

## Research letter

## Arterial dissections following cervical manipulation: the chiropractic experience

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Research into the effectiveness of spinal manipulation<sup>1,2</sup> has resulted in some acknowledgement of its use by independent agencies in Canada,<sup>3</sup> the United States,<sup>4</sup> the United Kingdom<sup>5</sup> and Denmark,<sup>6</sup> which has led to increased integration of chiropractors into mainstream health care delivery systems. This increased acceptance has led to greater interest in the potential complications of spinal manipulation and, in particular, the occurrence of arterial dissection following cervical manipulation.

Recent surveys have suggested that it is not uncommon for neurologists, particularly those with a specific interest in stroke, to treat patients who have developed a vertebral artery dissection following cervical manipulation.<sup>7,8</sup> In this study, we attempted to obtain an estimate of the rate of stroke following manipulation from a chiropractic perspective.

Following approval by the Institutional Review Board of the Canadian Memorial Chiropractic College in Toronto, Ont., a review of malpractice data from the Canadian Chiropractic Protective Association (CCPA) was carried out to evaluate all claims of stroke following chiropractic care for the 10-year period between 1988 and 1997. All case files were reviewed in order to determine the type of associated cerebrovascular event and the characteristics of the patients who experienced these complications. The diagnosis by the treating neurologist, which was obtained from the records, was used to determine the nature of the stroke. This was compared with the number of cervical manipulations performed each year by chiropractors covered by the CCPA. This denominator was obtained from a survey questionnaire that was completed for one week of practice by 10% of the practising chiropractors in Canada. The effective response rate was 77.8%. These data were extrapolated by multiplying the median number of visits in which a cervical manipulation was administered by the number of chiropractors in the survey group, and using a figure of 49.1 weeks of practice per year obtained from a previous survey. The results of the extrapolation suggested that approximately 134.5 million cervical manipulations were performed by chiropractors covered by the CCPA during this period.

There were 43 cases of neurological symptoms following cervical manipulation over the 10-year period. Of these, 20 were minor and were not diagnosed as stroke by a neurologist. Twenty-three cases of stroke or vertebral artery dissection following cervical manipulation were reported. The frequency of hypertension, diabetes, use of oral contraceptives, migraine headaches and smoking in these 23 patients is shown in Table 1.

There are over 4500 licensed chiropractors in Canada. The likelihood that a chiropractor will be made aware of an arterial dissection following cervical manipulation is approximately 1:8.06 million office visits, 1:5.85 million cervical manipulations, 1:1430 chiropractic practice years and 1:48 chiropractic practice careers. This is significantly less than the estimates of 1:500 000–1 million cervical manipulations calculated from surveys of neurologists.<sup>7-9</sup> These data also confirm the conclusions of a recent review of the literature in which patients at risk for this complication could not be identified.<sup>10</sup>

It is probable that the experience of chiropractors does not reflect all dissections that occur following cervical ma-

**Table 1: Characteristics of patients who developed vertebral artery dissections following cervical manipulation (n = 23)**

Characteristic	No. (and %) of patients*
Median age (and range), yr	42.5 (24–75)
Male:female	6 (26):17 (74)
Hypertension	4 (17.4)
Diabetes	0
Oral contraceptive use	1 (4.3)
Migraine	4 (17.4)
Smoking	5 (22)
Elevated cholesterol	0
Time of onset of symptoms following manipulation	
Within 20 min	15 (65)
1–24 h	5 (22)
1–9 d	3 (13)

\*Unless stated otherwise.

nipulation. Unfortunately, earlier surveys of neurologists did not review patient charts to determine the type of manipulation that was administered or even whether a manipulation was performed during the chiropractic visit implicated in the dissection. The only manner in which the real incidence of dissection following cervical manipulation can be established and the feasibility of screening patients determined is to carry out research in which both chiropractors and neurologists participate. Failure to cooperate in such research will result in confusing and conflicting information being given to patients and will reduce the likelihood that these complications can be avoided.

This article has been peer reviewed.

Dr. Haldeman is with the Department of Neurology, University of California, Irvine, Calif. Dr. Carey is with the Canadian Chiropractic Protective Association, Toronto, Ont. At the time of writing, Dr. Townsend was a research assistant to Dr. Carey. At the time of writing, Mr. Papadopoulos was with Professional Affairs, Canadian Chiropractic Association, Toronto, Ont.

**Competing interests:** None declared for Dr. Townsend. Dr. Haldeman has reviewed files or cases involving the Canadian Chiropractic Protective Association (CCPA) as an outside independent consultant. Dr. Carey is president of the CCPA and is in charge of claims, files and management on behalf of the CCPA. Mr. Papadopoulos was an employee of the Canadian Chiropractic Association until the spring of 2001.

**Contributors:** This project was conceived by Drs. Haldeman and Carey. Drs. Townsend and Carey reviewed the clinical and legal files and accumulated data from these files. Mr. Papadopoulos conducted the clinical practice survey and helped with the statistics. The data were analyzed and the manuscript was written and revised by Drs. Haldeman and Carey. Dr. Townsend and Mr. Papadopoulos commented on revisions of the manuscript.

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