Functional Anatomy of the Shoulder & Upper Arm

Objectives

- Identify and discuss the role of each of the following components of the shoulder:
  - Bony anatomy
  - Joint articulations
  - Static stabilizers
  - Dynamic stabilizers

Objectives

- Identify and discuss the common acute and chronic injuries associated with the shoulder
**Bony Anatomy**

**Anterior View**
- Clavicle
- Scapula
- Humerus

**Posterior View**

**Bony Anatomy**

**Humerus**
- Humeral head
  - Spherical
  - Covered with articular cartilage

**Scapula**
- Spine
- Acromian process
- Coracoid process
- Vertebral border
- Inferior angle
- Glenoid fossa
**Bony Anatomy**

**Scapula**
- Glenoid fossa
  - 1/3 to 1/4 the size of the humeral head
  - Fairly flat in shape
  - Does not contribute much to stability of shoulder joint

**Joint Articulations**
- Glenohumeral joint
- Acromioclavicular joint
- Sternoclavicular joint (not shown)
- Scapulothoracic articulation (not shown)

**Sternoclavicular Joint**
- The only true joint tying the upper extremity to the axial skeleton
Scapulothoracic Articulation
- Not a true joint
- Formed by the convex surface of the thoracic cage and the concave surface of the scapula
- Allows for motion beyond 120 degrees

Glenohumeral Joint
- Anatomical structure provides extreme mobility
  - Mismatch in size between the humeral head and the glenoid fossa

Glenohumeral Joint
**Static Stabilizers**
- Ligaments
  - Glenohumeral joint capsule
  - Acromioclavicular
  - Coracoclavicular
Glenohumeral Joint

**Dynamic Stabilizers**

Rotator Cuff Muscles
- Supraspinatus
- Infraspinatus
- Teres minor
- Subscapularis

*Anterior View*

*Posterior View*

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Glenohumeral Joint

**Dynamic Stabilizers**

Rotator Cuff Muscles

- Work collectively to hold the humeral head in the glenoid fossa through co-contraction

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Muscles of the Shoulder Girdle

- 17 muscles attach to or originate from the scapula to provide stability and movement
  - Trapezius
  - Rhomboids
  - Levator scapulae
  - Serratus anterior
  - Pectoralis minor
  - Deltoid
Muscles of the Shoulder Girdle

- Other major shoulder muscles
  - Latissimus dorsi
  - Pectoralis major
  - Biceps
  - Triceps

Assessment of Shoulder Injuries

- History
- Observation
- Palpation

Observation

- Scapular winging
  - Long thoracic nerve injury
  - Weakness of serratus anterior
Acute Injuries

- Contusions
- Sprains
- Strains
- Fractures
- Dislocations

Contusions

- Shoulder pointer
- Lateral upper arm (blocker’s exostosis)
Sprains

AC joint
GH joint
SC joint

AC Joint

AC “separation”

Mechanism
- Direct force
  - Fall on point of shoulder
- Indirect force
  - Fall on outstretched hand

Signs & Symptoms
- 1st degree (stretching of ligaments)
  - Pain, especially with ABD above 120°
  - Point tenderness
  - Swelling over the joint
Sprains

AC Joint

- AC “separation”

- Signs & Symptoms
  - **2nd degree** (partial disruption of AC ligament and/or coracoclavicular ligaments)
    - Increased pain
    - distal clavicle may be
    - Swelling elevated
    - Disability

- **3rd degree** (complete rupture of AC ligament & coracoclavicular ligaments)
  - Severe pain
  - Elevation of distal clavicle
  - Swelling
  - Unwillingness to raise arm

Sprains

Sternoclavicular Joint

- Sprains are rare
- SC joint is very stable
**Sprains**

**Sternoclavicular Joint**

- **Mechanism of injury**
  - Direct force
  - Indirect force through clavicle (falling on outstretched hand)

**Sprains**

**Sternoclavicular Joint**

- **Signs & Symptoms**
  - Localized pain
  - Swelling
  - Point tenderness

**GH Dislocations**

**Anterior**

- **Mechanism**
  - Indirect force
    - ABD & ER
  - Direct force
    - Posterior blow
GH Dislocation

Anterior

- Signs & Symptoms
  - Pain
  - Deformity, flattened deltoid
  - Loss of function
  - Carried in slight ABD & IR

Traumatic Fractures

Fractures

Clavicle
Chronic Injuries

Impingement

- Subdeltoid bursa
- Subacromian bursa
- Supraspinatus tendon
- Biceps tendon

Impingement

- Primary
  - Encroachment in the subacromian space
  - Results from repetitive overhead shoulder movements
  - Scarring of supraspinatus tendon
Impingement

- Secondary
  - Glenohumeral instability is the primary cause
  - Increased demands on the RC lead to overuse, fatigue, & repetitive microtrauma
  - Encroachment
Impingement

- Secondary

Signs & Symptoms
- Anterior lateral shoulder pain
- Pain with overhead movements
- Subacromial crepitace
- Night pain