

# **Common Pediatric Lower Limb Disorders**

**Mohamed M. Zamzam**

**Professor & Consultant Pediatric  
Orthopedic Surgeon**

# Leg Aches

- What is leg aches?
  - Growing pain
  - Benign
  - No functional disability
  - Resolves spontaneously
  - Unknown cause
- Clinical features
  - Diagnosis by exclusion



**History**



**Screening  
Examination**



**Tenderness  
Joint Motion**

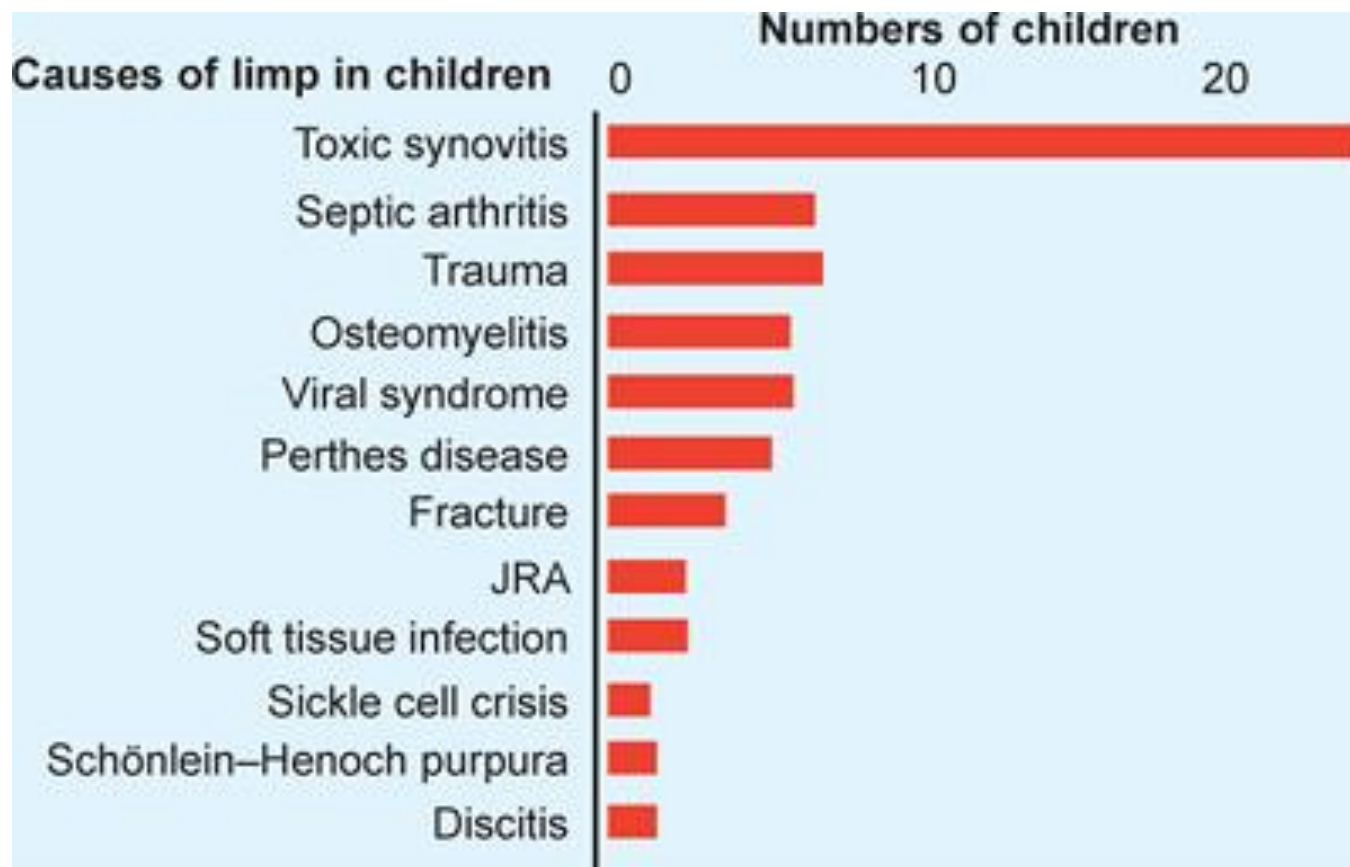
# Leg Aches

- Differential Diagnosis from serious problems mainly tumor
  - Osteoid osteoma
  - Osteosarcoma
  - Ewing sarcoma
- Management
  - Symptomatic
  - Reassurance

Feature	Growing Pain	Serious Problem
History		
Long duration	Often	Usually not
Pain localized	No	Often
Pain bilateral	Often	Unusual
Alters activity	No	Often
Causes limp	No	Sometimes
General health	Good	May be ill
Physical Examination		
Tenderness	No	May show
Guarding	No	May show
Reduced range of motion	No	May show
Laboratory		
CBC	Normal	± Abnormal
ESR	Normal	± Abnormal
CRP	Normal	± Abnormal

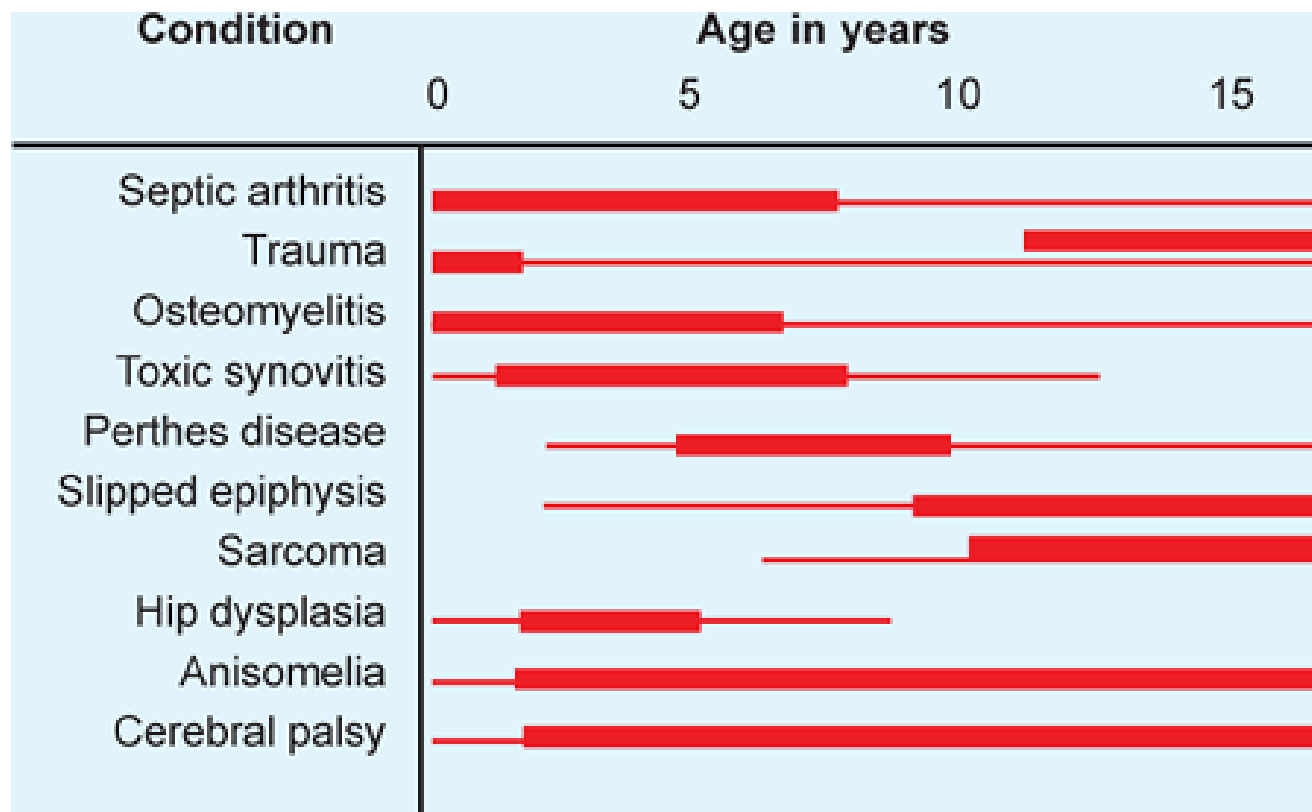
# Limp

Abnormal gait due to pain, weakness or deformity



# Limp

- Evaluation
  - History (Mainly age of onset)



# Limp

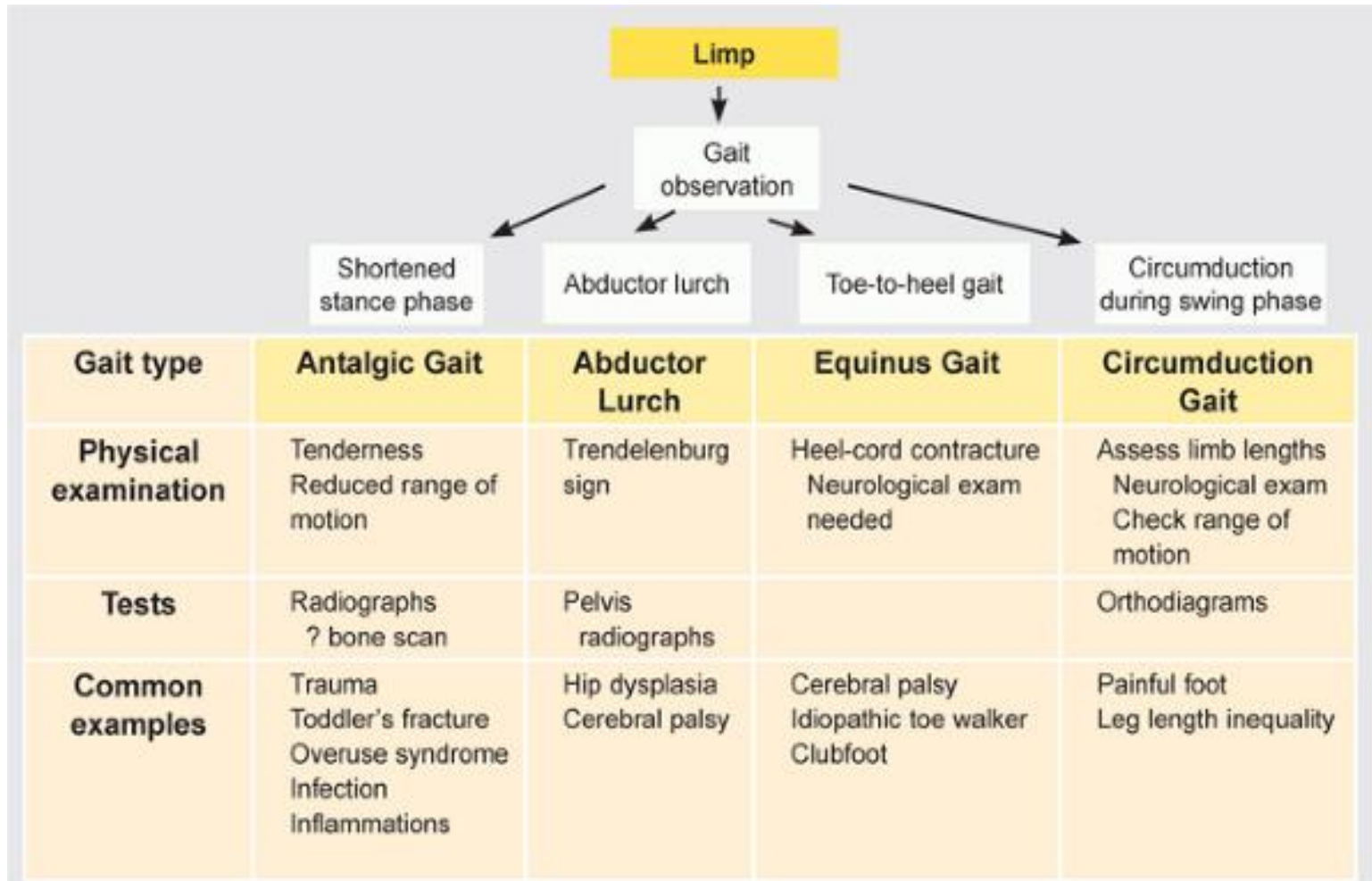
- Evaluation
  - Observation

Evaluate the limp by studying the child's gait while the child walks in the clinic hallway



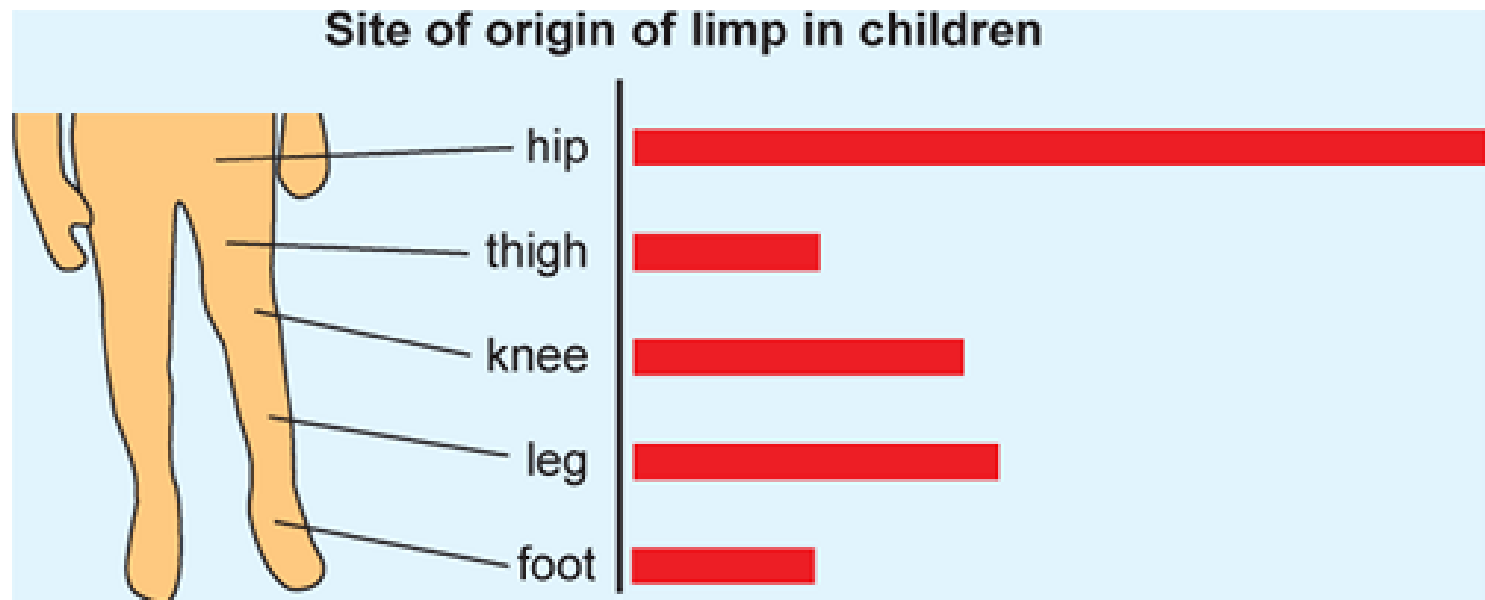
# Limp

- Types of limp



# Limp

- Management
  - Generalization regarding management cannot be made
  - Treatment of the cause





# In-toeing and Out-toeing

- Terminology

- Version

Describes normal variations of limb rotation

It may be exaggerated

- Torsion

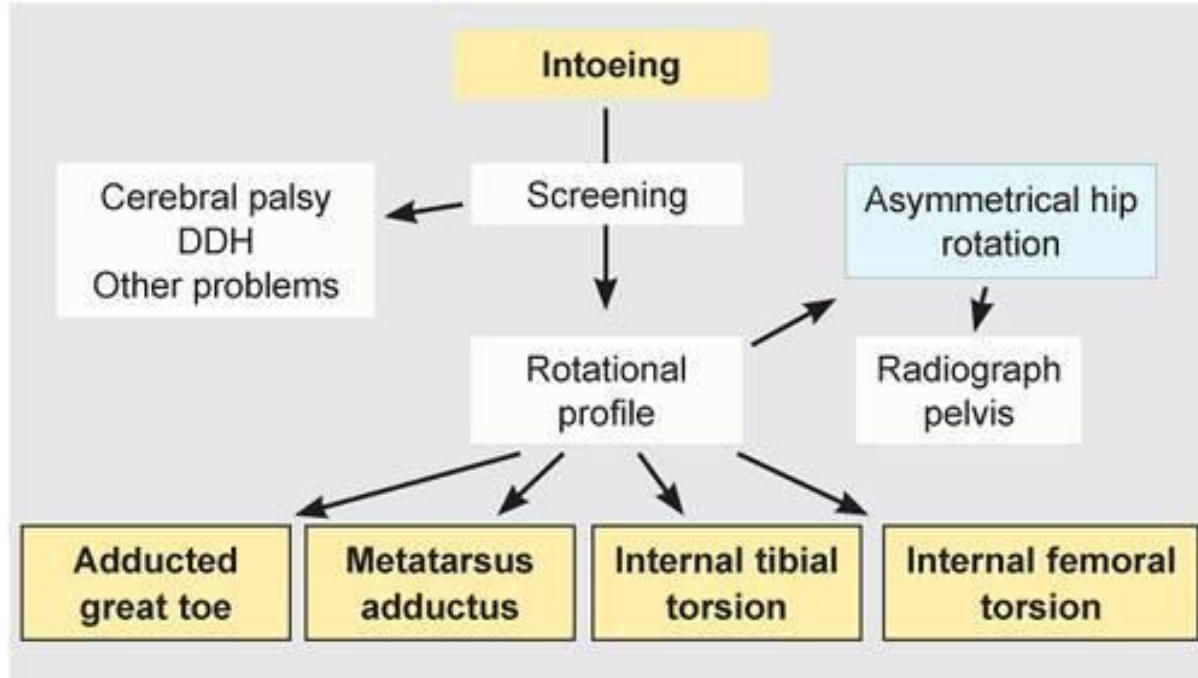
Describes abnormal limb rotation

Internal or external

It may be complex if there is compensatory torsion

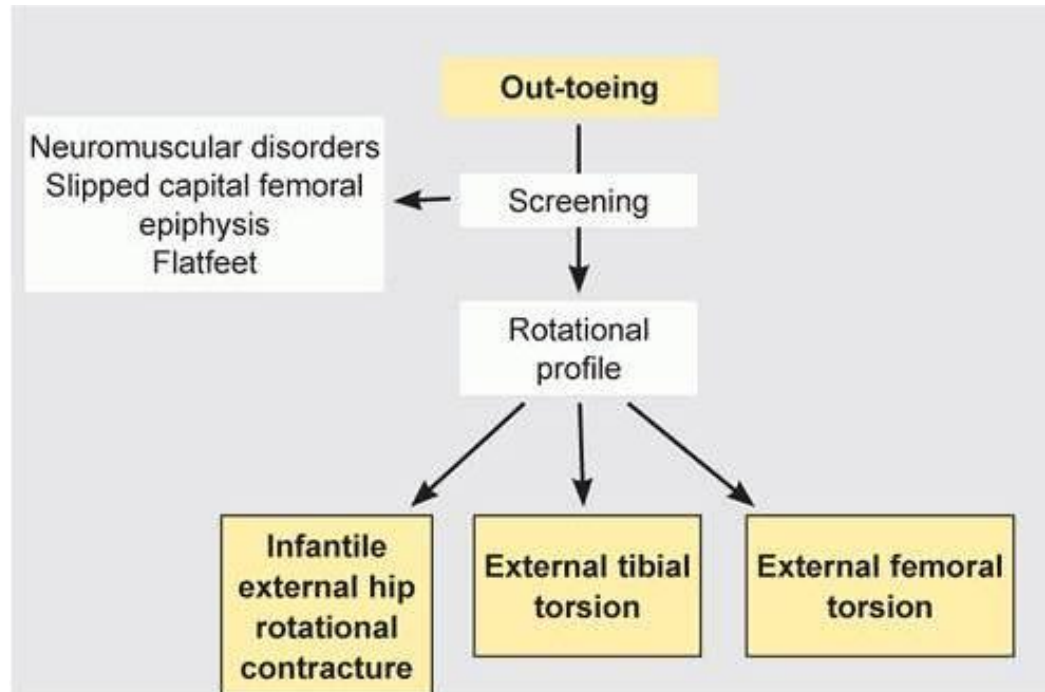
# In-toeing and Out-toeing

- Evaluation
  - History
  - Screening examination
  - Rotational profile



# In-toeing and Out-toeing

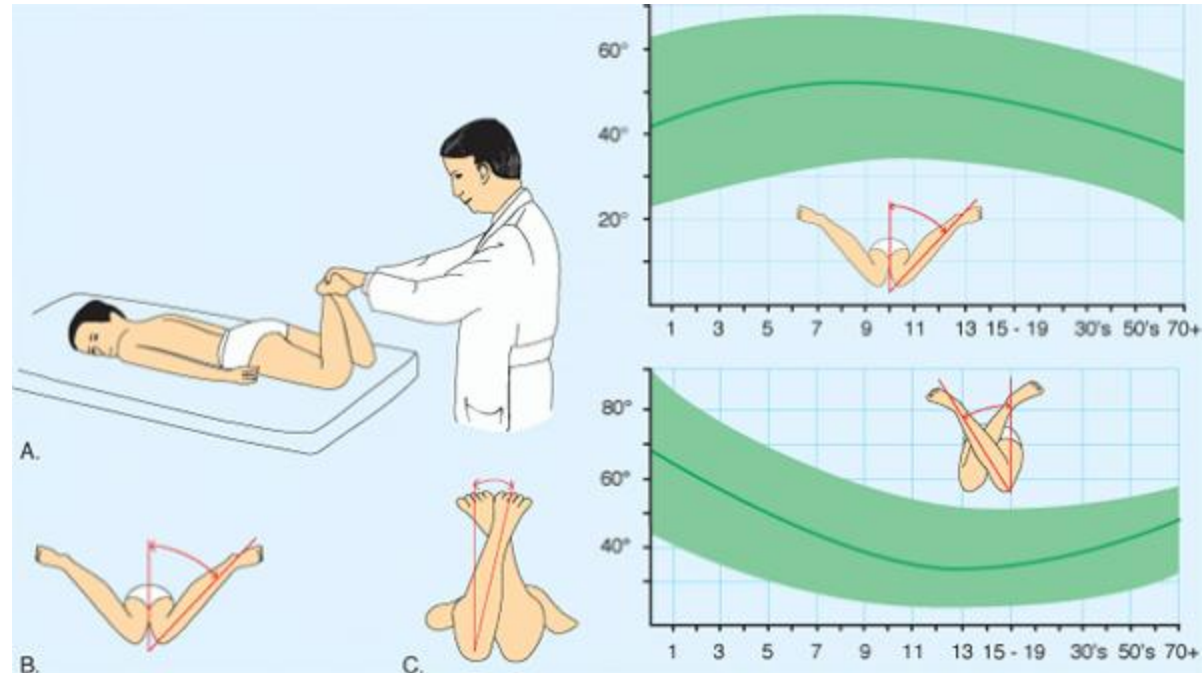
- Evaluation
  - History
  - Screening examination
  - Rotational profile



# In-toeing and Out-toeing

- Special tests

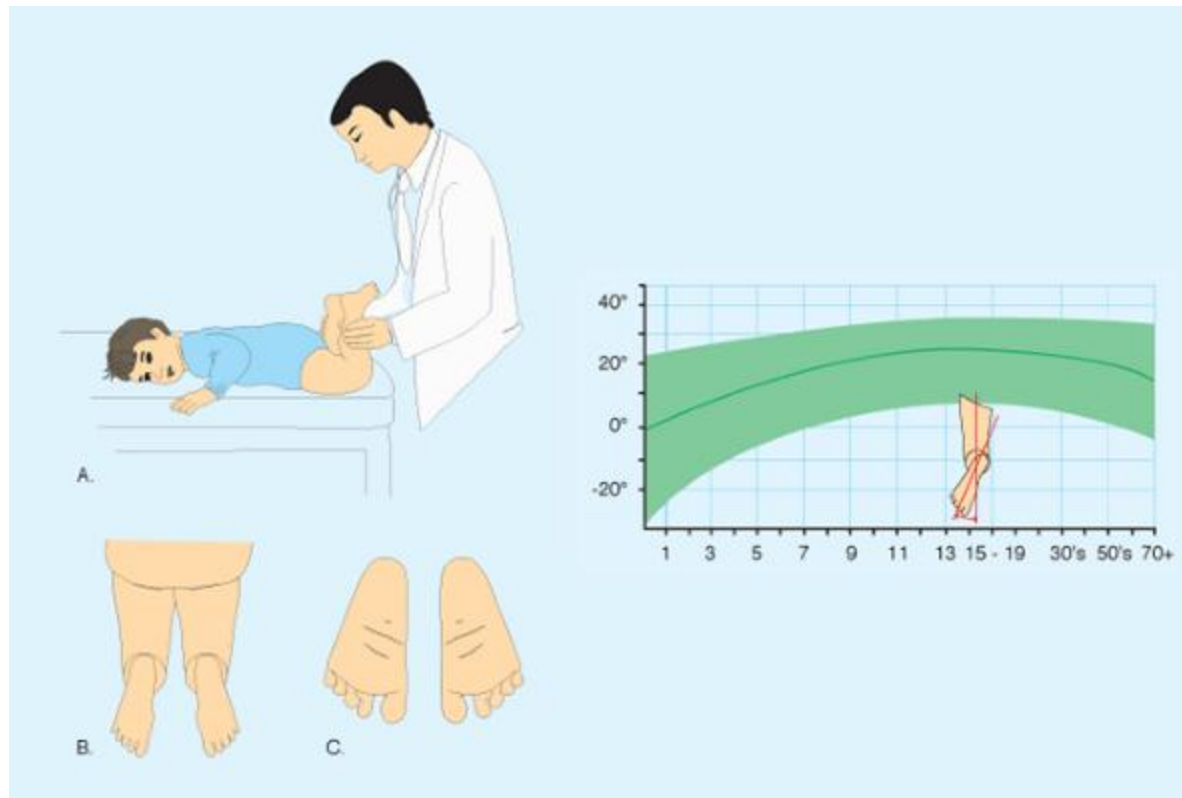
Assessing hip rotation



# In-toeing and Out-toeing

- Special tests

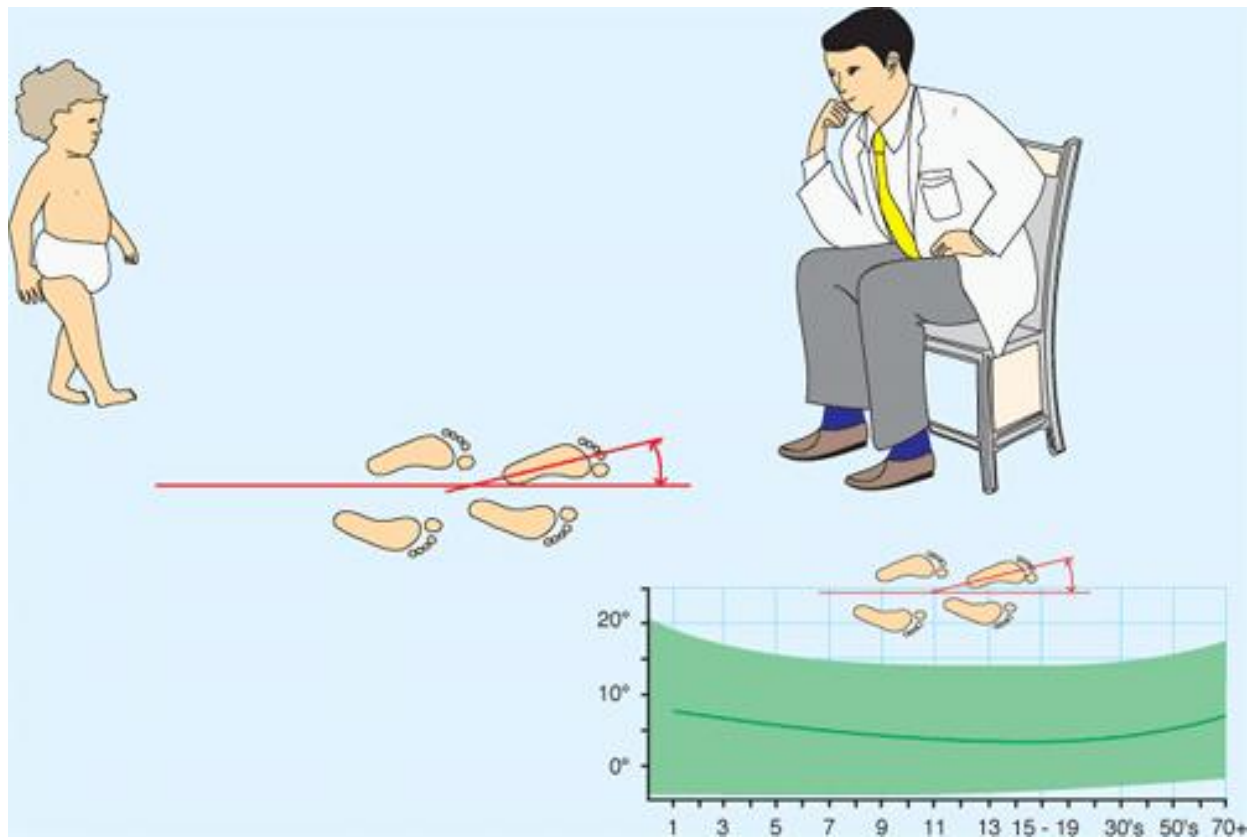
Assessing rotational status of tibia and foot



# In-toeing and Out-toeing

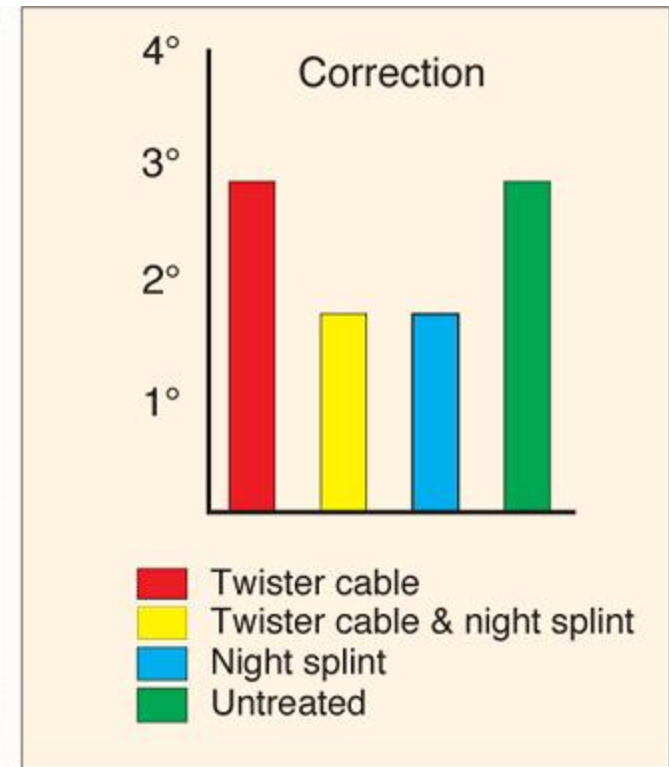
- Special tests

Foot propagation angle



# In-toeing and Out-toeing

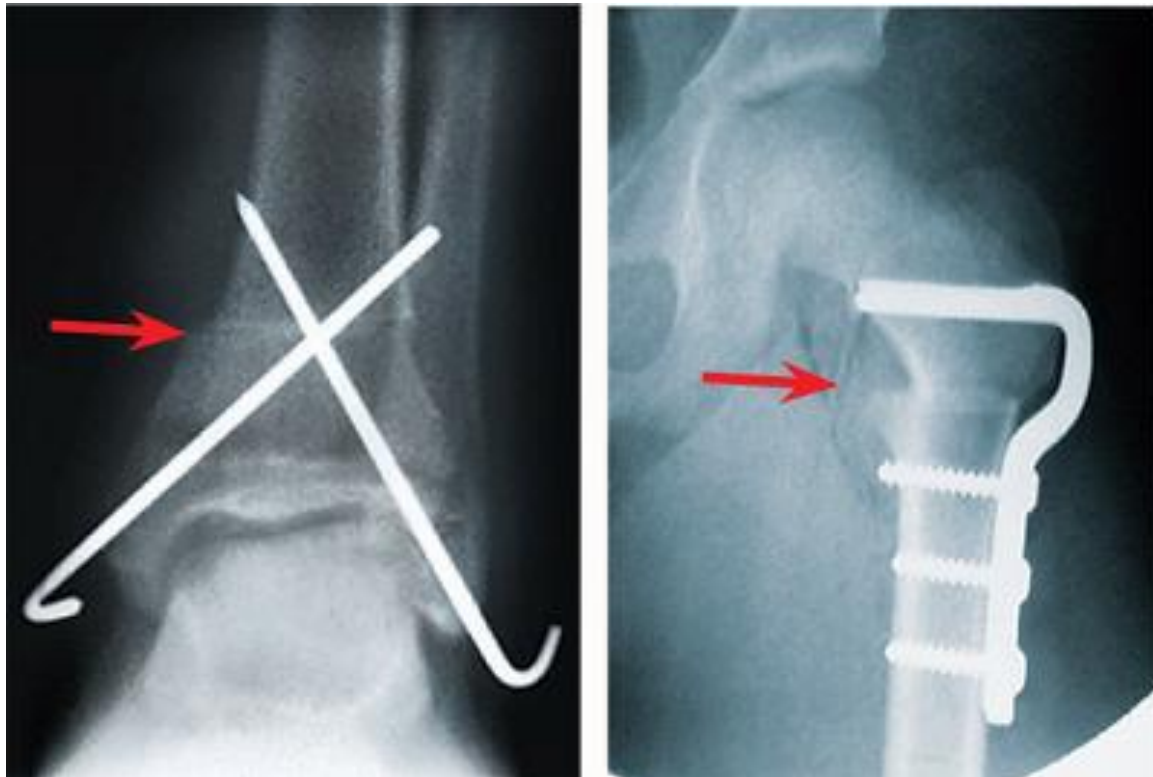
- Management principles
  - Establishing correct diagnosis
  - Allow spontaneous correction (observational management)
  - Control child's walking, sitting or sleeping is extremely difficult and frustrating
  - Shoe wedges or inserts are ineffective
  - Bracing with twister cables limits child's activities
  - Night splints have no long term benefit



# In-toeing and Out-toeing

- Operative correction

Indicated for children above the age of 8 years with significant cosmetic and functional deformity





# Limb Length Inequality

- True and apparent
- Etiology

Category	Short	Long
Congenital	Aplasia Hypoplasia Hip dysplasia Clubfoot	Hyperplasia
Neurogenic	Paralysis Disuse	Sympathectomy
Vascular	Ischemia Perthes disease	AV fistular
Infection	Physeal injury	Stimulation
Tumors	Physeal involvement	Vascular lesions
Trauma	Physeal injury Malunion	Fracture stimulation Distraction

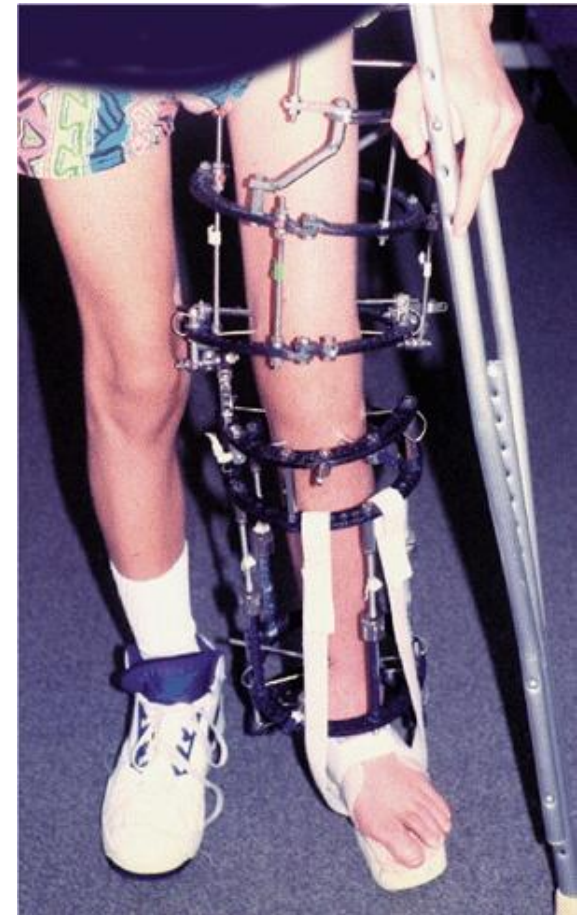
# Limb Length Inequality

- Gait
- Adverse effects
  - Back pain
  - Scoliosis
- Evaluation
  - Screening examination
  - Clinical measures of discrepancy
  - Imaging methods (Centigram)



# Limb Length Inequality

- Management principles
  - Severity
  - Lifts
  - Shortening
  - Epiphysiodesis
  - Lengthening



# Genu Varum and Genu Valgum

- Definitions
  - Bow legs
  - Knock knees



Feature	Physiologic	Pathologic
Frequency	Common	Rare
Family history	Usually negative	May occur in family
Diet	Normal	May be abnormal
Health	Good	Other MS abnormalities
Onset	Second year for bowing Third year knock-knees	Out of normal sequence Often progressive
Effect of growth	Follows normal pattern	Variable
Height	Normal	Less than 5th percentile
Symmetry	Symmetrical	Symmetrical or asym
Severity	Mild to moderate	Often beyond $\pm 2$ SD

# Genu Varum and Genu Valgum

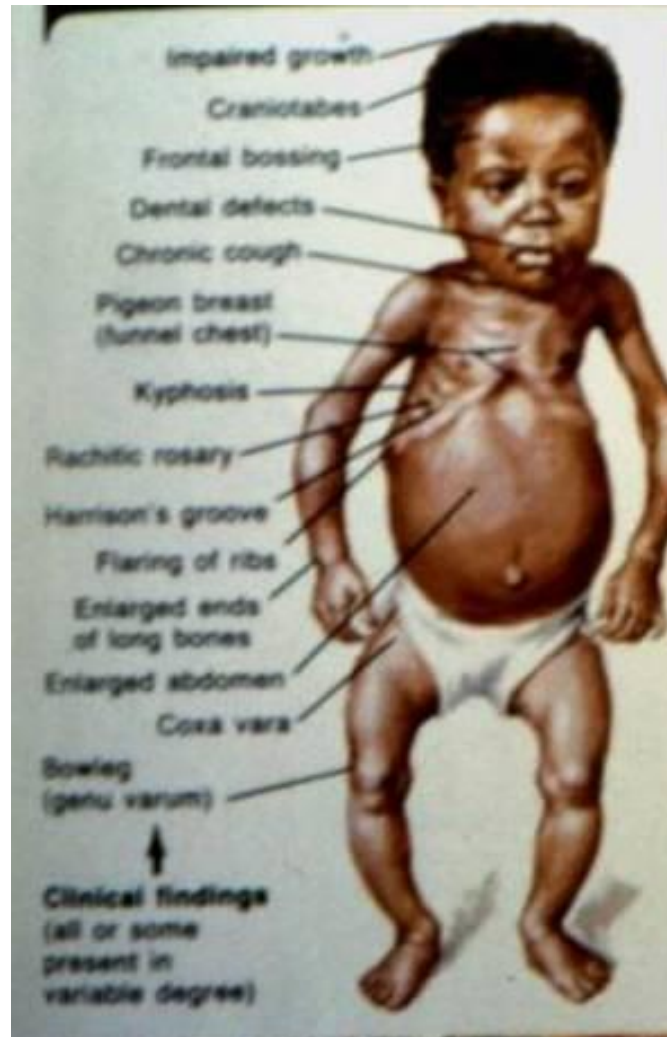
- Evaluation
  - Etiology

Cause	Genu Valgum	Genu Varum
Congenital	Fibular hemimelia	Tibial hemimelia
Dysplasia	Osteochondrodysplasias	Osteochondrodysplasias
Developmental	Knock-knee >2 SD	Bowing >2 SD Tibia vara
Trauma	Overgrowth Partial physeal arrest	Partial physeal arrest
Metabolic	Rickets	Rickets
Osteopenic	Osteogenesis imperfecta	
Infection	Growth plate injury	Growth plate injury
Arthritis	Rheumatoid arthritis knee	



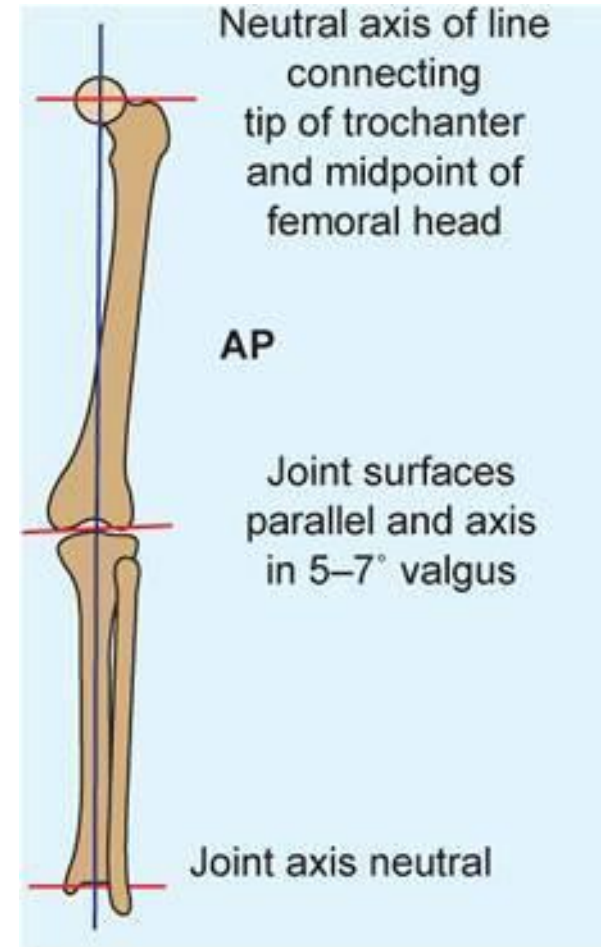
# Genu Varum and Genu Valgum

- Evaluation
  - History
  - Examination  
(signs of Rickets)
  - Laboratory



# Genu Varum and Genu Valgum

- Evaluation
  - Imaging



# Genu Varum and Genu Valgum

- Management principles
  - Nonoperative?
  - Epiphysiodesis
  - Corrective osteotomies

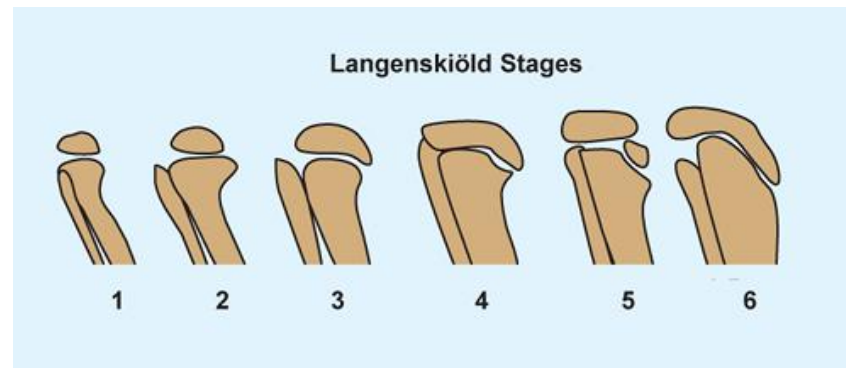
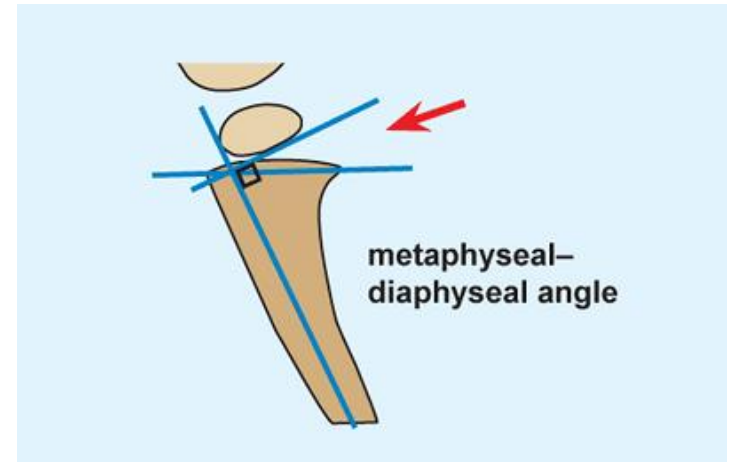




# Tibia Vara

- Blount disease

Damage of proximal medial tibial growth plate of unknown cause



# Tibia Vara



# Clubfoot

- Normal foot
  - **Stable:** for supporting the body weight in standing
  - **Resilient:** for walking and running
  - **Mobile:** to accommodate variations of surface
  - **Cosmetic**

# Clubfoot

- Etiology
  - Postural
  - Idiopathic (CTEV)
  - Secondary



# Clubfoot

- Clinical examination

## Exclude

- Neurological lesion that can cause the deformity “Spina Bifida”
- Other abnormalities that can explain the deformity “Arthrogryposis, Myelodysplasia”
- Presence of concomitant congenital anomalies “Proximal femoral focal deficiency”
- Syndromatic clubfoot “Larsen’s syndrome, Amniotic band Syndrome”

# Clubfoot

- Clinical examination  
Characteristic Deformity :

## Hind foot

- Equinus (Ankle joint)
- Varus (Subtalar joint)

## Fore foot

- Forefoot Adduction
- Cavus



# Clubfoot

- Clinical examination
  - Short Achilles tendon
  - High and small heel
  - No creases behind Heel
  - Abnormal crease in middle of the foot
  - Foot is smaller in unilateral affection
  - Callosities at abnormal pressure areas
  - Internal torsion of the leg
  - Calf muscles wasting
  - Deformities don't prevent walking



# Clubfoot

- Management

**The goal of treatment for clubfoot is to obtain a plantigrade foot that is functional, painless, and stable over time**

**A cosmetically pleasing appearance is also an important goal sought by the surgeon and the family**



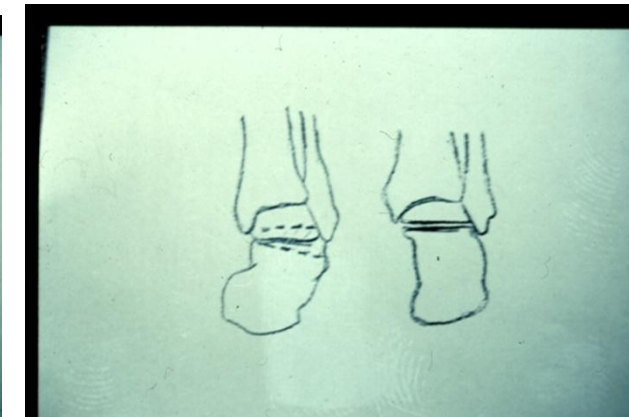
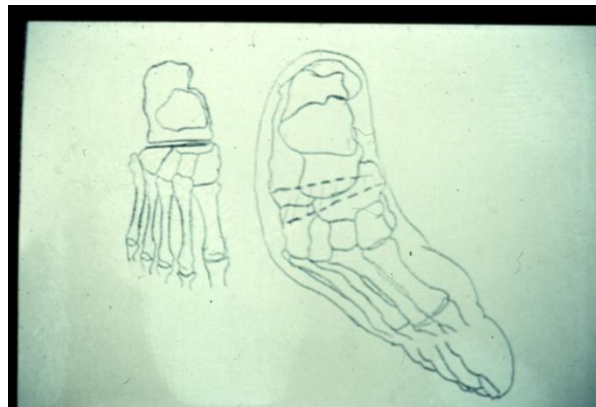
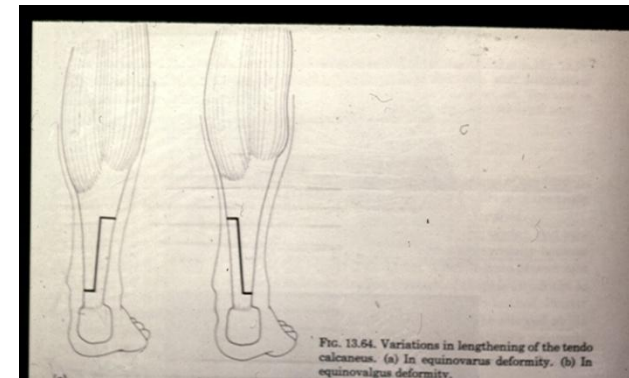
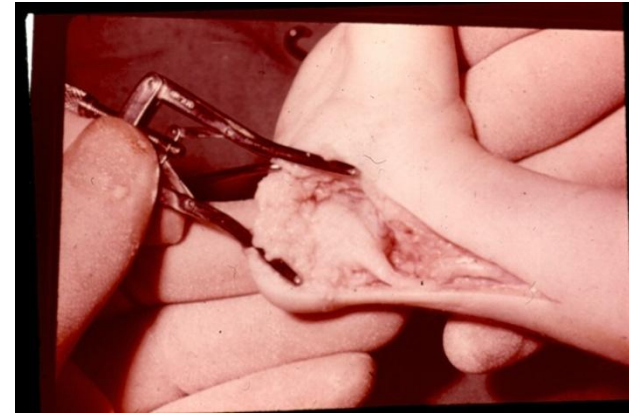
# Clubfoot

- Manipulation and serial casts
  - Validity, up to 12 months !
  - Technique “Ponseti”
  - Avoid false correction
  - When to stop ?
  - Maintaining the correction
  - Follow up to watch and avoid recurrence

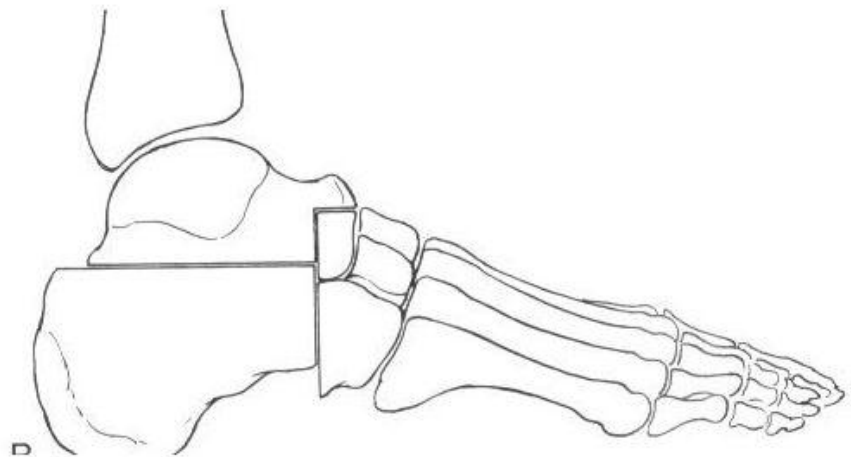


# Clubfoot

- Indications of surgical treatment
  - Late presentation, after 12 months of age !
  - Complementary to conservative treatment
  - Failure of conservative treatment
  - Residual deformities after conservative treatment
  - Recurrence after conservative treatment
- Types of surgery
  - Soft tissue
  - Bony
  - Salvage



# Clubfoot

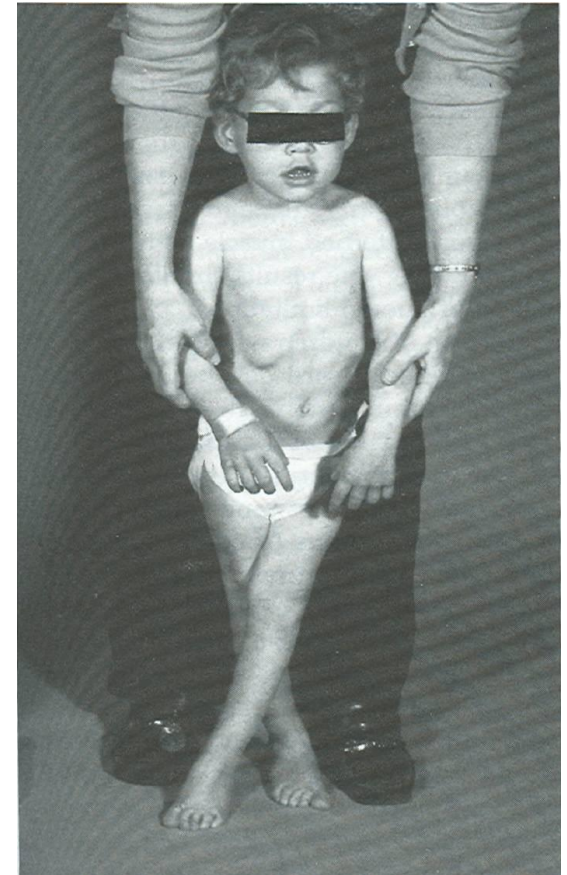


# Lower Limb Deformities in CP Child

- Physiological classification
  - Spastic
  - Athetosis
  - Ataxia
  - Rigidity
  - Mixed
- Topographic classification
  - Monoplegia
  - Paraplegia
  - Hemiplegia
  - Triplegia
  - Quadriplegia or tetraplegia
  - Bilateral hemiplegia
  - Diplegia

# Lower Limb Deformities in CP Child

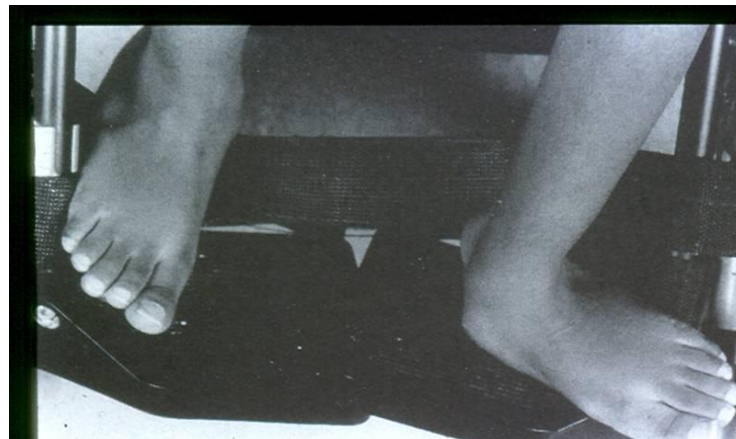
- Hip
  - Flexion
  - Adduction
  - Internal rotation
- Knee
  - Flexion
- Ankle
  - Equinous
  - Varus or valgus
- Gait
  - Intoeing
  - Scissoring





# Lower Limb Deformities in CP Child

- Assessment



# Lower Limb Deformities in CP Child

- Management principles
  - Multidisciplinary
- Options of Surgery
  - Neurectomy
  - Tenotomy
  - Tenoplasty
  - Muscle lengthening
  - Tendon Transfer
  - Bony surgery  
Osteotomy/Fusion

