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## REVIEW

# Spinal manipulation for asthma: A systematic review of randomised clinical trials

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Asthma;  
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**Summary**

Some clinicians believe that spinal manipulation is an effective treatment for asthma. The aim of this systematic review was to critically evaluate the evidence for or against this claim. Four electronic databases were searched without language restrictions from their inception to September 2008. Bibliographies and departmental files were hand-searched. The methodological quality of all included studies was assessed with the Jadad score. Only randomised clinical trials of spinal manipulation as a treatment of asthma were included. Three studies met these criteria. All of them were of excellent methodological quality (Jadad score 5) and all used sham-manipulation as the control intervention. None of the studies showed that real manipulation was more effective than sham-manipulation in improving lung function or subjective symptoms. It is concluded that, according to the evidence of the most rigorous studies available to date, spinal manipulation is not an effective treatment for asthma.

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The notion that spinal manipulation is an effective treatment for asthma might seem far fetched to many experts, yet it is an idea which is actively promoted by some clinicians. The American Chiropractic Association,<sup>1</sup> the British Chiropractic Association,<sup>2</sup> the Canadian Chiropractic Association,<sup>3</sup> the Chiropractic Patients Association<sup>4</sup> and the International Chiropractors Association<sup>5</sup> and the International Chiropractic Paediatric Association<sup>6</sup> all claim or imply that chiropractic is an effective symptomatic treatment for asthma. A Google search on "asthma/chiropractic" generated 1,570,000 hits (date: 16 Jan 2009) and the majority of them seem to promote this concept. Case reports<sup>7–13</sup> case series<sup>14–16</sup> uncontrolled studies<sup>17–19</sup> and a non-randomised trial<sup>20</sup> also seem to support this view.

Chiropractors employ a range of therapeutic modalities but the hallmark therapy is spinal manipulation.<sup>21</sup> DD Palmer, the founding father of chiropractic, believed that most diseases, including asthma, were caused by subluxations of the vertebrae: spinal manipulations, or "adjustments, have to correct these abnormalities".<sup>21</sup> "This is still a central tenet of chiropractic".<sup>22</sup> As currently no systematic review of this specific area exists, it seems desirable to evaluate the evidence from rigorous trials on this topic. This systematic review is aimed at summarizing and critically evaluating the data from randomised clinical trials (RCTs) of spinal manipulation as a treatment of asthma.

## Methods

Electronic searches were carried out (September 2008) in the following databases: Amed, Embase, Medline (using the Ovid interface) and Cinahl (using the Ebsco interface). The search terms were constructed over two concepts: spinal manipulation and asthma. Our own, extensive departmental files, the bibliographies of review articles and other relevant publications were hand-searched. No language or time limitations were imposed. The abstracts of the articles thus located were screened in End Note to remove duplicates and irrelevant studies.

To be considered for inclusion, a clinical trial had to be randomised, test the effectiveness of spinal manipulation, focus on human patients (of any age) with asthma and include clinical outcome (e.g. lung function, symptoms, medication usage). Any type of control intervention was admissible. Studies of chiropractic or osteopathic treatments not involving spinal manipulation were excluded, e.g., [23]. Trials which failed to include clinical endpoints or which were not fully published (e.g. available as an abstract only) were also excluded e.g., [24].

Key data of the included trials were extracted according to prespecified criteria (Table 1). Data extraction was performed by two independent reviewers. The methodological quality of all reviewed studies was estimated using the Jadad score.<sup>25</sup> Again, this was done by two independent reviewers. A meta-analytical approach was considered but was rejected because of the clinical heterogeneity of the primary studies.

## Results

The searches located 35 articles of which three met the inclusion criteria<sup>26–28</sup> (Fig. 1). All of these RCTs tested

chiropractic (as opposed to osteopathic, for instance) spinal manipulation and were sham-controlled. The treatment periods ranged between one and three months. Lung function tests were used in all studies to assess the success of the interventions. The sample sizes varied between 31 and 91. The methodological quality of all RCTs was excellent (Table 1). The quality of reporting, however, was poor in one study.<sup>26</sup>

The findings were consistently negative. Nielsen et al.<sup>26</sup> and Balon et al.<sup>27</sup> failed to demonstrate significant inter-group differences. Bronfort et al found "little or no change" when comparing pre-test with post-test lung function data and patient-rated symptoms. This study was aimed at determining the feasibility of a definitive trial and thus did not report inter-group differences "because of the high risk of committing type I and type II errors".

## Discussion

The results of this systematic review demonstrate that currently there are no data from rigorous RCTs to suggest that spinal manipulation is an effective treatment for asthma. On the contrary, all three RCTs show no significant benefit from spinal manipulation compared to sham-manipulation. This suggests that other types of studies (Table 2) have generated false positive results due to selection, expectation or other types of bias.

These unanimously negative findings seem to contradict conclusions from other reviews on the subject. Hawk et al suggest that "evidence from controlled studies...supports chiropractic care as providing benefit to patients with asthma...".<sup>29</sup> Citing the Bronfort pilot study,<sup>28</sup> Kemper et al recently stated "few RCTs have demonstrated significant benefits of chiropractic practice among paediatric patients.<sup>30</sup> A Cochrane review, on the other hand, concludes that "there is insufficient evidence to support the use of manual therapies for patients with asthma".<sup>31</sup> Part of the apparent contradictions could be due to the fact that Hawk et al.<sup>29</sup> reviewed not just spinal manipulation but "chiropractic care", i.e. the entire package of treatments administered by chiropractors. Similarly the Cochrane review<sup>31</sup> is not focussed on spinal manipulation but on any type of manual therapy, including massage therapy.

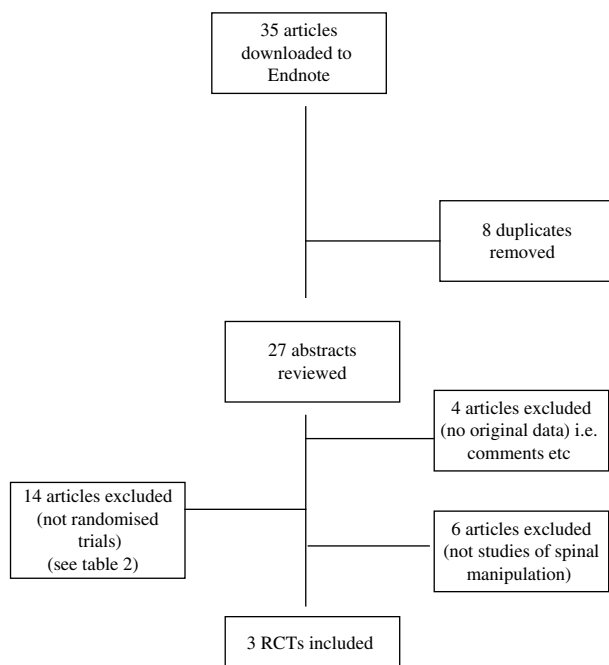
Therapeutic decisions are rarely made on the basis of therapeutic effectiveness alone. In the case of spinal manipulation, both safety and cost might come into play. Spinal manipulation has been associated with frequent but mild adverse effects<sup>32</sup> and (probably) infrequent but serious complications such as vertebral artery dissection.<sup>33</sup> The costs of any practitioner-based therapy that requires regular treatment sessions are bound to be considerable. Spinal manipulations are no exception.<sup>34</sup> Both factors would contribute to a recommendation against the use of spinal manipulation for the treatment of asthma.

The question arises when one should consider a treatment to be of proven ineffectiveness. Science in general and the RCT in particular are not good tools for proving a negative. Proponents of spinal manipulation might

**Table 1** Key data from the included trials.

First author (year)	Condition treated	Sample Size	Experimental treatment (therapist)	Control treatment	Treatment schedule	Primary outcome measure	Statistical analysis	Drop out/ withdrawal	Main results	Jadad score
Neilsen (1995)	Chronic asthma	31	High-velocity, low-amplitude thrusts at site of segmental dysfunction (chiropractor)	(Sham-manipulation rapid change of position of patient without direct manipulative thrust)	Twice weekly treatments for 4 weeks; 2 week washout then crossed over to alternative treatment for 4 weeks	Lung function tests, symptom score, bronchodilator use, bronchial reactivity	Repeated measures ANOVA, no sample size calculation	2 (Text is unclear)	No significant differences between groups or any measure <sup>a</sup>	5
Balon (1998)	Childhood asthma	91	Adjustments as judged to be optimal involving high-velocity, low-amplitude, directional push (chiropractor)	Sham-manipulation (gentle palpation to the spine and distraction manoeuvre low-amplitude low velocity)	Three times weekly for 4 weeks, then twice weekly for 4 weeks, then weekly for 8 weeks	Lung function tests, symptom score, bronchodilator use, peak expiratory flow	Analysis of covariance	10 + 1 removed (did not seem to use $\beta$ -agonist >3/week)	No significant differences between groups	5
Bronfort (2001)	Mild to moderate childhood asthma	36	High-velocity, low-amplitude thrust to dysfunctional joints of the spine (chiropractor)	Sham-manipulation (light manual contact without thrusts)	Twenty treatments during 3 months	Lung function tests, patient-rated symptoms, medication use	No inter-group comparisons were made	2	Only intra-group changes were reported	5

<sup>a</sup> Very confusing results section.



**Figure 1** Flow chart of excluded and included articles and studies.

therefore argue that, for a range of reasons, spinal manipulation is effective but the few RCTs available to date were inadequate and thus failed to demonstrate this fact. Even if this interpretation were correct, it would clearly be the responsibility of those who claim spinal manipulation to be effective to demonstrate this beyond reasonable doubt. In the absence of such proof, any claim that spinal

manipulation (or indeed any other therapy) is effective seems unjustified and irresponsible.

This review has several limitations. Even though the search strategy was thorough, there never can be an absolute certainty that all relevant studies were located. We know that journals of complementary and alternative medicine hardly ever publish negative results.<sup>35</sup> If this publication bias pertains to the current subject as well, the true overall result might even be more convincingly negative than the one generated here. The paucity of studies included in this review is another serious drawback. Any conclusion drawn from such a body of evidence has to be tentative and might rapidly change if new evidence emerges.

Systematic reviews often conclude that “more evidence is needed”. In this particular instance, however, I am not convinced that more studies of spinal manipulation should be funded with public money. The current evidence is clearly not positive, not even encouraging. If clinicians or organisations nevertheless imply (as they do) that spinal manipulation is an effective therapy for asthma, the onus is on them to fund, conduct and publish rigorous trials that demonstrate this claim to be true. Such trials should be designed along the lines of the best study that already exists.<sup>27</sup> In particular they should minimize bias (e.g. by randomisation, adequate control intervention, sufficient sample size), make sure that spinal manipulation is administered optimally (e.g. by employing several well-trained therapists) and the outcome is measured adequately (e.g. relevant clinical endpoints, validated outcome measures).

In conclusion, the currently available data from RCTs of spinal manipulation unanimously demonstrate that this treatment is not effective in alleviating the symptoms or signs of asthma.

**Table 2** Excluded reports of chiropractic spinal manipulation.

First author (year)	Study design	Outcome	Reference
Jamison (1986)	Uncontrolled study	Overall improvement	[17]
Lines (1993)	Uncontrolled study	Overall improvement	[19]
Garde (1994)	Case report	Symptomatic improvement	[7]
Killinger (1995)	Case report	Symptomatic improvement	[9]
Peet (1995)	Uncontrolled study	Overall improvement	[18]
Graham (1997)	Case series ( $n = 81$ )	Mostly positive, boys responded better than girls.	[14]
Peet (1997)	Case report	Symptomatic improvement	[10]
Nilssen (1998)	Case series	Most patients improved	[15]
Worrill (1998)	Case report	Improvements of symptoms	[11]
Hunt (2000)	Case report	Symptomatic improvement	[8]
Green (2001)	Case study	Objective improvement during therapy	[13]
Bockenbauer (2002)	Non-randomised pilot study	Increased respiratory thoracic excursions	[20]
Fedorchuk (2007)	Case report	Resolution of symptoms	[12]
Cuthbert (2008)	Retrospective case series	Mostly positive	[16]

## Conflict of interest

Author "Edzard Ernst" has no conflicts of interest to declare.

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