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Manipulation in the Treatment of Plantar Digital Neuralgia: A Retrospective Study of 38 Cases

David G. Cashley BSc Hons Podiatry [a,*], Lynda Cochrane PhD [b]

[a] *PhD Student, Department of Life Sciences, Queen Margaret University, Edinburgh, Scotland*
[b] *Doctor, Division of Population Health Sciences, Medical Research Institute, University of Dundee, Dundee, Scotland*

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Abstract

Objective: The purpose of this retrospective case series is to describe treatment outcomes for patients with plantar digital neuralgia (PDN) (Morton's neuroma) who were treated using foot manipulation.

Methods: Charts were reviewed retrospectively for patients with a diagnosis of PDN and who received a minimum of 6 treatments consisting of manipulation alone. Visual analogue pain scales (VAS) and pressure threshold meter readings (PTM) were extracted as outcome measures.

Results: Thirty-eight cases met inclusion criteria. Mean pretreatment duration of pain was 28 months. Mean pretreatment VAS was 69.5/100 mm. Mean pretreatment PTM was 2.54 Kp. By the sixth treatment, 30 (79%) of the 38 patients scored a VAS of 0 mm and a further 4 (10%) were below 10 mm. Contralateral limb PTM showed a mean pre-treatment score of 5.5 Kp, which rose slightly to 5.85 Kp. This compared to a pre-treatment score of 2.54 Kp rising to 5.86 Kp in the affected limb. This represents a 126% increase in the affected side compared to 6.5% in the unaffected limb. Statistical analysis demonstrated a significant linear trend between decreasing VAS and manipulation ($P < .001$).

Conclusion: The patients with PDN who were included in this case series improved with conservative care that included only foot manipulation.

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Introduction

Morton's neuroma (MN) (plantar digital neuritis, Morton's metatarsalgia and Morton's neuritis) is a common affliction of the forefoot. Affecting 87 in every 100,000 females and 50 in every 100,000 males in the UK, it is the most common compressive neuropathy after carpal tunnel syndrome.[1] Because the initial description by Durlacher in 1845[2] and the more widely recognized description by Morton in 1876[3] both refer to a lesion of the third inter-metatarsal (IM) space, it can be claimed that the term Morton's neuroma refers specifically to lesions in this locality, to the exclusion of identical lesions at other anatomical locations. For this reason, the term plantar digital

* Corresponding author at: Dundee Podiatry Clinic, 62a Dundee Road, Broughty Ferry, Dundee DD5 1HY. Tel.: +44 1382 779399.
E-mail address: dgcashley@googlemail.com (D. G. Cashley).

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neuralgia (PDN) as suggested by Hassouna et al is preferred here.[4] This term allows for the presence of the condition at any of the IM spaces and does not suggest any histological classification of the lesion. Since the same signs and symptoms have been reported in response to the presence of a neuroma and also of neuritis in the absence of a neuroma, it is perhaps more accurate to use the clinical nomenclature plantar digital neuralgia, which aptly covers both scenarios.

While the exact cause of PDN remains unclear,[5–7] it is most likely a mechanically induced neuropathy[5,8–11] caused by entrapment of the nerve as it passes inferiorly to the transverse inter-metatarsal ligament (IML).[7,11–13] The clinical presentation, positive clinical tests, and a good history are usually sufficient to make an accurate diagnosis.[5,12] Patients who present with this condition will commonly complain of a burning or lancing pain, with or without accompanying paresthesia in the ball of the foot which is relieved by rest and the removal of footwear.[5,9] Classically, the pain is in the third IM space but is not infrequently found in the second IM space and rarely in the first or fourth spaces. The severity of the pain can fluctuate greatly, both from patient to patient and from time to time in each patient. On examination a mass can be palpated in the affected IM space in one third of cases.[9]

Since its initial description by Durlacher, there have been a myriad of therapeutic interventions suggested for the treatment of PDN.[14] These have included a number of surgical procedures,[15] invasive techniques[4,16] and a number of conservative therapies.[11,17] Despite the range of advocated interventions, there is little agreement among clinicians as to the best treatment protocol for PDN.[18] It remains a difficult condition to resolve and is often a limiting factor in the individuals leisure pursuits and work life.[5,19] There is as yet very little empirical evidence that supports the use of one therapy over another and, despite surgery being generally accepted as the gold standard treatment, there is to date no evidence that it results in better patient outcomes than conservative care. Therefore, the purpose of this retrospective case series is to describe treatment outcomes for patients with PDN who were treated using foot manipulation.

Methods

This is a retrospective investigation of patients who were treated for PDN using manipulation alone. VAS and PTM scores were used to assess changes in the patients' pain levels. All patients who were treated for PDN within the previous 12 months were included unless they also received additional interventions such as orthoses at the same time as manipulation. In other words, patients included in this retrospective analysis were all treated using manipulation as a stand-alone therapy.

Patients

The files of all patients who, having attended a podiatric clinic complaining of pain in the forefoot from August 2012 to December 2013 were subsequently diagnosed with PDN and then treated using solely manual manipulation for at least six treatments were included for analysis. Each file was checked to ensure that it had a complete record of clinical tests performed as well as VAS and PTM scores for at least 6 treatments. An initial diagnosis was made according to the relevant history provided by the patient and subsequent clinical findings. In all cases a positive Mulder's click test and a positive digital nerve stretch test were required to confirm the diagnosis. These tests were considered primary inclusion criteria for this study. This led to the identification of 59 potential cases. Exclusion criteria included a history of foot surgery, concurrent foot complaints such as plantar fasciitis, painful hallux valgus and onychocryptosis, all of which may have altered their pain score results and therefore made it difficult to reliably assess the effectiveness of treatment. These exclusion criteria eliminated 10 patients. A further 11 patients were eliminated as their notes did not document whether the clinic's standard treatment protocol for MN treatment had been followed. This included eight patients who had incomplete pain scale records and three others were excluded as they failed to complete at least 6 treatments. These criteria reduced the number of cases to 38 (61%) of which 23 were female and 15 male (39%). All patients signed consent forms to have their personal health information included in this study.

Intervention

A positive digital nerve stretch test[1] and a positive Mulder's click test[2] were recorded for each patient. These tests are extremely straight forward and quick to perform and are valuable indicators for the clinician. Cloke and Greiss have described how to perform the digital nerve stretch test. "Both ankles are held in full dorsiflexion (passively, by the clinician), whilst the lesser toes either side of the

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