# CARPAL TUNNEL SYNDROME RESEARCH ABSTRACTS

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# Carpal tunnel syndrome: clinical outcome after LLLT-acupuncture, microamps TENS, and other alternative therapies: an open protocol study.

Branco K, Naeser MA,

***Journal of Alternative Complementary Medicine (1999) 1:5-26.***

Acupuncture Healthcare Services, Westport, Massachusetts, USA. They measured outcome for carpal tunnel syndrome (CTS) patients (who previously failed standard medical/surgical treatments) treated primarily with a red-beam, LLLT-AP and microamps TENS on the affected hand; secondarily, with other alternative therapies. Design: Open treatment protocol, patients diagnosed with CTS by their physicians. Treatment was given by licensed acupuncturist in a private practice office. 36 hands were treated (from 22 women, 9 men), ages 24-84 yr, median pain duration, 24 mo. Fourteen hands had failed 1-2 surgical release procedures. Primary treatment: red-beam, 670 nm, continuous wave, 5 mW, diode LLLT pointer (1-7 J per point), and microamps TENS (<900 uA) on affected hands. Secondary treatment: infrared LLLT (904 nm, pulsed, 10 W) and/or needle AP on deeper acupoints; Chinese herbal medicine and supplements, on a case-by-case basis (3 treatments/wk for 4-5 wk). Pre- and post treatment Melzack pain scores and profession and employment status were recorded. Post treatment, pain significantly reduced ($p<.0001$), and 33/36 hands (91.6%) had no pain, or pain reduced by >50%. Fourteen hands that failed surgical release were successfully treated. Patients remained employed, if not retired. Follow-up after 1-2 yr with cases aged <60, only 2/23 hands (8.3%) had return of pain, but were successfully re-treated within a few weeks. Possible mechanisms for effectiveness include increased adenosine triphosphate (ATP) on cellular level, decreased inflammation, temporary increase in serotonin. Combined treatment with LLLT-AP + microamp TENS + Chinese herbs has potential cost-savings (current estimated cost per case, $12,000; this treatment, $1,000). It is safe when applied by a licensed acupuncturist trained in laser-AP; supplemental home treatments may be performed by patient under supervision of acupuncturist.

# A pilot study to determine effectiveness of low level photon therapy for chronic Carpal Tunnel Syndrome "CTS"

Salansky N

***Presented at the Lasers in Surgery and Medicine conference (1994) Vol. 16.***

**Objective:**
The purpose of this study was to determine the potential effectiveness of LEPT for the treatment of chronic CTS.

**Methods:**
Twenty-one patients (aged 28-66 years) with chronic CTS were admitted for the study and provided treatments 3 times per week with 15 treatments as one course.

**Results:**
a) 15 (71.4%) patients obtained complete symptom relief and returned to their regular work; b) 2 (9.5%) patients obtained partial symptom relief (at least one evaluation criteria was negative on final measurement); c) 4 (19.1%) patients did not respond.
The 15 cured patients remained symptom free with follow-up interviews ranging from 3 –18 months after therapy. Overall, this study was considered successful related to using LEPT to resolve symptoms of chronic CTS.

## Future of laser biostimulation in America today: microlight 830

Smith CF & Vangsness CT

***Proceedings SPIE (1992) 1643; 275-276.***

For the last 2 years, we have been investigating the use of an 830 nm laser for LLLT in chronic pain syndromes. The laser output does not exceed 100 mW. This wave length has been carefully selected to be in the 'window' of wavelengths between 650 and 900 nm. At this level, the laser energy will penetrate the epidermis, the dermis and the subcutaneous layers to the deep tissue. The tissue effect of this laser energy is not thermal but rather a stimulation of micro-circulation with a secondary effect of blocking pain enzymes and activation of the synthesis of endorphin enzymes. We have experience with approximately 75 patients who have been treated with LLLT. We used a double-blind study at several General Motors facilities in Michigan to determine the effectiveness of LLLT in inflammatory conditions. Repetitive injuries in the work place have moved from 18% of industrial accidents in 1981 to 52% in 1989. Carpal Tunnel Syndrome is the number one economic problem in occupational medicine; 15% of employees of American automotive plants have Carpal Tunnel Syndrome. This large number of patients have been treated in the past by standard physiotherapy treatment modalities and ultimately by surgery for failure of conservative therapy. Incidence of 'return to work activities' has been low. LLLT affords a positive solution to this problem not only therapeutically but prophylactically. Indications for treatment are Chronic Pain Syndrome and Carpal Tunnel Syndrome of mild to moderate degree.

## Treatment of repetitive use carpal tunnel syndrome

Smith CF, Vangsness CT, Anderson T & Good W (1995)

***Proceedings SPIE (1995) 2395; 658-661.***

In 1990, a randomized, double-blind study was initiated to evaluate the use of an eight-point conservative treatment program in carpal tunnel syndrome. A total of 160 patients were delineated with symptoms of carpal tunnel syndrome. These patients were then divided into two groups. Both groups were subjected to an ergonomically correct eight-point work modification program. A counterfeit LLLT unit was used in Group A, while an actual LLLT unit was used in Group B. Groups A and B were statistically significantly different in terms of return to work, conduction study improvement, and certain range of motion and strength studies.

## Noninvasive laser neurolysis in carpal tunnel syndrome

Weintraub MI, MD, FACP

***Muscle Nerve (1997) 20:1029-1031.***

The peripheral nervous system is photosensitive providing the scientific rationale for this study, which determines the efficacy and safety of laser light exposure in 30 cases with CTS. Nine joules of energy over 5 points (7-15 treatments) reversed the signs and symptoms of CTS in 77% of cases with three-fold normalization of CMAP. A photobiologic response was seen in 80% of nerves. This unique and novel approach is cost-effective and will play a role in future management of CTS.

## The effectiveness of Low Level Laser Therapy on Carpal Tunnel Syndrome

Steven Balmes, Yolanda Cooper, Olabisi Jarrett, Bobby Kennedy, Jr

*Presented at WALT (World Association of Laser therapy) Annual Conference (2000) Athens, Greece.*

Carpal Tunnel Syndrome (CTS) is a debilitating musculoskeletal disorder, decreasing hand function and quality of life. Patients with CTS often complain of numbness and tingling during the day, waking at night, weakness and pain in hands and wrist. There are numerous treatment options available, including surgery, splinting, and steroid injections. However, no single treatment is consistently effective. The use o Low Level laser Therapy (LLLT) as a noninvasive, painless, and cost effective treatment technique for CTS is becoming popular in physical therapy worldwide. However, compelling evidence to support its efficacy does not exist yet. The purpose of this study is to assess the physiological effects of LLLT (MEDX$^{TM}$) in reducing any or all the signs and symptoms of CTS under placebo controlled, double-blind conditions.

Twenty participants (33 hands) were randomly assigned to one of two groups: LLLT for 4 min/day (dosage=5.184 J/cm$^2$) or a placebo for 4 min/day (dosage=0 J/cm$^2$), for an average of 15 (range 11 to 18) weekday treatments. Each participant was assessed standardized CTS questionnaire, 2) grip strength, 3) pinch strength, 4) median nerve sensory and motor distal latencies, prior to treatment, reassessed after the final treatment, and at the one month follow-up. Sensory and motor median nerve distal latencies were measured weekly, in addition to the above mentioned. Eighteen participants (30 hands) completed the study, and 11 participants (23 hands) made it to the one-month follow-up.

Data analysis was conducted using repeated measures ANOVA and a Kruskal-Wallis Test. The results indicated that there was a statistically significant decrease in median nerve sensory distal latency in the laser group compared to a placebo from pre-test to post-test; however, no statistically significance was found for the other five variables measured. There was a decrease in symptoms and an increase in functional status in both groups. Analysis of grip strength showed no statistical significance, although a slight decrease in placebo group and a slight increase in the laser group was observed. There was no difference within or between groups for pinch strength.

The results of this study suggest that LLLT may effectively decrease sensory distal latency of the median nerve and improve nerve function. The five remaining variables were not found to show statistically significant changes between groups. Verbal reports of improvement from the participants differed from the results of the CTS questionnaire. The researchers believe that LLLT is a beneficial alternative treatment for CTS when considering the participant's verbal reports and improvement in nerve function.

## Laser Therapy - Positive Double Blind Studies

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