Treatment of Intermetatarsal Neuroma With Decompression and Transposition to Adjacent Metatarsophalangeal Joint Capsule

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Purpose

The purpose of this case series is to investigate whether the transection of the deep transverse metatarsal ligament, along with transposition of intact intermetatarsal neuroma to the adjacent metatarsophalangeal joint capsule is a viable surgical alternative to the more mainstream techniques of excision and/or decompression alone.

Literature Review

Morton's neuroma was first described by Filippo Civinini in the 19th century as fusiform swelling of the third common digital nerve. This condition continues to be a common cause of neuropathic pain in the foot today [4]. While there are several etiological theories describing the cause of this pathology, numerous studies have demonstrated that the ultimate result is pain caused by a proliferative fibrosis of perineural tissue[7]. Traditionally, the primary surgical options have included nerve decompression with transection of the deep transverse intermetatarsal ligament and/or neurectomy (complete excision of the affected part of the interdigital nerve) [4]. The potential for recurrent stump neuroma formation with resection of intermetatarsal neuromas has prompted some surgeons to attempt alternative surgical options for recalcitrant symptomatic intermetatarsal neuromas [3]. While there are

Literature Review cont.

several studies pertaining to success of neuroma transposition in the hand without resection[5,6], our most recent literature review reveals only one published case study of such procedure in the foot[1,4]. This study, published by Vito et al in 2003, describes a method involving decompression of the DTML followed by transposition of the painful pedal neuroma into deep fascia and/ or adjacent periosteum[1]. Our technique follows a similar procedure, however, with the exception that the epineurium of the neuroma is attached to the adjacent dorsal metatarsophalangeal joint capsule to provide a more robust tissue to anchor the neuroma.

Procedure

A 2 cm incision is made dorsally over the intermetatarsal space. Blunt dissection is performed and the deep transverse intermetatarsal ligament is transected using metzenbaum scissors. Next the offending neuroma is identified and careful dissected free. A 5-0 prolene suture is used to suture the neuroma through the epineurium to the adjacent metatarsophalangeal joint capsule, followed by incision closure.

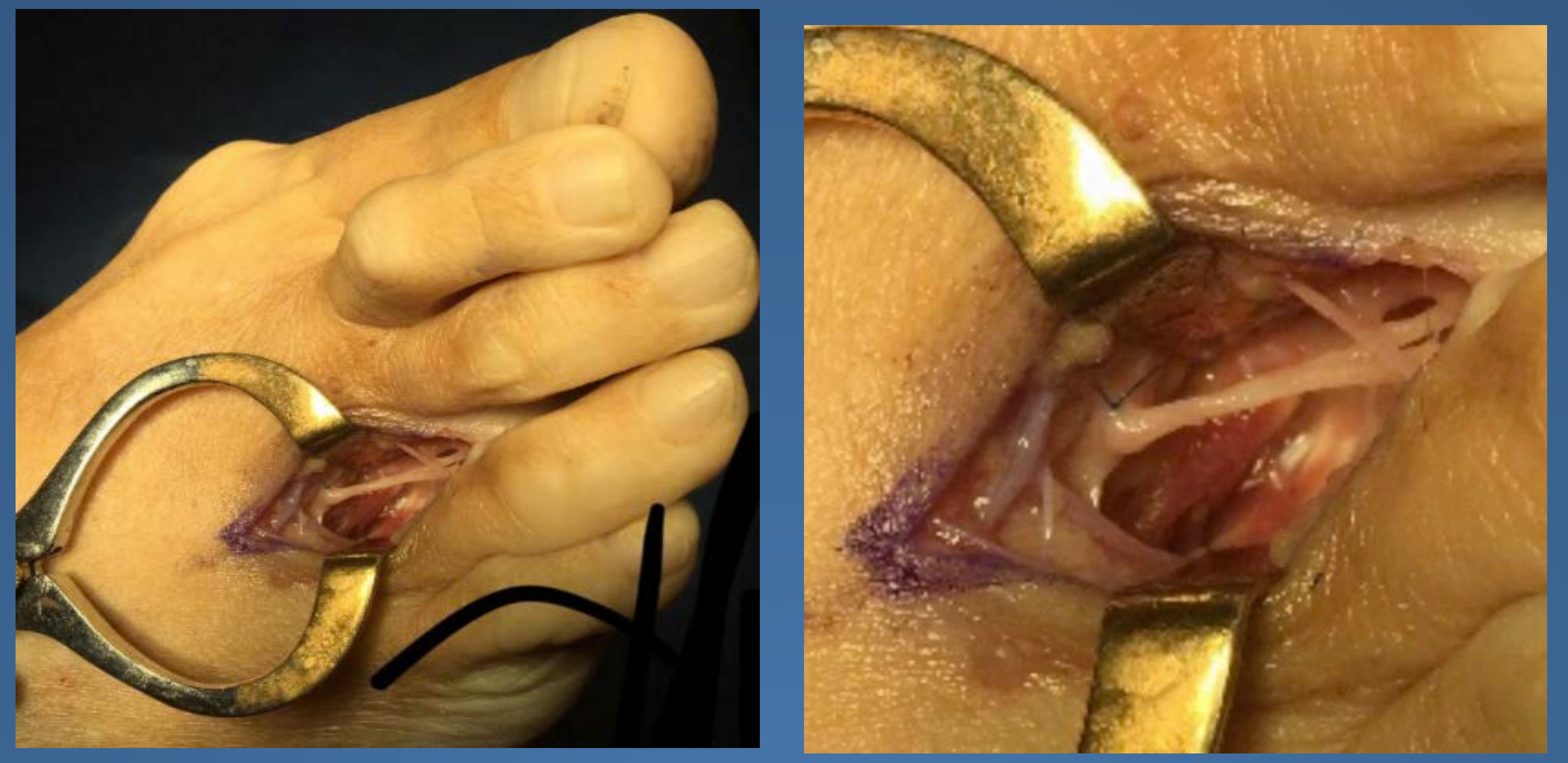

Fig 1. Third interspace neuroma attatched to third metatarsal phalangeal joint capsule

Age	Gender	Affected Interspace	Pre-Op VAS	6 week VAS	Post-Op VAS (last visit)	Average Return to Sneaker time (months)	Length of Follow up (months)
61	F	Left 2nd	8/10	0	1/10	1.5	12
63	F	Right 2nd and 3rd	7/10	7/10	2/10	1	17.8
52	M	Right 2nd	8/10	5/10	3/10	N/A	17
71	F	Left 2nd and 3rd	8/10	4/10	1/10	1.8	12.1
Average			*6.8/10*	*2.4/10*	*0.87/10*	*1.1*	*14.7*

Table 1. Results from included subjects with follow up

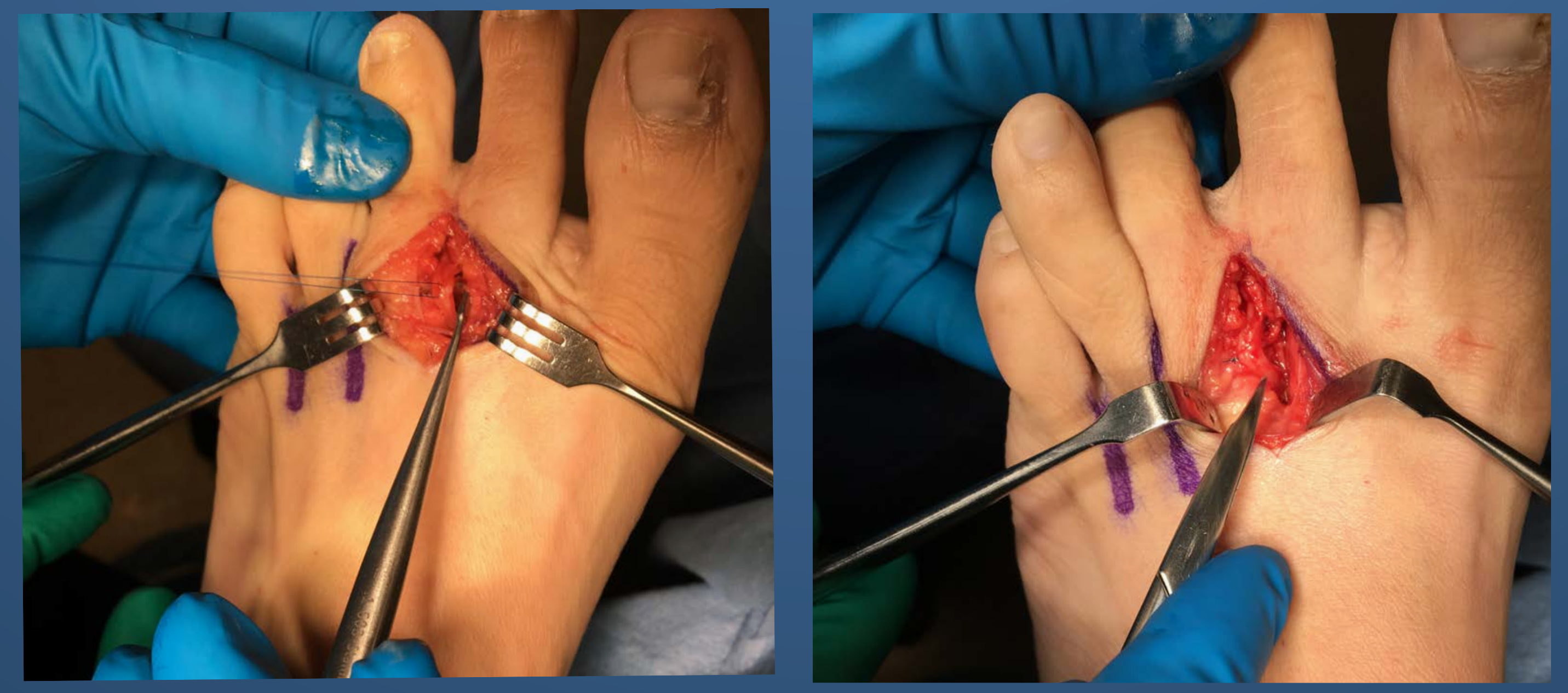

Fig 2. Translating plantar digital nerve dorsally with prolene suture.

Methods

A retrospective analysis was performed using the medical records of patients who had undergone neuroma surgery by a senior surgeon from November 2015 to June 2017. Inclusion criteria for the study included patients diagnosed with Morton's neuroma, either clinically or via MRI, patients treated with nerve transposition into the adjacent metatarsophalangeal joint capsule without resection, and patients with at least a twelve month follow up. Exclusion criteria included intermetatarsal neuromas treated with nerve resection and patients with less then 12 month follow up. Of the 23 patients treated surgically for this condition by the senior surgeon during this time frame, 4 met the criteria for this study. VAS scores were recorded at the initial visit, 6 week, and most recent follow up. Procedure selection was based on the following: The senior surgeon always performs decompression with transposition unless a neuroma has more than 2 tributaries and/or the neuroma is at least 1cm in width or above.

Results

The average follow up was 12.6 months, and the longest follow up was 17.8 months. VAS scores recorded from the initial, 6 week, and final follow up were 6.8/10, 2.4/10, and 0.87/10 respectively. While one patient reported numbness as a complication, no patient experienced a recurrence of initial symptoms by their last months' follow up.

Discussion

This case series examines an approach to neuroma surgery, eliminating the need for plantar incisions, and negating the risk of a post surgical stump neuroma complication. We present our data using a surgical technique first described by Vito et al, releasing the deep transverse metatarsal ligament, and providing a way to anchor the neuroma to a less compressible portion of the foot. In addition, we theorize transposing the neuroma from a plantar to dorsal position prevents weight bearing pressure from compressing the neuroma during ambulation. Further studies with larger samples and longer follow ups are needed to determine this method's long-term viability.

References:

1. Vito GR, Talarico LM. A Modified Technique for Morton's Neuroma. *Journal of the American Podiatric Medical Association*. 2003;93(3):190-194. doi: 10.7547/87507315-93-3-190.
2. Gauthier G. Thomas Morton's disease: a nerve entrapment syndrome. Anew surgical technique. *Clin Orthop*. 1979;142:90-92.
3. Shapiro SL. Endoscopic decompression of the inter-metatarsal nerve for Morton's neuroma. *Foot Ankle Clin*. 2004;9: 397-407.
4. Jain S, Mannan K. The Diagnosis and Management of Morton's Neuroma A Literature Review. *Foot and Ankle Specialist*. 2013;6(4):307 -317. https://doi-org.eresources.mssm.edu/10.1177/1938640013493464.
5. Swanson S, Macias LH, Smith AA. Treatment of bowler's **neuroma** with digital nerve **translocation**. Hand (N Y). 2009 Sep;4(3):323-6. doi: 10.1007/s11552-009-9170-2. Epub 2009 Feb 12.
6. De Smet L, Van Ransbeeck H, Fabry G. Bowler's thumb treated by **translocation** of the digital nerve.Acta Orthop Belg. 1999 Sep;65(3):367-8.
7. Morscher E, Ulrich J, Dick W. Morton's intermetatarsal neuroma: morphology and histological substrate. *Foot Ankle Int*. 2000;21:558-562.