doctor experienced in this type of procedure, and

b. In a hospital-based outpatient setting.

WARNING: SKIN TESTS ARE NON-EMERGENT PROCEDURES, WITH SIGNIFICANT RISK OF SEVERE REACTION, INCLUDING DEATH.

4. Chest radiograph – 1 postero-anterior and 1 lateral view allowed

5. Latex and laboratory animal dander RAST test(s) for specific work-related exposure – 1 allowed for each antigen.

V. Initial Treatment Program:

A. Prevention of further exposure to causal or precipitating agent(s):

1. When caused by a sensitizing agent, all further exposure to the causal agent must be eliminated because of the increased risk for irreversible airways obstruction, severe bronchospasm and/or *death*. A statement of the physician's discussion of these and other risks with the patient must be documented in the medical record.

2. When caused by an irritant, elimination of exposure is desirable but significant reduction of exposure may be sufficient.

3. When elimination of exposure is not possible, alternative approaches may include, in order of preference:

a. Engineering controls such as local exhaust ventilation

b. Appropriate use of respiratory protection provided by the employer

B. Where these approaches fail and the clinical condition warrants, removal of the workers from the workplace may be necessary.

C. Medications:

1. Medications should only be used in conjunction with prevention of further exposure as outlined in Section V. A. above.

2. Spirometric testing is allowed as needed to monitor effectiveness of therapy, not to exceed a maximum of 11 spirometry studies allowed in Section IV. D. above. Due to its unique nature, Occupational Asthma often requires a more aggressive therapeutic approach than Non-Occupational Asthma. The recommended therapeutic approach is as follows:

a. Step 1: Rapid-onset *B*-agonist as needed for control of symptoms of asthma occurring less than three times per week. If this fails, then:

b. Step 2: Inhaled low-to- medium dose corticosteroids to treat underlying inflammation, combined with a rapid-onset inhaled *B*-agonist as needed to control symptoms of asthma. If this fails, then:

c. Step 3: Increase inhaled corticosteroids to high dose, plus long-acting inhaled *B*-agonist, and/or theophylline with continued use of rapid-onset inhaled *B*-agonist as needed to control symptoms of asthma. If this fails, then:

d. Step 4: Add an oral corticosteroid.

D. Patient Education (The following shall be discussed with the patient at the initial physician visit and repeated thereafter as necessary):

1. Key points about signs and symptoms of asthma and characteristic airway changes in asthma.
2. Asthma triggers and how to avoid them.
3. How medications work and their potential adverse effects; instruction and demonstration in the correct use of all medications (e.g., proper use of MDIs).
4. Techniques of monitoring status of asthma, such as PEF readings.
5. Indications for emergency care.

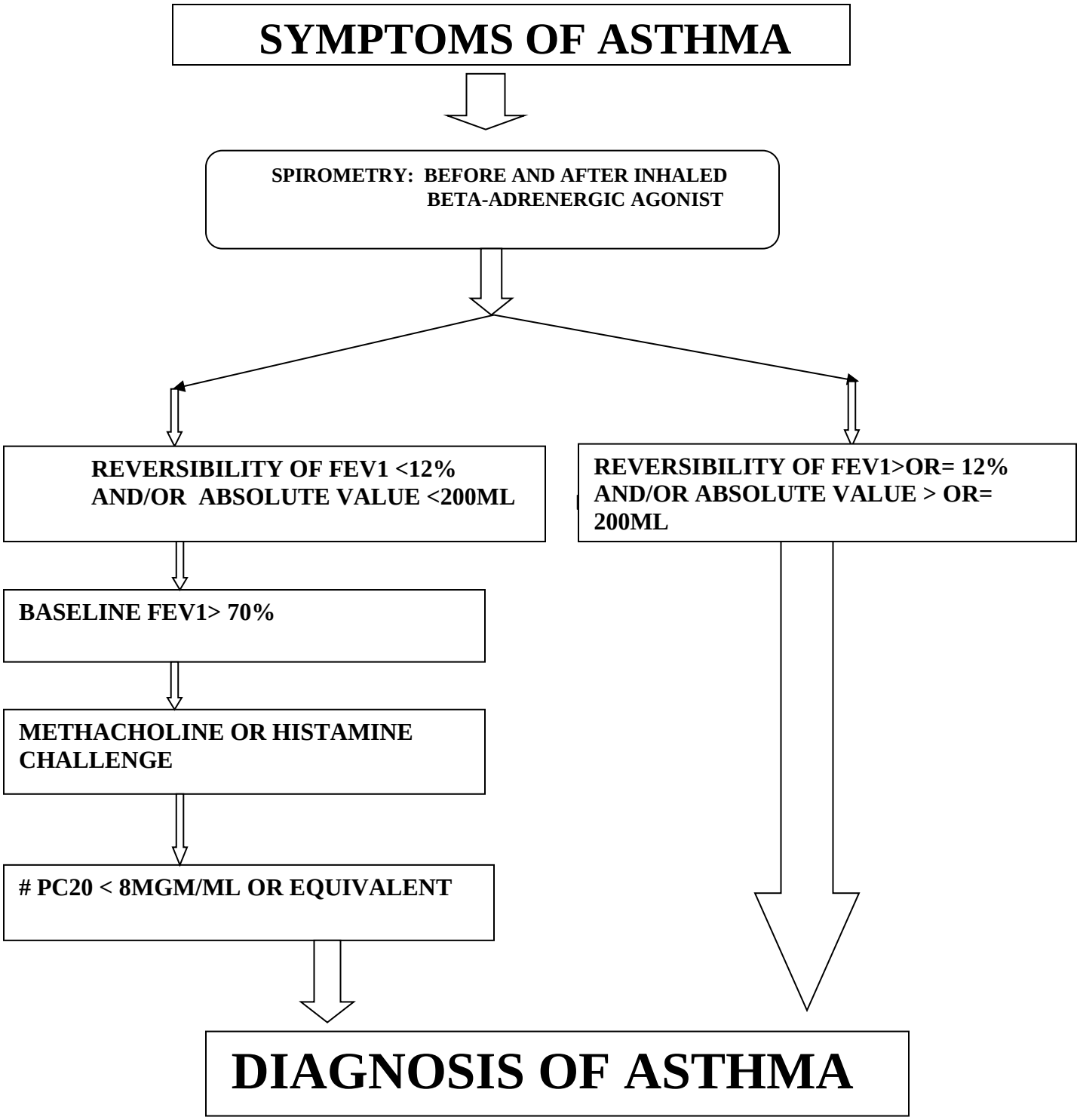
VI. Discharge Plan:

A. Future medical care will depend upon the outcome of initial medical management. This guideline is meant to address only the diagnosis and initial stabilization of occupational and occupationally-aggravated asthma.

B. If causal or aggravating exposure is eliminated or reduced and asthma symptoms resolve without medication, no further medical management is needed. If symptoms have resolved with medication, a period of medical follow-up will be needed to determine the necessity for continued medication and to establish an effective maintenance regimen. Practitioners should consult other guidelines, practice parameters and/or standards of care for guidance in the long-term management of persistent symptoms of asthma.

PROTOCOL HISTORY:
Passed: 4/20/2004
Revised: 1/31/2011

DIAGNOSIS OF ASTHMA ALGORITHM



Note: FEV1 improvement after steroid trial may suggest asthma; however, other pulmonary etiologies also may result in similar effect and improvement in pulmonary function. From a diagnostic standpoint, therefore, a positive response is not necessarily diagnostic of asthma.

OCCUPATIONAL ASTHMA CAUSING AGENTS:

*List of Known Sensitizers as of 6/5/97**

Organic Chemicals

Acrylates

Methyl methacrylate, cyanoacrylates
Ethylcyanoacrylate ester
Plexiglass

Alcohols

Furfuryl alcohol (furan based resin)
Alkylarul polyether alcohol, polypropylene glycol
(combination)

Aldehydes

Formaldehyde
Glutaraldehyde
Urea formaldehyde

Aliphatic Amines:

Ethylene diamine
Hexamethylene tetramine
Triethylene tetramine

Aliphatic Amines: Ethanolamines

Monoethanolamine
Aminoethylethanolamine
Dimethylethanolamine

Anhydrides

Phthalic anhydride
Trimellitic anhydride
Tetrachlorophthalic anhydride
Pyromellitic dianhydride
Methyl tetrahydrophthalic anhydride
Himic anhydride

Amines, Aliphatic: Other

3-(Dimethylamino)-propylamine

Amines, Heterocyclic

Piperazine hydrochloride
N-methylmorpholine

Amines: Other

Chloramine T

Aromatic Hydrocarbons, NOS

Styrene

Azo Compounds

Azodicarbonamide
Diazonium salt
Azobisformamide

Chlorinated Compounds

Chlorhexidine

Fluorinated Compounds

Freon

Isocyanates

Toluene Diisocyanate
Diphenylmethane diisocyanate
1,5 Naphthylene diisocyanate
Isophorone diisocyanate
TDI, MDI, HDI, PPI (combination)
TDI, MDI, HDI (combination)
TDI, MDI (combination)

Phenols

Hexachlorophene

Polymers

Latex, synthetic
Polyvinyl chloride (fumes or powder)

Sulphonates

Iso-nonanyl oxybenzene sulphonate

Inorganic Chemicals

Metals

Aluminum
Chromium and Nickel (combination)
Cobalt and Nickel
Platinum
Nickel
Zinc fumes
Tungsten carbide
Chromium

Nonmetallic Elements

Fluorine

Miscellaneous Chemicals

Pharmaceuticals

Penicillins and Ampicillin
Penicillamine
Cephalosporins
Phenylglycine acid chloride
Psyllium
Methyl dopa
Spiramycin
Salbutamol intermediate
Amprolium
Tetracycline
Isonicotinic acid hydrazide
Hydralazine
Tylosin tartrate
Ipecacuanha
Cimetidine
Rose Hips

Dyes

Levafix brilliant yellow E36
Drimaren brilliant yellow K-3GL
Cibachrome brilliant scarlet 32
Drimaren brilliant blue K-BL
Persulphate salts and henna
Reactive dyes

Fluxes

Colophony
Zinc chloride, ammonium chloride (mixture)
Alkylarul polyether alcohol, polypropylene glycol
(combination)
Pylene glycol

Miscellaneous Chemicals, NOS

Tetraxzene
Oil mist

Biological Agents

Animal/Animal Materials

Laboratory animal
Egg protein (Egg producers)
Chicken
Pig
Frog
Lacloserum
Casein (cow's milk)
Bat guano

Fish/Fish Materials

Crab
Prawn
Hoya
Cuttle-fish
Trout
Shrimpmeal
Fish-feed, Echinodorus lava
Red soft coral

Insect/Insect Materials

Grain mite
Locust
Screw Worm Fly
Cricket
Bee moth
Moth
Butterfly
Mexican bean weevil
Fruit fly
Honeybee
L. Caesar larvae
Lesser mealworm, (Grain and poultry workers)
Fowl mite, (Poultry workers)
Barn mite, (Farmers)
Parasites (Flour Handlers)
Mites, (Flour Handlers)
Acarian, (Apple Growers)
Daphnia, (Fish food store)
Weeping Fig, (Plant Keepers)
Sheep Blowfly, (Technicians)

Biological Agents, con't

Larva of Silkworm

Plants/Plant Material

Grain dust
Wheat, Rye
Soya Flour
Lathyrus sativus
Vicia sativa
Buckwheat
Gluten
Coffee bean
Caster bean
Tea
Herbal Tea
Tobacco Leaf
Hops
Baby's Breath
Freesia
Paprika
Mushroom
Cacoon seed
Chicory
Sunflower
Garlic dust
Lycopodium
Sericin
Nacre dust
Henna

Vegetable Gums

Gum, Acacia
Gum, Tragacanth
Gum, Guar
Latex, natural rubber

Wood Dust or Bark

Western red cedar, (Thuja plicata)
California redwood, (Sequoia sempervirens)
Cedar of Lebanon, (Cedra Libani)
Cocabolla, (Dalberqia retusa)
Iroko, (Chlorophora excelsa)
Oak, (Quercus robur)
Mahogany, (Shoreal Sp)
Abiruana, (Pouteria)
African Maple, (Triplochiton scleroxylon)
Tanganyika aningre
Central American Walnut, (Juglans olanchana)
Kejaat, (Pterocarpus angolensis)
African zebrawood, (Microberlinia)
Ramin, (Gonystylus bancanus)
Quillaja bark
Fernambouc, (Caesalpinia echinata)
Ashwood, (Fraxinus americana)
Eastern red cedar, (Thuja occidentalis)
Ebony wood, (Disospyros crassiflora)
Kotibe wood, (Nesorgordonia papverifera)
Cinnamon, (Cinnamomum Zeylanicum)

Biologic Enzymes

B.subtilis
Trypsin
Papain
Pepsin
Pancealin
Flaviastase
Bromelin
Fungal amylase
Fungal amyloglucosidade
Fungal hemicellulase
Esperase

*Adapted from: Chan-Yeung M. Malo JL, Actiological Agents in Occupational Asthma. European Respiratory Journal. 1994. Vol.7. pp.346-371.

**** FEV1 = Forced Expiratory Volume in one second***
 # PC20 = Provocative concentration to cause a 20% decline in FEV1

CHRONIC NONINTERVENTIONAL, NONCANCER PAIN PROTOCOL

The effective management of the patient with chronic pain involves the coordination of multiple medical and psychiatric specialties, and the implementation of a systematic assessment of an affected individual's biopsychosocial parameters, as well as the provision of an organized methodology of routine reassessment and adjustment of a proactive, functionally based program to restore health and return to a productive life. The goal of chronic pain management is to improve function with minimal intervention. There is often a delicate balance between under and overtreatment of chronic non-cancer pain. This protocol outlines optimal strategies for patient management, and should not be viewed as being prescriptive or prohibitive in nature

The treating medical practitioner's judgement, supported by an evidence-based medical plan, is paramount in the implementation of care for any specific patient. This protocol, therefore, is intended to assist in the provision of a guide to improve health care services for injured workers by outlining the appropriate evaluation and treatment procedures for the management of chronic, non-cancer pain in injured workers who do not have acute pain, and are not acutely postoperative in nature and in whom the cause is determined to be work-related.

This protocol provides information on the scope of the challenge, recommendations for prudent treatment, including prescribing and monitoring, advice on when and how to seek consultations, and patient education resources.

DEFINITIONS

The International Association for the Study of Pain defines pain as "an unpleasant sensory and emotional experience with actual or potential tissue damage". It is a complex experience involving physical, mental, social, and behavioral processes that often compromise the quality of life. Pain can be perceived without tissue damage or a clearly identified pathophysiologic cause.

Chronic pain, or "Pain Disorder", represents a specific diagnosis. Chronic pain is often defined as pain originating from an injury and lasting in excess of three months. It also refers to pain outlasting an expected duration of healing for the tissue injury incurred, as defined by evidence based guidelines based on the diagnosis. It is manifested by inappropriate pain, or an out of proportion amount of pain related to an injury or illness. It is not predicted by acute pain levels. Common clinical manifestations include persistent pain complaints, anxiety symptoms, impaired function beyond that anticipated based on the injury and degree of physical injury, depression, and anger/fear. It is often associated with psychosocial problems. Addictive behaviors, marked somatic over focus, and factitious disorders can form barriers to recovery. Chronic pain is not a phenomenon limited to anatomical or physiologic parameters. Expectations of a cure may not be

reasonable. Lifelong management is necessary in some cases, and may require repeat cycles of chronic pain treatment.

There are several pain classifications. Nociceptive pain originates from visceral origins or other tissues. Myofascial pain is nociceptive pain characterized by myofascial trigger points limited to specific muscles, in predictable locations, and can have possible psychogenic components. Neuropathic pain originates from the central nervous system (CNS) or peripheral nervous system (PNS). In injured workers, central and neuropathic mechanisms may confound nociceptive processes. Psychogenic pain originates in social, characterological, mood, or psychophysiological processes. Pain can involve neural remodeling within the spinal cord as well as higher levels of the CNS, changes in membrane responsiveness and connectivity leading to larger and more intricate pain pathways, and neurotransmitter recruitment. In addition, alterations in gene function/expression can lead to functional changes which, in turn, can lead to chronic pain in other body regions than that involved in the original injury.

INITIAL EVALUATION

Key components of the initial evaluation of a patient with chronic pain include:

- Thorough history and physical exam
- Completion of appropriate pain questionnaire(s)
    - Includes drug/alcohol use (past and present)
    - Includes nicotine use
- Psychiatric history
- Full medication list
- Social history
- Work history
- Legal history
- Employment history
- Evaluation of patient expectations

HISTORY

As with any other medical problem, a thorough medical history should be obtained and documented in the medical record. This should include the nature and intensity of the pain, current and past treatments for pain, underlying or coexisting diseases or conditions, the effect of the pain on physical and psychological function, and history of substance abuse. A thorough psychosocial history, medical management history, as well as description of history of any other factors that may affect treatment outcome should also

be addressed. Many evidence based guidelines are available for reference regarding more detailed descriptions of specific questions to be addressed. Inquiries for psychological and psychiatric issues are an important component of the evaluation of a patient presenting with chronic pain. Strong consideration, therefore, should be given to the implementation of disability questionnaires and pain diagrams in the evaluation of patients presenting with chronic pain. Many are readily available, such as the Zung Self-Rating Depression Scale, Modified Somatic Perception Questionnaire, Oswestry Disability Index, and the Fear Avoidance Behavior Questionnaire. There is currently no consensus agreement as to which specific questionnaires are preferable for use. The use of questionnaires that are brief, simple to understand and complete would be preferred. All health care practitioners who choose to incorporate specific questionnaires into their practices should thoroughly familiarize themselves with the correct interpretation and application of results.

PHYSICAL EXAM

Physical examination of the affected region should include inspection of any atrophy, posture and gait abnormalities, observation of non-organic signs, and general assessment of vital signs, speech and thought. Both active and passive range of motion testing should be done. Strength testing, including core stability, should be evaluated. Reflexes, sensation and neural tension should be tested.

In addition to conducting and documenting a focused examination of the relevant body systems affected by the original work injury, a psychologic evaluation should be conducted. As many physicians without specific training or expertise in this field may feel uncomfortable in this evaluation, strong consideration should be afforded for referral to a licensed, board certified mental health or behavioral medicine expert (commonly a psychiatrist or psychologist) for a full psychosocial evaluation. If available, referral to such an expert with experience in the treatment of injured workers/workers' compensation patients is preferred.

DIAGNOSTIC TESTING

Treatment modalities may be utilized sequentially or concomitantly, depending on chronicity and complexity of the problems. Care should be exercised to avoid duplicative services/testing. The focus of testing should be to most accurately diagnose any underlying illnesses or physical residua of the original injury, as well as the determination of level of function, physical conditioning, and delineation of contributing biopsychosocial factors delaying recovery. Any testing should only be considered if there is a potential for meaningful subsequent intervention, based on the testing results. Additionally, testing considerations are defined by the clinical entity and body part being investigated. Testing for the identification of other disorders is often required to omit the possibility of other diagnoses. They should be ordered only if there is a reasonable expectation that an additional diagnosis is present, with appropriate medical documentation for the ordering of the test. The diagnostic procedures protocol outlines these tests and their indications.

FUNCTIONAL/WORK/PHYSICAL CAPACITY EVALUATION. A systematic, structured evaluation of the injured worker's level of physical function, conducted by an appropriately trained individual (usually an occupational or physical therapist). Functional Capacity Evaluations (FCEs) are a battery of performance based tests conducted to determine a patient's ability to work and perform activities of daily living (ADL). There are several models used, each with assessment of inter-and intra-rater reliability. FCEs are performed for several reasons in chronic pain patients. These include: 1) identification of an individual's ability to perform *specific* job tasks; 2) to assess an individual's ability to perform physical activities associated with *any* job; and 3) to assist in the objective determination of impairment. In general, an FCE is utilized to assist in goal-setting and rehabilitation planning, monitor a patient's rehabilitation progress, assess an individual's participation level and performance consistency.

JOB SITE EVALUATION. A thorough review of the injured worker's worksite and essential functions required to perform her/his job should be considered, again using a systematic approach, using well accepted methodology. Strong consideration should be given to inclusion of the injured worker in this review, to insure the accuracy of the results. This review should include all potential alternative jobs available to the worker upon her/his return to work.

VOCATIONAL ASSESSMENT. Particularly if return to the former place/position of employment seems unlikely to be an option for return to work, an assessment of the worker's vocational capabilities/qualifications should be considered, again usually utililizing the services of an occupational therapist or vocational counselor.

WORK TOLERANCE SCREENING. Should be conducted upon initial evaluation, as well as at regular intervals (every 3 to 4 weeks, up to a total of 6 evaluations). Can be conducted as part of a functional capacity evaluation (FCE).

PSYCHOLOGICAL SCREENING. Referral to an interdisciplinary program as part of the initial care of a chronic pain patient should be strongly considered to minimize disability and maximize function. Documentation should be provided regarding the causal connection of the ongoing disability to a work event/injury/illness, as part of a referral to such a center. This concept is addressed in the Treatment section below. Identification of psychosocial issues should be a major aspect of the initial evaluation or consultation for a new patient with chronic pain.

TREATMENT

All treatment rendered should be based on the prevailing underlying original diagnosis, utilizing appropriate diagnostic procedures, and should be accompanied by an aggressive return to work (full or modified capacity) program. Frequent reassessment, focusing on functional improvement with effective pain reduction, should be documented.

INITIAL CARE

Intervention should be time-limited and goal-oriented. In general, injured workers returning to work sooner after an injury tend to have better outcomes. The focus of chronic pain management, therefore, is on proactive, function-based approaches to care. Keeping the patient as physically active as possible is key to recovery. Construction of a program with gradually increasing or graded activities to incrementally regain a fully functional status, while learning how to interpret and manage pain is the goal. Medical, surgical, pharmaceutical, chiropractic and physical therapy treatment paradigms are outlined in the protocols that have been established by the Workers' Compensation Court.

Optimally, a referral to an interdisciplinary rehabilitation treatment program should be made. In such programs, one medical practitioner should serve as the primary source for the coordination of care and monitoring of the treatment plan in conjunction with other health care specialists.

Identification of psychosocial issues constitutes a major aspect of initial evaluation or consultation of patients with suspected chronic pain. Depression, anxiety, fear avoidance behavior, catastrophization, poor coping and poor self-efficacy correlate with poor outcomes. Mental health issues as concomitant presentations or, in the past medical history or family history, should be identified. Dysfunctional relationships with family members, friends, co-workers, or supervisors can be indicative of underlying behavioral medicine needs, thoroughly explored in a comprehensive manner. Substance abuse related concerns are paramount to explore, as well. Any suspicion of barriers to progress from these psychosocial issues will necessitate involvement of a behavioral medicine team member.

Initial visits should include obtaining more information from the patient, confirming the accuracy of the relevant injury medical history, observing for illness/injury behaviors, diagnosis confirmation, as well as an assessment of the need for psychological referral and evaluation.

Patients should be educated regarding their specific injury, assessment findings, and treatment plan. They should be encouraged to take an active role in establishing functional outcome goals.

ONGOING CARE

TREATING PHYSICIAN VISITS. The initial evaluation with the primary treating physician should be comprehensive, utilizing diagnostic tools such as pain questionnaires and diagrams, assessing the accuracy of the relevant medical history, assessing pain behaviors, medication use (particularly opiates), and the psychosocial milieu of the patient. Additionally, it is imperative to institute the education process of informing the patient about functional status, as well as the need to engage in a functional rehabilitation program focusing on restorative exercises. The use of pharmaceuticals should be clearly

and concisely discussed, often with the provision and discussion of a pain contract. Such contracts thoroughly outline the basis for use of medications (particularly Schedule II, III, and IV drugs), the conditions of prescription, use of random drug screening, as well as conditions for termination, both of ongoing prescriptions and, if appropriate, ongoing care by that provider. Follow-up visits should initially be quite frequent (every 1-2 weeks), but later can be tailored to the patient's needs. Once the patient has reached a point of maximum medical improvement, a follow-up visit schedule of every 6 to 12 months may be appropriate.

If objective clinical improvement is delayed or slower than expected, the treating provider must justify the necessity of continued care with a valid clinical rationale, with supporting objective clinical findings. Timeframes for specific interventions commence once treatments are initiated, not on the date of injury.

INTERDISCIPLINARY REHABILITATION FACILITY. As stated previously, the proper evaluation and management of a chronic pain patient requires significant time commitments and expertise beyond the simple treatment of the initial causative work injury/illness. Many HCPs do not possess the required resources to individually provide effective care for these individuals. Additionally, reimbursement for medical services is often insufficient to allow a concerned HCP to effectively address and manage the many parameters involved in the care of a chronic pain patient. The availability of an interdisciplinary or multidisciplinary rehabilitation program, therefore, can be crucial in providing the appropriate care necessary for the comprehensive care of an injured worker with chronic pain.

There are two fundamental types of multispecialty rehabilitation programs. The first, a multidisciplinary program, involves one or two specialists who direct the services of a number of team members, with each specialist often having independent goals. These programs can be subdivided further into four pain program levels: multidisciplinary pain centers (often associated with academic centers and include a research arm); multidisciplinary pain clinics; pain clinics; and modality-oriented clinics.

The second type of program is an interdisciplinary pain program (IPRP). Such a program involves a team approach that is outcome focused and coordinated, offering goal-oriented interdisciplinary services. At least weekly communication between team members is stressed. Most intensive of this type of program is a Functional Restoration Program, which stresses maximization of function vs. minimizing pain. Components of an interdisciplinary pain program include: physical treatment; medical care and supervision; psychological and behavioral care; psychosocial care; vocational rehabilitation and training; and education. This interdisciplinary treatment generally involves various combinations of physicians, physician assistants, psychologists, chiropractors, nurses, nurse practitioners, physical therapists, occupational therapists, dentists, pharmacists, and other healthcare professionals.

Interdisciplinary pain rehabilitation programs are currently the gold standard of treatment of chronic pain that does not respond to less intensive treatment modes, are chronic pain

management programs that incorporate a biopsychosocial paradigm, usually with a proactive functional restorative approach, that aims to enhance function, reduce pain and illness behavior, while mitigating disability associated with chronic pain. IPRPs utilize an integrated team of professionals who collectively provide intensive, goal-oriented, coordinated care. The team is usually supervised by a physician who is directly involved with the program and routinely examines and evaluates the patient for relevant parameters as well as benchmarks consistent with reasonable programmatic progress. The composition of the team often includes a physical and/or occupational therapist, psychologist, vocational counselor, nurse, and case manager. It is preferable that all team members have extensive experience with the workers' compensation system.

The purpose of IPRPs is to manage the psychological, social, physical, and occupational factors associated with chronic pain patients. The components offered, as well as the approach to care**,** may differ between programs. Most, however, include progressive physical activity, working toward the goal of self maintenance with a home exercise program, with gradual increases in personal as well as occupational tasks. Most programs begin with 5 day per week attendance. Physical reconditioning (framed on the essential functions of the patient's occupation), patient education, fear avoidance, behavior modification, stress management (biofeedback), and group interactions are core components of most programs. Routine monitoring of outcomes and progress, flexible tailored treatment plan adjustments, as well as interdisciplinary communications and meetings are critical to success. Successful programs emphasize principles of functional restoration. When evaluated in consideration of cost-effectiveness (in terms of direct health care expenditures), disability costs, as well as other economic indicators, such programs are desirable, when available. There is a wide range of programs, with many factors (economic, etc.) influencing the breadth of services available in any given program. Work conditioning and work hardening programs, including functional capacity evaluations, are often a key component to IPRPs. Inpatient programs are occasionally indicated for high risk, medically unstable patients, those with moderate to severe physical or functional impairment or pain behaviors, or significant cognitive/emotional impairment, or those requiring inpatient withdrawal or around the clock nursing.

Criteria for admission to IPRPs include:

- Presence of an identified etiology underlying the chronic pain condition.
- Failure of appropriate medical/invasive care to restore functional status.
- Initial screening/assessment indicates rehabilitation potential.
- No contraindications to program participation (such as substance abuse disorder, cognitive limitations, or unstable medical conditions).

No specific timeframe exists to guide referral to an IPRP. Many patients manifest signs of chronic pain early on in their case; others do not.

Treatment objectives of IPRPs generally include:

- Functional improvement**,** including activities of daily living (ADLs).
- Relevant psychosocial improvement.
- Improvement in medical management parameters, including medication usage. This includes withdrawal from opioid, sedative-hypnotic, as well as muscle relaxant medications.
- Productivity improvement, including return to work in full/limited capacity.

If these benchmarks are not achieved within a reasonable amount of time (determined by the IPRP guidelines), the program is terminated. Note should be made, however, that there exists variability in the rate of patient response and progress, with some patients worsening before improving. Some patients may initially require inpatient care, including detoxification.

The median duration of IPRPs is 20 business days, including a 10 day initial trial with assessment of patient compliance, attendance, participation, and progress. Some flexibility need be allowed, however, on a case-by-case basis. Weekly attendance is usually all day, 5 days per week.

In the absence of an available interdisciplinary functional rehabilitation center, a "virtual center" may be useful. Such a center is comprised of the appropriate staff outlined above, however, there is no one structure/facility in which all treatment is rendered, but rather, a system is established whereby all staff members routinely meet, either telephonically, via skype, or in person, to manage each case appropriately.

MEDICATIONS

NSAIDs. NSAIDs may be indicated for use in chronic pain. Acetaminophen is recommended for those patients with contraindications for NSAIDs. Cytoprotective agents may need to be employed in patients with a history of gastrointestinal issues.

ANTIDEPRESSANTS. Antidepressants have been utilized for many years for the treatment of chronic pain. Where depression is moderate to severe, the dosage of antidepressants should be based primarily on the treatment of the depression, not of the chronic pain. In such cases, it is advisable to consult a mental health professional for guidance.

There are two main antidepressant classes used for chronic pain management, tricyclic antidepressants (TCAs) and serotonin norepinephrine reuptake inhibitors (SNRIs). This group includes duloxetine, venlafaxine and milnacipran. An additional group of agents, known as serotonin reuptake inhibitors (SSRIs) are not generally useful in the treatment of neuropathic pain. Included in this group of agents are fluvoxamine, citalopram, escitalopram, fluoxitine, sertraline, and paroxetine.

While SSRIs are not recommended for treatment of chronic persistent pain, these agents may be considered in those cases in which use of NSAIDs, exercise, manipulation, and a trial of TCAs has proven ineffective.

ANTICONVULSANTS. These agents have most commonly been used over the last 50 years for the treatment of neuropathic pain. Agents included in this category include: carbamazapine, valproic acid, phenytoin, clonazepam, lamotrigine, tiagabine, topiramate, levetiracetam, oxcarbazepine, and zonisamide. Two agents, namely, pregalbin and gabapentin, are used the most widely. In general, these agents are not recommended for use in nonradicular chronic pain. An exception to this may be topirimate, which may be considered as a fourth or fifth line agent in chronic low back pain. As with all agents, the length of medication use is indefinite and should be addressed routinely in all chronic pain cases, utilizing the lowest effective doses. Anticonvulsant use for chronic radicular or peripheral nerve pain is recommended.

BISPHOSPHONATES. Bisphosphonates reduce osteoclastic bone activity, with accompanying net gain of bone mass. They have been evaluated for potential analgesic properties. In patients with Chronic Regional Pain Syndrome (CRPS), they have been recommended in patients after failure of NSAIDs and exercise based therapy. However, they are not recommended for chronic pain patients other than those with CRPS.

GLUCOCORTICOSTEROIDS. Steroids have been used frequently for acute radicular pain, and for CRPS. Their use via systemic or topical routes is not recommended for trigger point/myofascial pain, nor are they recommended for use in chronic persistent pain, or nonradicular pain. The adverse effect s of steroids are well known.

CALCITONIN. Calcitonin is a hormone secreted by the parafollicular cells of the thyroid gland.–It is a treatment option for CRPS patients who remain significantly symptomatic despite a trial of NSAIDs, corticosteroids, active physical therapy, and bisphosphonates. Duration of use varies, and may be indefinite. It has not been shown to be an effective treatment option in other forms of chronic pain, however.

CLONIDINE. Clonidine is an alpha-agonist commonly used as an antihypertensive and has been used in CRPS patients, owing to its impact on nociceptive processing. Also in those with a history of CRPS, it is used with intravenous regional anesthesia prior to surgery, to minimize the recurrence of CRPS. It is not recommended for use in non-CRPS chronic pain patients, although it is used occasionally for epidural injections.

HERBAL PREPARATIONS, ALTERNATIVE TREATMENTS. Many complementary or alternative methods are available, including homeopathic, herbal, and naturopathic treatments. Unfortunately, the use of most of these interventions is not supported by quality evidence of efficacy.

DIETARY SUPPLEMENTS, VITAMINS. Evidence is generally poor that vitamin or mineral supplementation in normally over-nourished Western societies, is necessary.

Vitamin D deficiency may be an exception to this, as Vitamin D deficiency has been associated with various pain syndromes. When a deficiency of 25-OH-Vitamin D is identified on laboratory testing, supplementation is medically appropriate.

GLUCOSAMINE has not been shown to improve pain related disability in chronic low back pain.

NMDA RECEPTOR ANTAGONISTS. N-methyl-D-aspartate (NMDA) antagonists work by blocking receptors of neurotransmitters that are necessary to long-term memories. They are also thought to assist in preventing acute pain from transitioning into chronic pain, as well as potentially help reduce opioid tolerance and enhance opioid analgesia. As the most investigated member of this group, dextromethorphan has been found to be useful in select chronic pain patients who have failed a course of NSAIDs, TCAs, as well as anti-convulsant agents, and have a peripheral neuropathy, diabetic or otherwise. They are not, however, recommended for use in other chronic pain patients, or in CRPS cases.

SKELETAL MUSCLE RELAXANTS. There are many agents comprising this group, designed to effect muscle relaxation through, primarily, CNS effects, not effects on skeletal muscle. It is a diverse group, consisting of sedative-hypnotics, tranquilizers, CNS depressants, and neuromuscular blocking agents. Due to the high possibility of adverse effects exceeding anticipated beneficial impact, these agents are not recommended for mild to moderate chronic pain, nor for treatment of trigger points/myofascial pain. Their benefit in CRPS has been insufficiently studied to date.

TOPICAL MEDICATIONS. This also is a diverse group, including agents such as patches, sports creams, NSAIDs, dimethyl sulfoxide (DMSO), capsaicin and N-Acetylcysteine (NAC). One additional agent in this group, capsaicin, is considered to reduce pain by stimulating nerve fibers removed from the site of pain, these agents are thought to work by distraction. One of the purported benefits of these agents is the relatively low incidence of adverse systemic effects.

LIDOCAINE PATCHES. Increasingly popular, topical lidocaine patches can be used to treat chronic pain syndromes, including carpal tunnel syndrome and postherpetic neuralgia, when localized pain is present.

OPIOIDS . Opioids are potent analgesics used widely to manage moderate to severe acute pain and pain arising from cancer. Use of opioids has increased dramatically in recent years, owing in part to national initiatives for quality improvement mandating assessments and treatment of pain. Management of chronic non-malignant pain with long-term, high dose opiates, however, is controversial, and requires a structured program of frequent follow-ups with documentation of improved function and compliance. Approximately 50% of patients tolerate opioid side effects and receive acceptable levels of pain relief with their use.

If opiates are determined as being necessary as part of a function-based chronic pain rehabilitation program, one health care provider should act as the sole provider of prescriptions, with use of a single pharmacy. Evaluation of refill records through pharmacies to determine appropriateness of a prescription regimen should be undertaken. Evaluating the effectiveness/impact on function with past medication regimens should also occur. The HCP should utilize, where available, programs such as the Prescription Monitoring Program (PMP) offered by the Rhode Island Department of Health, to ensure that there is no prescription duplications, and that a comprehensive, accurate accounting of a chronic pain patient's current prescriptions is reviewed. The health care provider (HCP) should not rely on the accuracy of medication use provided by the patient. The provider should ensure that other members of the patient's treatment team (consultants, nurse case managers, etc.) are aware of the relevant medications prescribed, as well as any adjustments to a patient's physical or mental restrictions that accompany use of the medications, thus minimizing the risk of further injury or illness to both the patient as well as any other individuals who may come into contact with the patient (e.g., driving restrictions, performance of dangerous or safety sensitive functions).

In general, routine use of opiates for chronic non-malignant pain is not recommended. However, carefully selected patients may benefit from the judicious use of this group of medications. Those with chronic, persistent pain that is not well controlled with non-opioid treatment (physical functional restoration, behavioral modifications, modalities, non-opioid medications), as evidence by a lack of functional improvement, may benefit. In addition, patients who have demonstrated sustained improvement in function and pain levels in a previous opioid trial may be considered reasonable candidates for opioid treatment. The goal of opioid use should be to achieve sustained pain and physical function improvement. Initial prescription should not exceed a five day supply of medication, with follow-up scheduled before prescription renewal occurs. It is critical that, if no improvement in either parameter (sustained pain and physical function improvement) occurs, appropriate consultation with a chronic pain specialist/program be strongly considered.

Several risk factors warrant close scrutiny when prescribing opiates. Those patients with depression, prior psychological disorders, history of alcohol and/or drug abuse/dependence, nicotine use, as well as a history of a personality disorder are at increased risk of a poor outcome. The use of nicotine has been associated with an increased risk of substance abuse and should, therefore, be explored with the patient. Numerous medical conditions, when present, should preclude consideration of opiates:

- Chronic obstructive pulmonary disease
- Congestive heart failure
- Sleep apnea
- Current/past alcohol or substance abuse
- History of renal/hepatic dysfunction

- Concurrent use of sedative-hypnotics, benzodiazepines, or barbiturates. Do not initiate use of opiates with these agents unless a specific medical and/or psychiatric indication for combined use is present, and increased monitoring is instituted.

In addition to the above, there are several high risk warning signs for possible drug abuse/addiction, including:

- Active alcohol or other substance abuse
- Untreated mood or psychotic disorder (depression)
- Decreased physical or mental function with continued opioid use
- Addictive behaviors
    - Drug preoccupation
    - Medication taper refusal
    - Demanding a specific opioid (all others deemed as ineffective)
    - Preference for short over long-acting opioids
    - Multiple prescribers/pharmacies
    - Street drug use
    - Use of other's drugs
    - Non-compliance with prescriptive use
    - Multiple medication losses
    - Criminal behavior associated with obtaining drugs

An opioid trial is defined as the period of time during with the effectiveness of using opioids in a given patient is tested to see if the goals of functionality and decreased pain are met. Such a trial should be initiated prior to treating a patient with long-acting opioids, and should include clearly delineated treatment goals. If the trial goals are not met, the trial should be discontinued, and an alternative approach should be pursued to treat pain. After prescribing opiates to a chronic pain patient, frequent medical follow-up visits, at every 2 to 4 weeks initially, should be scheduled to monitor efficacy, compliance, adverse effects, and surreptitious medical use. Assessments must measure the same elements serially to determine progress. Documentation of objective functional improvement is a paramount component of the prescription program for opiates in a given individual. At least 30% reduction in pain with corresponding improvement in function (including returning to work and/or improvement in activities of daily living (ADLs) should be documented. Failure of initial trial to result in objective functional improvement or resolution of pain should warrant strong consideration of cessation of

further prescriptions. Several tools are available to assess opioid treatment on function and pain, as there is currently no universally accepted standard scale. Some tools commonly used include:

- Graded Chronic Pain Scale
- Brief Pain Inventory
- Quick Dash
- Oswestry Disability Index
- DIRE (Diagnosis Intractability Risk and Efficacy) Score

Prior to the initial prescription of opiates to a patient with chronic pain, who is not currently taking opiates, several procedures should occur. Screening of patients regarding prior alcohol/drug abuse can be facilitated by use of several assessment vehicles, such as the CAGE tool for alcohol use, the PHQ-9 screening test for severity of depression, and Graded Chronic Pain Scale for baseline assessment of function and pain, as well as similar tools that are readily available, for use in populations on or considering institution of opioid therapy. Individuals with a prior history of alcohol/drug abuse, and/or psychological problems are at increased risk of developing opioid related use/abuse issues. As many health care providers may not feel comfortable with the degree of complexity involved in the assessment and management of chronic pain patients, particularly those with a history of alcohol/drug abuse and/or nicotine use, strong consideration should be given for early referral to an appropriate pain or addiction specialist/psychologist/psychiatrist.

The use of a treatment agreement to document patient understanding and agreement with the expectations of opioid use, known as an “Opioid Contract”, is strongly recommended (see the Rhode Island Department of Health guidelines). It is recommended that this document be a "trilateral opioid agreement" which outlines an understanding among the patient, prescribing doctor and primary care provider. The primary care provider typically has the best understanding of a patient's medical history and, as an integral part of a patient's health care team, may wish to opine on the appropriateness of opioid medications. Because these medications tend to be ongoing once initiated, the primary care provider should be invited to communicate their beliefs about opioid use in chronic, benign pain and their willingness to assume the prescriptions once frequent visits with the occupational health professional or other specialist is no longer needed. Many versions of such a contract are available. Contractual components usually include medication side effects, requirement for continued active therapy, urine drug screening parameters, clearly delineated reasons for opioid management termination, referral to addiction specialists, as well as reasons for tapering opioids. The provision of a contract should accompany an explicit decision and agreement between the prescriber and patient prior to initiating opioid therapy. All reasonable attempts should be made to ensure that the patient understands the contents and intent of the document, and attests to this understanding by signing the contract. The document should be available in a written language that the patient comprehends fully, with verbal explanation if the patient is

illiterate. Patients should be informed regarding the responsible use of opioids and the proper process for obtaining their medications. As part of the initiation of a contract, the medical record should include documentation of failure of pain management alternatives (active therapies, cognitive behavioral therapy, pain self-management techniques, and any other appropriate medical interventions) in a motivated patient.

Unfortunately, it is well accepted that many patients do not adhere to prescribed treatment, even with the use of a contract. Therefore, in order to maximize the probability of adherence to the program, a urine drug screening program should be implemented. Screening can aid in the identification of aberrant behavior, undisclosed drug use and/or abuse, improve the safety and appropriateness of opioid therapy management, and verify compliance with treatment. Screening is recommended at baseline on all transferring patients already taking opioids as well as patients about to be placed on chronic opioids (usually not sooner than 6 weeks after acute injury). In addition to baseline testing, testing should also be conducted randomly at least twice, and up to four times per year, as well at termination of the testing interval. In addition, "for cause" testing should be pursued whenever the HCP suspects drug use in excess of prescriptions, the appearance of over-sedation, drug intoxication, a motor vehicle accident (as well as other accidents or injuries), driving while intoxicated, premature prescription renewals, self-directed dose changes, lost or stolen prescriptions, use of more than one prescriber, non-pain use of medications, use of alcohol for pain treatment, excessive alcohol use, missed appointments, medication hoarding, and evidence of selling medications. These are but recommendations for testing intervals, however, as there should remain flexibility in testing schedules, depending on the HCP's judgement in a given case. Random testing should be conducted at frequencies determined by the specific patient's risk category, based on screening, behavioral factors (in which the inclusion of family and friends' input can be helpful), with referral to an appropriate laboratory.

In many states, the choice of which opioids to prescribe, as well as the dosing of agents, utilizes comparison of the relative potencies of opioids compared with a corresponding dose using morphine, termed the Morphine Equivalency Dose (MED). In general, the choice of any opiate should be the lowest dose that is effective for decreasing pain while increasing function. Most studies focus on the use of opiates in the treatment of nociceptive pain, with few studies focusing on neuropathic pain. Evidence to support opiate use in neuropathic pain is weak. Some studies indicate that tramadol can be effective in this scenario, as well as oxycodone. Carbamazapine is more effective than morphine. In general, opioids are not effective in the treatment of radicular pain. The use of opioids for the treatment of myofascial pain/trigger points is not recommended. Also in general, the effectiveness of opioids for pain reduction and increased function, as well as a significant quality of life improvement, in chronic, non-visceral pain conditions is debatable, although the use of short-acting, as well as medium-term opioids may lead to pain decrease when compared to placebo. Although the use of other medications and treatments are superior to opioids for most chronic pain patients, a select number of patients may show significant improvement with their carefully implemented and monitored use. In this subset of patients, however, the goal should remain the

maximization of function with the integration of the use of opioids with a structured rehabilitation program, with reduction or eventual elimination of the need for opioid use. In some patients, the development of hyperalgesia can occur, which leads to an increase in pain due to the use of opioids. The development of this should prompt discontinuance of the medication in a gradual manner designed to avoid drug withdrawal.

Long acting oxycodone and oxymorphone have equal analgesic effects, as well as side effects. Long-acting opioids are not superior to short-acting opioids in improving function or pain, or inciting less addiction. Long-acting opioids result in less pronounced euphoria and are less likely to lead to addiction. The lowest opioid dose should be used when prescription of these agents is initiated. Many states recommend that 100-120mg MED be considered a cut-off for mandated referral to a board-certified addiction/noninterventional chronic pain specialist. Doses in excess of 100 mg MED are associated with increased duration of disability and, therefore, dictates close monitoring.

Opioid abstinence syndrome is rarely medically serious, and can include symptoms such as nausea, diarrhea, myalgias, and myoclonus. It can be treated with clonidine, 0.1-0.2 mg. p.o. q 6 hrs. (0.1 mg transdermal patch/24 hrs. weekly during the tapering interval). Monitoring for anticholinergic side effects, as well as hypotension, is recommended. Mild opioid withdrawal symptoms may persist for up to 6 months after discontinuance of the drug. A rapid reoccurrence of tolerance can occur for months to years after prior chronic use. Withdrawal symptoms should not be treated with opioids or benzodiazepines after discontinuing opioids. If considering withdrawal from a opiate for a chronic patient, strong consideration should be given to referral for appropriate management. In all instances, the prescriber should remain sensitive to preserving the therapeutic relationship to avoid behavioral issues and doctor shopping.

Deciding to begin the use of opioids in a chronic pain patient requires a thorough knowledge of the risks involved. HCPs who do not feel comfortable with this should strongly consider consultation/referral to a specialist with experience and expertise in the management of chronic pain (preferably with experience in the nuances involved in the treatment of injured workers).

Specialty consultation indications include:

- Ongoing severe pain symptoms without significant functional improvement or improvement in pain control, despite opioid treatment.
- Persistent pain with minimal or absent underlying tissue pathology, and correlation between the original injury and severity of impairment is unclear.
- Pain behaviors are present, and risk behaviors are present, with unsuccessful standard treatment measures.
- Strong evidence of worsening pain behaviors.
- Unusual knowledge of controlled substances

- Request for specific agents, or claims of allergies/ineffectiveness of other medications
- Demands for assessment/medications after hours
- Unscheduled refill requests
- "Loss" of prescriptions
- Mood disorder/other psychiatric condition
- Drug abuse physical signs
- No apparent interest in diagnosis, noncompliance with appointments.
- Feigning/exaggeration of physical problems
- Exertion of pressure (via solicitation of sympathy, guilt, or via direct threats) on HCP
- Subjective complaints exceeding objective findings
- "Firing" of physician after refusal to fill prescriptions
- No work for greater than 6 months with minimal functional improvement with active therapy.

From time to time, specialist consultation may be necessary to assist in the care of a patient with chronic pain. Reasons for referral may include identification of any undiagnosed conditions, assistance in pain management, identification of undiagnosed psychological conditions affecting treatment, identification of alternative treatments, and addiction management, as well as assistance in opioid tapering, methadone treatment inquiries, and management of aberrant behaviors. Consultations do not necessarily equate to transfer of care. Appropriate consultation with ABMS (American Board of Medical Specialties) certified/eligible physicians may be utilized as part of the care of an injured worker with chronic pain.

PROTOCOL HISTORY
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