MALUNITED COLLES' FRACTURE

Common presentation of patient with malunion of fracture around wrist:

Case summary: A 55-year-old female patient case of mild pain and deformity in her right wrist for 6 months. 6 months back, she had a fall on outstretched hand and sustained a fracture around the wrist. She underwent closed reduction and below elbow cast was application. The cast was removed after 6 weeks. After cast removal, she noticed a deformity which has been non-progressive. She also complains of mild pain during daily routine activities. There was no history of fever, loss of weight or appetite. General and systemic examination was normal. Local examination revealed manus valgus deformity with bony irregularity over the distal radius. There was tenderness over distal radioulnar joint. The radial styloid process was at the level of ulnar styloid process. Palmar and dorsiflexion were limited but not painful while pronation and supination were limited and painful. Neurovascular examination was normal.

Q. What is the clinical diagnosis?

The clinical diagnosis is malunited distal radius fracture with stiffness of wrist joint.

Q. Why do you say so?

It is because of the following reasons:

1. History of fall on outstretched hand (common mechanism to cause distal radius fracture)
2. History of cast application for 6 weeks (indicates a fracture)
3. Presence of manus valgus deformity (Fig. 1.4) (common after malunited Colles' fracture)
4. Irregularity at lower end of radius (healed fracture site)
5. Radial and ulnar styloid process at same level (indicates malunion of distal radius)
6. Limited movements at the wrist joint (indicates stiffness)

Fig. 1.4: Clinical photograph of both hands showing manus valgus deformity of right wrist

- Bony ankylosis occurs when subchondral bone from ***both the articular surfaces*** is denuded of the articular cartilage and subchondral bone is exposed resulting in bony fusion of the two articular surface.
- Bony ankylosis is characterized by **painless joint, with no movements.** It is painless as the two articulating surfaces are fused due to bony trabeculae formation across the joint due to severe or complete destruction of cartilage.
- X-ray of the joint reveals obliteration of joint space with bony trabeculae crossing the joint (Fig. 1.6).

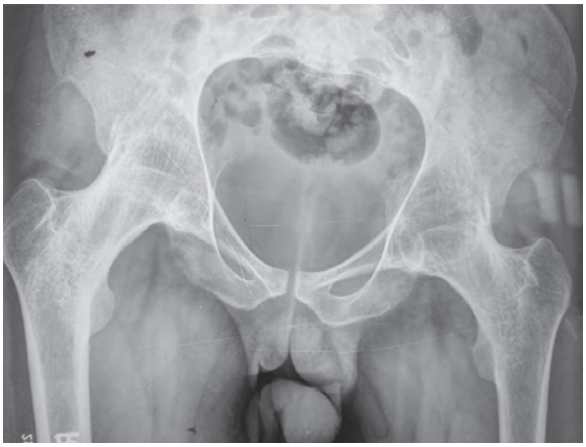


Fig. 1.6: Ankylosed hip with total obliteration of hip joint space copy

Q. What are the causes of false ankylosis?

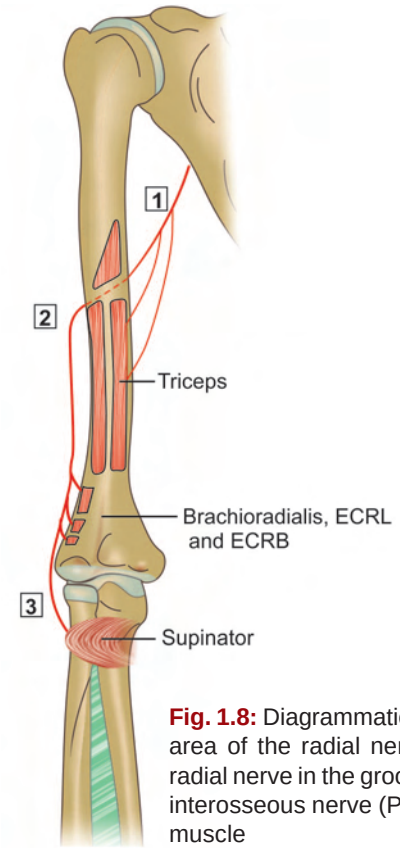
The causes of false ankylosis vary from skin to the joint.

a. ***Skin contracture:*** Burn scar, surgical or open wound scars
b. ***Underlying soft tissue contracture:*** Subcutaneous tissue/fascia scars, Dupuytren's contracture.
c. ***Muscles tendon units contracture*** which fails to slide while joint is attempting to move.
d. ***Joint capsule contracture*** after prolonged immobilisation, trauma, inflammation or surgical procedure . It fails to relax while joint is attempting to move.
e. ***Intra- and extra-articular ligaments contracture***
f. ***Bone:*** New bone formation (myositis) or excess callous formation after fracture healing or malunited displaced bone fragment.

Q. How will you manage true ankylosis?

a. *Bony Ankylosis*

1. **Arthrodesis in sound position** if bony ankylosis is in unsound position of the joint.
2. **Joint replacement if there is no evidence of infection.** At least few (5–10) years after the episode of septic arthritis and 1–2 years after complete treatment of tuberculosis, if ESR and CRP are normal.



Radial nerve, after crossing the elbow joint enters the supinator muscle which is around the radial head and neck. From this point, radial nerve is known as posterior interosseous nerve (PIN).

In Monteggia fracture dislocation; there is proximal ulna fracture with dislocation of proximal radioulnar joint. The PIN which winds around neck of radius, sustains traction injury due to dislocated head radius (Fig. 1.8).

Fig. 1.8: Diagrammatic representation of course of radial nerve. Point 1 represents area of the radial nerve before it enters the radial groove. Point 2 represents radial nerve in the groove and point 3 represents radial nerve to be called posterior interosseous nerve (PIN) just after it crosses the elbow joint and enters supinator muscle

Points to examine in nerve injury

a. Wasting of muscle
b. Deformity at joints
c. Scar and tenderness over nerve course
d. Trophic change in hand and nails
e. Joint movement
f. Tinel's sign, motor march
g. Sensori-motor examination, reflexes

Q. What are the clinical factors indicating a recovering nerve?

1. Improving sensory perception and motor power
2. Motor march phenomena
3. Progressive Tinel's sign
4. Return of reflexes

Q. How did you elicit Tinel's sign and what is its relevance?

Tinel's sign is elicited by gently tapping along the nerve its course from **distal to proximal**. In case of "**positive Tinel's sign"**, patient will experience current/shock-like sensation along the course of the nerve.

Thus distal palsy (lower lesion) results in "more deformed appearance (claw)" of the hand as compared to the proximal palsy (higher lesion) where less deformity is apparent in the hand.

So, this is the paradox! Higher the lesion, lesser is the apparent deformity in hand whereas lower the lesion, severe is the appearance! Normally one would expect more severe deformity with higher lesion and lesser deformity with lower lesion.

Q. What is tardy ulnar nerve palsy?

Tardy means "Late onset". Tardy ulnar nerve palsy is **most commonly observed in gradually progressive cubitus valgus deformity with non-union of lateral condyle fracture of humerus.** As the lateral condyle goes in for non-union, it results in progressive cubitus valgus deformity of the elbow. The progressive valgus deformity results in traction over the ulnar nerve. Further, every flexion-extension movement of the elbow results in frictional neuritis of the ulnar nerve followed by the fibrosis of ulnar nerve. So, this causes a slow onset of paralysis of ulnar nerve (tardy ulnar nerve palsy), usually a few months to years later after valgus deformity sets in.

Q. How do you treat tardy ulnar nerve palsy?

Tardy ulnar nerve palsy is treated by neurolysis and anterior transposition of ulnar nerve (anterior to medial epicondyle) to prevent further friction.

Q. What is the classical deformity after the median nerve injury?

Ape thumb deformity.

Note: The thumb abductor (abductor pollicis brevis) is paralysed with overacting adductor pollicis results in adducted thumb.

Q. Which splint is used after median nerve injury?

Thumb abductor splint.

Note: After abductor palsy, the thumb remains in adduction which could result in adduction contracture. Hence, an abduction splint keeps thumb in abduction avoiding adduction contracture.

Q. What is Klumpke's paralysis?

Klumpke's paralysis commonly occurs at birth during vaginal delivery. Occasionally, it happens due to catching a tree branch while fall from tree. It is due to **involvement of lower trunk of brachial plexus (C8, T1).** Mostly, **ulnar nerve is involved** resulting in paralysis involving intrinsic muscles of hand (interossei, medial two lumbrical, adductor pollicis and other hypothenar muscles) leading to clawhand and weakness of wrist and finger flexors (FCU, medial two FDP). Due to T1 involvement, there can be Horner's syndrome.

Q. What is Erb's paralysis?

Erb's paralysis is caused by injury to the upper trunk of the brachial plexus (C5, 6) in conditions wherein there is excess lateral flexion of the neck.