Islamic University College

of Medical Technologies / Department

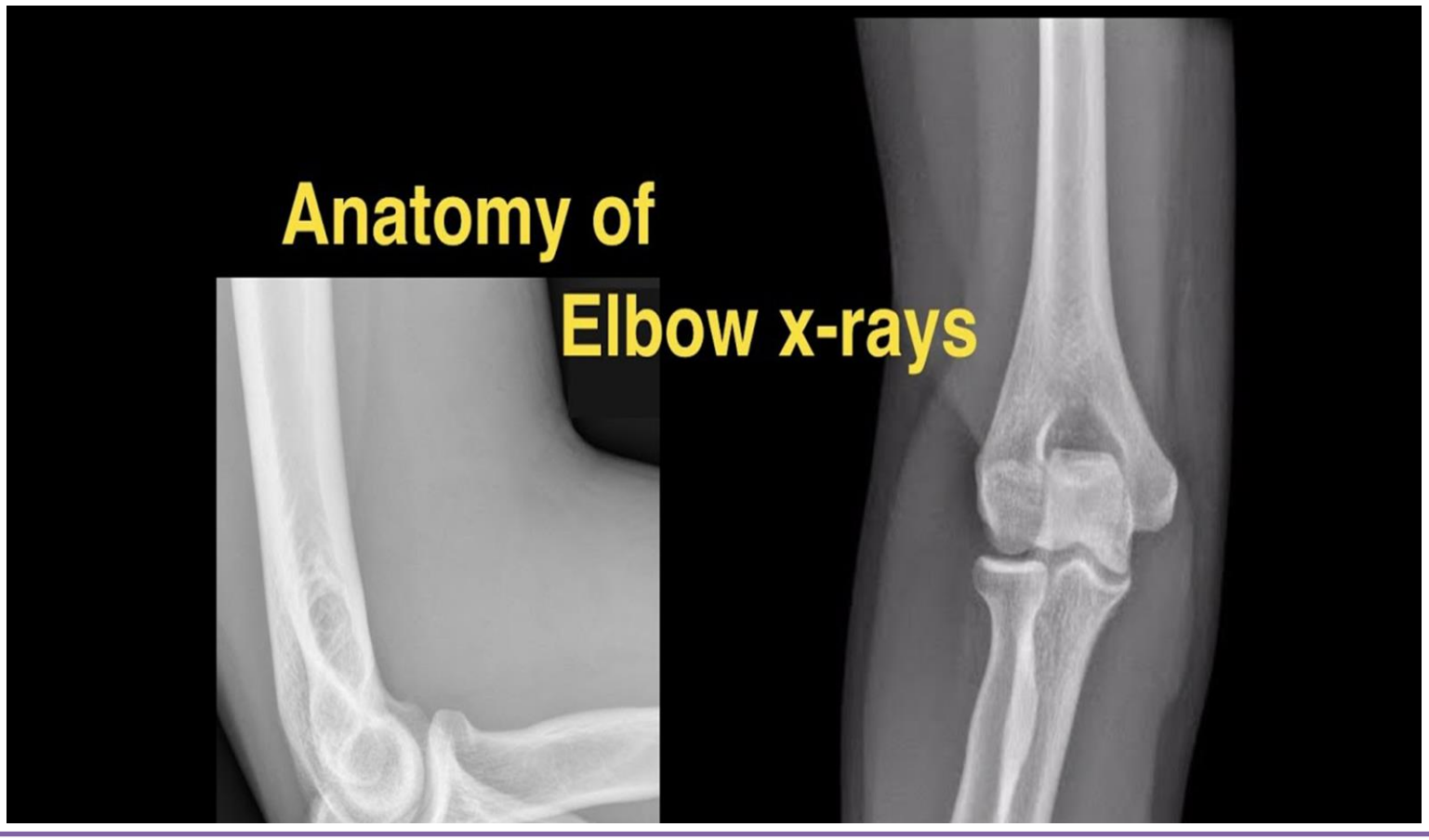
of Radiation Techniques

RADIOLOGICAL FEATURE ELBOW , WRIST JOINT AND BLOOD VESSELS OF UPPER LIMB

LECTURE-5-6-

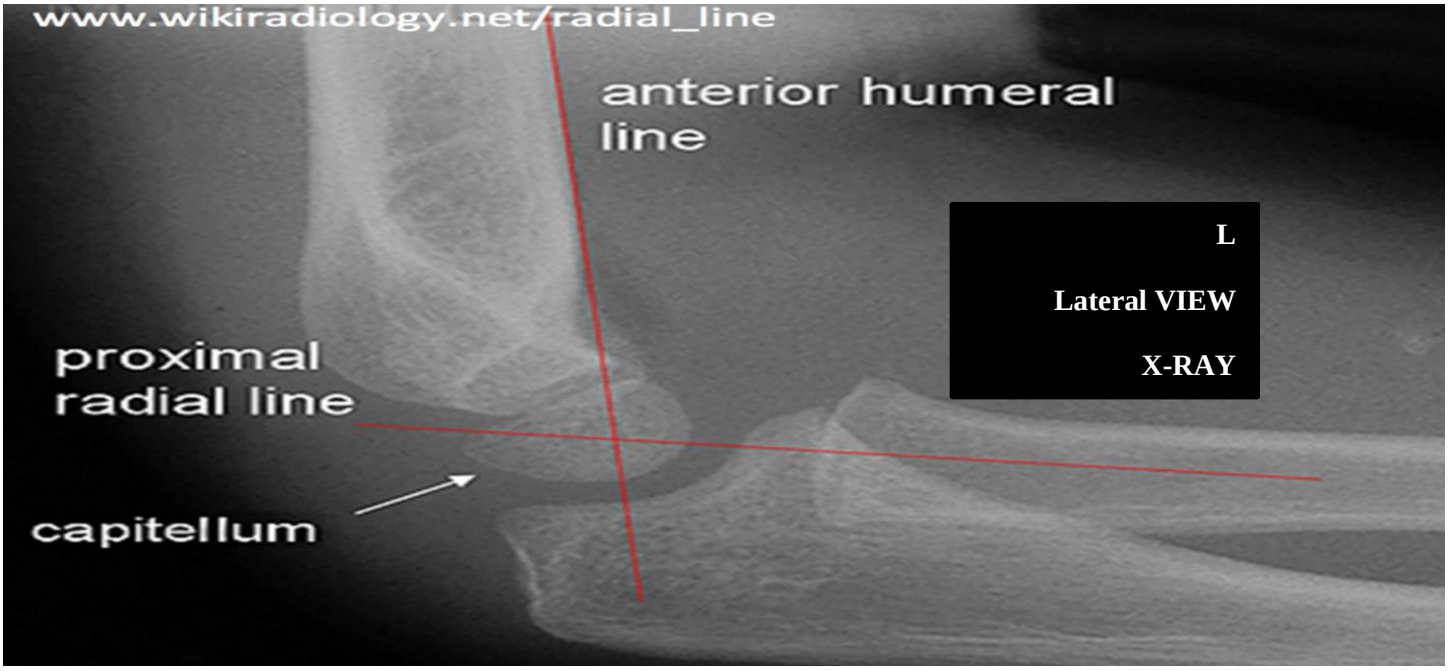
Dr. Safaa AL-Mosawy

M S C . Tariq Mhummed



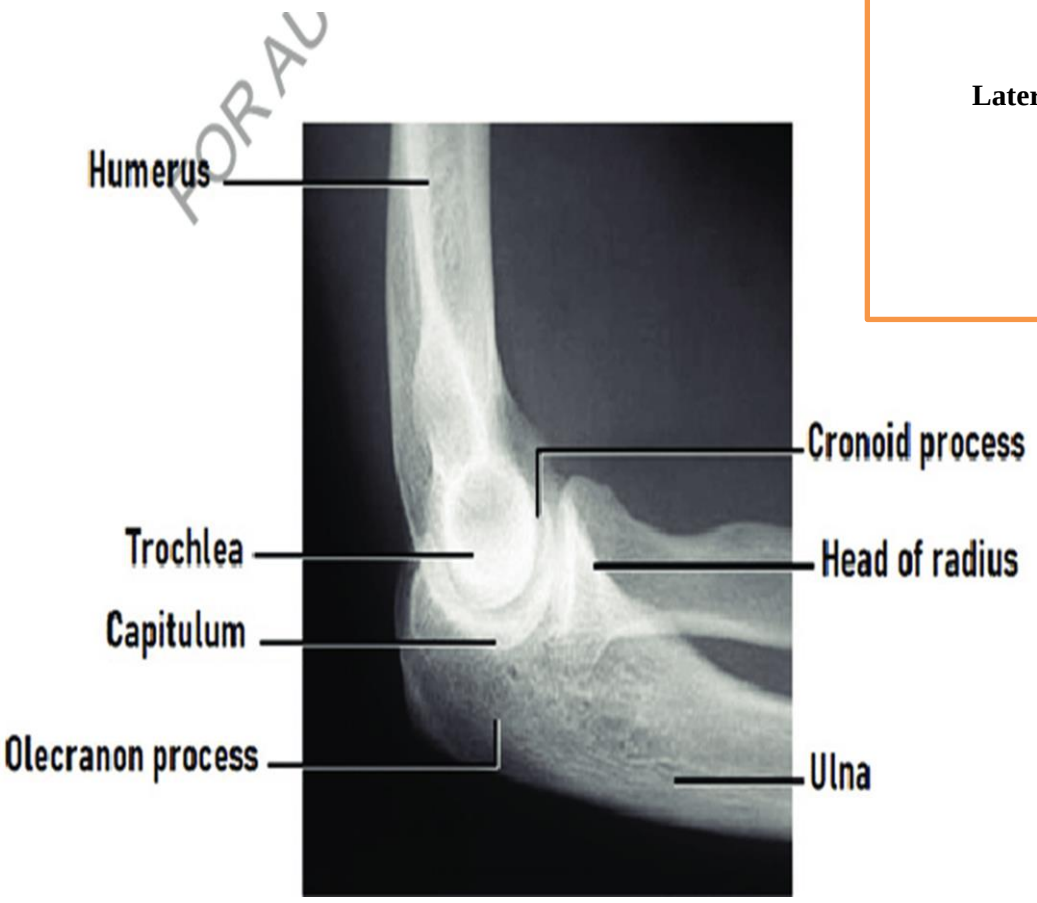
The elbow joint

The elbow joint is a synovial joint found in the upper limb between the arm and the forearm. It is the point of articulation of three bones: the humerus of the arm and the radius and the ulna of the forearm. The elbow joint is classified structurally as a synovial joint. It is also classified structurally as a compound joint, as there are two articulations in the joint. Synovial joints, also called diarthroses, are free movable joints. The articular surfaces of the bones at these joints are separated from each other by a layer of hyaline cartilage. Smooth movement at these joints is provided by a highly viscous synovial fluid, which acts as a lubricant.



COMPONENTS ELBOW JOINT

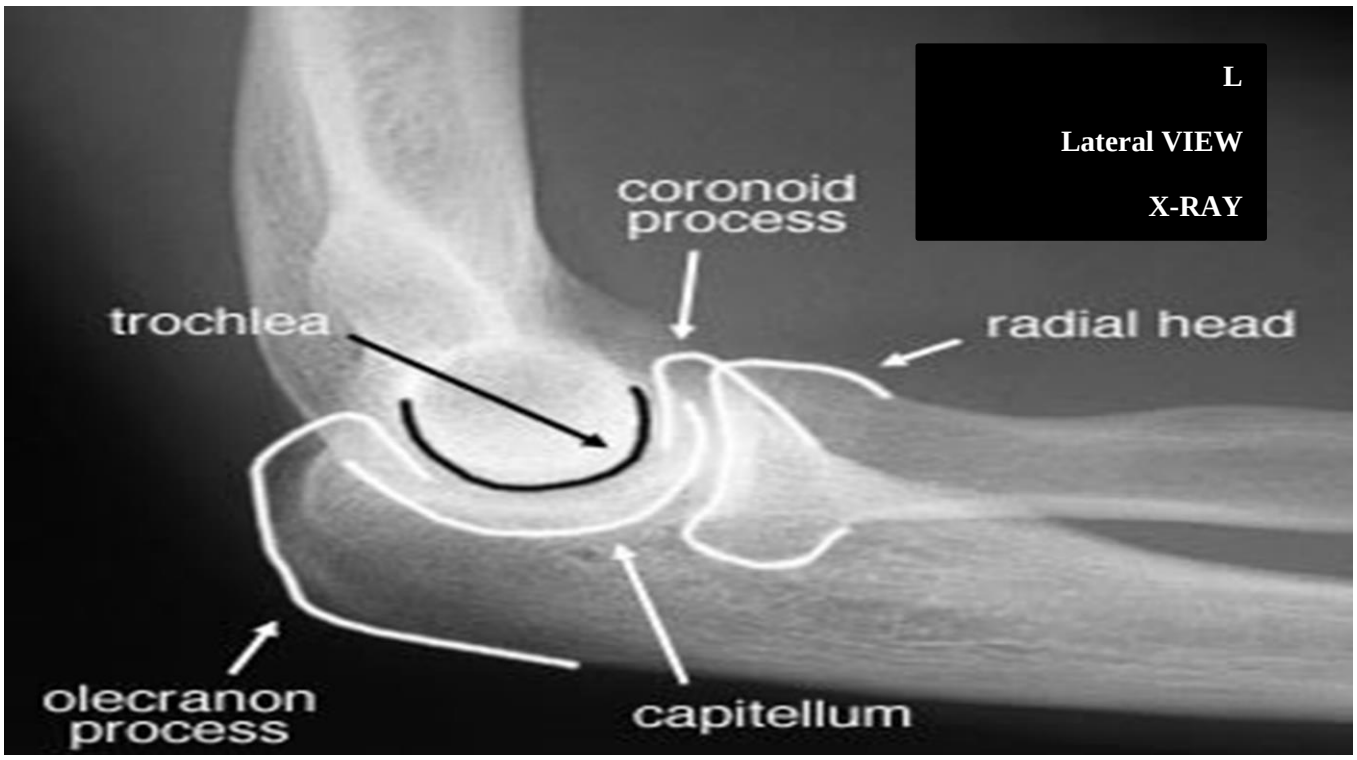
The elbow is a hinged joint made up of three bones, the humerus, ulna, and radius. The ends of the bones are covered with cartilage. Cartilage has a rubbery consistency that allows the joints to slide easily against one another and absorb shock. The bones are held together with ligaments that form the joint capsule.



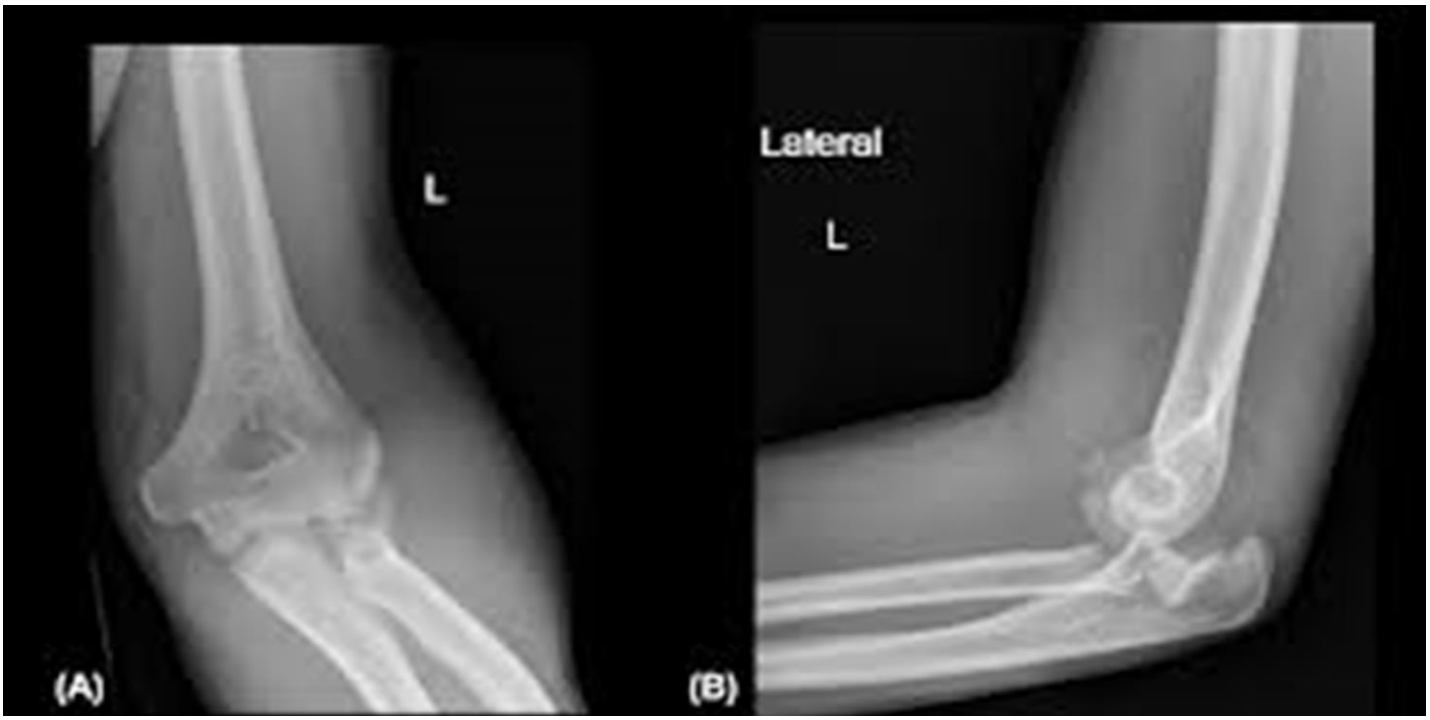
R

Lateral VIEW

x-rays

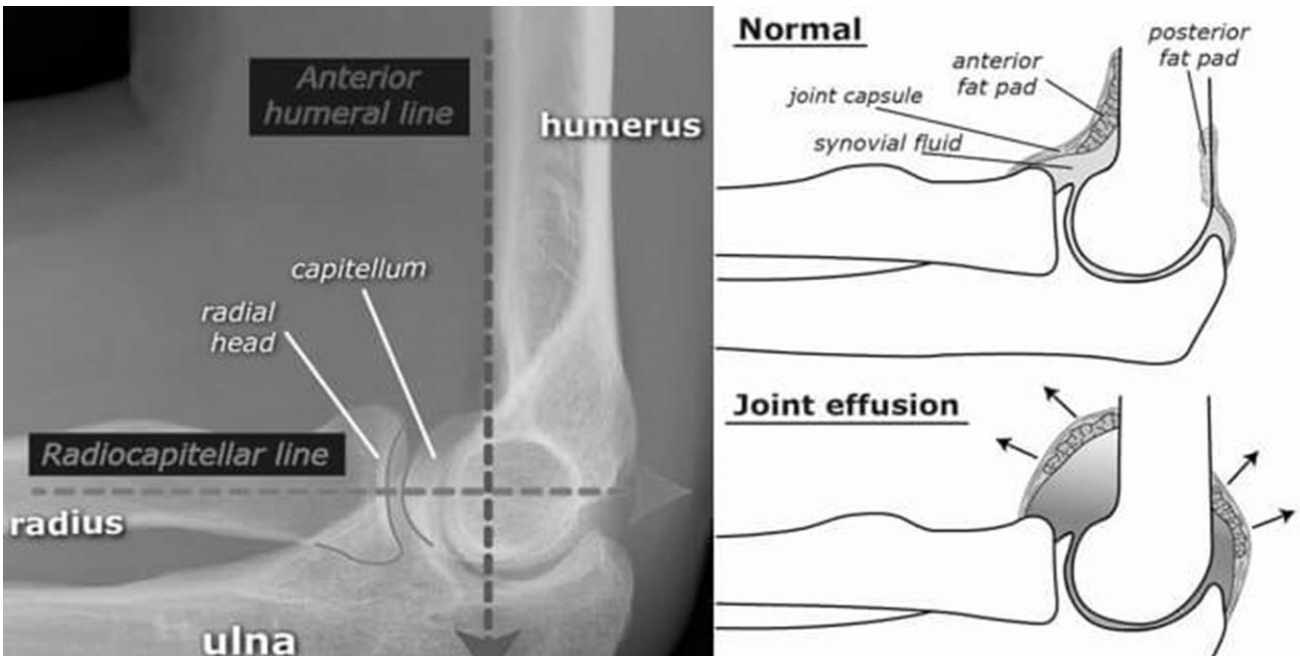

L
Lateral VIEW
X-RAY
coronoid process
trochlea
radial head
olecranon process
capitellum


Anterior Fat Pad
Humerus (Shaft)
Radial Head
Neck of Radius
Olecranon Process
Radius (Shaft)
Ulna (Shaft)
L
wiki



ARTICULATING OF ELBOW JOINT

The elbow joint consists of two types of articulations and thus allows two types of motion. The ulnohumeral articulation resembles a hinge joint, allowing flexion and extension, whereas the radiohumeral and proximal radioulnar joint allows axial rotation. Stability of the elbow joint is provided by the osseous articulations, medial and lateral collateral ligaments, and traversing muscles.



RADIOLOGICAL FEATURE ELBOW JOINT

An elbow X-ray is a medical test that produces an image of the inside of your elbow. The image displays the inner structure (anatomy) of your elbow in black and white. An elbow X-ray shows your soft tissues and elbow bones. Your elbow bones include the upper bone of your elbow joint (humerus) and the lower bones of your elbow joint (radius and ulna). Your healthcare provider will use an elbow X-ray to diagnose and treat health and medical conditions in your elbow.

THE WRIST JOINT

The wrist joint also referred to as the radiocarpal joint is a condyloid synovial joint of the distal upper limb that connects and serves as a transition point between the forearm and hand. A condyloid joint is a modified ball and socket joint that allows for flexion, extension, abduction, and adduction movements.

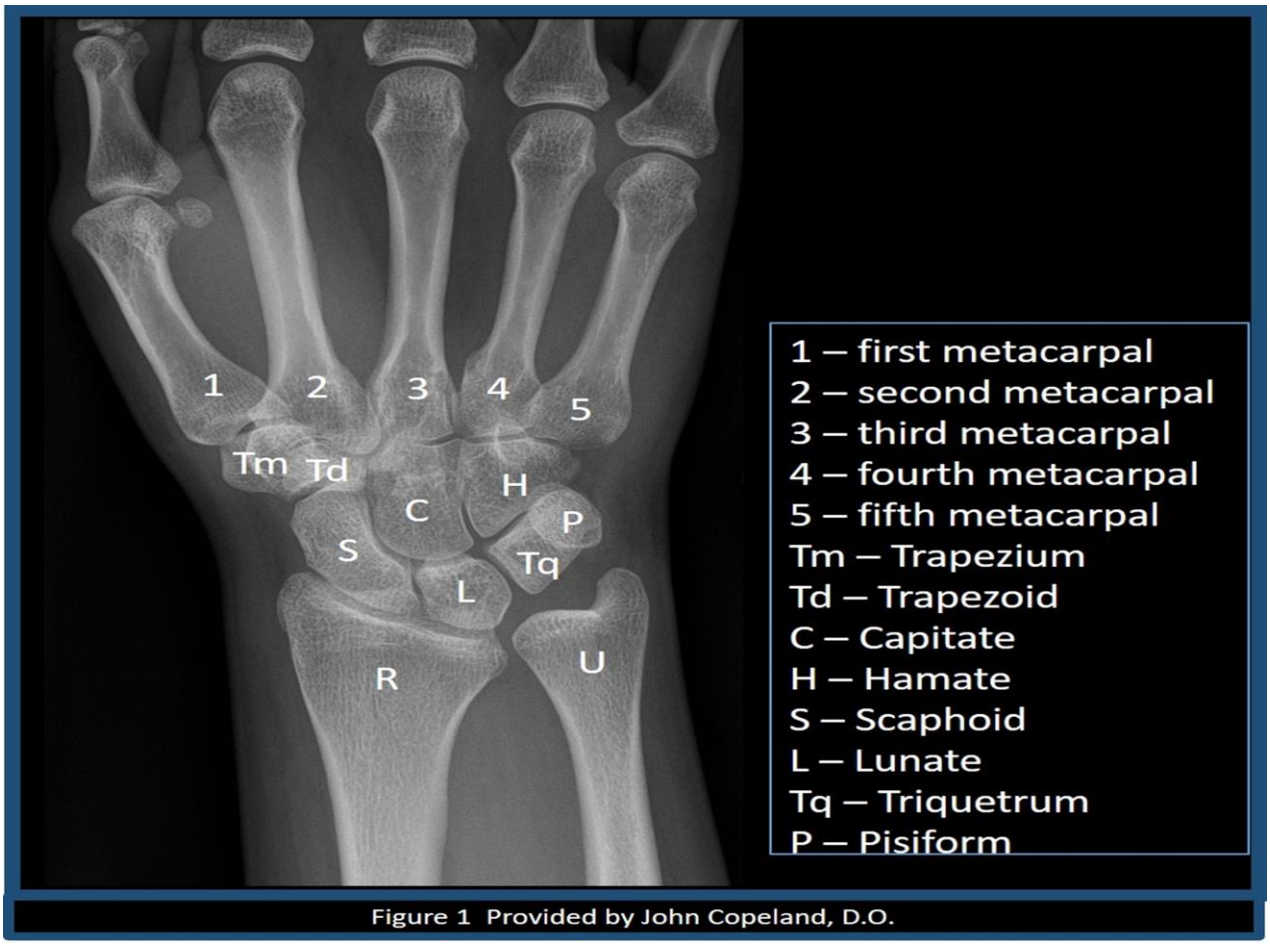


Figure 1 Provided by John Copeland, D.O.

COMPONENTS WRIST JOINT

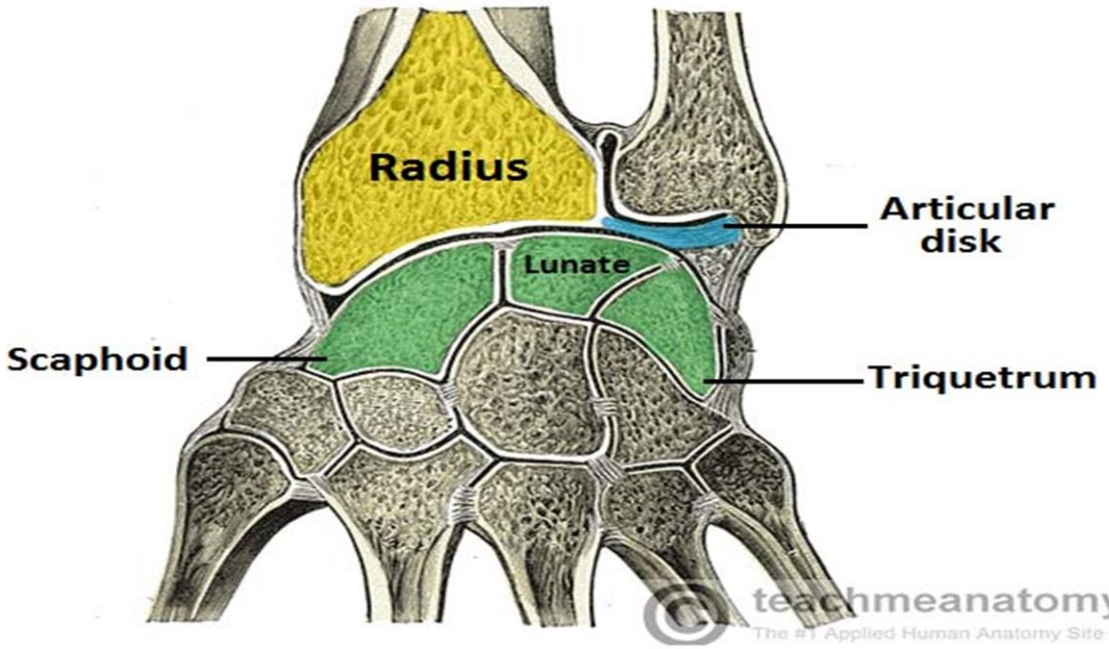
The wrist is a complex joint that bridges the hand to the forearm. It is actually a collection of multiple bones and joints. The bones comprising the wrist include the distal ends of the radius and ulna, 8 carpal bones, and the proximal portions of the 5 metacarpal bones

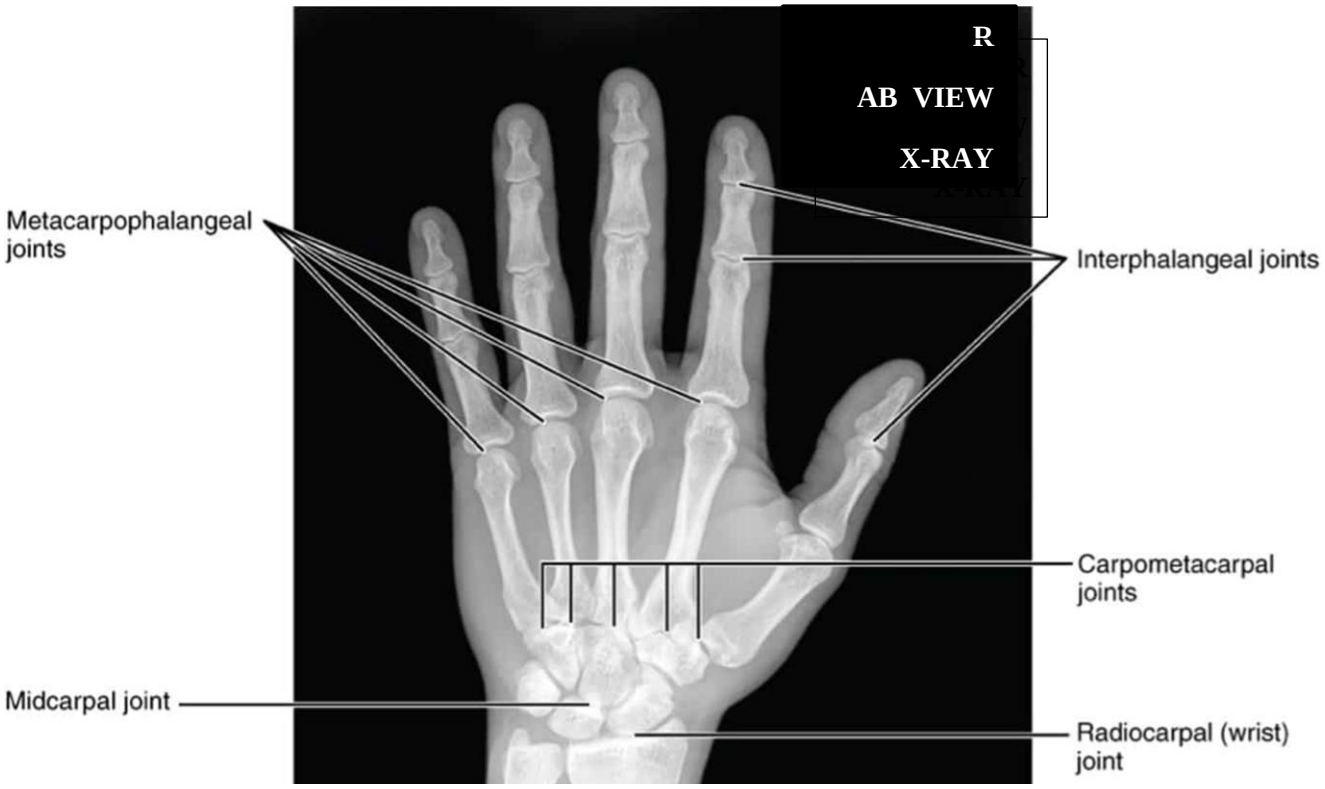
ARTICULATING OF WRIST JOINT

The wrist joint is formed by:

- **Distally** – The proximal row of the carpal bones (except the pisiform).
- **Proximally –** The distal end of the radius, and the articular disk (see below).

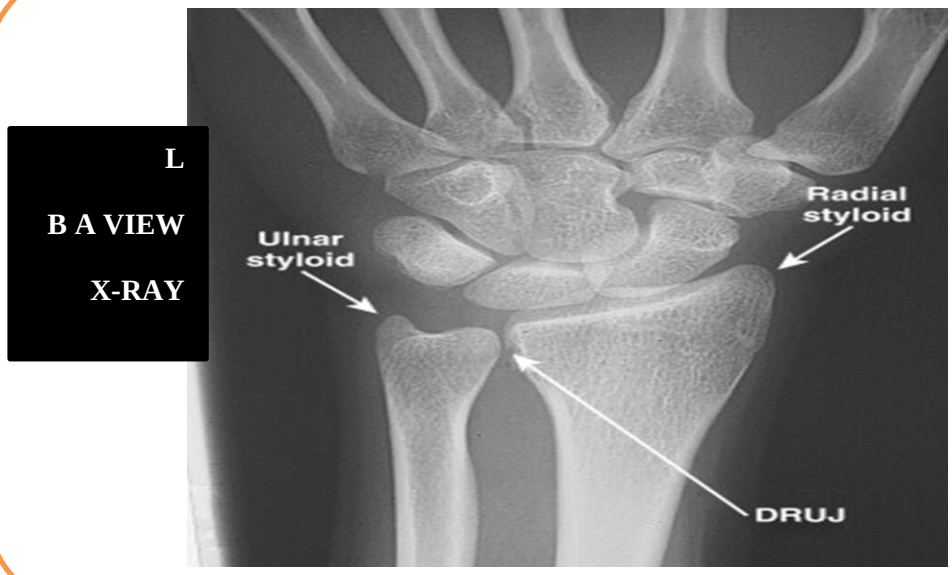
The ulna is <u>not</u> part of the wrist joint – it articulates with the radius, just proximal to the wrist joint, at the distal radioulnar joint. It is prevented from articulating with the carpal bones by a fibrocartilaginous ligament, called the articular disk, which lies over the superior surface of the ulna.





RADIOLOGICAL FEATURE WRIST JOINT

The "wrist joint" is really made up of three separate joints radiocarpal: concave distal surface of the radius and the attached articular disc of the distal radioulnar joint proximally with the convex surface of the proximal carpal row (the scaphoid, lunate and triquetral bones) distally.



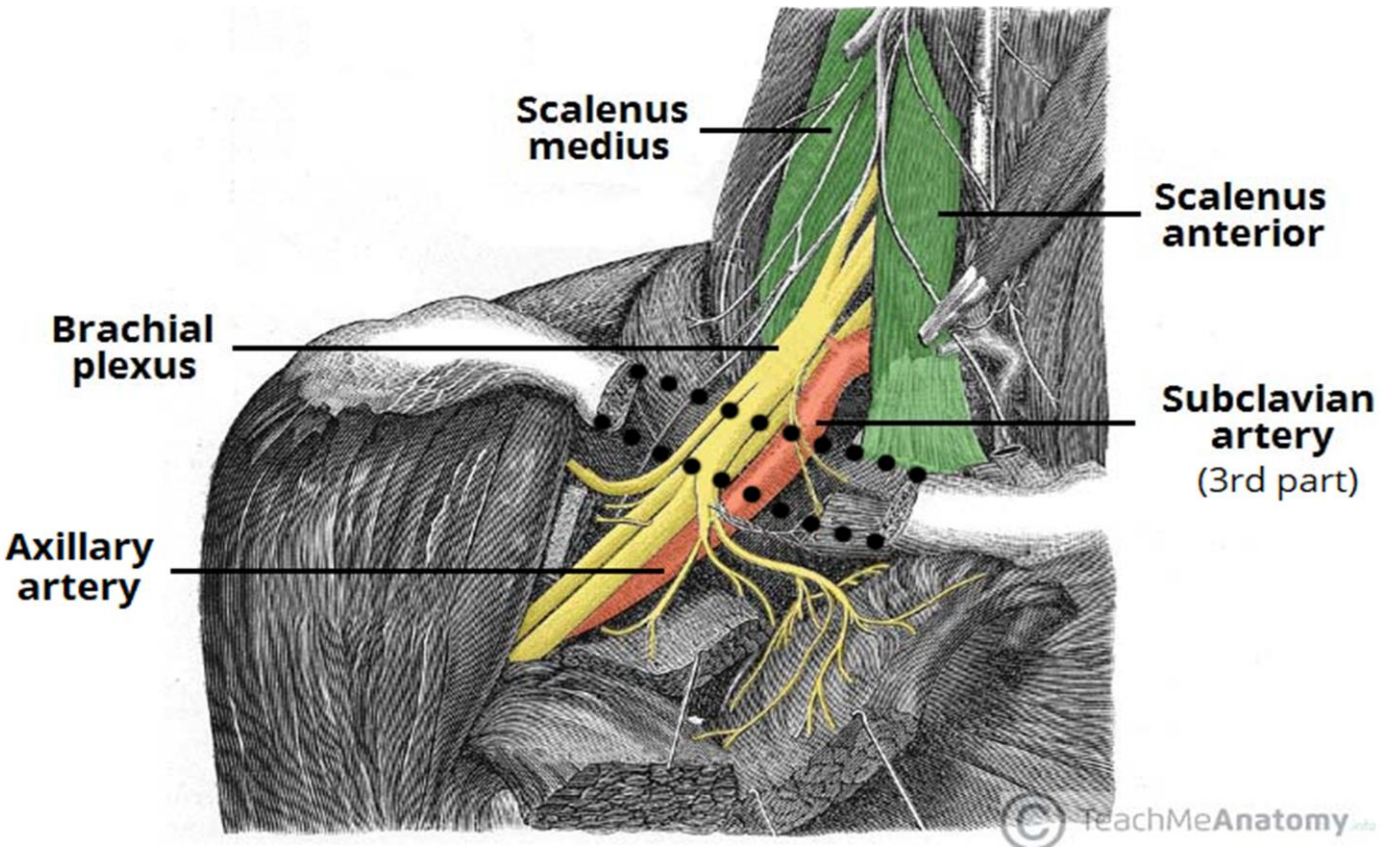
Blood supply of upper limbs arteries and vein

The arterial supply to the upper limb begins as the **subclavian artery**. On the right, the subclavian artery arises from the brachiocephalic trunk. On the left, it branches directly from the arch of aorta.

The subclavian artery travels laterally towards the axilla. It can be divided into three parts based on its position relative to the anterior scalene muscle:

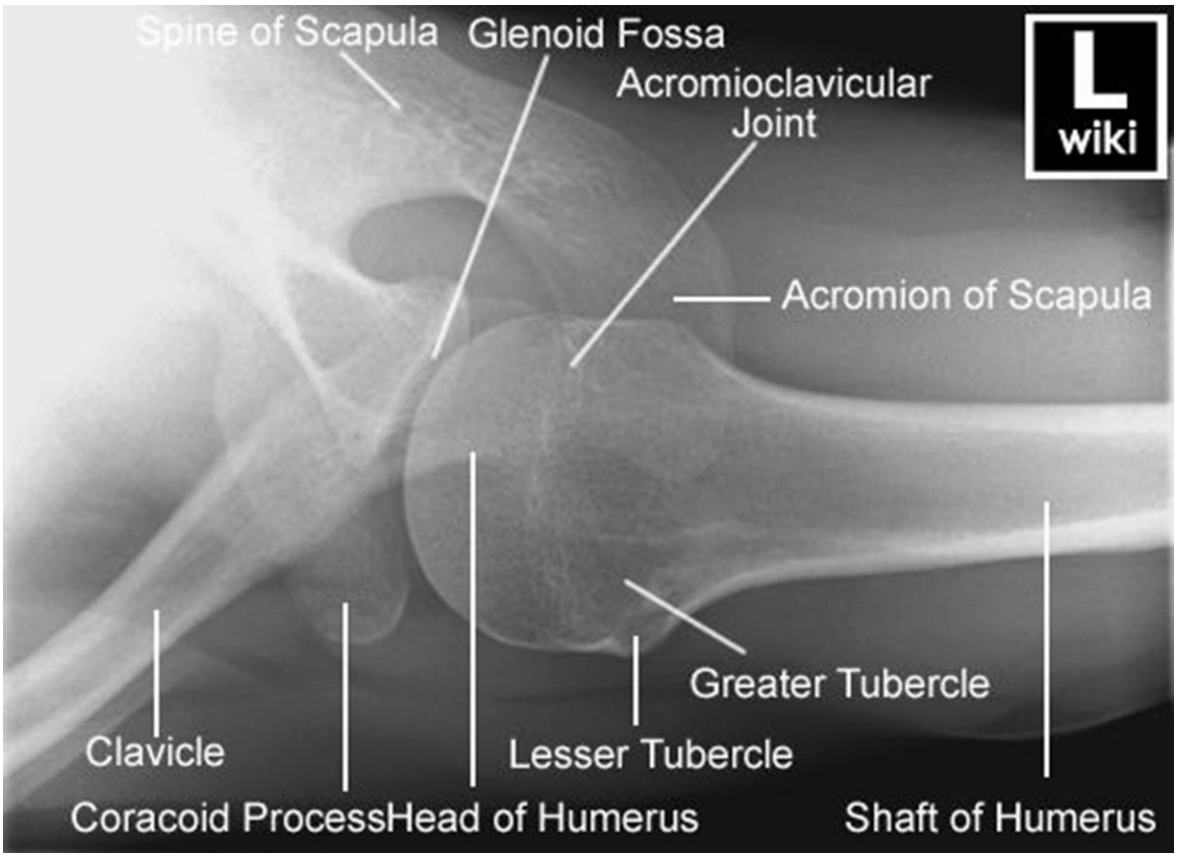
- **First part** – origin of the subclavian artery to the medial border of the anterior scalene.
- **Second part** – posterior to the anterior scalene.
- **Third part** – lateral border of anterior scalene to the lateral border of the first rib.

At the lateral border of the first rib, the subclavian artery enters the axilla – and is renamed the axillary artery

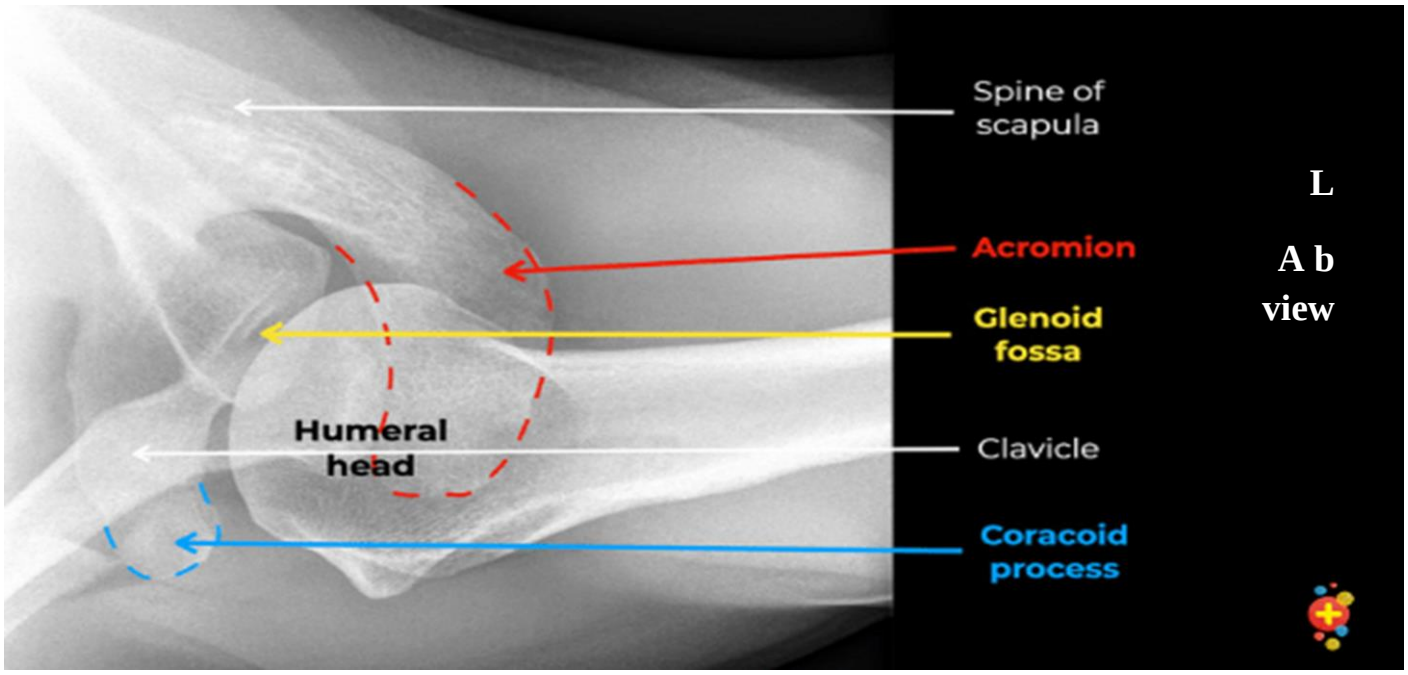


RADIOLOGICAL FEATURE OF THE AXILLARY

The axilla (plural: axillae), colloquially known as the armpit, is a space located between the upper limb and thorax, which permits the passage of major neurovascular structures, The axilla is pyramidal in shape with its apex opening superiorly towards the base of the neck between the subclavius muscle, first rib, superior border of the scapula and clavicle. The base/floor is composed of tough axillary fascia, which extends between the chest wall (at the level of the 4th rib), arm, and the posterior boundary.



X-ray Radiology shoulders



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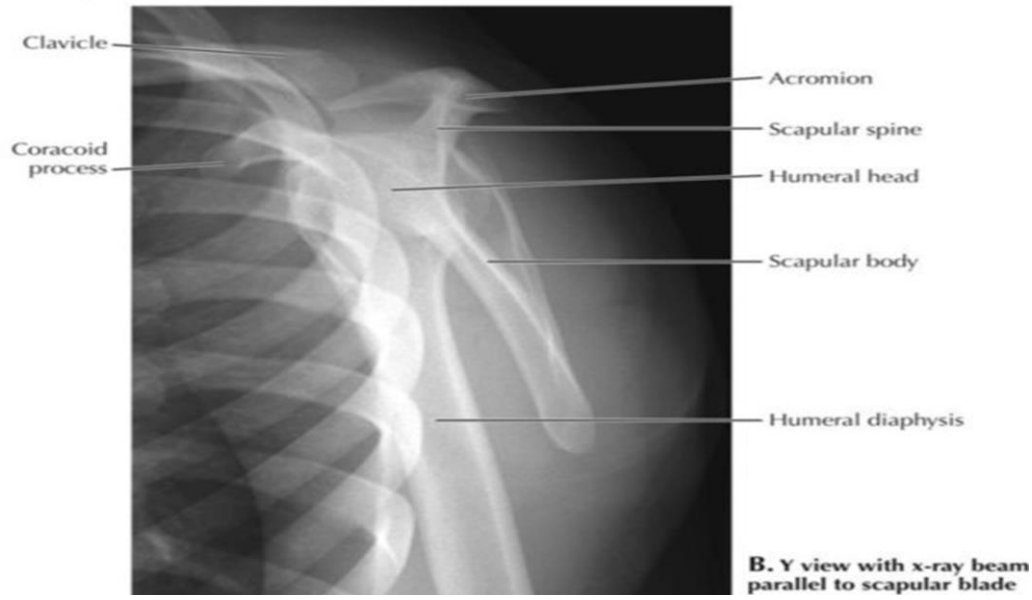
A b view

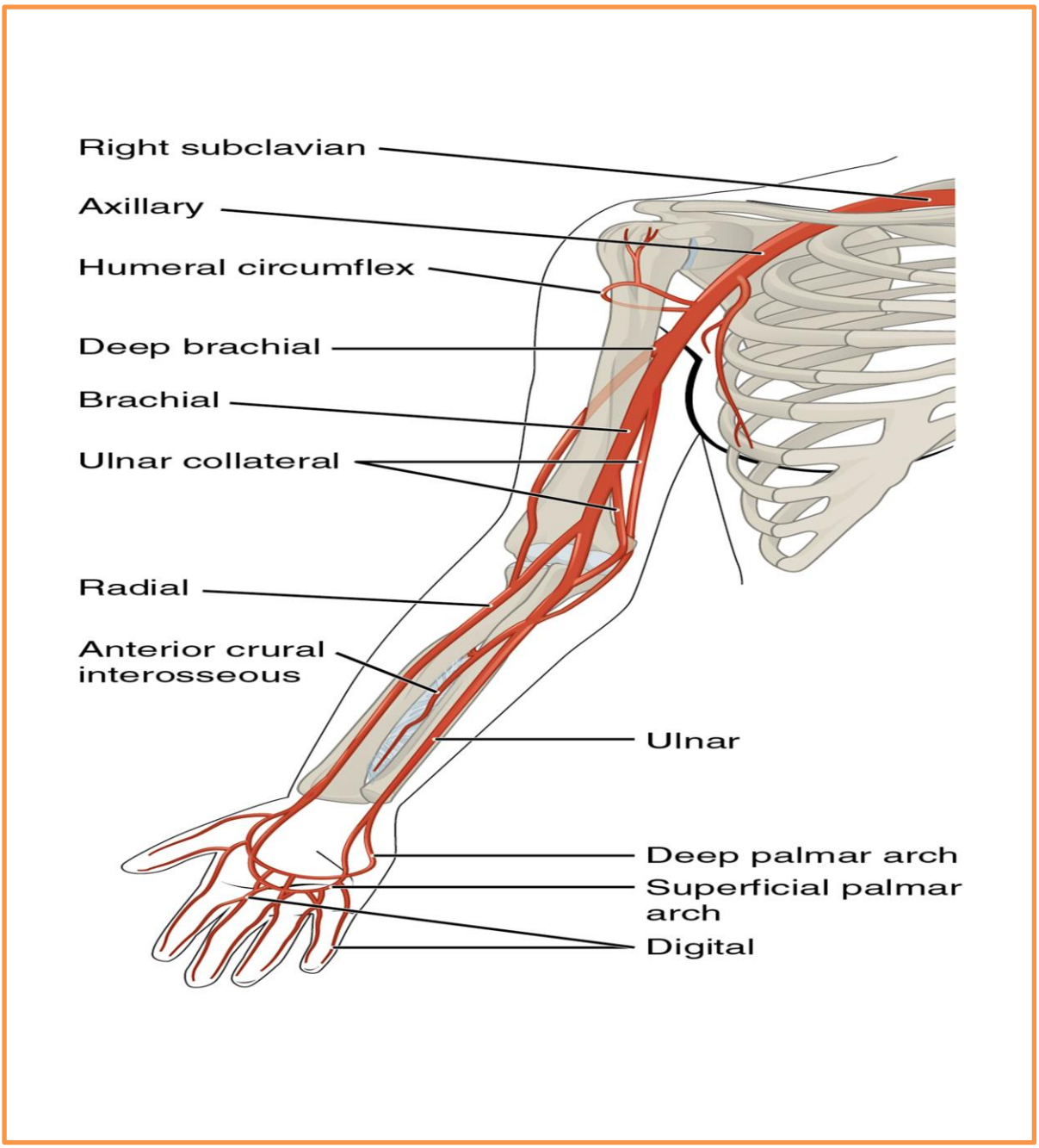
X-ray radiology

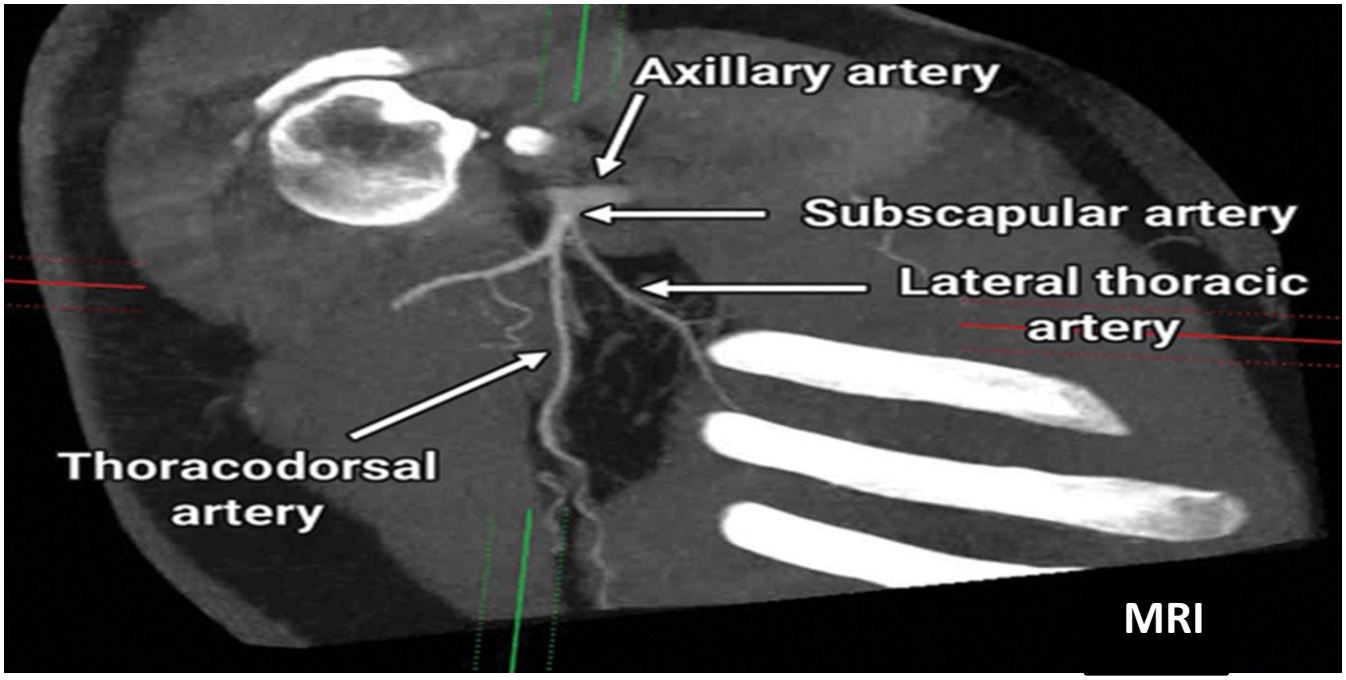
A. Axillary view from above



B. Y view with x-ray beam parallel to scapular blade

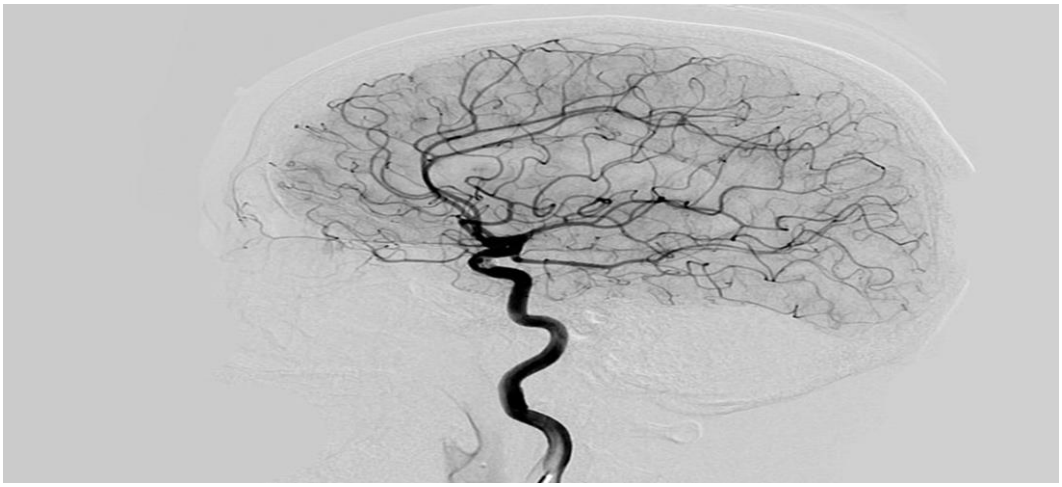
In terms of arterial supply, the upper limb has 5 main vessels, the: **subclavian, axillary, brachial, radial, and ulnar arteries**. The subclavian, axillary and brachial arteries are continuous with one another, with the brachial artery bifurcating into the radial and ulnar arteries which later converge in the hand





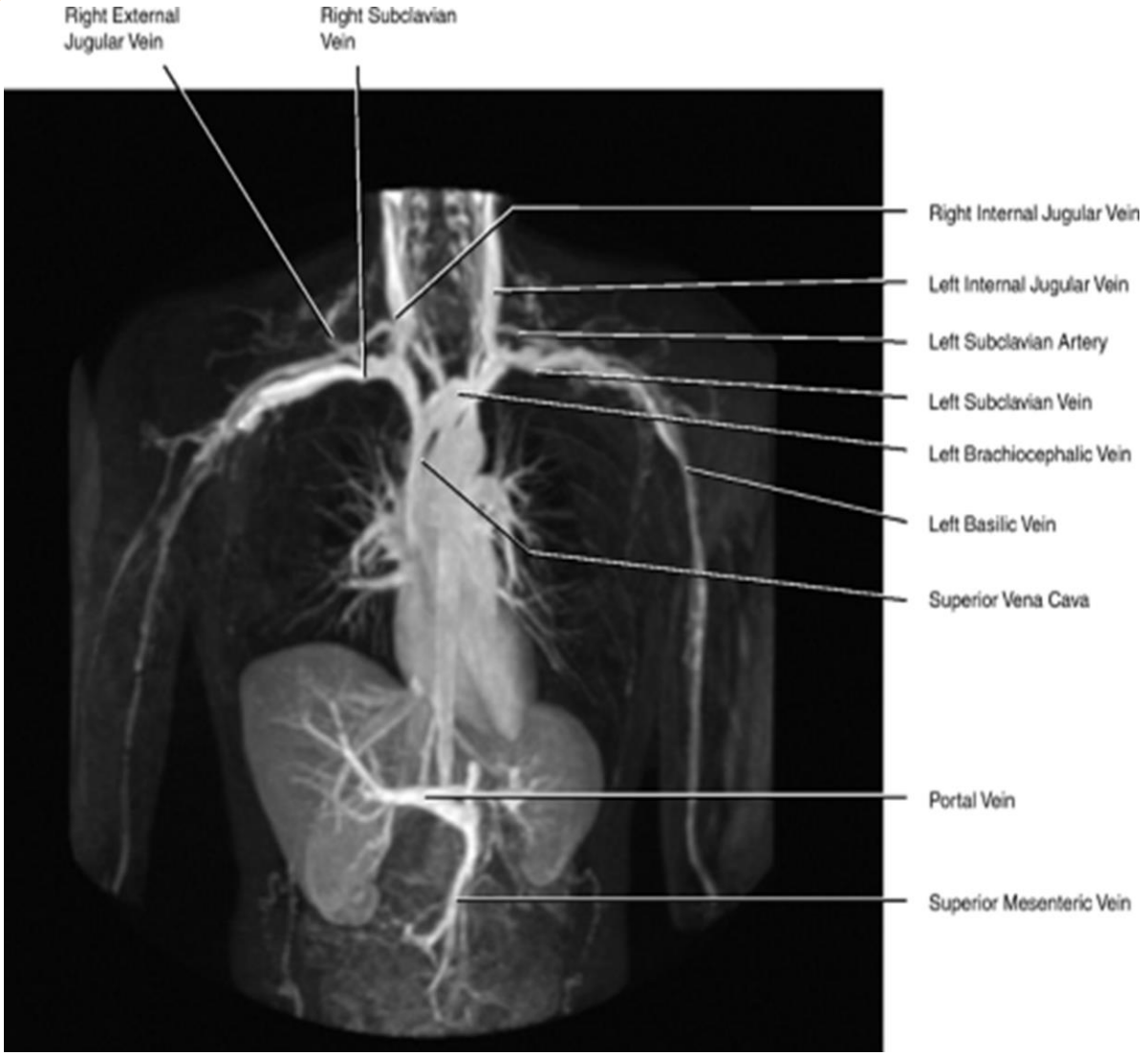
Arteriography

An arteriogram is done to see how blood moves through the arteries. It is also used to check for blocked or damaged arteries. It can be used to visualize tumors or find a source of bleeding. Usually, an arteriogram is performed at the same time as a treatment. An arteriogram is a procedure that produces an image of your arteries. During the procedure, your doctor will use contrast material, or dye, and X-rays to observe the flow of blood through your arteries and note any blockages. This procedure, also known as an angiogram, can be done on many different parts of your body

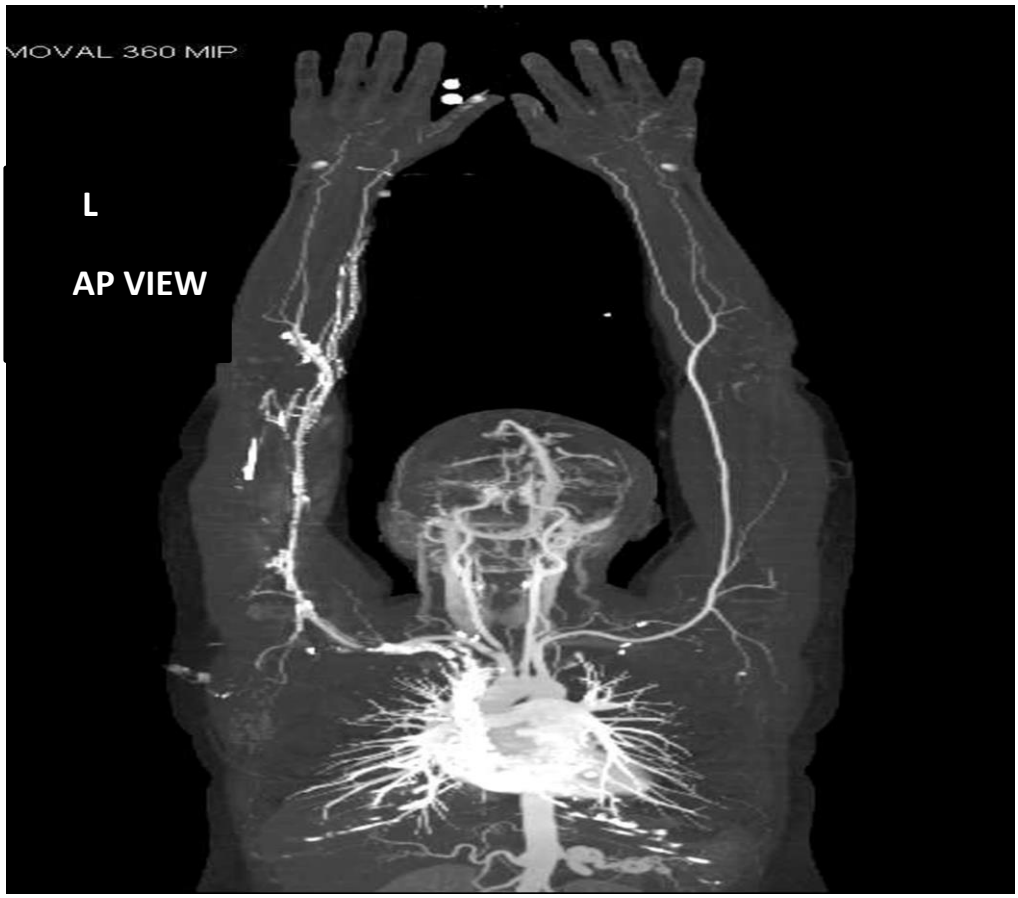


Veins of the upper limb

The deep veins of the upper extremity include the paired ulnar, radial, and interosseous veins in the forearm; paired brachial veins of the upper arm; and axillary vein. The axillary vein originates at the lower border of the teres major muscle in continuity with the brachial veins, Veins can be categorized into four main types: pulmonary, systemic, superficial, and deep veins



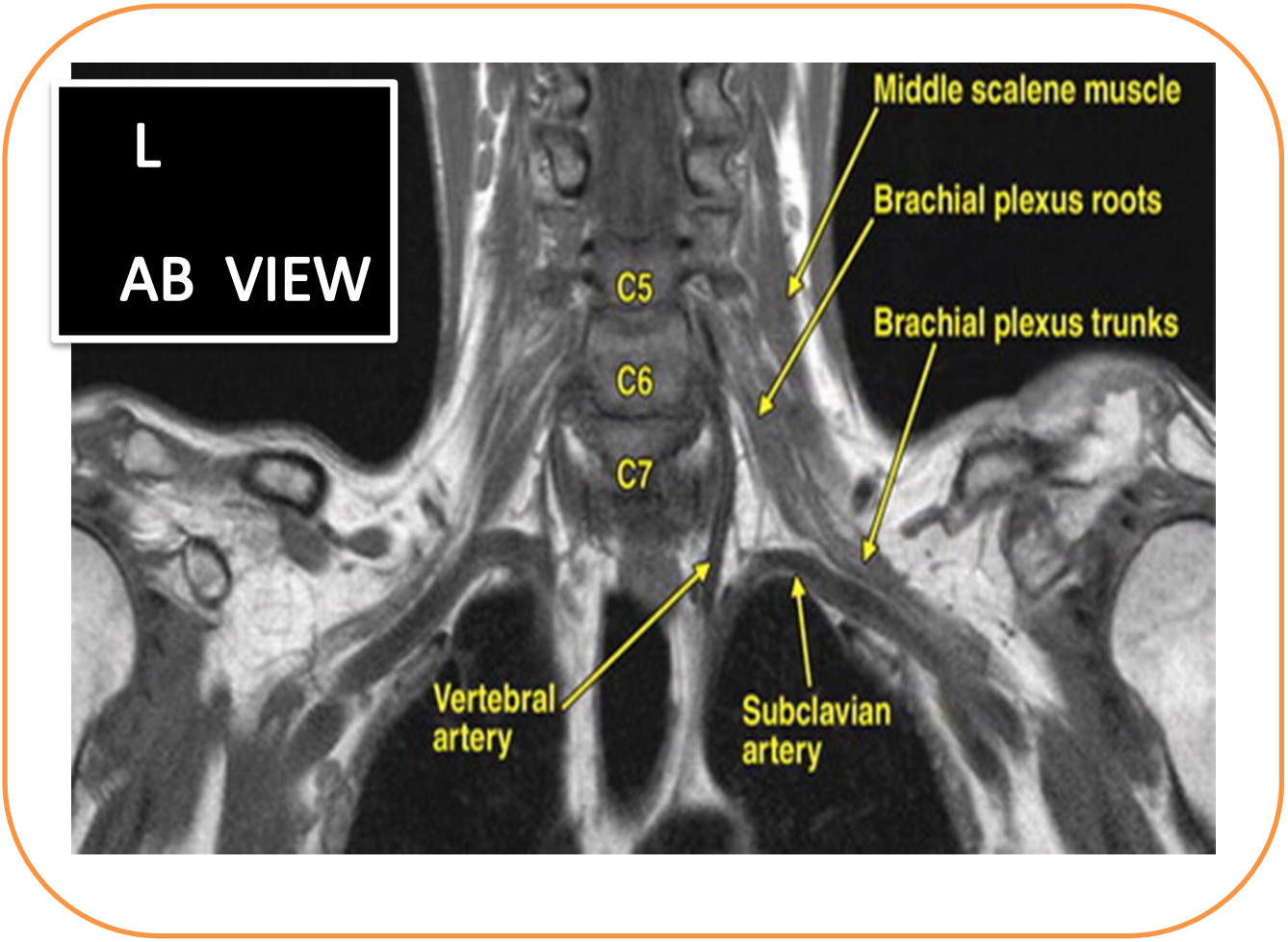
CT- radiology



Magnetic resonance imaging of the body(MRA)

RADIOLOGICAL FEATURE OF THE BRACHIAL

The **br`achial plexus** is a complex neural network formed by lower cervical and upper thoracic ventral nerve roots which supplies motor and sensory innervation to the upper limb and pectoral girdle. It is located in the neck extending into the axilla posterior to the clavicle.



Magnetic resonance imaging of the brachial plexus.

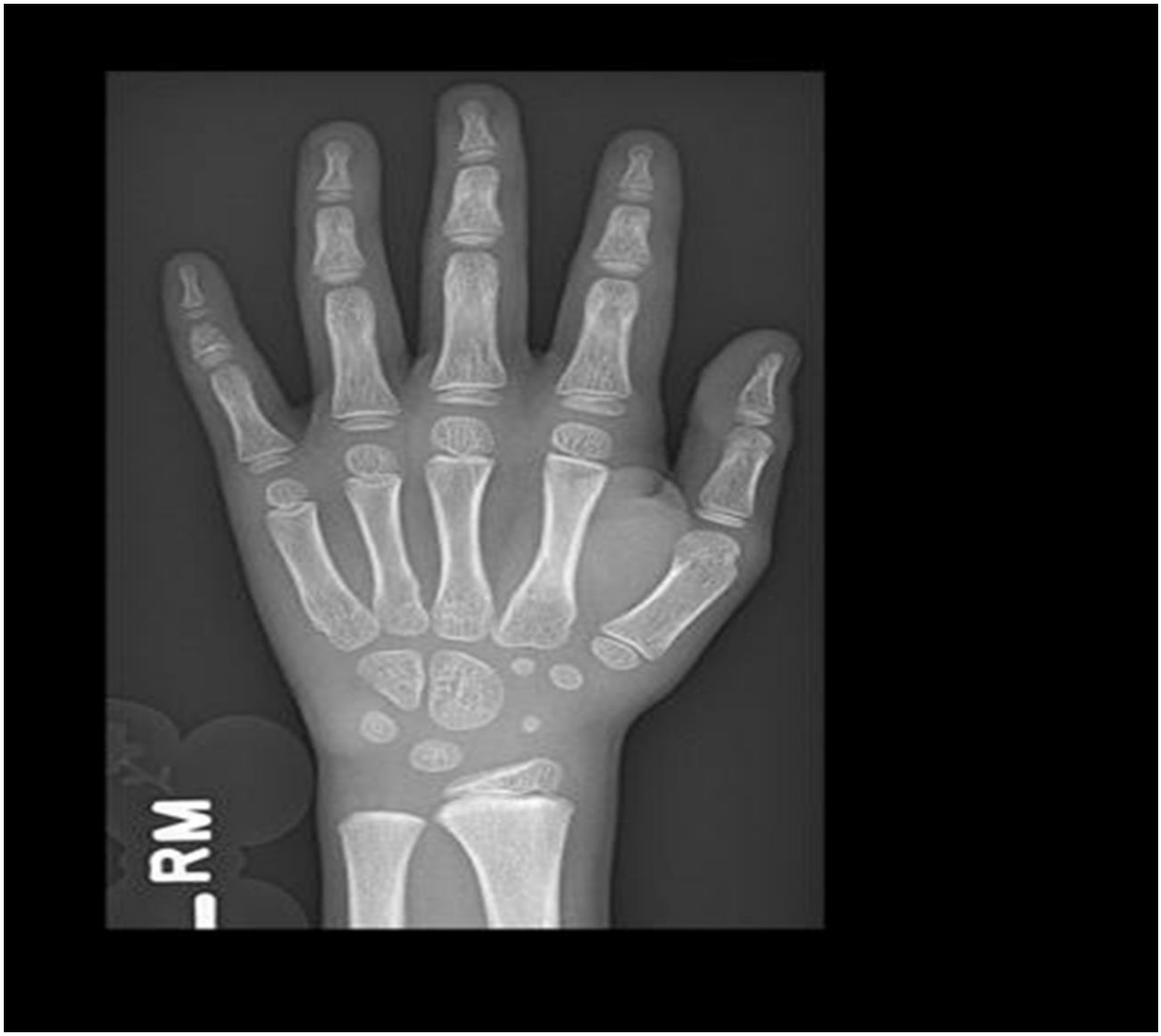
Ossification centers of carpal

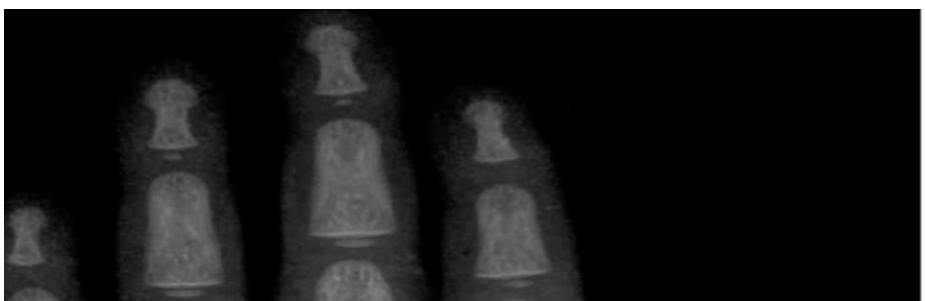
An ossification center is a point where ossification of the cartilage begins. The first step in ossification is that the cartilage cells at this point enlarge and arrange themselves in rows

A secondary ossification center is the area of ossification that appears after the primary ossification center has already appeared – most of which appear during the postnatal and adolescent years. Most bones have more than one secondary ossification center. In long bones, the secondary centers appear in the epiphyses. Ossification of the carpal bones occurs in a predictable sequence, starting with the capitate and ending with the pisiform.

- 1-3 months
- hamate: 2-4 months
- triquetrum: 2-3 years
- lunate: 2-4 years
- scaphoid: 4-6 years
- trapezium: 4-6 years
- trapezoid: 4-6 years
- pisiform: 8-12 years

Excluding the pisiform, a handy way to remember the order of ossification is to start at the capitate then move in an anti-clockwise direction on the volar surface of the right carpus.



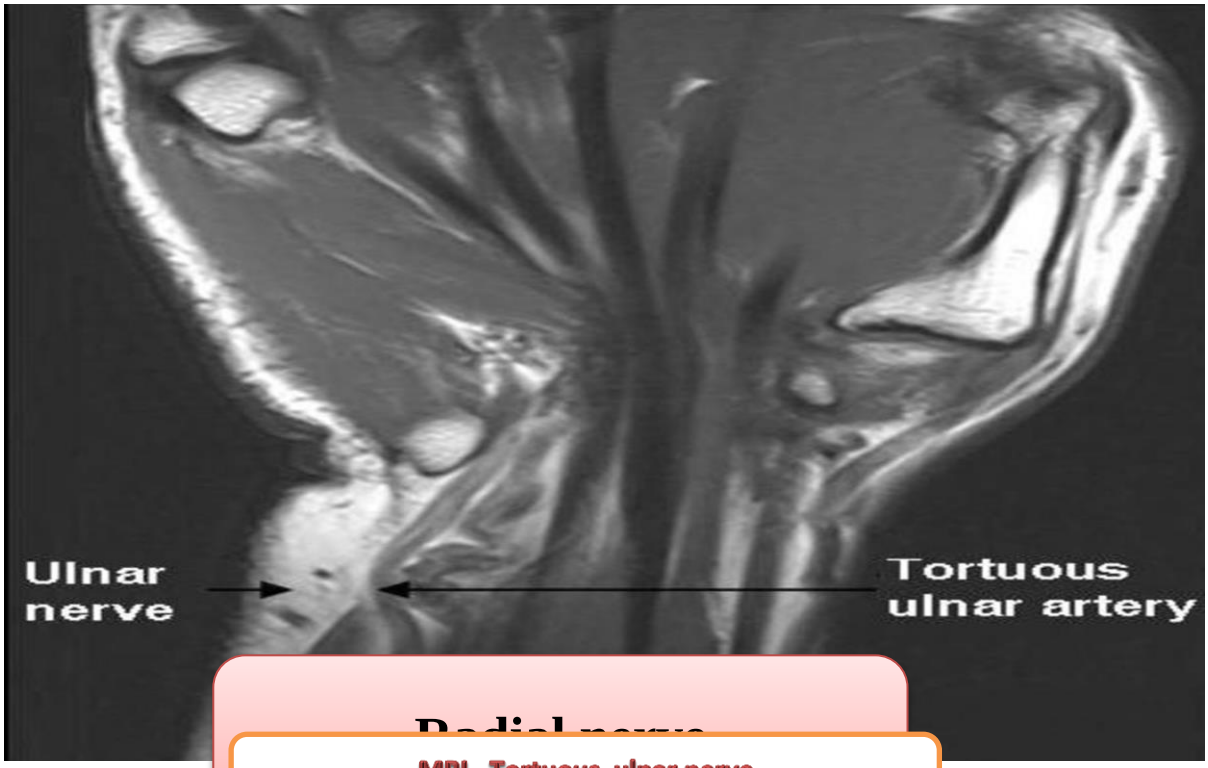


X-ray bone age

Ulna nerve

the ulnar nerve branches off the brachial plexus nerve system and travels down the back and inside of the arm to the hand. The ulnar nerve transmits electrical signals to muscles in the forearm and hand. The ulnar nerve is also responsible for sensation in the fourth and fifth fingers (ring and little fingers) of the hand, part of the palm and the underside of the forearm.

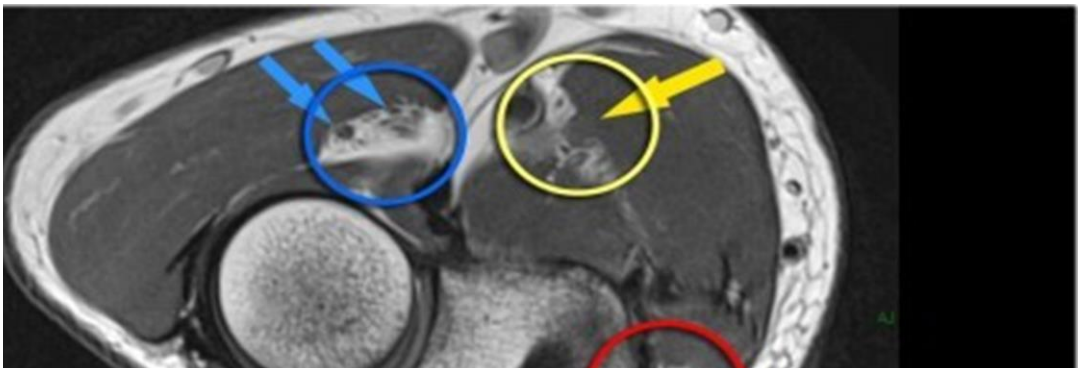
Ulnar nerve entrapment can cause pain, numbness and tingling in the forearm and the fourth and fifth fingers. In severe cases, ulnar nerve entrapment can cause weakness in the hand and loss of muscle mass

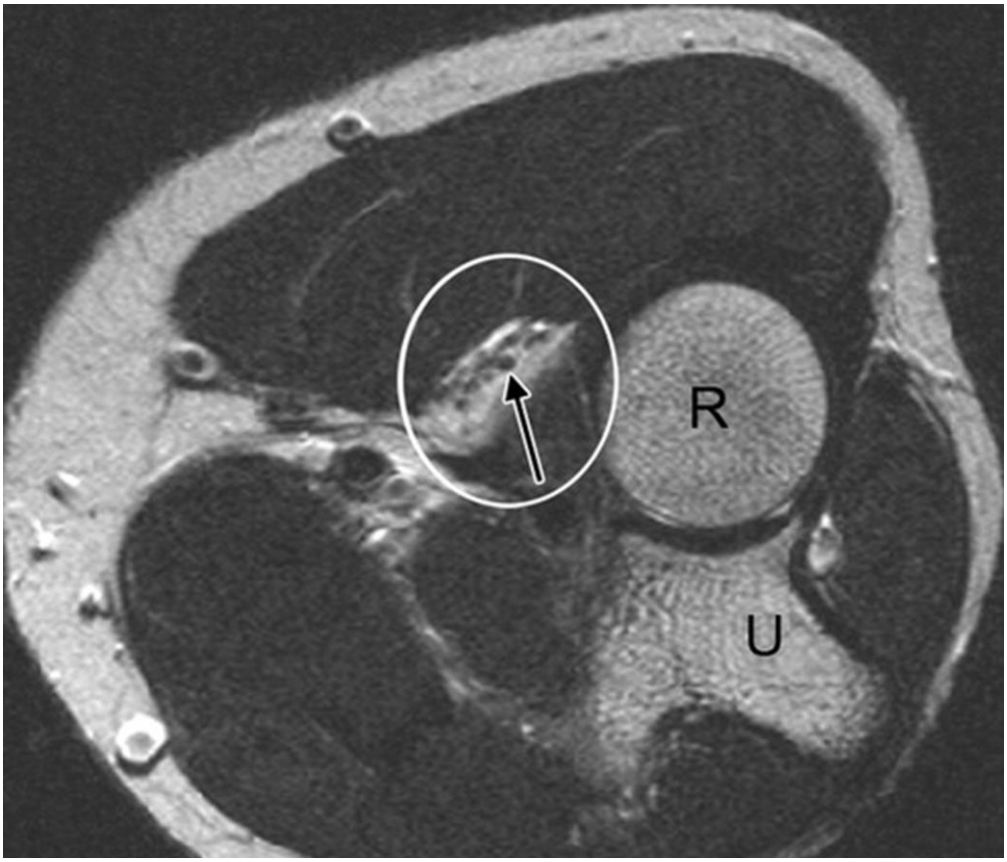


MRI –Tortuous ulnar nerve

The radial nerve is a peripheral nerve that provides motor and sensory function to the arm. The motor function innervates the posterior compartment of the arm, including the medial and lateral heads of the triceps brachii muscles in addition to all 12 muscles in the posterior forearm compartment, as well as the extrinsic extensor muscles found in the wrist and fingers. The sensory function provides cutaneous innervation to a portion of the anterolateral arm, distal posterior arm, posterior forearm, posterior aspects of the thumb, index finger, middle finger, and the lateral half of the ring finger. The radial nerve originates from the ventral roots of the spinal nerves C5-T1 of the brachial plexus, which eventually forms the posterior cord. Disruption of the radial nerve can have motor consequences such as an inability to extend the arm, wrist, and fingers and paresthesias about its sensory distribution

The radial nerve is formed as a continuation of the posterior cord of the brachial plexus and arises from the C5-T1 nerve fibers. It courses from the axilla to the posterior compartment of the arm, then into the anterior compartment of the arm, and continues into the posterior compartment of the forearm





Magnetic resonance neurography


THANK
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FOR
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