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Morton Neuroma: Comparative Results of Two Conservative Methods

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ABSTRACT

Background: **The initial treatment of Morton neuromas consists of conservative methods that include shoe modifications and steroid injections. The purpose of this prospective study was to compare the efficacy of these two methods to determine which is more effective as the initial treatment method.** ***Methods:*** **Eighty-two patients with Morton neuromas were randomly assigned to receive either footwear modification with orthoses or steroid injections as initial treatment. Outcomes were evaluated at 1 month, 6 months, and 12 months.** ***Results:*** **Patient satisfaction was significantly better ($p < 0.01$) in the group treated with steroid injections than those treated with shoe modifications at all three followup intervals. At 12-month followup, 82% of those treated with steroid injections had complete or partial relief of pain compared to 63% of those treated with footwear modifications alone.** ***Conclusion:*** **Steroid injections as initial treatment and shoe modifications with steroid injections at 6 months appear to give better results in Morton neuromas than shoe modifications alone, but the difference in the two groups were not statistically significant at one year followup.**

Key Words: Conservative Treatment; Morton Neuroma; Steroid Injection

INTRODUCTION

Interdigital (Morton) neuroma can be treated by alteration of footwear, steroid injections, or surgical excision of the neuroma. Some reports in the literature favor surgical excision,[4] while others advocate local steroid injection and footwear alterations.[2,7] Footwear modification usually is preferred as the initial treatment followed by steroid injection,[2,5] but the relative effectiveness of these two treatment methods has not been evaluated.

The purpose of this paper was to compare the effectiveness of footwear alterations and steroid injection in the treatment of Morton neuromas to determine which is better as the initial step in conservative treatment.

MATERIALS AND METHODS

Eight-five feet of 82 patients with foot pain were diagnosed as having a Morton neuroma. The diagnosis was made clinically by pain in the second or third web space and a palpable ''Mulder's click'' with or without a palpable lesion, and no other obvious cause of pain (Table 1).[6] All feet had standing anteroposterior and lateral radiographs to rule out osseous pathology, and stress tests were done to exclude metatarsophalangeal joint instability.

Fourteen feet (13 patients) were lost to followup or were excluded from the study because of noncompliance. This left 71 feet (69 patients) for study. There were 60 women (87%) and nine men (13%); average age was 51.9 ± 11.3 (range 25 to 71) years. Each patient was randomly assigned to one of the two groups (Table 2): group I, footwear modification (metatarsal pad, shoes with wide toe boxes and low heels); or group 2, steroid injection. Thirty-five patients in group I were given custom fitted inserts thought to relieve irritation by lifting and separating the metatarsals to reduce the pressure on the nerve. Thirty-four patients in group II received two steroid injections 3 weeks apart into the affected intermetatarsal space as recommended by Greenfield et al.[7] One cc of Prylocayn HCl (Citanest, AstrZeneca, England) was mixed with 1 cc (40 mg) of methylprednisolone acetate (Depo Medrol, Pharmacia

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@ Upjohn Company, Kalamazoo, MI, USA). All injections were given by the same orthopaedic surgeon (BS). The injection was given at the point of maximal tenderness in the involved interspace, usually proximal to or between the metatarsal heads, inferior and deep to the intermetatarsal ligament.

The patients in both groups were seen 1 month after treatment. At the end of 6 months, 25 patients (71.4%) in group I who were not completely satisfied received a steroid injection and continued to use the orthoses. Nine patients (26.5%) in group II received a third injection because they were not completely satisfied at 6-month followup. All patients were followed for another 6 months, with a total followup of 1 year.

Seventy-one feet (69 patients) were examined clinically. The third web was involved in 53 feet (74.6%) the second web in 13 feet (18.3%), and the second and third in five feet (7%).

The results were assessed as being complete satisfaction (complete pain relief), satisfaction with some discomfort (partial pain relief), and dissatisfaction.

A chi square test was used to analyze the differences between two groups. A nonparametric Friedman test was used to determine statistical significance longitudinally within each group, with p values of <0.05 considered significant.

Table 1: Summary of data according to clinical findings of patients

Clinical presentation	Patients	%
Plantar pain	69/69	100%
Pain worsened by walking	60/69	87%
Pain worsened with shoes on	62/69	90%
Pain relieved by removal of shoes	62/69	88.5%
Pain aggravated by compression	69/69	100%
Squeezing metatarsal heads	64/69	93%
Mulder's click	56/69	81%

RESULTS

No statistically significant difference was found between groups with regard to age, gender, or interdigital space involvement ($p < 0.05$). There were no complications of treatment in either group.

At the end of the first followup (1 month) eight patients (23%) in group 1 were completely satisfied, seven (20%) were satisfied with some discomfort, and 20 (57.1%) were not satisfied. In group II, 17 patients (50%) were completely satisfied, 10 (29.4%) were satisfied with some discomfort, and 7 (20.6%) were not satisfied. Patient satisfaction was significantly better ($p < 0.01$) in the group with steroid injections.

At the second followup (6 months), 10 patients in group I (28.6%) were completely satisfied, eight (22.9%) were satisfied with some discomfort, and 17 (48.6%) were not satisfied. In group II, total relief was achieved in 25 patients (73.5%), four (11.8%) were satisfied with some discomfort, and 5 (14.7%) were dissatisfied. Again, patient satisfaction was significantly better ($p < 0.001$) in group II.

At the end of the treatment (12 months), complete satisfaction was obtained in 22 patients (63%) in group I, four (11%) were satisfied with discomfort, and 9 were dissatisfied and reported persistent pain. In group II, 28 (82%) patients were completely satisfied, two (6%) were satisfied with discomfort, and four (12%) were dissatisfied with persistent pain. Although patient satisfaction was better in group II at the end of 12 months, there was no statistically significant difference between the groups ($p > 0.05$) with the numbers available. In group I, significant improvement was seen at the end of 12 months compared to 6-month results ($p < 0.001$) in the 25 patients who had a steroid injection at 6-month followup. In group II, pain improved in the nine patients who received a third injection,

Table 2: Characteristics of all patients according to groups

		Group I	Group II
Age	Mean $\pm$ SD	51.97 $\pm$ 11.80	51.88 $\pm$ 10.97
Gender	Female	31	29
	Male	4	5
Interspace	2nd	8	5
	3rd	26	27
	Both	2	3

$p > 0.05$.

Table 3: Patient satisfaction with two different conservative treatment methods

		1st month	6th month	12th month
Complete satisfaction	Group 1	22.9 %	28.6 %	62.9 %
	Group 2	50.0 %	73.5 %	82.4 %
Satisfaction with discomfort	Group 1	20.0 %	22.9 %	11.4 %
	Group 2	29.4 %	11.8 %	5.80 %
Dissatisfied	Group 1	57.1 %	48.6 %	25.7 %
	Group 2	20.6 %	14.7 %	11.8 %

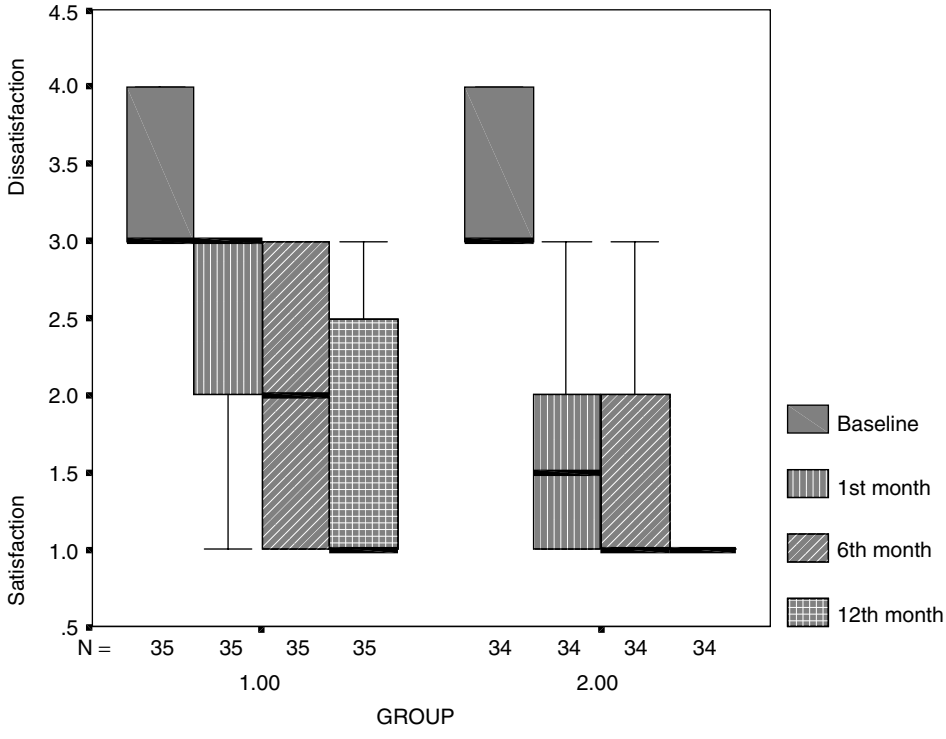

Fig. 1: Graph demonstrating the progression of groups according to months.

but this was not statistically significant ($p < 0.05$). A summary of data according to patient satisfaction is given in Table 3.

DISCUSSION

Interdigital neuroma of the foot was first described by Durlacher in 1845, but it was named for Morton who described a lesion between the third and fourth metatarsals.[5,9] Morton neuromas most commonly affect the third web space in middle-aged females; characteristic symptoms include burning, numbness, discomfort with footwear, and the feeling of having a pebble under the metatarsal region.

Treatment of Morton neuromas can be difficult. Footwear modifications and inserts usually are the first step in treatment followed by local steroid injections if pain persists.[2,7] Greenfield et al.[7] reported satisfactory results with steroid injections, and Bennett et al.[2] evaluated the efficacy of a staged treatment program that began with footwear modification, progressed to steroid injection, and finally to operative treatment, but no study has compared the efficacy of footwear modifications and steroid injections in matched patient groups. In the current study, at the end of the first month, steroid injection resulted in total relief in 50% of patients, while only 22.9% of patients were satisfied with footwear modifications.

Satisfaction with steroid injections gradually increased to 73.5% by the 6-month followup without any additional treatment. However, footwear modifications relieved pain in only 28.6% of patients at 6 months, a satisfaction rate much lower than that obtained by steroid injection at the end of the first month.

At the end of treatment, 82.4% of patients with steroid injections were pain-free while footwear modifications relieved pain in 62.9% of patients. However, the beneficial effects of steroid injection done at the 6-month followup must not be ignored (Figure 1) Bennett et al.[2] reported 80% patient satisfaction at 1-year followup of patients who had steroid injections after 3 months of footwear modifications. In the current study, this level of patient satisfaction was reached with steroid injections alone.

Steroid injections are effective for both the diagnosis and treatment Morton neuroma and are easy to perform and relatively noninvasive. Corticosteroids may have a therapeutic effect on the etiologic factors causing symptoms, such as increased fibrosis,[3] intermetatarsophalangeal bursitis,[1] and nerve entrapment.[6,7] Our results suggest that steroid injections can provide effective pain relief, but at 1-year followup, although favoring the use of steroid injections, does not given statistically significant benefit compared to treatment with footwear modifications.

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