Shoulders an Osteopathic Perspective Robert Gitlin, DO & Karla Frey-Gitlin, DO



Acknowledgements Many thanks to Nicole Peña DO (chairwoman) and Touro faculty OMM department Touro University College of Osteopathic Medicine 1310 Club drive Vallejo, CA

Presentation Objectives

- At the conclusion of the presentation, learners will be able to:
- recognize and locate common areas of Somatic Dysfunction that cause headaches, as well as shoulder and foot issues
- utilize multiple Osteopathic Manipulative Treatments (OMT) for common disorders such as rotator cuff strain, shoulder pain, foot and heel pain, as well as musculoskeletal related headaches
- utilize their Osteopathic skills for headaches, shoulder and foot pain; knowing better when it is time to use OMT and when it is time to obtain Xrays and/or surgical consultation

Shoulder Pain

Shoulder pain is the <u>third most common</u> <u>musculoskeletal complaint</u> and is often caused by intrinsic shoulder pathology but can also be due to referred pain (from neurological, abdominal or thoracic sources).

Shoulder- Anatomy

• There are 3 true synovial joints with the shoulder girdle complex:

- GH joint: allows greater freedom of motion than any other joint in the body (Humerus head/scapular Glenoid Fossa)
- AC joint: diarthrodial and allows gliding movement
- SC joint: is a synovial saddle joint and is the **only joint** that connects the UE to the axial skeleton.









• Note: there are 2 accessory joints: with 1st and 2nd ribsnot involved with shoulder girdle, but can interfer with shoulder motion

- -costosternal-anterior
- -costovertebral-posterior
- there are 2 functional joints: pseudo-joints

Shoulder- Anatomy cont'd- Pseudo-Joints

- There are 2 functional joints: pseudo-joints
- Suprahumeral: acts in concert with the GH joint as the humeral head articulates with the coracoacromial ligaments(arch). Space in the suprahumeral joint is where biceps tendon(long head) goes thru (as well as supraspinaus tendon, subacromial bursa and capsule).** Biceps tendonitis, capsulitis or adhesions may prevent free-gliding of the tendons and interfere with motion**
- 2) Scapulothoracic: scapula on thorax called pseudo-articulation. Formed by articulation of Anterior surface of scapula with the posterior thorax.



















Shoulder Joint Details- GH Joint

Increase mobility and stability as rotator cuff muscles keep the joint in place and stable. Scapular kinematics and rotator cuff function problems affect GH joint. Note: Orthopaedic problems associated with disruptions of joint stabilizers, commonly involves laxity and instability of end ROM.

Commonly, posterior capsule is tight, causing anterior translation and elevation of humeral head which can lead to impingement syndrome. Major motions: ABD/ADD, Flex/Ext, IR/ER

Shoulder Joint Details- AC Joint

- · Helps shoulder perform abduction and other motions
- It's axial rotation is allows for subtle adjustments of scapula relative to clavicle
- Stabilized by:
- · -acromioclavicular ligament
- -coracoacromial ligament
- · -coracoclavicular ligament
- Most common SD: superior/lateral AC joint

Shoulder Joint Details- AC Joint cont'd

- Note: AC separation is a true sprain
- Injury can be easily evaluated by palpating at the AC joint and applying a downward traction to the humerus
- The extent of gapping is a measure of the injury
- · Treat thoracic cage problems to help heal the separation

Shoulder Joint Details- SC Joint

- Articulation of the medial end of the clavicle with the manubrium may become sprained
- Motions: 1) anterior/posterior glide(retraction/protraction)
 - 2) superior/inferior glide(shrug/push shoulders toward feet)
 - 3) ant/post rotation(humerus IR/ER)
- 4) Motion on either end of clavicle are in opposite directions, ie:lateral end clavicle moves superior(shoulder shrug) and medial end moves inferior.
- Most Common SD: anterior /superior clavicle

Physical Examination

- Look at shoulder with shirt off best
- View from all sides, noting muscle bulk, imbalances
- Evaluate Cervical Spine- (Spurling's test)
- ROM (Flex, ABD, ADD-X-body, ER, IR, Ext-Thumb up spine)

Shoulders EXAMINATION

The four most common problems clinical examination tests suggested for diagnosing shoulder and neck pain has high sensitivity and specificity

Sensitivity/Specificity

- * Sensitivity- refers to a test's ability to designate an individual with disease as positive. A highly sensitive test means that there are few talse negative results, and thus fewer cases of disease are missed. From the 50 patients, the test has only diagnosed 25. Therefore, its sensitivity is 25 divided by 50 or 50%.
- Specificity: Specificity- of a test is its ability to designate an individual who does not have a disease as negative. From the 50 healthy people, the test has correctly pointed out all 50. Therefore, its specificity is 50 divided by 50 or 100%
- There is SNOUT SPIN:
- A Sensitive test, when Negative rules OUT disease.
- A Specific test, when Positive, rules IN a disease.

Shoulders- EXAMINATION cont'd

• **Spurling's test** (pain when extending and rotating the head to the affected side while pressing down on the head) might further help indicate **Cervical radiculopathy**, **weakness**, **decreased DTR's**, or **nerve root compression**, with low to mod sens(30–90%) and high specif (74–100%).

Shoulders- EXAMINATION cont'd

 Clinical tests to diagnose ACJ disorder are of limited diagnostic value.² Exclusive tenderness over the joint has a high sensitivity of 90–95%, however it has a poor specificity of 10%. The cross adduction test (pain when bringing arms across chest to touch the opposite shoulder) has sensitivity of 77–100% and specificity of 79%.

Shoulders- EXAMINATION cont'd

- Reduced range of passive external rotation is the principle diagnostic test for contracted Frozen shoulder (Adhesive Capsulitis). It is also reduced in advanced glenohumeral arthropathy, but no evidence is available for its diagnostic accuracy in primary care.
- Impingement tests include Hawkin's test (pain on rotating the arm internally while flexed at 90°) with a sensitivity and specificity of 80–92% and 25–60%, respectively. The painful arc test (pain at mid-range of active abduction) has sensitivity and specificity of 32–97% and 10–80% respectively. Jobe's test (resisted elevation with the arm at 90° and the thumb pointing down) has sensitivity and specificity of 77–95% and 65–85% respectively. Tests to identify the specific tendon or muscle affected have a questionable utility in clinical practice due to poor diagnostic accuracy.

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Hawkins Impingement sign	Flex patient's shoulder to 90°, flex elbow to 90°, place forearm in neutral position. Passively internally rotate arm (compresses space underneath acromion)	Reproduction of patient's pain in shoulder	Rotator cuff tear or impingement syndrome/rotator cuff tendonitis.
Extrinsic Shoulder Tests	s structures other than rotator cuff		
Crossover test	With Arm flexed 90° move arm passively across body into adduction. Compresses AC joint.	Reproduction of pain at AC joint	AC joint pathology (arthritis)
Shoulder Apprehension	<u>test</u> Supine or sitting. Place patient's arm in 90° abduction, elbow flexed to 90, they slowly externally rotate shoulder (to stress anterior joint capsule of shoulder). If patient demonstrates apprehension that shoulder will dislocate, this is positive for anterior glenohumeral joint instability.	+ apprehension is positive sign. Relief with anterior pressure (Fowlers) is confirmatory.	Anterior glenohumeral joint instability (chronic) (Not done in acute dislocations)



Drop Arm test	Assist patient to abduct both arms or one arm at a time to 90 degrees and have patient lower slowly. A seamless symmetrical descent is a normal exam.	A fast drop is suggestive of tendonitis or partial tear. A sudden or uncontrolled drop is suggestive of full tear.	Pathology of supraspinatus (0-15 degrees) or deltoid (15-90 degrees)
Infraspinatus/Teres Minor Isolated resistance	Have patient place arms at their side and flex elbows to 90 degrees with thumbs up. Provide resistance as patient presses forearms outward (external rotation)	Weakness with resistance (external rotation)	Infraspinatus and/or Teres Minor tendonitis or tear
Lift off Test Subscapularis	Have patient place hand behind their back with palm facing away from body. Instruct patient to "lift off" their hand (tests internal rotation) as they press their palm away from their back against your resistance.	Weakness with resistance partial tear or rupture (internal rotation)	Subscapularis tendonitis or tear
Subacromial Impinger	ment Tests	1	
Neer's Sign	Place your hand on the posterior scapula for stabilization. With your other arm, hold your patient's internally rotated arm at the wrist and bring shoulder into full flexion. This maneuver compresses the greater tuberosity of humerus into anterior acromion. narrowing the subacromial space	Reproduction of patient's pain in shoulder	Rotator cuff tendonitis or possible tear, subacromial impingement

(elevated arm stress test)	Have patient hold both arms up (abducted at shoulders, elbows flexed 90 degrees, externally rotated). Have patient open and close hands for 3 minutes.	Reproduction of paresthesia, cramping of hand(s) due to lower blood flow.	Thoracic outle syndrome
Y	Stresses structures of thoracic outlet. (scalene, pec minor, costoclavicular space)	High false positive due to fatigue	
Shoulder Exam (Intrir	sic tests for Rotator Cuff)		

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Region	Brief Description of Exam	Positive Test Findings	what <u>diagnosis</u> is a positive test consistent with?
Neck Special Tests			
Spurling Test	Have patient extend, side bend and rotate head to side being tested (to narrow the cervical intervertebral foramen). If no radicular symptoms, place axial load gently (5-10 lbs.) from too of head to reproduce symptoms of paresthesia. Apply axial load up to 5 seconds.	Reproduction of paresthesia (numbness, tingling symptoms) in neck or arm. If there is a reproduction of symptoms with set up and no axial force, no need to apply axial force.	Cervical radiculopathy
Lhermitte Sign	Instruct patient to flex head forward, chin to chest and hold for up to 30 seconds. Forward flexion of cervical spine is thought to put pressure on dorsal column of spinal cord.	Reproduction of paresthesia down spine or back	Spinal cord compression in cervical region (myelopathy, MS, spondylosis)
Adson Test	Position patient sitting. Extend and rotate head to the affected side. <i>Extend</i> arm on the same side and assess radial puck. Have patient take a deep breath and hold for 10- 15 seconds. These actions narrow thoracic outlet structures (scalene, pee minor, costodavicular space) and increase	Reproduction of paresthesia and decreased radial pulse.	Thoracic outlet syndrome



Autonomics to shoulder

- Sympathetics-originates T1-4 innervation-sympathetic ganglia lie anterior to the rib head of the fascia. -function: vasomotor, pilomotor(and secretory), pupillodilator in head and neck
- T1-4 goes to cervical ganglion before making its way to the UE-preganglionic SNS fibers to the UEs originate in the T1-T4(5) segments and synapse in the superior, middle, and inferior(stellate) cervical ganglia.

• (80% people, the stellate ganglion actually is made up of

Autonomics to shoulder cont'd

 Note: Nociceptive afferents from the cervical spine travel in the sympathetic chain and synapse in upper thoracic cord. This can produce an irritable focus in the cord and result in somatic and sympathetic hyperactivity. -SD of upper thoracic spine and ribs may increase sympathetic tone to the upper extremities and produce altered motion, nerve dysfunction, lymphatic and venous congestion

Autonomics to shoulder cont'd

- Motor innervation: brachial plexus (nerve roots C5-8 and T1) Roots pass between ant/mid scalenes and form the trunks.
- -Innervation of muscles of shoulder. Look at where they can be entrapped/impinged by looking at cervical spine
- (neurovascular bundle: subclav. art., subclav. vein, brachial plexus, sympathetic nerve plexus)

Biomechanic: glides and glides:

- · Restrictions in one joint can lead to compensatory movement in other joints
- All joints need to move freely in the shoulder for optimal shoulder ROM

Factors that predispose to shoulder pain

- Unstable GH joint
- · Weakness of scapular stabilizers
- Abnormal posture(UCS)-forward head posture, decreased neck ROM,IR shoulders, increased hyphosis, protracted/devated sequalae. Posture causes weak/tonic muscle groups, causing chronic S/S like shoulder pain and HAs
- · Hypomobility of cervical and thoracic spine-
- · SD of pelvis: long musculature and fascial connections(Lat. dorsi) attach into iliac crest and humerus -thoracic spine, rbs and cervical spine: scapulae must glide over thoracic spine, SD of thoracic spine may alter the
 position of scapulae or affect musculature to scapulae.
- Many muscles that control scapular motion, connect to cervical spine. SD cervical area can affect shoulder/scapulae

Rotator Cuff Muscle Examination

- Supraspinatus- 90 degrees, resist, and thumb down resistance (Empty Can Test)
- Infraspinatus and Teres Minor- Elbow 90 degrees and ER resistance
- · Subscapularis- IR and Elbow Flexed behind body- Gerber's lift off test
- Serratus Anterior- Though not a RCM, Important!! Weakness noted with Winging of Scapula with Standing Push-up

Shoulder Impingement Syndrome

- Supraspinatus- Neer's Test Supinate (IR and Passively Flex Shoulder joint), Empty Can Test (Thumb down/IR), Hawkin's-Kennedy Test (Floppy- IR/ADD)
- Speeds- Resisted Forward Flexion, while Palpating Bicep Tendon
- Yergason's- Resisted Supination- elbow at 90 degrees

Biceps Tendonopathy

- Speeds- Resisted Forward Flexion, while Palpating Bicep Tendon
- Yergason's- Resisted Supination- elbow at 90 degrees, while Palpating Bicep Tendon origin and insertion

Adhesive Capsulitis (aka Frozen Shoulder)

- External Rotation limitation and pain
- Asymmetry of Scapular Muscles
- Trapezius Muscle TP's
- MUA

AC Joint Issues

- Usually the easiest to diagnose
- Pain over AC joint
- Scarf Test (Cross Body ADD)
- · Point tenderness over AC Jt, step-off and crepitous
- Painful Arc of Motion

Calcific Tendonitis

- Often Extremely painful
- Patients will present with h/o minimal even as a trigger, if at all
- Often h/o holding arm in an extended position for decades with work EX: UPS Driver
- Extreme Point tenderness over area of calcification
- If someone offer surgery, RUN (away :-))
- · Self-limiting and better with OMT, followed by PT, and may

come up every 10-20 years

Shoulder Instability

- Sulcus Sign- Pull down inferiorly, Lateral deltoid void
- SLAP- A SLAP tear or SLAP lesion is an injury to the glenoid labrum (fibrocartilaginous rim attached around the margin of the glenoid cavity in the <u>shoulder blade</u>). SLAP is an acronym for "superior labral tear from anterior to posterior".
- X-ray, MRI and referral to specialist

When is arm/shoulder pain something more?

- Referred pain :
- 1) Heart- r/o MI, PE, Pneumonia etc...-> EKG, CXR, LABS etc
- 2) Cervical spine--> C- disc ds
- 3) Intestines (Kehrs-left-spleen rupture) and Pelvis (Chandelier-->Kehrs sign)
- 4) Stomach and Liver/GB (rights sided Kehrs)
- 5) Lungs and Diaphragm can present as shoulder pain.

Osteopathic Clinical Practice Pearls

- Combined Subscapularis/Serratus Anterior and Rib S.D. often culprit-
- a) Often the reason that a good Surgical outcome cannot be realized until OMT is performed
- b) Often the proverbial 'string in the ball of yarn' for unwinding shoulder issues such as Frozen shoulder, Calcific Tendonitis, 'Rotator cuff strain', and atraumatic acute painful shoulder with limited ROM
- * Suspect Calcific Tendonitis with point tenderness over Acromial-mid deltoid JXN \rightarrow Check X-Ray
- Pain that comes back minutes to an hour after OMT, suspect C-disc disease→ X-Ray/MRI C-spine





Lateral Recumbent Stretch of Scapulothoracic Area Standing with patient lying lateral recumbent facing SD.

5. Reassess

 Drape your patient's arm over your cophalad forearm. Identify the inferior angle and the medial border of the scapula with your fingers.
 Gently curl your fingers 'under' the scapula medially and place your thenar eminences on the inferior and superior aspects of the scapula establishing a gentle, firm contact with the scapula
 Gently move the scapula inferior' superior, medially laterally, and circumferentially to find areas of tension.
 Rhythmically stretch and release these tensions until the parascapular muscles have relaxed.

