

A Case Report on Isolated Naviculo-Medial Cuneiform Tarsal Coalition

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Abstract

Tarsal coalition typically involves the talo-calcaneal and calcaneo-navicular joints and is an important cause of rigid or peroneal flatfoot. We present a rare case of isolated navicular-medial cuneiform non-osseous coalition presenting as post-traumatic medial foot pain. A 12-year-old girl presented with progressively worsening pain on the medial side of her right mid-foot for 6 months. Initial imaging with lateral and anteroposterior radiographs of the foot is a useful approach to screen for tarsal coalition.

Keywords: Tarsal coalition; Naviculo-medial cuneiform coalition; Talo-calcaneal joint; Calcaneo-navicular joint

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Introduction

A tarsal coalition is the abnormal union of two or more tarsal bones, which results in abnormal relative motion between them. The coalition may be bony (synostosis), cartilaginous (synchondrosis) or fibrous (syndesmosis). The two commonest types are the calcaneo-navicular and talo-calcaneal coalitions. They typically present with pain around the subtalar joint and loss of varying degrees of the medial arch [1]. We present the case of a patient with an isolated non-osseous naviculo-medial cuneiform coalition.

Case Report

A 12-year-old girl presented with progressively worsening pain on the medial side of her right mid-foot for 6 months. This became unbearable following contact sports injury at school, and she was no longer able to participate in school sporting activities. The pain was worse in the evenings, exacerbated by exercise and other activities such as walking and running and eventually causing a limp. She also had frequent flare-ups during the winter. The pain became severe enough to cause a reduced school attendance, but improved with rest. She had used over the counter analgesia with no relief. She is of normal weight (90-95% centile for age). There was no similar occurrence in her siblings or other family members.

Examination revealed tenderness and swelling over the right medial cuneiform and navicular joint. The medial arch was normal and there was no stiffness of the peroneal muscles. The

range of motion of the subtalar joint was normal. The left foot was essentially normal. Inflammatory markers were normal with a CRP<5 and ESR of 11. She was started on Vitamin D to correct low Vitamin D levels, and pain relief with non-steroidal anti-inflammatory drugs (NSAIDs) and oral steroids which seemed to be of little benefit. She also had physiotherapy referral at the local hospital for strengthening exercises on the right leg. The patient had failed three months of conservative treatment and was therefore referred for a specialist paediatric orthopaedic opinion with a presumed diagnosis of chronic septic arthritis.

Radiographs (**Figure 1**) and CT (**Figure 2**) of the right foot showed an area of cortical irregularity involving the infero-medial portion of the navicular-medial cuneiform joint with a sclerotic margin and partial bony bridging. MRI of the right foot showed evidence of a partial pseudarthrosis between the navicular and medial cuneiform with associated subchondral bone marrow oedema-like changes. There was fluid signal intensity at the pseudarthrosis (**Figure 3**). A radiological diagnosis of non-osseous, partial navicular-medial cuneiform coalition was made. The patient was treated with intra-articular injection of long lasting local anaesthetic (3 mL of 0.5% levobupivacaine) and steroid (triamcinolone 40 mg) with good treatment results. Follow-up feedback at three months revealed sustained response to treatment. The patient is currently pain free.



Figure 1 Radiograph of the mid-foot showing irregular erosion of the navicular-medial cuneiform articulation with a sclerotic margin (arrow).



Figure 2 Sagittal CT MPR shows the non-osseous coalition involving the infero-medial portion of the joint (arrow), with some evidence of bone bridging.

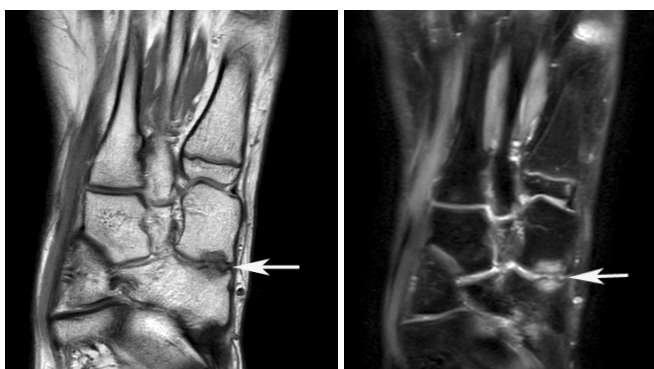


Figure 3 Axial PDW FSE and fat suppressed PDW FSE MR images showing fluid SI at the coalition (arrows) consistent with a synchondrosis, and reactive oedema-like marrow changes in both bones.

Discussion

Tarsal coalition is a congenital condition in which there is an abnormal union between two or more tarsal bones due to failure of mesenchymal segmentation during the embryonic period [1]. This defect is thought to be an autosomal dominant genetic condition, with an incidence of approximately 1% in the general population. Most patients with tarsal coalition present during the adolescent years when the initial fibrous or cartilaginous union between the tarsal bones begins to ossify.

There is also an association with increased mechanical strain on the joints in this condition. The clinical features of tarsal coalition (pain, stiffness and deformity) are usually not observed until early puberty. As in this patient, there was a history of activity preceding the onset of symptoms, and her pain became more noticeable following a basketball injury. The explanation for this is that the cartilaginous coalition needed time to ossify, causing joint restriction and symptomatology. Recurrent ankle sprains are also common [1].

The incidence of coalitions is higher in the Asian population, especially Koreans [2]. A few cases have been reported in the literature of European and white American ethnicity, but none in the black British race. There is also a slightly higher male preponderance [2]. Any bony combination is possible, but the commonest types are the calcaneo-navicular and talo-calcaneal which account for over 90% of cases [1]. Coalition may also be bilateral. The naviculo-cuneiform coalition is one of the least common types, with a few cases reported presenting as flat foot, peroneal spasticity and tarsal tunnel syndrome. Pain on the medial aspect of the foot is also a common presentation of a naviculo-cuneiform coalition. Prominence of this feature in the adolescent age group could be attributed to increased physical activity on the joints [2-4]. Clinically, the patient was afebrile and had normal blood counts, not suggesting an infectious cause. This case is the first case reported in a person of black ethnicity, with the clinical and imaging features initially thought to be those of chronic infection.

Initial imaging with lateral and anteroposterior radiographs of the foot is a useful approach to screen for tarsal coalition [5]. Classical radiographic findings can be divided into direct and indirect. Direct findings include osseous continuity between the involved bones in cases of synostosis, or abnormal narrowing and irregularity of the joint space in non-osseous coalitions, as was seen in the current case.

Indirect findings include the talar beak, C-sign, drunken waiter sign, absent middle facet sign, and anteater sign, these being typically seen with talo-calcaneal and calcaneo-navicular coalitions, and were not evident in the current case. Computerized tomography scan is also of value in confirming radiographic suspicion of coalition and will show similar findings to radiographs [6]. It will also clarify the patho-anatomy of the lesion prior to surgical resection. Magnetic resonance imaging will allow differentiation between synchondroses and synodesmoses depending upon the signal characteristics of the tissue at the pseudarthrosis, fluid signal being consistent with a cartilaginous coalition while low

signal suggest a fibrous coalition. Bone marrow oedema-like signal and subchondral cysts are also common findings [6,7]. The current case showed similar radiographic appearances to those previously described [2-4], and the MRI study suggested that the coalition was cartilaginous in nature.

The treatment of tarsal coalition is initially conservative for a minimum of 6 months, to be followed by surgical intervention if the former fails. Conservative measures include a reduction in physical activities, a walking POP cast, shoe modification, use of NSAIDs and steroids. With regards to naviculo-medial cuneiform coalition, conservative management appears to have better outcome than operative treatment [8].

Our patient had been treated with oral NSAIDs and oral steroids with disappointing results prior to treatment with intra-articular combination therapy of long acting steroid and local anaesthetic agent. Informed consent was obtained for this.

Follow-up feedback through clinic attendance and phone call has revealed sustained response to treatment. However, we are conscious of the fact that a cartilaginous coalition becomes ossified with advancing age, the patient may need further treatment. It is therefore, our plan to continue with her follow-up until skeletal maturity. Surgical treatment options include

excision of the coalition with soft tissue interposition, or less commonly arthrodesis.

The clinical and radiographic differential diagnoses included chronic septic arthritis and juvenile idiopathic arthritis. However, in both cases it would have been expected that the whole of the joint space would have been affected and more reactive marrow and soft tissue oedematous changes would have been evident on MRI.

Conclusion

In conclusion, we describe the clinical, radiographic, CT and MRI appearances in a rare case of isolated navicular-medial cuneiform coalition presenting in a young girl of black origin as chronic mid-foot infection. Clinical examination, and more importantly, imaging are necessary to make a diagnosis of a coalition as it could mimic other common causes of foot pain and stiffness in the adolescent age group. Specialist opinion is also necessary if a coalition is suspected to ensure early diagnosis and appropriate treatment as it is under reported due to a failure of diagnosis.

Conflict of Interest

We, the authors declare that there are no conflicts of interest.

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