WORKERS' COMPENSATION BOARD
New York State

New York

Shoulder Injury

Medical Treatment Guidelines

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A GENERAL GUIDELINE PRINCIPLES

The principles summarized in this section are key to the intended application of the New York State Medical Treatment Guidelines (MTG).

Medical Care

A.1 MEDICAL CARE

Medical care and treatment required as a result of a work-related injury should be focused on restoring functional ability required to meet the patient's daily and work activities and return to work, while striving to restore the patient's health to its pre-injury status in so far as is feasible.

A.2 RENDERING OF MEDICAL SERVICES

Any medical provider rendering services to a workers compensation patient must utilize the Treatment Guidelines as provided for with respect to all work-related injuries and/or illnesses.

A.3 POSITIVE PATIENT RESPONSE

Positive results are defined primarily as functional gains which can be objectively measured. Objective functional gains include, but are not limited to, positional tolerances, range of motion, strength, endurance, activities of daily living (ADL), cognition, psychological behavior, and efficiency/velocity measures which can be quantified. Subjective reports of pain and function should be considered and given relative weight when the pain has anatomic and physiologic correlation.

A.4 RE-EVALUATE TREATMENT

If a given treatment or modality is not producing positive results, the provider should either modify or discontinue the treatment regime. The provider should evaluate the efficacy of the treatment or modality 2 to 3 weeks after the initial visit and 3 to 4 weeks thereafter. Recognizing that treatment failure is at times attributable to an incorrect diagnosis should prompt the clinician to reconsider the diagnosis in the event of an unexpected poor response to an otherwise rational intervention.

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Education

A.5 EDUCATION

Education of the patient and family, as well as the employer, insurer, policy makers and the community should be a primary emphasis in the treatment of work-related injury or illness. Practitioners should develop and implement effective educational strategies and skills. An education-based paradigm should always start with communication providing reassuring information to the patient. No treatment plan is complete without addressing issues of individual and/or group patient education as a means of facilitating self-management of symptoms and prevention of future injury.

Time Frames

A.6 DIAGNOSTIC TIME FRAMES

Diagnostic time frames for conducting diagnostic testing commence on the date of injury. Clinical judgment may substantiate the need to accelerate or decelerate the time frames discussed in this document.

A.7 TREATMENT TIME FRAMES

Treatment time frames for specific interventions commence once treatments have been initiated, not on the date of injury. Obviously, duration may be impacted by disease process and severity, patient compliance, as well as availability of services. Clinical judgment may substantiate the need to accelerate or decelerate the time frames discussed in this document.

A.8 DELAYED RECOVERY

For those patients who are failing to make expected progress 6-12 weeks after an injury, reexamination in order to confirm the accuracy of the diagnosis and re-evaluation of the treatment program should be performed. Assessment for potential barriers to recovery (yellow flags/psychological issues) should be ongoing throughout the care of the patient. However, at 6-12 weeks, alternate treatment programs, including formal psychological or psychosocial evaluation, should be considered. Referrals to mental health providers (i.e.: psychology/psychiatry) for the evaluation and management of delayed recovery do not indicate or require the establishment of a psychiatric or psychological condition. The evaluation and management of delayed recovery does not require the establishment of a psychiatric or psychological claim.

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Treatment Approaches

A.9 ACTIVE INTERVENTIONS

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

A.10 ACTIVE THERAPEUTIC EXERCISE PROGRAM

Active therapeutic exercise program goals should incorporate patient strength, endurance, flexibility, range of motion, sensory integration, coordination, and education as clinically indicated. This includes functional application in vocational or community settings.

A.11 DIAGNOSTIC IMAGING AND TESTING PROCEDURES

Clinical information obtained by history taking and physical examination should be the basis for selection and interpretation of imaging procedure results. All diagnostic procedures have variable specificity and sensitivity for various diagnoses.

When a diagnostic procedure, in conjunction with clinical information, provides sufficient information to establish an accurate diagnosis, a second diagnostic procedure will be redundant if it is performed only for diagnostic purposes. At the same time, a subsequent diagnostic procedure (that may be a repeat of the same procedure, when the rehabilitation physician, radiologist or surgeon documents the study was of inadequate quality to make a diagnosis) can be a complementary diagnostic procedure if the first or preceding procedures, in conjunction with clinical information, cannot provide an accurate diagnosis, and is permissible under the MTG.

It is recognized that repeat imaging studies and other tests may be warranted by the clinical course and to follow the progress of treatment in some cases. It may be of value to repeat diagnostic procedures (e.g. imaging studies) during the course of care to reassess or stage the pathology when there is progression of symptoms or findings, prior to surgical interventions and therapeutic injections when warranted, and post-operatively to follow the healing process. Regarding CT examinations, it must be recognized that repeat procedures result in an increase in cumulative radiation dose and associated risks.

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A.12 SURGICAL INTERVENTIONS

Contemplation of surgery should be within the context of expected functional outcome. The concept of "cure" with respect to surgical treatment by itself is generally a misnomer. All operative interventions must be based upon positive correlation of clinical findings, clinical course and imaging and other diagnostic tests. A comprehensive assimilation of these factors must lead to a specific diagnosis with positive identification of pathologic condition(s). For surgery to be performed to treat pain, there must be clear correlation between the pain symptoms and objective evidence of its cause. In all cases, shared decision making with the patient is advised. The patient should be given the opportunity to understand the pros and cons of surgery, potential for rehabilitation as an alternative where applicable, evidence-based outcomes, and specific surgical experience.

A.13 PRE-AUTHORIZATION

All diagnostic imaging, testing procedures, non-surgical and surgical therapeutic procedures within the criteria of the Medical Treatment Guidelines and based on a correct application of the Medical Treatment Guidelines are considered authorized, with the exception of the following procedures: Lumbar Fusion, Artificial Disc Replacements, Vertebroplasty, Kyphoplasty, Electrical Bone Growth Stimulators, Spinal Cord Stimulators, Intrathecal Drug Delivery (Pain Pumps), Osteochondral Autograft, Autologous Chondrocyte Implantation, Meniscal Allograft Transplantation and Knee Arthroplasty (Total or Partial Knee Joint Replacement). These are not included on the list of pre-authorized procedures. Providers who want to perform one of these procedures must request pre-authorization from the carrier before performing the procedure.

Second or subsequent procedures (the repeat performance of a surgical procedure due to failure of, or incomplete success from the same surgical procedure performed earlier, if the Medical Treatment Guidelines do not specifically address multiple procedures) also require pre-authorization.

A.14 PERSONALITY/PSYCHOLOGICAL/PSYCHOSOCIAL EVALUATIONS

In select patients, diagnostic testing procedures may be useful when there is a discrepancy between diagnosis, signs, symptoms, clinical concerns or functional recovery. Psychological testing should provide differentiation between pre-existing depression versus injury-caused depression, as well as post-traumatic stress disorder, and other psychosocial issues that may include work or non-work-related issues when such conditions are identified in the patient.

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

A professional fluent in the primary language of the patient is strongly preferred. When such a provider is not available, services of a professional language interpreter must be provided.

Frequency: One time visit for evaluation. If psychometric testing is indicated by findings in the initial evaluation, time for such testing should not exceed an additional two hours of professional time.

A.15 PERSONALITY/PSYCHOLOGICAL/PSYCHOSOCIAL INTERVENTION

Following psychosocial evaluation, when intervention is recommended, such intervention should be implemented as soon as possible. This can be used alone or in conjunction with other treatment modalities.

- Time to produce effect: 2 to 8 weeks.
- Optimum duration: 6 weeks to 3 months.
- Maximum duration: 3 to 6 months. Counseling is not intended to delay but to enhance functional recovery. For select patients, longer supervision may be required, and if further counseling is indicated, documentation of the nature of the psychological factors, as well as projecting a realistic functional prognosis, should be provided by the authorized treating practitioner every 4 to 6 weeks during treatment.

Return to Work

A.16 FUNCTIONAL CAPACITY EVALUATION (FCE)

Functional capacity evaluation is a comprehensive or more restricted evaluation of the various aspects of function as they relate to the patient's ability to return to work. Areas such as endurance, lifting (dynamic and static), postural tolerance, specific range-of-motion, coordination and strength, worker habits, employability, as well as psychosocial, cognitive, and sensory perceptual aspects of competitive employment may be evaluated. Components of this evaluation may include: (a) musculoskeletal screen; (b) cardiovascular profile/aerobic capacity; (c) coordination; (d) lift/carrying analysis; (e) job-specific activity tolerance; (f) maximum voluntary effort; (g) pain assessment/psychological

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screening; (h) non-material and material handling activities; (i) cognitive; (j) visual; and (k) sensory perceptual factors.

In most cases, the question of whether a patient can return to work can be answered without an FCE.

When an FCE is being used to determine return to a specific job site, the treating physician is responsible for understanding and considering the job duties. FCEs cannot be used in isolation to determine work restrictions. The authorized treating physician must interpret the FCE in light of the individual patient's presentation and medical and personal perceptions. FCEs should not be used as the sole criteria to diagnose malingering.

An FCE may be considered at time of MMI, following reasonable prior attempts to return to full duty throughout course of treatment, when the treating physician is unable to make a clear determination on work status on case closure.

A.17 RETURN TO WORK

For purposes of these guidelines, return to work is defined as any work or duty that the patient is able to perform safely. It may not be the patient's regular work. Ascertaining a return to work status is part of medical care, and should be included in the treatment and rehabilitation plan. It is normally addressed at every outpatient visit. A description of the patient's status and task limitations is part of any treatment plan and should provide the basis for restriction of work activities when warranted. Early return to work should be a prime goal in treating occupational injuries. The emphasis within these guidelines is to move patients along a continuum of care and return to work, since the prognosis of returning an injured worker to work drops progressively the longer the worker has been out of work.

A.18 JOB SITE EVALUATION

The treating physician may communicate with the employer or employer's designee, either in person or by telephone, to obtain information regarding the demands of the patient's pre-injury job, including a description of the exertional demands of the job, the need for repetitive activities, load lifting, static or awkward postures, or any other factors that would pose a risk of re-injury or impedance of convalescence. When returning to work at the patient's previous job task/setting is not feasible, given the clinically determined restrictions on the patient's activities, inquiry should also be made about modified duty work settings, and a similar set of questions should be posed by the physician about work activities/demands in modified duty jobs.

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Ideally, the physician would gain the most information from an on-site inspection of the job settings and activities; but it is recognized that this may not be feasible in most cases. If job videos/CDs/DVDs are available from the employer, these can contribute valuable information.

Frequency: 1 or 2 calls

- 1st call: Patient is in a functional state where the patient can perform some work.
- 2nd call: Patient has advanced to state where the patient is capable of enhanced functional demands in a work environment.

The physician shall document the conversation.

Other

A.19 GUIDELINE RECOMMENDATIONS AND MEDICAL EVIDENCE

The Workers' Compensation Board and its Medical Advisory Committee have not independently evaluated or vetted the scientific medical literature used in support of the guidelines, but have relied on the methodology used by the developers of various guidelines utilized and referenced in these Guidelines.

A.20 EXPERIMENTAL/INVESTIGATIONAL TREATMENT

Medical treatment that is experimental/investigational and not approved for any purpose, application or indication by the FDA is not permitted under these Guidelines.

A.21 INJURED WORKERS AS PATIENTS

In these Guidelines, injured workers are referred to as patients recognizing that in certain circumstances there is no doctor-patient relationship.

A.22 SCOPE OF PRACTICE

These Guidelines do not address scope of practice or change the scope of practice.

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B INTRODUCTION TO SHOULDER INJURY

This Guideline addresses the ten most common work-related injuries/ syndromes/disorders to or involving the shoulder complex. This Guideline is divided into the following sections:

1) HISTORY TAKING AND PHYSICAL EXAMINATION

   History taking and physical examination provides information common to all injuries through a discussion of provider procedures which should be applied to each patient, regardless of the injury and diagnosis.

2) SPECIFIC DIAGNOSES, TESTING AND TREATMENT PROCEDURES

   Specific diagnoses, testing and treatment procedures provides information unique to each of the following work-related injuries/ syndromes/ disorders:

   1) Acromioclavicular (AC) Joint Sprains/Dislocations
   2) Adhesive Capsulitis/Frozen Shoulder Disorder
   3) Bicipital Tendon Disorders
   4) Brachial Plexus Injuries
      a) Brachial Plexus
      b) Axillary Nerve
      c) Long Thoracic Nerve
      d) Musculocutaneous Nerve
      e) Spinal Accessory Nerve
      f) Suprascapular Nerve
   5) Bursitis of the Shoulder
   6) Impingement Syndrome
   7) Rotator Cuff Tears
   8) Rotator Cuff Tendinitis

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9) Shoulder Fractures

   g) Clavicular Fracture

   h) Proximal Humeral Fracture

   i) Humeral Shaft Fracture

   j) Scapular Fracture

   k) Sternoclavicular Dislocation/Fracture

10) Shoulder Instability

Each diagnosis is presented in the following format:

- History and Mechanism of Injury;
- Discussion of relevant physical findings;
- Laboratory tests;
- Testing procedures;
- Diagnosis-based, non-operative therapeutic treatment procedures;
- Options for operative/surgical treatment; and
- Options for post-operative rehabilitation/treatment procedures.

If a non-operative treatment approach is initially recommended, surgery may be indicated after the failure of conservative management. The patient must continue to exhibit the designated objective findings, subjective symptoms and (where applicable) imaging findings.

3) THERAPEUTIC PROCEDURES: NON-OPERATIVE (including medications)

Therapeutic Procedures: Non-Operative provides information common to all injuries through detailed discussions of referenced medications and therapeutic procedures with indications for expected time to produce effect, frequency, and optimum and maximum durations.

As shoulder injuries frequently involve a complex of problems, it is always necessary to consider the possible interaction of the various parts of the shoulder mechanism when proceeding with a diagnostic workup and a therapeutic treatment plan.

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C HISTORY TAKING AND PHYSICAL EXAMINATION

There are two standard procedures that should be utilized when initially diagnosing work-related shoulder instability. These procedures establish the foundation/basis for and dictate all other following stages of diagnostic and therapeutic procedures. When findings of clinical evaluations and those of other diagnostic procedures are not complementing each other, the objective clinical findings should have preference.

C.1 HISTORY TAKING

History Taking should address at least the following for each shoulder injury diagnosis:

C.1.a.i Thorough medical history.

C.1.a.ii Occupational relationship.

C.1.a.iii History of non-occupational injury and avocational pursuits need to be specifically documented.

C.1.a.iv Prior shoulder condition.

C.2 PHYSICAL FINDINGS

Physical Findings are specific to and addressed within each shoulder injury diagnosis noted in this section. Given the complexity of the shoulder mechanism, an evaluation for concomitant injury should be considered.

C.3 RED FLAGS

Certain findings, "red flags", raise suspicion of potentially serious medical conditions. Assessment (history and physical examination) should include evaluation for red flags. In the shoulder, these findings or indicators may include: fracture; infection or inflammation; subdiaphragmatic problems; and cardiac disease. Further evaluation/consultation or urgent/emergency intervention may be indicated and the *New York Shoulder Injury Medical Treatment Guidelines* incorporate changes to clinical management triggered by the presence of "red flags."

C.4 FOLLOW-UP DIAGNOSTIC IMAGING/TESTING

Clinical information obtained by history taking and physical examination should be the basis for selection and interpretation of imaging procedure results. All diagnostic procedures have variable specificity and sensitivity for various diagnoses.

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When a diagnostic procedure, in conjunction with clinical information, provides sufficient information to establish an accurate diagnosis, a second diagnostic procedure will be redundant if it is performed only for diagnostic purposes. At the same time, a subsequent diagnostic procedure (that may be a repeat of the same procedure, when the rehabilitation physician, radiologist or surgeon documents the study was of inadequate quality to make a diagnosis) can be a complementary diagnostic procedure if the first or preceding procedures, in conjunction with clinical information, cannot provide an accurate diagnosis and is permissible under the MTG.

It is recognized that repeat imaging studies and other tests may be warranted by the clinical course and to follow the progress of treatment in some cases. It may be of value to repeat diagnostic procedures (e.g. imaging studies) during the course of care to reassess or stage the pathology when there is progression of symptoms or findings, prior to surgical interventions and therapeutic injections when warranted, and post-operatively to follow the healing process. Regarding CT examinations, it must be recognized that repeat procedures result in an increase in cumulative radiation dose and associated risks.

D SPECIFIC DIAGNOSES, TESTING AND TREATMENT PROCEDURES

D.1 ACROMIOCLAVICULAR (AC) JOINT SPRAINS/ DISLOCATIONS

An acute acromioclavicular (AC) joint injury is frequently referred to as a shoulder separation.

Classification of Injury: The degree of clavicular displacement depends on the severity of injury to the AC and Coracoclavicular (CC) ligaments, the AC joint capsule, and the supporting muscles of the shoulder (trapezius and deltoid) that attach to the clavicle.

The traditional Allman and Tossy classification is a 3-grade classification scheme. Rockwood expanded that classification to 6 types of injury. The Rockwood Type I injury corresponds to the original Allman/Tossy Grade I; Rockwood Type II to the original Allman/Tossy Grade II and Rockwood Types III-VI are in the original Grade III Allman/Tossy category.

The Allman/Tossy classification and the corresponding Rockwood classification are illustrated in Table 1.

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Table 1: Allman/Tossy and Rockwood Classification Systems

Allman	Rockwood
Grade I:	Type I: Partial disruption of the AC ligament and capsule.
Grade II:	Type II: Sprains consisting of a ruptured AC ligament and capsule with incomplete injury to the coracoclavicular (CC) ligament, resulting in minimal AC Joint subluxation.
Grade III:	Type III: Separation or complete tearing of the AC ligament and/or CC ligaments, possible deltoid trapezius fascial injury, and dislocation of the AC Joint.
	OR
	Type IV: Dislocation consisting of a displaced clavicle that penetrates posteriorly through or into the trapezius muscle.
	OR
	Type V: Dislocation consisting of complete separation of the AC and CC ligaments and dislocation of the AC joint with a large CC interval.
	OR
	Type VI: Dislocation consisting of a displaced clavicle that penetrates inferior to the coracoid.

Types I-III are common, while Types IV-VI are not and, when found, require surgical consultation. For AC joint degeneration from repetitive motion that is found to be work-related, see Impingement Syndrome.

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D.1.a History and Mechanism of Injury (AC Joint Sprains/Dislocations)

D.1.a.i Mechanism of Injury (AC Joint Sprains/Dislocations): generally, patients sustain an AC joint injury when they land on the point of the shoulder, driving the acromion downward, or fall on an outstretched hand or elbow, creating a backward and outward force on the shoulder. It is important to rule out other sources of shoulder pain from an acute injury, including rotator cuff tear, fracture and nerve injury.

D.1.b Physical Findings (AC Joint Sprains/Dislocations)

Physical Findings may include:

D.1.b.i Tenderness at the AC joint, at times with contusions and/or abrasions at the joint area; prominence/asymmetry of the shoulder can be seen; and/or

D.1.b.ii decreased shoulder motion, and tenderness of the distal end of the clavicle on palpation; there may be increased clavicular translation; cross-body adduction can cause exquisite pain.

D.1.c Laboratory Tests (AC Joint Sprains/Dislocations)

Laboratory tests are not indicated unless a systemic illness or disease is suspected.

D.1.d Testing Procedures (AC Joint Sprains/Dislocations)

Plain x-rays may include:

D.1.d.i AP view;

D.1.d.ii AP radiograph of the shoulder with the beam angled 10° cephalad (Zanca view);

D.1.d.iii Axillary lateral views; and

D.1.d.iv Stress view; side-to-side comparison with 10-15 lbs. of weight in each hand.

D.1.e Non-Operative Treatment Procedures (AC Joint Sprains/Dislocations)

Non-Operative Treatment Procedures may include:

D.1.e.i Procedures such as patient-directed thermal treatment and immobilization (up to 6 weeks for Type I-III AC joint

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separations). Immobilization treatments for Type III injuries are controversial.

D.1.e.ii Medication, such as nonsteroidal anti-inflammatories and analgesics, are indicated; narcotics are not normally indicated.

Subacromial space injection with steroids may be therapeutic if the patient responded positively to a diagnostic injection of an anesthetic. Steroid injections directly into the tendons are not recommended.

- Frequency: Not more than 2-3 times annually. Usually 1 or 2 injections adequate. A minimum of 3 weeks interval between injections is recommended.
- Time to produce effect: Immediate with local anesthetic, or within 3 days with corticosteroids.
- Maximum duration: Limited to 3 injections annually to the same site.

D.1.e.iii Manipulation may be indicated in a Type II sprain.

D.1.e.iv Physical medicine interventions should emphasize a progressive increase in range of motion without exacerbation of the AC joint injury. With increasing motion and pain control, a strengthening program should be instituted and a return to modified/limited duty would be considered at this time. By 8-11 weeks, with restoration of full or near-full motion, return to full duty should be anticipated.

D.1.f Operative Procedures (AC Joint Sprains/Dislocations)

D.1.f.i With a Type III AC joint injury, an appropriate orthopedic consultation could be considered initially, but should be considered when conservative care fails to increase function.

D.1.f.ii With a Type IV-VI AC joint injury, an orthopedic surgical consultation is recommended.

D.1.g Post-Operative Procedures (AC Joint Sprains/Dislocations)

These should be coordinated by the orthopedic and the primary care physician working with the interdisciplinary team. Keeping with the therapeutic and rehabilitation procedures found in this Shoulder Guideline, the patient could be immobilized for 2-3 weeks, restricted in activities, both work-related and avocational, for 6-8 weeks while undergoing rehabilitation,

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and be expected to progress to return to full duty based upon his/her response to rehabilitation and the demands of the job.

D.2 ADHESIVE CAPSULITIS/FROZEN SHOULDER DISORDER

Adhesive capsulitis of the shoulder, also known as frozen shoulder disorder, is a soft tissue lesion of the glenohumeral joint resulting in restrictions of passive and active range of motion. Occupational adhesive capsulitis arises secondarily to any chest or upper extremity trauma. It may also occur following stroke, traumatic brain injury or spinal cord injury among other etiologies. Primary adhesive capsulitis is rarely occupational in origin. The disorder goes through stages, specifically:

Stage 1: Consists of acute pain with some limitation in range of motion; generally lasting 2-9 months.

Stage 2: Characterized by progressive stiffness, loss of range of motion, and muscular atrophy; it may last an additional 4-12 months beyond Stage 1.

Stage 3: Characterized by partial or complete resolution of symptoms and restoration of range of motion and strength; it usually takes an additional 6-9 months beyond Stage 2.

D.2.a History and Mechanism of Injury (Adhesive Capsulitis/Frozen Shoulder)

D.2.a.i Mechanism of Injury: There often is some history of prior injury. Often adhesive capsulitis is seen with impingement syndrome or other shoulder disorders; refer to appropriate subsection of this Guideline.

D.2.a.ii Patient will usually complain of pain in the sub-deltoid region, but occasionally over the long head of the biceps or radiating down the lateral aspect of the arm to the forearm. Pain is often worse at night with difficulty sleeping on the involved side. Motion is restricted and painful.

D.2.b Physical Findings (Adhesive Capsulitis/Frozen Shoulder)

Restricted active and passive glenohumeral range of motion is the primary physical finding. It may be useful for the examiner to inject the glenohumeral joint with lidocaine and then repeat range of motion to rule out other shoulder pathology; failure to demonstrate an increase in the range of motion confirms the diagnosis. Postural changes and secondary trigger points along with atrophy of the deltoid and supraspinatus muscles may be seen.

D.2.c Laboratory Tests (Adhesive Capsulitis/Frozen Shoulder)

Laboratory Tests are not indicated unless systemic illness or disease is suspected.

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D.2.d Testing Procedures (Adhesive Capsulitis/Frozen Shoulder)

D.2.d.i Plain x-rays are generally not helpful except to rule out concomitant pathology.

D.2.d.ii Arthrography may be helpful in ruling out other pathology when other pathology is suspected or establishing the identification and diagnosis of a contracted joint capsule. Arthrography can also be therapeutic as steroids and/or anesthetics may be injected and a brisement or distension arthrogram can be done at the same time (refer to the next subsection on non-operative treatment procedures for further discussion).

D.2.e Non-Operative Treatment Procedures (Adhesive Capsulitis/Frozen Shoulder)

Non-Operative Treatment Procedures address the goal to restore and maintain function and may include:

D.2.e.i Physical medicine interventions are the mainstay of treatment and may include thermal treatment, ultrasound, TENS, manual therapy, and passive and active range-of-motion exercises; as the patient progresses, strengthening exercises should be included in the exercise regimen.

D.2.e.ii Medications, such as NSAIDs and analgesics, may be helpful; narcotics are indicated only for post-manipulation or post-operative cases.

D.2.e.iii Occasionally, subacromial bursa and/or glenohumeral steroid injections can decrease inflammation and allow the therapist to increase functional exercise and range of motion. Subacromial space injection with steroids may be useful if the patient responded positively to a diagnostic injection of an anesthetic. Steroid injections directly into the tendons are not recommended.

- Frequency: Not more than 2-3 times annually. Usually 1 or 2 injections adequate. A minimum of 3 weeks interval between injections is recommended.
- Time to produce effect: Immediate with local anesthetic, or within 3 days with corticosteroids.
- Maximum duration: Limited to 3 injections annually to the same site.

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D.2.e.iv In cases that are refractory to conservative therapy lasting at least 3-6 months and where range of motion remains significantly restricted (abduction less than 90°), the following more aggressive treatment may be considered:

D.2.e.iv.a Distension arthrography or "brisement" in which saline, an anesthetic and usually a steroid are forcefully injected into the shoulder joint causing disruption of the capsule. Early and aggressive physical medicine to maintain range of motion and restore strength and function should follow distension arthrography or manipulation under anesthesia (MUA); return to work with restrictions should be expected within one week of the procedure; return to full duty is expected within 4-6 weeks.

D.2.e.v Manipulation: Manipulative treatment (not therapy) is defined as the therapeutic application of manually guided forces by a physician to improve physiologic function and support homeostasis that has been altered by the injury or occupational disease, and has associated clinical significance.

- Time to produce effect for shoulder treatment: 1-6 treatments.
- Frequency: Up to 2-3 times a week for 8-12 weeks, as indicated by the severity of involvement and the desired effect, then up to 2 treatments per week for the next 4 weeks.
- Optimum duration: 8-12 weeks.
- Maximum duration: 3 months. Extended durations of care beyond what is considered "maximum" may be necessary in cases of intractable adhesions, or when resumed after intra-articular injection, arthrogram or manipulation under anesthesia (performed by a qualified surgeon).

D.2.f Operative Procedures (Adhesive Capsulitis/Frozen Shoulder)

For cases failing conservative therapy of at least 3-6 months duration and which are significantly limited in range of motion (abduction less than 90°), the following operative procedure may be considered:

D.2.f.i Manipulation Under General Anesthesia (MUA) is indicated in cases of intractable restriction, and may be performed by a

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duly qualified surgeon. It may be done in combination with steroid injection or distension arthrography.

D.2.g Post-Operative Procedures (Adhesive Capsulitis/Frozen Shoulder)

Post-Operative Procedures would include an individualized rehabilitation program based upon communication among the physician, the surgeon and the therapist.

D.2.g.i Early and aggressive physical medicine interventions are recommended to maintain range of motion and progress strengthening; return to work with restrictions after surgery should be discussed with the treating provider. The patient should be approaching MMI within 8-12 weeks post-operative; however, coexistence of other pathology should be taken into consideration.

D.3 BICIPITAL TENDON DISORDERS

Bicipital tendon disorders may include 1) primary bicipital tendonitis, which is exceedingly rare; 2) secondary bicipital tendinitis which is generally associated with rotator cuff tendinitis or impingement syndrome (refer to the appropriate diagnosis subsections); 3) subluxation of the biceps tendon which occurs with dysfunction of the transverse intertubercular ligament and massive rotator cuff tears; and 4) acute disruption of the tendon, which can result from an acute distractive force or transection of the tendon from direct trauma. Evaluation of the elbow may be required when evaluating bicipital tendon injury.

D.3.a History and Mechanism of Injury (Bicipital Tendon Disorders)

D.3.a.i Mechanism of Injury: Bicipital tendon disorders may include symptoms of pain and/or achiness that occur after repetitive use of the shoulder and/or blunt trauma to the shoulder. Secondary bicipital tendinitis may be associated with prolonged above-the-shoulder activities, and/or repeated shoulder flexion, external rotation and abduction. Acute trauma to the biceps tendon of the shoulder girdle may also give rise to injury of the biceps tendon.

D.3.a.ii Disorders of the biceps tendon may accompany scapulothoracic dyskinesis, rotator cuff injury, AC joint separation, subdeltoid bursitis, shoulder instability or other shoulder pathology. Symptoms may be exacerbated or provoked by work that activates the biceps muscle. Symptoms may be exacerbated by other activities that are not necessarily work-related.

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D.3.a.iii Symptoms may include aching, burning and/or stabbing pain in the shoulder, usually involving the anterior medial portion of the shoulder girdle. The symptoms are exacerbated with above-the-shoulder activities and those specifically engaging the biceps (flexion at the shoulder, flexion at the elbow and supination of the forearm). Relief occurs with rest. Patients may report nocturnal symptoms which interfere with sleep during the acute stages of inflammation; pain and weakness in the shoulder during activities; repeated snapping phenomenon with a subluxing tendon; immediate sharp pain and tenderness along the course of the long head of the biceps following a sudden trauma which would raise suspicions of acute disruption of the tendon; and/or with predominant pain at the shoulder, accompanied by referral patterns which may extend pain into the cervical or distal structures, including the arm, elbow, forearm and wrist.

D.3.b Physical Findings (Bicipital Tendon Disorders)

Physical Findings may include:

D.3.b.i If continuity of the tendon has been lost (biceps tendon rupture), inspection of the shoulder would reveal deformity (biceps bunching);

D.3.b.ii Palpation demonstrates tenderness along the course of the bicipital tendon;

D.3.b.iii Pain at end range of flexion and abduction as well as biceps tendon activation; and/or

D.3.b.iv Provocative testing may include:

D.3.b.iv.a Yegerson's sign - pain with resisted supination of forearm;

D.3.b.iv.b Speed's Test - pain with resisted flexion of the shoulder (elbow extended and forearm supinated); or

D.3.b.iv.c Ludington's Test - pain with contraction of the biceps (hands are placed behind the head placing the shoulders in abduction and external rotation).

D.3.c Laboratory Tests (Bicipital Tendon Disorders)

Laboratory Tests are not indicated unless a systemic illness or disease is suspected.

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D.3.d Testing Procedures (Bicipital Tendon Disorders)

D.3.d.i Plain x-rays include:

- Anterior/Posterior (AP) view visualizes elevation of the humeral head, indicative of absence of the rotator cuff due to a tear;
- Lateral view in the plane of the scapula or an axillary view determines if there is anterior or posterior dislocation or the presence of a defect in the humeral head (a Hill-Sachs lesion);
- 30° caudally angulated AP view determines if there is a spur on the anterior/inferior surface of the acromion and/or the far end of the clavicle; and
- Outlet view determines if there is a downwardly tipped acromion.

D.3.d.ii Adjunctive testing, such as sonography, MRI or arthrography, should be considered when shoulder pain is refractory to 4-6 weeks of non-operative conservative treatment and the diagnosis is not readily identified by standard radiographic techniques.

D.3.e Non-Operative Treatment Procedures (Bicipital Tendon Disorders)

D.3.e.i Benefit may be achieved through procedures such as thermal therapy, immobilization, alteration of occupation and/or work station and manual therapy.

D.3.e.ii Medications, such as nonsteroidal anti-inflammatories and analgesics, are indicated; narcotics are not normally indicated.

D.3.e.iii Physical medicine and rehabilitation interventions should emphasize a progressive increase in range of motion. With increasing motion and pain control, a strengthening program should be instituted and return to modified/limited duty would be considered at this time. By 8-11 weeks, with restoration of full motion, return to full duty should be anticipated.

D.3.e.iv Soft tissue injections (biceps tendon insertion) with steroids may be therapeutic if the patient responded positively to a diagnostic injection of an anesthetic. Steroid injections directly into the tendons are not recommended.

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- Frequency: Not more than 2-3 times annually. Usually 1 or 2 injections adequate. A minimum of 3 weeks interval between injections is recommended.

- Time to produce effect: Immediate with local anesthetic, or within 3 days with corticosteroids.

- Maximum duration: limited to 3 injections annually to the same site.

D.3.f Operative Procedures (Bicipital Tendon Disorders)

D.3.f.i Bicipital Tendinitis: Conservative care prior to potential surgery must address flexibility and strength imbalances. Surgical remedies would be considered after 12 weeks of appropriate conservative care has failed. Since impingement of the biceps tendon could cause continued irritation, an acromioplasty may be necessary, especially when the presence of an obstructing osteophyte is demonstrated on plain x-rays.

D.3.f.ii Subluxing Bicipital Tendon: The decision to surgically stabilize the bicipital tendon is not commonly indicated. In the vast majority of cases, optimal outcome is achieved through successful rehabilitation procedures, and appropriate non-surgical measures should be maximized prior to surgical intervention.

D.3.f.iii Acute Disruption of the Bicipital Tendon: Surgery has been shown to be more effective than conservative care in the treatment of full thickness ruptures of the distal biceps tendon.

D.3.g Post-Operative Procedures (Bicipital Tendon Disorders)

Post-Operative Procedures (Bicipital Tendon Disorders) would include an individualized rehabilitation program based upon communication among the physician, the surgeon and the therapist. Rehabilitation, lasting 6-12 weeks, is necessary to facilitate maximum medical improvement (MMI).

D.4 BRACHIOPLEXUS INJURIES

Brachioplexus injuries to the nerves and shoulder girdle region result in loss of motor and sensory function, pain and instability of the shoulder. Signs and symptoms vary with the mechanism of injury. The two modes of injury are: 1) acute direct trauma, and 2) repetitive motion or overuse. Transient compression, stretch or traction (neuropraxia) causes sensory and motor signs lasting days to weeks. Damage to the axon (axonomesis) without disruption of the nerve framework may cause similar

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symptoms. The recovery time is delayed and depends upon axon regrowth distally from the site of injury. Laceration or disruption of the entire nerve with complete loss of framework (neurotmesis) is the most severe form of nerve injury. Return of function is dependent upon regrowth of the nerve distal to the injury site.

Electrodiagnostic studies (EDX) are the most commonly used diagnostic modality to analyze nerve injuries. These studies should be utilized when necessary as an extension of the history and clinical examination.

Slowing of motor nerve conduction velocities due to demyelinization localizes regions of entrapment and injury. Denervation demonstrated on the electromyographic portion is indicative of motor axonal or anterior horn cell loss. Studies should be performed 3-4 weeks following injury or description of symptoms. If the symptoms have been present for longer than 3-4 weeks, studies may be performed immediately after the initial evaluation. Serial studies may be indicated if initial studies are negative and may also be useful for gauging prognosis. Limb temperature influences nerve conduction velocities. In cases when significant slowed conduction is recorded, the standard of the American Association of Neuromuscular and Electrodiagnostic Medicine (AANEM) including temperatures should be followed. It is recommended and preferred that EDX in the outpatient setting be performed and interpreted by physicians board certified in Neurology or Physical Medicine and Rehabilitation.

There are six relatively common nerve injuries to the shoulder girdle. Each type will be addressed separately.

D.4.a <u>Brachial Plexus</u>

Brachial Plexus is formed by the nerve roots of C5-C8 and T1; these nerve roots exit the cervical spine and pass through the scalene musculature; after leaving the scalene musculature, at the level of the clavicle, they form trunks, divisions and chords which ultimately form the peripheral nerves of the arm.

D.4.a.i History and Mechanism of Injury (Brachial Plexus):

D.4.a.i.a Mechanism of Injury: direct injury to brachial plexus results in widespread sensory and motor loss. Direct trauma, subluxation of the shoulder, clavicular fractures, shoulder depression, and head deviation away from the arm may result in variable brachial plexus lesions. It is important to differentiate injuries to the brachial plexus from the acquired (non-work-related) syndrome of brachial plexus neuritis, Parsonage-Turner Syndrome.

D.4.a.ii Physical Findings (Brachial Plexus) may include:

D.4.a.ii.a Inspection for evidence of trauma or deformity;

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D.4.a.ii.b Identification of sensory loss and demonstration of weakness which relates to the severity and anatomy of the injury to the brachial plexus; and/or

D.4.a.ii.c Pain with recreation of the motions during the mechanism of injury.

D.4.a.iii Laboratory Tests (Brachial Plexus)

Laboratory Tests are not indicated unless a systemic illness or disease is suspected.

D.4.a.iv Testing Procedures (Brachial Plexus)

Testing Procedures may include electrodiagnostic studies (EDX). If they do not localize and give sufficient information, then additional information may be obtained from MRI and/or myelography. These studies are employed to differentiate root avulsion from severe brachial plexus injuries. Evaluation of brachial plexus may include an apical lordotic chest x-ray.

D.4.a.v Non-Operative Treatment Procedures (Brachial Plexus):

D.4.a.v.a In closed injuries, observation is favored; repeat electrodiagnostic studies may be helpful to follow recovery.

D.4.a.v.b Rehabilitation utilizing procedures set forth in Section E, Therapeutic Procedures: Non-Operative.

D.4.a.v.c Medications, such as analgesics, nonsteroidal anti-inflammatories, antidepressants and anticonvulsants may be indicated; steroids may be prescribed to help diminish the inflammatory response. Narcotics may be indicated acutely and should be prescribed as indicated for limited periods.

D.4.a.vi Operative Procedures (Brachial Plexus): For open injuries, exploration may be worthwhile if there is poor progression of recovery from a conservative approach; for closed injuries, if progressive weakness and loss of function is documented after 4-6 months of conservative care, then exploration is also warranted.

D.4.a.vii Post-Operative Procedures (Brachial Plexus) would include an individualized rehabilitation program based upon communication among the physician, surgeon and therapist.

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This program would begin with 4-6 weeks of rest followed by progressive increase in motion and strength.

D.4.b Axillary Nerve

Axillary Nerve is derived from the 5th and 6th cervical roots. It passes around the shoulder and supplies motor branches to the teres minor and the three heads of the deltoid; it gives sensation to the lateral aspect of the proximal arm at the level of the deltoid.

D.4.b.i History and Mechanism of Injury (Axillary Nerve):

Mechanism of Injury: direct injury and penetrating wounds to the shoulder and upward pressure on the axilla can cause injury to the axillary nerve; abnormalities of the nerve can also be seen with fractures of the surgical neck of the humerus and dislocation of the shoulder. Finally, axillary nerve injury can be seen with shoulder surgery in and of itself.

D.4.b.ii Physical Findings (Axillary Nerve) may include:

D.4.b.ii.a Weakness and atrophy of the deltoid muscle;

D.4.b.ii.b Strength is lost in abduction, flexion and extension of the shoulder; and/or

D.4.b.ii.c Sensory loss can be seen over the upper arm.

D.4.b.iii Laboratory Tests (Axillary Nerve)

Laboratory Tests are not indicated unless a systemic illness or disease is suspected.

D.4.b.iv Testing Procedures (Axillary Nerve)

Testing Procedures may include electrodiagnostic studies for patients with persistent symptoms.

D.4.b.v Non-Operative Treatment Procedures (Axillary Nerve):

D.4.b.v.a Rehabilitation utilizing procedures set forth in Section E, Therapeutic Procedures: Non-Operative.

D.4.b.v.b Medications such as analgesics, nonsteroidal anti-inflammatories, antidepressants and anticonvulsants may be indicated and narcotics may on rare occasions be indicated acutely.

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D.4.b.vi Operative Procedures (Axillary Nerve)

Operative Procedures are usually not necessary, since most injuries to the axillary nerve are due to stretch and/or traction. One may consider surgery after 4-6 months with electrodiagnostic studies documenting ongoing enervation and loss of function.

D.4.b.vii Post-Operative Procedures (Axillary Nerve)

Post-Operative Procedures would include an individualized rehabilitation program based upon communication among the physician, the surgeon and the therapist. This program would begin with 4-6 weeks of rest followed by progressive increase in motion and strength.

D.4.c Long Thoracic Nerve

Long Thoracic Nerve is formed by the cervical fifth, sixth, and seventh roots; it crosses the border of the first rib and descends along the posterior surface of the thoracic wall to the stratus anterior.

D.4.c.i History and Mechanism of Injury (Long Thoracic Nerve):

D.4.c.i.a Mechanism of Injury: injury can occur by direct trauma to the posterior triangle of the neck or trauma may be the result of chronically repeated or forceful shoulder depression. Repeated forward motion of the arms as well as stretch or compression of the nerve with the arms abducted can lead to long thoracic nerve dysfunction.

D.4.c.ii Physical Findings (Long Thoracic Nerve) may include:

D.4.c.ii.a Dull ache in the region of the shoulder without sensory loss;

D.4.c.ii.b Scapular deformity and/or winging may be described by patient or family; and/or

D.4.c.ii.c Serratus Anterior (scapular winging) may be demonstrated by asking the patient to flex and lean on the patient's arms, such as against a wall and/or the examiner resisting protraction.

D.4.c.iii Laboratory Tests (Long Thoracic Nerve)

Laboratory Tests are not indicated unless a systemic illness or disease is suspected.

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D.4.c.iv Testing Procedures (Long Thoracic Nerve)

When signs or symptoms persist, electrodiagnostic studies are used to define the anatomy and severity of the injury; side-to-side comparisons of the nerve can be helpful to confirm the diagnosis. Studies may also exclude more widespread brachial plexus involvement.

D.4.c.v Non-Operative Treatment (Long Thoracic Nerve):

D.4.c.v.a Rehabilitation utilizing procedures set forth in Section E, Therapeutic Procedures: Non-Operative.

D.4.c.v.b Medications, such as analgesics, nonsteroidal anti-inflammatories, antidepressants and anticonvulsants may be indicated, and narcotics, on rare occasions, may be indicated acutely.

D.4.c.vi Operative Procedures (Long Thoracic Nerve)

Operative Procedures such as scapular fixation may be recommended, but only in the most severe cases where there is documented significant loss of function.

D.4.c.vii Post-Operative Procedures (Long Thoracic Nerve)

Post-Operative Procedures would include an individualized rehabilitation program based upon communication among the physician, the surgeon and the therapist. This program would begin with 8-10 weeks of rest followed by progressive increase in motion and strength.

D.4.d Musculocutaneous Nerve

Musculocutaneous Nerve is derived from the fifth and sixth cervical roots; it innervates the coracobrachialis, biceps and brachialis muscles and also provides sensation to the lateral aspect of the forearm. Trauma (including surgery) or penetrating wound to the brachial plexus, coracobrachialis, and shoulder often can cause nerve injury.

D.4.d.i History and Mechanism of Injury (Musculocutaneous Nerve):

D.4.d.i.a Mechanism of Injury: most commonly a stretch/traction injury due to forceful extension of the elbow inducing nerve dysfunction; trauma can be seen to the sensory component (lateral antebrachial cutaneous nerve) which delineates loss of sensation to the forearm.

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D.4.d.ii Physical Findings (Musculocutaneous Nerve) may include:

D.4.d.ii.a Pain in the arm;

D.4.d.ii.b Weakness and atrophy in the biceps and brachialis; and/or

D.4.d.ii.c Sensory loss over the lateral aspect of the forearm; however, this is not always seen.

D.4.d.iii Laboratory Tests (Musculocutaneous Nerve)

Laboratory Tests are not indicated unless a systemic illness or disease is suspected.

D.4.d.iv Testing Procedures (Musculocutaneous Nerve)

Testing Procedures include electrodiagnostic studies when signs or symptoms persist; side-to-side comparisons of the motor and sensory components of the nerve may be useful since standard norms are not always reliable.

D.4.d.v Non-Operative Treatment Procedures (Musculocutaneous Nerve):

D.4.d.v.a Rehabilitation utilizing procedures set forth in Section E, Therapeutic Procedures: Non-Operative.

D.4.d.v.b Medications, such as analgesics, nonsteroidal anti-inflammatories, antidepressants and anticonvulsants, may be indicated. Narcotics, on rare occasions, may be indicated.

D.4.d.vi Operative Procedures (Musculocutaneous Nerve)

Operative Procedures are usually not necessary unless there has been increasing loss of function over 4-6 months and/or a laceration to the nerve has been identified.

D.4.d.vii Post-Operative Procedures (Musculocutaneous Nerve)

Post-Operative Procedures would include an individualized rehabilitation program based upon communication among the physician, the surgeon and the therapist. This program would begin with 8-10 weeks of rest followed by progressive increase in motion and strength.

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D.4.e Spinal Accessory Nerve

Spinal Accessory Nerve is the eleventh cranial nerve; the nerve innervates the ipsilateral sternocleidomastoid and trapezius muscles which are extremely important for scapular control and ultimately shoulder function.

D.4.e.i History and Mechanism of Injury (Spinal Accessory Nerve):

D.4.e.i.a Mechanism of Injury: direct trauma to the posterior neck, forceful compression of the shoulder downward and/or deviation of the head away from the traumatized shoulder can lead to injury to this nerve; surgical procedures in the posterior neck can disrupt the nerve.

D.4.e.ii Physical Findings (Spinal Accessory Nerve) may include:

D.4.e.ii.a Pain in the shoulder;

D.4.e.ii.b Weakness or paralysis of the trapezius which is seen as winging with the arms out to the side (abduction); and/or

D.4.e.ii.c Drooping of the shoulder.

D.4.e.iii Laboratory Tests (Spinal Accessory Nerve)

Laboratory Tests are not indicated unless a systemic illness or disease is suspected.

D.4.e.iv Testing Procedures (Spinal Accessory Nerve)

Testing Procedures include electrodiagnostic studies when signs and symptoms persist. Electrodiagnostic studies are used to define the anatomy and severity of the injury; side-to-side comparisons of the nerve can be helpful to confirm the diagnosis; radiographic procedures may be necessary to exclude lesion at the base of the brain or upper cervical spine.

D.4.e.v Non-Operative Treatment Procedures (Spinal Accessory Nerve):

D.4.e.v.a Rehabilitation utilizing procedures set forth in Section E, Therapeutic Procedures: Non-Operative.

D.4.e.v.b Medications, such as analgesics, nonsteroidal anti-inflammatories, antidepressants and anticonvulsants, may be indicated and narcotics, on rare occasions, may be indicated acutely.

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D.4.e.vi Operative Procedures (Spinal Accessory Nerve)

Operative Procedures are usually not necessary unless increased loss of function over 4-6 months has been documented and/or a laceration to the nerve has been identified.

D.4.e.vii Post-Operative Procedures (Spinal Accessory Nerve)

Post-Operative Procedures would include an individualized rehabilitation program based upon communication among the physician, the surgeon and the therapist. This program would begin with 8-10 weeks of rest followed by progressive increase in motion and strength.

D.4.f Suprascapular Nerve

Suprascapular Nerve is derived from the fifth and sixth cervical root, superior trunk of the brachial plexus, and it innervates the supraspinatus and infraspinatus muscles of the rotator cuff.

D.4.f.i History and Mechanism of Injury (Suprascapular Nerve):

D.4.f.i.a Mechanism of Injury: supraclavicular trauma, stretch, and friction through the suprascapular notch or against the transverse ligament at the notch can cause injury to the nerve; repetitive use of the arm has been shown on occasion to cause traction to the nerve.

D.4.f.ii Physical Findings (Suprascapular Nerve) may include:

D.4.f.ii.a Pain at the shoulder;

D.4.f.ii.b Wasting at the supraspinatus and/or infraspinatus muscles with weakness; and/or

D.4.f.ii.c Tinel's can help to elicit a provocative pain response.

D.4.f.iii Laboratory Tests (Suprascapular Nerve)

Laboratory Tests are not indicated unless a systemic illness or disease is suspected.

D.4.f.iv Testing Procedures (Suprascapular Nerve)

Testing Procedures include electrodiagnostic studies when signs and symptoms persist. Side-to-side comparisons may be useful since standard norms are not always reliable. If one suspects a

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mass lesion at the suprascapular notch, then an MRI may be indicated.

D.4.f.v Non-Operative Treatment Procedures (Suprascapular Nerve)

D.4.f.v.a Rehabilitation utilizing procedures set forth in Section E, Therapeutic Procedures: Non-Operative.

D.4.f.v.b Medications, such as analgesics, nonsteroidal anti-inflammatories, antidepressants and anticonvulsants, may be indicated and narcotics, on rare occasions, may be indicated acutely.

D.4.f.vi Operative Treatment Procedures (Suprascapular Nerve)

Operative Treatment involving surgical release at the suprascapular notch or spinoglenoid region is warranted depending upon the results of the electrodiagnostic studies and/or absence of improvement with conservative management.

D.4.f.vii Post-Operative Procedures (Suprascapular Nerve)

Post-Operative Procedures would include an individualized rehabilitation program based upon communication among the physician, the surgeon and the therapist. This program would begin with 8-10 weeks of rest followed by progressive increase in motion and strength.

D.5 BURSITIS OF THE SHOULDER

Acute or chronic inflammation of the bursa (a potential fluid filled sac) that may be caused by trauma, chronic overuse, inflammatory arthritis, and acute or chronic infection that generally presents with localized pain and tenderness of the shoulder.

D.5.a History and Mechanism of Injury (Bursitis of the Shoulder)

D.5.a.i Mechanism of Injury: onset of symptoms, date, mechanism of onset, and occupational history and current requirements should be correlated with the intensity, character, duration and frequency of associated pain and discomfort.

D.5.a.ii History may include nocturnal pain, pain with over-the-shoulder activities, feeling of shoulder weakness, prior treatment for presenting complaint(s), specific limitations of movement and pertinent familial history.

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D.5.b Physical Findings (Bursitis of the Shoulder)

Physical Findings may include:

D.5.b.i Palpation elicits localized tenderness over the particular bursa or inflamed tendon; loss of motion during activity;

D.5.b.ii Painful arc may be seen between 40-120°; and/or

D.5.b.iii Bursitis may be associated with other shoulder injury diagnoses such as impingement, rotator cuff instability, tendinitis, etc.; refer to applicable diagnosis subsections for additional guidelines.

D.5.c Laboratory Tests (Bursitis of the Shoulder)

Laboratory Tests may be used to rule out systemic illness or disease when proper clinical presentation indicates the necessity for such testing. On rare occasions, when indicated, testing could include sedimentation rate, rheumatoid profile, complete blood count (CBC) with differential and serum uric acid level. Routine screening of other medical disorders may be necessary, as well as bursal aspiration with fluid analysis.

D.5.d Testing Procedures (Bursitis of the Shoulder)

D.5.d.i Plain x-rays may be performed to rule out other shoulder pathology.

D.5.e Non-Operative Treatment Procedures (Bursitis of the Shoulder)

D.5.e.i Benefits may be achieved through non-operative treatment procedures, such as immobilization, therapeutic exercise, alteration of occupation and work station, thermal therapy, and ultrasound. Exclusive use of passive modalities should be limited to the first 2-3 weeks during the acute phase of shoulder discomfort, and accompanied by active therapies as soon as these are appropriate.

D.5.e.ii May return to work without overhead activities and lifting with involved arm until cleared by physician for those and heavier activities.

D.5.e.iii Additional modalities/treatment procedures may include physical medicine and rehabilitation including instruction in therapeutic exercise, proper work technique and manual therapy; vocational rehabilitation, vocational assessment and interdisciplinary team approach. Biofeedback is not recommended.

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D.5.e.iv Medications such as nonsteroidal anti-inflammatories, oral steroids and analgesics may be considered.

D.5.e.v Intrabursal injection with steroids may be therapeutic.

- Frequency: Not more than 2-3 times annually. Usually 1 or 2 injections adequate. A minimum of 3 weeks interval between injections is recommended.
- Time to produce effect: Within 3 days with corticosteroids.
- Maximum duration: Limited to 3 injections annually to the same site.

D.5.f Operative Procedures (Bursitis of the Shoulder)

Operative Procedures are not commonly indicated for pure bursitis.

D.6 IMPINGEMENT SYNDROME

A collection of symptoms, not a pathologic diagnosis. The symptoms result from the encroachment of the acromion, coracoacromial ligament, coracoid process, and/or the AC joint on the rotator cuff mechanism that passes beneath them as the shoulder is moved. The cuff mechanism is intimately related to the coracoacromial arch. Separated only by the thin lubricating surfaces of the bursa, compression and friction can be minimized by several factors, such as:

- Shape of the coracoacromial arch that allows passage of the subjacent rotator cuff;
- Normal undersurface of the AC joint;
- Normal bursa;
- Normal capsular laxity; and
- Coordinated scapulothoracic function.

The impingement syndrome may be associated with AC joint arthritis and both partial- and full-thickness rotator cuff tears, as well as adhesive capsulitis/frozen shoulder. Normal function of the rotator cuff mechanism and biceps tendon assist to diminish impingement syndrome.

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D.6.a History and Mechanism of Injury (Impingement Syndrome)

D.6.a.i Mechanism of Injury: established repetitive overuse of the upper extremity; many times this is seen with frequently repeated overhead motion.

D.6.a.ii History may include:

D.6.a.ii.a Delayed presentation: Since the syndrome is usually not an acute problem, patients will access care if their symptoms have not resolved with rest, time and "trying to work it out";

D.6.a.ii.b Complaints of functional losses due to pain, stiffness, weakness and catching when the arm is flexed and internally rotated; and

D.6.a.ii.c Poor sleep is common and pain is often felt down the lateral aspect of the upper arm near the deltoid insertion or over the anterior proximal humerus.

D.6.b Physical Findings (Impingement Syndrome)

Physical Findings may include:

D.6.b.i Inspection of the shoulder may reveal deltoid and rotator cuff atrophy;

D.6.b.ii Range of motion is limited, particularly in internal rotation and in cross-body adduction;

D.6.b.iii Passive motion through the 60-90° arc of flexion may be accompanied by pain and crepitus; this is accentuated as the shoulder is moved in and out of internal rotation;

D.6.b.iv Active elevation of the shoulder is usually more uncomfortable than passive elevation;

D.6.b.v Pain on maximum active forward flexion is frequently seen with impingement syndrome, but is not specific for diagnosis;

D.6.b.vi Strength testing may reveal weakness. This weakness may be the result of pain, disuse, tendon damage, or poor scapulothoracic mechanics;

D.6.b.vii Pain on resisted abduction or external rotation may also indicate that the integrity of the rotator cuff tendons may be compromised; and/or

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D.6.b.viii Weakness of the posterior scapular stabilizers can also be seen as a contributing factor to impingement syndrome by altering the mechanics of the glenohumeral joint.

D.6.c Laboratory Tests (Impingement Syndrome)

Laboratory Tests are not indicated unless a systemic illness or disease is suspected.

D.6.d Testing Procedures (Impingement Syndrome)

D.6.d.i Plain x-rays may demonstrate calcification or bone spurs.

D.6.d.ii Subacromial space injection can be used as a diagnostic procedure by injecting an anesthetic, such as sensorcaine or xylocaine solutions, into the space. If the pain is alleviated with the injection, the diagnosis is confirmed.

D.6.d.iii Adjunctive testing, such as standard radiographic techniques (sonography, arthrography or MRI), should be considered when shoulder pain is refractory to 4-6 weeks of non-operative conservative treatment and the diagnosis is not readily identified by a good history and clinical examination.

D.6.e Non-Operative Treatment Procedures (Impingement Syndrome)

Non-Operative Treatment Procedures may include:

D.6.e.i Medications, such as nonsteroidal anti-inflammatories and analgesics.

D.6.e.ii Subacromial space injection with steroids may be therapeutic if the patient responded positively to a diagnostic injection of an anesthetic. Steroid injections directly into the tendons are not recommended.

- Frequency: Not more than 2-3 times annually. Usually 1 or 2 injections adequate. A minimum of 3 weeks interval between injections is recommended.
- Time to produce effect: Immediate with local anesthetic, or within 3 days with corticosteroids.
- Maximum duration: Limited to 3 injections annually to the same site.

D.6.e.iii In order to have the most favorable outcome from a conservative approach, an aggressive attempt should be made

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to define the contributing factors which are driving the syndrome, such as shoulder stiffness, humeral head depressor weakness (rotator cuff fiber failure), and subacromial crowding or AC joint arthritis.

D.6.e.iv Non-Operative Treatment Procedures, such as relative rest, immobilization, thermal treatment, ultrasound, therapeutic exercise and physical medicine and rehabilitation should be considered.

D.6.f Operative Procedures (Impingement Syndrome)

Operative Procedures for impingement syndrome should not be considered prior to an adequate trial of physical rehabilitation that includes direction and supervision by an appropriate, licensed professional and active patient participation. Such a trial should normally last for a minimum of 6 weeks.

Refer to Table 2: Criteria for Shoulder Surgery - Impingement Syndrome.

Table 2: Criteria for Shoulder Surgery – Impingement Syndrome

If the patient has	AND the diagnosis is supported by			AND this has been done (if recommended)	The following surgery may be appropriate
DIAGNOSIS	CLINICAL FINDING SUBJECTIVE	OBJECTIVE	IMAGING	CONSERVATIVE CARE	SURGICAL PROCEDURE
Acromial Impingement Syndrome (80% of these patients will get better without surgery)	Pain with active arc motion 90 - 130° AND Pain at night; Tenderness over the greater tuberosity is common in acute cases.	Weak or absent abduction. May also demonstrate atrophy AND Tenderness over rotator cuff or anterior acromial area AND Positive impingement sign and temporary relief of pain with anesthetic injection (diagnostic injection test).	Conventional x-rays , AP, and true lateral or axillary view AND MRI, Ultra-sound or Arthrogram shows positive evidence of deficit in rotator cuff.	Recommend 3-6 months: three months is adequate if treatment has been continuous, six months if treatment has been intermittent. Treatment must be directed toward gaining full range of motion, which requires both stretching and strengthening to balance the musculature.	Anterior Acromioplasty

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D.6.g Post-Operative Procedures (Impingement Syndrome)

D.6.g.i Individualized rehabilitation programs based upon communication among the physician, the surgeon and the therapist might include:

D.6.g.i.a Sling or abduction splint;

D.6.g.i.b Gentle pendulum exercise, passive glenohumeral range of motion and aggressive posterior scapular stabilizing training can be instituted;

D.6.g.i.c At 4 weeks post-operative, begin isometrics and ADL involvement; and/or

D.6.g.i.d Depending upon the patient's functional response, at 6 weeks post-operative consider beginning light resistive exercise; concomitantly, return to a light/modified duty may be plausible given the ability to accommodate "no repetitive overhead activities."

D.6.g.ii Progressive resistive exercise from 2 months with gradual returning to full activity at 5-7 months; all active non-operative procedures listed in Section E, Therapeutic Procedures: Non-Operative, should be considered.

D.6.g.iii Work restrictions should be evaluated every 4-6 weeks during post-operative recovery and rehabilitation with appropriate written communications to both the patient and the employer. Should progress plateau, the provider should reevaluate the patient's condition and make appropriate adjustments to the treatment plan.

D.7 ROTATOR CUFF TEARS

Partial or full-thickness tears of the rotator cuff tendons, most often the supraspinatus, can be caused by vascular, traumatic or degenerative factors or a combination. Further tear classification includes: a small tear is less than 1 cm; medium tear is 1-3 cm; large tear is 3-5 cm; and massive tear is greater than 5 cm, usually with retraction.

D.7.a History and Mechanism of Injury (Rotator Cuff Tear)

D.7.a.i Mechanism of Injury: established with sudden trauma to the shoulder or chronic over-use with repetitive overhead motion with internal or external rotation.

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D.7.a.ii History may include:

D.7.a.ii.a Partial-thickness cuff tears usually occur in age groups older than 30. Full-thickness tears can occur in younger age groups.

D.7.a.ii.b Complaints of pain along anterior, lateral or posterior glenohumeral joint.

D.7.b Physical Findings (Rotator Cuff Tear)

Physical Findings may include:

D.7.b.i Partial-Thickness Tears

D.7.b.i.a There will be pain at the end of range of motion with full passive range of motion for abduction, elevation, external rotation; internal rotation is attainable;

D.7.b.i.b Active range of motion will be limited and painful for abduction and external rotation, as well as internal rotation and forward flexion;

D.7.b.i.c A painful arc may be present with active elevation;

D.7.b.i.d Pain will be positive for resisted tests (abduction, flexion, external rotation, internal rotation, abduction/internal rotation at 90°, and abduction/external rotation at 45°; and/or

D.7.b.i.e If there are positive impingement signs, refer to Section D.6, Impingement Syndrome.

D.7.b.ii Full-Thickness Tears

D.7.b.ii.a Passive and resisted findings are similar to those for partial-thickness tears; and/or

D.7.b.ii.b Active elevation will be severely limited with substitution of scapular rotation being evident.

D.7.c Laboratory Tests (Rotator Cuff Tear)

Laboratory Tests are not indicated unless a systemic illness or disease is suspected.

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D.7.d Testing Procedures (Rotator Cuff Tear)

D.7.d.i Plain x-rays include:

D.7.d.i.a AP view visualizes elevation of the humeral head, indicative of absence of the rotator cuff due to a tear;

D.7.d.i.b Lateral view in the plane of the scapula or an axillary view determines if there is anterior or posterior dislocation or the presence of a defect in the humeral head (a Hill-Sachs lesion);

D.7.d.i.c 30° caudally angulated AP view determines if there is a spur on the anterior/inferior surface of the acromion and/or the far end of the clavicle; and

D.7.d.i.d Outlet view determines if there is a downwardly tipped acromion.

D.7.d.ii Adjunctive testing should be considered when shoulder pain is refractory to 4-6 weeks of non-operative conservative treatment and the diagnosis is not readily identified by standard radiographic techniques, then sonography, arthrography or MRI may be indicated. MRI should be performed sooner (e.g., 1-2 weeks), when there is clinical suspicion of full-thickness rotator cuff tear.

D.7.e Non-Operative Treatment Procedures (Rotator Cuff Tear)

D.7.e.i Medications, such as nonsteroidal anti-inflammatories and analgesics, would be indicated; acute rotator cuff tear could indicate the need for limited narcotics use.

D.7.e.ii Relative rest and non-operative treatment procedures, such as immobilization, therapeutic exercise, alteration of occupation/work station, thermal treatment, and therapeutic ultrasound. Exclusive use of passive modalities should be limited to the first 2-3 weeks during the acute phase of shoulder discomfort, and accompanied by active therapies as soon as these are appropriate. If no clinically significant increase in function for a partial- or full-thickness tear is observed after adequate participation in a rehabilitation program, a surgical consultation is indicated. Adequate is here defined as at least 75% attendance in an active physical therapy program with a minimum of 2-3 sessions per week for 4 weeks. A physical therapy program that is based solely on

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passive modalities, or for which the claimant has not demonstrated compliance, is insufficient. Early surgical intervention produces better surgical outcome due to healthier tissues and often less limitation of movement prior to and after surgery.

D.7.f Operative Procedures (Rotator Cuff Tear)

Table 3: Criteria for Shoulder Surgery – Rotator Cuff Tear

If the patient has	AND the diagnosis is supported by			AND this has been done (if recommended)	The following surgery may be appropriate
DIAGNOSIS	CLINICAL FINDINGS SUBJECTIVE	OBJECTIVE	IMAGING	CONSERVATIVE CARE	SURGICAL PROCEDURE
Full Thickness Rotator Cuff Tear AND Cervical pathology and frozen shoulder syndrome have been ruled out.	Shoulder pain and inability to elevate the arm; Tenderness over the greater tuberosity is common in acute cases.	Patient may have weakness with abduction testing; May also demonstrate atrophy of shoulder musculature; Usually has full passive range of motion.	Conventional x-rays , AP, and true lateral or axillary view AND MRI, Ultrasound, or Arthrogram shows positive evidence of deficit in rotator cuff.	Not required.	Rotator Cuff Repair.
Partial Thickness Rotator Cuff Tear.	Pain with active arc motion 90 - 130° AND Pain at night; Tenderness over the greater tuberosity is common in acute cases.	Weak or absent abduction. May also demonstrate atrophy AND Tenderness over rotator cuff or anterior acromial area AND Positive impingement sign and temporary relief of pain with anesthetic injection (diagnostic injection test).	Conventional x-rays , AP, and true lateral or axillary view AND MRI, Ultrasound, or Arthrogram shows positive evidence of deficit in rotator cuff.	Recommend 3-6 months; three months is adequate if treatment has been continuous, six months if treatment has been intermittent. Treatment must be directed toward gaining full range of motion, which requires both stretching and strengthening to balance the musculature.	Rotator Cuff Repair OR Anterior Acromioplasty.

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D.7.g Post-Operative Procedures (Rotator Cuff Tear)

D.7.g.i Individualized rehabilitation program based on communication among the physician, the surgeon and therapist might include:

D.7.g.i.a Sling or abduction splint;

D.7.g.i.b Gentle pendulum exercise, passive glenohumeral range of motion in flexion and external rotation to prevent adhesions and maintain mobilization;

D.7.g.i.c At 6 weeks post-operative begin isometrics and ADL involvement;

D.7.g.i.d Active assisted range of motion in supine with progression to sitting;

D.7.g.i.e At 6-8 weeks, depending on quality of tissue, begin light resistive exercise;

D.7.g.i.f Manual resistive exercise to 90°, scapular mobilization exercise with glenohumeral stabilization; and

D.7.g.i.g Scapular plane exercise.

D.7.g.i.h Pool exercise is not recommended.

D.7.g.ii Progressive resistive exercise from 3-6 months, with gradual returning to full activity at 6-9 months. All active non-operative procedures listed in Section E, Therapeutic Procedures: Non-Operative, should be considered.

D.7.g.iii Work restrictions should be evaluated every 4-6 weeks during post-operative recovery and rehabilitation with appropriate written communications to both the patient and employer. Should progress plateau, the provider should reevaluate the patient's condition and make appropriate adjustments to the treatment plan.

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D.8 ROTATOR CUFF TENDINITIS

Inflammation of one or more of the four musculotendinous structures which arise from the scapula and insert on the lesser or greater tuberosity of the humerus. These structures include one internal rotator (subscapularis), and two external rotators (infraspinatus and teres minor), and the supraspinatus which assists in abduction.

D.8.a History and Mechanism of Injury (Rotator Cuff Tendinitis)

D.8.a.i Mechanism of Injury: established with sudden trauma to the shoulder or chronic over-use with repetitive overhead motion with internal or external rotation.

D.8.b Physical Findings (Rotator Cuff Tendinitis)

Physical Findings may include:

D.8.b.i Pain with palpation to the shoulder with active or passive abduction and external rotation of the shoulder (painful arc);

D.8.b.ii Pain with impingement signs; and/or

D.8.b.iii Pain with specific activation of the involved muscles.

D.8.c Laboratory Tests (Rotator Cuff Tendinitis)

Laboratory Tests are not indicated unless a systemic illness or disease is suspected.

D.8.d Testing Procedures (Rotator Cuff Tendinitis)

Testing Procedures may include:

D.8.d.i Plain x-ray films including AP lateral, axial, 30° caudally angulated AP, outlet view;

D.8.d.ii If shoulder pain is refractory to 4-6 weeks of non-operative care and the diagnosis is not readily identified by standard radiographic techniques, then adjunctive testing, such as MRI, sonography or arthrography, may be indicated to rule out a rotator cuff tear;

D.8.d.iii Subacromial space injection can be used as a diagnostic procedure by injecting an anesthetic, such as sensorcaine or xylocaine solutions, into the space. If the pain is alleviated with the injection, the diagnosis is confirmed.

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D.8.e Non-Operative Treatment Procedures (Rotator Cuff Tendinitis)

Non-Operative Treatment Procedures may include:

D.8.e.i Medications, such as nonsteroidal anti-inflammatories, oral steroids and analgesics.

D.8.e.ii Subacromial space injection with steroids may be therapeutic if the patient responded positively to a diagnostic injection of an anesthetic. Steroid injections directly into the tendons are not recommended.

- Frequency: Not more than 2-3 times annually. Usually 1 or 2 injections adequate. A minimum of 3 weeks interval between injections is recommended.
- Time to produce effect: Immediate with local anesthetic, or within 3 days with corticosteroids.
- Maximum duration: limited to 3 injections annually to the same site.

D.8.e.iii Non-operative treatment procedures/modalities such as relative rest, immobilization, thermal treatment, ultrasound, therapeutic exercise, physical medicine and rehabilitation should be limited to the first 2-3 weeks during the acute phase of shoulder discomfort, and accompanied by active therapies as soon as these are appropriate.

D.8.f Operative Procedures (Rotator Cuff Tendinitis)

Operative Procedures are not indicated for this diagnosis.

D.9 SHOULDER FRACTURES

There are five common types of shoulder fractures. Each type will be addressed separately and in the order of most frequent occurrence.

D.9.a Clavicular Fracture

D.9.a.i History and Initial Diagnostic Procedures (Clavicular Fracture)

D.9.a.i.a Mechanism of Injury: can result from direct blows or axial loads applied to the upper limb; commonly associated injuries include rib fractures, long-bone

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fractures of the ipsilateral limb and scapulothoracic dislocations.

D.9.a.ii Physical Findings (Clavicular Fracture)

Physical Findings may include:

D.9.a.ii.a Pain in the clavicle;

D.9.a.ii.b Abrasions on the chest wall, clavicle and shoulder can be seen;

D.9.a.ii.c Deformities can be seen in the above regions; and/or

D.9.a.ii.d Pain with palpation and motion at the shoulder joint area.

D.9.a.iii Laboratory Tests (Clavicular Fracture)

Laboratory Tests are not indicated unless a systemic illness or disease is suspected.

D.9.a.iv Testing Procedures (Clavicular Fracture)

Testing Procedures would usually include routine chest x-rays . If they do not reveal sufficient information, then a 20° caudalcranial AP view centered over both clavicles can be done.

D.9.a.v Non-Operative Treatment Procedures (Clavicular Fracture)

D.9.a.v.a Most are adequately managed by closed techniques and do not require surgery. After reduction, the arm is immobilized in a sling or figure-8 bandage. Shoulder rehabilitation is begun with pendulum exercises 10-14 days after injury. Subsequently, with pain control, the therapy program can be progressed with non-operative therapeutic approaches.

D.9.a.v.b Medication, such as analgesics and nonsteroidal anti-inflammatories, would be indicated; narcotics, on rare occasions, may be indicated acutely for fracture.

D.9.a.vi Operative Procedures (Clavicular Fracture)

Operative Procedures would be indicated for open fractures, vascular or neural injuries requiring repair, bilateral fractures, ipsilateral scapular or glenoid neck fractures, scapulothoracic dislocations, flail chest and nonunion displaced-closed fractures

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that show no evidence of union after 4-6 months. Also a Type II fracture/dislocation at the AC joint where the distal clavicular fragment remains with the acromion and the coracoid, and the large proximal fragment is displaced upwards.

D.9.a.vii Post-Operative Procedures (Clavicular Fracture)

Post-Operative procedures would include an individualized rehabilitation program based upon communication among the physician, the surgeon and the therapist. This program would begin with 2-3 weeks of rest with a shoulder immobilizer while encouraging isometric deltoid strengthening; pendulum exercises with progression to assisted forward flexion and external rotation would follow; strengthening exercises should be started at 10-12 weeks.

D.9.b Proximal Humeral Fracture

D.9.b.i History Mechanism of Injury (Proximal Humeral Fracture)

D.9.b.i.a Mechanism of Injury: may be caused by a fall onto an abducted arm; may also be caused by high-energy (velocity or crush) trauma with an abducted or non-abducted arm; associated injuries are common, such as glenohumeral dislocation, stretch injuries to the axillary, musculocutaneous, and radial nerves; axillary artery injuries with high energy accident.

D.9.b.ii Physical Findings (Proximal Humeral Fracture)

Physical Findings may include:

D.9.b.ii.a Pain in the upper arm;

D.9.b.ii.b Swelling and bruising in the upper arm, shoulder and chest wall;

D.9.b.ii.c Abrasions about the shoulder; and/or

D.9.b.ii.d Pain with any attempted passive or active shoulder motion.

D.9.b.iii Laboratory Tests (Proximal Humeral Fracture)

Laboratory Tests are not indicated unless a systemic illness or disease is suspected.

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D.9.b.iv Testing Procedures (Proximal Humeral Fracture)

D.9.b.iv.a X-ray trauma series (3 views) are needed; AP view, axillary view and a lateral view in the plane of the scapula. The latter two views are needed to determine if there is a glenohumeral dislocation.

D.9.b.iv.b Vascular studies are obtained emergently if the radial and brachial pulses are absent.

D.9.b.iv.c Classification is by the Neer Method: there can be four fragments – the humeral shaft, humeral head, greater tuberosity, and the lesser tuberosity. The fragments are not truly considered fragments unless they are separated by 1 cm or are angulated 45° or more.

D.9.b.v Therapeutic Procedures: Non-Operative (Proximal Humeral Fracture)

D.9.b.v.a Impacted fractures of the humeral neck or greater tuberosity are managed non-operatively.

D.9.b.v.b Isolated and minimally displaced (less than 1 cm) fractures are treated non-operatively.

D.9.b.v.c Anterior or posterior dislocation associated with minimally displaced fractures can usually be reduced by closed means, but a general anesthetic is needed.

D.9.b.v.d Medications, such as analgesics and nonsteroidal anti-inflammatories, would be indicated. Narcotics may be indicated acutely for fracture and should be prescribed as indicated in Section E. 1.

D.9.b.v.e Immobilization is provided with a sling, to support the elbow, or with an abduction immobilizer if a non-impacted greater tuberosity fragment is present.

D.9.b.v.f Immobilization is continued for 4-6 weeks.

D.9.b.v.g Shoulder rehabilitation is begun with pendulum exercises 10-14 days after injury. Subsequently, with pain control, the therapy program can be progressed with therapeutic approaches noted in Section E, Therapeutic Procedures: Non-Operative.

D.9.b.vi Operative Procedures (Proximal Humeral Fracture)

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Indications for operative treatment would include:

D.9.b.vi.a Unstable surgical neck fractures (no contact between the fracture fragments).

D.9.b.vi.b Partially unstable fractures (only partial contact) with associated same upper extremity injuries.

D.9.b.vi.c Displaced 3- and 4-part fractures may be managed by a prosthetic hemiarthroplasty and reattachment of the tuberosities.

D.9.b.vii Post-Operative Procedures (Proximal Humeral Fracture)

Post-Operative Procedures would include an individualized rehabilitation program based upon communication among the physician, surgeon and therapist.

D.9.b.vii.a Refer to Section D.9.b.v, Therapeutic Procedures: Non-Operative, Proximal Humeral Fracture.

D.9.b.vii.b Schanz pins are removed from the greater tuberosity fragment at 2-3 weeks.

D.9.b.vii.c Shanz pins across the humeral neck are removed at 4-6 weeks.

D.9.c Humeral Shaft Fracture

D.9.c.i History and Initial Diagnostic Procedures (Humeral Shaft Fracture)

D.9.c.i.a Mechanism of Injury: a direct blow can fracture the humeral shaft at the junction of its middle and distal thirds; twisting injuries to the arm will cause a spiral humeral shaft fracture; high energy (velocity or crush) will cause a comminuted humeral shaft fracture.

D.9.c.ii Physical Findings (Humeral Shaft Fracture)

Physical Findings may include:

D.9.c.ii.a Deformity of the arm;

D.9.c.ii.b Bruising and swelling; and/or

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D.9.c.ii.c Possible sensory and/or motor dysfunction of the radial nerve.

D.9.c.iii Laboratory Tests (Humeral Shaft Fracture)

Laboratory Tests are not indicated unless a systemic illness or disease is suspected.

D.9.c.iv Testing Procedures (Humeral Shaft Fracture)

D.9.c.iv.a Plain x-rays including AP view and lateral of the entire humeral shaft.

D.9.c.iv.b Vascular studies if the radial pulse is absent.

D.9.c.iv.c Compartment pressure measurements if the surrounding muscles are swollen, tense and painful and particularly if the fracture resulted from a crush injury.

D.9.c.v Non-Operative Treatment Procedures (Humeral Shaft Fracture)

D.9.c.v.a Most isolated humeral shaft fractures can be managed non-operatively.

D.9.c.v.b Medications, such as analgesics and nonsteroidal anti-inflammatories, would be indicated. Narcotics may be indicated acutely for fracture and should be prescribed as indicated in Section E.1.d.

D.9.c.v.c A coaptation splint may be applied. The splint is started in the axilla, extended around the elbow and brought up to the level of the acromion. It is held in place with large elastic bandages.

D.9.c.v.d At 2-3 weeks after injury, a humeral fracture orthosis may be used to allow for full elbow motion.

D.9.c.vi Operative Procedures (Humeral Shaft Fracture)

Indications for operative care would include:

D.9.c.vi.a Open fracture;

D.9.c.vi.b Associated forearm or elbow fracture (i.e., the floating elbow injury);

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D.9.c.vi.c Burned upper extremity;

D.9.c.vi.d Associated paraplegia;

D.9.c.vi.e Multiple injuries (polytrauma);

D.9.c.vi.f A radial nerve palsy which came on after closed reduction; and/or

D.9.c.vi.g Pathologic fracture related to an occupational injury.

Accepted methods of internal fixation include:

D.9.c.vi.h A broad plate and screws; and/or

D.9.c.vi.i Intramedullary rodding with or without cross-locking screws.

D.9.c.vii Post-Operative Procedures (Humeral Shaft Fracture)

Post-Operative Procedures would include an individualized rehabilitation program based upon communication among the physician, the surgeon and the therapist. Following rigid internal fixation, therapy may be started to obtain passive and later active shoulder motion using appropriate therapeutic approaches as seen in Section D.9.c.v, Non-Operative Treatment Procedures, Humeral Shaft Fracture. Active elbow and wrist motion may be started immediately.

D.9.d Scapular Fracture

D.9.d.i History and Mechanism of Injury (Scapular Fracture)

D.9.d.i.a Mechanism of Injury: these are the least common of the fractures about the shoulder and include acromial, glenoid, glenoid neck and scapular body fractures. With the exception of anterior glenoid lip fractures caused by an anterior shoulder dislocation, all other scapular fractures are due to a high energy injury.

D.9.d.ii Physical Findings (Scapular Fracture)

Physical Findings may include:

D.9.d.ii.a Pain about the shoulder and thorax;

D.9.d.ii.b Bruising and abrasions;

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D.9.d.ii.c Possibility of associated humeral or rib fractures; and/or

D.9.d.ii.d Vascular problems (pulse evaluation and Doppler examination).

D.9.d.iii Laboratory Tests (Scapular Fracture)

Because of the association of high energy trauma, may include a complete blood count, urinalysis and chest x-ray.

D.9.d.iv Testing Procedures (Scapular Fracture)

D.9.d.iv.a X-ray trauma series (3 views) are needed: AP view, axillary view, and a lateral view in the plane of the scapula.

D.9.d.iv.b Arteriography if a vascular injury is suspected.

D.9.d.iv.c Electromyographic exam (EMG) if nerve injuries are noted.

D.9.d.v Non-Operative Treatment Procedures (Scapular Fracture)

D.9.d.v.a Non-displaced acromial, coracoid, glenoid, glenoid neck and scapular body fractures may all be treated with the use of a shoulder immobilizer.

D.9.d.v.b Medication, such as analgesics and nonsteroidal anti-inflammatories, would be indicated. Narcotics may be indicated acutely for fracture and should be prescribed as indicated in Section E.1.d.

D.9.d.v.c Pendulum exercises may be started within the first week.

D.9.d.v.d Progress to assisted range of motion exercises at 3-4 weeks using appropriate therapeutic procedures.

D.9.d.vi Operative Treatment (Scapular Fracture)

D.9.d.vi.a Acromial fractures which are displaced should be internally fixed to prevent a nonunion. These fractures may be fixed with lagged screws and a

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superiorly placed plate to neutralize the muscular forces.

D.9.d.vi.b Glenoid fractures which are displaced greater than 2-3 mm should be fixed internally. The approach is determined by studying the results of a CT scan.

D.9.d.vi.c Scapular body fractures require internal fixation if the lateral or medial borders are displaced to such a degree as to interfere with scapulothoracic motion.

D.9.d.vi.d Displaced fractures of the scapular neck and the ipsilateral clavicle require internal fixation of the clavicle to reduce the scapular neck fracture.

D.9.d.vii Post-Operative Procedures (Scapular Fracture)

Post-Operative Procedures would include an individualized rehabilitation program based upon communication among the physician, the surgeon and the therapist. A shoulder immobilizer is utilized, pendulum exercises at one week, deltoid isometric exercises are started early, and, at 4-6 weeks, active range of motion is commenced.

D.9.e Sternoclavicular Dislocation/Fracture

D.9.e.i History and Mechanism of Injury (Sternoclavicular Dislocation/Fracture)

D.9.e.i.a Mechanism of Injury: established with sudden trauma to the shoulder/anterior chest wall; anterior dislocations of the sterno-clavicular joint usually do not require active treatment; however, symptomatic posterior dislocations will require reduction.

D.9.e.ii Physical Findings (Sternoclavicular Dislocation/Fracture)

Physical Findings may include:

D.9.e.ii.a Pain at the sternoclavicular area;

D.9.e.ii.b Abrasions on the chest wall, clavicle and shoulder can be seen;

D.9.e.ii.c Deformities can be seen in the above regions; and/or

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D.9.e.ii.d Pain with palpation and motion at the sternoclavicular joint area.

D.9.e.iii Laboratory Tests (Sternoclavicular Dislocation/Fracture)

Laboratory Tests are not indicated unless a systemic illness or disease is suspected.

D.9.e.iv Testing Procedures (Sternoclavicular Dislocation/Fracture)

D.9.e.iv.a Plain x-rays of the sternoclavicular joint are routinely done. When indicated, comparative views of the contralateral limb may be necessary.

D.9.e.iv.b X-rays of other shoulder areas and chest wall may be done if clinically indicated.

D.9.e.iv.c Vascular studies should be considered if the history and clinical examination indicate extensive injury.

D.9.e.v Therapeutic Procedures: Non-Operative (Sternoclavicular Dislocation/Fracture)

D.9.e.v.a Symptomatic posterior dislocations should be reduced in the operating room under general anesthesia.

D.9.e.v.b Immobilize with a sling for 3-4 weeks. Subsequently, further rehabilitation may be utilized using procedures set forth in Section E, Therapeutic Procedures: Non-Operative.

D.9.e.v.c Medications, such as analgesics and nonsteroidal anti-inflammatories, may be indicated; narcotics may be indicated acutely for fracture and should be prescribed as indicated for limited periods. Refer to Section E.1.

D.9.e.v.d Manipulation (for Sternoclavicular Dislocation): Manipulative treatment (not therapy) is defined as the therapeutic application of manually guided forces by an operator to improve physiologic function and/or support homeostasis that has been altered by the injury or occupational disease, and has associated clinical significance.

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- Time to produce effect for shoulder treatment: 1-6 treatments

D.9.e.vi Operative Procedures (Sternoclavicular Dislocation/Fracture)

Operative Procedures are not recommended.

D.10 SHOULDER INSTABILITY

Subluxation (partial dislocation) or dislocation of the glenohumeral joint in either an anterior, interior, posterior or multidirectional position.

D.10.a History and Mechanism of Injury (Shoulder Instability)

D.10.a.i Mechanism of Injury: instability should be apparent following a direct traumatic blow to the shoulder, or indirectly by falling on an outstretched arm, or while applying significant traction to the arm, or may also develop with a cumulative trauma to the shoulder. Symptoms should be exacerbated or provoked by work and initially alleviated with a period of rest. Symptoms may be exacerbated by other activities that are not necessarily work-related (e.g., driving a car).

D.10.a.ii History may include:

D.10.a.ii.aA slipping sensation in the arm;

D.10.a.ii.b Severe pain with inability to move the arm;

D.10.a.ii.c Abduction and external rotation produce a feeling that the shoulder might "come out"; or

D.10.a.ii.d Feeling of shoulder weakness.

D.10.a.iii In subacute and/or chronic instabilities, age of onset of instability is important in the history. Older age group (over age 30) has a propensity not to re-dislocate. Younger age groups need a more aggressive treatment plan.

D.10.a.iv Avoid any aggressive treatment in patients with history of voluntary subluxation or dislocation. These patients may need a psychiatric evaluation.

D.10.b Physical Findings (Shoulder Instability)

D.10.b.i Anterior dislocations would likely include loss of normal shoulder contour; a fullness in the axilla; pain over the

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shoulder with any motion and often the patient holding the extremity in a very still position.

D.10.b.ii Posterior dislocations usually occur with a direct fall on the shoulder or outstretched arm resulting in posteriorly directed forces to the humeral head. These patients present with inability to externally rotate the shoulder.

D.10.b.iii Neurologic examination could reveal most commonly axillary nerve injuries, but occasionally musculocutaneous nerve injuries are seen.

D.10.b.iv Abduction and external rotation positioning will produce pain in those who have anterior instability. Direct posterior stress in a supine position will produce pain in those with posterior instability. Longitudinal traction will produce a "sulcus sign" (a large dimple on the lateral side of the shoulder) when there is inferior instability.

D.10.c Laboratory Tests (Shoulder Instability)

Laboratory Tests are not indicated unless a systemic illness or disease is suspected.

D.10.d Testing Procedures (Shoulder Instability)

D.10.d.i Plain x-rays to rule out bony deficit on the glenoid, including AP, axillary view, lateral in the plane of the scapula and possibly the West Point view. Axillary view to identify larger Hill-Sachs lesion of humeral head.

D.10.d.ii On more difficult diagnostic cases with subtle history and physical findings suggesting instability, MRI, or CT- assisted arthrogram or MRI-assisted arthrogram may be ordered for lateral detachment after 4-8 weeks of therapy. (This is done only after other conservative therapies have failed.)

D.10.e Non-Operative Treatment Procedures (Shoulder Instability)

D.10.e.i First-Time Acute Severe Bony Involvement:

D.10.e.i.a Therapeutic Procedures

- Immobilization
- Therapeutic Exercise

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- Superficial Heat and Cold
- Ultrasound
- TENS is not recommended
- Alteration of Occupation and Work Station
- May not return to work with overhead activity or lifting with involved arm until cleared by physician for heavier activities.

D.10.e.i.b Additional therapies may include:

- Physical Medicine and Rehabilitation
  - Instruction in Therapeutic Exercise and Proper Work Techniques
  - Manual Therapy Techniques
- Biofeedback is not recommended.
- Medications
  - Analgesics
  - Anti-inflammatories

D.10.e.ii Acute or chronic dislocations with large fracture fragments contributing to instability:

D.10.e.ii.a Attempt to treat with immobilization if in acceptable position, otherwise repair surgically.

D.10.e.ii.b Return to work may be directly related to time it takes for the fracture to heal.

D.10.e.iii Subacute and/or chronic instability:

D.10.e.iii.a Provocative dislocation should first be treated similarly to acute dislocation.

D.10.e.iii.b If acute treatment is unsuccessful, and still having findings of instability, consider operative repair.

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D.10.f Operative Procedures (Shoulder Instability)

D.10.f.i Identify causative agent for the instability (i.e., labral detachment, bony lesion, or multidirectional instability), then proceed with:

D.10.f.i.a Bony block transfer;

D.10.f.i.b Capsular tightening; or

D.10.f.i.c Bankart lesion repair.

D.10.g Post-Operative Procedures (Shoulder Instability)

Post-Operative Procedures would include an individualized rehabilitation program based upon communication among the physician, the surgeon and the therapist. Depending upon the type of surgery, the patient will be immobilized for 3-6 weeks. As soon as it is safe to proceed without damaging the repair, progressive therapy with consultation involving an occupational and/or physical therapist should begin with therapeutic exercise, physical medicine and rehabilitation. During this period of time, the patient could resume working when:

D.10.g.i Medications which would predispose to injury are no longer being prescribed or used; and

D.10.g.ii The treating physician has cleared the patient for the specific vocational activities.

D.11 SUPERIOR LABRUM ANTERIOR AND POSTERIOR (SLAP) LESIONS

Lesions of the superior aspect of the glenoid labrum that extend anteriorly and posteriorly in relation to the biceps tendon insertion. There are several different types of SLAP lesions described:

1) Type I is a fraying of the superior labral edge without detachment of the labrum from the glenoid rim.

2) Type II is a detachment of the biceps anchor from the glenoid. Three distinct Type II lesions have been described as anterior only, posterior only, or combined anterior and posterior.

3) Type III is a bucket handle tear in the superior labrum only with biceps tendon and remainder of the superior labrum having stable attachment.

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4) Type IV is a bucket handle tear as in Type III, but with extension of the tear in to the biceps tendon. Additional types of lesions have been described that include extensions of the above-described lesions or extensions of Bankart lesions.

D.11.a History and Mechanisms of Injury (SLAP lesion)

D.11.a.i Mechanism of Injury:

Common mechanisms of injury that are thought to contribute to SLAP lesions include:

a) Compression injury such as fall on an outstretched arm with the shoulder in forward flexion and abduction or direct blow to the glenohumeral joint;

b) Traction injury such as repetitive overhead throwing, attempting to break a fall from a height, and sudden pull when losing hold of a heavy object;

c) Driver of an automobile who is rear ended;

d) Repetitive overhead motions with force such as pitching; or

e) A fall on adducted arm with upward force directed on elbow.

In some cases no mechanism of injury can be identified.

D.11.a.ii History may include:

a) Symptoms with overhead throwing motions;

b) Dislocation, subluxation, or subjective sense of instability;

c) Poorly localized shoulder pain that is exacerbated by overhead activities;

d) Catching, locking, popping or snapping;

e) Subtle instability.

D.11.b Physical Findings (SLAP lesion)

D.11.b.i The physical examination is often nonspecific secondary to other associated intra-articular abnormalities.

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D.11.b.ii No one test or combination of tests has been shown to have an acceptable sensitivity and specificity or positive predictive values for diagnosing SLAP lesion. Sensitivity and specificity are relatively low for individual tests and combinations.

D.11.b.iii Overall physical examination tests for SLAP lesions may be used to strengthen a diagnosis of SLAP lesion, but the decision to proceed to operative management should not be based on physical examination alone.

- Speed Test.
- Yergason's Test.
- Active Compression (O'Brien) Test.
- Jobe Relocation Test.
- Crank Test.
- Anterior Apprehension Maneuver.
- Tenderness at the bicipital groove.
- Anterior Slide (Kibler) Test.
- Compression Rotation Test.
- Pain Provocation Test.
- Biceps Load Test II.

D.11.c Diagnostic Testing Procedures (SLAP lesion)

D.11.c.i Radiographs are usually normal in isolated SLAP lesions. However, they can be useful in identifying other sources of abnormalities.

D.11.c.ii Magnetic resonance imaging (MRI) with arthrogram has the highest reported accuracy for both diagnosis and classification of SLAP lesions; however, it may be difficult to differentiate SLAP lesions, especially Type II lesions, from normal anatomic variants and from asymptomatic age-related changes.

D.11.c.iii Arthroscopic evaluation is the most definitive diagnostic test.

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D.11.d Non-Operative Treatment Procedures (SLAP Lesion)

Most SLAP lesions are associated with other pathology such as rotator cuff tears, Bankart lesions, joint instability, biceps tendon tears, and supraspinatus tears. The provider should refer to the treatment protocols for these conditions and follow both the surgical and non-surgical recommendations. For suspected isolated SLAP lesions, non-invasive care, consider the following.

D.11.d.i Medications such as analgesics and anti-inflammatories may be helpful.

D.11.d.ii Therapeutic procedures may include instruction in therapeutic exercise and proper work techniques, and evaluation of occupational work station.

D.11.d.iii Benefits may be achieved through therapeutic rehabilitation and rehabilitation interventions. They should include range of motion (ROM), active therapies, and a home exercise program. Passive as well as active therapies may be used for control of pain and swelling. Therapy should progress to strengthening and an independent home exercise program targeted to further improve ROM and strength of the shoulder girdle musculature.

D.11.d.iv Subacromial bursal and/or glenohumeral steroid injections may decrease inflammation and allow the therapist to progress with functional exercise and ROM.

- Time to Produce Effect: One injection.
- Maximum Duration: 3 injections in one year at least 4 to 8 weeks apart.

Steroid injections should be used cautiously in diabetic patients. Diabetic patients should be reminded to check their blood glucose levels at least daily for 2 weeks after injections.

D.11.d.v Return to work with appropriate restrictions should be considered early in the course of treatment.

D.11.d.vi Other non-operative therapies may be employed in individual cases.

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D.11.e Surgical Indications

There is a significant amount of normal anatomic variation of the superior glenoid labrum and origin of the long head of the biceps tendon. Differentiation between normal variation and pathology is imperative.

D.11.e.i The physician should identify other shoulder pathology if any exists and follow the appropriate surgical indications. If a SLAP lesion is suspected, an arthroscopic exam should be performed in conjunction with the primary surgical procedure and an appropriate repair performed if necessary.

or

D.11.e.ii When no additional pathology is identified and there is an inadequate response to at least three months of non-operative management with active patient participation as evidenced by continued pain with functional limitations and/or instability significantly affecting activities of daily living or work duties.

D.11.e.iii Prior to surgical intervention, the patient and treating physician should identify functional operative goals and the likelihood of achieving improved ability to perform activities of daily living or work activities and the patient should agree to comply with the pre- and post-operative treatment plan and home exercise requirements. The patient should understand the length of partial and full disability expected post-operatively.

The patient should also understand that 1) non-operative treatment is an acceptable option and that 2) a potential complication of the surgery is shoulder stiffness with pain and possibly decreased function.

D.11.f Operative Procedures (SLAP lesion)

Operative treatment of SLAP lesions depends on the type of lesion present and whether any other intra-articular abnormalities are present. The following are generally accepted protocols for surgical intervention.

D.11.f.i Type I: Debridement is reasonable but not required;

D.11.f.ii Type II: Repair via suture anchors or biceps tenotomy are reasonable options;

D.11.f.iii Type III: Debridement or excision of the bucket handle component alone or repair via suture anchors or biceps tenotomy/tenodesis are reasonable options;

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D.11.f.iv Type IV: Debridement and/or biceps tenotomy or tenodesis are reasonable options.

D.11.g Post-Operative Treatment (SLAP lesion)

Post-operative rehabilitation programs should be individualized and dependent upon whether any other intra-articular abnormalities exist and were operatively treated. There is a paucity of information on rehabilitation of isolated SLAP lesions. Common post-operative care involves wearing a sling, without active shoulder motion for 4 to 6 weeks. Elbow, wrist, and hand range-of-motion (ROM) exercises may be used at this time. The sling is removed at 4 to 6 weeks and active ROM is usually begun with restrictions directed by the surgeon. It is reasonable to restrict external rotation and abduction up to six months post-operative.

E THERAPEUTIC PROCEDURES: NON-OPERATIVE

E.1 MEDICATIONS

Medication use in the treatment of shoulder injuries is appropriate for controlling acute and non-acute pain and inflammation. Use of medications will vary widely due to the spectrum of injuries.

All drugs should be used according to patient needs. A thorough medication history, including use of alternative and over-the-counter medications, should be performed at the time of the initial visit and updated periodically. Treatment for pain control is initially accomplished with acetaminophen and/or NSAIDs. The patient should be educated regarding the interaction with prescription and over-the-counter medications as well as the contents of over-the-counter herbal products.

Please consult the *New York Non-Acute Pain Medical Treatment Guidelines* for additional recommendations on the use of medications in non-acute pain.

The following medications are listed in alphabetical order.

E.1.a Acetaminophen

Acetaminophen is an effective analgesic with antipyretic but not anti-inflammatory activity. Acetaminophen is generally well tolerated, causes little or no gastrointestinal irritation, and is not associated with ulcer formation. Acetaminophen has been associated with liver toxicity when the recommended daily dose is exceeded or in patients who chronically use alcohol. Patients may not realize that many over-the-counter preparations may contain acetaminophen. In general, the total daily dose of acetaminophen should not exceed 3 grams per 24-hour period from all

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sources, including narcotic-acetaminophen combination preparations. Patients who consume three or more alcoholic drinks per day are at greater risk for liver toxicity, and consideration should be given to the use of other analgesics or limiting the acetaminophen dose to 2 grams per 24-hour period from all sources. Monitoring liver function via blood testing for use beyond 10 days is advisable.

Recommendations:

E.1.a.i Acetaminophen is a reasonable alternative to NSAIDs, although evidence suggests it is modestly less efficacious.

E.1.a.ii Acetaminophen is recommended for treatment of shoulder pain, particularly for those with contraindications for NSAIDs.

- Optimum Duration: 7 to 10 days.
- Maximum Duration: Chronic use as indicated on a case-by-case basis.

E.1.b Compound Medications

Topical, oral and/or systemic compound medications are not recommended.

E.1.c Hypnotics

Hypnotics may be given to shoulder injury sufferers because of a chief complaint of "inability to sleep." Such medications must be used with caution because of their dependence-producing capabilities. As an alternative, sedating tricyclic antidepressants may be considered when necessary. Physical methods of restoring a normal sleep pattern can usually be employed as an alternative to medication.

- Time to produce effect: 1-3 days.
- Frequency: At night.
- Optimum duration: 1 week.
- Maximum duration: 2-3 weeks

E.1.d Narcotics

Narcotics should be primarily reserved for the treatment of severe shoulder pain. In mild-to-moderate cases of shoulder pain, narcotic medication should be used cautiously on a case-by-case basis. Adverse effects include respiratory depression, the development of physical and psychological dependence, and

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impaired alertness. This medication has physically addictive properties and withdrawal symptoms may follow abrupt discontinuation.

- Narcotic medications should be prescribed with strict time, quantity, and duration guidelines, and with definitive cessation parameters. Pain is subjective in nature and should be evaluated using a scale to rate effectiveness of the narcotic prescribed. Optimum Duration: 3-7 days.

- Maximum Duration: 2 weeks. Use beyond two weeks is acceptable in appropriate cases.

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

Please consult the *New York Non-Acute Pain Medical Treatment Guidelines* for detailed recommendations regarding the use of opioids.

E.1.e Nonsteroidal Anti-Inflammatory Drugs (NSAIDs)

NSAIDs are useful for pain and inflammation. In mild cases, they may be the only drugs required for analgesia. There are several classes of NSAIDs and the response of the individual patient to a specific medication is unpredictable. For this reason a range of orally administered NSAIDs may be tried in each case with the most effective preparation being continued. Patients should be closely monitored for adverse reactions.

The US Food and Drug Administration advises that all NSAIDs may cause an increased risk of serious cardiovascular thrombotic events, myocardial infarction, and stroke, which can be fatal. Prescribers should be aware of the most updated information on this topic. Some NSAIDs may have more favorable cardiovascular risk factors than others.

Administration of proton pump inhibitors, histamine 2 blockers, or misoprostol, a prostaglandin analog, along with these NSAIDs may reduce the risk of duodenal and gastric ulceration associated with NSAID use but do not impact possible cardiovascular complications. Due to the cross reactivity between aspirin and NSAIDs, NSAIDs should not be used in aspirin-sensitive patients, and should be used with caution in all asthma patients. NSAIDs are associated with abnormal renal function, including renal failure, as well as abnormal liver function. Certain NSAIDs may have interactions with various other medications. Individuals may have adverse events not listed above. Intervals for metabolic screening are dependent upon the patient's age, general health status and should be within parameters listed for each specific medication. Complete blood count (CBC), liver and renal function should be monitored in patients on chronic NSAIDs.

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In patients receiving low-dose aspirin for primary or secondary cardiovascular disease prevention, to minimize the potential for the NSAID to counteract the beneficial effects of aspirin, aspirin should be taken two hours before or at least eight hours after the NSAID.

Chronic use of NSAIDs is generally not recommended. Chronic NSAIDs may be used cautiously in selected cases with regular monitoring.

E.1.e.i **Non-selective Nonsteroidal Anti-Inflammatory Drugs**:

Non-selective NSAIDs are generally recommended as first-line medications.

Serious gastrointestinal toxicity, such as bleeding, perforation, and ulceration can occur at any time, with or without warning symptoms in patients treated with traditional NSAIDs. Patients at particularly high risk for GI bleeding include those with a history of prior GI bleed, diabetes, alcohol use, smoking, corticosteroid or anticoagulant use, patients older than 65 or those who have a longer duration of therapy.

Physicians should inform patients about the signs and/or symptoms of serious gastrointestinal toxicity and what steps to take if they occur.

Anaphylactic reactions may occur in patients taking NSAIDs.

NSAIDs may interfere with platelet function.

Fluid retention and edema, and renal toxicity in those with underlying reduction of renal function have been observed in some patients taking NSAIDs.

E.1.e.ii **Selective Cyclo-oxygenase-2 (COX-2) Inhibitors:**

COX-2 inhibitors should not be first-line for low risk patients who will be using an NSAID short-term but are indicated in select patients for whom traditional NSAIDs are not tolerated. Patients who receive COX-2 inhibitors should take the lowest effective dose for the shortest time necessary to control symptoms.

The major advantages of selective COX-2 inhibitors over traditional NSAIDs are that they have less GI toxicity and no platelet effects.

Serious upper GI adverse events can occur even in asymptomatic patients who are taking COX-2 inhibitors.

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Patients at a high risk include those with a history of prior GI bleed, diabetes, alcohol use, smoking, corticosteroid or anticoagulant use, patients older than 65 or those who have a longer duration of therapy.

COX-2 inhibitors can worsen renal function in patients with renal insufficiency; thus, renal function may need monitoring.

Selective COX-2 inhibitors should be used with great caution in patients with ischemic heart disease and/or stroke and avoided in patients with risk factors for coronary heart disease. In these patients it appears to be safest to use acetaminophen, aspirin or non-selective NSAIDs as first-line therapy.

Celecoxib is contraindicated in sulfonamide allergic patients.

E.1.f Psychotropic/Anti-Anxiety Medications

Not recommended.

E.1.g Skeletal Muscle Relaxants

Not recommended.

E.1.h Topical Drug Delivery

Topical drug delivery (e.g., capsaicin, lidocaine, topical NSAIDs and topical salicylates and non-salicylates) may be an acceptable form of treatment in selected patients. A topical agent should be prescribed with strict instructions for application and maximum number of applications per day to obtain the desired benefit and avoid potential toxicity. For most patients, the effects of long-term use are unknown and thus may be better used episodically. These agents may be used in those patients who prefer topical treatments over oral medications. Localized skin reactions may occur, depending on the medication agent used.

Physicians should consider that topical medication can result in toxic blood levels.

E.1.h.i.a **Capsaicin** offers a safe and effective alternative to systemic NSAIDs, although its use is limited by local stinging or burning sensation that typically disappears with regular use. Patients should be advised to apply the cream on the affected area with a plastic glove or cotton applicator to avoid inadvertent contact with eyes and mucous membranes.

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- Optimal Duration: 1-2 weeks to determine effectiveness.
- Discontinuation: Resolution of pain, or development of adverse effects that necessitate discontinuation.
- Long-term use of capsaicin is not recommended.

E.1.h.i.b **Topical lidocaine** is only indicated when there is documentation of a diagnosis of neuropathic pain. In this instance, a trial for a period of not greater than four weeks can be considered, with the need for documentation of functional gains as criteria for additional use.

E.1.h.i.c **Topical NSAIDs** (e.g., diclofenac gel) may achieve tissue levels that are potentially therapeutic. Overall the low level of systemic absorption can be advantageous, allowing the topical use of these medications when systemic administration is relatively contraindicated (such as patients with hypertension, cardiac failure, peptic ulcer disease or renal insufficiency).

E.1.h.i.d **Topical salicylates or non-salicylates** (e.g., methyl salicylate) overall do not appear to be more effective than topical NSAIDs. May be used for a short-term course especially in patients with chronic conditions in whom systemic medication is relatively contraindicated or as an adjuvant to systemic medication.

E.1.i Tramadol

Tramadol is useful in relief of pain and has been shown to provide pain relief equivalent to that of commonly prescribed NSAIDs. Although Tramadol may cause impaired alertness, it is generally well tolerated, does not cause gastrointestinal ulceration, or exacerbate hypertension or congestive heart failure. Tramadol should be used cautiously in patients who have a history of seizures or who are taking medication that may lower the seizure threshold, such as monoamine oxidase (MAO) inhibitors, SSRIs, and tricyclic antidepressants. This medication has physically addictive properties and

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withdrawal symptoms may follow abrupt discontinuation. It is not recommended for those with prior opioid addiction.

- Maximum Duration: 2 weeks. Use beyond 2 weeks is acceptable in appropriate cases.

E.2 IMMOBILIZATION

Time is dependent upon type of injury, then progress with muscle girdle strengthening.

- Time to produce effect: 1 day.
- Frequency: Once.
- Optimum duration: 1 week.
- Maximum duration: 12 weeks.

The arm is immobilized in a sling for 1-12 weeks post-injury, depending upon the age of the patient. The patient is instructed in isometric exercises while in the sling for the internal and external rotators and the deltoid.

E.2.a Kinesiotaping, Taping or Strapping

Other than for acute joint immobilization (for example, acute ankle sprain), kinesiotaping, taping or strapping are not recommended for acute or non-acute pain.

E.3 RELATIVE REST

Relative Rest may last 3-5 weeks and require job modification/modified duty so as not to exacerbate the acute inflamed shoulder.

E.4 THERAPEUTIC EXERCISE

Therapeutic exercise where the therapist instructs the patient in a supervised clinic and home program to increase strength of the supporting shoulder musculature. Motions and muscles to be strengthened include shoulder internal and external rotators, abductors and scapula stabilizers. Isometrics are performed initially, progressing to isotonic exercises as tolerated.

- Frequency of visits: 2-3 times/week for 8-12 weeks.
- Weeks 1-3: Isometrics in sling.

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- Weeks 3-8: Progressive isotonic exercises.
- Weeks 8-12: Begin overhead activities when the rotator cuff strength is normalized and full active elevation has been achieved.

E.5 SUPERFICIAL HEAT AND COLD

Superficial heat and cold therapies are thermal agents applied in various manners that lower or raise the body tissue temperature for the reduction of pain, inflammation, and/or effusion resulting from injury or induced by exercise. It may be used acutely with compression and elevation. Indications include acute pain, edema and hemorrhage, need to increase pain threshold, reduce muscle spasm and promote stretching/flexibility. Includes portable cryotherapy units. May be performed in conjunction with other active therapy, or may be self-administered by the patient.

- Time to produce effect: Immediate.
- Frequency: 2-5 times per week.
- Optimum duration: 3 weeks as primary, or up to 2 months if used intermittently as an adjunct to other therapeutic procedures, or longer for adhesive capsulitis (Refer to Section D.2, Adhesive Capsulitis.)
- Maximum duration: 2 months.

E.6 TRANSCUTANEOUS ELECTRICAL NERVE STIMULATION (TENS)

TENS treatment should include at least one instructional session for proper application and use. Indications include muscle spasm, atrophy and control of concomitant pain in the office setting. Minimal TENS unit parameters should include pulse rate, pulse width and amplitude modulation. Consistent, measurable, functional improvement must be documented and determination of the likelihood of chronicity prior to the provision of a home unit. TENS treatment should be used in conjunction with active physical therapy.

- Time to Produce Effect: Immediate.
- Frequency: Variable.
- Optimum Duration: 3 sessions.
- Maximum Duration: 3 sessions. Purchase or provide with home unit if effective.

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E.7 THERAPEUTIC ULTRASOUND WITH OR WITHOUT ELECTRIC STIMULATION

Therapeutic ultrasound with or without electric stimulation using sonic generators to deliver acoustic energy for therapeutic thermal and/or non-thermal soft tissue treatment. Indications include scar tissue, adhesions, collagen fiber and muscle spasm, and the need to extend muscle tissue or accelerate the soft tissue healing.

- Time to produce effect: 6-15 treatments.
- Frequency: 3 times/week.
- Optimum duration: 4 weeks, or longer for adhesive capsulitis. (Refer to Section D.2, Adhesive Capsulitis.)

E.8 ELECTRICAL THERAPEUTIC MODALITY

Electrical Therapeutic Modality can be utilized as an adjunct for recovery. In order to justify its use, one must provide documentation regarding functional gains.

- Time to produce effect: 8-12 sessions.
- Frequency: 3 times/week.
- Optimum duration: 4 weeks.

E.9 RETURN TO WORK

May return to work with no overhead activity, lifting, or repetitive motion with the involved arm until cleared by the primary treating physician for heavier activities. Each case regarding task tolerance should be individualized based on the diagnosis and job demands.

E.10 BIOFEEDBACK

Not recommended.

E.11 PHYSICAL MEDICINE AND REHABILITATION

E.11.a Instruction in Therapeutic Exercise and Proper Work Techniques

An active therapeutic exercise program may be beneficial and should contain elements of improving patient flexibility, mobility, posture/body mechanics, activities of daily living, splinting, bracing, sensory reeducation, endurance, strength and education.

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- Time to produce effect: 2 weeks.
- Frequency: 2-3 times/week.
- Optimum duration: 4-6 weeks, or longer for cases of adhesive capsulitis. Refer to Section D.2.e, Non-Operative Treatment Procedures (Adhesive Capsulitis/Frozen Shoulder).
- Maximum duration: 12 weeks.

E.11.b Manual Therapy Techniques

Soft tissue mobilization/manipulation techniques may be used as an adjunctive treatment modality.

E.11.c Post-Operative Treatment

Post-Operative Treatment may include scar/adhesion reduction techniques.

E.12 THERAPY: ONGOING MAINTENANCE CARE

A maintenance program of physical therapy or occupational therapy may be indicated in certain situations, after the determination of MMI, when tied to maintenance of functional status.

- Although the current body of scientific evidence as reviewed does not support the routine use of this intervention, maintenance therapy modalities may be indicated in certain situations in order to maintain functional status, without which an objective deterioration of function has been previously observed and documented in the medical record.
- Specific objective goals should be identified and measured in order to support the need for ongoing maintenance care.
- Progressively longer trials of therapeutic withdrawal are to be attempted to ascertain whether therapeutic goals can be maintained in the absence of clinical interventions.
- Within a year and annually thereafter, a trial without maintenance treatment should be instituted.
- The care of chronic shoulder symptoms should include an ongoing patient self-management plan performed by the patient regularly and a self-directed pain management plan initiated as indicated:

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- An ongoing clinically appropriate self-management plan, typically independent, home-based and self-directed, developed jointly by the provider and patient, should be implemented to encourage physical activity and/or work activities despite residual pain, with the goal of preserving function.
- In addition to the self-management plan, a self-directed pain management plan should be developed which can be initiated by the patient in the event that symptoms worsen and function decreases.

- If deterioration of ability to maintain function is documented, reinstatement of ongoing maintenance may be acceptable.

Frequency: Maximum up to 10 visits/year, after the determination of MMI, according to objectively documented maintenance of functional status. No variance from the maximum frequency is permitted.

Please consult the *New York Non-Acute Pain Medical Treatment Guidelines* for additional information about functional maintenance care.

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Sources:

This Treatment Guideline is adopted, with modifications, from the State of Colorado's Shoulder Injury Medical Treatment Guideline with supplementation from the State of Washington's Medical and Surgical Treatment Guidelines.

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