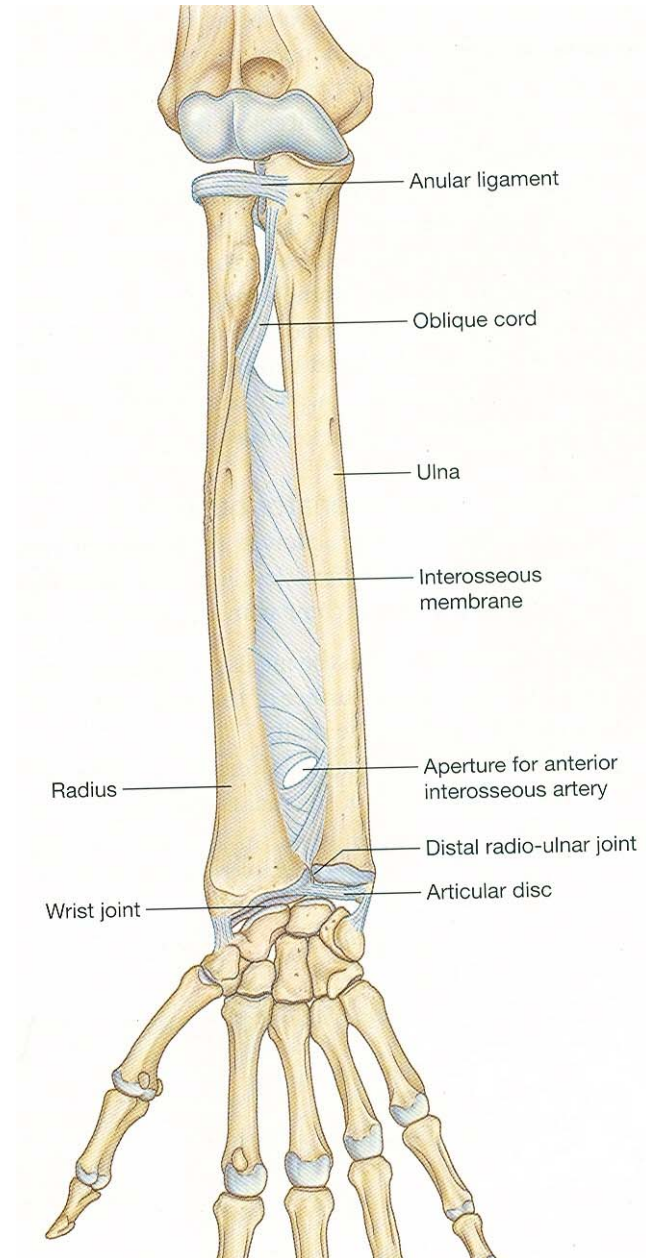


RADIOULNAR JOINTS

The radius and ulna articulate by –

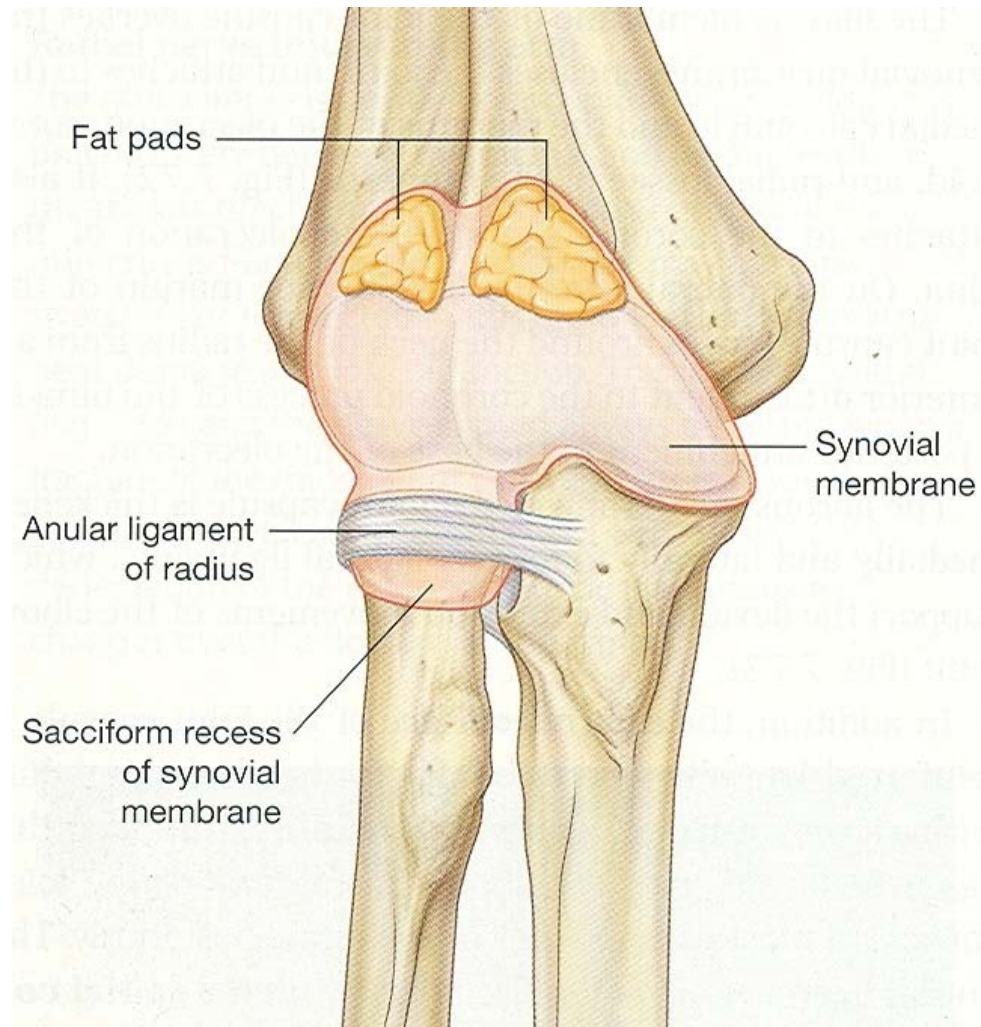
- Synovial
 1. **Superior radioulnar joint**
 2. **Inferior radioulnar joint**
- Non synovial
Middle radioulnar union



Superior Radioulnar Joint

This articulation is a trochoid or pivot-joint between

- the circumference of the head of the radius
- ring formed by the radial notch of the ulna and the *annular ligament*.



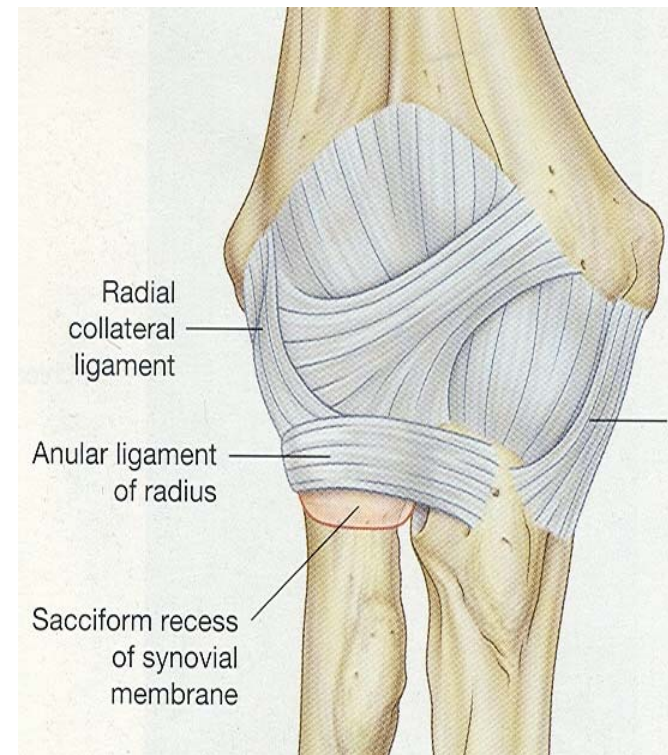
The Annular Ligament (*orbicular ligament*)

This ligament is a strong band of fibers, which encircles the head of the radius, and retains it in contact with the radial notch of the ulna.

It forms about four-fifths of the osseofibrous ring, and is attached to the anterior and posterior margins of the radial notch

a few of its lower fibers are continued around below the cavity and form at this level a complete fibrous ring.

Its upper border blends with the capsule of elbow joint while from its lower border a thin loose synovial membrane passes to be attached to the neck of the radius

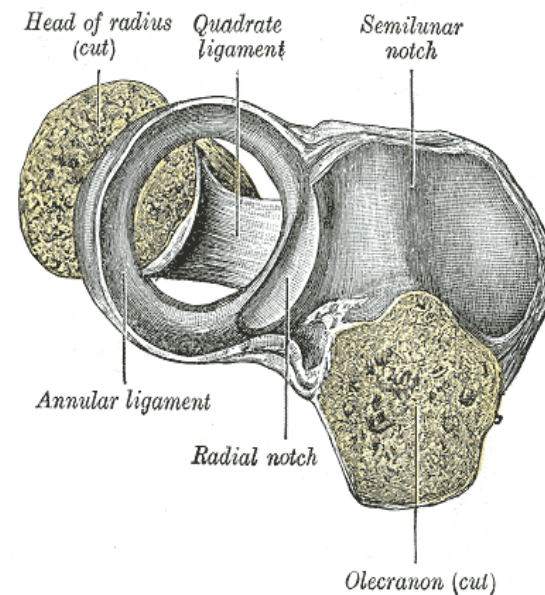


The **superficial surface** of the annular ligament is strengthened by the radial collateral ligament of the elbow, and affords origin to part of the Supinator.

Its *deep surface* is smooth, and lined by synovial membrane, which is continuous with that of the elbow-joint.

Quadrato ligament

A thickened band which extends from the inferior border of the annular ligament below the radial notch to the neck of the radius is known as the **quadrato ligament**.



Movements

The movements allowed in this articulation are limited to

rotatory movements of the head of the radius within the ring formed by the annular ligament and the radial notch of the ulna

- rotation forward being called *pronation*
- rotation backward, *supination*



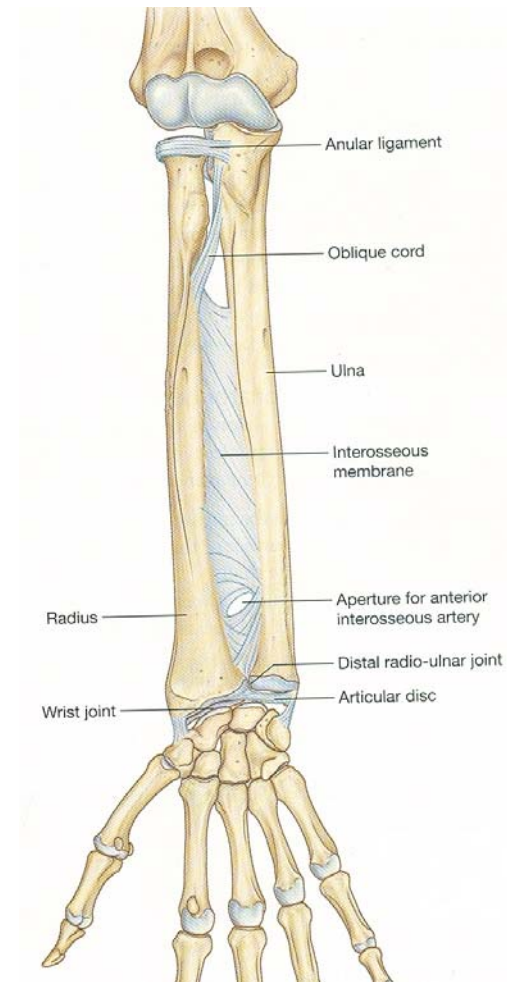
Middle Radioulnar Union

The shafts of the radius and ulna are connected by

Oblique Cord and
Interosseous Membrane

The Oblique Cord (*oblique ligament*)

The oblique cord is a small, flattened band, extending downward and laterally, from the lateral side of the ulnar tuberosity to the radius a little below the radial tuberosity. Its fibers run in the opposite direction to those of the interosseous membrane.

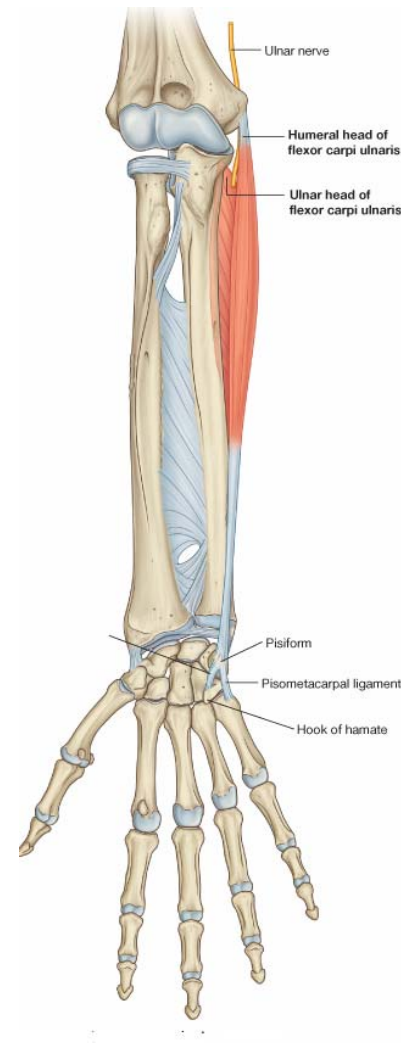


The Interosseous Membrane

The interosseous membrane is a broad and thin plane of fibrous tissue descending obliquely downward and medially

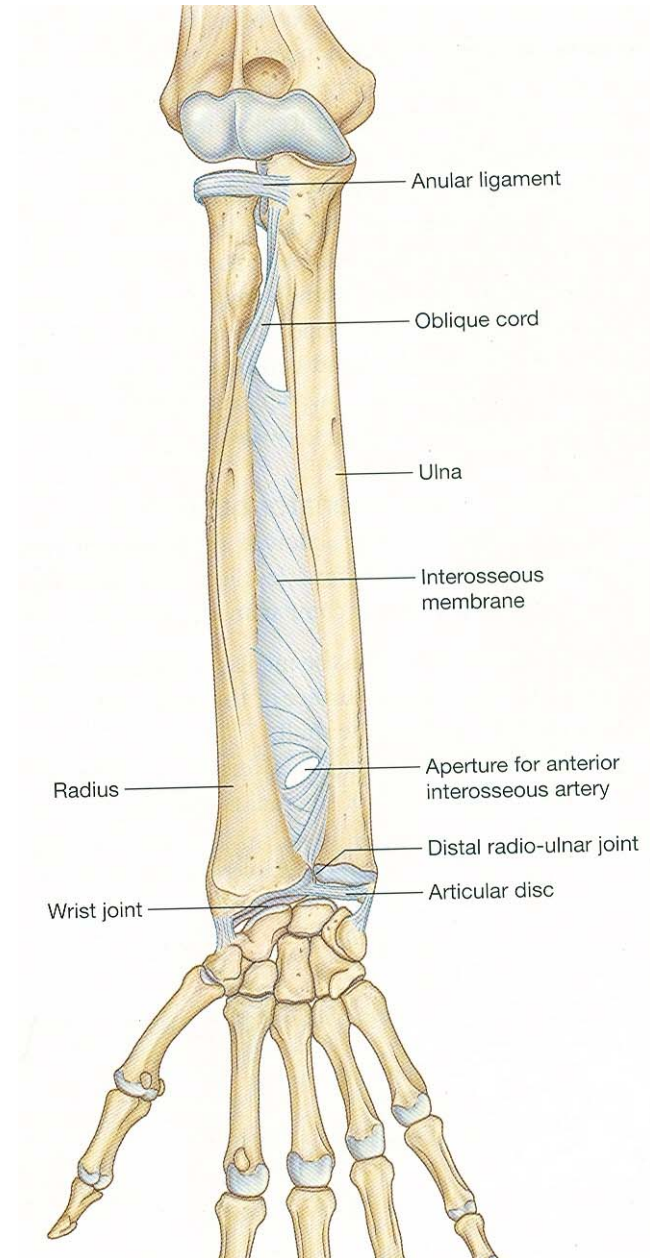
It extends from the interosseous crest of the radius to that of the ulna.

It is deficient above, commencing about 2.5 cm. beneath the tuberosity of the radius.



This membrane is broader in the middle than at either end and presents an oval aperture a little above its lower margin for the passage of the anterior interosseous vessels to the back of the forearm.

Between its upper border and the oblique cord is a gap, through which the posterior interosseous vessels pass.



This membrane serves to

- connect the bones
- to increase the extent of surface for the attachment of the deep muscles
- It helps to transmit to ulna and humerus forces acting proximally from hand to radius

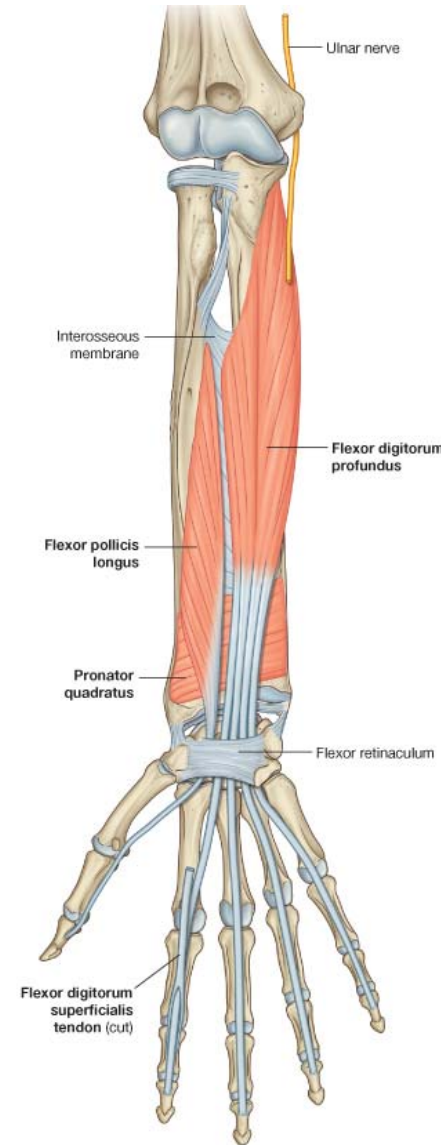
Anterior Relations -

in upper three-fourths,

- Flexor pollicis longus on the radial side
- Flexor digitorum profundus on the ulnar side
- lying in the interval between which are the anterior interosseous vessels and nerves

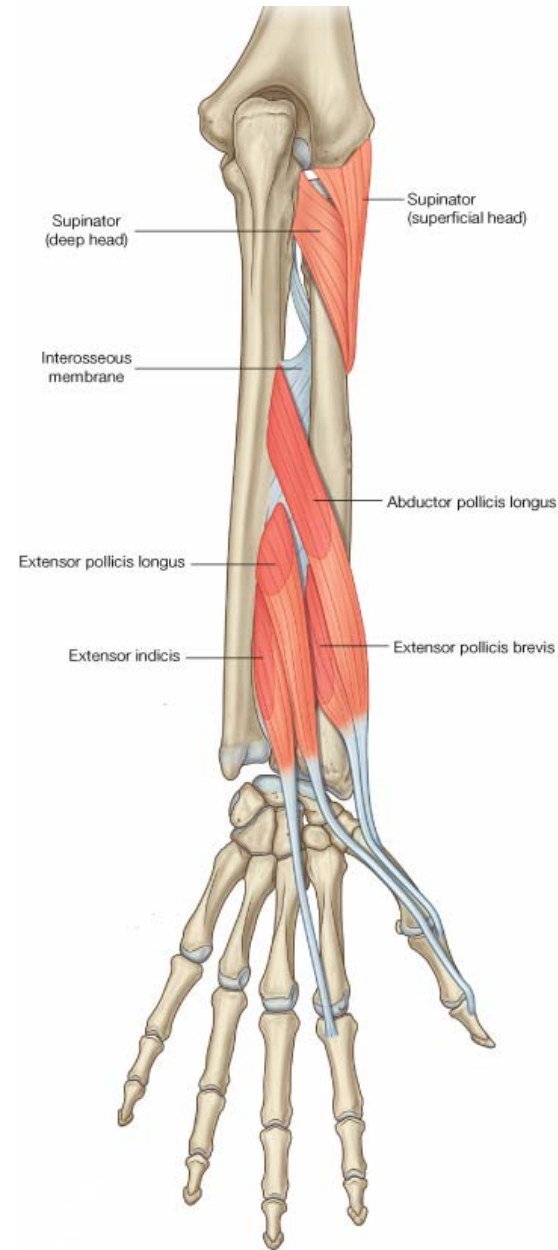
by its lower fourth

- Pronator quadratus



Posterior relations –
with the

- Supinator
- Abductor pollicis longus
- Extensor pollicis brevis
- Extensor pollicis longus
- Extensor indicis
- near the wrist, with the anterior interosseous artery and posterior interosseous nerve.



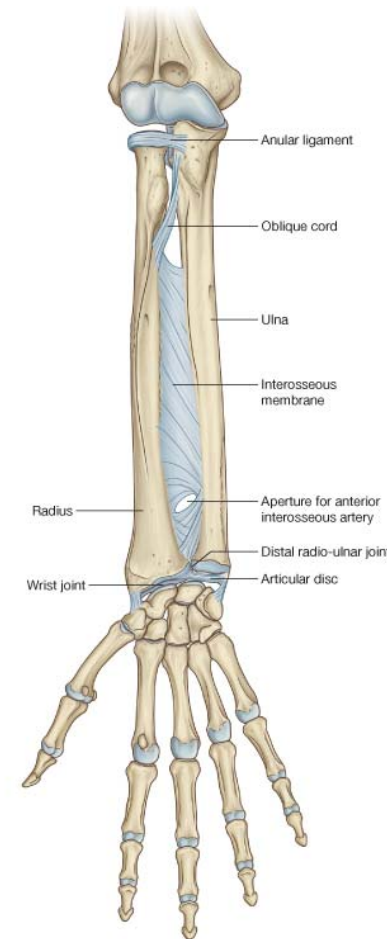
Inferior Radioulnar Joint

Uniaxial pivot-joint

between head of the ulna and the ulnar notch on the lower end of the radius.

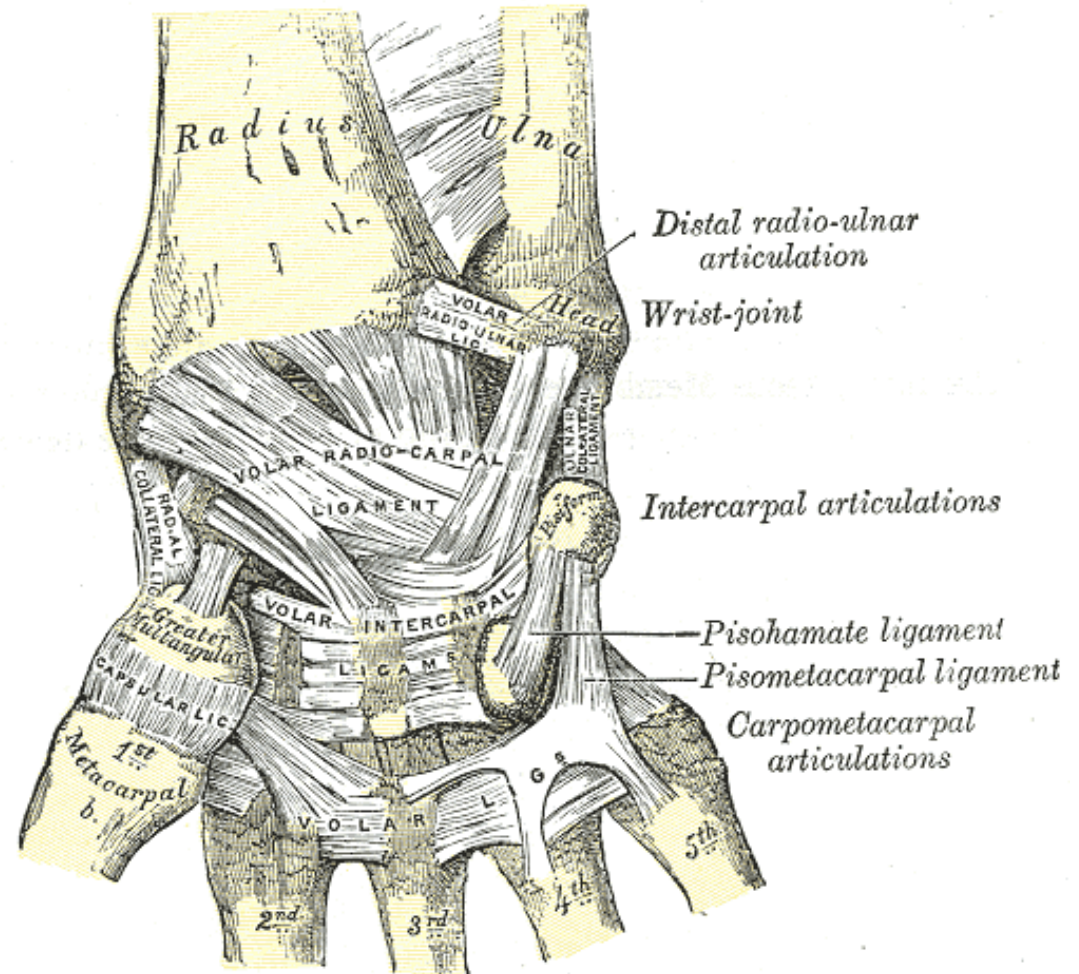
The articular surfaces are enclosed by capsule and connected together by –

- Articular ligaments
 1. Anterior radioulnar ligament
 2. Posterior radioulnar ligament
- Articular disc



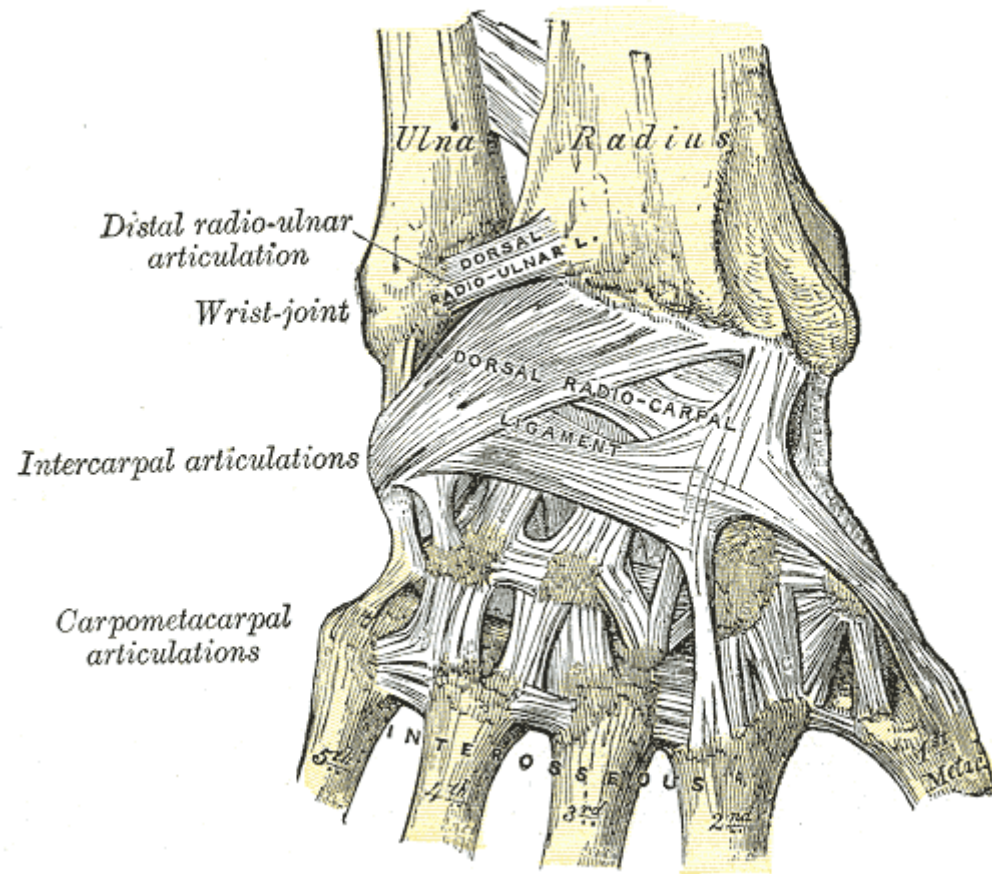
Anterior Radioulnar ligament

This ligament is a narrow band of fibers extending from the anterior margin of the ulnar notch of the radius to the front of the head of the ulna.



Posterior Radioulnar ligament

This ligament extends between corresponding surfaces on the dorsal aspect of the articulation.



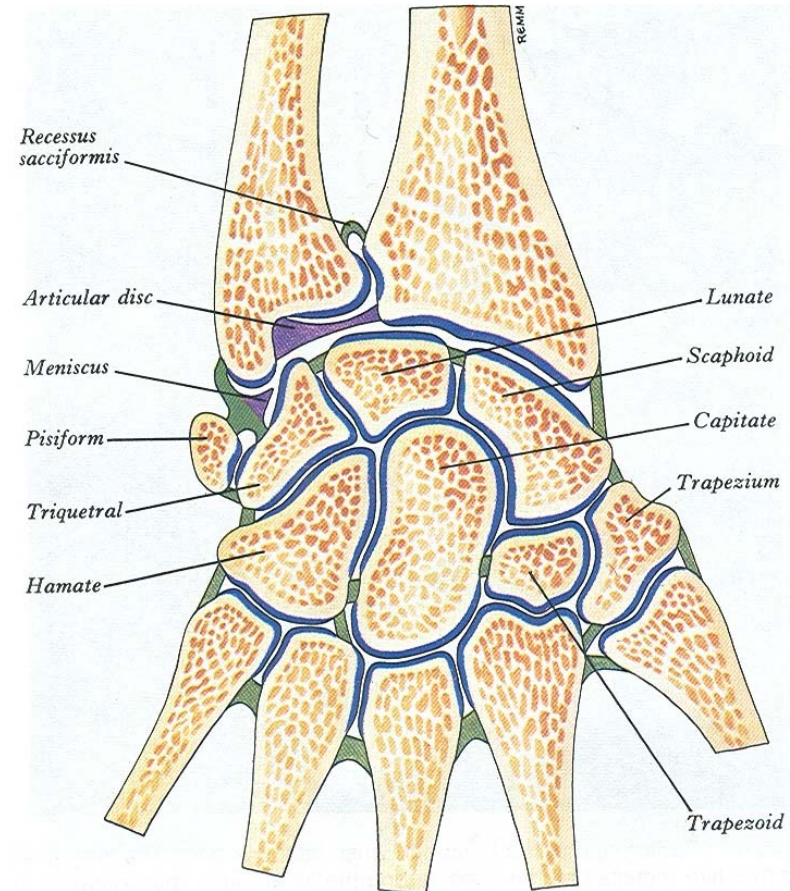
The Articular Disc

The articular disc is triangular in shape placed transversely beneath the head of the ulna. Its periphery is thicker than its center, which is occasionally perforated.

Attachment –

apex to a depression between the styloid process and the head of the ulna;

base, which is thin, to the prominent edge between the ulnar notch and carpal articular surface of the radius.



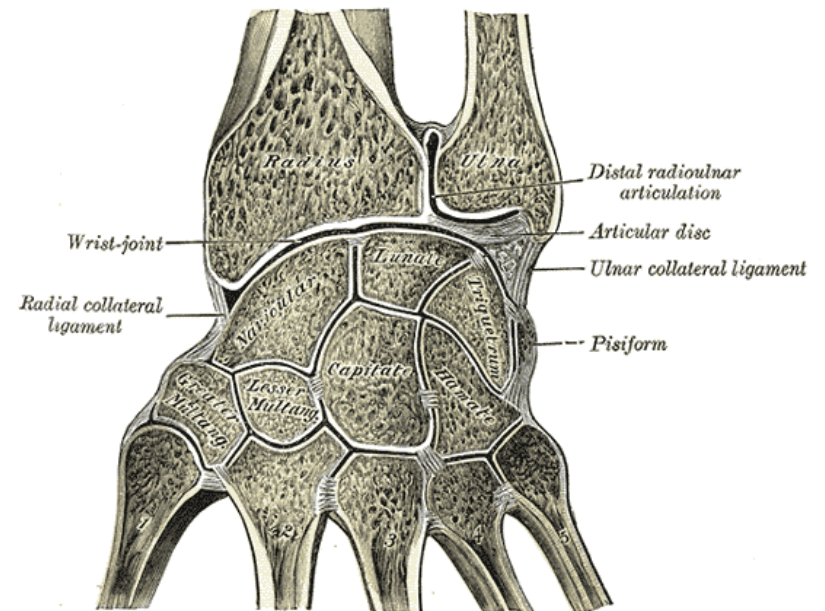
Its margins are united to the ligaments of the wrist-joint.

Its **upper surface**, smooth and concave, articulates with the head of the ulna

its **lower surface**, also concave and smooth, forms part of the wrist-joint and articulates with the triangular bone and medial part of the lunate and when hand is adducted, triquetral.

Both surfaces are closed by synovial membrane; the upper, by that of the distal radioulnar articulation, the lower, by that of the wrist.

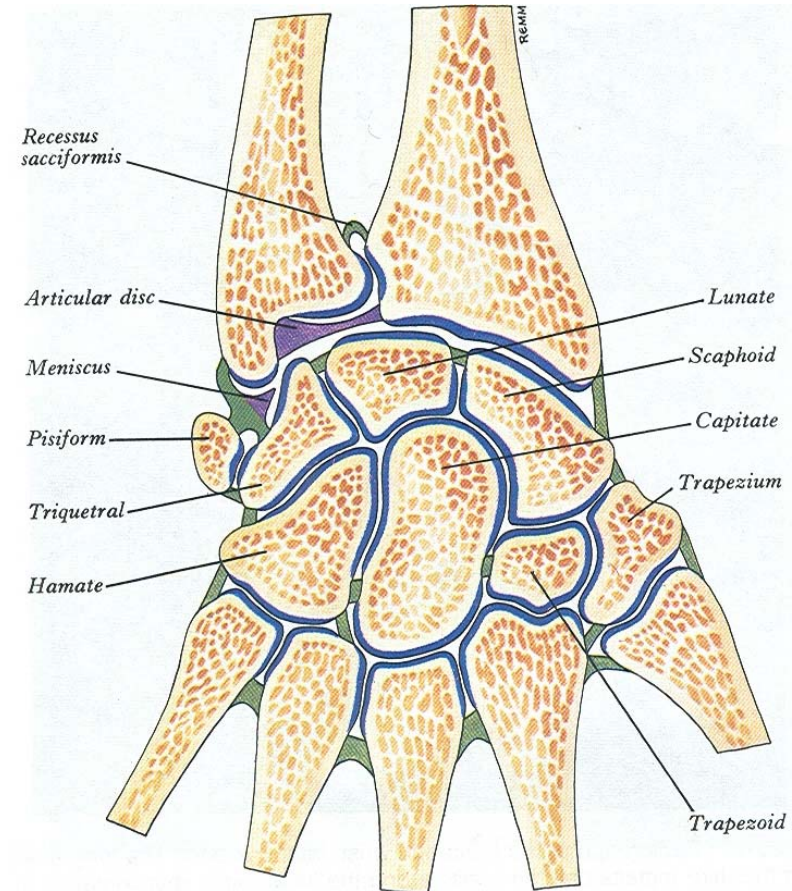
binding the lower ends of the ulna and radius firmly together.



Synovial Membrane

The synovial membrane of this articulation is extremely loose,

It extends upward as a recess (*recessus sacciformis*) between the radius and the ulna.



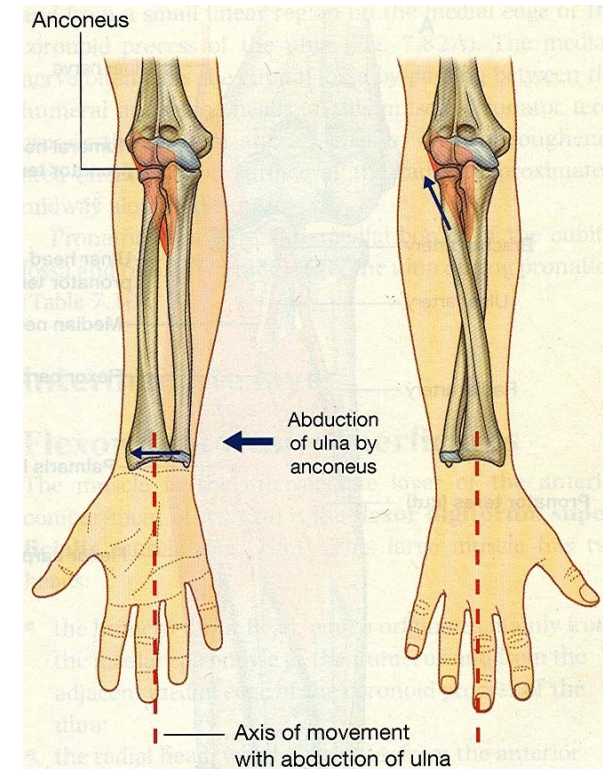
Movements

The movements in the distal radioulnar articulation consist of rotation of the lower end of the radius around an axis which passes through the center of the head of the ulna.

Pronation – Radius turns anteromedially and obliquely across the ulna, its proximal end remaining lateral and distal end becoming medial. During this action, interosseous membrane becomes spiralled.

Supination – Radius returns to a position lateral and parallel to ulna and interosseous membrane becomes unspiralled.

Hand can thus be turned through 140° – 150° and with elbow extended this can be increased to 360° by humeral rotation and scapular movement.



In pronation and supination the radius describes the segment of a cone, the axis of which extends from the center of the head of the radius to the ulnar attachment of articular disc. This is axis of movement of radius relative to ulna and it does not remain stationary.

In this movement the distal head of the ulna is not stationary, but describes a curve in a direction opposite to that taken by the head of the radius.

The axis for supination and pronation of forearm and hand passes between both bones at

- superior and inferior radioulnar joints, when movement is marked at ulna and
- through the centre of radial head and ulnar styloid when movement is minimal at ulna

Accessory Movements

These include –

Backward and Forward translation of radial head on the ulnar radial notch

And the ulnar head likewise translates anteriorly and posteriorly on ulnar notch of radius

Muscles Producing Movement

Pronation – Pronator quadratus

Pronator Teres

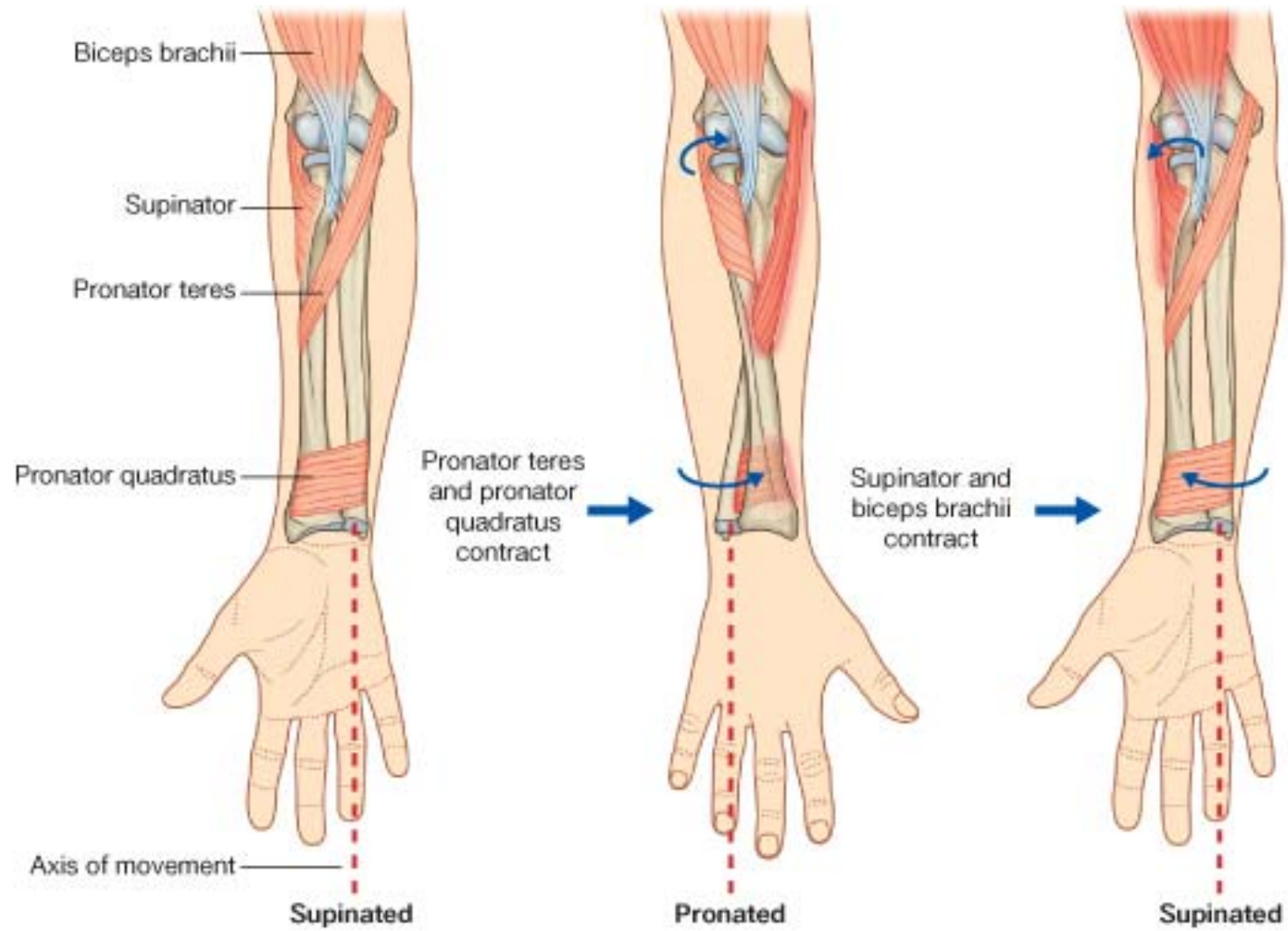
Gravity also assists in pronation

When these muscles contract, they pull the distal end of the radius over the ulna, resulting in pronation of the hand

Supination – Supinator

Biceps brachii

The tendon of the biceps brachii muscle and the supinator muscle both become wrapped around the proximal end of the radius when the hand is pronated. When they contract, they unwrap from the bone, producing supination.



Anconeus Muscle –

In addition to hinge-like flexion and extension at the elbow joint

some abduction of the ulna also occurs which is controlled by anconeus so that if forearm is to turn over the hand it does not move medially and maintains the position of the palm of the hand over a central axis during pronation.

The muscle involved in this movement is the **anconeus** muscle.

