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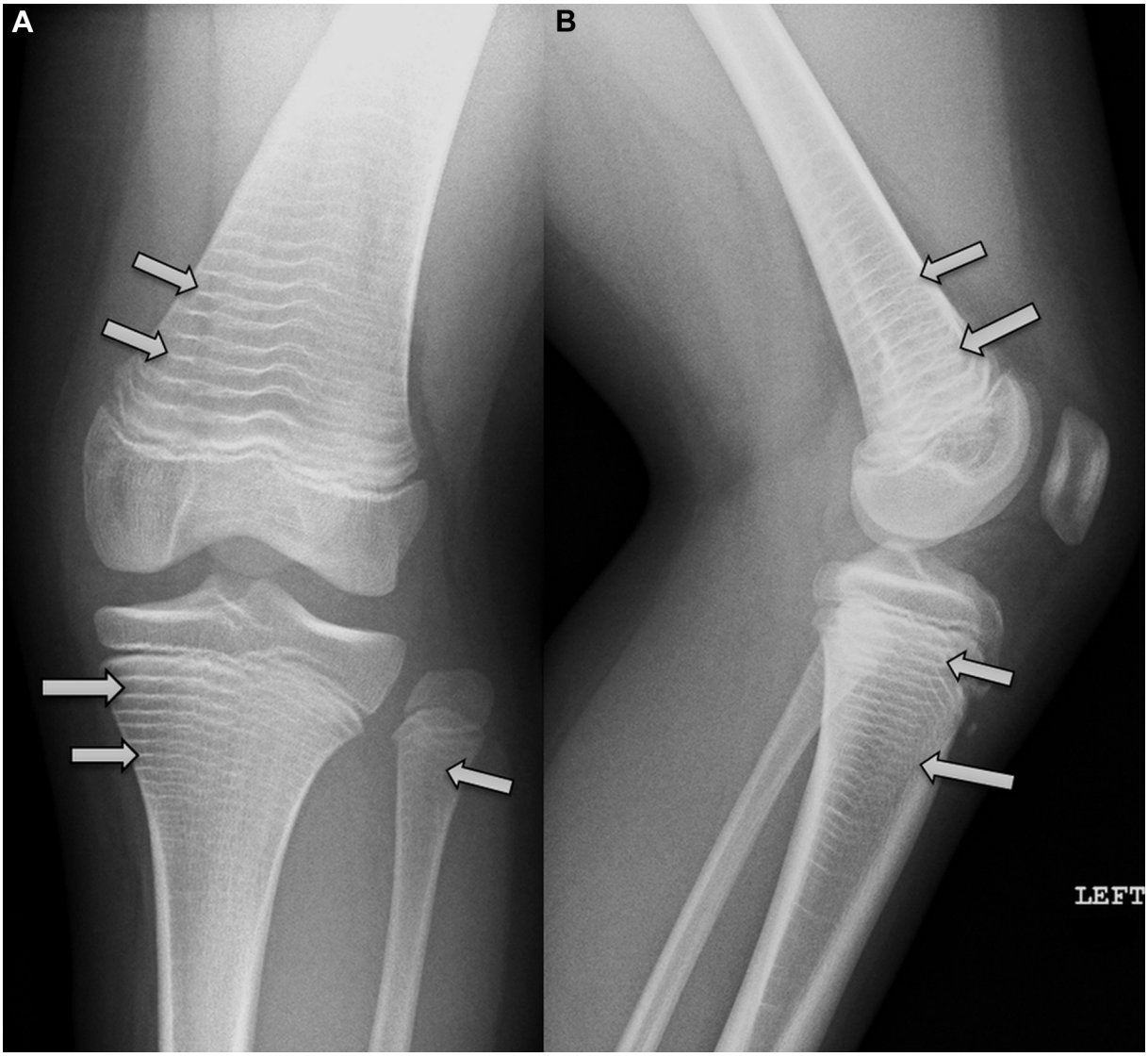

Figure. Radiograph of the left leg, anteroposterior view (*A*) and lateral view (*B*), demonstrating several thin sclerotic lines (arrows) at the distal metaphysis of the femur, as well as in the proximal metaphysis of the tibia and fibula, corresponding to growth recovery lines.

[Ann Emerg Med. 2019;74:e75-e76.]

An 11-year-old girl with type IV osteogenesis imperfecta presented to the emergency department with pain in the left leg after a fall. She was receiving cyclic pamidronate therapy to reduce the rate of fractures. Physical examination revealed a bruise over the anterior portion of the knee. Radiograph of the left knee was performed.

For the diagnosis and teaching points, see page e76.
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DIAGNOSIS:

Bisphosphonate-induced zebra lines. The radiograph of the left knee showed no acute fracture or joint effusion. However, several thin linear sclerotic lines were observed within the distal metaphysis of the femur, as well as in the proximal metaphysis of the tibia and fibula (Figure *A* to *B*), suggestive of growth recovery lines, also known as zebra lines.

Osteogenesis imperfecta, or brittle bone disease, is an inheritable bone disorder characterized by excessive bone fragility, recurrent fractures, and bone deformities, often resulting in severe disability. There are several subtypes that range from mild disease to lethal. Bisphosphonate therapy has been the mainstay of treatment for years and has been shown to be effective in reducing bone pain and long bone fracture incidence as well as in improving mobility and functional outcome.[1] Zebra lines, or metaphyseal lines, are radiologic manifestations of cyclic antiosteoclastic activity of bisphosphonate therapy in children before epiphyseal growth plate closure, resulting in alternating bands of increased and normal bone mineralization.[2] The distance between each line depends on the patient's age, the rate of bone growth, location of the metaphysis, and the bisphosphonate dosing regimen, whereas the number of sclerotic bands correlates with the number of previous cycles of bisphosphonate therapy. These lines disappear over a period of time without affecting the overall skeletal growth.

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REFERENCES

1. Grissom LE, Harcke HT. Radiographic features of bisphosphonate therapy in pediatric patients. *Pediatr Radiol*. 2003;33:226-229.
2. Loizidou A, Andronikou S, Burren CP. Pamidronate "zebra lines": a treatment timeline. *Radiol Case Rep*. 2017;12:850-853.