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## Low level laser treatment of tendinopathy: a systematic review with meta-analysis

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### CRD summary

The authors concluded that low level laser treatment was potentially effective in treating tendinopathy using recommended doses, but overall evidence was inconclusive. Although the statistical synthesis of results was limited and there was a possibility of missing studies, other parts of the review were well-conducted and the authors' tentative conclusion seems justified.

### Authors' objectives

To evaluate the effectiveness of low level laser treatment for treating pain in patients diagnosed with tendinopathy.

### Searching

MEDLINE, CINAHL, AMED, EMBASE, EBM, PEDro and SCOPUS were searched without language restrictions for articles published in peer-reviewed journals in the date range 1950 to 2008. Full search strategies were reported.

### Study selection

Randomised controlled trials (RCTs) and controlled clinical trials (CCTs) of low level laser treatment administered to patients diagnosed with tendinopathy and assessing pain and/or functional outcomes, were eligible for inclusion in the review. Tendinopathy typically included tendinitis, tendinosis and insertional tendinopathy. The comparisons of interest were placebo, no treatment, medication, exercise therapy and electrotherapy. Combination therapies were excluded.

Most of the included low level laser treatment trials were compared with placebo. Patients had various diagnoses: medial, lateral and radiohumeral epicondylitis; elbow, shoulder, supraspinatus and rotator cuff tendinitis; Achilles tendinitis or tendinopathy; patella tendinitis epicondylitis; De Quervains tenosynovitis; and other tendinopathies. Various outcome measures were used, such as visual analogue scales (VAS) for pain, tenderness and function, grip strength, various other pain, strength, and flexibility measures, range of movement score, inflammatory markers and patient satisfaction.

Two independent reviewers carried out the study selection. Disagreements were resolved by consensus.

### Assessment of study quality

Trial quality assessment was carried out by three independent reviewers who used the PEDro scale of eligibility criteria, randomisation, allocation concealment, baseline comparability of groups, blinding, follow-up, intention-to-treat analysis, between-group comparisons, point estimates and variability. Studies could achieve a maximum score of 11. Studies that scored 6 or more were considered to have high methodological quality.

### Data extraction

Where possible, data were extracted to enable calculation of relative risks for dichotomous data and mean differences for continuous data, together with 95% confidence intervals (CI). Where necessary, authors were contacted for missing information.

Three independent reviewers carried out data extraction.

### Methods of synthesis

Where possible, summary relative risks and weighted mean differences (WMDs) were estimated using a fixed-effect or random-effects meta-analysis. The latter was applied in the presence of statistically significant heterogeneity, which was assessed using  $X^2$  and  $I^2$ . Studies were grouped in terms of site of injury (lateral epicondylitis, Achilles tendinopathies, rotator cuff injuries). Sensitivity analyses were conducted according to comparison group and for higher quality studies only.

### Results of the review

Twenty-five trials (n=1,023 participants, range 14 to 89) were included in the review, 22 of which were randomised controlled trials. Twenty trials scored at least 6 on the PEDro scale, which indicated high quality. Poor blinding, allocation concealment and intention-to-treat analysis were featured throughout.

Results were conflicting: 12 trials showed positive effects and 13 were inconclusive or showed no effect. Ten high-quality studies with positive effects revealed that the dosage used was in line with recommendations; other studies were conflicting in this respect.

Statistical heterogeneity precluded meta-analysis in most cases. In two pooled analyses, grip strength was significantly improved in patients with lateral epicondylitis treated with low level laser treatment compared to control group (WMD 9.59kg, 95% CI 5.90 to 13.27,  $I^2=4.7%$ ; four high-quality trials). Pain was significantly reduced in patients with Achilles tendinopathy (WMD -13.64mm on a 100mm VAS, 95% CI -26.17 to -1.11,  $I^2=44.3%$ ; two high-quality trials).

Sensitivity analyses did not materially affect the main findings.

### Authors' conclusions

Low level laser treatment was potentially effective in treating tendinopathy using recommended doses, but the overall evidence was inconclusive.

### CRD commentary

The review question was clear and supported by potentially reproducible inclusion criteria. The search strategy covered several relevant sources. Attempts were made to minimise language bias. Publication bias was a possibility given the restriction to published studies. The review process was carried out with good efforts to minimise reviewer error and bias. An appropriate quality assessment tool was applied. Detailed quality results were presented. Study details were presented clearly, statistical heterogeneity was assessed and the chosen method of synthesis appeared appropriate.

Although the statistical synthesis of results was limited and there was a possibility of missing studies, other parts of the review were well-conducted and the authors' tentative conclusion seems justified.

### Implications of the review for practice and research

Practice: The authors did not state any implications for practice.

Research: The authors stated that further research should seek to improve reporting of clinical application techniques, parameters and results.

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