Clinical efficacy of low power laser therapy in osteoarthritis

Marks R, de Palma F

Authors' objectives
To conduct a systematic and critical analysis of studies of patient outcomes following either continuous or pulsed low level laser treatment of an osteoarthritic joint.

Searching
MEDLINE (1966 to 1998), CINAHL (1982 to 1998) were searched using the following terms: osteoarthritis, articular cartilage, arthritis, joints, lasers, laser therapy, low level laser therapy, infra-red rays, phototherapy, and therapeutic intervention. Other databases investigated included Excerpta Medica, Science Citation Index, MEDLARS, Index Medicus, and Health.

Study selection

Only controlled, blinded clinical studies were considered for inclusion in the review.

Specific interventions included in the review
Infra-red laser therapy and helium neon laser therapy were included in the review. The duration of treatments and the number of treatments given varied between studies.

Participants included in the review
Adult patients suffering from osteoarthritis, with an age range of 21 to 89 years.

Outcomes assessed in the review
Outcome measures varied between studies. Pain was the outcome measure in five studies. Range of motion, medication intake levels and tenderness were the outcome measures in two studies, and excretion of a derivative serotonin and time to requesting repeat treatment were the outcome measures in one study.

How were decisions on the relevance of primary studies made?
The authors do not state how the papers were assessed for validity, or how many of the reviewers performed the validity assessment. They do however, state that the analysis "was conducted separately by both authors to avoid single-reviewer bias".

Assessment of study quality
A qualitative analysis of the studies was undertaken using the 24 criteria and scoring approach of Beckerman et al. 1992 (see Other Publications of Related Interest no.1). The authors do not state how the papers were assessed for validity, or how many of the reviewers performed the validity assessment. They do however, state that the analysis "was conducted separately by both authors to avoid single-reviewer bias".

Data extraction
The authors do not state how the data were extracted for the review, or how many reviewers performed the data extraction. The following categories of data were extracted: Study design, clinical diagnosis, sample characteristics, blinding procedures, treatment modes, treatment parameters, treatment dosages, treatment sites, inclusion and exclusion criteria, outcome measures, measurement frequency and study results.

Methods of synthesis
How were the studies combined?
As no standardisation of measurement of patient outcome was employed in the various studies they were combined using a narrative synthesis.

How were differences between studies investigated?
The review acknowledged that there were considerable differences between the studies. The narrative synthesis divided the studies into those that found a positive response to low level laser therapy and those that did not.

Results of the review
Six studies were included in the review (n=202). The range of sample sizes in the various studies was 26 to 81. Five of the six studies were randomised, double-blind, placebo-controlled studies (although one study that compared both infra red laser and helium neon laser with placebo was blind for the infra-red versus, placebo comparison only). The sixth study was double-blind and placebo controlled but not randomised.

No study met all the quality criteria for an unbiased study, although all the studies achieved at least 50% of the total number of points attainable. The major flaws were: failure to establish the validity of the randomisation processes; failure to detail the reliability and validity of the outcome measures used; failure to describe, standardise and control for co-interventions; omission of therapist and analytic blinding; failure to conduct power analyses to establish whether negative findings were potentially attributable to deficient study power. Despite their shortcomings, the six studies included in the review did report post-treatment improvements in a variety of osteoarthritic problems, including pain, mobility, tenderness and function, with few adverse effects.

Authors’ conclusions
The studies documented in this review generally indicated statistically superior results in pain and tenderness post-laser treatment. Yet, owing to their design shortcomings, caution is warranted concerning any definitive statement regarding the clinical efficacy of low power laser stimulation for the treatment of painful osteoarthritic joints.

CRD commentary
The review addressed an appropriate question with well-defined inclusion/exclusion criteria. The literature search was comprehensive and probably identified all studies in this field of research. The results of this search were however, then deliberately restricted by the authors’ selection criteria. Although this improved the quality of the studies included in the review, it is possible that some interesting non-English studies, or unpublished studies were missed. The validity of the studies included in the review was formally assessed and major flaws identified and detailed in the review. The details of the individual studies are tabulated within the review, enabling readers to judge their nature and heterogeneity. The narrative of the review also includes pertinent details of the individual studies. Given the wide range of techniques, study methods etc. employed in the different studies the narrative synthesis presented by the authors is appropriate. The findings and rather general conclusions drawn from the data are fully supported by the data presented in the review.

Implications of the review for practice and research
Practice: The authors do not state any implications for practice.

Research: The authors state 'Clearly, much more work is needed in this area' and '...carefully designed clinical as well as basic research appears warranted'.

Bibliographic details

PubMedID
10444763
Other publications of related interest

Indexing Status
Subject indexing assigned by NLM

MeSH
Humans; Laser Therapy; Osteoarthritis /therapy; Treatment Outcome

AccessionNumber
11999004314

Date bibliographic record published
28/02/2001

Date abstract record published
28/02/2001

Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.