Title: BMJ Head to Head debate “Should we abandon C-spine manipulation for mechanical neck pain? Yes”

Authors: Benedict M Wand¹, Peter J Heine², Neil E O’Connell³

¹ Associate Professor, School of Physiotherapy, The University of Notre Dame Australia
19 Mouat Street, Fremantle, WA 6959, Australia.

² Research Fellow, Warwick Clinical Trials Unit, Division of Health Sciences, University of Warwick,
Gibbet Hill Rd, Coventry, CV4 7AL, UK

³ Lecturer, Centre for Research in Rehabilitation, Brunel University, Kingston Lane, Uxbridge,
Middlesex, UB8 3PH, UK

Corresponding Author

Neil O’Connell

Email: neil.oconnell@brunel.ac.uk
Tel: 01895 268814
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 longstanding and not fully resolved, hampered particularly by the difficulty in obtaining conclusive evidence regarding rare adverse events. What can be accepted is that the incidence of vertebral artery dissection is low with estimates between 1 (95% Confidence intervals (CI) 0.5-1.4) and 1.7 (95% CI 1.1-2.3) per 100,000 person years in the USA [1]. The estimates for stroke resulting from vertebrobasilar artery pathology 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, a large number of case-studies report neurovascular complications immediately following 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 [4,5,6]. While absolute risk increases cannot be accurately estimated, these studies have reported large effects in general populations (adjusted odds ratios (OR) 6.62, 95% CI 1.4-30 [4]; 12.67, 95% CI 1.43-112.0[5]), and in patients under 45 (adjusted OR 5.03 95% CI 1.58–16.07 [6]). However, the causal nature of this association has recently been called into question by the findings of one case-crossover study [7]. Although demonstrating an association between vertebrobasilar stroke and chiropractic care in patients under 45 (adjusted OR 3.13,95% CI 1.48–6.63), a comparable relationship was found between vertebrobasilar stroke and primary care practitioner visits (adjusted OR 3.57, 95% CI 2.17–5.86). The authors suggest that the increased risk after chiropractic treatment may be an artefact of patients seeking care for neck pain resulting from existing vertebral artery dissection and that their results indicate no excess risk associated with chiropractic treatment. This finding certainly suggests that some cases of vertebrobasilar stroke may be misattributed to manipulation but to rule out all association ignores the possibility of three distinct clinical populations: patients experiencing spontaneous dissection (who largely consult their GP but may present to a manipulative therapist), patients experiencing spontaneous dissection in which the clinical sequelae is potentially worsened by manipulation, and dissection specifically induced by manipulation.

To conclude that all adverse neurovascular events seen post-manipulation are the manifestation of a pre-existing spontaneous dissection is at odds with a number of findings. This interpretation is not congruent with the results of a previous case–control study which reported that manipulation remained an independent risk factor for dissection after controlling for the prior presence of neck pain (adjusted OR 6.62, 95%CI 1.4-30)[4], nor is it consistent with the finding 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 following neck manipulation [9], and it appears the vast majority of 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 frequently [9]. While causality is not proven, legitimate concerns remain
regarding the risk of such serious events. Whether there are factors that leave some patients more
susceptible to VAD 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 only be
used 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 (SMD) -0.90, 95%CI -1.78 to -0.02 ), is unlikely to
offer meaningful long term benefit for people with neck pain, and does not appear to be superior to
other manual therapy techniques such as cervical mobilisations (SMD -0.07, 95%CI -0.47-0.32 [10]. A
recent clinical trial suggests this equivalence remains even in patients who 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, and confers
no additional benefit when added to, other physical interventions such as exercise [12,13].

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

References

Neurol 2009; 8: 668–78

2. Boyle E, Côte P, Grier AR, Cassidy JD. Examining vertebrobasilar artery stroke in two Canadian

338


5. Thomas LC, Rivett DA, Attia JR, Parsons M, Levi C. Risk factors and clinical features of


7. Cassidy JD, Boyle E, Côté P, He Y, Hogg-Johnson S, Silver FL, Bondy SJ. Risk of vertebrobasilar
stroke and chiropractic care. Results of a populatin-based case-control and case-crossover study.


The Corresponding Author has the right to grant on behalf of all authors and does grant on behalf of all authors, a worldwide licence to the Publishers and its licensees in perpetuity, in all forms, formats and media (whether known now or created in the future), to i) publish, reproduce, distribute, display and store the Contribution, ii) translate the Contribution into other languages, create adaptations, reprints, include within collections and create summaries, extracts and/or, abstracts of the Contribution, iii) create any other derivative work(s) based on the Contribution, iv) to exploit all subsidiary rights in the Contribution, v) the inclusion of electronic links from the Contribution to third party material where-ever it may be located; and, vi) licence any third party to do any or all of the above.

All authors have completed the Unified Competing Interest form at www.icmje.org/coi_disclosure.pdf (available on request from the corresponding author) and declare: no support from any organisation for the submitted work; no financial relationships with any organisations that might have an interest in the submitted work in the previous three years, no other relationships or activities that could appear to have influenced the submitted work.

Benedict M Wand, Peter J Heine and Neil E O’Connell all played a key role in the conception, drafting and revising of this manuscript critically for important intellectual content, and in the final approval of the version to be published.
Benedict M Wand, Peter J Heine and Neil E O’Connell are the guarantors of this manuscript and accept full responsibility for the work and controlled the decision to publish.