

# What are the Risk of Chiropractic Neck Treatments?

By William J. Lauretti, DC

Several recent news items have reported on the supposed risks of chiropractic manipulation to the neck. As a practicing chiropractor who uses neck manipulation everyday in my practice, I find these reports exaggerated and alarmist. In seven years of practice, I have personally performed, received and/or witnessed well over 7,000 neck manipulations, without a single significant complication. Clearly, the risks of neck manipulation are not as extreme as some of the more irresponsible reports imply. I believe the rash of sensationalist reporting has obscured the three key questions involved in this issue:

1. Just how risky is chiropractic neck treatment (cervical manipulation)?
2. How risky are the other common treatments for neck symptoms compared with chiropractic treatments?
3. How effective is chiropractic neck treatment compared to other common treatments?

This essay will discuss these points and attempt to clarify this issue for consumers, health care practitioners and policy makers.

## How Risky is Cervical Manipulation?

Every published study which has estimated the incidence of stroke (CVA) from cervical manipulation has agreed that the risk is 1 to 3 incidents per million treatments. Dvorak, (1) in a survey of 203 practitioners of manual medicine in Switzerland, found a rate of one serious complication per 400,000 cervical manipulations, without any reported deaths, among an estimated 1.5 million cervical manipulations. Jaskoviak (2) reported approximately 5 million cervical manipulations from 1965 to 1980 at The National College of Chiropractic Clinic in Chicago, without a single case of vertebral artery stroke or serious injury.

Henderson and Cassidy (3) performed a survey at the Canadian Memorial Chiropractic College outpatient clinic where more than a half-million treatments were given over a nine-year period, again without serious incident. Eder (4) offered a report of 168,000 cervical manipulations over a 28 year period, again without a single significant complication. After an extensive literature review performed to formulate practice guidelines (5), the authors concurred that "the risk of serious neurological complications [from cervical manipulation] is extremely low, and is approximately one or two per million cervical manipulations." The "one in a million" estimate was echoed in another extensive literature review performed by the RAND corporation (6).

In another survey, based on a computerized registration system in Holland, Patjin (7) found an overall rate of one complication in 518,886 manipulations. A survey done at Stanford University (8), asked every neurologist in California if they saw any neurological complications they thought resulted from chiropractic treatment in 1990-91. Their survey found 55 reported CVAs statewide over that two-year period. During that period there were about 110 million office visits to chiropractors in California, and between 33 and 50 million neck adjustments. Other experts on manipulation (9) have published opinions that the risk of stroke from cervical manipulation is two or three more-or-less serious incidents per million treatments.

In addition to these published studies, data from the [National Chiropractic Mutual Insurance Company](#) (NCMIC), which insures over 50 percent of US chiropractors, is also useful for estimating the risk of cervical manipulation. Since chiropractors deliver 80-90 percent of the spinal manipulation performed in the US, and this company insures about one-half of the profession in the US, this malpractice insurer is a good source of statistics on this subject. According to a member of NCMIC Board of Directors (personal communication with Louis Sportelli, DC, Dec. 21, 1994), in the three years of 1991-92-93, NCMIC closed a total of 96 claims for CVA; of this total 61 were closed with payment, and 35 were closed without payment. If one concludes that there was little or no merit to the 35 claims which were closed without payment, this would represent an average of 20 CVA claims per year.

If these NCMIC chiropractors are similar to the national average, they see approximately 120 patient visits per week (10). Curtis and Bove (11) report that rotary adjustments of the cervical spine comprise about 30% of the visits made to chiropractors. Therefore, chiropractors insured by NCMIC each performed some 1800 cervical manipulations in each of those three years. Considering these numbers, we calculate that NCMICs 24,000 DCs perform some 43,000,000 cervical manipulations per year. If this leads to 20 strokes, that's a rate of less than one stroke per 2 million cervical manipulations.

Another study based on malpractice history was done in Canada (12). This study reported there were 13 documented CVAs related to chiropractic care in Canada (with no reported deaths) over a 5 year period. The author estimated there were at least 50,000,000 cervical manipulations performed by Canadian chiropractors during that time period.

He concluded that a reasonable estimate of risk is 1 serious neurological complications per 3,000,000 neck manipulations.

Finally, in what might be the best documented study to date, Klougart et al (13), sought to identify the total number of cases of CVAs related to chiropractic manipulation that occurred in Denmark over a ten-year period. They surveyed all members of the Danish Chiropractors' Association, and cross-referenced the members' reports of CVA occurrences with published cases, official complaints and insurance data. Then they estimated the total number of neck manipulations performed by chiropractors over the same time period from the survey responses cross-referenced with insurance reimbursement data. They found five cases of "irreversible CVA after chiropractic treatment" occurred in Denmark between 1978 and 1988, in the course of 6,600,000 cervical spine treatment sessions. They estimated a risk of 1 CVA per 1,320,000 cervical spine treatments sessions, and 1 CVA per 414,000 cervical spine sessions using rotation techniques in the upper cervical spine.

Based upon these studies, the most reasonable estimate of the risk of stroke from cervical manipulation is one-half to two incidents per million manipulations performed. Only a minority of these cases are fatal. About one-third of the cases of stroke following cervical manipulation reported in Terrett's review of 107 cases (14) resolved with mild or no residuals. In a later review, Terrett (15) found a total of 126 cases of vertebrobasilar accidents following manipulation reported in the international literature from 1934-1987, of which 29 cases resulted in death. This yields a mortality rate of 23% among the incidences reported in the literature. While it has been argued that the rate of strokes may be significantly under-reported in the literature, it is probable that the rate of deaths are proportionally over-reported, since it is likely the more serious and impressive cases would be described in the literature.

Therefore, a conservative estimate of the risk of death from stroke caused by neck manipulation is about one fatality per 4,000,000 neck manipulations.

## **Risks of Other Common Treatments for Neck Symptoms**

For proper perspective, the risks of chiropractic neck treatment should be compared to the risks of other treatments for similar conditions. For example, even the most conservative "conventional" treatment for neck and back pain, prescription of Non-Steroidal Anti-Inflammatory Drugs (NSAIDs), may carry a significantly greater risk than manipulation. One study (16) found a 4/10,000 annual mortality rate for NSAID induced ulcers among patients treated for non-rheumatic conditions such as musculoskeletal pain and osteoarthritis; that extrapolates to 3,200 deaths in the US annually.

While it might be argued that the population covered in this study were only patients under long-term NSAID therapy, and that acute use carries far less risk, it is not true that these complications are limited only to chronic NSAID users. Gabriel et al, in a meta-analysis, found short-term NSAID use was actually associated with a much higher rate of GI complications than chronic use (17). They calculated that the odds ratio for adverse GI events associated with NSAID use was 1.92 for more than 3 months of NSAID exposure, but 8.00 for less than 1 month of NSAID exposure.

Less conservative treatments such as neck surgery are also commonly used for conditions very similar to the conditions chiropractors treat using spinal manipulation. There is a 3-4% rate of complication for cervical spine surgery, and 4,000-10,000 deaths per million neck surgeries (18).

## **Effectiveness of Chiropractic Neck Treatment**

[Numerous recent studies](#) have found that spinal manipulation provides superior clinical outcomes compared to conventional care for neck and back complaints. Dozens of other studies have shown chiropractic care to be more cost-effective and more preferred by patients than medical care for several conditions.

A comprehensive literature review (6) concluded, "In summary, evidence from the literature supports the conclusion that cervical spine manipulation and/or mobilization may provide at least short-term pain relief and range of motion enhancement for persons with subacute or chronic neck pain." They also concluded, "the literature is sparse but suggests that cervical spine manipulation and/or mobilization may provide short-term relief for some patients with muscle tension (and other nonmigraine) headaches. The evidence for long-term benefit is much less conclusive."

The highest rated, large-scale, randomized trial comparing manipulative therapy to general practitioner management (including NSAIDs) in the treatment of back and neck pain was performed by Koes (19). He found manipulative treatment significantly superior, with the advantages for the group treated with manipulation persisting even at the 12-month follow-up.

More studies are currently underway comparing the effectiveness of cervical manipulation with other treatments for neck pain, headache and related conditions.

Ironically, despite their well-documented risks and widespread use, the evidence supporting the effectiveness of NSAIDs for neck pain is extremely limited. In a recent review of medications used for neck pain, the authors noted

that the current standard of accepted practice "may rest on a quagmire of possibly valid, but unproven, treatments" (20). Even though NSAIDs are considered to be a well-established treatment for musculoskeletal pain, in a recent Medline search (1966 to 1996), we were unable to locate even a single randomized, controlled trial examining the use of NSAIDs specifically for neck pain.

---

#### SUMMARY:

- A reasonable estimate of the risks of stroke following cervical manipulation is 1/2 to 2 incidents per one million treatments.
- About one-third will resolve with mild or no residuals (probably more due to reporting bias).
- About one-fourth will prove fatal (probably less due to reporting bias).
- Therefore, there are about 40-50 manipulation-caused strokes in the US per year, and perhaps a dozen deaths.

To place this in perspective, if we agree that the risk of dying from a stroke after a neck adjustment is 1/4,000,000, there may be as much as a 100 times greater risk of dying from an ulcer due to taking a prescription NSAID like Motrin. If you drive about 8 miles each way to get to your chiropractic appointment, you have a statistically greater risk of being killed or seriously injured in a car accident getting to the office than of having a serious complication from your treatment.

The chiropractic profession has a well established record of safety and efficacy, and chiropractors' malpractice insurance rates remain among the lowest in the health professions. The profession is leading the way in research to learn more about complications from treatments, and working to reduce them still further. Despite occasional sensationalistic reports in the media, the facts show that chiropractic treatments rank among the safest and most effective form of health care ever offered.

---

*Bill Lauretti, DC*

*Bethesda, Maryland*

*Voice: (301) 718-6118*

*E-Mail: [bill-lau@chiro.org](mailto:bill-lau@chiro.org)*

*Editorial Director, [Chiropractic OnLine](#), the American Chiropractic Association's Web Page.*

This essay is based on an article which was published in the *Journal of Manipulative and Physiological Therapeutics* in October, 1995. The author will gladly send a reprint to any interested parties upon request. An expanded version will appear as a chapter in *Contemporary Chiropractic* (Daniel Redwood, DC, Editor), a text book to be published in 1997 by leading medical publisher Churchill Livingstone.

---

#### REFERENCES:

1. Dvorak J, Orelli F. How dangerous is manipulation to the cervical spine? *Manual Medicine* 1985; 2: 1-4.
2. Jaskoviak P. Complications arising from manipulation of the cervical spine. *J Manip Physiol Ther* 1980; 3: 213-19.
3. Henderson DJ, Cassidy JD. Vertebral Artery syndrome. In: Vernon H. Upper cervical syndrome: chiropractic diagnosis and treatment. Baltimore: Williams and Wilkins, 1988: 195-222.
4. Eder M, Tilscher H. Chiropractic therapy: diagnosis and treatment (English translation). Rockville, Md: Aspen Publishers, 1990: 61.
5. Haldeman S, Chapman-Smith D, Petersen DM. Guidelines for chiropractic quality assurance and practice parameters. Gaithersburg, Md: Aspen Publishers, 1993: 170-2.
6. Coulter ID, Hurwitz EL, Adams AH, et al. The appropriateness of manipulation and mobilization of the cervical spine. Santa Monica, CA: RAND Corporation 1996: xiv. (RAND Home page: <http://www.rand.org>).
7. Patijn J. Complications in Manual Medicine: A Review of the Literature. *J Manual Medicine* 1991; 6: 89-92.
8. Lee KP, Carlini WG, McCormick GF, Albers GW. Neurologic complications following chiropractic manipulation: A survey of California neurologists. *Neurology* 1995; 45: 1213-5.
9. Guttman G: Injuries to the vertebral artery caused by manual therapy (English abstract), *Manuelle Medizin* 1983; 21: 2-14.
10. Plamandon RL. Summary of 1992 ACA annual statistical survey. *ACA J Chiropractic* 1993; 30 (Feb): 36-42.
11. Curtis P, Bove G. Family physicians, chiropractors, and back pain. *J Family Practice* 1992; 35 (5): 551-5.

12. Carey PF. A report on the occurrence of cervical cerebral vascular accidents in chiropractic practice. *J of Canadian Chiropractic Assoc* 1993; 37 (2): 104-6.
13. Klougart N, Leboeuf-Yde C, Rasmussen LR. Safety in chiropractic practice. Part I: The occurrence of cerebrovascular accidents after manipulation to the neck in Denmark from 1978-1988. *J Manipulative Physiol Ther* 1996; 19: 371-7.
14. Terrett AG. Vascular accidents from cervical spine manipulation: Report of 107 cases. *J Aust Chiro Assoc* 1987; 17: 15-24.
15. Terrett AG, Kleynhans AM. Cerebrovascular complications of manipulation. In: Haldeman S., ed. *Principals and Practice of Chiropractic*. Norwalk, Ct.: Appleton & Lang, 1992: 579-98.
16. Fries, JF. Assessing and understanding patient risk. *Scand J Rheumatol* 1992; Suppl. 92: 21
17. Gabriel SE, Jaakkimainen L, Bombardier C. Risk for serious gastrointestinal complications related to use of nonsteroidal anti-inflammatory drugs; a meta-analysis. *Ann Int Med* 1991; 115: 787-96.
18. The cervical spine research society editorial committee. *The Cervical Spine*, Second edition. Philadelphia: J.B. Lippincott Company 1990: 834.
19. Koes BW, Bouter LM, et al. Randomized clinical trial of manipulative therapy and physical therapy for persistent back and neck complaints. *BMJ* 1992; 304: 601-5.
20. Dillin W, Uppal GS. Analysis of medications used in the treatment of cervical disc degeneration. *Orthop Clin North Am* 1992; 23(3): 421-33.

**Suggested Additional Reading:**

Terrett AGJ. Vertebrobasilar stroke following manipulation. West Des Moines, IA: National Chiropractic Mutual Insurance Company: 1996 (NCMIC Home page: <http://www.ncmic.com>).

Dabbs V, Lauretti WJ. A risk assessment of cervical manipulation vs. NSAIDs for the treatment of neck pain. *J Manip Physiol Ther* 1995; 18(8): 530.

Dock DP. A false claim: Stroke from manipulation. Duluth, MN: Dr. Daniel P. Dock 1994. To order call: (218) 525-2033.

---