

Common Pediatric Lower Limb Disorders

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**

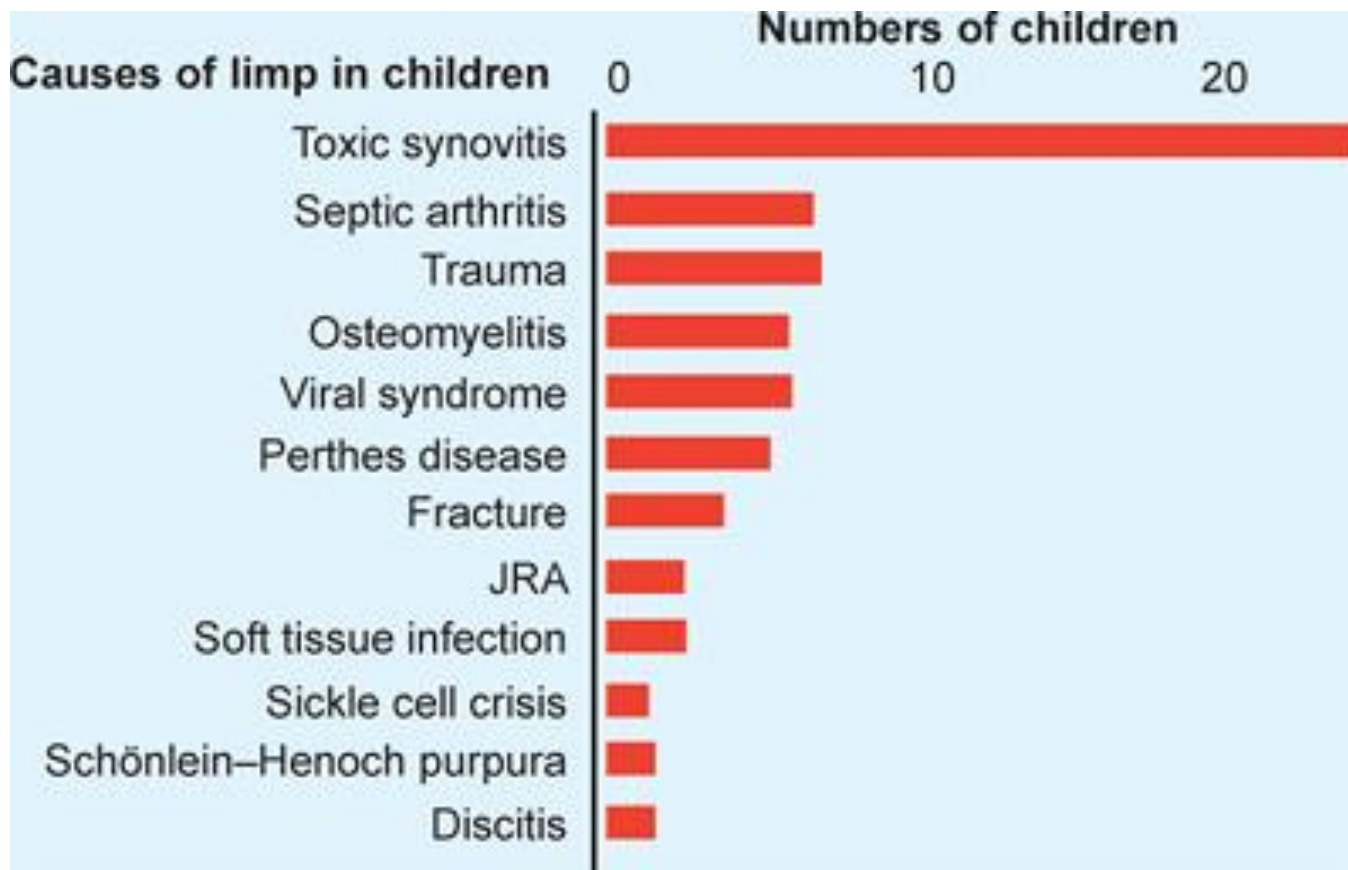
Leg Aches

- 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 |

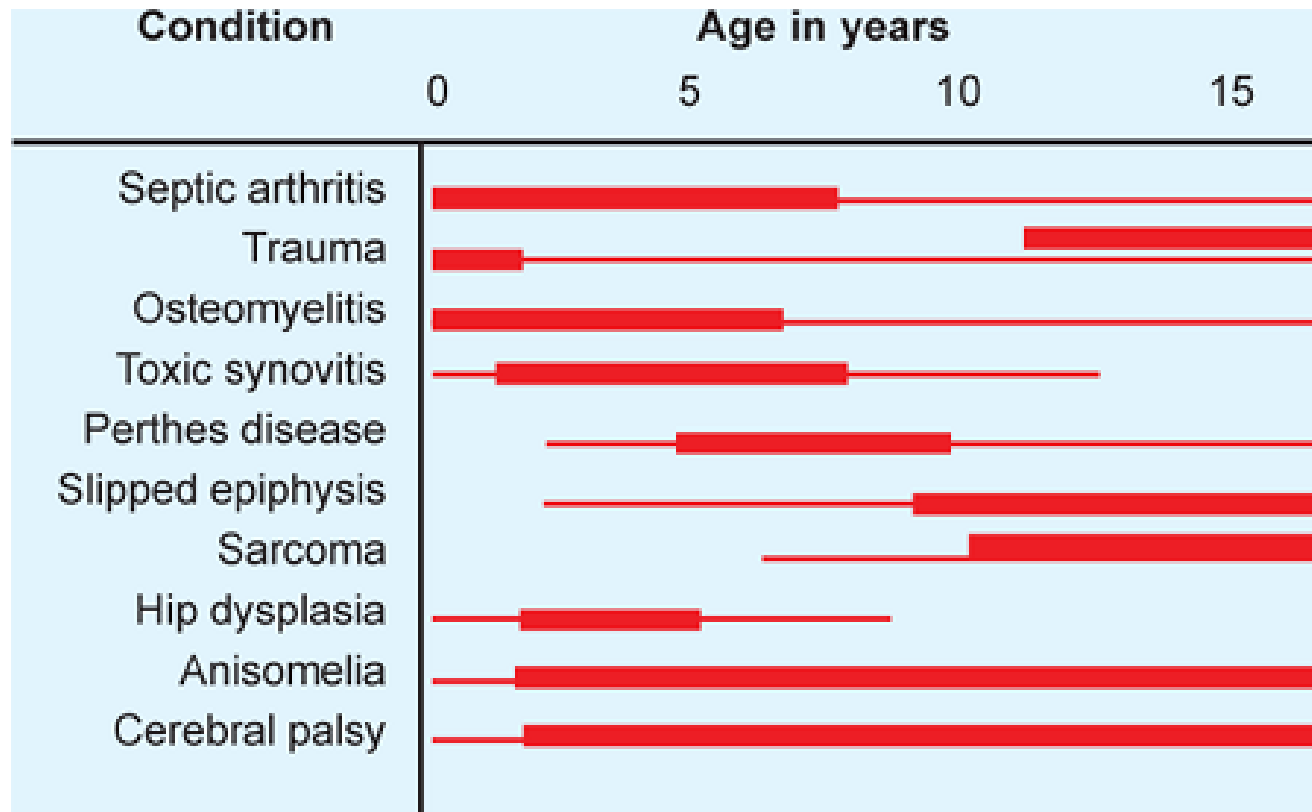
Limp

Abnormal gait due to pain, weakness or deformity



Limp

- Evaluation
 - History (Mainly age of onset)



Limp

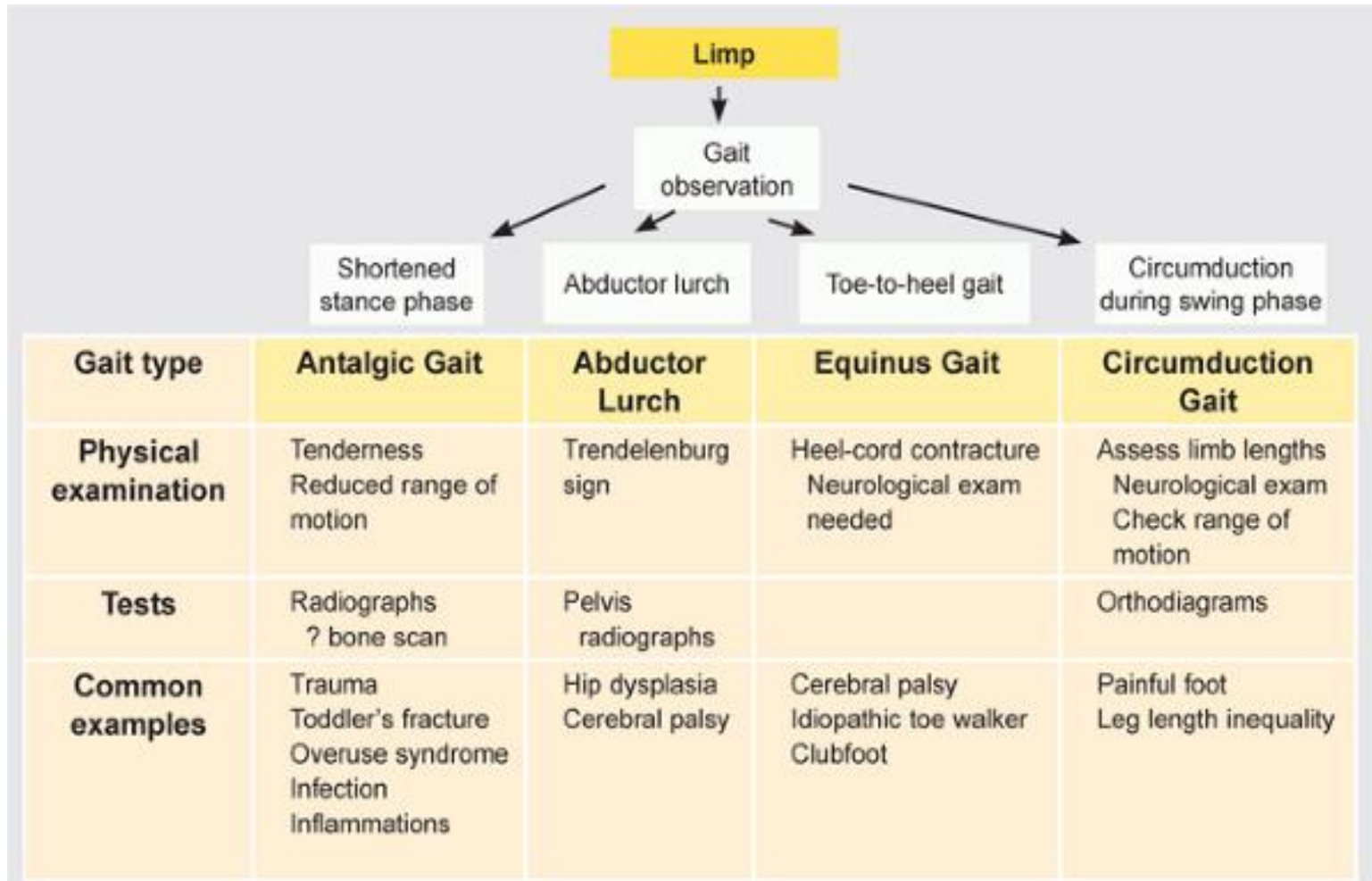
- Evaluation
 - Observation

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



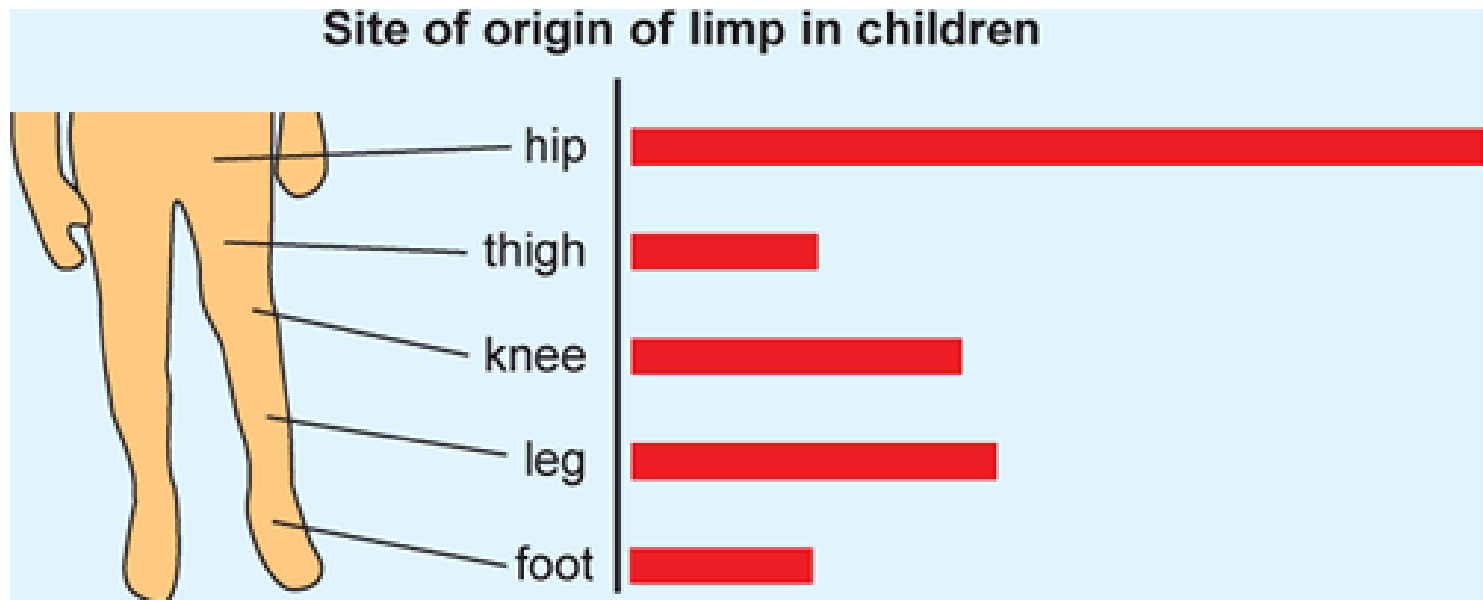
Limp

- 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

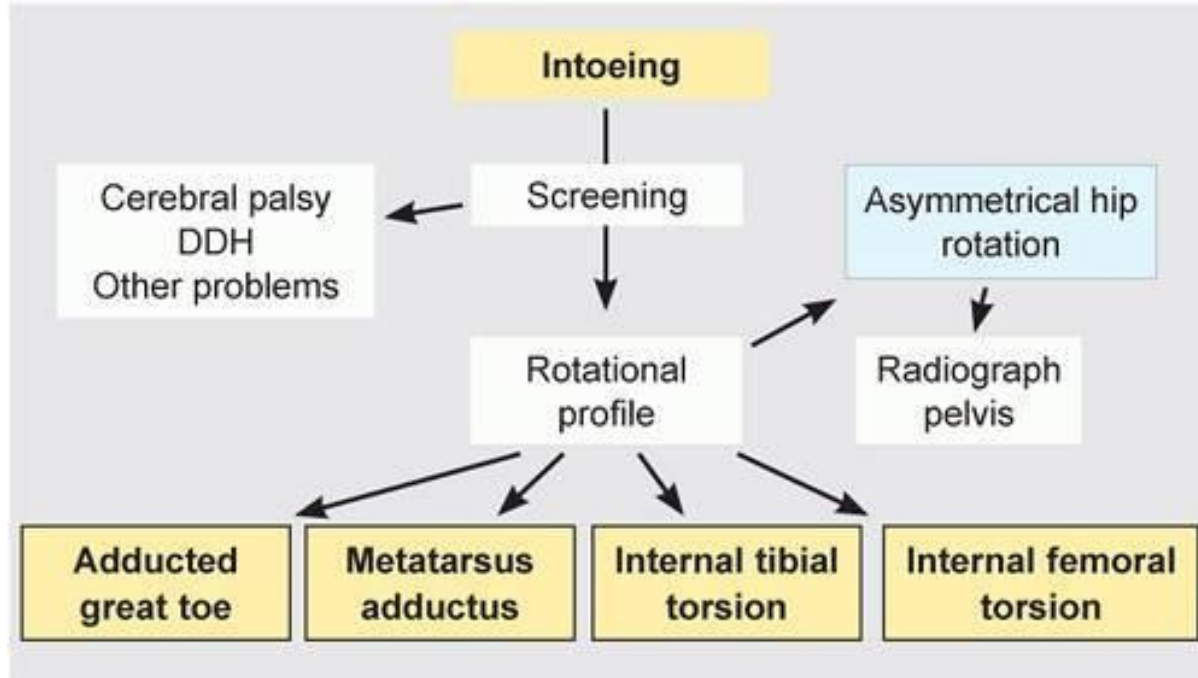
- Describes abnormal limb rotation

- Internal or external

- It may be complex if there is compensatory torsion

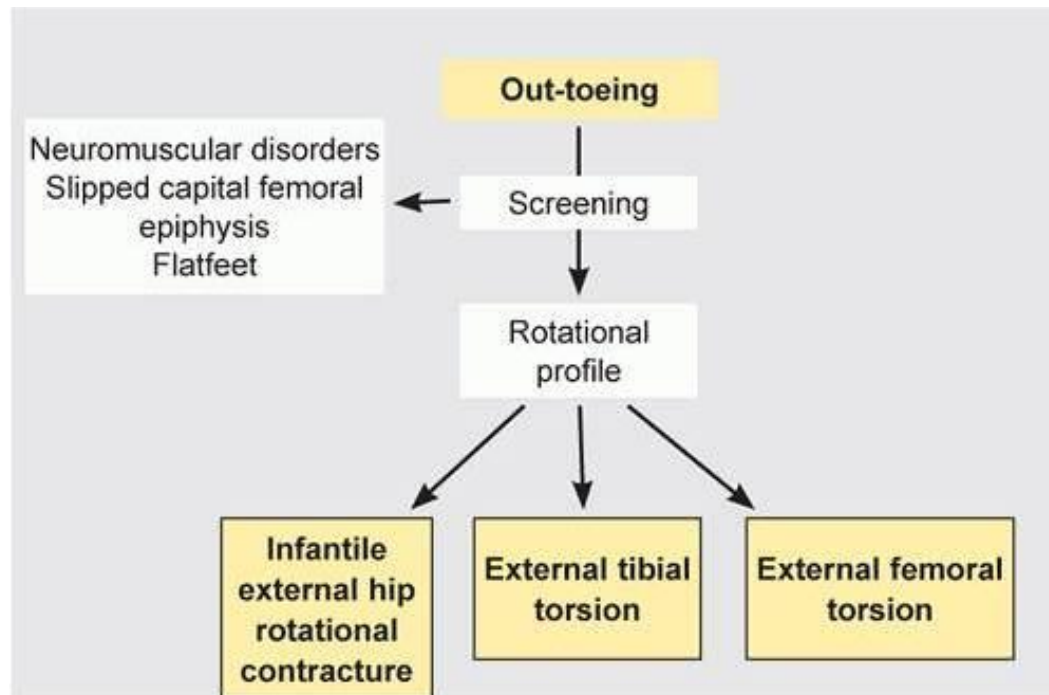
In-toeing and Out-toeing

- Evaluation
 - History
 - Screening examination
 - Rotational profile



In-toeing and Out-toeing

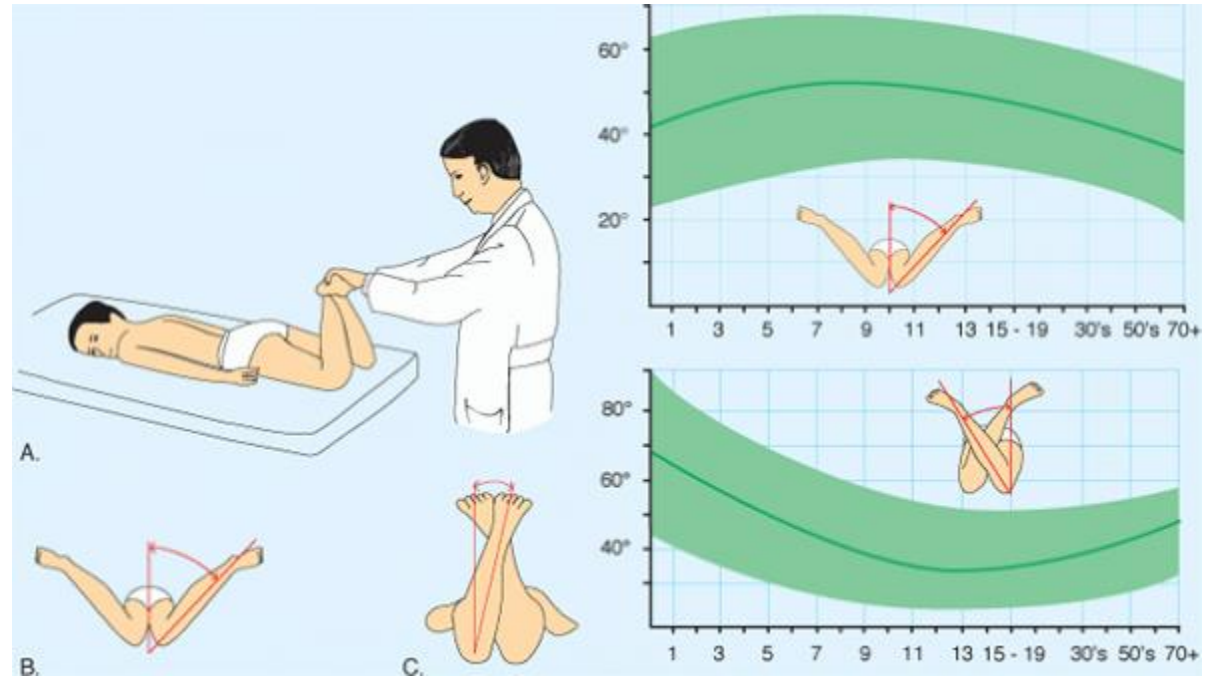
- Evaluation
 - History
 - Screening examination
 - Rotational profile



In-toeing and Out-toeing

- Special tests

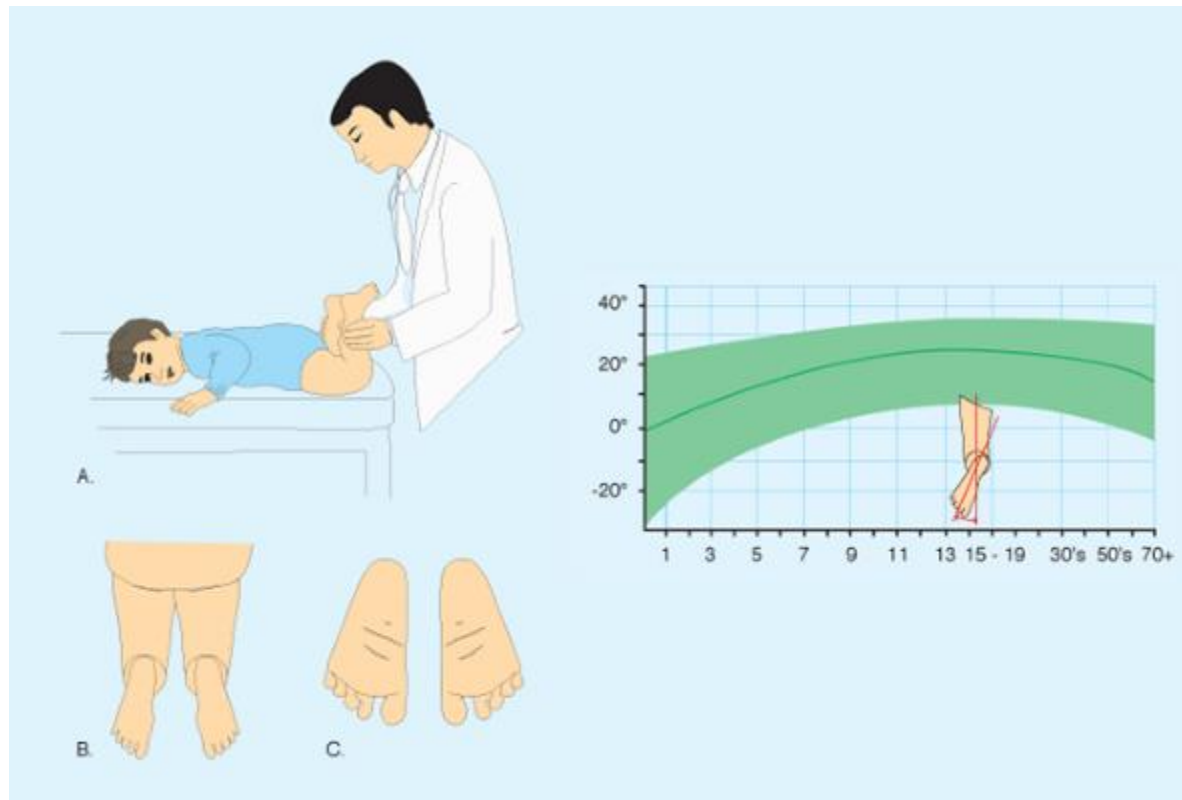
Assessing hip rotation



In-toeing and Out-toeing

- Special tests

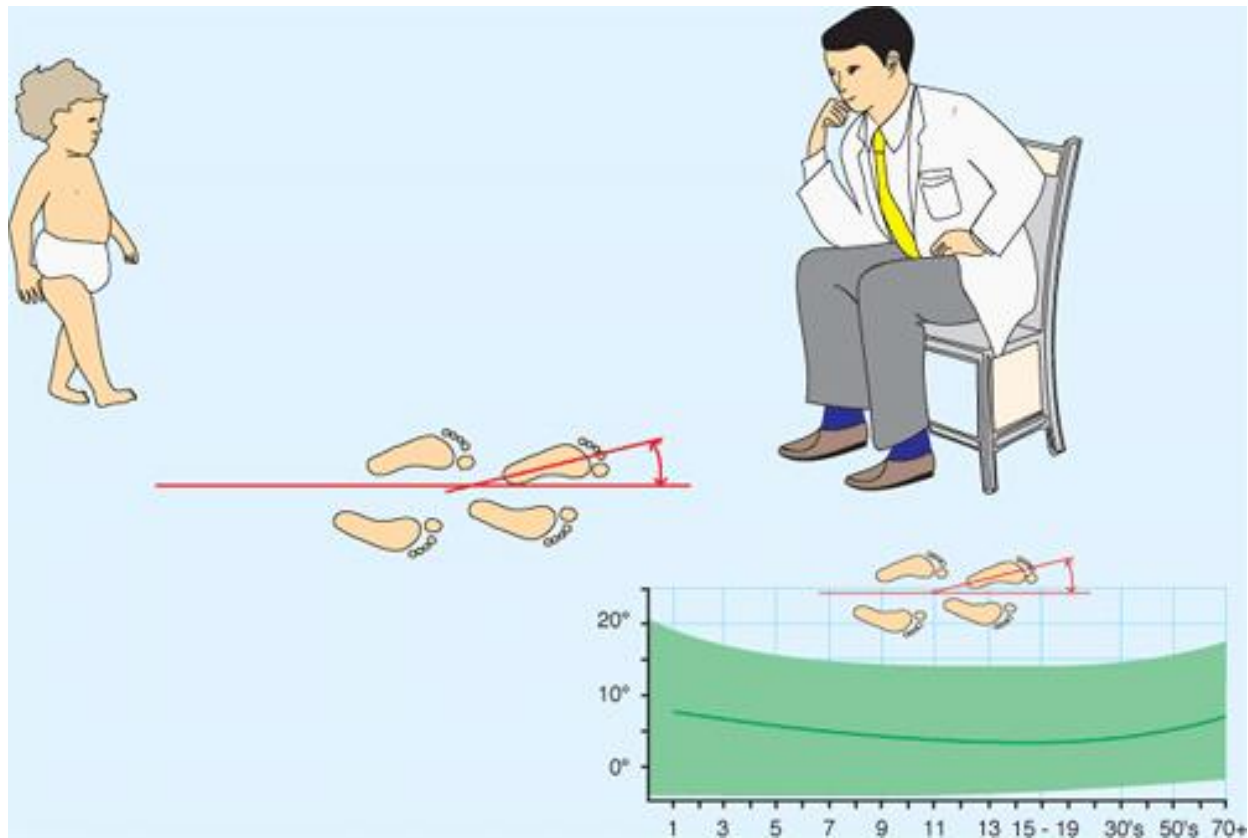
Assessing rotational status of tibia and foot



In-toeing and Out-toeing

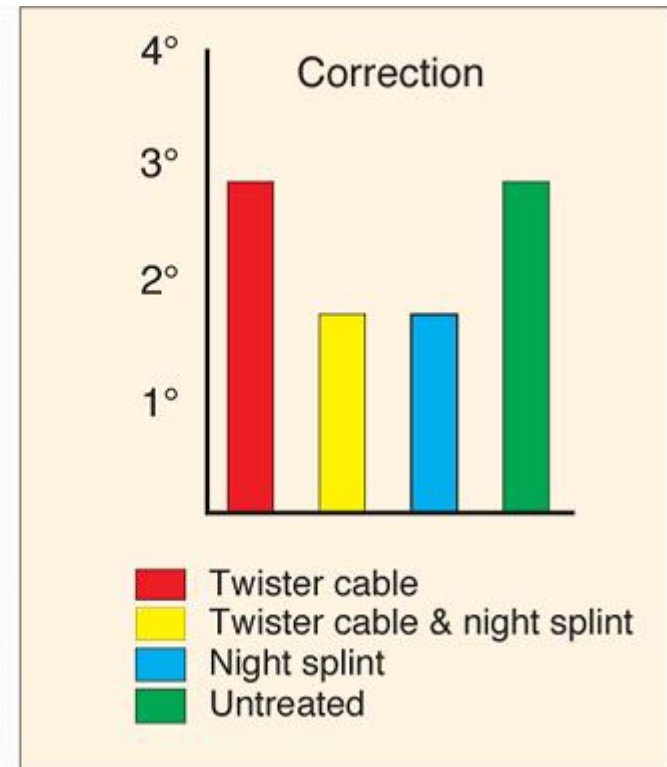
- Special tests

Foot propagation angle



In-toeing and Out-toeing

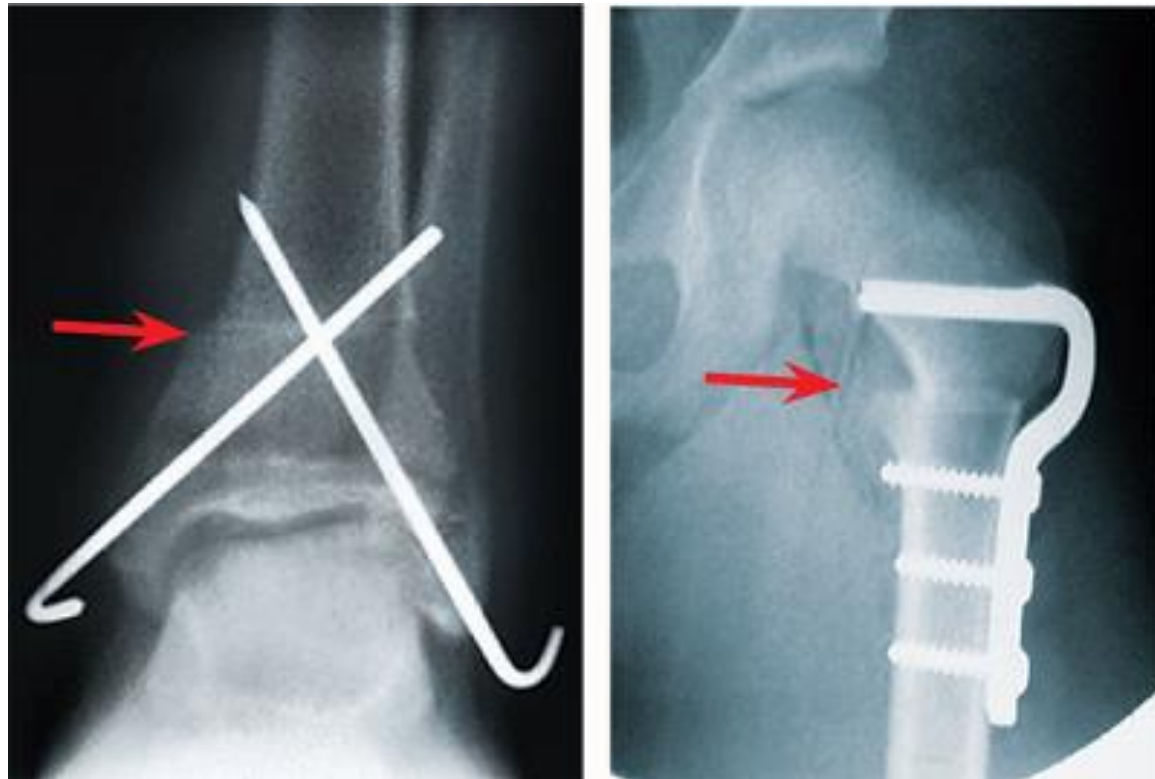
- Management principles
 - Establishing correct diagnosis
 - Allow spontaneous correction (observational management)
 - Control child's walking, sitting or sleeping is extremely difficult and frustrating
 - Shoe wedges or inserts are ineffective
 - Bracing with twister cables limits child's activities
 - 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 |

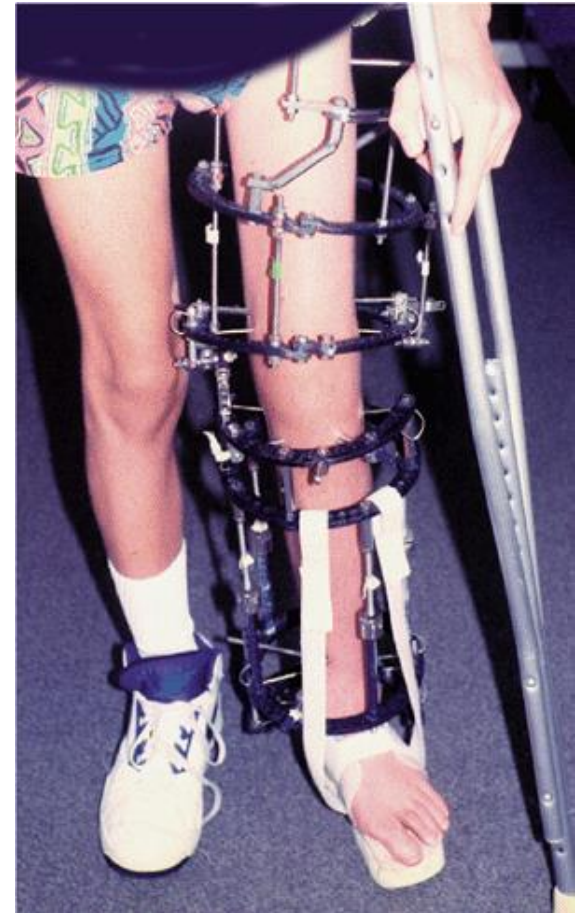
Limb Length Inequality

- 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 ± 2 SD |

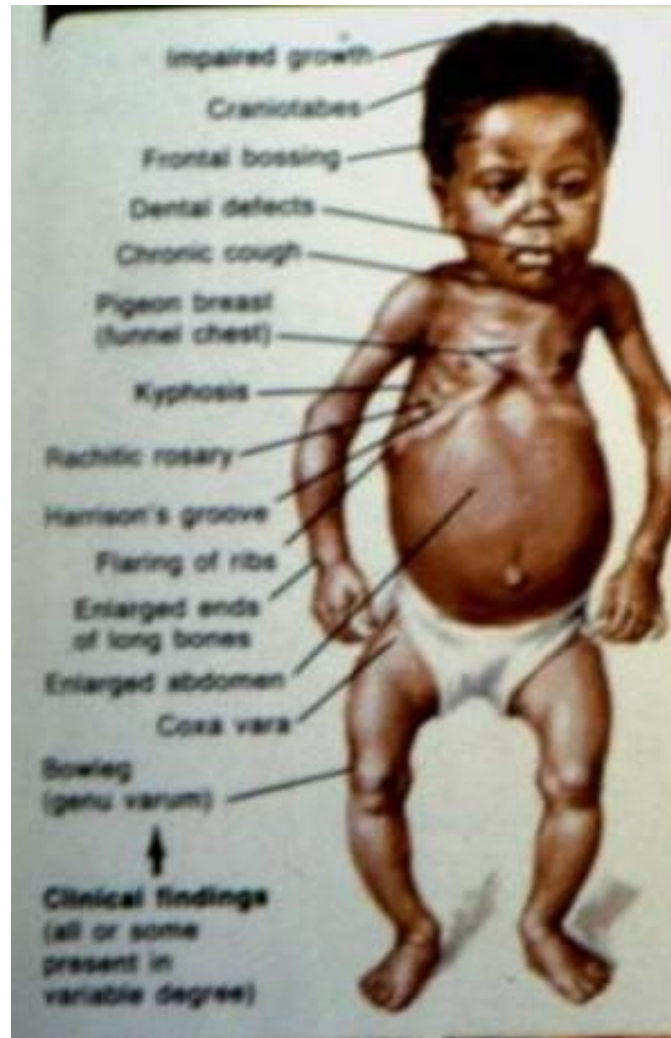
Genu Varum and Genu Valgum

- 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 | |

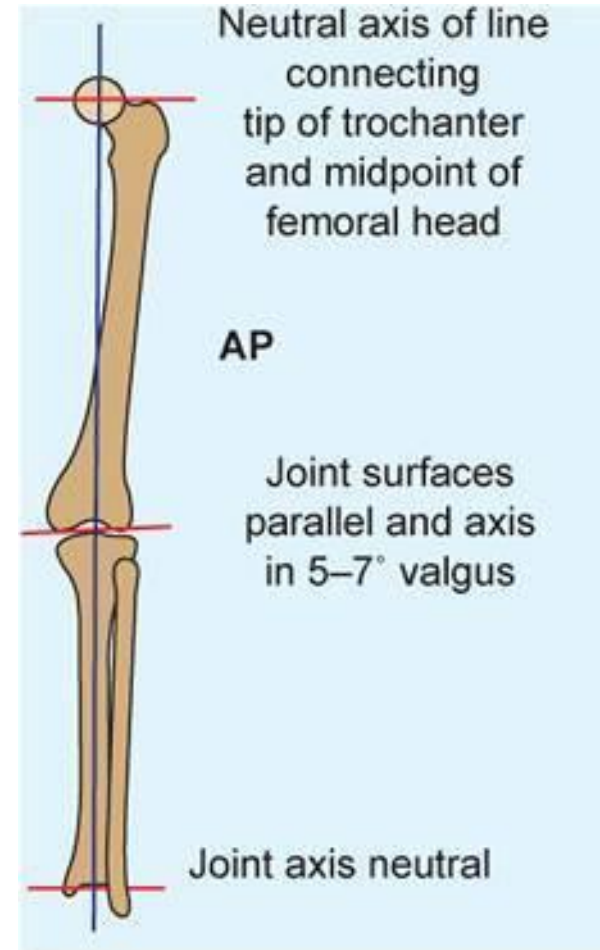
Genu Varum and Genu Valgum

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



Genu Varum and Genu Valgum

- Evaluation
 - Imaging



Genu Varum and Genu Valgum

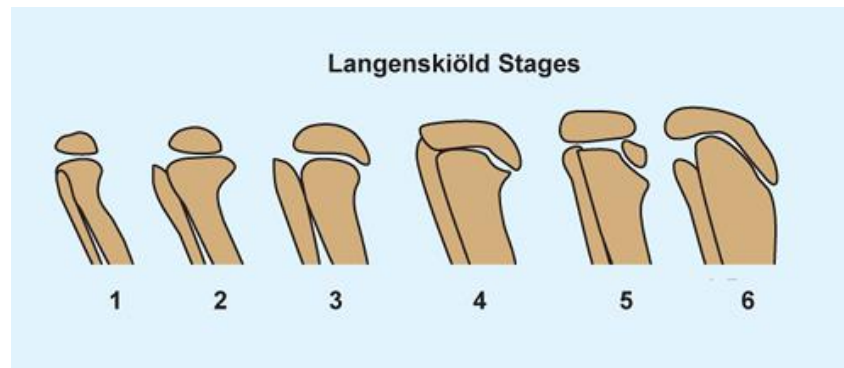
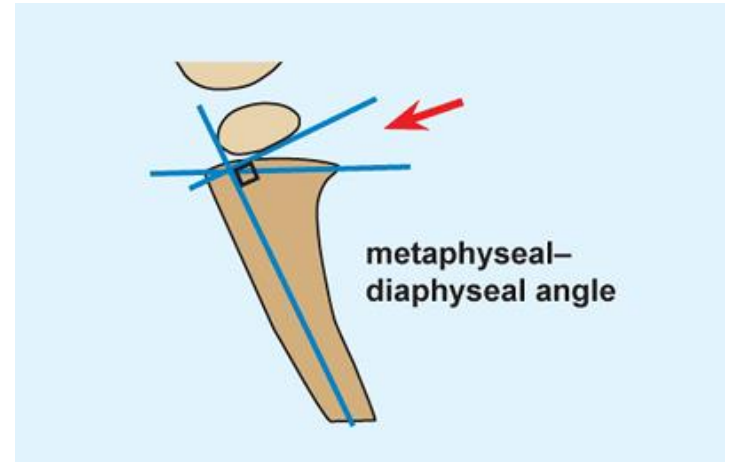
- Management principles
 - Nonoperative?
 - Epiphysiodesis
 - Corrective osteotomies



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

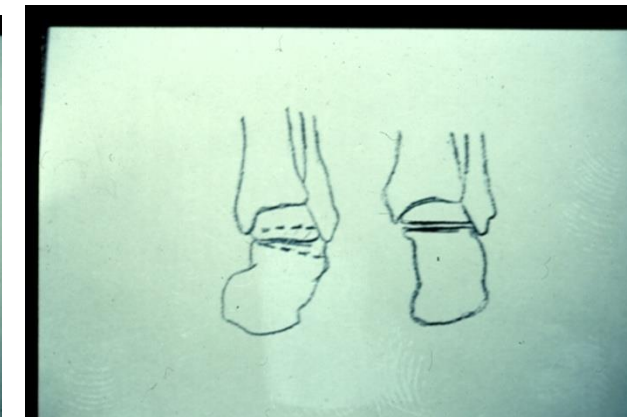
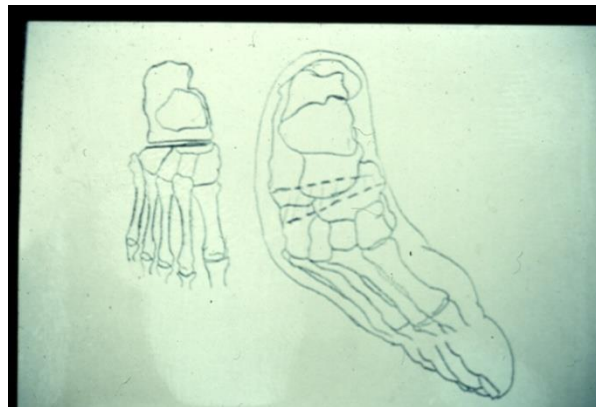
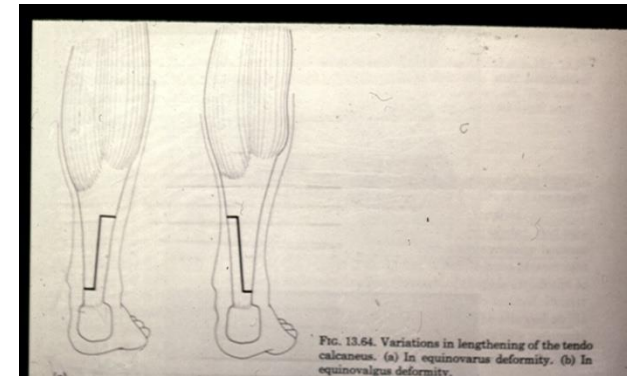
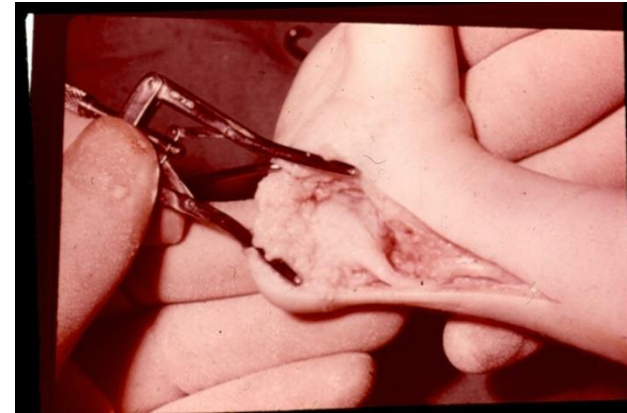
Clubfoot

- 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

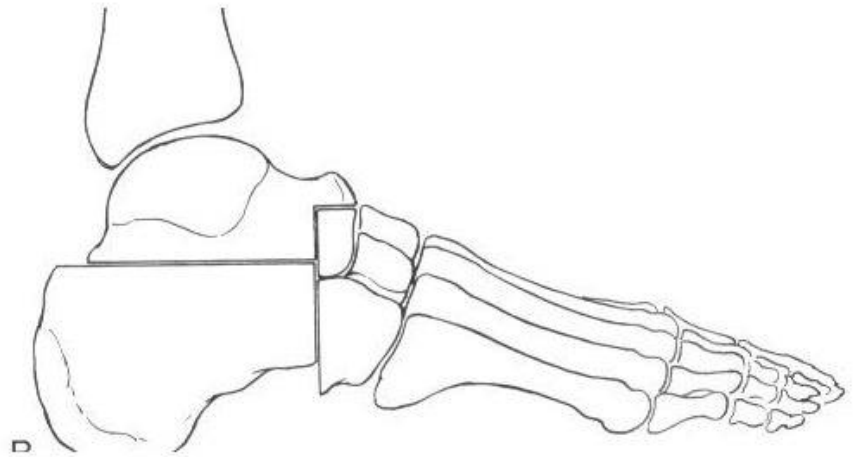


Clubfoot

- 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

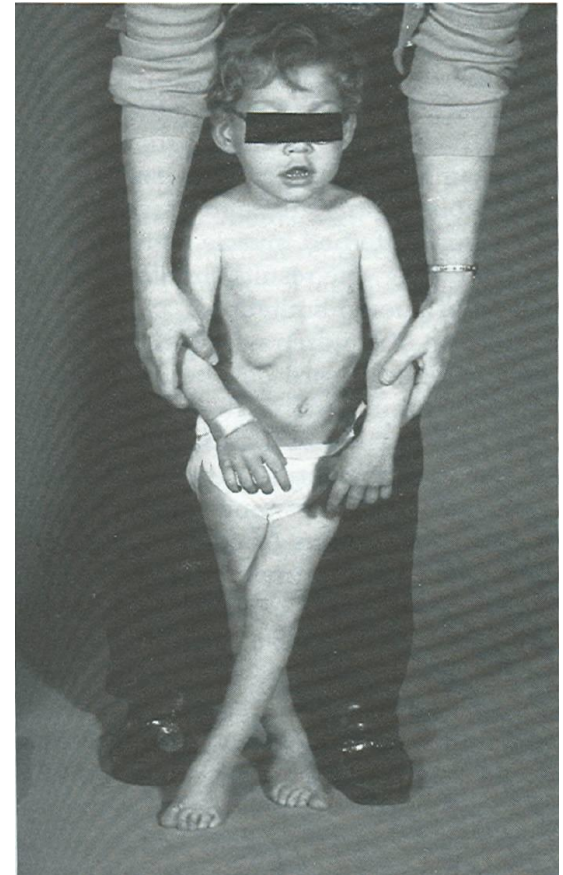


Lower Limb Deformities in CP Child

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

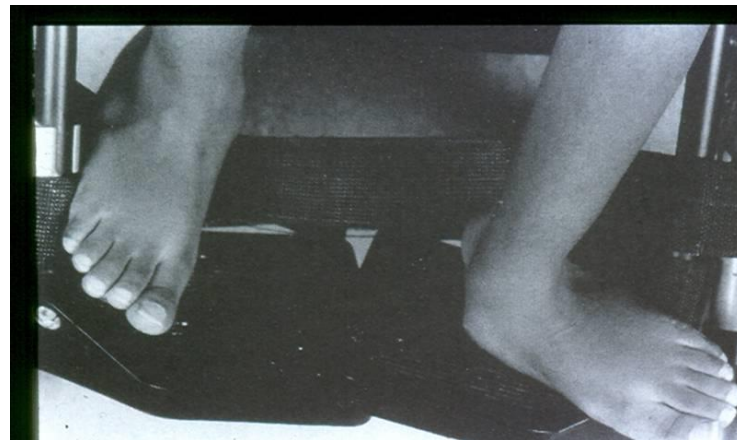
Lower Limb Deformities in CP Child

- 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

