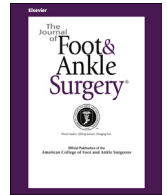


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## Case Reports and Series

## Posteromedial Ankle Impingement Caused by Hypertrophy of Talocalcaneal Coalition: A Report of Five Cases and Introduction of a Novel Index System

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## ABSTRACT

Ankle impingement syndromes are common disorders that can be attributed to many factors. To the best of our knowledge, posteromedial ankle impingement syndromes caused by talocalcaneal coalition have never been previously reported. The present report describes 5 patients with posteromedial ankle pain and inversion limitation. The physical examination, radiographic, and magnetic resonance imaging findings suggested posteromedial ankle impingement syndrome and talocalcaneal coalition. The 5 patients underwent surgery after conservative treatment had failed. A novel index system, namely the angle and thickness of the medial talocalcaneal facet, was introduced. The talocalcaneal coalitions protruded medially and impinged on the malleolus medialis. The medial facet of the talus and calcaneum had a wider angle and thickness than normal. Pain relief was noted, and good long-term outcomes were achieved after resection of the medial prominence and coalition in all 5 patients. Talocalcaneal coalition can cause posteromedial ankle impingement syndrome when the coalition is hypertrophic. The angle and thickness of the medial talus facet could be a simple index to diagnose this disorder.

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Talocalcaneal coalition is a foot deformity that is quite common; however, in many individuals with talocalcaneal coalition, it is well tolerated and not symptomatic (1). If symptoms do occur, they usually develop in adolescence and occasionally in adulthood, presenting as pain in the hindfoot (2). The primary source of pain can be attributed to ligament strain, peroneal spasm, sinus tarsi syndrome, or subtalar arthrosis (1). A mobile or rigid planovalgus foot, spasm of the peroneal muscles, and heel valgus have usually been observed in most of the symptomatic cases. Also, it is well-known that with incomplete tarsal coalitions, a common cause of pain is residual motion, which can also be cause of peroneal spasm (2). Resection of the coalition is considered the standard method of treatment of symptomatic talocalcaneal coalition. Favorable results have been attained when resection was performed on talocalcaneal coalitions >50% of the posterior facet and with hindfoot valgus angles >16° (3). A talocalcaneal coalition can be

congenital or acquired. The most common cause is segmentation failure of the primitive mesenchyme during development (4). Acquired coalition can result from trauma, surgery, arthritis, infection, and neoplasia (1).

Ankle impingement syndromes are common disorders of the ankle. They are pathologic conditions involving painful movement restriction at the tibiotalar joint caused by osseous or soft tissue overgrowth or the presence of accessory ossification centers (5). Most of the impingement exists in the anterior, anteromedial, posterior, and lateral side of the ankle. The etiology includes overuse of the joint, degenerative joint diseases, and trauma. The sites of impingement at the ankle include anterolateral, anterior, anteromedial, posteromedial, and posterior. However, posteromedial ankle impingement has rarely been observed (6).

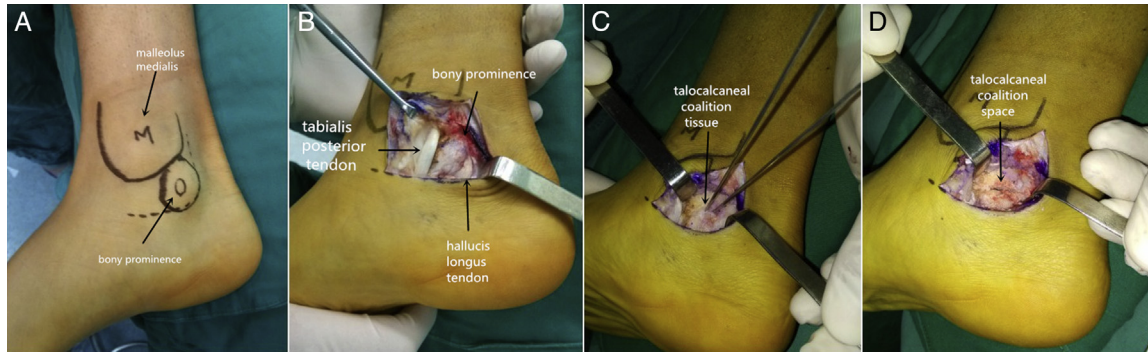
In our clinical practice, from March 2008 to December 2011, 89 patients were diagnosed with symptomatic talocalcaneal coalition. Of these 89 patients, 53 had complained of flatfoot and 31 of lateral ankle pain. However, only 5 of these patients complained of posteromedial ankle pain. The cases of these 5 patients who had complained of posteromedial ankle pain caught our attention. Thus, we considered whether talocalcaneal coalition deformity could also be a possible cause of ankle impingement. To introduce such a rare condition, we

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**Fig. 1.** (A) Incision at surgery. (B) Bony prominence formed by the hypertrophic talocalcaneal coalition. (C) The prominence has been resected and the edge of the coalition was confirmed by needles. (D) The talocalcaneal coalition was resected and the joint space regained.

report the details of these 5 cases in which hypertrophy of the talocalcaneal coalition caused posteromedial ankle impingement. In addition, we introduce a novel index system that grades the measurements of the angle and thickness of the medial talocalcaneal facet. The clinical presentation, radiographic studies, and treatment course for these patients were reviewed.

## Patients and Methods

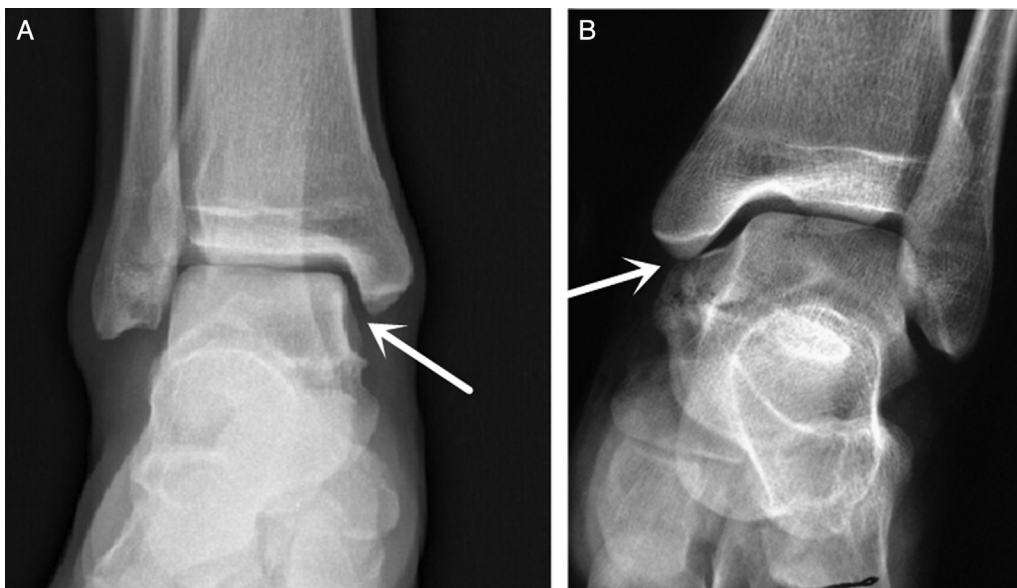
### Subjects

All 5 patients were male, with a mean age of 24 (range 17 to 35) years, and the duration until surgery was 4 years (range 6 months to 6 years). The practice was conducted in Sun Yat-Sen Memorial Hospital, and surgery was performed by 1 of us (W.S.). Data abstraction (T.Y.), outcome assessment (X.C.), radiographic measurements (W.L., B.C.), and data analyses (A.A.) were also performed. The data measurements from the 2 (W.L., B.C.) performing them were averaged to ensure objectiveness.

The present report describes the cases of 5 patients (6 feet) with clinical and radiographic findings that suggested

posteromedial ankle impingement syndrome and talocalcaneal coalition. The patient data were collected from the medical records, including the clinical notes, surgical history, medical history, and imaging data (plain radiography, spiral computed tomography, and magnetic resonance imaging). Preoperative and postoperative American Orthopaedic Foot and Ankle Society (7,8) scores were compared. These included the scores on function (50 points), alignment (10 points), and pain (40 points). The items of function included activity limitations, maximum walking distance, walking surface, gait abnormality, sagittal motion, hindfoot motion, and ankle-hindfoot stability (7). The surgery outcomes were graded using the 7-point postoperative outcome score that measures and grades postoperative pain, function, and subtalar motion and describes the clinical result as excellent, good, fair, or poor, as described by Comfort and Johnson scoring system, which is described in reports of talocalcaneal coalition resection outcomes (2,9).

The present study was conducted in accordance with the Declaration of Helsinki. The ethics committee of Sun Yat-Sen University approved the present study, and all participants provided written informed consent.



**Fig. 2.** Compared with a normal ankle (A), the "kissing sign" (B, arrow) indicates that the malleolus medialis is touching the bony prominence formed by the coalition bone in the anteroposterior radiographic view.

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