Case Report

Incidental discovery of isolated talonavicular coalition: Report of two cases

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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...
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].
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.

REFERENCES

[1] Macera A, Teodonno F, Carulli C, Frances Borrego A, Innocenti M. Talonavicular coalition as a cause of foot pain. Joints 2017;5:246–8.
[2] Newman J, Newberg A. Congenital tarsal coalition: multimodality evaluation with emphasis on CT and MR imaging. Radiographics 2000;20:321–32.
[3] Shtofmakher G, Rozenstrauch A, Cohen R. An incidental talonavicular coalition in a diabetic patient: a podiatric perspective. BMJ Case Rep 2014. doi:10.1136/bcr-2014-204510.
[4] Rojas L, Cerpi R. El signo de la seta en la coalición talonavicular. Rev Chil Rad 2016;22:189–93.
[5] Buckingham R, Winson I. Bilateral agenesis of the tarsal navicular. Foot Ankle Surg 2000;6:185–8.
[6] Perlman M, Wertheimer S. Tarsal coalitions. J Foot Surg 1986;1:58–67.
[7] Jack E. Bone anomalies of the tarsus in relation to peroneal spastic flat foot. J Bone Joint Surg Br Vol 1954;36:530–42.
[8] Takano K, Ogasawara N, Matsunaga T, Mutai H, Sakurai A, Ishikawa A, et al. A novel nonsense mutation in the NOG gene causes familial NOG-related symphalangism spectrum disorder. Hum Genome Var 2016;3:16023.