

Case Study: Bilateral Osseous Naviculo-Medial Cuneiform Coalitions and Surgical Management

Brian Houg, DPM¹, Kevin Nguyen, DPM¹, Elizabeth Hewitt, DPM, FACFAS²

1: Resident, Foot & Ankle Surgery, Grant Medical Center, Columbus, OH
2: Attending Physician, Foot & Ankle Surgery Residency Program, Grant Medical Center, Columbus, OH

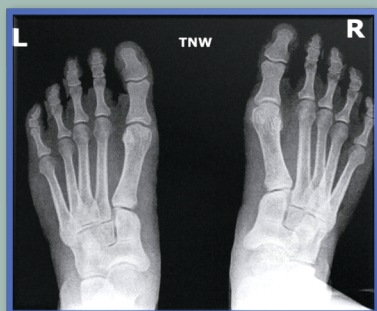
OhioHealth
Grant Medical Center

Purpose and Literature Review

Tarsal coalitions in the foot are a relatively rare defect. While the exact causes of these defects are not completely known, it is speculated that these deformities are attributed to the failure of embryonic mesenchymal cells to differentiate and divide.¹ The most common tarsal coalitions are the talocalcaneal and calcaneonavicular coalitions, which account for approximately 90% of cases.²⁻⁴

Naviculo-medial cuneiform (NMC) coalitions are extremely rare and are amongst the least reported tarsal coalitions. A majority of reported cases are from Asian descent and more commonly involve fibrous coalitions.⁴ As a result, there is no gold standard for the treatment of NMC coalitions. The current treatment options include conservative therapy, resection of coalition with interposition or distraction, and resection with arthrodesis.

To our knowledge, this is the third case report and second bilateral case of osseous NMC coalitions reported of a patient of North American descent. Due to the rarity of the case, we provide a report to highlight the clinical and radiographic presentation, as well as surgical management of symptomatic NMC coalitions.



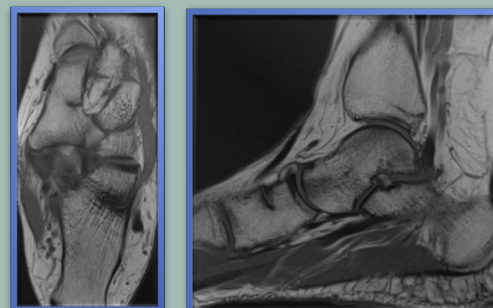
Bilateral osseous union of the navicular and medial cuneiform



Lateral radiograph demonstrating decreased calcaneal inclination and talar declination angles.

Case Study

- Our patient is a 31-year-old female with no significant past medical history who presented two months after a reported right ankle inversion injury.
- On physical exam, she endorsed pain in her right foot over the sinus tarsi as well as pain with palpation to the peroneal tendons and along the medial column of her right foot. She denied pain to the base of the 5th metatarsal and at the insertion of peroneus brevis. Weightbearing examination revealed flexible pes planovalgus deformities, bilaterally. She denied any other pedal complaints to the left foot.
- An MRI of the right ankle confirmed an osseous coalition involving the right navicular and medial cuneiform.
- Despite conservative efforts that included immobilization with a CAM boot, bracing, and physical therapy, her pain continued and surgical intervention was warranted.



MRI Coronal and sagittal views demonstrating near complete osseous union of the navicular and medial cuneiform

Surgical Management

- Surgical management began with a gastrocnemius recession in the form of a Strayer procedure to correct our patient's gastrocnemius muscle contracture.
- Attention was then directed to the lateral foot where an Evan's lateral column lengthening procedure was performed using an 8mm Evan's allograft with a two-hole plate and corresponding 3.5mm locking screws.
- Following the Evan's procedure, planar resection of the NMC coalition was performed and a 6mm Cotton allograft wedge was inserted to achieve a Hoke-like arthrodesis and plantarflexion of the first ray. A four-hole plate with corresponding 3.5mm locking screws was then used for fixation.



Post-operative radiographs demonstrating allografts with plate and screw fixation.

Discussion

While sparse, there are documented cases of NMC coalitions treated successfully with surgical management. The first reported case of bilateral NMC synchondroses was by Hynes et al. in 1987. Their patient was a 37-year-old Hispanic male soldier who underwent arthrodesis of the NMC joint with adjunct cancellous iliac crest graft. Saxena et al. reported a case in 2016 of two sisters with symptomatic naviculo-cuneiform coalitions. The sisters, 17 and 16 years of age, were treated with resection of fibrous coalition and arthrodiastasis with bone wax implantation. Both returned to activity and reported no signs or symptoms of midfoot arthritis at 5 and 3 years postoperatively.⁶

Our 31-year-old female patient presented with bilateral NMC coalition with complaint of symptoms to her right foot only. We performed a right gastrocnemius recession, an Evan's lateral column lengthening, resection of the right NMC coalition, and arthrodesis of the naviculo-medial cuneiform joint with insertion of a Cotton wedge allograft. Post operative radiographs reveal evidence of osseous bridging across the arthrodesis sites as well as increases in the calcaneal inclination and first metatarsal declination angle, an improved Seiberg's index, and a decrease in talar head uncoverage. The patient has since returned to full weightbearing status with no limitations and reports no pain or complications.

Conclusion

To our knowledge, there have been no other documented cases of NMC coalition resection with concomitant pes planovalgus corrective procedures. While early, we believe this procedure has resulted in a successful outcome and will be a viable option for patients with similar pathology.

References

1. Zaw H, Calder JDF. Tarsal coalitions. *Foot Ankle Clin.* 2010;15(2):349-364. doi:10.1016/j.fcl.2010.02.003
2. Lievever AR, Cooper DML, Gorjunova OI. A rare naviculocuneiform I coalition from Bronze Age Siberia. *Int J Paleopathol.* 2012;2(1):25-30. doi:10.1016/j.ijpp.2012.03.002
3. Ross JR, Dobbs MB. Isolated naviculo-medial cuneiform tarsal coalition revisited: a case report. *J Pediatr Orthop.* 2011;31(8):e85-88. doi:10.1097/BPO.0b013e31822cd47f
4. Byun S-E, Lee HS, Ahn J-Y, Seo D-K, Seo JH. Treatment of naviculo-first cuneiform coalition of the foot. *Foot Ankle Int.* 2014;35(5):489-495. doi:10.1177/1071100714520696
5. Hynes RA, Romash MM. Bilateral symmetrical synchondrosis of navicular first cuneiform joint presenting as a lytic lesion. *Foot Ankle.* 1987;8(3):164-168.
6. Saxena A, Fournier M. Naviculocuneiform Coalition: Case Reports of Two Sibling Soccer Players. *J Foot Ankle Surg Off Publ Am Coll Foot Ankle Surg.* 2016;55(5):1013-1017. doi:10.1053/j.jfas.2015.09.001