EVIDENCE-BASED
SHOULDER ASSESSMENT
AOTA CONFERENCE 2016

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LEARNING OBJECTIVES

• Gain evidence-based knowledge in at least five areas of shoulder assessment
• Be aware of at least five evidence-based special tests for the shoulder
• Be able to construct a comprehensive strategy for evidence-based assessment of shoulder dysfunction
INTRODUCTION:
SHOULDER PAIN IS A COMMON MEDICAL CONDITION

- Shoulder pain is the third most common musculoskeletal reason for seeking medical care (Hermans et al 2013)
- Rotator cuff disease is the most common cause of shoulder pain seen by physicians (Hermans et al 2013)
- 1% of adults over the age of 45 present with shoulder pain each year (Donnelly et al 2013)
SHOULDER DYSFUNCTION IS COMPLEX

• The shoulder has the greatest range of motion of any joint in the body (Cooper 2014) and restriction of it can have a significant effect on functional ability (Donnelly 2013)

• The etiology of shoulder dysfunction is often complex and difficult to assess clinically (Donnelly 2013)

• Causality of shoulder dysfunction is difficult to quantify yet occupational therapists are asked do this every day by general practice doctors
COMMON TYPES OF SHOULDER DYSFUNCTION

• Acute: fracture, dislocation, muscular injury, glenoid labral tears
• Chronic: osteoarthritis, rotator cuff tears, recurrent dislocations (instability), biceps long head tendinitis, rotator cuff tendinitis, adhesive capsulitis, impingement
• Neuropathic: cervical spine pathology, herpes zoster infection, or brachial neuritis
• (Donnelly et al 2013, Durall 2013)
UPPER EXTREMITY ANATOMY REVIEW: SHOULDER COMPLEX
(COOPER 2014)

- Has the greatest range of motion (ROM) in the entire body
- Has three bones: the humerus, the clavicle, and the scapula
- Has three joints: glenohumeral, acromioclavicular, and sternoclavicular
- Has one pseudojoint: the scapulothoracic articulation
IMPORTANCE OF ROTATOR CUFF (RC)

• Primary mover of GH joint
• Supraspinatus, infraspinatus, subscapularis, and teres minor
• Accessory muscles can be very important as well: e.g., serratus anterior causes scapular winging; lower trapezius weakness can cause elevation of the shoulder
• Supraspinatus most frequently injured
ROTATOR CUFF MUSCLES

HTTP://PHYSIOWORKS.COM.AU/IMAGES/INJURIES-CONDITIONS/ROTATOR%20CUFF%20MUSCLES%20INJURY.JPG

Front View

Muscles of the Rotator Cuff

Subscapularis

Supraspinatus

Infraspinatus

Supraspinatus

Teres Minor

©MMG 2001
EVIDENCE-BASED SHOULDER ASSESSMENT STRATEGY: OVERVIEW

• History of shoulder dysfunction: occupational history, onset process (or event) and symptoms
• “Look, Feel, Move”: inspect for abnormalities during clinical examination
• Special tests & individual muscle testing
STEP 1: PATIENT HISTORY OF SHOULDER DYSFUNCTION
(DONNELLY ET AL 2013)

• Onset: gradual or sudden?
• Symptoms: pain at rest & with movement, neurological complaints (e.g., sensation), kinematics (joint issues and/or instability), stiffness, & when symptoms occur, pain pattern?
STEP 1: PATIENT HISTORY OF SHOULDER DYSFUNCTION (DONNELLY ET AL 2013)

- Occupational history: ADL and IADL (especially work)
- Results of history should begin to suggest etiology
STEP 2: CLINICAL EXAMINATION

• “Look”: Check for abnormalities (bilateral shoulders are exposed) (Limb & Limb 2014)
  – Redness or swelling
  – Bony prominences (e.g., scapula, clavicle)
  – Muscle wasting and/or asymmetry
  – Postural abnormalities: Rounded shoulders, forward head, kyphotic thoracic spine, shoulder height differential, bilateral shoulder elevation
  – Scapular winging
EXAMPLE #1

ROUND SHOULDER

C/o bilateral shoulder pain when doing strengthening at the gym (resistive overhead lifting), crepitus in left shoulder, history of neck pain and difficulty with jaw pain/locking

MMT: 3/5 in B middle trapezius muscles, B rhomboids 4/5
EXAMPLE #2
MUSCLE ASYMMETRY

C/o right shoulder pain when washing dishes using bilateral UE’s; Left upper trapezius and infraspinatus are larger than right, is a student. Carries grocery bags on left side.

MMT: middle trapezius R 3+/5, L 3/5; lower trapezius R 4/5, L 4+/5
EXAMPLE #3
SHOULDER HEIGHT DIFFERENTIAL

Student’s left shoulder is higher than right, history of initial right shoulder injury 5 years ago during heavy lifting with no medical treatment; second injury was during resistive right shoulder horizontal abduction with pain in deltoid (snapping sound); no complaints at present.

MMT results: 3+/5 R posterior deltoid & middle trapezius vs. 3/5 LUE
STEP 2: CLINICAL EXAMINATION

• “Feel”: Bony landmarks are palpated systematically (Limb & Limb 2014)
  – AC, SC & GH joints
  – Overall palpation during movement especially when patient reports ‘crunching’ (helps to localize crepitus as specific region/joint)
  – Neuro signs are noted
EXAMPLE #4
SCAPULAR WINGING

Student has winging L greater than R with “pinching” on L side at times with trunk movement and protracted kyphotic posture; history of dancing 15 years until 18 years old (now 25 yrs); palpation of T12 is painful on left, no neuro signs
STEP 2: CLINICAL EXAMINATION

• “Move”: Assess fluidity, quality, & quantity (AROM, then PROM) (Donnelly et al 2013)
  – Sternoclavicular (SC) movement: palpate SC joint & clavicle
  – Acromioclavicular (AC) movement: note any dyskinesis especially with shoulder abduction and horizontal abduction/adduction
  – Scapulothoracic (ST) movement: note that GH to ST movement should be 5:4 after 30 degrees of abduction
  – Glenohumeral (GH) movement: all planes
STEP 2 TO STEP 3 TRANSITION

• Once analysis of Step 2 is complete the clinician should select special tests (Donnelly et al, 2013) and/or individual manual muscle testing to investigate abnormalities such as:
  – Abnormal posture
  – Muscle wasting
  – Abnormal bone position
  – Abnormal movement and joint structure
  – A/PROM deficits
  – Pain and neurological signs
STEP 3: SPECIAL TESTS & MMT

• Please note that to select special tests and individual muscle testing effectively one must have basic knowledge of common shoulder conditions for which these tests are given

• Recommended readings:
  – Special Tests for Orthopedic Examination (4th Ed.) by Konin et al. (2016), Sections 1 & 2
STEP 3: SPECIAL TESTS

• Review of research/statistical terms
  – Sensitivity: Ability of a test to identify people who have a condition
  – Specificity: Ability of a test to identify people who don’t have a condition
• Both sensitivity and specificity range from 0 to 1 with values closer to 1 being considered more accurate
• Remember, no clinical test is 100% accurate
STEP 3: SPECIAL TESTS FOR CERVICAL SCREENING

• Note that if your patient has signs of cervical spine dysfunction you should do special tests to screen for this.
• Symptoms that suggest cervical dysfunction:
  – Forward head posture
  – Dizziness
  – Headaches (frequent – can be daily or multiple per day)
  – Unilateral or bilateral shoulder pain & numbness
  – Limited and/or painful cervical A/PROM
  – Pain referral pattern for cervical spine dysfunction
CERVICAL RADICULOPATHY PATTERNS

Note: Schematic demarcation of dermatomes (according to Keegan and Garrett) shown as distinct segments. There is actually considerable overlap between adjacent dermatomes. An alternative dermatome map is provided online.
CERVICAL DISC PAIN REFERRAL PATTERNS

Figure 2. Pattern of pain provoked by discography at each cervical level: C2–C3 (A), C3–C4 (B), C4–C5 (C), C5–C6 (D), and C6–C7 (E). For purposes of illustration only, pain is depicted as unilateral to the left at C4–C5 through C6–C7.

Grubb, et al 2000

- Patients referred for shoulder pain sometimes have cervical radiculopathy that has been misdiagnosed.
- If neuro symptoms are present special tests can be done:
  - Spurling’s Test
  - Distraction Test
  - Upper Limb Tension Test for Median Nerve
  - Ipsilateral cervical rotation AROM < 60 degrees
- If all four of the above are positive this indicates .99 specificity that patient has cervical radiculopathy and he/she could be referred to PT for cervical treatment if needed.
EXAMPLE #5

C/o pain in C5-6 disc distribution with corresponding forward head posture

History: Aggressive exercise program with “plyometric” pushups, thoracic spine “went out”; cervical rotation is 70 degrees to R, 80 degrees to L

Special Tests:
Spurling’s – negative; Distraction – positive; ULTT - negative
STEP 3: SPECIAL TESTS (SHOULDER)

• Special tests for the shoulder should be selected based on history, clinical exam and symptomatology
• The following is a summary of common types of shoulder dysfunction and evidence-based special tests for each
• Sensitivity and specificity have been converted to percentages for ease of understanding
• Remember, special tests are positive only if specific test criteria are met
STEP 3: SPECIAL TESTS (SHOULDER)

- AC Joint Pathology
  - Sensitive Test (rules-out when negative)
    * AC Joint Palpation (97%), Walton et al. 2004
  - Specific Tests (rules-in when positive)
    * Cross-Body Adduction (79%), Chronopoulos et al. 2004
    * Active Compression Test (~95%), Chronopoulos et al. 2004, Walton et al. 2004
STEP 3: SPECIAL TESTS (SHOULDER)

- Shoulder Impingement
  - Sensitive Test (rules-out when negative)
    - Neer Test (~80%), Calis et al. 2000, MacDonald et al. 2000, Park et al. 2005
    - Hawkins-Kennedy Test (~80%), Calis et al. 2000, MacDonald et al. 2000, Park et al. 2005
  - Specific Tests (rules-in when positive)
    - Hawkins-Kennedy Test + painful arc + ER weakness in neutral (~95%) Park et al. 2005
STEP 3: SPECIAL TESTS (SHOULDER)

- Anterior Instability
  - Sensitive Test (rules-out when negative)
    - Release/Surprise Test (~64%) Lo et al. 2004
  - Specific Tests (rules-in when positive)
    - Apprehension Test (>90%) Lo et al. 2004, Farber et al. 2006
    - Relocation Test (>90%) Lo et al. 2004, Farber et al. 2006
    - Release/Surprise Test (~64%) Lo et al. 2004, Gross & Distefano 1997
STEP 3: SPECIAL TESTS (SHOULDER)

- **Biceps Tendonitis/Pathology**
  - Sensitive Tests (rule-out when negative)
    - Upper cut (77%) Kibler et al. 2009
  - Specific Tests (rule-in when positive)
    - Speed’s test (~83%) Kibler et al. 2009
    - Belly Press (~83%) Kibler et al. 2009

- **Anterior-Inferior Labral Pathology**
  - Specific Tests (rules-in when positive)
    - Crank Test + history of popping, clicking, or catching (91%) Walsworth et al. 2008
STEP 3: SPECIAL TESTS (SHOULDER)

• Supraspinatus Tear
  – Specific Tests (rules-in when positive)
    • Drop Arm Test (~90%) Calis et al. 2000, Murrell & Walton 2001, Park et al. 2005

• Infraspinatus Tear
  – Specific Tests (rules-in when positive)
    • External Rotation Lag Sign (~90%), Park et al. 2005, Miller et al. 2008, Walch et al. 1998
STEP 3: SPECIAL TESTS (SHOULDER)

• Subscapularis Tear
  – Sensitive Test (rules-out when negative)
    • Bear Hug Test (82%) Barth et al. 2012
  – Specific Test (rules-in when positive)
    • Lift-Off Test (~70%) Leroux et al. 1995, Barth et al. 2012
EXAMPLE #6

C/o pain after 5 months of working as a waitress, postural asymmetry with left scapula higher than right; states “it doesn’t feel like it’s in the right place”

History: Waitress for 10 months, carries trays on left side but is right dominant

Special Tests/MMT: Negative Hawkins-Kennedy & Drop Arm but lower trapezius MMT is 2/5, rhomboid MMT 4/5
EXAMPLE #7

C/o brief shoulder pain on waking in the AM, hypermobility, can’t do standard push-up

History of Pottenger’s Saucer, nursemaid’s elbow; brief 7/10 pain in morning if sleeping with right shoulder in external rotation and will get “stuck”; received exercises from chiropractor for improving thoracic spine flexibility

MMT: Rhomboids R 4/5, L 5/5; Middle Trapezius R 4/5, L 3/5; Lower Trapezius R 3+/5, L 3+/5
EXAMPLE #8

C/o pain in right UT, deltidoid & scapula at times, forward head posture, slight right scapular winging, lacks fluidity of movement during shoulder abduction

History of violin playing on and off for 7 years

Special Tests/MMT: Hawkins-Kennedy & Drop Arm negative; lower traps R 2+/5 L 3/5, rhomboids B 3+/5
PRESENTATION REVIEW: EVIDENCE-BASED OT ASSESSMENT OF SHOULDER PATIENTS

• Step 1: Patient history of shoulder dysfunction
• Step 2: Clinical examination: “Look, Feel, Move”
• Step 3: Special tests & individual muscle tests
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QUESTIONS?
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Thank you


REFERENCES


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