Upper Limbs I

- Bones of the thorax
- Bones of the shoulder girdle
- Bones of the Upper Limb
Bony Thorax (Thoracic Cage)

- Jugular notch
- Clavicular notch
- Manubrium
- Sternal angle
- Body
- Xiphisternal joint
- Xiphoid process
- True ribs (1–7)
- False ribs (8–12)
- Floating ribs (11, 12)
- Intercostal spaces
- Floating ribs (11, 12)
- Costal cartilage
- Costal margin
- L1 Vertebra
- Sternum
Bony Thorax (Thoracic Cage)

- The thoracic cage is composed of the thoracic vertebrae dorsally, the ribs laterally, and the sternum and costal cartilages anteriorly.

- Functions
  - Forms a protective cage around the heart, lungs, and great blood vessels.
  - Supports the shoulder girdles and upper limbs.
  - Provides attachment for many neck, back, chest, and shoulder muscles.
  - Uses intercostal muscles to lift and depress the thorax during breathing.
Sternum (Breastbone)

- A dagger-shaped, flat bone that lies in the anterior midline of the thorax
- Results from the fusion of three bones – the superior manubrium, the body, and the inferior xiphoid process
- Anatomical landmarks include the jugular (suprasternal) notch, the sternal angle, and the xiphisternal joint
Sternum

- Clavicular notch
- Jugular (suprasternal) notch
- Costal cartilage of 1st rib
- Manubrium
- Sternal angle (manubriosternal joint)
- Transverse ridge
- Body of sternum
- Costal notches
- 2nd, 3rd, 4th, 5th, 6th, 7th
- Xiphisternal joint
- Xiphoid process
Structure of a Typical True Rib

- Bowed, flat bone consisting of a head, neck, tubercle, and shaft
Superior facet
Inferior facet
Articular facet of tubercle
Transverse articular facet
Tuberculum (tubercle) of rib
Capitulum (head)
Neck
Angle
Articular facet of tubercle
Superior facet
Interarticular crest
Inferior facet
Attachment to costal cartilage (sternal end)
Costal groove
Appendicular Skeleton

- The appendicular skeleton is made up of the bones of the limbs and their girdles
- Pectoral girdles attach the upper limbs to the body trunk
- Pelvic girdle and the lower limbs
The Upper limb

Pectoral or shoulder girdle
Shoulder: Bony elements.

- Acromion
- Acromial angle
- Supraglenoid tubercle
- Head
- Greater tubercle
- Lesser tubercle
- Anatomical neck
- Intertubercular sulcus; Bicipital groove
- Glenoid cavity
- Surgical neck
- Infraglenoid tubercle
- Crest of greater tubercle; Lateral lip
- Crest of lesser tubercle; Medial lip
- Humerus
- Spine of scapula
- Superior angle
- Superior border
- Supraspinous fossa
- Suprascapular notch
- Clavicle
- Coracoid process
- Scapula
- Medial border
- Neck of scapula
- Subscapular fossa
- Lateral border
- Inferior angle
Pectoral (Shoulder) Girdles

- The pectoral girdles: Consist of the clavicles anterior and the scapulae posterior.
- They attach the upper limbs to the axial skeleton in a manner that allows for maximum movement.
- They provide attachment points for muscles that move the upper limbs.
Clavicles (Collarbones)

- The clavicles are slender, doubly-curved long bones
  subcutaneous bone lying across the superior thorax
  across the root of the neck

- The acromial (lateral) Flat supro-inferior end
  articulates with the acromion process of the
  scapula.

- the Sternal (medial) end is rounded and
  articulates with the sternum (manubrium) and
  first costal cartilage

- They provide attachment points for numerous
  muscles, and act as braces to hold the
  scapulae and arms out laterally away from the
  body
(a) Articulated pectoral girdle
(b) Right clavicle, superior view
(c) Right clavicle, inferior view
Shaft

First costal cartilage attachment

Subclavius notch

Concave

Medial

Convex

Lateral

Acromial (lateral) end

Anterior

Posterior

Acromial end

Sternal (medial) end

Sternal end

(b) Right clavicle, superior view

(c) Right clavicle, inferior view
Scapulae (Shoulder Blades)

- The scapulae are triangular, flat bones lying on the dorsal surface of the rib cage, between the second and seventh ribs
- Has three borders and three angles
- Major markings include the suprascapular notch, the supraspinous and infraspinous fossae, the spine, the acromion, and the coracoid process
Scapulae (Shoulder Blades) : Posterior Aspect

Coracoid process
Suprascapular notch
Supraspinous fossa
Spine
Infraspinous fossa
Medial border
Lateral border
Acromion
Lateral angle
Scapula Lateral Aspect

- 1. Coracoid Process
- 2. Glenoid Cavity
- 3. Scapular Spine
- 4. Acromion Process
- 5. Infraspinous Fossa
- 6. Inferior Angle
- 7. Lateral border
Shoulder: superior Axillary View

coracoid

glenoid

coracoid

humeral head

glenoid

acromion

greater tuberosity

lesser tuberosity
Shoulder -- Internal Rotation
AP View

- 1st Rib
- Superior Angle Scapula
- Superior Border Scapula
- Acromioclavicular Joint
- Acromion Process
- Head of Humerus
- Anatomical Neck
- Greater Tubercle
- Intertubercular Groove
- Lesser Tubercle
- Surgical Neck
- Coracoid Process
- Glenoid Fossa
- Medial Border Scapula
- Lateral Border Scapula
- Inferior Angle Scapula
- Humerus

http://www.wikiradiography.net/
The Upper Limb

- The upper limb consists of the arm (brachium), forearm (antebrachium), and hand (manus)
- Thirty-seven bones form the skeletal framework of each upper limb
The Arm (The humerus)

- The humerus is the sole bone of the arm
- It articulates with the scapula at the shoulder, and the radius and ulna at the elbow

Major markings

- **Proximal humerus**
  - includes the head, anatomical and surgical necks, greater and lesser tubercles, and the intertubercular groove

- **Distal humerus**
  - includes the capitulum, trochlea, medial and lateral epicondyles, and the coronoid and olecranon fossae

- **Medial portion includes the radial groove and the deltid process**
Arm bone (Humerus) An	
terior View

Greater
tubercle
Lesser
tubercle
Inter-
tubercular
groove

Head of
humerus
Anatomical
neck

Deltoid tuberosity

Coronoid
fossa
Olecranon
fossa
Medial
epicondyle
Trochlea

Lateral
supracondylar
ridge
Radial
fossa
Capitulum

(a) Anterior view
Arm bone (Humerus)
Posterior View
Forearm Bones (the Radius and The Ulna)

- The bones of the forearm are the radius and ulna
- They articulate proximally with the humerus and distally with the wrist bones
- They also articulate with each other proximally and distally at small radioulnar joints
- Interosseous membrane connects the two bones along their entire length
Ulna

- The ulna lies medially in the forearm and is slightly longer than the radius
- Forms the major portion of the elbow joint with the humerus
- Its major markings include the olecranon, coronoid process, trochlear notch, radial notch, and the styloid process
Radius

- The radius lies opposite (lateral to) the ulna and is thin at its proximal end, widened distally
- The superior surface of the head articulates with the capitulum of the humerus
- Medially, the head articulates with the radial notch of the ulna
- Major markings include the radial tuberosity, ulnar notch, and styloid process
Radius

(a) Anterior view

Radial notch
Head
Neck
Radial tuberosity
Olecranon process
Trochlear notch
Coronoid process
Proximal radioulnar joint
Interosseous membrane
Ulna
Styloid process of radius
Ulnar notch
Head of ulna
Distal radioulnar joint

(b) Posterior view

Olecranon process
Head of radius
Neck of radius
Interosseous membrane
Ulna
Ulnar notch
Head of ulna
Styloid process of ulna
Styloid process of radius
Bones of the forearm
Elbow: Lateral View
The anterior humeral line (blue) and the radiocapitellar line (red) should both bisect the capitellum. If they do not, suspect a displaced fracture.
1. **Simple**
   A clean break of the bone with little or no break in the overlying skin.

2. **Greenstick**
   An incomplete break of the bone in which part of the outer shell (cortex) remains intact.
   This occurs particularly in children, who have more flexible bones than adults.

3. **Compound (also known as 'Open')**
   A broken bone that pierces the overlying skin.

4. **Comminuted**
   A fracture in which the bone is broken into more than two pieces.
   A crushing force is usually responsible and there is extensive injury to surrounding soft tissues is common.

5. **Impacted**
   A fracture in which the bones involved are driven into each other.

6. **Complicated**
   A broken bone that also involves damage to other organs - in addition to broken bone(s) and possibly also broken skin.
   An example is a broken rib that punctures a lung.
FIGURE 12

Displaced supracondylar fracture

A type III supracondylar fracture with no contact between fragments and posterior displacement of the distal portion.
- Colles’ fracture (outstretched hand)
- Smith’s fracture (fall on the back of the hand)

**FIGURE 6**
Type I fracture of the distal radius

The anteroposterior view (A) of the injured radius appears normal, but widening of the physis is apparent on the lateral view (B).