دعمارنجم

Fractures ; fracture usually results from traumatic injury to bones causing the discontinuity of bone tissues or bony cartilage or broken.

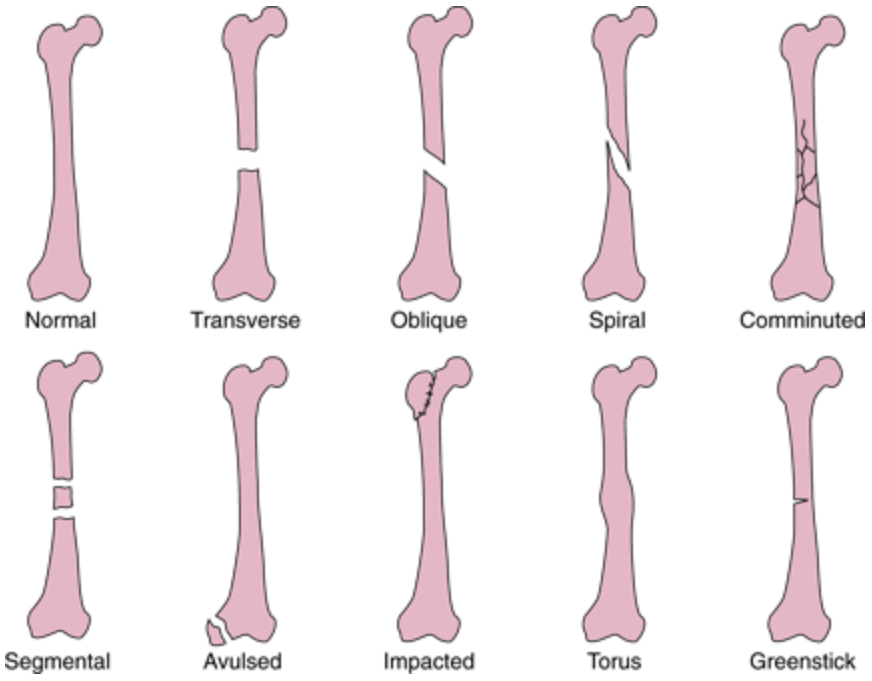
also it may associate with soft tissue damage.

How fractures happen

(1) injury; (2) repetitive stress; (3) abnormal weakening of the bone (a pathological fracture).

Mechanism and type of fracture :

- Greenstick fracture: an incomplete fracture in which the bone is bent. This type occurs most often in children.
- Transverse fracture: a fracture at a right angle to the bone's axis due tension.
- Oblique fracture: a fracture in which the break has a curved or sloped pattern due to compression.
- Segmental fracture; it is in two level in the same bone
- Avulsion fracture: happened when there is muscle or ligament attachment to bone
- Spiral fracture in which it tack spiral pattern(twisting).
- Comminuted fracture: a fracture in which the bone fragments into several pieces.
- An impacted fracture is one whose ends are driven into each other. This is commonly seen in arm fractures in children and is sometimes known as a buckle fracture.
- Other types of fracture are pathologic fracture, caused by a disease that weakens the bones,
- Fatigue and stress fracture these fractures occur in normal bone which is subject to repeated heavy loading.



Types of fractures.

COMPLETE FRACTURES
The bone is split into two or more fragments

INCOMPLETE FRACTURES
Here the bone is incompletely divided and the periosteum remains in continuity.

Types of displacement.

1. Traslation (shift).
2. Angulation.
3. Rotation.
4. Alteration. Separation or overlap.

Types of bone healing .

A. Healing by callus formation .

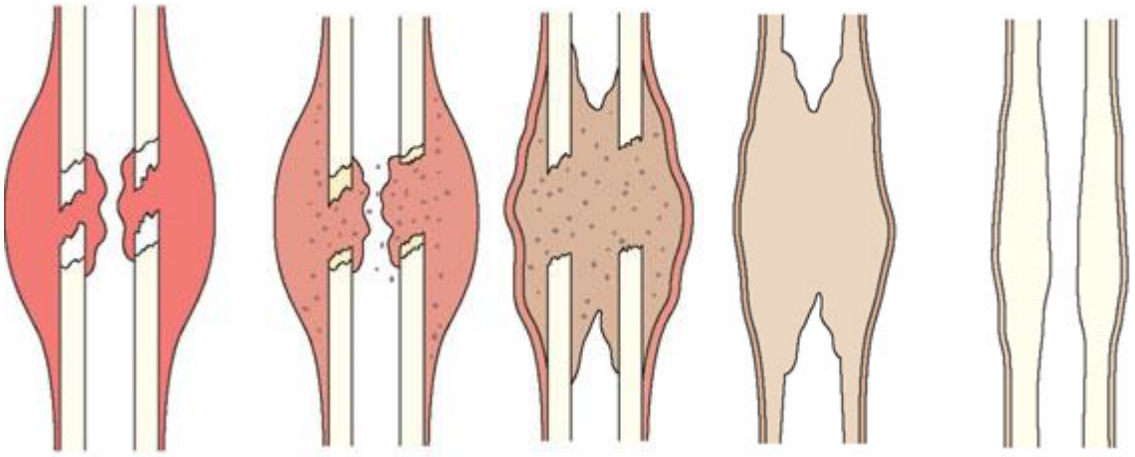
1. *Tissue destruction and haematoma formation* ,immediate after fracture

2. *Inflammation and cellular proliferation* – Within 8 hours of the fracture there is an acute inflammatory reaction with migration of inflammatory cells.

3. *Callus formation* – The differentiating stem cells they will start forming bone and, in some cases, also cartilage. The osteoclasts (probably derived from the new blood vessels), which begin to mop up dead bone. The thick cellular mass, with its islands of immature bone and cartilage, forms the callus or splint on the periosteal and endosteal surfaces. As the immature fiber bone (or 'woven' bone) becomes more densely mineralized, movement at the fracture site decreases progressively and at about 4 weeks after injury the fracture 'unites'.

4. *Consolidation* – With continuing osteoclastic and osteoblastic activity the woven bone is transformed into lamellar bone. The system is now rigid enough to allow the debris at the fracture line, and close behind osteoclasts to burrow through them. Osteoblasts fill in the remaining gaps between the fragments with new bone. This is a slow process and it may be several months before the bone is strong enough to carry normal loads.

5. *Remodeling* – The fracture has been bridged by a cuff of solid bone. Over a period of months, or even years, this is reshaped by a continuous process of alternating bone resorption and formation. Thicker lamellae are laid down where the stresses are high, unwanted buttresses are carved away and the medullary cavity is reformed. Eventually, and especially in children, the bone reassumes something like its normal shape.



B.

HEALING BY DIRECT UNION

Instead, osteoblastic new bone formation occurs directly between the fragments. Gaps between the fracture surfaces are invaded by new capillaries and osteoprogenitor cells growing in from the edges, and new bone is laid down on the exposed surface (*gap healing*). osteogenesis produces lamellar bone; wider gaps are filled first by woven bone, which is then remodeled to lamellar bone. By 3–4 weeks the fracture is solid enough to allow penetration and bridging of the area by bone remodeling units, i.e. osteoclastic 'cutting cones' followed by osteoblasts. Where the exposed fracture surfaces are in intimate contact and held rigidly bridging may occasionally occur without any intermediate from the outset, internal stages (*contact healing*).

UNION, CONSOLIDATION AND NON-UNION

Union –is incomplete repair; the callus is calcified. fracture site is still a little tender and. X-Rays show the fracture line still clearly visible, with fluffy callus around it. Repair is incomplete and it is not safe to subject the unprotected bone to stress.

Consolidation –is complete repair; the calcified callus is ossified. Clinically the fracture site is not tender, no movement can be obtained and attempted angulation is painless. X-rays show the fracture line to be almost obliterated and crossed by

bone trabeculae, with well-defined callus around it. Repair is complete and further protection is unnecessary.

Non-union –the bone fails to unite. Causes of non-union are:
(1) separation of the fragments by soft tissues between them .
(2) excessive movement at the fracture line;
(3) a severe injury with local tissues nonviable;
(4) a poor local blood supply
(5) infection.

Non-unions are septic or aseptic. or *hypertrophic non-union or atrophic non-union*

CLINICAL FEATURES

A. HISTORY

- Of injury with inability to use the limb.
- Mechanism
- Age of patient
- General medical health
- Simple trauma lead to fracture(pathological)

B. GENERAL SIGNS

Unless it is obvious from the history Follow the ABCs

- **A**irway obstruction
- **B**reathing problems
- **C**irculatory problems and **C**ervical spine

C. LOCAL SIGNS

- Examine the most obviously injured part.
- Test for artery and nerve damage.
- Look for associated injuries in the region.
- Look for associated injuries in distant parts.

D. LOOK

- Swelling
- Bruising
- Deformity
- skin is intact or not
- Note also the posture of the distal extremity and the color of the skin

E. FEEL The injured part is gently palpated for

- localized tenderness(fractured scaphoid)
- associated injuries
- examine the spine and pelvis
- Vascular and peripheral nerve abnormalities should be tested

F. MOVE Crepitus and abnormal movement may be present, but why inflict pain when x-rays are available? It is more important to ask if the patient can move the joints distal to the injury.

G. X-RAY X-ray examination is mandatory. Remember the *rule of twos*:

- *Two views*(anteroposterior and lateral).
- *Two joints* The joints above and below the fracture must both be included on the x-ray films.
- *Two limbs* In children, x-rays of the uninjured limb are needed for comparison.
- *Two injuries* fractures of femur it is important to also x-ray the pelvis and spine.
- *Two occasions* another x-ray examination a week or two later may show the lesion(clavicle, scaphoid).

CTS and MRI also may need in dx the fracture

Full description to fracture.

ASSOCIATED SECONDARY INJURIES

• *Thoracic injuries* – Fractured ribs or sternum may be associated with injury to the lungs or heart. It is essential to check cardio respiratory function.

• *Spinal cord injury* – With any fracture of the spine, neurological examination is essential to: (1) establish whether the spinal cord or nerve roots have been damaged and (2) obtain a baseline for later comparison if neurological signs should change.

• *Pelvic and abdominal injuries* – Fractures of the pelvis may be associated with visceral injury. It is especially important to enquire about urinary function; if a urethral or bladder injury is suspected, diagnostic urethrograms or cystograms may be necessary.

• *Pectoral girdle injuries* – Fractures and dislocations around the pectoral girdle may damage the brachial plexus or the large vessels at the base of the neck. Neurological and vascular examination is essential.