The effectiveness of non-invasive treatments for active myofascial trigger point pain: a systematic review of the literature

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CRD summary
This review evaluated the use of noninvasive treatment for myofascial pain with trigger points. The authors concluded that there was some evidence to support the short-term effectiveness of laser therapy, magnet therapy and transcutaneous electrical nerve stimulation. However, the evidence for other therapies or longer term effectiveness was limited. Given the limited reporting of the review process and methodological weaknesses of the included studies, the reliability of the author's conclusions is unclear.

Authors' objectives
To evaluate the effectiveness of noninvasive interventions in the treatment of myofascial pain resulting from myofascial trigger points (MTrPs).

Searching
MEDLINE, CINAHL, EMBASE, PEDro and the Cochrane CENTRAL Register were searched from inception to May 2006 for articles written in the English language; the search terms were reported. The references of retrieved studies were handsearched. A manual of MTrPs was also searched (see Other Publications of Related Interest).

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) or quasi-randomised studies were eligible for inclusion. Studies were excluded if allocation was not concealed from the outcome assessor.

Specific interventions included in the review
Studies of noninvasive interventions for MTrPs were eligible for inclusion if the intervention was clearly defined in the study. The interventions studied were laser therapy, electrotherapies, ultrasound, magnet therapies, and physical or manual therapies; the types of intervention varied within these categories. Eligible studies compared the noninvasive intervention with placebo, other treatment or a no treatment control group.

Participants included in the review
Studies of participants with myofascial pain with active MTrPs were eligible for inclusion. Minimum diagnostic criteria were the presence of a taut band and spot tenderness on palpitation. The location of MTrPs studied were neck and/or upper trapezius, upper and lower back, and on the abdomen as treatment for chronic pelvic pain.

Outcomes assessed in the review
Studies of subjective pain intensity or pain relief were eligible for inclusion. The primary outcome reported was pain, as measured by the McGill Pain Questionnaire, visual analogue scales, pain threshold algometry, pain disability index, pain tolerance and percentage of time in pain. The secondary outcomes reported were range of motion, MTrP characteristics, Beck Depression Inventory (BDI), Nottingham Health Profile (NHP) and patient global assessment.

How were decisions on the relevance of primary studies made?
The author did not state how the papers were selected for the review, or how many reviewers performed the selection.

Assessment of study quality
One reviewer assessed the methodological quality of the studies using a 20-item critical evaluation list developed by Bronfort et al. for a review of noninvasive treatments for headache. Fourteen items assess internal validity, with a score of one or zero being allotted to each item. The total number scored for each study out of 14 was used to calculate a percentage validity score for each study. The Jadad scale was also applied to assess study quality, although the results were not reported because of the low correlation between the two scales and the author's belief that the Jadad scale over-
emphasised blinding.

**Data extraction**

One reviewer extracted the data, but the author did not state how the data were extracted. The main findings of the studies, with p-values, were extracted.

**Methods of synthesis**

**How were the studies combined?**

The studies were combined in a narrative. Further information was apparent from the tables.

**How were differences between studies investigated?**

The studies were grouped according to the different types of intervention. Some differences between the studies were evident from the tables and text.

**Results of the review**

Twenty-three studies (n=1,321) were included in the review. There was insufficient information to determine the different study types.

Thirteen studies scored between 50% and 75% on the validity scale and two scored between 75% and 85%.

Five of the 6 trials of laser therapies showed a statistically significant difference between treatment and placebo groups following treatment on measures including pain, BDI, cervical range of motion, NHP, and on the neck pain and disability scale (p-values ranged from p<0.05 to p<0.001). In 2 trials there continued to be a statistically significant difference between treatment and placebo groups at the 3-month follow-up.

One low-quality study found transcutaneous electrical nerve stimulation (TENS) was equal to electrical muscle stimulation in reducing pain at follow-up, although superior immediately following treatment (p<0.01). Other trials found TENS to be effective but had final outcome measures immediately following treatment.

Two of the 4 studies assessing ultrasound found no significant effect on pain. One study reported a significant benefit of ultrasound, but the study was of a low quality. One study comparing high-power pain threshold ultrasound (HPPT-US) with conventional ultrasound reported a significant benefit of HPPT-US. However, this study also had a low validity score.

Three studies examined the use of magnet therapies. Two studies used repetitive magnetic stimulation and both found it to be superior to placebo on pain measures (p-values ranged from 0.022 to 0.001). One study reported that magnets placed on MTrPs on the abdomen for chronic pelvic pain were superior to placebo on measures of pain (p<0.05).

Four studies assessed as being of a higher quality examined various forms of physical or manual therapy. All suggested that therapies including Thai massage, Swedish massage, self applied ischaemic compression, massage and exercise, and transverse friction massage may offer benefits, but long-term follow-up was lacking.

**Authors' conclusions**

There is significant evidence for the short-term effectiveness of laser therapy on pain intensity and the immediate benefits of TENS. There are insufficient data to determine the long-term effectiveness of TENS. The evidence for the effectiveness of frequency modulated electrical muscle stimulation, electrical muscle stimulation, high voltage galvanic stimulation and interferential current is limited. Preliminary evidence indicates that magnet therapy may be effective. Ultrasound is no more effective than placebo. The evidence for physical and manual therapies is moderate, owing to the high level of heterogeneity in this group.

**CRD commentary**

The inclusion criteria were broad, resulting in a high level of heterogeneity in interventions, participants, outcomes and study designs. A wide range of sources were searched. However, appropriate steps do not appear to have been taken to minimise language or publication bias, therefore important data may have been omitted. There was insufficient
information on the study selection and data extraction processes to rule out the possibility of error and bias. A validity assessment was carried out; however, this was performed by only one reviewer, which may have introduced error and bias. The review is hampered by the lack of high-quality evidence available. The decision to combine the studies in a narrative analysis was appropriate given the high level of clinical heterogeneity. Indeed, the wide variation in interventions, participants and outcome measures used makes it difficult to draw overall conclusions. Given the methodological weaknesses of the included studies, the lack of information on the review process, and clinical heterogeneity, the reliability of the author's conclusions is unclear.

Implications of the review for practice and research
Practice: The author stated that evidence for the interventions is limited. However, greater attention should be paid to the concept of myofascial pain as a multi-dimensional problem requiring multi-modal treatment.

Research: The author stated that further high-quality trials are needed with clear documentation of diagnostic criteria and location of MTrPs, and using diagnostic characteristics as outcome measures. Further research is needed on the optimum dosage, frequency and duration of laser therapy with long-term outcome measures. Particular attention needs to be paid to randomisation and statistical power in future trials.

Funding
Not stated.

Bibliographic details

Other publications of related interest

Indexing Status
Subject indexing assigned by CRD

MeSH
Acupuncture Therapy; Anesthetics, Local /administration & dosage /adverse effects; Cognitive Therapy /methods; Combined Modality Therapy; Electric Stimulation Therapy; Exercise; Facial Pain /psychology /therapy; Injections, Intramuscular; Lidocaine /administration & dosage; Massage; Masticatory Muscles /physiopathology; Myofascial Pain Syndromes /therapy; Neck Pain /therapy; Physical Therapy Modalities; Posture; Pressure; Relaxation Therapy; Self Care /methods; Transcutaneous Electric Nerve Stimulation; Treatment Outcome; Ultrasonic Therapy /methods

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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.