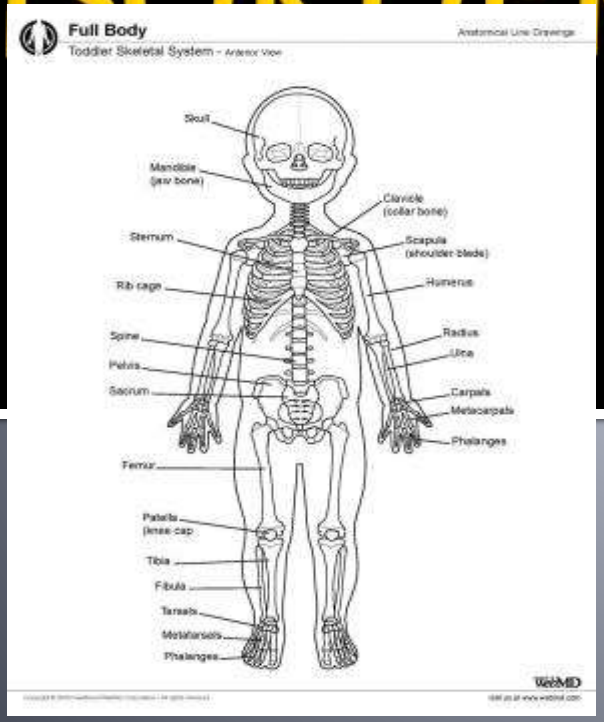

HELLO

ORTHOPEDIC DISORDERS



BY,
Ms. SHEEN S P BELSYLIN
M.SC NURSING 1ST YEAR
CMC, VELLORE

GENERAL OBJECTIVE

- By the end of the class students are able to gain knowledge about Club foot, Congenital Hip Dysplasia and Fracture.

SPECIFIC OBJECTIVES

- Students are able to –
- Define Club foot, Congenital Hip Dysplasia and Fractures.
- Students explain the incidence and global burden.
- List the types of Club foot, Congenital Hip Dysplasia and Fractures.
- Enumerate the etiology of Club foot, Congenital Hip Dysplasia and Fractures.

- Explain the pathophysiology of Club foot, Congenital Hip Dysplasia and Fractures.
- List down the clinical features of Club foot, Congenital Hip Dysplasia and Fractures.
- Describe the diagnostic tests used to diagnose Club foot, Congenital Hip Dysplasia and Fractures.
- Brief the management of Club foot, Congenital Hip Dysplasia and Fractures.

Pictogram

CLUB FOOT

INTRODUCTION

- Other name- Congenital Talipes Equino Varus.
- It is a complex deformity of the ankle and the foot, involving abnormalities of bony architecture and soft tissues.

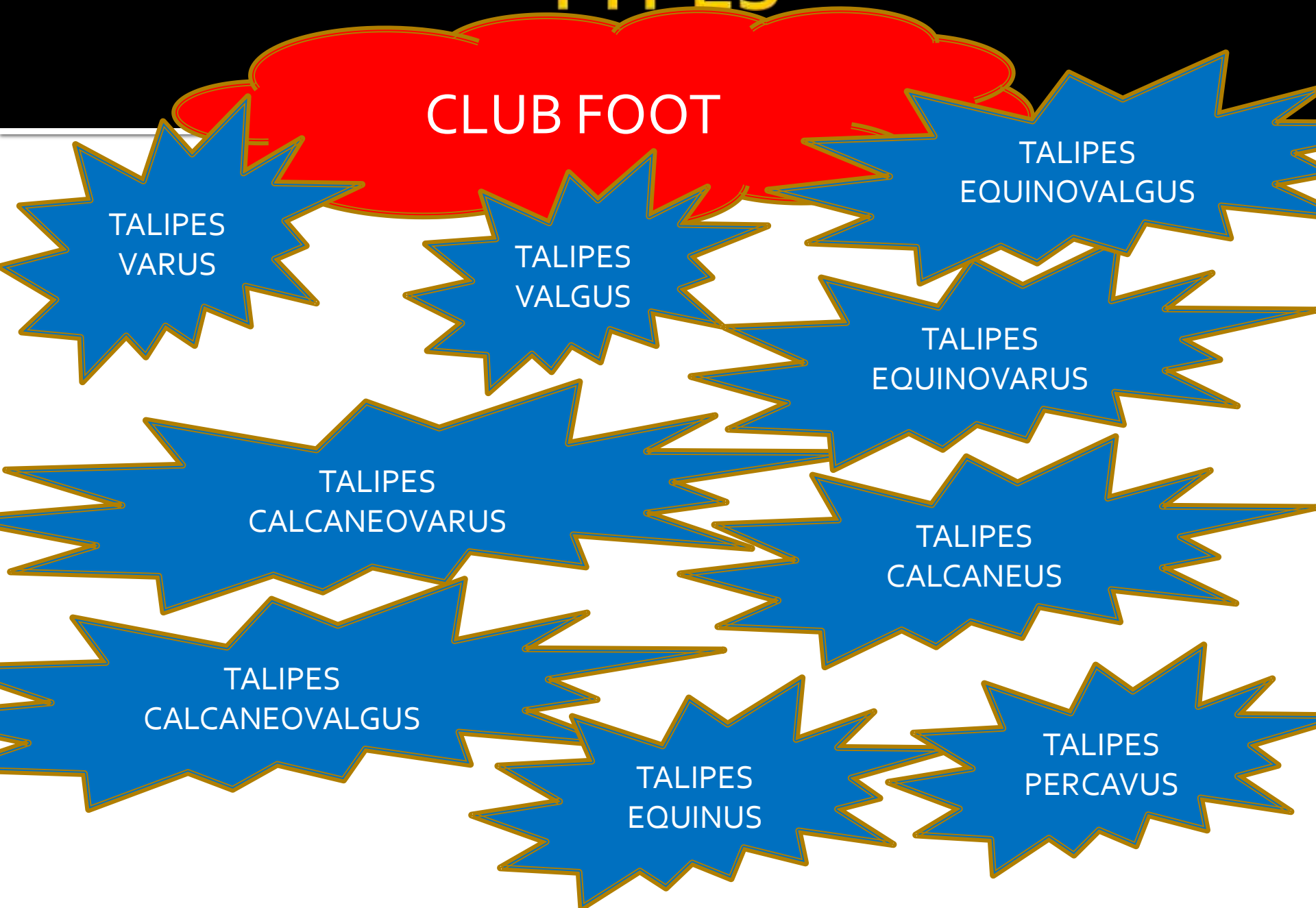
DEFINITION

- A deformity in which the foot is twisted out of its normal shape or position in utero and is fixed, it can not be moved to an autocorrected position.
- Talipes- foot and ankle
- Varus- bending forward
- Valgus- bending outwards
- Equinus- toes are lower than the heels
- Calcaneus- toes are higher than the heels

INCIDENCE

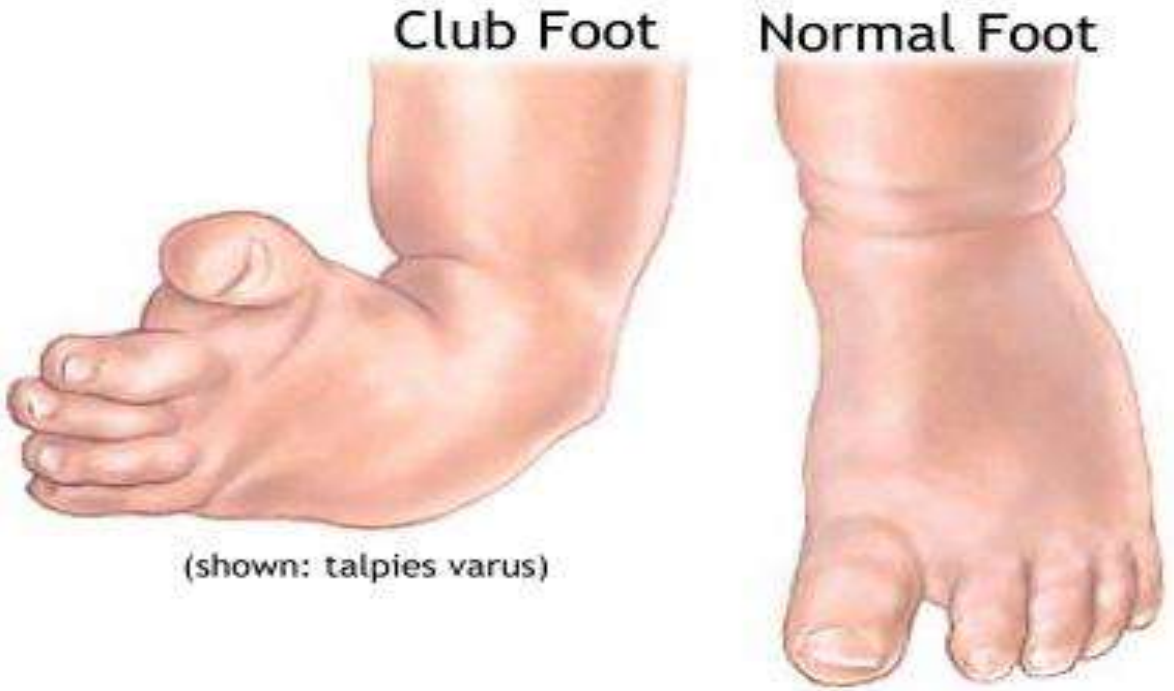
- 1 in 700 to 1 in 1000 live births
- Boys > Girls
- 1,50,000 – 2,00,000 babies / year

TYPES


CLUB FOOT
TALIPES VARUS
TALIPES VALGUS
TALIPES EQUINOVALGUS
TALIPES EQUINOVARUS
TALIPES CALCANEOVARUS
TALIPES CALCANEUS
TALIPES CALCANEOVALGUS
TALIPES EQUINUS
TALIPES PERCAVUS

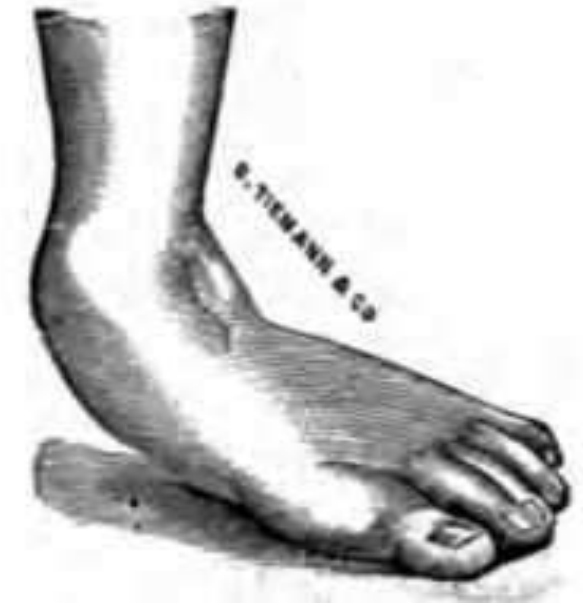
1. TALIPES VARUS

Due to the heels being turned inwards from the midline of the leg only the outer portion of the sole rests on the floor.



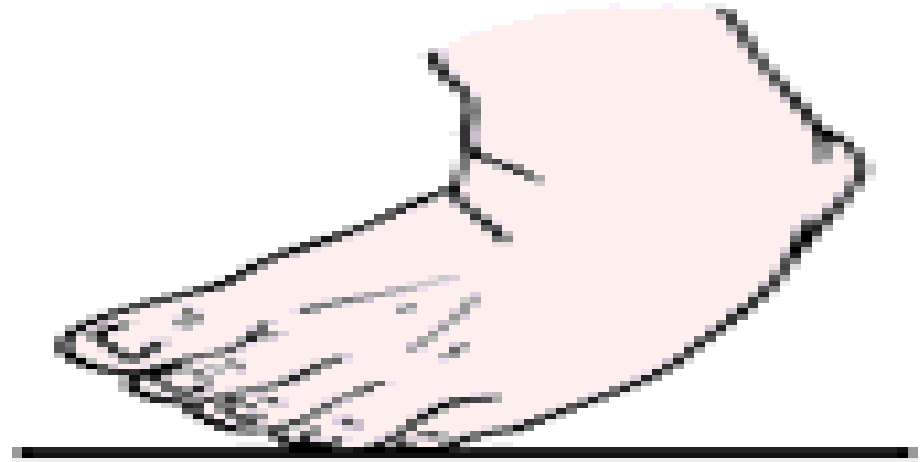
2. TALIPES VALGUS

Due to the heels being turned outwards from the midline of the leg only the inner side of the sole rests on the floor.



3.TALIPES EQUINOVALGUS

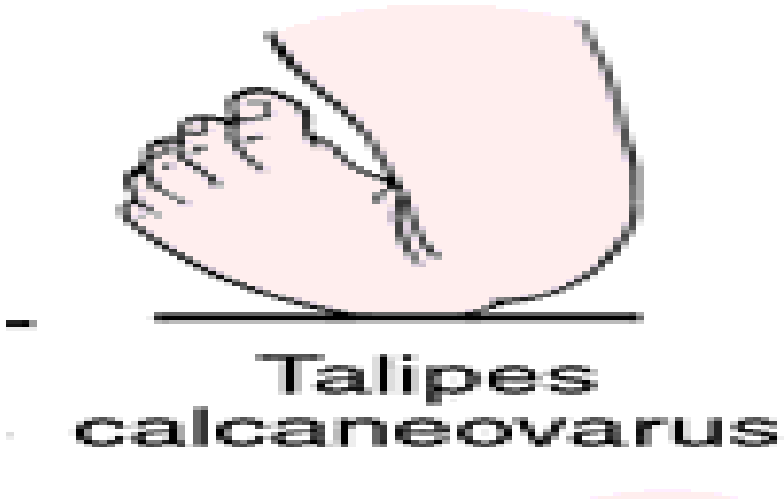
- Due to the heels being elevated and turned outwards from the midline from the midline of the body



Talipes equinovalgus

4. TALIPES CALCANEOVARUS

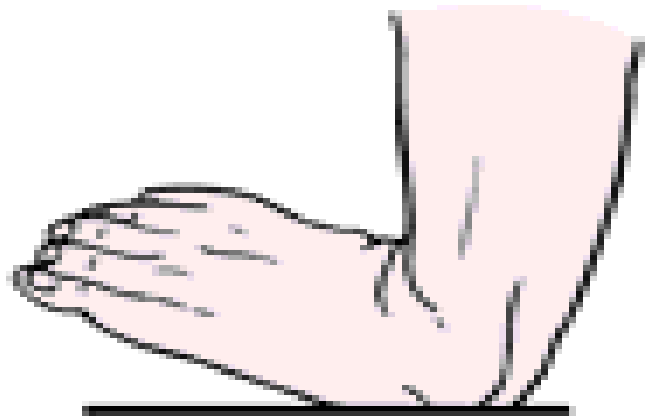
Due to the heels being turned towards the midline of the body and the anterior part of the foot being elevated only the heel rests on the floor.



Talipes calcaneovarus

5. TALIPES CALCANEOVALGUS

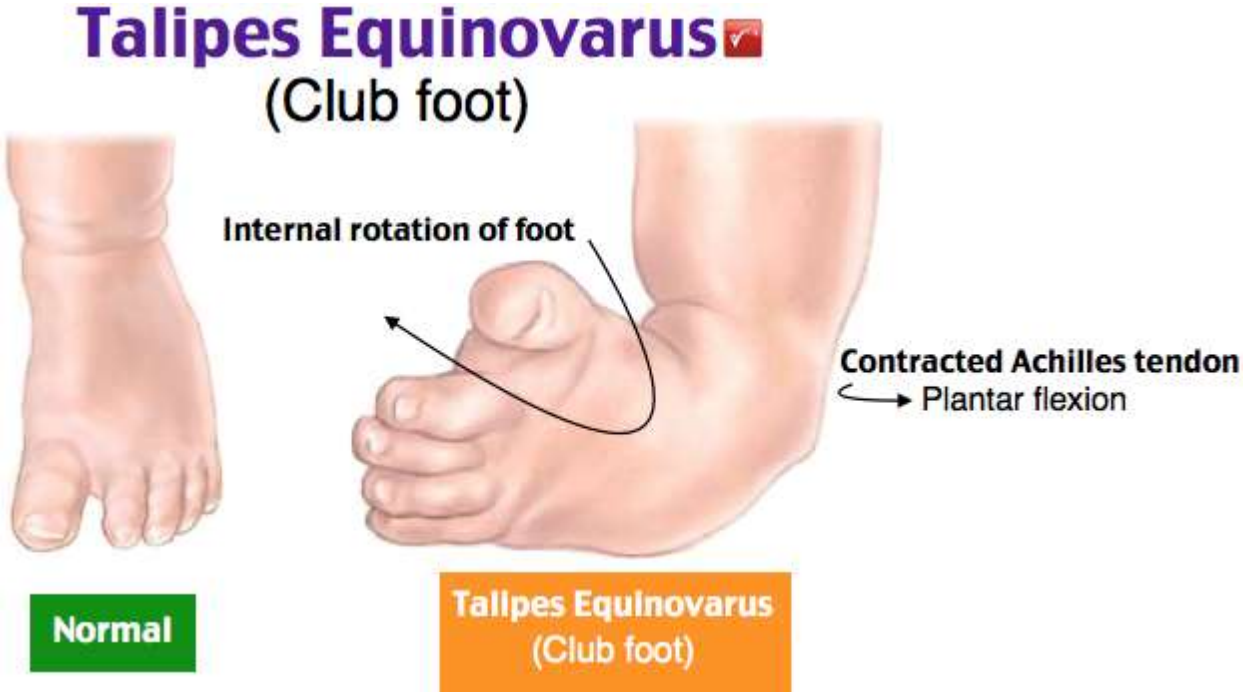
The heel is turned outside from the midline of the body and the anterior part of the foot is elevated on the outer border.



Talipes calcaneovalgus

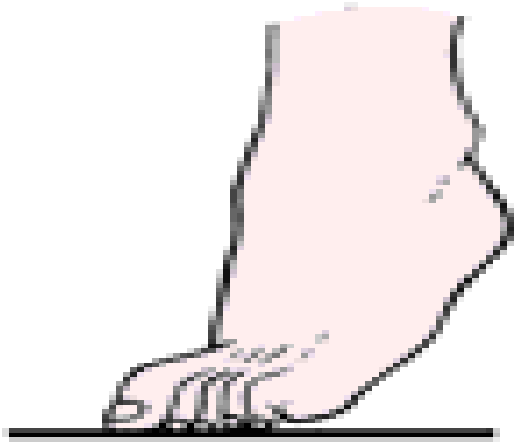
6. TALIPES EQUINOVARUS

Foot is in plantar flexion and deviated medially. Heel is elevated and foot is twisted inward.



7. TALIPES EQUINUS

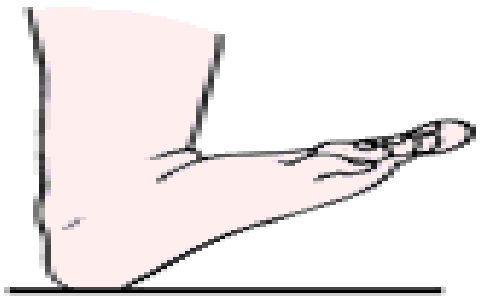
The toes are lower than the heel, foot is extended and the child walks on toes.



Talipes equinus

8.TALIPES CALCANEUS

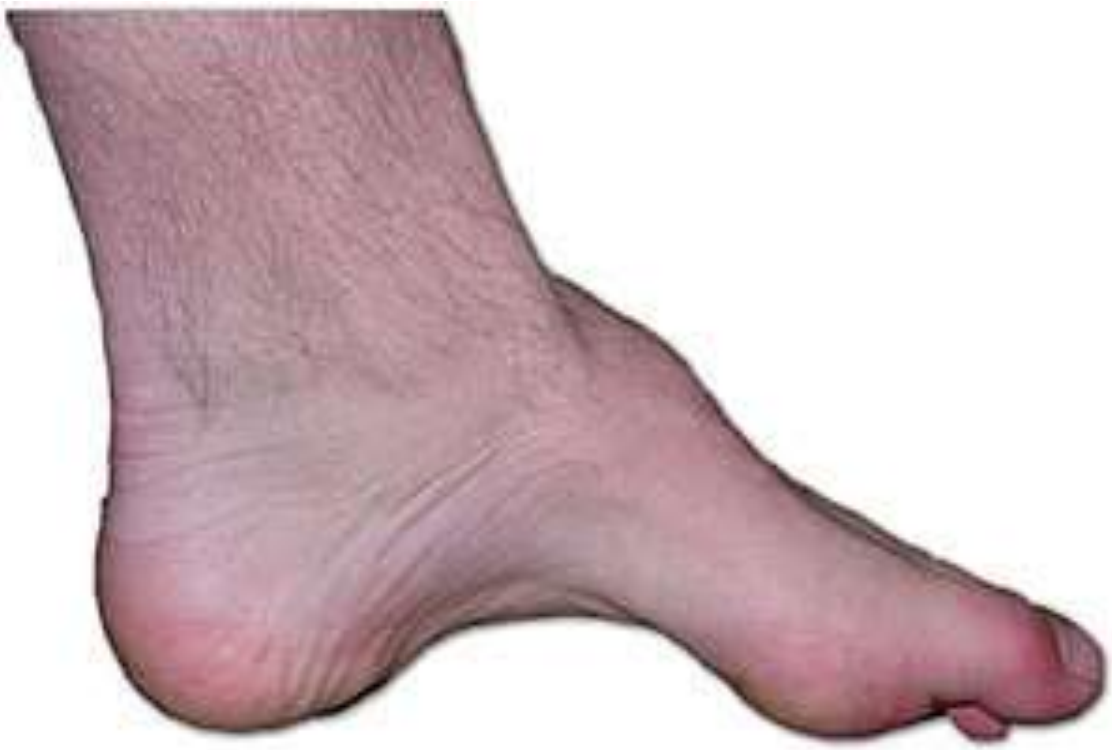
Toes are higher than heel, foot is flexed, heel alone touches the ground causing the child to walk on the inner side of the heel, which often follows infantile paralysis of the muscle of Achilles Tendon.



Talipes calcaneus

9. TALIPES PERCAVUS/ ARCUATE

When there is excessive plantar curvature of the foot.



ETIOLOGY

- Arrested development during the 9th and 10th weeks of embryonic life, when the feet are formed.
- Deformed talus
- Shortened Achilles tendon
- Genetic predisposition
- If monozygotic twin has club foot, the second twin has 32% chances of having it.
- Consanguineous marriage- 2%
- Second degree consanguineous marriage- 0.6%

PATHOPHYSIOLOGY

AMNION FORMS CONSTRICTIVE BANDS AROUND THE FEET IN UTERO (AMNIOTIC BANDING)

CUTTING OF THE CIRCULATION TO THE FEET

ABNORMAL/ ARRESTED DEVELOPMENT

CLUB FOOT

ARRESTED FETAL DEVELOPMENT OF SKELETAL & SOFT TISSUE DURING GESTATIONAL WEEKS 9-10, WHEN FOOT DEVELOPMENT OCCURS.

ABNORMAL NEUROMUSCULAR DYSFUNCTION/ MUSCLE ABNORMALITIES

DEFECT IN THE PRIMARY GERM PLASMA

ANKLE DYSPLASIA

CLINICAL FEATURES

- Adduction of the forefoot
- Contracture of the Achilles tendon leading to plantar flexion of the foot
- Foot is also inverted so the lateral border is directed downwards.
- Thin and atrophic calf muscles
- Affected development of lower leg.

DIAGNOSTIC EVALUATION

- Physical examination
- X- ray
- Prenatal diagnosis by ultrasound

MANAGEMENT

Goal of management-

To achieve a painless, plantigrade and stable foot.

Stages of treatment-

1. Correction of the deformity
2. Maintenance of the correction until normal balance is regained
3. Follow up

NON-SURGICAL MANAGEMENT

- **Denis- Browne Splint**
- ✓ Splintage begins at 2-3 days after birth.
- ✓ It is made of 2 foot plates attached to a crossbar.
- ✓ The infant's feet may be attached to the splint with adhesive tape/ well fitted shoes.
- ✓ 3 months
- ✓ Protect the feet with socks if shoes are worn
- ✓ Check skin for reddened areas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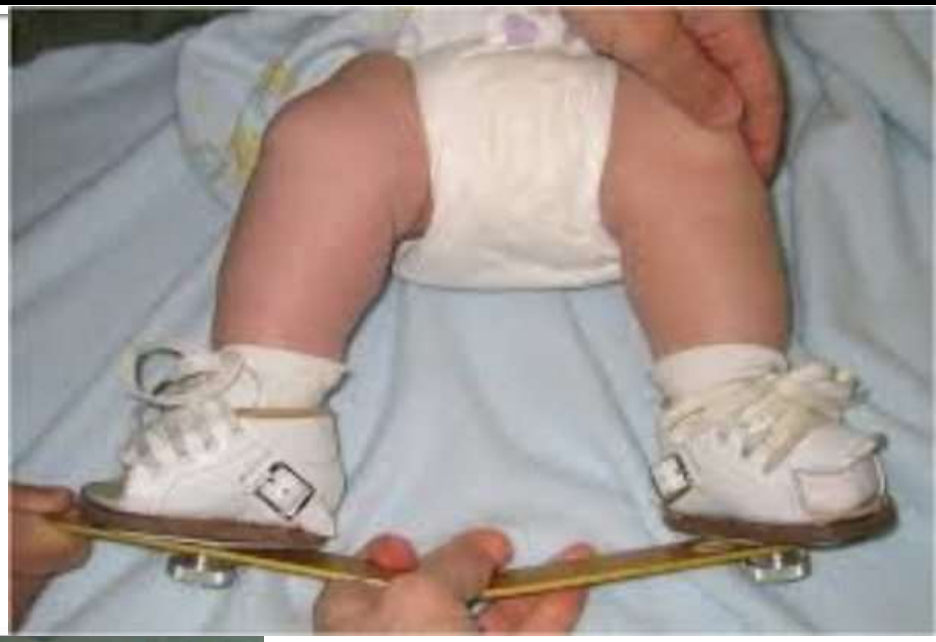


- **Manipulation by Ponseti method**
  - ✓ Daily or weekly manipulation with casting or taping and splinting of affected extremity.

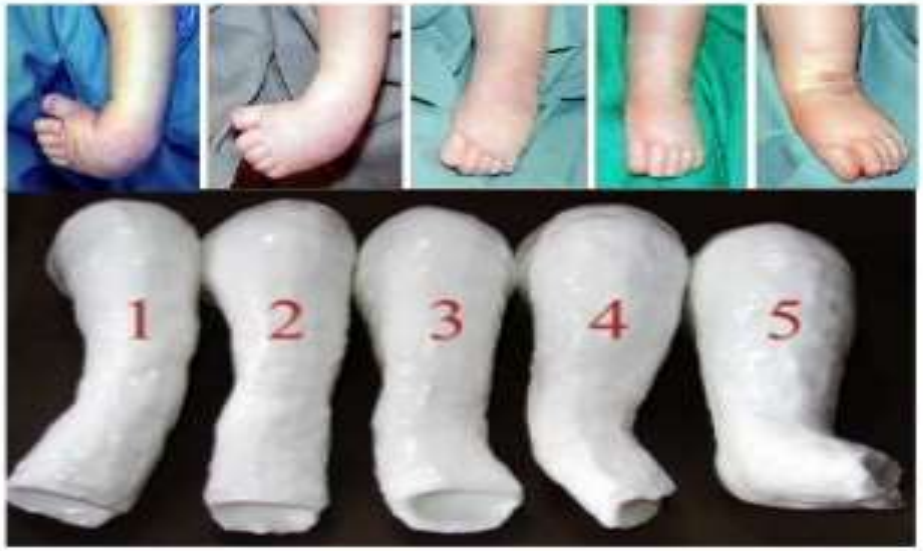
- **Cast**
  - ✓ Gradual stretching of tight muscles
  - ✓ Contraction of previously relaxed muscles until overcorrection position
  - ✓ Change cast every 2-3 weeks

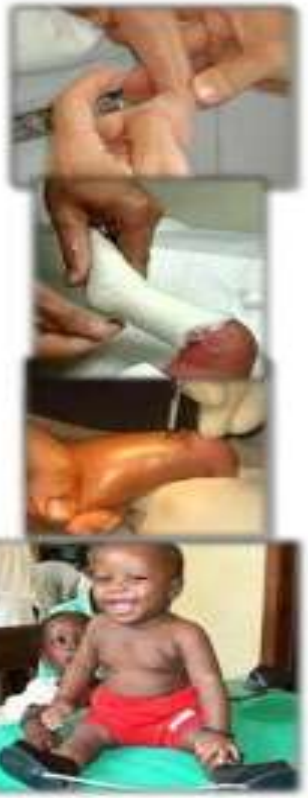
The Ponseti Method Treatment of Clubfoot

Ignacio V. Ponseti
(1914-2009)

The PONSETI METHOD

- Gentle manipulation and stretching
- Series of precisely applied plaster casts
- Percutaneous tenotomy (most cases)
- Wear brace while sleeping to age four





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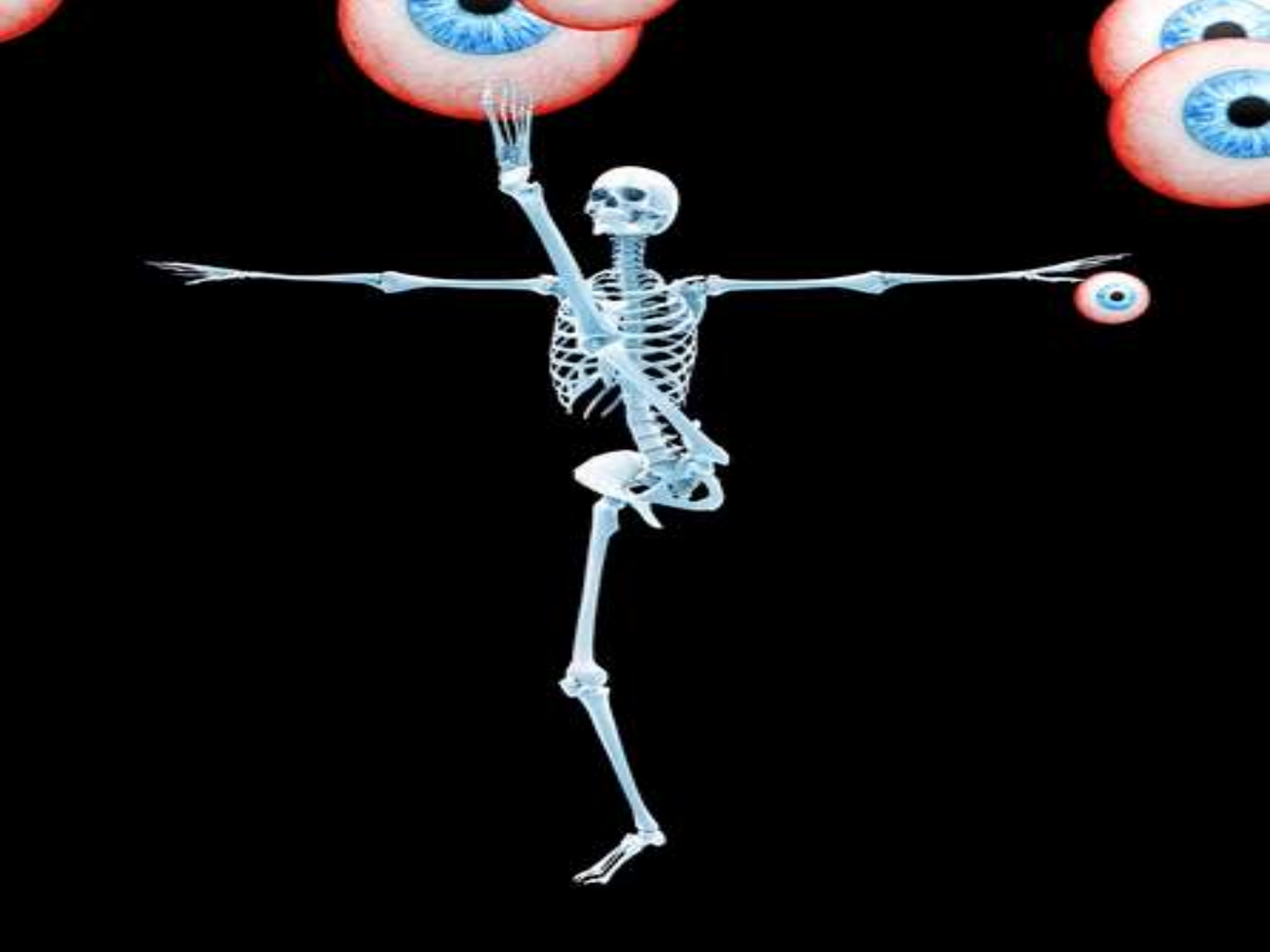
SURGICAL MANAGEMENT

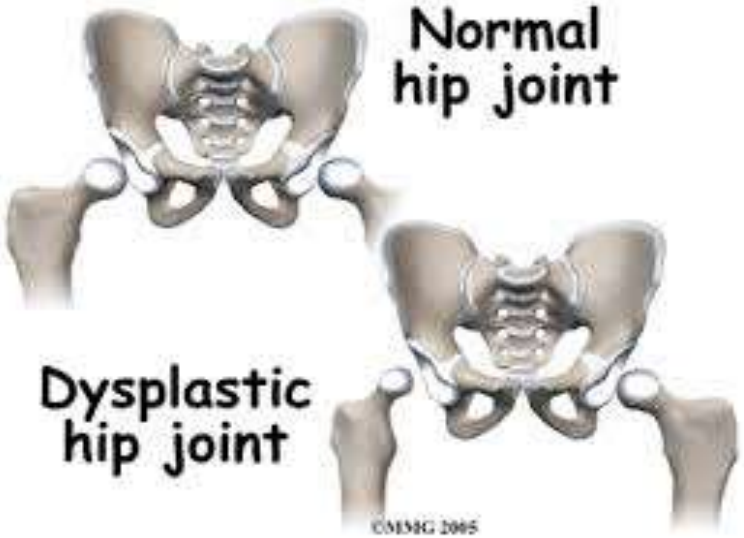
- ♣ Pin fixation
- ♣ Tenotomy (release of Achilles tendon)
- ♣ Other structures to be released/ lengthened are-
- ✓ Tendon sheath of the muscle crossing the subtalar joint
- ✓ Posterior ankle capsule and deltoid ligament
- ✓ Inferior tibiofibular ligament
- ✓ Fibulocalcaneal ligament
- ✓ Capsules of the subtalar joint
- ✓ Plantar fascia and intrinsic muscles



CONGENITAL HIP DYSPLASIA

DEFINITION

- Refers to a variety of conditions in which the head of femur and acetabulum cavity are improperly aligned and the femur head lies outside the hip socket/ acetabulum cavity.
- It could be unilateral/ bilateral



INCIDENCE

- 1 in 1000 live births
- Female 8 times > male
- Bilateral in 20% cases
- 30-50% breech presentation
- Caucasian children > other children
- 60% left hip
- 20% right hip
- 20% both hips

RISK FACTORS

- Prenatal factors-
  - Maternal hormone imbalances
  - Intrauterine positioning- breech
  - Large baby
  - Multiple fetuses
  - Oligohydramnios

- Genetic factors

TYPES

Congenital Hip Dysplasia

- Typical
- Teratologic

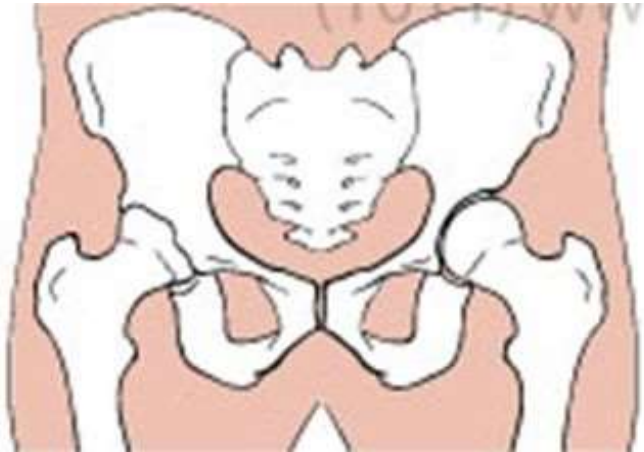
1) Typical Congenital Hip Dysplasia-
   In this the infant is neurologically intact.

2) Teratologic Congenital Hip Dysplasia-
   Involves neuromuscular defects like Arthrogryposis (congenital joint contracture in two/ more areas of the body) ; or myelodysplasia (type of cancer).

DEGREES

1. Preluxation / Acetabular dysplasia-

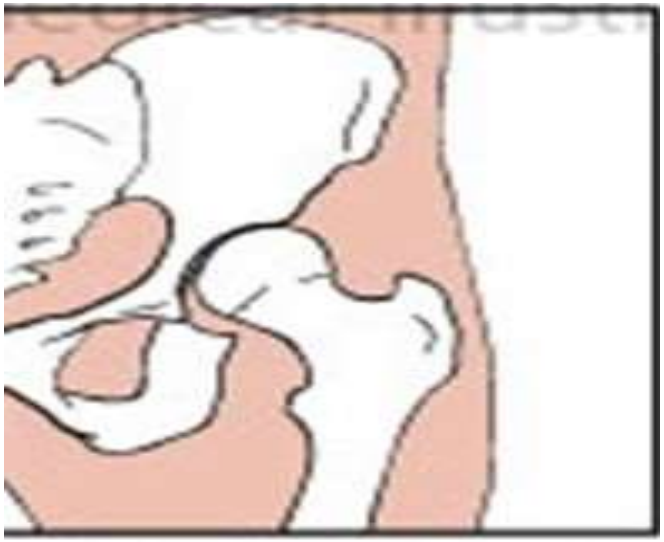
- Mildest form
- Dysplasia reflects delay in acetabular development
- Osseous hypoplasia of the acetabular roof, which is oblique and shallow
- Cartilaginous roof is comparatively intact
- Femoral head remains in the acetabulum.



2. Subluxation-

- Largest percentage of CHD.
- Incomplete dislocation/ disclosable hip
- Intermediate state in the progression from primary dysplasia to complete dislocation
- Femur head in contact with acetabulum

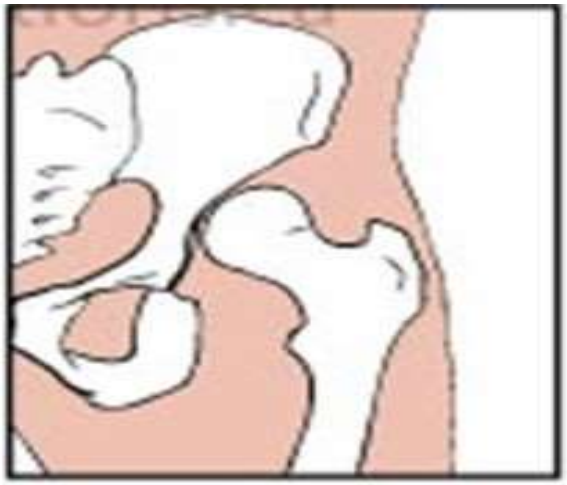
- Stretched capsule or ligament of femur causes partial displacement of femur head.
- Pressure on the cartilaginous inhibits ossification
- Flattening of the socket



Subluxation

3. Dislocation-

- Most severe form
- Femur head loses contact with acetabulum
- Displaced posteriorly and superiorly
- Round ligament of femur is elongated.



Dislocation

PATHOPHYSIOLOGY

- Structures of hip joint i.e, acetabulum, femoral head & capsule are not properly developed

- Partial/ complete dislocation of femoral head from the shallow acetabular cavity

CLINICAL MANIFESTATIONS

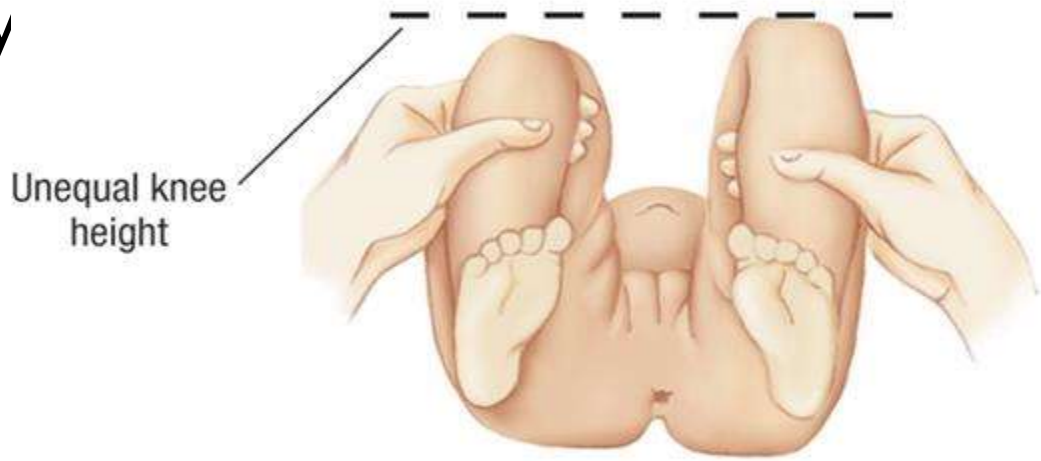
- In infants-
  - Shortening of legs
  - Asymmetry of legs
  - Asymmetry of gluteal folds of skin, when infant is in prone position.
  - Limited range of motion in affected hip.
  - Short femur on affected side.
  - After 3 months of age the affected leg may turn outward/ become shorter than other leg.

- In older children-
  - Unequal length of legs
  - Gait abnormalities- toe walking or limping

DIAGNOSTIC EVALUATION

1. Ultrasound
2. X- ray
3. GALEAZZI SIGN-

It is demonstrated by placing both hips at 90 degree of flexion and comparing the height of knees and looking for asymmetry. This can be performed in older children only

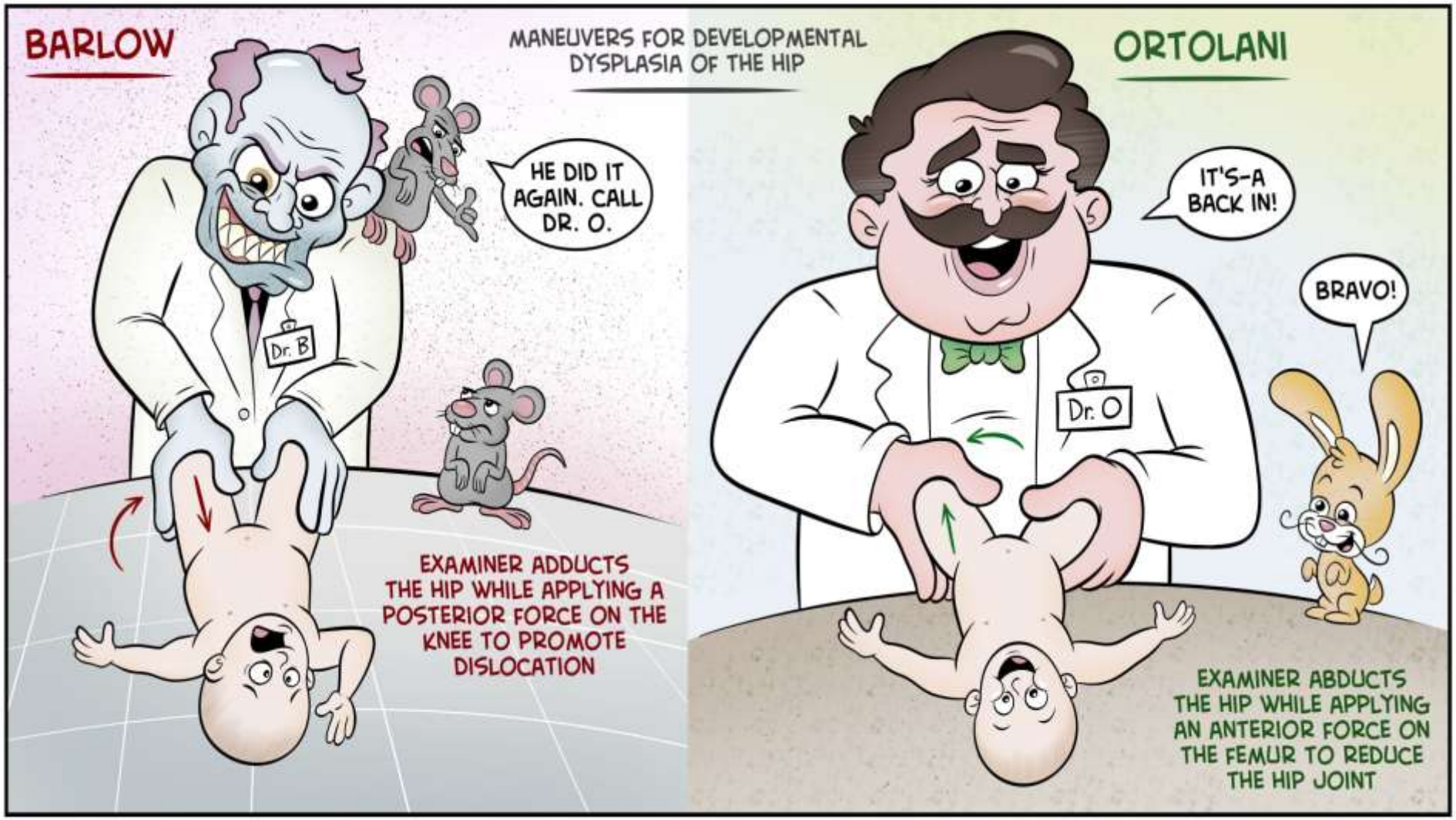


2. BARLOW'S SIGN-

A click is felt when the infant is placed supine with abducted hips flexed 90 degree, knees fully flexed and the hip adducted to the midline.

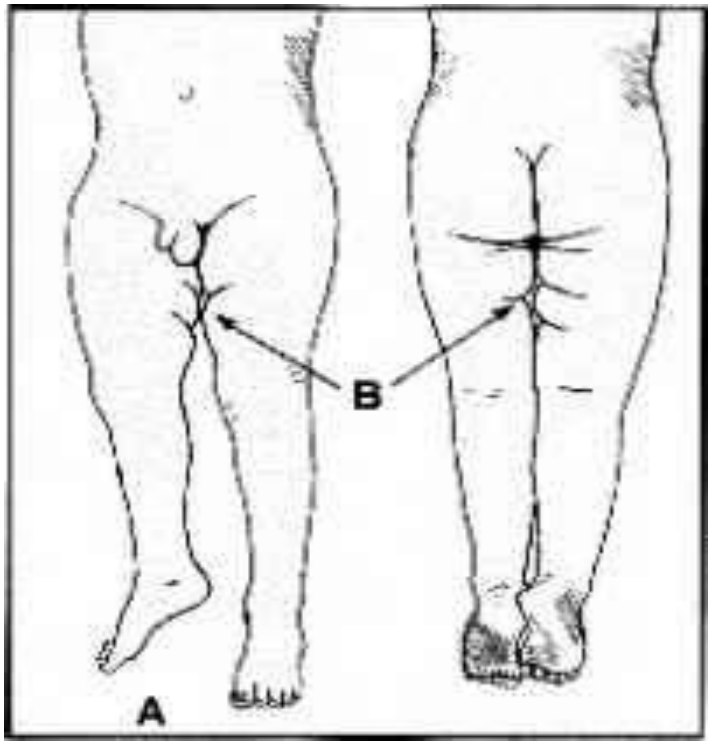
3. ORTOLANI'S SIGN-

The infant is placed on his back with hip flexed and in adduction while the examiner presses the femur downward to dislocate the hip. A click/ jerk indicates subluxation in a neonate and subluxation/ luxation in an older infant.



- 4. TRENDLENBURG'S TEST-

When the child stands on the affected leg, the opposite pelvis dips to maintain erect posture

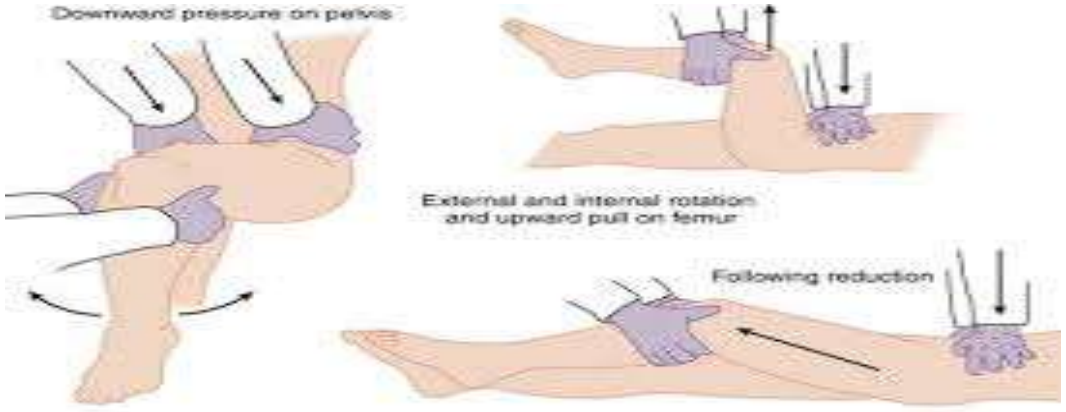


MANAGEMENT

- <u>For newborns and infants <6 months age-</u>
  - Pavlik harness for 6 weeks on a full time basis.
  - The anterior straps of the harness should be set to maintain the hips in flexion and posterior straps maintain abduction.

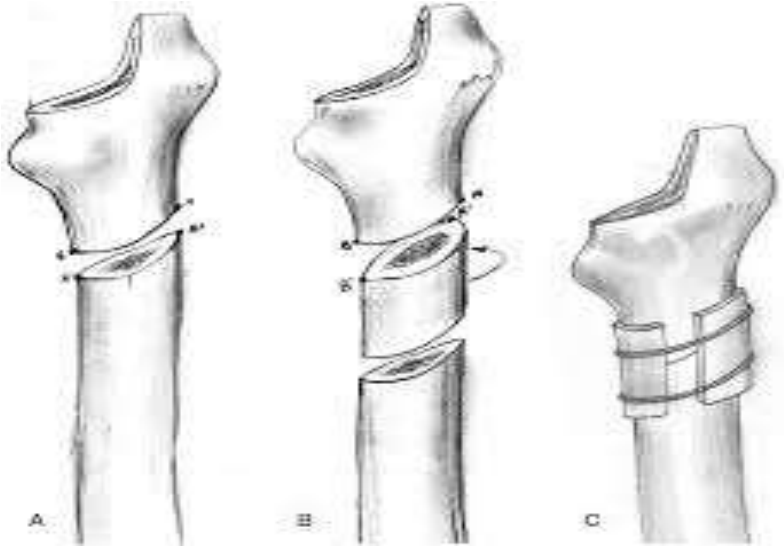
For children 6 months to 2 years age-

- Gradual reduction by traction for 3 weeks
- Closed reduction under general anesthesia
- Maintained in well moulded spica cast with hip in moderate flexion and abduction.
- Cast removed after 12 weeks
- Abduction orthoses used for acetabulum remodeling.



Children older than 2 years-

- Open reduction surgery- femoral shortening osteotomy to reduce pressure on proximal femur and to reduce risk of osteonecrosis.
- Post op spica cast for 6-12 weeks.

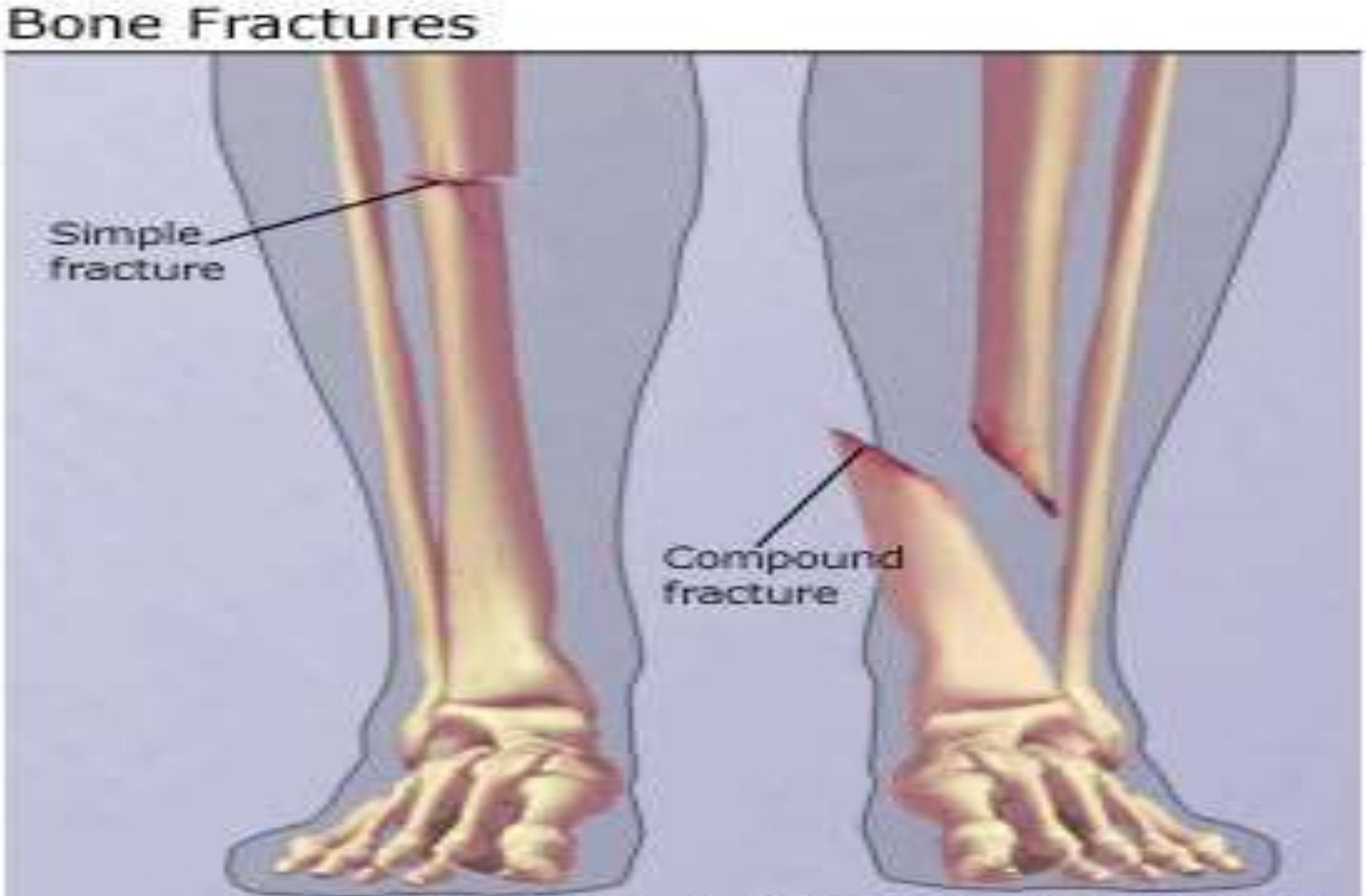


NURSING MANAGEMENT

- Promoting normal growth and development
- Maintain correct position of the hip
- Maintain physical mobility
- Elevate the head while feeding
- Well balanced diet with high fiber and adequate fluid intake
- Wash the area of the harness with mild soap
- And dry thoroughly.
- Cotton shirt and sock under the braces.
- Turn and adjust position to avoid pressure ulcers
- Keep the baby clean and dry

Pictogram

FRACTURES



DEFINITION

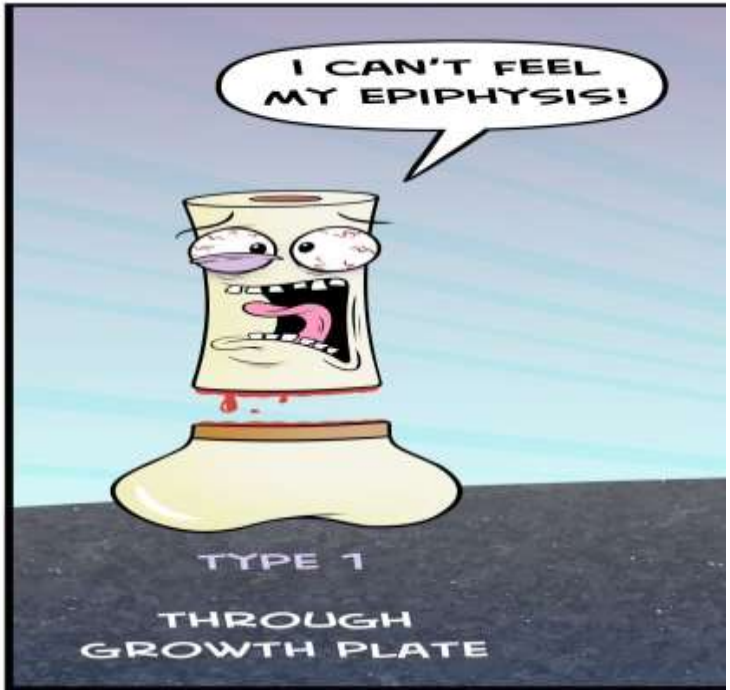
A break in the continuity of bone caused by trauma or twisting as a result of muscle spasm/ indirect loss of leverage/ bone decalcifications.

INCIDENCE

- 15% of all injuries in children are fractures
- 60% of boys and 40% of girls sustain fracture by the age of 15 yrs

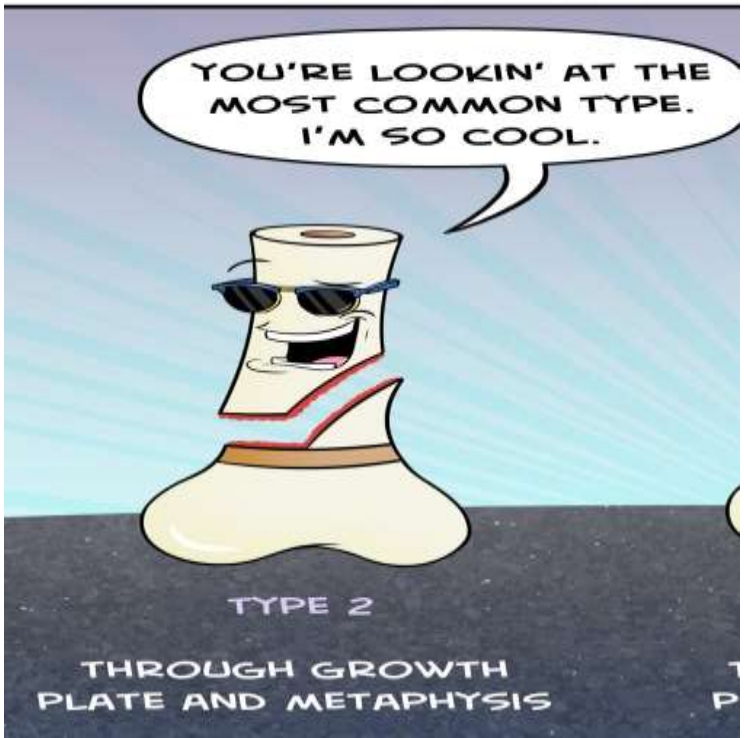
TYPES

- Salter classification of Growth plate fractures
- Type I-
  - Break through the bone at the growth plate separating bone end from bone shaft and completely disrupting the growth plate.



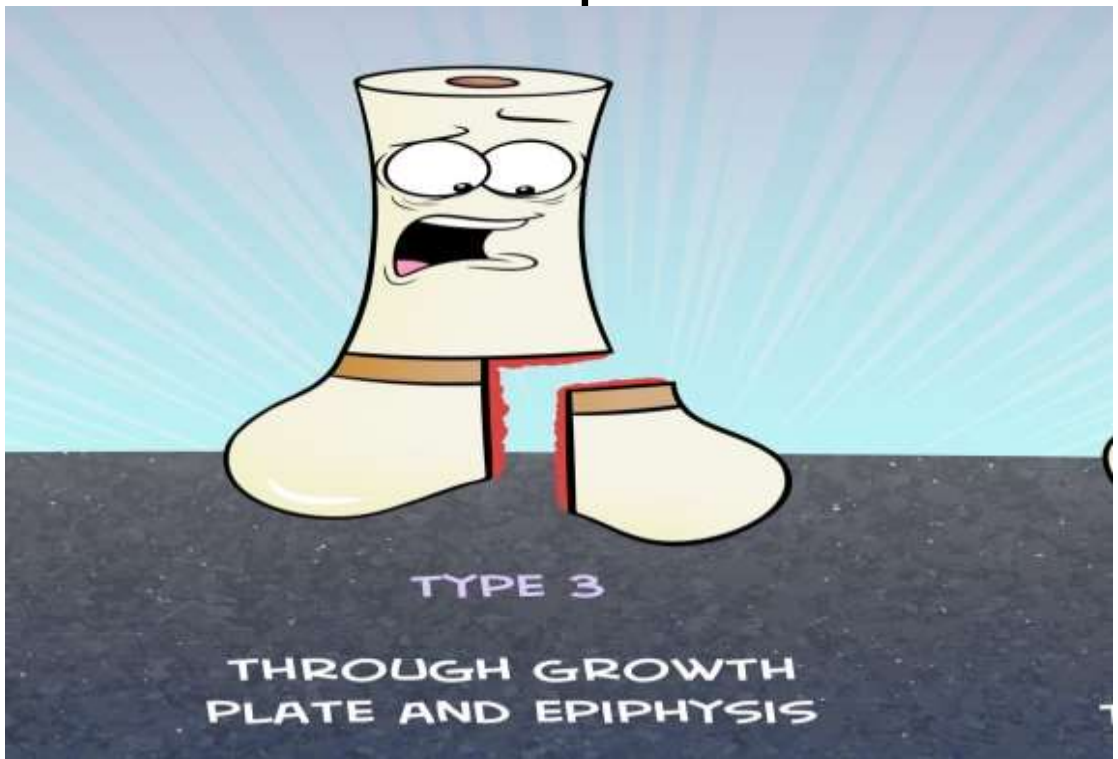
- Type II

These fractures break through part of the bone at the growth plate and crack through the bone shaft as well.



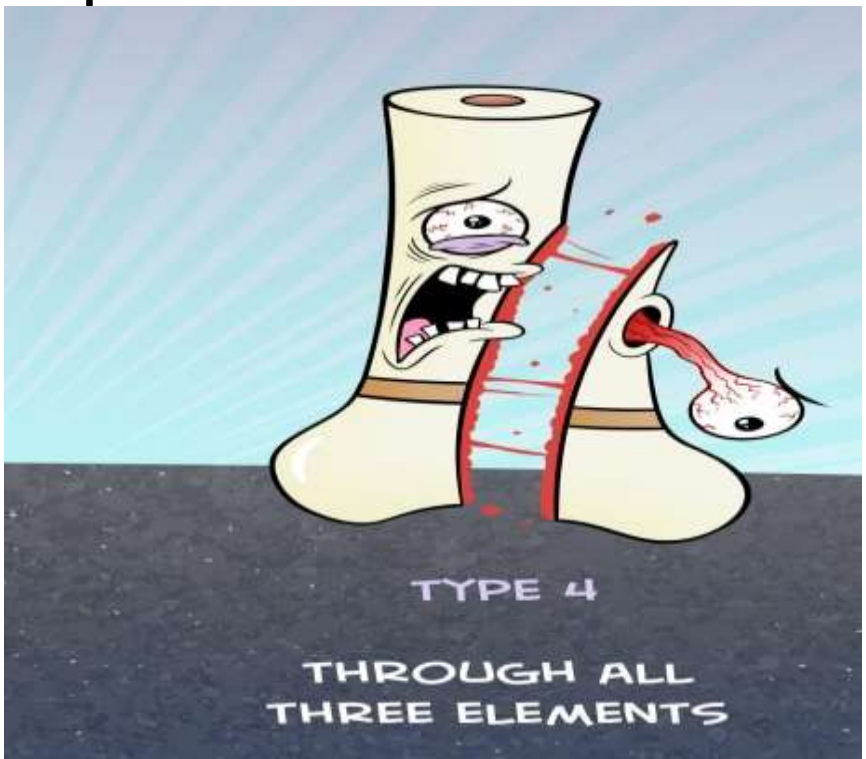
- Type III

These fractures cross through a portion of the growth plate and break off a piece of the bone end.



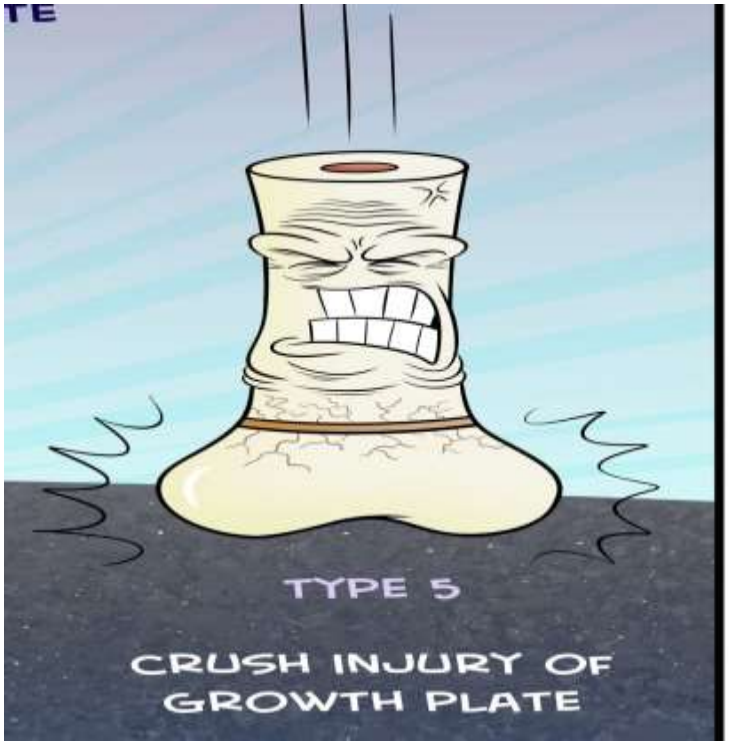
- Type IV

These fractures break through the bone shaft, the growth plate and the end of the bone.



- Type V

These fractures occur due to a crushing injury to the growth plate from a compression force.



- On the basis of communication with environment-

1. Simple/ closed fracture-

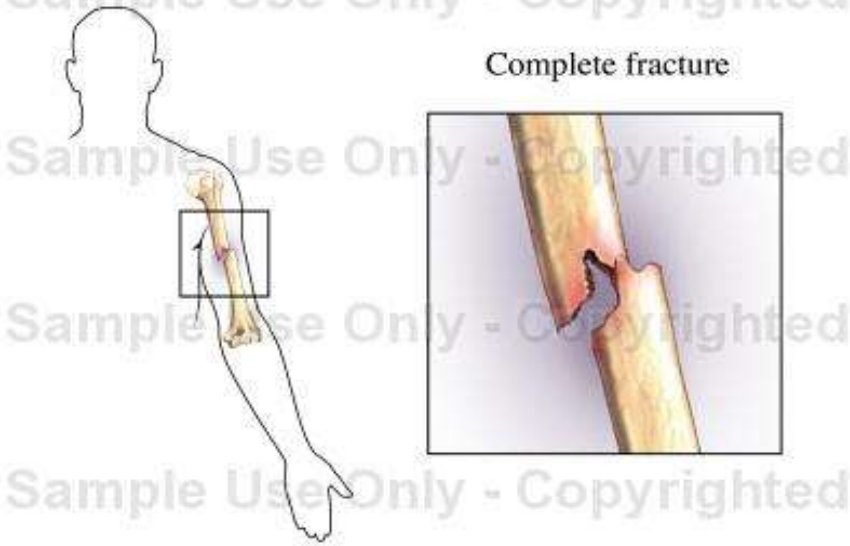
In this skin over the fracture area remains intact.

2. Compound/ open fracture-

The bone is exposed through a break in the skin

3. Complete fracture-

In this type bone is broken across entirely destroying the continuity of the bone, resulting in proximal and distal bone fragments.



4. Incomplete fracture-

A fracture that does not completely destroy the continuity of the bone. This type of fracture is stable and displaced.

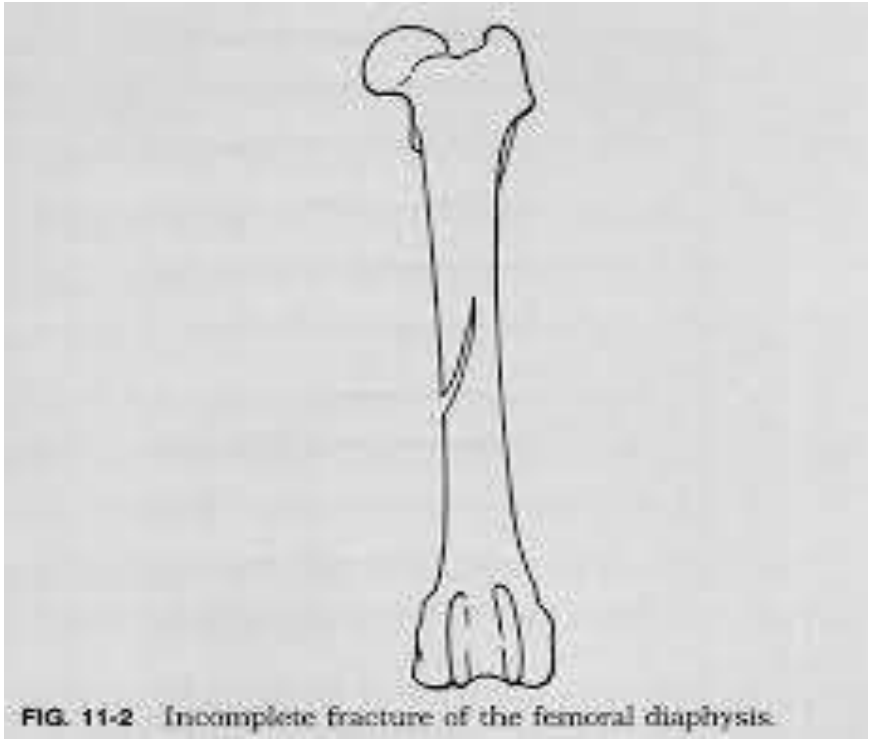


FIG. 11-2 Incomplete fracture of the femoral diaphysis.

- Classification on the basis of pattern-

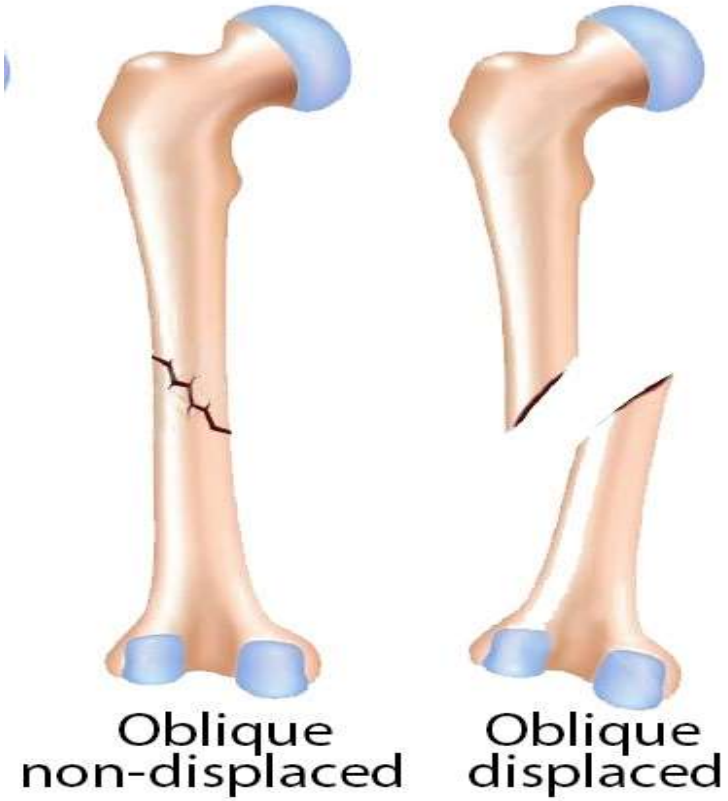
1. Transverse fracture-

Bone is fractured straight across i.e fracture at right angle.

Traverse

2. Oblique fracture-

Break ends in an oblique direction.



3. Spiral fracture/ Torsien fracture-
In this the bone has been twisted apart.

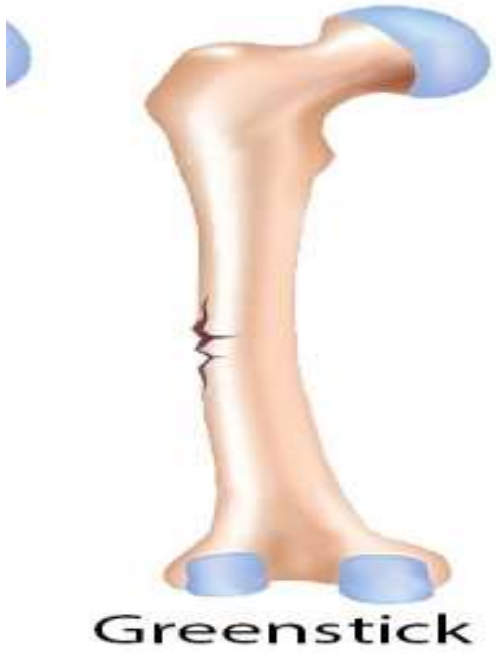
4. Linear fracture-
Bone is broken longitudinally.

no

- Miscellaneous types-

1. Greenstick fracture-

One side of the bone is broken and the other side is bent.



2. Comminuted fracture-

Bone is splintered or crushed into 3 or more fragments.

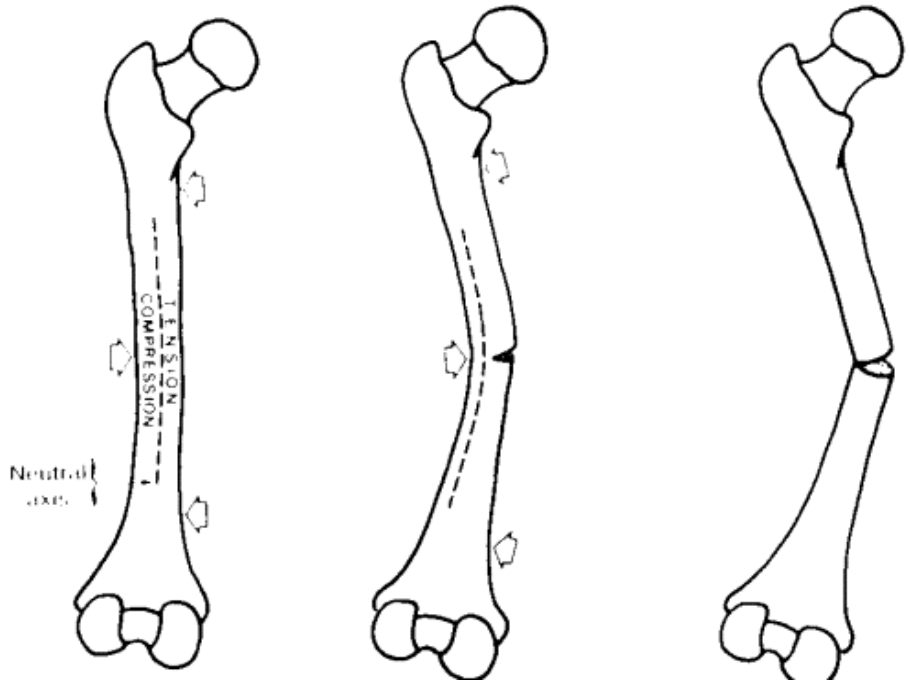
Comminuted

3. Impacted fracture-

A part of fractured bone is driven into another bone.

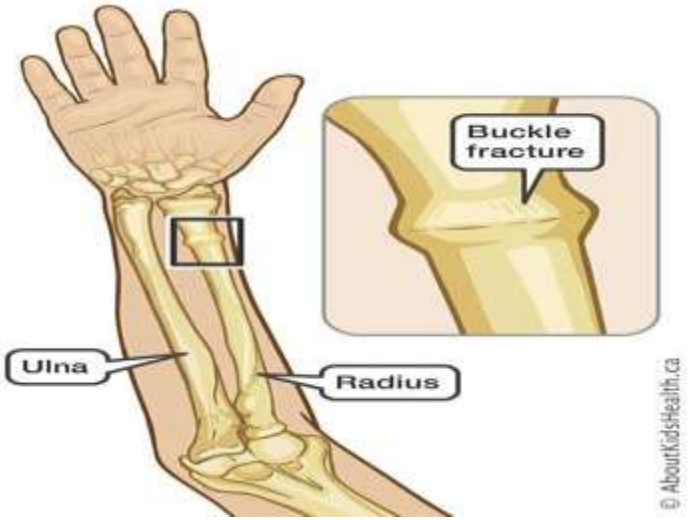
4. Bend fracture-

When bone bends to a breaking point and is not straightened completely without intervention.



5. Buckle fracture-

Occurs near bone metaphysis. Results from compression of bone



6. Periosteal hinge- periosteum forms hinge at breakage site.

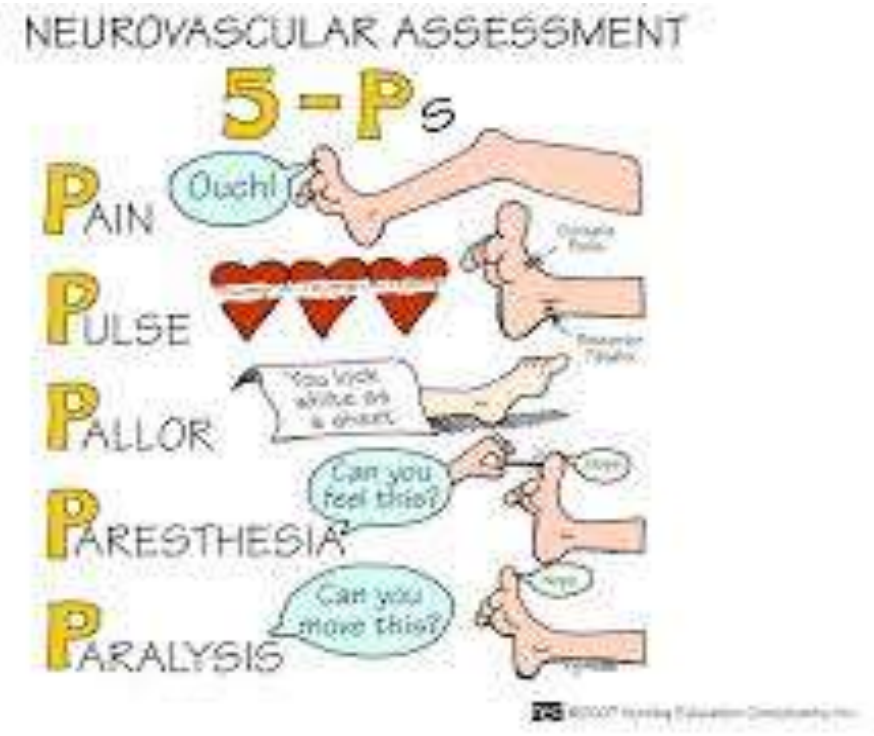
ETIOLOGY

- Trauma
  - ✓ Fall
  - ✓ Sport related injury
  - ✓ Child abuse
  - ✓ RTA
  - ✓ Repetitive force on a bone
  - ✓ Vigorous play
- Physiological causes
  - ➢ Metabolic disease
  - ➢ Bone tumors
  - ➢ Osteoporosis

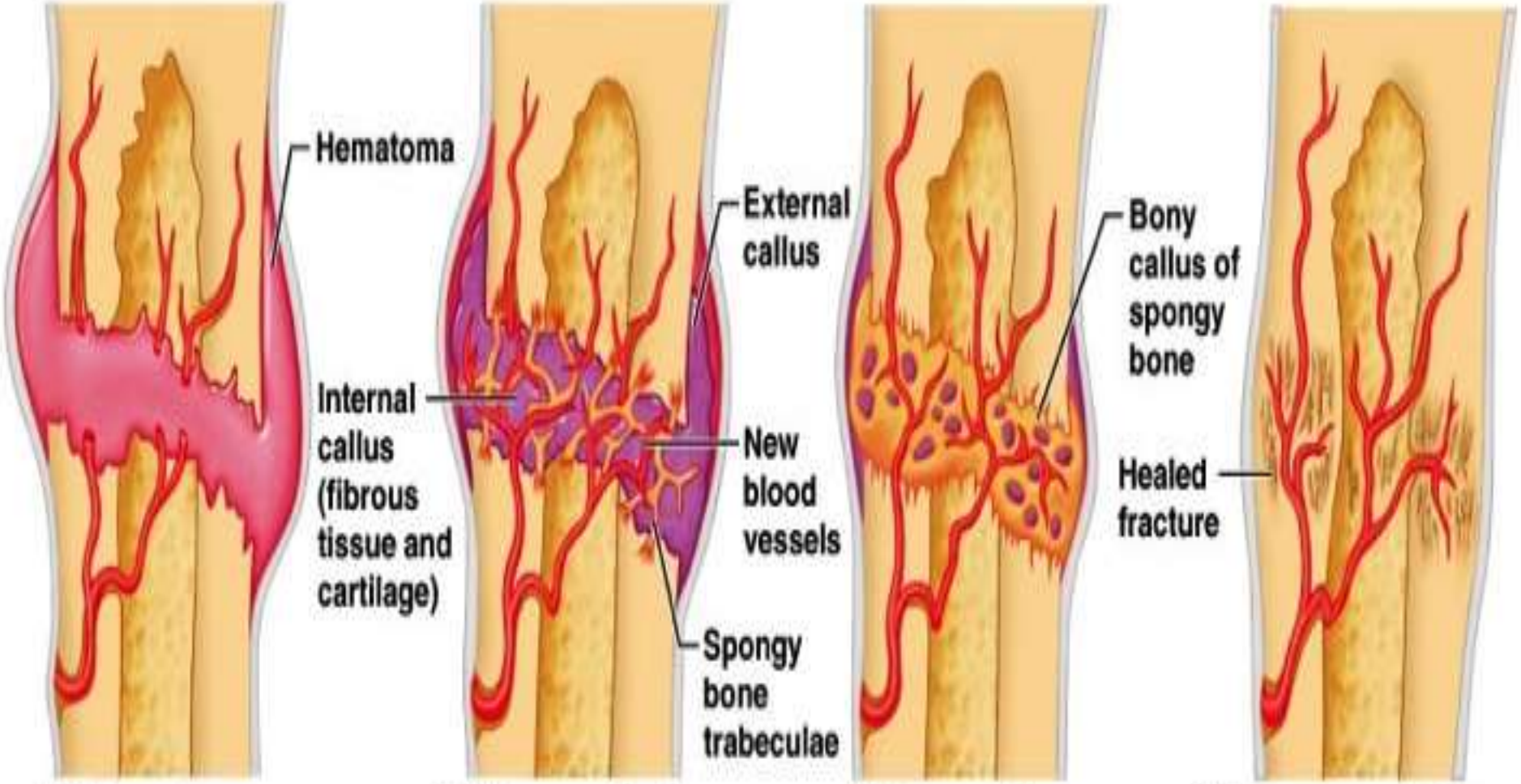
CLINICAL FEATURES

- Pain
- Skin wound
- Deformity
- Swelling
- Discoloration
- Crepitus
- Loss of limb function
- Neurological signs and symptoms
- Numbness and tingling

- Mottled cyanosis
- Cold extremity
- Loss of pulse distal to injury



BONE HEALING



DIAGNOSTIC EVALUATION

- History
- Physical examination
- X- ray

MANAGEMENT

- Immediate management-
- Splinting the limb above and below the suspected fracture
- Applying cold pack
- Elevating the limb
- In case of blood loss- apply direct pressure
  - fluid replacement
- Immobilization
- Tetanus prophylaxis

NURSING MANAGEMENT

- Watch for signs of shock
- Monitor vital signs
- Administer IV fluids, analgesics and antibiotics as advised.
- Urge adequate fluid intake to prevent urinary stasis.
- Support cast with pillows
- Look for signs of impaired circulation
- Teach care giver cast care/ traction care/ pin site care.
- Demonstrate how to use crutches.

- Other management-
  - Cast
  - Traction
  - Reduction - open/ closed
  - Prophylactic antibiotics

Care For Your Cast

DO's

- Make sure to keep the cast dry. Cover the cast with plastic bag while taking a bath or shower

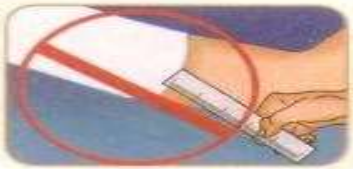
- Elevate arm or leg above the heart level, by using pillows or a recliner to avoid pain & to reduce swelling

- Exercise the joints that are near to the cast like fingers, toes, elbow or knee- it improves blood circulation

- Use supportive tools such as crutches or sling as directed by your doctor

DON'Ts

- Do not insert any object into the cast for scratching the skin



- Do not apply powder or deodorant into the cast

- Do not cut or pull the padding from inside the cast

- Do not drive or lift anything heavy until the cast has been removed

Cast Caution Signs

Consult your doctor if you observe any of the following :

- The skin around the edge of the cast is painful, swollen or red
- The cast is cracked or has soft spots
- The cast seems too tight or too loose
- A bad odour coming from inside the cast
- Tingling or cold sensation on being touched

SUN PHARMA

CARE OF PATIENT IN TRACTION

T Temperature < Extremity Infection

R Ropes Hang Freely

A Alignment

C Circulation Check (5 P's)

T Type & Location of Fracture

I Increase Fluid Intake

O Overhead Trapeze

N No Weights On Bed Or Floor

COMPLICATIONS

- Permanent deformity or dysfunction
- Aseptic necrosis of bone segments
- Hypovolemic shock
- Muscle contractures
- Renal calculi from decalcification
- Fat embolism
- Compartment syndrome

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THANK YOU


BYE