The forearm

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The radius

- The narrow proximal radius has a small, cupped head, which articulates with the capitullum of the humerus and the radial notch of the ulnar at the elbow joint.

- The radial tuberosity, onto which biceps inserts, projects from the anteromedial surface of the radius, just beyond the radial head

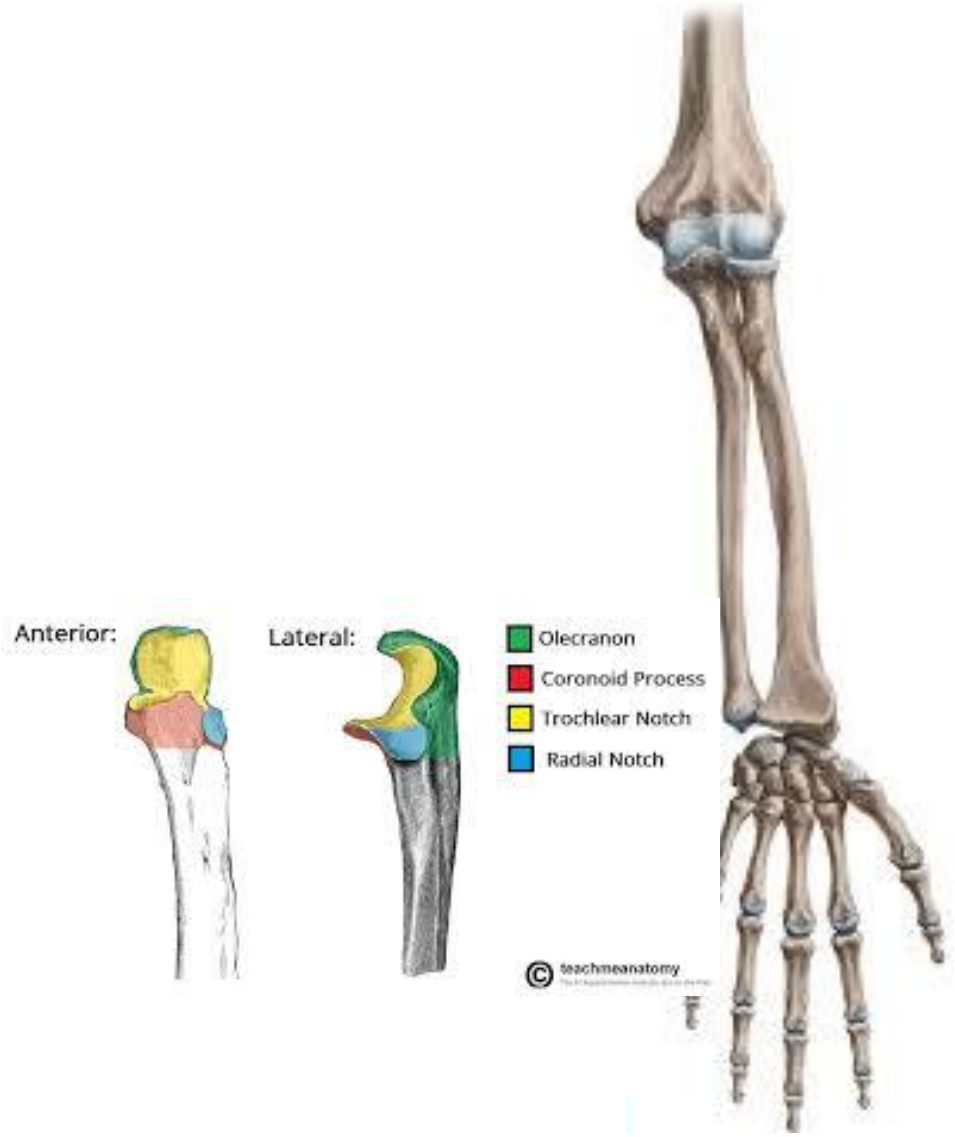
- The distal radius is expanded to accommodate the insertions of the flexor and extensor muscle groups of the wrist and hand.

- The distal radius is angled medially. The lateral margin of the radius forms the styloid process and the medial surface is grooved to accommodate the ulna at the distal radioulnar joint.

The ulna

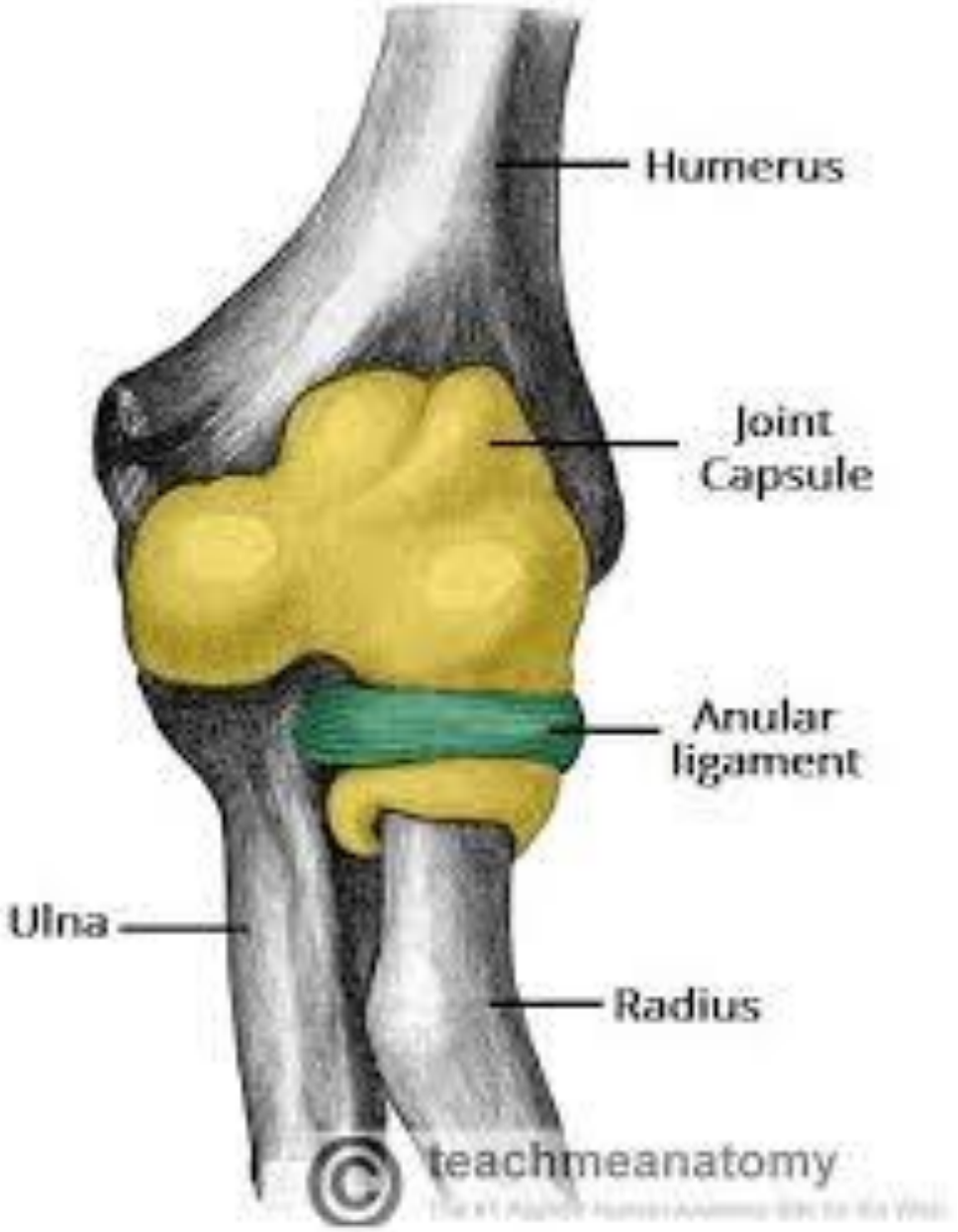
- The expanded proximal ulnar has a deep-cupped anterior surface, known as the trochlear notch, which articulates with the trochlea of the humerus.

- The olecranon is formed by the most proximal aspect of the ulna and fills the olecranon fossa of the humerus on elbow extension. It gives insertion to the triceps



- Anteriorly, the coronoid process of the ulna projects from the border of the trochlear notch and gives attachment to brachialis.

- The annular ligament, which holds the radial head in articulation with the ulna at the proximal radioulnar joint, attaches to the margins of the radial notch of the lateral aspect of the ulna.

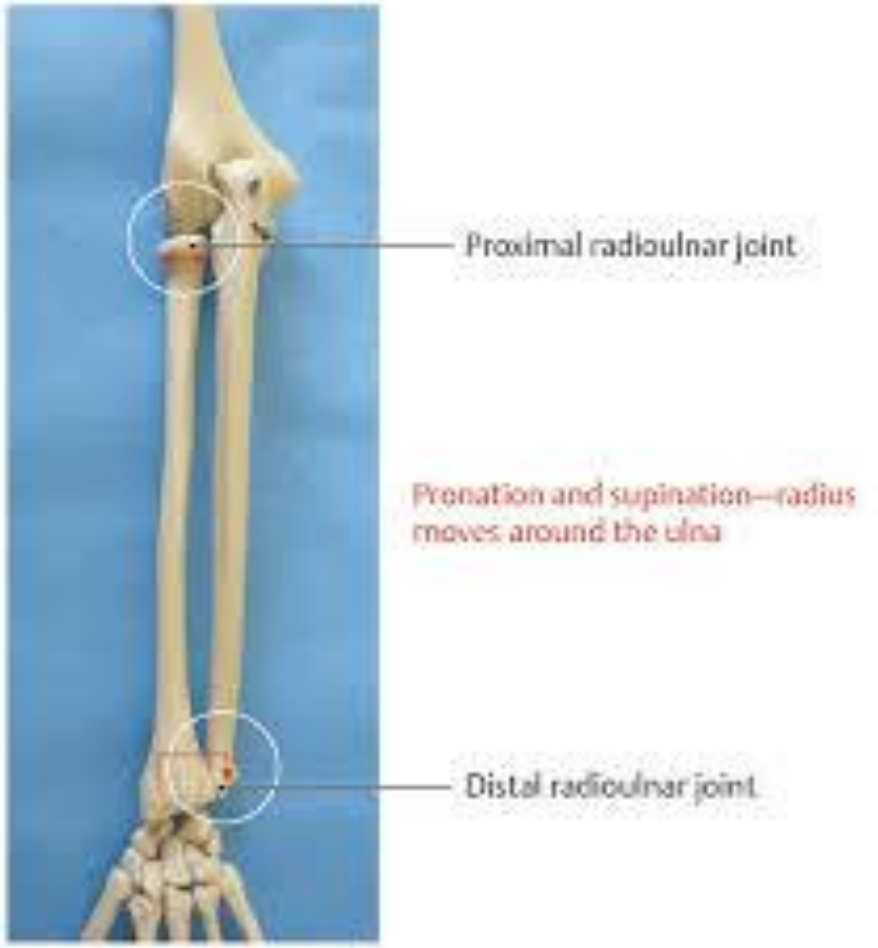


- Like the radius, the shaft of the ulna gives origin to some of the flexor and extensor muscle groups of the forearm.
- The distal ulna gives rise to a medial styloid process and a small rounded head.

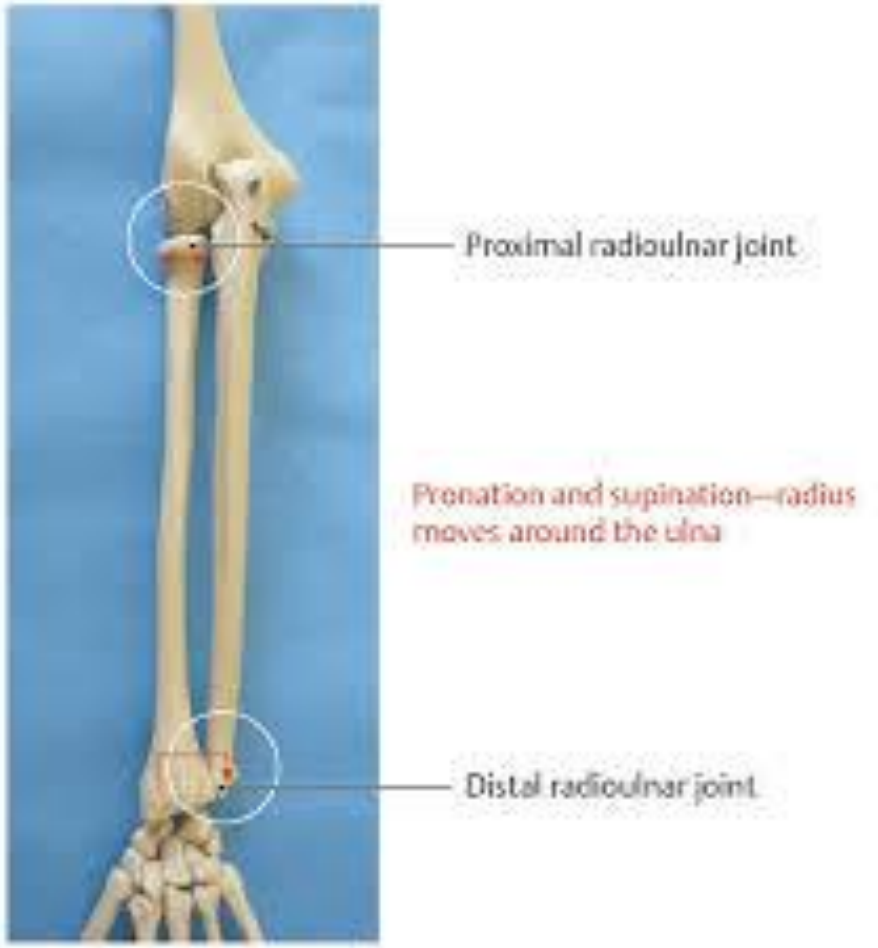
- The radius and ulna are closely related by a strong interosseous membrane, which divides the forearm into the anterior flexor and posterior extensor compartments.

- The ulna stabilizes the forearm and allows the radius to rotate about its axis

- The proximal and distal radioulnar joints are both synovial pivot joints.
- The capsule of the proximal joint is continuous with the synovial capsule of the elbow joint.



- The capsule of the distal radioulnar joint does not usually communicate with the capsule of the wrist joint.
- Because of the close relationship between the radius and ulna, disruption and angulation of one bone are often accompanied by a fracture or dislocation of the second.

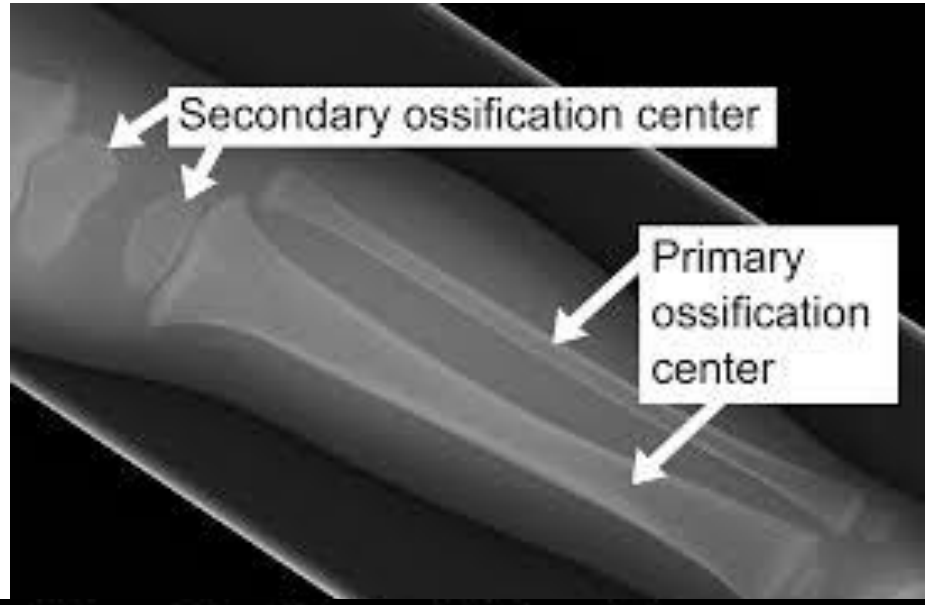


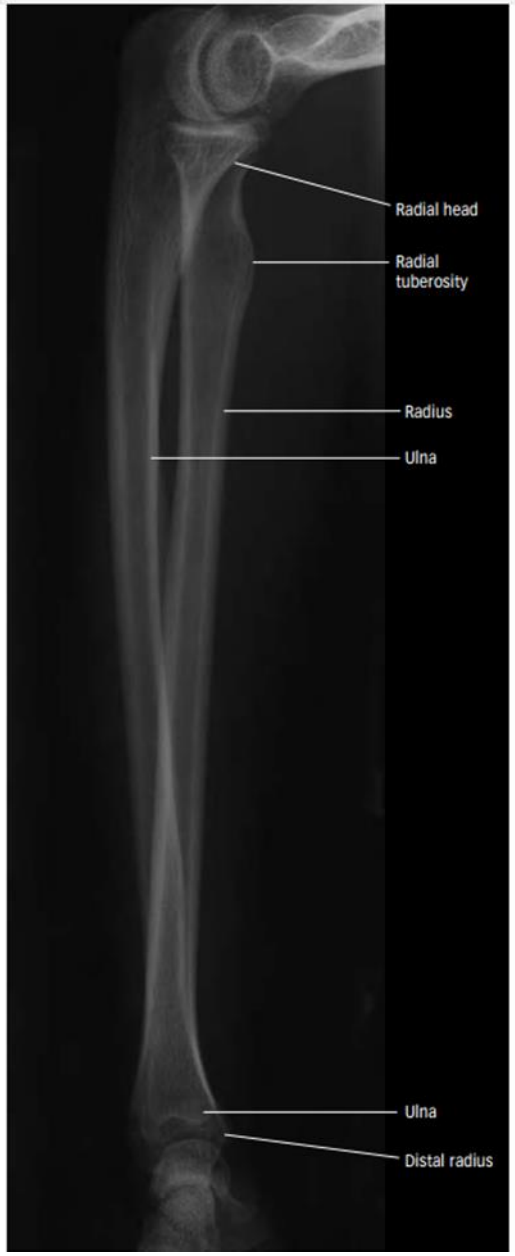
Ossification of the radius

- The primary ossification center of the radius appears in the eighth week of fetal life
- Secondary centers appear distally in the first year and proximally at 5 years of age These fuse at 20 years and 17 years, respectively.

Ossification of the ulna

- The shaft of the ulna ossifies in the eighth week of fetal life
- Secondary centers appear in the distal ulna at 5 years and in the olecranon at 10 years of age
- These fuse at 20 and 17 years, respectively





The ossification centers of the elbow should be considered as one unit. The pattern of ossification follows the mnemonic CRITOL; the secondary ossification centre for the Capitulum appears at 1 year of age, the Radial head and Internal (medial) epicondyle at 5 years of age, the Trochlea at 11 years, the Olecranon at 12 years and the lateral Epicondyle at 13 years (Fig. 12.11). Fusion of the epiphyses with the humerus should be complete by 17 years of age.

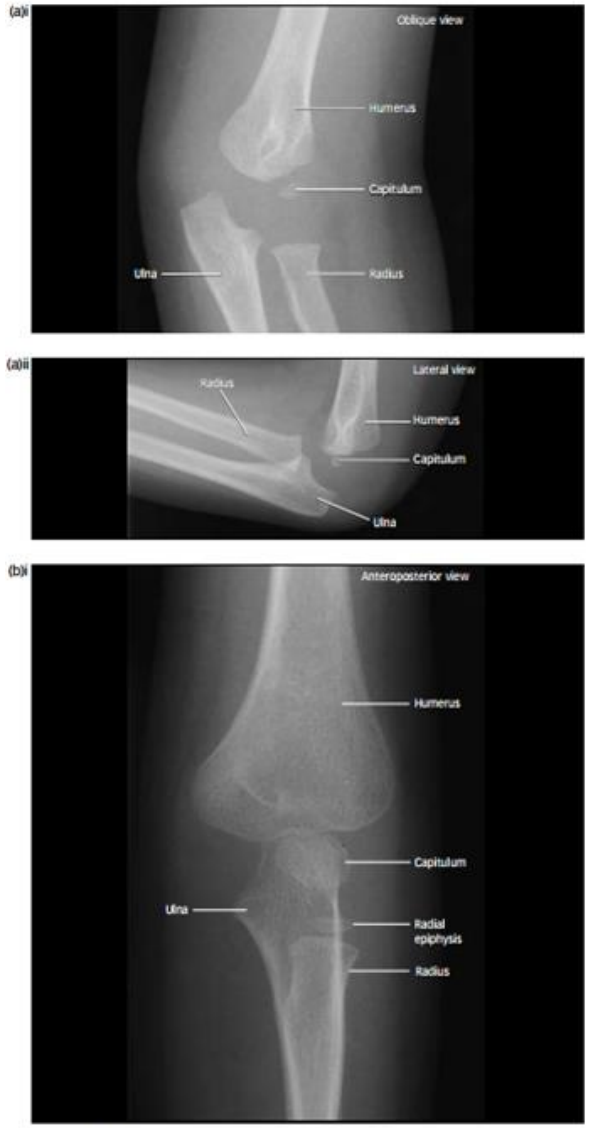


Fig. 12.11. **Radiographs of the secondary ossification centers of the elbow.** (a) 2 years, (b) 5 years, (c) 5 years, (d) 10–11 years, (e) 12 years.

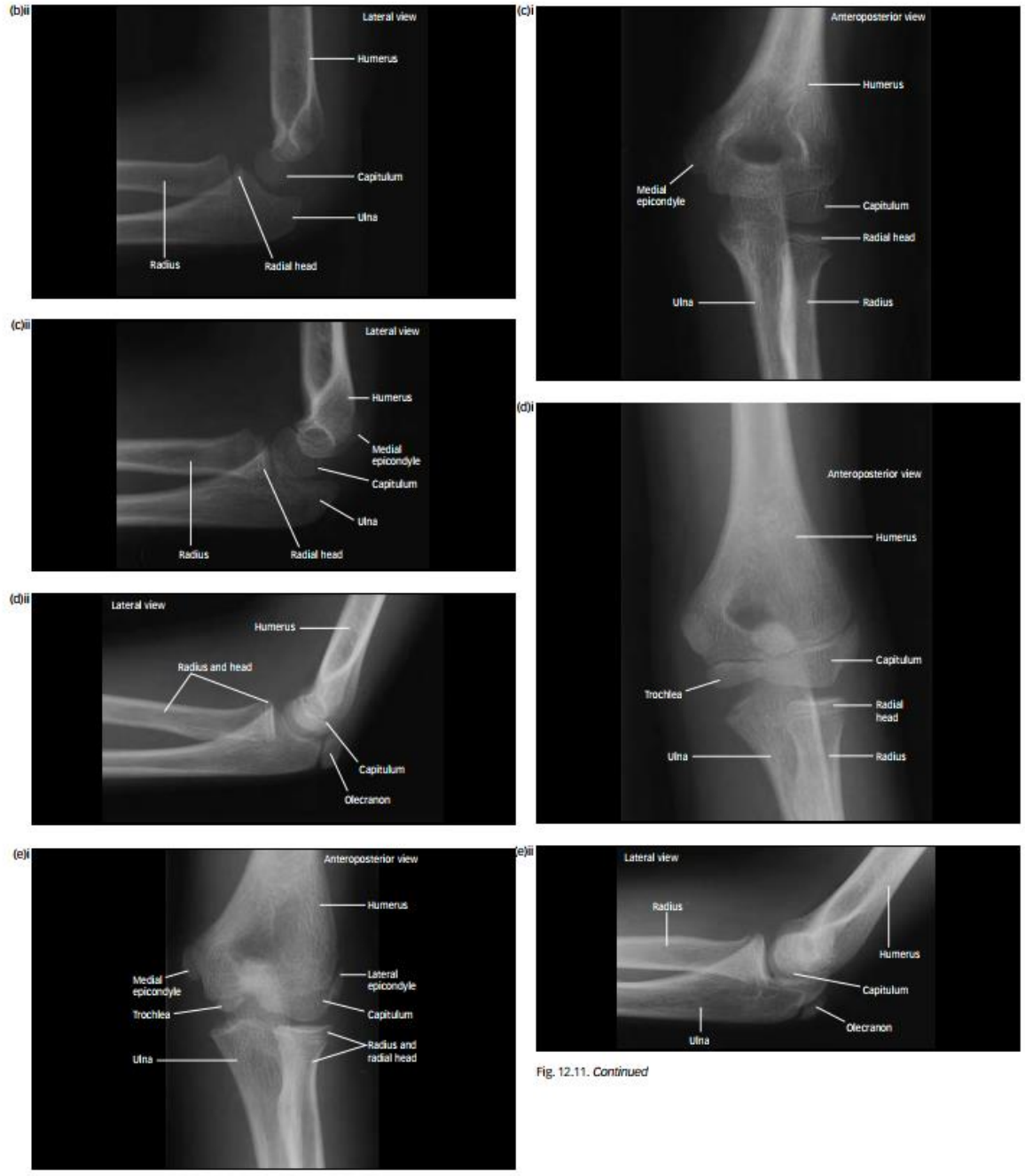


Fig. 12.11. *Continued*

Radiological features of the radius and ulna

- **Plain radiographs**
- The head of the radius has a single cortical line on its upper surface and is perpendicular to the neck in the normal radiograph (Angulation of the head or a double cortical line are signs of fracture of the radial head

Radiological features of the radius and ulna

- **Plain radiographs**
- The triceps muscle is inserted into the tip of the olecranon
- Fracture of the olecranon is therefore associated with proximal displacement by the action of this muscle

- The ulnar styloid is proximal to the radial styloid, with a line joining them on an AP radiograph lying at an angle of 110 ° with the long axis of the radius

Figure 7.7 • AP radiograph of the wrist and hand.

1. Distal radius
2. Styloid process of radius
3. Distal ulna
4. Styloid process of ulna
5. Distal radioulnar joint
6. Radiocarpal joint
7. Scaphoid
8. Lunate
9. Triquetral
10. Pisiform
11. Hamate
12. Hook of hamate
13. Capitate
14. Trapezoid
15. Trapezium
16. First metacarpophalangeal joint
17. Base of fourth metacarpal
18. Shaft of fourth metacarpal
19. Head of fourth metacarpal
20. Fourth metacarpophalangeal joint
21. Shaft of proximal phalanx, ring finger
22. Proximal interphalangeal joint, little finger
23. Middle phalanx, middle finger
24. Distal interphalangeal joint, index finger
25. Distal phalanx, thumb
26. Sesamoid bone
27. Soft tissues overlying distal phalanx of middle finger

- In a lateral radiograph, the articulating surface of the distal radius is angled 10 ° to a line through the shaft of the radius

- Recognition of these normal angles is important in reduction of fractures of the wrist

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Radiology pearl

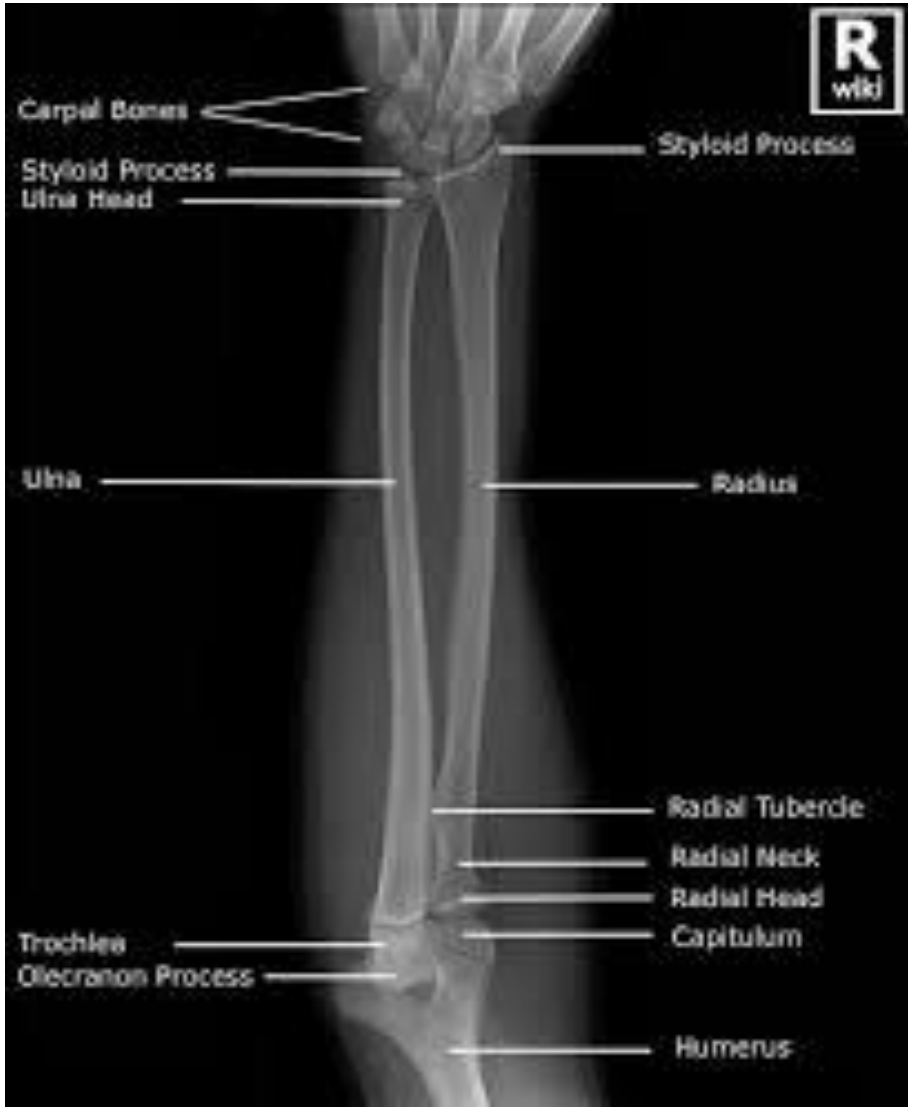
- Failure to restore volar angulation of the distal radius following a fracture of the distal radius often results in loss of grip strength due to impaired flexor function.

- The pronator quadratus is a square, flat muscle that arises on the distal ulna and passes to the distal radius A thin fat pad overlying this muscle is visible as a linear lucency on a lateral radiograph of the wrist

- Thickening of the muscle, such as by haematoma in fracture of the underlying bone, can be detected on a radiograph by bowing of the pronator quadratus fat pad .

practical


Supracondylar Humerus
Anterior Fat Pad
Coronoid Process
Radial Head & Neck
Olecranon
Posterior Fat Pad
Supracondylar Humerus
Medial Condyle
Lateral Condyle (Capitellum)
Coronoid Process
Radial Head & Neck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Carpal Bones
Styloid Process
Styloid Process Ulna Head
Ulna
Radius
Radial Tubercle
Radial Neck
Radial Head
Capitulum
Trochlea
Olecranon Process
Humerus


Radial styloid fracture
Intra-articular fracture


A


B


L
L