THE SHOULDER

PTA 216
Many structures that perform many movements

- Injuries inside or outside of the joint capsule

Magee, 2008. pg. 231
Composed of 4 articulations between the sternum, humerus, scapula, and clavicle.

3 synovial joints
- Glenohumeral joint
- Acromioclavicular joint (AC joint)
- Sternoclavicular joint (SC joint)

2 functional articulations
- Supr humeral/subacromial
- Scapulothoracic
Articulation between the articular end of the clavicle, the clavicular notch of the manubrium of the sternum, and the cartilage of the first rib

Motions include:
- Elevation and Depression
- Protraction and Retraction
- Axial rotation

Dutton, 2012. pg. 354
**ACROMIOCLAVICULAR JOINT**

- Formed by the acromion and the lateral end of the clavicle
- Serves as the lever for the upper extremity against the torso
- Attachment site for many soft tissues
- Main articulation that suspends the UE from the trunk
- Joint about which the scapula moves

Dutton, 2012. pg. 356
Glenohumeral Joint

- Ball and socket joint
- Relatively unstable requiring assistance from other structures
  - Labrum
  - Glenohumeral ligaments
    - Superior, middle, and inferior
  - Coracoacromial ligament
  - Coracoclavicular ligaments
  - Joint capsule
  - Muscular dynamic stabilizers
    - Rotator cuff, biceps tendon, muscles of scapular motion

Dutton, 2012. pg. 357
SCAPULOTHORACIC ARTICULATION

- Functionally acts as a joint, but lacks anatomic characteristics of a synovial joint
- Lacks ligamentous support
- Relies solely on muscular support between the scapula and thorax

Dutton, 2012. pg. 356
Motions that occur

- Elevation, Depression, Protraction, Retraction
  - Seen with clavicular motion at the SC joint, when the humerus moves, and shoulder shrugging

- Upward and Downward rotation
  - Seen with clavicular motion at the AC joint and with humerus movement

- Winging and Tipping
  - Seen with motions of the AC joint and humerus movement

Dutton, 2012. pg. 356
Boundaries are formed by:

- Greater tuberosity of the humeral head, inferiorly
- Coracoid process, anteromedially
- Coracoacromial arch, superiorly

Dutton, 2012. pg. 363
SCAPULOHUMERAL RHYTHM

- Synchronized motion that occurs between the glenoid cavity and the humerus during arm elevation
  - Allows the glenoid to stay centered under the humeral head which resists downward (inferior) dislocation
  - Ratio of ROM is 2:1
    - Every 2 degrees of abduction, there should be 1 degree of scapular upwards rotation

Dutton, 2012. pg. 363
MUSCLES OF THE SHOULDER

- 3 main groups of muscles
  - Thoracoscapular
    - Rhomboids, levator scapulae, serratus anterior, and trapezius muscles
  - Thoracohumeral
    - Latissimus dorsi and pectoralis major
  - Scapulohumeral
    - Supraspinatus, infraspinatus, teres minor, subscapularis, and deltoid
Rotator Cuff

- Made up of 4 muscles
  - Supraspinatus
  - Infraspinatus
  - Teres minor
  - Subscapularis
Inflammation of the tendon

Most common forms:

- Bicep’s Tendonitis
- Supraspinatus Tendonitis
- Rotator Cuff Tendonitis
CLINICAL TREATMENT FOR TENDONITIS

- Decrease pain and inflammation
  - Modalities as needed
  - Increase flexibility
  - Manual intervention

- Increase joint stability
  - Initiate therapeutic exercise as tolerated
  - Joint stabilization activity
Increased superior translation with shoulder elevation resulting in encroachment of the coracoacromial arch producing compression of the suprahuernal structures.

2 separate types:
- Primary
- Secondary

Dutton, 2012. pg. 377
Primary
- Intrinsic degenerative process
- Superior aspect of the rotator cuff is compressed and abraded by the surrounding bony and soft tissues secondary to decreased subacromial space

Secondary
- Results from GH instability
- Causes poor control of the humeral head during overhead activities
- Usually occurs in those under the age of 35

Dutton, 2012. pg. 377
Stage I: (under 25 years of age)
- Edema and hemorrhage
- Pain with shoulder ABDuction over 90 degrees
- Considered reversible at this stage
- Typically responds to PT intervention

Shankman, 2011. pg. 349
Dutton, 2012. pg. 379
3 Stages of Impingement/ Tears

- Stage II (between 25 and 40 years of age)
  - Fibrosis and tendonitis
  - Pain with daily activities and at night
  - Considered irreversible
    - Supraspinatus and bicep tendon as well as subacromial bursa are fibrotic

Shankman, 2011. pg. 349
Dutton, 2012. pg. 379
Stage III (over 40 years of age)

- Long history of shoulder pain
- Significant muscle weakness
- Tendon degeneration
- Rotator cuff tears
- Rotator cuff ruptures

Shankman, 2011. pg. 349
Dutton, 2012. pg. 379
Indications

- Persistent pain that interferes with ADL’s
- Unresponsive to conservative care
- Active, young patients with full thickness tear

Dutton, 2012. pg. 379
Vertical incision made over anterior shoulder
Deltoid is divided allowing access to rotator cuff and subacromial space
Anterior/inferior acromioplasty is performed
Humeral head is roughened
Holes are drilled for sutures
Sutures in place attaching tendon to bone

Dutton, 2012. pg. 379
Advantages

- Smaller incisions
- GH joint inspection
- Treatment of intra-articular lesions
- Avoidance of deltoid attachment
- Less soft tissue dissection
- Less pain

Dutton, 2012. pg. 380
POST-SURGICAL CARE

- Period of immobilization (depending on MD)
- Gentle range of motion
  - Glenohumeral
  - Scapulothoracic
- Strengthening as per MD protocol
- Manual intervention

General standards:

- Improvement in ROM noted for approx. 6 months
- Return to strength in 12 months
Shoulder is the most commonly dislocated joint in the body
- Men more often than women

Anterior: shoulder ABDuction, extension, and external rotation

Posterior: shoulder ABDuction, flexion, and internal rotation

Shankman, 2011. pg. 354
Generalized capsular laxity
Leads to chronic subluxation/dislocation
- Anterior
- Posterior
- Inferior
Primary complaint is pain
- Possible instability complaints

Dutton, 2012. pg. 380
Most common direction of instability
  - Repetition towards anterior apprehension position
    - External rotation and horizontal abduction

Patient complaints
  - Pain with overhead movement
  - Impingement like symptoms
    - Positions of abduction and external rotation

Dutton, 2012. pg. 380
GH JOINT INSTABILITY

- **Conservative treatment**
  - Dynamic strengthening
  - Stability activities

- **Surgical intervention**
  - “Capsulorrhaphy”
  - Tightens the inferior capsule
  - Tightens the rotator interval

Dutton, 2012. pg. 382
**THE LABRUM**

- Fibrocartilagenous tissue that deepens the glenoid cavity of the scapula

- Injury occurs with trauma or with repetitive movement

Magee, 2008. pg. 231
SLAP LESIONS

- SLAP (Superior Labrum Anterior to Posterior)
- Causes:
  - Repetitive overhead movements
  - FOOSH injury
  - Sudden deceleration/traction forces
  - MVA
  - Chronic ant/post instability

Dutton, 2012. pg. 382
SLAP LESIONS

- **Type 1: Fraying and degeneration of superior labrum**
  - Can not horizontally Abd or ER with forearm pronation without pain

- **Type 2: Pathologic detachment of the labrum and biceps tendon anchor**
  - Loss of stabilizing effect of labrum and biceps

- **Type 3: Vertical tear of the labrum**
  - Remaining portions of labrum and biceps are intact

- **Type 4: Extension of tear into the biceps tendon**
  - Portion of labrum and biceps tendon displaced into GH joint

Dutton, 2012. pg. 382
Avulsion of the anterior inferior labrum from the glenoid rim
Requires surgical stabilization
“TUBS” procedure
- Traumatic
- Unidirectional instability
- Bankart lesion requiring
- Surgery

Dutton, 2012. pg. 380
Compression fracture on the posterior humeral head at the site where the humeral head impacted the inferior glenoid rim.
Conservative treatment is attempted first

- Avoidance of provocative position
- Gentle ROM/ submaximal isometric exercises
- Scapular stability exercises
- Closed chain exercises
- Improve scapulohumeral rhythm
- Open chain activities

Dutton, 2012. pg. 382
SURGICAL INTERVENTION FOR LABRAL TEARS

- For persons who remain symptomatic following conservative Rx
- For persons whose instability is so gross that conservative Rx is not appropriate

Dutton, 2012. pg. 383
Most common fracture of the humerus
Results from direct blow to anterior, lateral, or posterolateral humerus or FOOSH
Represent a major morbidity in the elderly population
Involve the proximal third of the humerus

Dutton, 2012. pg. 391
Non-displaced fractures:
- Immobilization x 2-3 weeks
- Gentle ROM
- Therapeutic exercise as indicated by physician

Displaced fractures:
- Classified into categories
  - Greater tuberosity, lesser tuberosity, surgical neck, and anatomic neck
- ORIF
  - Allows progression of ROM and strengthening quicker due to stabilization of fracture

Shankman, 2011. pg. 361
Dutton, 2012. pg. 391
Primary goals to achieve with rehab

- Functional motion of the glenohumeral joint
- Purposeful, functional strength
- Regain scapular mobility

Shankman, 2011. pg. 361
ADHESIVE CAPSULITIS

“FROZEN SHOULDER”
- Most common in women between 40 and 60 years old

Symptoms include:
- Decreased shoulder ROM
- Pain
- Capsular Inflammation
- Fibrous synovial adhesions
- Reduction of joint cavity

Shankman, 2011. pg. 358
Adhesive Capsulitis

- **Primary**
  - Spontaneous development with no known cause

- **Secondary**
  - Develops following trauma or immobilization
    - In older patients, this can occur after 1-2 days

- Current literature is inconclusive as to the best way to treat adhesive capsulitis.

Shankman, 2011. pg. 358
Joint manipulation under anesthesia to increase mobility
SURGICAL INTERVENTION FOR SHOULDER PATHOLOGY

- Acromioplasty:
  - Surgical removal of a piece of bone to allow for increased space within the joint space

- Distal clavicle resection:
  - Removal of the end of the clavicle closest to the acromion to alleviate pain and loss of motion
TOTAL SHOULDER ARTHROPLASTY

- Removal of the humeral head and glenoid and replaced with metal or plastic
- TSR requires intact rotator cuff in order to provide return to functional activity

Shankman, 2011. pg. 362
Switching of the glenoid and humeral head positioning in order to provide functional movement without intact rotator cuff
Rehabilitation following Total Shoulder Arthroplasty

- Immobilization
- Early range of motion
- Progressive exercises

- Functional return of the affected arm can be expected around 6 months post-operatively

Shankman, 2011. pg. 362
SPECIAL TESTS FOR THE SHOULDER
The patient stands with both shoulders ABducted to 90 degrees first with their thumbs up.

The tester provides a downward force on the arms and notes the patient’s strength.

Next, the patient elevates the arms to 90 degrees of ABDuction and 30 degrees of horizontal ADDUCTION with thumbs down.

The tester provides downward pressure on the arms and notes the patient’s strength.

Cook, 2013. pg. 166
EMPTY CAN (SUPRASPINATUS) TEST
**EMPTY CAN (SUPRASPINATUS) TEST**

- Increased weakness in the empty can position vs the full can position with or without complaints of pain is indicative of a positive result.

Cook, 2013. pg. 166
The patient sits on a table with the involved shoulder flexed to 90 degrees, the elbow in full extension, and the forearm in supination.

The tester places one hand on the volar aspect of the patient’s forearm and the other on the proximal aspect of the patient’s humerus and resists the patient’s attempt to flex the humerus.

Konin, 2006. pg. 27
A positive test is indicated by pain in the bicipital groove that may suggest bicipital tendinitis.
The patient sits on a table while the tester passively ABducts the arm to 90 degrees.

The patient is asked to slowly lower their arm to the side.

If the patient is unable to slowly lower the arm to their side or experiences significant pain with task, this is a positive result indicating supraspinatus pathology.

Cook, 2013. pg. 170
NEER IMPINGEMENT TEST

- The patient sits with both upper extremities relaxed
- The tester stands with one hand on the scapula (posteriorly) and the other hand on the patient’s elbow (anteriorly)
- The tester passively flexes the test shoulder through end range

Cook, 2013. pg. 177
Pain and/or apprehension with forward flexion are indicative of shoulder impingement, specifically the supraspinatus and biceps long head tendons.
HAWKINS-KENNEDY IMPINGEMENT TEST

- The patient sits or stands with both UE’s relaxed. The tester stands and raises the arm into approximately 90 degrees of flexion and/or abduction with one hand and stabilizes the scapula with the other hand.
- The tester then internally rotates the UE.

Cook, 2013. pg. 178
Shoulder pain and apprehension are indicative of supraspinatus tendon impingement.

This test is considered the most sensitive for assessing subacromial impingement.
The patient lies supine on the table
The tester places the patient’s arm in 90 degrees of abduction and 90 degrees of elbow flexion and then slowly externally rotates the shoulder

The patient demonstrating apprehension is indicative of a positive test. This position mimics the positioning of an anterior dislocation, recreating instability

Cook, 2013. pg. 189
The patient sits with hands resting in their lap. The tester uses the proximal hand to grasp the scapula and the distal hand to grasp the patient’s elbow.

The tester then applies an inferior force (distraction) with the distal hand.

Konin, 2006. pg. 56
Excessive inferior humeral head translation with a visible or palpable “step-off” is indicative of inferior and/or multi-directional instability.
The patient stands with the arm in 90 degrees of flexion, 30-45 degrees of horizontal ADDuction and maximal internal rotation while the tester grasps their wrist.

The patient tries to flex and horizontally ADDuct the arm against the tester’s resistance.

The test is then repeated with the arm in external rotation.

Konin, 2006. pg. 74
Pain and/or clicking in an internally rotated position but absent in the externally rotated position is indicative of a SLAP lesion.
Stretching and Exercises

SHOULDER COMPLEX
SCAPULAR RETRACTION
INTERNAL ROTATION STRETCH
INFERIOR CAPSULAR STRETCH
POSTERIOR CAPSULE STRETCH
ACTIVE ASSISTED SHOULDER ABDUCTION
WITH WAND
ACTIVE ASSISTED EXTERNAL ROTATION WITH WAND
MANUAL INTERVENTION

SHOULDER
PASSIVE FLEXION
PASSIVE EXTERNAL ROTATION
PASSIVE INTERNAL ROTATION
SCAPULAR ASSIST
PEC MINOR STRETCH
BIBLIOGRAPHY