Bipartite medial cuneiform: congenital variant in a patient with foot trauma. MRI findings
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Section: Musculoskeletal system
Area of Interest: Musculoskeletal bone Musculoskeletal system
Procedure: Diagnostic procedure
Imaging Technique: MR
Special Focus: Congenital Case Type: Clinical Cases
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Patient: 62 years, male

Clinical History:

The patient presented with mid-foot medial pain, due to a blunt trauma two days earlier. He had no functional limitation and had no relevant medical history.

Imaging Findings:

MR images showed soft tissue oedema consistent with recent trauma (fig. 1), and a complete bipartite medial cuneiform with dorsal and plantar components. Sub-cortical degenerative changes with osseous edema were observed at the plantar segment (fig. 2).

Discussion:

Bipartite medial cuneiform (BMC) is a rare congenital variant at the Lisfranc joint. In humans, the incidence of this finding ranges from 0.3% to 2.4% in cadaveric studies [2, 3].
Bi-partition of the medial cuneiform is a malsegmentation defect based on the prevalence of two unfused primary ossification centres (dorsal and plantar segments) that remain apart through a fibrocartilaginous/cartilaginous synchondrosis. Normally, the medial cuneiform is formed by one ossification centre. Ossification of the medial cuneiform begins at the age of 2, in this case ensuing two fragments [2, 3].

Bipartite medial cuneiform can be assigned to one of three described morphological categories:
A. Complete bi-partition, in which the medial cuneiform is divided into two upper elements, dorsal and plantar (fig. 1).
B. Incomplete bi-partition, in which the two segments are partially fused, with clefts on the medial and lateral surfaces that demark dorsal and plantar segments (fig. 4).
C. Division of the distal articular surface only.

There is a slight predilection for males, bilaterality can be expected in 60% of the cases [4].
Diagnosis through plain radiographs can be challenging due to superimposition of osseous structures, lateral view proved to be the best perspective, moreover lateral oblique view (30 °) has been suggested to aid diagnosis [2, 4, 5]. The gap in the joint space between the ossicles of the BMC and the first ray, create a rift in “E” configuration, hence the “E sign” appreciated in a sagittal/lateral views [2-4, 6], (fig. 3). Sophisticated imaging techniques such as TC or MRI have shown great impact in high detailing this finding, with the use multiplanar reconstruction (along with 3D virtual rendering) and the possibility of depicting bone marrow oedema respectively [2-5].

BMC is vastly an asymptomatic finding, symptomatic BMC can cause midfoot chronic pain due to
inflammation/disruption of fibrocartilaginous synchondrosis during high impact sporting activity, or after taking a
direct blow [2-5].
The main differential diagnosis to consider is the medial cuneiform fracture, which has irregular edges, and usually
splits the cuneiform vertically into an anterior and posterior fragment. Isolated medial cuneiform fractures are rare,
only after a direct trauma [2-6].
When a BMC becomes symptomatic, treatment alternatives range from orthotics, immobilization, corticosteroid
injections, to surgical interventions including fusion and excision of bone fragments [2-5].

**Differential Diagnosis List:** BIPARTITE MEDIAL CUNEIFORM, MEDIAL CUNEIFORM FRACTURE, BIPARTITE
MEDIAL CUNEIFORM

**Final Diagnosis:** BIPARTITE MEDIAL CUNEIFORM

**References:**

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Description: Fig. 1: sagittal T1 (A) and FS FSE T2 (B) MR images show a complete bipartite medial cuneiform (arrow) with dorsal (d) and plantar (p) components. Note subcortical degenerative changes with osseous oedema (asterisk in B). Origin: Napoli, A. department of musculoskeletal, fundacion cientifica del sur. Buenos Aires Argentina.
**Figure 2**

**Description:** Fig. 2: axial PD (A), T2 (B), T1 (C), and STIR (D). Complete bipartite medial cuneiform (large arrows), with degenerative changes (small arrows), osseous oedema (asterisk) and oedema in the subcutaneous tissue (dotted arrow). **Origin:** Napoli, A. musculoskeletal department, Fundacion Cientifica Del sur. Buenos Aires Argentina.
Description: Fig. 3: sagittal T1 showing dorsal and plantar segments forming the "E" sign. Origin: Napoli, A. musculoskeletal department, Fundacion Cientifica Del sur. Buenos Aires Argentina.
**Figure 4**

Description: Fig. 4: sagittal T1(A) and STIR(B), showing partial bipartite cuneiform. Note the clefts (arrowheads) and the two segments partially fused in the middle (arrow). **Origin:** Napoli, A. musculoskeletal department, Fundacion Cientifica Del sur. Buenos Aires Argentina.