Medical Treatment Guideline for Shoulder Diagnosis and Treatment

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I. Review Criteria for Shoulder Surgery

A request may be appropriate for	**If the patient has**	**AND the diagnosis is supported by these clinical findings:**			**AND this has been done**
Surgical Procedure	Diagnosis	Subjective	Objective	Imaging	Non-operative care
Rotator cuff tear repair **Note:** The use of allografts and xenografts in rotator cuff tear repair is not covered. **Note: Distal clavicle resection as a routine part of acute rotator cuff tear repair is not covered.**	Acute full-thickness rotator cuff tear	Report of an acute traumatic injury within 3 months of seeking care **AND** Shoulder pain: With movement and/or at night	Patient will usually have weakness with one or more of the following: • Forward elevation • Internal/external rotation • Abduction testing	Conventional x-rays, AP and true lateral or axillary view **AND** MRI, ultrasound or x-ray arthrogram reveals a full thickness rotator cuff tear Routine use of contrast imaging is not indicated	May be offered but not required

A request may be appropriate for	**If the patient has**	**AND the diagnosis is supported by these clinical findings:**			**AND this has been done**
Surgical Procedure	Diagnosis	Subjective	Objective	Imaging	Non-operative care
Rotator cuff tear repair	Partial thickness rotator cuff tear	Pain with active arc motion 90-130°	Weak or painful abduction **AND** Tenderness over rotator cuff **AND** Positive impingement sign	Conventional x-rays, AP and true lateral or axillary view **AND** MRI, ultrasound or x-ray arthrogram shows a partial thickness rotator cuff tear **Routine use of contrast imaging is not indicated**	Conservative care* required for at least 6 weeks, then: If tear is >50% of the tendon thickness, may consider surgery; If <50% thickness, do 6 more weeks conservative care.
Rotator cuff tear repair **Note:** The use of allografts and xenografts in rotator cuff tear repair is not covered. This restriction does not apply to superior capsular reconstruction surgery.	Chronic or degenerative full-thickness rotator cuff tear	Gradual onset of shoulder pain without a traumatic event **OR** minor trauma; night pain	Patient will usually have weakness with one or more of the following: • Forward elevation • Internal/external rotation • Abduction testing	Conventional x-rays, AP and true lateral or axillary view **AND** MRI, ultrasound or x-ray arthrogram reveals a full thickness rotator cuff tear Routine use of contrast imaging is not indicated	Conservative case*, for at least 6 weeks. If no improvement after 6 weeks, and tear is repairable, surgery may be considered.

A request may be appropriate for	**If the patient has**	**AND the diagnosis is supported by these clinical findings:**			**AND this has been done**
Surgical Procedure	Diagnosis	Subjective	Objective	Imaging	Non-operative care
Rotator cuff tear repair **after** previous rotator cuff surgery 1. One revision surgery may be considered. Revision surgery is **not covered** in the presence of a massive rotator cuff tear, as defined by one or more of the following: a. >3cm of retraction b. severe rotator cuff muscle atrophy c. severe fatty infiltration	Recurring full thickness tear	1. New traumatic injury with good function prior to injury	Patient may have weakness with forward elevation, internal/external rotation, and/or abduction testing	Conventional x-rays, AP and true lateral or axillary view **AND** MRI, ultrasound or x-ray arthrogram reveals a full thickness rotator cuff tear Routine use of contrast imaging is not indicated	Conservative care*, for at least 6 weeks. If no improvement after 6 weeks, and tear is repairable, surgery may be considered.
	Note: **Smoking/nicotine use is a strong relative contraindication for rotator cuff surgery.** [1-4] Smoking cessation may be covered in some cases; see dept guideline at: http://www.lni.wa.gov/ClaimsIns/Providers/TreatingPatients/ByCondition/CovMedDev/SpecCovDec/TobaccoCessation.asp				
2. Second and subsequent revisions Revision surgery is **not covered** in the presence of a massive rotator cuff tear, as defined by one or more of the following:	Recurring full thickness tear	2. No new injury, but gradual onset of pain with good function for over a year after previous surgery 2nd revision will only be considered when patient	Patient may have weakness with forward elevation, internal/external rotation, and/or abduction testing	Conventional x-rays, AP and true lateral or axillary view **AND**	2. Second revision: Conservative care* for 6 weeks is required; if no improvement, surgery may be considered

A request may be appropriate for	If the patient has	AND the diagnosis is supported by these clinical findings:			AND this has been done
Surgical Procedure	Diagnosis	Subjective	Objective	Imaging	Non-operative care
a. >3cm of retraction b. severe rotator cuff muscle atrophy c. severe fatty infiltration		has returned to work or has clinically meaningful improvement in function, on validated instrument, after the most recent surgery		MRI, ultrasound or x-ray arthrogram reveals a full thickness rotator cuff tear Routine use of contrast imaging is not indicated	
Rotator cuff salvage procedure aka Superior Capsular Reconstruction (SCR) **Note:** Physician review is required. **Note:** Pre and Post op ASES scores are required **Note:** L&I recommends SCR be performed within the framework of a clinical study. **Note:** The use of xenografts and allografts in SCR is covered	Irreparable rotator cuff tear in patients without osteoarthritis	Pain and shoulder dysfunction with active arc motion 90—130°	Weakness with forward elevation or abduction and/or external rotation **AND** Preserved active elevation to 90° preoperatively	Intact glenohumeral joint space on x-ray **AND** MRI or CT findings of an irreparable supraspinatus or infraspinatus **AND** MRI or CT findings of an intact subscapularis and teres minor	6 weeks of physical therapy **Note:** A steroid injection may be considered prior to physical therapy if no contraindication and clinically appropriate

A request may be appropriate for	**If the patient has**	**AND the diagnosis is supported by these clinical findings:**			**AND this has been done**
Surgical Procedure	Diagnosis	Subjective	Objective	Imaging	Non-operative care
Partial claviculectomy (includes Mumford procedure) **Not authorized as a part of acute rotator cuff repair** **Note:** Mumford procedure done alone must meet all these criteria. Mumford as an add-on to any other shoulder surgery must also meet all diagnostic criteria preoperatively. Intraoperative visualization of AC joint, in the absence of radiographic findings, is not a sufficient finding to authorize the claviculectomy.	Arthritis of AC joint	Pain at AC joint; aggravation of pain with shoulder motion	Tenderness over the AC joint **AND** **Documented** pain relief with an anesthetic injection	MRI (radiologist interpretation) reveals: • Moderate to severe degenerative joint disease of AC joint, or • Distal clavicle edema, or • Osteolysis of distal clavicle **OR** Bone scan is positive **OR** Radiologist's interpretation of x-ray reveals moderate to severe ac joint arthritis	Conservative care* for at least 6 weeks (if done in isolation) Surgery is not indicated before 6 weeks.

A request may be appropriate for	**If the patient has**	**AND the diagnosis is supported by these clinical findings:**			**AND this has been done**
Surgical Procedure	Diagnosis	Subjective	Objective	Imaging	Non-operative care
Isolated subacromial decompression with or without acromioplasty	Subacromial impingement syndrome	Generalized shoulder pain	Pain with active elevation	MRI reveals evidence of tendinopathy/tendinitis **OR** **A rotator cuff tear**	12 weeks of conservative care* **AND** Subacromial injection with local anesthetic gives documented pain relief
Debridement of calcific tendonitis	Calcific tendonitis	Generalized shoulder pain	Pain with active elevation	Conventional x-rays show calcium deposit in the rotator cuff	12 weeks of conservative care*
Open treatment of acute acromioclavicular dislocation **Note**: Surgery for acute types I and II AC joint dislocations is not covered.	Shoulder AC joint separation	Pain with marked functional difficulty	Marked deformity	Conventional x-rays show Type III or greater separation	Conservative care* only for types I and II. Conservative care for 3 months for type III separations, with the exception of early surgery being considered for heavy or overhead laborers. Immediate surgical intervention for types IV-VI.

A request may be appropriate for	If the patient has	AND the diagnosis is supported by these clinical findings:			AND this has been done
Surgical Procedure	Diagnosis	Subjective	Objective	Imaging	Non-operative care
Repair, debridement, or biceps tenodesis for labral lesion, including SLAP tears	Labral tears without instability (including SLAP tears)	Traumatic event reported or an occupation with significant overhead activity **AND** Pain worse with motion and active elevation	Pain reproduced with labral loading tests (e.g. O'Brien's test)	MRI shows labral tear	At least 6 weeks of conservative care*
Capsulorrhaphy (Bankart procedure)	Glenohumeral instability	History of a dislocation that inhibit activities of daily living	Positive apprehension/relocation test	Conventional x-rays **AND** MRI demonstrates one of the following: a. Bankart/labral lesion b. Hill Sachs lesion c. Capsular tear	If only one dislocation has occurred, recommend 1-2 weeks of immobilization then PT for 6-8 weeks. If a positive apprehension is present at 6 weeks, surgery may be considered. Two or more dislocations in 3 months may proceed to surgery without conservative care. Early surgery may be considered in patients with large bone defects, or in patients under 35 years old.

A request may be appropriate for	If the patient has	AND the diagnosis is supported by these clinical findings:			AND this has been done
Surgical Procedure	Diagnosis	Subjective	Objective	Imaging	Non-operative care
Tenodesis or tenotomy of long head of biceps	Partial biceps tear, biceps instability from the biceps groove, proximal biceps enlargement that inhibits gliding in the biceps groove, complete tear of the proximal biceps tendon	Anterior shoulder pain, weakness and deformity	Tenderness over the biceps groove, pain in the anterior shoulder during resisted supination of the forearm Partial thickness tears do not have the classical appearance of ruptured muscle.	MRI required if procedure performed in isolation. If biceps tendon pathology identified and addressed during separate procedure the code may be added retroactively	Surgery almost never considered in full thickness ruptures.
Total/hemi shoulder arthroplasty	Severe proximal humerus fracture with: post traumatic arthritis, post traumatic avascular necrosis **OR** comminuted fractures of proximal humerus	Pain with ROM, history of work related fracture	Pain/crepitance with ROM, decreased ROM	Conventional x-rays show moderate to severe glenohumeral arthritis **OR** avascular necrosis **OR** **comminuted fractures of proximal humerus**	Conservative care* may be offered but not required
Reverse total shoulder arthroplasty	Rotator cuff arthropathy **OR** Severe proximal humerus fractures	Pain, weakness **AND** history of work related rotator cuff tear	Inability to elevate arm, pain with ROM	Conventional x-rays show moderate to severe glenohumeral arthritis and a high riding humeral head	Conservative care* may be offered but not required

A request may be appropriate for	If the patient has	AND the diagnosis is supported by these clinical findings:			AND this has been done
Surgical Procedure	Diagnosis	Subjective	Objective	Imaging	Non-operative care
Manipulation under anesthesia/arthroscopic capsular release	Idiopathic adhesive capsulitis, postoperative adhesive capsulitis	Pain, loss of motion	Loss of passive motion	Conventional x-rays do not show bone pathology that can explain the loss of motion	12 weeks of conservative care*
Diagnostic arthroscopy	Arthroscopy for diagnostic purposes	**Diagnostic arthroscopy is not covered.**			

*Conservative care should include at least active assisted range of motion and home-based exercises.

II. Introduction

This guideline is intended as an educational resource for health care providers who treat injured workers in the Washington workers' compensation system under Title 51 RCW and as review criteria for the department's utilization review team to help ensure treatment of shoulder injuries is of the highest quality. The emphasis is on accurate diagnosis and treatment that is curative or rehabilitative (see WAC 296-20-01002 for definitions).

This guideline, focusing on work-related shoulder conditions, was developed in 2013 by a subcommittee of the statutory Industrial Insurance Medical Advisory Committee (IIMAC). One of the committee's goals is to provide standards that ensure a uniformly high quality of care for injured workers in Washington State.

The subcommittee is comprised of a group of physicians of various medical specialties, including rehabilitation medicine, occupational medicine, orthopedic surgery and family practice. The subcommittee based its recommendations on the weight of the best available clinical and scientific evidence from a systematic review of the literature, and on a consensus of expert opinion when scientific evidence was insufficient.

Shoulder pathologies are common in both the workers' compensation and general populations. Accurate assessment and treatment are critical to ascertaining work-relatedness and facilitating the worker's return to health and productivity.

III. Establishing Work-relatedness

Shoulder conditions are a common cause of pain and disability among adults, with a prevalence of 7-10% [5]. A shoulder condition may arise from acute trauma or, in some circumstances, from non-traumatic industrial activities.

Risk factors associated with shoulder conditions include trauma, overuse, inflammation, age-related tissue degeneration, and smoking [6]. A careful history is needed both for elucidating the mechanism of injury and for establishing causation.

A. Shoulder conditions as industrial injuries:

A shoulder condition may be induced acutely, e.g. a patient falls on an outstretched hand and experiences concomitant trauma. To establish a diagnosis of a shoulder condition as a work-related injury, the provider must give a clear description of the traumatic event leading to the injury (See Table 1).

B. Shoulder conditions as occupational diseases:

Work-related activities may cause or contribute to the development of shoulder conditions caused by chronic exposures. Conditions that support work-relatedness are:

1. Carrying/lifting heavy loads on or above the shoulders, or carrying with hands.
2. Pushing/pulling heavy loads.
3. Working with arms above the shoulder for more than 15 minutes at intervals.
4. Repetitive arm/wrist movements combined with force for long periods.

To establish a diagnosis of an occupational disease, all of the following **are required**:

1. Exposure: Workplace activities that contribute to or cause shoulder conditions, **and**
2. Outcome: A diagnosis of a shoulder condition that meets the diagnostic criteria in this guideline, **and**
3. Relationship: Generally accepted scientific evidence, which establishes on a more probable than not basis (greater than 50%) that the workplace activities (exposure) in an individual case contributed to the development or worsening of the condition relative to the risks in everyday life. In epidemiological studies, this will usually translate to an odds ratio (OR) ≥ 2.

In order for a shoulder condition to be allowed as an occupational disease, the provider must document that the work exposures created a risk of contracting or worsening the condition relative to the risks in everyday life, on a more-probable-than-not basis. (*Dennis v. Dept. of Labor and Industries*, 1987).

When the Department receives notification of an occupational disease, the Occupational Disease & Employment History form is mailed to the worker, employer or attending provider. The form should be completed and returned to the Department as soon as possible. If the worker's attending provider completes the form, provides a detailed history in the chart note, and gives an opinion on causality, he or she may be paid for this (use billing code 1055M).

Table 1: Exposure and Risk

Exposure	Examples of types of jobs	Risk	Type of shoulder claim
Sudden trauma or fall on an outstretched arm	Construction workers, logging, painters	High	Injury
Chronic overuse with high force and repetitive overhead motion	Shipyard welders and plate workers, fish processing workers, machine operators, ground workers (e.g. pushing a lawn mower), and carpenters.	Medium	Injury or occupational disease
Moderate lifting	Grocery checkers	Low	Injury or occupational disease

There is no substantial scientific evidence to support the existence of "overuse syndrome", i.e. an injury to one extremity causing the contralateral extremity to be damaged by overuse.

IV. Making the Diagnosis

A case definition for a shoulder condition includes appropriate symptoms, objective physical findings and abnormal imaging. A presumptive diagnosis may be based on symptoms and objective findings, but the diagnosis usually requires confirmation by clinical imaging prior to proceeding to surgery.

A. History and clinical exam

A thorough occupational history is essential for determining whether a shoulder condition is work-related, and whether it is due to an acute or chronic exposure. The provider should take extra care in documenting the reasons for diagnosing an occupational disease, as multiple employers might share liability. Providers should document the exposure and submit a complete work history as soon as a diagnosis of occupational disease is made; see "Establishing Work-Relatedness".

Although nonspecific and non-diagnostic, the primary symptom associated with most shoulder conditions is pain at night and pain with movement. The primary symptom associated with most rotator cuff tears is weakness: with elevation, internal/external rotation, and/or abduction testing. Some shoulder conditions, like dislocations, show marked deformity.

Physical examination should consist of accepted test and examination techniques applicable to the joint area being examined. Clinical judgment should be applied when considering which test to perform, for example Neer's, Abduction, and O'Brien's tests. For details of commonly used shoulder tests see Appendix 1.

B. Diagnostic imaging

Conventional X-ray, MRI, and ultrasound are the best imaging tools to corroborate the diagnosis of a shoulder condition [7-11]. MRI has been considered the gold standard; however, research has demonstrated the efficacy of ultrasound, done by a skilled provider or technician, to diagnose rotator cuff tears. A systematic review found ultrasound to have a pooled sensitivity of .95 and specificity of .96 in detecting full thickness rotator cuff tears [7]. Ultrasound was nearly as effective as MRI in diagnosing partial tears, therefore ultrasound may be recommended to diagnose full and partial thickness tears [9].

Contrast MRI is not necessary to diagnose rotator cuff tears, but may be considered when there is suspicion of a SLAP lesion/tear. [12, 13]**.**

V. Treatment

A. Conservative treatment

Shoulder injuries may be complex, often involving more than a single tissue or anatomic element. Different shoulder problems can present with similar findings, such as limited, painful motion and tenderness. It is important to consider which components of the shoulder girdle may be affected and tailor a conservative treatment plan accordingly. Published reports have reported utility for a variety of conservative interventions to reduce pain and improve function for a number of shoulder conditions. However, well designed research studies on conservative care for musculoskeletal injuries are limited in both quantity and quality.

The following is an example of a conservative intervention treatment algorithm:

- Non-steroidal anti-inflammatory (NSAID) medications and acetaminophen may be considered to treat pain [14].
- Brief rest and immobilization (less than 4 days) in the early stage, however, early unloaded movement and manual interventions such as mobilization and manipulation have been reported to reduce symptoms and facilitate greater shoulder motion, especially with acromioclavicular injuries [15].
- Immobilization beyond 3 days carries the risk of a frozen shoulder and is therefore not recommended, with the exception of fractures or glenohumeral dislocations.

- Therapeutic exercise and mobilization to improve shoulder range of motion and strength, and decrease pain in soft tissue injuries such as shoulder sprain, rotator cuff tendonitis or tears, and glenohumeral dislocations [16-18].
- Incorporating strengthening exercise once range of motion is increased and pain is reduced [18].
- Corticosteroid injections, typically within the subacromial space have been reported to provide short term relief for adhesive capsulitis, rotator cuff tendinopathy, impingement syndrome, tendon disorders, and SLAP disorders [19-22]. Care must be exercised when giving a corticosteroid injection to a partial rotator cuff tear, as this may lead to tear extension. Because corticosteroid use is associated with side effects such as weakening of connective tissue, no more than 3 injections are recommended under one claim for the shoulder, 4 injections per lifetime.
- Ergonomic interventions such as work station and/or work flow modification appear to be helpful in sustaining return to work [23-25].

Any worker who does not gain meaningful functional improvement (30-50%) within 4 -6 weeks of conservative treatment should be considered for a specialist consultation. Meaningful functional improvement may best be determined using validated shoulder/arm function instruments such as the Simple Shoulder Test (SST)[26] , the Shoulder Pain and disability Index (SPADI)[27, 28] the DASH or Quick DASH[29-32] or the American Shoulder and Elbow Surgeons Assessment (ASES)[30] form.

B. Surgical treatment

Shoulder surgeries under workers' compensation must be pre-authorized by utilization review. Criteria for authorizing shoulder surgery are contained in the review at the beginning of this guideline. If a proposed surgery is not listed, other standard review criteria may be used. For further information on utilization review, see http://www.lni.wa.gov/ClaimsIns/Providers/AuthRef/UtilReview/default.asp

VI. Specific Conditions

A. Rotator cuff tears

Rotator cuff tears can be acute or chronic in onset, and will vary in the thickness of the tissue tear and the presentation of signs and symptoms.

As industrial injury:

A worker presenting with acute pain suspicious for a rotator cuff tear should be able to report a precipitating traumatic event, such as a severe fall on an outstretched arm or an episode of heavy overhead lifting.

As occupational disease:

Chronic exposure risk factors for rotator cuff tears include heavy repetitive overhead work, such as in the examples in Table 1. However, many rotator cuff tears are due to non-work related conditions, such as age-related degeneration. The likelihood of having a rotator cuff tear increases with age. Studies show that more than half of individuals 60 and over have partial or complete tears, yet are asymptomatic and have no history of trauma [33]. Smoking has also been associated with rotator cuff tears [1].

Diagnosis and treatment

A careful occupational history and good clinical exam are most important in making a diagnosis of a rotator cuff tear and relating it to work exposures. Nonspecific symptoms reported with rotator cuff tears are pain with movement and pain at night. Objective clinical findings include weakness on testing forward elevation; internal rotation and abduction (subscapularis); and external rotation (infraspinatus).

Ultrasound and conventional MRI are the best imaging tools for diagnosing rotator cuff tears [9, 11]. MRI remains the gold standard in the radiographic assessment of rotator cuff tears [34]. X-ray or CT arthrogram is appropriate if there is a contraindication to an MRI. Contrast MRI is not necessary for making the diagnosis of a rotator cuff tear. Arthroscopy for the purpose of diagnosing rotator cuff tears is not appropriate.

Symptomatic, full-thickness rotator cuff tears, especially in a young worker, should be surgically repaired as soon as possible because of increased risk of tear progression [35]. For a rotator cuff tear that was previously treated conservatively, worsening pain usually indicates tear progression or migration of the humeral head [36-38] and could warrant operative care. Tears that are found incidentally and are asymptomatic are generally not work related and tend to get better with conservative care.

Partial tears, small tears and chronic full thickness tears in individuals >65 years old should be treated conservatively before surgery is considered [6]. Many workers, regardless of age, will recover function without surgery; there is limited risk of developing irreversible chronic changes such as a fatty infiltration, tendon retraction or cuff tear arthropathy when conservative care is initiated.

Injured workers with full or partial thickness tears may continue to work with restricted use of involved extremity, if work accommodation is allowed.

Rotator cuff repairs are increasingly done arthroscopically. Evidence does not support a difference in outcomes accorded to surgical technique, whether it is arthroscopic, mini-open or single or double row techniques [39]. Acromioplasty is not usually necessary during a rotator cuff repair; acromioplasty does not change the functional outcome after arthroscopic repair of the rotator cuff. [40-43].

Tissue Grafts (i.e., acellular human dermal matrix)
The use of xenografts and allografts is currently not covered, given clinical concerns about localized reactions and a lack of studies demonstrating superiority to conventional techniques. There is an increased risk of infection and rejection reported with the use of xenografts and there is no difference in outcome when they are used [44]. **This restriction does not apply to superior capsular reconstruction (SCR) surgery.**

** Distal clavicle resection as a routine part of acute rotator cuff tear repair is not covered.

Revision rotator cuff repairs

Nicotine has been associated with delayed tendon-to-bone healing after rotator cuff tear repair surgery [1-3]. It is strongly recommended that revision surgery not be performed in current nicotine users. Revision rotator cuff surgery should not be done if a patient has a massive rotator cuff tear (i.e. tears > 3cm or with severe fatty infiltration). The outcome of revision surgery for symptomatic failed primary repairs is inferior to a successful primary repair [45].

A second revision surgery or subsequent surgeries will only be considered if compelling evidence exists that the injured worker had returned to a state of clinically meaningful functional improvement (at least 30%) after the last revision surgery, followed by an ongoing significant decline in function. Measures of functional improvement should be documented on a validated instrument (e.g. DASH, SST, SPADI, and ASES) for a second revision surgery to be allowed.

Irreparable Rotator Cuff Tears

Superior capsular reconstruction (SCR) is a relatively new salvage procedure for irreparable rotator cuff tears. This surgery is reserved for tears that cannot physically be repaired (e.g. a retracted, atrophied, fat infiltrated torn supraspinatus tendon), or that will predictably fail (e.g. a repaired tendon that has poor tensile strength).

Irreparable rotator cuff tears cause an imbalance of the forces that in the normal shoulder stabilize the humeral head. A common result of such instability is the migration of the humeral

head superiorly with abduction of the upper extremity. SCR is a method of minimizing such instability by placing a tendinous or acellular graft that attaches to the superior tubercle of the glenoid proximally, and to the greater tuberosity of the humerus, distally. The graft forms a physical restraint to the superior migration of the humeral head, which has been demonstrated in biomechanical cadaver models and in several small case series [46-52].

It does not, however, remedy the underlying imbalance of forces that act on the humeral head caused by an irreparable rotator cuff tear. Thus, the usefulness of superior capsular reconstruction is as a salvage procedure that, with post-operative shoulder rehabilitation, may result in a more functional shoulder.

If considering an SCR procedure for an injured worker who meets surgical criteria, L&I recommends that the procedure be performed within the framework of a clinical study. If the procedure is approved, pre and post-operative usage of the American Shoulder and Elbow Surgeons (ASES) score is required.

B. Subacromial impingement syndrome without a rotator cuff tear

Subacromial impingement syndrome (SIS) results when the soft tissues of the glenohumeral joint, between the coracoacromial arch and the humeral tuberosity, are compressed, disturbing the normal sliding mechanism of the shoulder when the arm is elevated. SIS can be an occupational disease. Occurrence has been associated with heavy overhead work, high force and repetition [53].

Diagnosis and treatment

Workers may report generalized shoulder pain. An objective clinical finding is pain with active elevation. To confirm the diagnosis of SIS, an MRI should reveal evidence of tendinopathy/tendinitis or a rotator cuff tear.

Non-operative treatments of SIS have been shown to be as effective as subacromial decompression [54, 55]. For decompression to be allowed for SIS, the diagnosis must be verified by pain relief from a subacromial injection of local anesthetic, and the worker must have failed to improve function and decrease pain after twelve weeks of conservative care.

Subacromial decompression is also a reasonable treatment option for massive, irreparable rotator cuff tears that are not amenable to repair.

C. Calcific tendonitis

The exact etiology of calcific tendonitis is still unknown. It does, however, affect up to 10-20% of the population between the ages of 30-50 [56-58].

Diagnosis and Treatment

The diagnosis of calcific tendonitis is typically made with conventional plain films alone. Calcific tendonitis is not always symptomatic. When calcific tendonitis is symptomatic, non-operative treatment of the condition is typically successful [56, 59]. If symptoms continue after 12 weeks of conservative management then debridement of the calcified tendon is reasonable.

D. Acromioclavicular dislocation

Acute acromioclavicular (AC) injury is typically referred to as shoulder dislocation. The degree of clavicular displacement depends on the severity of the injury. The injury is classified using the Rockwood Classification [60].

Diagnosis and treatment

AC dislocations (Types III-VI) show marked deformity, and are accompanied by pain and tenderness over the AC joint. Conventional X-ray is the best imaging tool to use when AC dislocation is suspected.

Table 2: Rockwood Classification of acromioclavicular injuries

Rockwood classification	
Type I:	Sprain of the acromioclavicular or coracoclavicular ligament.
Type II:	Subluxation of the acromioclavicular joint associated with a tear of the acromioclavicular ligament; coracoclavicular ligament is intact.
Type III:	Dislocation of the acromioclavicular joint with injury to both acromioclavicular and coracoclavicular ligaments.
Type IV:	Clavicle is displaced posteriorly through the trapezius muscle.
Type V:	Gross disparity between the acromion and clavicle, which displaces superiorly.
Type VI:	Dislocated lateral end of the clavicle lies inferior to the coracoid.

*Types I- III are common, while types IV-VI are rare.

Surgery is not covered for type I and II injuries, whereas surgery is usually indicated for types IV, V, and VI. Management of type III injuries is more controversial but most patients with type

III AC joint dislocations are best treated conservatively. Surgery should be considered only when at least 3 months of conservative care fails. For patients with a type III dislocation and high physical demands on the shoulder, early orthopedic surgical consultation and /or surgery may be indicated.

E. Labral tears, including superior labral anterior-posterior (slap) tears

Labral lesions constitute a wide range of pathology. The most common labral lesions are SLAP tears, which are superior labral tears that extend anteriorly and posteriorly. Some SLAP tears result from acute trauma and others are degenerative in nature. There are several types of SLAP tears; type II SLAP tears are the most common and constitute more than fifty percent of all tears [61, 62].

Table 3: Types of SLAP tears

Tear type	Description
I	Fraying of the labrum without detachment from glenoid.
II	The labrum is completely torn off the glenoid. Type II SLAP tears are subdivided into a) Anterior b) Posterior c) Combined anterior and posterior.
III	"Bucket handle tear": the torn labrum hangs into the joint and causes symptoms of "locking, popping".
IV	Labral tear extends into the long head of the biceps tendon.

Diagnosis and treatment

No single examination technique is highly specific or sensitive in diagnosing labral tears because patients often have concomitant pathology. Some signs and symptoms include locking, popping, and grinding sensation, and pain worse when doing activities [63]. Physical exam (e.g. O'Brien's test, Neer's test, Yergason's test) may be used to strengthen a diagnosis, but the decision to proceed to operative management should be based on imaging findings.

Conventional MRI may be used, but MRI with contrast has the highest reported sensitivity and specificity for the diagnosis of SLAP tears [12, 64-67].

Since most SLAP tears are associated with other pathology, the provider should identify other shoulder conditions, if any, and follow appropriate surgical indications. Operative treatment for labral tears depends on the type of tear that is present. Type I tears are mostly debrided, type II tears are repaired using one of the several arthroscopic techniques [68] and types III and IV tears involving the biceps are repaired by tenotomy or tenodesis [68-72]. Literature suggests that there are no advantages to repairing type II lesions associated with rotator cuff tears in patients over the age of 50 [70]. Indications for surgery for SLAP tears are not standardized and remain somewhat controversial. Expert opinion, including the American Academy of Orthopedic Surgeons, recommends initial conservative care management for SLAP tears. In general conservative care management should last a minimum of 6-12 weeks. Early surgery should be considered only in cases where there is evidence of symptomatic suprascapular nerve compression.

E. Acromioclavicular arthritis

Acromioclavicular (AC) arthritis may result from previous trauma to the joint or may be the result of heavy lifting over a period of time.

Diagnosis and treatment

Symptoms include pain and tenderness at the AC joint. Symptomatic AC arthritis may initially improve with steroid injection. During rotator cuff repair, the decision to resect the distal clavicle should be based upon x-ray, MRI (radiologist-interpreted) or bone scan showing moderate to severe AC joint arthritis, distal clavicle edema or distal clavicle osteolysis.

Claviculectomy/Mumford as an add-on or as a stand-alone procedure should meet all criteria (criteria table) and should not be done without the specified objective findings. It is important to document the source of pain, including pain relief with local anesthetic injection.

Prior authorization is required. The routine use of the Mumford procedure during a rotator cuff tear repair will not be approved.

F. Glenohumeral dislocation

Glenohumeral dislocations typically involve a soft tissue injury, such as a rotator cuff tear or a tear of the glenohumeral ligament.

Diagnosis and treatment

Swelling, weakness and numbness are the main symptoms. Dislocations that are not accompanied by tears can be treated by reduction of the humeral head and initial immobilization followed by structure rehabilitation.

Surgical interventions have been shown to reduce the rate of recurrent instability in young (under 35) active patients with first-time dislocation [73, 74]. When a dislocation is associated with a rotator cuff tear, then repair of the tear is appropriate without additional conservative care. If the dislocation is associated with a labral tear, then initial conservative care is reasonable.

If instability persists after 6 weeks of conservative care, surgery is warranted. Surgery may also be appropriate if there is a history of more than one dislocation in a 3 month period. Arthroscopic and open labral/Bankart (capsulorrhaphy) repairs yield similar results in regard to recurrent instability, clinical outcomes and post-operative osteoarthritis [75, 76]. **Thermal capsulorrhaphy is not covered,** as there is no evidence of benefit [77].

It is not the intent of the department to accept treatment for multi-directional instability that pre-dates injury.

G. Tendon rupture or tendinopathy of the long head of the biceps

Tendinopathy of the long head of the biceps most commonly presents in combination with rotator cuff tears, SLAP lesions, and bursitis.

Diagnosis and treatment

Patients typically present with increasing anterior shoulder pain, declining function and a history of chronic repetitive overhead use. An MRI or an ultrasound may reveal tendinopathy, a partial tear or a complete tear of the tendon; however all imaging studies lack sensitivity and specificity as compared to arthroscopy.

For proximal long head biceps tendon rupture, active participation in conservative treatment is often successful; however in a young active patient surgery may be indicated. Nonsurgical management should be initiated for tendinopathy. Surgery may be considered for symptomatic partial tears and medial subluxation of the tendon. Tenotomy and tenodesis have comparable favorable results in literature, with the only major difference being a higher incidence of deformity with biceps tenotomy [69, 78]. Tenodesis is typically preferred for younger patients to avoid a cosmetic deformity [79].

H. Glenohumeral arthritis and arthropathy

Treatment of degenerative conditions such as glenohumeral arthritis or rotator cuff tear arthropathy is generally initiated with non-operative management techniques such as NSAID's and physical therapy. Conservative management is not, however, mandatory if severe degenerative changes are noted on conventional x-rays as the likelihood of meaningful long term relief is negligible.

Arthoplasties are a treatment option for acute comminuted fractures, post-traumatic arthritis, glenohumeral arthritis, and rotator cuff tear arthropathy. Total shoulder arthroplasties are primarily used to treat glenohumeral arthritis. Reverse shoulder arthoplasties have become the treatment of choice for the management of rotator cuff tear arthropathy where the glenohumeral arthritis is associated with a chronic rotator cuff tear and a high riding humerus.

All conditions are heralded by pain and limitations in range-of-motion. Conventional x-rays are typically sufficient to make the diagnosis of any of the preceding conditions.

Highly comminuted fractures of the proximal humerus may not always be reparable. If deemed irreparable then proceeding to a hemi-arthroplasty urgently or emergently is reasonable.

I. Manipulation under anesthesia/arthroscopic capsular release

Manipulation under anesthesia, or arthroscopic capsular release, may be considered if a patient has persistent stiffness, typically after a procedure that has not responded to at least 12 weeks of physical therapy and/or directed home exercises.

J. Diagnostic arthroscopy

Diagnostic arthroscopy is not currently accepted as a viable treatment option. If conventional x-rays and a MRI are unable to identify an anatomic explanation for a workers pain then surgery should not be performed.

VII. Post-Operative Treatment and Return to Work

It is important for the attending provider and the surgeon to focus on preoperative planning for postop recovery, reactivation and return to work activities. During the immediate postop period, (6 weeks) the surgeon should be involved in helping to direct these activities.

Unless a patient has multiple injuries, return to work within 6 weeks after surgery is reasonable if appropriate modifications are available.

Work accommodation during the early recovery periods with conservative interventions appear to be well supported. Jobsite modifications are dependent on the nature of the patient's work tasks, their injury, and their response to rehabilitation. Typically, factors such as lifting, pulling, and repetitive overhead work require modifications in position, force, repetitions, and/or duration. Those workers returning to jobs with heavy lifting or prolonged overhead work may need additional weeks of rehabilitation to regain full strength.

VIII. Specific Shoulder Tests

Rotator cuff impingement

- **Neer's** test assesses for possible rotator cuff impingement. Stabilize the scapula (place your hand firmly upon the acromion, or hold the inferior angle of the scapula with your hand) and with the thumb pointing down and passively flex the arm. Pain is a positive test.
- **Hawkins** test assesses for possible rotator cuff impingement. Stabilize the scapula, passively abduct the shoulder to 90 degrees, flex the shoulder to 30 degrees, flex the elbow to 90 degrees, and internally rotate the shoulder. Pain is a positive test.

Rotator cuff tears

- **Abduction test** –Active abduction to 90 degrees while providing resistance proximal to the elbow (primary abductor: supraspinatus).

- **External rotation** test – Examiner places one hand on the medial elbow and the other on the lateral aspect of the distal forearm. Instruct the patient to externally rotate the shoulder while you provide resistance. It is important to stabilize the patient's elbow against their side to prevent them from substituting abduction for external rotation. Compare the strength of the involved shoulder with that of the uninvolved shoulder. This test may also elicit pain indicating inflammation and weakness in the external rotators (primary external rotator: infraspinatus).
- **Lateral Jobe test** – Patient holds their arm at 90 degrees abduction in the coronal plane with elbows flexed at 90 degrees and hands pointing inferiorly with the thumbs directed medially. A positive test consists of pain or weakness on resisting downward pressure on the arms or an inability to perform the tests.

Acromioclavicular joint test

- **Crossed arm adduction**: Flex the shoulder to 90 degrees and adduct arm across body (reaching for opposite shoulder). Pain at the acromioclavicular joint is a positive test.

Labral tears, tendon disorders, dislocations

- **O'Brien's test:** point the thumb down,
- Flex shoulder to 90 degrees and adduct the arm across midline. Provide resistance against further shoulder flexion and evaluate for pain. Repeat with thumb pointing up and again evaluate for pain. If pain was present with the thumb down but relieved with the thumb up, it is considered a positive test, suspicious for a labral tear.
- **Yergason' s** test: flex elbow to 90 degrees, shake hands with patient and provide resistance against supination. Pain indicates possible bicipital tendinopathy or a labral tear.
- **Speed's** test: flex the shoulder to 90 degrees with the arm supinated. Provide downward resistance against shoulder flexion. Pain indicates possible bicipital tendinopathy or a labral tear.
- **Biceps load** test: supinate the arm, abduct shoulder to 90 degrees, flex elbow to 90 degrees, externally rotate arm until patient becomes apprehensive and provide resistance against elbow flexion. Pain indicates possible bicipital tendinopathy or a labral tear.
- **Apprehension** test: evaluates for anterior glenohumeral stability. With the patient supine, abduct shoulder to 90 degrees and externally rotate arm to place stress on the glenohumeral joint. If the patient feels apprehension that the arm may dislocate anteriorly, the test is positive. The apprehension test is usually followed by the

relocation test: with hand, place a posteriorly directed force on the glenohumeral joint. Relief of apprehension for dislocation is a positive test.

http://www.shoulderdoc.co.uk/article.asp?section=497
http://at.uwa.edu/special%20tests/specialtests/UpperBody/shoulder%20Main%20Page.htm
http://sitemaker.umich.edu/fm_musculoskeletal_shoulder/shoulder_exam_manuevers

IX. Functional Disability Scales for Shoulder Conditions

The Simple Shoulder Test (SST) and Shoulder Pain and Disability Index (SPADI) are publically available and free of charge. They are reproduced on the following pages.

The DASH and *Quick*DASH can be obtained by individual clinicians from the Institute for Work and Health, http://www.dash.iwh.on.ca/

The American Shoulder and Elbow Surgeons (ASES) Score is also publically available. It can be obtained free of charge at http://orthotoolkit.com/ases/

Simple Shoulder Test (SST) – Circle Yes or No

1.	Is your shoulder comfortable with your arm at rest by your side?	Yes	No
2.	Does your shoulder allow you to sleep comfortably?	Yes	No
3.	Can you reach the small of your back to tuck in your shirt with your hand?	Yes	No
4.	Can you place your hand behind your head with the elbow straight out to the side?	Yes	No
5.	Can you place a coin on a shelf at the level of your shoulder without bending your elbow?	Yes	No
6.	Can you lift 1 lb (a full pint container) to the level of your shoulder without bending your elbow?	Yes	No
7.	Can you lift 8 lb (a full gallon container) to the level of the top of your head without bending your elbow?	Yes	No
8.	Can you carry 20 lb (a bag of potatoes) at your side with the affected arm?	Yes	No
9.	Do you think you can toss a softball underhand 10 yards with the affected arm?	Yes	No
10.	Do you think you can throw a softball overhand 20 yards with the affected arm?	Yes	No

11. Can you wash the back of your opposite shoulder with the affected arm?	Yes	No
12. Would your shoulder allow you to work full-time at your regular job?	Yes	No

Score (Total # of No's)_____

Shoulder Pain and Disability Index (SPADI)

How severe is your pain?

1. At its worst:	*(No pain)* 0 1 2 3 4 5 6 7 8 9 10 *(Worst Pain Imaginable)*
2. When lying on involved side:	*(No pain)* 0 1 2 3 4 5 6 7 8 9 10 *(Worst Pain Imaginable)*
3. Reaching for something on a high shelf:	*(No pain)* 0 1 2 3 4 5 6 7 8 9 10 *(Worst Pain Imaginable)*
4. Touching the back of your neck:	*(No pain)* 0 1 2 3 4 5 6 7 8 9 10 *(Worst Pain Imaginable)*
5. Pushing with the involved arm:	*(No pain)* 0 1 2 3 4 5 6 7 8 9 10 *(Worst Pain Imaginable)*

How much difficulty do you have?

1. Washing your hair:	*(No difficulty)* 0 1 2 3 4 5 6 7 8 9 10 *(So difficult - help is required)*
2. Washing your back:	*(No difficulty)* 0 1 2 3 4 5 6 7 8 9 10 *(So difficult - help is required)*
3. Putting on an undershirt or pullover sweater:	*(No difficulty)* 0 1 2 3 4 5 6 7 8 9 10 *(So difficult - help is required)*
4. Putting on a shirt that buttons down the front:	*(No difficulty)* 0 1 2 3 4 5 6 7 8 9 10 *(So difficult - help is required)*
5. Putting on your pants:	*(No difficulty)* 0 1 2 3 4 5 6 7 8 9 10 *(So difficult - help is required)*
6. Placing an object on a high shelf:	*(No difficulty)* 0 1 2 3 4 5 6 7 8 9 10 *(So difficult - help is required)*
7. Carrying a heavy object of 10 pounds:	*(No difficulty)* 0 1 2 3 4 5 6 7 8 9 10 *(So difficult - help is required)*
8. Removing something from your back pocket:	*(No difficulty)* 0 1 2 3 4 5 6 7 8 9 10 *(So difficult - help is required)*

Scoring

Pain score: _____ / 50 x 100 = ____% Sum of #'s circled in pain section	***Total Score:***

Disability Score: _____ / 80 x 100 = ____% Sum of #'s circled in disability section	_____ / 130 x 100 = ____% Sum of #'s circled in both sections

Roach KE, Budiman-Mak E, Songsiridej N, Lertratanakul Y. Development of a shoulder pain and disability index. Arthritis Care Res. 4[4], 143-149. 1991.

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