Dorsal Approach for Excision of Morton's Neuroma: A Midterm Follow-up Study

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ABSTRACT

Objective: The purpose of the present study was to evaluate patients following Morton's neuroma excision using a dorsal approach.

Methods: From January 2007 to December 2013, 23 feet of 21 patients underwent surgical excision of interdigital neuroma using a dorsal approach. Patients were evaluated at a mean of 43.4 months (range, 18–93 months) and asked for pain, activity limitations, footwear modifications, walking distance, numbness, and overall satisfaction with results of the surgery. American Orthopedic Foot Ankle Society (AOFAS) Lesser Metatarsophalangeal–Interphalangeal Scale and Gianni interdigital neuroma clinical evaluation score were assessed.

Results: None of the patients had surgical complications, and none of them required revision surgeries. The average AOFAS score was 93.7 (SD, 7.63; range, 78–100), and the neuroma score was 68.2 (SD, 7.78; range, 50–80). Excellent results were reported for 18 feet (78%), good results for 3 feet (13%), and fair results for 2 feet (9%). Minor pain, not impairing patients' daily life, was reported for 8 feet (35%), and 5 patients preferred using comfortable shoes following the surgery. Numbness was assessed in 14 feet (60%). All of the patients were completely satisfied with the surgery and expressed that they can recommend the procedure to others.

Conclusion: Surgical excision of Morton's neuroma results in excellent and good outcome in majority of the patients for mid-long term follow-up. Minor pain and numbness do not affect patients' overall satisfaction and do not impair their daily life. Interdigital neuroma excision using a dorsal approach is a satisfactory treatment method for patients and surgeons. *(JAREM 2016; 6: 45-8)*

Keywords: Morton's neuroma, interdigital neuroma, metatarsalgia, excision, neurectomy

INTRODUCTION

Morton's neuroma (interdigital neuroma) is a disease characterized by pain spreading to the front foot and toes as a result of abnormal thickening of the interdigital nerves between the metatarsal heads. Chronic traumatic factors such as long term use of improper footwear are thought to cause compression of the nerve under the transverse intermetatarsal ligament and initiate an inflammatory process (1).

The incidence of Morton's neuroma is higher in women. The main complaint is a burning pain that occurs between the metatarsal heads when one stands or walks for a long time that is relieved by rest or by removal of one's shoes. History and physical examination are sufficient for diagnosis. Ultrasonography and MRI can support the diagnosis by showing the lesions. The most commonly seen locations are the 3rd and 2nd intermetatarsal intervals (2).

Although the results are not very successful, shoe modifications, orthesis, and conservative treatment methods such as local anesthetic and corticosteroid injections are the first recommended treatments for patients. Neuroma and the excision process of the branches (neurectomy) that are performed through dorsal or plantar approaches are the most effective treatment methods (3).

Publications that indicate the function and satisfaction of patients after surgery are scarce in the literature. The aim of this study is to evaluate the outcomes of patients who underwent this surgery with a dorsal approach.

METHODS

Neuroma excision was performed in 23 feet of 21 patients whose forefoot pain complaints continued despite conservative treatment and in whom the presence of interdigital neuroma was demonstrated by MRI between September 2007 and December 2013. The mean age of the patients, 19 of whom were female and 2 of whom were male, was 41.1 (23 to 56). Fifteen left and 8 right feet were operated on by three experienced surgeons through a dorsal approach and similar techniques. Interventions were performed in the right and left feet of two patients in the same session. The neuroma was located in the 3rd intermetatarsal interval in 17 feet (74%) and in the 2nd intermetatarsal interval in 6 feet (26%) (Table 1).

In the procedures performed using a tourniquet under general anesthesia, following the 3 cm dorsal incision through the proper space, the interosseous fascia and muscle tissue were passed; after the metatarsal heads were separated using a lamina spreader, the deep transverse ligament was cut and the common digital nerve was reached (Figure 1). Excision was completed by cutting the nerve, including the neuroma tissue, 1 cm distal and 3 cm proximal to the deep transverse ligament. After lowering the tourniquet, bleeding control was performed; following the closure of the skin, a medical dressing was applied and the operation ended. The operation lasted 45 minutes on average. Elevation and rest were recommended to the patients following the first week of the operation. Sutures were removed 15 days later, and the patients were allowed to step on the ground. No activ-

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ity limitation was recommended. Histopathologic examination of the excised tissue was performed, and the samples were found to be consistent with interdigital neuroma.

The patients whose average follow-up duration was 43.4 (18–93) months were asked about whether or not they had pain, the pain level (none, mild, moderate, or severe) if they had pain, restrictions in their activities, problems in the use of shoes and modification requirements, walking distance, loss of sensation (numbness), and sensitivity. The American Orthopedics Foot and Ankle Society (AOFAS) small fingers, metatarsophalangeal, interphalangeal scale (4) and the Giannini interdigital neuroma assessment score (5) were used in the evaluation. A maximum of 100 points can be obtained from the AOFAS standard scoring system and a maximum of 80 points can be obtained from the interdigital neuroma evaluation score (Table 2). In the scoring of interdigital neuroma evaluation, scores under 50 points are regarded as bad, scores between 50 and 59 are regarded as medium, scores between 60 and 69 are regarded as good, and scores between 70 and 80 are regarded as excellent. The patients were also asked whether they had repeated operations, whether they recovered from their complaints, about their satisfaction, and whether they would recommend the procedure to others.

RESULTS

While 18 (85%) of 21 patients were very satisfied with the surgical intervention, 3 (15%) of patients reported that they were satisfied but stated mild complaints (pain in the cold, touching tenderness, and mild limitation of toe movements). No wound problems, infection, or other complications were observed in the patients, and recurrent interventions were not needed.

The average AOFAS score was found to be 93.7 (SD 7.63; range 78 to 100). There were rare instances of mild pain that did not affect daily life and activities in 8 (35%) of the feet on which the operation was performed. Five of the patients preferred to use more comfortable shoes. Two of the patients additionally had asymptomatic malalignments in their small toes, and one had moderate movement limitation (30 degrees) in the metatarsophalangeal joint (MTP). Asymptomatic malalignments in the small toes were identified in 3 of 15 feet, for which no pain was expressed. The patients did not experience any restriction in their activities or any need to use ortheses.

The average Giannini interdigital neuroma assessment score was found to be 68.2 (SD 7.78, range 50 to 80). Excellent results were obtained in 18 feet (78%), good results in 3 feet (13%), and medium results in 2 feet (9%). The patients expressed a mild to moderate loss of sensation and numbness at a rate of 60% (14 feet) in the sensitive area of the interdigital nerve.

All patients reported that they did not regret their choice of surgical treatment and that they would choose this method again if they had similar complaints; they also reported that they would readily recommend the process to others.

DISCUSSION

Although the etiology, diagnosis, and treatment of Morton's neuroma have been frequently discussed in the literature, there are few studies reporting long-term results of surgical treatment. In

Table 1. Characteristics of the study group

Characteristic	Value
The number of patients	21
The number of feet that were operated on	23
Average age	41.1 (23–56)
Gender (female:male)	19:2
Right:left foot	8:15
Intermetatarsal interval	(3:2) 17:6
Follow-up period (months)	43.4 (18–93)

Table 2. The basic parameters of the AOFAS small fingers, metatarsophalangeal, interphalangeal and Giannini interdigital neuroma assessment scores and the maximum scores that can be achieved.

AOFAS		Giannini	
Parametre	**Score**	**Parametre**	**Score**
Pain	40	Pain	20
Function	45	Shoe requirements	20
• Activity limitation	10	Walking distance	20
• Shoe requirements	10	Sensitivity	20
• MTP joint motion	10		
• IP joint movement	10		
• Stability of the MTP-IP joints	5		
• Calluses in the MTP-IP joints	5		
Alignment	15		
Total	100	Total	80

AOFAS: American Orthopedic Foot and Ankle Society; MTP: metatarsophalangeal; IP: interphalangeal

Figure 1. Interdigital neuroma excision with dorsal approach

our study, we report the clinical results of 21 patients who underwent surgical treatment. In the evaluation, which was performed 43.4 months after the surgery on average, all of the patients stated that they were satisfied with the results. While there were rare instances of pain that did not affect daily life in 8 (35%) of 23 feet that underwent the operation, complaints of pain were completely absent in the other feet. These results are compatible with post-surgical follow-up studies in the literature.

After neuroma excision performed with the dorsal approach, Coughlin et al. (6) reported excellent and good results at a rate of 85% in evaluations after an average of 5.8 years, Giannini et al. (5) reported excellent and good results at a rate of 78% after 47 months, and Kasparek et al. (3) reported excellent and good results at a rate of 75% after an average of 15.3 years.

Womack et al. (7) reported excellent results at a rate of 51% and poor results at a rate of 40%, which are lower success rates than the literature in general. We believe that we obtained relatively high excellent and good results at a rate of 91% in our study because the complications that were rarely reported in other studies did not occur, and recurrent operations were not needed.

In the period following the surgery, complaints of mild pain and sensitivity in the intermetatarsal interval were reported at ratios ranging from 64% to 25% in different studies. Although this is a relatively common problem, the general belief is that it does not influence patient satisfaction (3, 6). In our study as well, 35% of the patients reported that they rarely felt mild pain in the surgery area. However, the presence of pain did not affect the satisfaction of the patients with the surgical intervention and daily activities.

Restrictions in shoe selection and the need to use orthesis are seen relatively more often after interdigital neuroma excision. Schroven et al. (8) reported that 70% of their patients had special preferences in selecting shoes and had some restrictions after surgery; Pace et al. (1) reported that although 71% of their patients were satisfied with their surgical procedures, they felt pain when they wore stylish shoes. In our study, 5 patients (24%) said that they carefully chose shoes in which they felt comfortable in their daily lives and had less pain in the postoperative period. None of the patients needed to use a special orthesis.

Postoperatively, loss of sensation and numbness are other common problems that are seen in the toes and in the interval where the intervention was performed. Kasparek et al. (3) reported numbness and loss of sensation at a rate of 72%, and Coughlin and Pinsonneault (6) reported the same at a rate of 51% after neuroma excision; however, they stated that this did not influence the satisfaction and clinical outcomes of the patients. It is important that patients should be informed sufficiently about these issues in the preoperative period. In our study, we also found numbness and loss of sensation at a rate of 60% in the surgical area and in the toes. Consistent with the literature, patients who complained of numbness stated that they were satisfied with the intervention they received and said the numbness did not cause any problems in their daily activities.

In our study, none of the patients had forefoot pathologies that accompanied Morton's neuroma and caused pain. However, it has also been reported that forefoot pathologies do not adversely affect the results of surgical excision (9).

It is possible to perform interdigital neuroma excision using either the plantar or dorsal approach. Karges (10) has reported that better proximal nerve resection can be performed and that clinical outcomes are better with the plantar approach. Glasoe and Coughlin (11), likewise, have stated that plantar transverse incision provides greater visibility and convenience to reach the neuroma. However, the biggest problem with the plantar approach is painful plantar scarring, which is reported at a ratio ranging from 5% to 36% in the literature (9, 12). Consistent with the literature, the high success rates that we obtained in our study and the lack of repeated attempts resulting from insufficient resection prove that the dorsal approach provides sufficient visibility for the resection.

CONCLUSION

We found that excision treatment gave excellent and good results at high rates in our follow-up study, in which we aimed to evaluate patient satisfaction and clinical outcomes after excision of Morton's neuroma. The complaint of mild pain and numbness that is frequently seen in the intermetatarsal interval and in the toes did not affect the daily lives and satisfaction of the patients. Interdigital neuroma excision performed through the dorsal approach has been evaluated as a successful and satisfactory treatment for patients and surgeons. No complications developed and recurrent attempts were not required; therefore, our results were relatively better than those in the literature.

Ethics Committee Approval: Ethics committee approval was not received due to resrospective nature of this study.

Informed Consent: Written/Verbal informed consent was not obtained from patients due to resrospective nature of this study.

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