

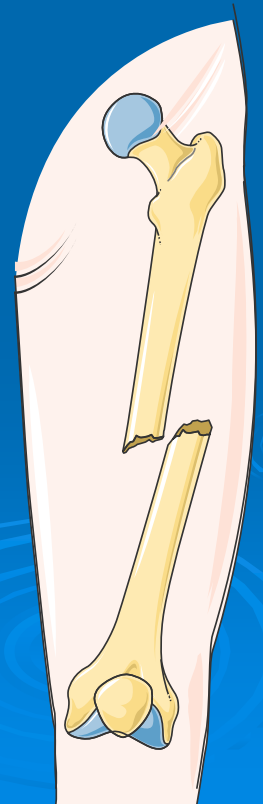
Treatment And Management Of Fracture In Dogs

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FRACTURE

It is defined as a break in continuity of hard tissues like bone, cartilage etc.



Cause:

1) Pre-disposing/ indirect causes

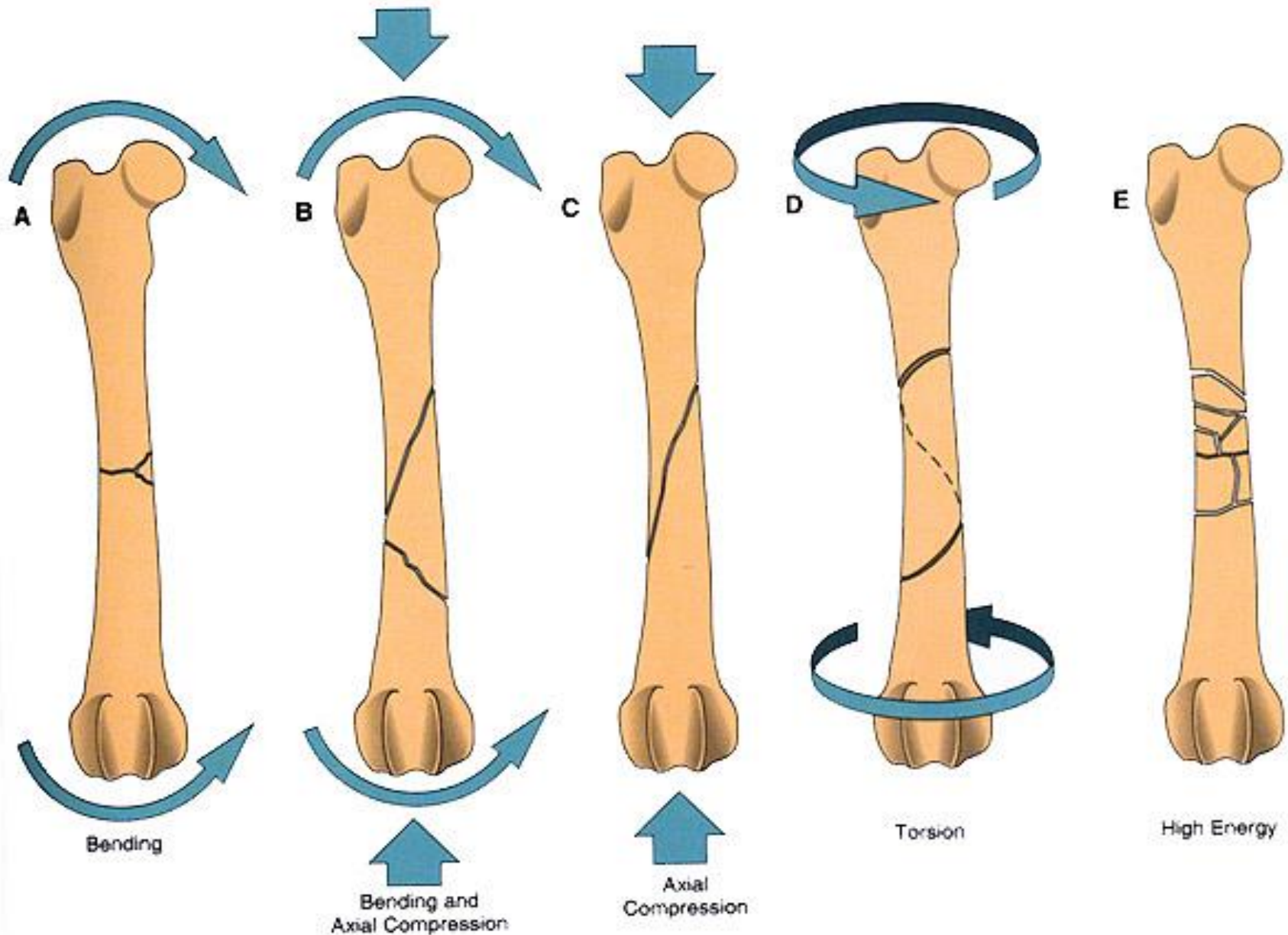
- ❖ Age
- ❖ Superficial position of bone/shape/osseous structure/function of bone
- ❖ Smooth roads/slippery floor
- ❖ Disease condition like osteomalacia / osteoporosis / osteitis / necrosis

2) Exciting / direct causes

Divided into

- (a) External violence: blows, kicks, accidents.
- (b) Internal violence

FRACTURE FORCES



Classification of fracture

1) Simple fracture:

A fracture which doesn't communicate to outside



2) Compound fracture:

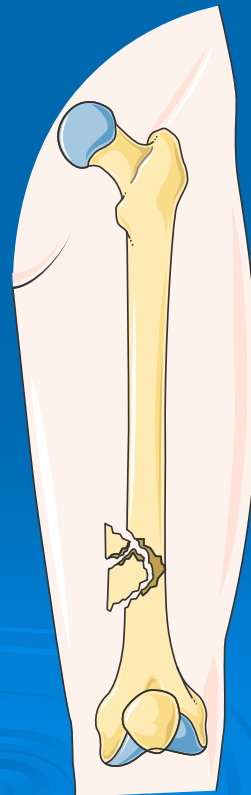
A fracture which is communicating to outside through open wound on skin.

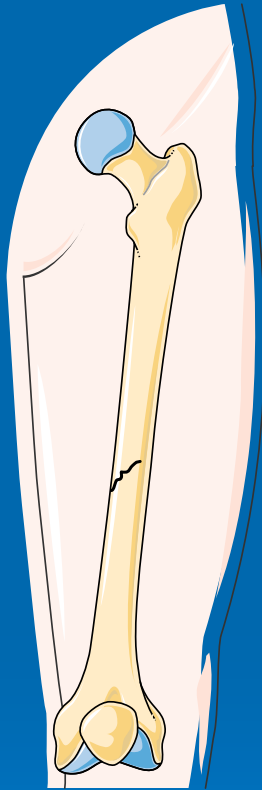


3) Complicated fracture:

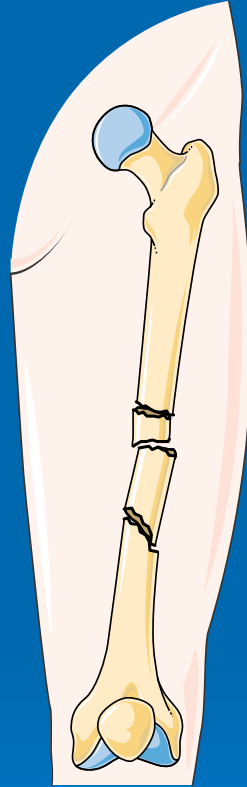
A simple fracture but there will be damage to surrounding muscles, nerves, joints, cavities.

Eg. Fracture of rib - no skin wound but can penetrate into lungs.

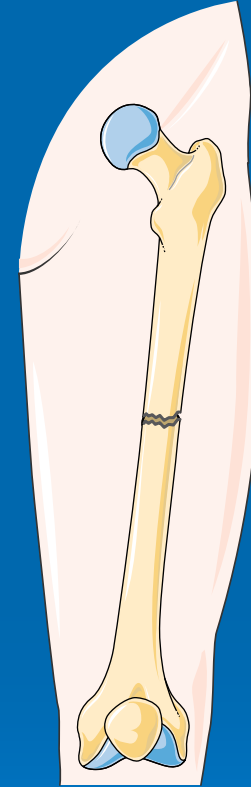




Greenstick



Segmental



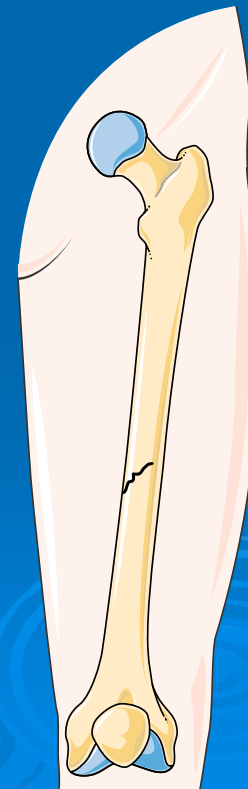
Transverse

Classification based on thickness of bone involved

Incomplete fracture:

Complete thickness of bone is not involved.

Eg. Green stick fracture.



- ❖ Fissured fracture - cracks, fragments not separated.
- ❖ Sub-periosteal fracture - Periosteum is intact but bone is fractured.
- ❖ Deferred fracture - At beginning, incomplete fracture but after sometime it will become a complete fracture
- ❖ Fracture of vertebral column.

2) Complete fracture:

Involves complete thickness of bone.

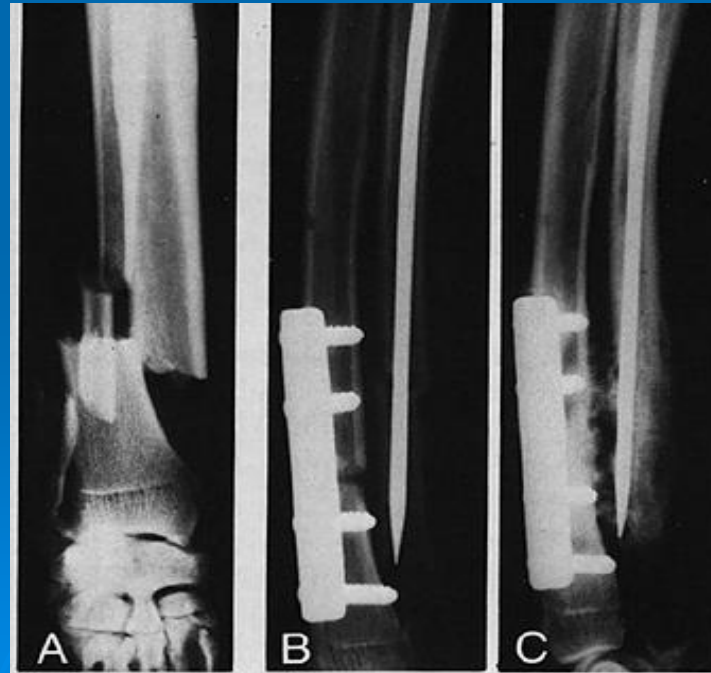
- ❑ Single fracture - Bone is broken at one place.
- ❑ Double fracture - Bone fractured at 2 places.
- ❑ Comminuted fracture - Multiple fractures.



- ❑ Avulsion fracture - Tearing of bony prominence by a forceful pulling of tendon/ muscular attachment.

Eg. Fracture of prominence of olecranon process.

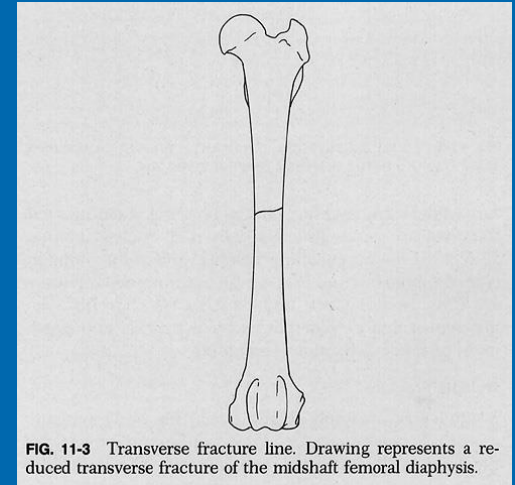
- ❑ Distracted fracture - Bony segment will be fractured and separated.



Classification based on portion of bone involved

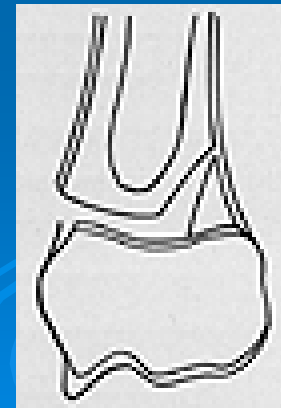
1) Diaphysary fracture:

Fracture involving shaft of bone.



2) Epiphysary fracture:

Fracture at junction of shaft and epiphysis.



3) **Supra-condylar fracture:**
Fracture above condyle.

4) **Peri-articular fracture:**

At articular extremity but will not extend into joint.



5) **Articular fracture:**

It will extend into joint.

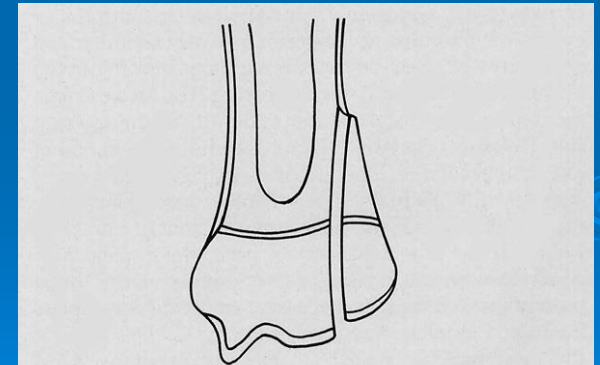


FIG. 34-4 Type IV epiphyseal plate injury: fracture of the epiphysis and epiphyseal plate. (Redrawn after Salter RB, Harris WR: Injuries involving the epiphyseal plate. J Bone Joint Surg 45A:588, 1963)

Classification depending on direction of fracture

1) Transverse fracture:

Fracture perpendicular to long axis of bone or right angle to long axis.

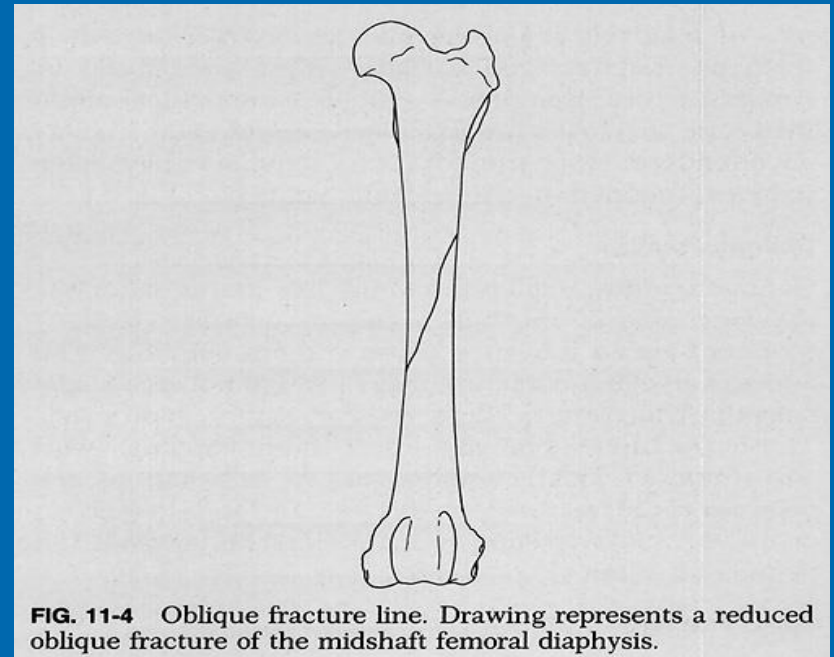


2) Longitudinal fracture:

Fracture extending in longitudinal direction.

Eg. Split pastern in horse.

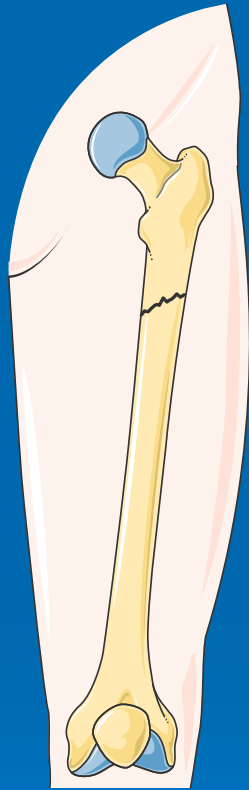
3) Oblique fracture:
Fractured in oblique direction



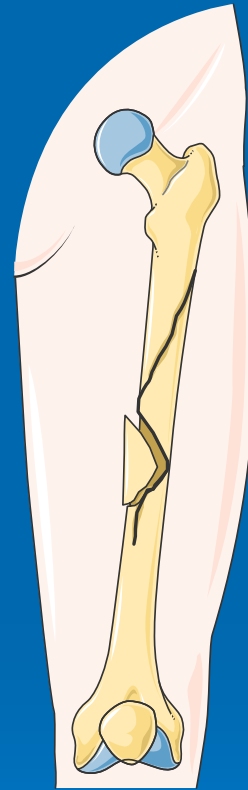
4) Spiral fracture:
In spiral direction



Classification depending on direction of fracture



Oblique



Spiral

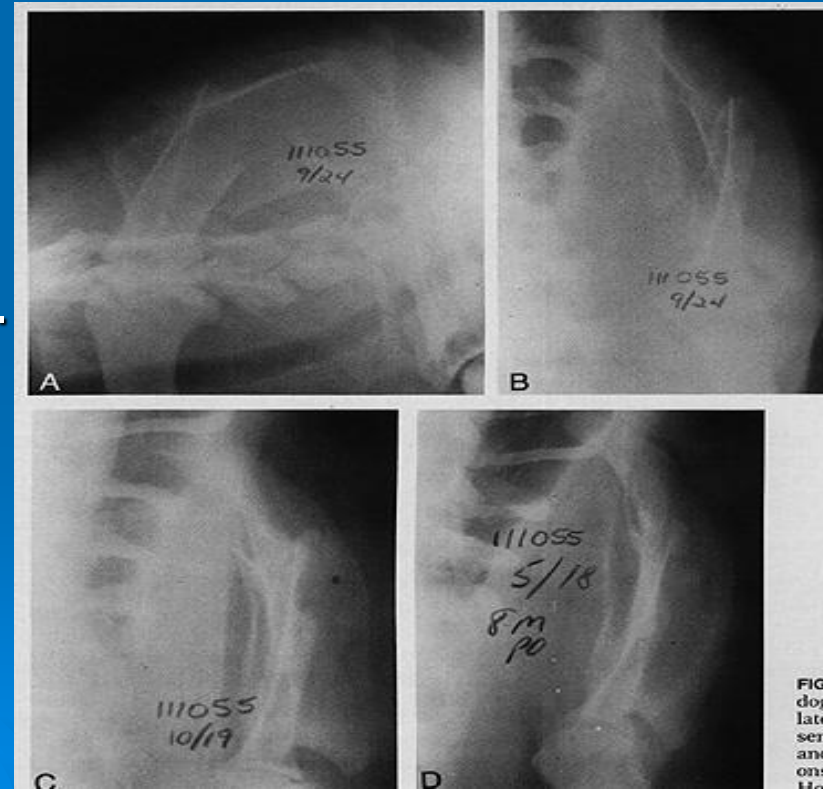
Depending on relationship to fragments in a fracture

1) Torsion fracture:

Fracture in which 1 fragment has been twisted and separated.

2) Impacted fracture:

1 fragment will be driven into other.



Scapular Body Fractures

3) Dentate fracture:

Because of muscle contraction. The fracture side will be dentate/toothed and will be interlocked.

4) Over-riding fracture:

Fragment lie side by side causing shortening of limb.



Classification

1) Compression fracture:

A fracture produced by compression reducing apparent size of bone due to pressure.

Eg. Vertebral fracture.

2) Depressed fracture:

A Fracture of skull in which fragment is depressed below surface.

Eg. Hammer hit on skull



3) Cole's fracture:

Fracture of distal end of radius.

4) **Pathological Fracture secondary/spontaneous Fracture:** Fracture not due to any trauma but due to weakening of bone.

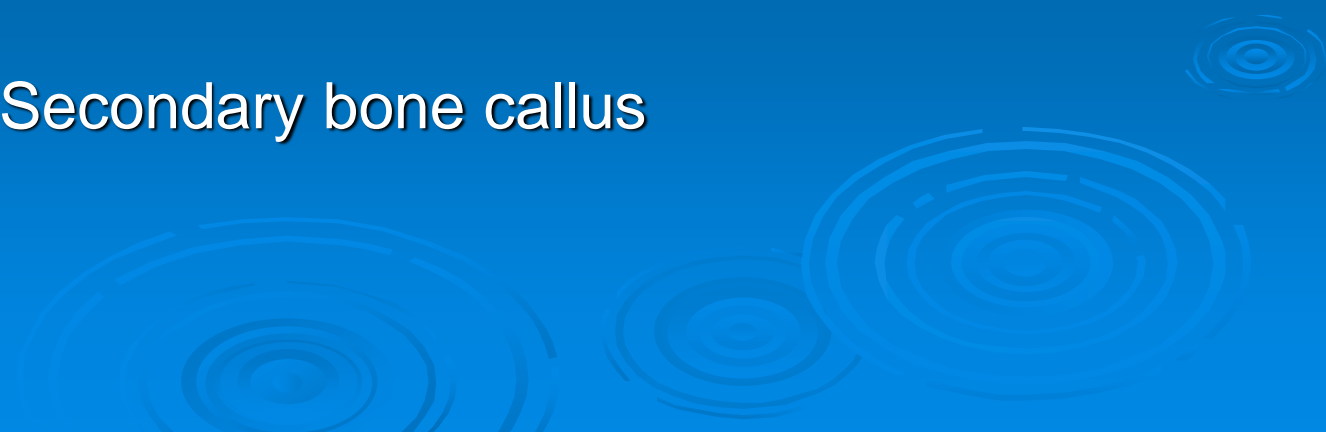
5) Congenital Fracture:

Intra-uterine fracture, fracture of bone of fetus.

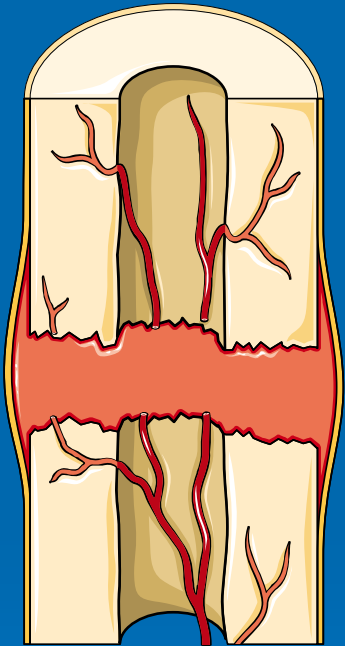


HEALING OF FRACTURE

4 Stages

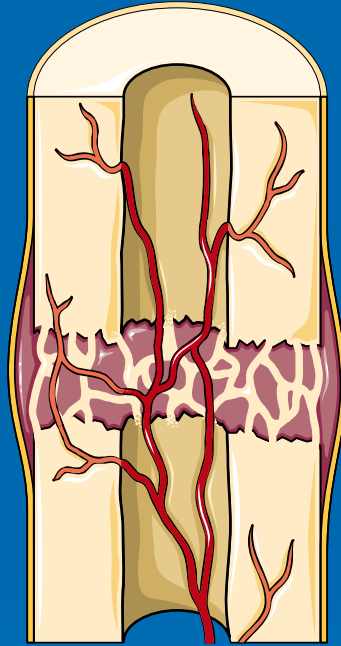
- 1) Formation of Haematoma
 - 2) Formation of Soft callus
 - 3) Formation of Primary bone callus
 - 4) Formation of Secondary bone callus
- 
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Fracture repair



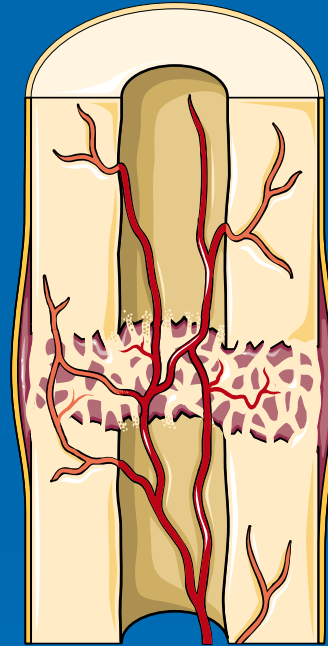
Stage 1

Haematoma



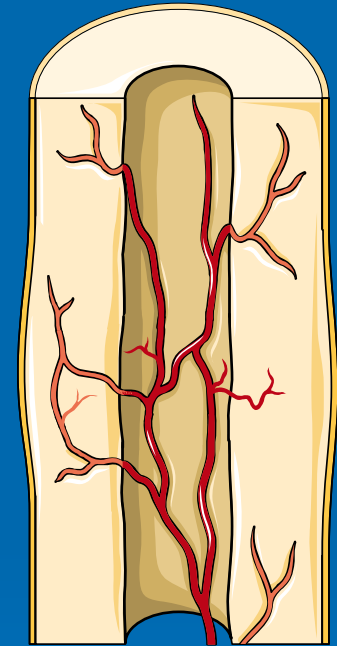
Stage 2

Soft callus



Stage 3

Primary bone callus



Stage 4

Secondary bone callus

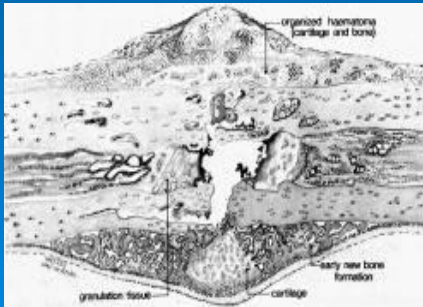
Formation of Haematoma:

- ❖ Periosteum, haversian canal, endosteum and bone marrow.
- ❖ Blood accumulate in and around fracture site within 24 hours.
- ❖ It gets coagulated and forms haematoma.



Formation of Soft Callus/Fibrous/ Temporary callus:

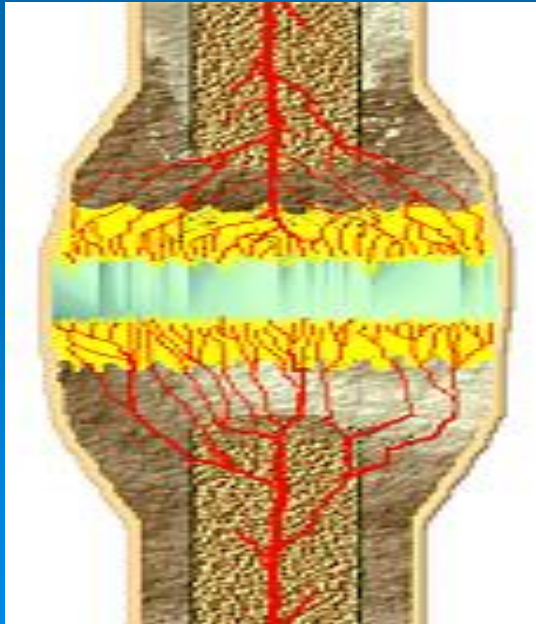
- ✦ There will be ingrowth of fibroblast, fibrin and capillaries into clot and capillaries from periosteum, haversian canal, endosteum and bone marrow.
- ✦ At same time there will be migration of wandering phagocytic cells, macrophages, remove RBC, debris, then we get the fibro-vascular- soft callus.



Formation of Primary bone callus:

- ❁ pH of medium/clot is lowered or is acidic in beginning because of presence of damaged tissues.
- ❁ This acidity mobilize calcium from bone fragments.
- ❁ At same time enzyme Phosphatase is released by osteoclast cells which will also favor mobilization of calcium from plasma and the area will be hypersaturated with calcium.

- Gradually osteoclast cells changes the medium pH to alkaline.
- This will favor deposition of calcium.
- This is known as primary bone callus. Takes about 3 weeks.



Formation of Secondary callus:

- For proper healing, sustained immobilization is a must.
- Permanent bone is formed. Resorption and construction of bone takes place.



Symptoms

- 1) Deformity
- 2) Loss of function
- 3) Abnormal mobility
- 4) Pain
- 5) Crepitus



❖ **Deformity:**

May be due to displacement.

Eg. Shortening, lengthening, angulation.

❖ **Loss of function:**

May not be able to bear the weight.

❖ **Abnormal mobility:**

Its exhibited by mobility of abducted part or in a direction in which normal movement is not possible.

❖ Pain:

Especially when fragments are moved.

Initially pain exhibited at time of fracture but vanishes after few minutes lasting for about 10 - 20mins.

No pain is felt at site of fracture and is known as numbness.

During this there will be muscle relaxation.

Pain is less in impacted fracture.



❖ Crepitus:

Because of rubbing of edges but may not be heard.

Eg. Interposition of soft tissues crepitation is not visible.
Fracture of vertebral column, crepitation is very rarely heard.



Other symptoms

🏠 Increase of temperature

🏠 Albuminuria

🏠 Lipuria

Diagnosis

- Symptoms
- Radiography

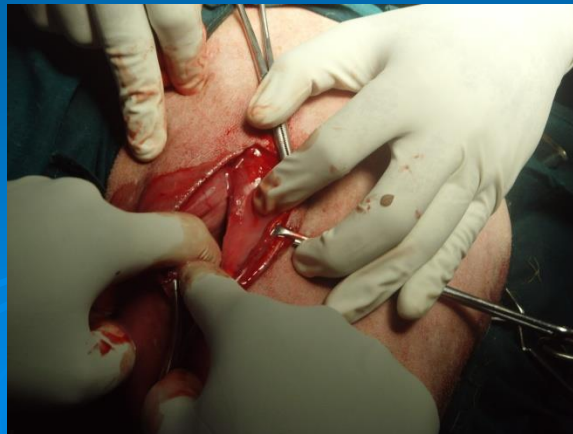


Treatment

Reduction of fracture:

Bringing of 2 fragments of bone into normal apposition and alignment.

If displacement is slight it can be corrected by holding segment and then moving lower segment.



Retention and immobilisation:

✓ Application of Charge:

Charge is an immobilising dressing prepared by smearing melted pitch and tow over it.

Mainly used in fracture of hip region/shoulder in large animals.

✓ Coaptation.

Pins and cast, gum bandage, starch bandage.

These are used for fracture of limbs. 1 joint above and 1 joint below should be involved while using splint.



➤ Schroeder Thomas splint:

Is both used for **correction** and **immobilisation**. It should be made with light metal.

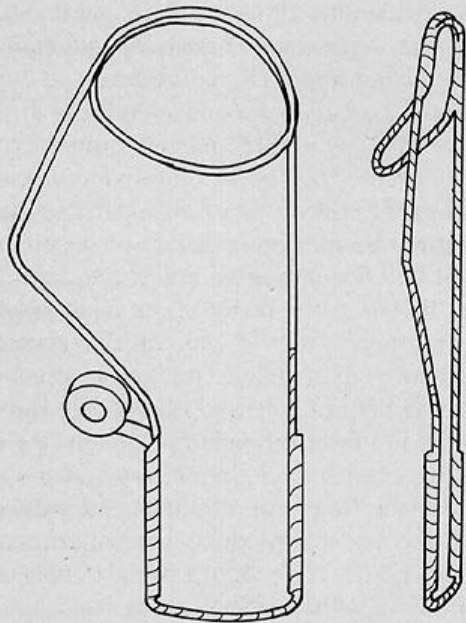


FIG. 15-7 A pelvic limb Schroeder-Thomas splint. The finished splint is shown with flattened tilted groin bar. Tape is applied to keep the traction members from slipping.

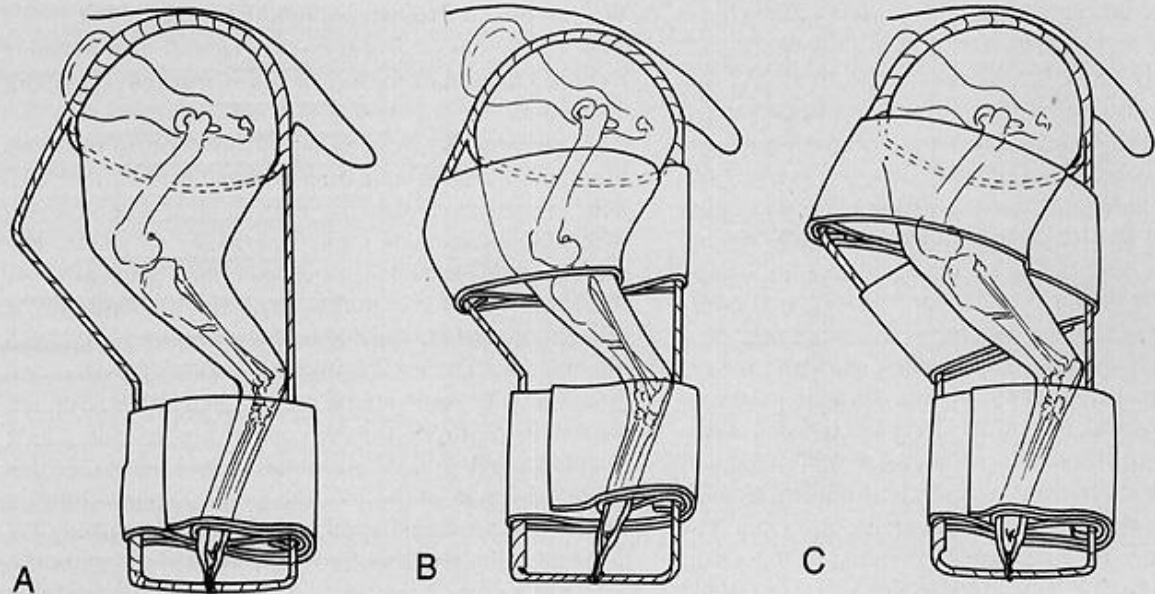


FIG. 15-8 Application of a Schroeder-Thomas splint. (A) The bottom sling is placed first, as shown. Following completion, the combine roll material is taped in place. (B) The process is reversed to apply the top combine roll to pull the femur forward, thereby applying traction to the tibia. (C) Medial support is applied to the tibia by continuation of the bandage medial to the tibia.

➤ Mason metasplint:

Made of aluminium conforming shape of metacarpal including carpal and fetlock joint in forelimb.

Tarsal and fetlock joint in hind limb.

Used in calves.



- **Suturing of fragments:**
expose the site surgically and suture it.

Technique is known as Cerclage.

2 Techniques:

- ✓ Full cerclage
- ✓ Hemi cerclage.

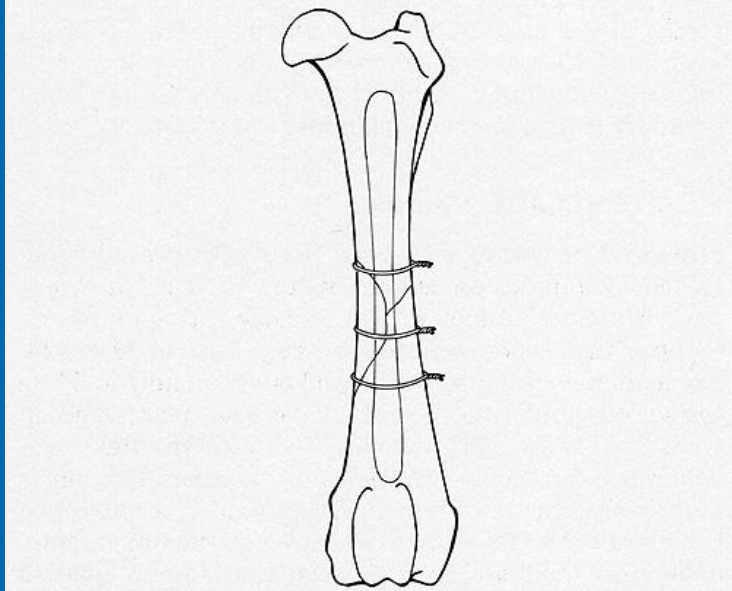


FIG. 16-12 Full cerclage wiring. Multiple cerclage wires are placed before the introduction of a Steinmann pin.



FIG. 29-9 (A) Lateral radiograph of a transverse femoral fracture in a 6-month-old poodle. (B) Cranial-caudal radiograph demonstrates the fracture following reduction and fixation using an intramedullary pin and lateral figure-of-eight wire. (C) Radiograph demonstrates the healed fracture 8 weeks post fixation.

- Application of bone plates/screws: metal plates/ screws are used for this.



➤ **Bone pins:**

Rush pins, Steinmann pin, K-nail. Bone pins divided into:
External pinning.
Internal pinning.

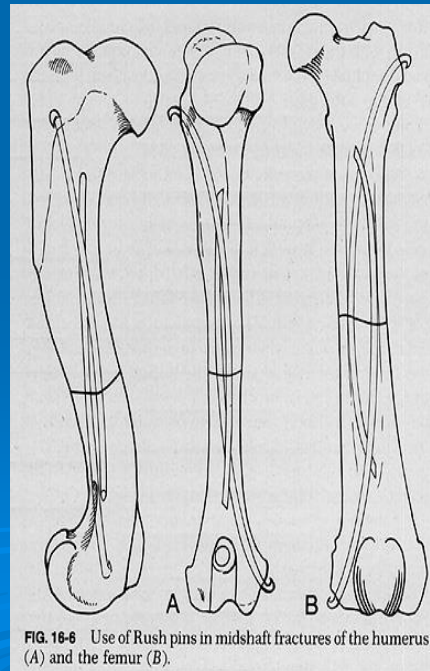
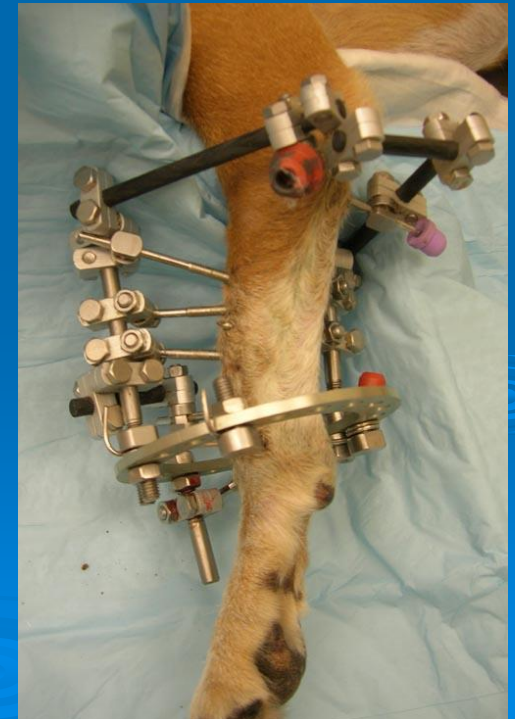


FIG. 10-6 Use of Rush pins in midshaft fractures of the humerus (A) and the femur (B).



Complications of fracture

- **Injury to vessels and nerves:** Leads to necrosis, atrophy, degeneration, paralysis.
- **Non-union and delayed union:** When gap is very wide non-union occurs and of improper immobilisation or interposition of soft tissue or infection delayed union happens.



FIG. 16-3 Lateral radiograph of a canine femur. This animal presented with a rotational and angular nonunion caused by rotation around an intramedullary pin and angulation due to premature pin migration.



- **Mal-union:** malformed or over-riding union



THANK YOU

