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Neurectomy versus Neurolysis for Morton's Neuroma

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ABSTRACT

Background: We evaluated a series of patients who underwent neurectomy or neurolysis for the surgical treatment of Morton's neuroma. **Materials and Methods:** A group of 50 patients (69 feet) who underwent surgery for a symptomatic Morton's neuroma were retrospectively reviewed. Surgery was performed through a dorsal approach in all cases. When the nerve showed macroscopic thickening or the typical pseudoneuroma, it was resected; when the nerve had no macroscopic changes, the intermetatarsal ligament and any other potentially compressive structure were released. In 17 cases, adjacent claw toes were treated. **Results:** Nerve thickening (pseudoneuroma) were resected in 46 cases; in the other 23 cases, the nerve was preserved. Total relief from digital nerve related symptoms was obtained in all cases but one in each group. These patients were reoperated on 6 months later by performing a neurectomy in the case where the nerve had been preserved, and a more proximal resection in the case in which the nerve had been resected. Both patients finally achieved complete pain relief. **Conclusion:** When treating Morton's neuromas surgically, neurolysis can be a valid option when a pseudoneuroma has not developed.

INTRODUCTION

Morton's neuroma is a mechanical neuropathy of a plantar interdigital nerve, which is more prevalent in adult women with the onset being most likely in the fifth decade of life. The third intermetatarsal space is the most common location and symptoms are exacerbated with constricting footwear.^{1,3} The etiology is controversial; several causes having been proposed, including neuritis, perineural connective tissue degeneration, vascular injury and neurofibroma.⁶

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Gauthier⁷ first suggested that Morton's neuroma was a nerve entrapment syndrome in which the nerve was compressed between the plantar soft tissue and the anterior edge of the plantar fascia (intermetatarsal ligament) which is thick and rigid at the level of the metatarsal heads. As a result of this entrapment, the nerve enlarges and progressively becomes a "pseudoneuroma" wrapped in inflammatory tissue. The first pathologic signs of nerve injury are vascular alteration, perineural fibrosis, endoneural vessel edema, thickening of the epineural wall vessels and axonal degeneration.⁸

Clinical features are often clear enough to permit a correct diagnosis, although imaging methods can be useful to determine if there are macroscopic changes in the nerve. The differential diagnosis includes mechanical metatarsalgia, bursitis, Freiberg disease, stress fracture, metabolic neuropathy and an atypical form of sciatic pain.⁵

Conservative treatment consists of footwear modification, orthoses and local injection of anesthesia and corticosteroids.^{1,3} If conservative treatment fails, most surgeons recommend complete resection of the interdigital nerve. Some authors have proposed a surgical procedure in which the nerve can be preserved, by performing a neurolysis as described by Gauthier in 1979.^{2,7,9} In this study, we compare the results of resection in cases with macroscopic thickening and simple release when visible thickening was not found.

MATERIAL AND METHODS

We retrospectively reviewed the clinical history of 50 patients who underwent surgery for Morton's neuroma alone or in combination with other forefoot conditions. Morton's neuromas were identified at 69 locations (19 patients having 2 intermetatarsal spaces affected). Forty-nine patients were female and only one was male. The average age was 57 (range, 30 to 75) years. Forty lesions were located in the second intermetatarsal space and 29 at the third. Associated foot disorders were corrected in the same operation in 36

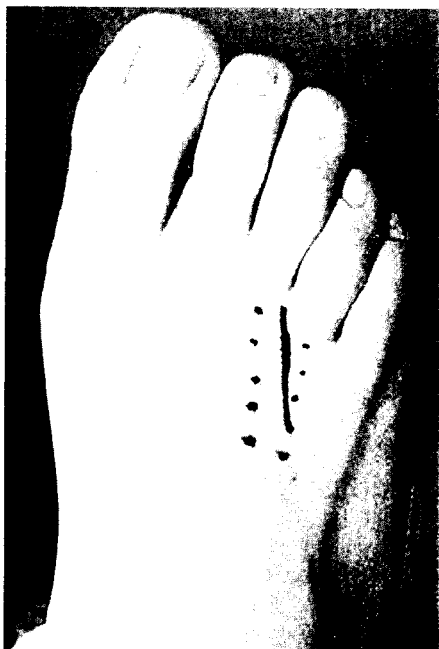


Fig. 1: Photograph showing dorsal approach.

cases, consisting of hallux valgus (16), hallux rigidus (3) and lesser toe abnormalities (17).

The diagnosis was based exclusively on clinical findings, with preoperative symptoms consisting of lancinating pain in the metatarsal interspace (distal to the metatarsal heads) and sensory abnormalities aggravated by footwear and walking. The main diagnostic feature was the existence of sharp pain when direct pressure was applied selectively to the affected interspace (Mulder click is not pathognomonic and Gauthier test is quite inconstant). Radiographs were performed in all cases to exclude other possible conditions affecting the adjacent bones and joints. No other imaging studies (CT, MRI, or ultrasound) were used. Resection or neurolysis was chosen depending on the external morphology of the nerve at the time of the operation.

Surgery was indicated when pain persisted after conservative treatment such as orthotic devices, metatarsal pads, non-steroidal anti-inflammatory drugs or shoe-wear modifications.

All operations were performed with the use of a standard technique, by the senior author (CV). Under tourniquet control, a dorsal longitudinal incision over the involved interspace was made (Figure 1) and with careful dissection we identified the intermetatarsal ligament (Figure 2). The intermetatarsal ligament was then divided visualizing the digital nerve (Figure 3). When the nerve was thickened, it was transected proximal to the "pseudoneuroma" and distally past the bifurcation (Group 1). When the nerve appeared of normal thickness, we performed a careful dissection both proximally and distally, confirming its complete release (Group 2).



Fig. 2: Intraoperative picture of intermetatarsal space and the intermetatarsal ligament.

Walking was allowed on the first day after the operation, with an orthopedic shoe; full weightbearing was allowed in patients undergoing surgical procedures not including an open osteotomy for hallux valgus or metatarsalgia correction. The average postoperative followup was 2 (range, 1 to 4) years.

The American Orthopedic Foot and Ankle Society (AOFAS) forefoot scale and Visual Analogic Scale (VAS) were used for pre and postoperative function and pain evaluation.

RESULTS

Nerve thickening (pseudoneuroma) was found and resected in 46 cases. Twenty-three cases had nerves which looked normal macroscopically, so the nerve was preserved.

The average preoperative pain rating according to VAS was 7.2 (range, 4 to 9). The AOFAS average preoperative score was 65 (range, 52 to 76). The average AOFAS postoperative score was 92 in group 1 and 89 in group 2. Total relief of symptoms related with the digital nerve (VAS = 0) was achieved in all cases but one in each of the 2 groups. These patients were reoperated on 6 months and one year later by performing a neurectomy in the case in which the nerve was preserved, and a more proximal resection in the case in which, after the nerve had been resected, a true neuroma developed. Both patients finally achieved complete pain relief. Six patients developed complex regional pain syndrome, with no difference between the 2 groups, four in group 1 (9.1%) and two in group 2 (8.7%). Other surgical procedures such as scarf and Akin osteotomies were performed in 4 of 6 patients with complex regional

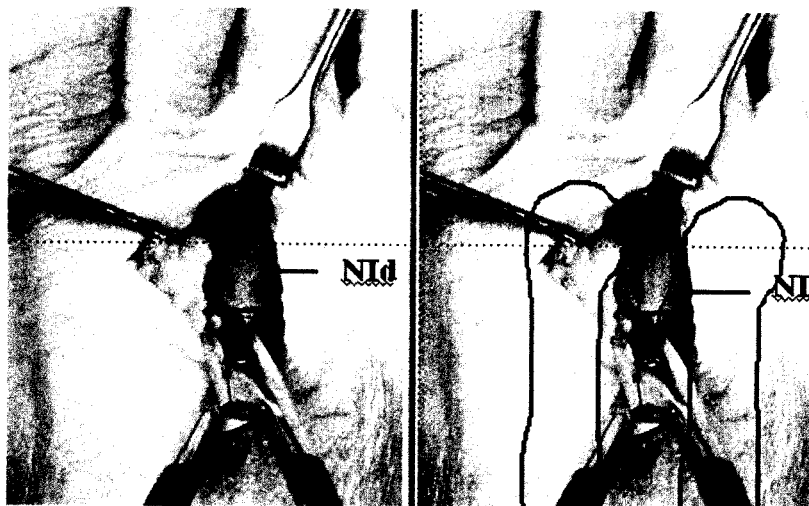


Fig. 3: Photograph showing intermetatarsal space after intermetatarsal ligament has been transacted revealing interdigital nerve (arrow).

pain syndrome. No other postoperative complications were observed.

DISCUSSION

Morton's neuroma can be one of the most intense forms of forefoot discomfort and we believe that it is due to nerve compression which should be treated when there is no nerve thickening as proposed by Gauthier in 1979.⁷ He obtained 83% good results in the treatment of 304 neuromas treated with release of the transverse intermetatarsal ligament without nerve resection. In the last two decades, literature supporting this point of view has been published. Okafor⁹ reported a series of 35 patients with Morton's neuroma treated by neurolysis and dorsal transfer of the interdigital nerve. He obtained 34 cases of excellent and good results, and only one dissatisfied patient. Diebold et al.⁶ reported a series of 40 patients with Morton's neuroma treated by true epineurolysis, with 37 excellent results.

Release of the intermetatarsal ligament can be performed endoscopically which could have additional benefits. Barrett et al.² reported a series of 69 patients (96 interspaces) with Morton's neuroma treated by endoscopic decompression, in which 86% of the results were excellent. Endoscopic technique permits visualization of anatomy with minimal tissue trauma, which could result in less postoperative pain and earlier return to regular activity. These two points were not demonstrated in Barrett's report and the rates of success were similar to excision surgery. Other authors like de Prado et al.⁴ proposed percutaneous release of the intermetatarsal ligament and distal metatarsal osteotomies of the involved metatarsal bones in all cases of Morton's neuroma; they obtained excellent rates of good results.

Excision is still the most common surgical management of Morton's neuroma, but in our opinion, should be limited to patients with pseudoneuroma. The only chronic nerve

compression syndrome where the recommended treatment is resection of the entrapped nerve is Morton's neuroma. This procedure leads to loss of sensation of the involved interspace. In addition, Morton's neuromas can occasionally affect 2 adjacent intermetatarsal nerves. Also, some patients develop a painful stump neuroma after excision.

We think that simple neurolysis with release of the intermetatarsal ligament is a good option when there is no macroscopic nerve thickening. If this procedure fails, we perform neurectomy only for those cases in which pain persists after neurolysis (one case out of 23). In cases where other surgical procedures are performed, poor postoperative results may be related to the other conditions.

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