

## CLINICAL ARTICLE

# Is a positive nerve conduction study a predictor of a satisfactory result after tarsal tunnel release?

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### Abstract

We reviewed 28 patients who had had tarsal tunnel syndrome diagnosed clinically and with the aid of nerve conduction studies over the last five years. The aim was to establish if a positive nerve conduction study was an indicator of a good postoperative result. We found that in general less than 50% of all patients were satisfied with the procedure and a positive nerve conduction study did not predict a good post-surgical outcome. We advise that surgery for tarsal tunnel syndrome even with positive nerve conduction studies be undertaken as a last resort, and patients be informed of the potential of a poor outcome after surgery.

### Introduction

Tarsal tunnel syndrome is entrapment of the posterior tibial nerve within the tarsal canal, or one of its branches after it has left the canal. It was first described by Kopell in 1960.<sup>1</sup>

The tarsal tunnel is a fibro-osseous structure created by the tibia anteriorly, the posterior process of talus and calcaneus laterally. The flexor retinaculum forms the roof. It contains the posterior tibial nerve and in 93% of cases its three terminal branches, the medial plantar, lateral plantar and medial calcaneal nerve.

Recent studies report more than 50% of patients as being dissatisfied with the results after surgical decompression.<sup>2</sup>

Nerve conduction studies should be performed on all patients with a suspected tarsal tunnel syndrome.

The terminal latency of the medial plantar nerve should be less than 6.2 m/s and that of the lateral plantar nerve 7 m/s. Studies of motor evoked potentials show decreased amplitude and increased duration to be 90% sensitive.<sup>3</sup>

### Materials and methods

Twenty-eight patients (28 feet) had surgery for tarsal tunnel release (14 males: 14 females). The mean age was 42.7 years (range: 23–67 years).

All patients had preoperative nerve conduction studies for tarsal tunnel syndrome. Duration of symptoms ranged from 4 weeks to 13 months.

One patient had underlying rheumatoid arthritis.

Besides the nerve conduction studies, no other investigations (MRI, ultrasound) were carried out.

The average surgical time was 57 minutes, (range 42–80 minutes). All procedures were performed under tourniquet control.

Intra-operative findings are shown in *Table I*.

The postoperative protocol is given in *Table II*. Protocol was not discussed in studies reviewed.

More than 50% of patients are dissatisfied with the results after surgical decompression

**Table I: Intra-operative findings**

Ganglion	1
Bone spike	1 (from talus)
Severe scar tissue	5 (3 ankle fracture, 2 severe sprain)
Leash of vessels	5
No obvious pathology	16

**Table II: Postoperative protocol**

- Immobilisation in Plaster of Paris for three weeks
- Sutures removed at two weeks if wounds healed
- Referred to physiotherapy for progressive, range of motion exercise, as tolerated
- Scar massage and desensitisation to limit adhesions
- Finally gait training

## Results

All 28 patients were contacted telephonically and asked whether symptoms improved after surgery, whether they were satisfied with the outcome and would they have surgery again.

The average duration of follow-up was 39 months (range 11–60 months).

Of the 28 patients:

- 19 had preoperative positive nerve conduction studies

- 9 had pre-operative negative nerve conduction studies

Postoperatively:

- 19 patients with positive nerve conduction studies:
  - 9 were satisfied (47.4%)
  - 10 were dissatisfied (52.6%)

- 9 patients with negative nerve conduction studies:
  - 2 satisfied (22.2%)
  - 7 not satisfied (77.7%)

In total, 11 patients were satisfied with the procedure and would have it again (39.3%), while 17 patients were not satisfied at all and would not have it again (60.7%).

From the above results, we see that only 40% of patients were satisfied and their symptoms improved following tarsal tunnel release. Although the majority of the satisfied patients were from the positive pre-surgery nerve conduction study group, even that group had only a 50% satisfaction rate. The vast majority of the negative nerve conduction study group were dissatisfied.

## Discussion

Jerosch in his review of tarsal tunnel found only 43 out of his 75 patients subjectively satisfied with the results after surgery.<sup>2</sup> He concluded that the decision for operative release in patients with tarsal tunnel should be carried out with great care!

This is confirmed in our review. A positive nerve conduction study does not indicate that the patient will have relief of their symptoms and is not a good predictor for a satisfactory outcome.

These findings do not correlate with earlier published work, that claimed satisfaction in excess of 7–90% after surgical decompression of the tunnel.<sup>3,4,5</sup>

Better results can be expected if an identifiable cause can be found for the compression. Van der Jagt and co-workers reported 100% improvement post release in patients who had sustained trauma to the ankle.<sup>6</sup>

Removal of any space-occupying lesions can also be expected to have higher rates of satisfaction.

## Conclusion

We found no satisfactory correlation between a positive nerve conduction study and satisfaction after surgical release of tarsal tunnel syndrome.

Unless the symptoms of tarsal tunnel are associated with a known identifiable cause, such as a space-occupying lesion and with a positive nerve conduction study at least, the surgical release should be undertaken only when all other methods of conservative management have failed. Patients need to be counselled, so as not to have unrealistic expectations.

The suggested conservative management that should be tried is as follows:

- Administration of non-steroidal anti-inflammatory
- Tricyclic antidepressants
- Selective serotonin receptor inhibitors
  - Prozac (fluoxetine)
  - Lyrica (pregabalin)
  - Narcotic medication to enhance pain control
  - Steroid injection into nerve, or nerve vicinity
  - Orthosis if postural abnormality of the foot exists.

Patients are not always comfortable on antidepressants. The author has had encouraging results with Lyrica and uses that if trial of NSAIDS fails.<sup>3</sup>

### Note from the Editor:

As pointed out, a good result can follow if definite pathology in the tarsal tunnel is present. The prognosis with systemic diseases, such as diabetes, is not good.

*This article was not submitted to an ethical committee for approval. The content of this article is the sole work of the authors. No benefits of any form have been derived from any commercial party related directly or indirectly to the subject of this article.*

## References

1. Kopell HP, Thompson WAL. Peripheral entrapment neuropathies of the lower extremity. *N Eng J Med* 1960;262:56-60.
2. Jerosch J, Schunck J, Khoja A. Results of surgical treatment of tarsal tunnel syndrome. *Foot and Ankle Surgery* 2006;12(4):205-8.
3. Coughlin MJ, Mann RA, Saltzman CJ. Surgery of Foot and Ankle 8<sup>th</sup> edition. Philadelphia: Mosby Elsevier; 2007. Chapter 11:637-59.
4. Gmino, WR. Tarsal tunnel syndrome review of the literature. *Foot Ankle* 1990;11:47-52.
5. Mann RA. Tarsal tunnel syndrome. *Orthop Clinics North Am* 1974;5:109- 15.
6. Van der Jagt DR, Tiemessen CH, Stein RJL, Webster PI. Post traumatic tarsal tunnel syndrome. *South Africa Bone and Joint Surgery* 1999;IX(1):21-3.