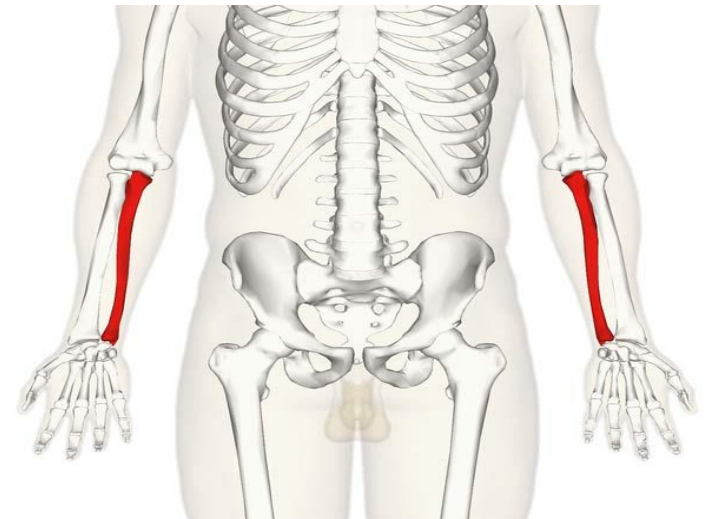


Bones of Forearm and Hand

Dr Attaullah

Ulna

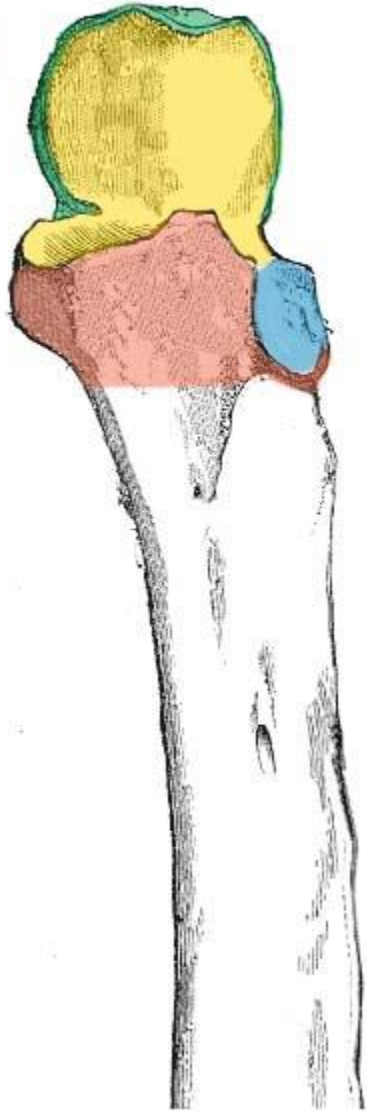
- The **ulna** is a long bone in the forearm. It lies medially and **parallel** to the [radius](#), the second of the forearm bones. The ulna acts as the **stabilising** bone, with the radius pivoting to produce movement.
- Proximally, the ulna articulates with the [humerus](#) at the elbow joint. Distally, the ulna articulates with the **radius**, forming the distal radio-ulnar joint.



Proximal Osteology and Articulation


- The proximal end of the ulna articulates with the **trochlea** of the humerus. To enable movement at the elbow joint, the ulna has a specialised structure, with bony prominences for muscle attachment.
- Important landmarks of the proximal ulna are the olecranon, coronoid process, trochlear notch, radial notch and the tuberosity of ulna:
- **Olecranon** – a large projection of bone that extends proximally, forming part of trochlear notch. It can be palpated as the ‘tip’ of the elbow. The triceps brachii muscle attaches to its superior surface.
- **Coronoid process** – this ridge of bone projects outwards anteriorly, forming part of the trochlear notch.
- **Trochlear notch** – formed by the olecranon and coronoid process. It is wrench shaped, and articulates with the trochlea of the humerus.
- **Radial notch** – located on the lateral surface of the trochlear notch, this area articulates with the head of the radius.
- **Tuberosity of ulna** – a roughening immediately distal of the coronoid process. It is where the brachialis muscle attaches.

Anterior:



Lateral:



-  Olecranon
-  Coronoid Process
-  Trochlear Notch
-  Radial Notch

Shaft of the Ulna

- The ulnar shaft is **triangular** in shape, with three borders and three surfaces. As it moves distally, it decreases in width.
- The three surfaces:
 - **Anterior** – site of attachment for the pronator quadratus muscle distally.
 - **Posterior** – site of attachment for many muscles.
 - **Medial** – unremarkable.
- The three borders:
 - **Posterior** – palpable along the entire length of the forearm posteriorly
 - **Interosseous** – site of attachment for the interosseous membrane, which spans the distance between the two forearm bones.
 - **Anterior** – unremarkable.

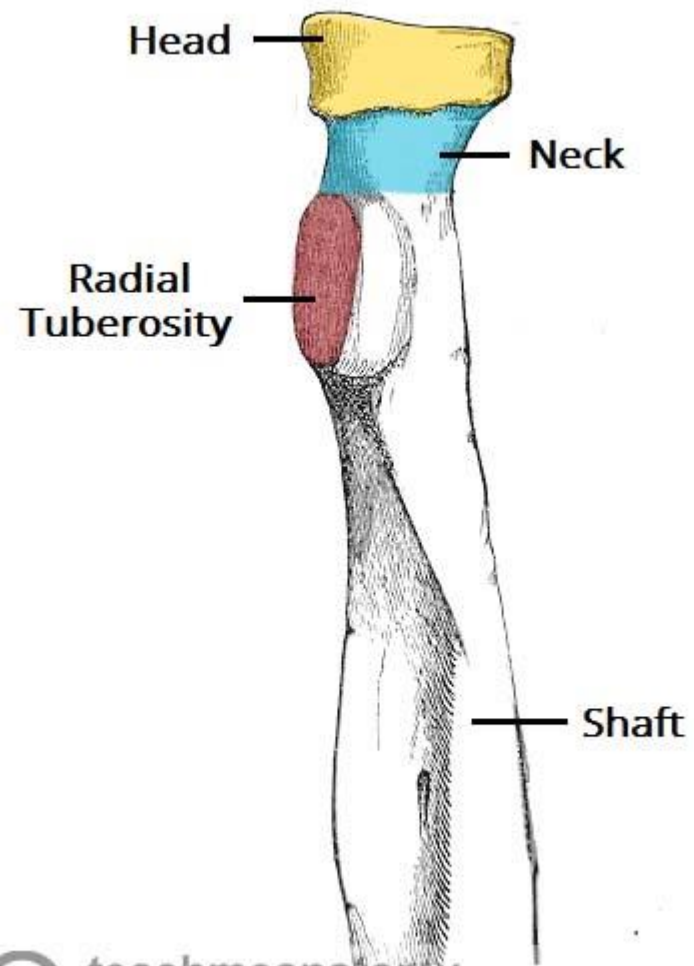
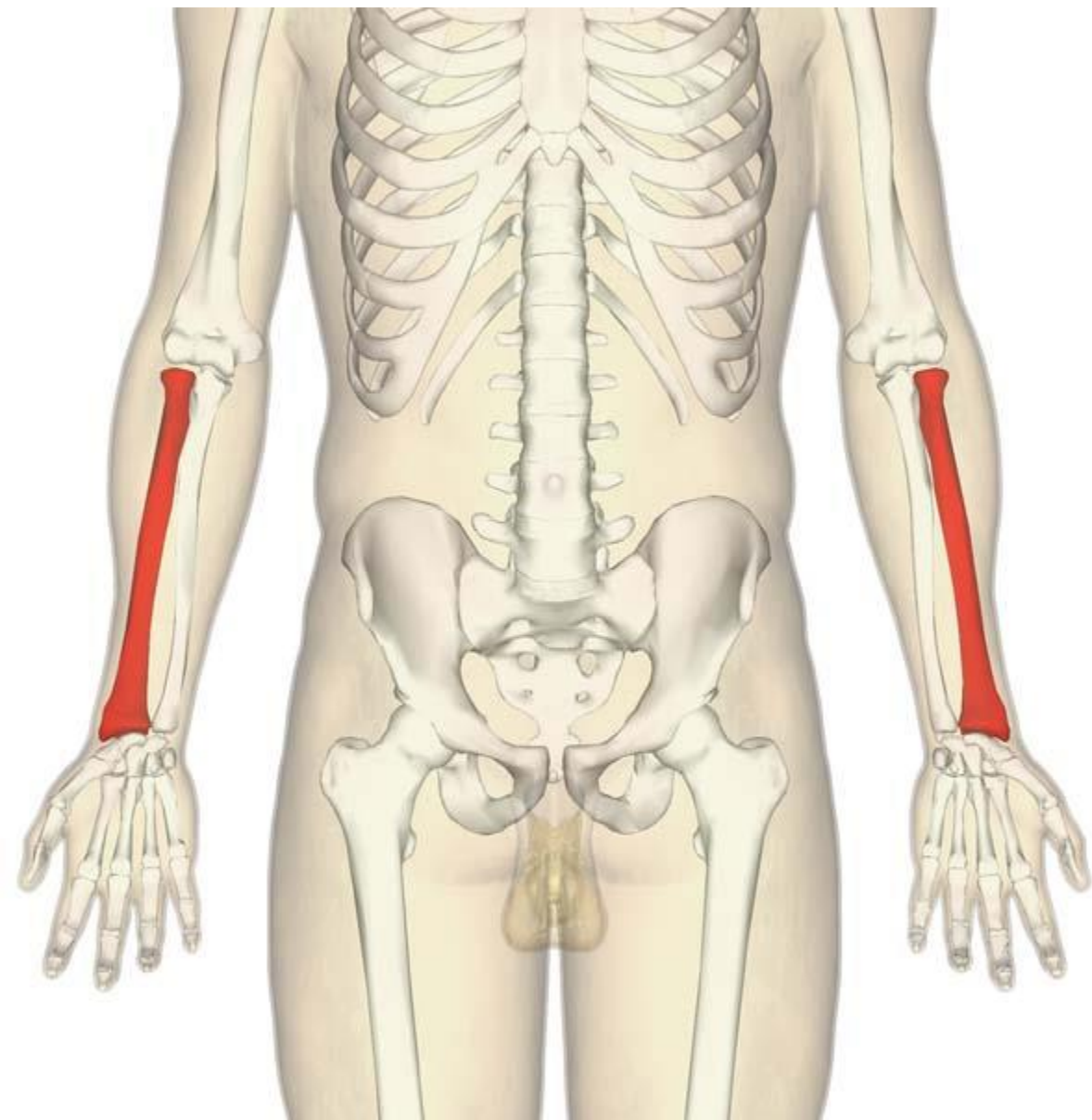
Distal Osteology and Articulations

- The distal end of the ulna is much smaller in diameter than the proximal end. It is mostly unremarkable, terminating in a rounded head, with distal projection – the ulnar **styloid process**.
- The head articulates with the **ulnar notch** of the radius to form the [distal radio-ulnar joint](#).



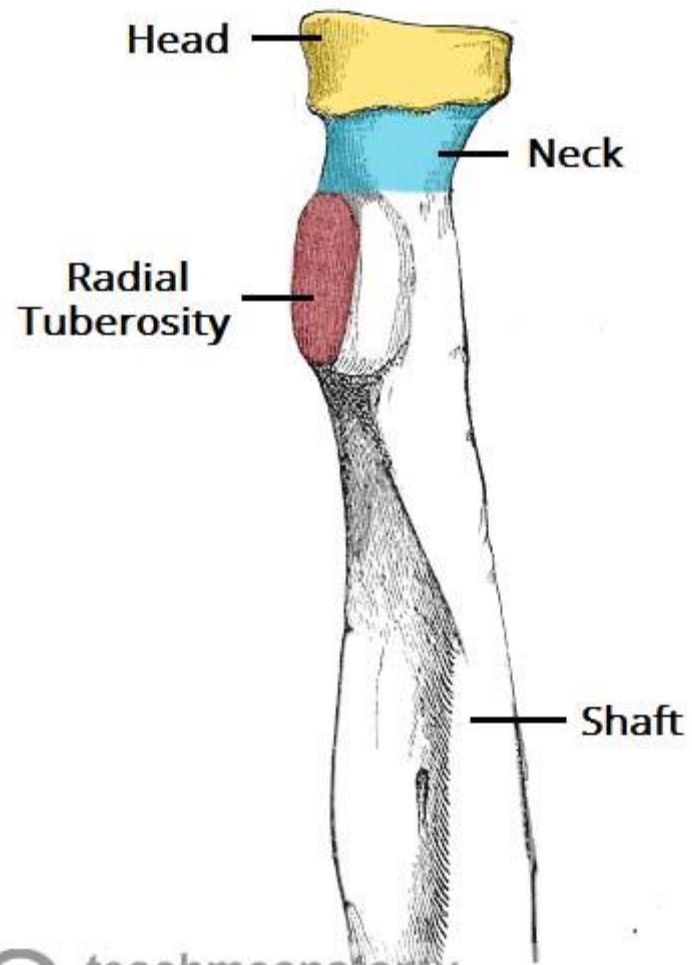
Radius

- The **radius** is a long bone in the forearm. It lies laterally and parallel to [ulna](#), the second of the forearm bones. The radius pivots around the ulna to produce **movement** at the proximal and distal radio-ulnar joints.
- The radius articulates in four places:
- [Elbow joint](#) – Partly formed by an articulation between the head of the radius, and the capitulum of the humerus.
- [Proximal radioulnar joint](#) – An articulation between the radial head, and the radial notch of the ulna.
- [Wrist joint](#) – An articulation between the distal end of the radius and the carpal bones.
- **Distal radioulnar joint** – An articulation between the ulnar notch and the head of the ulna.



Proximal Region of the Radius

- The proximal end of the radius articulates in both the elbow and proximal radioulnar joints.
- Important bony landmarks include the **head**, **neck** and **radial tuberosity**:
- **Head of radius** – A disk shaped structure, with a concave articulating surface. It is thicker medially, where it takes part in the proximal radioulnar joint.
- **Neck** – A narrow area of bone, which lies between the radial head and radial tuberosity.
- **Radial tuberosity** – A bony projection, which serves as the place of attachment of the biceps brachii muscle.

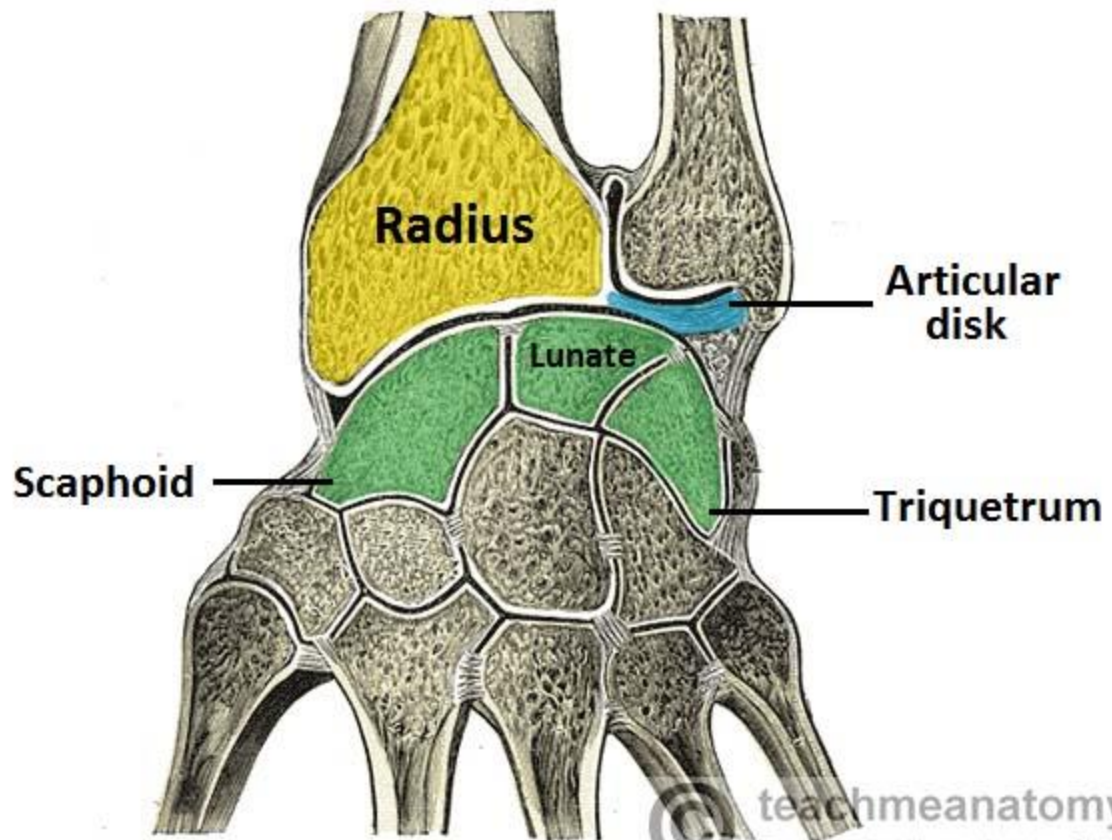


Shaft of the Radius

- The radial shaft expands in diameter as it moves distally. Much like the ulna, it is **triangular** in shape, with three borders and three surfaces.
- In the middle of the lateral surface, there is a small roughening for the attachment of the **pronator teres** muscle.

Distal Region of the Radius

- In the distal region, the radial shaft expands to form a rectangular end. The lateral side projects distally as the **styloid process**. In the medial surface, there is a concavity, called the **ulnar notch**, which articulates with the head of ulna, forming the distal **radioulnar joint**.
- The distal surface of the radius has two facets, for articulation with the **scaphoid** and **lunate** carpal bones. This makes up the **wrist joint**.



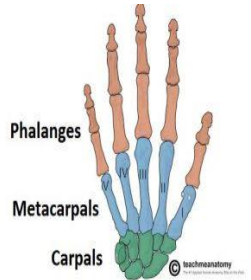
Clinical Relevance: Common Fractures of the Radius

- The forearm is a common site for bone fractures. Here, we shall look at the common fracture types involving the radius:
- **Colles' Fracture** –It produces what is known as the 'dinner fork deformity'.
- **Smith's Fracture** – . It is the opposite of a Colles' fracture, as the distal fragment is



Bones of Hand

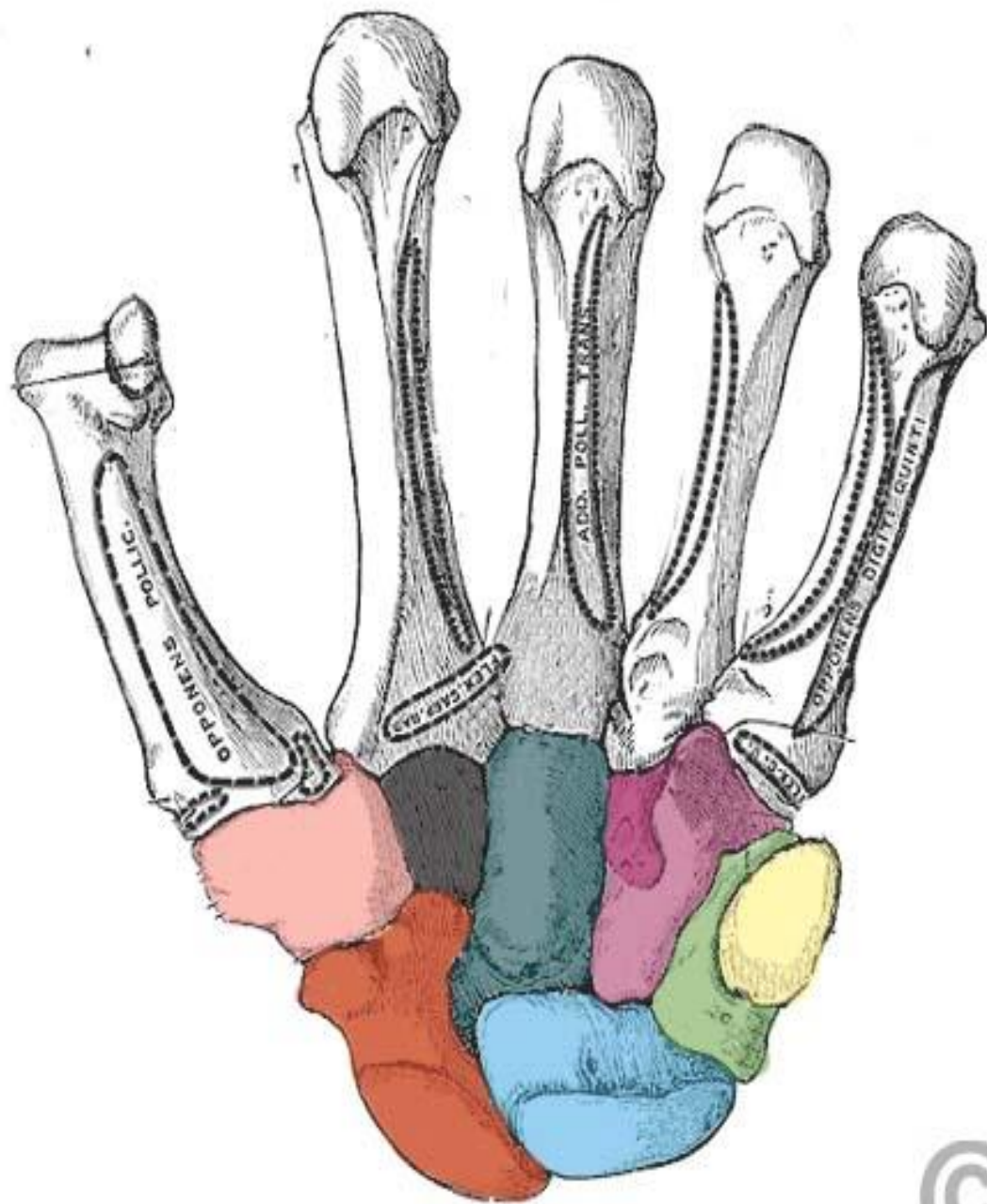
- The bones of the hand provide support and flexibility to the soft tissues. They can be divided into three categories:
- **Carpal bones** (Most proximal) – A set of eight irregularly shaped bones. These are located in the wrist area.
- **Metacarpals** – There are five metacarpals, each one related to a digit
- **Phalanges** (Most distal) – The bones of the fingers. Each finger has three phalanges, except for the thumb, which has two.



Carpal Bones

- The carpal bones are a group of eight, irregularly shaped bones. They are organised into two rows; proximal and distal.

Proximal Row (lateral to medial)	Distal Row (lateral to medial)
<ul style="list-style-type: none">•Scaphoid•Lunate•Triquetrum•Pisiform (a sesamoid bone, formed within the tendon of the flexor carpi ulnaris)	<ul style="list-style-type: none">•Trapezium•Trapezoid•Capitate•Hamate (has a projection on its palmar surface, known as the 'hook of hamate')



-  Scaphoid
-  Lunate
-  Triquetrum
-  Pisiform
-  Trapezium
-  Trapezoid
-  Capitate
-  Hamate



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Metacarpal Bones

- The metacarpal bones articulate proximally with the carpals, and distally with the proximal phalanges. They are numbered, and each associated with a digit:
- Metacarpal I – Thumb.
- Metacarpal II – Index finger.
- Metacarpal III – Middle finger.
- Metacarpal IV – Ring finger.
- Metacarpal V – Little finger.
- Each metacarpal consists of a base, shaft and a head

Phalanges

- The **phalanges** are the bones of the fingers. The thumb has a proximal and distal phalanx, while the rest of the digits have proximal, middle and distal phalanges.

THANK YOU.