

## The Worst Nightmare: Patient Stroke -- Can It Be Prevented?

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Chiropractic, osteopathy, and physical therapy have all published recommendations in 1996 to help avoid iatrogenic damage to the cervical spine during manipulation. Unfortunately, these recommendations conflict. We will review the recommended procedures and see how these and additional literature can be easily located by using online computer databases.

Determining the appropriate use of diagnostic and treatment procedure can often be difficult for the practitioner. Although few would argue today about the value of plain x-ray, MRI, or blood laboratory testing, even these diagnostic procedures took time to be refined and accepted by the biomedical community. Chiropractors, osteopathic physicians, and physical therapists use various forms of adjustments, manipulation and mobilization techniques and are concerned about the risks to their patients from these procedures.

Perhaps the most significant patient risk is associated with manipulation of the cervical spine. Although rare (1:400,000 to 1:2,000,000) patients have suffered injury from these procedures. The prospect of causing serious injury to a patient is a health provider's worst nightmare. Since the early 1980s, there have been several papers published addressing examination procedures for preventing injury to the cervical spine and vertebral arteries during manipulation. What has been taught by several health disciplines, including chiropractic, is a variety of provocative tests to screen for patients at risk of injury. Most chiropractors are familiar with these tests which involve maximum neck rotation and extension.

Searching online databases for information about testing to prevent patient injury can be quite simple. Only a basic understanding of the process is required. The first question is where to search. Because MANTISTM (ChiroLars) is the largest database of chiropractic and manual medical literature, it is the most important database resource. The second question is how to search. Studies indicate that text or keyword searches are the most commonly used by practicing physicians. Indexed headings are more commonly used by library science personnel. Because medical jargon varies so much (e.g., backache, lumbalgia, low back pain, lumbago), indexers settle on just a single word (heading) to represent a concept. Searching by "heading" produces a more powerful search by locating more of the desired information and at the same time eliminating the extraneous (much like a diagnostic procedure that is both specific and sensitive). Information can be located with either method of searching, but heading searches are worth the added effort to master.

To use a "heading" search for information about testing patients to prevent injury during cervical spine manipulation, we must take a somewhat indirect approach. A term like provocative tests is not a medical subject heading (MeSH) used by indexers. The word stroke is also not an accepted heading. Here are examples of headings that could be used to locate the desired information, along with the results from each MANTISTM search:

manipulation, orthopedic	and	3059
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cerebrovascular disorders	and	253
prevention & control		2350

Total # of Articles Meeting Search Strategy 41

Another possible strategy would be:

cerebrovascular disorders	and	252
manipulation		3179

Total # of Articles Meeting Search Strategy 114

As you will note, the searches located 41 and 114 articles, respectively, meeting the search criteria. In reviewing these it was distressing to see the diversity of opinion both between profession and within professions. As you will note from reading the abstracts below, the opinions range from 1) provocative testing is a required part of the standards of care to 2) provocative testing is neither valid nor ethical. If we look at the relative scientific rigor of the studies, the work by Cote et al., is superior to the other articles listed here. This research suggests to the practitioner that there is no testing that will insure the avoidance of some minimal risk during cervical manipulation. Taking a thorough history, conducting a complete exam (as recommended by all authors), and using prudent adjustive procedures are the best courses of action. Cote et al., not only questions the validity of cervical provocative tests, but states "from an ethical point of view, the consequences of unnecessarily alarming patients about the risk of a potential stroke are unsupported and unacceptable." It is incumbent on each health care provider to obtain and critically read the full text of these and other articles before making a decision.

Here are the citations and abstracts of four articles published in 1996 that address the use of examination procedures to prevent patient injury:

Cote, P; Kreitz, B.; Cassidy, J.; Thiel, H.; The Validity of the Extension-Rotation Test as a Clinical Screening Procedure before Neck Manipulation: A Secondary Analysis. *Journal of Manipulative and Physiological Therapeutics* 1996; 19(3):159-64

Objective: To determine the validity of the neck extension-rotation test as a clinical screening procedure to detect decreased vertebrobasilar blood flow that might be associated with dizziness.

Design: Secondary analysis of a clinical screening test.

Methods: Twelve subjects with dizziness reproduced by the neck extension-rotation test and 30 healthy control subjects had Doppler ultrasonography examination of their vertebral arteries with the neck extended and rotated. Vascular impedance to blood flow was measured and the presence of signs and symptoms of vertebrobasilar ischemia was recorded.

Results: Cut-off points for validity estimates were derived through the percentile and Gaussian methods using impedance to blood flow as the standard. The sensitivity of the extension-rotation test for increased impedance to blood flow was zero percent, regardless of the selected cutoff point. The specificity rates for the left vertebral artery were 71 percent and 67 percent for the percentile and Gaussian methods, respectively. The extension-rotation test was more specific on the right side, with a rate varying from 90 percent with the percentile method to 86 percent with the Gaussian technique. The positive predictive value of the test was zero percent and its negative predictive value ranged from 63 percent to 97 percent.

Conclusion: We were unable to demonstrate that the extension-rotation test is a valid clinical screening procedure to detect decreased blood flow in the vertebral artery. The value of this test for screening patients at risk of stroke after cervical manipulation is questionable.

Carver, G.; Willits, J. Comparative Study and Risk Factors of a CVA. Journal of the American Chiropractic Association, Oct. 1996; 32(10):65-8.

Nearly all DCs have read accounts charging that manipulation of the cervical spine is potentially dangerous due to the possibility of cerebrovascular accidents. These statements prompted the authors to write this paper, which attempts to put into proper perspective the actual risk of chiropractic manipulation and how it compares with other methods of treatment of other allied professions. We will review the anatomy of the carotid and vertebrobasilar system, common causes of stroke, related conditions, testing procedures and proper standards of care.

Grant, R. Vertebral Artery Testing: the Australian Physiotherapy Association Protocol After 6 Years. Manual Therapy 1996; 1(3):149-53.

This professional issues paper has delineated the background to the APA Protocol and the compliance with it, and had deduced that there is value in such a protocol. Elements of testing and issues of informed consent have been identified which need to be considered in a refinement of the APA Protocol, and the paper has highlighted the challenge which remains, namely to identify the most sensitive vertebral artery test or tests to predict the patient at risk.

Vick, D.; McKay, C.; Zengerle, C.; The Safety of Manipulative Treatment: Review of the Literature from 1925 to 1993. Journal of the American Osteopathic Association 1996; 96(2):113-5.

Many osteopathic medical students and physicians have an inherent fear of injuring patients when they perform osteopathic manipulative treatment (OMT). Based on the estimated several hundred million treatments performed each year in the United States as well as a review of the literature over the past six decades, only 185 reports of injury were found. However, besides good training in these techniques, the key to the safety of OMT is the taking of a thorough patient history and performing a thorough physical examination before the application of any manipulative procedure.

Direct your questions about searching online database systems to: MANTISTM, P.O. Box 50837, Denton, TX 76206, (817) 898-0234.

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