UPPER LIMB

- What is a limb?
- Sensory to upper limb
- Making it move
  - Bones and joints
  - Muscles and nerves
- Vascular supply
- Surface anatomy
- (muscle study hint)

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What is a limb?

◆ Ventral somatic outgrowth of outer tube
  - Bones (with bone, cartilage, marrow, NAV, etc.)
  - Joints
  - Muscle
  - Nerves
  - Vascular supply

◆ No viscera—all innervation is somatic (motor or sensory) from ventral ramus of spinal nerve (except autonomies to blood vessels)
Sensory from limb (dermatomes/sensory skin segments from spine)

- Dermatomes extend over limbs
- Twisted orientation reflects twisting of limb during development
- Named nerves generally innervate skin over muscles that they innervate
Sensory territory of nerves

Brachial plexus serves to redirect spinal routes into named nerves covering certain territory.

Cutaneous branches of medial cord/ulnar nerve.

Fig. 2: Sensory supply areas of the brachial plexus.
Upper Limb Skeleton (old hat?)

- Scapula
- Humerus
- Radius, ulna
- Carpals—proximal, distal
- Digits
  - Metacarpals
  - Phalanges
## Joints

<table>
<thead>
<tr>
<th>JOINT</th>
<th>BETWEEN</th>
<th>MOVEMENT</th>
<th>TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
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<td></td>
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<td></td>
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</tr>
</tbody>
</table>
If INSERTION on scapula = Move scapula
- Rhomboids
- Trapezius
- Pectoralis Minor
- Serratus Ventralis
- Levator Scapulae

If ORIGIN on scapula = Move Arm
- Subscapularis
- Supraspinatus
- Infraspinatus
- Teres Minor
- Teres Major
- Latissimus Dorsi (partial O on scap)

Use location of Insertion to determine exact movement!!
M&M, Fig. 14.11

- Posterior Compartment—posterior cord
- Anterior compartment—medial, lateral cords
- Name of cord is relative to axillary artery
## ANTERIOR MUSCLES

- **M-C**
  - Biceps
  - brachialis

- **Median**
  - Forearm flexors
  - Thumb intrinsics (1M$ nerve)

- **Ulnar**
  - Flexor carpi ulnaris
  - Hand intrinsics

## POSTERIOR MUSCLES

- **Muscles (radial nerve)**
  - Triceps
  - Anconeus
  - Brachioradialis
  - Carpal, digit extensors
<table>
<thead>
<tr>
<th>ANTERIOR</th>
<th>POSTERIOR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NERVES</strong></td>
<td></td>
</tr>
<tr>
<td>M-C, ulnar, median</td>
<td>Radial</td>
</tr>
<tr>
<td><strong>MOVEMENT</strong></td>
<td></td>
</tr>
<tr>
<td>Flexion</td>
<td>Extension</td>
</tr>
<tr>
<td><strong>MUSCLES</strong></td>
<td></td>
</tr>
<tr>
<td>Biceps, flexors</td>
<td>Triceps, extensors</td>
</tr>
<tr>
<td><strong>TWIST</strong></td>
<td></td>
</tr>
<tr>
<td>Flexors from medial epicondyle</td>
<td>Extensors from lateral epicondyle</td>
</tr>
</tbody>
</table>
Forearm

- Extensor digitorum
- Extensor carpi ulnaris
- Ext Carpi Radialis Longus
- Lateral Epicondyle
- Brachioradialis

Posterior View
Anterior Compartment Forearm

- Brachioradialis
- Flexor Carpi Radialis
- Flexor Carpi Ulnaris
- Pronator Teres
- Flexor Retinaculum

Medial Epicondyle

Flexor Digitorum Superficialis is deep to other flexors

pg 302
Routes of nerves (in human)

- **M-C**: between biceps brachii and brachialis

- **Median**: medial/posterior to biceps, branches into forearm flexors at elbow then to hand through carpal tunnel
  - Recurrent median (1M$) superficial at wrist to thumb over thenar eminence) deficit - ape’s hand

- **Ulnar**: medial in arm, posterior to medial epicondyle of humerus (funny bone) down medial forearm medial to carpal tunnel into palm

- **Radial**: deep posterior arm around lateral epicondyle of humerus to forearm (deep
Vascular supply

- Subclavian → axillary → radial (same street, new street sign every block)
- Collateral circulation
  - Posterior/anterior circumflex humeral
  - Deep brachial a.
- Radial a. (with median n.) → deep palmar arch
- Ulnar a. (with ulnar n.) → superficial palmar arch
Axilla = Armpit

- Region between arm and chest

- Boundaries
  - Ventral - pectoral muscles
  - Dorsal = latissimus dorsi, teres major, subscapularis
  - Medial = serratus ventralis
  - Lateral = bicipital groove of humerus

- Contents
  - Axillary lymph nodes, Axillary vessels, Brachial Plexus
Surface Anatomy of Upper Limb

- Biceps + Triceps brachii
- Olecranon Process
- Medial Epicondyle
- Cubital Fossa
  - Anterior surface elbow
  - Contents
    - Median Cubital Vein
    - Brachial Artery
    - Median Nerve
  - Boundaries
    - Medial = Pronator teres
    - Lateral = Brachioradialis
    - Superior = Line between epicondyles

pg 786 + 784
Surf
ace
Anatomy of
Upper Limb

- Carpal Tunnel
  - Carpals concave anteriorly
  - Carpal ligament covers it
  - Contains: long tendons, Median nerve
  - Inflammation of tendons = compression of Median nerve

- Anatomical Snuffbox
  - Lateral = E. pollicis brevis
  - Medial = E. pollicis longus
  - Floor = scaphoid

pg 306, 788
Suggestion: a muscle table organized by
Joint crossed?
Nerve innervating?
Action?
Compartments?
All of the above?

<table>
<thead>
<tr>
<th>MUSCLE</th>
<th>ACTION</th>
<th>ORIGIN</th>
<th>INSERTION</th>
<th>INNERVATION (cord to nerve)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biceps</td>
<td>Flex, sup.</td>
<td>Humerus, glenoid</td>
<td>Radial tuberosity</td>
<td>Medial cord—M-C.</td>
</tr>
</tbody>
</table>