

Entrapment Neuropathies of the Foot and Ankle



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KEYWORDS

- Jogger's foot • Tarsal tunnel syndrome • Lateral plantar nerve entrapment
- Morton neuroma in athletes • Superficial and deep peroneal nerve entrapment

KEY POINTS

- Posterior tarsal tunnel syndrome is the result of compression of the posterior tibial nerve.
- Anterior tarsal tunnel syndrome (entrapment of the deep peroneal nerve) typically presents with pain radiating to the first dorsal web space.
- Distal tarsal tunnel syndrome results from entrapment of the first branch of the lateral plantar nerve and is often misdiagnosed initially as plantar fasciitis.
- Medial plantar nerve compression is seen most often in running athletes, typically with pain radiating to the medial arch.
- Morton neuroma is often seen in athletes who place their metatarsal arches repetitively in excessive hyperextension.

TARSAL TUNNEL SYNDROME

Introduction: Nature of the Problem

Posterior tarsal tunnel syndrome is a compression of the posterior tibial nerve and its associated branches that occurs within the tarsal tunnel, a fibro-osseous space that is defined by the medial malleolus (superiorly), tibia (anterior border), posterior process of the talus (posterior border), calcaneus (lateral border), abductor hallucis (inferior border), and the flexor retinaculum (lacinate ligament), which lays over the tibial nerve to create an enclosed space. The contents of the tunnel include the posterior tibial nerve, the posterior tibialis, the flexor hallucis longus, the flexor digitorum longus, and the posterior tibial artery/vein. Recently, it has been described that there are 3 well-defined fascial septae (medial, lateral, and intermediate), in addition to the flexor retinaculum and the abductor hallucis, as potential sites of compression.¹ The

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posterior tibial nerve is a branch of the sciatic nerve that divides into the medial calcaneal nerve and the lateral plantar nerve (LPN) and medial plantar nerve (MPN).

Tarsal tunnel contents

- Posterior tibial nerve
- The posterior tibialis
- The flexor hallucis longus
- The flexor digitorum longus
- Posterior tibial artery/vein

The syndrome was initially described Kopell and Thompson² in 1960, and is an uncommon diagnosis in athletes, although a slightly higher predominance is seen in women.³

Typically the tibial nerve is entrapped within the tarsal canal because of trauma and repetitive stress in runners and soccer players, and hyperpronation and poor running mechanics can predispose athletes to entrapment. Compression can also occur by space-occupying masses, such as ganglion cysts, tumors, or accessory musculature. Multiples sites of entrapment can create a double-crush phenomenon that, when it radiates proximally, is known as the Valleix phenomenon.

Symptoms

- Burning, tingling, and shooting pain along the heel and medial aspect of the ankle
- Increase in symptoms with standing, walking, or running
- Evaluate for ankle instability, which can also contribute to tarsal tunnel syndrome in running athletes

MRI can be a helpful way of identifying the pathologic cause of symptoms. In one study, MRIs found the symptomatic mass in 88% of patients presenting with clinical signs of tarsal tunnel syndrome.⁴

Therapeutic Options and/or Surgical Technique

Nonoperative management

- Immobilization
- Oral and topical nonsteroidal antiinflammatory drugs (NSAIDs), compounding creams
- Orthotics
- Tricyclic antidepressants, gabapentin, pregabalin
- Steroid injections

Operative management

With the patient supine with a thigh tourniquet, an incision of 5 to 7 cm is made along the posteromedial aspect of the ankle from just proximal to the medial malleolus extending distally along the course of the nerve, gently curving anteriorly at the LPN. It is important to protect the medial calcaneal nerve. Sharply release the retinacula and, if necessary, remove any space-occupying mass. Be sure to release any arterial vascular leash that may indent on the nerve or create scar tissue surrounding the nerve. Trace the posterior tibial nerve distal to the MPN and LPN branches if required and the fascia of the abductor hallucis, both superficial and deep, to prevent any source of further compression.

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