Muscles Crossing the Shoulder joint: Movements of the Arm

- Nine muscles cross the shoulder joint and insert into the humerus

- Prime movers include:
  - Pectoralis major – arm flexion
  - Latissimus dorsi and posterior fibers of the deltoid – arm extension
  - Middle fibers of the deltoid – arm abduction
Muscles Crossing the Shoulder

- Deltoid
- Sternum
- Pectoralis major
- Coracobrachialis
- Triceps brachii:
  - Lateral head
  - Long head
  - Medial head
- Biceps brachii
- Brachialis
- Brachioradialis

(a)
Rotator Cuff

- Supraspinatus, infraspinatus, teres minor, subscapularis (rotator cuff)

- They originate on the scapula and their tendons blend with the fibrous capsule of the shoulder joint en route to the humerus.

- Function to reinforce the capsule of the shoulder joint to prevent dislocation of the humerus
Muscles Crossing the Shoulder

- Supraspinatus*
- Spine of scapula
- Deltoid (cut)
- Greater tubercle of humerus
- Infraspinatus
- Teres minor
- Teres major
- Triceps brachii:
  - Lateral head
  - Long head
- Latissimus dorsi
- Humerus
- Olecranon process of ulna
- Anconeus

(d)
Muscles Crossing the Shoulder

- Coracobrachialis and teres major: Act as synergists for the latissimus dorsi and pectoralis major. Do not contribute to reinforcement of the shoulder joint
- Pectoralis Major: prime mover for arm flexion (lifting the arm anteriorly)
- Latissimus dorsi and deltoid muscles: prime movers for arm extension
- Teres major: synergist for latissimus dorsi and deltoid muscles
- Deltoid: prime mover of arm abduction
- Pectoralis major and latissimus dorsi: prime movers for arm adduction
- Thus, the pectoralis major and latissimus dorsi & deltoids are antagonists in the flex/extension of the arm
Muscles Crossing the Shoulder

- Deltoid
- Sternum
- Pectoralis major
- Coracobrachialis
- Triceps brachii:
  - Lateral head
  - Long head
  - Medial head
- Biceps brachii
- Brachialis
- Brachioradialis

Clavicle
Muscles Crossing the Shoulder

- Supraspinatus
- Spine of scapula
- Deltoid (cut)
- Greater tubercle of humerus
- Infraspinatus
- Teres minor
- Teres major
- Triceps brachii:
  - Lateral head
  - Long head
- Latissimus dorsi
- Humerus
- Olecranon process of ulna
- Anconeus

Figure 10.14(d)
Muscles Crossing the Shoulder

- Subscapularis
- Coraco-brachialis
- Brachialis

(c)
Muscles Crossing the Elbow: Flex/extension of the forearm

- Forearm extension
  - The triceps brachii is the prime mover of forearm extension
  - The anconeus is a weak synergist

- Forearm flexion: chief movers
  - Brachialis (Strongest)
  - biceps brachii
  - Brachioradialis (Weakest)
  - These three are involved with elbow flexion due to their origin and insertion points
  - Biceps brachii also supinates the forearm and is ineffective in flexing the elbow when the forearm is pronated (e.g. palms down)
Muscles of the Forearm: Movements of the Wrist, Hand, and Fingers

- Forearm muscles consist of the anterior flexors and the posterior extensors
- Anterior Forearm:
  - Pronator quadratus: prime mover of forearm pronation
  - Pronator teres: pronates forearm
  - Flexor carpi radialis: powerful flexor of wrist, abducts hand
  - Flexor digitorum superficialis: flexes wrist and middle fingers 2-5
- Deep Muscles:
  - Flexor pollicis longus: flexes distal phalanx of thumb
  - Flexor digitorum profundus: flexor of all fingers. Flexes distal interphalangeal joints
Muscles of the Forearm

- Posterior Forearm:
  - Extensor carpi radialis longus: extends & abducts wrist
  - Extensor carpi radialis brevis: “ “
  - Extensor digitorum: prime movers of finger extension
  - Extensor carpi ulnaris: extends & adducts wrist

- Deep Muscles:
  - Supinator: assists biceps brachii to supinate forearm
  - Abductor pollicis longus: abducts/extends thumb
  - Extensor pollicis brevis & longus: extends thumb
Muscles of the Forearm: Anterior Compartment

- These muscles are primarily flexors of the wrist and fingers

![Muscles of the Forearm: Anterior Compartment](image-url)
Muscles of the Forearm: Anterior Compartment
Muscles of the Forearm: Posterior Compartment

- These muscles are primarily extensors of the wrist and fingers
Muscles of the Forearm: Posterior Compartment

- These muscles are primarily extensors of the wrist and fingers.
Muscle Action of the Arm: Summary

- The posterior extensor and anterior flexor muscles are shown.
Muscle Action of the Forearm: Summary

- Posterior extensors of the wrist and fingers, and anterior flexor muscles are shown.
Intrinsic Muscles of the Hand: Fine Movement of the Fingers

- All muscles are in the palm of the hand (none on the dorsal side)
- All muscles move the metacarpals and fingers
- All are weak muscles involved in controlling precise movements (e.g., threading a needle)
- Are the main abductors and adductors of the fingers
- Produce opposition – move the thumb toward the little finger
Intrinsic Muscles of the Hand

Tendons of:
- Flexor digitorum profundus
- Flexor digitorum superficialis
- Third lumbral
- Fourth lumbral
- Opponens digiti minimi
- Flexor digiti minimi brevis
- Abductor digiti minimi
- Pisiform bone
- Flexor carpi ulnaris tendon
- Flexor digitorum superficialis tendons

Fibrous sheath
- Second lumbral
- Dorsal interossei
- First lumbral
- Adductor pollicis
- Flexor pollicis brevis
- Abductor pollicis brevis
- Opponens pollicis
- Flexor pollicis
- Flexor retinaculum
- Abductor pollicis longus
- Tendons of:
  - Palmaris longus
  - Flexor carpi radialis
  - Flexor pollicis longus

(a)
Intrinsic Muscles of the Hand

- Flexor digitorum profundus tendon
- Flexor digitorum superficialis tendon
- Dorsal interossei
- Adductor pollicis
- Flexor pollicis brevis
- Abductor pollicis brevis
- Opponens pollicis
- Anterior interossei
- Opponens digiti minimi
- Flexor digiti minimi brevis (cut)
- Abductor digiti minimi (cut)
- Flexor pollicis longus tendon

(b)
Intrinsic Muscles of the Hand

- Thumb:
  - Abductor pollicis brevis: abducts thumb
  - Flexor pollicis brevis: flexes thumb
  - Opponens pollicis: opposition
  - Adductor pollicis: adducts thumb, aids opposition
- Little Finger:
  - Abductor digiti minimi: abducts little finger
  - Flexor digiti minimi brevis: flexes little finger
  - Opponens digiti minimi: aids in opposition
  - ...and the rest
  - Lumbricalis: flex fingers
- Palmar interossei: adductors of fingers toward 3rd digit
- Dorsal interossei: abductors of fingers
Intrinsic Muscles of the Hand: Groups

(c) Palmar interossei

(d) Dorsal interossei

Figure 10.18c, d