KUWAIT ANNUAL RADIOLOGY CONFERENCE 2026
FROM VISION TO PRECISION

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‘DON’T TOUCH’ BONE LESIONS: A PRACTICAL RADIOLOGIC APPROACH

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Teaching points

Definition:

- Don’t-touch bone lesions are benign osseous entities with characteristic imaging appearances that allow confident diagnosis based solely on imaging findings, obviating the need for biopsy, further invasive intervention, or routine follow-up when classic features are present

Teaching points:

- A structured, stepwise approach incorporating patient age, lesion location, and imaging characteristics allows confident diagnosis of do-not-touch bone lesions.
- These lesions demonstrate non-aggressive imaging features, enabling diagnosis based on imaging alone without biopsy or surgical intervention. Although on certain occasions, short-term follow-up is recommended.
- Recognition of red flags is essential to avoid misdiagnosis and inappropriate reassurance.
- Pattern recognition and familiarity with typical features are key to preventing unnecessary follow-up or intervention.

Pathophysiology & Disease spectrum

Pathophysiology

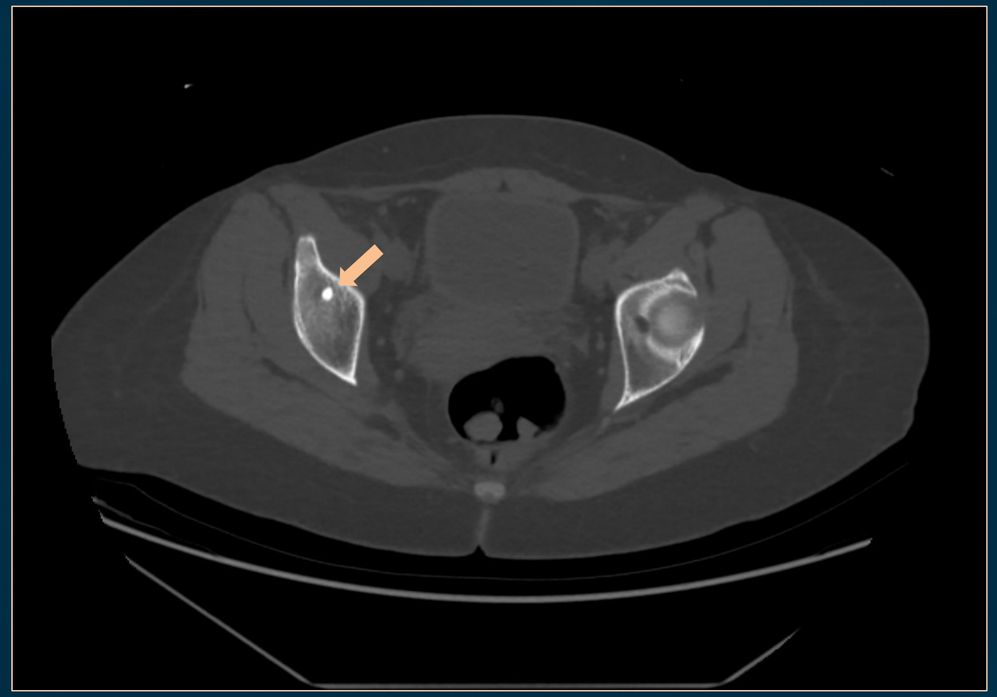
- Don’t-touch bone lesions result from non-aggressive processes, including developmental bone variants, reactive bone remodeling, benign fibro-osseous changes, and vascular or ischemic phenomena.

Disease spectrum

- Common don’t-touch bone lesions include bone island (enostosis), fibrous dysplasia, non-ossifying fibroma, bone infarct, vertebral hemangioma, osteopoikilosis, and subchondral cysts.

A. Bone island

- Dense intramedullary sclerosis
- ‘Stellate’ or ‘brush-like’ margins
- Very high CT attenuation (>1000 HU)
- High calcium content – marked hypointense signals in all MRI sequences
- No marrow edema or post-contrast enhancement

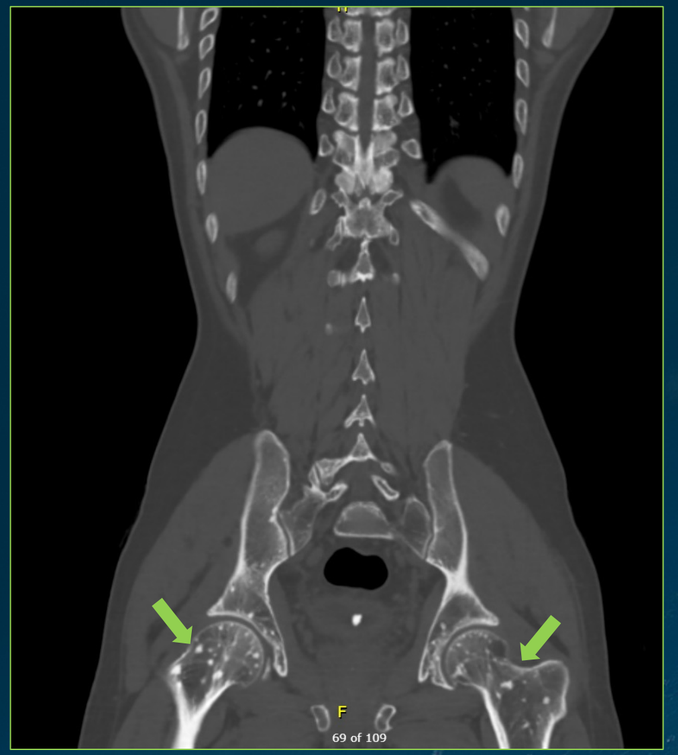


NCCT pelvis – *Axial*

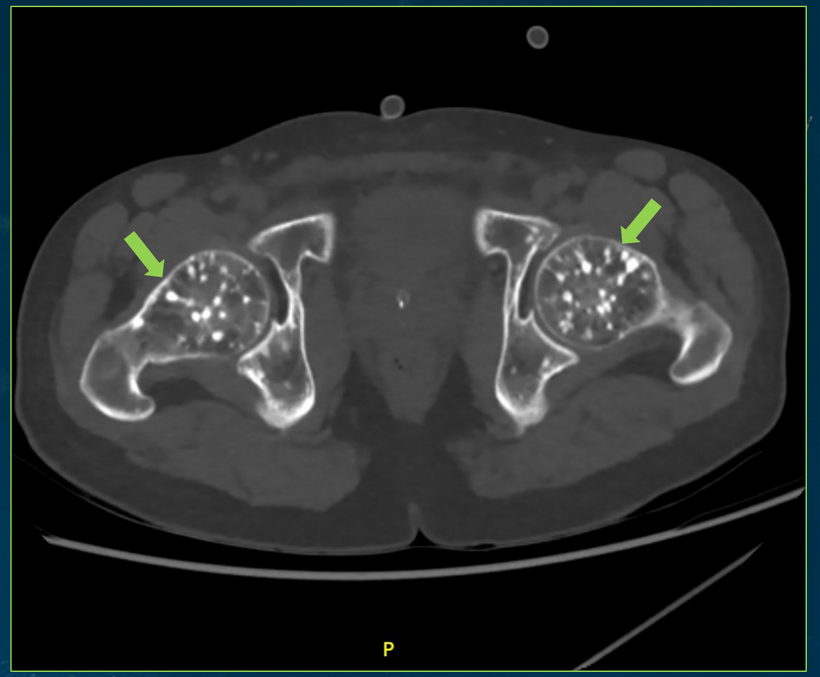
Small well-defined sclerotic focus within the right acetabulum, showing homogenous high attenuation with brush-border margins, denoting a bone island (enostosis)

B. Osteopoikilosis

- Hereditary disorder in which small bone islands appear in groups around several joints, affecting long bones, tarsal bones or carpal bones.
- Multiple small, round sclerotic foci – ranging from 1-2mm up to 1-2cm
- Symmetric periarticular distribution
- No bone destruction or symptoms
- Low T1 & T2 signal – composed of mature dense bone
- *Key mimic of sclerotic metastases*



(a) NCCT pelvis – *Coronal*



(b) NCCT pelvis – *Axial*

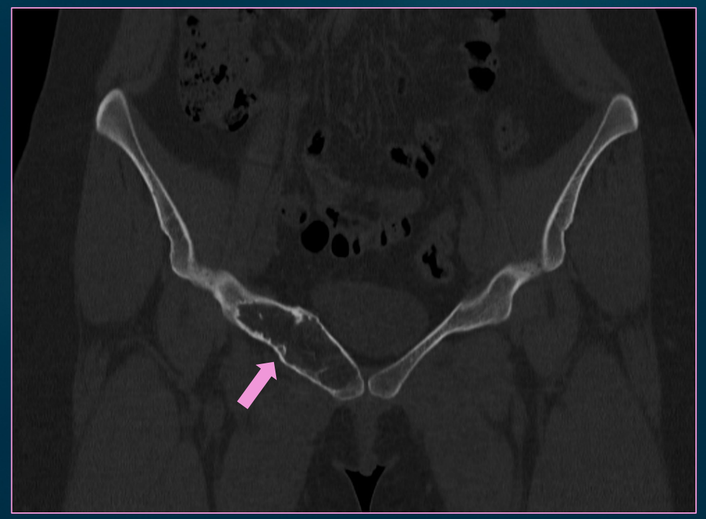
Multiple symmetric sclerotic foci in the femoral heads and acetabulae with an elongated and brush like morphology, denoting *osteopoikilosis*

C. Fibrous dysplasia

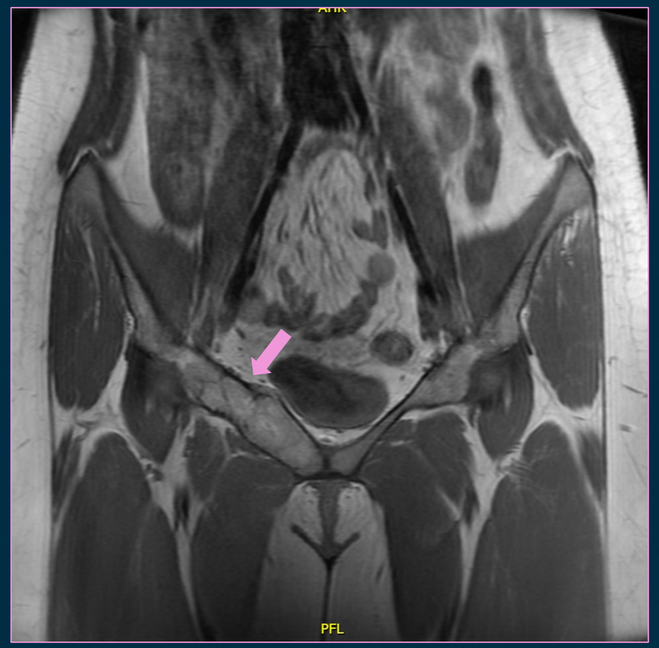
- Ground glass matrix (56%), homogenously sclerotic (23%), cystic (21%)
- ‘Rind sign’
- Bone expansion with preserved cortex
- Intermediate to low signal on T1, variable SI on T2
- May be monostotic or polyostotic

(a) NCCT pelvis – *Coronal, (b) MR T1 – Coronal, (c) MR T2FS - Coronal*

Ill-defined fusiform intramedullary expansile lesion in the superior ramus of the right pubic bone, with septated isointense signal and small cystic areas (T1 hypointense, T2/FS hyperintense), causing cortical thinning without cortical breach.



(a)



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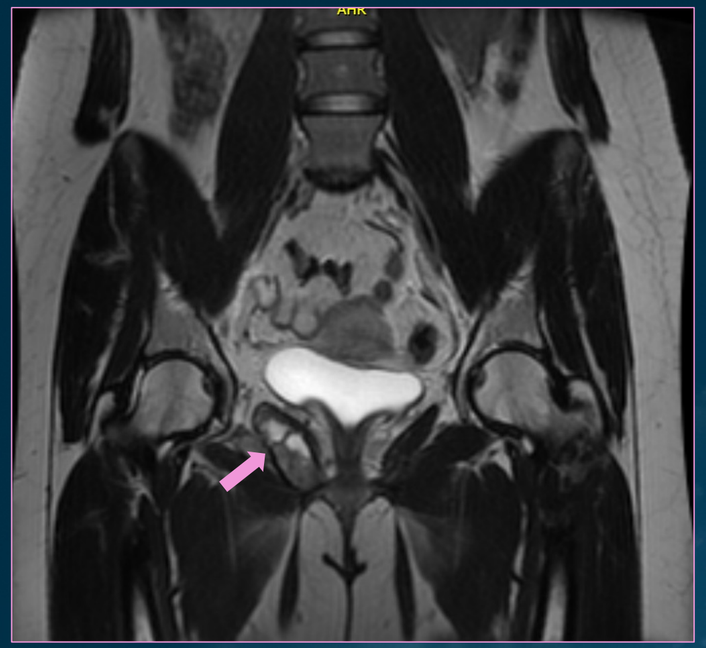


(c)

C. Hemangioma

- Vertebral body predilection
- “corduroy” sign on radiograph
- “Polka-dot” sign on CT
- High T1 and T2 signal due to fat content

Well-defined intraosseous lesion with high signal intensity on T1 and T2 weighted images, showing coarse trabeculations and signal suppression on fat-saturated sequences.

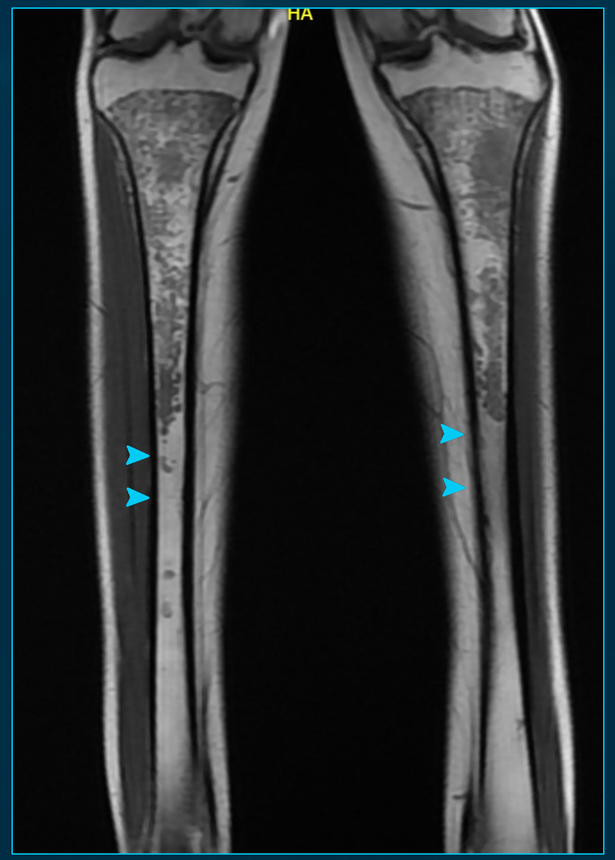
(c) MR STIR – *Sagittal*

(a) MR T1 – *Sagittal*

(b) MR T2 – *Sagittal*

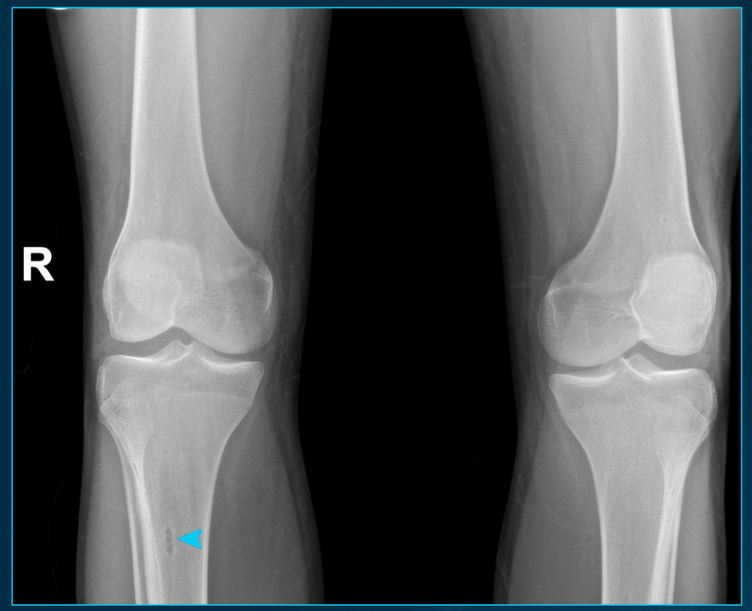
D. Bone infarct

- Serpiginous peripheral sclerosis on radiographs/CT surrounding a central metadiaphyseal lucency .
- Central fatty marrow signal on MRI
- ‘Double line sign’
- No enhancement or cortical destruction



T1 weighted MR LL – *Coronal*

Serpiginous sclerosis and central fatty marrow signal consistent with *bone infarct (intramedullary)*

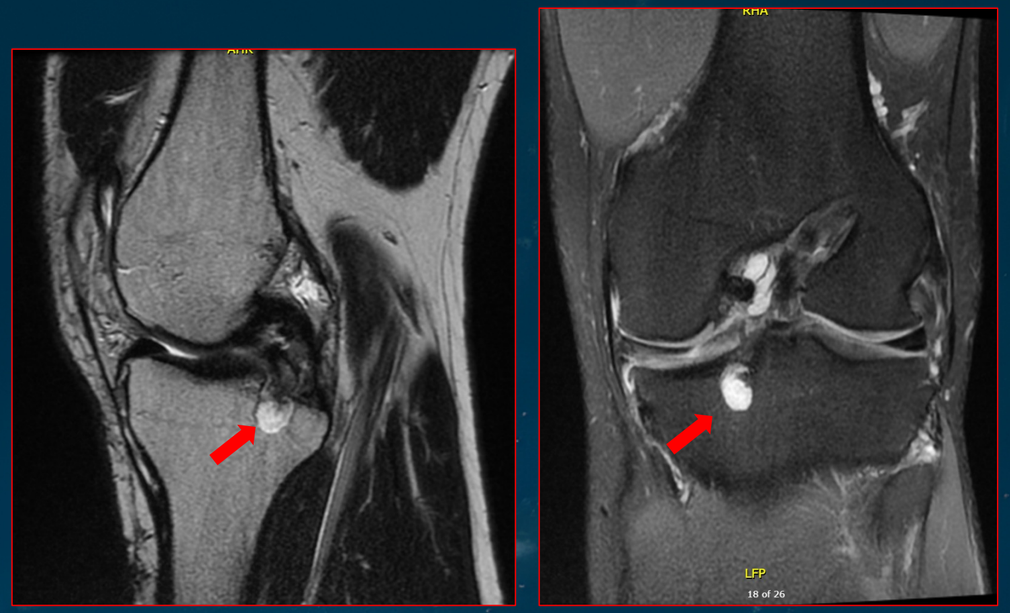


AP Radiograph LL

Well-defined intramedullary serpiginous sclerosis with a geographic configuration and central relative lucency

E. Subchondral cyst/geode

- Juxta-articular location
- Round/oval lesions with thin sclerotic margins
- Associated with degenerative joint disease
- Smooth margins without aggressive features



(a) T2 weighted MR knee –*Sagittal OBL* ***(b) PDFS - Coronal***

Well-defined subchondral cyst (geode) within the proximal tibia, on a background of osteoarthritis, demonstrating high T2 signal intensity.

F. Non-ossifying fibroma

- Eccentric metaphyseal lucent lesion
- Lobulated with thin sclerotic rim
- Long axis parallel to the axis of bone
- Usually seen in children & Adolescents. Tends to regress with age.

(a) T1 weighted MR Ankle – *Coronal, (b) AP radiograph LL*
Ovoid lucent lesion, located eccentrically in the distal fibular metadiaphysis. The lesion has a sclerotic rim with cortical thinning. No periosteal new bone formation.

Key imaging features of ‘Don’t touch bone lesions’:

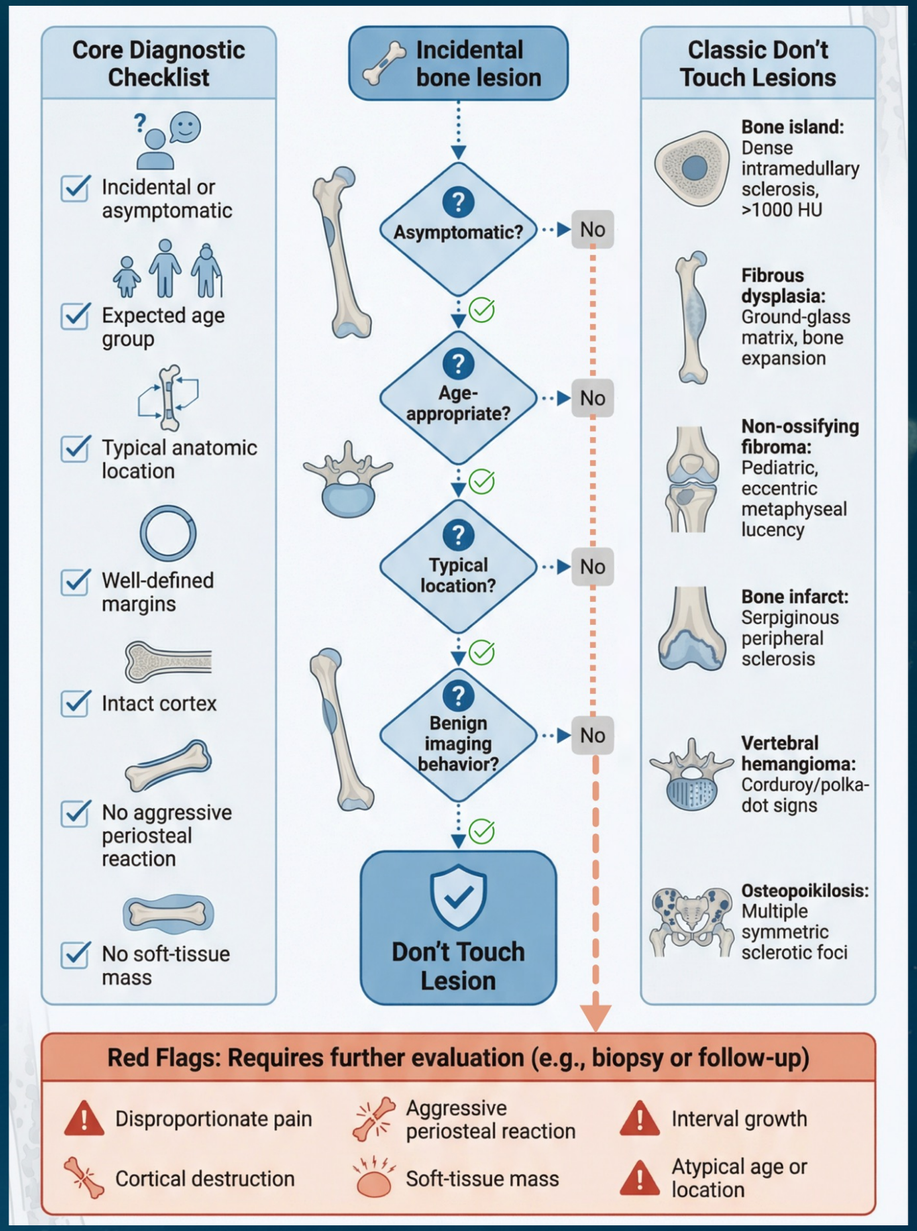
- Well-defined margins
- Narrow zone of transition
- Intact cortex
- Lack of aggressive periosteal reaction
- Stability over time

Red Flags: Requires further evaluation

- Disproportionate pain
- Aggressive periosteal reaction
- Cortical destruction
- Soft tissue mass
- Interval growth
- Atypical age or location

Radiologic Decision-Making framework

- Clinical context
  - Age of patient
  - Symptoms (most are asymptomatic)
  - Incidental vs targeted imaging
- Lesion location
  - Epiphyseal/metaphyseal/diaphyseal
  - Medullary vs cortical vs surface
  - Axial vs appendicular skeleton
- Imaging features
  - Cross-sectional imaging further aids differentiation by demonstrating internal matrix and signal characteristics



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