

RADIOLOGICAL CONFERENCE

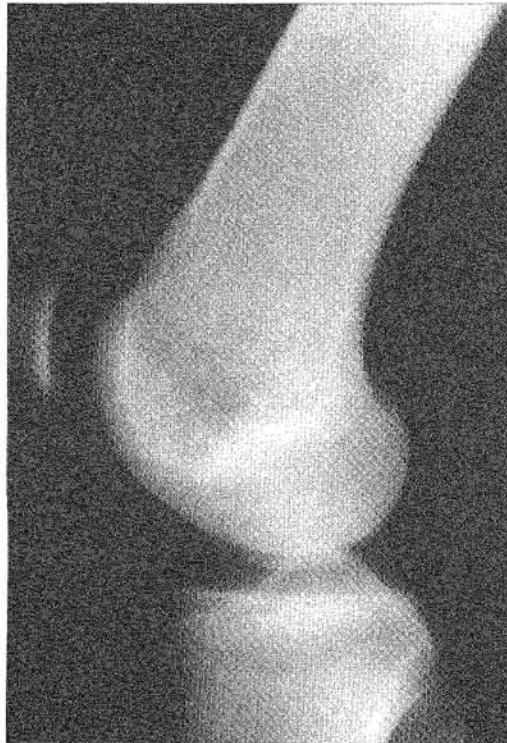
Clinical History:

A 18-year-old boy sustained a right knee injury. He was previously well. Radiographs (Figures 1 & 2) were obtained.

Figure 1: Frontal radiograph of the right knee



Figure 2: Lateral radiograph of the right knee



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What is the diagnosis?

- a) Avulsion fracture
- b) Osteochondritis dissecans
- c) Giant cell tumour
- d) Ewing's sarcoma
- e) Non-ossifying fibroma

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Answer:

- e) Non-ossifying fibroma

Radiological findings

Radiographs (Figures 3 & 4) show an ovoid lucent lesion in the posterolateral aspect of the right lower femur. It is located eccentrically in the diaphyseal region of the femoral shaft. Its margins are well-defined with a narrow zone of transition and a thin sclerotic rim. There is no associated lesion calcification, cortical breach, periosteal reaction or soft tissue swelling.

Figure 3: Same radiograph as Figure 1 with the addition of arrows. An ovoid lesion is located in the diaphyseal junction of the lower femur. It has well-defined margins with a thin sclerotic rim (arrows). No periosteal reaction

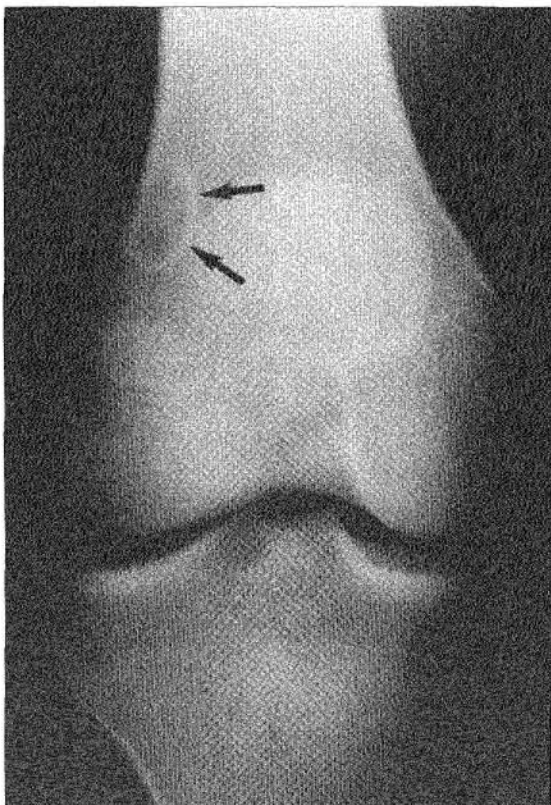


Figure 4: Same radiograph as Figure 2 with the addition of arrows. The thin sclerotic rim and smooth margins (arrows) are appreciated. No bone expansion or cortical breach



Discussion

Non-ossifying fibroma

Non-ossifying fibromas are not true neoplasms but are considered to be developmental defects. They are found in subjects ranging from 2 to 20 years of age, and are usually asymptomatic although occasionally larger ones may be painful or may fracture. Non-ossifying fibromas are histologically identical to fibrous cortical defects. The latter lesions tend to arise on the cortical surface, unlike non-ossifying fibroma which are primarily intramedullary. Microscopically, these lesions are composed of fibrous tissue, xanthoma cells and giant cells.¹

Non-ossifying fibromas are located eccentrically within the medullary cavity of bone and are found

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predominantly in the lower extremities, especially around the knee. Radiographically, they are geographical lucent lesions which are sharply demarcated by a thin sclerotic rim. Their outer margins may be scalloped and the overlying cortex may be thinned or thickened as a result of reactive change. They arise near the growth plate but normal bone growth gradually carries the lesion towards the diaphysis. Non-ossifying fibromas usually heal spontaneously. The importance of recognising radiologically-typical non-ossifying fibromas is that they do not require biopsy or treatment, and are regarded as "don't touch" lesions.^{1,2}

Avulsion fracture

Avulsion fractures may produce an aggressive radiographical appearance. They can however be recognised from their characteristic location at the insertion sites of tendons. Such sites around the knee include the anterior tibial tubercle due to traction from the patellar tendon, the tibial spine by tension from the anterior cruciate ligament, and the inferior pole of the patella where the infrapatellar tendon inserts.³ Delayed radiographs after several weeks would allow the diagnosis to be clearer. The absence of trauma and radiographical appearance in our patient excludes this diagnosis.

Osteochondritis dissecans

Osteochondritis dissecans is a term applied to a form of osteochondral fracture. The mechanism of injury is thought to be trauma transmitted through the articular cartilage to the subchondral bone. Fracture healing and possible osteonecrosis contribute to development of an isolated fracture fragment, which may or may not have

an intact overlying articular cartilage. The loose fragment has been called a "joint mouse". In the knee, the common site of osteochondritis dissecans is at the medial femoral condyle.³ Radiographically, a well-defined oval fragment adjacent to the condylar defect is seen. These features are not present in our patient.

Giant cell tumour

Giant cell tumour classically occurs in patients with closed epiphyses, i.e. young adults. Radiographically, it is epiphyseal in site and abuts the articular surface. The lesion is typically eccentrically located in the medullary cavity, and is well-defined with a non-sclerotic margin.² This diagnosis can be excluded in our patient based on age and location within bone.

Ewing's sarcoma

Ewing's sarcoma is a highly malignant bone tumour found in children and adolescents. Radiographically, it is typically seen as a permeative lesion with an onion-skin type of periosteal reaction, although sunburst or amorphous periosteal reaction may also be present.² Our patient does not have any radiographical feature to suggest Ewing's sarcoma. ■

References

1. Hudson TM, Stiles RG, Monson DK. Fibrous lesions of bone. *Radiol Clin North Am.* 1993;31:279-297.
2. Helms CA. *Fundamentals of Skeletal Radiology.* 2nd ed. Philadelphia: WB Saunders. 1995;pp56-77.
3. Chew FS. *Skeletal Radiology – the Bare Bones.* Rockville, Maryland: Aspen. 1989;pp79-94.