

# THE INTERRELATIONSHIP OF VENOUS INSUFFICIENCY, TARSAL TUNNEL SYNDROME AND RECALCITRANT HEEL PAIN, A DISTINCT TRIAD.



ZAHN, NICOLE DPM; BOWLES, ASHLEY DPM, FACFAS; ORTIZ, JULIO DPM, FACFAS  
KINMON, KYLE DPM, FACFAS, CABALLES, ROBBY J DPM



### Statement Of Purpose

Recalcitrant heel pain (RHP) is debilitating for patients and difficult to manage for physicians. Varicose veins are a frequent space-occupying lesion found within the tarsal tunnel. Tarsal tunnel syndrome (TTS), a neuritic etiology of RHP, results from entrapment of the medial calcaneal nerve. The purpose of this study was to correlate findings of venous mapping and NCV/EMG studies in the setting of RHP with aims of expeditious symptom relief.

### Methodology

Retrospective analysis was performed over a 15 month period from 5/16/2018 to 8/1/2018 on patients who had NCV/EMG studies positive for tarsal tunnel syndrome, venous mappings with resultant below the knee (BTK) venous reflux, and with whom had clinically documented heel pain recalcitrant to appropriate treatments.



Figure 2. Inferior calcaneal nerve (large black arrow), medial plantar nerve (white arrow), and lateral plantar nerve (small black arrow).

### Analysis and Discussion

Heel pain is often found to be self-limiting, however chronic heel pain resists conservative measures and presents frequently in those with venous insufficiency and TTS. In evaluating RHP, when symptoms extend beyond classic first-step pain and medial tuberosity tenderness to include: pain at rest and slow relief of pain when the foot is unweighted in the setting of venous insufficiency, the physician should consider RHP, venous insufficiency and TTS as a likely etiological triad and redirect their treatment strategies accordingly.

### Results

Of the 45 patients reviewed with NCV/EMG studies positive for tarsal tunnel syndrome, seventy-five percent (32 of the 45) met the inclusion criteria of concomitant venous mapping studies positive for BTK reflux. Of the resultant 32 patients, seventy-eight percent were found to have heel pain upon physical exam.

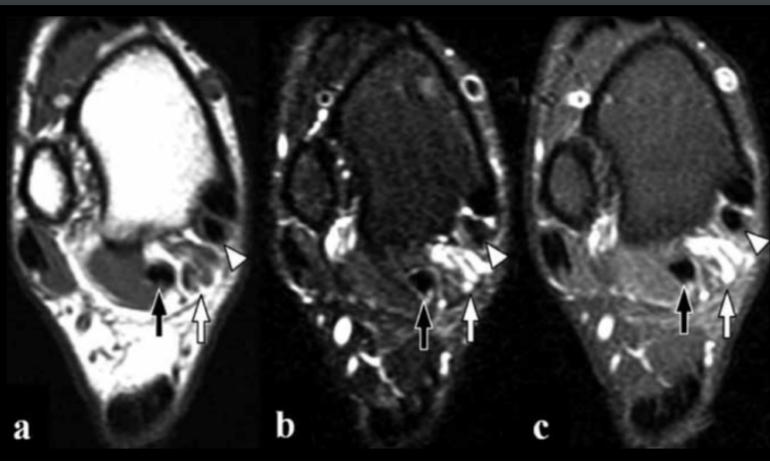


Figure 1. Axial T1-weighted (a), fat-suppressed T2-weighted (b), and Gd-enhanced fat-suppressed T1-weighted (c) MR images demonstrate varicose veins (white arrow) within the tarsal tunnel, between the flexor digitorum longus (arrowhead) and flexor hallucis longus tendons (black arrow).

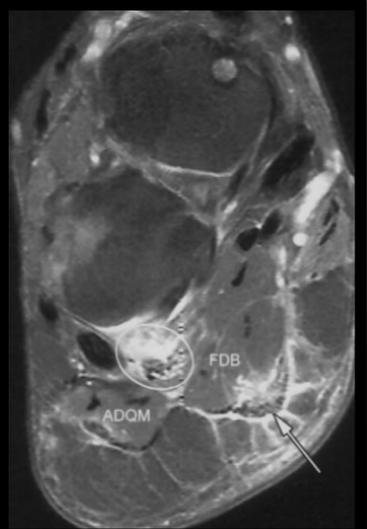


Figure 3. Patient with heel pain not responding to corticosteroids/anesthetics. Plantar fasciitis (arrow) with soft-tissue contrast material uptake in the area of the medial calcaneal nerve course (circled).

### References

Kobashi Y, Ogiwara S, Fukuda K, Kubota M. Tarsal tunnel syndrome due to varicose vascular structures: a case report. *Radiol Open J*. 2016; 1(1): 17-20.  
 Pasku DS, Karampekios SK, Kontakis GM, Katonis PG. Varicosities as an etiology of tarsal tunnel syndrome and the significance of tinell's sign: report of two cases in young men and a review of the literature. *J Am Podiatr Med Assoc* 2009; 99: 144-147  
 Andrea Donovan, MD et al. MR Imaging of Entrapment Neuropathies of the Lower Extremity Part 2. *RadioGraphics* 2010; 30:1001-1019 • Published online 10.1148/rg.304095188  
 Rondhuis JJ, Huson A. The first branch of the lateral plantar nerve and heel pain. *Acta Morphol Neerl Scand* 1986; 24:269-279.  
 Emmanuelle M. Delfaut, MD • Xavier Demondion, MD, PhD • Anne Bieganski, MD • Marie-Camille Thiron, MD • Henry Mestdagh, MD Anne Cotten, MD, PhD. Imaging of Foot and Ankle Nerve Entrapment Syndromes: From Well-demonstrated to Unfamiliar Sites. *RadioGraphics* 2003; 23:613-623  
 Erickson SJ, Quinn SF, Kneeland JB, et al. MR imaging of the tarsal tunnel and related spaces: normal and abnormal findings with anatomic correlation. *AJR Am J Roentgenol* 1990; 155:322-328.