

Dislocation of the elbow and fractures around the elbow

Anatomy

The elbow is a complex hinge joint between 3 bones

1. The capitellum of the humerus and the head of radius
2. The humeral trochlear and the sigmoid notch of the ulna.

The important ligaments of the joint are:

- i. The lateral collateral ligaments
- ii. The medial collateral ligaments
- iii. The annular ligament that holds the head of the radius to the ulna

Stability of the joint is primarily dependent on the shape and fit of the bones and secondarily on the ligaments.

The carrying angle of a normal adult elbow is $10 - 13^{\circ}$. It is higher in females and children.

- The ulna nerve lies behind the medical epicondyle
- The brachial artery and median nerve lie anterior
- The radial nerve lies more laterally to the brachial artery and median nerve.
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The fractures

- i. supracondylar fracture of the humerus
- ii. Fractures of the condyles
- iii. Fracture of the capitellum
- iv. Fracture of the olecranon
- v. Fracture of the radial head
- vi. Dislocation of the elbow.

1. *Supracondylar fracture*

- These are among the commonest fractures in children. It is far less common in the adult.

Mechanism

Fall on the outstretched hand.

Pathology

The humerus breaks just above the condyles. The distal fragment is usually displaced backwards. The jagged end of the proximal fragment may injure the brachial artery or the median or radial nerve.

Anterior displacement is very rare and it is usually due to direct trauma e.g. a fall on to the point of the elbow.

X – rays

The fracture is seen most clearly in the lateral view. The fracture line runs obliquely downwards and forwards. A-P views are more difficult to obtain due to difficulty with positioning [pain]. It shows side way tilt and displacement.

Clinical features

- ✓ History of fall & deformity

- ✓ Pain and swelling around the elbow
- ✓ The normal relationship between the epicondyles and the tip of the olecranon is maintained
- ✓ Check! For radial pulsation, capillary refill, and evidence of nerve injuries.

Treatment

i. *Manipulation:*

Most will be treated adequately by MUA and application of full arm back slab. However, this must be done before the swelling becomes marked as this will make reduction difficult; otherwise, put in back slab till the swelling is down, then reduce by MUA and cast.

ii. *Continuous traction*

- a. Skeletal traction through olecranon or
- b. Skin traction applied to the forearm [also called Dunlop's traction]

Traction is indicated

- i. When MUA fails
- ii. If the pulse disappears during MUA
- ii. Some cases of open fracture

iii. *ORIF*

Usually indicated when there is associated vascular injury or if MUA failed especially in the adult.

Complications of Supracondylar fractures

- Early:**
- i. Vascular injury
 - ii. Compartment syndrome
 - iii. Nerve injury

- Late:**
- i. Malunion

-Very common. Most will remodel with time. However, angular and rotational deformities will not improve with growth.

Medial angulation will lead to cubitus varus (gun stock deformity) and is very unsightly, while lateral angulation may lead to late ulna nerve palsy.

- ii. Myositis ossificans
- iii. Elbow deformity

B. Fracture of the condyles

This can involve either condyles alone, [more common in children] or both condyles together [commoner in adults]

i. *Fracture of only one condyle*

The lateral condyle is more commonly fractured than the medial. The lateral condyle is fractured, if, when the child falls on the outstretched hand it is forced into varus while medial condyle fracture occurs with lateral angulation.

Clinical features.

The elbow is swollen and deformed. Tenderness is more over lateral aspect [lateral condyle fracture] or medial aspect [medial condyle fracture]

X – rays

In young children, because of incomplete ossification, these fractures may not be easily appreciated; hence always x – ray the contralateral elbow for comparison.

Treatment

1. MUA and POP back slab.
2. ORIF with Kirchner wires when MUA fails.

Complications

- 1 Non union
- 2 Recurrent dislocations
- 3 Late ulna nerve palsy
- 4 Elbow stiffness

II. *Fracture of the two condyles [Also called Tand Y fractures]***Mechanism**

Usually from a direct blow to the ulna which rams into the humerus and fractures it.

Clinical features

The epicondyles are displaced; hence the posterior triangle relationship is altered. There is massive swelling and movement is not possible.

In the minimally displaced cases, MUA and casting may be successful. However accurate reduction is necessary because of the intra-articular extension of the fracture.

C. *Fractures of the capitellum*

An intra-articular fracture that occurs only in the adult. It is due to a fall on the outstretched hand or a direct blow on the elbow. The anterior part of the capitellum is sheared off and displaced proximally.

X – ray

It is difficult to diagnose accurately by X – ray. It is best seen though on the lateral view. Oblique view may sometimes be needed.

Clinical features

Pain is located more on radio-humeral joint and it is aggravated by pronation/supination but not by flexion – extension.

Treatment

1. MUA is sometimes possible and successful
2. ORIF with screws or kirchner wire may be necessary
3. If the fragment is very small, it may simply be excised.

D. *Fractures of the Olecranium*

- Due either to a direct blow or fall on the elbow which results in a comminuted fracture or a traction injury when the patient falls onto the hand while the triceps contracts; resulting in a transverse fracture. It extends into the elbow joint.

Treatment

- Undisplaced transverse fracture is immobilized in 60⁰ of flexion for about 3 weeks.

- Displaced fractures are reduced operatively by tension – band wiring

Comminuted fractures: In the elderly with osteoporotic bones are treated by placing the arm in a sling. Active movement is encouraged within 1-2 weeks to avoid stiffness.

E. Fractures of the radial head

Common in the adult but very rare in children. There is tenderness and pain over the radial head, which is worsened by supination/pronation.

Treatment

Undisplaced fractures are splinted.

Displaced, comminuted fractures are best treated by excising the head. But in children all effort should be made to preserve the radial head to ensure its growth.

F. Dislocation of the Elbow

This is more common in the adult than children. It is classified according to the direction of displacement - posterior, posterolateral, lateral, and posteromedial or anterior.

Posterior or posterolateral dislocations account for 90% of the cases.

There may be associated fractures of the coronoid or radial head or the olecranium. Associated fractures make dislocations unstable and therefore liable to re – dislocation.

Mechanism

- Fall on the outstretched hand with the elbow in extension

Clinical features

- History of trauma
- Patient supports his or her forearm with the elbow in slight flexion.
- The bony landmarks [olecranon and epicondyles] are abnormally placed.
- Examine the hand for sign of vascular or nerve damage

X – ray

- Confirms the diagnoses
- Identifies associated fractures

Treatment

1. Uncomplicated dislocations are reduced under anaesthesia and then placed in a POP back slab for 3 weeks.
2. Dislocations with associated fractures are reduced and the fractures fixed by ORIF.

Complications

Early

1. Vascular injury – Brachial artery damage
2. Median or ulna nerve injury

Late

1. Joint stiffness
2. Myositis ossificans
3. Recurrent dislocation
4. Osteoarthritis