

# Low Level Laser Therapy for Painful Joints

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## Abstract:

Low Level Laser Therapy (LLLT) uses a light source that generates extremely pure light, of a single wavelength<sup>1</sup>. 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<sup>2</sup>. A Cochrane review of LLLT in osteoarthritis included five trials, and concluded that despite some positive findings, the meta-analysis lacked data on how LLLT effectiveness was affected by the important factors of wavelength, treatment duration of LLLT, dosage, and site of application over nerves instead of joints<sup>1,3,4,5,6,7</sup>. A different review<sup>2</sup> addresses some of these issues in a wider range of trials, and is broadly positive, if limited by numbers.

**Keywords:** LLLT; joint; pain

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## Systematic review

An extensive search included not only a number of electronic databases, but used a wide range of key words to be sure of finding different types of lasers. Physiotherapy journals from 10 countries were also searched by hand, and researchers contacted. The search was stopped at the end of 2001.

Included trials had to:

- Include patients with a joint disorder of more than six months duration, or include patients with osteoarthritis verified by X-ray.
- Have a control group with otherwise identical placebo treatment.
- Have patients and assessors blind to the therapy received.
- Have laser exposure of skin overlying the inflamed joint capsule.
- Have an outcome measure of pain or change in health status.

Main outcome measures chosen were pain assessed during activity, and health status, usually as a global

measure, with improved or better being counted as success<sup>8,9</sup>.

The authors also considered which characteristics of the laser treatment made sense in terms of dose and duration (number of sessions and sessions per week). They made pre-hoc determinations about laser power, dose, location, and duration for each of several possible joints to be treated, and this was done for each of several different types of laser.

## Results

Fourteen trials with 695 patients were included, three of which (130 patients) had doses below the suggested range. Trial size ranged from 20 to 115 patients. Pain before treatment was 50 mm on a 100 mm scale in most trials, and above 35 mm in all, so that included patients had pain of at least moderate intensity, and in most trials it would have been severe. Joints included were knee, thumb, lumbar and cervical spine, and temporomandibular<sup>10</sup>. The largest trial had a single application of laser therapy, but for most,

laser was used between five and 20 times over two to four weeks. Many different lasers were used. Use of analgesics was allowed in some, but not all, trials.

The pooled mean reduction in pain intensity was 30 mm (95% CI 19 to 41 mm) more than with control in seven trials within the suggested dose range. Laser treated patients had reduction in pain by about half (30 mm), while there was virtually no change with control (Figure 1).

Six trials, including one outside the dose range,

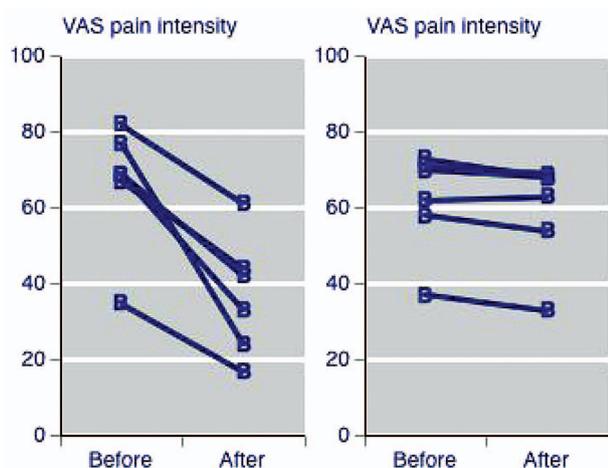


Figure 1. Pain intensity change for laser and control

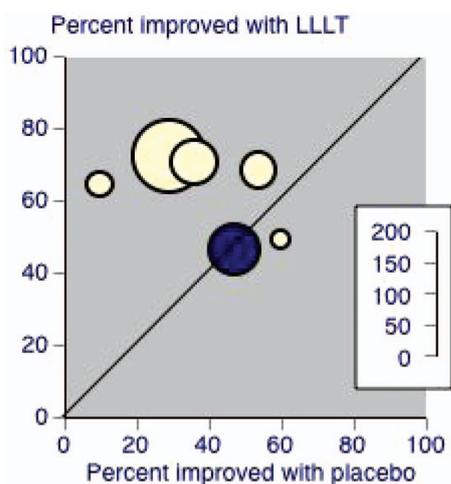


Figure 2. Percent of patients improved with laser and control (dark symbol outside recommended dose range)

reported on patients improved (Figure 2). In these six trials with 391 patients, 64% were improved with laser and 38% with control. The relative benefit was 1.7 (1.4 to 2.1) and the number needed to treat for one patient to be improved was 3.8 (2.8 to 6.0).

The one low power trial outside the dose range had identical results for laser and control. The five studies within the dose range (310 patients) had 69% improved with laser and 35% with control. The relative benefit was 1.9 (1.5 to 2.5) and the NNT was 3.0 (2.3 to 4.4) (Table 1).

Adverse events were explicitly stated to be absent in six optimal dose trials, and another trial had a single transient adverse event in each group.

**Comment**

The two reviews conclude that treatment looks positive, but there are problems about what is being done, how, to whom, with what outcome. The first limits itself to osteoarthritis; the second looks at chronic joint pain, and so has more trials, but it also addresses issues of appropriateness.

What it says is interesting<sup>11</sup>. It demonstrates a clinically as well as statistically significant halving of pain intensity by 30 mm compared with control, and in absolute terms. Improvement in global health status was twice as common with treatment than with controls, and the NNT of 3 was consistent with an effective treatment.

Problems still remain, especially about how long the pain relief lasts. Another randomised trial (published since the review looking at laser therapy in knee arthritis) showed pain reduction continuing for at least 10 weeks. It also confirmed a halving in pain intensity with laser therapy.

Even so, this is limited information, on what is clinically and methodologically heterogeneous evidence. The amount of information on a particular laser, used at a particular power, for a particular course of treatment, for particular patients and looking at particular outcomes over a particular period is close to zero. So a bit of a curate’s egg<sup>12</sup>.

Table 1. NNTs for low level laser therapy in painful joints

Trials included	Trials	Improved/total (%)		Relative benefit (95% CI)	NNT (95% CI)
		Laser	Control		
All trials	6	132/207 (64)	69/184 (38)	1.7 (1.4 to 2.1)	3.8 (2.8 to 6.0)
Appropriate laser dose	5	110/160 (69)	53/150 (35)	1.9 (1.5 to 2.5)	3.0 (2.3 to 4.4)

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