

Low level laser therapy (Classes III) for treating osteoarthritis

Brosseau Lucie, Welch Vivian, Wells George A, de Bie Rob, Gam Arne, Harman Katherine, Morin Michelle, Shea Beverley, Tugwell Peter

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Cochrane Database of Systematic Reviews, Issue 12, 2010 (Status in this issue: WITHDRAWN FROM PUBLICATION FOR REASONS STATED IN THE REVIEW)

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DOI: 10.1002/14651858.CD002046.pub2

This review should be cited as: Brosseau Lucie, Welch Vivian, Wells George A, de Bie Rob, Gam Arne, Harman Katherine, Morin Michelle, Shea Beverley, Tugwell Peter. Low level laser therapy (Classes III) for treating osteoarthritis. Cochrane Database of Systematic Reviews. In: *The Cochrane Library*, Issue 12, Art. No. CD002046. DOI: 10.1002/14651858.CD002046.pub2

Abstract

Background

Osteoarthritis (OA) affects a large portion of the population. Low Level Laser Therapy (LLLT) is a light source that generates extremely pure light, of a single wavelength. The effect is not thermal, but rather related to photochemical reactions in the cells. LLLT was introduced as an alternative non-invasive treatment for OA about 30 years ago, but its effectiveness has to be examined more closely, especially in the treatment of OA.

Objective

To assess the effectiveness of class III LLLT for osteoarthritis when irradiation is directed at the osteoarthritic joint capsule.

Criteria for considering studies for this review

Searches were conducted in the following databases: MEDLINE, EMBASE, the Cochrane Musculoskeletal registry, the Rehabilitation and Related Therapies field registry and the Cochrane Controlled Trials Register up to May, 2005.

Selection criteria

Following an a priori protocol, only controlled clinical trials of LLLT for the treatment of patients with a clinical diagnosis of OA were eligible. Abstracts lacking data were excluded unless further data could be obtained from the authors.

Data collection and analysis

Two reviewers independently selected trials and extracted data using predetermined forms. A fixed effects model was used throughout for continuous variables, except

where heterogeneity existed; in which case, a random effects model was used. Results were analyzed as weighted mean differences (WMD) with 95% confidence intervals (CI), whereas the difference between the treatment and control groups was weighted by the inverse of the variance. Standardized mean differences (SMD) were calculated by dividing the difference between treatment and control by the baseline variance, and were used in the analysis of pain because different scales were used to measure it. Dichotomous outcomes were analyzed with relative risk (RR).

Main results

Eight trials were included with 233 patients randomized to laser and 172 patients to placebo laser. Treatment duration ranged from two to six weeks. Pain was assessed in seven trials. When the results were pooled from different pain scales used in these seven trials, a statistically significant difference in favor of laser treatment was found with a SMD of -0.28 (95% CI: -0.48 to -0.09). One of these studies also measured pain during movement and found a statistically significant difference in favor of laser treatment with a WMD of -1.16 (95% CI: -2.02 to -0.30). Two studies found significant results for increased knee range of motion. Two others studies found a statistically significant difference in favor of laser treatment for patient-assessed global disease activity with laser compared to placebo (RR 1.70, 95%CI: 1.1. to 2.63). One trial evaluated the effectiveness of laser treatment in temporomandibular joint OA and found a statistically significant difference (WMD 38.69, 95% CI: 29.25 to 48.13) using the change in VAS score to measure pain. One study found a statistically significant difference in favor of laser treatment at the end of treatment and at 4 and 8 weeks post-treatment for morning stiffness. Other outcome measures of joint tenderness and strength did not yield significant differences.

Authors' conclusions

Five trials included in this review showed a statistically significant difference favoring laser treatment when compared to placebo for at least one outcome measure. Three trials did not report beneficial effects. The varying results of these trials may be due to the method of laser application and/or other features of LLLT application. Clinicians and researchers should consistently report the characteristics of LLLT devices and application techniques used. New trials on LLLT should make use of standardized, validated outcomes. There is clearly a need to investigate the effects of different dosages on LLLT effectiveness for OA in future randomized, controlled clinical trials. Also, more studies should be done to investigate the anti-inflammatory action of laser as well as the appropriate parameters needed to achieve an anti-inflammatory effect.