



## Case Report

# Charcot neuroarthropathy: realignment of diabetic foot by means of osteosynthesis using intramedullary screws – case report<sup>☆,☆☆</sup>



Alexandre Leme Godoy dos Santos<sup>\*</sup>, Rômulo Ballarin Albino, Rafael Trevisan Ortiz, Marcos Hideyo Sakaki, Marcos de Andrade Corsato, Tulio Diniz Fernandes

Institute of Orthopedics and Traumatology, Hospital das Clínicas, Medical School, Universidade de São Paulo (USP), São Paulo, SP, Brazil

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### ABSTRACT

Diabetes mellitus is a serious disease that affects a large portion of the population. Charcot neuroarthropathy is one of its major complications and can lead to osteoarticular deformities, functional incapacity, ulcers and ankle and foot infections. Realignment of the foot by means of arthrodesis presents a high rate of implant failure due to weight-bearing on an insensitive foot. The aim of this report was to describe successful use of intramedullary osteosynthesis with compression screws to stabilize the deformed foot, in a diabetic patient with neuroarthropathy.

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### Neuroartropatia de Charcot: realinhamento do pé diabético por meio de osteossíntese com parafusos intramedulares – relato de caso

### RESUMO

O diabetes mellitus é uma doença grave que afeta uma grande parcela da população. A neuroartropatia de Charcot é uma das grandes complicações que podem levar a deformidades osteoarticulares, incapacidade funcional, úlceras e infecção no tornozelo e no pé. O realinhamento do pé por meio de artrodeses apresenta elevado índice de falha do implante por causa da descarga de peso em um pé insensível. O objetivo deste relato de caso é descrever o uso bem-sucedido de osteossíntese intramedular com parafusos de compressão para estabilização do pé com deformidade em paciente diabético com neuroartropatia.

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#### Palavras-chave:

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<sup>☆☆</sup> Work developed by the Foot and Ankle Surgery Group, Institute of Orthopedics and Traumatology, Hospital das Clínicas, Medical School, Universidade de São Paulo (USP), São Paulo, SP, Brazil.

<sup>\*</sup> Corresponding author.

E-mail: [alexandrelemegodoy@gmail.com](mailto:alexandrelemegodoy@gmail.com) (A.L.G. Santos).

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## Introduction

There are 285 million diabetics worldwide, representing 6.6% of the population aged 20–79 years. Of these, up to 2.5% develop Charcot neuroarthropathy at some stage of the disease.<sup>1</sup> This complication most frequently involves the mid-foot and it results in osteoarticular deformities, significant functional loss, increased risk of ulcers and local infection.<sup>2</sup>

The ideal treatment protocol continues to be a topic of debate in the literature. A recent survey by the American Orthopedic Foot and Ankle Society revealed that treatment of the deformities resulting from Charcot neuroarthropathy is one of the two most controversial problems within the specialty.<sup>3</sup>

Controversy still exists regarding what the best treatment option should be and has given rise to intense debate in papers published within the specialty.<sup>4-8</sup>

With regard to choosing surgical treatment, the major discussion is in relation to the best technique for reestablishing the anatomy of the plantigrade foot and diminishing recurrences of deformities, ulcers and infection. Thus, the type of implant used to stabilize the arthrodesis of the medial and lateral columns of the foot is an important factor.

External fixators show potential disadvantages, with higher rates of superficial infection and non-consolidation.<sup>9</sup>

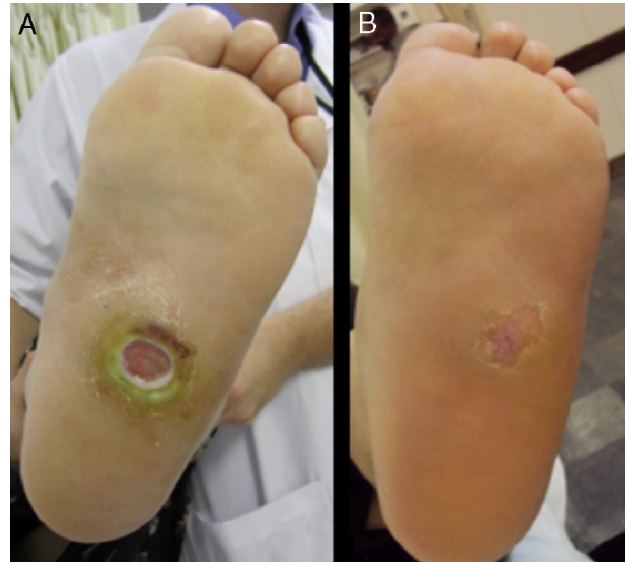
Dynamic compression plates or plates with angular stability present three disadvantages: greater aggression toward soft tissues, higher osteosynthesis failure rates and higher rates of non-consolidation.<sup>10</sup>

Use of cortical screws in these cases frequently presents the complication of peri-implant fracturing, mainly due to low bone mineral density and the very acute angle of entry into the bone in the midfoot region.<sup>7-10</sup>

Intramedullary screws for stabilizing the medial and lateral columns are a promising alternative for increasing the success rate of this surgical procedure.<sup>2,7,10</sup>

## Case report

The patient was 35-year-old woman who had post-gestational diabetes for 20 years and was using insulin. She first came to

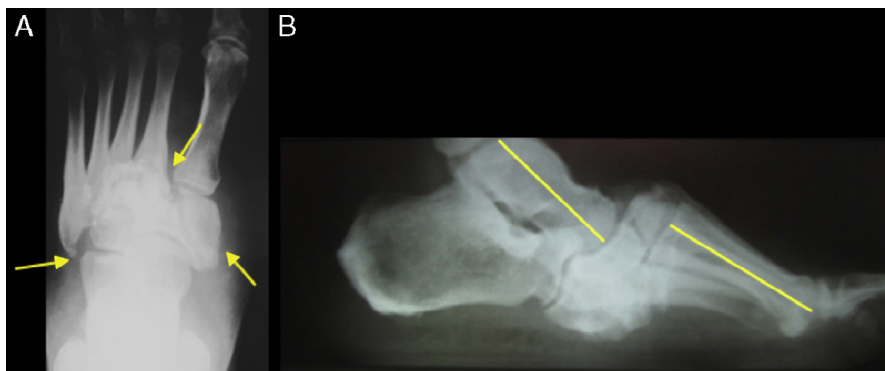


**Fig. 1 – (A) Plantar appearance of the foot at the first consultation; (B) plantar appearance of the foot after serial debridement and use of full contact plaster cast.**

our clinic two years before the time of the present report, with a history of pain in her left foot, and she now presented a plantar ulcer on the midfoot that had been evolving for four months.

In the initial examination, she presented pain, edema, hyperemia and temperature elevated by 4°C in comparison with the contralateral side in the midfoot region, associated with a superficial ulcer of 2 cm in diameter on the plantar face of the midfoot (Fig. 1A and B). Investigation of plantar sensitivity by means of the monofilament test showed the presence of peripheral neuropathy. Vascular examination showed that the pulse was normal. A probe-to-bone test was negative.

The initial radiographic evaluation revealed loss of the usual bone anatomy of the midfoot, with bone fragmentation in the region of the tarsometatarsal joint and alteration of the talus-first metatarsal angles seen in anteroposterior and lateral view, along with plantar bone prominence in the midfoot (Fig. 2A and B).



**Fig. 2 – Initial radiographic investigation: (A) anteroposterior view of the left foot showing bone fragmentation in the tarsometatarsal region; (B) lateral view showing loss of the medial longitudinal arch of the foot and alteration of the alignment of the talus with the first metatarsal.**

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