



# POSNA

## The Core Curriculum

### **Fibrous cortical defect**

#### **Objectives**

1. List 3 synonyms for fibrous cortical defect
2. Describe the pathology of fibrous cortical defect
3. Describe the radiographic features of fibrous cortical defect
4. Describe the natural history of fibrous cortical defect
5. Discuss surgical indications and choice of procedure for a fibrous cortical defect

#### **Discussion points**

1. What are the indications for further imaging studies (CT, MRI) of a patient with fibrous cortical defect?
2. What is the incidence of fibrous cortical defect in the general population?

#### **Discussion**

Fibrous cortical defect, also known as nonossifying fibroma, nonosteogenic fibroma, metaphyseal cortical defect, and in the distal femur sometimes as cortical desmoid, is a very common lesion of bone in children. Estimates are that up to 40% of children between ages 4 and 8 have fibrous cortical defects. Most are found incidentally when a radiograph is made for another purpose. The natural history is obviously benign, with complete healing expected. Radiographically, the lesion is lytic, ovoid, medullary based, with geographic bone destruction, marginal sclerosis, and well defined edges. Most are in the distal ends of long bones. It is particularly common in the distal femur at the origin of the medial head of the gastrocnemius. Radiographically, fibrous cortical defects most resemble unicameral bone cysts, but there is no fallen fragment. There is no periosteal reaction or cortical disruption. Occasionally, fibrous cortical defects can become large, and cause pathologic fractures. A series from the Mayo Clinic noted that all fractures occurred in the lower extremity, most often the distal tibia. Average age at fracture was 12. The percentage of bone occupied by the fibrous cortical defect was greater than 50% in both planes radiographically in every patient sustaining fracture. Of course, we do not know how many children with lesions of this size did not sustain a fracture. Primary treatment consisted simply of cast immobilization, biopsy performed after healing if necessary. Most fibrous cortical defects are so typical that biopsy is not necessary. MRI has been reported as helpful in questionable lesions, eliminating the need for biopsy on some occasions. If a lesion is so large that pathologic fracture appears imminent, curettage and bone grafting has been uniformly successful. Microscopically, one sees benign, spindle shaped fibroblasts arranged in a storiform pattern. Macrophages,

sometimes foamy, and giant cells are common. Hemosiderin can be seen in the fibroblasts and giant cells. There is no bone formation, and there are no mitoses.

## References

1. Araki Y, Tanaka H, Yamamoto H, Yamamoto T, Tsukaguchi I, Shino K, et al. MRI of fibrous cortical defect of the femur. *Radiation Medicine* 1994;12(3):93-8.
2. Arata MA, Peterson HA, Dahlin DC. Pathological fractures through non-ossifying fibromas. Review of the Mayo Clinic experience. *J Bone Joint Surg(Am)* 1981;74:980-88.
3. Friedland JA, Reinus WR, Fisher AJ, Wilson AJ. Quantitative analysis of the plain radiographic appearance of nonossifying fibroma. *Investigative Radiology* 1995;30(8):474-9.
4. Jee WH, Choe BY, Kang HS, Suh KJ, Suh JS, Ryu KN, et al. Nonossifying fibroma: characteristics at MR imaging with pathologic correlation. *Radiology* 1998;209(1):197-202.
5. Marcinko DE. Nonossifying fibroma of the fibula with open section defect. *Journal of the American Podiatric Medical Association* 1988;78(9):461-4.
6. Marks KE, Bauer TW. Fibrous tumors of bone. *Orthopedic Clinics of North America* 1989;20(3):377-93.
7. Steiner GC. Fibrous cortical defect and nonossifying fibroma of bone. A study of the ultrastructure. *Archives of Pathology & Laboratory Medicine* 1974;97(4):205-10.