

Original Paper

## Treatment of Carpal Tunnel Syndrome With Medical Acupuncture

Robert A. Schulman, MD,<sup>1</sup> Brian Liem, BS,<sup>2</sup> and Alex Moroz, MD<sup>3</sup>

### ABSTRACT

**Background:** Conservative management plays an important role in the treatment of carpal tunnel syndrome. Non-surgical options include physical and occupational therapy, splints, steroid injections, yoga, carpal bone mobilization, and anti-inflammatory drugs. Clinical experience demonstrates that acupuncture should be considered among these treatments as it may provide symptomatic relief to patients with this disorder.

**Objective:** To demonstrate an acupuncture protocol for the treatment of carpal tunnel syndrome.

**Design, Setting, and Patients:** Seventeen patients with electrodiagnostically confirmed carpal tunnel syndrome treated by a solo medical acupuncture practitioner for carpal tunnel syndrome. Patients were seen between 1998 and 2007 at the practitioner's New York office.

**Intervention:** Needling of PC 6, PC 7, TH 5, and Baxie 1 and 2 points. Most patients additionally received osteopathic manual therapy.

**Main Outcome Measure:** Patient-reported symptom relief.

**Results:** Twelve of 17 patients had partial or complete symptom relief with treatment. Two patients' symptoms were considered too severe for acupuncture treatment. The remaining 3 patients had no appreciable change in their symptoms.

**Conclusion:** The acupuncture method described herein can be an effective treatment for mild to moderate carpal tunnel syndrome. This report should prompt a larger prospective trial.

**Key Words:** Acupuncture, Carpal Tunnel, OMT

### INTRODUCTION

CARPAL TUNNEL SYNDROME is a compression disorder of the median nerve as it passes underneath the transverse carpal ligament, causing paresthesias in the palm and first 3½ digits of the affected hand. Patients typically complain of numbness, tingling, and pain in the hand which worsens at night, and is often relieved by shaking or rubbing of the hand.<sup>1,2</sup> Other symptoms may include shoulder pain and headaches. Compression is commonly due to increased edema in the carpal tunnel secondary to overuse

of the wrist from excessive flexion and extension, as can be seen in such occupations as meatpacking and automobile assembly line work.<sup>3</sup> Other causes of carpal tunnel syndrome include diabetes, hypothyroidism, rheumatoid arthritis, pregnancy, lupus, congestive heart failure, and obesity.<sup>4</sup> Presenting patients may be of any age, but typically range from 30 to 60 years, with women affected more frequently than men.<sup>5</sup>

Conservative treatments for carpal tunnel syndrome may include wrist splints, steroid injections, anti-inflammatory medications, osteopathic manipulation,<sup>6</sup> and changes to the

<sup>1</sup>Weill-Cornell Medical College, New York, NY.

<sup>2</sup>New York University, New York, NY.

<sup>3</sup>Department of Rehabilitation Medicine, New York University School of Medicine, New York, NY.

work environment.<sup>7</sup> Steroid injections may provide effective pain relief; however, the benefits may last only several months.<sup>8</sup> In approximately 45% of carpal tunnel syndrome cases, surgery is recommended; however, one-third of these patients continue to have pain and functional impairment.<sup>9</sup> Post-surgical recovery is generally slow, with resumption of light work after 1 month in only 50% of patients in 1 study.<sup>10</sup> These results have prompted clinicians and researchers to look toward other less invasive and costly treatment modalities, including acupuncture.<sup>11</sup> Preliminary studies indicate that acupuncture may be an effective treatment in carpal tunnel syndrome.

A search of MEDLINE, EMBASE, and CINAHL databases found 1 randomized controlled study by Naser et al of 11 patients who had significant decreases in their McGill Pain Questionnaire score, median nerve sensory latency, and Phalen and Tinel signs following laser acupuncture.<sup>9</sup> These patients had no therapeutic response to standard medical or surgical treatments prior to the study. In Aigner and Fialka's randomized single-blind study of 13 carpal tunnel syndrome patients, results showed a significant reduction in night pain, but not paresthesias, following laser acupuncture compared with placebo laser.<sup>12</sup> (Only an abstract for this study could be found.) Branco treated 36 hands (from 22 women and 9 men) that had previously failed standard medical or surgical treatment with red beam laser acupuncture and transcutaneous electrical nerve stimulation (TENS). Results demonstrated successful pain relief in 33 of the 36 hands as measured by decreased Melzack pain scores.<sup>13</sup> Follow-up 2 years post-treatment of those patients who were 60 years or younger showed only residual pain in 2 of 23 hands. In yet another study, Chen examined the effectiveness of needle acupuncture in electromyography (EMG) diagnosed carpal

tunnel syndrome patients. Of the 36 patients studied, 24 reported full relief of pain; however posttreatment electromyograms were not done.<sup>14</sup> The average number of pain-free years following the final acupuncture treatment was 5.1 years. Multiple review articles on non-surgical treatments of carpal tunnel syndrome, including those by Gerritsen et al,<sup>15</sup> Goodyear-Smith and Arroll,<sup>5</sup> and O'Connor et al<sup>16</sup> reference Aigner's study and conclude that although promising, data to support the use of acupuncture in carpal tunnel syndrome are insufficient.

These studies demonstrate the potential for acupuncture in the treatment of carpal tunnel syndrome. This paper serves to add support to the literature and provide practitioners with a practical guide for treatment.

## METHODS

From 1998–2008, 17 patients presented (to this solo practitioner's New York office) with signs and symptoms consistent with carpal tunnel syndrome (Table 1). Electrodiagnostic studies were performed on each patient prior to treatment to confirm this diagnosis. Based on physical examination and nerve conduction studies, these patients were categorized into 3 groups of carpal tunnel syndrome severity: (1) Mild indicated no atrophy of abductor pollicis brevis, median motor distal latencies below 5 milliseconds, and median, sensory peak latency below 4 milliseconds, (2) Moderate indicated no atrophy of the abductor pollicis brevis, median motor distal latency below 7.5 milliseconds, and median sensory peak latency greater than 4 milliseconds, (3) Severe indicated abductor pollicis brevis atrophy, median motor distal latency greater than 7.5 milliseconds, and ab-

TABLE 1. BASELINE PATIENT CHARACTERISTICS

<i>Patient no.</i>	<i>Age, y</i>	<i>Sex</i>	<i>Duration of symptoms prior to treatment</i>	<i>Prior steroid injections</i>	<i>Prior carpal tunnel surgery</i>
1	37	M	1 year	No	Yes
2	38	M	1 year	No	No
3	38	F	2 years	No	No
4	53	M	1 year	No	No
5	60	F	1 month	No	No
6	61	M	3 years	No	No
7	62	M	1 year	Yes	No
8	66	F	1 year	No	No
9	68	M	1.5 years	No	No
10	69	F	1 year	No	No
11	74	F	2 years	No	No
12	80	F	1 year	No	No
13	84	F	5 years	Yes	No
14	84	F	7 years	No	No
15	86	F	10 years	No	No
16	86	M	6 months	No	No
17	59	M	6 months	No	No

TABLE 2. PRETREATMENT NERVE CONDUCTION STUDY AND APB ATROPHY

Patient no.	APB atrophy	Median motor distal latency, ms		Median sensory peak latency, ms		Severity
		Left	Right	Left	Right	
1	No	4.3	4.06	3.69	3.91	Mild
2	No	2.89	3.52	3.00	3.45	Mild
3	No	4.92	4.77	5.11	4.99	Mild
4	No	4.22	4.14	4.06	3.98	Mild
5	No	3.52	4.38	3.66	3.98	Mild
6	No	6.48	NA	5.53	NA	Moderate
7	No	6.09	4.38	5.46	4.43	Moderate
8	No	4.69	6.02	4.81	5.18	Mild
9	No	6.88	6.56	6.09	7.55	Moderate
10	No	3.83	4.14	3.73	3.82	Mild
11	Yes	3.91	7.19	NR	NR	Severe
12	No	3.52	5.63	3.28	5.04	Mild
13	Yes	7.58	9.141	7.22	NR	Severe
14	Yes	14.14	3.83	NR	NR	Severe
15	Yes	5.63	5.39	NR	NR	Severe
16	No	3.13	4.61	3.47	NR	Severe
17	No	4.45	4.14	4.52	4.57	Mild

Abbreviations: APB, abductor pollicis brevis; NA, not available; NR, not reported.

sent sensory latencies (Table 2). The categorization was based on the clinician's experience. Two of the 16 patients had severe carpal tunnel syndrome and were excluded from treatment and referred to a hand surgeon.

In the protocol used for this study, acupuncture points were selected based on their neuroanatomical relation to the median nerve, transverse carpal ligament, and the structure of the radius and ulna. The specific points used were PC 6, PC 7, TH 5, and Baxie 1 and 2. TH 5 point was taken in a functional zone approximately 2 cun distal to the dorsal crease of the wrist, with the needle inserted deeply to enter through the plane of the interosseous membrane (approximately 60 mm). Points were needled unilaterally on the affected side only.

Sterile disposable needles (Serin No. 5, 0.25 × 40 mm) were inserted into PC 6 in a transverse/oblique fashion over the median nerve. The same size needles were inserted into PC 7 using a transverse/oblique method to penetrate dorsal to the transverse carpal ligament and the palmar aponeurosis (approximately 30–40 mm). De Qi was not deliberately elicited. Electrical stimulation (using an Ito brand IC-1107 stimulator; the stimulator was not externally calibrated) at 4 Hz was applied with the negative electrode at PC 6, positive electrode at PC 7, to augment the flow along the direction of the meridian. In 2 patients, 150 Hz was used instead. Sterile disposable needles (Seirin No. 8, 0.30 × 60 mm) were inserted perpendicularly into TH 5 functional zone, penetrating through the interosseous membrane. Baxie 1 and 2 were needled using perpendicular insertion (approximately 20–30 mm). The needles were retained for 20 minutes; they were not manipulated to obtain De Qi. From Deadman: "When the hand is made into a fist, 6 of these points lie in the depressions between the metacarpal heads,

proximal to the web margins. The remaining 2 points lie equidistant between the thumb and index metacarpals, proximal to the web margins."

All of the treatments were performed by the same practitioner (trained in the French Energetic style of Medical Acupuncture, with additional training in Neuroanatomical acupuncture and Traditional Chinese Medicine, with 5 years experience prior to treating the first patient; primary medical specialty training, Physiatry, with added Board Certification in Pain Medicine [American Academy of Physical Medicine and Rehabilitation] and Medical Acupuncture [American Board of Medical Acupuncture].)

In addition to needle acupuncture, most patients received osteopathic manipulation therapy (OMT) to the carpal bones, and were instructed in a home exercise program for stretching the transverse carpal ligament. As this was a case series, no control intervention was performed.

Patients received a varying number of treatments; the treatment interval varied according to each patient's schedule although typically, treatments were given once per week. Patients were asked at follow-up visits about the resolution of their symptoms. Their responses were divided into 3 categories: complete, partial, or no resolution. One patient had posttreatment nerve conduction studies.

## RESULTS

Of the 17 patients evaluated for carpal tunnel syndrome, 14 were treated with the described acupuncture protocol. Twelve of those patients reported either partial or complete resolution of their symptoms at follow-up visits. Three of

the patients had no symptom relief. Patient number 3 had recurrence of her symptoms 1 year after treatment when she became pregnant and developed gestational diabetes. Additional treatment alleviated her symptoms. Table 3 lists the number of treatments each patient received, whether they had osteopathic manipulation therapy, and the subjective responses to treatment.

## DISCUSSION

This case series demonstrated gratifying efficacy using medical acupuncture as part of a treatment program for carpal tunnel syndrome. Cases rated as severe did not appear to respond to the acupuncture protocol used. The majority of the patients were able to tolerate the treatment protocol, with a few exceptions. Osteopathic manipulation of the carpal bones and transverse carpal ligament ap-

peared to enhance the overall effectiveness. The use of osteopathic manipulation is illustrative of the type of case series typically performed in a practitioner's office; the practitioner appropriately treats the patient, and follows the outcome of each patient, altering the subsequent treatments and interventions. Osteopathic manipulation of the carpal bones appears to be a rational addition to acupuncture in an attempt to increase the structural diameter of the carpal canal.

Future investigators may choose to examine other medical acupuncture clinical protocols for the treatment of carpal tunnel syndrome. These include the Luo to Yuan shunt (negative stimulation TH 5, positive PC 7, negative stimulation PC 6, positive TH 4), and osteopuncture using LU 9 and HT 7 as the periosteal points. It may also be important to treat the cervical and thoracic nerve roots using the PENS style of treatment to activate the relevant nerve plexi. Adding TH 8 and the contralateral GB 34 might be useful to create an N - N + 1 flow through Shao Yang.

TABLE 3. TREATMENT AND SUBJECTIVE RESULTS

<i>Patient no.</i>	<i>No. of acupuncture treatments</i>	<i>Received osteopathic manipulation therapy</i>	<i>Subjective report of improvement</i>	<i>Notes</i>
1	6	No	Complete	
2	1	No	Complete	
3	5	Yes	Complete	Symptoms recurred 1 year after last treatment when patient became pregnant and developed gestational diabetes
4	3	Yes	Partial	
5	16	Yes	Complete	Electrical stimulation at 150 Hz
6	7	Yes	None	Referred to hand surgeon following acupuncture treatments
7	5	Yes	Complete	
8	5	No	Complete	
9	25	Yes	Complete	
10	2	No	Partial	
11	8	Yes	None	
12	5	Yes	Partial	
13	2	Yes	None	
14	0	No	Not applicable	Condition considered too severe to treat based on nerve conduction study and physical examination
15	0	No	Not applicable	Condition considered too severe to treat based on nerve conduction study and physical examination
16	2	Yes	Complete	Had posttreatment nerve conduction study: right median motor distal latency, 3 milliseconds and right median sensory peak latency, 3.7 milliseconds
17	4	Yes	Complete	

## CONCLUSIONS

Total costs (treatment and lost work time) for workers injured with carpal tunnel syndrome have been estimated to be as high as \$30,000.<sup>17,18</sup> We have demonstrated efficacy in this case series of treatment of mild to moderate cases of carpal tunnel syndrome using medical acupuncture. Treatment costs using acupuncture are likely to be significantly less (using an estimate of \$100–160 per treatment). As with other conditions, early intervention yields the best outcomes, and acupuncture did not appear to be effective in advanced cases (at least with the number of treatments given to these patients). We anticipate that this case series will spur further research, including prospective randomized controlled trials, so that the benefits of medical acupuncture as a common intervention will reach a wider audience of practitioners and patients.

## REFERENCES

1. Dawson DM. Entrapment neuropathies of the upper extremities. *N Engl J Med.* 1995;329:2013–2018.
2. Wilson JK, Sevier TL. A review of treatment of carpal tunnel syndrome. *Disabil Rehabil.* 2003;25:113–119.
3. Bernard B. *Musculoskeletal Disorders and Workplace Factors: A Critical Review of Epidemiologic Evidence for Work-Related Musculoskeletal Disorders of the Neck, Upper Extremity, and Low Back.* Washington, DC: National Institute for Occupational Safety and Health; 1997.
4. Solomon D, Katz JN, Bahn R, Mogun H, Avorn J. Nonoccupational risk factors for carpal tunnel syndrome. *J Gen Intern Med.* 1999;14:310–314.
5. Goodyear-Smith F, Arroll B. What can family physicians offer patients with carpal tunnel syndrome other than surgery? *Ann Fam Med.* 2004;2:267–273.
6. Sucher BM, Hinrichs RN. Manipulative treatment of carpal tunnel syndrome: biomechanical and osteopathic intervention to increase the length of the transverse carpal ligament. *J Am Osteopath Assoc.* 1998;98(12):679–686.
7. Feuerstein M, Burrell LM, Miller VI, Lincoln A, Huang GD, Berger R. Clinical management of carpal tunnel syndrome: a 12 year review of outcomes. *Am J Indust Med.* 1999;35:232–245.
8. Gelberman RH, Aronson D, Weisman MH. Carpal-tunnel syndrome: results of a prospective trial of steroid injection and splinting. *J Bone Joint Surg.* 1980;62:1181–1184.
9. Naser A, Hahn KA, Lieberman BE, Branco KF. Carpal tunnel syndrome pain treated with low-level laser and microamperes transcutaneous electric nerve stimulation: a controlled study. *Arch Phys Med Rehabil.* 2002;83:978–988.
10. Brown RA, Gelberman RH, Seiler JG, et al. Carpal tunnel release: a prospective, randomized assessment of open and endoscopic methods. *J Bone Joint Surg Am.* 1993;75:1265–1275.
11. Naeser M. Neurological rehabilitation: acupuncture and laser acupuncture to treat paralysis in stroke, other paralytic conditions, and pain in carpal tunnel syndrome. *J Altern Complement Med.* 1997;3:425–428.
12. Aigner N, Fialka C. Results of laser-acupuncture in carpal tunnel syndrome: a prospective, randomized and blinded study (presented at the 5th Annual Symposium on Complementary Healthcare, 10–12 December 1998, Exeter). *FACT: Focus on Alternative and Complementary Therapies.* 1988;4:180.
13. Branco K, Naeser MA. Carpal tunnel syndrome: clinical outcome after low-level laser acupuncture, microamps transcutaneous electrical nerve stimulation, and other alternative therapies—an open protocol study. *J Altern Complement Med.* 1999;5:5–26.
14. Chen GS. The effect of acupuncture treatment on carpal tunnel syndrome. *Am J Acupuncture.* 1990;18:5–9.
15. Gerritsen AA, de Krom MC, Struijs MA, Scholten RJ, de Vet HC, Bouter LM. Conservative treatment options for carpal tunnel syndrome: a systematic review of randomized controlled trials. *J Neurol.* 2002;249(3):272–280.
16. O'Connor D, Marshall S, Massy-Westropp N. Non-surgical treatment (other than steroid injection) for carpal tunnel syndrome. *Cochrane Database Syst Rev.* 2003.
17. National Institute of Neurological Disorders and Stroke Web site. Carpal tunnel syndrome fact sheet. [http://www.ninds.nih.gov/disorders/carpal\\_tunnel/detail\\_carpal\\_tunnel.htm](http://www.ninds.nih.gov/disorders/carpal_tunnel/detail_carpal_tunnel.htm). Updated April 10, 2008. Accessed April 29, 2008.
18. Carpal tunnel syndrome: the rise of an occupational illness. <http://www.csa.com/discoveryguides/archives/carpal.php>. November 1999. Accessed April 28, 2008.

Address correspondence to:  
 Robert A. Schulman, MD, FAAPMR, FAAMA  
 104 E 40th Street, Suite 702  
 New York, NY 10016