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Case Report
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Incidental Finding of the *Os Subtibiale*: a Case Report

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ABSTRACT

Introduction: *os subtibiale* is a rare accessory bone, present on the poosterior surface of the medial malleolus. The estimated prevalence of this anatomical variation is between 0.2 and 1.2%. They are generally asymptomatic, but when they cause pain, treatment is based on applying ice, using non-steroidal anti-inflammatory drugs and adjusting the intensity of physical activities.

Case report: man admitted to the emergency department with ankle pain. On X-ray, a bone trace was observed below the medial malleolus of the tibia.

Conclusion: it is possible to misdiagnose subtibial fractures as a fracture, resulting in unnecessary and inadequate treatment. Therefore, it is important to know this anatomical variation.

Keywords: Ankle; *Os subtibiale*; Anatomical variations.

Introduction

The *os subtibiale* (OS) is a rare, small accessory bone located on the posterior surface of the medial malleolus. It was first described by Bircher in 1918 and it can also be known as it may be known as talus accessories. The OS usually has a rounded triangular shape, but in some cases, it can be multipartite[1, 2]

The estimated prevalence is between 0.2 and 1.2%[1,3-5]. For instance, an analysis of 1651 radiographic images conducted by Candan (2022) showed the presence of the OS in 0.24% of cases, while another study carried out by Tsuruta *et al*. (2023), 3460 radiographs were analyzed; OS was found in 31 cases (0.9% of the sample), 10 in women and 21 in men[2].

The OS can be classified into 2 types according to its size: if bigger than 7 mm the OS is classified as type 2, if smaller than 7 mm, type 1[3,5]. Even though the OS is often asymptomatic, it can lead to pain, usually associated with the second type (e.g. larger bones). Furthermore, it can be associated with degenerative diseases, osteonecrosis, infection or trauma[1,3].

The treatment of individuals with symptomatic OS initially requires the adoption of a conservative approach, based on the ice application, rest, use of non-steroidal anti-inflammatory drugs, and adjustment of the intensity of physical activity. If there is no success with this initial approach, the possibility of opting for surgical intervention can be considered[1,6]

Due to its rarity, the present work aims to report a case of OS found incidentally in a male patient.

Case Report

A 34-year-old male patient was admitted to an emergency service complaining of pain at the ankle. On physical examination, painful limitation of range of motion while supporting partial load was found. The leg was painless on examination and deformities in the ankle and foot were not found.

The patient complained of a previous pain in the ankle during sport activities. Radiographic examination of the ankle showed no evidence of dislocations and misaligned fractures, however, the x-ray showed a bony apophysis below the medial malleolus of the tibia (Figure 1) which was promptly diagnosed as the *os*

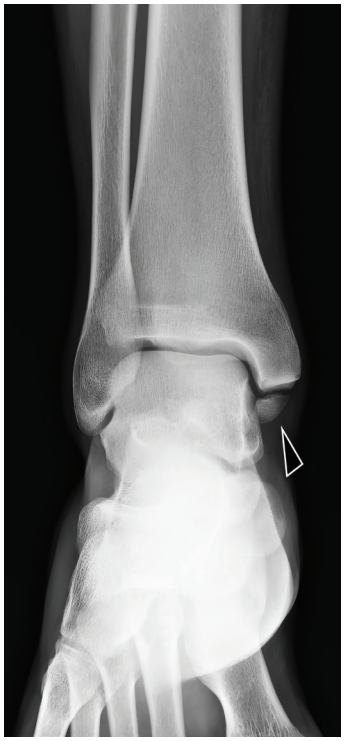

Figure 1. X-ray of the patient showing the os subtibiale (arrowhead).

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subtibiale. The patient was referred to the Foot and Ankle clinic for possible treatment and follow-up.

Discussion

Skeletal variations of the foot can be divided into bipartitions, coalitions, sesamoid bones, and accessory bones. The latter, also called supernumerary bones, have a prevalence between 21 and 49.2%, varying in accordance with the population studied and the method used[1].

Throughout evolution, the foot has undergone drastic changes. Distinct hind and forelimbs were initially developed in early Amphibians in the Middle Denovian period (395 million years BC)[7]. When comparing the amphibian hindlimb to the human foot, one of the differences is the number of tarsal bones. This could explain some of the accessory bones in humans as rudimentary remnants of supernumerary bones seen in amphibians[1]. Therefore, *os subtibiale* might be the remnant of os tibiale in amphibians.

It is thought that the *os subtibiale* could be a sesamoid bone of the deltoid ligament[2]. Furthermore, the presence of accessory ossicles usually stems from the failure of the union of secondary ossification centers (SOC) adjacent to the main bone mass [5]. Therefore, some authors consider that the origin of the subtibial is related to an unfused SOC at the distal tip of the medial malleolus[3,8].

A SOC of the medial malleolus merges with the primary ossification center between 13 and 14 years of age; while the primary ossification center merges with the diaphyseal ossification center between 15 and 20 years of age[2]. A SOC has been described as part of the normal development of the medial malleolus between 6 and 9 years of age in females and between 8 and 9 years of age in males[3,6]. However, in rare cases, SOC may persist into adulthood. The exact etiology remains elusive.

Although they are usually asymptomatic, it is important not to confuse them with fragments of fractures of the medial malleolus or a tumor of bone origin. This can be avoided by knowing their typical location and size[9]. When symptomatic, they can cause pain, redness, and swelling, which can lead to an incorrect diagnosis or treatment for a medial malleolus fracture[4]. Accessory ossicles in general are often confused with avulsion fractures in trauma patients with musculoskeletal injuries[8].

The misinterpretation as an acute fracture can lead to unnecessary complications, immobilizations, or surgeries[1]. It is important to note that a large *os subtibiale* can result in posterior tibial tendon dysfunction[10] in the medial retromalleolar region. The medial malleolus is a thick ridge projecting from the medial shaft of the tibia and is the main attachment point for the deltoid ligament. The lower border is divided by a groove into a large anterior colliculus and a smaller posterior colliculus, where the tendon of the posterior tibial muscle is found[6].

The most convenient method for diagnosis is X-ray[10], additional clinical information can be acquired by magnetic resonance imaging (MRI). On MRI, accessory ossicles usually demonstrate a fat-like medulla signal intensity, with a thin cortical margin of low intensity[9].

Treatment of symptomatic *os subtibiale* should start with conservative treatment with ice, rest, non-steroidal anti-inflammatory drugs, and activity modification. If a course of conservative treatment fails, surgical treatment can be planned. However, it is recommended to ensure that the ossicle is the real underlying reason for the symptoms. In the current literature, two main surgical treatment modalities are described: fixation of the ossicle to the main bone or removal of the bone[1,8].

A previous report by Kim *et al.* (2012)[11] discussed two misdiagnoses of the OS as an old fracture. These cases were treated surgically by fusion of the OS to the medial malleolus with surgical fixation and autogenous bone graft, instead of removing the ossicle.

In some cases, the fixation could be preferred over surgical removal to achieve stability of the ankle joint, especially where the accessory bone is greater than 10 mm. Treatment with arthroscopic debridement of the hypertrophic synovium on the anterior capsule and in the space between the ossicle and the tibia itself, without removal of the ossicle, has also been reported by Han *et al.* (2008)[12], Vega, *et al.* (2010)[13], Bellapianta *et al.* (2011)[14] and Shinohara *et al.* (2016)[15], the symptoms were also relieved.

Conclusion

The *os subtibiale* can lead to misdiagnosis and inadequate treatment, hence the importance of knowing the characteristics and location of this ossicle. Although asymptomatic in most cases, it can cause pain, the first treatment being pain management and rest. Its etiology is still not completely understood.

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Mini Curriculum and Author's Contribution

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