**Fusakul Y, Aranyavalai T, Saensri P, and et al. Low-level laser therapy with a wrist splint to treat carpal tunnel syndrome: a double-blinded randomized controlled trial. Lasers Med Sci 2014; 29:1279–1287.**

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**Reviewer:** Linda Metzger 1-29-16

**Design:** Randomized controlled trial

**Objective:** To investigate the clinical and electroneurophysiological effectiveness of low level laser therapy (LLLT) combined with a wrist splint in the short and long term for patients with mild to moderate carpal tunnel syndrome (CTS).

**Summary of Results:**

* A total of 59 patients or 112 hands were divided into 2 treatment groups: 1) LLLT + wrist splint, and 2) placebo LLLT + wrist splint.
* The results of this study suggest that LLLT is an effective alternative conservative treatment for patients with mild to moderate CTS. It can improve hand grip strength and one electroneurophysiological parameter (distal motor latency) with a carry-over effect up to 3 months after treatment for grip strength.

**Reasons not to cite as evidence:**

* The designation of a primary outcome was not clear. Nine outcome measures assessed at 5 and 12 weeks after treatment were reported including the VAS pain scale, Boston symptom severity scale, the Boston functional status scale, grip strength, pinch strength, and nerve conduction tests which included 4 parameters.
* Only one of 10 “*p”* values for the 5 clinical parameters at both follow-up times was statistically significant and showed a positive difference between groups (symptom severity decreased after 5 weeks in the LLLT group). None of the nerve conduction tests showed any statistically significant improvements at 12 weeks post-treatment within the same group. Only one of 4 “*p”* values for the nerve conduction tests, distal motor latency after 12 weeks, showed statistically significant differences between the two groups favoring the LLLT group. All the other outcomes showed no statistically significant differences between the 2 groups. Basing the conclusions of the study on just 2 positive outcomes is selective outcome reporting.
* According to Table 2, grip strength did not show any significant differences between groups at baseline or either follow-up time point. Table 2 did show a significant difference between groups for symptom severity score after 5 weeks favoring the LLLT group. However, the text reports that improvements were significantly more pronounced in the LLLT-treated group than the placebo group especially for grip strength at 5- and 12-week follow-ups. These inconsistencies between the table and text are disturbing and don’t allow proper interpretation of results. This also weakens our confidence in the quality and validity of the study.
* It appears that the patients may have been blinded to their real or placebo LLLT treatments. There is no mention of allocation concealment or blinding of assessors or physicians who were conducting the clinical or nerve conduction measurements.
* The authors failed to include information on the study’s inclusion criteria, for example the duration of CTS symptoms required for study inclusion.
* A major limitation of the study was that it violated the assumption of independent observations for the Student T test which was used for data analysis. The observations in this study lack independence from one another, since most (106) of the 112 symptomatic hands analyzed in this study came from patients with bilateral CTS. For observations to be independent, they must come from different individuals. Non-independent observations can make the results of the Student T Test incorrect or misleading, or simply give too many false positives. Because the conclusions from this study are suspect for violating the assumptions of the statistical test, the conclusions are rejected.
* There were too many issues to make any evidence recommendations and the author’s conclusions are based on only 2 positive results out of at least 9 outcome measures assessed at 2 time points. The conclusions are too weak for evidence.

**Assessment:**

* Inadequate for evidence of the effectiveness of 5 weeks of LLLT plus wrist splinting in patients with carpal tunnel syndrome on pain and function.