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Low level laser therapy (Classes I, II and III) for treating osteoarthritis (Cochrane Review)

**Brosseau L, Welch V, Wells G, deBie R, Gam A, Harman K, Morin M,
Shea B, Tugwell P**

Background: Osteoarthritis (OA) affects a large proportion 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 10 years ago, but its effectiveness is still controversial.

Objectives: To assess the effectiveness of LLLT in the treatment of OA.

Search strategy: We searched MEDLINE, EMBASE, the Cochrane Musculoskeletal registry, the registry of the Rehabilitation and Related Therapies field and the Cochrane Controlled Trials Register up to December 31, 2002.

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 were excluded unless further data could be obtained from the authors.

Data collection and analysis: Two reviewers independently selected trials and abstracted data using predetermined forms. Heterogeneity was tested with Cochran's Q test. 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), where the difference between the treated and control groups was weighted by the inverse of the variance. Standardized mean differences (SMD) were calculated by dividing the difference between treated and control by the baseline variance. SMD

were used when different scales were used to measure the same concept (e.g. pain). Dichotomous outcomes were analyzed with odds ratios.

Main results: Five trials were included, with 112 patients randomized to laser, 85 patients to placebo laser. Treatment duration ranged from 4 to 10 weeks. Pain was assessed by four trials. The pooled estimate (random effects) of three trials showed no statistically different effect on pain measured using a scale (SMD: -0.2, 95% CI: -1.0, +0.6), but there was statistically significant heterogeneity ($p > 0,05$). Two of the trials showed no effect and one demonstrated very beneficial effects with laser. In another trial, with no scale-based pain outcome, significantly more patients reported pain relief (yes/no) with laser with an odds ratio of 0.05, (95% CI: 0.0 to 1.56). Other outcomes of joint tenderness, joint mobility and strength were not significant.

Reviewers' conclusions: For OA, the results are conflicting in different studies and may depend on the method of application and other features of the LLLT application. Clinicians and researchers should consistently report the characteristics of the LLLT device and the application techniques used. New trials on LLLT should make use of standardized, validated outcomes. Despite some positive findings, this meta-analysis lacked data on how LLLT effectiveness is affected by four important factors: wavelength, treatment duration of LLLT, dosage and site of application over nerves instead of joints. There is clearly a need to investigate the effects of these factors on LLLT effectiveness for OA in randomized controlled clinical trials.

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