

# What is Chiropractic?

Chiropractic today is one of the largest primary care health professions in Canada with over 6,000 practicing chiropractors. Approximately four and a half million Canadians use the services of a chiropractor each year.<sup>1</sup>

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## **Natural, non-invasive approach to health care**

Chiropractors practice a drug-free, manual approach to health care that includes patient assessment, diagnosis and treatment. In particular, chiropractors assess patients for disorders related to the spine, pelvis, extremity joints, and their effect on the nervous system. Chiropractors are also trained to recommend therapeutic exercise, to utilize other non-invasive therapies, as well as to provide nutritional, dietary and lifestyle counseling.<sup>2</sup>

Adjustment is the most common form of treatment utilized by chiropractors in clinical practice. Also known as spinal manipulative therapy, adjustment is a non-invasive, manual procedure that utilizes the highly refined skills developed through four years of intensive chiropractic education. Adjustment is a carefully controlled procedure delivered by a skilled practitioner to dysfunctional spinal or extremity joints. The primary goal is to decrease pain and restore function by improving areas of reduced movement in the joints and supporting tissues, and decreasing muscle tightness or spasm.<sup>3</sup>

The vast majority of patients who seek chiropractic health care do so for complaints of the musculoskeletal system, most often for conditions affecting the spine such as back pain, neck pain and headaches.<sup>4</sup> Research studies have demonstrated that chiropractic treatment is effective for these conditions.<sup>5</sup>

Legislative bodies across Canada, as well as researchers and governments around the world have conducted extensive reviews of the chiropractic profession and have consistently endorsed chiropractic services.<sup>6</sup>

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## **Primary care**

Chiropractors are regulated, primary care health providers. In cases such as low back pain, chiropractic care may be the preferred method of treatment. Where other medical conditions exist, chiropractic care may support medical treatment by relieving the musculoskeletal aspects associated with the condition. Chiropractic care may also be palliative, providing symptomatic relief of the musculoskeletal disorders associated with chronic conditions.

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## **Regulation & standards**

Chiropractic is regulated by provincial statute in all provinces. Chiropractors along with medical doctors, dentists, psychologists, and optometrists have the legislated right and obligation to communicate a diagnosis and to use the title doctor. Each province has a regulatory college established by legislation in the same manner, and with the same structure and similar regulations, as the regulatory bodies for other health care professions. The regulatory colleges are responsible for protecting the public, standards of practice, disciplinary issues, quality assurance and maintenance of competency.

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- <sup>5</sup> Bronfort G, Evans R et al. A randomized clinical trial of exercise and spinal manipulation for patients with chronic neck pain. *Spine* 2001; 26(7):788-800.
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# Chiropractic Education

Chiropractic education in Canada is offered at the Canadian Memorial Chiropractic College (CMCC) in Toronto, and at l'Université du Québec à Trois-Rivières (UQTR). Both programs are fully accredited by the Council on Chiropractic Education of Canada that has adopted standards similar to those of the Council on Chiropractic Education in the United States which is, in turn, recognized by the United States Department of Education.

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## Seven years university-level education

Chiropractic students undergo a rigorous course of study similar to that of other health care professionals. Entrance requirements are also similar. Students are required to complete a minimum of three years of university before they are eligible for admission to the CMCC accredited program. Approximately 90 per cent of students entering the CMCC program have completed a baccalaureate or graduate degree.

The CMCC program requires four years of full-time study, including a 12-month internship in CMCC's clinics. In Quebec, the UQTR has a five-year program following graduation from CÉGEP.

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## Multi-disciplinary faculty

In addition to the academic program, chiropractic education requires hands-on clinical experience under the supervision of highly-qualified faculty. This experience includes clinical assessment, diagnosis, treatment, and referral protocols. The multi-disciplinary faculty at both CMCC and UQTR have diverse backgrounds and offer students a wide range of expertise. Faculty come from such disciplines as biological sciences, pathology, medicine and psychology, as well as chiropractic.

Both the CMCC and the UQTR programs include courses in anatomy, biochemistry, physiology, neurology, embryology, principles of chiropractic, radiology, immunology, microbiology, pathology, nutrition, and clinical sciences specifically relating to diagnosis.

In particular, chiropractors receive training in radiology that covers a range of topics from radiation biophysics and protection to clinical X-ray interpretation and diagnosis. Radiology training consists of more than 360 contact hours followed by application during clinical internship.

CMCC and UQTR have also developed relationships – both formal and informal – with other universities in Canada. For example, faculty and students of CMCC are currently conducting research with fellow scientists at the University of Alberta, University of Calgary, University of Saskatchewan, McMaster University, University of Toronto and Ryerson University. UQTR has collaborations with l'Université du Québec à Montréal and Laval University.

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# Chiropractic Research

The history and development of chiropractic, in many ways, mirrors the advancement of the medical profession over the past century. During the late 1800s, the concept of "spinal irritation" was popular in medical circles and the practice of chiropractic was consistent with many aspects of scientific thought at the time. These theories seem quaint today, but as science has advanced, so has our understanding of the neurological and biomechanical principles that underlie the effectiveness of chiropractic treatment. Today, these evidence-based principles form the foundation of chiropractic education.

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## **Consortium of University-Based Research Centres**

The Consortium of Canadian Chiropractic Research Centres (CCCRC), established in 1998 by The Canadian Chiropractic Association (The CCA) represents research collaborations with many universities and institutions across the country. The CCCRC currently comprises the Canadian Memorial Chiropractic College and twelve university-based research sites where chiropractic researchers either hold faculty appointments or are taking advanced research training. The CCCRC facilitates inter-disciplinary research and has sponsored four significant research symposia since its inception.

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## **International Collaboration**

The Canadian Chiropractic Association is an affiliate member of the Canadian Cochrane Network and Centre and a representative of the chiropractic profession serves on the Executive Committee of the Network. The Cochrane Collaboration, established in the United Kingdom in 1993, is an international organization whose mission is to prepare, maintain and promote the accessibility of systematic reviews of the effects of health care interventions.

The CCA also participates in international projects such as the World Health Organization's Bone and Joint Decade Task Force on Neck Pain and Its Associated Disorders which is conducting multi-disciplinary, international studies.

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## **The Canadian Memorial Chiropractic College**

The Canadian Memorial Chiropractic College (CMCC) has been recognized as an international leader in chiropractic research for more than five decades. Over the years, members of CMCC's faculty have developed collaborative research relationships with faculty at many academic institutions in North America. CMCC and the profession also participate in inter-professional health policy development. An example of this is the 2003 award of almost \$2 million by the Ontario Ministry of Health and Long-Term Care to faculty at CMCC for a primary care project to develop a model of collaborative, inter-disciplinary practice.

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## **World Class Research**

The profession's researchers are funded by many premier agencies such as the Canadian Institutes of Health Research, Natural Sciences and Engineering Research Council of Canada, Health Canada, Ontario Ministry of Health and Long-Term Care, Industry Canada, Alberta Provincial CIHR Training Program in Bone and Joint Health, and the Canada Primary Care Transition Fund, to name a few. The profession's researchers undertake broad-based, substantive research in biomedical and clinical sciences, health systems and services, and in social cultural areas, and they are widely published in both chiropractic and non-chiropractic peer-reviewed journals. Some of these journals include the New England Journal of Medicine, the Lancet, Annals of Internal Medicine, Arthritis and Rheumatism, British Medical Journal, Canadian Medical Association Journal, Spine, Archives of Physical Medicine and Rehabilitation, the Clinical Journal of Pain, the Journal of the Canadian Chiropractic Association and the Journal of Manipulative and Physiological Therapeutics.

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## **Building a Research Culture**

One of the primary goals of the Canadian Chiropractic Research Foundation(CCRF) is to support chiropractors to obtain their Masters and PhD degrees and support their research projects. This is one of the ways in which the profession continually nurtures a chiropractic research culture that will inform the quality of care. The Canadian Institutes for Health Research (CIHR) has also partnered with the profession to fund doctoral and fellowship awards.

The training of chiropractic researchers through sponsored PhD programs will enable the profession to further develop the research leadership to ensure continued research into chiropractic health care. A national community of fulltime research scholars in chiropractic will ensure that Canadians benefit from high quality, evidence-based care.

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## **Chiropractic Research Agenda**

In 2000, The Canadian Chiropractic Association began a complex process to establish a national chiropractic research agenda in Canada. This process is funded in part by four CIHR Institutes: the Institute of Musculoskeletal Health and Arthritis, the Institute of Aging, the Institute of Neuroscience, Mental Health and Addiction, and the Institute of Population and Public Health.

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## **University Chairs in Chiropractic**

The chiropractic profession has also established a university Research Chair program jointly funded with CIHR. Dr. Greg Kawchuk was the first member of the profession to be awarded a university-based Chiropractic Research Chair. He was subsequently awarded a Canada Research Chair at the University of Edmonton, one of the federal government's highest research awards.

Dr. Mark Erwin was awarded the profession's second Research Chair in 2003 at the University of Toronto where he is investigating degenerative disc disease, the most common cause of lower back pain and associated disability.

The profession's Research Chair program will significantly build the profession's intellectual research capacity and help Canadians live healthier lives.

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# Chiropractic Treatment and Patient Safety

Chiropractic is widely recognized as one of the safest, drug-free, non-invasive therapies available for the treatment of headache, and neck and back pain. It has an excellent safety record. However, no health treatment is completely free of potential adverse effects. Even common over-the-counter medicines carry a risk.

Most patients experience immediate relief following an adjustment, however, some may experience temporary pain, stiffness or slight swelling. Some patients may also experience temporary dizziness, local numbness, or radiating pain. However, adverse effects associated with spinal adjustment are typically minor and short-lived.

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## Safety of Neck Adjustment: The Most Recent Research

Neck adjustment is a precise procedure, generally applied by hand, to the joints of the neck. Neck adjustment works to improve joint mobility in the neck restoring range of motion and reducing muscle spasm, thereby relieving pressure and tension. Patients typically notice a reduction of pain, soreness, stiffness and improved mobility.

Neck adjustment, particularly of the top two vertebrae of the spine, has on rare occasions been associated with stroke and stroke-like symptoms. This risk is considerably lower than those serious adverse events associated with many common health treatments such as long-term use of non-prescription pain relievers or birth control pills. While estimates vary, a range of one to two events per million neck adjustments is the ratio generally accepted by the research community.

An extensive commentary on chiropractic care, published in the February 2002 issue of the *Annals of Internal Medicine*, which is the journal of the American College of Physicians, reviewed more than 160 reports and studies on chiropractic. It states the following with regard to the safety of neck adjustment: "The apparent rarity of these accidental events has made it difficult to assess the magnitude of the complication risk. No serious complication has been noted in more than 73 controlled clinical trials or in any prospectively evaluated case series to date."<sup>1</sup>

A Canadian study, published in 2001 in the medical journal *Stroke*, also concluded that stroke associated with neck adjustment is so rare that it is difficult to calculate an accurate risk ratio.<sup>2</sup> The study was conducted by the Institute for Clinical Evaluative Sciences (ICES) and the authors have stated: "The evidence to date indicates that the risk associated with chiropractic manipulation of the neck is both small and inaccurately estimated. The estimated level of risk is smaller than that associated with many commonly used diagnostic tests or prescription drugs."

The most recent research into the association between neck adjustment and stroke is biomechanical studies to assess what strain, if any, neck adjustment may place on the vertebral arteries. The preliminary findings of this ongoing work indicate that neck adjustment is done well within the normal range of motion and that neck adjustment is "very unlikely to mechanically disrupt the VA [vertebral artery]."<sup>3</sup>

There are many risk factors for stroke including blood clotting problems, hypertension, smoking, high cholesterol, birth control pills, heart problems and trauma such as blows to the head from car accidents, sports injuries or falls. Some strokes happen spontaneously with no obvious cause during activities of daily living such as backing up a car. A patient's health history and activities have to be examined very carefully in order to determine the most probable cause of a stroke.

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## Informed consent

Prior to starting treatment, all health professionals are required in law to obtain informed consent to treatment from their patients. Health care consumers must receive adequate and accurate information to assist them in evaluating their health care choices, and in balancing the relative risks of treatment options with the benefits. The chiropractic profession takes this responsibility seriously and has been a leader in obtaining informed consent.

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## Ongoing research

Chiropractic researchers are involved in studying the benefits and risks of spinal adjustment in the treatment of neck and back pain through clinical trials, literature reviews and publishing papers reviewing the risks and complications of neck adjustment. For example, the World Health Organization's Bone and Joint Decade Task Force on Neck Pain and Its Associated Disorders is an international, multi-disciplinary, multi-centre study in which the Canadian chiropractic profession is a partner. One of the Task Force studies is focused specifically on the safety of neck adjustment. This is one example of the ongoing research that will ensure that care is provided as effectively and safely as possible.

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<sup>1</sup> Meeker WC, Haldeman S. Chiropractic: A Profession at the Crossroads of Mainstream and Alternative Medicine. *Annals of Internal Medicine*. February 5, 2002, Vol. 136, No. 3.

<sup>2</sup> Rothwell DM, Bondy SJ, Williams JI. Chiropractic Manipulation and Stroke: A Population-Based Case-Control Study. *Stroke*, May 2001.

<sup>3</sup> Herzog W, Symons BP, Leonard T. Internal forces sustained by the vertebral artery during spinal manipulative therapy. *Journal of Manipulative and Physiological Therapeutics*. Oct. 25 2002 (8): 504-10.

# Frequently Asked Questions About Chiropractic

## **Does chiropractic treatment require referral from an MD?**

No. A patient does not have to be referred. Chiropractors are legislated as primary contact health care professionals in every province in Canada. This means that patients can consult them directly. Similarly, chiropractors frequently refer to medical doctors when necessary.

## **How is chiropractic adjustment performed?**

Chiropractic adjustment or manipulation is a manual procedure that utilizes the highly refined skills developed during four intensive years of chiropractic education. The chiropractor typically uses his/her hands to manipulate the joints of the body, particularly the spine, in order to reduce pain, and restore or enhance joint function.

Chiropractic manipulation is a highly controlled procedure that rarely causes discomfort. The chiropractor adapts the procedure to meet the specific needs of each patient. Patients often note positive changes in their symptoms immediately following treatment.

## **Can chiropractic treatment cure colds, earaches and other ailments?**

Chiropractic care cannot "cure" these conditions, but there is some evidence to indicate that adjustment may have a beneficial effect on a variety of conditions. Adjustment may alleviate some of the secondary, or referred pain, arising from the response of the musculoskeletal structures to the primary cause. For example, research conducted in Denmark resulted in chiropractic treatment being recommended for the relief of infantile colic.<sup>1</sup> Similarly, a recent U.S. study concluded that the application of manipulative techniques in children with recurring ear infections can prevent or decrease surgical intervention or antibiotic overuse.<sup>2</sup>

## **Is chiropractic adjustment a safe procedure?**

Chiropractic adjustment or manipulation is a drug-free, non-invasive approach to common musculoskeletal conditions such as headache, and neck and back pain. As such, it is a low risk therapy. Complications arising from adjustment are rare.



## **Is chiropractic treatment appropriate for children?**

Yes, children may benefit from chiropractic care. Children are very physically active and experience many types of falls and blows from activities of daily living as well as from participating in sports. Injuries such as these may cause many symptoms including back and neck pain, stiffness, soreness or discomfort. Chiropractic care is always adapted to the individual patient. It is a highly skilled treatment, and in the case of children, very gentle.

While there is some clinical evidence that musculoskeletal treatment of infants may have positive effects, well-controlled studies are required to verify the benefits that are seen in clinical practice.

## **Does chiropractic treatment require X-rays?**

X-rays can play an important role in diagnosis and are taken when a need has been determined after taking a patient case history and conducting a physical examination. Chiropractors receive 360 hours of education in radiology covering a full range of topics from protection to X-ray interpretation and diagnosis. Governments in every province have recognized the training and competence of chiropractors to take and interpret X-rays and have granted them this right.

## **Can chiropractic treatment provide a preventive function?**

Clinical experience suggests that individuals with chronic conditions such as degenerative joint disease (osteoarthritis) or recurrent neck pain, back pain or headaches may experience less frequent and less severe symptoms when under regular chiropractic care. This also applies to individuals in highly stressful situations and those who experience repetitive physical and postural strain from their daily activities. Whether ongoing chiropractic treatment can prevent back pain from occurring in the first place, or prevent a previous condition from re-occurring, requires further study.

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<sup>1</sup> Wiber JMM et al. The Short-Term Effect of Spinal Manipulation in the Treatment of Infantile Colic. Journal of Manipulative and Physiological Therapeutics. October 1999, Vol. 22, No. 8.

<sup>2</sup> Mills MV et al. The Use of Osteopathic Manipulative Treatment as Adjuvant Therapy in Children with Recurrent Acute Otitis Media. Archives of Pediatrics and Adolescent Medicine, September 2003, Vol. 157.

# Common Questions About Neck Adjustment

## **Why is there a popping sound when a joint is adjusted?**

Adjustment of a joint may result in release of a gas bubble between the joints that makes a popping sound – it's exactly the same as when you "crack" your knuckles. It is not painful. It is caused by the change of pressure within the joint resulting in gas bubbles being released.

## **Why would neck adjustment have an effect on anything other than neck pain?**

Pain or discomfort in one area of the body may be linked functionally to discomfort arising from another area. Consequently, addressing dysfunction in one part of the body may relieve symptoms in another part. If you look at a model of the spine, you can see that the spine is an interconnected structure. Adjustment at various points along the structure may be needed to help reduce biomechanical stresses on other parts of the spine and to relieve discomfort.

## **Does neck adjustment require stretching or rotating the neck beyond its normal range of motion?**

No, it does not, as anyone who has had their neck adjusted will attest. Neck adjustment is done within the normal range of motion and is often performed to improve flexibility and reduce pain. The normal range during treatment is less than what is required to turn your head when backing up a car.

## **Is neck adjustment a forceful action?**

No. This has been demonstrated in studies to determine the degree of physical strain applied during adjustment.<sup>1</sup> It is skill, not strength, that is needed to conduct a safe, effective adjustment.

## **Is neck adjustment safe?**

All health treatments have the potential for adverse effects and, on rare occasions, neck adjustment has been associated with stroke and stroke-like symptoms. A Canadian study, published in 2001, concluded that stroke symptoms associated with neck adjustments are so rare that it is difficult to quantify.<sup>2</sup> Similarly, a medical review published in 2002 looked at 73 studies of chiropractic care and found no serious complications reported in any of them.<sup>3</sup> By way of comparison, neck adjustment is significantly safer than other common treatments for headache, neck and back pain.<sup>4,5</sup>

## **Are all neck adjustment techniques equally safe?**

Canadian chiropractors are taught a variety of adjustment techniques and there is no evidence to suggest that any one technique is less safe than the others.

Chiropractic techniques that are applied appropriately are effective and safe.<sup>6,7,8</sup>

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<sup>1</sup> Herzog W, Symons BP, Leonard T. Internal forces sustained by the vertebral artery during spinal manipulative therapy. *Journal of Manipulative and Physiological Therapeutics*. Oct. 25 2002 (8): 504-10

<sup>2</sup> Rothwell DM, Bondy SJ, Williams JI. Chiropractic Manipulation and Stroke: A Population-Based Case-Control Study. *Stroke*. May 2001.

<sup>3</sup> Meeker WC, Halderman S. Chiropractic: A Profession at the Crossroads of Mainstream and Alternative Medicine. *Annals of Internal Medicine*. February 5, 2002, Vol. 136, No. 3.

<sup>4</sup> Dabbs V, Lauretti WJ. A risk assessment of cervical manipulation vs. NSAIDs for the treatment of neck pain. *J Manipulative Physiol Ther*. 1995; 18(8):530-6

<sup>5</sup> Haneline M, Triano J. Cervical artery dissection. A comparison of highly dynamic mechanisms: manipulation versus motor vehicle collision. *J Manipulative Physiol Ther*. 2005; 28(1):57-63.)

<sup>6</sup> UK BEAM Trial Team. United Kingdom back pain exercise and manipulation (UK BEAM) randomized trial: effectiveness of physical treatments for back pain in primary care. *BMJ* 2004; 329: 1377-81.

<sup>7</sup> Gross AR, Hoving JL, Haines TA, Goldsmith CH, Kay T, Aker P, Bronfort G. A Cochrane review of manipulation and mobilization for mechanical neck disorders. *Spine* 2004, 29(14):1541-8

<sup>8</sup> Bronfort G, Haas M, Evans RL, Bouter LM. Efficacy of spinal manipulation and mobilization for low back pain and neck pain: a systematic review and best evidence synthesis. *Spine* 2004; 4(3):335-56.)

# Effectiveness of Chiropractic Treatment

Over the years, spinal manipulation, which is also referred to as adjustment, has undergone rigorous evaluation from researchers within the profession itself, and from the legislative, health care and scientific communities resulting in a significant body of evidence around the efficacy of spinal manipulation for musculoskeletal disorders such as back pain, neck pain and headache.

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## Cost Effective Health Care

Numerous governments have evaluated the effectiveness of chiropractic care both from a public funding perspective and in terms of establishing clinical guidelines for the management of back pain. One of the most thorough analyses of the scientific literature on chiropractic treatment of low back pain was conducted in 1993 by health economists at the University of Ottawa.

This report concluded that spinal adjustment applied by chiropractors is more effective than alternate treatments for lower back pain, and that there would be significant cost-saving to the health care system if more management of lower back pain was transferred from physicians to chiropractors.<sup>1</sup>

Recently, a major four-year study in the United States, published in the American Medical Association journal *The Archives of Internal Medicine*, concluded that benefit plan members with chiropractic coverage returned to work faster, had lower claim costs and experienced fewer interventions such as MRIs compared to plan members without chiropractic benefits.<sup>2</sup>

Similarly, a United Kingdom study published in the *British Medical Journal* concluded that adding spinal manipulation to current "best care" in general practice was effective and cost-effective for patients with low back pain.<sup>3</sup>

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## International Studies Agree

In addition to independent studies, there have been a number of international reports. One of the most significant reports was produced by the Clinical Standards Advisory Group (CSAG) in the UK in 1994. The CSAG guidelines for the management of back pain recommend spinal manipulation along with active exercise and physical activity to modify pain mechanisms and speed recovery.<sup>4</sup>

The 1997 New Zealand Acute Low Back Pain Guide is a government sponsored, evidence-based guideline based on an extensive review of the international literature and wide consultation with professional groups in New Zealand. The New Zealand guideline reinforced the CSAG recommendations by including adjustment as an appropriate treatment for pain relief and improvement in mobility and function for acute low back pain.<sup>5</sup>

The Danish Institute for Higher Technology Assessment (DIHTA) produced a report in 1999 on frequency, management and prevention of low back pain. DIHTA states that spinal manipulation is indicated for management of acute pain and to improve function, and should be considered for use in patients who have been experiencing pain for longer than two to three days. DIHTA also recommends that manipulation be considered for recurrent, chronic low back pain and for nerve root/disc conditions.<sup>6</sup>

Similarly, the U.K. Royal College of General Practitioners (RCGP) 2001 Clinical Guidelines for the Management of Acute Low Back Pain state that there is strong evidence that spinal manipulation can provide short-term improvement in pain and activity levels and demonstrates higher patient satisfaction than alternate treatments. The guidelines recommend that adjustment be considered for pain relief and for patients who are failing to return to normal activities.<sup>7</sup>

The Ontario Workplace Safety and Insurance Board (WSIB) guidelines for the treatment of chronic pain, published in The Clinical Journal of Pain supplement in December 2001, state that manipulation is more effective for chronic low back pain than usual care by a general practitioner, bed rest, analgesics or massage in the short to intermediate term.<sup>8</sup> A 2004 review of the WSIB Program of Care for acute low back injuries found faster return to work and high satisfaction levels with chiropractic care.<sup>9</sup>

Studies in other countries have reached similar conclusions and the international medical literature contains a broad range of published studies attesting to the effectiveness and safety of chiropractic care for musculoskeletal complaints including back pain, neck pain and headaches.<sup>10</sup>

As research advances, evidence continues to accumulate to support the benefits of chiropractic care for a variety of conditions.

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<sup>1</sup> Manga P, Angus D, Papadopoulos C, Swan W. The Effectiveness and Cost-effectiveness of Chiropractic Management of Low-Back Pain, Commissioned by the OCA. Funded by the Ontario Ministry of Health, 1993.

<sup>2</sup> Legoretta AP, Metz RD, et al. Comparative Analysis of Individuals With and Without Chiropractic Coverage. Arch Int Med 2004;164:1985-1992

<sup>3</sup> United Kingdom back pain exercise and manipulation (U.K. BEAM) randomized trial and cost-effectiveness of physical treatment for back pain in primary care. British Medical Journal, Nov. 19, 2004

<sup>4</sup> Epidemiology Review: The Epidemiology and cost of back pain. U.K. Clinical Standards Advisory Group. 1994 HMSO.

Back Pain. Report of a Clinical Standards Advisory Group Committee on Back Pain. U.K. 1994 HMSO.

<sup>5</sup> New Zealand Acute Low Back Pain Guide. New Zealand Guidelines Group, 1997.

<sup>6</sup> Danish Institute for Health Technology Assessment: Low-Back Pain. Frequency, Management and Danish Health Technology Assessment 1999; 1(1).

<sup>7</sup> Waddell G, McIntosh A, Hutchinson A, Feder G, Lewis M. Low Back Pain Evidence Review London: Royal College of General Practitioners 1999.

<sup>8</sup> Mior S. Manipulation and mobilization in the treatment of chronic pain. The Clinical Journal of Pain 2001; 17:S70-S76.

<sup>9</sup> Program of Care for Acute Low Back Injuries: One Year Evaluation Report, Ontario Workers Safety and Insurance Board, June 2004.

- <sup>10</sup> Koes BW, Assendelft WJJ, van der Heijden GJMG et al. Spinal manipulation and mobilisation for back and neck pain: a blinded review. *BMJ* 1991a; 363:1298-1303.
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