Should we abandon cervical spine manipulation for mechanical neck pain?

Benedict Wand and colleagues argue that the risks of cervical spine manipulation are not justified, but **David Cassidy and colleagues** think it is a valuable addition to patient care

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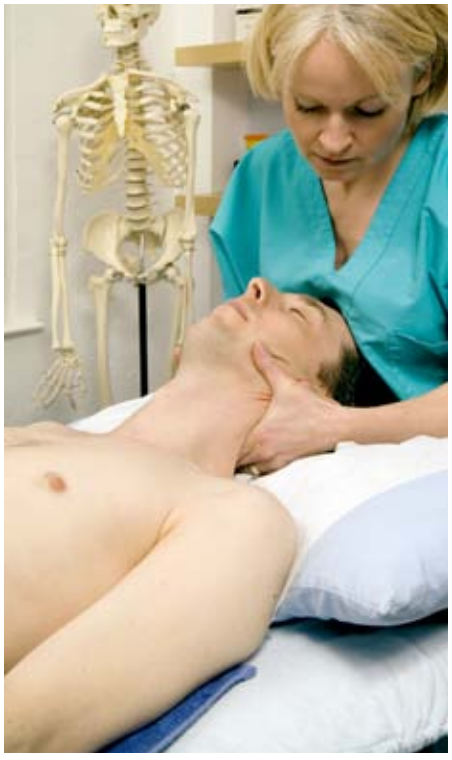
Of 1160 votes cast, 876 (76%) said no



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YES

Cervical spine manipulation (a high velocity, low amplitude, end range thrust manoeuvre) is a common treatment option for mechanical neck pain yet may carry the potential for serious neurovascular complications, specifically vertebral artery dissection and subsequent vertebrobasilar stroke. The non-superiority of manipulation to alternative treatments, coupled with concerns regarding safety, renders cervical spine manipulation unnecessary and inadvisable.

The controversy surrounding the association between manipulation and neurovascular complications is long standing and not fully resolved, partly because it is difficult to obtain conclusive evidence on rare adverse events. What can be accepted is that the incidence of vertebral artery dissection is low, with estimates between 1 (95% confidence interval 0.5 to 1.4) and 1.7 (1.1 to 2.3) per 100 000 person years in the United States.[1] The estimates for stroke resulting from vertebral artery dissection are lower still, ranging from 0.75 to 1.12 per 100 000 person years,[2] and many are unlikely to be the result of cervical manipulation.

Nevertheless, numerous case studies report neurovascular complications immediately after cervical manipulation,[3] and more robust case-control studies provide consistent evidence of an association between neurovascular injury and recent exposure to cervical manual therapy, particularly manipulation.[4-6] Although absolute risk cannot be accurately estimated, these studies have reported large effects in general populations (adjusted odds ratios 6.62, 95% confidence interval 1.4 to 30[4]; 12.67, 1.43 to 112.0[5]) and in patients under 45 (5.03, 1.58 to 16.07[6]). However, the causal nature of this association has recently been called into question by the findings of one case-crossover study.[7] Although the study found an association between vertebrobasilar stroke and chiropractic care in patients under 45 (3.60, 1.46 to 10.84), a comparable association was found between vertebrobasilar stroke and primary care practitioner visits (2.99, 1.81 to 4.96). The authors suggest that the increased risk after chiropractic treatment may be an artefact of patients seeking care for neck pain resulting from

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NO

Manipulation of the cervical spine should not be abandoned. Recently, an international multidisciplinary task force endorsed manipulation as one of several firstline treatments for neck pain, whiplash, and related headaches based on a systematic review of randomised clinical trials of interventions and research on adverse events.[1] They also published an original decision analysis model examining drugs, exercise, mobilisation, and manipulation for neck pain, including summary estimates on benefits and harms, and incorporating patient preferences using the standard gamble method.[2] Overall, there was no clear winner when the objective was to maximise quality adjusted life.

Another systematic review on conservative interventions for acute neck pain found that manipulation, multimodal physical therapy, neck exercises, and drugs (orphenadrine/paracetamol combined) all had significant short term effects on pain compared with placebo.[3] In addition, acupuncture and manipulation had significant short term effects on disability compared with placebo. Thus the evidence clearly suggests that manipulation benefits patients with neck pain. Furthermore, a recent high quality trial found spinal manipulation more effective for acute and subacute neck pain, over both the short and long term, than management with non-steroidal anti-inflammatory drugs or paracetamol.[4] The authors did not advocate abandoning these drugs, even though their harms are well documented.[5]

The evidence clearly suggests that manipulation benefits patients with neck pain

Extent of risk

One concern about manipulation is the risk of stroke, and stroke has been reported in association with other activities that include rotation or extension of the neck such as yoga, looking up, and hair washing at a salon.[6] Indeed, there are multiple case reports of vertebrobasilar artery dissection and stroke after cervical manipulation, but case reports provide the lowest level of evidence. They raise hypotheses to be tested in analytical designs that include control groups but cannot be used to infer causation. In the case of rare events like vertebrobasilar stroke, the design of choice is the case-control study. Three such studies have been published, and their results are remarkably similar.

Manipulation is not superior when directly compared with other physical interventions such as exercise

existing vertebral artery dissection rather than the result of treatment itself. Although the results suggest that some cases of vertebrobasilar stroke may be misattributed to manipulation, this does not rule out that some patients have dissection induced by manipulation or that the clinical sequelae are worsened by manipulation in some patients with spontaneous dissection.

To conclude that all adverse neurovascular events seen after manipulation are the manifestation of a pre-existing spontaneous dissection is at odds with several findings. A previous case-control study found that manipulation remained an independent risk factor for dissection after controlling for the previous presence of neck pain (adjusted odds ratio 6.62, 95% confidence interval 1.4 to 30),[4] and another study reported that patients with vertebral artery dissection and previous exposure to manipulation are more likely to present with damage to the more mechanically vulnerable upper cervical portion of the artery than those without exposure (increase in prevalence ratio attributable to manipulation 4.14).[8] Furthermore, patients presenting with conditions that do not share symptoms with vertebral artery dissection (such as low back pain) have reported neurovascular complications after neck manipulation,[9] and it seems most reported cases of vertebral artery dissection and stroke after manual therapy have followed chiropractic care rather than osteopathy or physiotherapy, where manipulation is used less often.[9]

No benefit over alternatives

Though causality is not proved, legitimate concerns remain regarding the risk of such serious events. Whether there are factors that leave some patients more susceptible to dissection remains a matter of conjecture,[1 5] and there are no satisfactory screening procedures that acceptably mitigate this risk.[5] It follows that neck manipulation should be used only if there is substantial and unique benefit associated with this technique.

On this point the literature is clearer. A recent Cochrane review of randomised controlled trials of neck manipulation or mobilisation concluded that as a stand alone treatment, manipulation provides only moderate short term pain relief versus waiting list control, sham manipulation, or muscle relaxants (standardised mean difference −0.90, 95% confidence interval −1.78 to −0.02), is unlikely to offer meaningful long term benefit for people with neck pain, and does not seem to be better than other manual therapy techniques such as cervical mobilisation (−0.07, −0.47 to 0.32).[10] A recent clinical trial suggests this equivalence remains even in patients whom the clinician deemed particularly suitable for manipulation.[11] Other recent large, high quality randomised trials reinforce the message that manipulation is not superior when directly compared with other physical interventions such as exercise and confers no additional benefit when added to them.[12 13]

Given the equivalence in outcome with other forms of therapy, manipulation seems to be clinically unnecessary. The potential for catastrophic events and the clear absence of unique benefit lead to the inevitable conclusion that manipulation of the cervical spine should be abandoned as part of conservative care for neck pain. In the interests of patient safety, the regulatory and professional bodies associated with professions that use manual therapy should consider adopting this as a formal policy.

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The first study was nested in the Ontario population and identified 582 patients admitted to hospital with vertebrobasilar stroke over five years.[7] When compared with 2328 matched controls, there was a strong association between chiropractic care received within the previous week and stroke in people younger than 45 years (odds ratio 5.03, 95% confidence interval 1.32 to 43.87). There was no association in older people. The authors calculated the risk attributable to chiropractic care was 1.3 cases per 100 000 people aged less than 45 years (95% confidence interval 0.5 to 16.7).

The second study by Smith et al was nested in two California stroke registries.[8] Cases included 26 strokes related to carotid dissection and 24 related to vertebral dissection compared with 100 non-dissection related strokes. They found a strong association between manipulative therapy received in the previous month and stroke related to vertebral dissection (odds ratio 6.6, 1.4 to 30) but not carotid dissection.

The most recent study, by Cassidy et al, replicated the results of the two previous studies using the Ontario population over nine years—that is, over 100 million person years at risk.[9] They confirmed a strong association between chiropractic care and subsequent vertebrobasilar stroke in people under 45 years old using both case-control and case-crossover designs (odds ratio 3.60, 1.46 to 10.84) for those consulting a chiropractor in the previous month. However, they found a similar association between family physician care and vertebrobasilar strokes (odds ratio 2.99, 1.81 to 4.96). Furthermore, the estimates for previous chiropractic or family physician care were similar when investigating different hazard periods up to 30 days before the stroke. Both associations increased when the analyses were limited to neck related diagnoses (such as cervical pain, strain, sprain, and headaches). This suggests that the association between manipulation and stroke is confounded by indication—that is, the disease (early dissection related neck pain or headache) is causing the exposures (visits to chiropractors and family doctors).[10] Neck pain and headache are the most common presenting complaints in people with cervical artery dissections[11] and are common reasons for seeking care. This evidence raises doubt about any causal relation between manipulation and stroke.

Patient preference

Neck pain affects a large proportion of the population and causes considerable disability and health expenditure.[12 13] Manipulation is one of the most common treatments for neck pain and is clearly preferred by many patients given that 6-12% of the population receives it annually.[14] The effectiveness of manipulation for neck pain has been examined in several high quality systematic reviews, evidence based clinical guidelines, and health technology assessment reports.[15] When combined with recent randomised trial results, this evidence supports including manipulation as a treatment option for neck pain, along with other interventions such as advice to stay active and exercises. However, when risk, benefit, and patient preference are considered, there is currently no preferred firstline therapy, and no evidence that mobilisation is safer or more effective than manipulation. Thus, the identification of safe and effective interventions for neck pain remains a high priority. We say no to abandoning manipulation and yes to more rigorous research on the benefits and harms of this and other common interventions for neck pain.

Competing interests: JDC has received research grants from the Canadian Chiropractic Protection Association, the Ontario Chiropractic Association, and the National Chiropractic Malpractice Insurance Company, and he has been paid by the Canadian Chiropractic Protection Association and the International Chiropractic Association for expert testimony on the issue of stroke and chiropractic care; GB has received research grants from the National Center for Complementary and Alternative Medicine to conduct research on chiropractic spinal manipulation and has been commissioned by the General Chiropractic Ethics Council to be the lead author of an evidence report on the effectiveness of spinal manipulation; JH has received research grants from the Danish Chiropractors Research Foundation and holds a part time position at the Nordic Institute of Chiropractic and Clinical Biomechanics; the authors have no other relationships or activities that could appear to have influenced the submitted work.
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