

Tarsal Tunnel Syndrome: Elusive, But Easily Managed

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When a patient presents with pain around the heel, especially along the medial aspect, the common diagnoses are plantar fasciitis or Achilles tendinitis. Although these are reasonable, tibial nerve compression should always be considered. That's because a branch of the sciatic nerve, the tibial nerve can become irritated and symptomatic at the medial ankle and foot, especially in athletes, dancers and people who are on their feet all day.

This condition, known as "tarsal tunnel syndrome," is relatively easy to treat in most cases because the frequent cause is biomechanical imbalance and overuse. Yet many times patients suffer for weeks or years when no one examines their medial arch and foot carefully.

The No. 1 Challenge: Variable Symptoms

The symptoms can vary substantially among patients, making this condition more difficult to pin down.¹⁻² Instead of medial ankle symptoms, patients may have pain or burning or other paresthesias affecting the ball of the foot and toes, and along the sole of the foot at the medial arch. In some patients, the pains may extend up into the calf.

Some of these symptoms are similar to plantar fasciitis and Achilles tendinitis, which must be differentiated. These sensory changes tend to be worse at night, but are also aggravated by extended standing or athletic activities.

Onset is usually insidious and intermittent, gradually becoming more intense and constant, but the condition can also develop acutely.³ Sustained compression can lead to atrophy of the intrinsic muscles of the foot, resulting in the appearance of a high-arched foot with claw toes. This extent of muscle atrophy can develop silently, causing no painful symptoms until quite advanced.⁴

Compressions and Collapses

The [tarsal tunnel](#) is created by the medial malleolus of the tibia, the calcaneus and the lacinate ligament, which is a strong, fibrous retinaculum. This tunnel is just posterior to the medial malleolus on the inside of the ankle. The contents of the tunnel include several tendons (of the posterior tibialis, flexor hallucis longus and flexor digitorum longus muscles), along with the posterior tibial artery, vein and nerve.

Biomechanical dysfunction of the foot and ankle complex is the most common cause of compression of the tibial nerve in the tarsal tunnel.⁵ This may be due to a recent ankle sprain, but more likely develops due to chronic factors such as collapse of the plantar vault and excessive pronation.

Exam Findings

Examination of the foot will reveal sensory changes to pinprick and light touch testing, and Tinel's

sign (re-creation of paresthesias when tapping over the area of entrapment) will often be positive.⁶ Motor nerve involvement should be checked by manual muscle testing of the intrinsic foot muscles, especially the flexor hallucis brevis and flexor digitorum brevis muscles.

Careful testing may reveal that these short flexor muscles are weaker than the flexor hallucis longus and flexor digitorum longus muscles,⁷ since the longus muscles receive their innervation from the nerve before it passes through the tarsal tunnel. This means the toes will demonstrate a "hammer toe" position, due to the different stimulus to the longus and brevis flexors.

A manual resistance test for the posterior tibialis muscle should also be performed, since pain on resistance may indicate a tendinitis of this muscle, which can cause swelling in the tunnel and compression of the contents.

The dorsiflexion-eversion test is analogous to Phalen's test for carpal tunnel syndrome. The ankle is passively everted and dorsiflexed to end range, while keeping the metatarsal joints in full extension. The patient is asked to hold this position for 10 seconds while the tunnel region is carefully palpated.⁸ This maneuver will almost surely provoke an increase in symptoms with a tarsal tunnel, but not with a plantar fasciitis or Achilles tendinitis.

On weight-bearing inspection, there is very likely to be excessive pronation and medial deviation of the ankle with medial arch collapse. Remember, though, that intrinsic muscle atrophy may give the false appearance of a high or normal arch - even in the presence of substantial arch collapse.

Palpation and motion testing for fixations and subluxations should be performed, looking particularly at the subtalar joint for a posterior calcaneus and/or an anterior talus. Since the tibial nerve is a branch of the sciatic nerve, lumbosacral involvement must be checked in all cases.

If no evidence of a biomechanical cause is found, a search for other, less common causes of local entrapment is required. Possible sources include benign tumors, systemic inflammatory diseases or peripheral vascular disease, such as [thrombophlebitis](#).

Methods of Care

Specific corrective adjustments to the talus, calcaneus and lumbosacral spine are usually necessary. Other areas of involvement may be the navicular and metatarsals, due to medial arch collapse and transferred weight-bearing to the forefoot.

Excessive pronation, medial arch collapse, and poor shock attenuation will need to be addressed with individually designed stabilizing orthotics that can support the patient's foot throughout the gait cycle while controlling the impact forces. Stabilizing orthotics are necessary to reduce pronation stresses on the medial ankle.

Flexible orthotics are particularly important in this condition, as they permit sufficient mobility to stimulate and retrain the foot muscles, and will help reduce muscle atrophy.

Any training errors or improper work conditions will also need to be addressed to let the nerve heal. Nutrients (especially B vitamins) can also be helpful, and counseling for proper footwear may be necessary.

References

1. Logullo F, Ganino C, Lupidi F, Perozzi C, Di Bella P, Provinciali L. Anterior tarsal tunnel

syndrome: a misunderstood and a misleading entrapment neuropathy. *Neurol Sci*, 2013 Dec 12. [Epub ahead of print]

2. Ahmad M, Tsang K, Mackenney PJ, Adedapo AO. Tarsal tunnel syndrome: a literature review. *Foot Ankle Surg*, 2012;18(3):149-152.
3. Andrews JR, Harrelson GL, Wilk KE. *Physical Rehabilitation of the Injured Athlete, 2nd Edition*. Philadelphia: Saunders, 1998.
4. Stull PA, Hunter RE. Tibial nerve entrapment at the ankle. *Operative Tech Sports Med*, 1996;4:54-60.
5. Jackson DL, Haglund BL. Tarsal tunnel syndrome in runners. *Sports Med*, 1992;13:146-149.
6. Souza TA. *Differential Diagnosis for the Chiropractor: Protocols and Algorithms, 2nd Edition*. Gaithersburg, MD: Aspen Pubs., 2000.
7. Walther DS. *Applied Kinesiology: Basic Procedures and Muscle Testing, Volume 1*. Pueblo, CO: Systems DC, 1981.
8. Kinoshita M, Okuda R, Morikawa J, et al. The dorsiflexion-eversion test for diagnosis of tarsal tunnel syndrome. *J Bone Joint Surg*, 2001;83A:1835-1839.

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