Evidence-based review of lasers, light sources and photodynamic therapy in the treatment of acne vulgaris

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CRD summary
This review investigated the efficacy and safety of optical treatments for acne vulgaris. The authors concluded that the treatments had short-term efficacy. Photodynamic therapy had the most consistent outcomes. Poor reporting of the review process and limitations in the included studies precluded a thorough evaluation of the reliability of the authors’ conclusions.

Authors' objectives
To assess the efficacy and adverse effects of optical treatments of acne vulgaris.

Searching
PubMed and The Cochrane Library were searched in March 2007 for relevant studies in the English language. Search terms were reported. Reference lists were also searched for studies.

Study selection
Controlled studies were eligible if they used a sample size of at least 10 individuals for each tested intervention and compared lasers, light sources or photodynamic therapy with no treatment, other optical treatment or traditional topical acne treatments. Primary review outcomes were inflammatory and non-inflammatory response, patient satisfaction or side effects reported in a controlled manner.

A wide range of optical treatments were used in the included studies, including photodynamic therapy, infrared lasers, broad-spectrum light sources, pulsed dye lasers, intense pulsed light and potassium titanyl phosphate laser. The site of treatment was mostly the face, but effects were also measured on the back. Participants were mostly aged less than 50 years. Severity of acne ranged from mild to severe.

One author checked the titles and abstracts of potential studies for possible relevance and another author checked the identified publications. Any disagreement was resolved by discussion.

Assessment of study quality
Study validity was assessed by determining the study design (parallel group or within-patient trial), generation of randomisation sequence, allocation concealment and blinding of observers. The authors did not state how the validity assessment was performed.

Data extraction
The authors did not state how the data were extracted for the review or how many reviewers performed the data extraction.

Methods of synthesis
Studies were combined in a narrative synthesis supported by detailed evidence tables. Study differences were discussed in the text in terms of study design, type of intervention and comparison, outcome measurement, methodology and follow up.

Results of the review
Nineteen trials (n=587) were included: 16 randomised controlled trials (RCTs) (n=536) and three controlled clinical trials (CTs) (n=51). The randomisation method was specified clearly in six RCTs. Only one RCT reported adequate allocation concealment. Twelve of the 19 trials were intra-individual trials and 12 had blinded response evaluations. Follow up ranged from two to 26 weeks.
Treatments with photodynamic therapy (two trials) using methyl-aminolevulinic acid were associated with a 54 per cent to 68 per cent reduction in inflammatory lesions in facial acne 12 weeks after final treatment. Photodynamic therapy with aminolevulinic acid (one trial) also improved back acne (figures not reported). Intense pulsed light assisted photodynamic therapy was associated with improvements in acne compared with intense pulsed light alone, but results from the three RCTs were not consistent (figures were not reported for all trials). Conflicting results were reported for the other interventions. Side effects, including pain, erythema, oedema, crusting, hyperpigmentation and pustular eruptions were more intense for optical treatments combined with aminolevulinic acid or methyl-aminolevulinic acid.

**Authors' conclusions**

Optical treatments had short-term efficacy for acne vulgaris. Photodynamic therapy had the most consistent outcomes.

**CRD commentary**

The review addressed a clear research question with inclusion criteria that appeared to be appropriate. Two sources were used to search for relevant studies. There were no attempts to minimise language bias or locate unpublished studies, which meant that relevant studies may have been missed. Publication bias was not assessed. Methods were used to minimise bias and reviewer error in the selection of studies. There was potential for bias and error in the data extraction and validity assessment, as no detail was supplied on how these were performed. Most of the studies had methodological flaws due to lack of allocation concealment and intention to treat analyses, and limited sample sizes. Details reported on the included studies indicated a wide range of different types of optical treatments and comparisons, which suggested that the decision not to combine the studies in a meta-analysis was appropriate. The authors' conclusions that optical treatments had short-term efficacy for acne, appeared to be overstated. Limited evidence, together with potential methodological flaws in the review process, meant that the reliability of the conclusions is not clear.

**Implications of the review for practice and research**

Practice: The authors stated that participants should be informed of the existing evidence on optical treatments for acne.

Research: The authors stated that further RCTs comparing optical treatments with standard acne treatments were needed. Such studies needed to include long-term follow up times and evaluate frequency of relapse at different follow up times.

**Funding**

Not stated.

**Bibliographic details**


**PubMedID**

18221341

**DOI**

10.1111/j.1468-3083.2007.02503.x

**Indexing Status**

Subject indexing assigned by NLM

**MeSH**

Acne Vulgaris /therapy; Controlled Clinical Trials as Topic; Evidence-Based Medicine; Humans; Laser Therapy/methods; Photochemotherapy/methods; Randomized Controlled Trials as Topic

**AccessionNumber**
12008103321

Date bibliographic record published
23/12/2008

Date abstract record published
08/07/2009

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.