

Shoulder Stuff

An Osteopathic Approach to the Treatment of Shoulder Injuries

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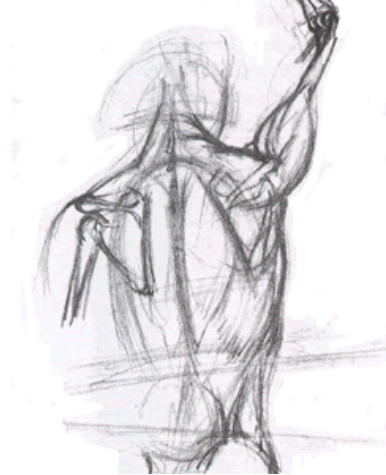
Objectives



- Describe the associated anatomy of the shoulder
- Review the important history and patient symptoms for shoulder injuries
- Describe the physical exam findings and diagnostic tests for various common shoulder conditions
- Describe the common management of the discussed disorders
- Review common osteopathic treatment techniques including Spencer, ligamentous balance, scapular release

Introduction The Upper Extremity

- The upper extremity is essential in one's activities of daily living
- Minor injuries can produce disabilities that can significantly affect one's overall function
- Effective diagnosis and treatment of these injuries and dysfunctions necessitates a thorough understanding of the STRUCTURE and FUNCTION of this region



Introduction Shoulder

- **Third** most common MS complaint in primary care offices
- Up to **26% of athletic injuries involve the shoulder**
- Alterations in the kinetic chain—including core instability, scapular dyskinesis, and GIRD have been associated with shoulder injury in 50%- 100% of reported cases
- Complicated anatomical and biomechanical joint
 - **“Fragile Equilibrium”**



Keeley, DW. J Pediatr Orthop. 2008; 28 (4): 452-459
Sciascia, A and B Kibler. J Musculoskel Med. 2011;28:58-64
http://www.kan.com/images/CRW_1207_JFR.jpg

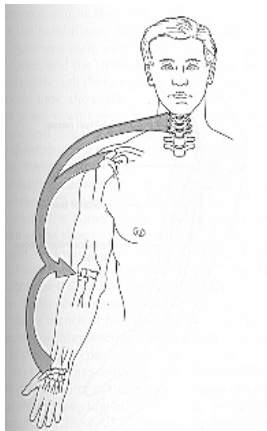
The Medical Exam

I'VE ALREADY GOT A DIAGNOSIS FROM
HOMEDOC.COM...BUT I THOUGHT I'D
SEE YOU FOR A SECOND OPINION!



- History
- Inspection
- Palpation
- ROM
- Muscle testing
- Neurovascular testing
- Biomechanics
- Specific Tests

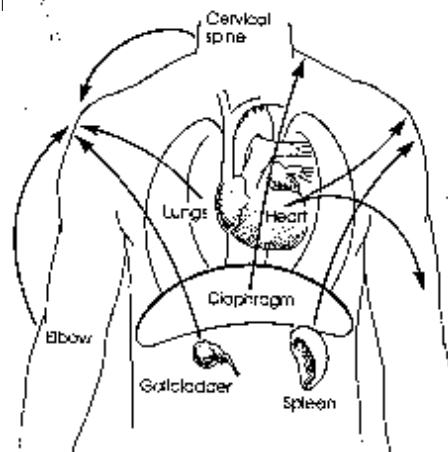
History



- Remember referred pain patterns and viscerosomatic effects
- A good history can help rule out a cervical or shoulder problem
- Examination of joint above and below

Introduction Shoulder

- Referred pain
 - Role of structure and function
- Intrinsic factors
 - Skeletal immaturity
- Extrinsic factors
 - Level of competition
 - Intensity, duration, and frequency
 - Biomechanical and physiological demands of each sport



Inspection

- Expose the area
- Compare bilaterally
- Joint alignment/deformity
 - Posture, (a)symmetry
 - Spoon-shaped or clubbed nails
- Signs of previous surgeries/injuries
 - Scars, muscle atrophy, contractures, loss of digit or extra digit, ecchymosis
- Muscular imbalances
- Functional aspects

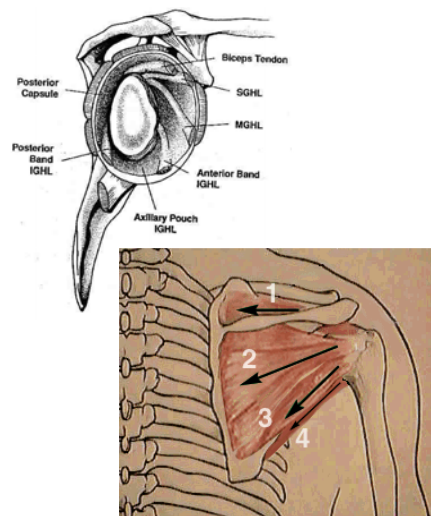


Physical Exam: ROM

- Forward flexion
 - 180°
 - Extension
 - 45°
 - ABduction
 - 180°
 - ADduction
 - 45°
 - External rotation
 - 40-45°
 - Internal rotation
 - 55°
- Possibilities for loss of ROM:
- Muscle weakness
 - Soft tissue contractures
 - Bony blockage
 - Extra-articular blockage: rubbery feel and gives slightly under pressure
 - Intra-articular blockage: inflexible and ROM ends abruptly
 - Somatic dysfunctions

Glenohumeral Joint (GH)

- Multi-axial ball and socket
- Most of the support is provided by the RC
- Contraction of RC pulls the humerus down into lower/wider portion of the glenoid cavity
- Without the “dropping down”, full ABduction is impossible
- Hydrostatic component



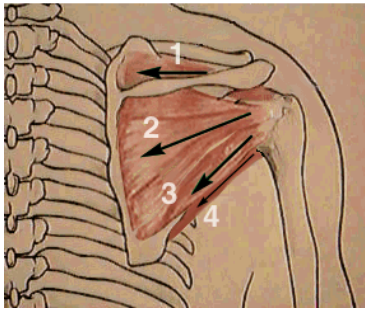
Anatomy—Shoulder

- Static stabilizers

- Labrum
- Capsule
- Adhesion-cohesion
- Intra-articular pressure

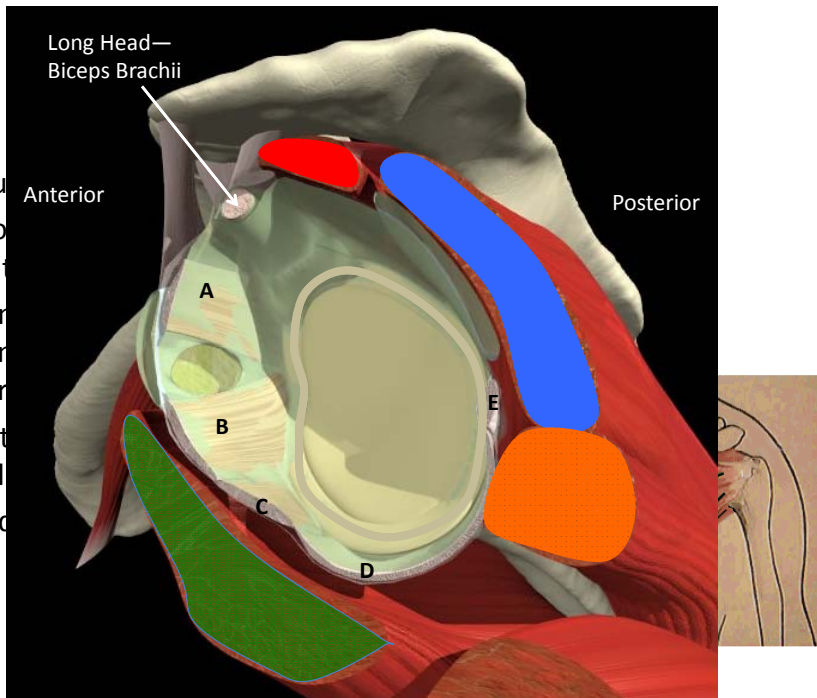
- Dynamic stabilizers

- Mainly through compression
 - RC muscles
 - Deltoid
 - Long head of biceps
 - Scapulothoracic muscles
- Allows the “dropping down”
- Proprioceptive feedback

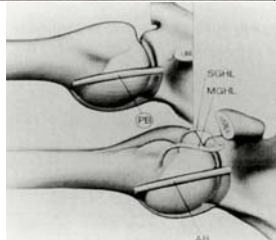
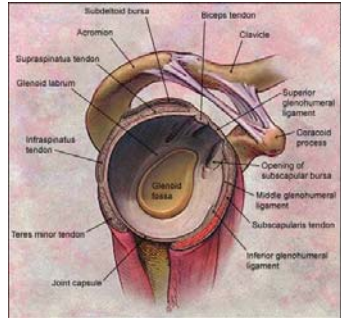


<http://www.sportfit.com/tips/rotatorcuff/images/Z4rtrs.gif>

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Anatomy—Shoulder

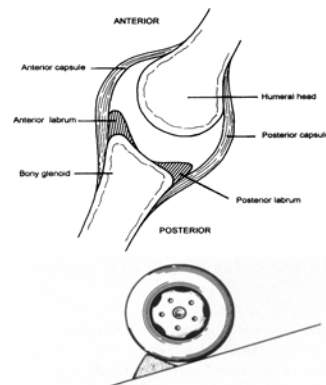
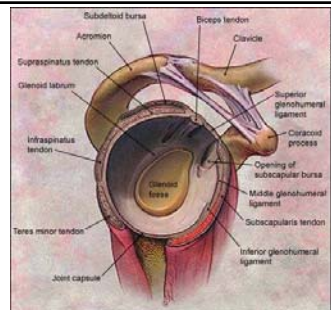


- Labrum
 - Ring of fibrocartilage
 - Increases contact area ~70%
 - “Chock block”
- Ligaments
 - Superior Glenohumeral
 - Middle Glenohumeral
 - Inferior Glenohumeral

<http://www.aafp.org/afp/990515ap/2773.html>

Static Stabilizer

- Labrum
 - Surrounds/deepens fossa
 - Attached firmly to inferior portion
 - Loosely to superior portion
 - Attachment site for capsule, ligaments, biceps
 - **Increases contact area ~70%**
 - Only part of the humeral head is in contact with the glenoid at a time
 - “Chock block”



<http://www.aafp.org/afp/990515ap/2773.html>

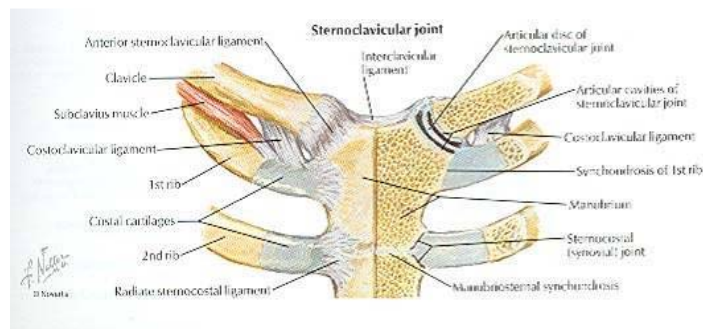
Acromioclavicular Joint (AC)

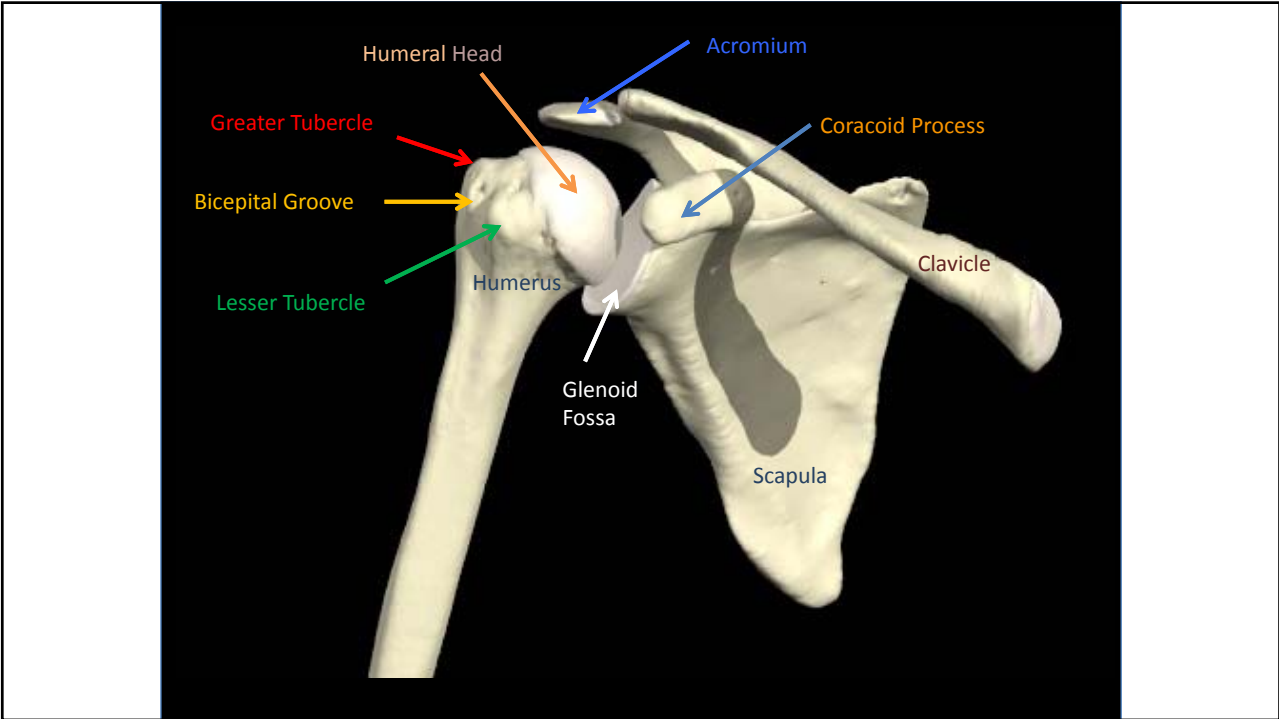
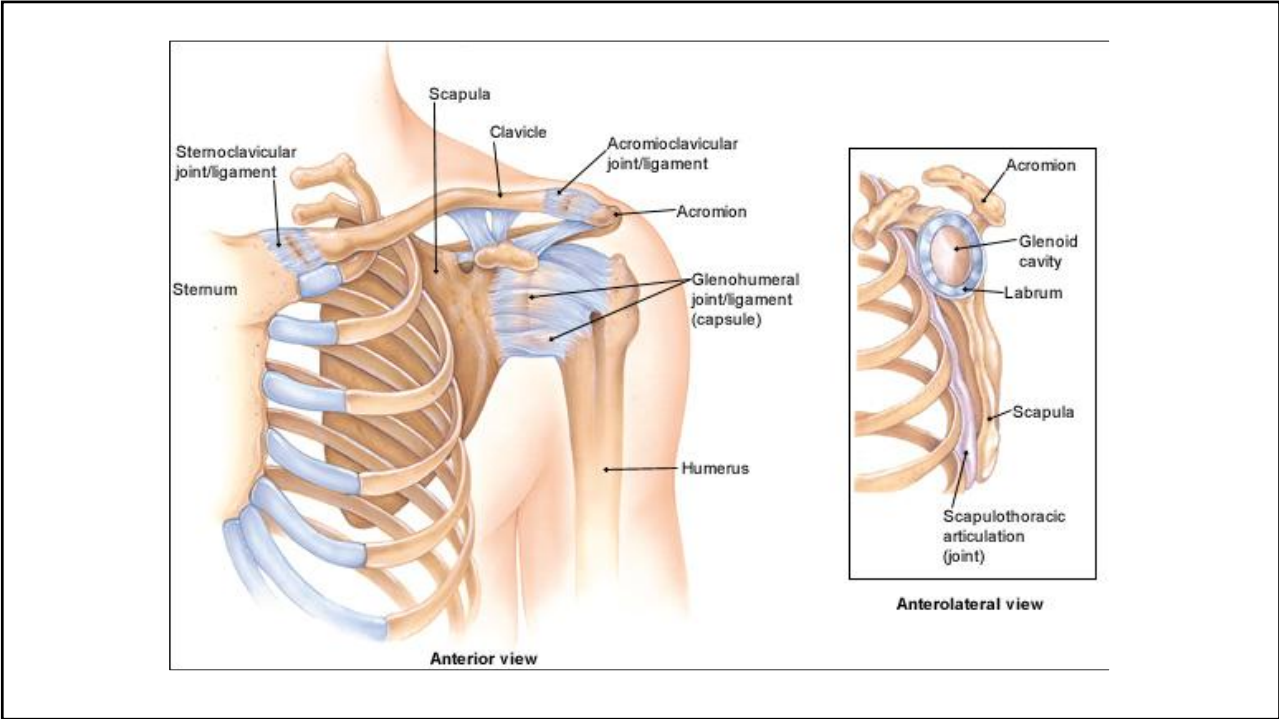
- Oval-shaped, synovial-lined articulation
- Fibrous capsule with an articular disc
- AC ligament stabilizes
 - thick and strong superior, weaker inferior capsular thickenings
- Posterior-superior portions of the capsule limit ant/post translation of distal clavicle
- Coracoclavicular ligaments stabilize the clavicle to the scapula
 - Conoid ligament primarily prevents anterior and superior clavicular displacement
 - Trapezoid ligament is the primary constraint against compression of the distal clavicle into the acromion

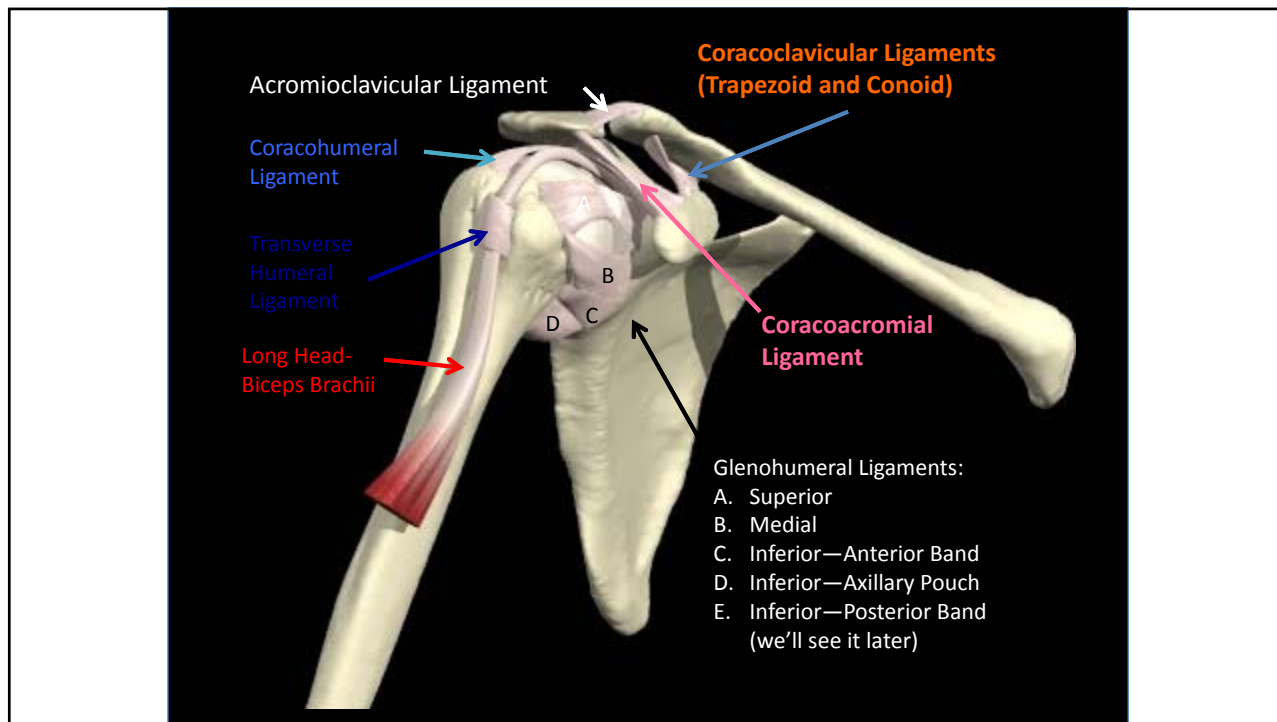


Sternoclavicular Joint (SC)

- Saddle shaped synovial joint
- 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° of ABduction

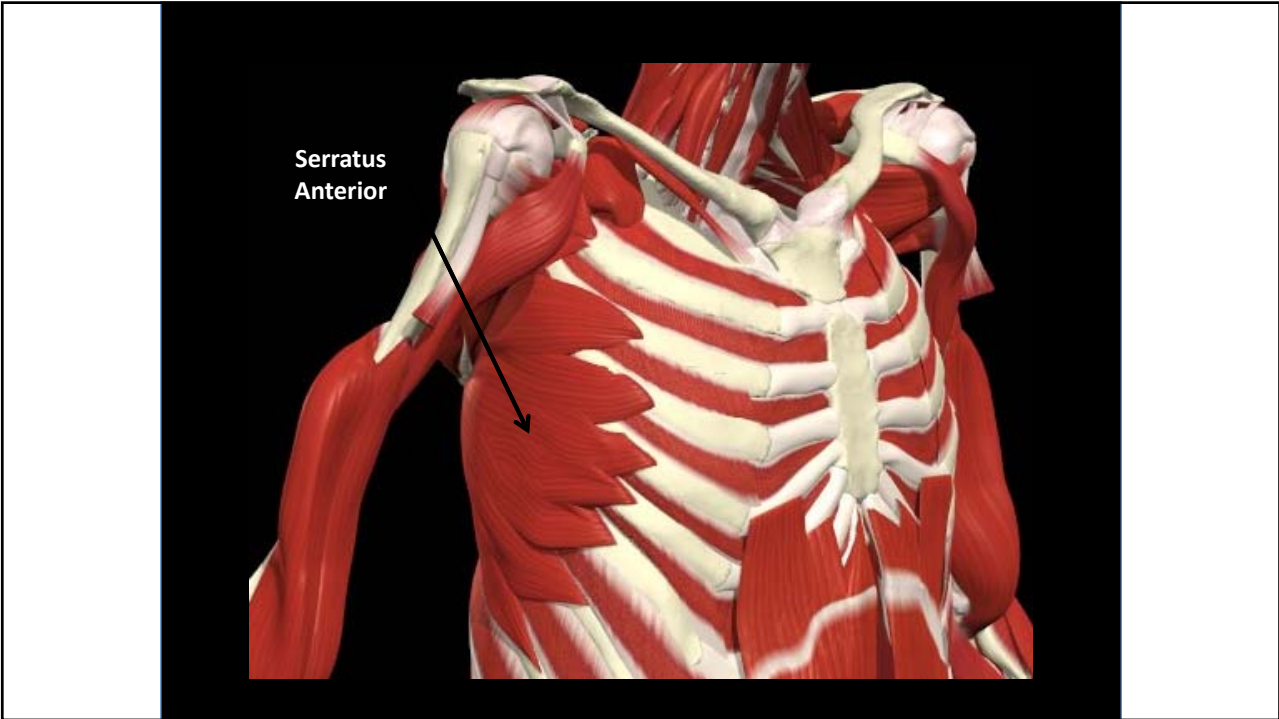
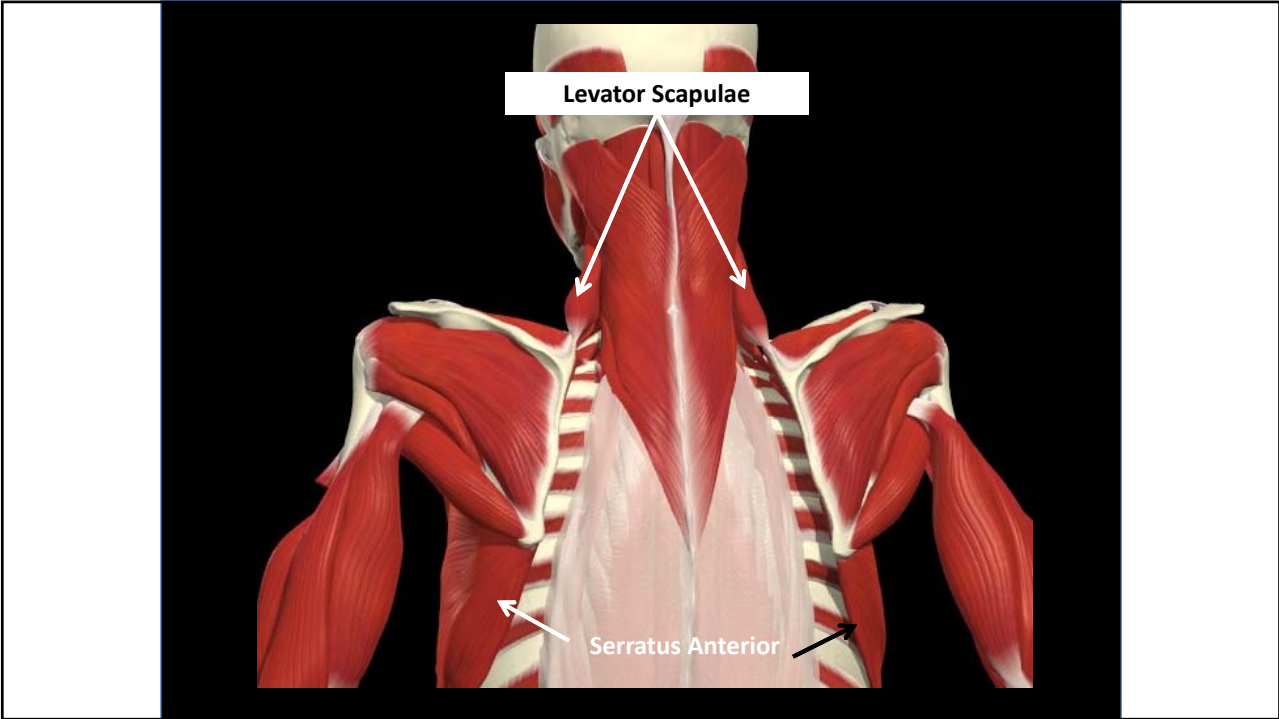


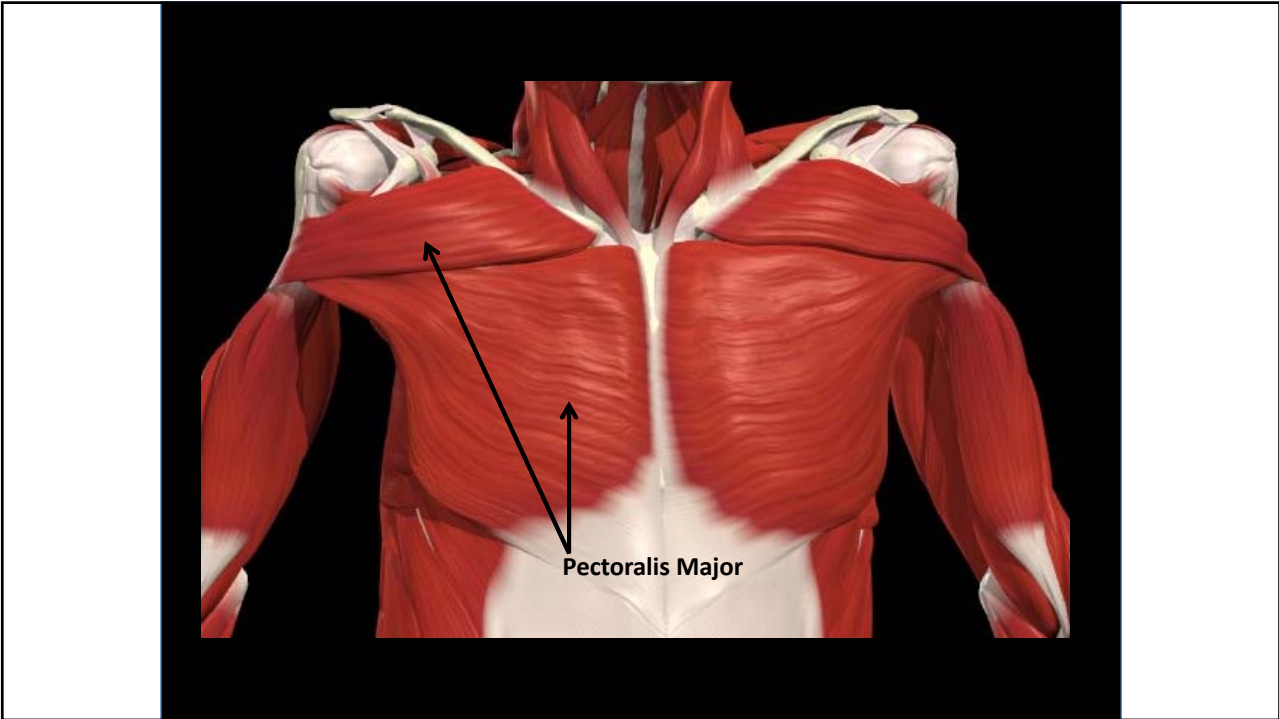
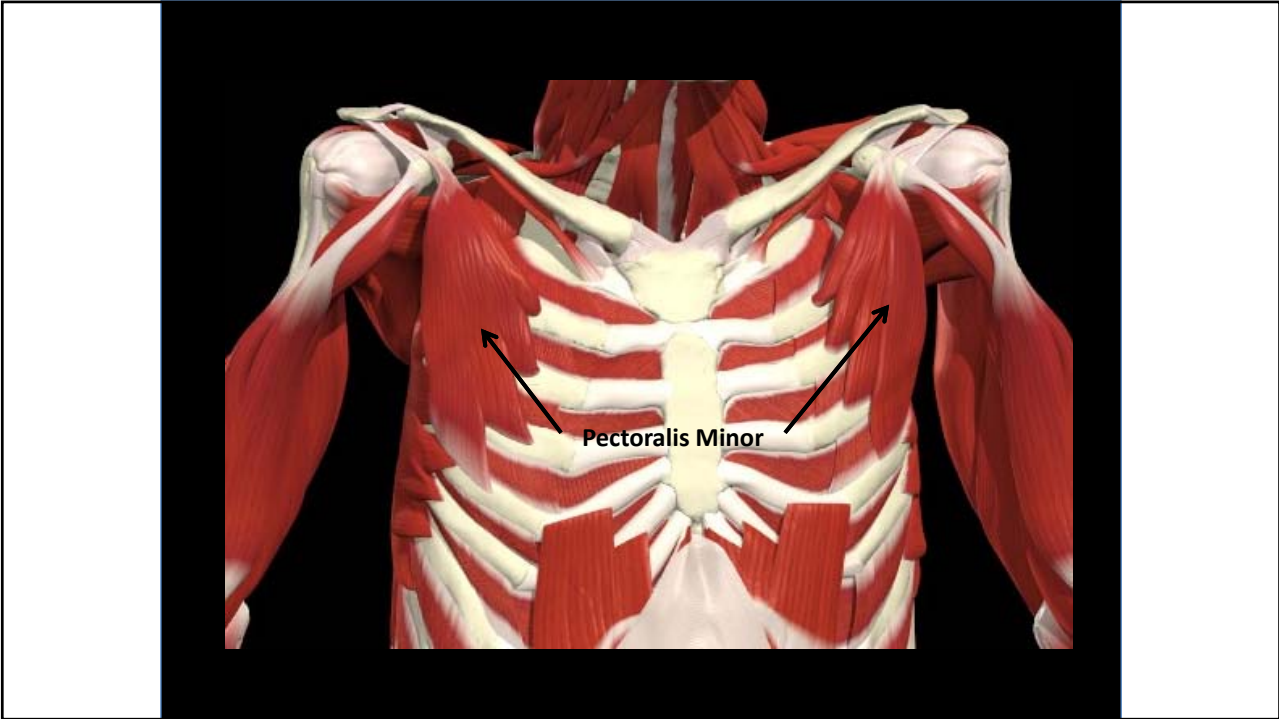


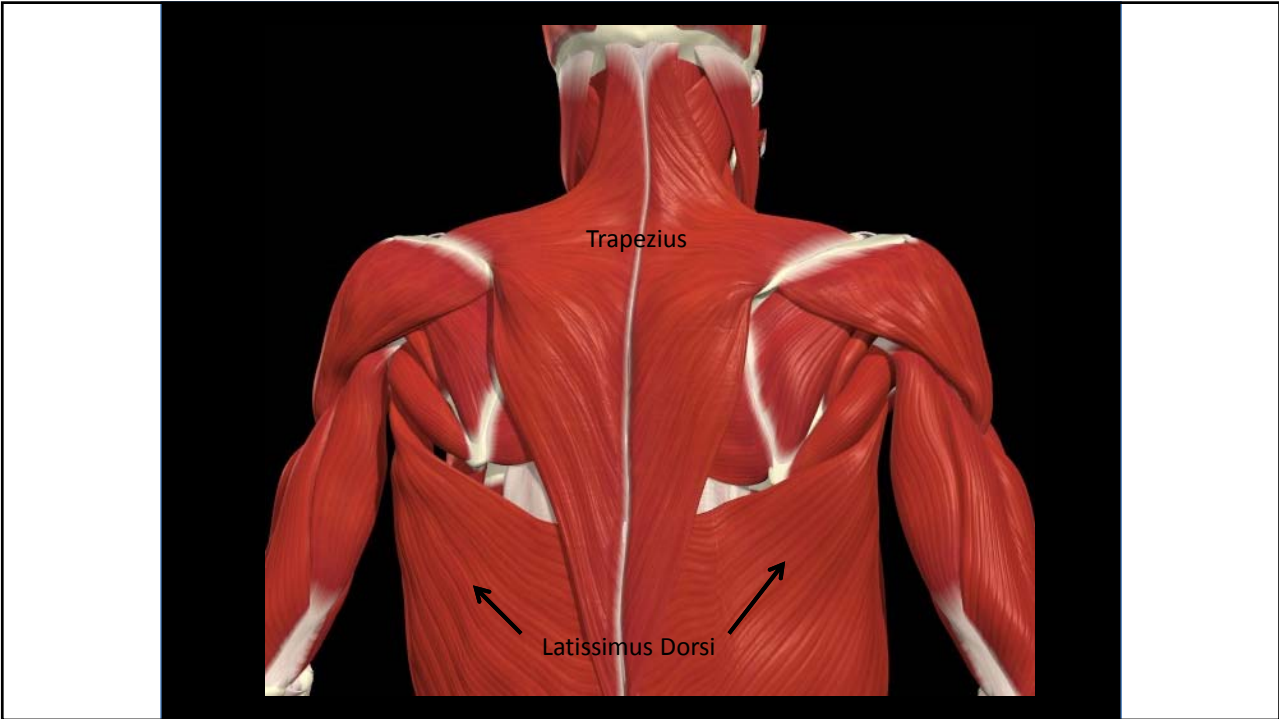
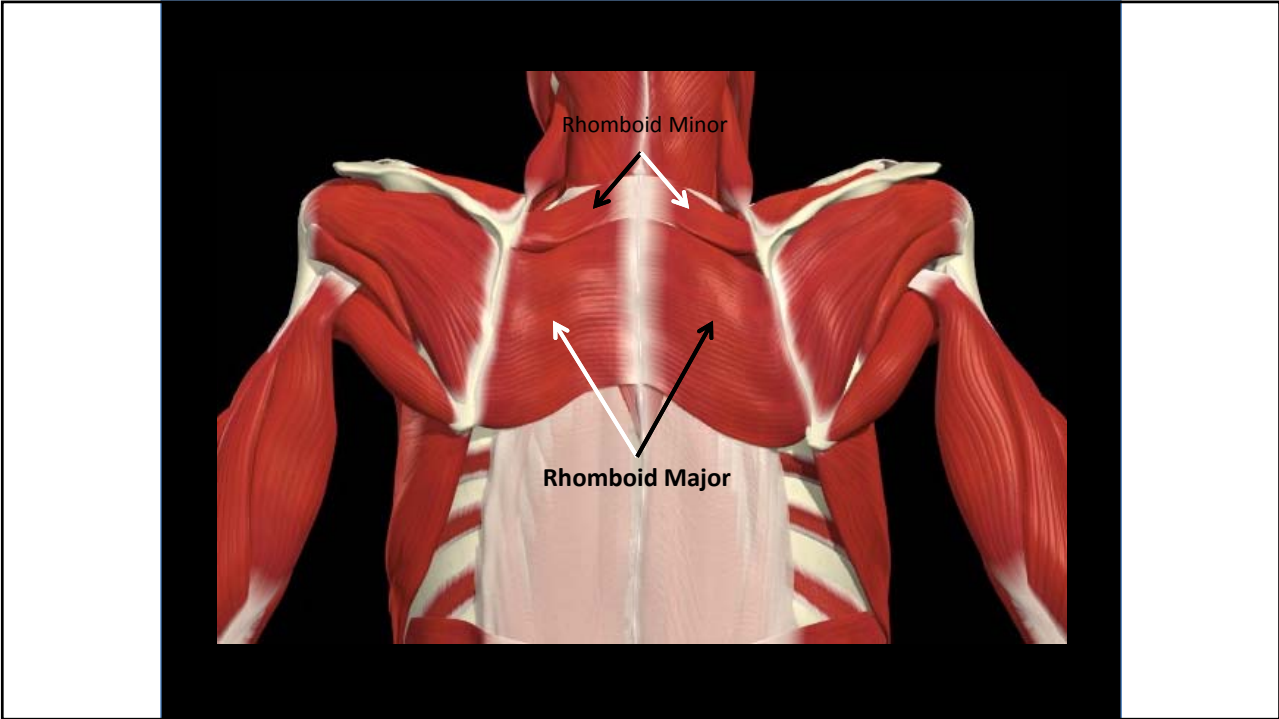


Muscle	Action	Innervation	
Suprapinatus	ABd	Suprascapular	C5-C6
Infraspinatus	ER	Suprascapular	C5-C6
Teres minor	ER	Axillary	C5-C6
Subscapularis	IR	Subscapular	C5-C6
Biceps brachii	Flex	Musculocutaneous	C5-C7
Triceps brachii	Ext	Radial	C5-T1
Deltoid	Flex/IR(a); ABd(m); Ext/ER(p)	Axillary	C5-C6
Pectoralis major	ADd/Flex/ER	Lat/med pectoral	C5-T1
Latissimus dorsi	Ext/ADd/IR	Thoracodorsal	C6-C8
Teres major	ADd/IR	Subscapular	C5-C6
Trapezius	Elev(s)/Retract(m)/Depress(i)	Accessory	CN XI
Levator scapulae	Elevate	Dorsal scapular	C3-C5
Pectoralis Minor	Depress	Med pectoral	C8-T1
Rhomboids	Retract	Dorsal scapular	C5
Serratus anterior	Protract	Long thoracic	C5-C7

Adapted from Table 11.1 Muscles of the Shoulder from Anderson et. al. *Sports Injury Management* 2nd ed. (2000).

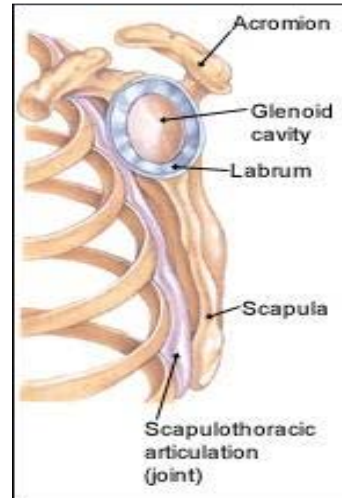






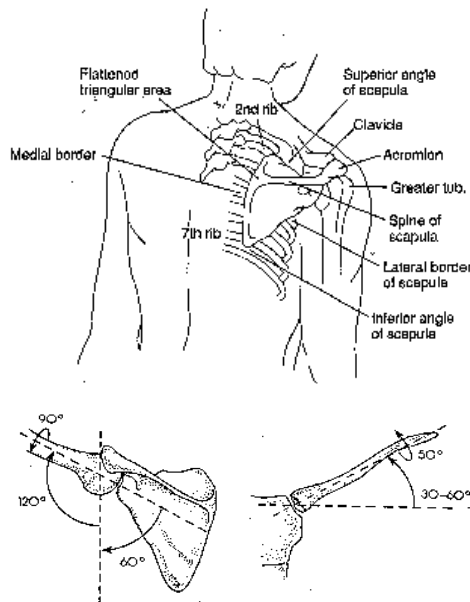
Scapulothoracic Articulation

- Also called scapulocostal joint
- Body of the scapula and the muscles covering the posterior chest wall
- Scapula serves as a mobile platform from which the upper limb operates
- Allows the scapula to glide medially, laterally, superiorly and inferiorly and rotate over the posterolateral chest cage



Anterolateral view

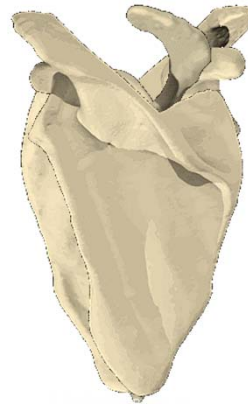
Scapulothoracic Articulation



- Scapula aligns itself to allow the glenoid cavity to be in the best position to receive the head of the humerus
- Neurologically complex
- Movement of the scapula, humerus and clavicle are necessary for normal scapulohumeral ABduction
- GH joint: scapula move in a 2:1 ratio
- Pain or stiffness may disturb synergy of motion

Anatomy—Scapular Mechanics

- 6 motions possible in 3 planes:
 - Frontal plane
 - Upward/downward rotation
 - Sagittal plane
 - Anterior/posterior tilt
 - Transverse plane
 - Internal / External rotation



Anatomy—Scapular Mechanics

- 6 motions possible in 3 planes:
 - Frontal plane
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 - Sagittal plane
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 - Internal / External rotation



Anatomy—Scapular Mechanics

- Also can have superior/inferior & medial/lateral shifts over the posterior rib cage



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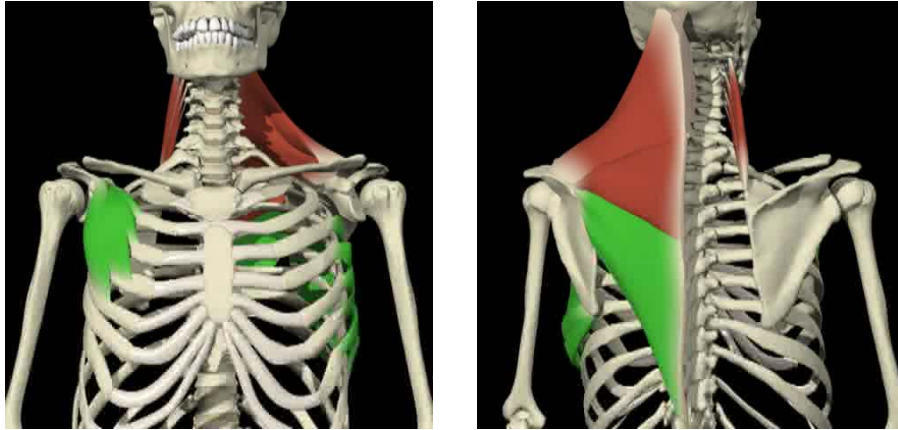
Anatomy—Scapular Mechanics

- These motions are rarely individual, but are usually combined to allow for smooth glenohumeral function
- **Functional base for shoulder**
- Complex biomechanics

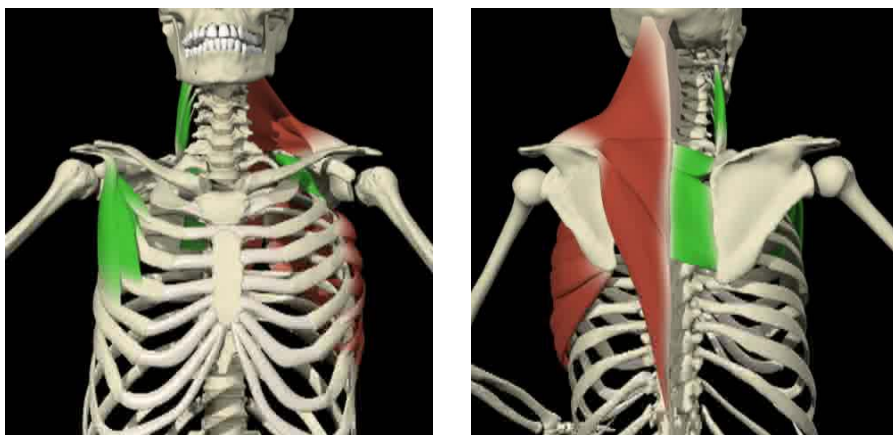


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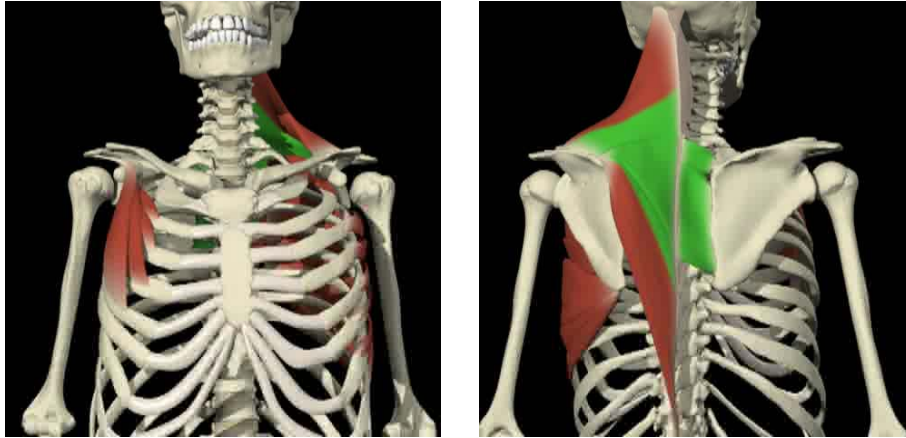
Scapular Motion: Elevation/Depression



Scapular Motion: Upward/Downward Rotation



Scapular Motion: Protraction/Retraction



Scapular Dyskinesia

- Functional base for shoulder
- Alterations in the resting position affects timing and magnitude of:
 - Acromial upward rotation
 - Excessive movement of the glenoid
 - Decrease maximal RC activation
- Often associated with other upper extremity disorders



Pain Location and Rotator Cuff Injury

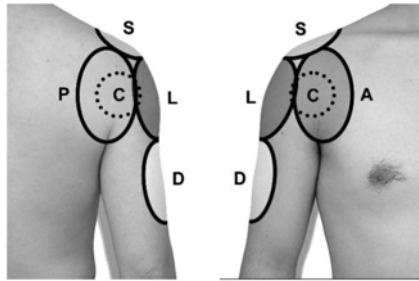


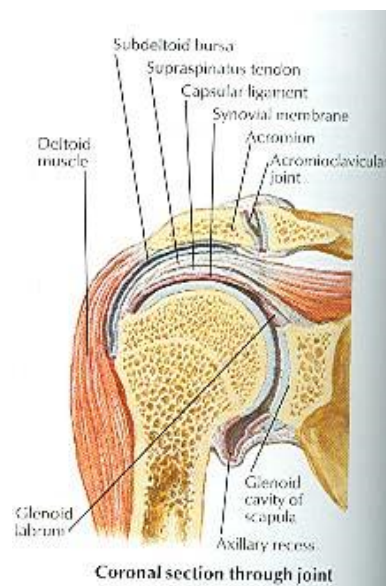
Figure 1. Location of pain. The shoulder was divided into 6 areas: anterior (A), lateral (L), posterior (P), superior (S), central (C), and distal (D) (mm).

Itoi, E. AJSM 2006; 34 (2): 256-264

- Existence of tear and the location of tear did not influence the location of pain
- Most common location of pain with tendonitis
 - Lateral region (45%)
 - Anterior region (40%)
- Most common location of pain with tears
 - Lateral
 - Supraspinatus (54%)
 - Infraspinatus (59%)
 - Anterior
 - Subscapularis (54%)

Review-Rotator Cuff

- Supraspinatus
 - Full Can
 - Empty Can
 - Scapular Retraction Test
- Subscapularis
 - Gerber Lift Off Test
 - Belly Press
 - Napoleon Test
 - Bear Hug Test
- Infraspinatus/Teres Minor
 - ER Strength Test
 - Patte's Test



Role of Laxity in Clinical Practice

- Varies widely
- 57% boys, 48% girls found “signs of instability” (Emery)
- Laxity is normal... Instability is painful



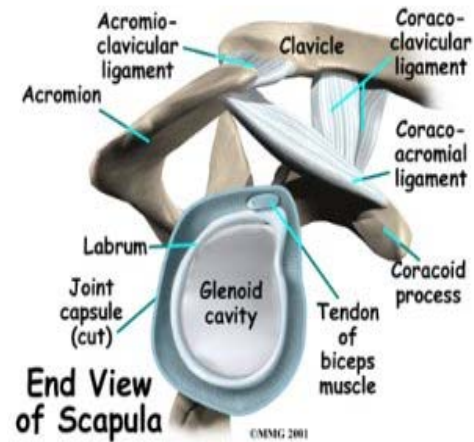
Bahk, M, et al. AJSM 2007; 35:131-144
Lintner, SA AJSM 1999; 27: 460-463
Emery, RJH J Bone Joint Surg Br. 1991; 73: 406-408
<http://www.odditycentral.com/wp-content/uploads/2008/03/rubberboy.jpg>

Stability Testing

- Impingment Testing
 - Neer
 - Hawkins
- Stability Testing
 - Apprehension
 - Relocation
 - Anterior Release
 - Sulcus
 - Posterior Drawer

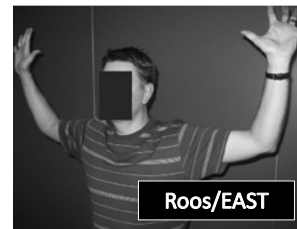
Review-SLAP Testing

- Biceps Load I/II
- Crank/Clunk
- O'Brien's Test
- Compression-Rotation
- Supination-ER Test
- Internal Rotation Resistance Strength Test



Special Testing: TOS

- Thoracic Outlet Syndrome
 - Adson maneuver
 - Military maneuver
 - Wright test
 - Roos test/EAST



Treatment

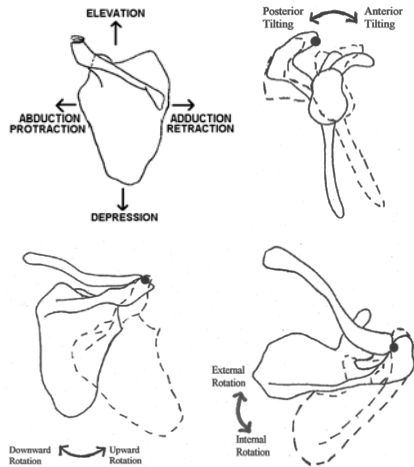
- Rest
- NSAIDs, muscle relaxants, analgesics
- OMT correcting the dysfunctional components and restoring neutral mechanics
- Muscle strengthening
- Surgery in extreme cases



"Apparently, they're better than The Cure..."

Osteopathic concepts
for the upper extremity

Scapulothoracic Dysfunctions



- Physician can assess for static/dynamic asymmetry
- Physician can physically take scapula through ROM, assessing for ease/restriction

Scapular Release

1. Patient in lateral recumbent position with physician at side of table
2. Hook fingers of cephalad hand over superior angle of scapula. Grasp elbow with opposite hand, resting patient's arm on physician's cephalad forearm (1)
3. Carry scapula inferiorly and laterally to muscular restrictive barrier
4. Apply sufficient force to feel muscles relax
5. Force is slowly relaxed
6. Stretching repeated rhythmically until max response obtained
7. Move fingers to medial scapular margin (2)
8. Carry scapula laterally and repeat #4-#6
9. Move fingers to inferior angle (3)
10. Carry scapula superiorly and laterally, repeating #4-#6

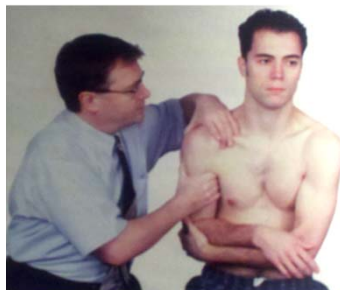


Glenohumeral Somatic Dysfunction Assessment

- Palpate position of humeral head in glenoid fossa, comparing sides
- Physician stabilizes scapula
- Grasp humerus at head or just distal
 - Apply anterior (pull forward)/posterior (push backward) pressure with thumb and fingers
 - Distract (pull down inferiorly)/compress (push up superiorly) with hand looking for evidence of sulcus sign
 - Pull medially/laterally (may have to change hand grasp position)
- Assess for ease/restriction of motion



GH Treatment: Ligamentous Balance



Dx: Humeral head ant/sup

1. Pt sits end of table, physician on side of dysfunction
2. Monitor humeral head w/post hand and places palm and/or fingers of ant hand on medial aspect of humerus as high in axilla as possible
3. Pt lays hand of dysfunctional arm across chest, grasps elbow or wrist w/other hand to pull elbow across chest against counterforce of physician's hand to gap GHJ. Pt also lifts elbow to assist physician w/superior glide.
4. Position humerus into int/ext rot by lifting/depressing elbow to obtain ligamentous tension balance
5. Test respiratory phases and pt holds breath as long as possible in best phase, making minor adjustments to other positions as needed.
6. Repeat step 5 until best motion

Spencer Technique

- Series of proprioceptive neuromuscular facilitation techniques
- Can be expanded to include ME treatment
 - Physician stabilizes scapula
 - Physician engages barrier of joint
 - Patient pushes against (away from barrier)
 - Repeat 3-5 times
 - Taking up slack and engaging new barrier each time
- Engages all of the muscles around the GH joint
- Both diagnostic & therapeutic



Spencer Technique

The seven stages of motions are:

1. Engage GH extension barrier with elbow flexed
2. Engage GH flexion barrier with the elbow flexed
3. Circumduction with compression
 - Start small circles, then gradually increase size
 - Clockwise and counterclockwise
 - May also do ME of IR/ER barriers



4. Circumduction with traction on straight arm

- Start small circles, then gradually increase size
- Clockwise and counterclockwise



5. Engage abduction barrier

6. Adduction/IR with elbow flexed

7. GH pump with distraction and compression along straight arm



Questions

