Low level laser therapy for tendinopathy: evidence of a dose-response pattern

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CRD summary
This review assessed the effects of low-level laser therapy (LLLT) on pain from tendinopathy. The authors concluded that LLLT can reduce pain in subacute and chronic tendinopathy if a valid treatment procedure and location-specific dose is used. Differences among the studies were not examined and only the short-term outcomes were assessed. The authors' conclusions may not be reliable.

Authors' objectives
To assess the effects of low-level laser therapy (LLLT) on pain from tendinopathy.

Searching
MEDLINE, EMBASE, CINAHL, PEDro and the Cochrane Controlled Trials Register were searched for publications after 1980; the search terms were stated. National physiotherapy and medical journals from Norway, Denmark, Sweden, Holland, UK, Canada and Australia were handsearched. Researchers in the field were contacted for additional information.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) were eligible for inclusion if the placebo-controlled group contained at least 10 patients and the patients and outcome assessors were blinded.

Specific interventions included in the review
Studies that compared LLLT with placebo were eligible for inclusion. The studies had to use laser therapy with the following characteristics: the exposed area was the skin overlying the site of inflammation or post-inflammatory process in the tendon; the intensity and dose were as indicated in the paper; and treatment had to be given at least twice weekly and no less than six times in total. The paper listed the type, power density and dose of laser treatment given in each included study.

Participants included in the review
Studies of patients with tendinopathy, including studies with subgroups of patients with tendinopathy, were eligible for inclusion. The included studies were conducted in patients with epicondylitis, rotator cuff/biceps, patellar, Achilles, or plantar fasciitis tendinopathy. The participants generally had sub-acute and long-term tendinopathy with an average duration of symptoms of 3 to 4 months.

Outcomes assessed in the review
The studies had to assess the specified outcomes within 2 to 6 weeks. The review assessed pain preferably using a continuous scale. Measures of pain involving physical function of the treated tendon were selected where studies reported several measures of pain.

How were decisions on the relevance of primary studies made?
The authors did not state how the papers were selected for the review, or how many reviewers performed the selection.

Assessment of study quality
The authors did not state that they assessed validity.

Data extraction
The authors did not state how the data were extracted for the review, or how many reviewers performed the data extraction. The extracted data included the number of patients with the specified type of tendinopathy and the total number of patients in that study.

For all studies, the mean change from baseline to end point between treatment groups was calculated, where possible, together with the 95% confidence intervals (CIs). The percentage difference between treatment groups from baseline to end point was also calculated. Where studies compared laser with placebo for subgroups of patients with different sites of tendinopathy, the subgroups were considered as separate treatment arms.

**Methods of synthesis**

**How were the studies combined?**
The studies were combined using a meta-analysis. The pooled weighted mean differences (WMDs) and 95% CIs were calculated. A funnel plot was used to assess publication bias.

**How were differences between studies investigated?**
Summary outcomes were compared between RCTs using optimal laser treatment dose and power density and those RCTs not using optimal treatment parameters.

**Results of the review**

Thirteen RCTs with sixteen treatment comparisons were included (n approximately 789).

Nine RCTs using optimal laser treatment dose and power density found that LLLT reduced pain in patients with sub-acute and chronic tendinopathy compared with control (WMD 32%, 95% CI: 23, 41).

Nine RCTs using optimal laser treatment dose and power density and 4 RCTs not using optimal treatment parameters found that LLLT reduced pain compared with control (WMD 22%, 95% CI: 5.9, 36.1). There was a statistically significant difference between RCTs using optimal laser treatment dose and power density and those RCTs not using optimal treatment parameters (P<0.001).

The funnel plots suggested there was potential for some publication bias.

**Authors’ conclusions**

LLLT could reduce pain in sub-acute and chronic tendinopathy if a valid treatment procedure and location-specific dose were used.

**CRD commentary**

The review question was clear in terms of the study design, intervention and participants. Neither the criteria used to diagnose tendinopathy nor the measure of pain used in the included studies were reported. Attempts were made to limit publication bias. The methods used to select the studies and extract the data were not described, so it is not known whether any efforts were made to reduce errors and bias. Only double-blind RCTs were included, but no formal validity assessment was performed.

There was insufficient information on the type of control treatment (whether sham laser was used or not), the methods used to measure the outcomes, and the characteristics of the patients. It was not possible to comment on the appropriateness of the meta-analysis because of the lack of information on pain assessment. The review appears to have assessed short-term outcomes only, limited to 2 to 6 weeks, and this must be taken into account when interpreting the conclusions.

**Implications of the review for practice and research**

Practice: The authors did not state any implications for practice.
Research: The authors stated that the most important area for future studies may be to examine the role of LLLT used in combination with other treatments, especially exercises in the remodelling phase of tendon repair.

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**Bibliographic details**

**Other publications of related interest**
This additional published commentary may also be of interest. Baxter D. Laser therapy shows potential for pain-relieving effects in the treatment of tendinopathy. FACT 2002;7:132-3.

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Subject indexing assigned by CRD

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**Record Status**
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.