BMJ

BMJ 2012;344:e3680 doi: 10.1136/bmj.e3680 (Published 7 June 2012)

HEAD TO HEAD

Should we abandon cervical spine manipulation for mechanical neck pain? No

Benedict Wand and colleagues (doi:10.1136/bmj.e3679) 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

J David Cassidy *professor* [1], Gert Bronfort *professor*[2], Jan Hartvigsen *professor*[3]

[1]Division of Epidemiology, Dalla Lana School of Public Health, University of Toronto, Toronto, Ontario, Canada; [2]Department of Research, Northwestern Health Sciences University, Bloomington, Minnesota, USA; [3]Institute of Sports Science and Clinical Biomechanics, University of Southern Denmark, Odense, Denmark

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]

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.

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

Correspondence to: J D Cassidy dcassidy@uhnresearch.ca

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: All authors have completed the ICMJE unified disclosure 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; 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.

Provenance and peer review: Commissioned; not externally peer reviewed.

1 Hurwitz EL, Carragee EJ, van der Velde G, Carroll LJ, Nordin M, Guzman J, et al. Treatment of neck pain: noninvasive interventions: results of the Bone and Joint Decade 2000-2010 Task Force on neck pain and its associated disorders. *Spine* 2008;33(suppl 4):S123-52.
2 Van der Velde G, Hogg-Johnson S, Bayoumi AM, Cassidy JD, Cote P, Boyle E, et al. Identifying the best treatment among common nonsurgical neck pain treatments: a decision analysis. *Spine* 2008;33(suppl 4):S184-91.
3 Leaver AM, Refshauge KM, Maher CG, McAuley JH. Conservative interventions provide short-term relief for non-specific neck pain: a systematic review. *J Physiotherapy* 2010;56:73-85.
4 Bronfort G, Evans R, Anderson AV, Svendsen KH, Bracha Y, Grimm RH. Spinal manipulation, medication, or home exercise with advice for acute and subacute neck pain: a randomized trial. *Ann Intern Med* 2012;156:1-10.
5 Chang CH, Shau WY, Kuo CW, Chen ST, Lai MS. Increased risk of stroke associated with nonsteroidal anti-inflammatory drugs: a nationwide case-crossover study. *Stroke* 2010;41:1884-90.
6 Schievink WI. Spontaneous dissection of the carotid and vertebral arteries. *N Engl J Med* 2001;344:898-906.
7 Rothwell DM, Bondy SJ, Williams JI. Chiropractic manipulation and stroke: a population-based case-control study. *Stroke* 2001;32:1054-60.
8 Smith WS, Johnston SC, Skalabrin EJ, Weaver M, Azari P, Albers GW, et al. Spinal manipulative therapy is an independent risk factor for vertebral artery dissection. *Neurology* 2003;60:1424-8.
9 Cassidy JD, Boyle E, Cote P, He Y, Hogg-Johnson S, Silver FL, et al. Risk of vertebrobasilar stroke and chiropractic care: results of a population-based case-control and case-crossover study. *Spine* 2008;33(suppl 4):S176-83.
10 Salas M, Hofman A, Stricker BH. Confounding by indication: an example of variation in the use of epidemiologic terminology. *Am J Epidemiol* 1999;149:981-3.
11 Lee VH, Brown RD Jr, Mandrekar JN, Mokri B. Incidence and outcome of cervical artery dissection: a population-based study. *Neurology* 2006;67:1809-12.
12 Haldeman S, Carroll L, Cassidy JD. Findings from the Bone and Joint Decade 2000-2010 Task Force on neck pain and its associated disorders. *J Occup Environ Med* 2010;52:424-7.
13 Martin BI, Deyo RA, Mirza SK, Turner JA, Comstock BA, Hollingworth W, et al. Expenditures and health status among adults with back and neck problems. *JAMA* 2008;299:656-64.
14 Hurwitz EL. Epidemiology: spinal manipulation utilization. *J Electromyogr Kinesiol* 2012 Jan 28. [Epub ahead of print]
15 Guzman J, Haldeman S, Carroll LJ, Carragee EJ, Hurwitz EL, Peloso P, et al. Clinical practice implications of the Bone and Joint Decade 2000-2010 Task Force on Neck Pain and its associated disorders: from concepts and findings to recommendations. *Spine* 2008;33(suppl 4):S199-213.

Cite this as: *BMJ* 2012;344:e3680