

Tarsal Coalitions: Etiology, Diagnosis, Imaging, and Stigmata

Klaus J. Kernbach, DPM

KEYWORDS

- Tarsal coalition • Pes planus
- Middle facet talocalcaneal coalition
- Calcaneal fibular remodeling
- Calcaneonavicular coalition • Flatfoot

Tarsal coalition is a congenital condition characterized by the aberrant union (osseous or fibrous) between 2 bones in the rearfoot, most commonly talocalcaneal coalition (TCC), calcaneonavicular coalition (CNC), and talonavicular coalition (TNC), that results in restriction or absence of motion. Cruveilhier¹ in 1829 and Zuckerkandl² in 1877, documented the anatomic descriptions of tarsal coalition. Harris and Beath,³ in their landmark article (1948), popularized the association between tarsal coalition and peroneal spastic flatfoot. Since then, associations between tarsal coalition and a variety of coexisting conditions have been reported. These associations are believed to be secondary effects of the coalition and/or fixed rearfoot position, such as pes planovalgus (also known as coalition-associated flatfoot), equinus, rearfoot arthrosis, traction spurring of the talonavicular and calcaneonavicular joint, ball-and-socket ankle joint, and/or calcaneal fibular remodeling (CFR).^{4–19}

INCIDENCE AND ETIOLOGY

The incidence of tarsal coalition has been estimated to be between 2% and 13%.^{20–23} Without the use of advanced imaging, most studies have estimated the incidence to be less than 2%.^{3,23} Pfitzner's²⁰ cadaveric study from 1896 and more recent literature have suggested that tarsal coalition is more common than classically described.^{21,22} In a 1984 review article on tarsal coalitions and peroneal spastic flatfoot, Mosier and Asher¹¹ commented that Pfitzner's cadaveric dissection of 520 feet of skeletons may represent "the most accurate incidence study of tarsal coalition in the general population." Evaluating for TCC and CNC, Pfitzner²⁰ identified an incidence of almost 6%. Solomon and colleagues,²² in their dissection and computed tomography (CT) review of 100 cadaveric feet, estimated the incidence of tarsal coalition to be nearly 13%. In

Financial disclosures, none; Conflicts of interest, none.

Department of Podiatry, Kaiser Foundation Hospital, 975 Sereno Drive, Vallejo, CA 94589, USA
E-mail address: kkernbach@gmail.com

Clin Podiatr Med Surg 27 (2010) 105–117

doi:10.1016/j.cpm.2009.08.006

podiatric.theclinics.com

0891-8422/09/\$ – see front matter © 2010 Elsevier Inc. All rights reserved.

2008, a prospective evaluation of 667 consecutive ankle magnetic resonance imaging (MRI) scans has suggested that the frequency of tarsal coalitions may be as high as 11%, although there may be population bias in this particular study.²¹ Stormont and Peterson²³ authored one of the most frequently cited articles on the relative incidence of tarsal coalition. In their review of the literature spanning almost 60 years, they found that TCC and CNC are the most common locations of coalition, with an incidence rate of 48.1% and 43.6%, respectively. It is clear that more incidence-based studies that use advanced imaging would be useful in better understanding how frequently tarsal coalitions occur.

Bilateral tarsal coalition is not uncommon. Leonard¹⁹ identified the presence of bilateral coalition at 80% in his review of 31 patients and 98 of their first-degree relatives. Stormont and Peterson²³ estimated the incidence of bilateral TCC and CNC to be about 22% and 68%, respectively. Solomon and colleagues²² found the incidence of bilateral coalition to be as high as 40% in their cadaveric dissection. Lahey and colleagues²⁴ identified bilateral involvement in more than half of the TCCs and TNCs in their series.

The exact cause of tarsal coalition is not entirely clear, but it seems to be a condition that one is born with. Histopathologic studies have identified the presence of coalition in embryonic development²⁵ and immediately after birth on surgical dissection.²³ Failure of embryonic mesenchyme has been implicated as a potential cause of tarsal coalition, and it has been theorized to present as an autosomal dominant trait with variable penetrance.^{19,25,26} Leonard¹⁹ also suggests a nonspecific expression of the involved gene whereby coalition phenotype is not consistent along the familial lineage. Various syndromes and conditions have identified the presence of tarsal coalitions. They include Nievergelt syndrome, carpal coalition, symphalangism, phocomelia, fibular hemimelia, and other gross limb anomalies.^{19,27–30} There does not appear to be a correlation between tarsal coalition and accessory tarsal bones.²²

It has been suggested that the incidence of tarsal coalitions is nearly equal between men and women, although some studies do identify a male prevalence.^{19,23,31,32} Conway and Cowell³¹ reported 4 times as many men with tarsal coalition than women in their retrospective review. In a large epidemiologic review of nearly 1 million foot and ankle surgical procedures performed in Australia over a 10-year period, Menz and colleagues³² identified that men had 1.5 more surgeries for tarsal coalition than women. Stormont and Peterson²³ did not find a statistically significant difference in sex distribution.

DIAGNOSIS

Diagnosis of tarsal coalition is, first and foremost, a radiographic inclusion diagnosis. The history identifies symptoms and behavior patterns that seem to occur as a result of a symptomatic coalition. The patient and family members may describe a lack of physical activity with peers and siblings. Parents may acknowledge a family history of similar foot problems and/or whether their child is more sedentary because of the complaints of foot fatigue or pain. There may be a noticeable limp or a reluctance to run. In some cases, the symptoms of tarsal coalition may be unmasked (and/or initiated) by a history of trauma, such as an ankle sprain.^{11,13,16} The pain is frequently exacerbated with activity and alleviated with rest. When coalition-associated flatfoot is present, patients may identify the flatfoot as being the pathologic problem and the cause for the pain.⁸ Unexplained hindfoot pain with or without peroneal spasms may be identified.^{11,15} Less commonly, tarsal tunnel syndrome–like symptoms may also be present.¹⁵

Download English Version:

<https://daneshyari.com/en/article/3462122>

Download Persian Version:

<https://daneshyari.com/article/3462122>

[Daneshyari.com](https://daneshyari.com)