Orthopaedic Section
National Orthopaedic Physical Therapy Outcomes Database

Shoulder Disorders Project

Manual of Operations and Procedures
9/25/15

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INTRODUCTION

One of the objectives in the Orthopaedic Section Strategic Plan is to develop a National Orthopaedic Physical Therapy Outcomes Database (NOPTOD). The purpose of the NOPTOD is to provide clinicians with a tool that they can use to assess their clinical performance. Additionally, information accumulated in the NOPTOD can be used to describe orthopaedic physical therapy practice and to provide evidence of the value of orthopaedic physical therapy.

As the first step in the development of the NOPTOD, the Orthopaedic Section is conducting a 6-month pilot project to collect and analyze clinical and process outcome data for patients with shoulder disorders. The purpose of this pilot project is to demonstrate the feasibility of collecting and analyzing outcomes data as well as to determine the usefulness of the information to enhance clinician performance and to establish the value of orthopaedic physical therapy. The results of the pilot study will be used to plan and determine the resources needed for an electronic data capture and analysis system for the NOPTOD. Ultimately, the NOPTOD will be a repository for clinical and process outcomes data for the most common conditions treated by orthopaedic physical therapists.

The shoulder disorders project will be done using paper-based data collection forms. Data that will be collected includes information related to episode of care (duration of care, number of visits), patient characteristics (age, sex, height, weight, comorbidities), symptoms, examination findings, treatment classification, interventions, and outcomes (Penn Shoulder Score, numeric pain rating scale). Completed forms will be submitted to the Orthopaedic Section office for data entry and analysis. The data will be summarized to determine completeness of data collection, accuracy of the treatment classification, adherence to evidence-based treatment guidelines, and an assessment of patient outcomes. A summary of personal results will be provided to all Section members that contribute cases to the outcomes database. Additionally, to permit comparison with peers across the country, a summary will be provided to compare an individual's results with the results of all others that submitted data to the outcomes database. All results will be reported anonymously.

Participation in this project is voluntary and open to all physical therapist members of the Orthopaedic Section. Individuals wishing to participate in the project should submit a registration form to the Orthopaedic Section office. The registration form includes the physical therapist's name, date of entry level degree, advanced degrees, completion of residencies and/or fellowships, ABPTS specialist certification, and practice setting and address. Once the registration form is submitted, the Orthopaedic Section office will assign physical therapist and practice identification numbers that are to be included on the individual case report forms for each patient submitted to the database.

The period for collecting and reporting data for the shoulder disorders project will run from October 1, 2015 to March 31, 2016. **Data should be collected and recorded throughout the course of care provided to patients.** Retrospective chart reviews of patients treated prior to the data collection period should not be included in the project. To protect patient confidentiality, no patient identifiers should be included on the data collection forms. Completed forms will be submitted to the Orthopaedic Section office, where the Section staff will input the data into an electronic database

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REGISTRATION FORM

To participate in the shoulder disorders project, members of the Orthopaedic Section must complete and submit a Registration Form to the Orthopaedic Section office. Upon receipt and review of the registration form, the Orthopaedic Section will issue a physical therapist identification number as well as a clinic/facility identification number. These numbers will be placed on individualized Case Report Forms that will be sent to you for your use to submit data to the NOPTOD.

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SHOULDER DISORDERS CASE DOCUMENTATION FORM

A separate Case Documentation Form should be completed for each patient that is submitted to the database. **DO NOT INCLUDE ANY PATIENT IDENTIFICATION INFORMATION ON THE FORM.** Instructions for completing the form are as follows:

Identification Information

The Section office will send individuals participating in the pilot project a file that contains 10 Shoulder Disorders Case Documentation Forms ready to use. They will each have the PT Clinic ID, Physical Therapist ID, and separate Patient ID number. Each patient will have one documentation form. Patient ID numbers will start at 001 and be numbered consecutively to 010. **DO NOT** include the patient's name, social security number, medical record number or any other identifying information on the form. Be sure to use the Shoulder Disorders Case Documentation Forms that were provided to you by the Orthopaedic Section office that have **your** individual clinic/facility and physical therapist identification numbers. Do not use Shoulder Disorders Case Documentation Forms that were designated for other physical therapists. If you need additional Shoulder Disorders Case Documentation Forms, please contact the Orthopaedic Section office.

Patient Characteristics

Enter the following information:

- Patient age (in years)
- Gender
- Height (in inches)
- Weight (in pounds)
- Ethnicity and race (as described by the US Census Bureau)
- Insurance type
- Presence of comorbidities including a history of diabetes, thyroid disease, cardiac disease
- Total number of comorbidities (none, 1 to 3, or greater than 3)
    - Arthritis, broken bones/fracture, cancer, cardiac disease, circulation/vascular problems, degenerative joint disease, diabetes, head injury, hypertension, infectious diseases, neurologic diseases, obesity, osteoporosis, chronic pain, pediatric congenital condition, peripheral neuropathy, psychiatric disorder, respiratory disease, spinal cord injury, skin disease, stroke, thyroid disease, etc.
- Current smoker
- Current narcotic use
- Current NSAID use
- History of corticosteroid injection (less than 30 days ago, more than 30 days ago, or none)
- History of dislocation/subluxation

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- Is surgery the reason for current episode of care?
    - If yes, complete the next 2 columns (Non-surgical AND Surgical)
    - If no, complete just the non-surgical column and skip the surgical column
- Onset date (Enter exact date if known. If only the month is known, enter the first day of the month [i.e., injury in March of 2015 is entered 03/01/2015]. If only the year is known, enter the 1st day of the year [i.e., injury was in 2008, onset date should be recorded as 01/01/2008])
- Onset mechanism
- Recurrent problem
- Surgery date (Enter exact date in dd/mm/yyyy format)
- Surgery (Check type of primary surgery for the ipsilateral shoulder for this episode of care)

Page Two

Enter the following information from the initial exam.

Symptoms

Record the presence or absence of each symptom at the initial visit. If the symptom was not assessed or recorded, indicate that the symptom was "not tested" (NT). See **SYMPTOMS** on page 12 for the operational definition for each symptom.

Examination Findings

Record positive and negative examination findings at the initial visit. If the examination procedure was not assessed or recorded, indicate that it was "not tested" (NT). See **EXAMINATION FINDINGS** on page 14 for the operational definition, technique, and method of determining a positive and negative result for each examination procedure.

Pathoanatomic Classification

Record the pathoanatomic classification for the patient based upon your evaluation of the patient's symptoms and examination findings. The classification should be determined during the initial visit. The pathoanatomic classification will remain constant throughout the duration of care. It is also understood that a patient may fit into more than one classification category; however, record only the primary classification that directed the intervention for the episode of care. See **CLASSIFICATION** on page 25 for the operational definition of each classification including the criteria for classification based on the patient's symptoms and examination findings.

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Page Three

Episode

Enter dates for start of care, end of care, and total number of visits over the episode of care. The format for entering all dates is mm/dd/yyyy. Indicate if the patient was discharged by the physical therapist at the end of care, discharged to have surgery, or if the patient terminated treatment on their own.

Weekly Reporting

Enter the date for the start of each week of treatment.

Indicate if the patient was not scheduled during the week, if the patient was discharged by the physical therapist or if the patient terminated his/her own treatment by checking the box in the column for that week. The box should be checked if the patient was not seen during the week for any 3 of these reasons.

Irritability Classification

Record the irritability classification for the patient based upon your evaluation of the patient's symptoms and examination findings. The classification should be determined during the initial visit as well as weekly throughout the patient's duration of care. The irritability classification can change over the duration of care. See **CLASSIFICATION** on page 28 for the operational definition of each classification based on the patient's symptoms and examination findings.

Interventions

Record the **number** of days each intervention was provided during each week of treatment. "Initial" treatment should include all of the interventions that were provided to the patient during the initial week of treatment. Interventions provided in subsequent weeks (i.e., week 2, week 3, etc.) should include all interventions provided during each week of treatment. If a patient was treated beyond 6 weeks, record the total number of times each treatment was provided beyond 6 weeks to the end of care in the column labeled "DC" (discharge). (See Figure on page 10) See **INTERVENTION STRATEGIES** on page 29 for an operational definition of each intervention.

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So, <u>for example</u>, if you did resistive exercise on two visits within week 2, you would put a "2" in that cell (1 for each day). Regardless of how many individual exercises the patient did each visit. Obviously, more than 1 intervention type may occur each visit so if you also did end-range joint mobilization on both visits, you would mark as below

Episode of Care Summary

Start of Care Date (mm/dd/yyyy): __ / __ / __	End of Care Date (mm/dd/yyyy): __ / __ / __	# of Visits: _____
End of care status (select one): ❑ Discharged by PT	❑ Discharged to Surgery	❑ Patient terminated treatment

Weekly Reporting

Date: (mm/dd/yyyy)							
Not Scheduled/Discharged/Terminated Treatment:		❑	❑	❑	❑	❑	❑
	Initial	**Wk 2**	**Wk 3**	**Wk 4**	**Wk 5**	**Wk 6**	**DC**
Irritability Classification: (check primary category only)	❑ High ❑ Moderate ❑ Low	❑ High ❑ Moderate ❑ Low	❑ High ❑ Moderate ❑ Low	❑ High ❑ Moderate ❑ Low	❑ High ❑ Moderate ❑ Low	❑ High ❑ Moderate ❑ Low	❑ High ❑ Moderate ❑ Low
Patient demonstrates adherence to instructions	❑ Y ❑ N ❑ NT	❑ Y ❑ N ❑ NT	❑ Y ❑ N ❑ NT	❑ Y ❑ N ❑ NT	❑ Y ❑ N ❑ NT	❑ Y ❑ N ❑ NT	❑ Y ❑ N ❑ NT
INTERVENTIONS (record number of days intervention is provided each week)	**Initial Wk**	**Wk 2**	**Wk 3**	**Wk 4**	**Wk 5**	**Wk 6**	**DC**
Shoulder: Joint Mobilization – Non-end range							
Shoulder: Joint Mobilization – End range		2					
Spinal Mobilization (Non-thrust)							
Spinal Manipulation (Thrust)							
Manual Soft Tissue Mobilization							
Instrumented Soft Tissue Mobilization							
Dry Needling							
ROM Exercises (non-end range)							
ROM Exercises (end range)							
ROM/Stretching Exercises (overpressure/long duration)							
Neuromuscular Control/Coordination Training		2					
Resistive Strength Training Exercises (including isometric)							
Taping/Strapping							
Patient Education/Activity Modification							
Therapeutic Ultrasound							
Electrical agents (e-stim, light, laser)							
OUTCOMES	**Initial**	**Wk 2**	**Wk 3**	**Wk 4**	**Wk 5**	**Wk 6**	**DC**
Penn Shoulder Score (0 to 100, 0 worst)							
Pain with normal activities (eating, dressing, bathing)? (0-10, 10 worst)							

Outcomes

Complete the Penn Shoulder Score form and record the Penn Shoulder Score (function subscale) (0 to 100, lower scores indicating greater disability) and Pain with normal activities (eating, dressing, bathing) (0 to 10, 10 worst) at the initial visit and weekly throughout the duration of care and at the end of care (i.e., DC). If the patient was discharged before the end of 6 weeks, the last values for the last outcome measures should be transferred forward to the "DC" column. If the patient was treated beyond 6 weeks, record the values for the outcome measurements at the end of care in the column labelled "DC" (discharge). See **OUTCOMES** on page 32 for a description of the outcome measures.

SUBMISSION OF CASE REPORT FORMS

Data should be collected and recorded throughout the course of care provided to patients. **Completed case report forms should be forwarded to the Orthopaedic Section office. Forms may be scanned and e-mailed, faxed, or sent by the US Postal Service. It is preferred that you submit the Case Report Forms soon after the end of care. However, if you prefer to send completed case report forms monthly or at the end of the data collection period, that is acceptable as well.**

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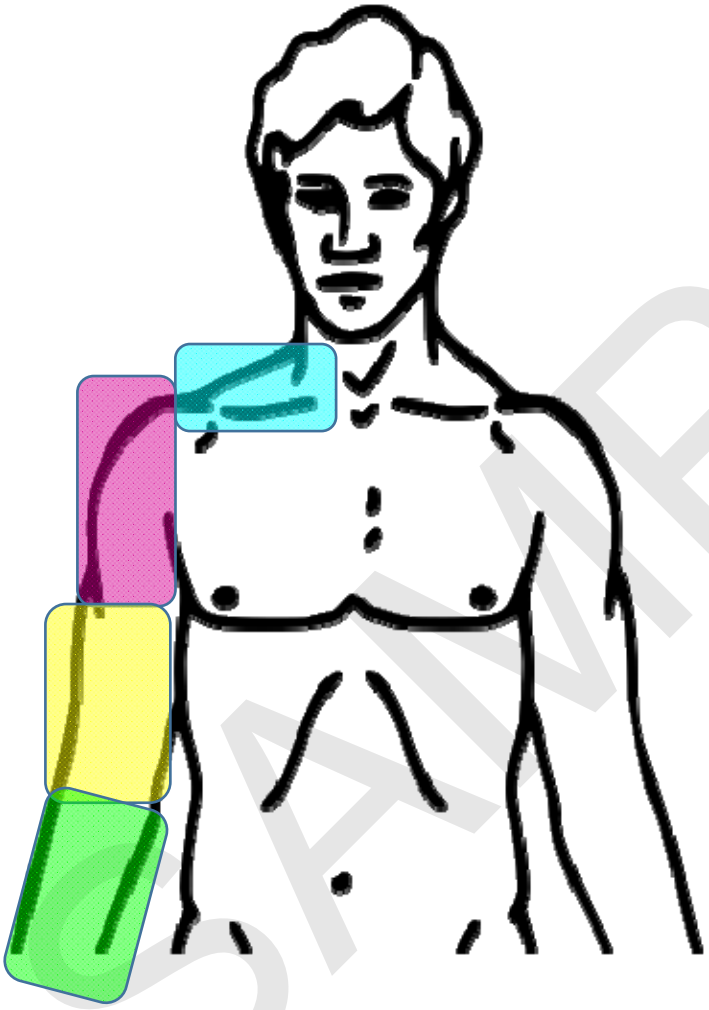
SYMPTOMS

1. **Location of Most Distal Pain**
   Questioning of the patient should determine the most distal aspect of pain. The most distal aspect of pain will be recorded as:

   Above Acromion (AA) – proximal to the acromion (in blue)
   Proximal Humerus (PH) – the proximal ½ of the humerus (in pink)
   Distal Humerus (DH) – the distal ½ of the humerus (in yellow)
   Distal to Elbow (DE) – distal to the humero-ulnar joint (in green)



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2. **Progressive Worsening of Shoulder Pain and Stiffness**
   Questioning of the patient should include questions to determine if pain and stiffness in the shoulder has been progressively worsening.

3. **Night or Resting Pain**
   Questioning of the patient should determine the presence of shoulder pain at night or while at rest.

4. **Functional limitation with ADLs**
   Questioning of the patient should include questions to determine if the shoulder pain results in functional limitations with activities of daily living (ADLs).

5. **Functional limitation with work duties**
   Questioning of the patient should include questions to determine if the shoulder pain results in functional limitations with work, school, or housework duties.

6. **Functional limitation with strenuous activity/sport**
   Questioning of the patient should include questions to determine if the shoulder pain results in functional limitations with strenuous activity such as heavy lifting or sport.

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EXAMINATION FINDINGS

7. Positive Hawkins or Neer

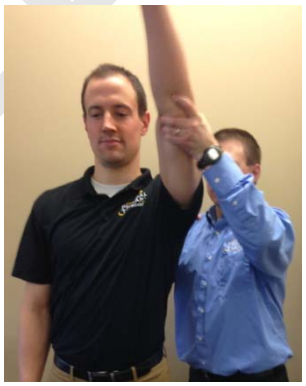
This category is positive if one or more (≥1) of the following tests are positive:

a. Hawkins

As described by Johansson and Ivarson,[1] the patient's arm is positioned in 90 degrees of flexion at the glenohumeral and elbow joint. The arm is then forcefully medially rotated by lower the forearm while simultaneously supporting the elbow. The test is considered positive when it reproduces the patient's symptoms.[1,2]

YouTube link – Hawkins[3]

b. Neer



As described by Michener et al.,[4] the examiner stabilizes the scapula with a downward force while fully flexing the humerus overhead while applying overpressure. The test is considered positive when it reproduces the patient's symptoms.[2,4]

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8. Positive Painful Resisted Elevation or External Rotation

This category is positive if one or more (≥1) of the following tests are positive:

a. Full Can (resisted elevation)

The patient is asked to elevate the shoulder to 90° in the scapular plane with the thumb pointing upward (forearm and shoulder in neutral). Examiner applies a downward force while instructing the patient to resist the applied force.[5] A positive test is indicated by weakness or reproduction of pain.[2]

b. Empty Can (Jobe's)

The patient is asked to elevate the shoulder to 90° in the scapular plane with the thumb pointing downward (forearm pronated and shoulder internally rotated). Examiner applies a downward force while instructing the patient to resist the applied force.[5] A positive test is indicated by weakness or reproduction of pain.[6]

YouTube link – Empty Can/Jobe's[7]

c. Resisted External Rotation Test

Patient sits or stands with the elbow at 90 degrees of flexion and the humerus in neutral rotation. The examiner stands just lateral to the arm being tested, and applies a medial rotation force that the patient resists.[6] Positive: Pain or an inability to resist a medial rotation force.[5,6]

YouTube link: Infraspinatus Test[8]

9. Positive Painful Arc

Patient is asked to actively elevate the arm in the scapular plane with elbows fully extended until full elevation was reached and then to bring the arm down in the same arc. The test was considered to be positive if the patient had pain or painful catching between 60° and 120° of elevation.[2,6]

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10. Rotator Cuff Tear Signs

This category is marked positive if one or more (≥1) of the following findings are present upon examination:

a. Drop Arm

Patient is seated or standing with the examiner to the front or back. The examiner asks the patient to elevate the arm fully and then to slowly reverse the motion in the same arc. If the arm drops suddenly or the patient has severe pain, the test is considered to be positive.[6]

YouTube link: Drop Arm Test[9]

b. ER lag sign

Patient is seated with arms at side. Examiner passively flexes the elbow to 90° and elevates the shoulder to 20° in the scapular plane. The examiner passively externally rotates the shoulder to 5° from full external rotation. Patient is asked to maintain that position when examiner releases the arm.[10] The test is repeated with the shoulder elevated to 90° while the examiner passively externally rotates the shoulder to 5° from full external rotation and releases. Test is positive if the patient is unable to hold the position.[11]

YouTube link: External Rotation Lag Sign[12]

c. IR lag sign

Patient is seated with arms at side. Examiner passively holds the patient's hand behind the lumbar region in full medial rotation. Patient is asked to maintain that position when examiner releases the arm.[11] Test is positive if the patient is unable to hold the position.[11]

YouTube link: Internal Rotation Lag Sign[13]

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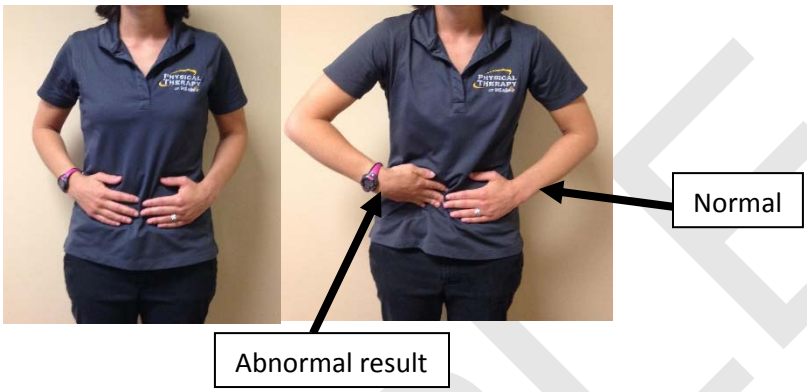
d. Belly Press test

The patient is standing or sitting with the hand flat on the abdomen and the arm adducted to the body. The patient is then asked to bring the elbow forward and straighten the wrist. The final flexion angle of the wrist is then measured by a goniometer or via visualization. The test was considered positive when the measured belly-press angle at the wrist showed a side-to-side difference of at least 10°.[14]



YouTube link: Belly Press Test[15]

e. Confirmation of full thickness rotator cuff tear on imaging

Confirmation of full thickness rotator cuff tear on imaging (MRI, ultrasound imaging, etc.) by a physical therapist or physician (i.e. not just patient report).

11. Labral signs

This category is marked positive if one or more (≥1) of the following findings are present upon examination:

a. Crank test

The patient is sitting or supine. The clinician elevates the patient's shoulder to 160° in the scapular plane. The clinician then applies an axial load on the humerus while internally and externally rotating the humerus. A positive test result is reproduction of the symptoms of pain, popping, or catching.[16]

YouTube link: Crank Test[17]

b. Anterior slide

The patient is sitting with hand on waist and thumb posterior (hands-on-hips position). The clinician stabilizes the scapula and clavicle with one hand and applied anterior-superior force at the elbow with the other hand. A pop or click localized to the anterior shoulder or reproduction of painful symptoms is a positive test result.[16]

YouTube link: Anterior Slide[18]

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c. Confirmation of labral tear on imaging

Confirmation of labral tear on imaging (MRI, ultrasound imaging, etc.) by a physical therapist or physician (i.e. not just patient report).

12. Scapular dyskinesis

Scapular dyskinesis evidenced by impaired scapular kinematics with shoulder elevation in any plane. This category is marked positive if one or more (≥1) of the following findings are present upon examination:

- Aberrant movement with shoulder elevation in any plane not attributable to glenohumeral tightness;
- Positive scapular reposition test (shown below in "a")
- Positive Scapular assistance test (shown below in "b") or immediate improvement in symptoms with verbal cueing to alter movement. (>2 point decrease on Numeric Pain Rating Scale)

a. Scapular Repositioning Test

The scapular repositioning test (SRT) is performed if there is pain with elevation. The examiner places a finger just anterior to the acromioclavicular joint and resting the palm and thenar eminence along the spine of the scapula and the forearm angled obliquely toward the inferior angle of the scapula. The examiner places a moderate force to tilt the scapula posteriorly and into external rotation (medial border and inferior angle are guided anteriorly toward the thorax). The aim of the test is to reposition the scapula in mid-position and thus end range retraction must be avoided. The test is positive if application of the SRT decreases (>2 points on 0-10 NPRS) or eliminates pain during an impingement provocation test that originally produced symptoms.[19]

b. Scapular Assistance Test

The scapular assistance test is used to assess scapular stabilization and muscular control of the scapula during elevation. As described by Kibler[20], the test is performed if there is pain with elevation. The examiner places their hands on the inferior medial aspect of the scapula and superior base of the scapula. The examiner then provides an upward rotation assistance through the scapula while the patient actively elevates the arm in either the scapular or sagittal plane. A positive test is increased range of motion or decreased pain by > 2 points on 0-10 NPRS.[21-23]

YouTube link – Scapular Assistance test[24]

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13. Weakness/Decreased force production

Weakness is recorded when there is a decrease in force production in either elevation or external rotation with ≤4/5 manual muscle strength testing (MMT) or ≥20% deficit when compared to the contralateral side with repetition maximum testing (RM) or dynamometry testing.

a. **Elevation**[25]

With the patient seated or standing, place their arm at approximately 90 degrees of shoulder elevation in the scapular plane. Ensure that the patient's feet are supported if sitting. Then, the examiner places their hand on the distal portion of the upper extremity and applies a downward force. This is a "break test," therefore instruct the patient "do not let me move you."

b. **External rotation**[25]

With the patient seated or standing, and their feet firmly supported on the surface, place their arm to their side, and position the elbow in 90 degrees of flexion, and forearm in neutral pronation/supination. Instruct the patient "do not let me move you" and apply a medial force causing them to recruit their external rotators to resist the force.

14. Positive upper limb tension test

Patient lies supine with arms at the side. Examiner stands on the side of the test arm and systematically applies the following movements to the upper quarter:

a. Upper Limb Tension Test A (ULTT A, median nerve bias)[26]
    a. Scapular depression
    b. Shoulder abduction
    c. Forearm supination
    d. Wrist and finger extension
    e. Shoulder lateral rotation
    f. Elbow extension
    g. Contralateral/ipsilateral cervical sidebending

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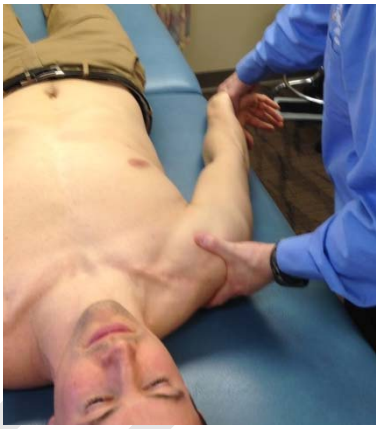
b. Upper Limb Tension Test B (ULTT B, radial nerve bias)[26]



   a. Scapular depression
   b. Shoulder medial rotation
   c. Full elbow extension
   d. Wrist and finger flexion
   e. Contralateral/ipsilateral cervical sidebending

The test is positive when any of the following are present:[26]

- Patient symptoms reproduced
- Side-to-side difference of >10° in:
  - ULTT A – elbow extension or
  - ULTT B – wrist flexion
- Contralateral cervical sidebending increases symptoms or ipsilateral sidebending decreases symptoms

YouTube links – Upper Limb Tension Test A;[27] Upper Limb Tension Test B[28]

15. Positive apprehension test

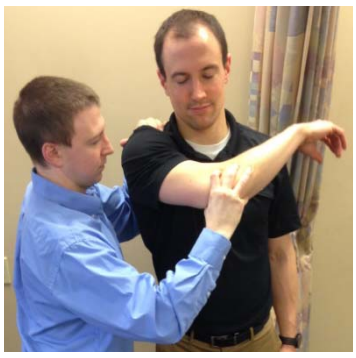
As described by Rowe & Zarins,[29] the patient's arm is positioned in 90 degrees of abduction at the glenohumeral and elbow joint in sitting or supine. The glenohumeral joint is then maximally externally rotated and the posterior aspect of the humeral head is also pressed forward. The combined motion and anterior directed pressure during the apprehension test causes subluxation of the shoulder. Positive: When it causes sudden apprehension feeling (not just pain) in the shoulder and reproduces the patient's symptoms.[2]

16. Positive posterior instability

This category is marked positive if one or more (≥1) of the following findings are present upon examination:

a. **Posterior Jerk Test**

Patient is sitting with arms at the side. Examiner stands on the side of the test arm and blocks the scapula with one hand and medially rotates and abducts the patient's arm to 90° with the other hand. The examiner then applies an axial compression force while horizontally adducting the arm.[30] A positive test is indicated by apprehension or reduction clunk, not just pain.[30]



YouTube link – Posterior Jerk Test[31]

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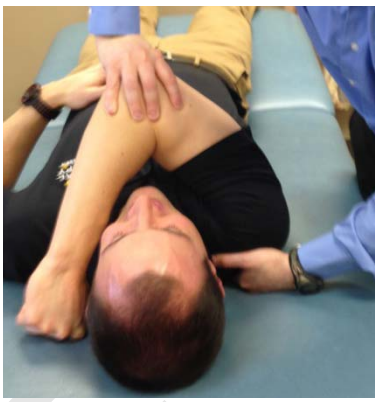
b. **Posterior Apprehension Test**



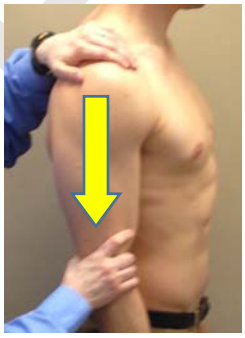
Patient is supine with arms at the side. Examiner stands on the side of the test arm and blocks the scapula with one hand and medially rotates and abducts the patient's arm to 90° with the other hand. The examiner then applies a posterior force to the patient's elbow while horizontally adducting and medially rotating the arm.[32] A positive test is indicated by apprehension or reduction clunk, not just pain.[2,32,33]

17. Accessory motion testing

a. Glenohumeral joint accessory mobility

This category is marked as hypermobile/increased (Inc), normal (Normal), or hypomobile/decreased (Dec) based upon the results of one or more (≥1) of following three tests:

i. Sulcus Sign



Patient is either sitting or standing with arms at the side. Examiner applies an inferior distraction force to the shoulder.

YouTube link: Sulcus Sign[32,34]

ii. Anterior Glide

Patient lies prone with arms at the side. Examiner stands on the side of the test arm and abducts the shoulder to 90 degrees. The examiner places a anteriorly directed force to the proximal humerus.[35]

iii. Posterior Glide

Patient lies supine with arms at the side. Examiner stands on the side of the test arm and abducts the shoulder to 90 degrees. The examiner places a posteriorly directed force to the proximal humerus.[35]

SAMPLE

b. Thoracic Spine

The patient is prone. The examiner contacts each thoracic spinous process with the hypothenar eminence (just distal to the pisiform) of one hand. The examiner should be directly over the contact area, keeping elbows extended, and then he/she uses the upper trunk to impart a force posterior to anterior, in a progressive oscillatory fashion, over the spinous process. This is repeated over each thoracic segment. Interpretation of the examination is based on the examiner's perception of mobility at each segment, relative to the segments above and below the tested segment, and based on the examiner's experience and perception of normal mobility.

Subsequently, a judgement is made about the overall mobility of the thoracic spine. This category is marked as hypermobile/increased (Inc), normal (Normal), or hypomobile/decreased (Dec).[36-38]

18. Difference between AROM and PROM for elevation

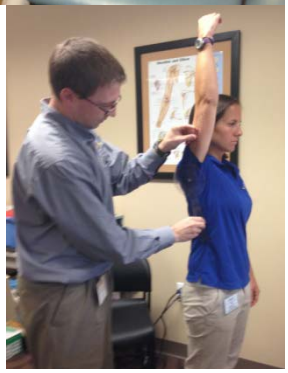
Measurements of active ROM (AROM) are performed to determine limitations in motion, and the impact of movement on symptoms. Active elevation of the shoulder is performed in an upright position. Care should be taken to ensure the patient maintains an upright position throughout the examination and during subsequent follow-up examinations. Passive elevation of the shoulder is performed in the supine position. In addition to using a goniometer, an inclinometer or visualization can also be used for clinical purposes.[39-42]

The categories of selection are:

- >20° difference between AROM and PROM
- 5-20° difference between AROM and PROM
- <5° difference between AROM and PROM

a. **Shoulder flexion**:

i. **Passive**: To measure flexion ROM, the patient is positioned in supine with the arm comfortably by the side. The examiner passively flexes the shoulder until end range is reached (with no compensatory movements from the thorax and the lumbar spine). ROM is measured by placing the axis of the goniometer on the greater tuberosity. The stationary arm is aligned with the midline of the trunk. The movable arm is aligned with the lateral epicondyle.[43]



ii. **Active**: Patient is positioned in a standing position. The patient is asked to actively flex the shoulder to end range with measurement as above.[43]

SAMPLE

19. Limited passive flexion ROM

To measure shoulder passive elevation range of motion (ROM), the patient is positioned in supine with the arm comfortably by the side. The examiner passively elevates the shoulder until end range is reached (with no compensatory movements from the thorax and the lumbar spine). ROM is measured by placing the axis of the goniometer on the greater tuberosity. The stationary arm is aligned with the midline of the trunk. The movable arm is aligned with the lateral epicondyle.[43]

A limitation in passive elevation is present when elevation ROM is less than 140° bilaterally **or** if there is a difference in passive elevation greater than 20° when compared contralaterally.

20. Limited passive external rotation ROM

To measure external rotation ROM, the patient is positioned in supine with the humerus in the frontal plane (glenohumeral abduction is to be between 0 and 90°) and the elbow flexed to 90°. The examiner passively externally rotates the glenohumeral joint until end range is reached. ROM is measured by visualization or by goniometry by placing the axis of the goniometer on the olecranon process, the stationary arm is aligned with the vertical position and the movable arm is aligned with the ulnar styloid process.[43]

A limitation in passive external rotation is present when external rotation ROM is less than 45° bilaterally or if there is a difference in passive external rotation greater than 20° when compared contralaterally.

SAMPLE

21. Limited passive internal rotation ROM

Internal rotation ROM is measured with the patient positioned in supine, the shoulder abducted to 90°, and the elbow flexed to 90°. If glenohumeral abduction is less than 90°, a 45° abduction angle can be used. The examiner passively internally rotates the glenohumeral joint until end range is reached, ensuring that there is no scapular compensation by stabilizing the coracoid process. ROM is measured by visualization or by goniometry by placing the axis of the goniometer on the olecranon process, the stationary arm is aligned with the vertical position, and the movable arm is aligned with the ulnar styloid process.[43]

A limitation in passive internal rotation is present if there is a difference in passive internal rotation greater than 20° when compared contralaterally.

22. Onset of pain during ROM

Shoulder range of motion is measured in the same manner described above. The reproductions of the patient's presenting symptoms[44] are recorded as:

- Before end range (BE) – Pain is reproduced prior to the achieving end range due to soft tissue tension or tissue/bony approximation.
- At end range (E) – Pain is reproduced at end range of motion
- None or only with overpressure (None/OP) – No pain is reproduced with ROM testing or pain is only reproduced when overpressure is applied.

SAMPLE

PATHOANATOMIC CLASSIFICATION

23. Post-Surgery

Select this category if the surgical procedure is the reason for this episode of care. If this classification is selected, make sure to also select the options on the first page which include the type of surgery.

24. Subacromial pain syndrome

The classification of subacromial pain syndrome can be made with a reasonable level of certainty when the patient presents with the following clinical findings[43]**:**

Rule in if:

- Symptoms developed from, or worsen with, repetitive overhead activities or from an acute strain such as a fall onto the shoulder
- Midrange (about 90°) catching sensation/arc of pain with active elevation
- Manual resistive tests to the rotator cuff muscles, performed in midranges of shoulder flexion and abduction, reproduce the patient's reported shoulder pain
- Rotator cuff muscle weakness

Rule out if:

- Resistive tests are pain free
- Supraspinatus, infraspinatus, and biceps brachii have normal strength
- Significant loss of passive motion

Example diagnoses within this category:

- Rotator cuff tendinopathy
- Bursitis
- Partial thickness rotator cuff tear
- Full thickness rotator cuff tear
- Biceps tendinopathy
- Labral pathologies

SAMPLE

25. Passive motion deficits

The classification of shoulder passive motion deficits can be made with a reasonable level of certainty when the patient presents with the following clinical findings[43]**:**

Rule in if:

- Patient's age is typically over 40 years old
- Patient reports a gradual onset and progressive worsening of pain and stiffness
- Pain and stiffness limit sleeping, grooming, dressing, and reaching activities
- Glenohumeral passive range of motion (ROM) is limited in multiple directions, with external rotation the most limited, more particularly in adduction
- Passive motions into the end ranges of glenohumeral motions reproduce the patient's reported shoulder pain
- Joint glides/accessory motions are restricted in all directions

Rule out if:

- Passive ROM is normal
- Upper-limb nerve tension testing reproduces the reported symptoms and shoulder pain can be increased or decreased with altering nerve tension positions
- Shoulder pain is reproduced with palpatory provocation of the relevant peripheral nerve entrapment site

Example diagnoses within this category:

- Adhesive Capsulitis/Frozen Shoulder
- Glenohumeral osteoarthritis
- Post-fracture (closed reduction)
- Arthrofibrosis
- Acromioclavicular joint osteoarthritis

26. Instability

The classification of instability can be made with a reasonable level of certainty when the patient presents with the following clinical findings[43]**:**

Rule in if:

- Patient's age is typically less than 40 years
- History of shoulder dislocation/subluxation
- Excessive glenohumeral accessory motions in multiple directions
- Apprehension at end ranges of flexion, horizontal abduction, and/or external rotation

SAMPLE

Rule out if:

- No history of dislocation/subluxation
- Presence of gross passive glenohumeral motion loss
- No apprehension with end-range shoulder active or passive motions

Example diagnoses within this category:

- Glenohumeral anterior/inferior instability
- Glenohumeral posterior instability
- Multi-directional instability
- Acromioclavicular separation

27. Miscellaneous

This classification of shoulder pain with accessory joint or myofascial referred pain can be made with a reasonable level of certainty when the patient presents with the following clinical findings**:**

Rule in if:

- Does not meet criteria for other categories
- Positive upper limb neural tension
- Myofascial referred pain produced with palpation of trigger points

Rule out if:

- Positive impingement signs
- History of shoulder dislocation
- Excessive glenohumeral accessory motions in multiple directions
- Apprehension at end ranges of flexion, horizontal abduction, and/or external rotation
- Spontaneous progressive pain
- Loss of motion in multiple planes

Example diagnoses within this category:

- Peripheral nerve injury
- Thoracic outlet syndrome
- Brachial plexopathy
- Myofascial pain
- Snapping scapula

SAMPLE

IRRITABILITY CLASSIFICATION

28. Irritability Classification:

Choose one (1) of three (3) levels symptom irritability (**High, Moderate,** or **Low**) considering the following criteria:

Stage of Irritability[45]		
High	**Moderate**	**Low**
High pain (≥7/10)	Moderate pain (4-6/10)	Low pain (≤3/10)
Consistent night or resting pain	Intermittent night or resting pain	Absent night or resting pain
Pain before end of ROM	Pain at end of ROM	Minimal pain with overpressure
AROM < PROM	AROM ~ PROM	AROM = PROM
High disability	Moderate disability	Low disability

ADHERENCE TO INSTRUCTIONS

29. Patient Demonstrates Adherence to Instructions

Adherence to instructions inherently incorporates compliance with and understanding of those instructions. This category is to be marked true ("Y") if BOTH the criteria (compliance and understanding) are met. If either is not met, this category is to be marked as false ("N").

SAMPLE

INTERVENTION STRATEGY

30. Shoulder: Joint Mobilization – Non-end range

Shoulder: Joint mobilization – Non-end range is defined as a manual therapy technique directed at the shoulder girdle comprising a continuum of skilled passive movements to the joints that are applied at varying speeds and amplitudes but NOT encountering tissue resistance.[43,46]

31. Shoulder: Joint Mobilization – End range

Shoulder: Joint mobilization – End range is defined as a manual therapy technique directed at the shoulder girdle comprising a continuum of skilled passive movements to the joints that are applied at varying speeds and amplitudes, including a small amplitude/high-velocity therapeutic movement, and are aimed at encountering tissue resistance.[43,46]

32. Spinal Mobilization (Non-thrust)

Spinal mobilization (Non-thrust) is defined as a manual therapy technique directed at the cervical, thoracic, or lumbar spine comprising a continuum of skilled passive movements to the joints that are applied at varying speeds and amplitudes, excluding small amplitude/high-velocity therapeutic movements.[43,46]

33. Spinal Manipulation (Thrust)

Spinal manipulation (Thrust) is defined as a manual therapy technique directed at the cervical, thoracic, or lumbar spine comprising a continuum of skilled passive movements to the joints that are applied utilizing a small amplitude/high-velocity therapeutic movement.[43,46]

34. Manual Soft Tissue Mobilization

Manual soft tissue mobilization is defined as a manual therapy technique comprising a continuum of skilled passive movements to the soft tissue that are applied at varying speeds and amplitudes. Examples include, but are not limited to, deep pressure and various massage techniques.

35. Instrument-Assisted Soft Tissue Mobilization

Instrument-assisted soft tissue mobilization is defined as a manual therapy technique performed with ergonomically designed instruments comprising a continuum of skilled passive movements to the soft tissue that are applied at varying speeds and amplitudes.

36. Dry Needling

Dry needling uses a thin filiform needle without medication to penetrate the skin and stimulate underlying myofascial trigger points, contractile tissues, and connective tissues for the management of neuromusculoskeletal pain and movement impairments.[47]

SAMPLE

37. ROM Exercises (non-end range)

ROM Exercises is defined as a continuum of therapeutic movements, either manually applied by the clinician or performed by the patient, directed at moving the shoulder girdle through the physiologic range of motion. The non-end range category includes all movements that avoid end range of movement, usually prescribed to facilitate pain reduction and fluidity of joint movement, while avoiding end-range stress on tissue.

38. ROM Exercises (end range)

ROM Exercises is defined as a continuum of therapeutic movements, either manually applied by the clinician or performed by the patient, directed at moving the shoulder girdle through the physiologic range of motion. The end range category includes all movements that aim at reaching end range of movement but do not include those techniques aimed at maintaining end range positioning for longer periods of time.

39. ROM/Stretching Exercises (long duration)

ROM Exercises is defined as a continuum of therapeutic movements, either manually applied by the clinician or performed by the patient, directed at moving the shoulder girdle through the physiologic range of motion. The stretching exercises category includes all movements that aim at providing end-range stress to increase movement and utilize end range positioning for longer periods of time, typically between 30 seconds and several minutes.

40. Neuromuscular Control/Coordination Training

Neuromuscular control/coordination training is defined as procedures or exercises designed to retrain the movement pattern[48] of the shoulder girdle, spine, and/or other interdependent body regions. This training focuses on precision and quality of movement rather than overload. At this time, the literature shows strong evidence for the use of neuromuscular control and coordination exercises.[49]

41. Resistive Strength Training Exercises (including isometric)

Resistive strength training exercises are defined as interventions that intend to increase strength and/or endurance of muscles including isometric, isotonic, and isokinetic movements. Strengthening exercises may begin in a protected mid-range position with the limb supported and progress to end-range positions that work against gravity and additional external resistance. Exercise is progressed based on variables such as repetitions, resistance, speed and complexity of movement, body and joint position, and timing of muscular activation.[48] Strength training specifically involves overloading the muscle and exercising until fatigue is achieved.[49]

42. Taping/Strapping

Taping or strapping interventions include those techniques utilizing tape with varying levels of adhesiveness and elasticity to facilitate or inhibit specific joint movements, muscle function, and/or motor coordination.

SAMPLE

43. Patient Education/Activity Modification

Patient education, counseling and activity modification can be done in a variety of ways. Media such as pamphlets, videos, and verbal advice have been assessed in the current literature. Additionally, demonstrations with and without verbal and/or tactile cueing can is frequently utilized in clinical practice. At this time, the literature shows moderate evidence for the use of patient education and counseling for patients who have suffered from adhesive capsulitis and rotator cuff syndrome.[43,50]

44. Therapeutic Ultrasound

Therapeutic ultrasound is the use of sound waves to produce heating of deeper tissues (including muscles, tendons, ligaments, and scar tissue) and alteration of cellular activity (acoustical streaming and stable cavitation).[49]

45. Electrical agents

Electrical agents include interventions such as laser, pulsed electromagnetic field, and electrical modalities aimed at modulating pain or eliciting a muscular contraction.[49,51,52]

SAMPLE

OUTCOMES

The Penn Shoulder Score can be calculated utilizing the Penn Shoulder Score Cheat Sheet.

46. Penn Shoulder Score (PSS)

The Penn Shoulder Score (PSS), originally published in 1999[53] and validated in 2006,[54] is a self-report questionnaire consisting of three sections: pain, satisfaction, and function.

The function subscale consists of twenty (20) items, each on a 4-point Likert scale. Each item is scaled from 0 (can't do at all), 1 (much difficulty), 2 (with some difficulty), and 3 (no difficulty). The item scores are then summed to determine the subscale score out of 60 (no difficulty for all items). Resultant scores for each subscale are divided by the total range from 0-100 with 0 as greatest disability and 100 as no disability.[53] (See Appendix)

Reliability and Responsiveness

Test-Retest $ICC_{2,1}$	0.94[54]
SEM_{90}	8.5[54]
MDC_{90}	12.1[54]
MCID	11.4[54]
Substantial clinical benefit	21[55]

47. Numerical Pain Rating Score (NPRS)

An 11-point NPRS can be used to measure pain intensity. The NPRS is a standard pain assessment scale that uses a 0-10 (no pain-worst pain imaginable, respectively) scale in order to determine a patient's level of pain**. Patients rate their level of pain with normal activities (eating, dressing, bathing).** The NPRS has demonstrated good reliability ($ICC_{2,1}$=0.74[56]) and responsiveness (MDC = 2.5[56], MCID = 2.17[57]) in subjects with shoulder pain and excellent reliability in an upper extremity orthopaedic population.[58] Furthermore, the NPRS has been used to assess pain severity of both traumatic and atraumatic etiologies.[59]

SAMPLE

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SAMPLE

Appendix

The Penn Shoulder Score, Part 1: Pain and Satisfaction Subscales

Please circle the number closest to your level of pain or satisfaction	Official Use Only
Pain at rest with your arm by your side: 0 1 2 3 4 5 6 7 8 9 10 No Pain ... Worst pain possible	_____ (10 - # circled)
Pain with normal activities (eating, dressing, bathing) 0 1 2 3 4 5 6 7 8 9 10 No pain ... Worst pain possible	_____ (10 - # circled) Score 0 if not Applicable
Pain with strenuous activities (reaching, lifting, pushing, pulling) 0 1 2 3 4 5 6 7 8 9 10 No pain ... Worst pain possible	_____ (10 - # circled) Score 0 if not Applicable
Pain Score	= ___ / 30
How satisfied are you with the current level of function of your shoulder? 0 1 2 3 4 5 6 7 8 9 10 No pain ... Worst pain possible	_____ (10 - # circled)

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SAMPLE

Penn Shoulder Score: Function Subscale

Please circle the number that best describes the level of difficulty you might have performing each activity					
	No difficulty	Some difficulty	Much difficulty	Can't do at all	Did not do before injury
1. Reach the small of your back to tuck your shirt in with your hand	3	2	1	0	X
2. Wash the middle of your back/neck bra	3	2	1	0	X
3. Perform necessary toileting activites	3	2	1	0	X
4. Wash the back of opposite shoulder	3	2	1	0	X
5. Comb hair	3	2	1	0	X
6. Place hand behind head with elbow held straight out to the side	3	2	1	0	X
7. Dress self (including put on coat and pull shirt off overhead)	3	2	1	0	X
8. Sleep on affected side	3	2	1	0	X
9. Open a door with affected arm	3	2	1	0	X
10. Carry a bag of groceries with affected arm	3	2	1	0	X
11. Carry a briefcase/ suitcase with affected arm	3	2	1	0	X
12. Place a soup can (1-2 lb) on a shelf at shoulder level w/o bending elbow	3	2	1	0	X
13. Place a one gallon container (8-10 lb) on a shelf at shoulder level w/o bending elbow	3	2	1	0	X
14. Reach a shelf above your head w/o bending your elbow	3	2	1	0	X
15. Place a soup can (1-2 lb) on a counter overhead w/o bending your elbow	3	2	1	0	X
16. Place a one gallon container (8-10 lb) on a shelf overhead w/o bending elbow	3	2	1	0	X
17. Perform a usual sports hobby	3	2	1	0	X
18. Perform household chores (cleaning, laundry, cooking)	3	2	1	0	X
19. Throw overhand/swim/overhead raquet sports. (circle all that apply to you)	3	2	1	0	X
20. Work full-time at your regular job	3	2	1	0	X
Scoring					
Total of colums = _____ (a)					
Number of Xs x 3 =_____ (b), 60- ____(b) = _____(c) (If no Xs are circled, function score = total # of columns)					
Function Score = (_____ ÷ _____) = _____ x 60 = (a) (c)	**Function Score = /60**				

SAMPLE

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