

Treatment of CARPAL TUNNEL SYNDROME with Laser Acupuncture

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In a previous article,¹ I introduced some basic understanding of laser acupuncture (LAT). The use of low-level laser over acupuncture points in treating ailments is a relatively new idea in this country. The therapy is a subset treatment of a broader scope of practice called low-level laser therapy (LLLT), which has been in practice around the world during the past 30 years. LLLT refers to bio-stimulation with low-level lasers that are painless, non-invasive, and do not burn tissues. The procedure has been used to treat many disorders with noticeable success, from spinal cord injury in Israel to breast cancer in Russia to post-herpetic neuralgia in the UK.² When a LLLT is applied over acupuncture points, the treatment becomes laser acupuncture therapy and is of potential interest to practicing acupuncturists for a relative convenience and effectiveness.

One laser acupuncture application that has been researched is the treatment of carpal tunnel syndrome. One such study was published in 1999 by Dr. Margaret Naeser, PhD, Lac, Dipl Ac, research professor of neurology, Boston University School of Massachusetts. She and her team observe success in treating carpal tunnel pain in 33 of 36 hands (91.6%) after a treatment schedule of one month duration, three treatments per week.³

Carpal tunnel syndrome (CTS) refers to the entrapment of the median nerve as it travels through the wrist into the hand. The carpal tunnel on the palmar surface is a narrow space, formed by carpal bones below and flexor retinaculum above, through which pass the median nerve and tendons from many hand flexor muscle. Often resulting from repetitive strain injury, inflammation within the tunnel can cause pressure on the nerve and a well-defined feeling of pins and needles perceived at the anterior aspect of the radial three-and-one-half digits (i.e. excluding the little finger). The feeling of pins and needles is the first symptom, but in due course, pain may be felt in the hand and forearm. The symptoms are increased by use of the hand and must be differentiated from a cervical disc lesion, thoracic outlet syndrome,⁴ and from shortening of the pronator teres muscle (pronator syndrome) which can also press on the median nerve and lead to similar symptoms.⁵

¹ "Laser Acupuncture Primer," CJOM, Winter 2001

² Naeser MA & Deuel SK. *The Journal of Alternative and Complementary Medicine*. 1999; 5(2): 177-180

³ Naeser MA & Branco K. 1999. *The Journal of Alternative and Complementary Medicine*. 1999; 5(1):5-26

⁴ Cyriax JH & Cyriax PJ. 1993. *Cyriax's Illustrated Manual of Orthopaedic Medicine*. Butterworth-Heinemann, 1983, P. 69.

⁵ Marcus A. 1998. *Muskuloskeletal Disorders – Healing Methods from Chinese Medicine, Orthopedic Medicine and Osteopathy*. North Atlantic Books. 1998. P.542.

The symptoms from true CTS may be evoked by: (1) pressing over the carpal tunnel while the patient flexes and extends his or her fingers; (2) holding the wrist flexed for about a minute and then extending it abruptly; and (3) Tinel's sign is positive in some 70% of cases.⁶ Often the syndrome is misdiagnosed in patients with elbow and hand pain who then seldom find relief with physical therapy and surgery. Cervical and elbow disorders should always be evaluated prior to making the diagnosis of CTS. In some cases it could be simply an overuse of the upper extremities and treated by acupuncture with microcurrent stimulation.⁷

Treatment Options

Conventional treatment options include NSAIDS (Non-steroidal anti-inflammatory drugs), corticosteroid drugs, physical therapy, wrist splints, steroid injection, and surgery. These approaches are often ineffective and, in the case of drugs, potentially toxic or distributing to the GI tract. Alternative options include lifestyle changes, supplementation with vitamin B-6, yoga practice, and acupuncture. A further, highly effective CTS treatment uses laser acupuncture and microamps TENS (Transcutaneous Electrical Nerve Stimulation). This was first explored and proven effective in a 1996 randomized, blinded, placebo-controlled, cross-over study. The same protocol has been used since 1998 to successfully treat many patients in a private clinic. It is important to note that controlled research is possible with low-level laser and microamps TENS because it produces no sensation in the patient. The rationale for combining microamps stimulation into CTS treatment is founded in the observation that it has an effect on adenosine triphosphate (ATP) concentrations and protein synthesis on the cellular level in rat skin (Chang et al., 1982). This stimulation also has been used in a double-blind study to successfully treat low back pain in 40 cases where each patient received a total of 16 treatments (Meyer & Nebrensky, 1983).⁸

Laser Acupuncture Studies

Papers describing the details of the protocol, treatment procedures and results, were presented at the 2nd world Congress Meeting of the World Association for Laser Therapy (WALT) in 1998.⁹ In one, real vs. sham LLLT and microamps TENS were used to stimulate acupuncture points on the affected hand in 10 cases of CTS. Following a month of real treatments, 3 per week, there was a significant reduction in pain; in the control group, no significant reduction was noted. Following the real treatments, there was a significant reduction in median nerve sensory latencies, but no significant reduction following in the control group. In another, clinical outcome study with the same primary LAT and microamps treatment protocol in a private practice acupuncture office, 33 out of 36 (91.6%) cases were successfully treated.

⁶ Cyriax JH & Cyriax PJ. 1993. *Cyriax's Illustrated Manual of Orthopaedic Medicine*. Butterworth-Heinemann, 1983, P. 69.

⁷ "Treatment of The Overuse of the Upper Extremities" Katz AJ. *Acupuncture Today*, October 2000, P.18.

⁸ Naeser MA. 2001. *Handouts for CEU class: Laser Acupuncture to treat paralysis instroke, Carpal Tunnel Syndrome and Other Disorders*, March 31 – April 1, 2001, P.86.

⁹ Proceedings: 2nd Congress World Association for Laser Therapy, September 2-5, 1998, Kansas City, Missouri, USA, P.145-146.

The research protocol used a continuous wave (CW), 15 mW (2 mm diameter aperture probe tip), 632.8 nm, red-beam laser; a pulsed (180 ns pulse “on time”), 10W, 904 nm, infrared diode laser; and a microamps TENS. Laser calculations are based on laser output at probe tip; skin contact with probe tip was used during treatment. (Explanation of laser parameters and sample power calculations can be found in the previous article.)¹⁰ First, the red beam laser was placed on the point P7 with the dosage of 7 joules (J), 226 J/cm². Next, microamps TENS electrodes were applied to P6 and SJ4 to treat through the wrist for 20 minutes, using 292 Hz for 2 minutes and 0.3 Hz for 18 minutes. While the TENS was in place at the wrist, the red beam laser (632.8 nm) was applied to the other acupuncture points on the affected hand (dosage: 1 joule per point; 32.2 J/cm²). Also, the infrared laser (904 nm) was applied to no more than 5 deeper acupuncture points on the forearm, posterior neck, and upper back (at least one minute at each of the three pulse rate: 3,500 Pulses-Per-Second (PPS), 584 PPS, 73 PPS).¹¹

Clinical Protocol

The same research protocol was adapted for use with an inexpensive 670 nm red-beam, 5 mW, CW, diode laser lecture pointer, and a microamps TENS. All treatments were performed by Dr. Ken Branco with open protocol in his Westport, Massachusetts acupuncture office. A detailed analysis of this study was published in 1999 issue of *The Journal of Alternative and Complimentary Medicine*. There were three steps to this treatment program.

- 1) The tip of the laser pen was physically placed onto the skin at P7 for approximately 21 minutes (6-7 J; 30-35 J/cm²).
- 2) Microamp TENS device electrodes were placed on P7 and SJ4. The power was gradually increasing until a tingling sensation was felt at either electrode site, then it was immediately turned down until there was no sensation at all. The ideal setting is usually around 200 to 500 microamps. A modulated frequency of 292Hz was used for the first 2 minutes, followed by a lower frequency of 9.25 Hz or 0.3 Hz for the next 18 minutes.
- 3) While the TENS device was in place at the wrist, the laser pen was applied to the following acupuncture points on the affected hand for 3 minutes each (approximately 1 J; or 4.6 J/cm² per point): Lu11, LI1, P9, SJ1, H9, SI1, Ba Xie, SJ5, LI4, P8, H7, H8, Lu9, and Lu10. In addition to the primary LAT, secondary Traditional Chinese Medicine (TCM) therapies were used on a case-by-case basis, including herbal medicine, supplements, moxibustion, and stimulation of deeper acupuncture points on the posterior neck, shoulder, and elbow area with infrared-beam laser and/or needle acupuncture.¹²

¹⁰ C.f. note 1.

¹¹ Naeser MA. 2001. *Handouts for CEU class: Laser Acupuncture to treat paralysis instroke, Carpal Tunnel Syndrome and Other Disorders*, March 31 – April 1, 2001, P.88.

¹² Naeser MA & Branco K. 1999. *The Journal of Alternative and Compementary Medicine*. 1999, 5(1): p. 11,16.

Conclusion

According to U.S. Center for Health Statistics, nearly 2 million Americans suffered from CTS in 1995, up from 1.3million in 1989. In the United States, approximately \$20 billion is spent annually on this common and painful affliction. One firm estimates it costs \$37,000 per case in medical expenses – often involving surgery, lost work time and rehabilitation.¹³ The average cost of LAT and TENS is \$1,000 per case; a potential saving of \$36,000 per case, or potentially billions of dollars overall. Although conventional acupuncture provides an excellent alternative solution for the treatment of CTS, painless laser acupuncture therapy may become the treatment of choice, as some patients might avoid conventional acupuncture therapy which can involve additional discomfort. When educated about the painless nature of laser acupuncture, patients may seek earlier intervention, helping to prevent advanced cases of CTS, and thus reduce the need for costly and often ineffective surgery.

Steven Liu graduated from San Jose State University with Bachelor's and Master's degree in electrical engineering. He worked in Silicon Valley from 1982 to 1995, involved in the technological development of items such as the Optical Disc Drive and Laser Drive design. In 1985, he began studying Chinese Medicine at ACTCM in San Francisco, and did an additional tutorial with his acupuncturist mother. He was licensed in 1998, and currently practices in Ukiah, CA with his mother and wife, Wen, also an acupuncturist. He is also involved in researching laser acupuncture.

¹³ Keith JH. Winter 1996-1997. *Bostonia*. Boston University, Brookline, Massachusetts. P.33