Upper limb injuries

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Fracture clavicle

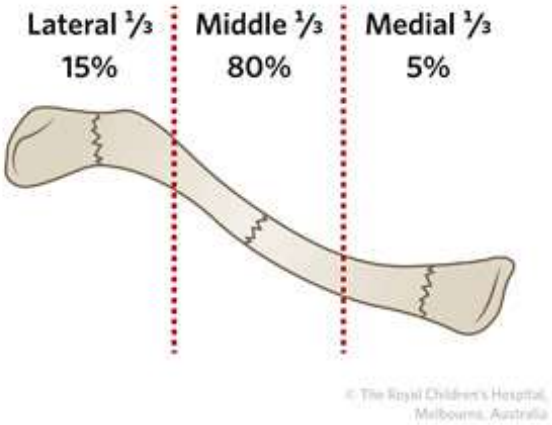
Allmans classification

Group I: fracture middle third

Group II: fracture lateral third

Group III: fracture medial third

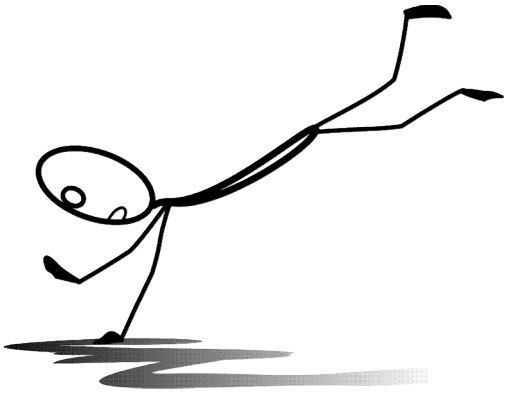
middle third is the most common site of fracture clavicle



Mechanism of injury

Falling on outstretched hand

Direct trauma to the shoulder

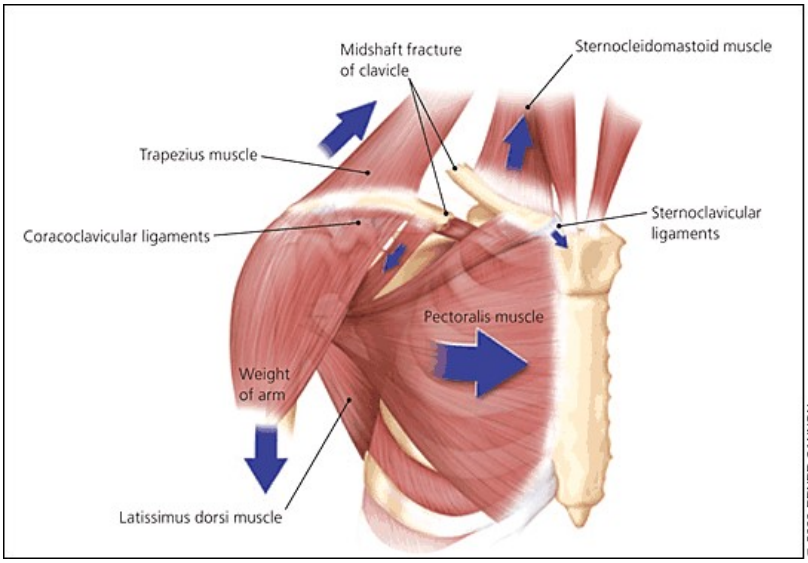


Group I
Middle third fracture

Pathoanatomy (displacement)

the medial fragment usually pulled upward by sternocleidomastoid muscle.

The lateral fragment pulled downward by Wight of the arm



Neer classification for middle shaft fracture

Non displaced

Less than 100% displacement

displaced

Greater than 100% displacement

Presentation

Pain
Deformity
Tenting of skin
Examine neurovascularity

management

Non displaced

Non operative

displaced

operative

Non operative

sling immobilization with gentle ROM exercises at 2-4 weeks

Indication for surgery

Displacement more than 100%

Tenting of skin

Open (compound fracture)

Subclavian artery or vein injuries

Floating shoulder (fracture clavicle and neck of scapula)

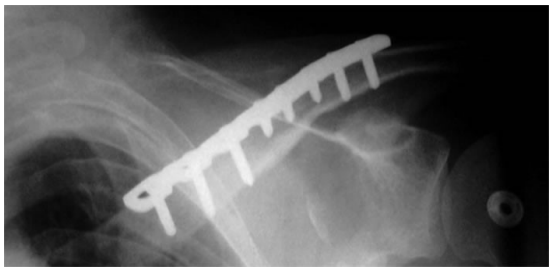
Non union

maleunion

Option of surgery

Intramedullary nail

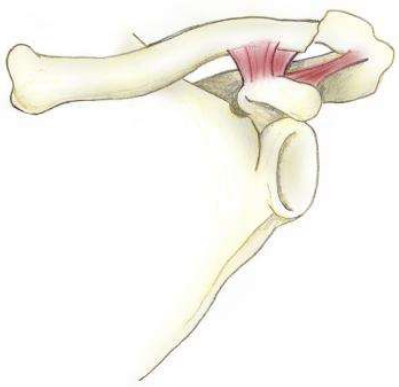
Plate and screws



Group II
Lateral third fracture

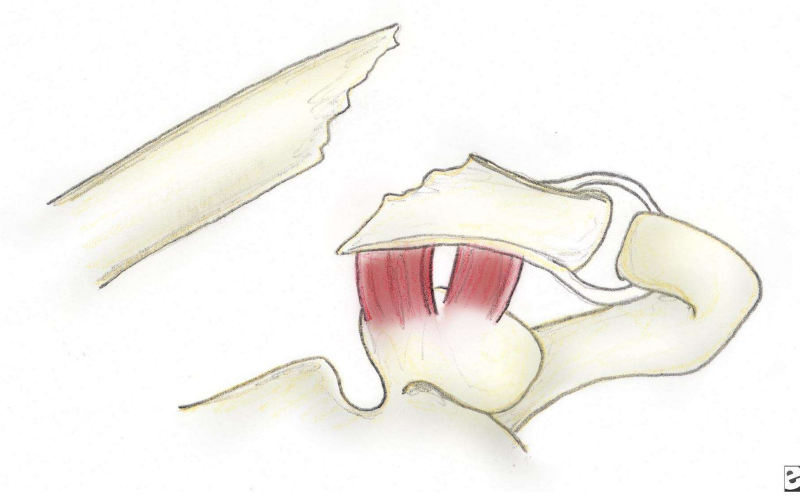
Group II subdivided into 2 subtypes

Type I fracture of the distal clavicle (group II). The intact ligaments hold the fragments in place. Treatment conservative



Type II

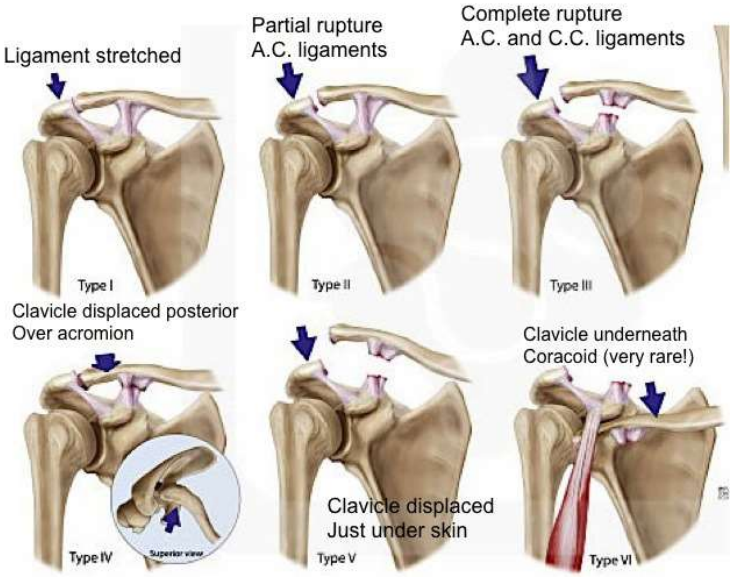
A type II distal clavicle fracture. In type IIA, both conoid and trapezoid ligaments are on the distal segment, while the proximal segment, without ligamentous attachments, is displaced, treatment is operative.



Acromioclavicular joint injuries

The most common mechanism for an acromioclavicular joint injury is a fall directly onto the acromion, with the arm adducted up against the body

Rockwood classification of AC joint injuries



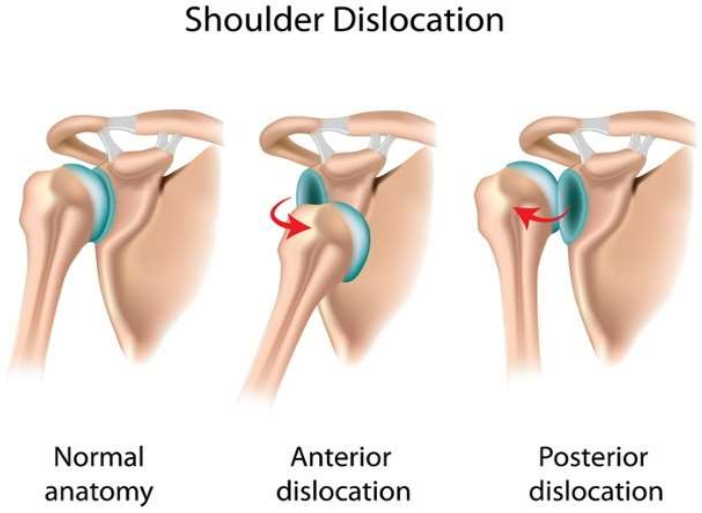
Management

Type I, type II , type III : conservative treatment by arm sling for 3-4 weeks followed by active shoulder exercises.

Type IV, V, VI need surgical fixation by coracoclavicular screw or hook plate.

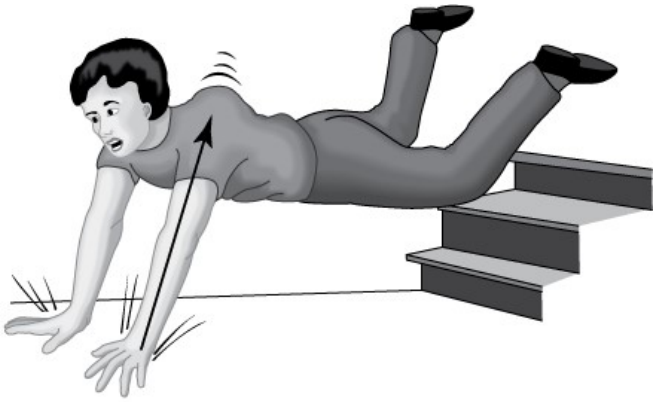
Shoulder dislocation

types



Anterior shoulder dislocation

Mechanism of injury: Falling on out stretched hand.



Pathoanatomy

The head of humerus driven forward tear the capsule of the joint and cause avulsion of glenoid labrum ; this avulsion called Bankart lesion

Clinical features

- Sever pain

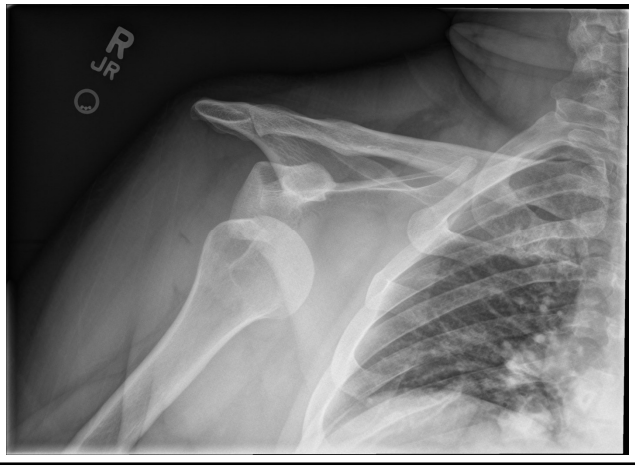
- The patient supports the arm with opposite hand

- Flattening of the shoulder contour

- Head of humerus can be felt below the clavicle

X- ray AP view

X ray will show overlapping shadows of humeral head and glenoid fossa with head usually lying below and medial to the socket



Normal x ray

Lateral view

Anterior dislocation

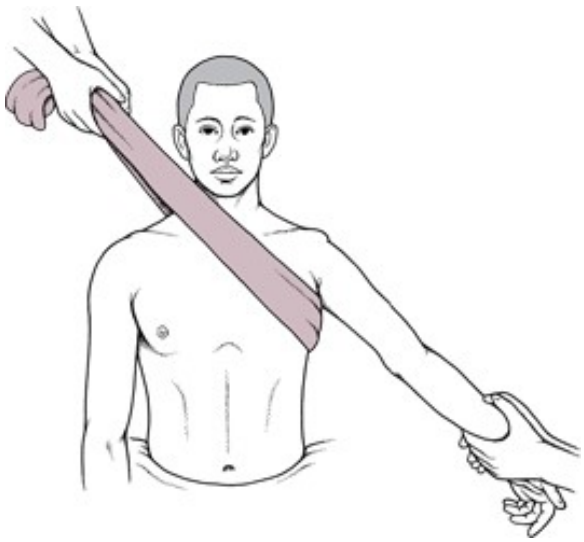
Normal lateral view

Treatment is immediate reduction of the dislocation either by sedation or by general anesthesia by one of the following methods:

Stimson method: the patient in prone position with arm hanging over the side of the bed after 15-20 minutes the shoulder may reduces.

Reduction by Hippocratic method

Supine patient ; Gently increasing traction on abducted arm with firm countertraction by hand or towel under the axilla



Hippocrates Method

After reduction

Check the neurovascularity

Take post reduction x ray

Arm sling for 3 weeks

Complication

Early	Late
Rotator cuff tear	Shoulder stiffness
Axillary nerve injury	Unreduced dislocation
Axillary artery damage	Recurrent dislocation

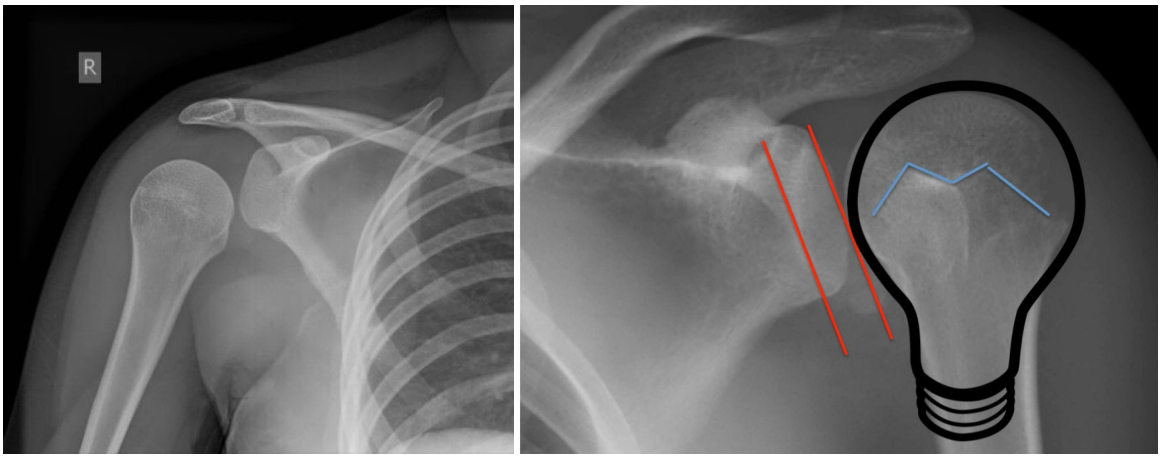
Posterior shoulder dislocation

Mechanism of injury : force causing marked internal rotation and adduction most commonly during convulsion or electric shock.

Clinical features: sever pain, the arm locked in internal rotation, prominent coracoid process

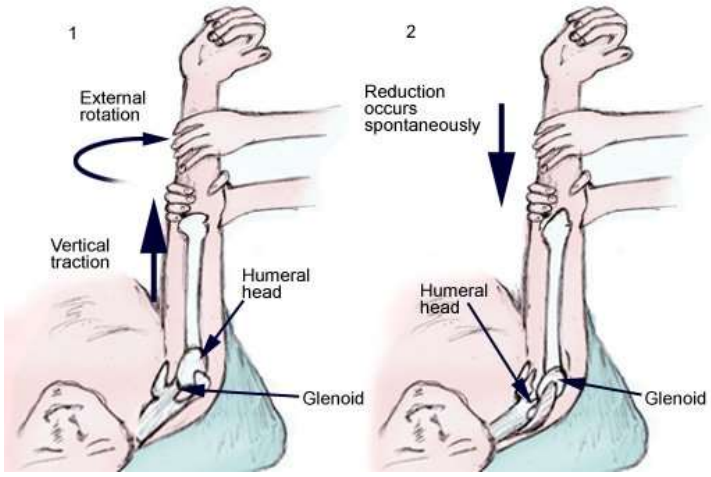
X ray

The humeral head like electric light bulb and stand away from the glenoid fossa (empty glenoid sign).



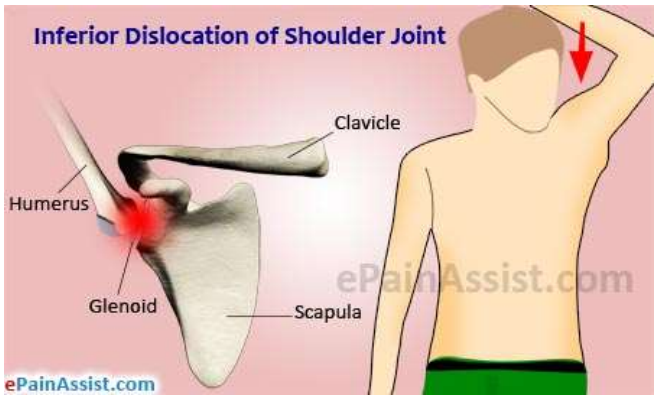
Treatment

Under general anesthesia, pulling on the arm with shoulder in adduction with gentle lateral rotation of the arm.



Inferior dislocation (LUXATION ERECTA)

It is very rare; but it has very serious complications especially neurovascular damage.



Mechanism

Sever hyperabduction force, the head of humerus will driven below the glenoid fossa.

Clinical features

The arm is locked in full abduction and the head of humerus can be palpated in the axilla.

Checking of neurovascularity is very important

X ray

The humerus shaft is in hyperabduction with head below the glenoid fossa

Treatment

Reduction under general anesthesia by pulling upward in the line of abducted arm with countertraction by pulling down over the top of the shoulder.

Fracture scapula

Mechanism of injury : mostly it is dueto direct crushing force to the shoulder.

Because it is caused by high energy trauma; many associated injuries may occur like :

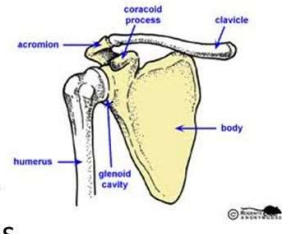
- Chest wall and rib fracture
- Pneumothorax and hemothorax
- Brachial plexus injury
- Spine injury
- Head injury

classification

Fractures of Scapula

Classification:

- Fractures of body of scapula
- Fractures of neck of scapula
- Fractures of glenoid cavity
- Fractures of coracoid process
- Fractures of acromion process



Treatment

Body fracture: arm sling for 2-3 weeks followed by physiotherapy.

glenoid fracture: arm sling for 2-3 weeks followed by physiotherapy

Intraarticular fracture: usually treated by surgery

Fracture acromion: Undisplaced fracture treated by arm sling, greatly displaced fracture treated by fixation.

Fracture coracoid process: fracture distal to coracoclavicular (CC) ligament treated arm sling; fracture proximal to (CC) ligament need fixation. a

Fracture proximal humerus

It is one of osteoporotic fracture which occurs in elderly patients. Usually caused by falling on outstretched hand.

It depends on whomany major fragment is displaced among the following 4 major fragment constituting the head of humerus :

-Head of humerus

-Greater tuberosity

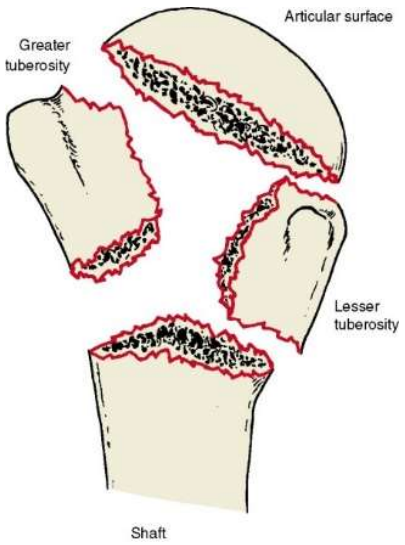
-Lesser tuberosity

-Shaft

Displacement defined as angulation more than 45 degree or 1cm separation.

So if no displaced fragment it classified as one part fracture, if one fragment is displaced it classified 2 parts fragment; likewise 3 part and 4 parts fracture.

Neer classification



Clinical features

Pain

Bruises over the shoulder

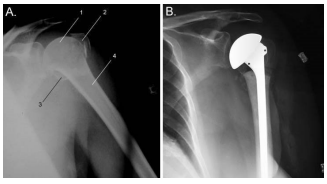
Check for axillary nerve injury

Management

One part fracture treated by rest in arm sling for 3-4 weeks followed by active shoulder exercises after 6 weeks.

2parts and 3 parts fractures usually treated by open reduction and internal fixation.

4 parts fracture treated by shoulder arthroplasty



Fracture shaft of humerus

Mechanism of injury

Direct trauma by bullet, RTA

Indirect by falling on the hand or elbow

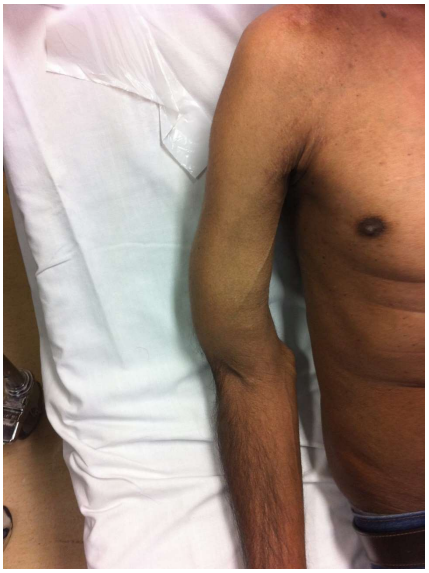
Pathological fracture (metastasis or infection)

Clinical features

The arm is bruised; swollen and deformed.

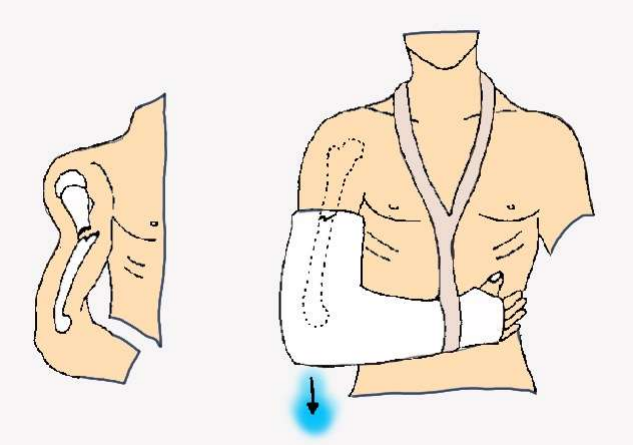
Asses radial nerve injury by asking the patient to do active dorsiflexion of fingers.

Dorsiflexion of the wrist may be misleading because extensor carpiradialis sometimes supplied by a branch arising proximal to injury.



Treatment

Usually treated by hanging cast with elbow flexed 90 degree for 8-10 weeks, the weight of the cast is enough to pull the fragments into alignment.



Indications of surgery

Multiple injuries

Open fracture

Segmental fracture

Intraarticular extension of the fracture

Pathological fracture

Floating elbow(fracture humerus and forearm bones)

Radial nerve palsy after manipulation

Non union

Radial nerve palsy in fracture humerus shaft

Radial nerve palsy in fracture humerus usually is neuropraxia (temporary) ; so we should wait up to 12 weeks as spontaneous recovery may occurs.

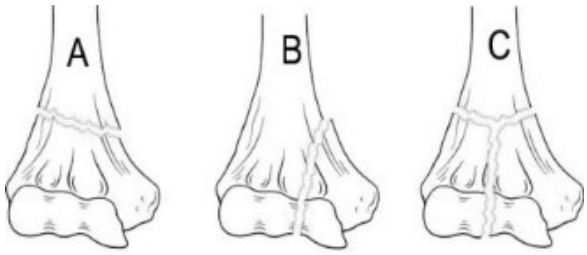
Radial nerve palsy which occurs after manipulation of fracture should be treated by immediate nerve exploration.

Supracondylar fracture in adult

It is a high energy fracture associated with vascular and nerve injuries.

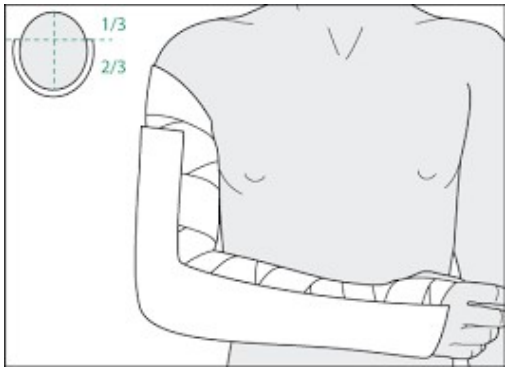
AO classification of distal humerus fracture in adult

Type-A: extraarticular supracondylar fracture. Type-B: Intraarticular unicondylar fracture Type-C: Intraarticular bicondylar fracture.



treatment

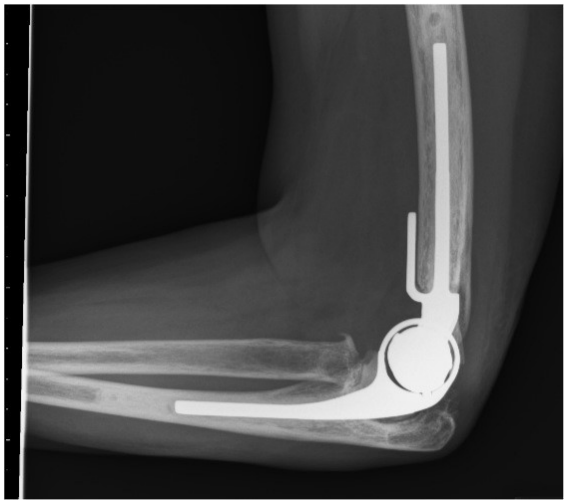
Undisplaced fracture treated by a posterior slab with elbow 90 degree flexed for 2 weeks followed by early physiotherapy to prevent elbow stiffness.



Displaced fracture

Open reduction and internal fixation by countered plates and screws

Comminuted fracture in elderly osteoporotic patient treated by elbow replacement

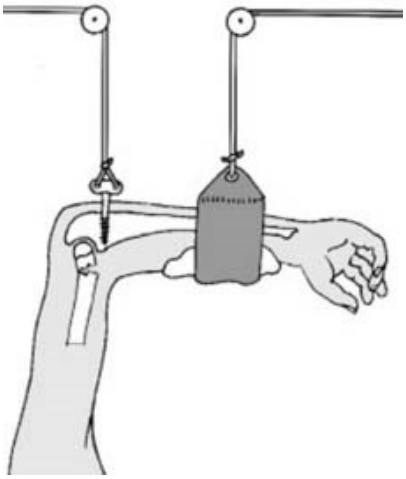


Bag of bone technique

The arm is held in a collar and cuff with elbow flexed above 90 degree for 6-8 weeks, used also for severely comminuted fracture

Skeletal traction

Other option for severely comminuted fracture is skeletal traction through olecranon process.



Supracondylar fracture in children

It is the one of the most common fracture in pediatric age group

Mechanism of injury

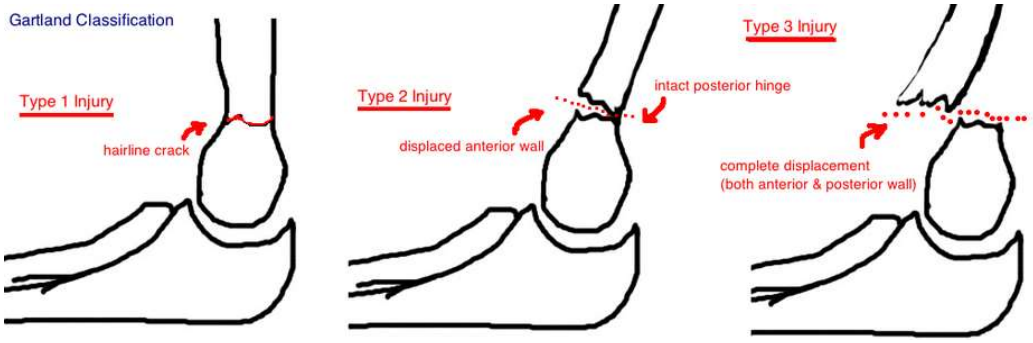
Fall on out stretched hand

95% displaced posteriorly

May cause injury to brachial artery or median nerve.

Gartlands classification

Type-I: Undisplaced Type-II: displaced but the posterior cortex still in contact Type-III: completely displaced



Clinical features

Swollen elbow

S shape deformity

Check the vascularity

Check for nerve injury

X-ray

Best view is lateral view: posteriorly displaced distal fragment in 95%.

5% anteriorly displaced fragment

X-ray

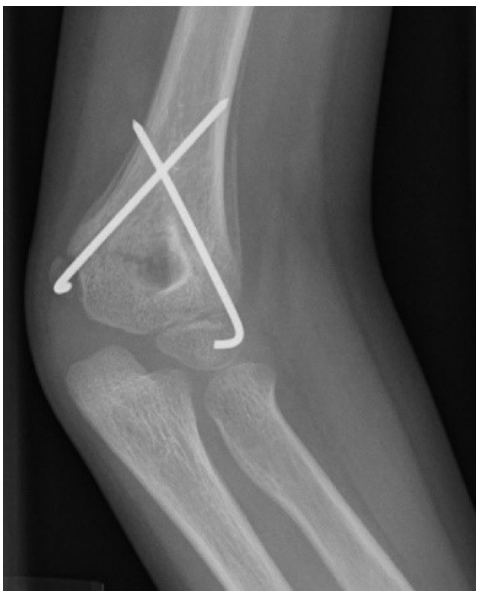
Undisplaced fracture : fat bad sign

Treatment

Type-I : backslap for 3 weeks followed by physiotherapy.

Type-II: reduction under general anesthesia by following steps 1. traction for 3 minutes 2. correction of sideway shift 3. gradual flexion of the elbow to 120 degree.; failure of closed reduction is indication for open reduction and fixation.

Type-3: open reduction and fixation by crossed k- wires



complications

Early

1. Vascular injury (brachial artery): 5%

2. Nerve injury: anterior interosseous branch of median nerve.

Late

1. Maleunion (cubitus Varus deformity): treated by supracondylar osteotomy.

2. Elbow stiffness: treated by physiotherapy.