


# Shoulder Clinical Practice Guidelines: A Presentation of the Evidence

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**PPTA** Pennsylvania Physical Therapy Association  
**TEMPLE UNIVERSITY** College of Public Health  
**DEPARTMENT OF PHYSICAL THERAPY**

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## Disclosures

- I have no financial disclosures related to this presentation



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## About Me



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  - Physical Therapist, Good Shepherd—Penn Partners University City, Philadelphia PA
  - Orthopaedic Residency, University of Chicago Medical Center
  - Doctor of Physical Therapy, Temple University



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## Presentation Objectives

1. Discuss the clinical decision making process of differential diagnosis and screening procedures for shoulder disorders warranting referral
2. Analyze the literature pertaining to examination procedures and proposed treatment classifications for shoulder pathology
3. Discuss evidence-based clinical management strategies for musculoskeletal management of shoulder disorders, including a review of clinical practice guidelines and recent literature guiding intervention

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## Sound Off

- What are your experiences with working with patients with shoulder pain?
- What do you find to be most challenging about managing patients with shoulder pain?




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## Setting the Stage

What does best practice care for musculoskeletal pain look like? Eleven consistent recommendations from high-quality clinical practice guidelines: systematic review

Ivan Lin,<sup>1\*</sup> Louise Wiles,<sup>2</sup> Rob Waller,<sup>3</sup> Roger Goucke,<sup>4</sup> Yusuf Nagree,<sup>5,6</sup> Michael Gibberd,<sup>7</sup> Leon Straker,<sup>8,9</sup> Chris G Maher,<sup>3</sup> Peter P B O'Sullivan<sup>10</sup>

- Musculoskeletal pain conditions are the biggest cause of disability internationally and a major societal burden
- Clinical practice guidelines aim to:
  - Guide clinical decision making
  - Present standard of care
  - Informing stakeholders for best practice
  - Allocation of resources

**Box 2 Consistent recommendations across musculoskeletal (MSK) pain conditions**

1. Care should be patient centred. This includes care that responds to the individual context of the patient, employs effective communication and uses shared decision-making processes.
2. Screen patients to identify those with a higher likelihood of serious pathologized flag conditions.
3. Assess psychosocial factors.
4. Radiological imaging is discouraged unless:
  - i. Serious pathology is suspected
  - ii. There has been an unsatisfactory response to conservative care or unexplained progression of signs and symptoms.
  - iii. It is likely to change management.
5. Undertake a physical examination, which could include neurological screening tests, assessment of mobility and/or muscle strength.
6. Patient progress should be evaluated including the use of outcome measures.
7. Provide patients with education/information about their condition and management options.
8. Provide management addressing physical activity and/or exercise.
9. Apply manual therapy only as an adjunct to other evidence-based treatments.
10. Unless specifically indicated (e.g. red flag condition), offer evidence-informed non-surgical care prior to surgery.
11. Facilitate continuation or resumption of work.

Vos et al, 2017; Lin et al, BJSM, 2019

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## Shouldering the Burden

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- 3<sup>rd</sup> most common musculoskeletal problem
- Prevalence estimated between 16-26%
- Pain beyond three months is associated with poorer recovery, disability, and reduced ability to work
- One third of patients still have some form of restriction and/or pain after one year of symptom onset

Luime et al 2004; Bot et al, 2005; Greving 2012; Bruls et al 2015

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## Encounter Triage

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Screen for red flags necessitating referral

Consideration for biopsychosocial themes that may influence progression through care

Initiation of healthcare services

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## Framework for Clinical Decision Making

SCAFFOLD FOR CRITICAL THINKING IN CLINICAL DECISION MAKING

**CONFOUNDERS: ACUTY/CHRONICITY** ←→ **SIMPLICITY/COMPLEXITY**

Reason for Referral: Medical/Emergency, Elective/Planned, Trauma, Change in Function

PMH/PSH, Prior level of Function, Med/Surgical Course/Management, Progress

MOVEMENT SYSTEMS IMPACT/CONSEQUENCES  
MENTATION/COGNITION IMPACT/CONSEQUENCES  
IMPAIRMENTS AT BODY STRUCTURE/FUNCTIONS

PERSONAL AND ENVIRONMENTAL FACTORS → FUNCTIONAL CONSEQUENCES (ACTIVITY LIMITATIONS)

PROGNOSIS FOR FUNCTIONAL AND PARTICIPATION RECOVERY AND PATIENT'S GOALS

TRiage TO THE NEXT LEVEL OF CARE

COLLABORATION/CONSULTATION/REFERRAL

Plan of Care/Interventions

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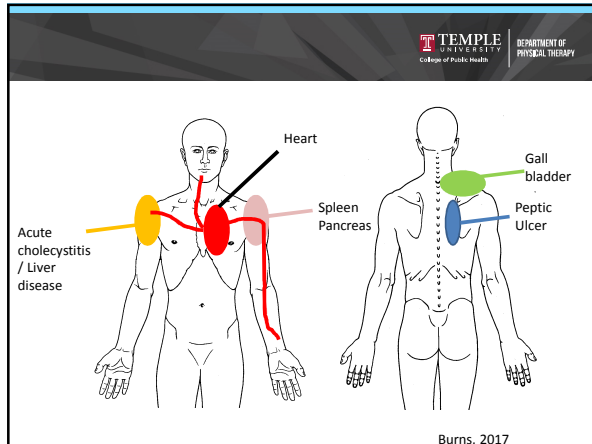
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### Application

**Salter-Harris Fracture of the Proximal Humerus in an Adolescent Gymnast**

- 13 year old female presents direct access to PT with suspected labral tear
- Lack of progress and ongoing symptoms warrants referral out

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### 'When you hear hoofbeats, think horses not zebras'

Review

Red flag screening for low back pain: nothing to see here, move along: a narrative review

Chad E Cook,<sup>1,2</sup> Steven Z George,<sup>2,3</sup> Michael P Reiman<sup>2,4</sup>

- Focus of paper is re: LBP, but there may be insight to gain for shoulder pain
- Critical of true screening of red flags, variability of definitions, clinician application
- Recommendation for watchful waiting, linking symptomology with health status, enhancement of value-based care

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**Shoulder Symptom Modification Procedure**

Lewis 2009; Lewis et al 2016; Meakins et al 2018

**Application of the McKenzie system of Mechanical Diagnosis and Therapy (MDT) in patients with shoulder pain; a prospective longitudinal study**

Afshin Heidar Abady<sup>1</sup>, Richard Rosedale<sup>2</sup>, Bert M Chesworth<sup>3,4</sup>, Michael A Rotondi<sup>5</sup>, Tom J Overend<sup>6</sup>

Abady et al JMMT 2017

- Many alternatives have been developed
  - No premiere method
  - Reliability and validity?

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### Staged Approach for Rehabilitation of Shoulder Disorders (STAR)

- Proposed classification system for shoulder disorders via pathoanatomical diagnosis, and a rehabilitation algorithm based upon irritability and impairments
- Seeks to guide conservative management for heterogeneous population diagnosed with shoulder pain
  - McClure and Michener 2015

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**Staged Approach for Rehabilitation of Shoulder Disorders**

Complaint of "Shoulder Symptom"

Level 1: Screening  
History, Basic Physical Examination, Red or Yellow Flags

Appropriate for Physical Therapy | Appropriate for Physical Therapy and Referral | Not Appropriate for Physical Therapy

Level 2: Pathoanatomic Diagnosis  
Specific Physical Examination

Shoulder Origin of Symptoms | Nonshoulder Origin of Symptoms

Subacromial Pain Syndrome | Adhesive Capsulitis | Glenohumeral Instability | Other

Level 3: Rehabilitation Classification  
(1) Tissue Irritability (Guides Intensity of Physical Stress)  
(2) Impairments (Guides Specific Intervention Tactics)

High Irritability and Identified Impairments | Moderate Irritability and Identified Impairments | Low Irritability and Identified Impairments

**Figure.**  
Overall system for classification incorporating screening, pathoanatomic diagnosis, and rehabilitation classification. The specific pathoanatomic diagnoses shown at level 2 are only given as common examples; these are not meant to represent a complete list. For clarity, pathoanatomic diagnosis and rehabilitation classification are listed sequentially. However, they both are derived primarily from the history and physical examination and, in practice, likely occur in parallel rather than sequentially.

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### Biopsychosocial Framework

- Prognosis affected by:
  - Anxiety
  - Depression
  - Stress
  - Fear avoidance
  - Maladaptive beliefs
  - High baseline pain
  - High perceived disability
  - Opioid use
  - Low locus of control

George et al 2016; Wolfensberger et al 2016; Jull 2017; Rhon et al 2019

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### Evidence Update RE: Common Dx

- Literature update:
  - SAPS, Rotator cuff related shoulder pain
  - Adhesive capsulitis
  - Glenohumeral instability
  - Other:
    - Post-op highlights

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### Shoulder pain: can one label satisfy everyone and everything?

Ann M Cools,<sup>1</sup> Lori A Michener<sup>2</sup>

SAI ←→ PTRTC

- One label is difficult to capture SPS, rotator cuff disease, rotator cuff-related shoulder pain, etc.
- Non-traumatic shoulder pain is multifactorial
  - Tendon-people, scapula-people, SSMP-people lens
  - Not one umbrella, but many smaller umbrellas
- Call to movement expert background with broad characteristics based on impairments

BJSM, 2017

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### Clinical Practice Guideline: SAPS

- Dutch Orthopedic Assoc. 2014
  - Preferably treated conservatively
    - No convincing evidence surgical treatment > conservative
    - No indication for surgery for asymptomatic RTC tear
  - Exercise therapy: specific, low intensity, high frequency exercise, attention to relaxation and posture can be considered
    - Consideration for pain perpetuating behavior
  - Diagnosis only made on combination of clinical tests
  - Acute pain can be treated with analgesics if necessary

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### Clinical Practice Guideline: SAPS

- Dutch Orthopedic Assoc. 2014
  - Diagnostic imaging (ultrasound) useful for persistent symptoms
  - Occupational modifications appropriate post 6 weeks
  - >3 months poorer prognosis, modified by psychological variables

Diercks et al 2014

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### Appropriate care for orthopedic patients: effect of implementation of the Clinical Practice Guideline for Diagnosis and Treatment of Subacromial Pain Syndrome in the Netherlands

Egbert J D Veen, Martin Stevens, Cornelis T Koorevaar & Ron L Diercks

Year	Tendonitis/Impingement (%)	Rotator cuff tear (%)
2012	~15	~35
2013	~15	~35
2014	~12	~32
2015	~10	~28
2016	~8	~25

- 5 year follow up post CPG
  - Statistically significant drop in SAPS (37%) and RCR (17%) surgery
- Shift likely in combination with other literature produced re: surgical, sham, non-op

APTA CPG ROTATOR CUFF IN DEVELOPMENT

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## Intervention Strategy



- Exercise effective for short term recovery and long term functional benefit (low quality evidence)
  - Exercise + MT > Exercise alone
  - Exercise + MT similar to CSI at 4wk-12mo
- No benefit of surgery vs. sham vs. conservative management
- Combination of RTC, scapular, ROM and stretching effective strategy
  - Specific vs. general?
  - Conflicting for pain, function, PROs for scapular-focused
- Little additive benefit of modalities

Ellenbecker and Cooks 2010; Hanratty et al 2012; Green et al 2013; Page et al 2016; Reijnenveld et al 2017; Shire et al 2017; Board et al 2018

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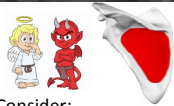
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## Scapular Dyskinesia: Much Ado About Nothing?

- Mainstay in laboratory and clinical research
- BUT
  - Present in painful and non-painful shoulders
    - Biased by knowledge of pain
  - Poor reliability among assessors
  - Degree of dyskinesia may not change with improvement in pain and function
  - Biomechanical plausibility ≠ clinical efficacy



- Consider:
  - All movement strategies are helpful, not just one
  - Pain modulation via symptom modification
  - Alternative for load progression

McClure et al 2009; Tate et al 2009; Tate et al 2009; Morais and Pascoal 2013; McQuade et al 2016; Plummer et al 2017; Haugsboe et al 2018

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## Prognostic Triage for Shoulder Pain

- Chester et al, BJSM, 2019
  - Regression tree model of 34 variables
  - Predictors (3) of 6 month outcomes
    - Baseline pain and disability level
    - Pain self-efficacy via PSEQ
    - Patient expectation for improvement
  - Implication: Inclusion as part of patient history and PROs

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## Patients' Beliefs and Understanding

- Gillespie et al, Musc Sci and Prac, 2017
  - *Understanding the pain*
    - What I think is happening, how it happened?
  - *It affects everything*
    - Role impacting ADLs, sleep, and cognition
  - *Pain-associated behaviors*
    - Avoidance and adaptation
    - Life 'goes on'
  - *Emotional response and the future*
    - Individual response and concern
    - Locus of control

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## Adhesive Capsulitis

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- Kelley et al, JOSPT, 2013

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

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## Adhesive Capsulitis: CPG

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- Assess for impairments in capsuloligamentous complex and musculotendinous structures (Foundational evidence)
  - Loss of gross GH PROM, GH ER at 0°-varying AB°
- More prevalent in 40-65 yo female with previous episode in contralateral arm; diabetes mellitus and thyroid disease (Moderate evidence)
- Continuum of 12-18 months, mild-moderate mobility and pain may persist (Weak evidence)
- Examination:
  - Pain
  - AROM, PROM
  - GH joint accessory motion

MAY 2012 | VOLUME 42 | NUMBER 5 | JOURNAL OF ORTHOPAEDIC & SPORTS PHYSICAL THERAPY

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CLINICAL GUIDELINES

## Adhesive Capsulitis: CPG Interventions

- Intervention
  - **CSI:** CSI+mobility/stretching>mobility/stretching in providing short term pain relief (4-6 weeks) (Strong evidence, A)
  - **Patient education** should include disease course, activity modification, and appropriately matched intervention based on irritability (Moderate evidence, B)
  - **Modalities** have weak evidence © for SWD, US, ES + ROM exercise to reduce pain and improve ROM
  - **Joint mobilization** directed to GH joint may be utilized (Weak evidence, C)
  - **Stretching/mobility** exercises that consider irritability levels should be utilized (Moderate evidence, B)

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## Familiar Approach

Evaluation/Intervention Component 4: Intervention strategies for shoulder pain and mobility deficits

High Irritability	Moderate Irritability	Low Irritability
<p><b>Modalities:</b></p> <ul style="list-style-type: none"> <li>• Heat for pain modulation</li> <li>• Electrical stimulation for pain modulation</li> </ul> <p><b>Self-care/home management training:</b></p> <ul style="list-style-type: none"> <li>• Patient education on positions of comfort and activity modifications to limit tissue inflammation and pain</li> </ul> <p><b>Manual therapy:</b></p> <ul style="list-style-type: none"> <li>• Low-intensity joint mobilization procedures in the pain-free accessory ranges and glenohumeral positions</li> <li>• Pain-free passive ROM exercises</li> <li>• Pain-free active assisted ROM exercises</li> </ul>	<p><b>Modalities:</b></p> <ul style="list-style-type: none"> <li>• Heat for pain modulation as needed</li> <li>• Electrical stimulation for pain modulation as needed</li> </ul> <p><b>Self-care/home management training:</b></p> <ul style="list-style-type: none"> <li>• Patient education on progressing activities to gain motion and function without producing tissue inflammation and pain</li> </ul> <p><b>Manual therapy:</b></p> <ul style="list-style-type: none"> <li>• Moderate-intensity joint mobilization procedures, progressing amplitude and duration of procedures into tissue resistance without producing posttreatment tissue inflammation and associated pain</li> <li>• Gentle to moderate stretching exercises, progressing the intensity and duration of the stretches into tissue resistance without producing posttreatment tissue inflammation and associated pain</li> </ul> <p><b>Neuromuscular re-education:</b></p> <ul style="list-style-type: none"> <li>• Procedures to integrate gains in mobility into normal scapulohumeral movement while performing reaching activities</li> </ul>	<p><b>Self-care/home management training:</b></p> <ul style="list-style-type: none"> <li>• Patient education on progression to performing high-demand functional and/or recreational activities</li> </ul> <p><b>Manual therapy:</b></p> <ul style="list-style-type: none"> <li>• End-range joint mobilization procedures, high amplitude and long duration of procedures into tissue resistance</li> </ul> <p><b>Stretching exercises:</b></p> <ul style="list-style-type: none"> <li>• Stretching exercises, progressing the duration of the stretches into tissue resistance without producing posttreatment tissue inflammation and associated pain</li> </ul> <p><b>Neuromuscular re-education:</b></p> <ul style="list-style-type: none"> <li>• Procedures to integrate gains in mobility into normal scapulohumeral movement during performance of the activities performed by the patient during his/her functional and/or recreational activities</li> </ul>

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## Case Application

- Duenas et al, JOSPT, 2019
  - 11 patients with FSCS
  - Measures assessed baseline, posttreatment, 6 mo, 9 mo
  - Individually tailored, multimodal program of manual therapy and home stretching program
  - Clinically meaningful change in pain, disability, ROM, and muscle strength

FIGURE 2. Scores on the DASH over time for each patient. Abbreviation: DASH, Disabilities of the Arm, Shoulder and Hand questionnaire.

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**TABLE 3 TREATMENT PROGRESSION AND OUTCOMES**

Treatment Phase	Week	NWS (Std. Error)	AROM			P
			Flexion	Abduction	ER	
Initial exam	0	370.33/30	61	33	7	5-10g
Neuroscience education	1	370.37/30	82	38	12	5-10g
Latency	2	470.67/30	97	43	17	15
Motor re-imagery	3	370.67/30	108	50	25	1.3
Motor therapy	4	370.67/30	122	62	34	1.3
Scale discrimination	5	370.47/30	139	70	38	1.2
CTMT	6	270.33/30	125	79	42	1.1
CT and shoulder MT	7	170.37/30	142	90	49	1.2
MT plus re-imagery	8	070.37/30	154	100	52	1.0

Abbreviations: AROM, active range of motion; CT, computerized; ER, external rotation; ER, internal rotation; MT, manual therapy; NWS, numeric pain-rating scale; SE, standard error. Values are degrees unless otherwise indicated. Values are mean (SD).

**Use of Pain Neuroscience Education, Tactile Discrimination, and Graded Motor Imagery in an Individual With Frozen Shoulder**

**FIGURE 8.** Outcome measures. Abbreviations: FABQ-PA, Fear-Avoidance Beliefs Questionnaire physical activity subscale; FABQ-W, Fear-Avoidance Beliefs Questionnaire work subscale; SPADI, Shoulder Pain and Disability Index.

Sawyer et al 2018; Louw et al 2019

- Case study of multimodal program, including PNE and GMI
- 20 visits over 12 weeks
- Clinically meaningful gains in SPADI, resting pain, and fear-avoidance beliefs

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## Instability

- Conservative management evidence spans evidence spectrum
  - Release of CPG from APTA/Ortho Section forthcoming
- Reliant on mixture of high quality evidence and expert opinion for guidance
  - Areas of strength, areas of improvement
- Common shoulder disorder within general population, particular emphasis on active/sporting groups
  - 23 per 100,000 person
  - 26-92% recurrence
    - Heterogeneous populations in studies

➔ Important area for continued study

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Postacchini et al 2000; Owens et al 2009; Leroux et al 2014; Olds et al 2019

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## Organizing Instability

**FREQUENCY**  
Solitary – “1 Episode”  
Occasional – “2-3 Episodes”  
Frequent – “>5 Episodes”

**ETIOLOGY**  
Traumatic – History of injury  
Atraumatic – No history of injury

**DIRECTION (PRIMARY)** Determined by provocative testing  
Anterior  
Inferior  
Posterior

**SEVERITY**  
Subluxation – Reduced without help  
Dislocation – Required help to reduce

Figure 1. FIEDS system for Classifying Glenohumeral Joint Instability. The FIEDS acronym stands for Frequency, Etiology, Direction, and Severity. Each component of the FIEDS system is subdivided into different descriptions. The descriptions are indicated and defined. One description from each component would be used to describe an individual patient. For example: Solitary, Traumatic, Anterior, Dislocation would be one type of instability.

- FIEDS Classification
  - Simple, reproducible classification system to better guide research
  - Patient, MD perceptions
  - Valid, reliable for GHI
  - STAD, OTAD 41.2%

Kuhn et al 2011; Hettrich et al 2019

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### Anterior Instability: Highlights

- Age, bony Bankart lesion, immobilization status, dominance of affected shoulder, fear of reinjury, and pain and disability level predictive of recurrent GHI at 1 year
- Recurrence rate likely not higher risk based on immobilization duration
- No preferred immobilization position to reduce recurrent rate (IR v. ER)

Kuhn 2006; Handoll et al 2006; Whelan et al 2015; Dugas and Crozier 2018; Kraeutler et al 2018; Olds et al 2019

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### Anterior Instability: Highlights

- Insufficient evidence to recommend conservative v. surgery for general population
  - Limited support for surgery in young, male, physically active, but most commonly undergo surgery
  - Spiegl et al, algorithm: Conservative small defect, Surgery for medium-large defects
- Focus re: strategy using ROM, strength, motor control, bracing
- Shanley et al, 2019
  - 82/97 scholastic athletes return to same sport without reinjury for at least one full season with conservative management

Handoll and Al-Maiyah 2004; Kraeutler et al 2018; Shanley et al 2019

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### Multidirectional Instability: Highlights

- Exercise effective for improving kinematics, Rowe score, status rating, and strength, but very low quality evidence
  - Watson MDI program > Rockwood loading on WOSI at 12, 24 weeks
- Low grade evidence for conservative v. surgery
  - EX > Sx re: PROs, Sx > EX re: RTS and kinematics
  - High levels of bias, study variability

Warby et al 2014; Warby et al 2016; Best and Tanaka 2018

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**Opioid Use**

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- ...but there are a few shining options for shoulder post-op populations
  - Order of treatment (MT+EX) and timing of treatment (< 30 days) significantly reduces cost, visits, and opioid use within one year
  - Pre-op narcotic education reduces use, earlier cessation of use by 3 months post RCR
  - Improved means for recognizing psychosocial variables to guide treatment

Sved et al 2018; Thorpe et al 2018; Rhon et al 2019

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**What's In a Surgery Anyway?**

- A thorough overview of *all* shoulder procedures is likely beyond the scope of one presentation
- While controversial, many sham procedures have been conducted re: shoulder disorders
  - Long term outcomes conservative v. surgery
    - False impression of true efficacy?
  - Non-specific effects of surgery
    - Placebo
    - Natural history of patient condition
    - Surgical rituals

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**Sham Outcomes**

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- Modest effect size in smaller studies, small difference between groups across all sham procedures (Jonas et al, 2015)
- No clinically important difference
  - Subacromial decompression (Karjalainen et al, 2019; Khan et al 2019)
  - Type II SLAP lesion (Schroder et al 2017)
  - Biceps tenodesis (Schroder et al 2017)

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**Take Away**

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- Non-operative procedures have a good prognosis long term
  - Reinforce with higher quality research to optimize conservative outcomes
- Better patient education process
- Triage for identification of who actually benefits from surgery

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**Evidence Update for Shoulder Disorders**

- Clinical practice guidelines provide physical therapists with evidence-based rationale to addressing musculoskeletal conditions
- All healthcare professionals are challenged to generate evidence for best management strategies
- The contemporary physical therapist must remain up to date across all domains of management for shoulder disorders

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**What Impression Are We Giving Our Patients?**

**A TRIP TO THE PHYSIO...**

"Let's figure out this shoulder pain."

@hannahmoves hm

**Recommendations for SHOULDER PAIN**

From Physical Therapy 2018 (1) with Dr. Jeremy Lewis.

1. Psychological factors are a red flag for chronic shoulder pain. Screen for people with shoulder pain.
2. Screen for red flags: Cervical radiculopathy, thoracic outlet syndrome, cardiac disease, pulmonary embolism, and malignancy.
3. Screen for red flags: Cervical radiculopathy, thoracic outlet syndrome, cardiac disease, pulmonary embolism, and malignancy.
4. Screen for red flags: Cervical radiculopathy, thoracic outlet syndrome, cardiac disease, pulmonary embolism, and malignancy.
5. Screen for red flags: Cervical radiculopathy, thoracic outlet syndrome, cardiac disease, pulmonary embolism, and malignancy.
6. Screen for red flags: Cervical radiculopathy, thoracic outlet syndrome, cardiac disease, pulmonary embolism, and malignancy.
7. EMG/ultrasound may be helpful to determine if the problem is a rotator cuff tear or a full-thickness tear.
8. The strength of EMG/ultrasound may be helpful to determine if the problem is a rotator cuff tear or a full-thickness tear.
9. EMG/ultrasound may be helpful to determine if the problem is a rotator cuff tear or a full-thickness tear.
10. EMG/ultrasound may be helpful to determine if the problem is a rotator cuff tear or a full-thickness tear.
11. EMG/ultrasound may be helpful to determine if the problem is a rotator cuff tear or a full-thickness tear.

EMG/ultrasound may be helpful to determine if the problem is a rotator cuff tear or a full-thickness tear.

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Questions?



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