Extra Ossification Center at the Tip of the Medial Malleolus Suspected as Fracture: A Clinical Clue

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ABSTRACT

The appearance of displaced bone inferior (distal) to the medial malleolus, present on radiographs in an adolescent patient, can be confused with a fracture, when, in fact, it is the radiographic appearance of a secondary center of ossification. Foot and ankle surgeons should be aware of extra ossification centers and accessory bones, including one at the tip of the medial malleolus, to avoid misdiagnosis and overtreatment. In the present report, I describe the case of a 9-year-old male with bilateral extra ossification centers at the tip of each medial malleolus.

A displaced bone fragment at the tip of the medial malleolus in an individual who has not yet reached skeletal maturity, as viewed on standard radiographs, should not be identified as a fracture in every patient. In the pediatric and adolescent population, most frequently at approximately 8 to 9 years of age, an extra ossification center can be seen at the tip of the medial malleolus. This secondary center of ossification typically consolidates with the remainder of the malleolus by 12 years of age (1). Fusion defects of this particular ossification center could result in the presence of an os subtibiale in adulthood (1). Secondary ossification centers and fusion defects of these centers causing accessory bone formation can be mistaken for fracture, and surgeons should be aware of this. In the present report, I describe the case of a young male who was misdiagnosed with an avulsion fracture after he sustained a sprain of his right ankle. The aim of this report is to increase awareness of this secondary center of ossification in the medial malleolus.

Case Report

A 9-year-old male was evaluated in the emergency department after he experienced a twisting event involving his right ankle. He explained that he had fallen over his right foot while he was trying to stop the ball during a football (soccer) game. He was referred to my clinic with the diagnosis of an avulsion fracture of his medial malleolus. On examination, he was observed to have an antalgic gait, with pain on the medial side of his right ankle. Swelling and local tenderness to palpation were noted at the distal tip of, and inferior to, the medial malleolus of his right ankle. He had no ecchymosis, bulla, or vesicle formation and no discoloration. His right ankle active range of motion was restricted and extremely painful. He explained that he had been asymptomatic before the twisting event, and he denied any history of a previous ankle injury.

Radiographs (Fig.) of both ankles were obtained in the emergency department. The mortise views revealed an approximately 0.7 × 0.4 cm, smooth and rounded, bone fragment inferior to the medial malleolus on both sides. The physeal lines were open in the distal tibia and fibula. On the right side, the distal bony fragment was bipartite. On the mortise view of the left ankle, the distal fragment did not display a central cleft. On both sides, the distal bony fragment displayed the same radiographic density as the major portion of the medial malleolus and the entire distal tibial epiphysis. From these findings, the distal bony fragment observed on the radiographs of the injured right ankle was considered a secondary center of distal tibial ossification. The concomitant history of twisting his right ankle, the presence of pain and swelling, and the bipartite appearance of the distal bony fragment led us to believe that the secondary center of ossification had been subjected to traction and, as a result, avulsion displacement (consistent with a Salter-Harris type 3 fracture of the secondary ossification center (2)). A posterior splint was applied, the patient was treated with elevation and cold application to the injured ankle, and the diagnosis and treatment were discussed with the patient’s parents. Three days later, the follow-up examination revealed improvement, with resolution of the pain and swelling and an improved range of motion. The final follow-up visit 10 days later revealed full resolution of all the patient’s pain and symptoms, and he was discharged, with instructions given to his parents to return as needed.
Discussion

A displaced fragment, or fragments, of bone inferior to the medial malleolus could represent a secondary ossification center, an accessory bone, or an avulsion fracture. Lapidus (3) noted that a secondary ossification center in this location could result in formation of the accessory bone, the os subtibiale. Lapidus (3) described a 23-year-old adult with bilateral os subtibiale and a 9-year-old male with bilateral extra ossification centers in each medial malleolus, leading him to distinguish between the terms os subtibiale and inconstant ossification center. Powell and Wycombe (4) described two 12-year-old males with bilateral extra ossification

Fig. Secondary ossification centers at the distal tip of the medial malleolus, viewed bilaterally in the patient, on mortise and lateral views of each ankle. (A) Right ankle mortise view. (B) Right ankle lateral view. (C) Left ankle mortise view. (D) Left ankle lateral view.
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