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STRESS FRACTURES

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An unusual case of bilateral stress fracture in the upper third of the tibia, which was not diagnosed until 2 months after the onset of symptoms, is presented. The mechanism, symptoms and early X-ray findings are discussed and the literature is reviewed.

Key words: fatique; fractures; stress

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Stress fractures in the metatarsal bones are well documented and as a rule easy to diagnose. Judging from the literature the incidence of stress fractures in children is higher in the proximal part of the tibia than in the metatarsal bones. In children these fractures can give diagnostic problems as the X-ray finding may resemble osteosarcoma or osteomyelitis. As there are few reports regarding bilateral symmetrical stress fractures of the proximal part of the tibia, it was considered worthwhile to report such an occurrence in a 14-year-old girl.

CASE HISTORY

A 14-year-old school girl was seen in the outpatient clinic at the Orthopaedic Hospital in Aarhus in September 1972. Four months earlier she had noticed pain below both knees after she had been hill climbing on a school field trip.

Two months after the onset of the symptoms X-rays had been taken at the local hospital. The pictures showed transverse fractures 10 cm below both proximal epiphyseal plates. There was a marked periosteal reaction on both sides (Figure 1).

When we saw her 4 months after the field trip, she was without complaints. X-rays showed the fractures to be healing (Figure 2). Clinically there was no tenderness, and on both sides there was a slight thickening medially above the site of the fracture. Blood calcium, phosphorus and alkaline phosphatase values were within the normal ranges. No treatment has been given except that she has not been allowed to take part in gymnastic or sporting activities.

Two years after the start of the symptoms she was completely without complaints. The X-ray pictures showed nothing abnormal.

DISCUSSION

Repeated forceful muscle pull or weight strain can give rise to stress fractures in normal bones (Devas & Sweetman 1956, Burrows 1956, Devas 1958). Bone tissue is sensitive to changes in stress. Immobilization of bones and non-physiological strain on normal bone tissue can result in bone resorption (Blickenstaff & Morris 1966).

Johnson et al. (1963) studied 30 stress fractures in the upper part of the tibia by performing biopsies. During the first week no decalcification was seen, but active osteoplastic resorption of the tibial cortex was noticed. During the second week periosteal callus formation was pre-

Figure 1.

sent. If the stress-provoking activity was discontinued, no fracture developed. If the force continued, one third of the bones developed fractures. Resorption was completed by the end of 3 weeks; callus formation reached a maximum in about 6 weeks. In the case reported here, there had been no non-physiological strain on the tibial bones when the symptoms started.

In children the localization of stress fractures in the upper one third of the tibial shaft is characteristic (Devas 1963). In adults stress fractures are most commonly localized in the lower one third of the tibial shaft (Singer et al. 1954). In ballet dancers the fractures are often seen in the middle of the tibia (Burrows 1956), whereas in professional runners oblique stress fractures are seen (Devas 1958).

The common age for the fractures to occur is at about 20, but they are seen as early as 5 years of age (Devas 1963). The fractures can be multiple; symmetrical localization as reported here is not uncommon.

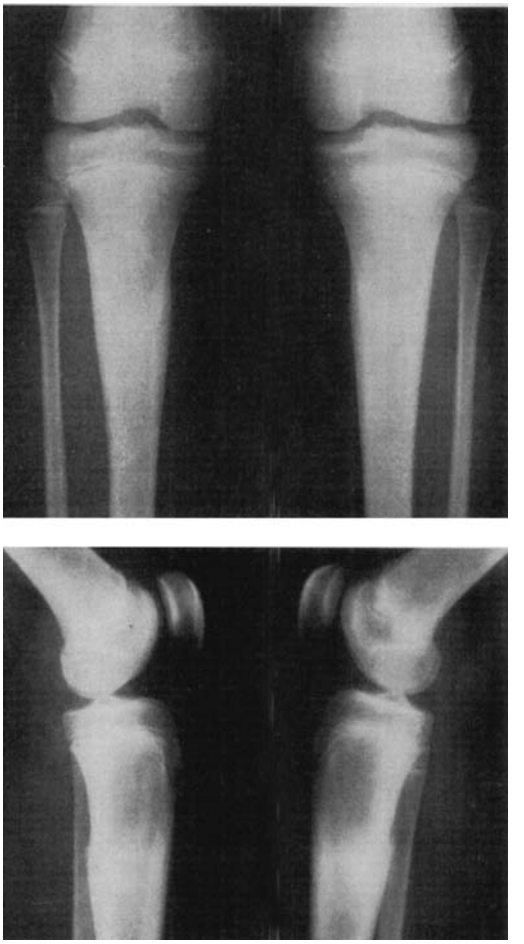

Figure 2.

The symptoms often start slowly with pain increasing over a period, often after physical activity. Clinically there is tenderness below and over the fracture line, caused by the periosteal loosening. The initial bone resorption is seen on X-ray. The early X-ray changes with abundant periosteal callus formation may give a picture resembling an osteogenic sarcoma, but changes in the X-ray picture after a few weeks confirm the diagnosis of stress fracture. Actual fracture lines can be seen. The treatment is conservative with diminished weightbearing until the patient is free from pain.

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