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

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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 ³ 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 management of symptomatic NMC coalitions.

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.

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.

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 adjacent 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 arthrodesis 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 Selberg’s index, and a decrease in talonavicular 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