Lab 1: clavicle, scapula, humerus

Clavicle – you should be able to palpate the clavicle from the sternal end to the acromial end, noting the curvatures of the bone – in the following order:

- **Sternal end**
  - Found at the medial aspect of the bone – is the more rounded portion that articulates with sternum.

- **Supraclavicular fossa**
  - Depression found just above the medial third of the clavicle.

- **Infraclavicular fossa**
  - Depression found just below the lateral third of the clavicle.

- **Acromial end**
  - Found at the lateral aspect of the bone – is the more flattened portion that articulates with acromial process of the scapula.

Scapula – triangular shaped bone found at the superior aspect of the posterior thoracic region.

- **Coracoid Process**
  - Can be found by deeply palpating the lateral part of the infraclavicular fossa. A good amount of digital pressure is needed in people whose pec major is large – and due to this you will only be palpatinng the tip of the process.

- **Acromion process**
  - Top of your shoulder area. It is prominent and has very little soft tissue covering it.
  - Palpate laterally to the acromial end of the clavicle. As you go from clavicle to the acromion process, you’ll notice a slight drop and once your finger has dropped you are now on the acromion process of the scapula.

- **Acromioclavicular joint**
  - The space between the acromial end of the clavicle and the acromion process of the scapula.

- **Spine of the scapula**
  - Is prominent in most individuals.
  - This is the medial continuation of the acromion process. It runs inferior and medial from the acromion process.

- **Medial/vertebral border**
  - Patient:

- **Inferior angle**
  - Palpate inferiorly down the vertebral border until you get to the prominent angle where the medial and lateral borders come together.

- **Superior angle**
  - Less prominent than the inferior angle.
  - Palpate superiorly up the vertebral border until you can’t feel the border and have come to soft tissue. Palpate through the soft tissue and you’ll feel the superior angle.

Humerus

- **Greater tuberosity/tubercle**
  - Press deeply at the superior lateral aspect of arm though deltoid. Found just below acromion process.
  - Patient:
    - Anatomical position

- **Medial epicondyle**
  - Quite prominent and is found at the distal end of the bone.

- **Lateral epicondyle**
  - Not as prominent as the ME and is found at the distal lateral end of the bone just above a prominent depression at the proximal lateral aspect of the forearm.

- **Medial and lateral supracondylar ridges**
  - Found just superior to the ME and LE respectively. Felt as somewhat prominent lines and the lateral is more prominent than the medial
Lab 2: superficial back & scapular area, posterior arm

**Superficial back & scapular area**

**Trapezius**
- Easily palpated on posterior aspect of cervical and thoracic region. Draw a line from EOP to each acromion process and then from there to the middle part of the lower back (T12).
- **Muscle test**
  - Have the patient elevate (“shrug”) against resistance and the upper portion of the muscle can be seen and felt.

**Rhomboids**
- Found in the space between vertebral border of scapula and vertebral column.
- **Muscle test**
  - Put upper extremity behind back and adduct arm against resistance.

**Latissimus Dorsi**
- Can be palpated at the posterior aspect of the lower back.
- **Muscle test**
  - Put your hand on the belly of the muscle and have the patient adduct arm against resistance.
  - Can feel it as well when patient coughs

**Teres Major**
- Can be palpated at the posterior aspect of the axilla.
- **Muscle test**
  - Abduct arm and have them adduct it against resistance. It will be seen and felt just below the posterior aspect of the axilla.

**Serratus Anterior**
- Will not palpate, but will be tested for.
- **Muscle test**
  - Push against a wall to check for winging of the scapula. If the muscle is weak – you will see the medial aspect of the scapula move away from the thoracic wall.

**Deltoid**
- Large muscle occupying lateral aspect of proximal arm. It's a complex muscle with 3 portions, but we will only palpate and test the middle which abducts the arm away from the body. After the patient carries out abduction against resistance the 3 portions may be visible.
- **Muscle test**
  - Put hand on the muscle and have the patient abduct arm against resistance.

**Supraspinatus**
- Palpated just above the spine of the scapula.
- **Muscle test**
  - Extend arm which pushes the muscle through the trapezius which covers it. Abduct arm against resistance to make the muscle more palpable.

**Triangle of Auscultation**
- Depression found medial to inferior angle of scapula. This is where you place a stethoscope to listen to lungs.

**Posterior arm**

**Triceps Brachii**
- After the patient has carried out the actions, the 3 distinct heads can be seen and felt.
- **Muscle test**
- Extend forearm at elbow joint against resistance. The muscle will become prominent and easy to palpate.
Lab 3: radius & ulna, anterior arm & forearm

**Radius** – lateral bone of the forearm

- **Head**
  - Easily palpated in a depression on the posterior lateral side of the forearm
  - **Patient:**
    - Extend forearm at elbow joint (feel) and rotate arm (head can be felt moving)
- **Styloid process**
  - Found at the distal lateral aspect of the forearm / lateral aspect of the wrist joint

**Ulna** – medial bone of the forearm

- **Olecranon process**
  - Posterior aspect of the elbow
  - **Patient:**
    - Flex forearm at elbow joint
- **Head**
  - Large bone protuberance at the distal posterior medial aspect of the forearm
- **Styloid process**
  - A tiny feature just inferior and medial to the head of the ulna. DO NOT cross the wrist joint or you’ll be palpating the carpal bones

**Anterior arm (superficial layer)**

**Biceps brachii** – most superficial muscle and easily palpated

- **Muscle test**
  - Extend forearm and supinate. Flex forearm against resistance. Bellies and tendons of insertion as it passes through cubital fossa should be easily palpated.
- **Bicipital furrow**
  - Depression found at the medial aspect of the arm at the interval of the biceps brachii and triceps brachii.
- **Brachialis**
  - Distal end of the bicipital furrow, deep to the biceps brachii. You should be able to feel the bone underneath your fingers – have the patient carry out the action for muscle testing, and you can feel and possibly see the muscle contract.
  - **Muscle test**
    - Flex forearm
- **Brachial artery**
  - Above the midpoint of the bicipital furrow, press fairly firmly with middle or index finger. Fairly strong resting pulse and you shouldn’t have difficulty finding it.

**Ulnar nerve**

- Lateral to the junction of medial epicondyle and trochlea of humerus (groove for ulnar nerve). Successful stimulation will leave patient with the sensation of pins and needles running down the medial aspect of their forearm.
Anterior forearm (superficial layer) – we will palpate their tendons of insertion

**Flexor carpi radialis**
- Most lateral of this group of muscles. An inch from the lateral side of the forearm
- **Muscle test**
  - Flex hand and abduct against resistance.

**Palmaris longus**
- Just medial and parallel to the tendon of flexor carpi radialis.
- **Muscle test**
  - Squeeze tip of thumb and little finger together, which will cause the tendon to pop up.

**Flexor carpi ulnaris**
- Distal medial aspect of the forearm.
- **Muscle test**
  - Flex and adduct hand against resistance.

**Radial artery**
- Pulse of this artery can be felt by palpating just lateral to the tendon of the flexor carpi radialis tendon.
- **Patient:**
  - Extend hand while taking the pulse.

**Ulnar artery**
- Pulse of this artery can be felt by palpating just lateral to the tendon of the flexor carpi ulnaris and press deeply. This is a weak pulse that can’t be easily found.

Anterior forearm (intermediate layer)

**Flexor digitorum superficialis**
- Their tendons of insertion are found as they cross the proximal interphalangeal joints of digits 2-5.
- **Muscle test**
  - Flex digits at PIP joints

Anterior forearm (deepest layer) - Their tendons of insertion can be palpated as they cross the palmar surface of the hand.

**Flexor digitorum profundus**
- This one is the larger and more medial muscle and its tendons of insertion are found as they cross the distal interphalangeal joint to their insertion on the distal phalanges of digits 2-5.
- **Muscle test**
  - Flex DIP joints against resistance (tendons will become prominent)

**Flexor pollicis longus**
- This one is the narrower and more lateral muscle and its tendon of insertion can be found as it crosses the proximal phalanx of digit one to its insertion on the distal phalanx.
- **Muscle test**
  - Flex IP joint of digit one against resistance (tendons will become prominent)

**Pronator teres**
- Small muscle found distal to the cubital fossa at the proximal portion of the anterior forearm.
- **Muscle test**
  - Pronate against resistance

**Pronator quadratus**
- Found at the distal end of the anterior forearm, deep to the tendons of the flexor pollicis longus and flexor digitorum profundus. This muscle can’t be palpated – we can only test for its strength.
• Muscle test
  o Have the patient completely flex their forearm and then pronate against resistance.
Lab 4: bones of the hand, axilla, pectoral region, superficial posterior forearm

**Bones of the hand**

![Diagram of hand bones]

**Metacarpals**
- Be able to distinguish this long bone of the hand and its base, shaft and head

**Phalanges**
- Be able to distinguish the proximal, middle and distal phalange as well as the base, shaft and head of each

**Anatomical snuffbox**
- Depression found at the lateral aspect of the wrist joint. The trapezium and scaphoid are contained in the snuffbox.
- Muscle test
  - Extend hand and abduct thumb

**Scaphoid bone**
- Found in the middle of the snuffbox (proximal aspect of snuffbox)

**Trapezium bone**
- Move your finger slightly distal to the scaphoid bone (distal aspect of snuffbox)

**Capitate bone**
- Just proximal and lateral to the base of the 3rd metacarpal in the depression that is created when the patient extends their hand.
- Muscle test
  - Extend hand.

**Lunate bone**
- Just proximal to the capitate bone.
- Muscle test
  - Extend hand.

**Triquetral**
- Found just distal to the styloid process of the ulna.
- Muscle test
  - Move hand laterally at the wrist joint. This allows the triquetral bone to move out from under the styloid process of the ulna.

**Pisiform**
- Easily palpated at the proximal medial aspect of the palm

**Hamate bone**
- Lateral and distal to the pisiform. Place the IP joint of thumb on patient's pisiform and then point the top of your thumb toward the web space between the thumb and index finger – the tip of your thumb should be on the hook of the hamate bone, but it requires some digital pressure through the soft tissue to feel it.
Lab 5: deep posterior forearm, hand

Deep posterior forearm

Anatomical snuffbox - (made from the tendons of these 3 muscles) "brevis sandwich"

- Abductor pollicis longus (tendon)
  - Most lateral boundary of anatomical snuffbox + shorter than EPB
  - Muscle test
    - Abduct thumb at MP joint against resistance

- Extensor pollicis brevis (tendon)
  - Immediately medial to tendon of APL
  - On some people, APL + EPB are not easily distinguishable from each other
  - Muscle test
    - Extend thumb at MP joint against resistance

- Extensor pollicis longus (tendon)
  - Medial aspect of snuffbox and continues up to dorsum of first digit
  - Muscle test
    - Extend thumb at IP joint
Hand

Thenar eminence (superficial) – prominent muscle eminence associated with the first metacarpal. These muscles are associated with movements of the first digit and are easily palpated and tested. The thenar eminence on the dominant hand may look and feel somewhat more developed than its counterpart on the opposite hand.

Abductor pollicis brevis

- Largest & most superficial of thenar muscles
- Muscle test
  - Abduct thumb against resistance = contraction

Opponens pollicis

- Go to lateral aspect of first metacarpal and palpate along the bone underneath the APB.
- Muscle test
  - Have the patient bring thumb to tip of fifth digit and it will bulge out along the lateral aspect of the first metacarpal

Flexor pollicis brevis

- Medial and parallel to abductor pollicis brevis in a crevice just medial to the APB
- Muscle test
  - Flex thumb at MP joint = contraction

Adductor pollicis

- In web space between thumb and index finger on palmar surface of the hand
- Muscle test
  - Adduct thumb against resistance = contraction

Hypothenar eminence (superficial) – muscle mass found on palmar surface of the fifth metacarpal (made up of 3 muscles but we only palpate the most superficial one)

Abductor digiti minimi

- Palpate the muscle mass
- Muscle test
  - Abduction of fifth digit against resistance = contraction

Hand creases

| Distal + proximal palmar creases | These are the 2 creases running diagonally and parallel to each other in the distal part of the palm  
|                                | Distal palmar crease starts at the medial aspect of palm and runs ¾ of the way across  
|                                | Proximal palmar crease starts at the lateral aspect of palm and runs ¼ of the way across |
| Simian crease                  | What it’s called when you can only see one of the distal and proximal palmar creases |
| Metacarpophalangeal creases     | One or more small creases at each metacarpophalangeal joint |
| Proximal interphalangeal creases| A couple of small creases at each proximal interphalangeal joint |
| Distal interphalangeal creases  | At the distal interphalangeal joints |
| Thumb interphalangeal crease    | At the thumb IP joint |
| Thenar crease(s)               | One or two creases that border the most medial aspect of the thenar eminence |