The role of CT and MRI in evaluation of Osteoid Oteoma

Elene Iordanishvili

Tbilisi Sate Medical University

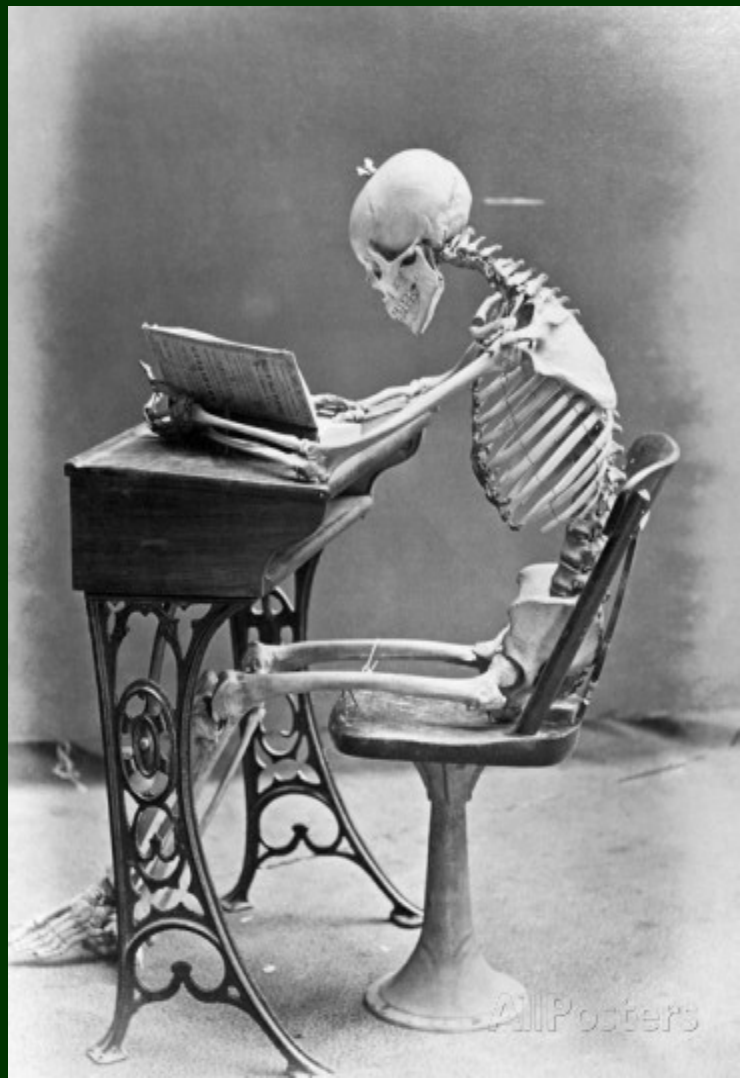
Instructor: **Prof. Dr. Ketevan Kotetishvili**

Department of Physics

Georgian Technical University

Overview

- Case Report;
- Brief review of Osteoid Osteoma;
- Classification;
- Pathologic characteristics;
- Clinical presentation;
- Diagnostic menu for Osteoid Osteoma
- Different cases of Osteoid Osteoma
- CT versus MRI



Case Report

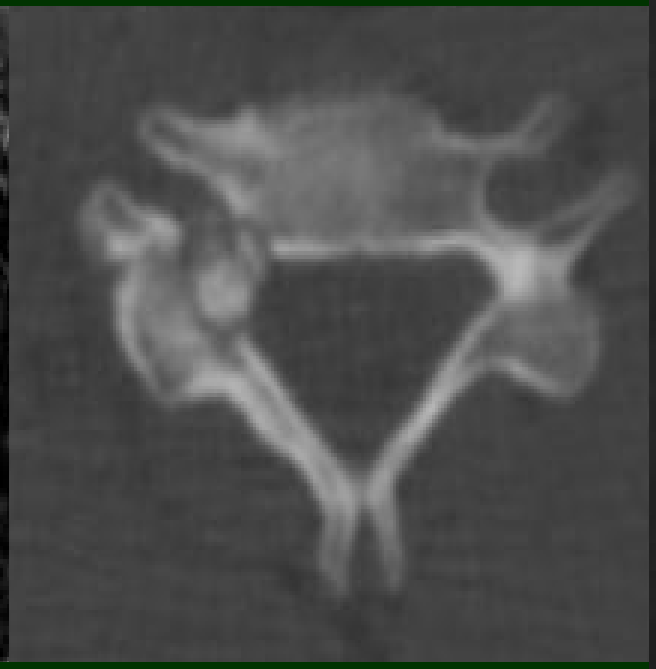
- 22 years old male presenting with neck pain irradiating in his right shoulder and arm;
- pain worsens at night and wakes the patient up;
- It is relieved with Aspirin;
- Denies trauma;
- No significant past, family or social history.

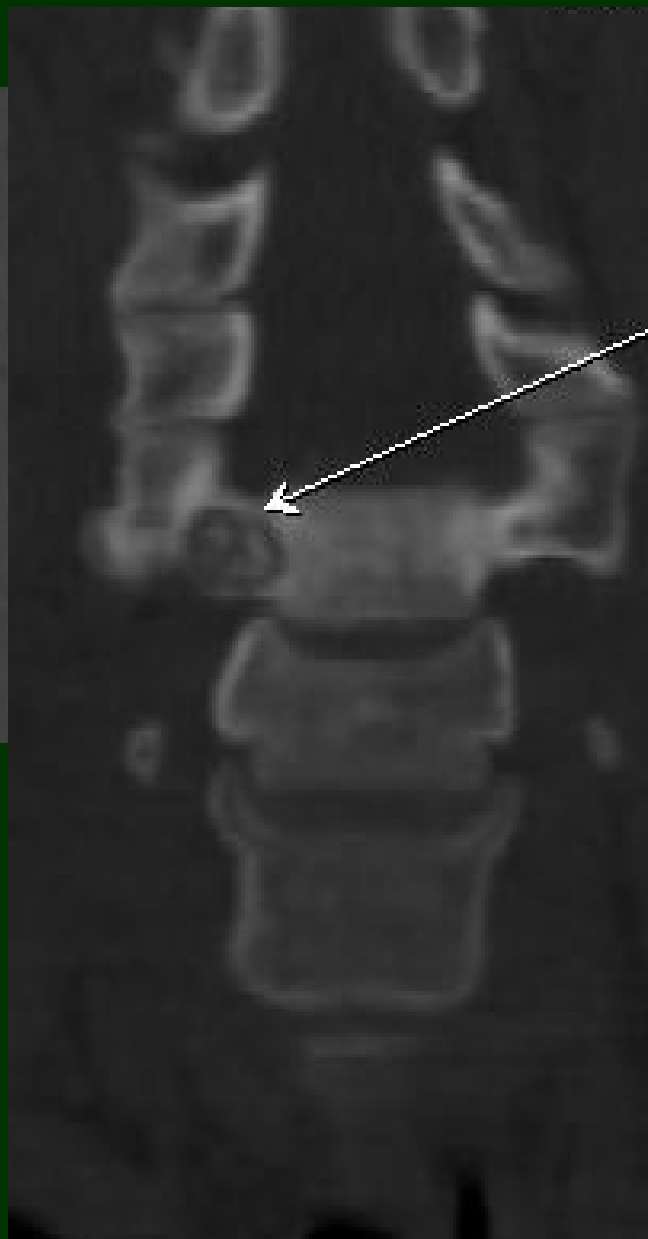
Case Report

Sagittal STIR image shows hypointense lesion with bone marrow edema of affected vertebral body, its posterior elements as well as adjacent vertebrae

T2-weighted coronal image demonstrates a well circumscribed hypointense lesion in the pedicle of C5 and hyperintense signals from surrounding soft tissues

Case Report





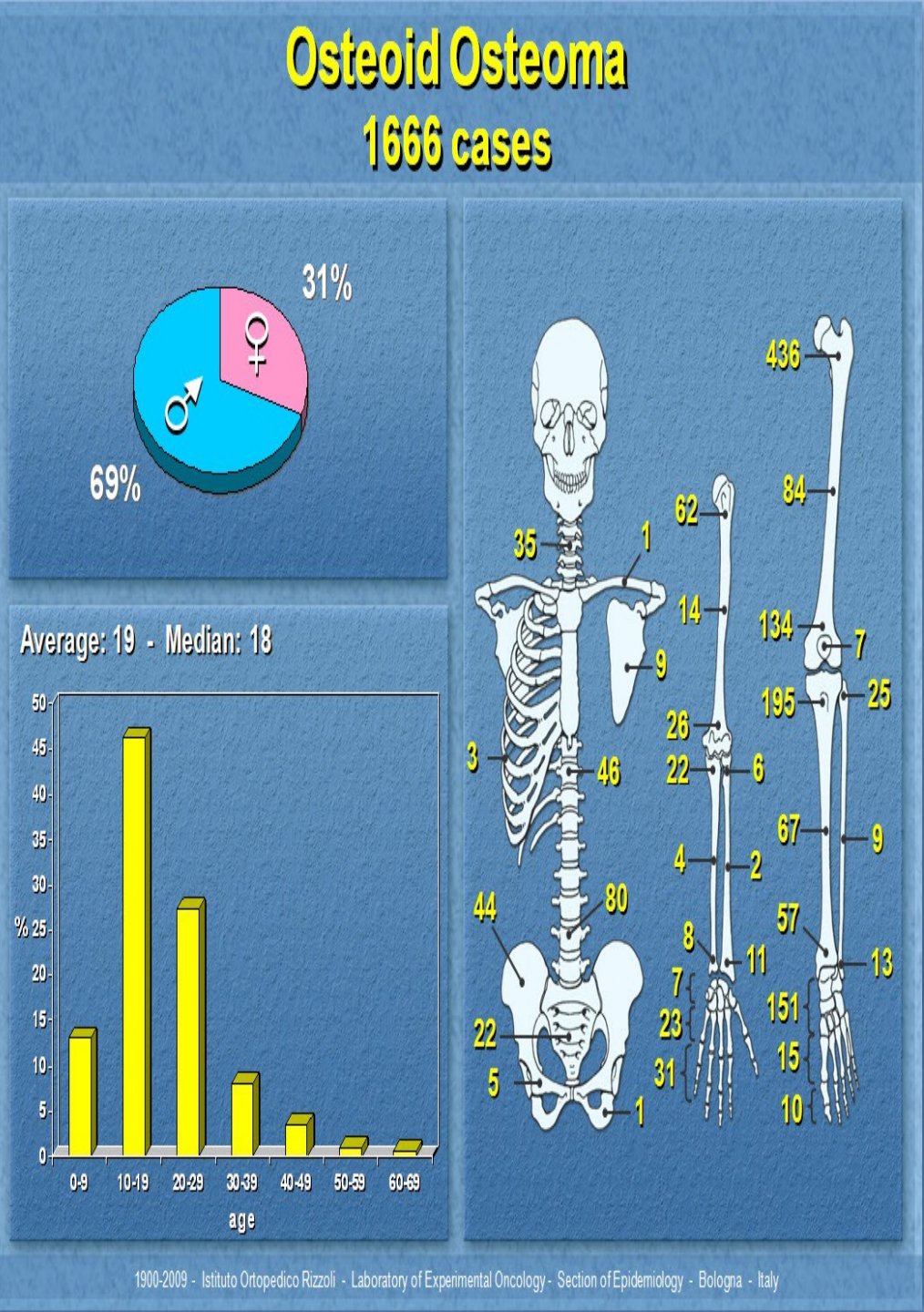
CT confirmed diagnosis of osteoid osteoma apparently showing oval radiolucent nidus with central bone density mineralization.

Brief Review

- OSTEOID OSTEOMA is a benign osteoblastic bone tumor consisting of central vascular nidus - less than 2cm with osteoid and woven bone usually surrounded by a halo of reactive sclerotic bone;
- In 1930 Bergstrand first described this condintion and in 1935 Jaffe identified it as a discrete clinical entity.
- It accounts for 5% of all bone tumors and 11% of benign osseous neoplasms with male predilection . Reported male to female ration ranges from 1.6:1 to 4:1.

Brief Review

- Second decade is the peak age of incidence ;
- localization can be virtually in any bones with predilection for lower extremities: 65-80%
- metaphysis/diaphysis of long bones: 70%
- Femur/tibia: 55%
- Phalanges: 20%
- Spine: 10% (lumbar>cervical>thoracic> sacrum) , may cause painful scoliosis with concavity towards the lesion.



Classification

- ***Cortical***
  - Most common: 80%
  - Nidus is within cortex, surrounded by fusiform cortical sclerosis and periosteal reaction
- ***Cancellous /Medullary***
  - Intermediate in frequency
  - Mild osteosclerosis
  - Predilection for femoral neck, hand and foot;
- ***Subperiosteal***
  - Rare
  - Almost no reactive sclerosis
  - Common location: medial site of femoral neck, hand and foot (neck of talus).
- ***Intraarticular***
  - Joint effusion or synovitis

Pathologic characteristics

- Ovoid spherical reddish tumor;
- Unknown etiology
- Nidus contains highly vascularized connective tissue with dilated capillaries and active osteoblast and osteoclast;
- Tendency of calcification toward the center;
- Elevated Prostaglandin E2 in the nidus is responsible for pain and vasodilatation

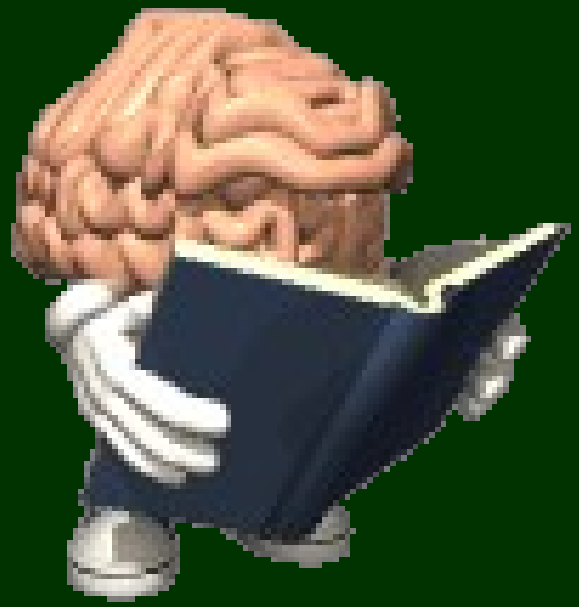
Mur's textbook of Pathology, 14th edition, 2008 Edward Arnold (Publishers) Ltd

Clinical Presentation

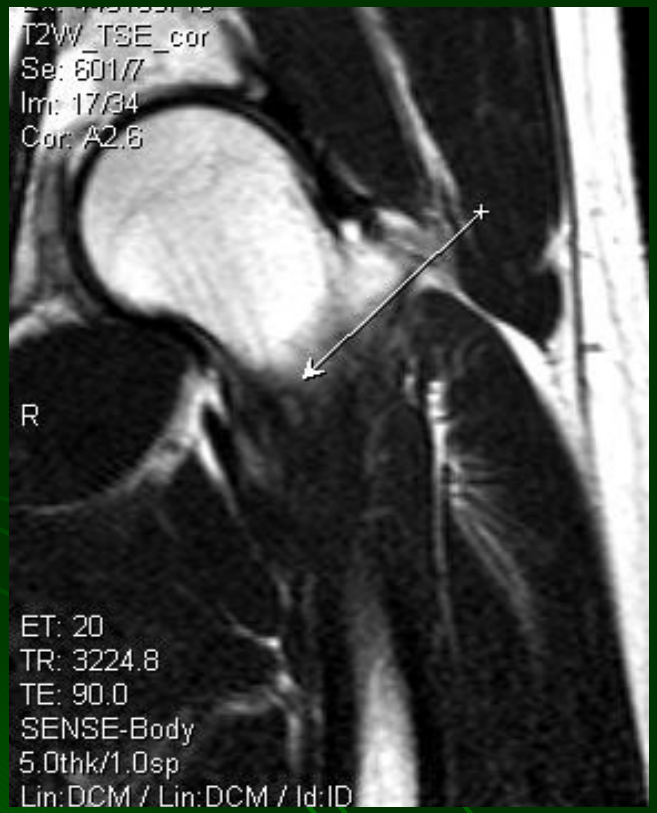
- Dull aching pain that worsens at night and wakes the patient up;
- It is relieved by Aspiring and other NSAIds in 75%;
- During spinal involvement muscular spasm may cause scoliosis with the lesion at the apex of the convexity;
- Intra or Juxta-articular location may cause synovitis with effusion and limited movement.

Diagnostic menu for Osteoid Osteoma

- X-ray;
- Computer Tomography;
- MRI;
- Nuclear Imaging;
- Ultrasonography;
- Angiography

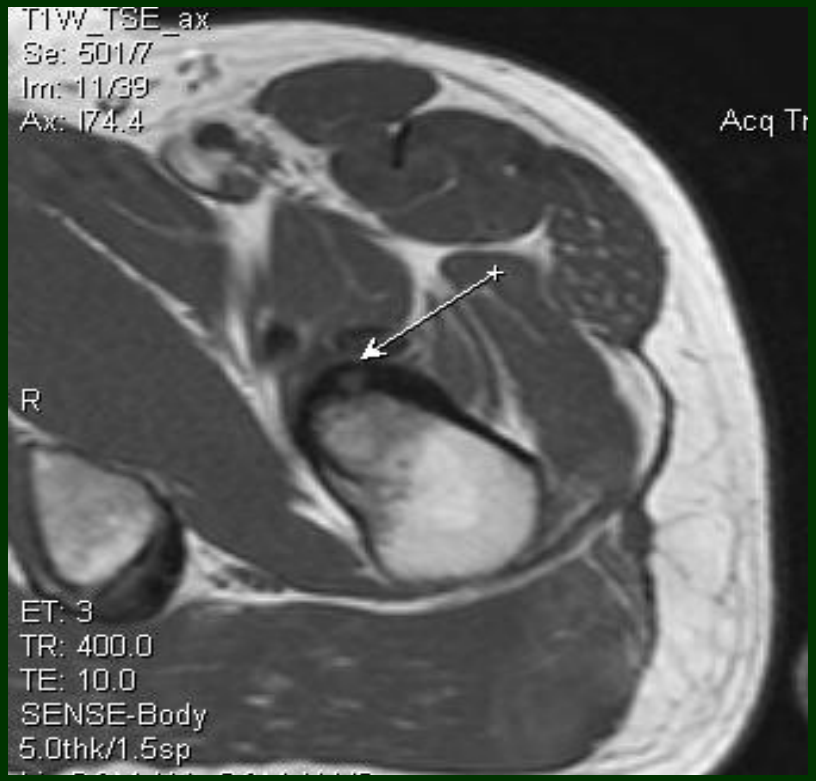


Osteoid Osteoma in proximal epiphysis of femur



T2 weighted sagittal image shows lytic lesion and PDW-SPAIR demonstrates periosteal reaction and bone marrow edema

Osteoid Osteoma in proximal epiphysis of femur

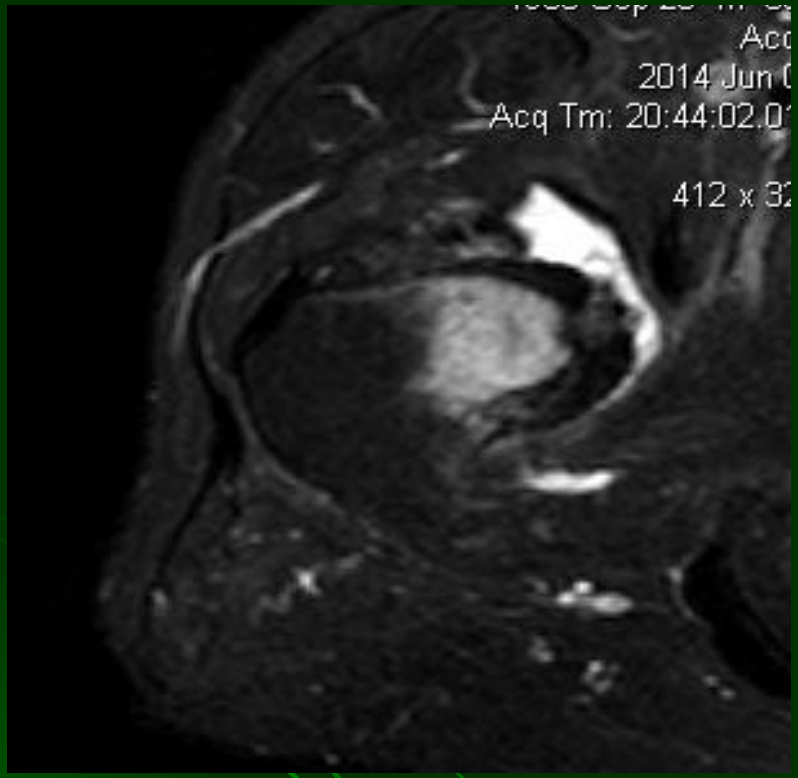


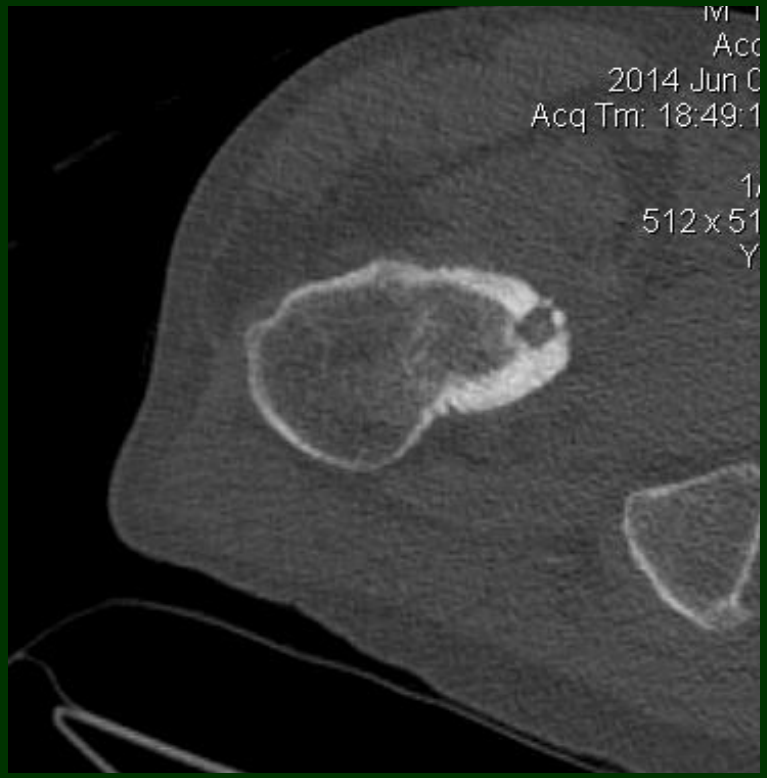
T2 SPAIR and T1 weighted axial images show lesion isointense to muscle with edema and cortical thickening

Intraarticular Osteoid Osteoma of the femoral neck

T1 and T2 weighted images reveal subperiosteal hypointense signals in the femoral neck. CT shows lytic lesion with central bone density focus and marked periosteal reaction

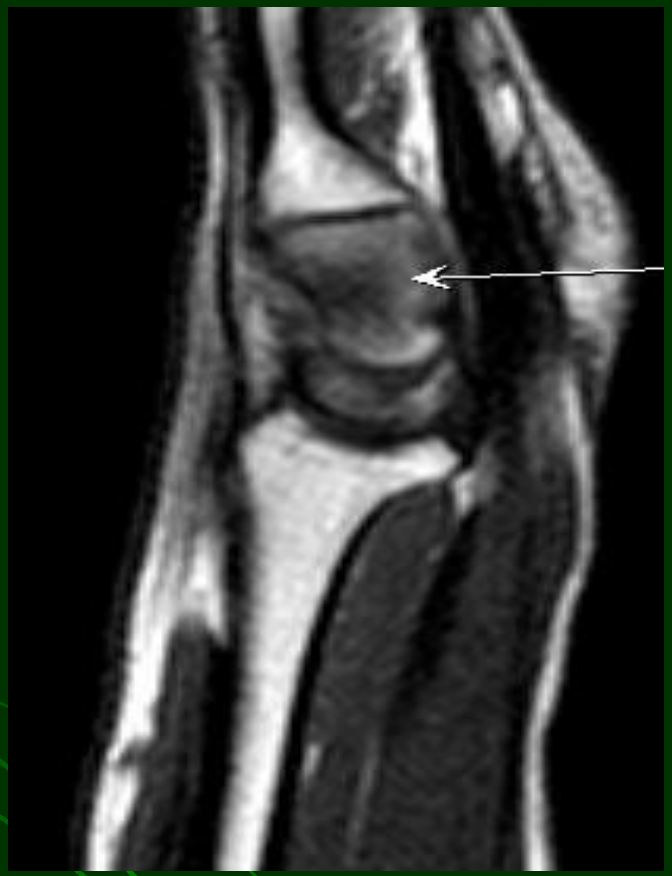
Intraarticular Osteoid Osteoma of the femoral neck

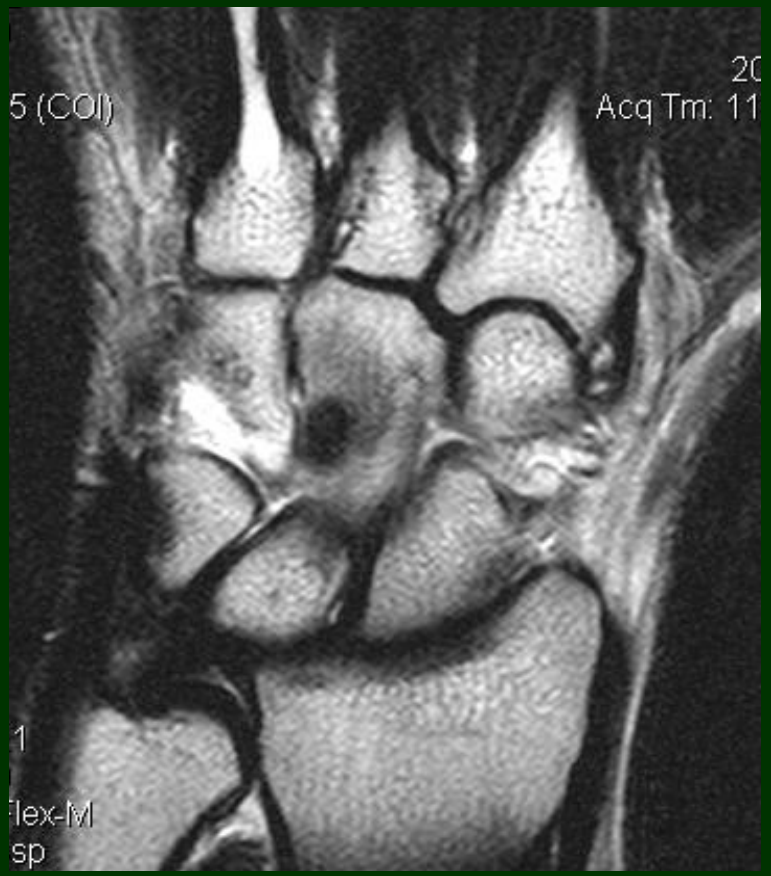




PDW-SPAIR and CT axial images demonstrate nidus. Fat suppressed image shows intraarticular effusion/synovitis and bone marrow edema

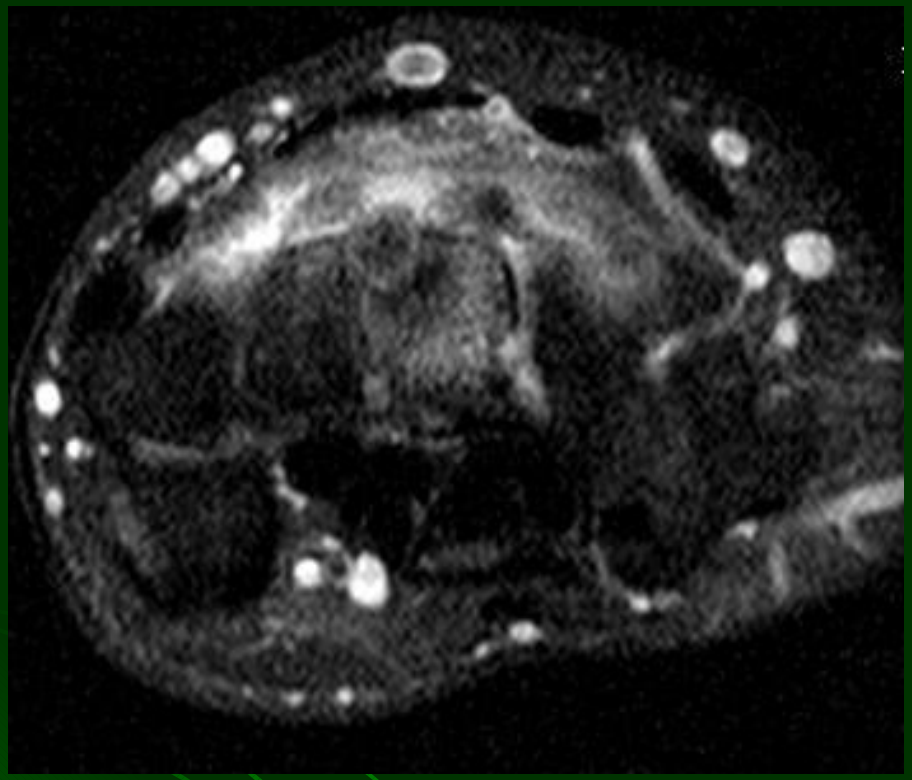
Osteoid Osteoma of wrist



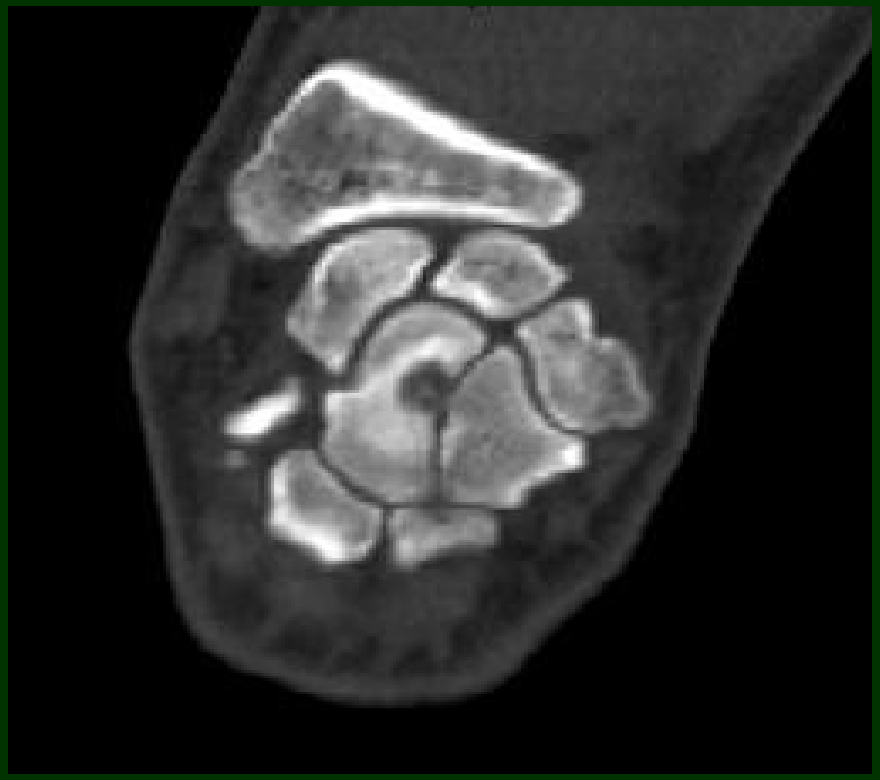


T1 weighted sagittal and T2 weighted coronal images show hypointense osteolytic lesion in capitate bone.

Osteoid Osteoma of wrist



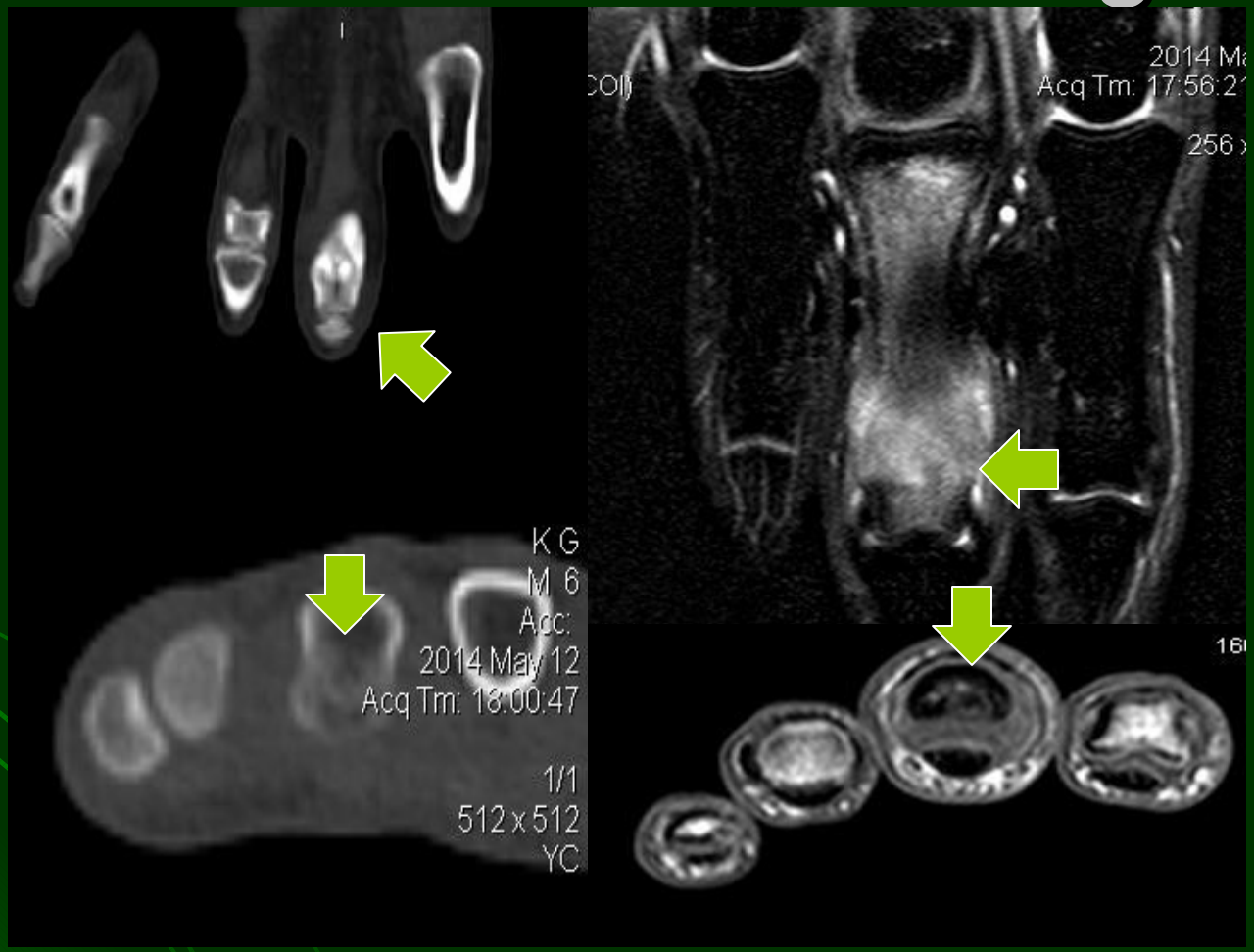
PDW-SPAIR demonstrates intraarticular isointense to normal bone lesion with hyperintense halo, marked marrow and soft tissue edema



A coronal reformatted CT image demonstrates subperiosteal radiolucent lesion with central aspect of calcification and reactive

Osteoid Osteoma of proximal phalanx of the third finger

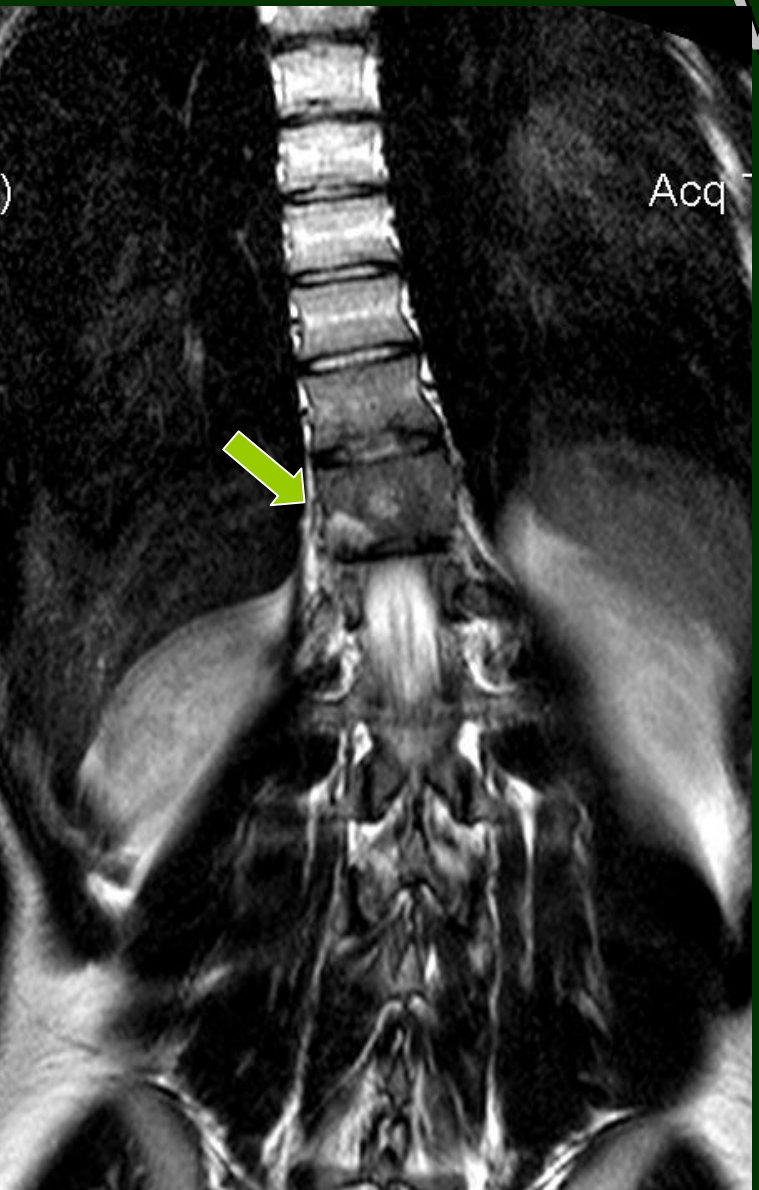
Coronal and axial CT revealed nidus at the apex of the proximal phalanx of third finger



PDW-SPAIR shows massive edema

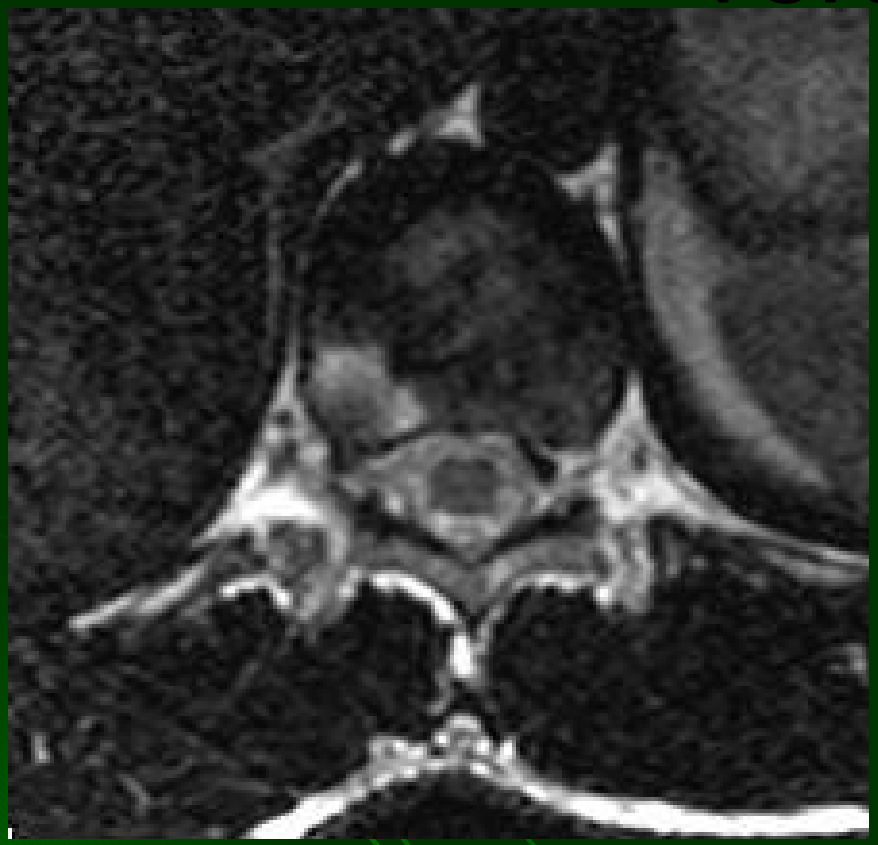
T1 weighted image demonstrates cortical thickening and intracortical intermediate signal with central hypointensity

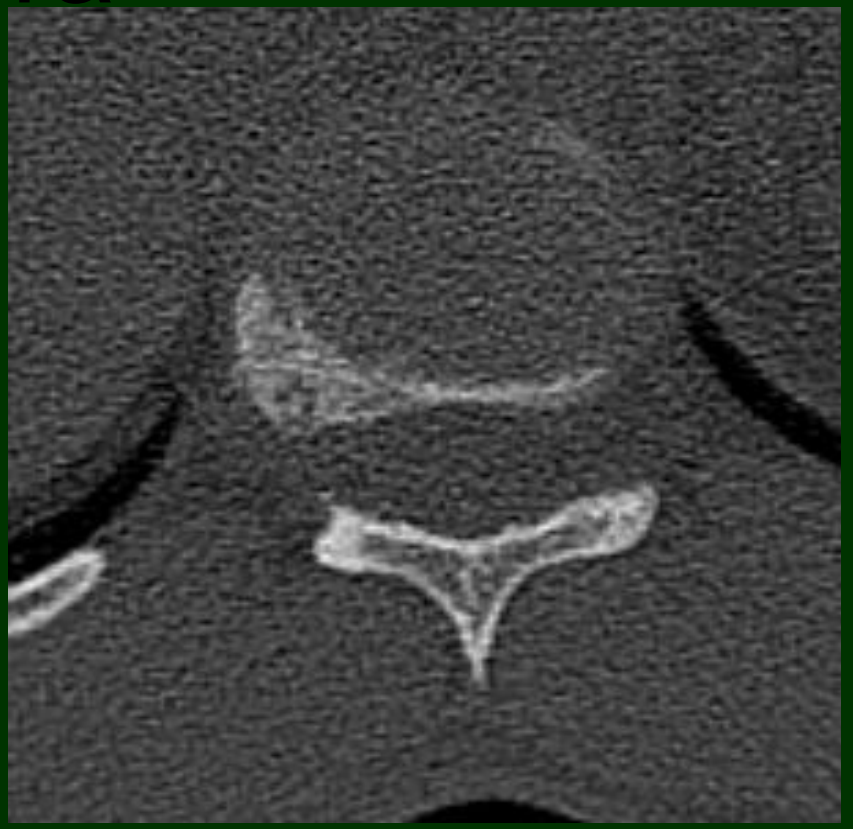
Osteoid Osteoma of Thoracic vertebra



T2 weighted sagittal and coronal views show heterogenious signal (hyper/isointense to bone) in caudal endplate of Th11 vertebral body with central hypointenssive focus indicating sclerosis. Mild thoracolumbal scoliosis with left sided concavity.

Osteoid Osteoma of Thoracic vertebra





T2 weighted axial image reveals lytic lesion with bone edema of vertebral body as well as posterior elements. Axial CT shows nidus and periosteal reaction.

Osteoid Osteoma of calcaneus

T1 weighted image shows intermediate signal intensity lesion with central hypointensity

PDW-SPAIR demonstrates massive bone marrow edema

Osteoid Osteoma of calcaneus

CT revealed osteoid osteoma

at the angle of Gissane with hypodense nidus, central mineralization and mild periosteal sclerosis

CT versus MRI

- Specific and sensitive for Osteoid Osteoma;
- can localize nidus;
- Better spatial resolution, in view of surgery.
- Good for detecting bone marrow and soft tissue edema;
- Demonstrates intraarticular effusion/synovitis
- Better at identifying cancellous Osteoid Osteoma

Bibliography

- Ramesh S. Iyer[1], Teresa Chapman[1] and Felix S. Chew[2] "Pediatric Bone Imaging: Diagnostic Imaging of Osteoid Osteoma";
- Panagotis KITSOULIS, George MANTELLOS, Marianna VLYCHOU : "Osteoid osteoma" From the Laboratory of Anatomy and Orthopaedic Department, University of Ioannina, Greece
- SuShIl. G. KachewaR, SMIta. B. SanKaye, DevIDaS.S. KulKaRnI : "Imaging in Osteoid Osteoma"
- Stephen F. Quinn: **MRI Web Clinic - March 2013 Intraarticular Osteoid Osteoma**
- **"MRI of Bone and Soft Tissue Tumors and Tumorlike Lesions" Steven P.Meyers**
- **Jee Won Chai, MD • Sung Hwan Hong, MD • Ja-Young Choi, MD Young Hwan Koh, MD • Joon Woo Lee, MD • Jung-Ah Choi, MD**

Heung Sik Kang, MD : "Radiologic Diagnosis of Osteoid Osteoma: From Simple to Challenging Findings"

Thank you

for your

Attention