Pediatric Orthopedic Pathology

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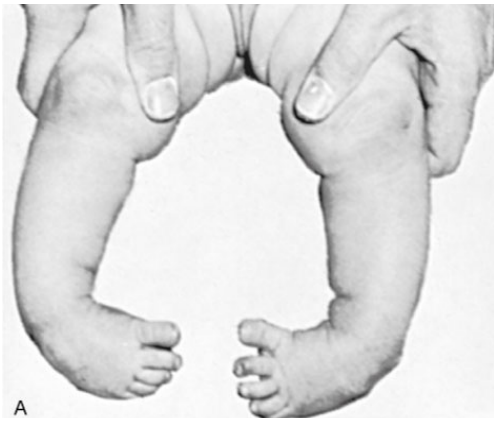
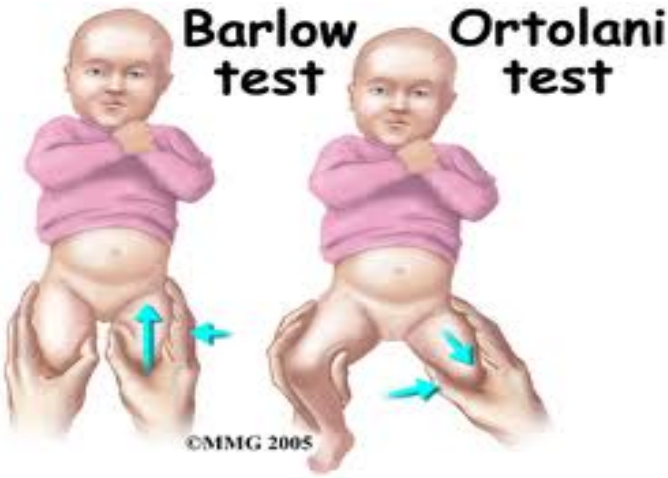
Congenital Defects - Clubfoot (congenital equinovarus)



- Forefoot is adducted and supinated
  - Positional equinovarus
  - Idiopathic congenital equinovarus
  - Teratologic equinovarus

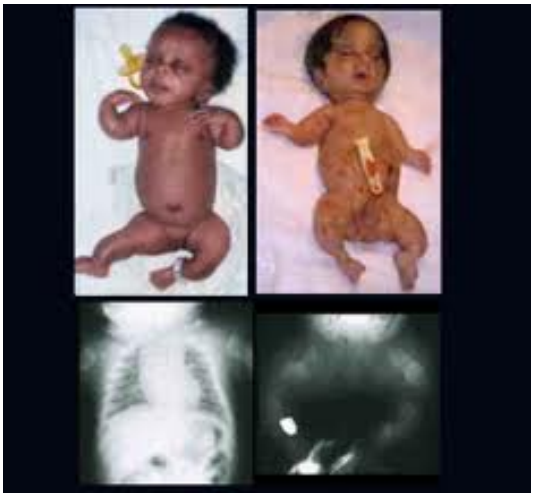
Congenital Defects - Developmental Dysplasia of the Hip (DDH)

- Abnormality of the hip that can affect the femoral head, acetabulum, or both
  - Risk factors:
    - Female sex
    - Positive family history
    - Breech presentation
  - The hip can present as subluxated, dislocated, or acetabular dysplasia
  - Manifestations:
    - Asymmetry of skinfolds at groin crease
    - Galeazzi sign
    - Limitation of hip abduction
    - Positive Ortolani sign
    - Positive Barlow test
  - Clinical management
    - Outcome becomes poorer with age
    - Pavlik harness
    - Closed reduction with spica casting
    - Surgery



Osteogenesis Imperfecta - "Brittle bone disease"

- Defect in type I collagen production
    - Bone and vessel collagen
- Clinical manifestations:
    - Osteopenia
    - Increased rate of fractures
    - Bone deformity (bowing)
    - Short stature
    - Blue sclera and poor dentition
    - Aortic aneurysm

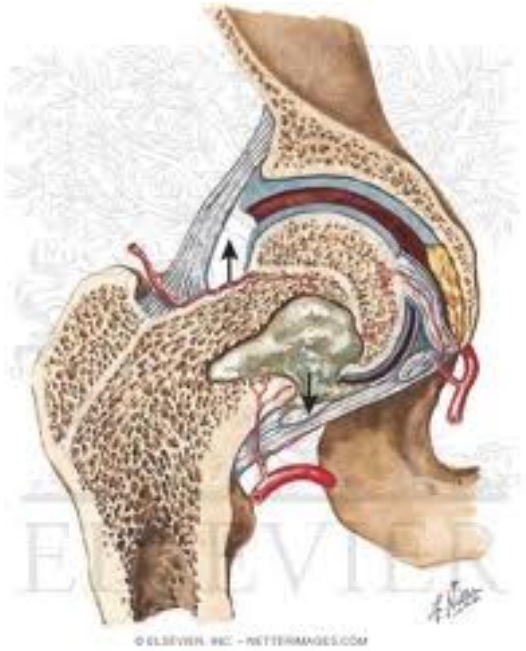


- Clinical management:
    - Surgical
        - Intramedullary and telescoping rod placement
    - Medical
        - Increased calcium and vitamin D
        - Biphosphates

Osteomyelitis

- Bone infection from bacteria or tuberculosis (granulomatous)
- Acute hematogenous osteomyelitis in children frequently begins as a blood abscess in the metaphysis of the bone
- The abscess ruptures under the periosteum and spreads along the bone shaft or into the bone marrow
- Clinical manifestations:
    - Pain, swelling, warmth, fever
    - Elevated white blood cells, C-reactive protein, and erythrocyte sedimentation rate
- Clinical management:
    - Antibiotics for 6-week regimen
    - Surgical debridement

Septic Arthritis



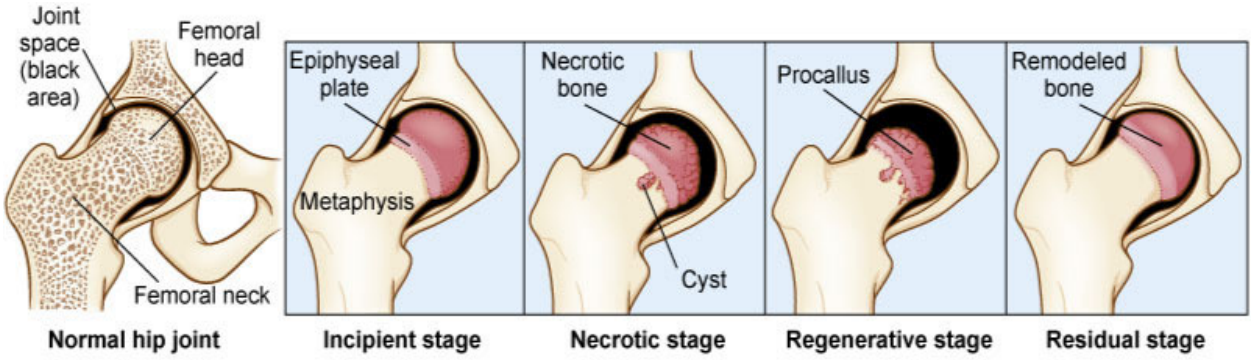
- Caused by bacteria or granulomatous
- Surgical emergency
- Occurs primarily or secondary to osteomyelitis
- Lysosomes destroy articular cartilage and interrupt blood supply
- Clinical manifestations:
    - Pseudoparalysis
    - Inability to bear weight
    - Guarded motion of the joint
    - Malaise
    - Anorexia
- Clinical management:
    - *Staphylococcus aureus* most common bacteria
    - Surgical debridement
    - Antibiotic therapy
    - Long-term follow-up

Juvenile Rheumatoid Arthritis (JRA)

- Childhood form of rheumatoid arthritis
- The basic pathophysiology of JRA is the same as the adult form
- Three distinct modes of onset:
    - Oligoarthritis
    - Polyarthritis
    - Stills disease
- Differences in JRA and adult RA:
    - Large joints are affected
    - Chronic uveitis
    - Low detection of rheumatoid factor
    - Subluxation and ankylosis of the cervical spine
- Treatment
    - Supportive with anti-inflammatories and methotrexate

Osteochondrosis

- Avascular diseases of the bone
- Decrease blood supply
    - Trauma
    - Change in clotting sensitivity
    - Vascular injury
- Legg-Calvé-Perthes disease
    - Interrupted blood supply to the femoral head
    - Deformation due to ischemia is permanent
    - Clinical manifestations:
        - Spasm on rotation of hip
        - Limited internal rotation or abduction of hip
        - Trendelenburg gait
    - Clinical management:
        - Anti-inflammatories
        - Serial radiographs
        - Surgery



Osgood-Schlatter Disease

- Tendinitis of the anterior patellar tendon and osteochondrosis of the tubercle of the tibia
- One of the most common ailments in children involved in sports
- Clinical manifestations:
    - Pain
    - Swelling
- Clinical management:
    - Restricted activity
    - Bracing and knee immobilizer

Scoliosis

- Scoliosis is a curvature of the spine that involves both lateral curvature and rotation
    - Idiopathic (80% of cases)
    - Congenital
    - Teratogen
- Medical management:
    - Bracing
    - Surgery

Muscular Dystrophies

- Group of inherited disorders that cause degeneration of skeletal muscle fibers
- The muscular dystrophies cause progressive, symmetric weakness and wasting of skeletal muscle groups

Duchenne Muscular Dystrophy

- Most common of the muscular dystrophies
- X-linked recessive inheritance
    - Deletion of a segment of DNA or a single gene defect on the short arm of the X-chromosome
- Generally affects boys
- Duchenne muscular dystrophy gene
    - Encodes for the dystrophin protein
    - Dystrophin maintains the structural integrity of the cytoskeleton
- Manifestations of the disorder begin to appear by approximately 3 years of age:
    - Slow motor development
    - Progressive weakness
    - Muscle wasting
    - Sitting and standing are delayed
    - The child is clumsy, falls frequently, and has difficulty climbing stairs

Musculoskeletal Tumors

- Benign bone tumors
- Osteochondroma
    - Inherited syndrome of hereditary multiple exostoses
- Nonossifying fibroma
    - Sharply demarcated, cortically based lesions of fibrocytes

Malignant bone tumors

- Osteosarcoma
    - Most common tumor in childhood
    - Originates in mesenchymal cells - Linked to deletion of genetic material
    - Bulky tumor extending into soft tissue
    - Clinical manifestations:
        - Night pain, swelling, warmth,
        - Cough, dyspnea, and chest pain if lung metastasis
    - Clinical management:
        - Graded according to malignancy
        - Surgery and chemotherapy
- Ewing sarcoma
    - Most lethal bone tumor
    - Translocation of chromosome
    - Breaks through bone to form soft tissue mass
    - Metastasizes to nearly every organ
    - Clinical manifestations:
        - Pain that increases in severity
        - Fever, Malaise, Anorexia
    - Clinical management:
        - Radiation and chemotherapy
        - Surgical debridement

Nonaccidental Trauma

- “Corner” metaphyseal fractures
    - Long bone fractures caused by a twisting force
    - Transverse tibial fractures are the most common
    - Associated with child abuse, but osteogenesis imperfecta must be ruled out
- Legally mandated to report child abuse