Subtalar Coalitions in the Adult

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KEYWORDS

• Subtalar • Coalition • Adults • Flatfeet • Hindfoot • Valgus

KEY POINTS

- Subtalar coalition in adults may present with a painful pes planovalgus deformity.
- Nonsurgical management has varying degrees of success and surgery is often required.
- In the presence of arthritic change, arthrodesis should be offered to the patient, which may be done arthroscopically if isolated to the subtalar joint, if alignment is appropriate, and if the surgeon has the requisite technical skills.

INTRODUCTION

A tarsal coalition is a bony or fibrous union of 2 or more tarsal bones. Its incidence has been reported as roughly 1% of the overall population, but may be significantly higher as many are asymptomatic or missed.[1–5] A computerized tomographic (CT) study on cadaveric feet suggested that subtalar coalitions may be present in as high as 12.7% of the population.[6] The most common tarsal coalitions occur between the calcaneus and the navicular (53%) or between the talus and the calcaneus, specifically at the middle facet of the subtalar joint (37%).[1,3,5,7]

The cause of a congenital tarsal coalition is a failure of the mesenchymal cells in the embryo to differentiate and segment. Coalitions are inherited in an autosomal-dominant pattern.[7–9] Rarely, and more in adults than adolescents, a coalition may be acquired from trauma, surgery, infection, arthritis, or neoplasia.[4,10]

Many of the studies on coalitions have focused on the pediatric/adolescent population, in which symptoms such as peroneal spastic flatfoot may present as the coalition begins to ossify.[11] In the adult population, many tarsal coalitions are

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discovered incidentally while a patient is being evaluated for a different condition.[5] Varner and Michelson[12] retrospectively reviewed 27 adult patients with a coalition and found that two-thirds of these were discovered during workup for symptoms such as an ankle instability and sinus tarsi pain, whereas one-third of the adult patients were completely asymptomatic.[12] Rankin and Baker[13] reported that in 24 military recruits undergoing basic training, symptoms may initially present after stressful activity, but further inquiry revealed prior history of foot pain.[13] Other case reports have shown incidental discovery of a coalition during the workup for a talar body fracture[14] or cavovarus foot deformity.[15] Recently, a fracture of a subtalar coalition was discovered during a workup for an ankle sprain.[16]

EVALUATION

Although deep subtalar joint pain[3,5] may cause a patient with a talocalcaneal coalition to present for evaluation, other symptoms can be varied and nonspecific. These symptoms range from ankle instability and sinus tarsi pain[12] to slowly resolving pain after a seemingly innocuous foot or ankle injury; sometimes a very diffuse, nonlocalized pain is present.[3] As such, a careful physical examination is paramount to the evaluation. In particular, evaluation of hindfoot motion and position is critical and must also be compared with the contralateral side.[5] Limited range of motion in the subtalar joint is consistently reported in studies on tarsal coalition, and subtalar coalitions have the greatest limitation in motion across that joint.[3] Specific attention to hindfoot valgus and varus position is also important, as both planovalgus and cavovarus deformity have been reported (**Fig. 1**A).[3,15] Finally, the peroneal tendons should be closely examined, because peroneal spasm, tenderness, or inflammation may be present.[3,5,10,17]

IMAGING

Standard weight-bearing foot and ankle views constitute the initial radiographic evaluation (see **Fig. 1**B, C). The typical 3 views of the foot may show signs that suggest a subtalar coalition. Specifically, beaking at the talonavicular joint, a broad lateral process of the talus, and/or a narrowing of the joint space in the posterior facet may be seen. Abnormal motion of the subtalar joint may lead to these findings and thus make the clinician suspicious of a subtalar coalition.[12,13,18] Additional signs that may be seen on plain radiographs as described by Crim and Kjeldsberg[19] include a loss of the middle facet, a short neck of the talus, and a dysmorphic sustentaculum tali.[3,19] Finally, the “C sign” has classically been described on lateral radiographs as a circular density formed by the outline of the dome of the talus and the inferior aspect of the sustentaculum.[3,20] Normal alignment of the talus and calcaneus is distorted by their bony connection, leading to the appearance of a “C” on the radiograph. However, the sensitivity and specificity of the C sign are lacking.[5,21] In addition to standard films, coronal alignment may be shown with a weight-bearing hindfoot alignment radiograph.[5] A Harris heel view is also helpful when suspicious of subtalar coalition. In a normal patient, the posterior and middle facets are parallel; patients with greater than 25° angulation of the middle facet away from the posterior facet likely have a subtalar coalition.[5,22]

Although radiographs are very useful in diagnosing subtalar coalitions, more sophisticated imaging is often obtained to assess and treat the pathologic abnormality. CT and magnetic resonance imaging (MRI) are very useful to help diagnose a coalition that may be missed on plain radiographs.[3,23,24] CT is especially useful when evaluating bony coalitions, revealing the size and location of the subtalar coalition.[3,5] MRI is

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