Conservative Care Options for Work-Related Mechanical Shoulder Conditions

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Purpose and Intended Use

This document updates a 2014 resource developed by the Industrial Insurance Chiropractic Advisory Committee (IICAC) of the Washington State Department of Labor and Industries. It provides concise summaries of published clinical and scientific literature regarding utility and effectiveness of commonly used conservative approaches for work-related mechanical shoulder conditions; history, examination and special studies, recommendations for supportive, manual, and rehabilitative care including practical clinical resources (useable without licensing/charge in practice for non-commercial use). It is intended to inform care options and shared decision-making. It is not a standard of care, claim management standard, or a substitute for clinical judgment in an individual case. This practice resource does not change L&I coverage or payment.

A comprehensive search of available scientific literature on conservative assessment and intervention procedures for mechanical shoulder conditions was conducted by the Policy, Practice, and Quality (PPQ) Subcommittee of the IICAC and department staff during early 2022. Literature was reviewed, assessed for relevance and quality and summaries were drafted by consensus of the subcommittee with expert content input from consultants and reviewers, including the department's Industrial Insurance Medical Advisory Committee and selected relevant professional societies in early 2022. An updated draft was posted for public comment and was revised and approved for distribution by the IICAC and department in July 2022. This resource is expected to be updated periodically by the IICAC. Interested parties are encouraged to submit new published scientific reports for consideration for future revisions.

This and other practice resources are in the public domain and are available for download at the State of Washington Department of Labor & Industries website. Contact information for public input and submission of studies for future revisions is available on the IICAC website.

The Department of Labor & Industries' Shoulder Conditions Diagnosis & Treatment Guideline has additional information, particularly related to surgical intervention: Treatment Guidelines and Resources (lni.wa.gov)

Practical Application Points

- Work-relatedness usually involves direct or indirect trauma to the shoulder, or prolonged, awkward or overhead arm use.
- Differential shoulder diagnosis is typically based on clinical criteria. Fracture or dislocation are important to rule in, however diagnostic precision for soft tissue conditions may not yield many differences in conservative manual care options as treatment typically involves passive and active interventions for the entire shoulder girdle.
- Rapid functional improvement gains should be evident with conservative care, particularly with severely restricted shoulder range of motion. Baseline and progress functional tracking instruments should be routinely used.

Work-Related Mechanical Shoulder Conditions

Work-related shoulder conditions of mechanical origin for which patients seek conservative care typically present as shoulder pain with full or limited movement following an identifiable workplace exposure. Serious underlying conditions, associated with acute mechanically-triggered shoulder pain and restriction, are extremely rare. Flags for non-mechanical conditions include fever, pain at rest, erythema, and unexplained swelling. Posttraumatic deformity and inability to perform any movements are flags for fracture or dislocation. Patient history, location of tenderness, and character of pain guide diagnosis. Examination is useful for discerning between articular, soft tissue, and referred pain sources. Imaging is not indicated initially in the absence of significant precipitating trauma, sudden onset of pain and/or swelling, palpable mass or deformity, or pain at rest. Acute onset, mild overuse/trauma, and lower shoulder disability scores predict a good outcome with conservative care. Increased age, female gender, severe or recurrent symptoms at presentation, concurrent neck pain, and higher disability scores are associated with poorer outcomes.

Evaluation Summary

- Rule-out potential red flag conditions that require prompt specialty referral: such as shoulder pain associated with muscle weakness or inability to raise the arm/shoulder, painless weakness associated with neck pain with or without trauma, deformity, swelling, fever/chills, suspected malignancy or shoulder instability or dislocation.
- Differentiate pain due to local shoulder pathology versus referral pain
- Rule-in mechanical causes prior to initiating manual care. Suspected full thickness rotator cuff tears should be referred to specialist for urgent evaluation.
- Evaluate Work place exposures – falls, blunt force, or extended periods of overhead or awkward arm position.
- Monitor health-related quality of life and shoulder function (e.g., shoulder questionnaires in Appendix A) to establish a baseline and assess improvement over time.
- Provocative testing may correlate with diagnostic categories, but may have minimal impact on specifying conservative treatment options.
- Diagnosis of a shoulder condition is usually based on clinical criteria. Imaging should be reserved for patients presenting with specific red flags or non-response to 4-6 weeks of appropriate conservative care.

Intervention Summary

- Limited evidence supports a combined manual approach of mobilization/manipulation, active/passive exercise, and soft tissue techniques for most mechanical shoulder conditions. Early improvement in pain and function is expected for recent acute injuries. Recovery may be delayed in chronic conditions.
- Consider reassessment and specialist consult if there is inadequate response to 4 weeks of conservative care.

Typical Interventions and Response Thresholds

1-2 wks	3-6 wks	7-8 wks	Beyond 8 wks
• ***Initially:*** *Patients with red flags or persistent severe pain should be referred to a specialist for urgent evaluation.* • ***Uncertain mechanical etiology, severe pain/restriction:*** *rule out fracture & dislocation; expect some measurable improvement w/ combined active exercise and manual work within patient tolerance.* • ***Known mechanical etiology:*** *expect early significant improvement for acute capsulitis/tendinosis, however recovery may be delayed in chronic conditions.*	• ***Early:*** *Re-assess pain interference and function within 3- 4 weeks of beginning care.* • ***Good improvement****: Shoulder function and compound movements improves measurably & perceptively by patient. Continue, emphasize self care.* • ***Inadequate improvement:*** *Worsening or no change in function (e.g., lower score on SST or SPADI). Consider additional diagnostics, specialist consultation. If only small improvement, consider change in intervention or referral for covered alternatives. (e.g., supervised exercise, more intense manual therapy).*	• ***Response should be evident:*** *With persistent loss of mobility beyond 4-6 weeks, chronic adhesion likely in traumatic onset. Recovery may be delayed in such cases.* • ***Good improvement:*** *At or near pain free, nearly full function. Transition to self-care, periodic follow-up assessment. MCID met for outcome measures.* • ***Inadequate improvement:*** *Pain interference & function limitations persist, minimal improvement. Consider specialist referral and assessment for psychosocial risk factors impeding recovery.*	• ***Approaching Resolution:*** *Most shoulder conditions should respond significantly within 8 weeks of appropriate care.* • ***Good improvement:*** *Improvement in function should be significant and measurable. Consider continuing combined care approach if there are physical capacity limitations.* • ***Inadequate improvement****: Consider additional diagnostics, specialist consultation.*

Shoulder Progress Checklist

Voluntary educational / practice aid – Not an L&I documentation requirement

Assessment / Intervention / Progress

Note these factors at baseline and roughly every two weeks assess changes:

Work limitation:

- ☐ Off work
- ☐ Weight restriction:_____
- ☐ Activity limits: _____
- ☐ Tolerance of awkward positions: _____ hrs

Function Score (e.g., SST or SPADI)

Baseline: _____

Pain Interference w/ activity:

None Total

0 1 2 3 4 5 6 7 8 9 10

Baseline (check all that apply):

- ☐ Arm weakness
- ☐ Stiffness
- ☐ Shoulder pain
- ☐ Pain interferes with sleep

Manual Interventions

- Combined mobilization, initial active and passive exercise, and soft tissue work typically reduce pain and improve function for mechanical shoulder problems. Treatment frequency reported in trials was usually 2-3 times per week.
- Incrementally increasing intensity of manual techniques within patient tolerance is recommended. Consider modification of methods in absence of meaningful functional improvement.
- Patients should receive home exercise and range of motion instructions. Supervised exercise may be beneficial with rotator cuff conditions and adhesive capsulitis. Trials generally reported twice weekly frequency for 6-8 weeks.

Modalities/Medications

- Modalities or NSAIDs do not appear to add benefit to manual interventions.
- Non-NSAID and non-opioid analgesics may provide pain relief.
- Subacromial steroid injection may be helpful for rotator cuff tears and tendinoses that do not respond with manual methods, although multiple or prolonged use is discouraged and may create worse outcomes.

Good Improvement

- Natural progression of uncomplicated shoulder problems is typically ~50% improvement in pain and function in 4-6 weeks and fully resolved in 8-12 weeks.
- Minimal clinically important difference varies for each shoulder outcome tool, but can be a good indicator of significant change.
- When mechanical etiology is identifiable, reduction in pain, and increased ranges of combined movements (e.g., reaching behind head and back) can be expected with 4-6 weeks of treatment.
- Acute shoulder-only conditions respond very quickly to conservative intervention. Chronic shoulder conditions and conditions with neck and shoulder involvement typically respond slower.

Inadequate improvement

- Reassessment for red flags, further diagnostics, and specialist consultation is warranted in non-responding cases after 4-6 weeks.
- Specialist consults and supervised exercise should be considered when continuing response to manual interventions is stalled/unexplained after 6 weeks.
- Surgical intervention for rotator cuff tears may be of greatest benefit for younger individuals whose response to 4-6 weeks of manual methods is inadequate.
- Difficult shoulder conditions include refractory frozen shoulder, chronic conditions such as adhesive capsulitis, and more severe rotator cuff tears. Recovery may take several months. Posterior glenohumeral dislocations are difficult to diagnose and may account for failure to respond in suspected cases of frozen shoulder or early adhesive capsulitis. Trauma from the anterior associated with condition onset may be a diagnostic clue.

Clinical Assessment Summary

Occupational Shoulder Assessment Overview

Clinical presentation [1, 2]

- Typically, shoulder pain is reproducible during particular movements.
- Movement may be restricted (pain precludes movement) or full (movement can be performed but causes pain).
- Onset follows mechanical workplace exposure.

Work place exposure: work injury

- Direct trauma (e.g., blunt force blow to shoulder, fall onto shoulder).
- Indirect trauma (e.g., fall onto outstretched arm/elbow that leverages sudden impact to shoulder).
- Identifiable work activity that triggers a specific episode of shoulder condition

Work place exposure: occupational disease [3]

- Overhead work for extended periods (e.g., >15 minute intervals), prolonged repetitive use of arms in awkward position or combined with heavy force, pushing or pulling heavy loads.
- In addition to such exposures known to contribute to or cause shoulder conditions, case law requires the establishment that the workplace activities contributed to the development or worsening of the condition on a more-probable-than-not basis compared to the risks in everyday life. (Dennis V. Dept of Labor & Industries, 1987)

Corroboration of diagnosis is usually clinical [1]

- History (exposure, painful restricted movement).
- Physical examination has poor diagnostic accuracy due to the overlap of many shoulder pathologies and the inability of testing to differentiate and may be of minimal utility in conservative management.
- Shoulder function questionnaire are important to document functional disability (e.g. SST, SPADI).
- Early imaging may only be helpful in cases with substantial trauma or to evaluate non-mechanical etiology such as tumor or infection.
- Imaging for mechanical shoulder problems is not routinely indicated unless there are red flags for underlying pathology or response is inadequate to appropriate conservative intervention.

History Components

Patient Presentation

Character of injury [1, 4]

- Pain upon shoulder movement or local tissue provocation.
- Stiffness with or without pain is common with adhesive capsulitis, posterior dislocation, and other arthritis.
- Instability or hypermobility may suggest ligamentous damage
- Weakness (distinct from movement avoidance due to pain) may be associated with muscle tears and neural injury.
- Numbness/tingling may be a sequel of neural trauma or vascular involvement.

Pain location and tenderness

- Identification of specific anatomical pain generators has not withstood scientific scrutiny. However, local tenderness elicited with specific shoulder positioning may be more discriminative
- For some shoulder conditions such as deltoid or sub acromial bursitis, tenderness may be useful for targeting inflamed structures.

Mobility

- Restriction of most any movements following trauma is a red flag for fracture or dislocation.

- Restriction of most movement due to pain following little or no trauma suggests bursitis or adhesive capsulitis.
- Instability is more common in younger workers (<35 years)

Onset

- Positional (e.g. pain and restriction followed extended overhead/awkward work).
- Trauma (e.g. a fall on or direct blow to the shoulder at work, consider imaging).
- Repetitive arm activity, particularly in prolonged/awkward positions.
- Insidious onset, unexplained erythema, swelling, elevated tissue temperature, or pain at rest are flags for non-mechanical causes and warrant consideration for specialist referral.
- Sudden acute shoulder pain at night consider imaging for calcific bursitis tendonitis

Nature of Trauma

The mechanical nature of initiating events may frequently help identify structures involved. [1]

Sudden arm traction – consider:

- Gleno-humeral subluxation, brachial plexus injury

Fall on outstretched straight arm (land on hand) – consider:

- Acromio-clavicular separation or clavicle fracture
- Posterior dislocation
- Labrum tear
- Rotator cuff tear

Blow/fall on > 90° flexed shoulder with external rotation (fall and tumble on face, arms overhead and elbow flexed) – consider:

- Anterior gleno-humeral dislocation
- Labrum tear

Anterior blow to shoulder – consider:

- Gleno-humeral dislocation or subluxation
- Contusion

Superior blow/fall on shoulder – consider:

- Acromio-clavicular separation, distal clavicle fracture
- Contusion (pointer)

Sudden pain on heavy loading (without dislocation, e.g. weight-lifting) – consider:

- Muscle/tendon rupture
- Labrum tear

Differential Diagnosis Considerations

Occupational Shoulder Conditions Diagnostic Classification

Diagnostic conclusions of occupational shoulder conditions require elements of workplace exposure related to condition onset, presentation, and clinical findings. Despite the extensive availability of clinical examination methods and "conventional wisdom" regarding differential diagnosis of shoulder problems, reliability and validity of various clinical assessments for shoulder conditions have been shown to be of limited value. Further, a similar mix of conservative interventions (e.g., passive and active movement) appear to provide benefit for a large variety of shoulder conditions which suggests that the importance of precise differential diagnosis of mechanical contributors may be of lower clinical importance. [5]

Shoulder conditions can be generally categorized pathologically along these lines, although there may be multiple contributing factors across these categories. Diagnostic grouping is especially difficult for patients with high pain severity, chronic, and bilateral conditions. Red flags should be assessed and imaging considered based on suspected conditions, as appropriate: [1]

- General shoulder pain/restriction (e.g. mechanical, sprain, strain)
- Rotator cuff tendinoses
- Impingement syndromes
    - Subacromial impingement syndrome – often related to rotator cuff tendinopathies
    - Capsular impingement syndromes – frequently involving posterior capsule
- Chronic tendinosis, bursitis, DJD
- Adhesive capsulitis
- Labral tear
- Dislocation
- Instability
- Neuorologic Sources (root, plexus, peripheral nerve)

Orthopedic Testing Clusters by Condition

While this table is organized by suspected condition, it may be useful to perform the evaluation based on patient positioning to maximize efficiency in the exam. Reference Cleland 2022[6] and Hegedus 2012[7] for specific instructions on how to perform as well as interpreting tests.

Condition	Cluster	Value
General Instability	1. Apprehension/Relocation/Release Tests 2. If the Release Test is not used, Additional testing with Anterior/Posterior Drawer Tests	Highly specific and moderately sensitive for instability[8]
General Labrum Screen	1. Crank Test (Compression Rotation) 2. Apprehension/Relocation 3. Load-and-Shift with Inferior Sulcus Sign	Highly specific and sensitive for labrum tears in general.[9, 10]
SLAP Lesions	1. Crank Test (Compression Rotation) 2. Apprehension/relocation 3. O'Brien	The matching of 2 out of 3 sensitive tests with one specific test is highly specific for SLAP lesions.[11, 12]

	PLUS 4. Yergasons, Speed's or Biceps Load II Test 5. Passive distraction test[7] • Additional testing may include the Anterior Slide Test	
Posterior-Inferior Lesions	1. Kim Test 2. Posterior Jerk Test	Highly sensitive and specific for posterior-inferior labral lesions sometimes seen after dislocations.[13]
Full-Thickness RTC		
General Screen	1. Drop-Arm Sign 2. Painful Arc 3. Infraspinatus Weakness (weak external rotation)	95% post-test probability of a full-thickness rotator cuff tear if all three are present[6, 7] Note that first and second degree tears are not easily detectable or distinguishable on physical examination.
Supraspinatus	1. Drop-Arm sign	
Subscapularis	1. Lift-Off Test 2. Internal Rotation Lag Sign Additional tests include bear-hug and belly-press)	
Infraspinatus/Teres Minor	1. External Rotation Lag Sign	
Impingement		
Primary	1. Hawkins/Kennedy 2. Painful Arc 3. Weak external rotation Additional test includes the Lift-Off Sign	95% post-test probability of subacromial impingement if all three are present.[14, 15]
Secondary	• Tests for Instability	Use clinical tests for instability to determine an underlying secondary cause of impingement
Tendonitis	1. Shoulder Shrug sign	[7]
Functional Causes		
Looseness (AMBRI)	• Load & Shift plus Inferior Traction for Sulcus Sign	When looseness is not pathologic, capsular laxity is present in all joints and may predispose to some injury.
Tight Posterior Capsule	• Posterior Capsular Stretch Test	May indicate functional migration of the humerus allowing subacromial impingement. May also indicate an area in need of manipulation.
Adhesive Capsulitis	1. Coracoid Pain Test 2. Distension Test in passive external rotation 3. Shoulder Shrug Sign	Sensitive but not specific
AC Disorders	1. Cross-Body Adduction 2. Resisted Horizontal Abduction 3. O'Brien's (Active Compression)	Resisted extension is the most sensitive; the combination is good both for ruling in and ruling out AC disorders.[16]

Clinical Examination for Functional Deficits

Range of Motion

This portion of the examination is useful in evaluating instability and restriction simultaneously through active and passive joint motions while observing and eliciting patient reactions.

- Flexion, abduction, and external rotation assessed by visual, goniometric and photographic methods have fair to good reliability, but measurement errors are large. [5, 17, 18]
- Internal rotation measured by reaching behind back is unreliable due to elbow movement.[19]
- Intrarater reliability of 4 physiologic shoulder movements was high. The standard error (SE) for **angular inclinometer measurements** of 2 physiological shoulder movements (flexion, abduction in a standing position, inclinometer positioned at deltoid insertion) is about 5°. Internal rotation measured visually using a visual midline between the humeral epicondyles starting from a maximal external rotation position (thumb out) to a maximal internal rotation position had a standard error of 13°. External rotation measured linearly (from a standing position using a tape measure between umbilicus and ulnar styloid) had a standard error of 1.6 cm. [20]
- **Gravity inclinometer** measurements show high intra- and inter-rater reliability for hand behind back & flexion. Intra- and inter-rater reliability is poor for abduction, external or internal rotation in abduction. [21, 22]

Pain Interference

Specific attention to how a patients' pain interferes with their ability to perform usual activities has been shown to be useful in predicting chronicity for low back and other musculoskeletal problems, particularly in injured worker populations. A fast and simple approach to track the impact of the patient's pain on their function could be a simple anchored 0-10 scale such as: [23-25]

> *In the last month, how much has your shoulder pain/problem interfered with your daily activities? (Use a scale from 0 to 10, where 0 is "no interference" and 10 is "unable to carry on any activities")*

Strength – Weakness

Rotator cuff tendinosis: [26-28]

- In general, tests for rotator cuff muscle weakness appear to correlate well in patients with cuff tears. Tests, based on presence or location of subscapular pain, do not appear to correlate well. First and second degree tears are not well distinguishable on physical exam.
- Detectable subscapularis weakness (usually indicating a partial or full-tear) by performing the **Lift-Off** test (patient places hand behind back and lifts it posteriorly) correlates well with rotator cuff tears.
- The internal rotation **Lag Sign** is more sensitive but less specific than the Lift-Off test for subscapularis involvement. It is more sensitive for partial subscapularis ruptures compared to the Lift-Off test.
- **Full/Empty Can** (aka supraspinatus strength) test (arms flexed 90°, abducted 30°, resists downward pressure in thumbs-up, then in thumbs-down position) - has slightly higher correlation with arthroscopy findings of rotator cuff tears than pain tests.
- The external rotation Lag sign is less sensitive than the Empty Can test but more specific for Infraspinatus/Teres Minor tears.
- Infraspinatus strength/weakness tests (elbow at side, flexed 90° forearm externally rotated against resistance), has more correlation with arthroscopy findings than pain tests however may be weak with either tears or subacromial impingement.

Clinical Examination by Provocation & Relief

Point provocation

General shoulder pain/restriction: [27]

- Assessment of tenderness has good inter and inter-rater reliability.

Rotator cuff tendinosis: [27]

- Eliciting tenderness at the insertion sites of some tendons is based on specific shoulder positioning. Palpation of the tendon insertion is not possible; creation of tenderness is the objective.
- Supraspinatus tendon insertion is reliably palpable below the AC joint with extension and internal rotation (flexed elbow behind back, reaching up to scapula and lifted posteriorly).
- Infraspinatus and teres minor tendons are palpable below the posterior acromion with 90° flexion, 10° adduction, and 20° external rotation (flexed elbow in front of nose, hand/forearm rotated laterally).

Dislocation: [29]

- Acromioclavicular (AC) region tenderness with deformity secondary to trauma suggests AC separation or distal clavicle fracture.
- Discrete AC tenderness without deformity suggests minor AC separation or local contusion. May indicate distal clavicle osteolysis in individuals with continued extreme loading (e.g. weightlifter).

Contractile provocation

Resisted contraction assessments of shoulder movements are often used for the purpose of localizing where pain occurs when specific contractile tissues are recruited. Studies of these tests have generally not correlated with surgical or imaging studies and are considered unreliable for localization or diagnosis. [5]

Positional provocation

General shoulder pain/restriction:

- **Painful Arc test** (painful active midrange abduction at 70°-100° with decreased pain above 100°) has good intra/inter rater reliability. When a pain occurs in this range on active movement, but not on passive movement, contractile tissue is likely involved. When a painful arc is found on both active & passive movement, any number of soft tissues may be involved (contractile, bursa, etc.) and is not helpful.[1, 30]
- Overall, the inter-examiner reliability of Cyriax classification of types of lesions has been demonstrated to be poor and unacceptable. However, experienced examiners may be able to differentiate between normal palpatory joint end feel and pathological palpatory joint end feel of passive shoulder end range. Examiners' findings of pathological end feel moderately correlates with patient report of pain. However, classic anatomic categorizations of end feel (e.g. Cyriax "capsular," "tendinous," etc end feel) may not reflect restrictions coming from the named structures.[5, 31]

Rotator cuff tendonosis:

- **Drop Arm Test** - Inability to control lowering outstretched arm from abducted position suggests rotator cuff involvement.[15]

Adhesive capsulitis:

- Multidirectional limitations equally restricted in both active AND passive movement suggest adhesive capsulitis, particularly when forward flexion is the least limited.
- Inability to perform most movements suggests early inflammation (e.g. bursitis, beginning adhesive capsulitis).
- Shoulder hunching during movement suggests compensation for restricted movement (e.g. with adhesive capsulitis, DJD).[1]

Labrum tear:

- Sharp, reproducible pain at a discrete point on active moment (that can be avoided with alternative movement) suggests internal Glenohumeral derangement such as labrum tear.[1]

Dislocation:

- Post traumatic avoidance of most-all movement generally suggests fracture or dislocation.
- Inability to flex the shoulder while maintaining forearm supination (palm up) suggests posterior dislocation.[1]

Imaging Studies

Imaging Indicators

Imaging for shoulder conditions is useful in some circumstances. A key issue when considering imaging is to anticipate how the result of an imaging study would modify a conservative care trial. For most pain and restriction conditions associated with a workplace exposure, imaging should only be considered if the condition does not respond to 4 weeks of conservative treatment. Circumstances where imaging should be considered include: [2, 32]

- Acute, severe trauma (blunt force, suspicion of fracture, abnormal shape/suspicion of dislocation).
- Non-mechanical pain (unrelenting pain at rest, constant or progressive symptoms and signs, pain not reproduced on assessment-particularly if patient has history of cancer, enlarging mass, unexplained deformity, pain at multiple sites, age > 50, pain at rest, unexplained weight loss).
- Suspicion of infection (red skin, fever, systemically unwell, history of immunosuppression, penetrating wound).
- Substantial activity and/or work restriction lasting beyond 4 weeks.
- Failure to respond to conservative care by 4 weeks (e.g., no change, worsening, increasing disability).

Plain film radiography is useful for assessing:

- In addition to a True anterior to posterior (AP) view with internal and external rotation, axial views such as a 30 degrees Rockwood view and a 45 degrees Garth view may be valuable (although may distort the structures imaged).
- Impingement – using Outlet view and Zanca (15 degree cephalad view) for subacromial impingement due to a hooked acromion or osteophytic impingement.
- Anterior dislocation – using AP internal rotation or anterior oblique (Y view), axillary projection for viewing glenoid
- Posterior dislocation – using the Y view or transthoracic view.
- AC joint separation – Zanca view is best; bilateral views (weighted and non-weighted) have not been shown to alter management.
- Instability
    - Osteolysis or fractures of the distal clavicle – using a Zanca view
    - Sternoclavicular joint – using Hobb's and serendipity views
    - Humeral head fractures – seen primarily on true AP internal and external rotation

Advanced imaging includes magnetic resonance imaging (MRI), computed tomography (CT), and ultrasonography (US). These should typically be reserved for cases where conservative care has failed to resolve the problem.

- MRI may be useful when patients are unresponsive to conservative care.
    - Standard MRI
    - Contrast MRI
- CT
    - CT arthrograms are used mainly for glenoid labrum and rotator cuff tears.
    - Plain film arthrograms
- US (diagnostic ultrasound) is valuable for detecting full thickness cuff tears. Partial tears are sometimes, but not reliably detectable.

Imaging for conditions

General shoulder pain/restriction

- MRI findings appear to have better correlation with clinical findings than ultrasound.

Shoulder pain/restriction attributed to "subacromial girdle" (acromioclavicular and glenohumeral joint) lesion (pain & restriction with specific localized findings)

- **A-C joint disorders –** Radiographs not initially indicated for non-traumatic origin. Plain film radiographs may be indicated to assess AC joint separation. AC dislocations (Types IV, V and VI) should be referred for orthopedic evaluation. Persistent AC

pain several weeks following a dislocation should be imaged to determine the possibility of osteolysis of the distal clavicle. MRI is more sensitive to A-C joint degeneration than plain film studies. Reactive bone edema on MRI is more reliable predictor of symptomatic A-C joint than degenerative changes seen on MRI. MRI allows assessment of adjacent soft tissues. [33, 34]

- **Adult patients with significant shoulder/glenohumeral joint trauma –** Radiograph is recommended to rule out fracture or dislocation. However, patients are unlikely to require initial radiographic examination if there is a fall and pain at rest but no swelling, palpable mass or deformity and normal ROM. Advanced imaging and specialist referral recommended. Repeat x-rays in 10 days if fracture remains a possibility, alternatively consider referral for CT.

Rotator cuff tendonosis

- Ultrasound is preferred over MRI for large rotator cuff tears and & biceps pathologies. Ultrasound is highly operator-dependent but is significantly less expensive than MRI.
- Radiographs are not initially indicated, however may be useful for ruling out suspected comorbidities.

Impingement syndrome

- Subacromial bursa inflammation on MRI correlates with impingement tests, thus MRI may only be warranted if improvement is not evident with an adequate trial of conservative care.

Chronic tendonosis, bursitis, DJD

- **Osteoarthritis (DJD):** Radiography is indicated if pain is not relieved after 4 weeks of conservative care or if there is a suspected underlying pathology such as a tumor.
- **Glenohumeral joint inflammatory arthritis:** Early MRI and rheumatologist referral is recommended in suspected septic and rheumatic arthritis.
- **Bursitis:** MRI is useful for assessing subacromial bursa effusion and calcific bursitis.

Adhesive capsulitis

- Radiographs are not routinely indicated, but may be used to exclude complicating factors.
- Arthrography is frequently used to evaluated capsular restrictions and may provide relief if rupture of adhesions occurs during the procedure.

Labrum tear

- MRI is superior to US for assessing labrum tears.
- Adding MRI with the shoulder in abduction and external rotation may reveal associated articular-sided rotator cuff tears.
- Greater pain, higher DASH, or restricted extension predicts labrum tear on MRI.
- Arthrogram may be useful in detection of labrum tear.

Dislocation

- **Glenohumeral dislocation –** Typically results from significant soft tissue injury (e.g., glenohumeral ligament or rotator cuff tear). Conventional x rays can usually establish the presence of dislocation, however, not instability.
    - Note that post-reduction, it is important to obtain AP views with a Y view, and if possible, an axillary view to detect commonly associated Hill-Sachs fractures, humeral tuberosity fractures, and glenoid rim fractures. Alternatively, an axial view (i.e. Rockwood or Garth) may detect Hill-Sachs lesions.
- **Acromioclavicular (AC) dislocation –** Severity of injury determines the degree of clavicular displacement. Rockwood Classification (Rockwood 1998) Types III-VI are true dislocations and are best imaged with conventional x-ray. AC sprains (Type I) are unlikely to be identified radiographically while AC subluxations (Type II) may be detectable on x-ray. [35]

Shoulder Radiography Quick Reference

Use this table to determine the best views to identify specific suspected pathologies. Combinations may be useful to rule out multiple conditions.[36]
For more information around radiographic evaluation and positioning, try these helpful resources with visual representations:

- https://musculoskeletalkey.com/radiographic-evaluation-of-shoulder-problems/
- https://ce4rt.com/positioning/radiographic-positioning-of-the-shoulder/

If the patient has trauma-induced shoulder pain:

- Order radiographs to detect fractures, dislocations, and separations
- If radiographs were taken previously, consider if they are appropriate for the differential of suspected pathologies.

Pathology	Primary Radiograph(s)	Supplementary Radiograph
Fractures		
Humeral Fracture	• True A-P Internal & External Rotation (Grashey View)	• Apical Oblique View
Glenoid Rim Fracture (Bankart Fractures)	• Apical Oblique View	• Stryker Notch View • Modified Axillary View • Grashey View
Hill-Sachs Lesions	• Apical Oblique View	• Stryker Notch
Distal Clavicular Fractures	• Zanca View	• Grashey View
Scapular Fractures	• Lateral Scapular View	• Apical Oblique View
Dislocations		
Anterior Glenohumeral	• Y View • Apical Oblique	• Grashey View
Posterior Glenohumeral	• A-P (no correction for obliquity) for Posterior Dislocations (Empty Fossa Sign)	• Apical Oblique View
Sternoclavicular Separation	• Hobb's View	• Serendipity View
AC Separations	• Zanca View	• Grashey View
Osteolysis of the Distal Clavicle	• Zanca View	
Calcific Tendinitis	• Grashey View	
Impingement (bony)	• Outlet View • Zanca View	

Shoulder Region Outcome Assessment Tools

There are a large number of shoulder outcome assessment tools and questionnaires available for assessing shoulder function and disability. These tools are important to measure baseline function and document the progress made in shoulder function, activities of daily living, and goals met toward return to work. Shoulder rehabilitation often requires considerable time for recovery and consistent tracking allows providers, patients, and claim managers to view progress. Simple tools like the Patient Specific Functional scale (PSFS) can help keep the worker and provider tracking meaningful, functional progress over the long recovery time.

Systematic reviews have analyzed the dozen of shoulder outcome measures available and concluded that the Subjective Shoulder Value (SSV), UCLA Shoulder Score, Disability of the Arm, Shoulder, and Hand Scale (DASH), the Shoulder Pain and Disability Index (SPADI), and the American Shoulder and Elbow Surgeons Standardized Shoulder Assessment Form (ASES) were all satisfactory but each had limitations and none were adequate for all properties scored (validity, reproducibility, responsiveness, inter probability, and practical burden). The Simple Shoulder Test (SST) or the Shoulder Pain and Disability Index (SPADI) are both simple validated instruments that are available for use without licensing requirements (examples are included in Appendix A – Shoulder Outcome Assessment Tools).[37-43]

Select one as a baseline and repeat to measure progress. Consider the tools below:

- **Simple Shoulder Test (SST)** is a high quality measure for shoulder instability surgery and is a 12 question shoulder activity scale developed at the University of Washington that has high patient utility, is highly reliable across age groups and is sensitive to change.[40, 44]
- **Shoulder Pain and Disability Index (SPADI)** is a high quality measure to assess pain and to a lesser extent disability in community-based patients reporting shoulder pain due to musculoskeletal pathology. It is not useful for initial differential diagnosis but appears sensitive to change especially for painful range of motion with adhesive capsulitis. It appears to be useful for assessing change over time (response to care).[30, 45-47]
- **Disability of Arm, Shoulder, Hand (DASH) Scale** has the best clinometric properties and has a work component. It's been used increasingly as an outcome measure for upper limb pathology, particularly in degenerative conditions and surgery cases.

It assesses entire upper arm function including elbow and hand. Reliability and reproducibility have been demonstrated in several studies.[48]

- **QuickDASH** is easier to use but underestimates symptoms and overestimates disabilities. It does not measure identical content as the DASH. QuickDASH is less specific than the DASH in the subdomains, especially in symptoms.[49]
- **American Shoulder & Elbow Surgeons (ASES) Assessment Form** – is a subjective shoulder pain scale that has acceptable correlation with SF-36 physical functioning, role physical, and bodily pain domains.[50]

Minimal clinically important differences (MCID) can give a good indication on whether the changes seen in an outcome measure are meaningful in terms of function and patient perceptions. Scores less than the MCID are considered noise and don't represent improvement, or worsening, in general.[51]

Questionnaires	MCID
ASES	6.4
DASH	8 - 10.2
SPADI	13.1
SST	None Reported

Workers' Compensation and Management Issues

Causation & Work Relatedness

Exceptionally clear medical justification for specific work exposure(s) is essential for fair and timely decisions. In Washington State, occupational conditions that may be a result of cumulative workplace exposure across multiple employers may have claim and experience costs apportioned to both former and current employers. Worker and employer appeals rights can factor into adjudication decisions and contribute to delays that are associated with worse outcomes.[52, 53]

To establish a diagnosis of an occupational disease, all of the following **are required**: [3]

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. [3] Consideration should be given to pre-existing conditions and aggravations or "lighting up" of a prior asymptomatic and non-disabling condition. If medical evidence discloses that the injury has accelerated a pre-existing symptomatic or disabling condition, the extent of that aggravation must be determined. Predisposing factors and full medical records can avoid delay in claim management and acceptance of a condition.

Assessment of Re-exposure on RTW

No studies were identified with current search strategies.
Clinical experience suggests that effective methods include opportunities for graduated return to work and potentially modified duties/work. Collaboration with vocational counselors can help ensure accurate job duties and foster job modifications and obtain resources to support return to work.

Prognostic Indicators

Disability management

The development of pain and disability may be associated with multiple risk factors noted below, which contribute to shoulder pathology. It is important to be aware some factors may contribute to a delay in recovery, but are secondary to the primary injury. For particular risk factors, the attending doctor might consider how these impact primary disability (the initial injury) or secondary disability, which involves the recovery of the worker and the propensity for safe re-entry to work. If some of these risk factors are modifiable, it may benefit the worker to address them during recovery, although their relation to the injury itself may not be causal and may not be a covered part of their treatment.

Risk Factors for Developing Shoulder Pain

Numerous correlated risk factors for shoulder pain in workers have been identified including:[54-65]

- Duration of employment - Prolonged employment (10 years) in shoulder stressing occupations was associated with supraspinatus tendinitis, shoulder pain with and without disability.
- Concurrent exposure to multiple factors (manual handling, working with hands above shoulders, working with vibration or mechanical exposure) increased risk.
- Physically demanding work (e.g. lifting >50 kg per hour at or above shoulder level, trunk flexed forward, or hands above shoulder).
- Job dissatisfaction
    - low level of control at work, little support, low decision opportunity
- Mental Status
    - Anxiety, mental stress, depressive symptoms
- Obesity *(BMI>30)*
- A high psychological job demand with low job decision latitude was associated with increased neck and shoulder pain in women.
- Degenerative rotator cuff tears and tendinosis are more common in older workers (>35 years)

Correlated Factors for Prolonged Disability

A number of factors have been identified that correlate with greater likelihood of prolonged disability with shoulder conditions: [58, 66-69]

- Baseline indicators – longer duration of symptoms, higher severity, gradual onset (each independently predicts longer term disability and poorer recovery).
- Older age (>50), female gender, and a chronic history of shoulder pain and restriction predict poorer outcomes.
- A SPADI disability score above 10, symptom duration longer than one month, receiving an injection at consultation, and having a past history of shoulder pain are significantly associated with poorer 6 month outcomes.
- Patients with severely restricted passive elevation at baseline (less than 101 degrees) have poorer 6 months outcomes.

- In patients with shoulder pain associated with capsulitis and/or other glenohumeral etiologies, concomitant neck pain at presentation and initial treatment is associated with poorer outcome.
- The overall natural progression of general shoulder pain for which care is sought by 166 patients in one British primary care setting was complete recovery in 21% of patients by 6 months and 49% of patients by 18 months. Longer recovery times correlated with longer symptom durations and more prior episodes.
- QuickDASH may serve as a useful screening tool for early identification of workers with significant shoulder activity exposure who may be at greater risk of becoming chronic. [70]

Conservative Interventions Summary

Overall, there is good support for manipulation/mobilization combined with exercise for a variety of conditions. There is little benefit seen in the literature for most modalities and passive activities, aside from very early in care. Clinically, a balance must be struck between increased mobility and restoring stability within the joint and surrounding soft tissue. Below is a table summarizing the evidence-based management options sorted by condition. Further explanation on each intervention follows.

Condition	Menu of Options
Rotator Cuff Tendinitis (osis)	• Manipulation/mobilization alone or in combination with exercise • PT alone or combined with modalities (10-24 sessions)
Impingement Syndrome	• Mobilization with Movement (MWM) 2 x's/wk for 2 weeks • Combined MT with SMT, exercise and KT
Adhesive Capsulitis	• Manual mobilization techniques MT from 1-3x's/wk for 3-4 weeks • PT combined with corticosteroid injections • Modalities alone over 6 days or combined with injection or exercise
AC Separations	• 2nd or 3rd degree separations may need 1-2wks immobilization • Follow with rehabilitation for increased stability

Manipulation & Mobilization

Summary – Mobilization is reasonably well studied on Glenohumeral, Acromioclavicular, and Cervico-Thoracic; high velocity manipulation is poorly studied. More aggressive mobilization compares more favorably to less aggressive forms. Effects seen across the studies are with 5-24 sessions within 12-16 weeks and benefit usually detectable/reported within 4-6 weeks.[1, 71] Effects of manual therapy combined with exercise may be similar to glucocorticoid or surgical interventions for rotator cuff disorders. There are limited benefits with rotator cuff disorders, shoulder disorders, adhesive capsulitis, and soft tissue disorders using manual or manipulative

therapy to the shoulder, shoulder girdle, and/or the full kinetic chain (FKC) combined with or without exercise and/or multimodal therapy.[72, 73]

Manipulation should only be applied when there is pain or dysfunction in the related area. With regard to cervicothoracic spine manipulation or mobilization for shoulder pain, it is beneficial in cases where there is associated pain or restricted movement in the cervicothoracic or thoracic spine, but not indicated for general movement or recovery of dysfunction below the shoulder, even when combined with exercise.[43]

General shoulder pain/restriction

- Manipulation appears to reduce neck and shoulder pain, while improving neck and shoulder mobility over the long term (12-26 weeks) when a six session intervention was combined with usual care. **[74, 75]**
- The addition of manual therapy to an exercise-only group appears beneficial and outperforms modality-only groups, although both exercise and exercise-with-manipulation interventions improve function. **[76-80]**
- A posteriorly directed joint mobilization technique was more effective than anteriorly directed mobilization technique for improving external rotation ROM in patients. Both directions of mobilization significantly reduced pain.

Impingement syndrome

- Small trials have demonstrated that active ROM, stretching and strengthening exercise combined with modalities and education was more effective in providing short term improvements in pain & function (range of motion, strength, and activity) than modalities and education alone or sham ultrasound. Functional improvement was sustained over the longer term. Adding Maitland mobilization provided substantial addition benefit in pain reduction at 4 weeks. **[81-83]**

- Thoracic thrust manipulation on patients diagnosed with shoulder impingement syndrome showed significant decreases in self-reported measures of pain, improved function, and disability (SPADI) scores at 48 hours post treatment. **[84]**

Rotator cuff tendinosis

- A systematic review of 11 published trials concluded that combining mobilization with exercise resulted in additional benefit when compared to exercise alone for rotator cuff disease. **[85]**

Chronic tendinosis, bursitis, DJD in elderly

- Low quality evidence supports short-term improvement in pain and range of motion with end range contract-relax muscle energy manipulation compared to control groups where the benefit decreased over several months. **[86]**

Adhesive capsulitis

- 12 weeks of high grade mobilization (passive stretch at end/painful range) instead of low grade (passive movement within pain free range only) showed slightly better disability scores and greater ROM (external rotation and passive abduction) at 1 year. **[87]**
- Steroid injection, ice, mobilization and placebo showed no differences in pain and function at 4 weeks, although a short term improvement was seen with steroid injections in some cases.[88] Effects are small and there are risks with injection. **[89]**

Glenohumeral Dislocation/Instability

- If only one dislocation has occurred, reduction followed by 1 – 2 weeks of immobilization, then 6 to 8 weeks of incrementally increasing mobility and active exercise appears to be effective. **[1]**
- Surgical intervention in active individuals under age 35 appears to be associated with a lower recurrence rate. **[3, 90, 91]**
- For individuals suffering two or more dislocations within 3 months, surgical consultation is recommended. It should be noted that arthroscopic and open procedures appear to have similar outcomes. **[3, 92, 93]**

The Council on Chiropractic Guidelines and Practice Parameters (CCGPP) have made the following expert opinion statements regarding High-Velocity Manipulation:[73]

The expert opinion of the CCGPP Upper Extremity Team supports the use of high-velocity, short-amplitude (HVSA) manipulation (adjustment) of the shoulder with some recommendations for use that include avoidance of any anticipated risk. Further evaluation and management may be required for patients with a failure to respond to treatment within a reasonable period of time.

- For all patients who have fracture, suspected fracture, dislocation, severe generalized or local osteoporosis, infection, tumor, or infection HVSA manipulation is contraindicated.
- For patients who have had surgery of the shoulder, consider date of surgery, extent of surgery, type of procedure, and other related factors in making decisions about use of HVSA manipulation.
- For all patients, an evaluation for joint stability must be performed. Based on the findings, it is recommended that no HVSA manipulation be used for patients with medical subluxation, hypermobility syndromes (e.g. Marfan's, Ehlers-Danlos syndrome), or gross looseness indicating multidirectional instability. Mobilization such as applying a load-and-shift or Maitland grade 1-4 type of translational movement may be appropriate in these case settings.
- For patients with adhesive capsulitis or any acute inflammatory condition such as rheumatoid arthritis, active hemiarthrosis or extensive swelling, rheumatoid variant disease, crystalline disease (e.g. gout), or acute bursitis it is recommended not to use HVSA. There is some literature evidence that aggressive mobilization may worsen or prolong the natural history of adhesive capsulitis. Based on this evidence and the experience of our panel, we feel that an HVSA approach is highly risky for certainly the early stages of adhesive capsulitis. For the middle and later stages of adhesive capsulitis chiropractors should consider a progressive application of increasing the grade of amplitude of manipulation. It is recommended that by using patient feedback and response as a guide, increasing grades of amplitude may be applied.
- For patients with impingement syndrome with a known structural cause (e.g. type 3 acromion, arthritis, etc.), we strongly recommend that any HVLA manipulation not be applied in a superior direction.

Modalities

General shoulder pain/restriction, tendonosis and capsulitis

With few exceptions, physiotherapeutic modalities are generally of little benefit for most shoulder conditions. **[82]**

Most modalities have little to no benefit beyond natural history or placebo for improving pain and function in most shoulder conditions. Some trials have shown small short term benefits in pain reduction, usually when combined with other therapies. Modalities that fit these overall summaries include:

- Bipolar interferential current
- Pulsed electromagnetic field and pulsed ultrasound **[94-96]**
- Laser **[97-99]**

Shock wave therapy is not a covered benefit for musculoskeletal conditions. See coverage decision here

Soft tissue techniques

There are numerous massage techniques that can be applied to shoulder rehabilitation, including Cyriax method, instrument assisted soft tissue mobilization, deep friction, trigger point, passive stretch, and others. Most of them have little direct benefit, but may be of limited use in the early phases of care in conjunction with exercise and other rehabilitation techniques. **[43, 100]**

Exercise

General shoulder pain/restriction

- In acute phases, exercise is of limited value, but becomes more valuable around three months duration.[43]
- Supervised exercise therapy, corticosteroid injections with multiple physical modalities, and range of motion exercises have all been shown effective for short term reduction shoulder pain. **[101]**
  Sustained (two year) significant benefit with respect to function from exercise compared to placebo in rotator cuff disease, **[102]** and improved muscle response for targeting strengthening to a painful trapezius over general fitness training. **[103]**
- Across upper extremity and neck conditions, there is limited evidence supporting the effectiveness of exercise compared to massage alone, massage as an add-on to manual therapy, and manual therapy as an add-on to exercise. No differences between types of exercises have been reported in studies comparing different types of exercise for various complaints of arm, neck, or shoulder pain & restriction. **[61, 104, 105]**
- In chronic mechanical shoulder pain, patients benefited equally with regards to pain and function in the short term from dynamic stabilizing exercise therapy, corticosteroid injection, or modalities and range of motion exercises. **[101]**

Rotator cuff tendonosis

- For chronic rotator cuff tendinosis, naturopathic care (anti-inflammatory diet counseling, acupuncture, enzyme supplementation) and physical exercise (passive, active assisted, and active exercise with a matched supplementation placebo) both showed improvement, with the naturopathic care group achieving better function and quality of life scores. **[106]**
  Exercise is effective in improving shoulder pain and function in subjects with rotator cuff impingement syndromes. Supervised exercise compared to home exercise shows mixed benefits; however, the addition of manual therapy enhanced the magnitude of the effect. **[85, 107]**
- Physical therapy (1 month of shoulder stretching, strengthen and stabilization exercise according to therapist discretion) shows improvement in pain intensity, range of motion, muscle strength and self-assessment of improvement while no treatment leads to deterioration in functional measurement scores. **[108]**
- Progressive exercise or best practice advice with a physiotherapist are equally effective and superior to corticosteroid injection.[109]

Impingement syndrome

- Progressive resistance training in patients with shoulder impingement syndrome was demonstrated to be effective in reducing pain and improving function. Exercises also help decrease analgesic and NSAID use. **[110]**
- Low quality evidence suggests exercise and mobilization may improve pain and function in subacromial impingement syndrome.**[111]**
- Supervised and home-based progressive shoulder strengthening and stretching for impingement are equally as effective as a single corticosteroid injection or an acromioplasty.[112-116]

Adhesive capsulitis

- Individualized 4 weeks rehabilitation program improved shoulder ROM except for internal and external ROM. Exercise therapy and rehabilitation also increased shoulder muscle isometric strength and endurance, and decreased shoulder pain. **[105]**

Types Of Exercise

There are many specific approaches within the physical therapy, sports medicine, and chiropractic literature on types of shoulder exercises for improving range of motion and strength. All should be performed gradually with incremental increases in degree of motion as condition and comfort permit. Exercise should include at least active assisted range of motion and home based strengthening exercises. Regular incremental increases in movement distances and loading appear to be essential elements for shoulder rehabilitation. Kuhn provided some basic low tech evidence-based exercises for impingement syndromes:**[85]**

- **Range of Motion:** Simple postural exercises beginning within patient tolerance including pendulum and wall walking exercises are used to maintain general range of motion, as well as stretches that preserve elevation and rotation.

- **Strengthening Exercises:** Focus should be on rotator cuff and scapular stabilizing musculature, again to patient tolerance.
    - For rotator cuff, utilize exercises with *resisted internal and external rotation*. Alternate with resistance to internal rotation then external rotation. Vary resistance, plane of motion, and range with progress.

    - For scapular stabilizers, exercises like serratus anterior presses, wall angels, trapezius and rowing exercises (see table below for more details).

Recommended Shoulder Exercises

The following are based primarily on EMG evidence of stimulation. The global recommendation is to choose exercises to stabilize the scapulae and the glenohumeral joint. Initial EMG evidence suggests an overlap of the two approaches.

Secondly, decisions based on injury or age-restricted movements are given as alternatives to more advanced challenges that occur above shoulder height (in abduction). Emphasis on the rotator cuff is primarily for stability through abduction and less on their secondary function as internal or external rotators. Terminal protraction maneuvers emphasize the serratus anterior. Diagonal movements are "functional" in that they combine movements from three different planes (i.e. flexion or extension, internal rotation or external rotation, abduction, or adduction)

A sequence based on function that has been suggested includes:

- Protectors - rotator cuff
- Pivoters - scapula positioning (mainly via trapezius and serratus anterior)
- Positioners - humeral positioning (mainly deltoid/supraspinatus)
- Propellers - mainly large muscles (pectoralis major and latissimus dorsi)

The exercises can be started with no resistance, then adding light weights, but eventually require constant resistance through elastic tubing or cable approaches.

	Menu of Choices *With* Limitations in Abduction	**Menu of Choices *Without* Limitations in Abduction**	**Advanced Recommendations**
Purpose			
Glenohumeral Stability	• Standing Shrug • External rotation • Seated Row Below 90 degrees • Side-lying Abduction	• Scaption • Flexion • Horizontal Abduction with External Rotation (prone) • Push-Up	• Horizontal Abduction with External Rotation (prone) • Diagonal Exercises (full-range)

Scapular Stability	• Seated Shrug with Retraction • Seated Row with Retraction (below 90 degrees) • Corner "Row"	• Scaption • Push-Up • Bent-Over Rows • Push-Up with a Plus	• Horizontal Abduction with External Rotation (prone) • Diagonal Exercises (full-range)
Serratus Anterior Stimulation	• Standing Punch with terminal Protraction	• Push-Up with a Plus • Dynamic Hug	

There are many resources for exercise instruction and protocol. One useful guide is:
American Academy of Orthopedic Surgeons Exercise Guide

Other Non-Surgical Interventions Summary

Patients who are non-responsive to initial conservative care methods, or require adjunctive therapies may be referred for a number of other non-surgical interventions. Some common ones interventions are discussed below. Coverage decisions for a variety of other non-surgical interventions can be searched using the Conditions and Treatment index tool or a full list here.

- Examples include: Injections, Acupuncture, shockwave, and others

Acupuncture

Evidence supporting benefit of acupuncture for shoulder conditions is limited. In a Cochrane review of nine trials of various methodology, acupuncture was of benefit over placebo in improving the Constant Murley Score (a measure of shoulder function) at four weeks (WMD 17.3). However, by 4 months, the difference between acupuncture and placebo groups, although still statistically significant, was no longer likely to be clinically significant (WMD 3.53). The review concluded that there is inadequate evidence to support or refute the effectiveness of acupuncture for shoulder pain. [117]
Acupuncture coverage decisions for Washington State can be found here.

Taping

- Not well supported in the literature, but is sometimes used to facilitate activation and remind patient of proper positioning.[43]

Injections and oral doses – steroid and NSAIDs

Rotator cuff tendonosis

- Corticosteroid injections are superior to physiotherapy (modality) interventions in short term only. [69]

Impingement syndrome

- Both blind and US-guided injection techniques are equally accurate; thus blind injections should be the technique of choice.[79, 80, 89, 118]
- NSAID injection may be superior to steroid injection for impingement and offer fewer side effects.[119]

Adhesive capsulitis

- Intra-articular corticosteroids have additive effects related to rapid pain relief, mainly in the first weeks of the exercise treatment period. At twelve weeks, combination of corticosteroid injection and therapeutic exercise is equally effective compared to therapeutic exercise alone. [120]
- Corticosteroid injections are effective for capsulitis of the shoulder in the short term. Physical therapy is effective in improving ROM at 6 weeks. Failure to improve is probably less likely with injections plus physical therapy. [121]
  A Cochrane review on the effectiveness and safety of arthrographic distention of the glenohumeral joint concluded that there is evidence that arthrographic distension with saline and steroid provides short-term benefits in pain, range of movement and function in adhesive capsulitis but it is uncertain whether this is better than alternative interventions. [122-124]
- Physical therapy tends to give the best results in capsulitis treatment, although not by large margins. Sodium hyaluronate (SH) or saline injections can be used as an alternative to PT and steroid injections with relatively similar results. [123, 125, 126]

- Based on a Cochrane review of 5 small randomized trials (n=149), oral steroids may decrease pain and improve ROM in the shoulder in the short term. The benefits of oral steroids are short term – about 6 weeks. Adverse effects are minimal in those who take oral steroids. There is limited evidence demonstrating a significant difference between oral steroids and steroid injections.[127]

NSAIDs

- Post-operative ibuprofen use reduces opioid requirements and improves pain levels without an increased risk of tendon re-tearing.[128]

Surgical Interventions

In general, shoulder conditions that respond well to immediate surgical interventions include some (but not all) shoulder displacement fractures, traumatic ligament tears, traumatic rotator cuff tears, and traumatic acromioclavicular joint separations. Labral tears (SLAP) should usually be treated conservatively before surgical consideration.[3] Other than specific indications, surgery should be reserved for cases that fail at least three months of conservative care. [90, 91, 103, 129] Surgical management decisions depend heavily on the age, tendon condition, and function of the patient. Peri-operative pain management strategies should be explored based on the patient's tolerance and needs.[130]
Detailed discussion, recommendations, and surgical guidelines can be found in L&I's "Shoulder Conditions Diagnosis and Treatment Guideline"

Post-surgical Rehab

Post-surgical rehabilitation is particularly important in a complex joint like the shoulder. In general, isometric exercises can be useful to prevent muscular atrophy and to minimize rotator cuff inhibition.

The type of surgical intervention will likely affect the rehab techniques but some general principles apply [131, 132]:

- Early care to increase soft tissue healing, which may or may not benefit from immobilization [133]
- Early passive motion is recommended for most surgical techniques
- Early active assisted motion and early active motion are recommended for mini-open and arthroscopic repairs, but not for open cuff surgeries
- Late strengthening exercises and range of motion restoration.

The goals and timeframes of post-surgical rehabilitation vary by surgical type, diagnosis, and tissue quality. Individual progression and recommended protocols vary widely across surgical and rehabilitative experts with little consistency.[134] Depending on the extent of repair, healing may take two to twelve weeks before strengthening exercises are added. Accelerated programs may improve range of motion with little risk of re-tear in appropriate patients.[135]
As a clinical example, rhymthic stabilization drills are often recommended to be performed in both external and internal ranges of motion while in the scapular plane. These drills can be progressed from low angles, such as supine or sidelying to eliminate gravity, progressing up to standing elevations with the shoulder below 90 degrees.

Workers' Compensation Considerations

Employer Contact for Return to Work

Contacting the employer to identify and discuss which activities the individual can safely perform at the worksite is considered a best practice in occupational health in order to facilitate effective return to work. In certain situations, involving a vocational counselor may facilitate communication and coordination.[136]

- Early communication with the employer helps to reduce delays and minimize system barriers. Interviews of injured workers in Ontario with prolonged claims identified numerous system and bureaucratic issues that were significant factors in prolonging a claim, particularly systematic issues impeding implementation of return-to-work options. **[137]**

Adding computer-prompted breaks to ergonomic and work-place interventions may benefit worker recovery.[138]

Administrative Interventions

Breaks, Duration

Including the shoulder rehabilitation team in conversations with the workplace is a best practice in facilitating a workplace-based RTW program.

Ergonomic Interventions

Engineering Interventions, Work Site Modification, Multiple Component Interventions

Potentially related studies may help inform some clinical issues for modifying shoulder work.

- Low quality evidence suggests that ergonomic interventions decrease pain in the long term. This is enhanced further when in combination with exercise. **[139]**
- Ergonomic intervention including advice and supervision from a physical therapist, adjustment of workstations, adjustment and alteration of existing furniture and equipment, and postural advice during daily tasks. **[140, 141]**
    - For example, a computer user with upper body musculoskeletal disorders and pain may benefit using a wide forearm support board. **[142]**
- Ergonomic controls vary significantly and need to be evaluated for each situation.[143]

The use of participatory ergonomics is an emerging method in reducing work disability. It aims to foster the interaction and feedback of the worker, employer and the healthcare team in identifying problems and developing solutions to modify job tasks.

Consider adjustments to jobs that require:

- Repeated outstretching of the arm away from the body especially if weighted

- Tasks performed at or above shoulder height
- Repeated fast or forceful activities with the whole arm
- Heavy lifting above waist level

Work Rehabilitation

Work conditioning and hardening programs may be beneficial in cases where there is a large gap between worker function and physical demands of their job. L&I has created a Work Rehabilitation Guideline outlining evidence-based best practices and eligibility criteria. These programs offer a patient centered approach and include goals of education, improved function, general conditioning, job-specific strengthening.[144] Mixed schedules that include modified duty at work are encouraged, whenever possible.

- Workplace-based rehabilitation intervention is more effective than conventional clinic-based rehabilitation in terms of decrease in perceived pain and disability, improvement in function, and prevention of further work disability. An activity coach can help minimize psychosocial problems that interfere with return to work (e.g. separation from work, peer group and/or the employer) **[145]**

Return-to-Work Assistance

There is some evidence that return to work coordination (such as modified duty, early return to work, workplace-based hardening) is more effective than clinic-based work hardening, if conditions allow. Most of these interventions seem to have greater impact on workers with pain levels greater than a 3/10.[146]
Where possible, a return to work program should be workplace based and match worker capabilities with possible workplace accommodations in conjunction with the vocational counselor and shoulder rehabilitation team.

Personal Controls

Personal controls of ergonomics include training, braces, biofeedback, on-the-job exercise programs.
Myofeedback and ergonomics training may help reduce pain and disability, studies are small and individual situations with the employer should be considered. **[138, 147, 148]**

Workflow/task Modifications

Well done studies demonstrating clinical benefit or reductions in work-related shoulder conditions were not identified with the current search strategy. Best practices indicate that task modification and progression should be measured with objective outcomes and advanced in a graded method. Modifying work pace may be one strategy to consider as part of early return to work strategies along with reducing job stress.[145]

Potentially useful link is the Ergonomic Guidelines for Manual Material Handling
https://www.cdc.gov/niosh/docs/2007-131

Documentation of Progress

Functional questionnaires such as the SST, SPADI, or QuickDASH should be used to establish a baseline functional level and re-administered at 2-4 week intervals to assess improvement. Realistic and specific goals regarding RTW, with appropriate timeframes, should be established early and progress monitored.
Workers who return to work had significantly higher shoulder satisfaction and shoulder function survey scores and may be used as predictors of the individual's ability to RTW.**[149]**

Methodology

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Literature Retrieval and Review

1. **Initial systematic searches** of electronic databases (e.g. PubMed). Search terms used typically included MeSH terms for tests and interventions with conditions being addressed. Follow-up searches also included population attributes (e.g., workers compensation, occupational).
2. **Abstract screening** for relevance.
3. **Original paper retrieval** with review for relevance, quality, outcome meaningfulness, and effect magnitude.
4. **Additional studies identified** through clinical summaries (e.g., reviews, texts), citation tracking, and feedback from public.

About Evidence for Physical Examination and Conservative Interventions

Conservative musculoskeletal care is typically care of first resort based on long standing practices. Typically 'low tech,' low cost, with minimal and rare side effects, it is frequently delivered in primary care settings, and by various health providers. The rigor and quality expected of high cost, higher risk, emerging, and tertiary interventions is less common for many routine physical examination procedures and conservative interventions. Much of the evidence summarized here would be considered Class "C" or "III" in ratings systems. Thus, the committee has not presented explicit *recommendations*, rather, *evidence summaries* guided by expert consensus to assist in formulating care options. Further, significant emphasis is made regarding tracking and documenting meaningful functional improvement with patients. Study attributes most likely to strengthen or limit confidence are characterized in the evidence descriptions.

Assessing Study Methodologic Quality

Attributes of study methodology quality vary according to the clinical procedure (eg, diagnostic, therapeutic intervention) looked at, and specific research questions being studied. The American Academy of Neurology's Clinical Practice Guideline Process Manual [150] offers a comprehensive guide to systematic evidence review, quality attributes and consensus process that generally serves as the approach taken by IICAC.

General attributes identified when extracting evidence from studies include identification of population, the intervention and co-interventions and outcomes being addressed in each study. The clinical questions addressed such as diagnostic accuracy, therapeutic effectiveness, or causation are determined. Studies are extracted into evidence tables including quality attributes and/or ratings which are reviewed both by department staff and committee members (usually 2 per study).

Specific quality attributes include: Diagnostic Accuracy – design, spectrum of patients, validity and relevance of outcome metric; Therapeutic Interventions – comparison groups (no treatment,

placebo, comparative intervention), treatment allocation, blinding/masking (method and degree: single, double, independent), follow-up (period and completion), and analysis (statistical power, intent-to-treat). Specific attention is paid to several factors including reporting of outcomes (primary vs. secondary), relevance of outcome (eg, function vs. pain), and meaningfulness (clinically important change vs minimally detectable change).

Synthesizing Evidence

Consideration of study quality (class), significance (statistical precision), consistency across studies, magnitude of effect, and relevance to populations and procedures were taken into account in preparing draft summaries. Special attention was given to clarifying conclusions related to the clinical questions of interest. Evidence, particularly with low tech and highly diffused examination and conservative procedures addressed here, is rarely truly "definitive," even when multiple studies exist. Inconsistent conclusions typically reflect error (systematic, random) and/or bias in studies. Data pooling via meta-analysis is useful to reduce random error when studies are of sufficient power and methodologic strength. Larger meaningful effect size may increases confidence in findings.

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146. Picón, S.P.B., et al., *Effects of workplace-based intervention for shoulder pain: a systematic review and meta-analysis.* Journal of Occupational Rehabilitation, 2021. **31**(2): p. 243-262.
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148. Voerman, G.E., et al., *Prognostic factors for the effects of two interventions for work-related neck-shoulder complaints: myofeedback training and ergonomic counselling.* Appl Ergon, 2008. **39**(6): p. 743-53.
149. Gutman, M.J., et al., *Understanding Outcomes and the Ability to Return to Work After Rotator Cuff Repair in the Workers' Compensation Population.* Cureus, 2021. **13**(3).
150. American Academy of Neurology, *Clinical Practice Guideline Process Manual* 2011.

Appendix A – Shoulder Outcome Assessment Tools

SIMPLE SHOULDER TEST (SST) *Voluntary educational / practice aid – Not an L&I documentation requirement*

Circle Yes or No

Patient Name_____

Claim # _____

Date: _____

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

_____

For office use - Comments

___ *Score (Total # of "No"s)*

Godfrey J, Hammoan R, Lowenstein S, Briggs K, Kocher M. Reliability, validity, and responsiveness of the simple shoulder test: psychometric properties by age and injury type. J Shoulder Elbow Surg 2007; 16:260-267.

Shoulder Pain & Disability Index (SPADI)

Voluntary educational / practice aid – Not an L&I documentation requirement

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)*

Patient Name_____

Claim # _____

Date: _____

_____

FOR OFFICE USE

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

Disability Score:

_____ / 80 x 100 = ____%
Sum of #'s circled in disability section

Total Score:

_____ / 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.

Appendix B – Occupational Shoulder Condition Terminology

Adhesive Capsulitis (Frozen Shoulder): Restricted and painful condition of the capsular ligaments of the shoulder resulting from scaring related to inflammatory processes. This is not a degenerative process nor is it necessarily the result of trauma; often insidious in onset.

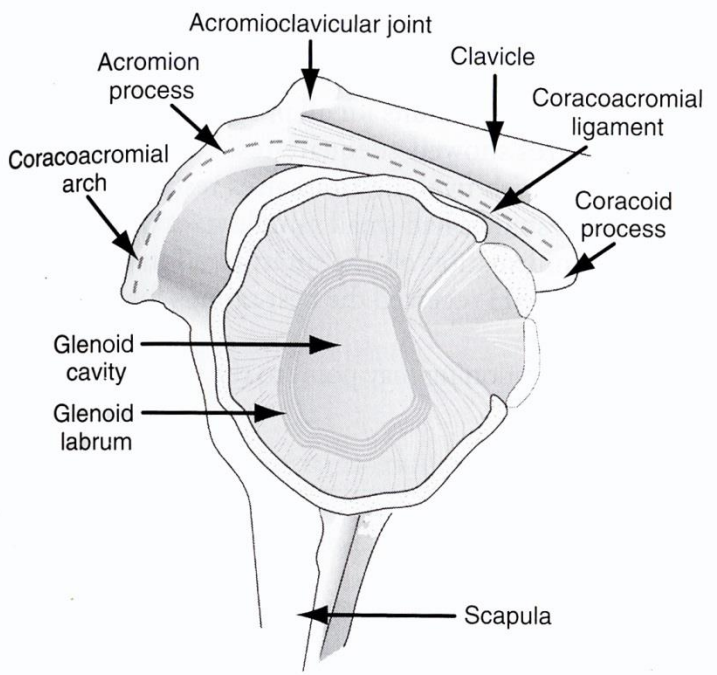
Chronic Tendonosis, Bursitis, Degenerative Joint Disease (DJD): Prolonged degenerative and or inflammatory process of soft tissues become painful and restricted. Chronically inflamed structures may become enlarged and/or infiltrated with scar tissue and calcium, e.g., calcific bursitis. Inflammation results from many causes including local trauma and overuse.

Dislocation: Dislocation typically results from excessive trauma to the shoulder leading to substantial rupture of the stabilizing ligaments and tendons. The most common and recognizable is an anterior dislocation which presents with an obvious history, swelling and deformity. Posterior dislocations are less common, more difficult to diagnose and may mimic other shoulder conditions.

Impingement Syndrome: Shoulder pain resulting from irritation of rotator cuff tendons and/or the subacromial bursa usually due to mechanical friction of these structures against bony structures.

Labrum Tear: Typically an avulsion of the glenoid cartilage which rings the scapular surface of the shoulder joint. The structure provides some stability by providing some depth to the "socket" side of the joint. Tears have been implicated as internal derangements that may cause restriction, clicking, and sometimes painful limitation of arm movement. Inferior tears are common with dislocation. Tears may also occur with sudden or excessive biceps contraction on the upper part of the labrum where the biceps tendon inserts. They are commonly categorized by location and severity as superior labral anterior to posterior (SLAP) lesions with Type I being least severe and Type IV being most severe.

Rotator cuff tendonosis/tear: The rotator cuff consists of the supraspinatus, infraspinatus, subscapularis, and teres minor muscles which originate on the scapula and whose tendons insert on the humerus. When damaged by sudden trauma, overuse, or overexertion, fibers of the tendon become sprained and inflamed. Partial supraspinatus tears are the most common and may occur on the bursal side or the articular side of the tendon.



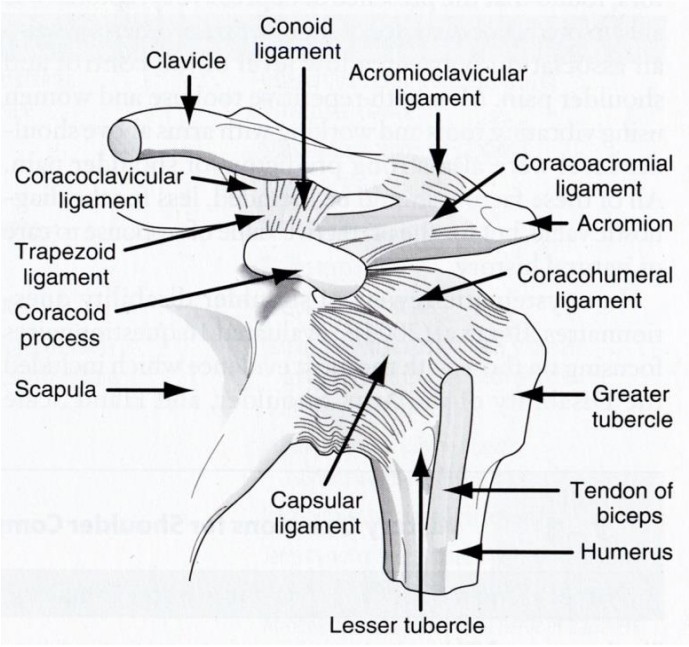


Image source: Souza TA. Differential Diagnosis and Management for the Chiropractor – Protocols and Algorithms. 2009 Jones and Bartlett Publishers, Sudbury, MA. www.jbpub.com . Reprinted with permission.

Appendix C – Shoulder Provocation Tests

General Shoulder Pain Restriction

- **Painful Arc test** – Active abduction from hand at side to hand over head is pain free until mid-range (~70°-100°) then reduced pain thereafter. Pain in midrange is positive.
- **Drop Arm test** – Arm is passively abducted to 90° then actively lowered. Inability to control lowering is a positive test.

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** – Stabilize the scapula, passively abduct the shoulder to 90° , flex the shoulder to 30°, flex the elbow to 90°, and internally rotate the shoulder. Pain is a positive test.

Rotator Cuff Tears

- **Abduction test** – Active abduction to 90° while providing resistance proximal to the elbow (primary abductor: supraspinatus).
- **External Rotation test** – Stabilize medial elbow and resist at lateral aspect of the distal forearm. Instruct the patient to externally rotate the shoulder against resistance. Stabilize the patient's elbow against their side to prevent substituting abduction for external rotation. Compare the strength of the involved shoulder with the uninvolved shoulder. Pain may indicate inflammation and weakness in the external rotators (likely infraspinatus).
- **Lateral Jobe test** – Patient holds their arm at 90° 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

- **Crossed Arm Adduction test** – Flex the shoulder to 90° and adduct arm across body (reaching for opposite shoulder). Pain at the acromioclavicular joint is a positive test.

Labral Tears, Tendon Disorders, Dislocations

- **Apprehension test** – Evaluates for anterior glenohumeral stability. With the patient supine, abduct shoulder to 90° 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. Follow this test with a relocation test: with hand, place a posteriorly directed force on the glenohumeral joint. Relief of apprehension for dislocation is a positive test.
- **Biceps Load test** – Supinate the arm, abduct shoulder to 90°, flex elbow to 90°, externally rotate arm until patient becomes apprehensive and provide resistance against elbow flexion. Pain indicates possible bicipital tendinopathy or a labral tear.
- **Load & Shift (L&S) test** – Manually assesses directional stability. From behind patient stabilize scapula with one hand and humeral head with other. Load shoulder by poster to anterior pressure toward glenoid to test anterior stability; pull backward to assess posterior stability. Pull down on arm to assess inferior stability. An observable sulcus may be visible under the acromion with multidirectional instability.
- **O'Brien's test** – Point the thumb down, Flex shoulder to 90° 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.
- **Relocation test** – Simply conduct the Apprehension test while stabilizing the front of the humerous with a posterior force to see if the pain and or sense of apprehension is relieved.
- **Speed's test** – Flex the shoulder to 90° with the arm supinated. Provide downward resistance against shoulder flexion. Pain indicates possible bicipital tendinopathy or a labral tear.
- **Yergason' s test** – Flex elbow to 90° , shake hands with patient and provide resistance against supination. Pain indicates possible bicipital tendinopathy or a labral tear.
- **Hawkins-Kennedy test** – Abduct the shoulder 90° and flex it forward 90° while passively internally rotating the humerous. Pain on this motion is a positive test

Acromioclavicular Injuries (Rockwood Classification) *Note: Types IV-VI are rare.*

- ***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.

Additional Resources for Clinical Examination of Shoulders

Souza TA. Differential Diagnosis and Management for the Chiropractor – Protocols and Algorithms. 2009 Jones and Bartlett Publishers, Sudbury, MA. www.jbpub.com.

http://www.shoulderdoc.co.uk/article.asp?section=497

http://at.uwa.edu/special%20tests/specialtests/UpperBody/shoulder%20Main%20Page.htm

Appendix D - Shoulder Quick Reference Evaluation, Diagnosis, Management summary

Shoulder Summary

Diagnosis	Comments	History Findings	Positive Examination Findings	Radiography/Special Studies	Treatment Options
Subluxation or Fixation of: **Glenohumeral Joint** **Acromioclavicular Joint** **Sternoclavicular Joint** **Scapulothoracic Joint (functional)**	• Adjunct Dx if patient is asymptomatic or mildly symptomatic (e.g. mild stiffness or pain level <2/10) • Must indicate chiropractic exam findings to support Dx	*Nonspecific*	*Palpation* – local tenderness or other signs of subluxation *Ortho* – None *Neuro* – None *Active ROM* - Variable restriction *Passive ROM* – End-range restriction *Motion palpation* - specific vertebral segmental restriction or symptoms produced on endrange	• Radiography not required for the diagnosis of subluxation • Radiographic biomechanical analysis may assist in treatment decisions. • For specifics see radiographic guidelines	• Chiropractic manipulative therapy (CMT) • Decisions regarding specifically which technique(s) is/are applied and modifications to the given approach will be directed by the primary Dx & patient's ability to tolerate pre-adjustment stresses
Infraspinatus or Teres Minor sprain/strain **Subscapularis sprain/strain** **Supraspinatus sprain/strain** **Biceps Sprain/Strain** ***Note: sprain/strain is not synonymous with spasm or hypertonicity***	• There are a spectrum of tendon damage including tendinitis, tendinosis, partial thickness tears and ruptures • Orthopedic testing is only sensitive to full-thickness tears	*Mechanism* - Overstretch or over-contraction Hx as acute event. In older individuals, degenerative full-thickness tendon tears are the most common *Worse with Specific ROM* - Contraction of muscle or stretch of muscle or joint	*Ortho* – Specific tests for each muscle including tenderness at muscle/tendon, stretch and contraction from a stretched position For Full thickness rotator cuff tears screen with a Painful Arc, Drop-Arm Sign, and weakn external rotation. Specifically test with: Supraspinatus – empty can or internal rotation lag sign Subscapularis – lift-off test or internal rotation lag sign Infraspinatus/teres minor – external rotation lag sign Biceps – Speed's *Neuro* - None *Active ROM* - Pain on active ROM that contracts involved muscles *Passive ROM* - Pain on endrange stretch of involved muscle or ligament	• Radiography not required for diagnosis • With significant trauma or for med/legal purposes, radiographs may be required • If calcific tendinitis is suspected, radiographs may be indicated • If associated with impingement, an outlet view is suggested • For specifics see radiographic guidelines	For Rotator Cuff Tendinitis/tendinosis, the following are EB options: • Manipulation/mobilization alone or in combination with exercise • Myofascial therapy • Limited orthotic support (taping or brace) • Ergonomic advice • Strengthening and preventative exercises

Diagnosis	Comments	History Findings	Positive Examination Findings	Radiography/Special Studies	Treatment Options
Adhesive Capsulitis	• In early stages, adhesive capsulitis appears as an acute process indistinguishable from other processes such as an acute calcific bursitis/tendinitis, or Parsonage-Turner Syndrome	*Onset* – Acute onset of pain usually idiopathic with regard to mechanism that may or may not be traumatic. Stiffness is progressive; Pain is not major feature in later stages. *ROM Comments* – Abduction and external rotation decreased first following by internal rotation	*Ortho* – No specific tests *Neuro* - None *Active & Passive ROM* – equal restriction in both passive and active ROM specifically in abduction and external rotation *Motion palpation* - Possible restriction globally	• Radiography not used for Dx, however, may used in ruling out other conditions such as calcific tendinitis in acute stages and OA in later stages • Arthrogram most sensitive test for adhesive capsulitis. Distension may be useful in resolving restrictions and pain	The following are EB Options: • Manual mobilization techniques MT from 11-3 x's/wk for 3-4 weeks • PT combined with corticosteroid injections • Daily exercises and stretches based on rhythmic stabilization; Adjusting contraindicated in acute stage; mobilization possible
Subdeltoid Bursitis	• Subdeltoid (same as subacromial) bursitis is often found associated with impingement syndrome or may be found as an isolated condition • Calcific bursitis is particularly acute and painful limiting all ROM and difficult to control pain	*Mechanism* – Often no Hx of trauma except with chronic bursitis where chronic repetitive microtrauma may occur *Worse with Specific ROM* – All ROM are often affected with acute bursitis; especially end-range forward flexion	*Palpation* – tenderness found anterior to AC joint on passive extension of shoulder *Ortho* – None; most movement is painful precluding most ortho testing; there may be some positives on impingement testing in subacute cases *Active ROM* – most movements are painful, in particular forward flexion *Passive ROM* – end-range forward flexion and abduction are painful	• Radiography not usually necessary initially except to rule-out fracture/dislocation with acute trauma or when calcific bursitis is suspected	The following are EB options for calcific bursitis or tendinitis: • Physical modalities For non-calcific bursitis: • Limited orthotic support • Physiotherapy for pain and swelling control • Herbal recommendations for pain and swelling • If pain is intolerable, referral for medical prescription for pain meds • Mobilization possible

Diagnosis	Comments	History Findings	Positive Examination Findings	Radiography/Special Studies	Treatment Options
Impingement Syndrome	• Subacromial impingement syndrome affects primarily the supraspinatus, and biceps tendons as well as the subdeltoid (subacromial) bursae • Impingement may be primarily mechanical (ie. subacromial spurs) or primarily functional (e.g. related to instability)	*Mechanism* – Variable, however, most commonly overhead activates over time produce impingement *Limited activities* – overhead activities most restricted	*Ortho* – Weak external rotaton Kennedy-Hawkins, and painful arcis the test cluster giving 95% post-test probability if all are positivie; more specific tests may then be used for specific structures	• Radiography may be used including an outlet view (for subacromial spurs or anomalies) and a Zanca view for the AC joint if degermation is suspected	The following are EB options: • Manipulation/mobilization alone or in combination with exercise • Myofascial therapy • Limited orthotic support • Ergonomic advice for sport or occupation
AC Separation (Indicate Degree)	• AC 1st degree separations do not result in deformity or instabiity • 2nd and 3rd degree AC separations are another form of instability • Always consider associated distal clavicular fracture in acute cases and osteolysis in chronic cases (when pain is still present)	*Mechanism* – direct fall onto AC or fall on outstretched arm/hand are most common causes	*Observation/Palpation* – with 2nd and 3rd degree there is an obvious step-deformity; palpation reveals localized tenderness and swelling *Ortho* – compression or distraction at AC are painful (used for 1st degree tears only) Test cluster of cross-body adduction, resisted horizontal adduction, Obrien's Test	• Radiography may include weighted and non-weighted bilateral views of the AC joints; degree based on coracoacromial distance, however, electing to have surgical correction is cosmetic only • In chronic pain cases consider a Zanca view for possible osteolysis	• Limited orthotic support using principle of Kenney-Howard Sling; time frame based on degree of injury • Use isometrics while patient is in sling; progress to isotonics when pain permits • Consider referral for surgical stabilization when patient concerned about cosmetic appearance
Anterior Dislocation **Posterior Dislocation**	• Anterior is the most common and presents with severe pain • Posterior dislocations are often undiagnosed (40%) for at least one month following occurrence	*Mechanism* – arm pulled back into abduction/external rotation (anterior dislocation) or direct anterior blow to shoulder or fall on outstretched arm (posterior dislocation	*Observation* – arm locked in external rotation (anterior); prominent coracoid, flat ant. shoulder (posterior) *Neuro* - check motor/sensory function distally *Active ROM* – patient unable to fully supinate and raise the arm with posterior dislocation	• Radiography required to determine any associated fractures; specialized views such as the Apical Oblique View and Stryker view are valuable • Scapular or Y view for posterior dislocation • Also an AP without correction for scapular angle (True AP) will reveal an Empty Fossa Sign	• Relocation in acute settings should be attempted if EM support is unavailable, otherwise, axial distraction of the involved arm may reduce pain until EM can arrive • Limited orthotic support in a sling for approximately 2-3 weeks followed by tape/support for several weeks • Avoid abduction/external rotation add stability exercises

Diagnosis	Comments	History Findings	Positive Examination Findings	Radiography/Special Studies	Treatment Options
Glenoid Labrum Tear	• Labrum tears may be obviously traumatic (usually anterior/inferior) or less obvious (SLAP lesions; anterior/superior) • In older individuals, degenerative tears are more common • Types of tears are classified similarly to meniscus tears	*Hx* - <25 y/o unresponsive to treatment *Mechanism* – may be associated with anterior dislocation (anterior/inferior) or sudden contraction of biceps or fall on forward flexed arm (SLAP lesion)	*Ortho* – Instability testing may be positive in addition to specific testing including: Crank Test, O'Brien test or add anterior slide test, or pronation provocative test For SLAP lesions add in Yergason's, Speed', or Biceps Load II test. *Active ROM* – may have a painful "sticking" in movement relieved by repositioning and a "clunk"	• Radiography may assist if there is bony involvement of the glenoid; these are best seen on modified axillary views or Stryker Notch views for glenoid rim fractures (Bankart fractures) • MRI is less sensitive than CT arthrograms	• Conservative trial of strengthening and modified work or sports activities • Patients unresponsive to conservative trial should be referred for surgical debridement and stabilization if necessary
Myofascitis	• Used when specific trigger points are identified on physical examination • Also may be used if a strain is not evident from the history however there are indicators of muscle tenderness, stiffness, or pain	*Onset*: Non-specific regarding onset *Symptoms*: Patient usually complains of pain, aching, and/or tenderness in specific muscle or tendon areas that may radiate pain in non-deramtomal pattern	Trigger points are evident as localized tenderness in a muscle that corresponds to traditional (Travell/Simons) trigger point charts. These points may be local or refer pain when compressed.	• Not required or recommended	• Mysofascial approaches such as myofascial stripping, trigger point massage, or spray and stretch approaches are the standard • Home stretching and modification of activity suggestions
Laxity **Hypermobility**	• Inherent looseness may be a nomal variant (AMBRI) or part of hypermobility disorders such as Euler-Danlos or Marfan's syndrome	A single-event, traumatic injury to the joint is not found, however, either overuse (microtrauma) or generalized inherent looseness is/are evident	Capsular or ligament testing reveals "looseness" that falls within the physiologic range of normal Testing includes the Load & Shift Test plus inferior distraction for a sulcus sign If painful, pain relief with stability taping	• Not usually recommended unless when differentiating pathological laxity from congenital or overuse acquisition •	• Strengthening program • Bracing or functional taping during rehabilitation or during strenuous activities