# Osteochondroses

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# Osteochondroses

- Most common among 3-12 year olds
- Can be diagnosed in adults
- M > F except Freiberg's
- Can be bilateral
- Variations of normal endochondral ossification well known
- Diagnoses based upon symptoms and abnormal imaging

# Osteochondroses

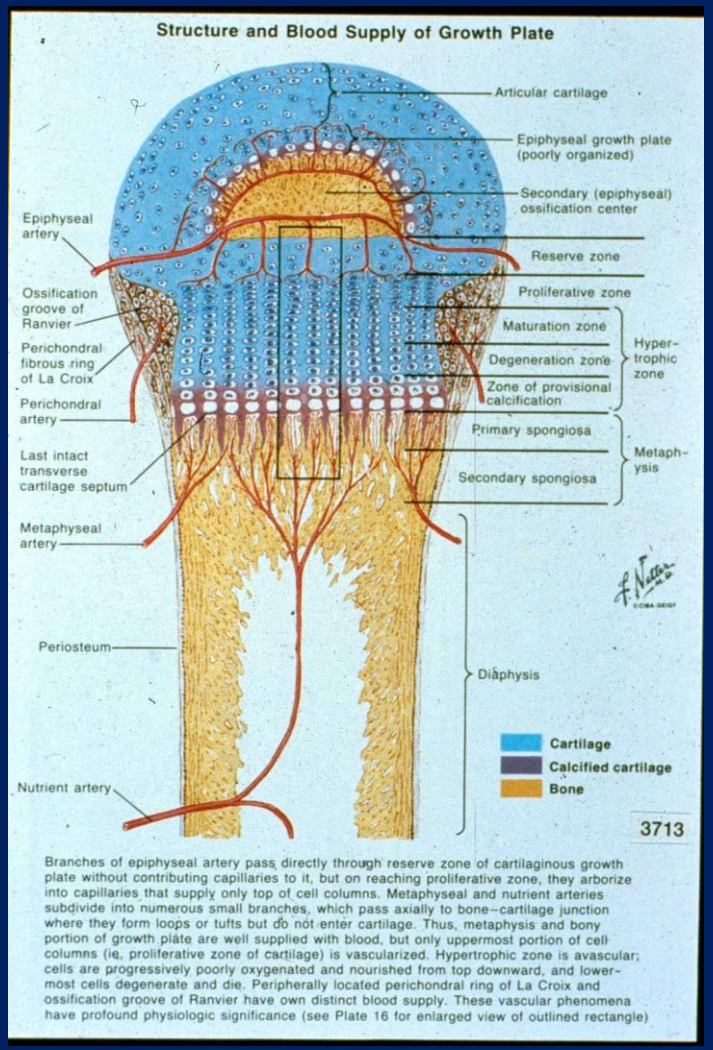
- Paget 1870 “quiet necrosis”
- Konig 1888 “osteochondritis dissecans”
  - Loose bodies
  - w/o OA, trauma

# Osteochondroses

- Osteochondroses thought to represent disorder of endochondral ossification
- Endochondral ossification
  - Mechanism in which cartilage is transformed into bone.
  - Chondrocyte proliferation, matrix production, calcification, ossification
- However, normal endochondral ossification may not be uniform

# Osteochondroses

- Epiphyseal artery
  - Chondrogenesis
  - Osteogenesis
  - Germinal layer (reserve zone)
- Metaphyseal artery
  - Longitudinal growth
  - Angulation

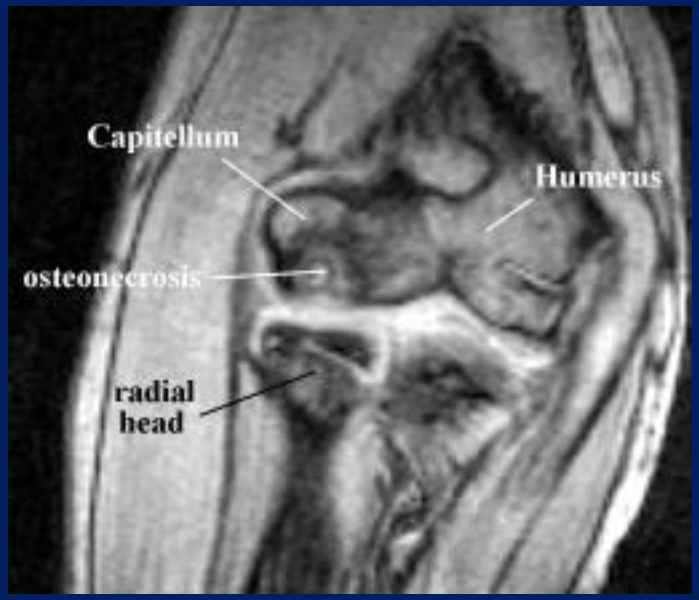


# Osteochondroses

- Specific etiology unknown, likely multifactorial
  - Trauma
  - Ischemia
  - Genetic factors
  - Idiopathic

# Pathogenesis

- Early necrosis – <u>condensation</u>
- Revascularization with bone deposition and resorption – <u>fragmentation</u>
- Bone healing - <u>reorganization</u>
- Residual deformity



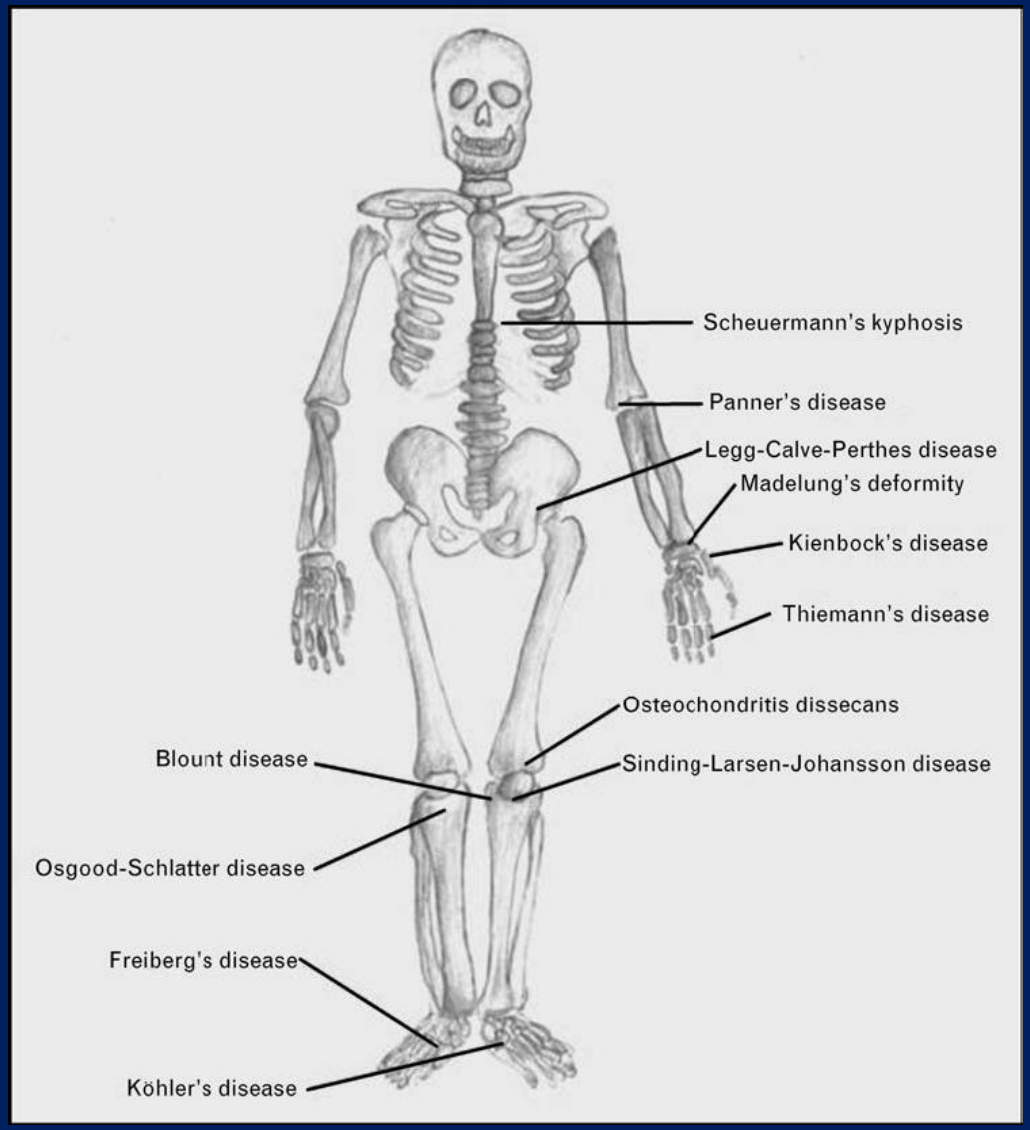
# Classification

- Articular
  - Primary – articular and epiphyseal cartilage and subjacent endochondral ossification
  - Secondary –articular and epiphyseal cartilage due to AVN of subjacent bone
- Non-articular
  - Tendon, ligaments, impact sites
- Physeal
  - Long bones
  - Vertebrae

Siffert 1981

Examples

- Panner's - capitellum, Freiberg's , Iselin's– MT
- LCP, Kohler's- navicular, Keinbock's – lunate, OCD
- Osgood-Schlatter, Sever's, LL elbow
- Tibia vara (Blount's), Scheuermann's




From Doyle SM, Monahan A. Curr Op Ped 2010,22:41-46.

# Clinical Classification

- Osteochondroses
- Osteochondritis dissecans – focal area of subchondral bone undergoing necrosis with splitting into fragments
- Traction apophysitis

# Clinical Features

- Localized pain, swelling
- Often insidious onset
- Sports participation (repetitive loading)
- Acute trauma
- TTP, swelling

# Clinical Features - OCD

- Adolescent age group
- Sports setting
- Mechanical symptoms
- Pain, swelling, stiffness
- TTP, effusion, decreased ROM
- Sites
  - Medial femoral condyle
  - Talus
  - Capitellum
  - Patella

# Diagnosis

- Radiographs display characteristic findings
- MRI – may predict prognosis in some cases (OCD)

# Treatment

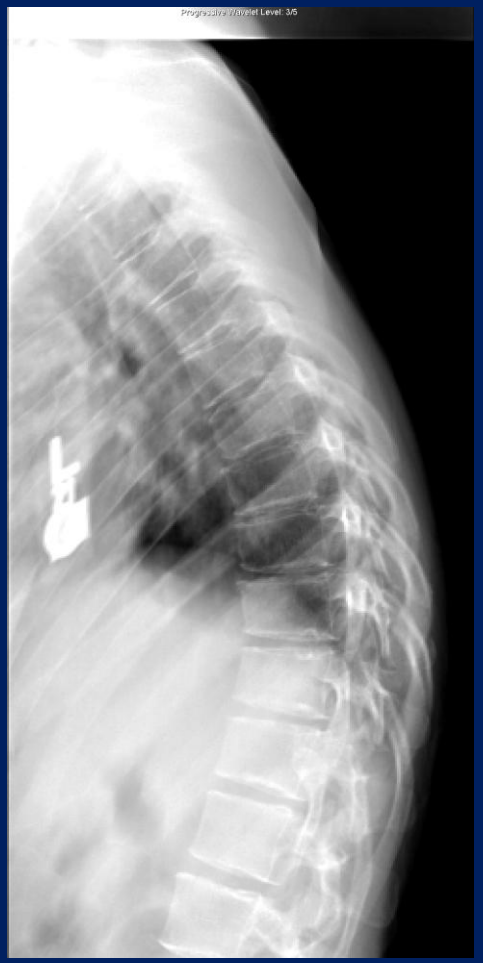
- Non-articular (traction aphophysitis)
  - Relative rest
  - Rehab – strengthening
  - Education

# Treatment - Physeal

- Blount's
  - Proximal tibial physis
    - Varus. flexion, IR
  - < 4-6y
    - Obese, early walking
    - Bilateral
    - Bracing vs surgery
  - > 4-6 yrs
    - Unilateral
    - Tibial osteotomy

# Treatment - Physeal

- Scheuermann's (adolescent kyphosis)
  - > $45^0$, wedging 3 consecutive vertebrae
    - <$50^0$ Rehab ?
    - >$50^0$ < $70^0$ Brace
    - >$70^0$ fusion with instrumentation



## Panner's

- 7-12y (peak 9y)
- +/- Sports related
- Full ROM
- No locking, catching
- Flattening and patchy sclerosis of most of capitellum
- No loose bodies
- Self limited
- No long term sequelae

## OCD Capitellum

- 11-16y
- Gymnasts, pitchers
- Limited ROM
- Catching/locking can occur
- Focal lesion
- Loose bodies
- May require intervention
- Residual deformity/disability

# Treatment – Primary Articular

- Freiberg's
  - Rest, immobilization 6-12wks
  - If persistent symptoms: tx depends on age
    - Debridement, dorsiflexion osteotomy, shortening osteotomy, Smillie procedure (debridement and bone grafting)
- Panner's
  - Complete rest
  - Serial radiographs
  - Rehab

# Treatment – Secondary Articular

- Kohler's
  - Cast immobilization
    - – 6-8wks
- Kienbock's
  - Surgical procedures depending on stage – modified Stahl's classification
    - ( radial shortening/ulnar lengthening, lunate excision with prosthesis, arthrodesis, proximal row carpectomy)

Stahl's classifcation

I. Lucent line
II. Sclerosis
III. Collapse
IV. Pancarpal arthrosis

# Treatment – Secondary Articular

- Legg-Calve´-Perthes
  - 4-8yr, M>F
  - Bilateral (20%), but not simultaneous
  - Genetic – Factor V Leiden
  - 2 year time course depending on age
  - Goal – maintain position of femoral head w/in acetabulum, ROM , prevent deformity
  - Best outcome  if <6y, <50%
  - PT
  - Containment
    - Bracing
    - Surgery -osteotomy

# Treatment - OCD

- Depends on site and stage
  - Stage with MRI
    - Stage I – thickening of articular cartilage
    - Stage II –low signal rim=fibrous
    - Stage III- high signal behind fragment =fluid – unstable
    - Stage IV – loose fragment
  - If stable – rest, observe
  - Unstable – arthroscopy - removal of loose fragments, debridement

# Thank you