Effectiveness of interferential current therapy in the management of musculoskeletal pain: a systematic review and meta-analysis

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CRD summary
The authors concluded that interferential current therapy alone for musculoskeletal pain treatment was not significantly better than placebo or comparison therapies; as a co-intervention, it was better than control or placebo for reducing musculoskeletal pain. A tentative interpretation of these conclusions may be required, as statistical pooling might not have been appropriate and there was potential for missing studies.

Authors’ objectives
To evaluate the analgesic effectiveness of interferential current therapy in managing musculoskeletal pain.

Searching
MEDLINE, EMBASE, CINAHL, The Cochrane Library, Scopus, Web of Science, and PEDro were searched for published English language articles, with search dates that ranged from 1950 to February 2010. Search terms were presented. Full search results were available in an online appendix (see Additional data URL). Bibliographies of retrieved articles were searched for key authors and journals.

Study selection
Randomised controlled trials (RCTs) that compared isolated or coadjutant interferential current therapy with placebo, control, another physical treatment, or other intervention type, were eligible for inclusion. Eligible patients were those aged between 18 and 80 years diagnosed with musculoskeletal pain. The primary outcome of interest was pain, measured by the visual analogue scale (VAS) or numeric pain rating scale (NRS).

Most of the included trials evaluated interferential current therapy as a co-intervention (combined with exercise, short wave diathermy, hot packs, ice, myofascial release, neuromuscular electrical stimulation, infrared radiation, or ultrasound). Included patients had a variety of acute or chronic pain conditions. A number of different outcome measures were included covering pain, function, disability, and quality of life. Treatment duration varied. Less than a quarter of included trials were conducted in the UK.

Two reviewers selected studies for inclusion independently. Disagreements were resolved by discussion.

Assessment of study quality
Seven scales (Delphi list, PEDro, Maastricht, Maastrick-Amsterdam list, Bizzini, van Tulder, and Jadad) were combined to evaluate the quality of included trials. Thirty-nine items were assessed across five categories covering patient selection, blinding, intervention, outcomes, and statistics. Each trial score was calculated by dividing the number of items met by the number of applicable items. Scores were used to determine the overall methodological quality as low (0 to 0.40), moderate (0.41 to 0.70), or high (0.71 to 1.00).

Two reviewers carried out the quality assessment independently. Disagreements were resolved by discussion.

Data extraction
Where possible, data were extracted to enable the calculation of mean differences (MDs) and 95% confidence intervals (CIs).

It appeared that two reviewers carried out the data extraction.

Methods of synthesis
Where possible, mean differences and 95% confidence intervals were pooled in a random-effects meta-analysis (DerSimonian and Laird). Statistical heterogeneity was assessed using the $X^2$ statistic. In the absence of statistical heterogeneity, a fixed-effect meta-analysis was conducted. Where statistical pooling was not possible, a narrative
synthesis was applied.

**Results of the review**
Twenty RCTs were included in the review. Fourteen RCTs (1,114 patients) were included in the meta-analysis. Of these, two trials were deemed to be high quality, eleven were moderate quality and one was poor quality. Follow-up ranged from none to 12 months.

Statistically significant differences on pain intensity at treatment discharge were reported in favour of interferential current therapy as a supplement to another treatment compared with a control group (pooled MD 2.45, 95% CI 1.69 to 3.22; three RCTs). Substantial heterogeneity was noted in this analysis (I²=70%).

Statistically significant differences were reported for pain intensity at three-months follow-up for interferential current therapy as a supplement to another treatment compared placebo (pooled MD 1.85, 95% CI 1.47 to 2.23; I²=0%; two RCTs).

At treatment discharge, pooled mean differences in pain intensity were not statistically significant for interferential current therapy alone versus placebo (two RCTs) or comparison group (two RCTs), or for interferential current therapy as a supplement to another treatment versus placebo (five RCTs) or comparison group (five RCTs).

Adverse effects were minimal (details reported in the review).

**Authors' conclusions**
Interferential current therapy alone for musculoskeletal pain was not significantly better than placebo or comparison therapies at treatment discharge. Interferential current therapy as a co-intervention was significantly better than control and placebo therapies for reducing musculoskeletal pain at discharge and at three months post-treatment.

**CRD commentary**
This review addressed a clear question. Inclusion criteria were sufficiently replicable. A wide range of data sources were accessed but the only published studies in English were included, so the potential for publication and language biases could not be ruled out. The review process contained sufficient efforts to minimise error and bias.

Trial quality was assessed thoroughly; the results indicated that the overall quality of included trials was moderate to high. Detailed trial characteristics were presented. The authors acknowledged that there was substantial clinical variation amongst the trials. This was confirmed in the analysis of statistical heterogeneity, which was high for most results. Therefore, it was not clear whether a statistical synthesis of results was appropriate.

Given that statistical pooling might not have been appropriate and the potential for missing studies due to limits in the search strategy, a tentative interpretation of the conclusions may be required.

**Implications of the review for practice and research**
**Practice:** The authors stated that limited evidence on the efficacy of interferential current therapy alone prevented a definitive conclusion for practice.

**Research:** The authors stated that further studies were needed to assess the effects of interferential current therapy alone, interferential current therapy in homogenous clinical samples and in acute pain conditions. For chronic conditions, further research should use a theoretical framework to select parameters associated with suprasegmental analgesic mechanisms (noxious stimulation) instead of sensory stimulation. Adverse effects should be reported as a mandatory requirement.

**Funding**
Canadian Institutes of Health Research (CIHR); Alberta Provincial CIHR Training Program in Bone and Joint Health; Government of Chile, MECE-SUP Program; Physiotherapy Foundation of Canada, Ann Collins Whitmore Memorial Award; University of Alberta, Provost Doctoral Entrance Award and an Izaak Walton Killam scholarship; University Catholic of Maule, Chile.
Bibliographic details
Fuentes JP, Armijo Olivo S, Magee DJ, Gross DP. Effectiveness of interferential current therapy in the management of musculoskeletal pain: a systematic review and meta-analysis. Physical Therapy 2010; 90(9): 1219-1238

PubMedID
20651012

DOI

Original Paper URL
http://ptjournal.apta.org/content/90/9/1219.abstract

Additional Data URL
http://ptjournal.apta.org/content/90/9/1219/suppl/DC1

Indexing Status
Subject indexing assigned by NLM

MeSH
Chi-Square Distribution; Electric Stimulation Therapy /methods; Humans; Musculoskeletal Diseases /therapy; Pain Management; Pain Measurement; Randomized Controlled Trials as Topic

AccessionNumber
12010007248

Date bibliographic record published
16/03/2011

Date abstract record published
30/04/2012

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.