Lecture # 02

PROXIMAL & DISTAL RADIOUTLAR JOINTS

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**RADIOULNAR JOINTS**

- The radioulnar articulations are the locations in which the **radius** and **ulna** articulate in the forearm:

- They are three in numbers:
  - **PROXIMAL RADIOULNAR JOINT**
  - **DISTAL RADIOULNAR JOINT**
  - **RADIOULNAR SYNDISMOsis.**
ARTICULATION

Between the:

- Circumference of the head of the radius
- The annular ligament
- The radial notch of the ulna.
TYPE

- Synovial Uniaxial pivot joint
Capsule

- The fibrous capsule encloses the joint and is continuous with that of the elbow joint.
SYNOVIAL MEMBRANE

- This is continuous above with that of the elbow joint.
- Below, it is attached to the inferior margin of the articular surface of the radius and the lower margin of the radial notch of ulna.
IMPORTANT RELATIONS

- **ANTERIORLY:**
  - Supinator muscle and the radial nerve.

- **POSTERIORLY:**
  - Supinator muscle and the common extensor tendon.
1. **THE SMALL QUADRAT LIGAMENT**

- The quadrate ligament is a fibrous band attached to the inferior border of the radial notch on the ulna and to the neck of the radius.

- Its borders are strengthened by fibers from the upper border of the annular ligament.

- The ligament is 11 mm (0.43 in) long, 8 mm (0.31 in) wide, and 1 mm (0.039 in) thick.

- It contributes to joint stability by securing the proximal radius against the radial notch and by restricting excessive *supination* (10–20° restriction) and, to a lesser degree, *pronation* (5–8°).
2. The Annular Ligament

- It is attached to the ulna anterior and posterior margins of the radial notch, surrounds the articular bony surface and form a collar.

- The deep fibers of the ligaments are attached to the synovial membrane, so as to allow the radius within the ligaments without binding, stretching or tearing of the Synovial membrane.
Movements of the Joint

- Movement is produced by the head of the radius rotating within the annular ligament.

- There are two movements possible at this joint; pronation and supination.

  - **Pronation:**
  - Produced by the pronator quadratus and pronator teres.

  - **Supination:** Produced by the supinator and biceps brachii.
The arterial supply of the PRUJ (proximal Radioulnar joint) is from the anastomoses around the elbow region i.e: Interosseous arteries.
Nerve Supply

- **Branches of**
  - Median
  - Musculocutaneous
  - Radial nerves

- **Pronation** is essentially a function of the median nerve, whereas
- **Supination** is a function of musculocutaneous and radial nerve.
DISTAL RADIOULNAR JOINT

(A) Anterior view

(B) Anterior view
ARTICULATION

Between the:

- Rounded head of the ulna
- Ulnar notch on the radius.

- This distal radioulnar joint is located just proximally to the wrist joint.

- It is an articulation between the ulnar notch of the radius, and the ulnar head.
Type

- Synovial Uniaxial pivot joint.
The capsule encloses the joint but is deficient superiorly.
The synovial membrane extends superiorly between the radius and the ulna to form the sacciform recess of the distal radio-ulnar joint.

This extension of the synovial capsule accommodates the twisting of the capsule that occurs when the distal end of the radius travels around the relatively fixed distal end of the ulna during pronation of the forearm.
"Resting position" (midway between pronation and supination) so that palm faces trunk.
The articular surfaces are connected together by the following ligaments:

- Palmar radioulnar ligament
- Dorsal radioulnar ligament
- Articular disk (triangular fibrocartilage)
ARTICULAR DISC

- This is triangular and composed of fibrocartilage.
- It is attached by its apex to the medial side of the base of the styloid process of the ulna and by its base to the lower border of the ulnar notch of the radius.
- It shuts off the distal radioulnar joint from the wrist and strongly unites the radius to the ulna.
NERVE SUPPLY:

- Anterior interosseous nerve and
- Deep branch of the radial nerve.
**BLOOD SUPPLY:**

**Branches from:**

Anterior and posterior Interosseous arteries.
The interosseous membrane is a sheet of connective tissue that joins the radius and ulna together between the radioulnar joints.

It spans the distance between the medial radial border, and the lateral ulnar border.

There are small holes in the sheet, as a conduit for the forearm vasculature: i.e. from anterior to posterior and vice versa.

The interosseous membrane divides the forearm into anterior and posterior compartments, serves as a site of attachment for muscles of the forearm, and transfers loads placed on the forearm.
This connective tissue sheet has three major functions:

- **Holds the radius and ulna together** during pronation and supination of the forearm, providing additional stability.
- **Acts as a site of attachment** for muscles in the anterior and posterior compartments of the forearm.
- **Transfers forces** from the radius to the ulna.
Humerus

Anular ligament

Force causes radial head to subluxate from anular ligament

Lump caused by displaced head of radius

Muscle pulls radial head superiorly

Subluxation and dislocation
Anterior view
The Elbow and Radioulnar Joints

- Usually grouped together due to close anatomical relationship
- Elbow joint movements may be clearly distinguished from those of the radioulnar joints

- Often grouped together due to proximity
- Entirely different
  - Structurally = 2, functionally = 1

- Elbow joint distal attachment:
  - Ulna

- Radioulnar joint distal attachment:
  - Radius
Although the radius and ulnar are two distinct and separate bones, when dealing with injuries to the forearm, they can be thought of as a ring.

A ring, when broken, usually breaks in two places.

The best way of illustrating with is with a polo mint – it is very difficult to break one side without breaking the other.
There are two classical fractures:

- **Monteggia’s Fracture** –
  - Usually caused by a force from behind the ulna.
  - The proximal shaft of ulna is fractured, and the head of the radius dislocates anteriorly at the elbow.

- **Galeazzi’s Fracture** –
  - A fracture to the distal radius, with the ulna head dislocating at the distal radio-ulnar joint.
Imagine you are in Africa.
You have been tied hanging on a tree with a rope anchored on the ground,
a candle is slowly burning the rope,
and the lion is waiting for you to drop and be his lunch.

Your survival hinges on the rope staying intact,
there is no one around to help you.

What to do now .........
Happy Birthday to you!

Candle no fire!

Happy Lion
Every student can learn,
Just not on the same day, or
on the same way

THANK YOU......