Does exercise therapy improve headache? A systematic review with meta-analysis
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CRD summary
The review concluded that overall the results suggested that exercise (particularly stretching and postural relaxation) had therapeutic value for tension type headache and temporomandibular disorder muscle pain and should be included in the treatment regimen for these conditions. The authors' conclusions reflected the evidence presented, but given the limitations of the included studies should be viewed with caution.

Authors' objectives
To assess the effectiveness of therapeutic exercise for headache and temporomandibular disorder muscle pain.

Searching
MEDLINE, The Cochrane Library and Cochrane Central Register of Controlled Trials (CENTRAL) were searched for published studies between 1966 and February 2008. Search terms were not reported. Reference lists of review papers were scanned and attempts were made to contact authors and specialists in the field.

Study selection
Randomised controlled trials (RCTs) that evaluated the effectiveness of therapeutic exercise for adults and children with pain related to tension-type headache and temporomandibular disorder muscle pain were eligible for inclusion. The primary outcome was pain severity.

Interventions included in the review were: jaw stretching alone or together with neck stretching with ice; reflex inhibition; posture training and self management; standard physiotherapy exercise; postural relaxation; cognitive-behavioural therapy (CBT) with progressive muscle relaxation and coping, or CBT and posture; home exercises integrated with education; and exercise and splints with or without medication. Comparators included education only, splint only, general information or placebo. Most participants were diagnosed with pain from temporomandibular disorder including joint and muscle; other participants were diagnosed with head and jaw myofascial pain. Outcome measures varied between studies and included pain relief or reduction, pain intensity, success rate and range of motion.

The authors did not state how papers were selected for the review or how many reviewers performed the selection.

Assessment of study quality
Validity assessment evaluated selection bias, measurement or detection bias, comparison group or performance bias and attrition bias. Studies were each awarded a total score of up to 1 point.

Validity was assessed independently by two to three reviewers. Disagreements were resolved through consensus.

Data extraction
Data on the mean and standard deviation were extracted for change in symptom scores and used to calculate odds ratio (OR) and absolute risk reduction (ARR), together with associated 95% confidence intervals (CI), for rate of pain reduction. Data on the number needed to treat (NNT) were extracted. A successful outcome was defined as approximately 50% reduction in a self-report measure of pain or a subjective report of at least an improved status.

Data were extracted independently by at least two and in some cases four reviewers.

Methods of synthesis
Where possible, pooled odds ratios, absolute risk reductions and corresponding 95% CIs were calculated using a random-effects model. Statistical heterogeneity was assessed (method not reported). Studies that were not included in the meta-analysis were described narratively.
**Results of the review**

Ten RCTs (n=254, range 22 to 70) were included in the review. Validity scores ranged from 0.4 to 0.8 (mean 0.55). Duration of follow-up ranged from directly after treatment to 12 months after treatment.

Therapeutic exercise for tension type headache or temporomandibular disorder muscle pain was significantly more effective at reducing pain than no treatment or placebo (OR 2.82, 95% CI 1.50 to 5.29; four RCTs). There was no evidence of statistical heterogeneity for this analysis (p=0.33).

One RCT reported that stretch relaxation had a significantly greater effect than postural rest therapy for reducing masseter electromyography activity. One RCT reported the addition of posture correction to CBT showed no significant effect compared to CBT or self-management alone for headache and temporomandibular disorder pain. Three RCTs reported combined treatments for headache and temporomandibular disorder muscle pain were effective; no difference was reported between groups with or without an exercise program. One RCT found that passive jaw motion device therapy and flat splint were more effective than a wooden tongue blade and flat splint or splint only for pain from temporomandibular disorder.

**Authors’ conclusions**

Overall, the results suggested that exercise (particularly stretching and postural relaxation) had therapeutic value for tension type headache and temporomandibular disorder muscle pain and should be included in the treatment regimen for these conditions.

**CRD commentary**

The review question was clearly defined with appropriate inclusion criteria. Several relevant sources were searched. Search terms were not reported, so it is not possible to evaluate the search. The review was restricted to published studies only, which risked publication bias. It was unclear whether language limitations were applied and so there was potential for language bias. Validity was assessed and results of the assessment were reported partially. Appropriate efforts were made to reduce reviewer error and bias during validity assessment and data extraction; it was unclear whether similar steps were taken during study selection. Where possible, studies were combined in a meta-analysis and statistical heterogeneity was assessed. The remaining studies were appropriately discussed narratively due to differences in terms of outcomes. Some details of the studies were presented, but few characteristics of participants were reported and so it was not possible to assess the generalisability of the results to different populations. The authors appropriately discussed limitations of some of the included studies; limitations included poor quality, low sample sizes, lack of measurement of compliance, different interventions and lack of assessment of behavioural factors or comorbid conditions.

The authors’ conclusions reflected the evidence presented, but given the limitations of the included studies should be viewed with caution.

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

**Practice:** The authors stated that patient motivation, co-operation and understanding of exercises were paramount. The clinician must take time to explain exercises with terminology that patients understand, demonstrate how procedures are performed and review patients’ performance of the exercise. Aggravation of the condition may occur with overly vigorous application of exercise. As exercise did not provide immediate relief, proper instruction on expectations for gradual relief and training to enhance long-term efficacy were required.

**Research:** The authors stated that further robust research was required to reach definitive conclusions and determine the efficacy of different exercises alone and in combination with other treatments. Future research should evaluate relevant headache and temporomandibular disorder subtypes and a range of symptoms from mild to severe. Future RCTs should be conducted in a multisite setting, include large study samples, investigate comparison treatments and placebo controls, measure multiple outcomes at short- and long-term follow-up and identify risk factors for delayed recovery.

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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.