# Three stress fractures at different sites in the same tibia—a case report

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An 8-year-old boy who had no significant past medical history had right leg pain for 2 months while practicing judo and with walking. He had been participating in 2 hours of judo practice twice a week and running almost every day for 2 years. He denied direct trauma to the leg. The anterior midshaft of the right leg was tender, without swelling or redness. Plain radiographs revealed a lucent area in the anterior cortex of the midshaft of the tibia. A bone scan with technetium-99 demonstrated locally increased uptake at the site of symptoms. MRI showed an abnormal signal intensity at the same spot. These findings were compatible with a stress fracture of the midanterior cortex of the tibia. He was treated with cast immobilization, no weight bearing and ambulation on crutches. The cast was removed after 2 months and he had no pain on standing, although he complained of mild tenderness over the anterior midshaft of the tibia. The lucent area was visible on repeated radiographs, but less distinct than on the initial radiographs. We removed the cast and permitted ankle motion, no weight bearing and use of crutches, but prohibited physical activities for 3 more months. 3 months later, he still had some pain and radiographs demonstrated a lucent area in the anterior cortex with linear sclerotic changes in the upper third of the tibia. We continued prohibition of weight bearing on the right leg for 2 more months. Nevertheless, 2 months later he still had pain and radiographs revealed sclerotic changes in the lower third of the tibia, in addition to findings in the midshaft and upper third. At that time, he confessed that he had been running now and then in order to maintain his competitive level with fellow athletes. We strictly prohibited weight bearing and sports activities, except swimming. 4 months later, he said he had been following our recommendation and had no symptoms and radiographs were normal. 1 year later he had no symptoms.

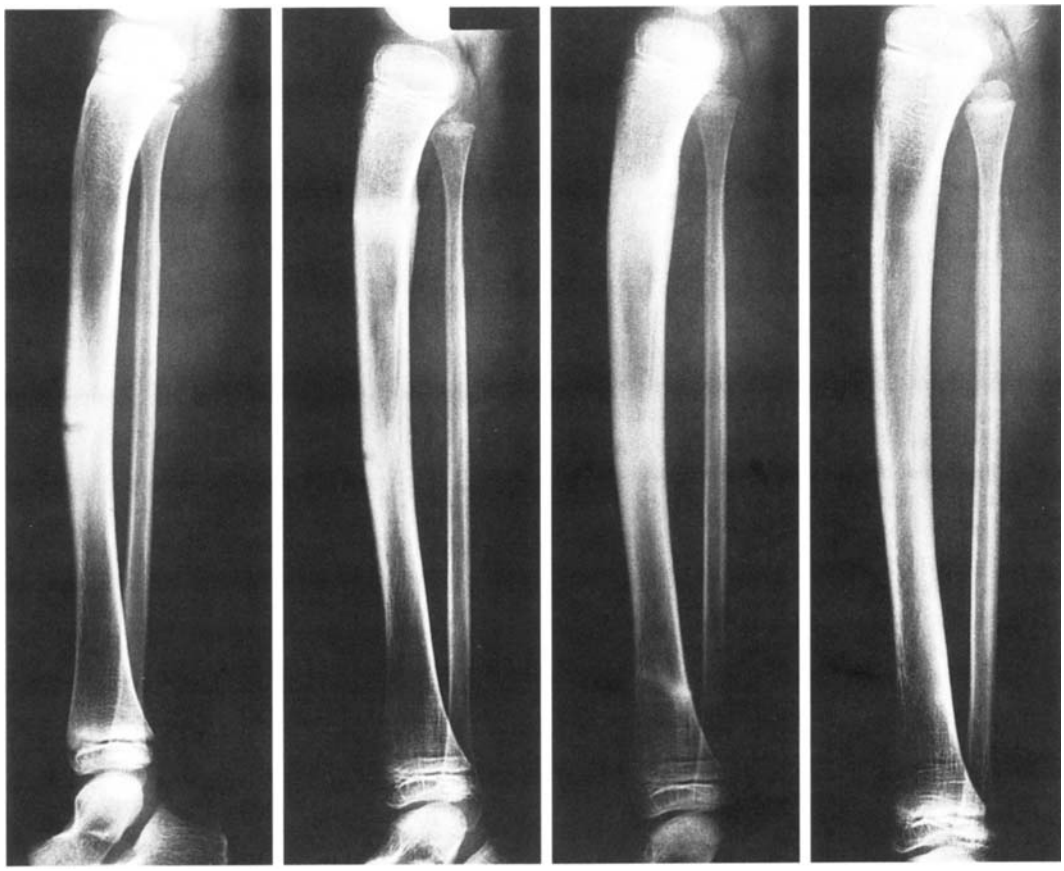
He had a normal physical constitution, normal skin condition, normal ocular and auditory systems, normal laxity and range of motion in his joints, with normal alignment of his legs. Laboratory findings including blood count, sedimentation rate, calcium, phosphate, alkaline phosphate, thyroid and parathyroid hormones were normal. There was no evidence of rickets at the end of the long bones and bone density was normal.

## Discussion

The tibia is the commonest site of stress fractures (Hartley 1942, Devas 1958, Hulkko and Orava 1987) which are often seen in the posteromedial cortex of the upper or lower third. Stress fractures of the midanterior cortex are much less frequent (Burrows 1956, Devas 1975, Orava et al. 1978, Orava and Hulkko 1984, Green et al. 1985, Blank 1987, Barrick and Jackson 1992, Chang and Harris 1996). Milgrom et al. (1985) reported a case of multiple stress fractures in a soldier where 2 stress fractures were observed simultaneously in the same tibia. However, there have been no reports of unilateral stress fractures occurring one after another in 3 parts of the tibia, as in our case.

Midanterior tibial stress fractures are particularly difficult to treat and frequently require a long period of closed treatment. Surgery is necessary in some cases. We employed cast immobilization with no weight bearing initially because the stress fracture was incomplete. When stress fracture of the upper third occurred, we continued closed treatment, because the lucent area at the midanterior cortex had become less distinct than in the initial radiographs and stress fracture of the posterior medial proximal tibia is more likely to heal with closed treatment. We also continued closed treatment when the stress fracture of the lower third occurred for the same reason.

The patient had no significant medical history, metabolic or musculoskeletal abnormalities that could explain the occurrence of multiple unilateral tibial stress fractures. After he stopped weight bearing on the affected leg and all athletic activities other than swimming, the symptoms and radiographic findings improved. Thus, overloading with continued repetitive weight load on the right leg probably caused the multiple stress fractures.



First stress fracture, a lucent area in the anterior cortex of the midshaft of the tibia.

5 months later a sclerotic zone in the upper third of the tibia.

2 months later, a linear sclerotic line in the lower third of the tibia in addition to the midshaft and upper third stress fractures.

4 months later, normal findings.

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