Supernumerary Intermediate Cuneiform with Bifid First Metatarsal: A Case Report

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Abstract
Anatomic anomalies of the cuneiform bones are a relatively rare finding in the lower extremity. Congenital abnormalities of the middle and lateral cuneiform specifically are not often documented in literature. We present a case of a patient with an additional osseous structure distal to the intermediate cuneiform which articulates with a bifid base of the first metatarsal. We hypothesize this to be a supernumerary intermediate cuneiform.

Introduction
Anatomic anomalies of the cuneiform bones are a relatively rare finding in the lower extremity. The most recognized congenital entity is the bipartite medial cuneiform, which has been reported in a number of archeological studies and case reports [1-3]. The bipartite medial cuneiform is split in the transverse plane, generally resulting in a smaller dorsal and a larger plantar segment [4]. The incidence of a bipartite medial cuneiform in the general population is believed to range between 0.1%-0.3%, with a higher rate in males [4,5]. The bipartite medial cuneiform is often of little clinical significance, and is usually an incidental finding of routinely obtained radiographic imaging. Nevertheless, there are some patients with symptomatic presentations secondary to bipartite medial cuneiforms that have required either conservative care or surgical intervention [6,7].

Congenital abnormalities of the middle and lateral cuneiform, in contrast, are rarely reported in literature. The os intercuneiform - an accessory ossicle between the medial and middle cuneiform just distal to the navicular - is one of the few entities described. To our knowledge only one case report has been published regarding a true supernumerary cuneiform, which was located between the base of the second metatarsal and the anterior aspect of the middle cuneiform [4].

We present a case of a patient with an additional osseous structure distal to the intermediate cuneiform which articulates with a bifid base of the first metatarsal. We hypothesize this to be a supernumerary intermediate cuneiform.

Case Presentation
A 61 year old female presented to our clinic with chief complaint of bilateral foot pain, left greater than right, for the past three months. The patient denied any acute traumatic incident, but does relate a recent increase in daily walking. The only relevant past medical history was a multilevel lumbar fusion for spinal stenosis eighteen months prior to her clinical visit.

On physical examination, tenderness to palpation was appreciated at the insertion of the Achilles tendon on the left foot. No edema, erythema or ecchymosis was noted, and no palpable nodules were appreciated within the tendon. Tenderness was elicited at the plantar aspect of the left second metatarsophalangeal joint, with associated medial deviation of the second digit. No frank vertical instability was found at the second digit. A pes planus foot type was observed bilaterally.

Dorsoplantar, lateral, oblique and axial sesamoid radiographs were obtained of both feet, which revealed surprising congenital tarsometatarsal abnormalities. On the right foot a bifid first metatarsal base is present, articulating with the medial cuneiform as well as a supernumerary intermediate cuneiform. This additional cuneiform bone notably has a partial osseous bridging with the base of the second metatarsal as well as a proximal osseous structure presumed to be the intermediate cuneiform. The intermediate cuneiform is noted to have partial osseous bridging with the second and third metatarsal bases (Figure 1 and 2). Interestingly imaging of the contralateral foot revealed a similar presentation with exception of what is suspected to be a complete osseous union between the
Despite the patient’s congenital radiographic abnormalities, her primary complaints were found to be unrelated to these abnormalities. As a result, no additional imaging was warranted.

**Discussion**

There is limited literature available regarding accessory intermediate cuneiform bones. In the only other case published by Brooks-Fazakerley et al. [4] the accessory intermediate cuneiform was associated with a shortening of the second metatarsal. The patient experienced persistent midfoot pain secondary to significant osteoarthritis at the level of the tarsometatarsal joints, and eventually underwent surgical fusion of the joints. In our patient, no metatarsal shortening was noted. However, two findings are of significant interest. First, there is the presence of a bifid first metatarsal base bilaterally. The first metatarsal base normally forms a reniform articulating surface solely with the medial cuneiform. In this case, an additional articulating surface is noted with the supernumerary cuneiform on the right foot and the intermediate cuneiform on the left foot, which is an unusual abnormality. This finding is especially notable given that most accessory ossicles do not form articulating joint surfaces [4]. Second, there are a significant number of coalitions noted across the tarsometatarsal joint level bilaterally. While functional movement across the LisFranc joint level is minimal in comparison to other joints in the foot, one would expect some arthritis in adjacent joints in a 61 year old patient due to compensation. However, our patient displays no significant radiographic evidence of osteoarthritis and was also noted to be asymptomatic at the tarsometatarsal joint level.

Fortunately for our patient, her congenital abnormalities have not caused any pathology thus far.

Based on our patient’s radiographic presentation, we suspect that the supernumerary cuneiform on the right foot is a result of an incomplete osseous union to the intermediate cuneiform. Complete union would have resulted in a presentation similar to that found in the left foot. This will be important to consider in the future should the patient suffer a traumatic injury on the right foot, disrupt the partial bridging and experience pain. Naturally, in the context of trauma clinicians should determine whether a fracture fragment or a true supernumerary bone is present, especially with new onset of pain. Chang et al. [5] describe a case where a bipartite medial cuneiform that was discovered after the patient sustained a Lisfranc injury. This case noted two separate attachments of the Lisfranc ligament complex, and highlights how treatment considerations may change in situations of anatomical anomalies in comparison to acute fracture fragments. Should our patient warrant further treatment, a CT scan would allow for better visualization of the tarsometatarsal complex. The range of treatment options for pain resulting from congenital abnormalities at the level of the cuneiforms range from accommodative shoe gear to oral anti-inflammatories to ultrasound or fluoroscopic guided cortisone injections [7]. Surgical options may include excision or primary fusion.

**Conclusion**

We report a clinically unique finding of a bifid first metatarsal base with a supernumerary intermediate cuneiform that has not been described in the literature to this date.
References


