

# Complete Ankle Joint that is Tibiotalar and Distal Tibiofibular Coalition Presenting with Foot and Ankle Pain – A Case Report

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## Learning Point of the Article:

We report the first case, from the Indian subcontinent, of the failure of mesenchymal segmentation leading to the talocrural coalition.

## Abstract

**Introduction:** Coalition is an abnormal, usually congenital, or developmental connection in between or the complete fusion of two bones that are otherwise separate. It is of three types, i.e., synostosis (bony connection), synchondrosis (cartilaginous connection), or syndesmosis (fibrous tissue). Its typical cause is the failure of mesenchymal segmentation and differentiation. Usually, it is seen in tarsal or carpal bones and very rarely in between other bones. Only a single case of a tibiotalar coalition has been reported previously in literature. Herein, we are reporting a case of the talocrural coalition, which is the first one from the Indian sub-continent.

**Case Report:** A 16-year-old moderately built female patient of Indian origin presented with chronic pain of 1-year duration in the right foot and ankle region on weight bearing. The pain was dull aching type, mild-to-moderate in severity and worsened with activity or prolonged walking, and relieved on taking non-steroidal anti-inflammatory drugs. No relevant history was present. On local examination, diffuse tenderness was present in the ankle and the tarsal bones. Almost negligible dorsiflexion and about 15° plantar flexion of the foot were possible. An initial radiograph of the right ankle revealed osseous fusion between the distal tibia and fibula, as well as between the tibia, fibula, and the dome of the talus. Magnetic resonance imaging (MRI) revealed osseous fusion involving the distal tibia, fibula, and the dome of the talus (both medially and laterally), indicative of talocrural fusion. No edema or inflammation was appreciable in the adjacent tendons or synovium. The patient was explained regarding the pathology and the prognosis. She was managed conservatively and was satisfied.

**Conclusion:** Radiographs play a crucial role in evaluating patients suspected of having a coalition or ankylosis. Complementary tools such as computed tomography and MRI are valuable for a more in-depth assessment of the fusion and aid in surgical planning.

**Keywords:** Talocrural, tibiotalar, coalition, ankylosis, bony, osseous, fusion, synostosis, synchondrosis, syndesmosis.

## Introduction

From the osteology viewpoint, the coalition is an abnormal, usually congenital, or developmental connection in between, or the complete fusion of two bones that are otherwise separate in the normal majority population. It is categorized into three types based on the nature of bridging tissue in between the two bones, i.e., synostosis (bony connection), synchondrosis (cartilaginous

connection), or syndesmosis (fibrous tissue) [1]. Its typical cause is the failure of mesenchymal segmentation and differentiation, in turn leading to failure of the formation of a normal joint between two bones. Usually, it is seen in tarsal or carpal bones and very rarely in between other bones.

There is a discrepancy regarding the most common type of tarsal coalition. In some places, talocalcaneal and calcaneonavicular

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## Author's Photo Gallery



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**Figure 1:** AP and Lateral radiograph of right ankle joint shows osseous fusion between distal tibia, fibula with dome of the talus (Blue arrows). AP: Anteroposterior.

have been mentioned to be the most common types, with both occurring in an almost equal proportion and talonavicular being rare [2]. While Xiaojun Duan mentions talonavicular to be the most common one [3], on the other hand, Denning JR and skeletal radiology textbook Yochum and Rowe's mention that calcaneo-navicular coalition is most common [4, 5].

Only a single case of a tibiotalar coalition has been reported so far by Clark et al. [6]. These coalitions are usually asymptomatic till the ossification of coalition in usually adolescent age leading to increased strain and subsequent degenerative changes at adjacent joints.

A similar but different term is the ankylosis of joints which just denotes the stiffness of a joint preventing its motion. It is not congenital, rather it is acquired post-trauma, inflammatory, degenerative, or infective diseases of joints. In the adolescent age group, at times, it becomes difficult for the radiologist to

differentiate between the two.

Foot radiographs play a crucial role in evaluating patients suspected of having a coalition or ankylosis. Complementary tools such as computed tomography (CT) and magnetic resonance imaging (MRI) are valuable for a more in-depth assessment of the fusion and aid in surgical planning [7-9].

Herein, we are reporting a case of the talocrural coalition, which is the first one from the Indian subcontinent.

### Case Report

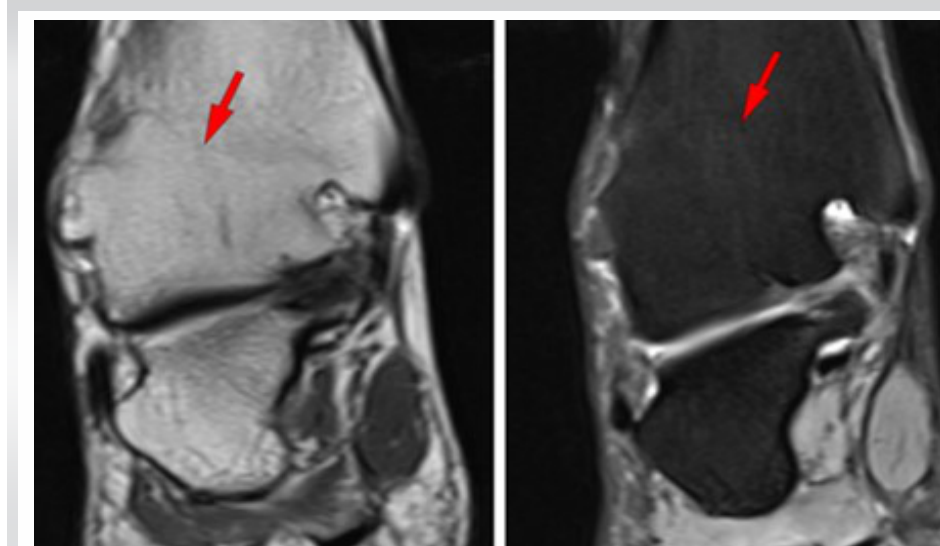
A 16-year-old moderately built female patient of Indian origin presented with chronic pain of 1-year duration in the right foot and ankle region on weight bearing. The pain was dull aching type, mild-to-moderate in severity and worsened with activity or prolonged walking, and relieved on taking non-steroidal anti-inflammatory drugs (NSAIDs). No history of trauma or any inflammatory pathology or pain or swelling in any other joint could be elicited. No relevant family history or consanguinity was present. There was no history suggestive of any inflammatory or auto-immune skin disease.

On inspection, no redness, swelling, discharging sinus, prominent vessels, or deformity could be seen in the foot and ankle region. Local temperature was not raised on palpation and diffuse tenderness was present in the ankle (more toward the lateral side) and the tarsal bones. Almost negligible dorsiflexion and about 15° plantar flexion of the foot were possible.

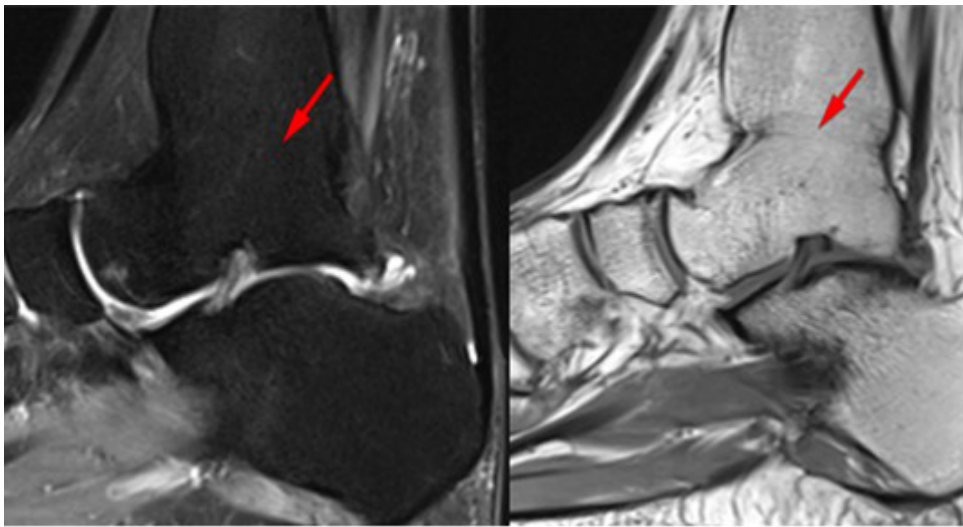
Complete blood counts, erythrocyte sedimentation rate, C-reactive protein, and anti-cyclic citrullinated peptide were unremarkable and within normal limits.

An initial radiograph of the right ankle was sought by the clinician that revealed osseous fusion between the distal tibia and fibula, as well as between the tibia, fibula, and the dome of the talus (Fig. 1). The preliminary diagnosis was regarded as a congenital talocrural coalition.

Further detailed assessment of the deformity was carried out through a 3T MRI (SIEMENS MAGNETOM SKYRA) using a dedicated ankle coil. The MRI revealed osseous fusion



**Figure 2:** Talocrural fusion on coronal MR. T2 sequence and PDFS showing osseous talocrural fusion (indicated by red arrows). MR: Magnetic resonance, PDFS: Proton density fat suppressed.



**Figure 3:** (a and b) Sagittal MR. PDFS and T1 sequence showing tibiotalar fusion (indicated by red arrows). MR: Magnetic resonance, PDFS: Proton density fat suppressed.

involving the distal tibia, fibula, and the dome of the talus (both medially and laterally), indicative of talocrural fusion (Fig. 2 and 3). No edema or inflammation was appreciable in the adjacent tendons or synovium. The patient was explained regarding the pathology and the prognosis. She elected the conservative approach at this stage and is satisfied with 1-year follow-up.

### Discussion

Literature is replete with reports of single or multiple talar coalitions but to date, there has been only a single case report of a tibiotalar coalition reported by Clark et al. [6]. Coalitions are anomalous, congenital, or developmental unions occurring between two or more bones, either intraarticular or extraarticular, and complete or incomplete. The most prevalent forms of osseous coalitions are developmental.

Common causes of post-infective ankylosis include septic arthritis, osteomyelitis, and post-traumatic infection. Other non-infective causes of ankylosis are inflammatory joint diseases such as rheumatoid arthritis, autoimmune conditions such as ankylosing spondylitis, and sometimes, even advanced osteoarthritis.

In all these acquired conditions, the detected MR findings include bone marrow edema, periarticular erosions, osteolysis, geographic or permeative pattern of bone destruction, synovial proliferation, loose bodies, joint effusion, and soft tissue edema in acute presentation, while over time edema subsides and sclerosis predominates. [9-11]. None of these features were observed in our patient, effectively ruling out the possibility of this entity being an acquired condition.

Its treatment involves addressing the underlying infection if it

persists and managing the resulting joint deformity with an aim to achieve the alignment of the joint in a functional position. It may include antibiotics, joint debridement, physiotherapy, and surgical intervention. Physiotherapy can be instrumental in preventing additional stiffness and enhancing overall function. In a few cases, surgical procedures such as joint reconstruction or joint replacement may be considered to restore function and reduce pain.

CT can characterize the coalitions better than X-rays, which is important for surgical planning.

MRI is very adept at picking up the

fibrous or cartilaginous bars and identifying early inflammatory or degenerative changes that may be missed in other imaging modalities.

Coalitions alter the mechanics of the affected and the surrounding joints. As the natural movement between the two bones is absent, an unnatural stress is created at the nearby joints causing pain, sprains, and degenerative changes.

The decision regarding the management of coalition or ankylosis is based on the site, type, and size of fusion, the presence of infection or degenerative changes in the affected or adjacent joints, deformity and limitation of movement, and the severity of pain.

Usually, conservative measures are attempted first with NSAIDs, orthotics, and activity restrictions. If no relief, then coalition resection may be needed with/without deformity correction and arthrodesis is kept as the last option for those with failed resection or significant arthritis [12, 13].

### Conclusion

Orthopedic surgeons should keep the possibility of talocrural coalition in young cases presenting with ankle pain without any history or features suggestive of traumatic or infective etiology and should not hesitate to rule out the same with advanced radiological imaging of the foot with CT or MRI.

### Clinical Message

Ankle and foot pain without any history of trauma or infection in adolescents could be indicative of tibiotalar, distal tibiofibular, or tarsal coalition.



**Declaration of patient consent:** The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given the consent for his/ her images and other clinical information to be reported in the journal. The patient understands that his/ her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

**Conflict of interest:** Nil **Source of support:** None

## References

1. Crim JR, Kjeldsberg KM. Radiographic diagnosis of tarsal coalition. *AJR Am J Roentgenol* 2004;182:323-8.
2. Ehrlich MG, Elmer EB. Saunders tarsal coalition. In: Jahss M, editor. *Disorders of the Foot and Ankle*. 2nd ed. Philadelphia, PA: W.B. Saunders; 1991. p. 921-38.
3. Duan X, Yang L. Treatment of isolated talonavicular coalition: Case report and literature review. *J Int Med Res* 2018;46:5322-30.
4. Denning JR. Tarsal coalition in children. *Pediatr Ann* 2016;45:e139-43.
5. Yochum TR, Rowe LJ. *Essential of Skeletal Radiology*. Vol. 1. Philadelphia, PA: Lippincott/Williams and Wilkins; 2005. p. 332-3.
6. Clark MJ, Murray J, Budhoo E, Metherall P, Highland A, Davies M. Tibio-talar coalition - a case report and review of the literature. *Int J Anat Res* 2019;7:7123-6.
7. Marth AA, Feuerriegel GC, Marcus RP, Sutter R. How accurate is MRI for diagnosing tarsal coalitions? A retrospective diagnostic accuracy study. *Eur Radiol* 2023 Oct 19. doi: 10.1007/s00330-023-10304-z. Epub ahead of print.
8. Lawrence DA, Rolen MF, Haims AH, Zayour Z, Moukaddam HA. Tarsal coalitions: Radiographic, CT, and MR imaging findings. *HSS J* 2014;10:153-66.
9. Newman JS, Newberg AH. Congenital tarsal coalition: Multimodality evaluation with emphasis on CT and MR imaging. *Radiographics* 2000;20:321-32; quiz 526-7, 532.
10. Weaver JS, Omar I, Mar W, Kauser AS, Mlady GW, Taljanovic M. Magnetic resonance imaging of rheumatological diseases. *Pol J Radiol* 2022;87:e93-112.
11. Alaia EF, Chhabra A, Simpfendorfer CS, Cohen M, Mintz DN, Vossen JA, et al. MRI nomenclature for musculoskeletal infection. *Skeletal Radiol* 2021;50:2319-47.
12. Catanzano AA Jr, Akoh CC, Easley ME, Mosca VS. Decision-making and management of tarsal coalition in the young adult patient: A critical analysis review. *JBJs Rev* 2023;11:6.
13. Shlykov MA, Minaie A, Schoenecker P, Hosseinzadeh P. Optimal surgical management of tarsal coalitions. *Instr Course Lect* 2020;69:371-80.

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