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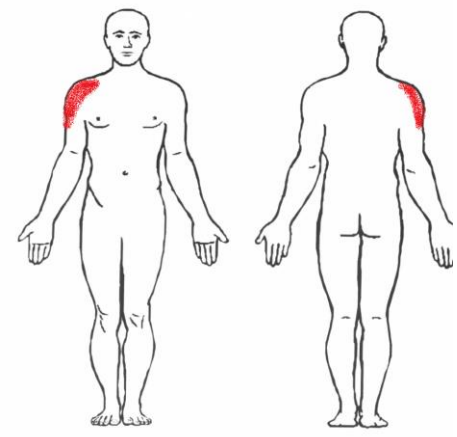
SHOULDER CASE 2

Dhinu Jayaseelan, PT, DPT, OCS, FAAOMPT

Orthopaedic Manual Physical Therapy Series
Charlottesville 2017-2018

Vicky Martinez, 54 y/o female



Initial Hypotheses:

- Rotator cuff tendinopathy
- Adhesive capsulitis
- Cervical referral
- GH Joint OA
- Proximal humeral fracture

Quick DASH (main module):

- 63.6

Psychometric properties of the shortened disabilities of the Arm, Shoulder, and Hand Questionnaire (QuickDASH) and Numeric Pain Rating Scale in patients with shoulder pain

Paul E. Mintken[a,*], Paul Glynn[b], Joshua A. Cleland[c]

- 11 item questionnaire
- Scored 0 – 100%, higher scores indicate greater disability
- Found to be **reliable, valid** and **responsive** when used for upper extremity disorders
  - MDC: 11.2 % points
  - MCID: 8 % points

J Shoulder Elbow Surg (2009) 18, 920-926

Subjective Exam Asterisks

(Aggravating/easing factors, description/location of symptoms, behavior, mechanisms of injury)

54 year-old female nurse 4 month history of right shoulder pain	
Mechanism of injury	Unclear, potentially rolling in bed and pulling the covers
Chief complaint(s)	Localized dull ache, occasional sharp pain Becoming more constant and intense Difficulty moving arm due to pain and stiffness
Aggravating activities	Moving arm away from body, dressing, reaching behind body, carrying heavy objects, laying on involved side
Alleviating activities	Medication, not doing agg activities
Past medical history	Hypothyroidism, family history of breast CA (mother and grandmother), "left shoulder stiffness"
Current level of function	Walks dog daily, yoga weekly, unable to sleep due to pain, requires assistance with dressing

Structure(s) at Fault

Joints in/refer to painful region	Myofascial tissue in/refer to painful region	Non-contractile tissue in/refer to painful region	Neural tissue in/refer to painful region	Other structures to be examined (non-MSK)
GH AC Scapulothoracic C-Spine T-spine Ribs	Cuff tendons Biceps long head Trigger points (UT, levator, deltoid, cervical paraspinals)	GHJ ligaments Labrum Joint capsule	Cervical radic (4,5) Axillary n. Suprascapular n.	Humeral fracture? Breast CA?

- Primary hypothesis after subjective: adhesive capsulitis
- Differential (rank order): rotator cuff tendinopathy/SAI, GHJ OA, cervical facet referral

Physical Exam Asterisks

(Special tests, movement/joint dysfunction, posture, palpation, etc)

54 year-old female nurse 4 month history of right shoulder pain	
Cervical Screen	(-)
Range of Motion	(Active) Flexion: 131º, Abduction: 92º, ER: 39º, IR: 60º (Passive) Generally equal to AROM, pain limits all motions Excessive scapular elevation with active elevation
Special Tests	Unclear results due to pain
Strength	Weak and painful with resisted shoulder ER and IR
Palpation	No remarkable tenderness to palpation at shoulder complex Latent TrPs in upper traps Increased tension in upper traps/levator scap, pec major/minor
Joint Accessory Motion	Walks dog daily, yoga weekly, unable to sleep due to pain, requires assistance with dressing

Rate your assessment of severity/irritability

Justify your assessment with examples from the subjective and/or objective exam

- Severity: None Min Mod **Max**
  - Unable to sleep, difficulty dressing/self-care, missed work due to condition
- Irritability: None Min **Mod** Max
  - Symptoms brought on rapidly with movement, takes ~30 min to reduce

Stage and stability?

- Acute **Subacute** Chronic Acute on chronic
  - Onset 4 months prior
- Stable Improving **Worsening** Fluctuating Red flags?
  - Increasing pain intensity and frequency, ROM becoming limited

- Are the relationships between the areas on the body chart, the interview, and physical exam consistent? "Do the features fit" a recognizable clinical pattern? If YES, what?

Adhesive Capsulitis

Stage II - Freezing

- Identify any potential risk factors (yellow, red flags, non-MSK involvement, biopsychosocial)

Night pain, worsening presentation, family history of CA

MARTIN J. KELLEY, DPT • MICHAEL A. SHAFFER, MSPT • JOHN E. KUHN, MD • LORI A. MICHENER, PT, PhD
AMEE L. SEITZ, PT, PhD • TIMOTHY L. UHL, PT, PhD • JOSEPH J. GODGES, DPT, MA • PHILIP W. MCCLURE, PT, PhD

Shoulder Pain and Mobility Deficits: Adhesive Capsulitis

Clinical Practice Guidelines Linked to the International Classification of Functioning, Disability, and Health From the Orthopaedic Section of the American Physical Therapy Association

J Orthop Sports Phys Ther 2013;43(5):A1-A31. doi:10.2519/jospt.2013.0302

CLINICAL GUIDELINES

Summary of Recommendations

PATHOANATOMIC AL FEATURES
Clinicians should assess for impairments in the capsuloligamentous complex and musculotendinous structures surrounding the shoulder complex when a patient presents with shoulder pain and mobility deficits (adhesive capsulitis). The loss of passive motion in multiple planes, particularly external rotation with the arm at the side and in varying degrees of shoulder abduction, is a significant finding that can be used to guide treatment planning.

C RISK FACTORS
Clinicians should recognize that (1) patients with diabetes mellitus and thyroid disease are at risk for developing adhesive capsulitis, and (2) adhesive capsulitis is more prevalent in individuals who are 40 to 65 years of age, female, and have had a previous episode of adhesive capsulitis in the contralateral arm.

B CLINICAL COURSE
Clinicians should recognize that adhesive capsulitis occurs as a continuum of pathology characterized by a staged progression of pain and mobility deficits and that, at 12 to 18 months, mild to moderate mobility deficits and pain may persist, though many patients report minimal to no disability.

DIAGNOSIS/CLASSIFICATION
Clinicians should recognize that patients with adhesive capsulitis present with a gradual and progressive onset of pain and loss of active and passive shoulder motion in both elevation and rotation. Utilizing the evaluation and intervention components described in these guidelines will assist clinicians in medical screening, differential evaluation of common shoulder musculoskeletal disorders, diagnosing tissue irritability levels, and planning intervention strategies for patients with shoulder pain and mobility deficits.

DIFFERENTIAL DIAGNOSIS
Clinicians should consider diagnostic classifications other than adhesive capsulitis when the patient's reported activity limitations or impairments of body function and structure are not consistent with the diagnosis/classification section of these guidelines, or when the patient's symptoms are not resolving with interventions aimed at normalization of the patient's impairments of body function.

A EXAMINATION – OUTCOME MEASURES
Clinicians should use validated functional outcome measures, such as the DASH, the ASES, or the SPADI. These should be utilized before and after interventions intended to alleviate the impairments of body function and structure, activity limitations, and participation restrictions associated with adhesive capsulitis.

EXAMINATION – ACTIVITY LIMITATION AND PARTICIPATION RESTRICTION MEASURES
Clinicians should utilize easily reproducible activity limitation and participation restriction measures associated with their patient's shoulder pain to assess the changes in the patient's level of shoulder function over the episode of care.

EXAMINATION – PHYSICAL IMPAIRMENT MEASURES
Clinicians should measure pain, active shoulder ROM, and passive shoulder ROM to assess the key impairments of body function and body structures in patients with adhesive capsulitis. Glenohumeral joint accessory motion may be assessed to determine translational glide loss.

A INTERVENTIONS – CORTICOSTEROID INJECTIONS
Intra-articular corticosteroid injections combined with shoulder mobility and stretching exercises are more effective in providing short-term (4-6 weeks) pain relief and improved function compared to shoulder mobility and stretching exercises alone.

B INTERVENTIONS – PATIENT EDUCATION
Clinicians should utilize patient education that (1) describes the natural course of the disease, (2) promotes activity modification to encourage functional, pain-free ROM, and (3) matches the intensity of stretching to the patient's current level of irritability.

C INTERVENTIONS – MODALITIES
Clinicians may utilize shortwave diathermy, ultrasound, or electrical stimulation combined with mobility and stretching exercises to reduce pain and improve shoulder ROM in patients with adhesive capsulitis.

C INTERVENTIONS – JOINT MOBILIZATION
Clinicians may utilize joint mobilization procedures primarily directed to the glenohumeral joint to reduce pain and increase motion and function in patients with adhesive capsulitis.

C INTERVENTIONS – TRANSLATIONAL MANIPULATION
Clinicians may utilize translational manipulation under anesthesia directed to the glenohumeral joint in patients with adhesive capsulitis who are not responding to conservative interventions.

B INTERVENTIONS – STRETCHING EXERCISES
Clinicians should instruct patients with adhesive capsulitis in stretching exercises. The intensity of the exercises should be determined by the patient's tissue irritability level.

A

Corticosteroid Injections

- Intra-articular injection for short term relief

B

Patient Education

- Natural course of disease
- Activity modification to maintain pain-free ROM
- Match intensity to irritability

Stretching

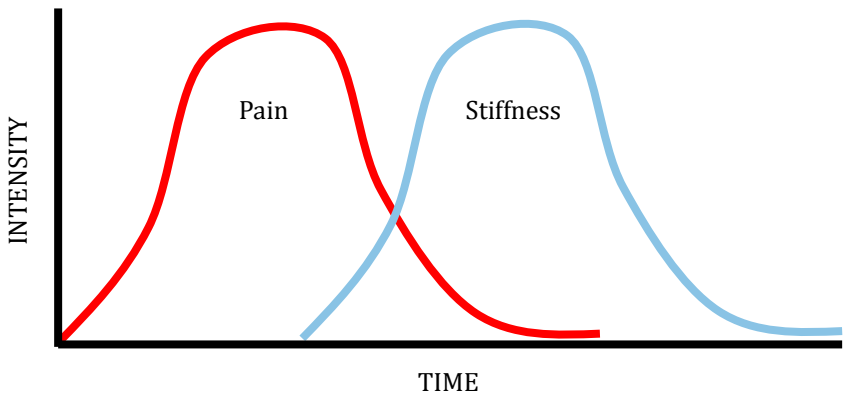
- Self-stretching, intensity to match tissue irritability

Adhesive Capsulitis

- Demographics
  - Unknown etiology
  - Females > males; primarily 45–60 y/o
  - PMHx: 10-38% DM/thyroid disease
  - 12–36 mo. self-limiting process*
  - Risk of contralateral involvement: 5-34%
  - Bilateral involvement: 14%
- Subjective Report
  - Insidious onset, 'trivial trauma'
  - Pain at night
  - Pain → painful! and stiff → stiff! and painful → painless stiffness

Kelley MJ JOSPT 2009

'General' Progression



Adhesive Capsulitis

- Objective findings
  - Capsular pattern of limitation (ER > abd > IR)
  - 50% ER loss at 0º abd
  - IR weakness
  - Pain
  - (+) shrug sign
- Imaging/diagnostics
  - Fibroblastic changes at rotator cuff interval
  - More info: Sharma P. Imaging of the shoulder with arthroscopic correlation. Clin Sports Med 2013 (32)

Kelley MJ JOSPT 2009

Treatment Planning

Impairments	Functional Limitations	Goals
- Pain - Limited A/PROM - Joint hypomobility - Capsular restriction - Scapular dyskinesia	- Reaching (all directions, especially overhead and behind head) - Self-care - Disturbed sleep	- Pt to sleep without waking due to pain - Pt to reach overhead without increased pain - Pt to dress self without compensation or pain

- What is your primary objective after intial eval?
  - Education: anatomy, pathology, prognosis – expected timeframes!
  - Manual therapy: gr II posterior GHJ glides
  - Exercise prescription: pain free AROM, scapular retraction/depression, capsule stretching to tolerance

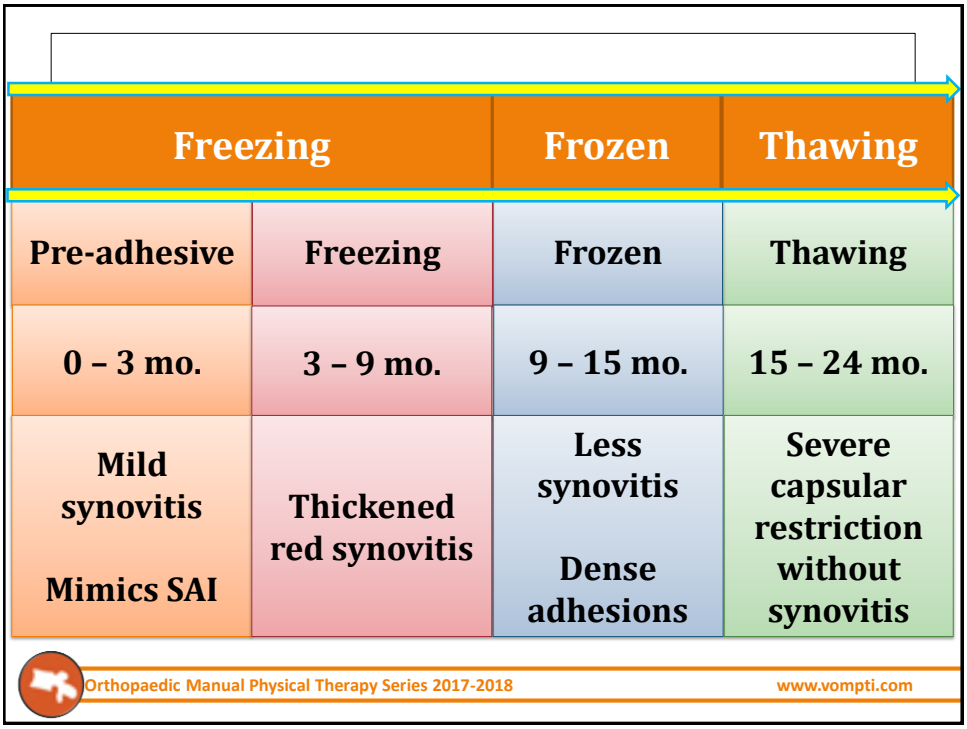
Kelley MJ JOSPT 2009

Let Irritability Guide Management

TABLE 1 IRRITABILITY CLASSIFICATION

High Irritability	Moderate Irritability	Low Irritability
High pain (≥7/10)	Moderate pain (4-6/10)	Low pain (≤3/10)
Consistent night or resting pain	Intermittent night or resting pain	No resting or night pain
High disability on DASH, ASES, PSS	Moderate disability on DASH, ASES, PSS	Low disability on DASH, ASES, PSS
Pain prior to end ROM	Pain at end ROM	Minimal pain at end ROM with overpressure
AROM less than PROM, secondary to pain	AROM similar to PROM	AROM same as PROM

	High Irritability	Moderate Irritability	Low Irritability
Modalities	Heat/ice/electrical stimulation	Heat/ice/electrical stimulation	...
Activity modification	Yes	Yes	...
ROM/stretch	Short-duration (1-5 s), pain-free, passive AAROM	Short-duration (5-15 s), passive, AAROM to AROM	End range/overpressure, increased-duration, cyclic loading
Manual techniques	Low-grade mobilization	Low- to high-grade mobilization	High-grade mobilization/ sustained hold
Strengthen	...	...	Low- to high-resistance end ranges
Functional activities	...	Basic	High demand
Patient education	+	+	+
Other	Intra-articular steroid injection	...	...



Stage I: Pain > Stiffness

- Duration: 0-3 months
- Pain with AROM and PROM
- Limited motion in all cardinal planes
- PROM under anesthesia: minimal, if any, loss of ROM
- Arthroscopic findings: diffuse GH synovitis, primarily anterosuperior capsule
- Pathologic changes: hypertrophic, hypervascular synovium, rare inflammatory cell infiltrates, normal underlying capsule

PTJ 2009

Adhesive Capsulitis: Establishing Consensus on Clinical Identifiers for Stage 1 Using the Delphi Technique

Sarah Walmsley, Darren A. Rivett, Peter G. Osmotherly

- Clinical indicators of **early stage** adhesive capsulitis:
  - Strong component of night pain
  - Marked increase in pain with rapid or unguarded movements
  - Uncomfortable to lie on affected shoulder
  - Patient reports pain easily aggravated by movement
  - Onset generally in people > 35 years old
  - On exam, there is global loss of A/PROM
  - On exam, there is pain at end ranges in all directions
  - Global loss of passive glenohumeral joint movement

PTJ 2014

Clinical Identifiers for Early-Stage Primary/Idiopathic Adhesive Capsulitis: Are We Seeing the Real Picture?

Sarah Walmsley, Peter G. Osmotherly, Darren A. Rivett

Criteria	No. of Participants (%)
There is a strong component of night pain	62 (96.9)
There is a marked increase in pain with rapid or unguarded movements	57 (89.1)
It is uncomfortable to lie on the affected shoulder	61 (95.3)
The patient reports the pain is easily aggravated by movement	55 (85.9)
The onset generally occurs in people older than 35 years of age	64 (100)
On examination, there is pain at the end of range in all directions	Active: 59 (92.2) Passive: 60 (93.8)
On examination, there is global loss of active and passive range of movement	Active: 42 (65.6) Passive: 43 (67.2)
There is global loss of passive glenohumeral joint movement	47 (73.4)

Clin Orthop Relat Res (2008) 466:2813–2819

Clinical Evaluation of the Shoulder Shrug Sign

Xiaofeng Jia MD, PhD, Jong-Hun Ji MD,
Steve A. Petersen MD, Jennifer Keefer PA-C,
Edward G. McFarland MD

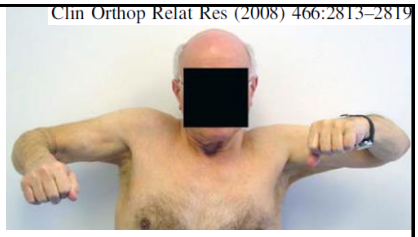


Table 2. Clinical usefulness of the shrug sign for various diagnostic groups

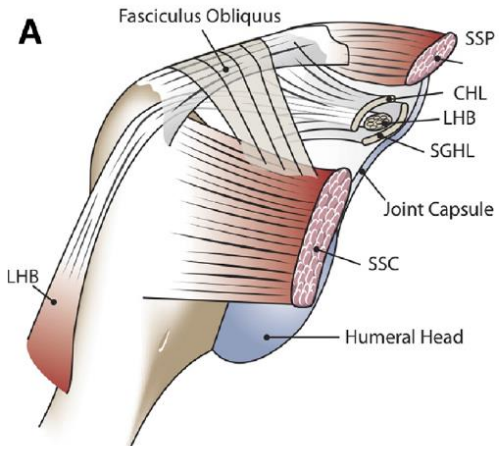
Presence of rotator cuff disease	Primary diagnosis	Sensitivity (%)	Specificity (%)	Positive predictive value (%)	Negative predictive value (%)	Overall accuracy (%)	Likelihood ratio	
							Positive	Negative
Yes	Tendinosis	33.3	47.2	5.0	89.5	46.1	0.631	1.413
	Partial cuff tear	43.2	47.9	7.5	89.5	47.5	0.828	1.187
	Full-thickness cuff tear	62.1	52.6	32.1	79.3	55.1	1.309	0.722
	Massive cuff tear	74.5	49.8	6.9	97.5	51.0	1.485	0.512
	SLAP	24.0	48.0	1.2	96.0	47.4	0.461	1.585
No	Glenohumeral instability	17.2	38.8	7.5	61.7	33.9	0.281	2.136
	Glenohumeral arthritis	90.5	56.8	30.4	96.7	62.6	2.097	0.167
	Acromioclavicular joint arthritis	27.9	47.1	3.4	90.8	45.9	0.527	1.531
	Frozen shoulder	94.7	49.5	3.6	99.8	50.4	1.877	0.106

Stage II: Pain! > Stiffness

- Duration: 3-9 months
- Chronic pain with AROM and PROM
- Significant ROM limitations all planes
- PROM under anesthesia essentially = PROM while awake
- Arthroscopic findings: diffuse pedunculated synovitis
- Pathologic changes: hypertrophic, hypervascular synovitis with perivascular and subsynovial scar, fibroplasia and scar formation in underlying capsule

Gaskill 2011 Arthroscopy

The Rotator Interval



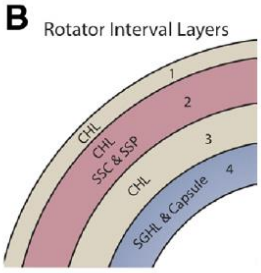
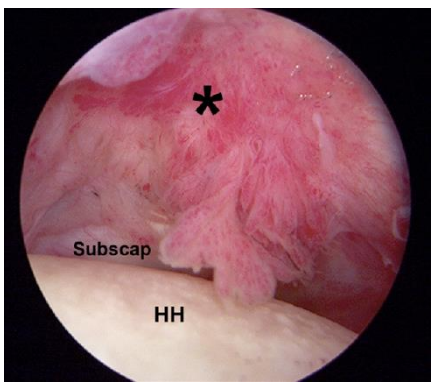


TABLE 1. *Proposed Rotator Interval Function*

- Contributes to glenohumeral stability
- Increases stability of long head of biceps tendon
- Limits excessive glenohumeral motion

The Rotator Interval
(In Adhesive Capsulitis)

- High prevalence of fibroblasts and myofibroblasts
  - Dense matrices of collagen within the capsule
- Abnormal expression of cytokines, proteases, growth factors
- Enhanced vascularity and hypoechoic change at RI on ultrasound sensitive and specific for adhesive capsulitis
  - Not seen in controls or in cuff pathology
  - Lee JC, Skel Rad 2005



Gaskill 2011 Arthroscopy

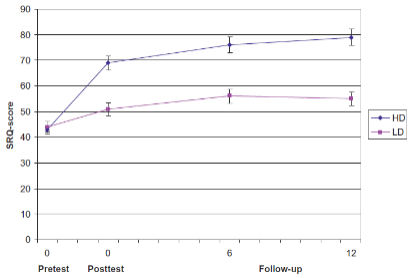
Stage III: Stiffness! > Pain

- Duration: 9-15 months
- Minimal pain, except at end ranges
- Significant ROM limitations, firm/rigid end feel
- PROM under anesthesia = PROM while awake
- Arthroscopic findings: no hypervascularity seen, notable remnants of fibrotic synovium, diminished capsular volume
- Pathologic changes: dense scar formation at capsule

High-Dosage Medical Exercise Therapy in Patients with Long-Term Subacromial Shoulder Pain: A Randomized Controlled Trial

Physiother. Res. Int. **15** (2010) 232–242

- Pain free graded exercise
- High dose (1000 reps)
- 8-11 exercises (3x30 reps)
- Pain free progressions of load, ROM
- Increase tissue perfusion/circulation
- Stimulate tissue regeneration
- Release endogenous opiates/gate theory
- Reinforce normal mechanics – pain free






Stage IV: Stiffness > Pain

- Duration: 15-24 months
- Minimal pain reported
- Progressive improvement in ROM
- Evaluation under anesthesia data unavailable
- Incorporate higher grade mobilizations

Manual Therapy

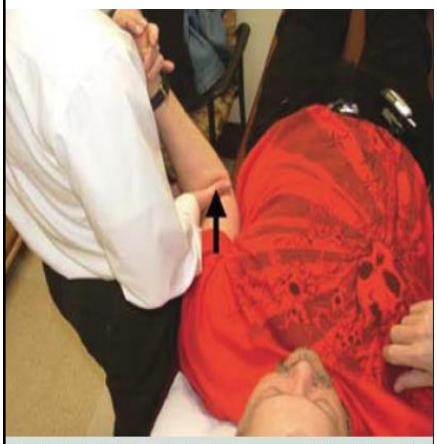


FIGURE 5. Inferior glide with the arm at the side and in external rotation.

FIGURE 6. Stretch to target the rotator cuff interval. The patient's hand remains fixed and the elbow is moved toward the table.

High Irritability:

Accessory v. Physiologic Mobilization?

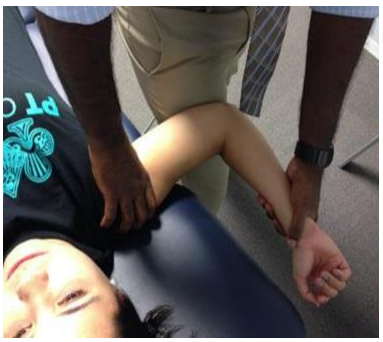
Glenohumeral - Inferior Glide

Glenohumeral - Posterior Glide

Glenohumeral - Anterior Glide

Low Irritability:

Progress into Tissue Resistance



Prone Functional ER

Anterior Glide

Inferior Glide

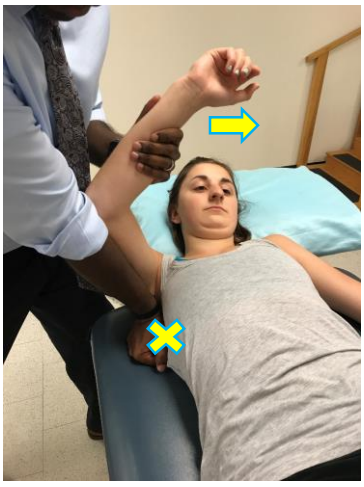
Prone Functional IR

PA with Distal Stabilization

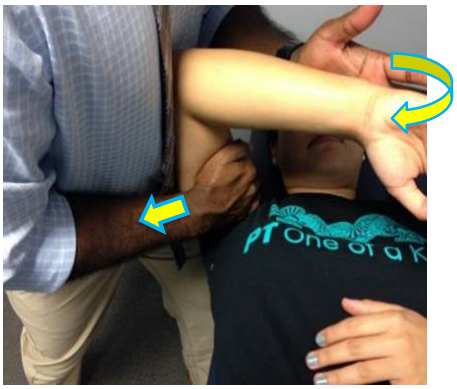
PA with physiologic ext/add/IR

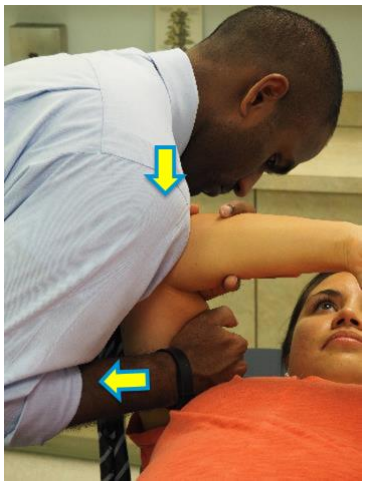
Seated Inferior Glides

Cross Body Adduction



Combined Motions





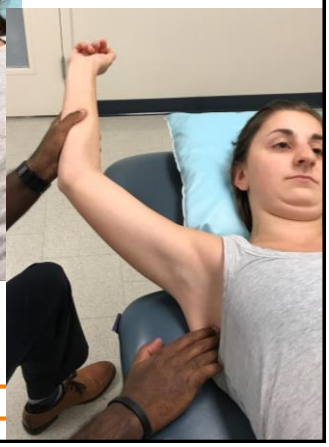
Arm Elevation - Scapular 'MWM'

Subscapularis Soft Tissue

Neutral

ER

Flexion



- What are you going to reassess at subsequent visits?
  - Symptom irritability will guide progression; ROM, end feel, sleeping tolerance, functional report to be reassessed

PROGNOSIS/EXPECTATIONS

- How do you expect to progress your treatment over subsequent visits?
  - Based on irritability; low grade mobilization → higher grade, motor control in available ROM, functional movement re-integration

Associated factors for expected outcome:

- Favorable
  - Typical clinical presentation, progressing through stages, contralateral involvement with resolution
- Unfavorable
  - Irritability of symptoms, severity/self-reported functional disability

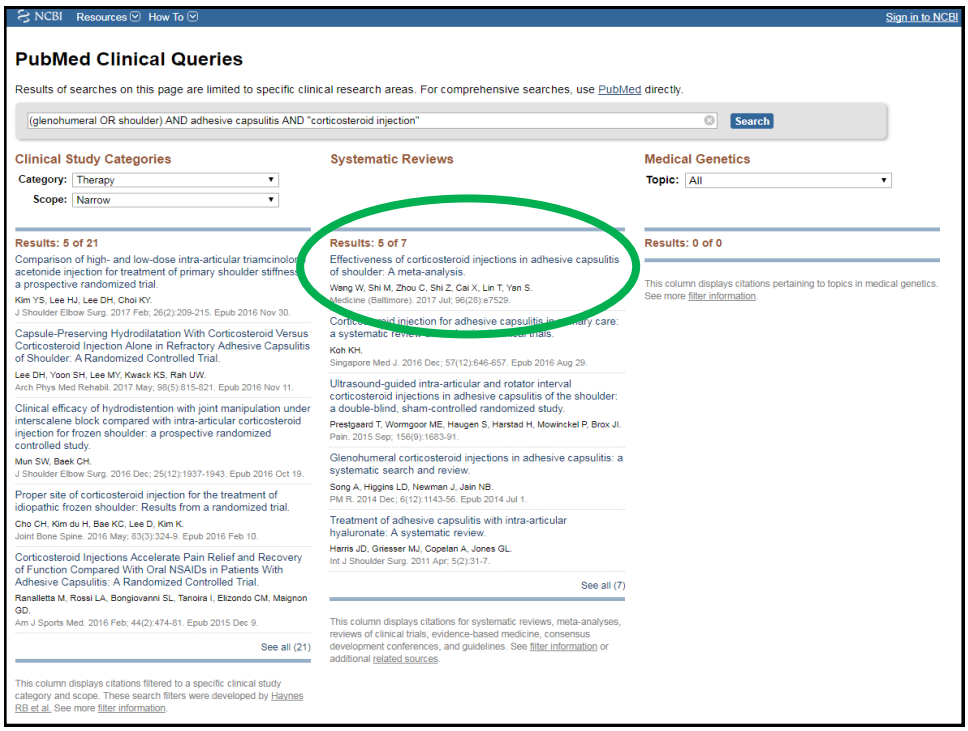
Possible referrals:

  - Ortho for intra-articular injection, ortho for capsular distension, imaging to rule out non-MSK condition

'Gap' in Knowledge

Patient or Problem	Intervention	Comparison Intervention	Outcomes
Patients with adhesive capsulitis (stage II)	Corticosteroid injection	No injection	More rapid progression through stages

- Article reviewed: Wang W, et al. Effectiveness of corticosteroid injections in adhesive capsulitis of shoulder: A meta-analysis. Medicine (Baltimore). 2017;96(28).
- Relevance to the clinical case:
  1. Intra-articular CSI more effective in short term, 0-8wks, for pain relief compared to placebo
  2. CSI associated with greater short and long term, 9-24wks, improvement in PROM



Frozen shoulder: the effectiveness of conservative and surgical interventions—systematic review

- Strong evidence for the effectiveness - Pain
  - Steroid injections (short term)
  - Laser therapy (short term)
- Moderate evidence
  - Mobilization techniques (short and long term)
  - Steroid injections (mid term)
  - Distension (short term)
  - Distension + active physiotherapy(short term)
  - Oral steroids compared with no treatment or placebo
  - Suprascapular nerve block compared with acupuncture, placebo or steroid injections

Favajee MM BJSM 2011

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Trigger Point Dry Needling as an Adjunct Treatment for a Patient With Adhesive Capsulitis of the Shoulder

Case Report

Addressing neurodynamic irritability in a patient with adhesive capsulitis: a case report

Kevin Farrell, Katherine Lampe

Journal of Manual & Manipulative Therapy 2017 VOL. 25 NO. 1

IJSPT

CASE REPORT

EVALUATION AND TREATMENT OF A PATIENT DIAGNOSED WITH ADHESIVE CAPSULITIS CLASSIFIED AS A DERANGEMENT USING THE MCKENZIE METHOD: A CASE REPORT

Ashley Bowser, DPT[1]
Brian T. Swanson, PT, DSc, OCS, FAAOMPT[1]

Volume 11, Number 4 | August 2016 | Page 627

Case Report

Use of thoracic spine manipulation in the treatment of adhesive capsulitis: a case report

Joshua R McCormack

Journal of Manual and Manipulative Therapy 2012 VOL. 20 NO. 1

Some Factors Predict Successful Short-Term Outcomes in Individuals With Shoulder Pain Receiving Cervicothoracic Manipulation: A Single-Arm Trial

Clinical Prediction Rule Criteria Identified in Logistic Regression Analysis
Pain-free shoulder flexion <127°
Shoulder internal rotation <53° at 90° of abduction
Negative Neer test
Not taking medications for their shoulder pain
Symptoms less than 90 d

No. of Predictor Variables Present	Sensitivity	Specificity	Positive Likelihood Ratio	Probability of Success (%)[a]	Patients Who Satisfied:	
					Success	Nonsuccess
Met all 5	.04 (.01, .15)	1.0 (.86, 1.0)	∞	100	2	0
Met at least 4	.27 (.15, .41)	1.0 (.86, 1.0)	∞	100	13	0
Met at least 3	.51 (.37, .65)	.90 (.73, .97)	5.3 (1.7, 16.0)	89	25	3
Met at least 2	.90 (.77, .96)	.61 (.42, .78)	2.3 (1.5, 3.6)	78	44	12
Met at least 1	1.0 (.90, 1.0)	.19 (.08, .38)	1.0 (1.2, 1.5)	61	49	25

Physical Therapy Volume 90 Number 1

Clinical Pattern Recognition

(Early to Mid Stage Adhesive Capsulitis)

SUBJECTIVE	OBJECTIVE
Insidious onset	Multidirectional limitations in AROM and PROM (pain, stiffness)
Middle aged female	ER limited at 0º
Thyroid dysfunction	Empty end feel (pain/guarding)
Sleep disturbances	Accessory glides hypomobile
Significant pain	Cuff weakness (IR > ER)
Functional limitations (reaching)	(+) Shrug sign