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Case Report

Incidental discovery of isolated talonavicular coalition: Report of two cases

Steven D. Lewis, MD*, Felix S. Chew, MD

Department of Radiology, University of Washington, 4245 Roosevelt Way N.E., Seattle, WA 98105, USA

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ABSTRACT

Tarsal coalitions may cause altered foot biomechanics leading to patient disability from osteoarthritis and other sequelae. While some types of coalition are common, isolated talonavicular coalitions are relatively rare. We present two cases of osseous talonavicular coalition that were incidentally discovered in adults and were most likely asymptomatic. Talonavicular coalition may have a hereditary component and may be associated with other anomalies, but many seem isolated, asymptomatic, and incidental.

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Introduction

Tarsal coalitions are frequently encountered in musculoskeletal radiology practice, with a prevalence of about 2% [1]. They can be classified as osseous, fibrous, or cartilaginous. Most tarsal coalitions of any kind are easily identified by x-ray. Plain radiographs and CT can differentiate osseous coalitions from fibrocartilaginous coalitions, but MRI is required to distinguish fibrous from cartilaginous coalitions. MRI is also useful to identify associated bone marrow edema, which signifies a symptomatic coalition in the appropriate clinical context. Roughly 90% of tarsal coalitions are calcaneonavicular or talocalcaneal [2]. Talonavicular coalition is extremely rare, thought to comprise only 1%-2% of all tarsal coalitions [3].

Case report 1

Patient 1 is a 27-year-old male with autism who had no prior orthopedic complaints. This patient sustained a pilon fracture

of the right ankle after jumping from a height. Right talonavicular coalition was incidentally noted. Oblique radiograph (Fig. 1A) demonstrates both the pilon fracture and the talonavicular coalition. The coalition is also well visualized on lateral radiograph (Fig. 1B), axial CT (Fig. 1C), sagittal CT (Fig. 1D), and on 3D reconstructions (Fig. 1E-G). On axial CT (Fig. 1F), the “mushroom sign” caused by the coalition is readily appreciated, and is a reliable sign of the condition [4]. Axial CT also demonstrates insertion of a tibialis posterior tendon slip on the anteromedial aspect of the fused talonavicular bone (Fig. 1H). This tendon slip insertion is usually found at the medial navicular bone. The patient underwent successful open reduction and internal fixation of the pilon fracture, and the talonavicular coalition was not addressed.

Case report 2

Patient 2 is a 25-year-old male with chromosome 9 deletion, autism, bilateral talonavicular coalition, left foot congenital cavovarus alignment, and right foot congenital severe hallux

* Corresponding author.

E-mail address: stevendl@uw.edu (S.D. Lewis).

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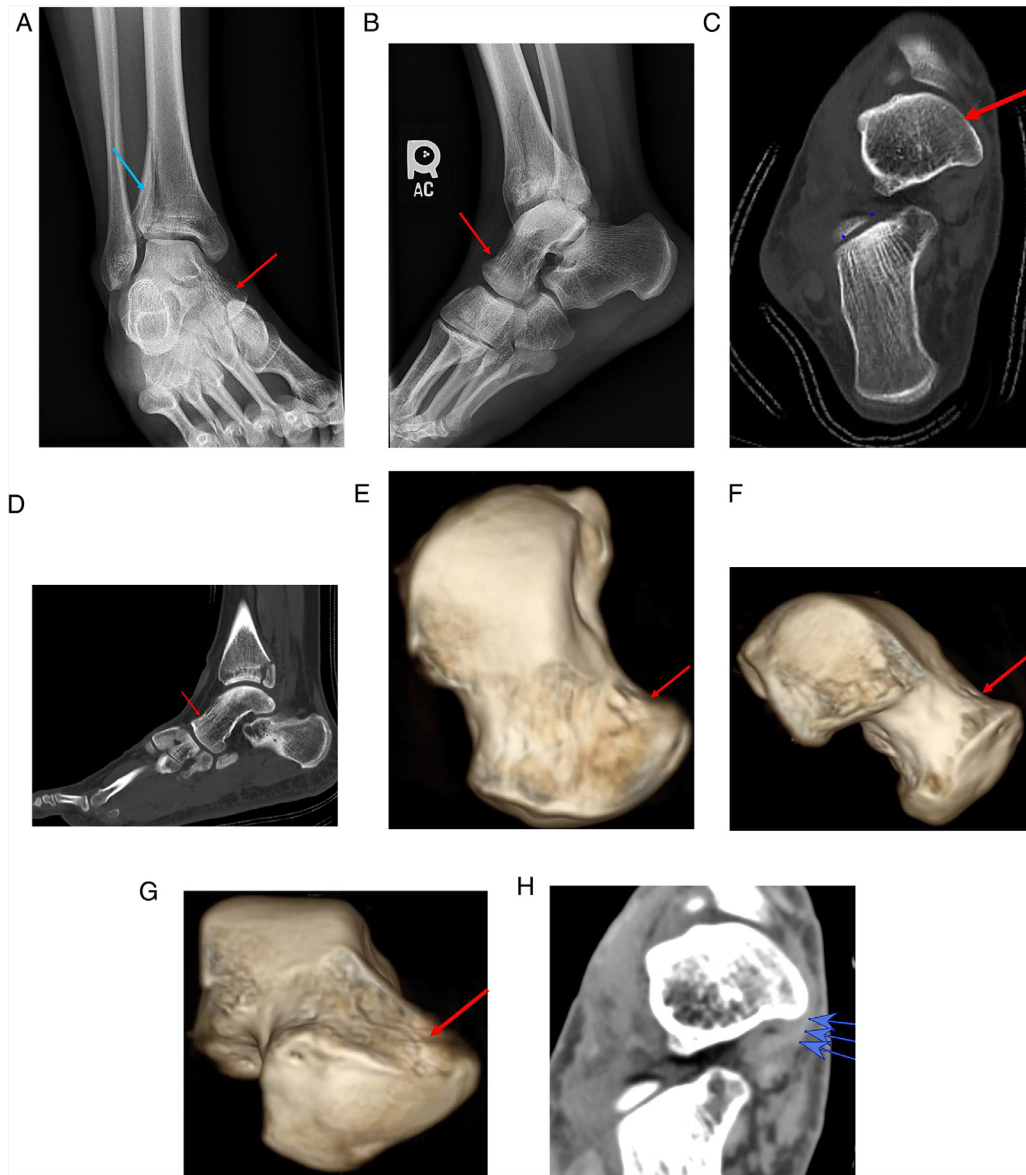


Fig. 1 – Case 1: 27-year-old man with right talonavicular coalition. (A) Oblique radiograph demonstrating talonavicular coalition (red arrow) and pilon fracture (blue arrow). (B) Lateral radiograph demonstrates talonavicular coalition (arrow). (C) Axial CT demonstrates “mushroom sign” of talonavicular osseous coalition (arrow). (D) Sagittal CT demonstrating talonavicular coalition (arrow). (E) Dorsal 3D reconstruction demonstrating talonavicular coalition (arrow). (F) Lateral 3D reconstruction demonstrating talonavicular coalition (arrow). (G) Frontal 3D reconstruction demonstrating talonavicular coalition (arrow). (H) Axial CT demonstrates tibialis posterior tendon insertion at the expected location on the navicular tuberosity (arrow).

valgus. The bilateral coalitions are well visualized on lateral views of both feet (Fig. 2A), right foot oblique radiograph (Fig. 2B), left foot frontal radiograph (Fig. 2C), and bilateral axial CT (Fig. 2D). This patient underwent several bilateral orthopedic foot procedures, but his bilateral talonavicular coalition was considered incidental and was never surgically treated.

Discussion

Talonavicular coalition was first described in 1879 [5]. Both autosomal dominant [5] and autosomal recessive [1] genetic

transmission have been proposed based on family histories in different case reports. Perhaps both autosomal recessive and dominant etiologies exist. Talonavicular coalitions seem to be asymptomatic in many reported cases. When symptomatic, the condition can present with limited joint motion, vague foot pain, flatfoot, or peroneal spasm, though clearly none of these symptoms is specific for coalition [6]. Talonavicular coalitions are very occasionally associated with peroneal spastic flatfoot, and can sometimes present with pain from shoe irritation along the medial aspect of the expected talonavicular joint [6].



Fig. 2 – Case 2: 25-year-old man with bilateral talonavicular coalition. (A) Lateral radiographs of both feet demonstrate bilateral talonavicular coalition (both arrows). (B) Oblique radiograph of the right foot demonstrates talonavicular coalition (arrow). (C) Frontal radiograph of the left foot demonstrates talonavicular coalition (arrow). (D) Axial CT demonstrates bilateral talonavicular coalition (both red arrows).

A leading proposed etiology for tarsal coalitions is the error of early mesenchymal tissue differentiation, likely hereditary [7]. Indeed, the human *Noggin* gene (*NOG*) has been shown to be associated with bone and joint development, and *NOG* mutations have been identified with tarsal-carpal coalition syndromes [8]. The tarsal bones ossify at different ages in childhood. For instance, the talus ossifies at 7 months gestational age, and the navicular ossifies at age 4 years [5]. Tarsal coalitions are somewhat more common in males and occur bilaterally in roughly 50% of patients [6].

Other literature reviews have demonstrated that talonavicular coalitions, if symptomatic, can be treated conservatively or with a range of surgical options depending on other foot and ankle abnormalities which may be present [1]. Clinically, neither of our patients was deemed symptomatic from their coalitions. It is also interesting that both patients at our institution with talonavicular coalition have autism. If the two conditions were ever shown to be related, one might wonder if symptomatic talonavicular coalition is underreported because of communication difficulties in the autistic patient. At this time, literature review revealed no reported link between the two conditions, nor any link between the *NOG* gene and autism.

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