



Images in Clinical Rheumatology

## Usefulness of $^{99m}\text{Tc}$ -hydroxymethylene-diphosphonate Single Photon Emission Computed Tomography/computed Tomography Hybrid Imaging in the Study of Tarsal Tunnel Syndrome<sup>☆</sup>



Utilidad de la imagen híbrida tomografía por emisión de fotón único/tomografía computarizada con  $^{99m}\text{Tc}$ -hidroximetileno-difosfonato en el estudio del síndrome del túnel tarsiano

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The patient was a 46-year-old man with a 2-year history of left talalgia, with no past injuries, who presented with mechanical factors associated with overload, symptoms that worsened with the first steps in the morning, and nocturnal neuropathic features, without diffuse radiation, except for occasional radiation toward the plantar region. There was a transient response to analgesics and local injections.

In the physical examination, localized pain was produced in response to pressure in the region of the tendon of the peroneal muscles, Achilles tendon and its insertion into the calcaneus, and medial border of the heel. Pain was also produced upon stretching of the plantar fascia. Other findings were grade 1 pes cava with rearfoot valgus of  $5^\circ$  in the right foot and  $10^\circ$  in the left, hyperkeratosis under the medial and central metatarsal heads of both feet and claudication on walking. There was no evidence of atrophy of the intrinsic musculature of the feet or trophic changes in the skin. The initial diagnosis was left plantar talalgia secondary to tendinitis and Achilles enthesitis. Ultrasound images and radiographies were inconclusive. As no response to physiotherapy or electrotherapy was observed, magnetic resonance imagining was performed to rule out tarsal tunnel syndrome (TTS). The images

revealed the presence of ankle joint effusion, talofibular ligament sprain, posterior tibial tenosynovitis and signal hyperintensity on MRI of the sinus tarsi, suggestive of sinus tarsi syndrome.

Magnetotherapy and local injections produced no improvement, and  $^{99m}\text{Tc}$ -hydroxymethylene diphosphonate bone scintigraphy and SPECT/CT fusion imaging (Fig. 1A) with 3D reconstruction (Fig. 1B) were carried out. The images showed the precise location of increased osteoblastic activity in left tibial malleolus, talus and talocalcaneal joint, and a diagnosis of TTS was established. The results of the electrophysiological study revealed no evidence of motor or sensory anomalies. Given the persistence of the neuropathy, which the patient described as an electrical pain that ran along the nerve to the tarsal tunnel, delivering a shock in the arch and sole of the foot, he was referred to surgery to undergo nerve release.

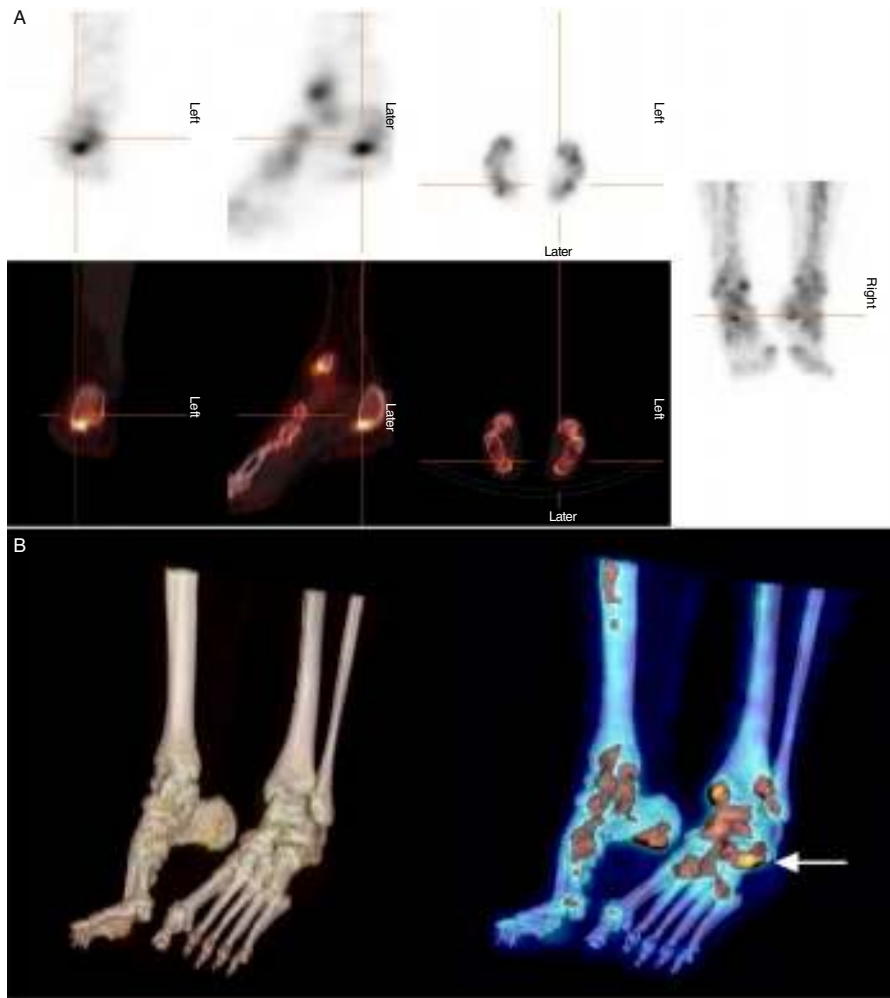
Osteoarticular disorders of the foot are difficult to diagnose because of the complex anatomy and function of that structure. This circumstance confers a fundamental role on the imaging techniques employed in the assessment, treatment and follow-up of these conditions.<sup>1,2</sup>

Tarsal tunnel syndrome is caused by a neuropathy due to the entrapment of posterior tibial nerve within its fibro-osseous tunnel beneath the flexor retinaculum on the medial side of the ankle<sup>3</sup> It is an uncommon condition, with important clinical implications. The combination of morphological imaging and functional imaging with 3D reconstruction significantly increases the sensitivity of scintigraphy,<sup>4</sup> substantially improving the accuracy of the anatomical localization of the lesion, aiding in the evaluation of its grade and extension and facilitating surgical planning.<sup>5</sup>

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**Fig. 1.** A. Axial, sagittal and coronal images obtained by bone SPECT/CT showing increased osteoblastic activity in left tibial malleolus, talus and talocalcaneal joint (cross). B. 3D reconstructions of the fusion images that enabled the precise localization of the point of entrapment (arrow).

### Instructive Message

Hybrid morphological and functional imaging with 3D reconstruction results in a substantial improvement in the quality of life of patients with TTS, enabling an early and accurate diagnosis, which leads to effective treatment, avoiding fruitless diagnostic and therapeutic measures.

### Ethical Disclosures

**Protection of human and animal subjects.** The authors declare that the procedures followed were in accordance with the regulations of the relevant clinical research ethics committee and with those of the Code of Ethics of the World Medical Association (Declaration of Helsinki).

**Confidentiality of data.** The authors declare that they have followed the protocols of their work center on the publication of patient data.

**Right to privacy and informed consent.** The authors have obtained the written informed consent of the patients or subjects mentioned in the article. The corresponding author is in possession of this document.

### Conflicts of Interest

The authors declare they have no conflicts of interest.

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