

## **CERVICAL ADJUSTMENT: BENEFITS AND SAFETY**

### **THE COLLEGE'S POSITION ON HIGH CERVICAL ADJUSTMENT**

The mandate of the British Columbia College of Chiropractors (the "BCCC") is to serve and protect the public interest by establishing, monitoring and enforcing standards of practice for chiropractors in BC.

The BCCC consistently solicits and values objective scrutiny of the safety, efficacy and risks associated with chiropractic treatment

### **SAFETY AND EFFICACY OF CHIROPRACTIC ADJUSTMENT**

The safety and effectiveness of chiropractic spinal adjustment has undergone considerable scrutiny from individuals and organizations within the health care and scientific communities, as well as from chiropractic doctors themselves. Few health care interventions have been assessed as extensively. All objective assessment is welcomed and embraced by the profession.

The result of this extensive study is a significant body of evidence surrounding the efficacy of chiropractic care.<sup>1</sup> Over the last 25 years, at least five formal government studies from around the world have found spinal adjustment therapy to be safe, effective and cost-effective.<sup>2</sup> Complementing the government inquiries are numerous scientific and clinical studies (including randomized controlled trials) assessing the appropriateness, effectiveness and cost-effectiveness of chiropractic spinal adjustment.<sup>3</sup>

### **EVALUATING THE RISK**

In relation to the risk of stroke associated with high cervical adjustment, the BCCC believes it is valuable to provide our members and the public with timely, accurate information that will enable them to continue to weigh the relative risks and benefits of the treatment options which typically include one or more of: (1) doing nothing to relieve a pain condition which may be or may become chronic; (2) prolonged use of medication to relieve pain symptoms; (3) spinal adjustment; and (4) surgical intervention.

Unfortunately, much of the information now available to the public is based on faulty or biased research. Many studies on the incidence of stroke are flawed or lack credibility. The problems with these studies include:

- (1) the results are inconsistent with the exhaustive, systemic literature reviews;
- (2) chiropractic treatment is singled out as having an "unacceptable" or "inappropriate" risk while precipitating events and predisposing factors unrelated to cervical adjustment (such as sports and lifestyle activities, previous neck injury disease and congenital anomaly) are undervalued or ignored;
- (3) cervical adjustment is assumed to be a cause, or even the cause of stroke without any effort to identify whether that assumption is valid or what the causal connection might be; the research currently available is not capable of making a causal connection between cervical manipulation and stroke;
- (4) the published natural causes of stroke are not recognized and accounted for; and

- (5) no or insufficient attention is given to the nature of the adjustment involved in the treatments at issue.

There are, however, more recent studies that provide a more careful and complete consideration of the safety of high cervical adjustment. According to these studies, the risk of stroke is actually quite small.

In *Current Concepts in Vertebrobasilar Complications following Spinal Manipulation*, following a comprehensive review of the existing literature concerning the incidence of stroke following high cervical adjustment, Dr. Allan G. Terrett assumed a risk of stroke of one in 2,000,000 patient treatments.<sup>4</sup> Research recently published in the *Canadian Medical Association Journal* reports the risk at one in 5,000,000 patient treatments.<sup>5</sup> In 1996, the journal *Spine*, published "Manipulation and Mobilization of the Cervical Spine: a systematic review of the literature"<sup>6</sup> in which the risk of stroke was stated to be between one and two per 1,000,000 treatments. These estimates are far below the risks commonly associated with many other medical and pharmaceutical interventions (see "Perspectives on Risk" below).

## **QUESTIONS AND ANSWERS ABOUT NECK MOVEMENT AND STROKE**

### **How might neck movement be associated with stroke?**

Over the years, researchers and health professionals have drawn an association between the onset of stroke symptoms and certain activities of daily living involving movement of the neck (see "Perspectives on Risk" below). However, incidents giving rise to this association are relatively rare and because of that, the relationship between neck movement and stroke is not well understood.

Nevertheless, current theories suggest that, in exceptional cases and likely when the individual has some unidentified predisposition, movement of the neck may start or contribute to a series of events leading to stroke.

According to this thinking, neck movement might disrupt the lining of one of the two vertebral arteries which, as indicated by their name, run up through the vertebrae of the neck and bring blood to the back of the brain. As the disruption to the lining of a vertebral artery heals, a thrombus, or blood clot, can form. In some cases, blood can also collect in a pocket between the layers of the artery wall which expands and, either by itself or together with a thrombus, limits or blocks the flow of blood to the brain. When some or all of these events occur, a person may experience symptoms of stroke. Usually, though, these symptoms do not persist, and no permanent injury results.

A bigger concern is when small pieces of a thrombus break off and travel to the small arteries in the back of the brain, where they become lodged and cut off blood supply. This process can cause areas of brain damage known as infarcts and leads to the neurological symptoms and more lasting injury associated with "stroke". One theory is that in some cases, instead of causing damage to the vertebral artery, neck movement may simply dislodge or break off pieces of a thrombus that was already present, either as a result of a prior injury or because of disease.

### **Who is susceptible to stroke in association with neck movement?**

The science in this area is also evolving. The traditional risk factors of stroke (such as: poorly-controlled high blood pressure, obesity, smoking, family history of cardiovascular disease) are not necessarily risk factors for stroke in association with neck movement. They do not appear to be helpful indicators of who is at risk for the series of events described above. Emerging science points to connective tissue diseases (including: Ehlers – Danlos syndrome, Marfans syndrome,

fibromuscular dysplasia, osteogenesis imperfecta and multiple exostosis syndrome) as a significant factor in the potential for arterial damage leading to stroke.<sup>7</sup>

### **What type of neck movement may lead to stroke in susceptible individuals?**

Many seemingly benign, everyday activities that involve movement of the neck have been associated with strokes in susceptible individuals, including: turning of the head while reversing a vehicle; cradling a telephone handset between one's ear and shoulder; sitting at a computer; undergoing dental procedures; swinging a golf club; hanging up laundry, and having one's hair washed at a beauty salon (see "Perspectives on Risk" below).

### **Can other factors or activities contribute to the potential for stroke?**

Yes. Risks of stroke are inherent in certain medical procedures, pharmaceutical interventions and lifestyle activities. For instance, certain levels of tobacco and alcohol consumption are known to contribute to the potential for stroke. In addition there is a one in 24,000 risk of stroke arising from the birth control pill<sup>8</sup> (see "Perspectives on Risk" below).

### **How is cervical adjustment related to stroke arising from neck movement?**

Some researchers have suggested an association between the neck movement involved in high cervical adjustment and the occurrence of a stroke moments, minutes, hours, and in some cases, days later. Given the presumed association between neck movement and stroke, it is, perhaps, understandable why people might assume a cause-and-effect relationship, particularly when there is a relatively short interval between treatment and the onset of the neurological symptoms associated with stroke. However, there is presently no medical or scientific evidence effectively linking high cervical adjustment to stroke in a causal way. The evidence to date only suggests an association between these events, and a 2007 study found a similar association between physician visits and stroke.<sup>9</sup> To the contrary, the only research which has attempted to measure the physical effects of high cervical adjustment on the vertebral arteries found that the treatment did not result in strain sufficient to damage the arteries, and in fact, may create less strain than neck movement during common activities of daily living.<sup>10</sup>

### **Who is entitled to perform spinal adjustments?**

In British Columbia, chiropractic doctors, medical doctors, physical therapists, and naturopathic doctors are entitled to perform spinal adjustments. However the public must understand that these professionals are not equally qualified to deliver this treatment.

### **Who is qualified to perform spinal adjustments?**

Doctors of chiropractic consistently maintain a standard of education, training and experience that is superior to other health professionals who diagnose neuromusculoskeletal disorders and perform spinal adjustment.

The BCCC opposes the use of spinal adjustment by health professions lacking the equivalent core competencies of chiropractic doctors. Allowing less qualified health professionals to perform spinal adjustment techniques places the public at increased risk of harm from neuromusculoskeletal disorders that have been misdiagnosed or improperly treated.

## **CONCLUSION**

It is crucial that patient decision making is based on informed consent. The chiropractic profession has been vigilant in providing timely, accurate information to help patients evaluate their health care choices and weigh the relative risks and benefits of treatment options.

Recent research and scientific studies and government analyses continue to support the safety, efficacy and cost-effectiveness of chiropractic spinal adjustment. Despite the high profile given the subject of treatment-related strokes, patient statistics reveal that increasing numbers of health consumers rely upon chiropractic as a safe, effective and non-invasive means of resolving head, neck and back pain.

Nevertheless, the BCCC urges all health care consumers to thoroughly investigate the benefits and risks associated with every health procedure and pharmaceutical intervention, and reiterates its commitment to patient safety and well-being through established initiatives to raise public awareness, including:

- (1) engaging in open, honest dialogue with the public and the media;
- (2) providing accurate, thorough information on a timely basis;
- (3) ensuring that the risks and range of treatment options are fully disclosed to all patients; and
- (4) advancing our leadership role in researching the benefits and risks of adjustment in the treatment of neck and back pain.

## **PERSPECTIVES ON RISK**

### **A comparison of risk:**

Almost all researchers and scientists studying this issue agree that whatever the risk of stroke in association with high cervical adjustment, it is exceedingly rare. Recent studies (see "Evaluating the Risk" above) indicate the risk can be conservatively estimated at one in every 1,000,000 procedures. This is significantly lower than risks that have been reported for other commonly utilized health care procedures:

Strokes from birth control pills = 1 in 24,000 persons<sup>11</sup>

Fatalities caused by NSAIDS (Aspirin, Naproxen, Ibuprofen, Motrin) = 1 in 1,200 persons<sup>12</sup>

Fatalities in association with cervical spinal surgery = 1 in 145 surgeries<sup>13</sup>

It is also significantly lower than the risk of death associated with many activities of daily living<sup>14</sup>, for example:

Canoeing = 1 in 100,000 persons

Playing soccer = 1 in 25,500 persons

Automobile driving (United Kingdom) = 1 in 5,900 persons

### **Activities of daily living and the risk of stroke**

Some of the activities of daily living associated with the onset of stroke symptoms include<sup>15</sup>:

\* a bleeding nose

- \* postural head changes
- \* angiography
- \* sit-ups
- \* turning head while backing up a car
- \* sleeping positions
- \* coughing
- \* stooping to pick up a bucket
- \* dental procedure
- \* tai chi
- \* emergency resuscitation
- \* cradling a telephone handset between ear and shoulder
- \* falls (minor)
- \* trampoline
- \* fitness exercise
- \* turning one's head
- \* hair dressing
- \* yawning & vigorous stretching
- \* overhead work (painting ceiling)
- \* yoga

## APPENDIX 'A'

<sup>1</sup> February 15, 2001, the Canadian Chiropractic Association website: <http://www.ccachiro.org>.

<sup>2</sup> *Chiropractic in the United States: Training, Practice and Research*, U.S. Department of Health and Human Services, AHCPR Research Report, Dec.1997. Hasselberg P.D. *Chiropractic in New Zealand, Report of the Commission of Inquiry*. Wellington: Government Printer, 1979. Thompson C.J. *Medicare Benefits Review Committee*. Australia: Commonwealth Government Printer, 1986. Commission on Alternative Medicine. *Legitimization for Vissa Kiropraktorer*, South Africa, 1987. Manga P., Angus D., Papadopoulos C., Swan W. *The Effectiveness and Cost-Effectiveness of Chiropractic Management of Low-Back Pain*. Ottawa: Kenilworth Publishing, 1993 (see <http://www.ccachiro.org>).

<sup>3</sup> Meade T.W., Dyer S., Browne W., Townsend J., Fran A.O. "Low back pain of mechanical origin: randomized comparison of chiropractic and hospital outpatient treatment", *British Medical Journal* 1990; 300: 1431-37. Meade T.W., Dyer S., Browne W., Frank A.O. "Randomized Comparison of Chiropractic and Hospital Outpatient Management for Low Back Pain: Results from Extended Follow Up", *British Medical Journal* 1995; 311: 349-251. Shekelle P.G., Adams A.H., Chassin M.R., Hurwitz E.L., Phillips R.B., Brook R.H. *The Appropriateness of Spinal Manipulation for Low Back Pain. Project Overview and Literature Review*, Santa Monica: RAND1991. Manga P., Angus D., Papadopoulos C., Swan W. *The Effectiveness and Cost-Effectiveness of Chiropractic Management of Low-Back Pain*, Ottawa: Kenilworth Publishing, 1993. Stano M., Smith M. "Chiropractic and Medical Costs of Low Back Pain", *Medical Care* 1996; 34(3): 191-204. Jarvis K.B., Phillips R.B., Morris E.K. "Cost per Case Comparison of Back Injury Claims of Chiropractic versus Medical Management for Conditions with Identical Diagnostic Codes", *Journal of Occupational Medicine* 1991; 33(8): 847-852. Ebrall P.S. "Mechanical Low-Back Pain: A Comparison of Medical and Chiropractic Management within the Victorian WorkCare Scheme", *Chiropractic Journal of Australia* 1992; 22(2): 47-53. Mosley C.D., Ilana G.C., Arnold R.M. "Cost-Effectiveness of Chiropractic in a Managed Care Setting", *The American Journal of Managed Care* 1996; 2: 280-282.

<sup>4</sup> Terrett A.G. *Current Concepts in Vertebrobasilar Complications following Spinal Manipulation*. Des Moines, Iowa: National Chiropractic Mutual Insurance Company, 2001.

<sup>5</sup> Haldeman S., Carey P., Townsend P. and Papadopoulos C. "Arterial dissections following cervical manipulation: the chiropractic experience", *Canadian Medical Association Journal* 2001; 165(7): 905-906.

<sup>6</sup> Hurwitz E.L., Aker P.D., Adams M.H., Meeker W.C., Shekelle P.G. "Manipulation and Mobilization of the Cervical Spine: a systematic review of the literature", *Spine* 1996; 21(15): 1746-1759.

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<sup>7</sup> Hill M.D., "Cervical Artery Dissection, Imaging, Trauma and Causal Inference", *Canadian Journal of Neurological Science* 2003; 30(4): 302-304.

<sup>8</sup> Gillium L.A., Mamidipudi A.K., Johnston, S.C. "Ischemic Stroke Risk with Oral Contraceptives, a Meta-analysis", *Journal of the American Medical Association* 2000; 284(1).

<sup>9</sup> Cassidy D., Boyle E., Côté P., He H., Hogg-Johnson S., Silver F.L. and Bondy S.J. "Risk of Vertebrobasilar Stroke and Chiropractic Care", *Spine* 2008; 33(4S): 1-8.

<sup>10</sup> Symons B.P., Leonard T., Herzog W. "Internal Forces Sustained by the Vertebral Artery During Spinal Manipulative Therapy", *Journal of Manipulative and Physiological Therapeutics* 2002; 25(8): 504-510.

<sup>11</sup> See above Gillium and others "Ischemic Stroke Risk with Oral Contraceptives, a Meta-analysis".

<sup>12</sup> Tramer M.R., Moore R.A., Reynolds J.M., McQuay H.J. "Quantitative Estimation of Rare Adverse Events Which Follow A Biological Progression: A New Model Applied To Chronic NSAID Use", *Pain* 2000; 85: 169-182 (see <http://www.elsevier.nl/locate/pain>).

<sup>13</sup> Rome P.L. "Perspectives: An Overview of Comparative Considerations of Cerebrovascular Accidents", *Chiropractic Journal of Australia* 1999; 29(3): 87-102.

<sup>14</sup> Dinman B.D. "The reality and acceptance of risk", *Journal of the American Medical Association* 1980; 233(11): 1226-1228.

<sup>15</sup> See above: Terrett *Current Concepts in Vertebrobasilar Complications following Spinal Manipulation* and Rome, "Perspectives: An Overview of Comparative Consideration of Cerebrovascular Accidents".