Talocalcaneal Coalitions

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KEYWORDS

• Tarsal • Talocalcaneal • Coalition • Treatment • Pediatric

KEY POINTS

- Talocalcaneal coalitions present with complaints of flatfeet, foot or ankle pain after minor injury, or persistent ankle sprains.
- Physical examination findings: limited subtalar motion and prominence inferior to the medial malleolus.
- Use of computed topography (CT) scan is recommended for preoperative planning and confirmation of resection with intraoperative CT.
- Resection of talocalcaneal coalitions with fat-graft interposition has superior results to primary arthrodesis.
- Improved outcomes have been reported after resection with foot scores averaging 90/100 (AOFAS).

INTRODUCTION

Tarsal coalition was thought to be first described by Zuckerland in 1877.[1] In 1921, Sloman linked tarsal coalitions to rigid flatfeet.[1,2] Then, in 1994, Lateur and colleagues[3] described the "C" sign on a lateral foot radiograph, which they believed was indicative for a talocalcaneal coalition.

Tarsal coalitions are a result of failure of segmentation of the primitive mesenchyme during development, with further failure of formation of a normal joint.[4] The underlying inheritance pattern has been suggested to be autosomal dominant. Tarsal coalitions have a reported prevalence of 1% to 2%, with middle facet talocalcaneal coalitions (TCCs) making up 25% to 40% of tarsal coalitions, second only to calcaneonavicular coalitions.[5–8] Bilaterality has been reported in 50% of patients with TCCs.[4,9]

SIGNS AND SYMPTOMS

Tarsal coalitions typically cause stiffness of the subtalar joint and present between the ages of 8 and 16 years.[10] Patients with TCC tend to present slightly later than those

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with a calcaneonavicular coalition with activity-related hindfoot and/or midfoot pain. The timing tends to correspond with ossification of the tarsal bones.[11] Patients will often present with foot and/or ankle injuries, pain, or flatfeet. Gantsoudes and colleagues[12] reported their results on treatment of TCC and found that although pain was the most common presenting symptom, a significant number of patients presented after an injury, including ankle sprains and fracture.

PHYSICAL EXAMINATION

1. Limited subtalar motion if performed with the ankle in near neutral position.
2. Double medial malleolus sign: prominence palpated inferior to the medial malleolus, which represents the enlarged medial facet.

RADIOGRAPHIC EVALUATION

At our institution, we use the following 4 views on patients with stiffness and/or pain:

1. Standing anteroposterior bilateral feet
2. Standing lateral bilateral feet
3. 45° internal oblique X-ray to detect calcaneonavicular coalitions
4. Harris heel view to detect TCCs

Recently, Moraleda and Mubarak reported on the prevalence of the C sign on standing lateral foot films and its relationship to TCC. They concluded that a complete C sign is present in 15% of cases and likely indicates the presence of a TCC. The same study identified that an interrupted C sign is present in 77% of TCC cases. However, an interrupted C sign is also prevalent in 45% of flexible flat feet without a TCC.

Although these findings should heighten suspicion for pathology, treatment should be based on symptoms and physical examination, with diagnosis confirmed by computed tomography (CT) scan.

A CT scan can provide valuable data into the shape and size of the coalition for preoperative planning.[13,14]

PREOPERATIVE PLANNING

All patients receive a CT scan with 3-dimensional (3D) reconstruction for preoperative planning. As defined by the Tarsal Coalition Protocol in the radiology department at our institution, all patients are positioned supine on the examination table with both feet flat against a positioning box. The patients are scanned feet first, from the bottom of the feet proximally through the ankle joint.

Rozansky and colleagues[14] described a radiologic classification of 5 types of TCC based on CT 3D reconstruction: type I, linear coalitions (41%); type II, linear coalitions with a posterior hook (17%); type III, shingled coalitions (15%); type IV, complete osseous coalitions (11%); and type V, posterior coalitions (17%) (**Fig. 1**).

SURGICAL INDICATIONS

In the opinion of the Moraleda and colleagues[1], all symptomatic TCCs should undergo resection unless there are 2 coalitions or the TCCs are solid and very large. It is thought the underlying pathology will eventually lead to painful degenerative changes throughout the course of the patient's life. Casting for symptomatic relief has not routinely been used in our institution. However, it is the practice of some to incorporate a trial of nonoperative treatment before considering surgery. This includes a trial of immobilization in a short-leg walking cast for 2 to 4 weeks, followed by fitting for an orthosis. If the patient has pain