Short term beneficial effects of low level laser therapy for patients with rheumatoid arthritis

Synopsis


**Question** To assess the effectiveness of low level laser therapy (LLLT) in the treatment of rheumatoid arthritis (RA). Data sources MEDLINE, EMBASE and The Cochrane Controlled Trials Register (CENTRAL) up to June 2005. Reference lists from relevant articles were scanned. Relevant studies were also traced by contacting experts. Study selection Randomised controlled trials of patients with RA which compared LLLT with other treatments or placebo laser therapy. Data extraction Methodological quality was assessed independently by two reviewers according to predefined criteria (Jadad scale), which included the appropriateness of randomisation, appropriateness of blinding, and description of dropouts and withdrawals. Results Six trials with a total of 222 patients were included. Five trials were placebo-controlled, while one trial used the opposite limb as a control. The median methodological quality was 3 (range 1–5). The included patients were adults with morning stiffness that ranged from 60 to 90 minutes. For five of the six trials the schedule of treatment was 2–3 sessions per week for 3–4 weeks. Four of the five placebo-controlled trials found a significant difference in pain in favour of the LLLT group. Weighted Mean Difference for the three trials using a 0–10 point visual analogue scale was 1.10 cm (95% CI 0.39 to 1.82). Statistically significant improvements were also found for tip to palm flexibility with a difference of 1.3 cm (95% CI 0.9 to 1.7) (two trials), and morning stiffness duration with an improvement of 27 minutes (95% CI 13 to 52) (three trials). In two trials patients were followed up three months after the end of treatment. No significant benefits of LLLT were evident at this time. The trial which used the opposite limb of the same individual as a control did not find any improvement in laser-treated hands. Conclusion This review clearly indicates that low level laser therapy decreases pain and morning stiffness in people with rheumatoid arthritis. It does not appear, however, to have long-lasting effects. Most of the studies tested laser therapy on the hand, so it is not clear whether laser therapy would affect other joints of the body the same way.

Commentary

This paper is an update of an original review of low level laser therapy (LLLT) for rheumatoid arthritis published in 1998. Rheumatoid arthritis is characterised by loss of mobility, muscle strength, aerobic capacity, and endurance as a result of pain, inflammation, and degeneration in joints, tendons, and muscles and as a result of physical inactivity in general (Ekdahl & Broman 1992). Physical activity has a well-documented effect on muscle strength, aerobic capacity, and endurance (van Den Ende et al 1998). Most trials in this review were double-blind and this contributes to higher quality scores. This degree of blinding is unusual for trials in physiotherapy, because of the difficulty in devising a convincing placebo for most physical interventions.

The main conclusions from this systematic review are that LLLT can reduce pain and duration of morning stiffness measured after 10 weeks, but the effects were not significant after 20 weeks. There were no significant differences between the intervention and the placebo group in functional assessments such as the Health Assessment Questionnaire, grip strength, and walking speed.

This review indicates that LLLT can be used to reduce pain as a part of physical rehabilitation for rheumatoid arthritis. No side effects were reported. It enables patients with rheumatoid arthritis to exercise with less pain. Because these benefits are temporary, some patients may not consider the time and expense involved in receiving a course of LLLT worthwhile.

The authors conducted a large number of subgroup analyses in order to provide recommendations about dosage, wavelength, site of application (joint versus nerve), and treatment length. They conclude that shorter wavelength (< 660 nm) and application on both nerve and joint seem to improve the effect, but there are insufficient data to give firm recommendations.

The authors report that most trials tested LLLT on the hand only and that there is great variability in the application and dosage of LLLT. Dosages are often not reported consistently. There is a great need for well-conducted trials investigating dosage, wavelength, site of application, and treatment length and it is of great importance that the intervention is described in detail in future studies in order to draw firm conclusions about the effect of LLLT.

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References


Immediate weight-bearing is not detrimental to operatively or conservatively managed rupture of the Achilles tendon

Synopsis


**Question** For patients with either operatively or non-operatively managed rupture of the tendo Achillis, does immediate weight-bearing mobilisation in an off-the-shelf orthosis improve functional outcomes over non-weight-bearing mobilisation? **Design** Two randomised, controlled trials with concealed allocation, blinded assessors, and intention-to-treat analysis. **Setting** Participants were recruited from the orthopaedic centres of three UK hospitals. **Patients** Patients who had ruptured their tendo Achilles within the previous seven days. Forty-eight operatively-treated patients were randomised to weight-bearing (n = 23) or non-weight-bearing (n = 25) groups on the first post-operative day. In a second trial, forty-eight non-operatively-treated patients were randomised to weight-bearing (n = 22) or non-weight-bearing (n = 26) groups upon presentation during working hours. **Interventions** In both trials, the weight-bearing group mobilised in an off-the-shelf, carbon-fibre orthosis with three 1.5 cm heel raises, while the non-weight-bearing group had a traditional plaster cast applied. Operatively-treated patients were reviewed fortnightly for eight weeks, with progressive reductions in the amount of plantarflexion of the orthosis/cast until plantigrade was reached. The orthosis/cast was removed at eight weeks. Non-operatively-treated patients only commenced reducing the amount of plantarflexion of the orthosis/cast after 6 weeks, continuing at fortnightly intervals until 12 weeks. **Outcomes** All patients were reviewed at 3, 6 and 12 months. The primary outcome was the time taken to return to normal performance of the following activities: sport, walking, stair climbing, and work. Secondary outcomes included health-related quality of life, calf diameter, joint range of movement, and dynamometry. Adverse events were also recorded. **Results** In the operatively-treated patients, return to normal walking was significantly earlier in the weight-bearing group, difference in medians 5.5 weeks (95% CI 0 to 11). Return to normal stair climbing was also significantly earlier in the weight-bearing group, difference in medians 9 weeks (95% CI 5.3 to 12.7). Weight-bearing did not affect time to return to sport or work, nor any of the secondary outcomes. In the non-operatively-treated patients, the weight-bearing and non-weight-bearing groups did not differ significantly on any outcomes. In both trials, adverse events including re-rupture were few and were not significantly different between weight-bearing and non-weight-bearing groups. **Conclusion** Patients with operatively managed rupture of the tendo Achillis have faster return to normal walking and stair climbing with weight-bearing mobilisation. Non-operatively managed patients attained similar functional outcomes regardless of weight-bearing status. The practical advantages of immediate weight-bearing nevertheless make it a preferable management strategy.

Commentary

There is a recent trend for early mobilisation in the management of Achilles tendon ruptures. Indeed, there is some anecdotal evidence, or evidence from relatively small studies, that weight bearing and active mobilisation are beneficial to the healing of the tendon, and produce good results.

Matthew Costa and his colleagues performed two independent, randomised, controlled trials in order to assess the potential benefits of immediate weight-bearing mobilisation after rupture of the tendo Achillis. In the first trial, based on patients managed operatively, they showed improved functional outcome when patients were mobilised fully weight-bearing after surgical repair. The authors stress that patients need to follow a structured rehabilitation regimen.

The second trial deals with patients managed conservatively. In this instance, there was no evidence of a functional benefit from immediate weight-bearing mobilisation. However, immediate weight-bearing did not predispose the patients to a higher complication rate, and patients showed no evidence of tendon lengthening or a higher re-rupture rate.

The message is clear: immediate weight-bearing is not detrimental to patients with rupture of the Achilles tendon, whether they are managed operatively or conservatively. If these patients are managed operatively, then early mobilisation as well as weight bearing should be considered.

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No difference in fall risk in older women between three exercise programs one year after the programs

Synopsis


Question What is the effect of three types of exercise-based interventions aiming to reduce fall risk in older women one year after formal cessation of the programs? Design One-year follow up of a randomised controlled trial. Setting Community. Patients 98 women aged 75 to 85 with low bone mass. Interventions Participants were assigned to one of three 25-week exercise programs: resistance training, agility training, and stretching (sham exercise). Outcomes Primary outcome was Physiological Profile Assessment (PPA), a fall risk score based on the performance of five physiological domains (vision, proprioception, strength, reaction time, and postural sway). Other outcomes were level of physical activity measured with the Physical Activities Scale for the Elderly questionnaire, and falls.

Results Of the 98 participants who completed the exercise programs 89 (90.8%) were assessed at 12-month follow-up. No significant between-group differences were found in fall risk score (p ≥ 0.23), any of the PPA components (p ≥ 0.38), or current physical activity (p ≥ 0.57). A significant decrease in fall risk score from baseline to the end of the one-year follow-up period was found for all three groups (p ≤ 0.001). The decrease in fall risk score was 43.3% in the resistance training group, 40.1% in the agility training group, and 37.4% in the stretching group. Physical activity level at the end of the one-year follow-up period was not significantly different from trial completion within the resistance training and stretching groups, while physical activity increased during the one-year follow-up within the agility training group (p < 0.02). During the one-year follow-up period, there were five falls among four participants from the resistance training group, six falls among five participants from the agility training group, and nine falls among seven participants from the stretching group. Conclusion The three interventions produced similar improvements in fall risk score and physical activity one year after cessation of the exercise programs.

Commentary

Hip fractures represent a major health problem in most western countries and Norway has the highest incidence in the world with more than 9000 fractures each year. This article contributes to existing knowledge about the prevention of falls and fractures and is therefore of great interest to physiotherapists and other health professionals.

This is a follow-up of a previously published, randomised, controlled trial (Liu-Ambrose et al 2004). The primary study investigated the effects of exercise on fall risk and physical activity level in older women with low bone mass. Three types of group-based exercise programs were compared. The results show reduction (ie, improvement) in PPA score in all groups: 57.3% and 47.5% reduction in the resistance and agility training groups, but only 20.2% reduction in the stretching group. The present study is a one-year follow-up after cessation of the exercise programs. The intention was to see if the positive effects of exercise could be maintained over time.

The number of falls in each group is a more direct measure of how the interventions affect falls than the PPA score. Unfortunately, in both the original study and this follow-up report, the incidence of falls was low and the differences were not tested statistically. We are therefore unable to draw strong conclusions from these data.

At one year follow-up there was no significant difference in PPA score between the three groups, but they all had significantly reduced PPA scores compared to baseline. The stretching group received stretching exercises, deep breathing and relaxation techniques, and general posture education (Liu-Ambrose et al 2004). These strategies do not reduce fall risk (Province et al 1995), so how could this intervention still be as effective as the exercise groups? Perhaps the reduction in fall risk score is related to the social aspect of being included in a group.

The PPA score data indicate that the interventions should be beneficial, but the trials do not provide evidence of how the exercises should be delivered. How can we organise preventive treatment in an effective way, and how do we identify those at risk of falling? Is primary healthcare responsible for this type of prevention or could hospital-based care play a role?

At Diakonhjemmet Hospital, we are faced with similar patients after hip fracture has occurred. Are the results of this report also relevant in postoperative rehabilitation? Our experience is that these patients are, unfortunately, a low-priority group in the Norwegian healthcare system. Very few, if any, are offered exercise or other physiotherapy interventions. From our point of view, more research and better care is needed to prevent the negative consequences of a hip fracture, such as reduced quality of life, institutionalisation, and death.

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References

Heat wrap therapy reduces pain and disability in early stage low back pain

Synopsis


Question Is superficial heat or cold therapy effective in the management of low back pain? Data sources Trials were located by searches of Medline, Embase, CINAHL, PEDro, Sportdiscus, OldMedline, Cochrane Back Review Group Specialised Register and Cochrane Central Register of Controlled Trials, as well as screening reference lists in relevant articles. Study selection and assessment Randomised and non-randomised controlled trials that examined superficial heat or cold in adults with non-specific low back pain (LBP) of any duration were eligible for inclusion. Trials comparing various modes of heat or cold therapy to placebo, no therapy, or other therapies were eligible. Methodological quality of included trials was assessed using the Cochrane Back Review group criteria. Outcomes Trials were eligible if they included at least one of the following outcomes: pain, disability/function, overall improvement, patient satisfaction, and adverse effects. Results were expressed as weighted mean differences (WMD) with 95% confidence intervals. Main results The literature revealed 1178 potentially eligible studies, but only nine fulfilled the eligibility criteria. Pooled data from two trials (Nadler 2003a & b) of 258 participants with a mix of acute and subacute LBP showed heat wrap therapy reduced pain (WMD = −1.06, −1.45 to −0.68, scale range 0 to 5) and disability (WMD = −2.10, −3.19 to −1.01, scale range 0 to 24) after 5 days compared with oral placebo. In one trial of acute LBP (Nuhr 2004) a heated blanket resulted in a moderate short-term reduction in pain (WMD = −32.20, −38.69 to −25.71, scale range 0 to 100) compared with a non-heated blanket when measured immediately after application. One high quality trial (Mayer 2005) of acute and subacute LBP subjects investigated whether exercise with heat wrap therapy was more beneficial than exercise alone. The addition of heat wrap resulted in moderate improvements in pain (WMD = −1.40, −2.11 to −0.69, scale range 0 to 5) and function (WMD = −3.20, −5.42 to −0.98, scale range 0 to 24) at day 7, but not earlier. Longer term effects of these interventions are unknown. No controlled trials were located that examined the effects of heat on pain or disability for chronic LBP. There is insufficient evidence to evaluate the effects of cold for LBP. Conclusion There is moderate evidence that heat wrap therapy results in small, short-term reductions in pain and disability in LBP of up to 12 weeks duration, and that the addition of exercise may provide further benefit.

Commentary

Heat and cold are commonly used by physiotherapists and other clinicians (Gracey et al 2002, Battie et al 1994), but their use has traditionally been taught without reference to evidence of their efficacy. Therefore, this Cochrane review of superficial heat and cold for non-specific low back pain (NSLBP) is clinically relevant and timely.

No randomised-controlled trials (RCTs) of cold, no RCTs of heat for chronic NSLBP, and only five RCTs of heat for recent-onset NSLBP met the simple inclusion criteria, highlighting the need for more high quality research.

Clinicians often ask ‘Is this treatment better than other alternatives by a clinically important amount?’ However, not all of the outcome measures used in the comparisons in this review have known thresholds for a minimally clinically important difference (MCID). The results of studies comparing the effects of heat to the effects of placebo (or non-heated wrap) consistently favoured heat (4/4 comparisons, 100%) and the increased effect was above the MCID for pain (Hagg et al 2003) but not for disability (Stratford et al 1998) where known (1/2, 50%). In contrast, the results of studies comparing heat to alternative treatments (analgesia, NSAID, educational booklet, McKenzie exercises) inconsistently (8/18, 44%) favoured heat and the increased effect was always less than the MCID (18/18, 100%) when known. The studies comparing heat plus exercise to alternative treatments (educational booklet, exercise alone, heat alone) also inconsistently (13/27, 48%) favoured heat and the increased effect (reduced disability) was rarely above the MCID (2/11, 18%) when known.

Overall, these results suggest that heat is better than no treatment but the effects of alternative treatments are similar. In addition, all outcomes were short-term (up to one week after treatment) and the medium and long-term effects are unknown. More research is required, particularly of any additive effect when heat is combined with other therapies and of the efficacy of cold.

References