


**Shoulder Disorders:
ICF-based Clinical Practice Guidelines**


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Aims of the Guidelines
Orthopaedic Section, APTA, Inc

Describe diagnostic classifications based upon ICF terminology
Describe best outcome measures to use
Describe best intervention strategies that are matched to the classification


in other words: - reduce unwarranted variation
 - do the right thing at the right time for the right patient



Aims of the Guidelines
Orthopaedic Section, APTA, Inc
- an associated benefit -

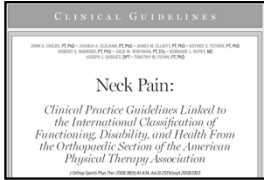
Strategic Outcome 1 – Standards of Practice:

Objective B – Develop National Orthopaedic Physical Therapy Outcomes Database



Orthopaedic Section
pilot study – 2012 & 2013

■ Clinical Practice Guidelines enable a seamless creation of “minimal data sets” – a critical foundation of outcome databases



Minimal Data Set Needs

1. Neck Pain
2. Shoulder Disorders
3. Low Back Pain
4. Knee Disorders

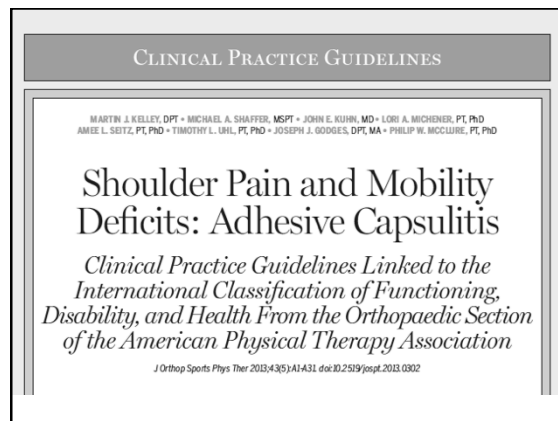
served by process & rigor of clinical guideline development

Published Clinical Practice Guidelines:

1. Heel Pain / Plantar Fasciitis (2008)
2. Neck Pain (2008)
3. Hip Osteoarthritis (2009)
4. Knee Ligament Sprain (2010)
5. Knee Meniscal Disorders (2010)
6. Ankle Tendinitis (2010)
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6. Ankle Tendinitis (2010)
7. Low Back Pain (2012)
8. Shoulder Adhesive Capsulitis (2013)



**Shoulder Pain & Mobility Deficits/
Adhesive Capsulitis
(May 2013)**

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**Shoulder Pain & Mobility Deficits/
Adhesive Capsulitis**

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Published Clinical Practice Guidelines:

www.jospt.org Open access

www.orthopt.org

www.guidelines.gov AHQR National
Guidelines
Clearinghouse

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5. Knee Meniscal Disorders (2010)
6. Ankle Tendinitis (2010)
7. Low Back Pain (2012)
8. Shoulder Adhesive Capsulitis (2013)
9. Ankle Sprains (Sept.2013)

ICF Guidelines Current Status
Guidelines – in Review:

10. Non-arthritis Hip Joint Pain

Look for publication later this spring

ICF Guidelines Current Status
Guidelines – under construction:

11. Patellofemoral Pain Syndrome

12. Carpal Tunnel Syndrome
(collaborating with the Hand Rehabilitation Section)

13. Distal Radius Fractures
(collaborating with the Hand Rehabilitation Section)

ICF Guidelines Current Status
Guidelines – under construction:

14. Hip Fractures
(collaborating with the Section on Geriatrics)

15. Medical Screening
(collaborating with the Federal PT Section)


16. Elbow Epicondylitis
(collaborating with the Hand Rehabilitation Section)

Future Clinical Practice Guidelines:

17. Subacromial Pain Syndrome

18. Shoulder Instability


19 + . Potential Collaboration(s) with
the Sports PT Section



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Feedback / Comments Very Welcomed!






Classification of Shoulder Disorders: A Staged Algorithm for Rehabilitation

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Tim Uhl PT, PhD, ATC






Shoulder Pain and Mobility Deficits: Adhesive Capsulitis
Clinical Practice Guidelines Linked to the International Classifications of Functioning, Disability, and Health From the Orthopaedic Section of the American Physical Therapy Association




The Shoulder and ICF

Popular Label	1 ^o ICD 9	Impairments		Activities/ Participation
		ICF Body Function	ICF Body Structure	
Rotator Cuff Tendinopathy (Impingement)	726.1 Rot Cuff Syndrome	B7300 Power of isolated muscles and muscle groups	S7202 Muscles of shoulder region	D4452 Reaching D4300 Lifting D850 Work D520 Caring for body parts
Frozen Shoulder	726.0 Adhesive Capsulitis	B7100 Mobility of a single joint	S7201 Joints of the shoulder region	D4451 Pushing D4452 Reaching D4300 Throwing
Glenohumeral Instability	840.2 Shoulder ligament sprain	B7601 Control of complex voluntary movements	S7203 Ligaments and fasciae of shoulder region	



Why Classify?

- Direct Intervention
- Prognosis
- Communication
 - Research
 - Payors
- Other?




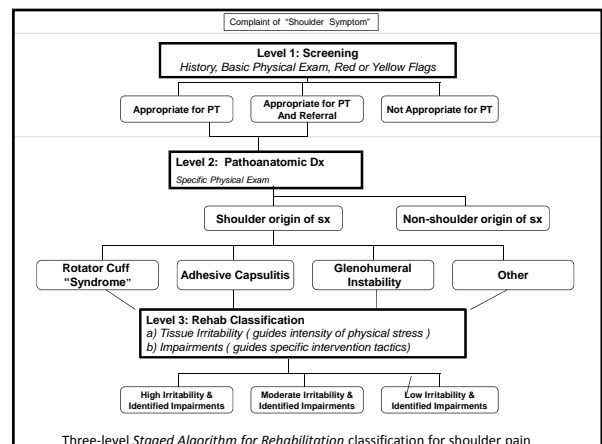
Shoulder Dx /Classification

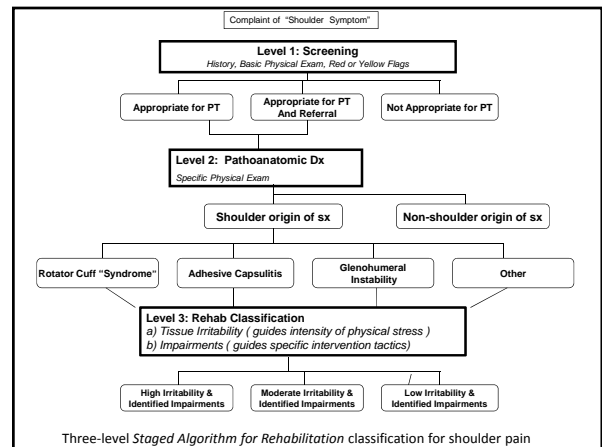
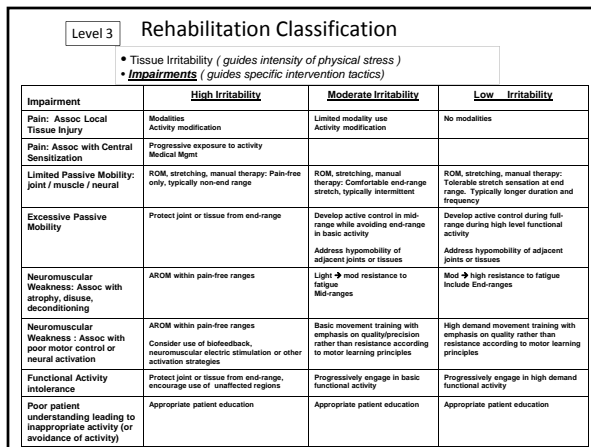
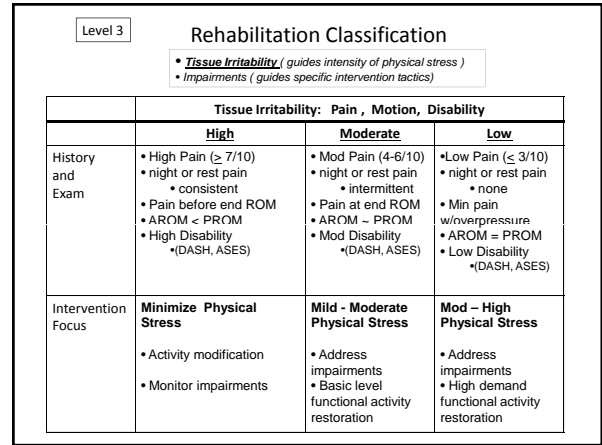
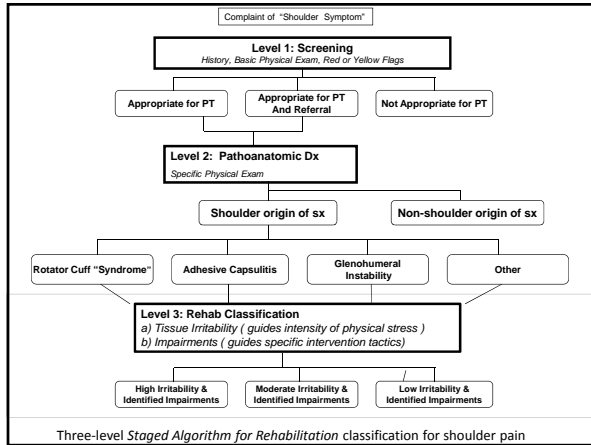
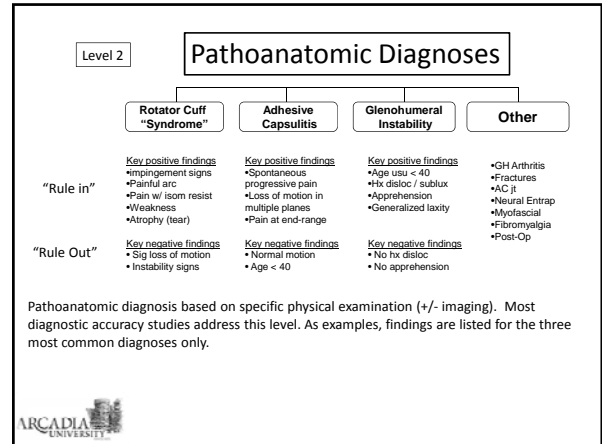
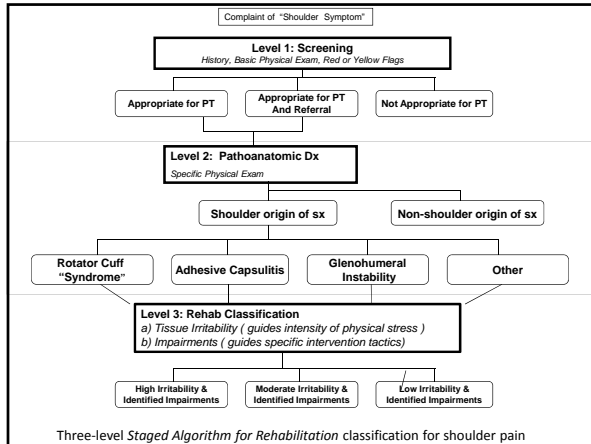
Pathoanatomic Classification

- Rotator Cuff “Syndrome” / Impingement
- Glenohumeral Instability
- Adhesive Capsulitis
- Others

Assumptions within a Pathoanatomic Model


- Tissue pathology represents an *homogenous group*
 - i.e. they look similar and should be treated similar
- Strong relationship between *tissue pathology and patient complaints*
 - i.e. must “fix” pathologic anatomy for pain and function to improve



Does the Pathoanatomic Dx Matter?
 Impairment: Limited GH mobility: Capsular

- 30 yo Post Fx Stiffness
- 50 yo Adhesive Capsulitis
- 70 yo GH Arthritis
- Prognosis
- Natural History
- Rehab Strategy



Key Decisions:

Level 1: Screening
 Hx, Basic Phys Exam,
 Red or Yellow Flags

PT and/or Referral ?


Level 2: Pathoanatomic Dx
 Specific Physical Exam

Specific Tissue Disorder?
 General Intervention strategy ?
 • Rehab vs Surgery
 • Key tissue and movement precautions
Prognosis and Patient Education

Level 3: Rehab Classification
 • Tissue Irritability
 • Impairments


What Physical Stress Intensity?
 • Minimal
 • Moderate
 • High

What are the *Key Impairments* driving symptoms or functional loss?




Discussion
 Comparison of Pathoanatomic Dx and Rehab Classification

<ul style="list-style-type: none"> • Pathoanatomic Dx <ul style="list-style-type: none"> - Primary Tissue Pathology - Stable over episode of care - Guides general Rx strategy - Informs prognosis - <i>Surgical Decisions</i> 	<ul style="list-style-type: none"> • Rehab Classification <ul style="list-style-type: none"> - Irritability / Impairment - Often changes over episode of care - Guides specific rehab Rx <ul style="list-style-type: none"> • Physical stress dosage • Specific Impairments - May inform prognosis ?
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Discussion:
 A Staged Algorithm for Rehabilitation

<p><u>Limitations</u> (at least a few)</p> <ul style="list-style-type: none"> • Conceptual Stage • Does "irritability" capture key features determining application of physical stress? • Does not address "non-physical" issues • Reliability • Validity 	<p><u>Potential Features</u></p> <ul style="list-style-type: none"> • Relatively simple • Captures thought process of many seasoned clinicians • Possible broad application • Not "separate" from medical framework
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Adhesive Capsulitis: Clinical Practice Guidelines

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Adhesive Capsulitis

- An entity of unknown etiology resulting in painful and limited active and passive shoulder motion, however, it demonstrates a characteristic history, presentation and recovery

This is not Adhesive Capsulitis

ETIOLOGY

- Auto-immune response
- Biceps tenosynovitis
- Trigger points-subscapularis
- Autonomic reflex dysfunction
- Relationship to increased cytokines levels
 - Hutchinson et al. 1998 reported on 12 patients with gastric cancer who were treated with synthetic matrix metalloproteinase
 - Six developed frozen shoulder

Etiology

- Cytokines
 - Involved in the initiation and termination of tissue repair
 - May be involved in the inflammatory and fibrotic process relate to adhesive capsulitis
 - Sustained production can result in fibrosis
 - Imbalance between aggressive healing, scarring, contracture and a failure of remodeling may lead to protracted stiffening of the capsule

Purpose

- Describe evidence-based physical therapy practice for adhesive capsulitis
- Classify and define adhesive capsulitis using the World Health Organization's terminology
- Identify interventions supported by current best evidence
- Identify appropriate outcome measures to assess changes resulting from physical therapy interventions
- Provide a description to policy makers, payers and claims reviewers regarding the practice of orthopaedic physical therapy
- Create a reference publication for orthopaedic physical therapy clinicians, academic instructors and students

Rodeo et al., J Orthop Res. 1997
Bunker, Reilly et al. 2000

Method

- The American Physical Therapy Association (APTA) Orthopaedic section appointed content experts
- The content experts identified impairments of body function and structure, activity limitations, and participation restrictions using ICF terminology to:
 - (1) categorize patients into mutually exclusive impairment patterns to base intervention strategies
 - (2) serve as measures of changes in function over the course of an episode of care.
- The content experts described interventions and supporting evidence

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Method

- Performed a systematic search of MEDLINE, CINAHL, and the Cochrane Database of Systematic Reviews (1966 through September 2011) for any relevant articles
- These guidelines were issued in 2013, based on publications in the scientific literature prior to September 2011
- These guidelines will be considered for review in 2017, or sooner if new evidence becomes available.

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Levels of Evidence

I	Evidence obtained from high-quality diagnostic studies, prospective studies, or randomized controlled trials
II	Evidence obtained from lesser-quality diagnostic studies, prospective studies, or randomized controlled trials (eg. weaker diagnostic criteria and reference standards, improper randomization, no blinding, less than 80% follow-up)
III	Case-controlled studies or retrospective studies
IV	Case series
V	Expert opinion

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Grades of Evidence

GRADES OF RECOMMENDATION BASED ON	STRENGTH OF EVIDENCE
A Strong evidence	A preponderance of level I and/or level II studies support the recommendation. This must include at least 1 level I study
B Moderate evidence	A single high-quality randomized controlled trial or a preponderance of level II studies support the recommendation
C Weak evidence	A single level II study or a preponderance of level III and IV studies, including statements of consensus by content experts, support the recommendation
D Conflicting evidence	Higher-quality studies conducted on this topic disagree with respect to their conclusions. The recommendation is based on these conflicting studies
E Theoretical/foundational evidence	preponderance of evidence from animal or cadaver studies, from conceptual models/principles, or from basic science/bench research supports this conclusion
F Expert opinion	Best practice based on the clinical experience of the guidelines development team

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Adhesive Capsulitis-Frozen Shoulder Classification

PRIMARY (Idiopathic)	SECONDARY (Known Disorders)	POST SURGERY
SYSTEMIC IDDM Hypo/ hyperthyroidism	EXTRINSIC CVA MI Cervical DD Immobility FX	INTRINSIC RC Tendon Biceps tendon Calcific tendon AC arthritis

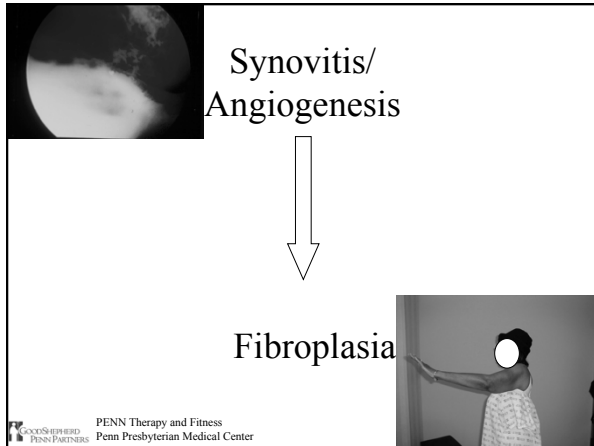
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Natural History

Reeves, 1975
Nevasier, 2010

The graph plots 'Status' on the y-axis against time on the x-axis. The curve starts at a low level, rises through the 'Freezing' phase (4 mo. ±), reaches a peak in the 'Frozen' phase (4 mo. ±), and then falls through the 'Thawing' phase (4 mo. ±). Below the x-axis, the 'Reactive phase' is indicated as the period from the start to the end of the 'Frozen' phase, and the 'Resolving phase' is indicated as the period from the end of the 'Frozen' phase to the end of the 'Thawing' phase.

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Examination

- Hallmark finding is the loss of passive external rotation with the arm at the side

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Intervention-based Classification

	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 secs) Pain-free passive → AAROM	Short duration (5-15 secs) Passive, AAROM → AROM	End-range/overpressure Increase duration Cyclic loading
Manual Techniques	Low grade mobilization	Low → high grade Mobilization	High grade mobilization/ sustained hold
Strengthen	--	--	Light → high resistance End-ranges
Functional Activities	--	Basic	High demand
Patient Education	+	+	+

Kelley, JOSPT, 2009

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Intervention Recommendations

CORTICOSTEROID INJECTIONS

A Strong evidence

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

Oh, 2011
Lorbach, 2010
Blanchard, 2009
Jacobs, 2009
Ryans, 2005
Carrette, 2003

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Intra-articular Corticosteroids, Supervised Physiotherapy, or a Combination of the Two in the Treatment of Adhesive Capsulitis of the Shoulder

- Prospective and randomized
- 93 patients
- Criteria
 - ≥ 25 % loss in at least 2 directions (FF, Abd, ER, IR)
 - SPADI total score ≥ 30
- Four groups
 - GH joint steroid injection under fluoroscopy
 - GH joint steroid injection under fluoroscopy and supervised PT (12 one hour sessions X 4 weeks)
 - Saline injection and PT
 - Saline injection alone

Carette et al., Arthritis and Rheum, 2003

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Results

- At 6 weeks
 - injection/PT SPADI highest
 - ROM increased in all groups but injection/PT group had greatest increase
- At 6 months SPADI scores were not different but AROM and PROM were better in injection/PT group.
- No difference at 12 months
- PT no better than placebo

Carette et al., Arthritis and Rheum, 2003

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Intervention Recommendations

MODALITIES

Cheing, 2008
Dogru, 2008
Leung, 2008
Guler-Uysal, 2004

C Weak evidence

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.

Intervention Recommendations

PATIENT EDUCATION

Diercks, 2004

B Moderate evidence

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.

Intervention Recommendations

JOINT MOBILIZATION

Tanaka, 2010
Chen, 2009
Johnson, 2007
Yang, 2007
Vermeulen, 2006
Nicholson, 1985
Bulgen, 1984

C Weak evidence

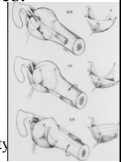
Clinicians may utilize joint mobilization procedures primarily directed to the glenohumeral joint to reduce pain and increase motion and function in patients with adhesive capsulitis.



Joint Mobilization

Effect-

- Reducing pain and influencing tissue length is what restores motion and normal arthrokinematics.
- Vermullen et al., 2000
 - Intense end range mobilization
- **Vermullen et al., 2006**
 - High-grade vs. low-grade mobilization
 - The high-grade mobilization group did better but only a minority of comparisons reached statistical significance and the overall differences between the two interventions was small.



Intervention Recommendations

TRANSLATIONAL MANIPULATION

Roubal, 1996
Placzek, 1998

C Weak evidence

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

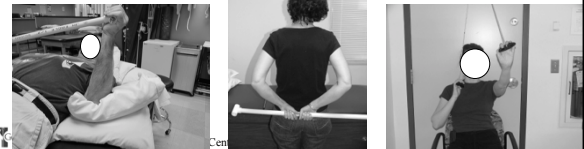
Intervention Recommendations

STRETCHING EXERCISES

Celik, 2010
Tanaka, 2010
Kivimäki, 2007
Levine, 2007
Diercks, 2004
Griggs, 2000
Lee, 1974

B Moderate evidence

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.



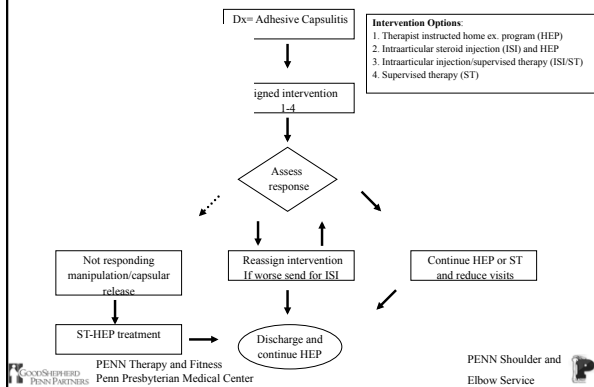
Joint Mobilization and Self-Exercise

- N=110
- Investigated the relationship of frequency (supervised PT) to outcome
- Patients received joint mobilization at high frequency (>2X a week), moderate frequency (1X a week) and low frequency (< 1X a week)
- All groups performed a HEP of pendulum and wall walks

Results

- No relationship between frequency of treatment and motion gain or time to reach plateau
- Was a significant relationship between frequency of HEP and both motion gained and shorter time to plateau

Adhesive Capsulitis Intervention Algorithm



When To Discharge?

- Improved pain, satisfaction and function
- Minimal irritability- can give overpressure at end range with little or no pain
- 0 – 5-10 degree intra-session change and minimal or no irritability
- Stagnant inter-session change in motion

“Hit the Fibrotic Wall”

Conclusion

- Strong evidence exist for intra-articular injections providing significant short-term relief
- Patients with frozen shoulder can dramatically respond to both a therapist instructed home exercise program and short duration supervised physical therapy
- Using an algorithmic treatment approach helps to determined response to treatment, need for treatment and a pathway for further intervention.

Thank You



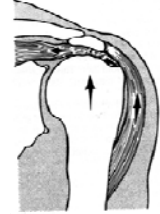
Shoulder Muscle Power and Movement Coordination Impairments: Rotator Cuff Disease

Lori Michener, PhD, PT, ATC, SCS
Virginia Commonwealth University
Richmond, VA

Rotator Cuff Disease

Prevalence: 7 – 26%
(Luime JJ, et al, Scad J Rheumatol, 2004)

Rotator Cuff Disease
What does this involve?

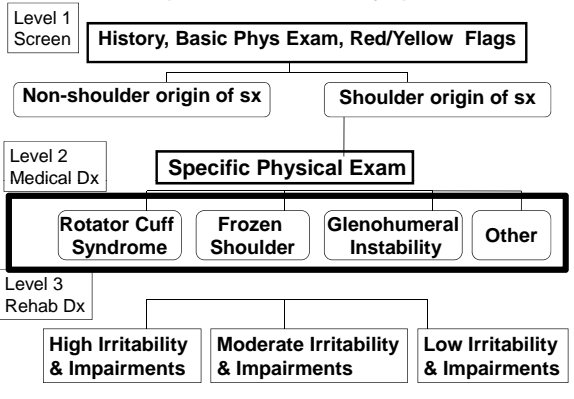


Rotator Cuff Disease

- Full-thickness RC tear
- Partial thickness RC tear
- Bursitis
- Tendinitis
- Tendinopathy
- Subacromial ('impingement') pain syndrome

** Is it better to label this RC Syndrome- as we are not sure of the pathology

Complaint of "Shoulder Symptom"



Rotator Cuff Syndrome What are the Dx criteria?

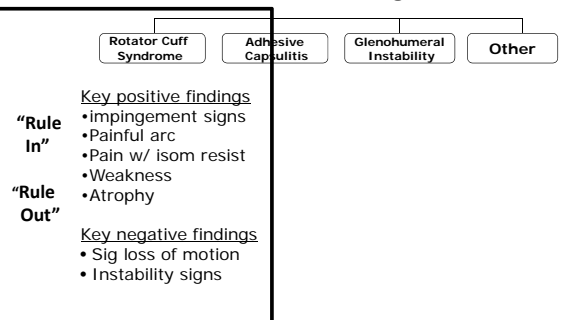
Rotator cuff disease

- Full-thickness RC tear
- Partial thickness RC tear
- Bursitis
- Tendinitis
- Tendinopathy
- Subacromial 'impingement' syndrome

All likely present with similar symptoms -- pain in the Subacromial Space

Subacromial Pain Syndrome

Pathoanatomic Diagnoses



Pathoanatomic Dx based on specific physical exam (+/- imaging).

Special Tests – RC Disease

- ✦ Painful arc
- ✦ Hawkin's test
- ✦ Neer's Test
- ✦ Speed's test
- ✦ Yergason's Test
- ✦ ER Resistance Test
- ✦ IR Resistance Test
- ✦ Full Can Test
- ✦ Empty Can / Jobe
- ✦ Drop Arm
- ✦ ER lag
- ✦ Belly Press/ Lift Off
- ✦ More..
- ✦ Combination of tests

Dx RCD - Lots of Syst Reviews

1. Hermans J, JAMA, 2013; 2. Hanchard NCA, Cochrane, 2013;
3. Hegedus EJ, BMJ, 2012; 4. Alqunae M, APMR, 2012

Confirm RCD

(R/In) – single tests

- 1- Painful arc
- 2- Resisted ER (ERRT) – pain or weakness
- 3- Full Can
- 4- Drop Arm

Screen Out RCD

(R/Out) – single tests

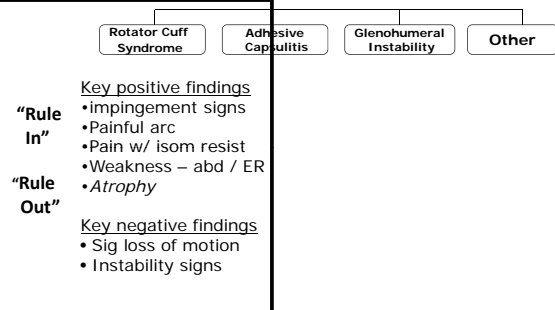
- 1- Painful arc
- 2- Hawkins
- 3- Neer
- 4- Resisted ER (ERRT) – pain or weakness
- 5- Empty Can
- 6- Full Can

Combination of Tests: RCD

- **Test Combo** (Michener LA, Archives PM&R, 2009)
 $\geq 3+/5$: Painful arc, Neer, R/In +LR: 2.93
 Hawkin's, ERRT
 Empty Can/ Jobe
 $< 3+ / 5$ (as above) R/Out -LR: 0.34
- **Test Combo** (Park HB, JBJS, 2005)
 $3+$: Hawkins, painful arc, ERRT R/In +LR: 10.6
 $3-$: Hawkins, painful arc, ERRT R/Out -LR: 0.17

Level 2

Pathoanatomic Diagnoses



Pathoanatomic Dx based on specific physical exam (+/- imaging).

Dx FT-RCT - Lots of Syst Reviews

1. Hermans J, JAMA, 2013; 2. Hanchard NCA, Cochrane, 2013;
3. Hegedus EJ, BMJ, 2012; 4. Alqunae M, APMR, 2012

Confirm FT-RCT only

(R/In) – single tests

- 1- Painful arc
- 2- Resisted ER – pain or weakness
- 3- ER lag test – supraspinatus infraspinatus
- 4- IR lag & Lift off subscapularis
- 5- Drop arm
- 6- Atrophy of infrasp.
- 7- Belly off

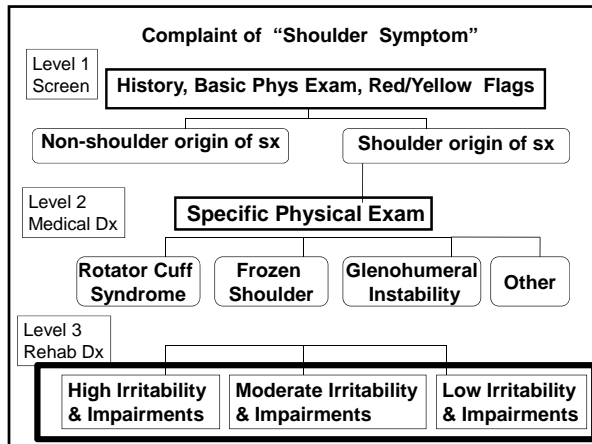
Screen Out FT-RCT

(R/Out) – single tests

- 1- IR lag & Lift-off subscapularis
- 2- Resisted ER (ERRT) – pain or weakness
- 3- Empty Can
- 4- Full Can

Combination of Tests: FT-RCT

- **Test Combo** (Park HB, et al; JBJS, 2005)
 3 Tests: Drop arm, Painful arc, ERRT
 All 3 tests + R/In +LR: 15.57
 All 3 tests - R/Out -LR: 0.16
- **Test Combo** (Litaker D, et al; J Am Geriatr Soc, 2000)
 $\geq 65yo$, ER weak, night pain
 All 3 +: R/In +LR: 9.84
 All 3 -: R/Out -LR: 0.54



Systematic Reviews of SA pain

(Hanratty CE, 2012; Littlewood C, 2012; Brudvig TJ, 2011; Marinko LN, 2011; Kromer TO, 2009; Kuhn JE, 2009; Ainsworth, 2007; Michener LA, 2004; Desmeules, 2003)

- 9- 16 RCTs
- ↓ pain & ↑ function / disability:
 - Exercise- stretch & strengthen/ MC
 - Exercise + manual therapy to the glenohumeral joint and/ or spine
 - Home exercise programs
- Passive treatments: not recommended
- US: not effective

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RCD Management

- Treatment approach
 1. Strengthen /Motor Control – Rotator cuff, scapular, shoulder
Motor control alone – unclear of effectiveness
 2. Flexibility –post cuff, pec minor, lats, CT spine
 3. Scapular Dysf –Scap taping + Motor Control, addition of scapular stabilization exercises
 4. Home exercise program + supervised or just HEP if appropriate

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5. Modalities – limited use, only in combination with active treatment
6. Manual: Spine *OR* combined (GH, spine)
 - Pain, ↑ joint motion, other neurophysiological effects, ?? biomechanical at spine??
 - GH – alone -doesn't appear effective

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Evidence – Manual Therapy (MT)

- Spine & GH MT + ex vs exercise alone
 - Addition of MT improved function (Bang M, 2000; Bennell, 2010; Winters, 1999)
- GH mobs alone or added to ex vs. ex
 - No diff in outcomes (Yiasemides R, 2011; Kachingwe A, 2008)
 - Better outcomes, but small trials & effect sizes (Senbursa, 2011; Senbursa, 2007; Conroy, 1998)
- Is spinal MT the active ingredient?
 - RCT – improved outcomes with thoracic manipulation/ mobs (Bergman, 2004; Winters J, 1999)

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5. Modalities – limited use, only in combination with active treatment
6. Manual: Spine *OR* combined (GH, spine)
 - Pain, ↑ joint motion, other neurophysiological effects, ?? biomechanical at spine??
 - GH – alone -doesn't appear effective
7. Use of impairments
 - Guiding Treatment
 - Hi – Moderate – Lo irritability
 - Dose: Hi reps (dose)

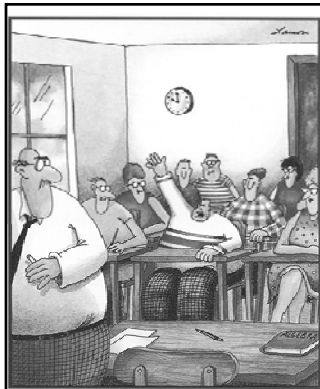
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Dose - Evidence

- High-dose vs low-dose chronic imping.
(Osteras H, Open Ortho, 2010; Osteras H, Physiother Res Int, 2010)
- Hi-dose: ↑ pain & function 3, 6 & 12 months post
- High-dose:
 - 1-hr session, 9-11 exercises, 3 x 30 reps, 1000 reps per treatment, aerobic ex
- Low -dose: 2 x 10 reps/ exercise

Treatment Approach – no evidence

- Unsure (limited or no evidence):
 - Scapular taping –immediate effects only
 - Scapular motor control and stabilization exercise focus
 - Core stability training
 - Eccentrics focus
- Frequency of treatment
- Progression of treatment
- Dose of exercise and manual therapy



"Mr. Osborne, may I be excused?
My brain is full!"

Questions?

