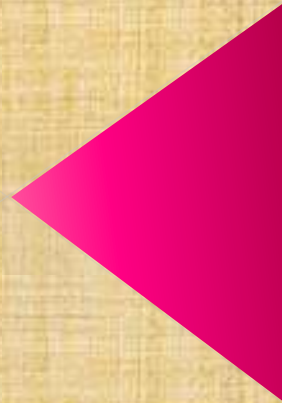


FRACTURE



DEFINITION

- ⦿ Fracture is a break or disruption in the continuity of bone.

ETIOLOGY:

- ⦿ Fall or direct trauma
- ⦿ Pathological cause
- ⦿ Severe muscular contraction
- ⦿ Child abuse

COMMON SITES OF FRACTURE IN CHILDREN

1. **Forearm fractures** are most common site (50%).
 - > About 3/4th of the forearm fractures involve distal third of radius and ulna.
2. **Epiphyseal fractures-** Mechanism of injury is usually fall on an outstretched hand.
 - > accounts for about 15 to 30%.
 - > Involves physeal injury of radius and ulna.
3. **Fracture humerus-** occurs due to fall on an outstretched arm hand involving proximal part of the shaft of the humerus.
 - > Direct trauma may cause this fracture.

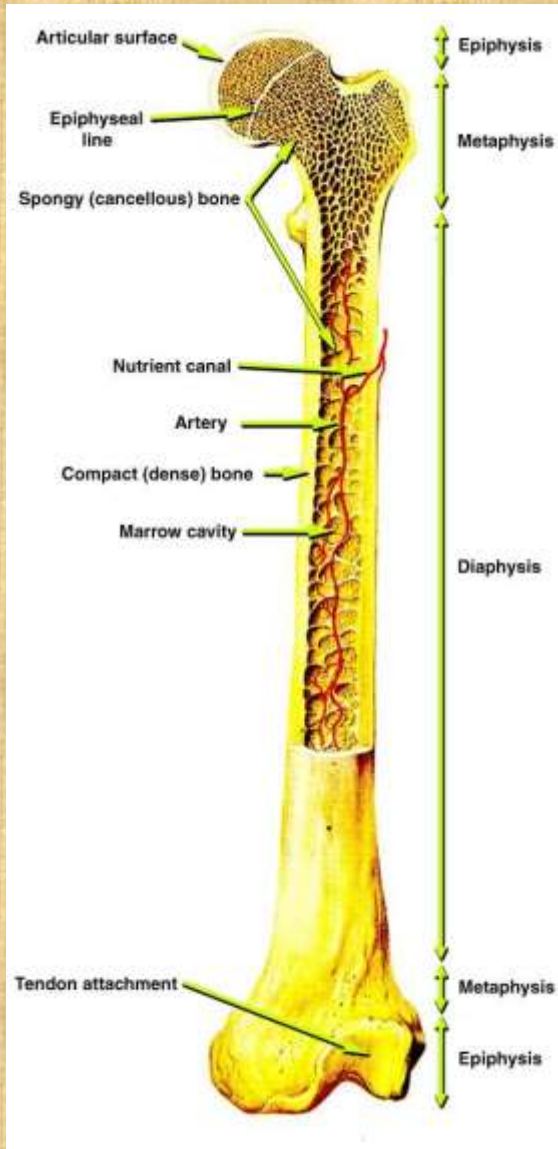
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Forearm Fracture

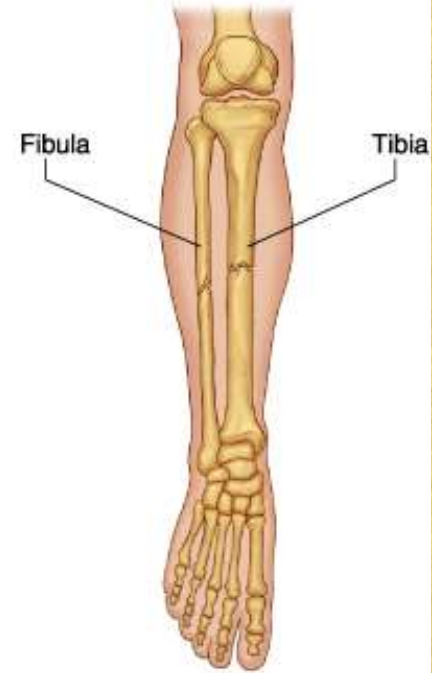


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Epiphyseal fracture

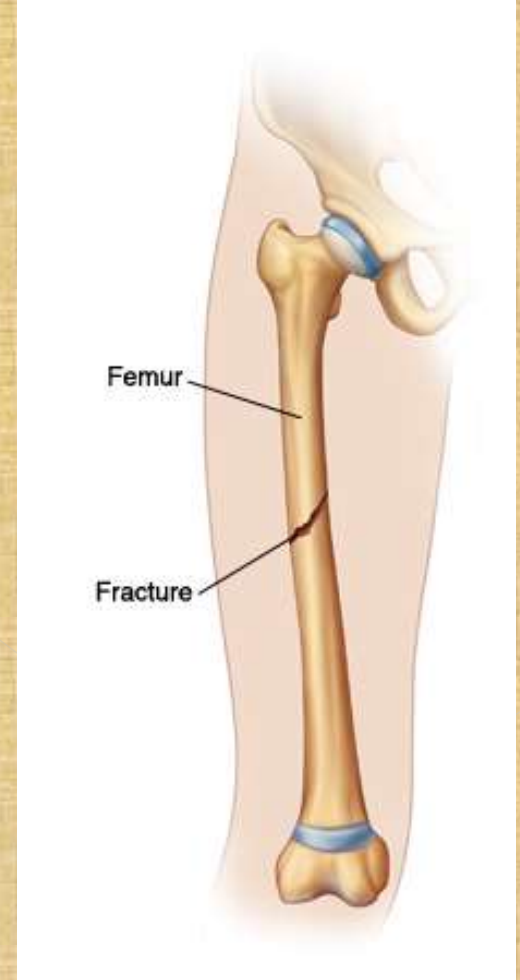
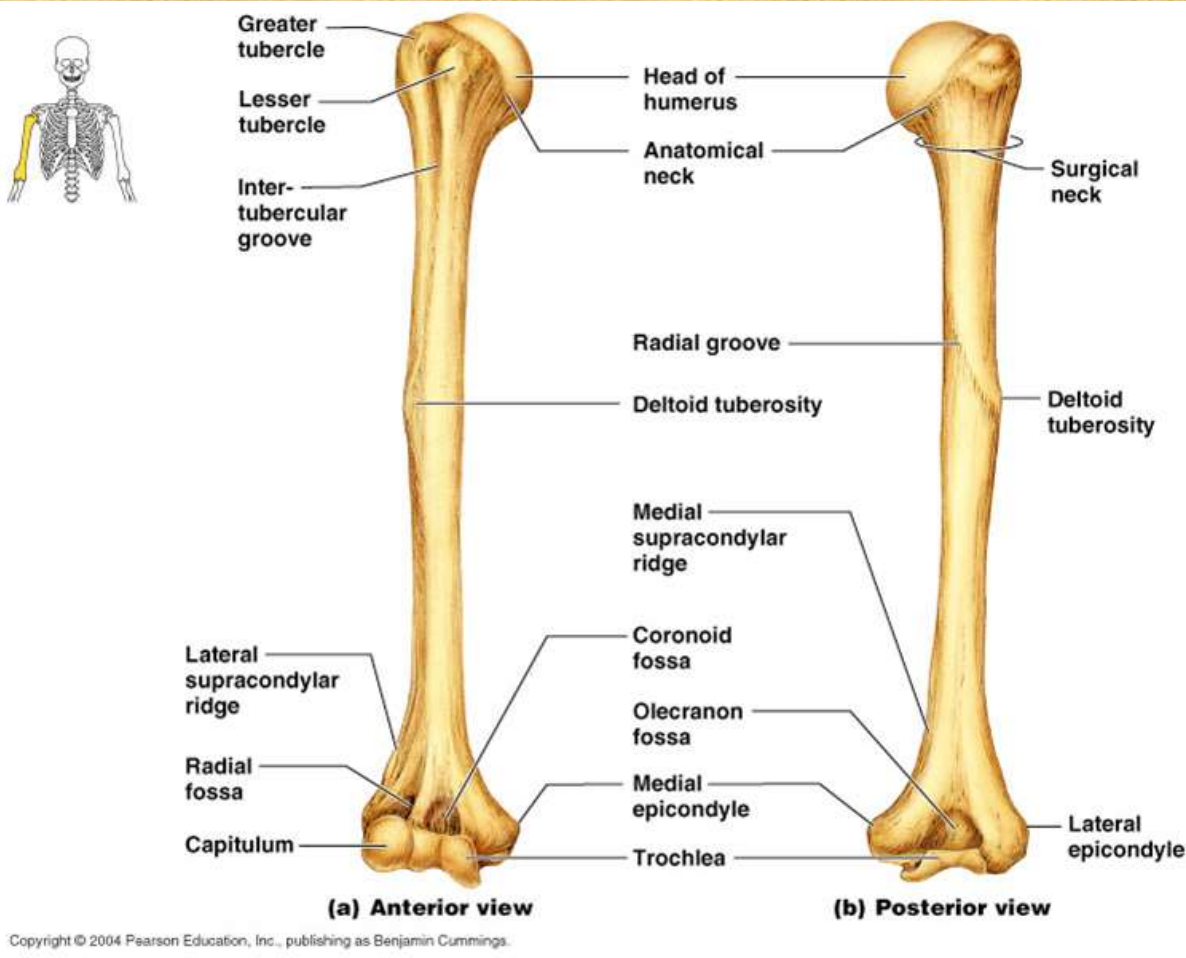


Tibia, fibula fracture



Supracondylar, Lateral condylar, Medial epicondylar fractures

Femur fracture



COMMON SITES OF FRACTURE IN CHILDREN

- > *Supracondylar fracture*-accounts for 60% of elbow fractures.
 - > *Lateral condylar fracture*-2nd most common
 - > *Medial epicondylar fractures*- 3rd most common elbow fractures.
4. **Femur fractures**- occurs at mid shaft of the femur.
- > Due to motor vehicle accidents.
5. **Tibial fracture and ankle fracture**- occurs in tibial and fibular shaft.
- > Due to motor vehicle accidents and sports injury.
 - > Ankle fracture may occur in adolescents due to direct trauma.

Contd....

OTHER SITES OF FRACTURE IN CHILDREN

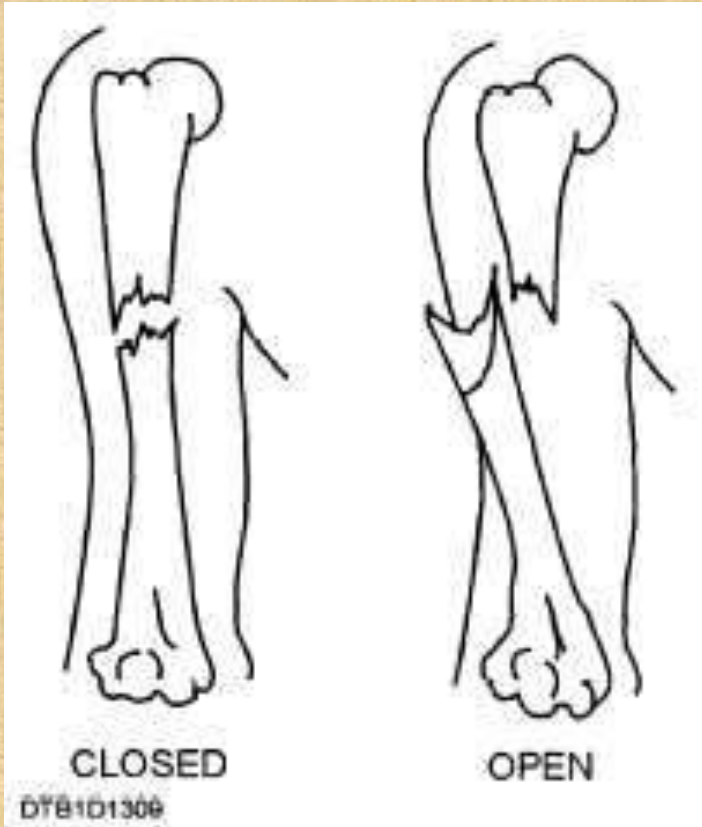
- **Spinal injury-** may occur due to fall from height (roof, trees) and automobile accidents.
- **Pelvis and hip fracture-** may occur due to motor vehicle accidents, bicycle accidents and fall from height.
- **Foot fracture-** may occur following direct trauma, jumping, or twisting injury involving metatarsals.
- **Clavicular fracture-** may occur due to fall or direct trauma.

COMMON TYPES OF FRACTURE IN CHILDREN

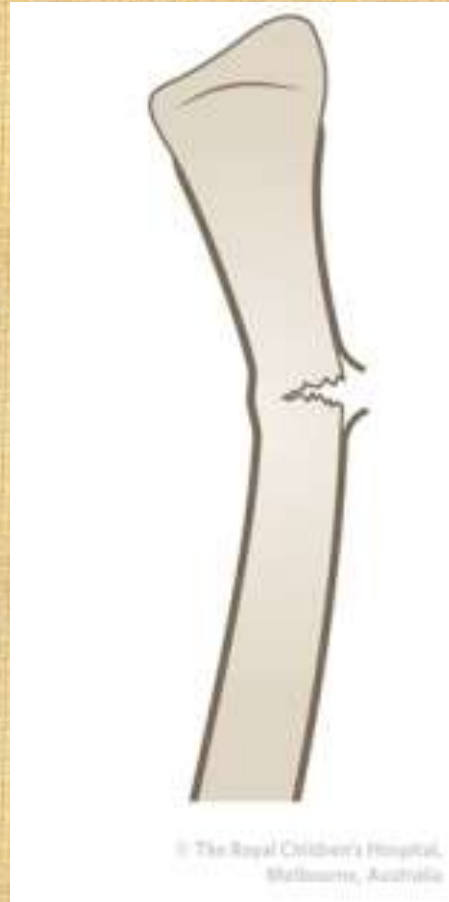
- a) **Open fracture**- it is a type of fracture in which a wound through the adjacent or overlying soft tissues communicates with the site of the break. It is also termed as compound fracture.
- b) **Closed fracture**- the fracture that does not produce an open wound in the skin.
- c) **Plastic deformation (bending)**- a bending of the bone occurs in such a manner as to cause a microscopic fracture line that does not cross the bone. It is unique to children and commonly found in the ulna.

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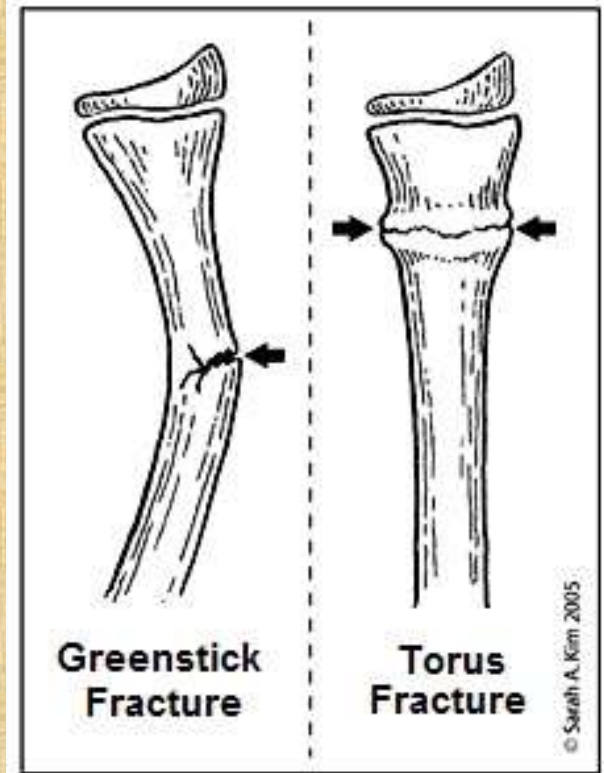
Open, closed fracture



Bending fracture



Buckle (torus), Greenstick fracture



COMMON TYPES OF FRACTURE IN CHILDREN

- d) **Buckle (torus) fracture**- A fracture occurring on the tension side of the bone near the softer metaphyseal bone. It crosses the bone and buckles the diaphyseal bone on the opposite site causing a bulge. The bone cortex is not broken but it is buckled.
- e) **Greenstick fracture**- A fracture in which the bone is partially bent and partially broken, as a green stick breaks. The bone is bent and the fracture begins but does not entirely cross through the bone.

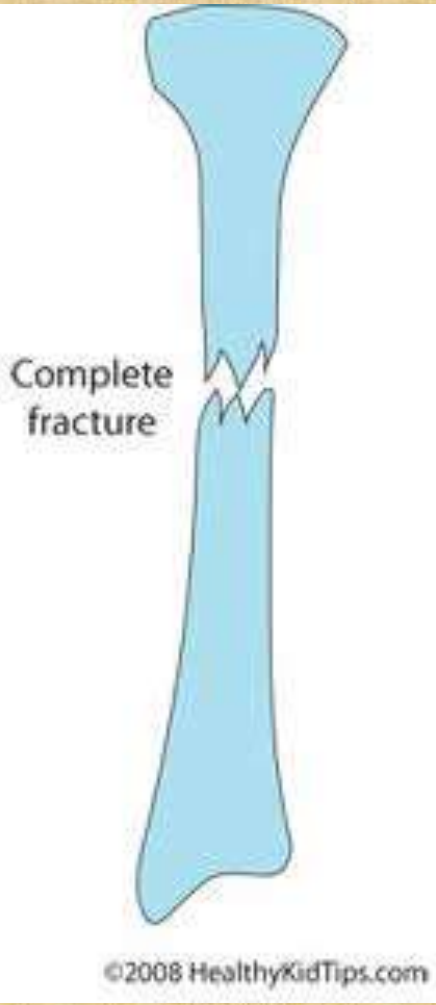
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COMMON TYPES OF FRACTURE IN CHILDREN

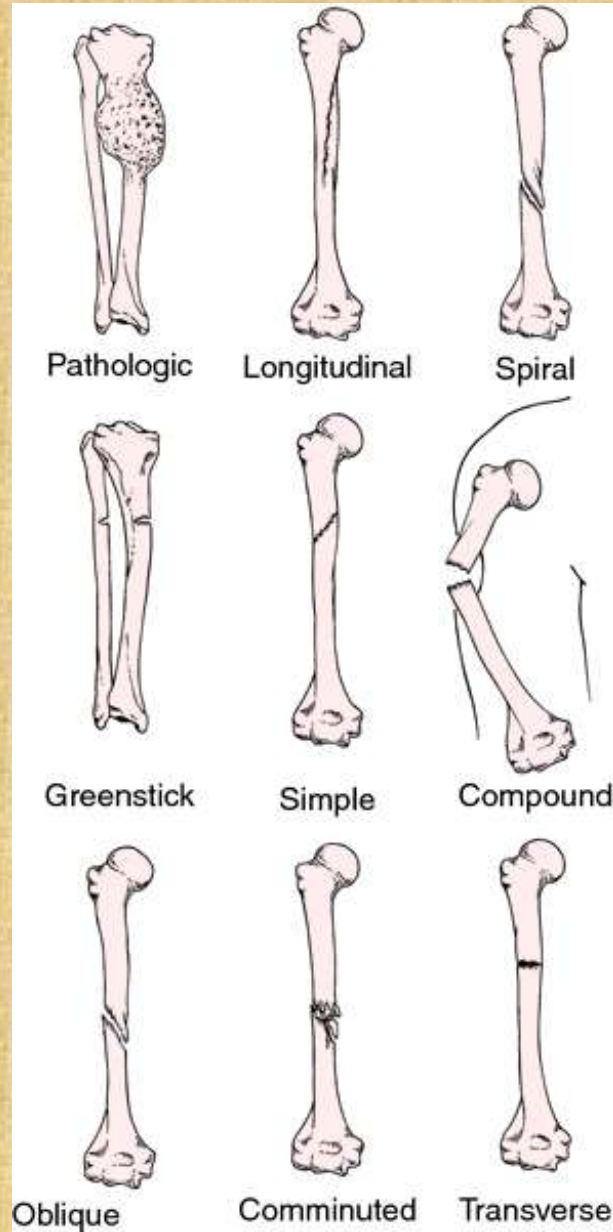
- f) **Complete fracture**- a fracture in which the bone is completely broken, neither fragment is connected to the other. This fracture can be spiral, oblique, transverse and epiphyseal.
- **Spiral fracture** occurs from a rotational force that follows a helical line.
 - **Oblique fracture** occurs diagonally across the diaphysis.
 - **Transverse fracture** occurs when the fracture line is at right angles to the long axis of the bone and usually diaphyseal.

Contd...

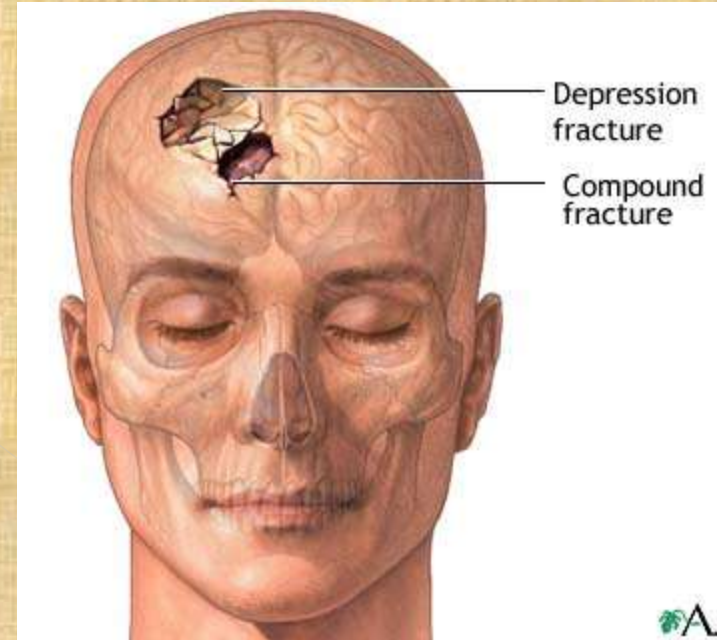
Complete fracture



Complete fracture- types



Depressed fracture



COMMON TYPES OF FRACTURE IN CHILDREN

- ◉ **Epiphyseal fracture** occurs as a separation of the epiphysis from the bone between the shaft of the bone and its growing end.

OTHER TYPES OF FRACTURES IN CHILDREN:

- ❖ **Pathological fracture-** due to weakening of the bone structure by pathological processes such as neoplasm, osteomyelitis etc.
- ❖ **Depressed fracture-** found in neonates due to fracture of the skull, in which a fragment of fractured bone is depressed.

CLINICAL MANIFESTATIONS

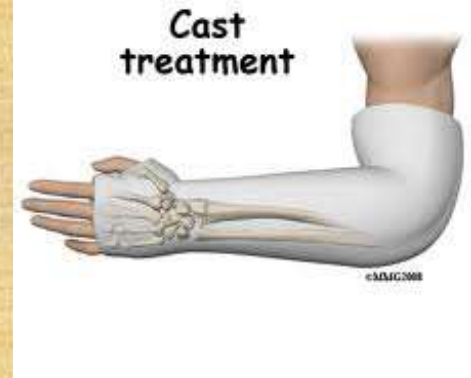
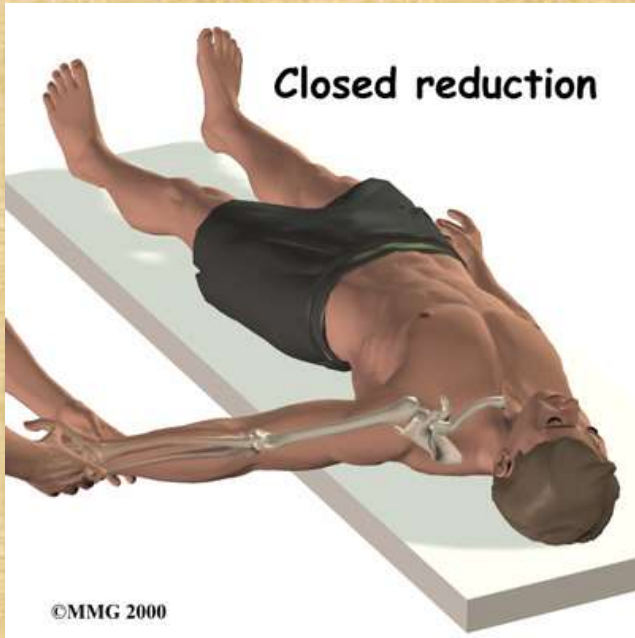
- Inability to use the injured part (standing, walking, moving)
- Presence of deformity (visible or palpable)
- Pain
- Tenderness
- Local swelling
- Bruising
- Unusual mobility
- Shortening of the part
- Crepitus or grating sound due to movement between fractured bone fragments
- Muscular spasm
- History of trauma or injury
- In pathological fracture, history of pathological conditions is present.

DIAGNOSTIC EVALUATION

- History of trauma or chronic diseases (osteomyelitis, carcinoma) should be obtained.
- Clinical examination
- Radiological studies-
 - > X-ray
 - > CT scan
 - > MRI
 - > Bone scan
 - > Fluoroscopy
 - > Vascular assessment

MANAGEMENT

- Immobilization of the fracture part by plaster cast, splint or brace.
 - Closed reduction followed by a period of immobilization in the cast or splint.
 - Closed reduction and percutaneous pinning followed by immobilization.
 - Closed or open reduction and application of external fixators.
 - Open reduction with or without internal fixation followed by immobilization in a cast or splint.
 - Traction for slow reduction of fracture followed by a period of immobilization.
- Contd...**



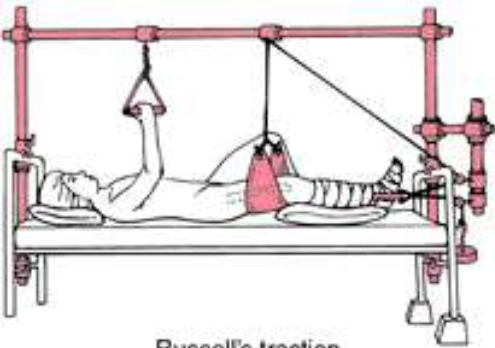
Open Reduction and Internal Fixation of Left Hip Fracture

<p>Pre-operative Condition</p> <p style="text-align: left; font-size: small;">Anterior view</p>	<p>Post-operative Condition</p>
<p style="font-size: x-small; text-align: center;">An 8 cm incision is made over the left hip. Subcutaneous dissection is carried out to expose the greater trochanter.</p>	<p style="font-size: x-small; text-align: center;">The intertrochanteric fracture is reduced and fixed with a side plate and multiple screws and Tvedek sutures.</p>

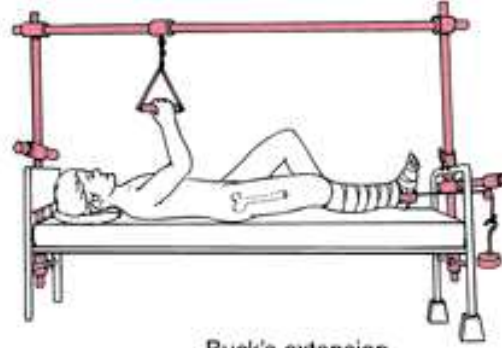
MANAGEMENT

- Specific traction used in children can be listed as following:
 1. **Bryant's traction**: it is indicated in fractures of femur and congenital dislocation of hip.
 2. **Russel's traction**: it is applied to reduce the fractures of the femur or hip or specific types of knee injuries or contractures.
 3. **Buck's extension**: it is used to prevent or to correct knee and hip contractures, to rest the limb, to prevent spasm of injured muscles or joint or to immobilize the fractured limb temporarily.

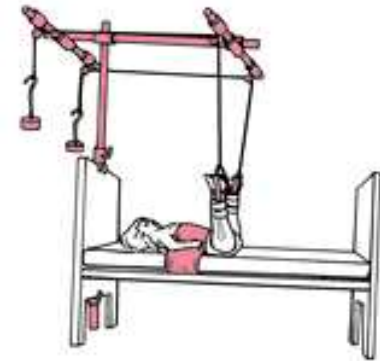
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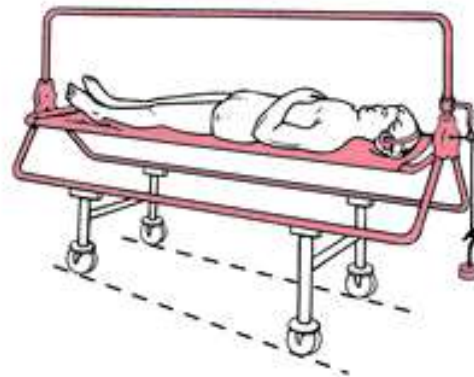
Russell's traction



Buck's extension



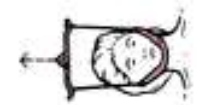
Bryant's traction



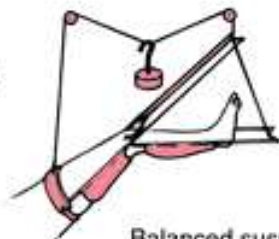
Skull tongs and turning frame



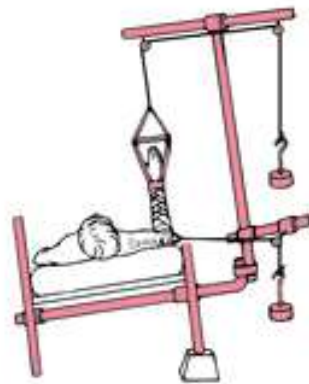
Head halter



Top view

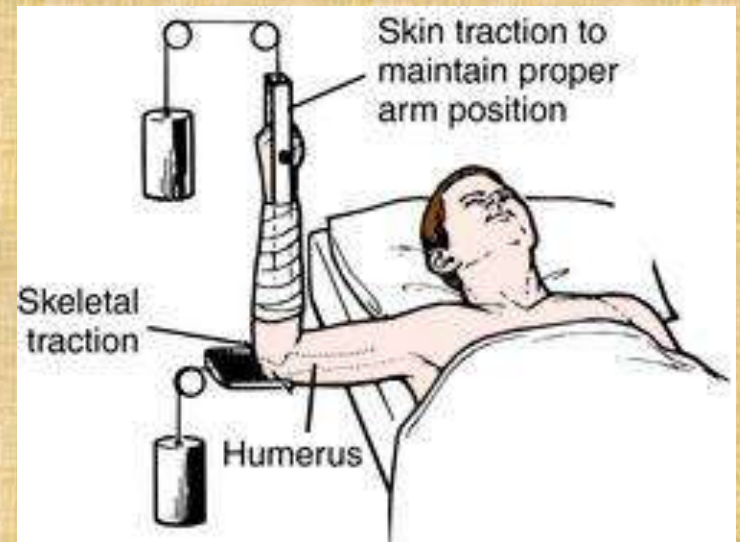


Balanced suspension

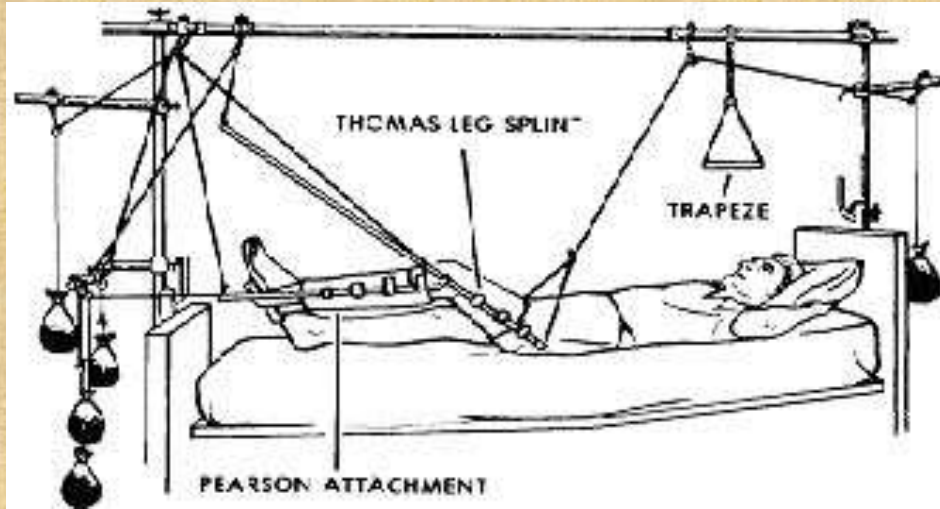


Lateral skeletal traction

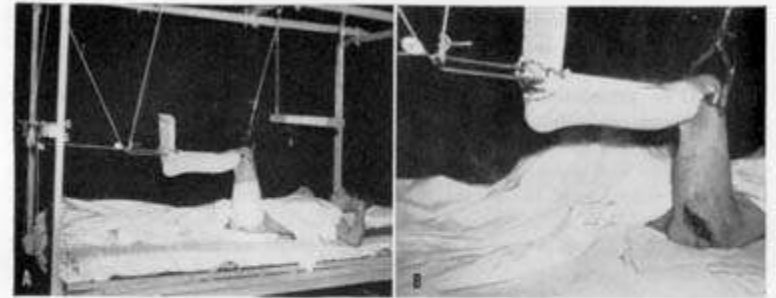
Dunlop's traction



Balanced suspension traction



90 degree-90 degree traction



U. S. Army photos

FIGURE 59.—Skeletal traction by 90-90-90 suspension method for fracture of left femur. A. Traction applied. B. Same as view A. Note ease of access to high posterior wound of thigh. This position, because of its possible adverse effect on the knee, should not be maintained for more than 2 or 3 weeks.



Cervical traction

MANAGEMENT

4. **Balanced suspension with *Thomas splint or Pearson attachment***: it is used in older children and adolescents or fractured femur to rest the injured lower extremity or joint.
5. **90 degree-90 degree traction**: it is indicated in fractured femur when skin traction is inadequate.
6. **Dunlop's traction**: it is used to treat fractures of the humerus and injuries in or around the shoulder girdle.
7. **Cervical traction**: it is applied for stabilization of spinal fractures or injuries or in muscle spasms and muscle contractures.

Contd...

MANAGEMENT

- Preoperative preparation and post operative care in case of open reduction should emphasize on prevention of infections and other complications.
- Symptomatic treatment with analgesics, antibiotics should be administered as prescribed.
- Restoration of complete function of fractured part by physical therapy and exercise.
- Parents need adequate explanation and instructions to continue the management.
- Special instructions to be given regarding external fixators and internal fixation devices.
- Emotional support
- Diversional therapy and continuation of school activities during illness.

COMPLICATIONS

- Infections
- Avascular necrosis
- Vascular injuries
- Nerve injuries and palsies
- Visceral injuries
- Tendon and joint injuries
- Fat embolism
- Delayed union
- Non-union or malunion
- Compartment syndrome
- Osteoarthritis
- Shortening due to epiphyseal arrest
- deformity

NURSING MANAGEMENT

Nursing diagnoses

- Pain related to tissue injury and muscle spasms due to fracture.
- Altered tissue perfusion related to swelling and immobilization.
- Impaired skin integrity related to cast/traction/other orthopedic devices.
- Impaired physical mobility related to fracture and immobilization.

Contd...

Nursing diagnoses

- Self care deficit related to injury/fracture or surgery or immobilization by external orthopedic devices.
- Risk for infections related to trauma or wound or surgical interventions.
- Risk for peripheral neurovascular dysfunction related to cast, splint and orthopedic appliances.
- Ineffective coping related to hospitalization and long term illness with its possible complications.