Osteochondrosis juvenilis of the medial malleolar epiphysis

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Osteochondrosis juvenilis is caused by a dysfunction of endochondral ossification. Several epiphyses and apophyses can be affected, but osteochondrosis juvenilis of the medial malleolus has not been reported. We describe a 12-year-old boy with bilateral pes planovalgus who was affected by this condition. Conservative management was successful. The presentation, aetiology and treatment are described and the importance of including it in the differential diagnosis is discussed.

Osteochondrosis juvenilis is a dysfunction of endochondral ossification, in a region of previously normal endochondral growth. It can affect all growth centres of the skeleton including the epiphyses and the apophyses.

All osteochondroses pass through three stages of evolution. The first is an arrest of ossification in the affected region, making it appear to be smaller radiologically. The second involves re-vascularisation, in which there is resorption of bone. Finally, re-ossification occurs and there may be an alteration in the shape of the affected region. Degenerative changes can occur occasionally but appear later in the disease process. The epiphyses most commonly affected by osteochondrosis juvenilis are those of the upper femur,\textsuperscript{1,2} the lunate bone,\textsuperscript{4} the navicular,\textsuperscript{5} the head of the second metatarsal\textsuperscript{6} and the vertebral bodies.\textsuperscript{7} Many other epiphyses are also occasionally affected, but to the best of our knowledge osteochondrosis juvenilis of the medial or the lateral malleolus has not been reported.

The prognosis and treatment are determined by the growth potential of the involved area.\textsuperscript{8} The younger the patient is the better the prognosis will be. Options for treatment include rest to avoid loading while maintaining a good range of movement. Drilling the area may stimulate re-vascularisation and a displacement osteotomy may improve the containment of the affected joint. If the osteochondral lesion is unstable an osteosynthesis may be required.

Case report

A 12-year-old boy presented with a history of pain in his right ankle of four to six weeks. This occurred typically after playing football when he used his right foot for kicking. There was no specific history of injury. Clinical examination revealed an increased valgus position of both hindfeet which corrected on tip-toeing (flexible pes planovalgus). Palpation showed tenderness with a discrete swelling around the medial malleolus. Radiographs showed fragmentation of the epiphysis of the right medial malleolus (Fig. 1a), while the contralateral side appeared to be normal (Fig. 1b). It was decided to treat this conservatively by tape dressing of the ankle for a period of four weeks. The increased valgus position of the hind foot was corrected by appropriate orthotics after pedography and treadmill analysis. Radiographs obtained four weeks after the initial presentation showed signs of repair in the epiphysis. However, MRI performed at this time still showed soft tissue and bone-marrow oedema at the medial malleolus (Fig. 2). Six weeks later he was free from symptoms and radiographs showed reconstitution of the epiphysis (Fig. 3). He was encouraged to return to playing football at the same level and remained free from symptoms at his last follow-up examination, six months after the initial presentation.

Discussion

The distal tibial physis is a relatively transverse structure and has a complex maturation process. As the tibia enlarges diametrically and the epiphyseal ossification centre matures, the physis becomes undulated with peripheral irregularity. The anteromedial area is the first to develop undulations. The secondary ossification centre of the tibia forms from within the central epiphysis and the medial margin is

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irregular and may also have peripheral ossification foci. Between the ages of seven and eight years, the secondary centre extends into the medial malleolus and reaches the distal tip by adolescence. The malleolar tip may also develop accessory ossification with different centres on both sides. Physiological epiphyseodesis of these ossification centres begins over the medial malleolus and then gradually extends laterally. However, some of this physiological process can be confused with pathology such as a fracture or osteochondrosis.

In our patient there was no history of injury which could explain the symptoms. The growth disturbance in osteochondrosis juvenilis itself is minimally symptomatic. Symptoms however, do occur when there is weakening of the bone or when mechanical alteration causes ligamentous strain. They include pain, restriction of movement and localised tenderness.
In addition, pathological findings were seen on the radiographs and the MR scans. This is in contrast to the above described maturation process of the medial malleolus with common variations.9,10

Several aetiological factors have been suggested for osteochondrosis juvenilis and endochondral growth disturbance can occur secondary to the occlusion of the blood supply,11 a systemic disorder12,13 or because of overload. Excessive load on the epiphysis can result in disordered growth by direct cellular or a local microvascular overload. In support of this theory a study in pigs showed that the incidence of spontaneous osteochondrosis in the femoral condyles was directly related to gain in weight.14 It appears that necrosis occurs primarily in the epiphyseal cartilage and only secondarily affects the subchondral bone.14

Our patient had flexible pes planovalgus with a normal talocalcaneal angle. The pes planovalgus in combination with the playing of intensive football could have caused this form of osteochondrosis due to increased loads on the medial structures of the hind foot and ankle.

In summary, an adolescent with pes planovalgus and involved in regular sports without a history of specific injury and pain in the ankle should be investigated for osteochondrosis of the epiphysis of the medial malleolus. It is a benign condition which responds well to conservative treatment.

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References