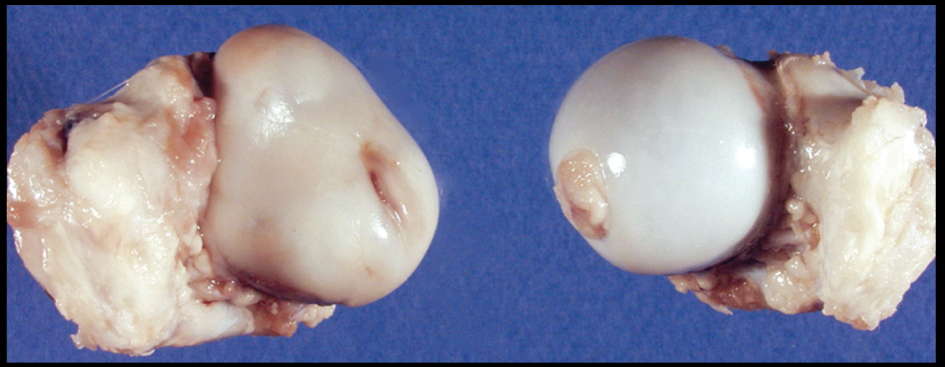
Current Thinking of the Osteochondroses



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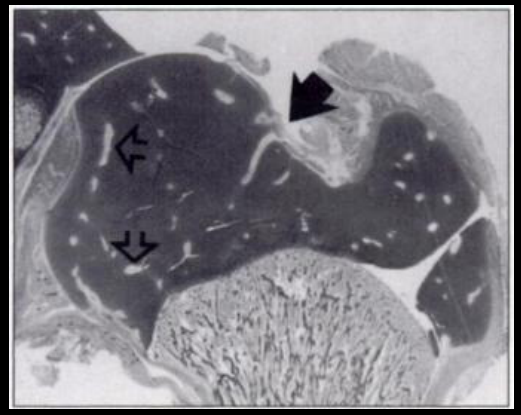
What is an osteochondrosis?



- Abnormal endochondral ossification and epiphyseal growth of epiphysis, apophyisis, or round bone

Delayed Ossification

Increased Activity

Vulnerable Vascular Supply (vascular canals)

Decreased Bone Production

AVN

- Axial Skeleton
  - Scheuermann disease
- Upper extremity
  - Panner
  - Kienbock
- Lower extremity
  - Legg-Calve-Perthes
  - Sinding-Larsen-Johansson
  - Osgood-Schlatter
  - Blount
  - Sever
  - Kohler
  - Freiberg

Osteochondroses- Stages

- necrosis of bone and cartilage
- revascularization
- granulation tissue invasion
- osteoclastic resorption of necrotic segments
- osteoid replacement
- formation of mature lamellar bone

Osteochondroses- Stages

Histology

1. necrosis of bone and cartilage
2. revascularization
3. granulation tissue invasion
4. osteoclastic resorption of necrotic segments
5. osteoid replacement
6. formation of mature lamellar bone

MRI

1. Lack of enhancement

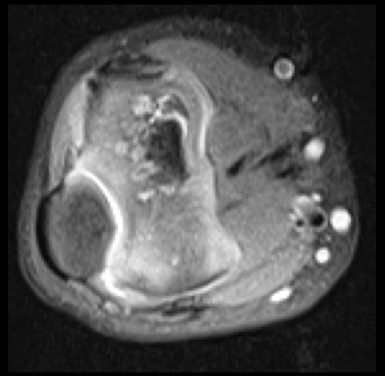
   Loss of marrow fat signal
2. New enhancement (transphyseal?)
3. Fragmentation and collapse
4. Healing

Osteochondrosis of the Capitellum: Panner Disease

- children <10 years
- Hx of throwing
- XR: fragmentation, sclerosis of capitellum
- MRI: low SI on T1-and high SI on T2
- intact articular cartilage

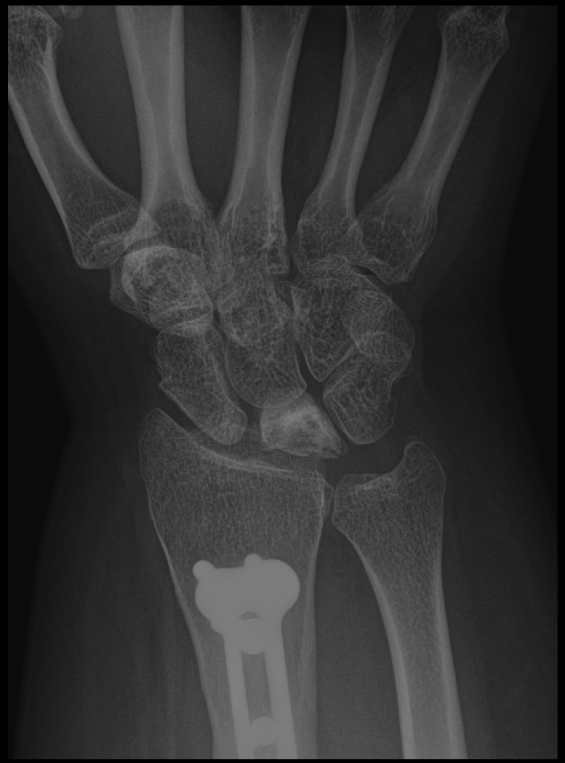
Panner Disease

- Tx: rest, anti-inflammatories
- normal capitellar growth resumes without long-term sequelae

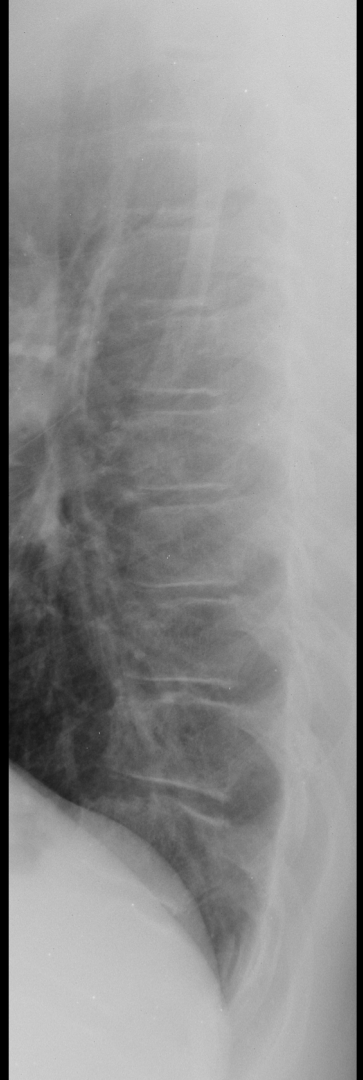


Osteochondrosis of the Lunate
Kienböck's Disease

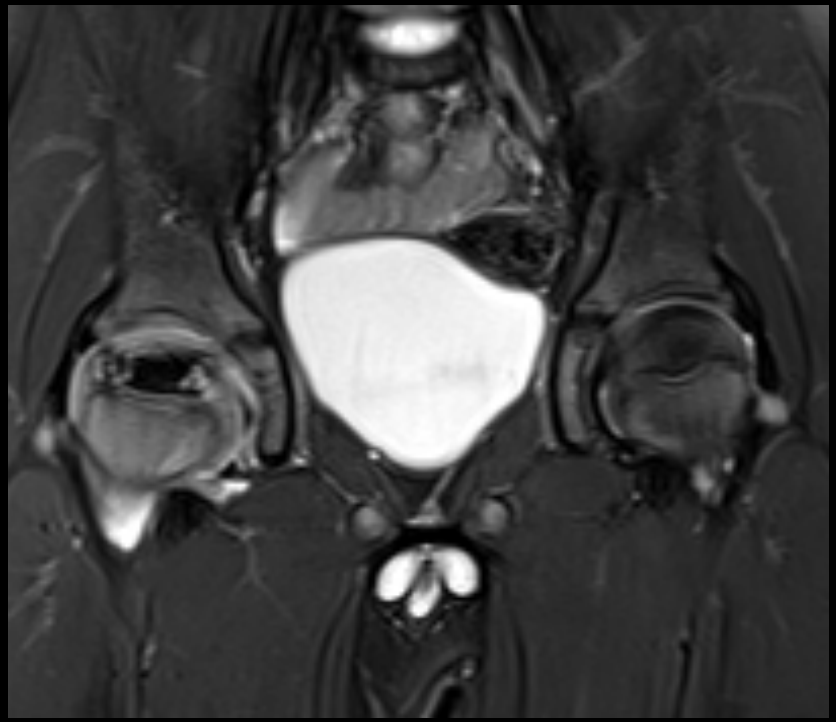
- AVN of entire lunate
- 20 to 40 years of age
- Manual labor
- 75%: negative ulnar variance

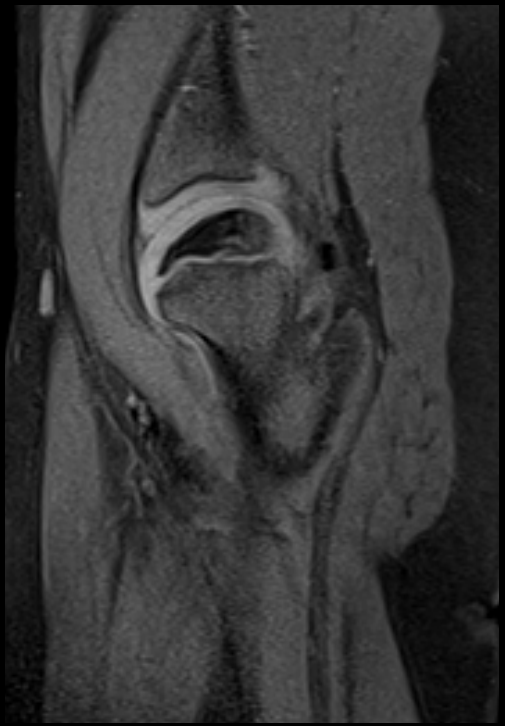


Osteochondrosis of Vertebral Ring Apophyiss Scheuermann Disease



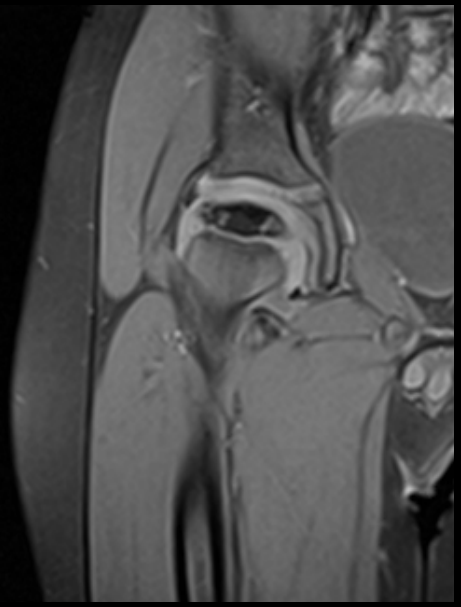
5 year-old boy with limping and pain in the right hip for the last 4 weeks

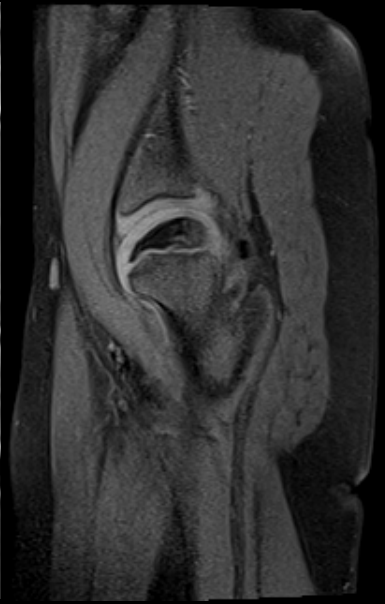


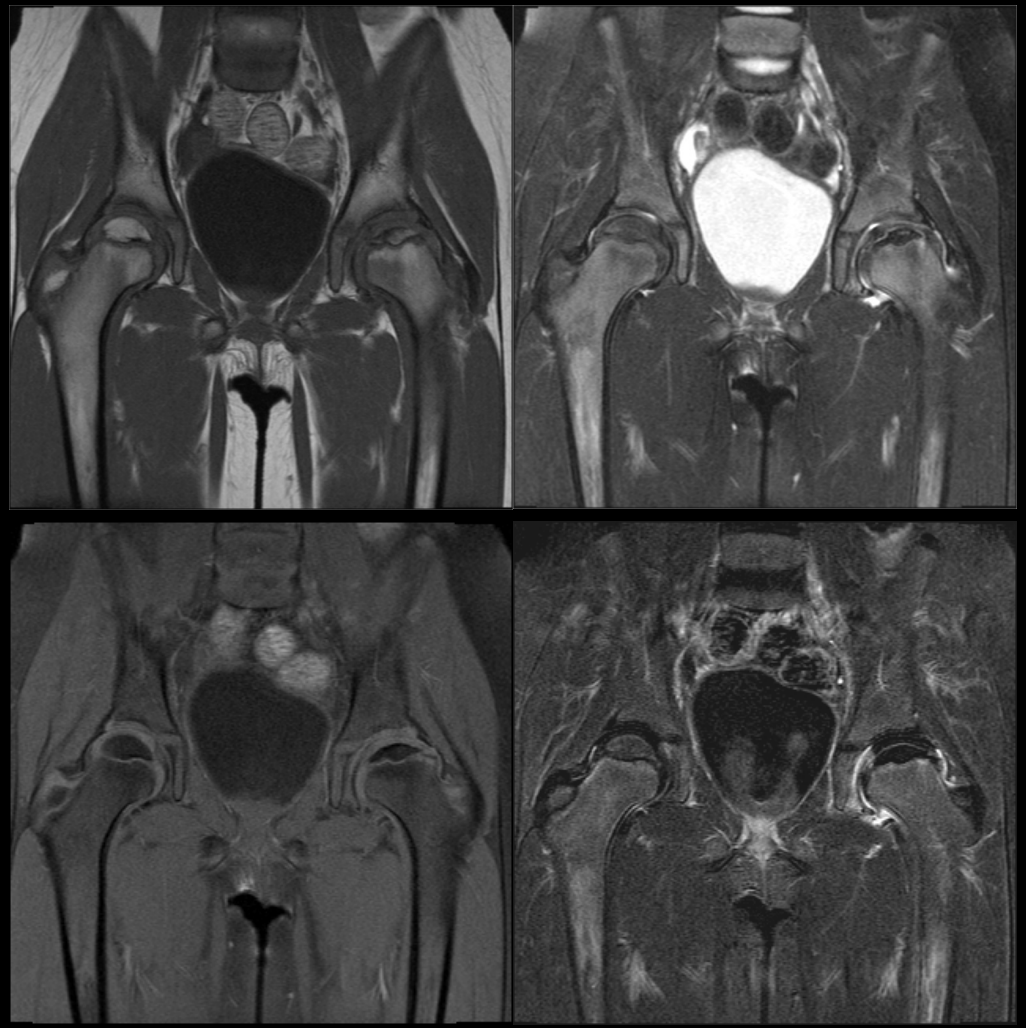


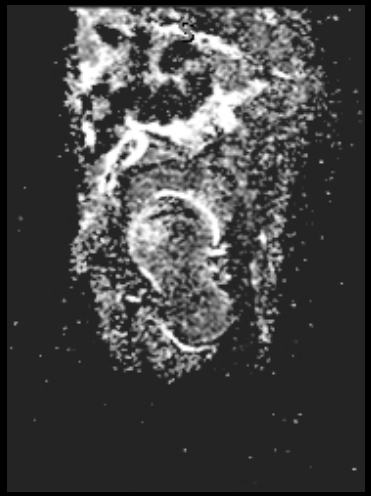
Legg Calve Perthes Disease

- Decreased SI
- Decreased height
- Fragmentation
- Anterior involvement

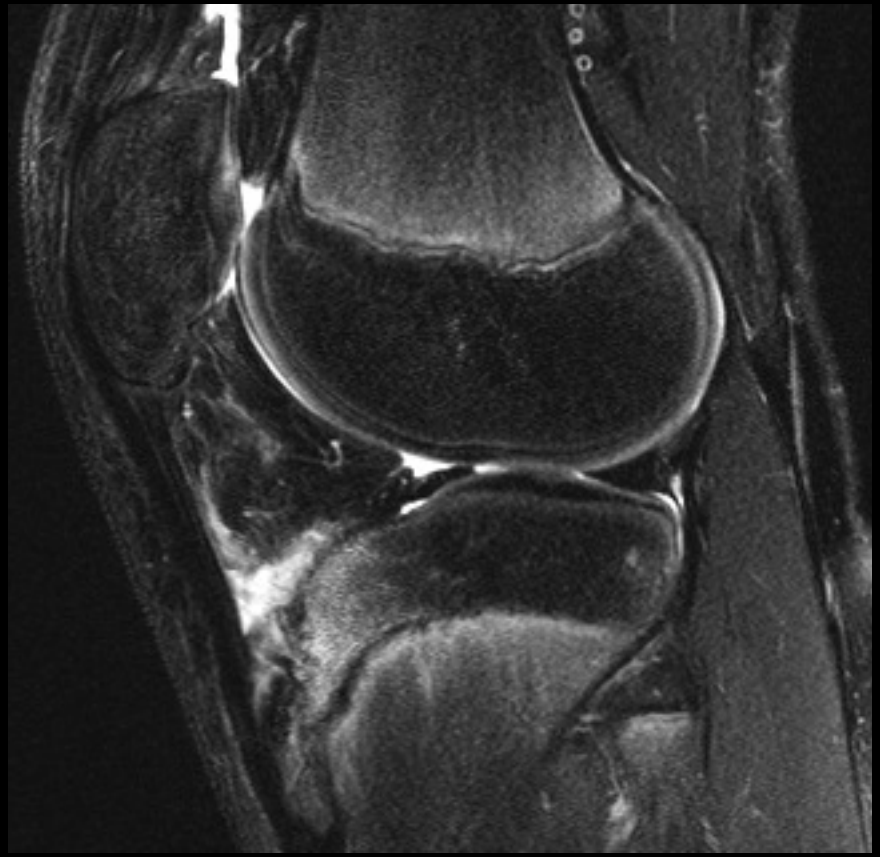








13-year-old boy with knee pain



Osgood-Schlatter Disease

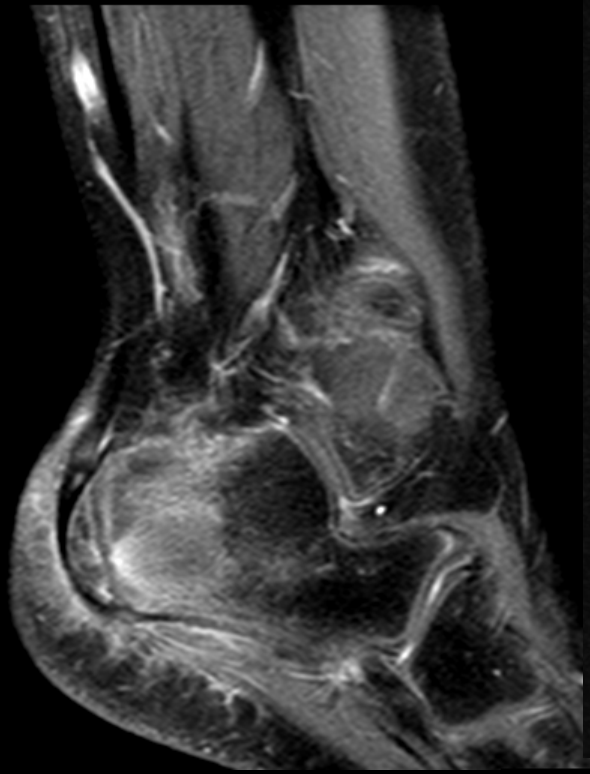
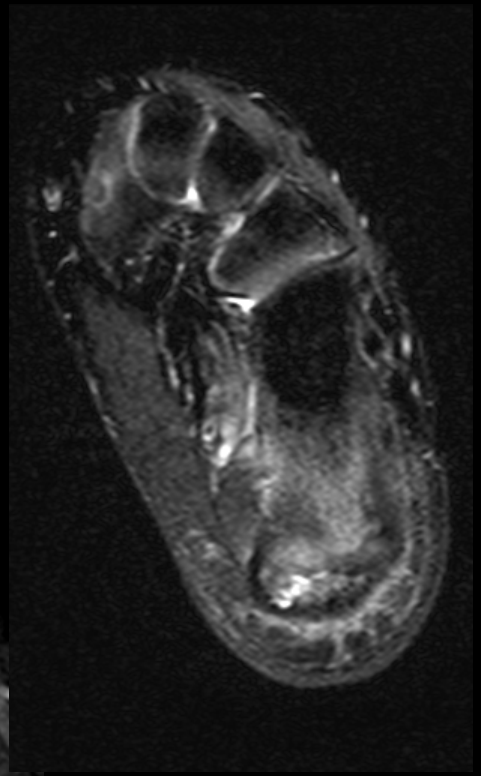
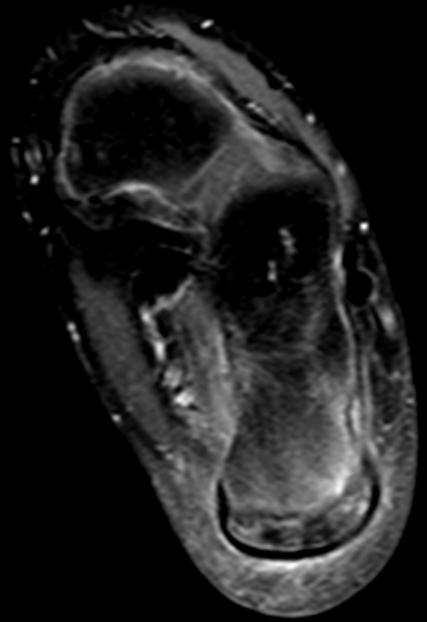
- Stress injury in the tibial tubercle
- Transition from fibrocartilage to hyaline cartilage
- Changes in soft tissues>> ossification irregularity

Sinding-Larsen-Johansson Disease

Blount Disease

- Sress to the medial compatment of knee
- Epiphyseal and physeal changes in the tibia and femur
- Medial meniscal hypertrophy

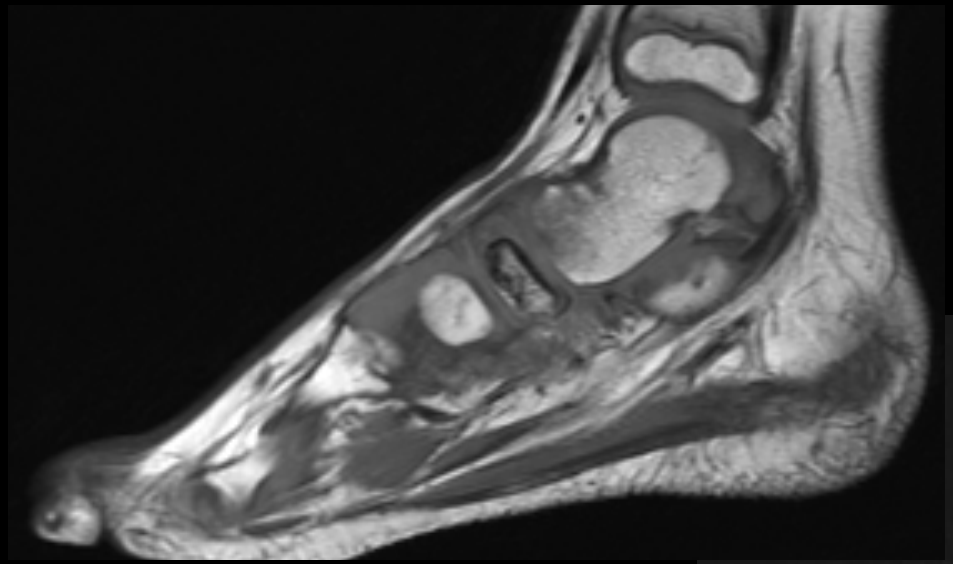
10-year-old girl with heel pain

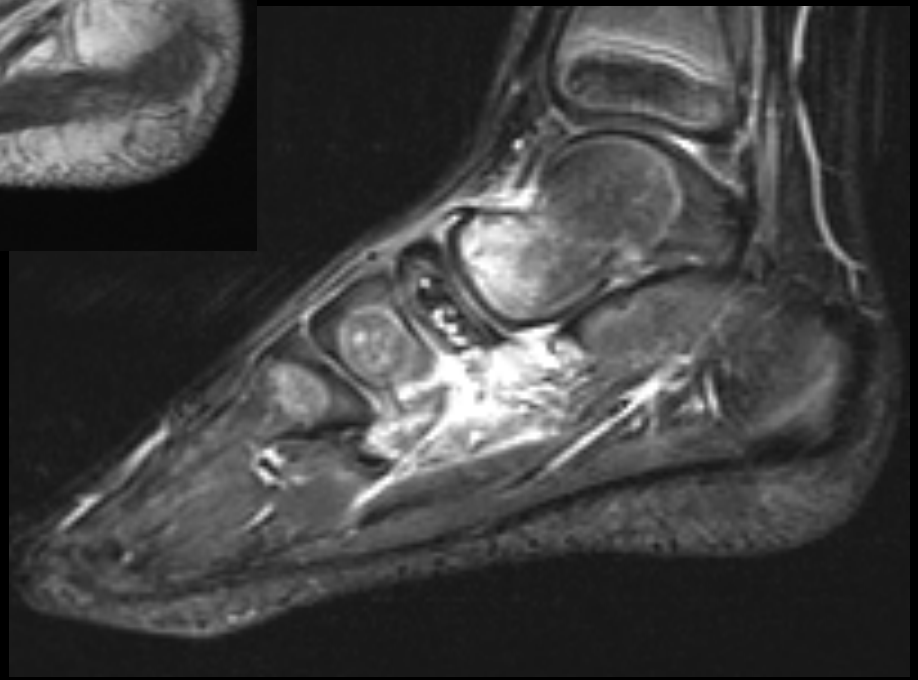




Sever's Disease

- 9-11 years of age
- Activity
- XR not diagnostic
- MRI: edema
  - Calcaneal apophysis
  - Metaphyseal equivalent
  - Surrounding soft tissues
  - Tendon thickening

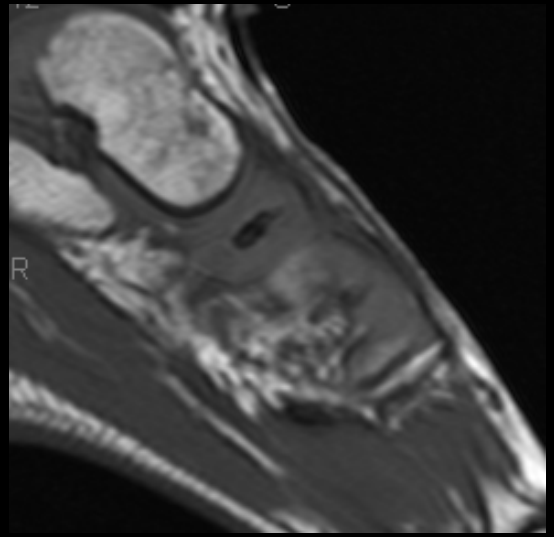
5-year-old girl with midfoot pain





Köhler's Disease

- Osteonecrosis of tarsal navicular
- Sclerosis and fragmentation can be normal
- Compared to normal variant, disease affects older children and is painful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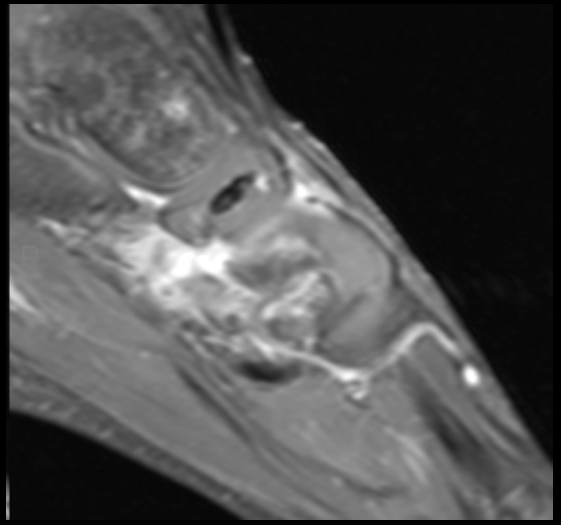
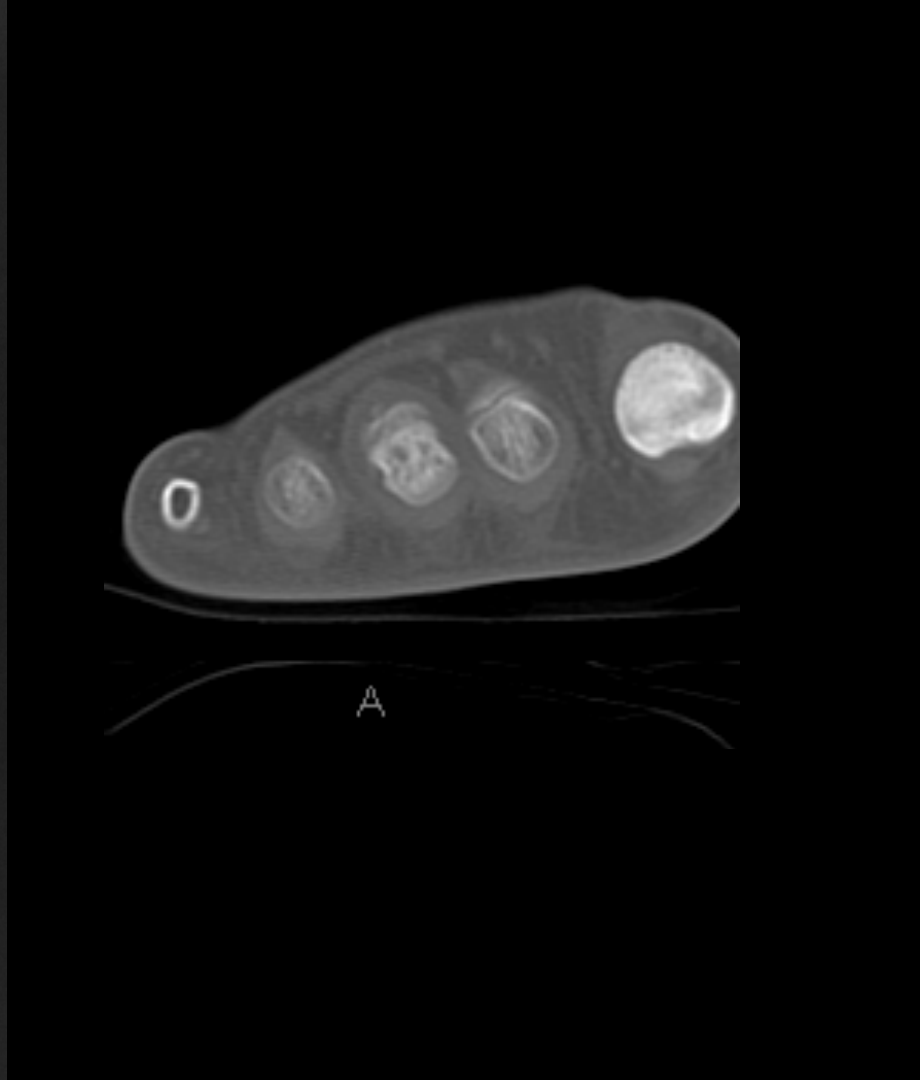


15-year-old girl with pain in the forefoot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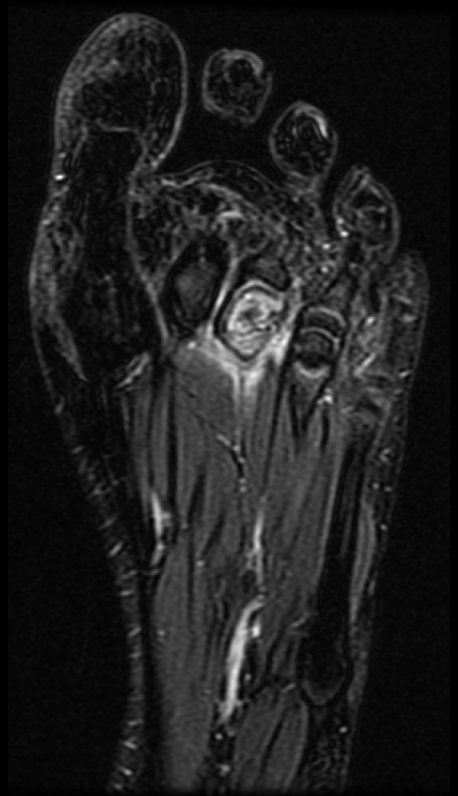
Freiberg's Disease

- Second or third metatarsal head osteonecrosis
- Repeated trauma
- More common in women
- Association with high heels


Does it make sense to talk about Osteochondrosis?

- Most are descriptions based on findings from early radiographic era
- A category makes sense if it enhances understanding or facilitates remembering

Etiology

- Trauma
  - Scheuermann
  - Panner
  - Kienboch
  - Sinding-Larsen-Johannson
  - Osgood-Schlatter
  - Blount
  - Sever
  - Freiberg
- Osteonecrosis
  - Panner
  - Kienboch
  - Legg-Calve-Perthes
  - Kohler
  - Freiberg

Radiographs: Fragmentation and Increased Density

- Can be normal
  - Inferior patellar pole (Sinding-Larsen-Johannson)
  - Tibial tubercle (Osgood-Schlatter)
  - Calcaneal apophysis (Sever)
  - Tarsal navicular (Kohler)
- Always pathologic
  - Vertebral endplate (Scheuermann)
  - Capitellum (Panner)
  - Proximal femur (Legg-Calve-Perthes) *
  - Proximal tibia (Blount)
  - Lunate (Kienboch)
  - Metatarsal (Freiberg)

MRI:

- Cartilage abnormality
  - All except Kienboch and Freiberg
- Decreased enhancement
  - Panner
  - Kienboch
  - Legg-Calve-Perthes
  - Kohler
  - Freiberg

Take Home Points

- Tendency to move away from Osteochondrosis
- MRI:
  - Soft tissue edema
  - Cartilaginous abnormalities
  - Decreased enhancement (in some)