

29 yr old male with right mid-foot pain. Navicular stress reaction/fracture?

MR right ankle/foot:

- Moderately degenerate non-osseous cuboid-navicular coalition present demonstrating minor oedema and fluid at the pseudoarticulation



PD Sagittal

PD SPAIR Sagittal



PD Axial

PD SPAIR Coronal

Discussion:

- **Congenital or acquired abnormal fusion (osseous, cartilaginous, or fibrous) of 2 tarsal bones**
- Tarsal coalition is rare (~1% incidence) with over 90% of coalitions being either talocalcaneal or calcaneonavicular (and up to 50% bilateral)
- **Cuboid-navicular coalition is extremely rare and often reported as asymptomatic except at specific moments of stress and exercise**

Imaging

XR - not sensitive for this very rare form of coalition (helpful and often diagnostic in calcaneonavicular)

CT - 3 plane re-formats ->bridging visible (required for cuboid-navicular and often talocalcaneal)

MRI -

- T1/PD –
 - Hypointense reactive changes
- T2/PD SPAIR
 - Ossific: Bone marrow contiguity across coalition
 - Cartilaginous: *Hyperintense fluid signal* connection + subchondral marrow oedema
 - Fibrous: *Intermediate* signal connection + reactive subchondral marrow oedema

Aetiology

- **Congenital** - failure of segmentation & differentiation of primitive mesenchyme
 - Autosomal dominance with high penetrance and associated with:
 - Apert, Hand-foot-uterus synd; Proximal focal femoral deficiency; Hered symphalangism
- **Acquired** - trauma, infection, arthritis, surgery

Clinical

- Coalitions often present in adolescence / early adulthood
- M>F
- Recurrent sprains, midfoot pain, limited subtalar motion, peroneal spastic flatfoot
- Symptoms occur as coalition ossifies (fibrous coalition at birth, ossifies 2nd decade)

Treatment

- Conservative
 - NSAIDs, arch supports, steroids, trial of casting, orthotics & physiotherapy
- Surgical or arthroscopic resection
 - Resection of bony bridge or arthrodesis +- fat autograft interposition
 - If excision fails or severe degenerative disease -> fusion or triple arthrodesis

Further Reading:

- Awan, O et al. *The Rare Cuboid-Navicular Coalition Presenting as Chronic Foot Pain*. Case Reports in Radiology. Article ID 625285, 2015.
- S. García-Mata et al. *Cuboid-navicular tarsal coalition in an athlete*. Anales del Sistema Sanitario de Navarra, vol. 34, no. 2, pp. 289–292, 2011.
- Williamson et al. *Cubonavicular coalition: an unusual cause of peroneal spastic flat foot*. Australian and New Zealand Journal of Surgery, vol. 62, no. 6, pp. 506–507, 1992.
- Stat Dx online