

## Fracture healing process

This is the bone self-healing process/ repair/union that has the following processes

### Inflammatory Phase.

Stage of hematoma formation- after the fracture, bleeding & edema precede a hematoma surrounding the fragment

There is swelling, edema & pain

The fracture fragments become devascularized

Injured bone is invaded by microphages which debride the area

### Reparative Phase.

Fibrin strands form within the fracture hematoma

Revascularization begins

Fibroblasts & osteoblasts produce collagen matrix at the fracture site.

Cartilage and fibrous connective tissue develop.

#### A) Formation of fibrocartilaginous callus.

? The phagocytic cells absorb the products of local necrosis.

? The hematoma changes to into Granulation tissue constituting of young blood vessels, fibroblasts, osteoblasts (the bone osteoid)

#### B) Formation bony callus (woven bone become calcified).

? Osteoid mineralization to form a network of cartilage, osteoblasts, and minerals

? Begins to appear by the 1st week of # and can be confirmed by X-ray

**Ossification:-** calcification of callous into the bone mass that prevents movement at the fracture site

? Begins 2-3 wks after fracture until the fracture is healed

? However, the fracture is still evident in the x-ray

? Pt can be converted from skeletal traction to cast or cast can be removed & the pt mobilized

**Consolidation:-** distance between bone continues to diminish & eventually closes & x-ray can confirm fracture union

## Remodeling Phase.

? Excess material inside bone shaft is replaced by more compact bone

? Excess cells are absorbed & union is completed.

? Return of bone to its pre-injury structure, shape and strength

? Bone remodeling enhanced by exercises & later weight bearing exercises

? New bone is deposited at the site of the fracture

## Factors affecting bone healing

### Enhancing

Early Immobilization of fracture fragments

Bone fragments contact

Adequate blood supply

Proper Nutrition

Exercise- wt. bearing for long bones

Adequate hormones –Growth hormone, Thyroxin, Calcitonin

The electric potential across the fracture

### Inhibiting

Extensive local trauma

Bone loss due to the severity of the fracture

Inadequate immobilization

Infection

Avascular Necrosis

Local malignancy

Dernervation

Age