The Shoulder Joint

Bones of the shoulder joint

- Scapula
  - Glenoid Fossa
  - Supraspinatus fossa
  - Spine
  - Acromion process
- Clavicle
- Humerus
  - Greater tubercle
  - Intertubercular groove
  - Head of Humerus
  - Lesser tubercle
  - Deltoid tuberosity

Shoulder Joint

- Bones:
  - humerus
  - scapula
  - clavicle
- Articulation
  - glenohumeral joint
    - Glenoid fossa of the scapula (less curved)
    - head of the humerus
    - enarthrodial (ball and socket)
Shoulder Joint

• Connective tissue
  – glenoid labrum: cartilaginous ring, surrounds glenoid fossa
    • increases contact area between head of humerus and glenoid fossa.
    • increases joint stability
  – Glenohumeral ligaments: reinforce the glenohumeral joint capsule
    • superior, middle, inferior (anterior side of joint)
    – coracohumeral ligament (superior)
• Muscles play a crucial role in maintaining glenohumeral joint stability.

Movements of the Shoulder Joint

• Arm abduction, adduction about the shoulder
• Arm flexion, extension
• Arm hyperflexion, hyperextension
• Arm horizontal adduction (flexion)
• Arm horizontal abduction (extension)
• Arm external and internal rotation
  – medial and lateral rotation
• Arm circumduction
  – flexion, abduction, extension, hyperextension, adduction

Scapulohumeral rhythm

• Shoulder Joint
  – abduction
  – adduction
  – flexion
  – extension
  – internal rotation
  – external rotation
  – horizontal abduction
  – horizontal adduction
• Shoulder Girdle
  – upward rotation
  – downward rotation
  – elevation/upward rot. 
  – Depression/downward rot.
  – Abduction (protraction)
  – adduction (retraction)
  – adduction (retraction)
  – abduction (protraction)
Understanding Scapula Movements

- Functions of movements:
  - Stabilize scapula when shoulder complex is loaded/moving
    • allows for different axes of rotation and lengths of muscles (which is related to force generating capability)
  - Positioning scapula to facilitate movement of glenohumeral joint by changing orientation of glenoid fossa.

Muscles of the Shoulder Joint

- Organization
  - anterior, posterior, superior, inferior
  - rotator cuff muscles
- Origins and insertions
- Organization
  - adductors, abductors, flexors, extensors …

Muscles of the Shoulder Joint

- Anterior
  - pectoralis major
  - coracobrachialis
  - subscapularis
  - biceps brachii
Muscles of the Shoulder Joint

• Posterior
  – infraspinatus
  – teres minor
  – latissimus dorsi
  – teres major
  – triceps brachii, long head
• Superior
  – deltoid
  – supraspinatus

Rotator Cuff muscles

• Rotator Cuff: provides stability
  – Supraspinatus
  – infraspinatus
  – teres minor
  – subscapularis
• Note: there is an inherent lack of inferior stability of the shoulder joint.

Muscles of the Shoulder Joint

• Origin
• Insertion
• Actions
• Palpation
### Deltoid Muscle

**Origin:**
- anterior fibers: anterior lateral third of the clavicle
- middle fibers: acromion process
- posterior fibers: inferior edge of the scapular spine

**Insertion:**
- deltoid tuberosity on the lateral humerus

### Deltoid Muscle

*(deltoid: triangular)*

**Action**
- anterior: abduction, flexion, internal rotation, horizontal adduction
- middle: abduction
- posterior: abduction, outward rotation, extension, horizontal abduction

### Coracobrachialis Muscle (p118)

**Origin**
- coracoid process of the scapula

**Insertion**
- Middle 1/3 of the medial surface of the humerus

**Action**
- horizontal adduction, flexion, adduction
Supraspinatus Muscle (p126)

- **Origin**
  - supraspinatus fossa
- **Insertion**
  - Superiorly on the greater tubercle of the humerus
- **Action**
  - abduction

Infraspinatus Muscle (p122)

- **Origin**
  - infraspinatus fossa of the scapula
- **Insertion**
  - Superior/lateral surface of the greater tubercle of the humerus
- **Action**
  - outward rotation, horizontal abduction, adduction, abduction

Teres Minor Muscle (p128)

- **Origin**
  - Upper 2/3 of axillary border of the scapula
- **Insertion**
  - Posterior surface of greater tubercle of the humerus
- **Action**
  - Outward rotation, extension, adduction, horizontal abduction
### Subscapularis Muscle (p125)
- **Origin**
  - subscapular fossa
- **Insertion**
  - lesser tubercle of the humerus
- **Action**
  - inward rotation, extension

### Teres Major Muscle (p127)
- **Origin**
  - Lower 1/3 of the axillary border of the scapula/inferior angle of scapula
- **Insertion**
  - crest of lesser tuberosity of humerus
- **Action**
  - extension, adduction, inward rotation

### Latissimus Dorsi Muscle (p123)
*(latissimus: widest)*
- **Origin**
  - Spines of lower 6 thoracic and lumbar vertebrae
  - Posterior surface of sacrum
  - Posterior aspect of crest of ilium
  - Lower 3-4 ribs
  - Inferior angle of scapula
- **Insertion**
  - intertubercle groove of humerus
- **Action**
  - extension, adduction, inward rotation, horizontal adduction
### Pectoralis Major Muscle (p124)

- **Origin**
  - upper fibers (clavicular head)
    - medial half of anterior surface of clavicle
  - lower fibers (sternal head)
    - anterior surface of costal cartilage of first six ribs, adjacent portion of sternum
- **Insertion**
  - Crest of the greater tuberosity of the humerus
  - tendon “twists” such that lower fibers insert superior to upper fibers

### Pectoralis Major Muscle

- **Action**
  - horizontal adduction
  - flexion
  - inward rotation
  - adduction

### Summary of Muscles

- Deltoid (anterior, middle, posterior)
- Coracobrachialis
- Supraspinatus
- Infraspinatus
- Teres minor
- subscapularis
- teres major
- Latissimus dorsi*
- Pectoralis major * (upper and lower)
  - *do not originate on the scapula
Summary: Shoulder Joint

• Bones: Humerus, Scapula (Glenoid Fossa)
  – glenohumeral joint

• Muscles
  – Rotator Cuff
    • supraspinatus, infraspinatus, teres minor, subscapularis
    – deltoid, coracobrachialis, teres major, latissimus dorsi, pectoralis major

• Stability is sacrificed for flexibility
  – ligaments: glenoid labrum, Glenohumeral ligaments, coraco humeral

Summary of actions

• Flexors
  – pectoralis major, anterior deltoid, coracobrachialis

• Extensors
  – Posterior deltoid, latissimus dorsi, teres major, teres minor subscapularis

• Abductors
  – Anterior and middle deltoid, supraspinatus

• Adductors
  – latissimus dorsi, teres major, teres minor

Summary of Actions (cont)

• Inward rotators
  – subscapularis, pectoralis major, latissimus dorsi, anterior deltoid

• Outward rotators
  – Teres minor, infraspinatus, posterior deltoid