

AMSER Case of the Month

July 2026

34-year-old Female with Navicular-Medial Cuneiform
Tarsal Coalition

Ryan Hefner MS3

Northeast Ohio Medical University

Dr. Navid Faraji

University Hospitals



Patient Presentation

- **HPI:** 34-year-old female s/p left peroneal tendon repair presents with constant, diffuse right foot/ankle pain and swelling after rolling her ankle 6 months ago. She wore an immobilization boot for 6 months without relief. The pain severely limits walking, standing, and driving. Past medical history includes a cholecystectomy. Pertinent negatives include no use of blood thinners, no kidney problems, and no stomach issues.
- **Exam:** Well-appearing female in no acute distress. Right lower extremity reveals an antalgic gait, valgus heel, mild pes planus, and diffuse swelling. There is no redness, ecchymosis, or effusion. She has focal tenderness over the posterior tibial tendon and is unable to perform a single leg heel rise. Distal pulses and sensation to light touch across all 4 compartments are grossly intact.

Pertinent Labs

- No pertinent labs, evaluation proceeded to imaging.

What Imaging Should We Order?

Select the applicable ACR Appropriateness Criteria

Variant 1: Adult. Chronic foot pain. Unknown etiology. Initial imaging.

Procedure	Appropriateness Category	SOE References	Adult RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Radiography foot	Usually appropriate	Moderate	☹️ <0.1 mSv	☹️ <0.03 mSv [ped]	9	9	1	0	0	0	0	0	0	0	13
US foot	Usually not appropriate	Expert Consensus	0 0 mSv	0 0 mSv [ped]	3	3	3	2	3	0	5	0	0	1	0
Image-guided anesthetic +/- corticosteroid injection foot or surrounding structures	Usually not appropriate	Expert Consensus	Varies	Varies	1	1	13	1	0	0	0	0	0	0	0
MRI foot without and with IV contrast	Usually not appropriate	Expert Consensus	0 0 mSv	0 0 mSv [ped]	1	1	10	2	1	0	1	0	0	0	0
MRI foot without IV contrast	Usually not appropriate	Expert Consensus	0 0 mSv	0 0 mSv [ped]	1	1	8	3	1	1	1	0	0	0	0
CT foot with IV contrast	Usually not appropriate	Expert Consensus	☹️ <0.1 mSv	☹️☹️ 0.03-0.3 mSv [ped]	1	1	9	2	2	0	0	0	1	0	0
CT foot without and with IV contrast	Usually not appropriate	Expert Consensus	☹️ <0.1 mSv	☹️☹️ 0.03-0.3 mSv [ped]	1	1	10	1	2	0	0	1	0	0	0
CT foot without IV contrast	Usually not appropriate	Expert Consensus	☹️ <0.1 mSv	☹️☹️ 0.03-0.3 mSv [ped]	1	1	8	3	0	3	0	0	0	0	0
Bone scan foot	Usually not appropriate	Expert Consensus	☹️☹️☹️ 1-10 mSv	☹️☹️☹️☹️ 3-10 mSv [ped]	1	1	10	1	1	0	1	0	0	1	0

Chronic foot pain; radiography ordered to investigate underlying structural abnormality

Findings (unlabeled)



Radiographs

- ★ Navicular Tarsal
- ★ Medial Cuneiform Tarsal

Findings (labeled)



Radiographs

AP radiographs of the right (symptomatic) and left (asymptomatic) feet. The green arrow highlights the navicular-medial cuneiform articulation, demonstrating equivocal mild irregularity and productive change.



Select the applicable ACR Appropriateness Criteria

Variant 4: Adult. Chronic ankle pain. Suspected tarsal coalition. Radiographs performed. Next imaging study.

Procedure	Appropriateness Category	SOE	Adult RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
MRI ankle without IV contrast	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	9	9	0	0	1	0	0	0	1	3	6
CT ankle without IV contrast	Usually appropriate	Limited	☹️ <0.1 mSv	☹️☹️ 0.03-0.3 mSv [ped]	9	9	0	0	1	0	2	0	0	2	6
US ankle	Usually not appropriate	Expert Consensus 🔗 References	O 0 mSv	O 0 mSv [ped]	1	1	9	0	1	0	0	1	0	0	0
MR arthrography ankle	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	8	1	1	1	0	0	0	0	0
MRI ankle without and with IV contrast	Usually not appropriate	Expert Consensus 🔗 References	O 0 mSv	O 0 mSv [ped]	1	1	8	1	1	1	0	0	0	0	0
CT ankle with IV contrast	Usually not appropriate	Expert Consensus	☹️ <0.1 mSv	☹️☹️ 0.03-0.3 mSv [ped]	1	1	9	0	1	1	0	0	0	0	0
CT ankle without and with IV contrast	Usually not appropriate	Expert Consensus	☹️ <0.1 mSv	☹️☹️ 0.03-0.3 mSv [ped]	1	1	9	0	1	1	0	0	0	0	0
CT arthrography ankle	Usually not appropriate	Expert Consensus	☹️ <0.1 mSv		1	1	8	1	1	1	0	0	0	0	0
Bone scan ankle	Usually not appropriate	Expert Consensus	☹️☹️☹️ 1-10 mSv	☹️☹️☹️☹️ 3-10 mSv [ped]	1	1	8	1	2	0	0	0	0	0	0

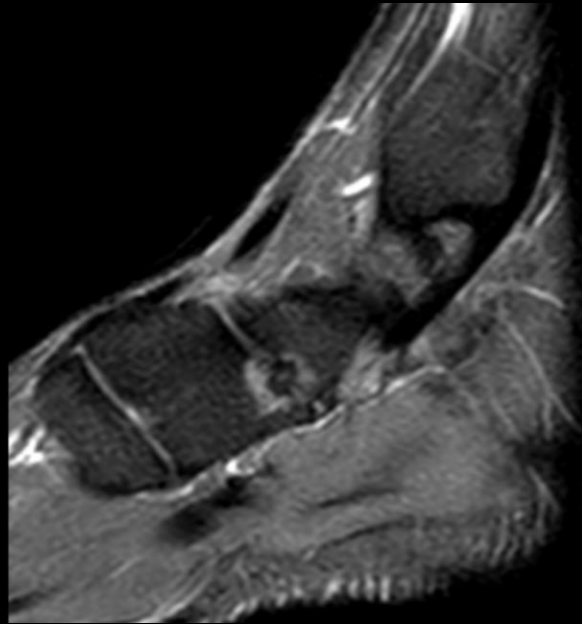
Radiographs normal;
MRI ordered to
evaluate for suspected
Tarsal Coalition



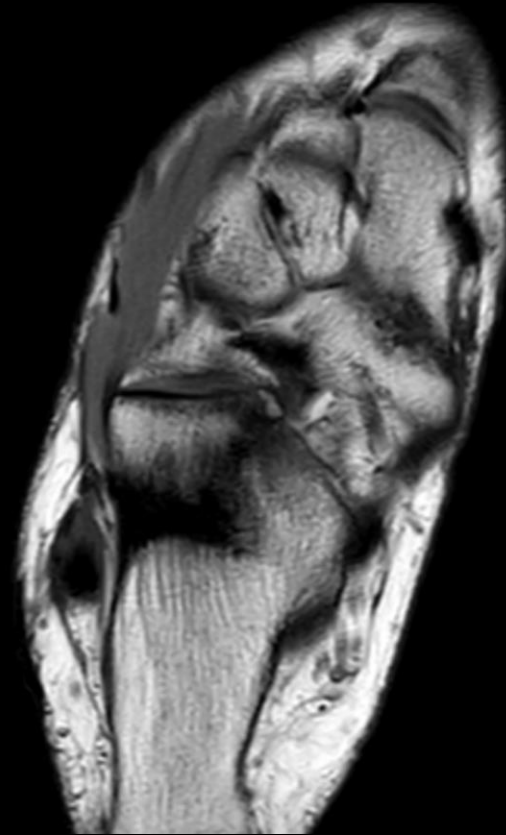
Findings (unlabeled)



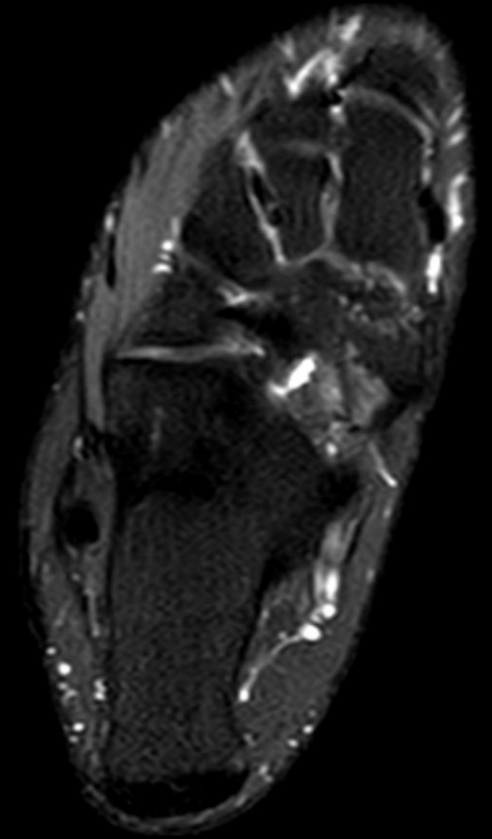
Sagittal T1



Sagittal T2 / STIR



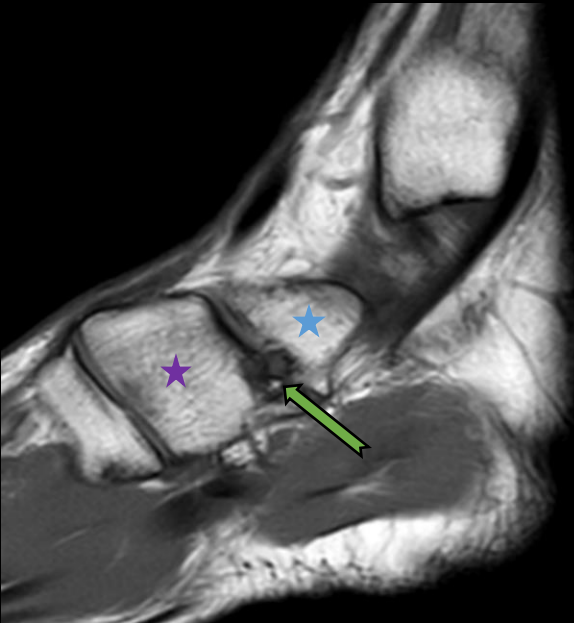
Coronal T1



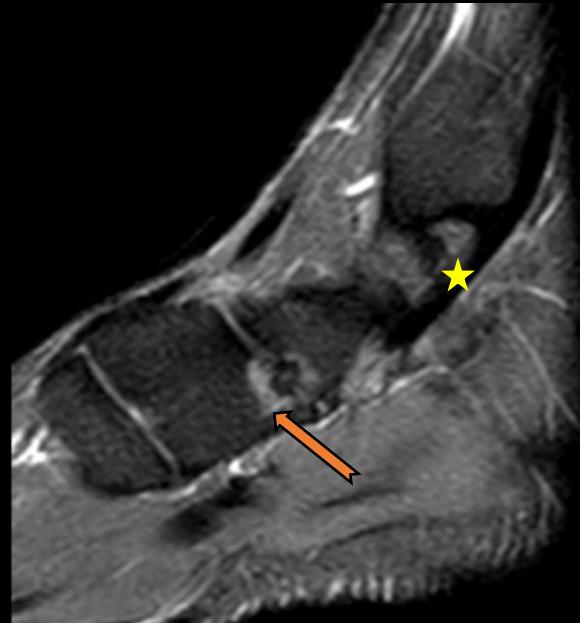
Coronal T2 / STIR

Findings (labeled)

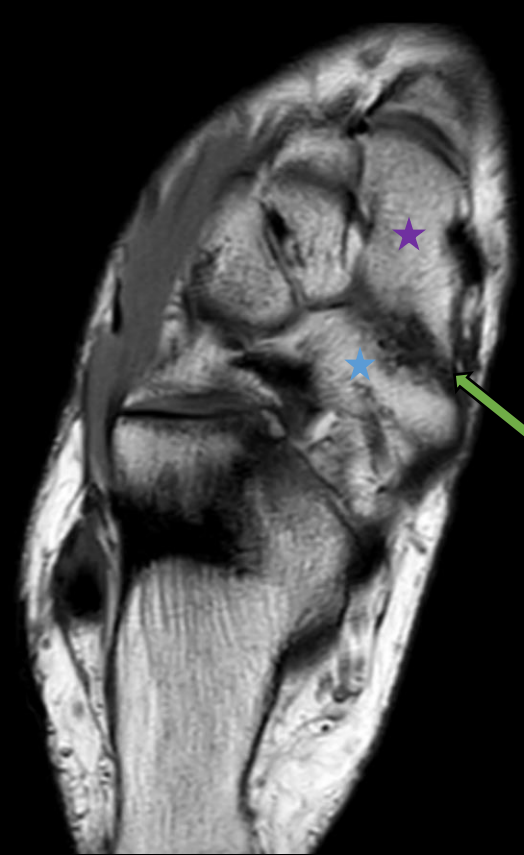
- ★ Navicular Tarsal
- ★ Medial Cuneiform Tarsal
- ★ Posterior Tibial Tendon



Sagittal T1



Sagittal T2 / STIR



Axial T1



Axial T2 / STIR

T2/STIR axial MRI at the level of the midfoot demonstrating abnormal fibrous irregularity at the navicular-medial cuneiform joint (**green arrow**). Axial and sagittal T1-weighted images show joint space narrowing, abnormal hypointense signal, and subchondral edema like signal(**orange arrow**) consistent with tarsal coalition. The posterior tibial tendon is highlighted for anatomic reference.

Final Dx:

Navicular-Medial Cuneiform Tarsal Coalition with
Associated Midfoot Arthritis

Case Discussion

- **Definition:** Tarsal coalition is an abnormal fusion between two or more tarsal bones, categorized as osseous, cartilaginous, or fibrous. It results from a failure of embryonic segmentation¹. While calcaneonavicular and talocalcaneal fusions comprise 90% of cases¹, rare variants like navicular-medial cuneiform coalitions restrict joint mobility, shifting mechanical stress to adjacent segments and causing progressive pain, particularly during physical activity². Symptoms often manifest in adolescence or early adulthood as the coalition progressively ossifies^{1,3}. Unlike hindfoot coalitions, naviculocuneiform coalitions are more commonly osseous⁴. This variant often presents with focal midfoot tenderness^{1,4,5}.
- **Epidemiology:** While tarsal coalitions have a general prevalence of 1% to 13%³, the navicular-medial cuneiform accounted for just 1 of 79 (1.3%) symptomatic tarsal coalitions identified over a 52-year period⁶.

Case Discussion

- **Risk Factors:**

- Congenital failure of tarsal segmentation, localized midfoot trauma, repetitive mechanical strain or rolling injuries to the ankle, and a history of progressive hindfoot/midfoot structural deformities such as rigid pes planus.

- **Radiographic Features:**

- **Radiographs:** May demonstrate mild pes planus or secondary degenerative clawing, though fibrous coalitions often show no acute bony abnormality on initial XR.
- **T1 MRI:** Demonstrates structural narrowing/irregularity at the base of the medial cuneiform and navicular with abnormal intraarticular signal suggesting fibrous tissue.
- **T2/STIR MRI:** Highlights associated reactive marrow edema or subchondral cystic changes surrounding the compromised articulation.

Case Discussion

- **Differential Diagnosis:**

- Isolated posterior tibial tendon dysfunction, chronic syndesmotic ankle sprain, rigid pes planus without coalition, osteochondral lesion of the talus, rheumatoid arthritis, or post-traumatic osteoarthritis.

- **Management:**

- Initial conservative options include activity modification, NSAID therapy (such as meloxicam 15 mg daily) and immobilization via a walking boot⁷. If symptoms persist, image-guided diagnostic and therapeutic corticosteroid and local anesthetic injections directly into the navicular-cuneiform joint⁸. Immediate anesthetic response confirms the joint as the primary pain generator. If conservative measures or localized steroid injections fail to provide substantial, prolonged relief, referral to orthopedic surgery for operative resection⁷ or joint arthrodesis is indicated⁴.

References:

1. Docquier PL, Maldaque P, Bouchard M. Tarsal coalition in paediatric patients. *Orthop Traumatol Surg Res.* 2019;105(1S):S123-S131. doi:10.1016/j.otsr.2018.01.019
2. Saxena A, Fournier M. Naviculocuneiform Coalition: Case Reports of Two Sibling Soccer Players. *J Foot Ankle Surg.* 2016;55(5):1013-1017. doi:10.1053/j.jfas.2015.09.001
3. Mehdi N, Bernasconi A, Lintz F. Tarsal coalition in adults. *Orthop Traumatol Surg Res.* 2024;110(1S):103761. doi:10.1016/j.otsr.2023.103761
4. Byun SE, Lee HS, Ahn JY, Seo DK, Seo JH. Treatment of naviculo-first cuneiform coalition of the foot. *Foot Ankle Int.* 2014;35(5):489-495. doi:10.1177/1071100714520696
5. Kernbach KJ, Boberg JS. Naviculocuneiform coalition: a case report and review of the literature. *J Foot Ankle Surg.* 2007;46(5):392-395. doi:10.1053/j.jfas.2007.05.009
6. Jackson TJ, Larson AN, Mathew SE, Milbrandt TA. Incidence of Symptomatic Pediatric Tarsal Coalition in Olmsted County: A Population-Based Study. *J Bone Joint Surg Am.* 2021;103(2):155-161. doi:10.2106/JBJS.20.00707
7. Catanzano AA Jr, Akoh CC, Easley ME, Mosca VS. Decision-Making and Management of Tarsal Coalition in the Young Adult Patient: A Critical Analysis Review. *JBJS Rev.* 2023;11(6):10.2106/JBJS.RVW.23.00021. Published 2023 Jun 12. doi:10.2106/JBJS.RVW.23.00021
8. Hansford BG, Mills MK, Stilwill SE, McGow AK, Hanrahan CJ. Naviculocuneiform and Second and Third Tarsometatarsal Articulations: Underappreciated Normal Anatomy and How It May Affect Fluoroscopy-Guided Injections. *AJR Am J Roentgenol.* 2019;212(4):874-882. doi:10.2214/AJR.18.20347