Shoulder Screening for Patients with Spinal Cord Injury

Sara Galante, SPT
UNC School of Medicine
Division of Physical Therapy
April 22, 2019

Objectives

- Discuss the prevalence and characteristics of shoulder pain in patients with spinal cord injury
- Describe the importance of screening for shoulder injury during inpatient rehab
- Learn to administer and score the Wheelchair User's Shoulder Pain Index
- Evaluate the clinical utility and applicability of selected shoulder special tests

Shoulder Pain After Neurological Injury[1]

- Common due to overuse of arms and weak musculature
- Difficult to treat and often not first priority due to other complications
- Pain-related dysfunction increases with age and compounds with arthritis

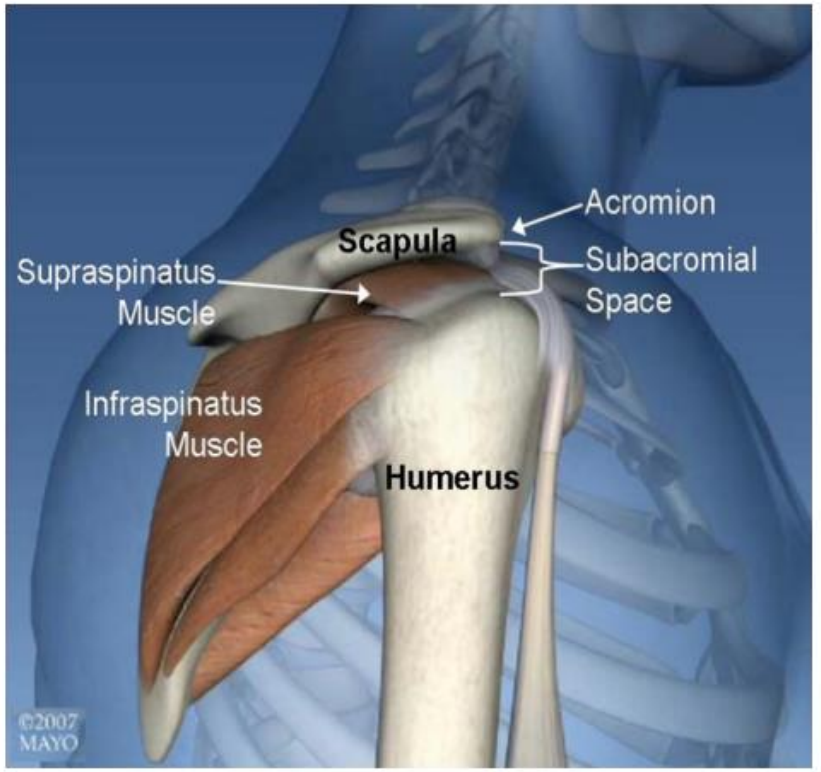
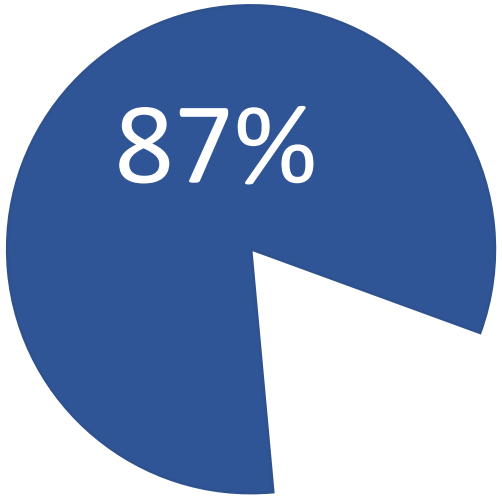


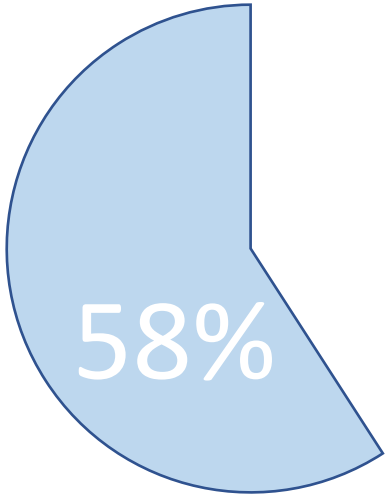
Figure 1: Anatomy of Shoulder Joint; Copyright Mayo Clinic.

Prevalence[2,3]



Tetraplegia

VS.



Paraplegia

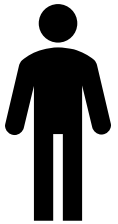
Jain et al:

Correlation between Assistive Device and Shoulder Pain

46.7%

35.4%

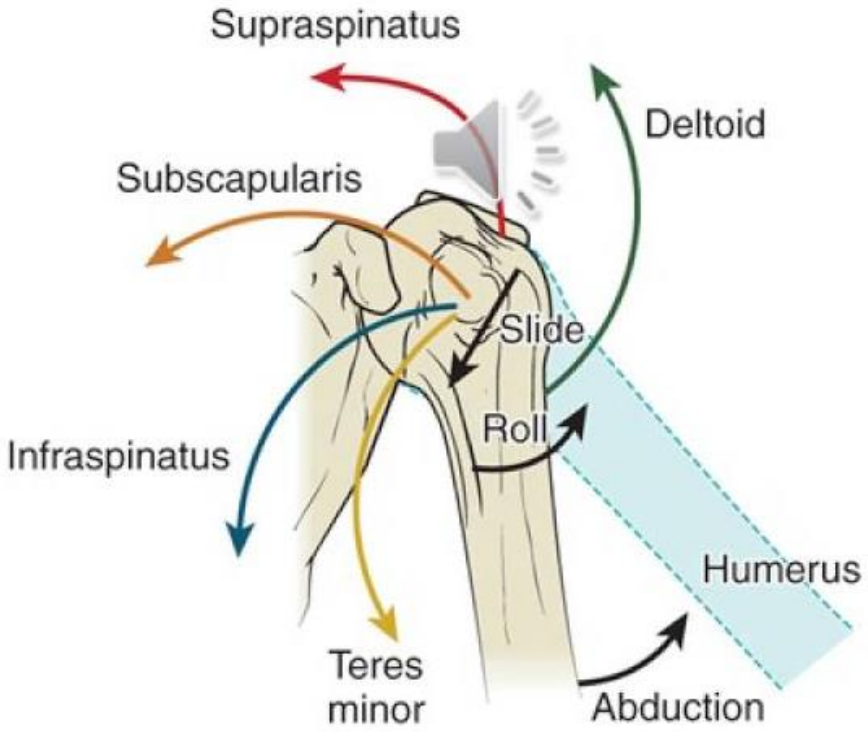
47.6%



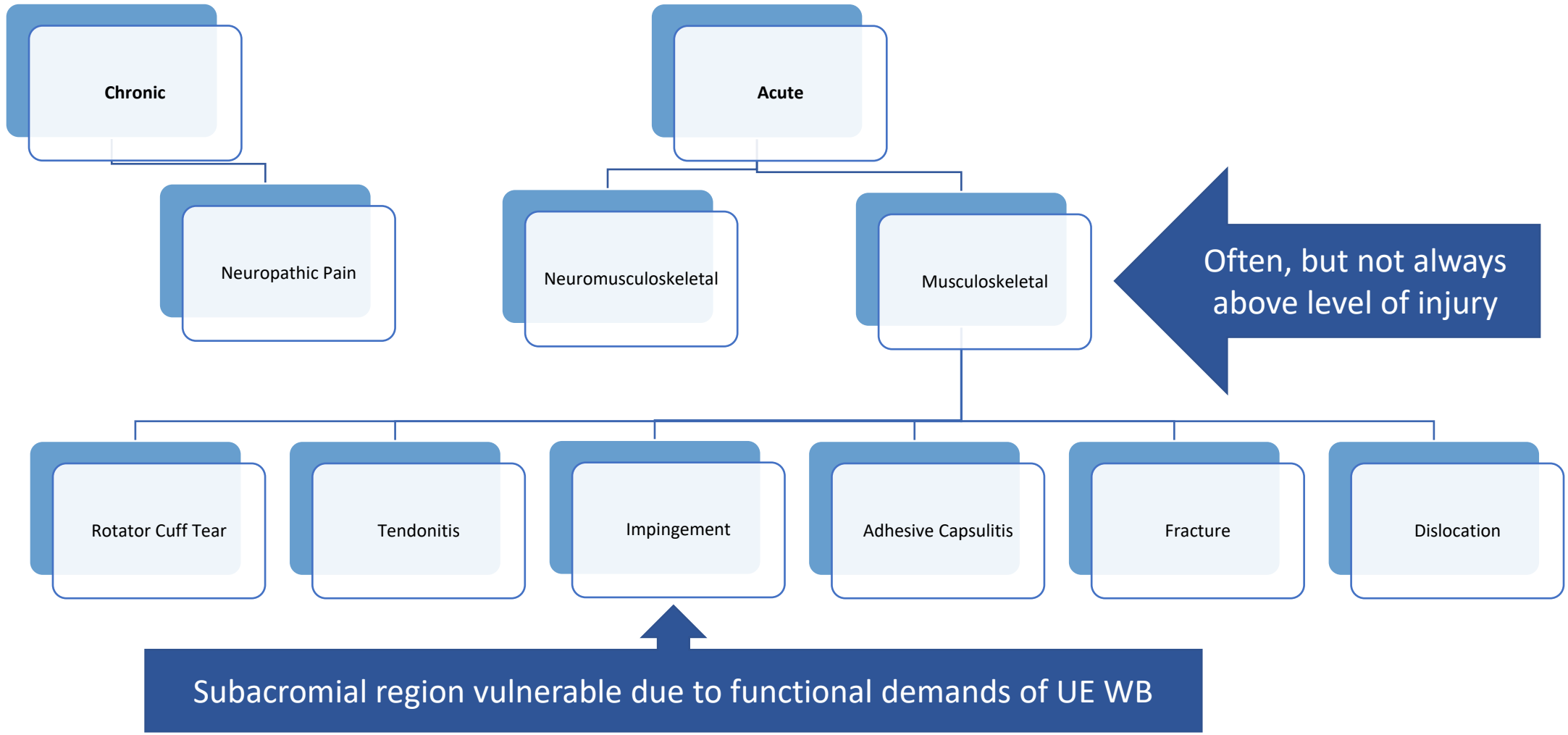
33.3%

Mechanism of Injury

- Largely unknown
- Pain is most intense with ADLs that require force through hand (WC propulsion, transfers)[1,2,5]
- Theorized that subacromial impingement is large contributor to rotator cuff pathology and pain[6]
- Ball and socket joint implies biomechanics of shoulder was meant for multidimensional mobility, not weightbearing[7]



Common Sources of Shoulder Pain[7]



Why Screen for Shoulder Injury Now?[7,9]

- Strengthen rotator cuff muscles
  - Prevent impingement
  - Decrease risk for neuromuscular fatigue
- Adapt ADLs and leisure to prevent overuse
  - Adapt environment to minimize affected arm during healing phase
  - Leading with painful shoulder during transfers
  - Transfer board
  - Adjusting surface height to level or downhill transfers
- Prevent unnecessary traction on shoulder by healthcare professionals and family
- Prevent chronic pain

Evaluation

- History
- Onset of pain
- Location of pain
- Aggs / Eases
- Upper Quarter Screen
  - Rule out c-spine
- Palpation
- ROM
- Strength
- Scapulothoracic movement quality
- Posture
- Kinematics during WC propulsion
- **Self-report outcome measures**
- **Special Tests**

Wheelchair User's Shoulder Pain Index (WUSPI)

- Self report
- Free
- 5-10 min
- VAS Scale
- 15 Items
- Score 0-150
- Performance Corrected when not all items are used

Normative Values[4,5,9]

Untreated shoulder pain→ 40.7 points

Tetraplegia→ 29.4 points

Paraplegia→ 17.3 points

MDC[4] = 5.10 points

Scoring

- Measure to "X"
- Raw Score = Sum of 15 Items
- Note # completed
- PC-WCUPI Score = (Raw Score / # of items) x 15

Shoulder Special Tests

- Requirements of Special Tests
- Clinical Value based on sensitivity and specificity
- Consider adapting the test to fit your patient's need
  - Positioning
- Practice!

KEY

- Good Clinical Value
- Average Clinical Value
- Strength
- A — Active Movement
- P — Passive Full ROM
- Cognition/ Command Following

Labral Tear/ Biceps Tendinopathy

Test	Requirements	Clinical Value	Description/ Result	Picture
Yergason's Test *(SLAP lesion, any labral tear, Biceps Tendinopathy)*	P, A, strength, cognition	Ruling IN (SLAP)[10]; Ruling IN (Biceps)[10]	pt sitting, elbow 90° flex, full pronation, resists supination while PT palpates biceps tendon (+) pain, biceps tendon moves out of groove	
Speed's Test *(SLAP lesion, any labral tear, Biceps Tendinopathy)*	P, A, strength, cognition	Ruling IN (SLAP)[10]; Ruling OUT (Biceps)[10]	pt sitting, flexes shoulder to 90° with full elbow ext and supination, resists PT's downward pressure (+) pain in bicipital groove	
Compression Rotation Test *(SLAP lesion)*	P	Ruling IN[11]	pt supine with 90° ABD, PT applies axial load through elbow and repeated IR and ER (+) catching or clicking in joint	
Jerk Test *(Posterior labrum tear, Inferior labrum tear)*	P	Ruling OUT & IN[12]	pt sitting, stabilize scapula with one hand and hold affected arm at 90° ABD and IR, apply axial force through humerus and move arm into horizontal ADD (+) pain	

Anterior Apprehension, Relocation, Release Cluster[10]

(Anterior Instability)

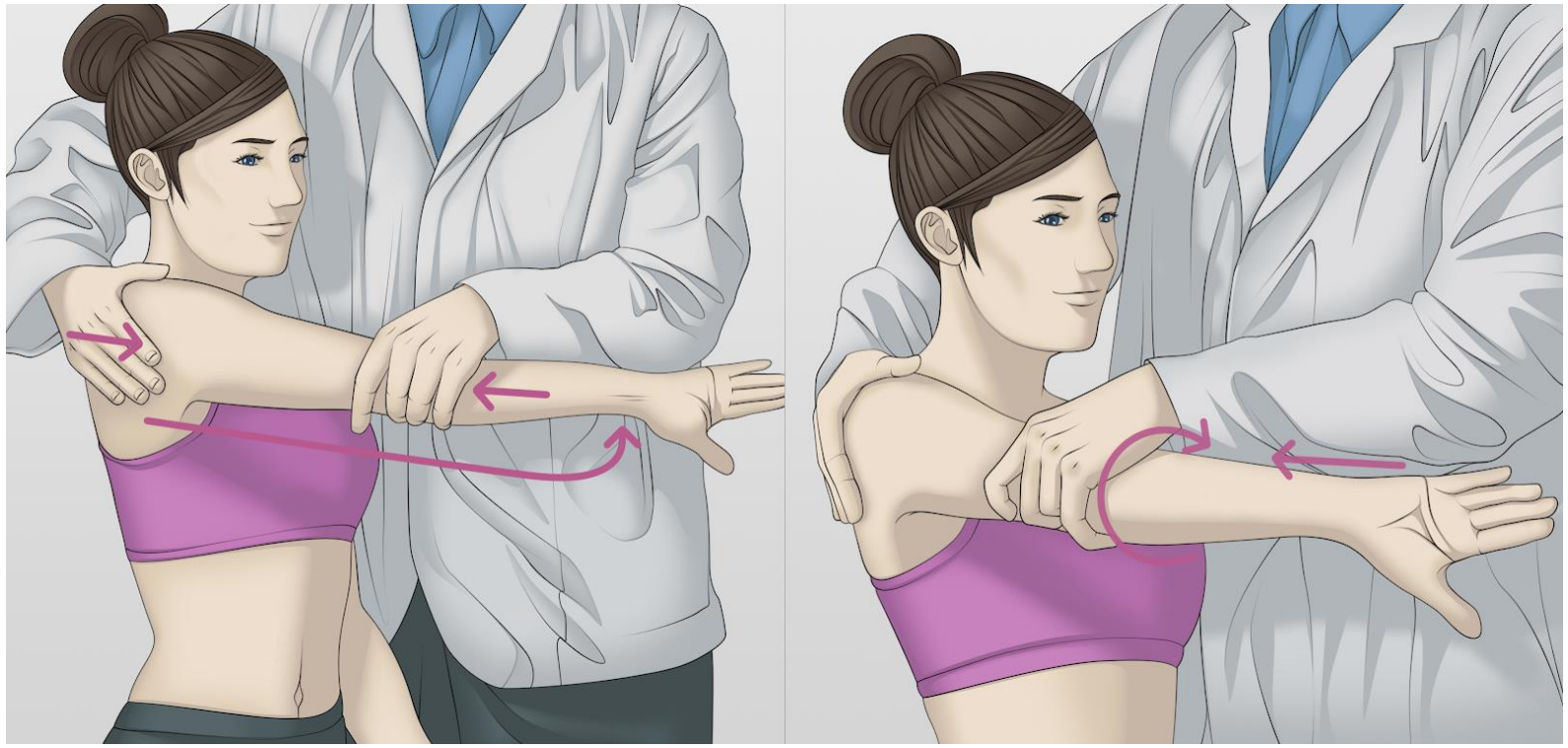
- Requires PROM into ER
- Good Clinical Value- ruling IN & OUT
  - Sensitivity: 81%
  - Specificity: 98%

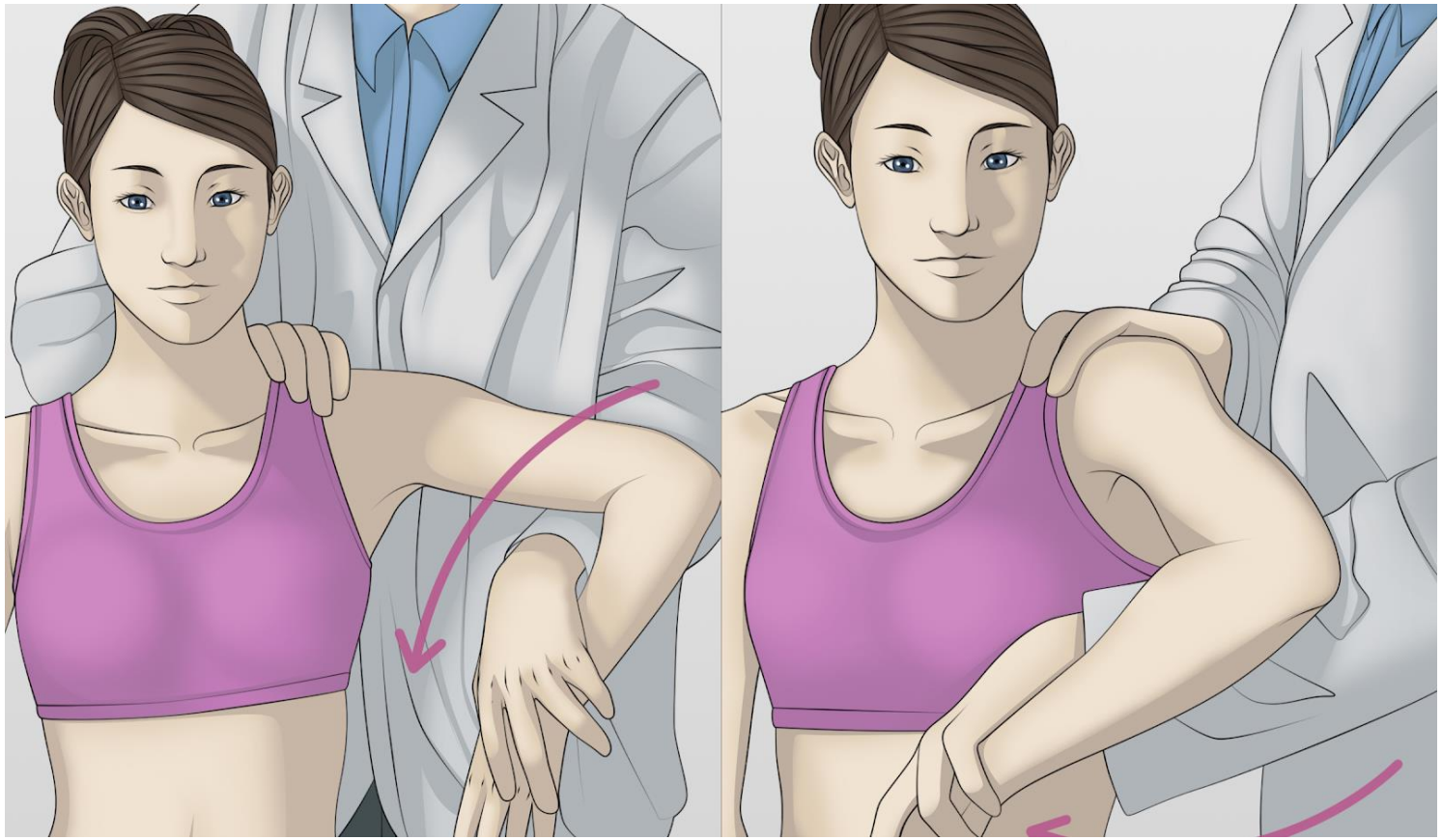
- Apprehension
  - Shoulder 90° ABD, Elbow 90° flex, full ER
  - (+) Pain or apprehension
- Relocation
  - Post force at humeral head
  - (+) pain diminishes
- Release
  - Suddenly release hand
  - (+) pain returns

Jerk Test[11] *(Posterior/Inferior labrum tear)*

- Requires PROM into flex and horizontal ABD
- Good Clinical Value- ruling IN & OUT
  - Sensitivity: 90%
  - Specificity: 85%

- Stabilize scapula, hold affected arm at 90° ABD and slight IR; apply axial force and move arm into horizontal ABD, (+) pain





Hawkins Kennedy[12]

(Subacromial Impingement)

- Requires PROM into 90° scaption and IR
- Good Clinical Value- ruling OUT
  - Sensitivity: 80%
  - Specificity: 56%

- Pt's shoulder positioned in 90° flex, PT passively IR at wrist
  - Move shoulder into 20° horizontal ABD if (-) in flex

  (+) pain with IR

ER Lag[13] *(Infraspinatus/ Teres Minor Tear)*

- Requires PROM, AROM, Strength, Cognition/ Command Following
- Good Clinical Value- ruling IN & OUT
  - Sensitivity: 97%
  - Specificity: 93%
- Passively position pt into 20° scaption and maximal ER; PT releases (+) pt cannot maintain position in ER

Questions?

Bibliography

1. Ludewig PM, Braman JP. Shoulder impingement: biomechanical considerations in rehabilitation. *Man Ther* 2011;16(1):33-9.
2. McCasland LD, Budiman-Mak E, Weaver FM, Adams E, Miskevics S. Shoulder pain in the traumatically injured spinal cord patient: evaluation of risk factors and function. *J Clin Rheumatol* 2006;12 (4):179-86.
3. Jain NB, Higgins LD, Katz JN, Garshick E. Association of shoulder pain with the use of mobility devices in persons with chronic spinal cord injury. *Pm R* 2010;2(10):896-900.
4. Curtis KA, Drysdale GA, Lanza RD, Kolber M, Vitolo RS, West R. Shoulder pain in wheelchair users with tetraplegia and paraplegia. *Archives of Physical Medicine & Rehabilitation* 80(4):453-7, 1999 Apr 1999.
5. Curtis KA, Roach KE, Applegate EB, Amar T, Benbow CS, Genecco TD et al. Development of the Wheelchair User's Shoulder Pain Index (WUSPI). Paraplegia 1995;33(5):290-3.
6. Morrow MM, Van Straaten MG, Murthy NS, Braman JP, Zanella E, Zhao KD. Detailed shoulder MRI findings in manual wheelchair users with shoulder pain. *Biomed Res Int* 2014;2014:769649.
7. Sisto SA, Druin E, Sliwinski MM. *Spinal Cord Injuries: Management and Rehabilitation.* St.Louis, MO: Mosby Elsevier; 2009.
8. Boninger ML et al. (Paralyzed Veterans of America Consortium for Spinal Cord Medicine). Preservation of upper limb function following spinal cord injury. *J Spinal Cord Med* 2005;28(5):434-470.
9. Brose SW, Boninger ML, Fullerton B, et al. Shoulder ultrasound abnormalities, physical examination findings, and pain in manual wheelchair users with spinal cord injury. *Arch Phys Med Rehabil*. 2008;89:2086–2093.
10. Farber AJ, Castillo R, Clough M, Bahk M, McFarland EG. Clinical assessment of three common tests for traumatic anterior shoulder instability. *J. Bone Joint Surg. Am.* 2006;88(7):1467-1474. doi:10.2106/JBJS.E.00594.
11. Kim K-M, Croy T, Hertel J, Saliba S. Effects of neuromuscular electrical stimulation after anterior cruciate ligament reconstruction on quadriceps strength, function, and patient-oriented outcomes: a systematic review. *J. Orthop. Sports Phys. Ther.* 2010;40(7):383-391. doi:10.2519/jospt.2010.3184.
12. Hegedus EJ, Goode AP, Cook CE, et al. Which physical examination tests provide clinicians with the most value when examining the shoulder? Update of a systematic review with meta-analysis of individual tests. *Br. J. Sports Med.* 2012;46(14):964-978. doi:10.1136/bjsports-2012-091066.
13. Castoldi F, Blonna D, Hertel R. External rotation lag sign revisited: accuracy for diagnosis of full thickness supraspinatus tear. *J. Shoulder Elbow Surg.* 2009;18(4):529-534. doi:10.1016/j.jse.2008.11.007.

Shoulder Screening for Patients with Spinal Cord Injury

Sara Galante, SPT
UNC School of Medicine
Division of Physical Therapy
April 22, 2019