

ARTHRITIS RESEARCH ABSTRACTS



THE PHOTOTHERAPY EXPERTS

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Laser better than NSAIDs?

From the WALT (World Association of Laser Therapy) News letter – Issue 1 2005

In the Dec 4th paper issue of the British Medical Journal, a new meta analysis on the effect of NSAIDs on knee osteoarthritis pain appears, that may become important to the recognition and future development of laser therapy. A research group from Norway, headed by Dr. Jan M. Bjordal summaries that non-steroidal anti-inflammatory drugs (NSAIDs), including cyclo-oxygenase-2 inhibitors (coxibs), reduce short-term pain associated with knee osteoarthritis only slightly better than placebo, and long-term use of these agents should be avoided. Up for analysis were 23 placebo-controlled trials involving 10,845 patients, 7767 of whom received NSAID therapy and 3078 placebo therapy.

21 of the NSAID-studies were funded by the pharmaceutical industry, and the results of 13 of these studies were inflated by patient selection bias as previous NSAID-users were excluded if they had not previously responded favourably to NSAID. Such an exclusion criterion for non-responders has never been seen in any controlled trial of laser therapy or other non-pharmacological therapies of osteoarthritis. In the remaining 10 unbiased NSAID-trials, the difference from placebo was only 5.9 mm on a 100mm pain scale. This is far less than established data on differences that are considered minimally perceptible (9 mm) or clinically relevant (12 mm) for knee osteoarthritis patients. In addition, none of the trials found any effects beyond 13 weeks.

Adverse events of long term medication with NSAIDs and particularly coxibs, has recently received much attention in the Vioxx-scandal. Consequently, coxibs like Vioxx has been withdrawn and Prexige has been withheld from the market, and the whole group of coxibs, are now under special observation by drug agencies in both Europe and the United States. In contrast to the virtually non-existent side-effects of laser therapy, NSAID side-effects cause an estimated number of 2000 deaths annually in Great Britain alone, because half of the 8.5 million osteoarthritis patients there take these drugs on a regular basis. The considerable international interest for the findings of the Norwegian research group has been highlighted by articles in several major newspapers across Europe and North America and more than 60 unique website-listings within two weeks after publication. The recent development is further moving the balance in disfavour of NSAIDs and coxibs, and may well be the end of the era where they served as reference treatment for osteoarthritis.

Osteoarthritis

The Effect of Low Power Laser Therapy On Osteoarthritis of the Knee

Basirnia A., Sadeghipoor G., Esmaeeli Djavid G. et al.

Radiol Med (Torino). 1998 Apr; 95(4):303-9.

Treatment was performed on 20 patients, aging from 42 to 60 years. All patients had received conservative treatment with poor results. Laser device used for this treatment was pulsed IR diode laser; 810 nm wave length once per day for 5 consecutive days, followed by a 2-day interval. The total number of applications was 12 sessions. Irradiation was performed on 5 periarticular tender points, each for 2 min.

The treatment outcome (pain relief and functional ability) was observed and measured according to the following methods: 1) Numerical rating scales (NRS), 2) Self assessment by the patient, 3) Index of severity for osteoarthritis of the knee (ISK), 4) Analgesic requirements.

We achieved significant improvement in pain relief and quality of life in 70% of patients, comparing to their previous status ($p < 0.05$). There was no significant change in range of motion of the knee.

The clinical efficacy of low-power laser therapy on pain and function in cervical osteoarthritis

Oezdemir F, Birtane M, Kokino S

Clinical Rheumatology (2001) 20(3): 181-184.

Pain is a major symptom in cervical osteoarthritis (COA). Low-power laser (LPL) therapy has been claimed to reduce pain in musculoskeletal pathologies, but there have been concerns about this point. The aim of this study was to evaluate the analgesic efficacy of LPL therapy and related functional changes in COA. Sixty patients between 20 and 65 years of age with clinically and radiologically diagnosed COA were included in the study. They were randomized into two equal groups according to the therapies applied, either with LPL or placebo laser. Patients in each group were investigated blindly in terms of pain and pain-related physical findings, such as increased paravertebral muscle spasm, loss of lordosis and range of neck motion restriction before and after therapy. Functional improvements were also evaluated. Pain, paravertebral muscle spasm, lordosis angle, the range of neck motion and function were observed to improve significantly in the LPL group, but no improvement was found in the placebo group. LPL seems to be successful in relieving pain and improving function in osteoarthritic diseases.

Infrared diode laser in low reactive-level laser therapy (LLLT) for knee osteoarthritis

M. A. Trelles, J. Rigau, P. Sala, G. Calderhead, T. Ohshiro

Laser Therapy, (1991); 3(4): 149-153.

Degenerative joint disease (DJD), in particular in the knee, is difficult to cure successfully at present, often requiring surgical intervention. In addition, the chronic DJD patient often exhibits symptoms of both a physiological and psychological nature. A study is presented using low reactive-laser therapy (LLLT) with an 830 nm infrared continuous wave gallium aluminum arsenide (GaAlAs) diode laser, with an output power of 60 mW, in light contact laser therapy for a population of 40 patients (power density of 18 J/cm² per session) two sessions per week for eight weeks. Radiological pain score and joint mobility assessments were made before the first session, immediately after, and at 4 months after the final LLLT session. All other medication and physical therapy was discontinued at least 15 days prior to the first treatment session. Thirty-three patients (82%) reported significant removal of pain and recovery of articular joint mobility. The remaining seven patients felt there was no significant effect following LLLT, and returned to their original pre-therapy medication. The side effects were minimal. LLLT is concluded to be a safe effective and noninvasive alternative to conventional surgical and medical treatment modalities for DJD patients.

Improvement of pain and disability in elderly patients with degenerative osteoarthritis of the knee treated with narrow-band light therapy

Stelian J, Gil I, Beni-Habot, Rosenthal M, Abramovici I, Kutok N, Khahil A

Journal American Geriatric Society (January 1992) 40(1); 23-26

Objective:

To evaluate the effects of low-power light therapy on pain and disability in elderly patients with degenerative osteoarthritis of the knee.

Design:

Partially double-blinded, fully randomized trial comparing red, infrared, and placebo light emitters.

Patients:

Fifty patients with degenerative osteoarthritis of both knees were randomly assigned to three treatment groups: red (15 patients), infrared (18 patients), and placebo (17 patients). Infrared and placebo emitters were double-blinded.

Interventions:

Self-applied treatment to both sides of the knee for 15 minutes twice a day for 10 days.

Main Outcome Measures:

Short-Form McGill Pain Questionnaire, Present Pain Intensity, and Visual Analogue Scale for pain and Disability Index Questionnaire for disability were used. We evaluated pain and disability before and on the tenth day of therapy. The period from the end of the treatment until the patient's request to be retreated was summed up 1 year after the trial.

Results:

Pain and disability before treatment did not show statistically significant differences between the three groups. Pain reduction in the red and infrared groups after the treatment was more than 50% in all scoring methods ($P < 0.05$). There was no significant pain improvement in the placebo group. We observed significant functional improvement in red and infrared-treated groups ($P < 0.05$), but not in the placebo group. The period from the end of treatment until the patients, required retreatment was longer for red and infrared groups than for the placebo group (4.2 ± 3.0 , 6.1 ± 3.2 , and 0.53 ± 0.62 months, for red, infrared and placebo, respectively).

Conclusions:

Low-power light therapy is effective in relieving pain and disability in degenerative osteoarthritis of the knee.

LLLT in osteoarticular diseases in geriatric patients

Giavelli S, Fava G, Castronuovo G, Spinoglio L, Galanti A (1998)

Radiology Medicine (Torino) (1998) Apr; 95(4):303-309.

Laser light absorption through the skin causes tissue changes, targeting the nervous, the lymphatic, the circulatory and the immune systems with an analgesic, anti-inflammatory, anti-edematous effect and stimulating tissue repair. Therefore, LLLT is now commonly used in many rehabilitation centers, including the "Istituto Gerontologico Pio Albergo Trivulzio", Milan, Italy. However, to activate the treatment program, the basic medical research results must always be considered to choose the best optical wavelength spectrum, technique and dose, for rehabilitative laser therapy. We analyzed the therapeutic effects of different wavelengths and powers in various treatment schedules. In particular, a protocol was designed to test such physical parameters as laser type, doses and individual schedule in different pathologic conditions. We report the results obtained with LLLT in the rehabilitation of geriatric patients, considering the various physical and technical parameters used in our protocol. We used the following laser equipment: an He-Ne laser with 632.8 nm wavelength (Mectronic), a GaAs Laser with 904 nm wavelength (Mectronic) and a CO₂ Laser with 10,600 nm wavelength (Etoile). To evaluate the patient clinical status, we use a different form for each involved joint; the laser beam is targeted on the region of interest and irradiation is carried out with the sweeping method or the points technique. Irradiation technique, doses and physical parameters (laser type, wavelength, session dose and number) are indicated on the form. The complete treatment cycle was 5 sessions/wk for 20 sessions in all. At the end of the treatment cycle, the results were scored on a 5-grade semi quantitative scale--excellent, good, fair, poor and no results. We examined 3 groups of patients affected with gonarthrosis (149 patients), lumbar arthrosis (117 patients), and algodystrophy (140 patients) respectively. In gonarthrosis patients, the statistical analysis of the results showed no significant differences between CO₂ laser and GaAs laser treatments ($p=.975$), but significant differences between CO₂ laser and He-Ne laser treatments ($p=.02$) and between GaAs laser and He-Ne laser treatments ($p=.003$). In lumbar arthrosis patients treated with GaAs or He-Ne laser, significant differences were found between the two laser treatments and the combined sweeping-points techniques appeared to have a positive trend relative to the sweeping method alone, especially in sciatic suffering. In the algodystrophy syndrome, in hemiplegic patients, significant differences were found between CO₂ and He-Ne laser treatments ($p=.026$), between high and low CO₂ laser doses ($p=.024$), and between low CO₂ laser dose and high He-Ne laser dose ($p=.006$). LLLT can be used to treat osteoarticular pain in geriatric patients. For best results, the diagnostic picture must be correct and a treatment program defining the physical parameters used (wavelength, dose and irradiation technique) must be designed.

Rheumatoid Arthritis

Beneficial effects of laser therapy in the early stages of rheumatoid arthritis onset

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Laser Therapy (1991) 11(2); 79-87.

The purpose of this study was to determine the effects of laser therapy in pain reduction and/or recovery of patients at the onset of Rheumatoid Arthritis (RA), comparatively with the traditional non-steroidal anti-inflammatory drugs (NSAIDs). Fifty-nine patients with RA of 6-12 months duration were included in the study. The patients were divided into 3 groups: Group 1 (21 patients) received laser therapy; Group 2 (18 patients) was submitted to placebo laser therapy and NSAIDs medication; Group 3 (20 patients) was treated only with NSAIDs. Physical therapy was instituted in all three groups. GaAIAs diode laser of 830 nm wavelength and 200mW maximum output power was used. Group 1 received laser therapy once each day, eight days per month, for a total of 32 treatments during a four-month period. The parameters used were 2-4 J/cm² energy density, and a frequency of 5 Hz or 10 Hz depending on the number and severity of pain in the affected joints. Placebo laser treatment was given to Group 2. The functional activity score, the acute pain phase reactants (ESR and C – reactive protein), T-lymphocytes and NK (natural killer) – cells were estimated. Synovial biopsies and Magnetic Resonance Imaging (MRI) of the synovial membrane were performed as well. The analysis of the clinical and biological parameters at the end of treatment showed a statistically significant decrease of duration of morning stiffness, of pain at rest and during movements, and improved acute phase reactants. The overall efficacy rate in these studies was 86% in the first group, 50% in laser placebo group and 40% in the NSAIDs-treated third group. After four months of treatment, our investigations showed that 830 nm infrared laser therapy promoted the restoration of function, relieved pain and limited the complications of RA.

Low Powered Laser Therapy for Rheumatoid Arthritis

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British Society for Rheumatology IXth Annual General Meeting, 1998

There are very few prospective controlled randomized trials of physiotherapy methods of treatment in arthritis. When new modalities of physical therapy become available it is especially important they are evaluated in this way. Low powered laser treatment is a novel form of local treatment which can be used in rheumatoid arthritis (RA). Placebo therapy can be given with specially adapted equipment. We used such an approach to examine the efficacy of laser therapy for RA knee joints using a double blind trial design.

A multi-head laser was used with optical light for direction finding and laser light (at 820nm) for therapy. Two leads were used for the study (coded A and B) but apparently identical to the operator, one was fully operational; the other gave optical light only. We studied 40 RA patients randomized to receive active or placebo low powered laser treatment. Where possible both knees were treated. Patients were assessed initially, at 3 and 6 weeks of therapy, and after treatment had been completed. Six variables were measured: flexion, extension, strength, stiffness, pain and overall grading of knee arthritis. Active therapy led to significant improvements in strength ($p=0.003$, unpaired t-test) and decreased pain ($p=.058$) compared to placebo treatment. Active treatment also led to fewer persistently flexed knees (22%) compared to controls (62%) and a greater number of normally graded knees (97.5%) compared to controls (73%); but were significant by Chi-squared testing ($p<0.025$ and <0.005 respectively).

This study shows randomized controlled studies of physiotherapy are possible; using such an approach low powered laser therapy appears to be an effective treatment for RA knees.

Laser Therapy - Positive Double Blind Studies

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