

# Zebra lines in osteogenesis imperfecta on bisphosphonate therapy

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## DESCRIPTION

A 7-year-old girl presented with a history of recurrent fractures since the age of 1 month. She was born out of a non-consanguineous marriage and had short stature with macrocephaly and triangular facies. Her sclera and teeth were normal. She did not have any hearing defect or a family history of frequent fractures. Her biochemical metabolic profile was normal except for vitamin D deficiency which was corrected. She was provisionally diagnosed as having osteogenesis imperfecta type IV of Sillence's classification<sup>1</sup> and initiated on cyclic pamidronate therapy to reduce the rate of fractures.<sup>2</sup> She, however, had a repeat fracture in her right shaft of femur during the course of therapy.

Her current follow-up skeletal imaging revealed four metaphyseal bands of increased density paralleling the contours of the physis in the distal femur, proximal tibia and proximal fibula, matching the number of treatment cycles she had undergone (figure 1). These metaphyseal bands, alternately described as 'zebra lines',<sup>3</sup> vary in spacing according to the age of the patient, rate of growth and the location of the metaphysis. Differential remodelling

due to cyclic antiosteoclastic activity of bisphosphonates leads to these 'zebra lines' corresponding to alternative periods of increased and normal bone mineralisation. The prognostic significance of these lines during therapy is currently restricted to serving as a marker of the course of prior bisphosphonate treatment received. The prognosis of this condition depends on the type of osteogenesis imperfecta, the genetic defect producing it and the treatment given.

## Learning points

- ▶ Zebra lines are metaphyseal bands of increased density observed near the ends of long bones during cyclic bisphosphonate therapy in osteogenesis imperfecta.
- ▶ They are most prominently seen around knee and elbow joints.
- ▶ They serve as a marker of the course of prior bisphosphonate treatment received.



**Figure 1** (A) x-Rays of bilateral knee joints showing 'zebra lines' in distal femur, proximal tibia and proximal fibula. (B) Gross facial phenotype of osteogenesis imperfecta child depicting triangular facies and macrocephaly. (C) X-ray of the skull of osteogenesis imperfecta child showing macrocephaly.

**To cite:** Sukumar SP, Balachandran K, Sahoo JP, et al. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2012-008536

**Competing interests** None.

**Patient consent** Obtained.

**Provenance and peer review** Not commissioned; externally peer reviewed.

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