

**Bronfort G, Nilsson N, et al Non-invasive physical treatments for chronic/recurrent headache. Cochrane Database of Systematic Reviews 2004; Issue 3. Art # CD001898.**

Design: Systematic review of clinical trials

PICOS:

- Patient population: persons of any age with chronic or recurrent headache (tension, cluster migraine, cluster) according to International Headache Society (IHS) Criteria
- Interventions: one or more types of non-invasive physical treatments: spinal manipulation (SMT), heat/cold, traction, TENS, trigger point therapy, stretching exercise, and others, exclusive of acupuncture
- Comparison interventions: placebo/sham physical treatment, medication, waiting list, or any other non-invasive physical treatment
- Outcomes: At least one patient-reported outcome measure such as headache intensity, frequency, quality of life, patient satisfaction, etc
- Study types: Both randomized and quasi-randomized studies, with quasi-randomized studies reported separately from properly randomized trials

Study search and selection:

- Study search went through November 2002 in MEDLINE, CINAHS, Cochrane Central Register of Controlled Trials, and other databases
- Two authors independently selected trials to be included in the review and rated them for quality; disagreements were resolved through discussion or through consultation with a third reviewer
- Quality was rated using 20 methodological items with operational definitions for yes/no/unclear/not applicable
  - o 14 items were designated as internal validity items and 6 were designated as informativeness items
  - o Validity score (VS) was the percent of applicable validity items which were satisfied by the study; a high quality study had a VS of 50 or greater
- Five levels of evidence were defined
  - o Strong: 2 or more high quality studies with evidence of superiority, inferiority, or similarity, having appropriate confidence intervals or tests of statistical significance
  - o Moderate: 1 high-quality study with evidence of superiority, inferiority, or similarity, with appropriate confidence intervals or tests of statistical significance
  - o Limited: At least 1 lower quality study (VS<50) with evidence of superiority, inferiority, or similarity, with appropriate confidence intervals or statistical significance
  - o Preliminary: Study findings did not meet criteria for strong, moderate, or limited, because of confidence intervals or lack of statistical significance
  - o Conflicting: Findings among studies which could not be pooled

- A clinically important difference for establishing superiority or inferiority of one intervention compared to another was defined in terms of the measured difference in the outcome, divided by the pooled standard deviation of the two groups; if the effect size were greater or equal to 0.4 standard deviation, the criterion for superiority was met

#### Results:

- 22 trials with a total of 2628 patients met the inclusion criteria for the review
- 5 categories of headache were assessed: migraine, tension, cervicogenic, mixed migraine/tension, and post-traumatic; the mixed migraine/tension and the post-traumatic headaches could not be classified with HIS criteria
- For migraine, there were 7 trials with 1593 patients; for tension headache, there were 8 trials with 1504 patients; for cervicogenic headache, there were 6 trials with 461 patients; for the headaches that could not be classified with HIS criteria, there were 2 trials with 85 patients
- For migraine headache, no intervention reached the level of strong or moderate evidence
- For tension headache, there was moderate evidence that spinal manipulation added to massage was at most similar to placebo laser added to massage (moderate level of inefficacy of spinal manipulation) for headache intensity after a 4 week treatment period
- For cervicogenic headache, there was moderate evidence for several noninvasive interventions:
  - o There was moderate evidence that spinal manipulation was superior to no treatment for reducing headache pain and frequency up to 12 months after treatment
  - o There was also moderate evidence that spinal manipulation is superior to massage plus placebo laser for headache pain measured 1 week after a 3 week treatment program
  - o There was moderate evidence that spinal manipulation was superior to placebo manipulation for headache pain and disability after 3 weeks of treatment
  - o There was moderate evidence that exercise is superior to no treatment in reducing headache pain and frequency up to 12 months following 6 weeks of exercise therapy
  - o There was moderate evidence that exercise is at least as effective as manipulation for headache pain and frequency up to 12 months following a 6 week treatment program
  - o There was moderate evidence that spinal manipulation plus exercise was superior to no treatment in reducing headache pain and frequency for up to 12 months following a 6 week treatment program
- For the 2 headache types that had no HIS classification, no intervention reached an evidence level of moderate or strong
- Sensitivity analyses were done, in which the effect of lowering the cutoff score for a “high-quality” study from 50% to 40%, and also the effect of

raising the cutoff score from 50% to 60%; few interventions had their evidence levels influenced by changing these cutoff scores

- A second sensitivity analysis was done in which the cutoff score for superiority of one intervention over another was raised from 0.4 standard deviations to 0.5 SD; this change in definition of superiority changed the “moderate” evidence of efficacy for spinal manipulation compared to no treatment for cervicogenic headache to “preliminary” evidence of lack of efficacy at the 1 year follow-up
- Lowering the cutoff score for superiority from 0.4 SD to 0.3 SD did not change the level of evidence of any of the tested headache interventions
- Clinical heterogeneity of the intervention and outcome measures prevented the authors from pooling the results from different studies into a meta-analysis for any of the comparisons that were examined
- Adverse reactions to the noninvasive physical interventions were uncommon, and no study suggested that there were important risks of adverse effects

#### Authors’ conclusions:

- The heterogeneity of the studies included in the review means that a few high-quality RCTs could readily change the tentative conclusions of the efficacy of any of the interventions for headache
- Spinal manipulation has moderate evidence of superiority to no spinal manipulation for cervicogenic headache
- There was preliminary (lower-level) evidence that spinal manipulation was similar to amitriptyline for prophylaxis of migraine headache, but there was substantial loss to follow-up in this study, and the study made one comparison (headache following withdrawal from amitriptyline) which does not resemble the use of that drug in clinical practice, rendering the comparison of dubious relevance for the treatment of migraine headache

#### Comments:

- The authors used a method of quality assessment which is superior to what appears in most other Cochrane reviews; the specification of the operational definitions of the criteria and the specification of when the criteria do not apply create a clear and useful model for interpreting study quality
- The authors also include useful discussions of the limitations of many studies which met the cutoff for high quality (validity scores of 50% or greater), some of which lead the reader to a better estimate of the evidence in support of the described interventions
- The criteria used in the study for quality (50%) and for effect size (0.4 SD) are fairly liberal, making the designations of “moderate” evidence comparable to “adequate” or “some” evidence which are used in other studies for the Division of Workers’ Compensation guidelines
- The authors use a definition of “conflicting” evidence for studies whose results cannot be pooled (for meta-analysis); since none of the studies could be pooled for meta-analysis, this criterion would appear to be met for all of

the comparisons for which more than one study was available; however, this was not often used when it could have been used

Assessment: adequate for some evidence that spinal manipulation is effective for the treatment of cervicogenic headache; adequate for some evidence that exercise is superior to no treatment for cervicogenic headache; adequate for some evidence that exercise is as good as spinal manipulation for cervicogenic headache, and adequate for evidence that the combination of spinal manipulation and exercise is superior to no treatment for cervicogenic headache