Shoulder Pain: 
Evaluation and Management 
Kansas Association of Osteopathic Medicine 

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Objectives

- Review anatomy of the shoulder complex
- Review motions of the shoulder complex
- Understand and be able to perform an evaluation of shoulder using various functional and special tests
- Review some common problems and Osteopathic interventions for the shoulder
Joints of the Shoulder

Shoulder Joints

- **Sternoclavicular**
  - Cartilaginous

- **Acromioclavicular**
  - Fibrous

- **Glenohumeral**
  - Synovial

- **Scapulothoracic**
  - False/ Pseudo
• Scapula
  – Glenoid fossa
    • Poorly shaped
    • Humeral head 3x larger than glenoid fossa
  – Acromion process
  – Coracoid process
• Humerus
• Clavicle
Scapula

Type III found in up to 80% of Rotator Cuff tears
Compared with 3% in Type I
Imaging

- Spine of scapula
- Coracoid process
- Scapula

- Acromial angle
- Acromion
- Head
- Supraspinous fossa
- Glenoid cavity
- Infraspinous fossa
- Subscapular fossa
- Surgical neck
- Clavicle
- Superior border
- Coracoid process
- Lesser tubercle
Shoulder

- 2 “Compartments”
  - Glenohumeral
    - Humeral Head
    - Scapula
      - Glenoid fossa
  - Subacromial space
    - Acromial arch
    - Humeral head
Glenohumeral Joint

- **Static stabilizers**
  - Labrum
  - Capsule/ Ligaments
  - Adhesion-cohesion
  - Intra-articular pressure

- **Dynamic stabilizers**
  - Rotator Cuff muscles
  - Deltoid
  - Long head of biceps
  - Scapulothoracic muscles
  - Proprioceptive feedback
Glenohumeral Joint

- Cartilage
  - Labrum
    - Attached almost completely around the edge of the glenoid
    - Wedge-shaped
    - Deepens cup of the glenoid socket for the ball of the humerus
    - Where the biceps tendon attaches to the glenoid
Glenohumeral Joint

• Coracohumeral
  – Limits downward displacement of the joint.
  – Becomes taut with external rotation
• Superior GHL
  – Resists inferior subluxation and contributes to stability in posterior and inferior directions
• Middle GHL
  – Limits anterior excursion instability, especially with arm in 45° abd position
  – Limits external rotation
• Inferior GHL
  – IGHL com
    • Single ligamentous stabilizer in the shoulder
  – Primary restraint is at 45-90° abduction
Glenohumeral Joint

• Capsule
  – Attached medially to margin of glenoid fossa
  – Laterally to circumference of anatomical neck of humerus
  – Anterior capsule thicker than posterior
  – 3 areas
    • Anterior labral attachment
    • Just medial to labrum
    • Further medially on glenoid
Arteries and Nerves
Acromioclavicular Joint (AC)

• Provides stability into abduction
• Functions as a pivot point acting as a strut to help with scapular movement increasing range of motion.
Ligaments

• Ligaments
  – Acromioclavicular
    • Provides horizontal stability to the acromioclavicular joint
  – Coracoclavicular
    • Stabilize the acromioclavicular joint
  – Coracoacromial
    • Secondary stabilizer as it forms part of the coracoacromial arch
Imaging

http://uwmsk.org/RadAnat/IntRotLabelled.html
Sternoclavicular Joint (SC)

- Articular disc separates the articular surfaces and adds significant strength to the joint
- Depends on capsular ligament for strength
- Enables the humerus to achieve $180^\circ$ of abduction
Scapulothoracic Articulation

- Scapula is a mobile platform from which the upper limb operates
- Dynamic, neurologically complex
- Body of the scapula and the muscles covering the posterior chest wall
- Allows the scapula to glide and rotate over the posteriolateral chest cage
- Scapula aligns itself to allow the glenoid to be in the best position to receive the head of the humerus
Shoulder Range of Motion

[Diagram showing shoulder joint with angles of 60° and 120°]
Shoulder Girdle

- Shoulder Function
  - Relies on muscles for support
  - Humerus is suspended from the scapula by soft tissue, muscles, ligaments and a joint capsule
    - Humerus
      - Lever
    - Scapula
      - Lever & pulley
    - Clavicle
      - Strut
    - Sternum
      - Pivot/anchor
Glenohumeral Range of Motion

- 3 planes of movements
  - Flexion/extension
  - Abduction/adduction
    - Horizontal
      - Abduction
      - Adduction
    - Internal/external rotation
Range of Motion

Sternoclavicular

• Horizontal
  – Extension (Abduction)
  – Flexion (Adduction)
Range of Motion

Acromioclavicular

• Abduction
• Horizontal
  – Adduction
  – Abduction
• External Rotation
• Internal Rotation
Range of Motion

- Scapulothoracic
  - Elevation/Depression
  - Pro/retraction
  - Up/downward rotation
- Scapular rotation is necessary to keep GH joint in position of maximum stability
Dynamic Range of Motion
Rotator Cuff (SITS)

Muscles of the Rotator Cuff:
- Subscapularis
- Supraspinatus
- Infraspinatus
- Teres Minor

Back View

Front View
Rotator Cuff (SITS)

- Help stabilize joint by holding humeral head in the glenoid socket
Lateral Shoulder
• Long Head
  – Inserts Anterior Labrum
• Short Head
  – Inserts Coracoid Process
Bursa

Subcoracoid

Subscapular

Subacromial
Bursa
Scapulothoracic “Joint”
Scapulothoracic Bursa
Musculature - Superficial

- SCM
- Trapezius
- Infraspinatus
- Deltoid
- Teres Minor
- Triceps
- Pectoralis
- Biceps
- Teres Major
- Rhomboid
Pathology

Shoulder Pain

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Glenohumeral (GH)

- Anterior Dislocation
  - Acute Pathology
    - Labral Tear
    - Hill Sachs Lesion
    - Axillary Neuropathy
  - Chronic Sequela
    - Adhesive Capsulitis
    - Glenohumeral Instability
Glenohumeral (GH)

- Labral Tear
  - Multiple subtypes
Glenohumeral (GH)

- Hills Sachs lesion
Glenohumeral (GH)

• Axillary Neuropathy
Glenohumeral (GH)

- Adhesive Capsulitis
- Glenohumeral Instability
Glenohumeral (GH)

• GIRD
  – Glenohumeral Internal Rotation Deficiency
    • Loss of range of motion joint as compared to the contralateral side
    • Occurs primarily in overhead athletes
      – often seen in baseball pitchers
Glenohumeral (GH)

- Biceps Rupture
  - Microtrauma
  - Macrotrauma

 Shoulder Biceps Rupture

Shoulder Biceps Rupture Symptoms

“Balled up” muscle with bruising

Shoulder and arm weakness

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Glenohumeral (GH)
Glenohumeral (GH)

- Rotator Cuff (RC) Tears
  - Most commonly Supraspinatous
    - Partial thickness
    - Complete
Shoulder Impingement

- Between 48-72% of shoulder pain in PCP office is subacromial impingement
  - Supraspinatous
  - Subacromial Bursa
Acromioclavicular (AC)
Acromioclavicular (AC)

- AC Joint Separation
Acromioclavicular (AC)
Sternoclavicular (SC)

- Dislocation
Scapulothoracic (ST)

• SICK Scapula Syndrome
  – Superior shoulder pain
    • Scapular malposition
    • Inferior medial border prominence
    • Coracoid pain and malposition
    • Dyskinesia of scapular movement
  – Develop in patients with chronic type III acromioclavicular (AC) dislocation
  – Thought due to loss of the stable fulcrum of the shoulder girdle represented by the AC joint and due to the caused by dislocation
Examination
Observation

• Head/ Neck Carriage
Observation

• Obvious Deformities
  – Acromioclavicular joint
  – Clavicle
  – Glenohumeral joint
    • in acute dislocations
Observation

- Range of Motion - GH
Observation

- Range of Motion - GH
Observation

- Range of Motion
  - Pure elevation
  - Pure tilt
  - Coupled motions
Observation

Range of Motion - SC

• Horizontal
  – Extension (Abduction)
  – Flexion (Adduction)
Observation

• Range of Motion - AC
  – Horizontal
    • Adduction
    • Abduction
  – External Rotation
  – Internal Rotation
Observation

- **Range of Motion – ST**
- **Scapation**
Observation

• **ST Rhythm**
  – Rhythm
    • Normal  ABN  – Winging  R / L
  – Wall push-up
    • Normal  ABN  – Winging  R / L
  – Hand Press
    • Normal  ABN  – Winging  R / L
Palpate

- SCM
- Clavicle
- Acromion Process
- AC Joint
- Coracoid process
- Greater & Lesser tuberosity
Palpate

- Bicipital Groove
- Deltopectoral groove
Palpate

• Axillary Nodes
• Spine of Scapula
• Medial and Lateral Scapular borders
Palpate

- Subacromial and Subdeltoid bursae
- SITS muscles
Provocative Testing

- Apprehension test
  - For anterior instability due to **labral tear**
  - The patient's arm is abducted to 90 degrees while the examiner externally rotates the arm and applies anterior pressure to the humerus
Provocative Testing

- **SLAP lesion (O'Brien test)**
  - shoulder is held in 90 degrees of forward flexion, 30 to 45 degrees of horizontal adduction and maximal internal rotation
  - Examiner grabs the patient's wrist and resists the patient's attempt to horizontally adduct and forward flex the shoulder
  - Indicative of **labral tear**
 Provocative Testing

• Speed’s Test
  – Suggests **bicipital tendonitis** involving long head of biceps or possibly **labral tear**
  – Patient forward flexes shoulder against resistance at forearm

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Shoulder
Bicep
Rupture
Symptoms
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"Balled up" muscle with bruising

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Provocative Testing

- **Rotator Cuff** "empty can" test
  - The patient attempts to elevate the arms against resistance while the elbows are extended, the arms are abducted and the thumbs are pointing downward.
  - Positive is pain over *supraspinatus tendon*
Provocative Testing

• Drop Arm Test
  – For Suspected **rotator cuff tear** or **AC Sprain**
  – Gentle tap over abducted arm may force arm to give way, arm drops to side quickly and not smoothly
Provocative Testing

• Apley scratch test.
  – The patient attempts to touch the opposite scapula to test range of motion of the shoulder
  – *(Left)* Testing abduction and external rotation
  – *(Right)* Testing adduction and internal rotation
  – Weakness possible **rotator cuff tear**
  – Limited ROM possible **impingement**
Provocative Testing

• Hawkins' test
  – For **impingement or rotator cuff tendonitis**
  – The arm is forward elevated to 90 degrees, then forcibly internally rotated
  – Impales tendons against coracoacromial arch
Provocative Testing

- Neer's test
  - For **impingement** of the rotator cuff tendons under the coracoacromial arch.
  - The arm is fully pronated and placed in forced flexion.
Provocative Testing

• Cross-arm test
  – For **acromioclavicular** or **sternoclavicular joint disease**
  – The patient elevates the affected arm to 90 degrees, then actively adducts it
  – **Differentiates AC joint disease from impingement**
Interventions
7 Steps of Spencer

- Developed by Spencer, D.O. in 1916
  - Articulatory technique used at shoulder to increase ROM
  - This is a modification adding a muscle energy component
  - Useful when restriction or fibrosis has developed in soft tissue during period of inactivity after injury
  - Properly done, very gentle and well tolerated.
7 Steps of Spencer

- Seven steps engaging motion around three axes, and along one axis, engaging all of the major muscles around the glenohumeral joint

- Treat limited Range of Motion due to:
  - Early adhesive capsulitis,
    - i.e. from healed fractures
  - Degenerative or traumatic condition
  - Rotator cuff strains
7 Steps of Spencer

Pure Glenohumeral motion

- **Extension** - elbow flexed

(Repeat each motion 3-5 times)
7 steps of Spencer

- **Circumduction** - Compression: elbow extended

  Step 3

- **Circumduction** – traction: elbow flexed

  Step 4
7 steps of Spencer

- Adduction - external rotation - elbow flexed
7 Steps of Spencer

- **Internal rotation** with arm horizontal
  - stretching tissues and pumping fluids

- **Internal rotation** with arm extended
Sleeper Stretches

Capsular Restriction

- Muscle Energy
  - Isometric stretch
Myofascial techniques

Rotator Cuff

• Most common tender point within myotendinous junction of the teres minor
  – Points within the belly of the muscle or in other muscles are possible

• Apply direct pressure onto the tender point until tissue texture softening is noted
Myofascial techniques

Scapulothoracic

- Grasp scapula along medial and lateral borders
- Can do direct or indirect myofascial release or even just direct stretch against restriction
Wall Push Up – Hand Press

• Protraction/ Retraction
Scapular Slides

- Pure elevation
Wall Washes

- Pure Tilt
Overhead pulls

- Coupled motion
Acromioclavicular joint

- **Abduction restriction**
  - Stand behind the patient and place your monitoring fingers over the ACJ.
  - Abduct the arm until the barrier is engaged
    - Can be difficult d/t patient’s inability to relax.
    - Sometimes helps to grasp at the elbow.
Acromioclavicular joint

• Abduction restriction
  – Patient is asked to adduct the arm gently against resistance, for 3-5 seconds.
  – Slack is taken up by further abducting the arm, to engage the new barrier.
  – Repeat 2-4 times and recheck.
**Sternoclavicular joint**

- **Abduction restriction:**
  - Place monitoring fingers over the SCJ
  - Using your other hand, extent the arm with slight internal rotation, off the table until movement is felt at the SCJ
Sternoclavicular joint

- **Abduction** restriction:
  - Ask the patient to gently push his hand forward while applying resistance, for 3-5 x’s
  - Take up the tissue slack by moving further into extension, until movement at the SCJ
  - Repeat 2-4 times, then recheck motion
Sternoclavicular joint

- **Flexion restriction**
  - Place monitoring fingers over the SCJ.
  - Ask the patient to grasp your shoulder while you reach your other hand behind the scapula.
  - Flex the clavicle on the manubrium until the barrier is engaged, by straightening your body.
Sternoclavicular joint

- **Flexion restriction**
  - The patient is asked to pull down with his shoulder for 3-5s.
  - Take up the slack by further straightening your body to engage the next barrier
  - Repeat 2-4 times and recheck.
Questions