

TARSAL TUNNEL SYNDROME: A REVIEW OF 30 CASES

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Tarsal tunnel syndrome is a peripheral compression neuropathy involving the posterior tibial nerve as it courses beneath the laciniate ligament along the medial aspect of the ankle. This is a preliminary report of an ongoing study of 30 cases. These cases were chosen at random from the surgical logs of Doctors Hospital and the Northlake Regional Medical Center from 1978 to the present.

The study considers age, sex, side affected, nerve conduction studies, intraoperative findings, biopsy results, previous surgeries on the same foot, and significant patient history.

Pt	Age	Sex	Side Affected	Nerve Conduction Studies	Biopsy Results	Previous Surgeries	Patient History
1.	45	F	L	N	fibrous tissue, no inflam changes	Sx #1) heel spur 4m Sx #2) neurectomy medial plantar nerve	
2.	48	F	R	N	fibrous tissue	Sx) posterior tibial neurolysis, laciniate ligament release	
3.	51	F	L	Y vel: peroneal 47 M/sec vel: post tib 64 M/sec lat: med plantar 7.6 msec. lat: plantar 6.7 msec.	neurofibromatosis	Sx) Gastoc recession, Hibbs tendo-suspension	depression, Sudeck's Atrophy, lumbar fibromyositis syndrome
4.	37	M	L	Y	N	Sx #1) calcaneal fracture ORIF 5m lat: med plantar 4.4 msec. no evoked potential response Sx #2) posterior tibial neurolysis, laciniate ligament release, release FDL entrapment 1m Sx #3) plate removal	
5.	44	F	L	N	no inflammatory changes	Sx) neurolysis medial plantar nerve, laciniate ligament release	
6.	38	F	R	Y lat: med plantar 5.7 msec. lat: lat plantar 8.7 msec.	no evidence of nflammation	Sx) posterior tibial neurolysis, laciniate ligament release "thickened laciniate ligament"	
7.	38	F	R	N	dense collagenous tissue	Sx #1) ORIF ankle 6m Sx #2) sural neurolysis, plate removed 3m Sx #3) posterior tibial neurolysis, laciniate ligament release	
8.	58	F	L	N	fibrous tissue entrapment	Sx #1) unknown Sx #2) sural neurolysis, gastroc recession 1y Sx #3) sural neurectomy 3y Sx #4) heel spur, neurectomy calcaneal branch, laciniate ligament release	depression, lower back pain

Pt	Age	Sex	Side Affected	Nerve Conduction Studies	Biopsy Results	Previous Surgeries	Patient History
9.	46	F	L	N	N	Sx #1) heel spur 2y Sx #2) second heel spur 1y Sx #3) posterior tibial neurolysis, laciniate ligament release, neurectomy calcaneal branch 10m traumatic neuroma Sx #4) posterior tibial neurolysis, abductor myotomy, free fat graft 2y dense fibrous connective tissue Sx #5) posterior tibial neurolysis, Silastic sheath implant 2y Sx #6) removal of Silastic sheath implant 7m foreign body granuloma Sx #7) posterior tibial neurectomy amputation neuroma	
10.	55	M	L	Y lat: med plantar L 6.3 msec. lat: lat plantar L 6.3 msec. lat: med plantar R 4.7 msec. lat: lat plantar R 6.0 msec.	N	Sx) posterior tibial neurolysis, laciniate ligament release	
11.	45	F	R	N	Y amputation neuroma, proliferative myelinated nerve	Sx) posterior tibial neurolysis, laciniate ligament release	
12.	21	F	B	N	N	Sx) posterior tibial neurolysis, laciniate ligament release	
13.	55	F	R	Y	increased latency lateral plantar nerve	Sx) posterior tibial neurolysis, laciniate ligament release "multiple venae comitans varicosities"	
14.	36	F	L	Y lat: med plantar 7.1 msec. lat: lat plantar 7.2 msec.	fibrous tissue and vascular plexus	Sx) posterior tibial neurolysis, laciniate ligament release "veins incorporated into the posterior tibial nerve"	
15.	31	F	L	Y vel: peroneal 65 M/sec. lat: peroneal 5.7 msec. lat: med plantar 5.2 msec. lat: lat plantar 5.5 msec.	Schwannoma	Sx) excision Schwannoma	
16.	39	F	R	Y lat: med plantar R 4.5 msec. lat: lat plantar R 3.6 msec. lat: med plantar L 3.6 msec. lat: lat plantar L 4.1 msec.	N	Sx) posterior tibial neurolysis, laciniate ligament release "fibrous band at abductor canal"	
17.	43	M	L	Y lat: med plantar L 5.28 msec. lat: lat plantar L 6.24 msec. lat: med plantar R 5.52 msec. lat: lat plantar R 6.08 msec.	venous structures, connective tissue	Sx) posterior tibial neurolysis, laciniate ligament release "multiple varicosities"	
18.	33	F	R	N	N	Sx) posterior tibial neurolysis, laciniate ligament release	
19.	32	F	L	Y lat: med plantar L 6.24 msec. lat: lat plantar L 5.28 msec. lat: med plantar R 3.92 msec. lat: lat plantar R 5.12 msec.	Fibrolipoma	Sx) excision Fibrolipoma	

Pt	Age	Sex	Side Affected	Nerve Conduction Studies	Biopsy Results	Previous Surgeries	Patient History
20.	46	F	L	Y	Synovium and vascular elements	Sx #1) posterior tibial neurolysis, laciniate ligament release normal NCS Sx #2) posterior tibial neurolysis with Silastic sheath implant	tendo-achilles rupture 6m
21.	55	F	L	Y vel: peroneal 48 M/sec. lat: peroneal 3.9 msec. lat: med plantar L 5.2 msec. lat: lat plantar L 7.2 msec. lat: med plantar R 4.8 msec. lat: lat plantar R 4.9 msec.	fat necrosis	Sx) posterior tibial neurolysis, laciniate ligament release	Raynaud's phenomenon, Rheumatoid arthritis, sural entrapment neuropathy
22.	44	M	R	N	N	Sx) posterior tibial neurolysis, laciniate ligament release	trauma 2 m
23.	56	F	L	Y lat: med plantar L 4.6 msec. lat: lat plantar L 4.9 msec. lat: med plantar R 5.6 msec. normal evoked response	bone	Sx) posterior tibial neurolysis, laciniate ligament release	trauma, fracture os tibial externum fracture, 2y
24.	45	M	L	Y lat: peroneal L 5.1 msec. vel: peroneal L 47.5 M/sec. lat: med plantar L 6.0 msec. lat: lat plantar L 5.5 msec. reduced evoked response L lat: med plantar R 5.1 msec. lat: lat plantar R 6.1 msec.	fatty infiltration of the nerve	Sx) posterior tibial neurolysis, laciniate ligament release	
25.	36	F	L	Y lat: peroneal L 3.3 msec. vel: peroneal L 44 M/sec. lat: med plantar L 6.1 msec. lat: lat plantar L 6.7 msec. lat: med plantar R 6.6 msec. lat: lat plantar R 7.1 msec.	chronic inflammatory cell infiltrate	Sx #1) delayed primary repair lateral ankle ligaments 6m Sx #2) lateral ankle stabilization 1y Sx #3) posterior tibial neurolysis, laciniate ligament release 1y Sx #4) posterior tibial neurolysis	
26.	43	M	L	Y vel: post tib L 59 M/sec. lat: med plantar L 6.4 msec. lat: lat plantar L 8.1 msec. vel: post tib R 40 M/sec. lat: med plantar R 5.9 msec. lat: lat plantar R 7.1 msec. vel: peroneal R 59 M/sec. lat: peroneal R 5.5 msec.	N	Sx #1) neuroma excision third interspace L 1y Sx #2) stump neuroma excision third interspace L 1y Sx #3) neuroma excision third interspace R 6m Sx #4) stump neuroma excision third interspace R, posterior tibial neurolysis, laciniate ligament release B/L Sx #5) posterior tibial neurolysis L with Silastic sheath implant	
27.	38	F	L	N	N	Sx) posterior tibial neurolysis, laciniate ligament release	
28.	42	F	R	N	Ganglion cyst	Sx) posterior tibial neurolysis, laciniate ligament release, excision of ganglion cyst	
29.	30	F	R	Y lat: med plantar R 4.8 msec. lat: lat plantar R 4.0 msec. vel: peroneal R 52 M/sec. lat: peroneal R 4.8 msec. lat: med plantar L 4.0 msec. lat: lat plantar L 5.0 msec.	no inflammatory changes	Sx) posterior tibial neurolysis, laciniate ligament release	
30.	48	F	R	N	Ganglion cyst	Sx) posterior tibial neurolysis, laciniate ligament release, excision ganglion cyst	

DISCUSSION

Nerve Conduction Studies (NCS)		
Normal Values	Latency	Velocity
Posterior Tibial		
Medial Plantar (abductor hallucis)	< 6.2 msec.	> 40 M/sec.
Lateral Plantar (abductor digiti quinti)	< 6.7 msec.	> 40 M/sec.
Peroneal (motor)	< 5.6 msec.	> 40 M/sec.
Sural (sensory)	< 4.0 msec.	

Nerve conduction studies were performed on 17 patients and 10 showed some abnormal result with 7 tests being normal. 29 of the 30 patients underwent surgical procedures to address the tarsal tunnel syndrome. 8 patients had multiple foot surgeries performed and 4 patients had been subjected to multiple tarsal tunnel procedures.

Biopsy specimens were excised from 18 patients including: 4 varicose veins, 2 ganglion cysts, 1 underlying osseous exostosis, 1 Schwannoma, 1 fibrolipoma, 1 neurofibromatosis, and 8 specimens with fibrous tissue. Silastic sheaths were implanted in 3 patients and 1 of these was removed.

The average age of the patients was 43. The left side was involved in 18 patients, the right side in 11, and both sides were involved in one patient.

SUMMARY

Preliminary results of this study reflect the complex nature of the tarsal tunnel syndrome. Numerous etiological factors have been identified in the literature and are reflected by the components of this study. Unfortunately, no matter what the etiology, the results of the surgery have been less than satisfactory. The continuation of the study with the inclusion of patient examination may identify certain preoperative criteria, intraoperative goals, and postoperative care that can improve the postoperative result.

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