

## **Efficacy of different therapy regimes of low-power laser in painful osteoarthritis of the knee: a double-blind and randomized-controlled trial.**

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### **Abstract**

#### **BACKGROUND AND OBJECTIVES:**

A prospective, double-blind, randomized, and controlled trial was conducted in patients with knee osteoarthritis (OA) to evaluate the efficacy of infrared low-power Gallium-Arsenide (Ga-As) laser therapy (LPLT) and compared two different laser therapy regimes.

#### **STUDY DESIGN/MATERIALS AND METHODS:**

Ninety patients were randomly assigned to three treatment groups by one of the nontreating authors by drawing 1 of 90 envelopes labeled 'A' (Group I: actual LPLT consisted of 5 minutes, 3 J total dose + exercise; 30 patients), 'B' (Group II: actual LPLT consisted of 3 minutes, 2 J total dose + exercise; 30 patients), and 'C' (Group III: placebo laser group + exercise; 30 patients). All patients received a total of 10 treatments, and exercise therapy program was continued during study (14 weeks). Subjects, physician, and data analysts were unaware of the code for active or placebo laser until the data analysis was complete. All patients were evaluated with respect to pain, degree of active knee flexion, duration of morning stiffness, painless walking distance and duration, and the Western Ontario and Mc Master Universities Osteoarthritis Index (WOMAC) at week 0, 6, 10, and 14.

#### **RESULTS:**

Statistically significant improvements were indicated in respect to all parameters such as pain, function, and quality of life (QoL) measures in the post-therapy period compared to pre-therapy in both active laser groups ( $P < 0.01$ ). Improvements in all parameters of the Group I and in parameters, such as pain and WOMAC of the Group II, were more statistically significant when compared with placebo laser group ( $P < 0.05$ ).

#### **CONCLUSIONS:**

Our study demonstrated that applications of LPLT in different dose and duration have not affected results and both therapy regimes were a safe and effective method in treatment of knee OA.

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## **Short-term efficacy of physical interventions in osteoarthritic knee pain. A systematic review and meta-analysis of randomised placebo-controlled trials.**

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### **Abstract**

#### **BACKGROUND:**

Treatment efficacy of physical agents in osteoarthritis of the knee (OAK) pain has been largely unknown, and this systematic review was aimed at assessing their short-term efficacies for pain relief.

#### **METHODS:**

Systematic review with meta-analysis of efficacy within 1-4 weeks and at follow up at 1-12 weeks after the end of treatment.

#### **RESULTS:**

36 randomised placebo-controlled trials (RCTs) were identified with 2434 patients where 1391 patients received active treatment. 33 trials satisfied three or more out of five methodological criteria (Jadad scale). The patient sample had a mean age of 65.1 years and mean baseline pain of 62.9 mm on a 100 mm visual analogue scale (VAS). Within 4 weeks of the commencement of treatment manual acupuncture, static magnets and ultrasound therapies did not offer statistically significant short-term pain relief over placebo. Pulsed electromagnetic fields offered a small reduction in pain of 6.9 mm [95% CI: 2.2 to 11.6] (n = 487). Transcutaneous electrical nerve stimulation (TENS, including interferential currents), electro-acupuncture (EA) and low level laser therapy (LLLT) offered clinically relevant pain relieving effects of 18.8 mm [95% CI: 9.6 to 28.1] (n = 414), 21.9 mm [95% CI: 17.3 to 26.5] (n = 73) and 17.7 mm [95% CI: 8.1 to 27.3] (n = 343) on VAS respectively versus placebo control. In a subgroup analysis of trials with assumed optimal doses, short-term efficacy increased to 22.2 mm [95% CI: 18.1 to 26.3] for TENS, and 24.2 mm [95% CI: 17.3 to 31.3] for LLLT on VAS. Follow-up data up to 12 weeks were sparse, but positive effects seemed to persist for at least 4 weeks after the course of LLLT, EA and TENS treatment was stopped.

#### **CONCLUSION:**

TENS, EA and LLLT administered with optimal doses in an intensive 2-4 week treatment regimen, seem to offer clinically relevant short-term pain relief for OAK.

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## **Meta-analysis of pain relief effects by laser irradiation on joint areas.**

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### **Abstract**

#### **BACKGROUND:**

Laser therapy has been proposed as a physical therapy for musculoskeletal disorders and has attained popularity because no side effects have been reported after treatment. However, its true effectiveness is still controversial because several clinical trials have reported the ineffectiveness of lasers in treating pain.

### **METHODS:**

In this systematic review, we investigate the clinical effectiveness of low-level laser therapy (LLLT) on joint pain. Clinical trials on joint pain satisfying the following conditions are included: the laser is irradiated on the joint area, the PEDro scale score is at least 5, and the effectiveness of the trial is measured using a visual analogue scale (VAS). To estimate the overall effectiveness of all included clinical trials, a mean weighted difference in change of pain on VAS was used.

### **RESULTS:**

MEDLINE is the main source of the literature search. After the literature search, 22 trials related to joint pain were selected. The average methodological quality score of the 22 trials consisting of 1014 patients was 7.96 on the PEDro scale; 11 trials reported positive effects and 11 trials reported negative effects. The mean weighted difference in change of pain on VAS was 13.96 mm (95% CI, 7.24-20.69) in favor of the active LLLT groups. When we only considered the clinical trials in which the energy dose was within the dose range suggested in the review by Bjordal et al. in 2003 and in World Association for Laser Therapy (WALT) dose recommendation, the mean effect sizes were 19.88 and 21.05 mm in favor of the true LLLT groups, respectively.

### **CONCLUSIONS:**

The review shows that laser therapy on the joint reduces pain in patients. Moreover, when we restrict the energy doses of the laser therapy into the dose window suggested in the previous study, we can expect more reliable pain relief treatments.

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## **The effect of low-level laser in knee osteoarthritis: a double-blind, randomized, placebo-controlled trial.**

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### **Abstract**

#### **INTRODUCTION:**

Low-level laser therapy (LLLT) is thought to have an analgesic effect as well as a biomodulatory effect on microcirculation. This study was designed to examine the pain-relieving effect of LLLT and possible microcirculatory changes measured by thermography in patients with knee osteoarthritis (KOA).

#### **MATERIALS AND METHODS:**

Patients with mild or moderate KOA were randomized to receive either LLLT or placebo LLLT. Treatments were delivered twice a week over a period of 4 wk with a diode laser (wavelength 830 nm, continuous wave, power 50 mW) in skin contact at a dose of 6 J/point. The placebo control group was treated with an ineffective probe (power 0.5 mW) of the same appearance. Before examinations and immediately, 2 wk, and 2 mo after completing the therapy, thermography was performed (bilateral comparative thermograph by AGA infrared

camera); joint flexion, circumference, and pressure sensitivity were measured; and the visual analogue scale was recorded.

**RESULTS:**

In the group treated with active LLLT, a significant improvement was found in pain (before treatment [BT]: 5.75; 2 mo after treatment : 1.18); circumference (BT: 40.45; AT: 39.86); pressure sensitivity (BT: 2.33; AT: 0.77); and flexion (BT: 105.83; AT: 122.94). In the placebo group, changes in joint flexion and pain were not significant. Thermographic measurements showed at least a 0.5 degrees C increase in temperature--and thus an improvement in circulation compared to the initial values. In the placebo group, these changes did not occur.

**CONCLUSION:**

Our results show that LLLT reduces pain in KOA and improves microcirculation in the irradiated area.

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