

# THE CHIROPRACTIC REPORT

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May 2001 Vol. 15 No. 3



## PROFESSIONAL NOTES

### LBP—Cochrane Reviews

Maurits van Tulder, PhD from the Netherlands and co-researchers continue to provide authoritative, systematic reviews for the Cochrane Collaboration for all forms of management of patients with low-back pain (LBP). Recent reviews deal with non-steroidal anti-inflammatory drugs (NSAIDs), lumbar supports and biopsychosocial rehabilitation.

a) **NSAIDs.** These, “the most frequently prescribed medications worldwide” and “widely used for patients with LBP”, are effective for patients with acute LBP. There is strong evidence that various types of NSAIDs have equal effectiveness for acute low-back, and are equally effective as spinal manipulation. Adding muscle relaxants does not provide any additional effectiveness. However, NSAIDs, van Tulder et al. note, have many side effects. Ibuprofen is associated with the lowest risk rate of serious GI complications.

b) **Lumbar Supports.** These are widely used and are increasingly popular. However Van Tulder et al. report moderate

*continued on page 5*

## SAFETY AND EFFECTIVENESS OF CERVICAL MANIPULATION

### Addressing the Gap Between Perception and Reality

“There is no evidence whatsoever that manipulation has any effect on headache nor any reason why it should.”

*Personal opinion*

— John Norris, MD, Neurologist.<sup>1</sup>

“Manipulation is effective in patients with cervicogenic headache.”

*Systematic literature review*

— Duke University EPC.<sup>2</sup>

**T**HERE are three reasons why it is now timely to review the subject of neck manipulation.

i) First, the publication of authoritative new evidence of effectiveness in the form of a systematic review from medical experts at the Duke University Evidence-Based Practice Center in North Carolina. Reviewing the research evidence supporting behavioral and physical treatments for headache, they conclude that “manipulation is effective in patients with cervicogenic headache.”

It is reported that this form of headache, arising from tension in the neck or cervical spine and more fully defined below, is extremely common — it is experienced at any given time by approximately 14-18% of adults with frequent headaches, or 2.5% of the general adult population.

ii) Second, and with respect to safety, publication by NCMIC Insurance, the largest chiropractic malpractice insurer in the US, of *Current Concepts in Vertebrobasilar Complications Following Spinal Manipulation*<sup>3</sup> by a leading authority in this field, Professor Allan Terrett, Faculty of Life Sciences, RMIT University, Melbourne, Australia. This new monograph provides the most complete available data on complication rates and extensive clinical and practical advice on risk management.

On NCMIC data from 24,000 insured chiropractors in the 1990s the risk rate for a serious complication following cervical

manipulation (e.g. vertebrobasilar stroke causing permanent neurological deficit) is approximately 1 in 2 million procedures. Another way of expressing this is “about 1 case for each 25 practitioners who all practice for a 40 year period.”

This is consistent with other evidence discussed below and confirms that neck manipulation is extremely safe by any standards. It is also considerably more safe than usual medical and surgical treatments for neck pain and headache, also discussed below.

iii) Third, the widening gap between perception and reality in the area of neck manipulation. As the evidence of safety and effectiveness grows, critics of neck manipulation from other specialties — most frequently neurologists it seems — are becoming more strident and public in their criticism.

One reason will be that such critics only see one side of the risk/benefit ratio in their practices. Another will be their unfamiliarity with a diagnostic and treatment method that falls outside their field of training and expertise. Further, this method of treatment challenges their traditional level of authority in the large field of practice represented by primary headaches. Recent surveys<sup>4,5</sup> document the public’s increasing shift to non-pharmaceutical remedies for headache, a shift now strongly supported by the new Duke Report.

Whatever the reasons, prominent specialists such as Dr. Norris from Sunnybrook Hospital and the University of Toronto, who is quoted above and now leads a new stroke consortium in Canada, are generating unfounded concerns for the public, family physicians and others through the ready use of anecdotal evidence and opinion in the media. These concerns need to be addressed in a frank and forthright manner that places the interests of patients above those of others. Therefore

this Report provides an overview of the evidence for and against the use of skilled neck manipulation — what chiropractors call cervical adjustment. Much has been discovered concerning anatomy, mechanisms of action, benefits and complications during the past 10 years.

## B. TERMINOLOGY

2. As the audience for this Report includes chiropractors, family physicians, other health professionals, patients and others, first a note on terminology. Chiropractors, as with all professional groups, have their own terms of art.

**a) Adjustment.** This is the traditional name given by chiropractors to all manual techniques used to move a joint, whether *joint manipulation* (quicker techniques that take a joint to its full ranges of movement) or *mobilization* (slower techniques that do not effect the same ranges of movement and mechanical and reflex effects). In this issue of the Report the terms *manipulation* and *chiropractic manipulation* are used, the latter referring to manipulation by a duly qualified chiropractor.

**b) Subluxation.** This is the traditional chiropractic term for the joint dysfunction or lesion that chiropractors diagnose — principally through palpation to assess joint position and range of motion, soft-tissue tone and provocation of pain — and treat. It is essentially a *functional* rather than a *structural* disorder. In an interdisciplinary environment the term is problematical because the medical profession has a contradictory definition, defining joint subluxation as a significant structural displacement, though something less than a full dislocation, that one would not adjust, manipulate or mobilize. Accordingly the terms *chiropractic subluxation* or *joint dysfunction* are used here.

## C. ANATOMICAL BASIS FOR NECK MANIPULATION

3. Cervical manipulation is most commonly used for patients with neck pain and headache. The root cause of historical medical criticism has perhaps been the view that there is no reasonable anatomical explanation of how these conditions, particularly headaches, can be caused by structures in the cervical spine amenable to manipulation.

4. **Headache.** During the 1990s dental researchers in the US<sup>6</sup> and chiropractic

researchers in the UK<sup>7</sup> confirmed and more clearly demonstrated earlier reports of the existence of bridges of connective tissue between muscles and ligaments in the upper cervical spine and the pain-sensitive dura that covers the brain. See Figure 1 for illustration of the uppermost myodural connective tissue bridge. The dura is extremely sensitive, and dural tension during neurosurgical procedures produces pain experienced as headache.

Hack et al., the scientists from the University of Maryland whose work is the basis of the Figure 1 illustration, make this comment writing in *Encyclopedia Britannica's 1998 Medical and Health Annual*:

“Spinal manipulation as a treatment for tension headache is predicated upon the assumption that dysfunction in the neck muscles contributes to the head pain; . . . The muscle-dura connection may represent — at least in part — the underlying anatomic basis for the effectiveness of this treatment. Such treatment, as performed by a chiropractor, would decrease muscle tension and thereby reduce or eliminate pain by reducing the potential forces exerted on the dura via the muscle-dura connection.”<sup>8</sup>

5. **Neck pain.** The role of the cervical spine facet joints in causing both headache and neck pain was demonstrated convincingly during the 1990s by medical researchers at the Cervical Spine Research Unit, University of Newcastle, Australia. A 10 year line of research culminated in a trial by Lord, Barnsley et al. published in *Spine* in 1998 and described by the journal as “rigorous and impeccable”.<sup>9</sup> Using sophisticated injection techniques Lord and her colleagues demonstrated that the exact source of headache and neck pain in 60% of 68 patients chronically disabled by whiplash injuries was the facet joints in the cervical spine, illustrated in Figure 2. They note that:

- “Few medical practitioners recognize the entity of cervical zygapophyseal joint (*i.e. facet joint*) pain.”
- The evidence from the past 10 years is now “compelling” that cervical facet joint pain is “extraordinarily common” and that this diagnostic entity and cause of pain “cannot be ignored” any longer.

Correcting restricted movement of cervical facet joints, and thereby influencing associated spinal reflexes and muscle

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tension, is a principal target of chiropractic adjustment or manipulation.

## D. EFFECTIVENESS — HEADACHE.

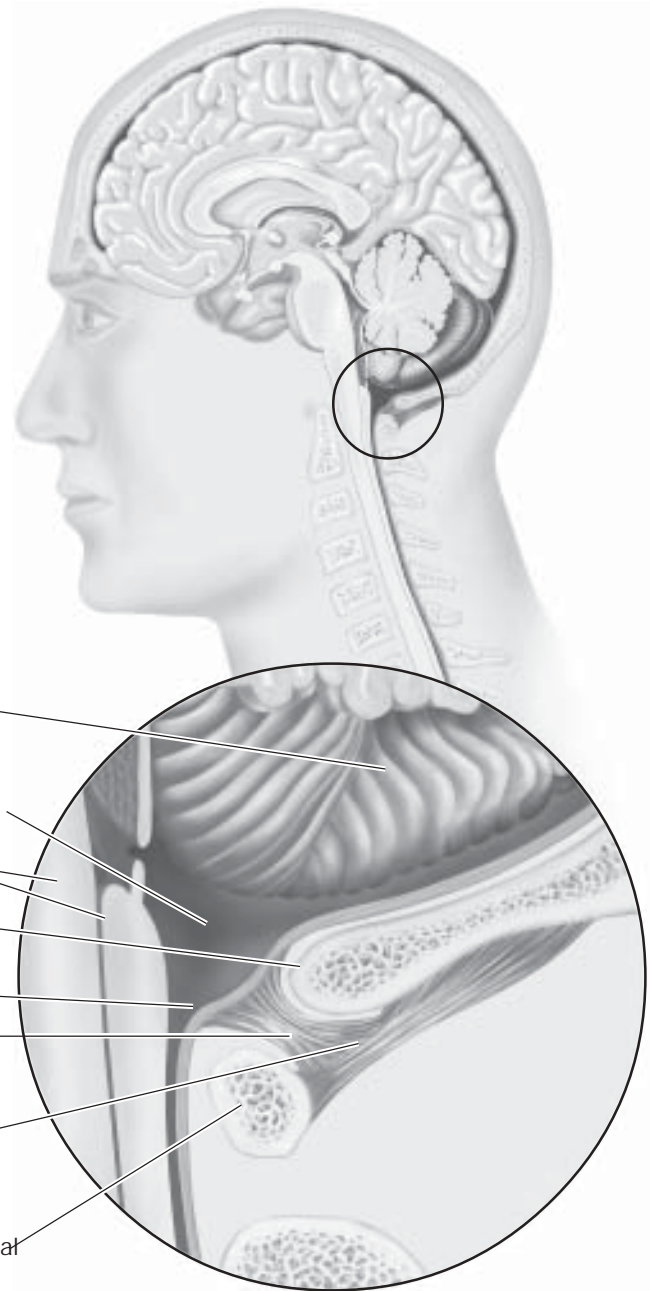
6. This discussion needs to start with background comment on diagnosis and terminology. In the 1980s the International Headache Society (IHS) reclassified headaches into many categories and sub-categories, but acknowledged that this was problematical, was mainly for research purposes, and would have little early impact on diagnosis and management in clinical practice.<sup>10</sup> Problems included definitional boundaries and overlap (in one North American study 28% of chronic headache sufferers met the criteria for migraine, but 50% of these also met the criteria for tension-type headache<sup>11</sup>), combination and transformational headaches, rebound headaches, etc.

One category of primary or benign headache described by the IHS, formerly absent from classifications and still questioned by many specialists at that time, was cervical headache.

**Figure 1**

**Connective Tissue Bridges Between Muscle and Dura  
In the Upper Cervical Spine**

*Right:* Illustration revealing the tissue bridge connecting the dura, the membranous covering of the brain and spinal cord, to the rectus capitis posterior minor (RCPM) muscle at the base of the skull between the atlas or first cervical vertebra and occipital bone of skull. A similar bridge exists between the 1st and 2nd cervical vertebrae.



Courtesy of Hack G, Dunn G, Toh MY and *Encyclopedia Britannica*'s 1998 Medical and Health Annual

7. For chiropractic and medical doctors in primary practice the issue of importance is not classification, the name assigned, but rather diagnosis of the cause or causes of a patient's headaches. This, where possible, is the foundation of successful management.

90% of patients with headache have primary or benign headache (i.e. not associated with any specific injury or disease process). Patients may have more signs of migraine or tension-type headache, still often called muscle-contraction or stress headache, but the issue is the cause — which may, for example, be one or more of psychological stress, food and environmental triggers, changes in blood chemistry that lower the patient's pain threshold, or cervical spine dysfunction.

8. Chiropractic management involves diagnosis of the cause or causes, and then a variety of interventions. These include manual and other physical therapies, and nutritional and lifestyle advice. Some patients require referral for medical or psychological management or co-management.

Here, however, we are concerned specifically with cervical manipulation, which is the central aspect of chiropractic management. There are trials supporting the effectiveness of manipulation for patients who, according to IHS criteria, have migraine,<sup>12</sup> tension-type headache (TTH),<sup>13</sup> cervical spine headache,<sup>14</sup> and post-traumatic headache.<sup>15</sup> The indication for manipulation, is not the

label or classification but the presence of cervical spine joint dysfunction (chiropractic subluxation) amenable to manipulation. The patient may have:

- 'Cervical spine headache' as rather narrowly defined by the IHS. The Danish trial by Nilsson et al.<sup>14</sup> reports the effectiveness of chiropractic manipulation for that.
- Any other headache where the primary source of pain is the cervical spine. The much wider definition of 'cervicogenic headache' (CGH) adopted by the multidisciplinary North American Cervicogenic Headache Society (NACHS) is:

"Referred pain perceived in any region of the head caused by a primary nociceptive

source in the musculoskeletal tissues innervated by cervical nerves.”

An important aspect of the new evidence review from Duke University is that it follows the NACHS approach, looking at CGH rather than the IHS’s definition of cervical spine headache. And, from an independent and respected source, it acknowledges the high prevalence of CGH — and thus of cervical spine disorders as a cause of primary headache.

**9. Duke Evidence Report.** There are other recent systematic reviews of research supporting the effectiveness of manipulation for patients with common forms of headache.<sup>16,17</sup> What makes the new systematic review from the Duke University EPC particularly important are the status of the center (1 of 12 research centers given the EPC trademark status by the US Department of Health and Human Services), the caliber of the 18 member interdisciplinary panel that did the literature review, the comprehensiveness of the evidence review (all behavioral and physical treatments for TTH and CGH), its evident scientific rigor and the nature of the conclusions reached. These conclusions include:

**a) Diagnostic difficulty.** There is “considerable disagreement” among researchers and clinicians on how to distinguish between CGH, TTH and migraine. (There is nothing new there. Norwegian neurologist Otto Sjaastad, as editor of the journal *Cephalalgia*, has described the diagnostic confusion as “grave”<sup>18</sup>)

**b) Cervicogenic headache (CGH).** Even on the relatively narrow definition of CGH given by the IHS, CGH has a point prevalence of approximately 1 in 5 (17.8%) of persons with frequent headaches (5 or more days per month), which equates to 2.5% of the adult population. (In other words, this is one of the most common forms of headache, similar in prevalence to migraine though less prevalent than TTH).

The one physical and behavioral treatment with proven effectiveness for CGH is manipulation. The other two physical treatments most frequently studied, acupuncture and physiotherapy (massage, mobilization, heat therapy, ultrasound, stretching and TENS) have insufficient data and no proven benefit.

**c) Tension-type headache (TTH).** Annually 20-30% of the adult population have TTH more than once a month, and 3% have chronic TTH — an average of 15 days or more with headache monthly. (Therefore TTH, often still called muscle-contraction headache, is the most common form of headache).

Behavioral treatments (relaxation training, cognitive behavioral therapy and EMG biofeedback with and without relaxation training) are all effective in treating TTH headache, “similar in effect to drug treatment with amitriptyline.” The effectiveness of manipulation is “less clear” for TTH than it is for CGH “since no placebo or non-treatment controlled studies have been performed” and there are only three randomized controlled trials. In the largest of these, by Bolin et al. in the US,<sup>13</sup> chiropractic manipulation was compared with amitriptyline and resulted in more sustained benefit, in terms of both headache frequency and intensity, during a 4-week follow-up period after 6 weeks of treatment. There is no controlled trial evidence of effectiveness for other physical treatments.

How can manipulation be effective for TTH? Probably the answer lies in definitional problems. Some patients with TTH, not classified as having CGH because they have no neck pain or headache provoked by neck movements, nonetheless have spinal joint

dysfunction/chiropractic subluxation — correction of this mechanical restriction and muscle tension removes a significant cause or predisposing factor for their TTH.

**d) Prevention.** As the Duke Evidence Report notes, and the results in the Bolin et al. trial indicate, medication is given primarily to control symptoms whereas behavioral and physical interventions are primarily aimed at the prevention of headaches. Prevention, where possible, would seem to be more important for patients.

**e) Importance of non-pharmacological treatments.** More provocatively, given the extensive use of medication in this large area of health care, these researchers from Duke conclude in their Executive Summary that “if effective and available . . . these non-pharmacological treatments may be the first choice for most patients”. Reasons why “significant interest has developed among both patients and health care providers in alternative treatments for tension-type headache” include, they suggest, the lack of suitability of drug treatments for many patients, lack of universal effectiveness, and the frequency of undesired side effects.

**f) Safety.** The Duke Report notes that best estimates suggest “that cervical spinal manipulation has a very low risk of serious complications” and concludes that “adverse effects are uncommon with manipulation and this may be one of its appeals over drug treatment.” (Issues of safety are reviewed more fully below — see paras 13-14).

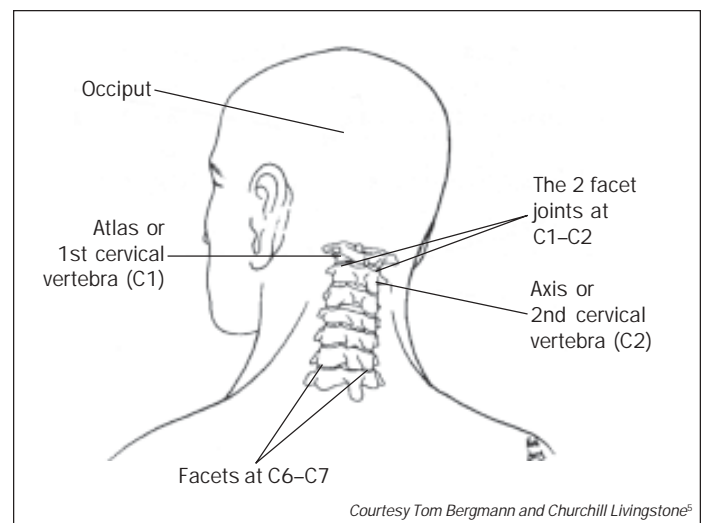
In summary, this current and authoritative evidence review from the Duke University EPC establishes that one of the proven benefits of neck manipulation is relief of CGH, which is a common form of chronic primary headaches, suffering and disability.

## E. EFFECTIVENESS — NECK PAIN

10. Three interdisciplinary expert reviews of the research — from the US RAND Corporation,<sup>19</sup> the Quebec Task Force on Whiplash Related Disorders<sup>20</sup> and the Cochrane Collaboration team of Aker, Gross, et al.<sup>21</sup> — all conclude that manipulation is effective and appropriate for many patients with acute and chronic mechanical neck pain. Hurwitz et al., summarizing the RAND Report in the journal *Spine*,<sup>16</sup> observe “manipulation is probably slightly more effective than mobilization or physical therapy for

*continued on page 6*

**Figure 2 Posterior View of Cervical Spine and Facet Joints**



*continued from page 1*

evidence that lumbar supports are *not* effective for primary prevention of LBP, and there is no evidence of effectiveness for secondary prevention (i.e. prevention of recurrent or chronic problems). There is limited evidence that lumbar supports are more effective than no treatment for patients with back pain, but no clear evidence on whether they are more effective than any other specific treatment.

**c) Rehabilitation.** There are only two RCTs looking at the effectiveness of biopsychosocial rehabilitation in adults with sub-acute LBP. These provide moderate evidence that such programs offer some benefit “but more studies are needed”. (*Cochrane Reviews - Spine 2001; 25(19):2501-2513, Spine 2001, 26(4):377-386, Spine 2001; 26(3):262-269.*)

**1. Australia — Response to Draft LBP Guidelines.** JMPT has just published an excellent critique by Lynton Giles, DC PhD, of the *Draft Clinical Guidelines for the Management of Acute Low Back Pain* submitted to the Australian Medical Research Council by Professor Bogduk, University of Newcastle on behalf of the Australian Faculty of Musculoskeletal Medicine. Giles concludes that Bogduk’s draft guidelines “are nothing more than the opinion of an individual,” are guilty of misleading analysis and poor methodology, and are not credible. Giles also sets forth the questions to be asked in assessing the merit of all guidelines. (Giles LGF. *Evidence-based Clinical Guidelines Submitted to the Australian National Health and Medical Research Council for the Management of Acute Low Back Pain: A Critical Review*, Commentary in *J Manipulative Physiol Ther*, 2001; 24(2):131-139).

**2. Bahamas — New Legislation.** Under the Health Professions Act 2000, several health professions, including chiropractic and podiatry, have been regulated and licensed for the first time. The chiropractic scope of practice, which is consistent with laws internationally, includes diagnosis with the right to perform or order diagnostic imaging, and treatment using various manual and physical therapies. There are currently seven chiropractors serving a population of 270,000 in the Bahamas. *Contact:* Susan Donald, DC, P.O. Box 55 19163, Nassau, Bahamas, Tel. 242-393-2774, Email: Sdonald@bahamasnet.com.

**3. Croatia — Association Established.** Croatia’s nine duly qualified chiropractors are now represented by the Hrvatsko Udruzenja Kiroprakticara or Croatian Chiropractic Association. As the practice of chiropractic is not yet regulated a number of other health professionals and laypersons still claim to offer chiropractic services. *Contact:* Michael Santek, DC, Srebrnjak 6, 10000 Zagreb, Croatia, Tel. 385-1-243-1116, Email: parnica@hotmail.com

**4. South Korea — Prosecutions.** The threat of prosecution of chiropractors for practising medicine without a licence is distant history in North America, recent history in some European countries, but current reality in South Korea. Paradoxically it is legal for a duly qualified foreign national to practise chiropractic in Korea, but not a Korean. There are approximately 200 Korean graduates of US colleges still practising in the US, but another 55 have returned to Korea to support the development of a college and fight for political recognition.

The President of the Korean Chiropractors’ Association, Seung Won Lee, DC MD PhD, a Parker College graduate, reports four new prosecutions. The defendant chiropractors, all of whom face real risk of imprisonment, are Dr. Youngju Cha of Taegye (Life, 1997), Dr. Changgyu Kim of Seoul (Life, 1996), Dr. Jungyoun Kim of Seoul (Northwestern, 1992), and Dr. Su-hee Song of Seoul (Palmer, 1996). Dr. Song is a daughter of former KCA President, Dr. Young Serb Song and returned to Korea to maintain his practice and fight for the recognition of chiropractic when her father was forced to leave practice last year on account of repeated prosecutions and ill health. Defence lawyers, assisted by the KCA and the World Federation of Chiropractic, will call for dismissal of the charges on the basis that they raise legislative rather than criminal issues. *KCA contact:* Dr. Seung Won Lee, Email: chirolee@shinbiro.com, Website: www.chiro.or.kr

**5. UK — Use of CAM in England.** A new survey from Thomas et al. at the University of Sheffield provides the first reliable population-based estimates of the use of complementary and alternative medicine (CAM) in England and reports substantial usage consistent with earlier surveys in Australia, Canada and the US — in 1998 more than 1 in 4 (28.3%) of adults used CAM during the past 12 months and approximately 1 in 2 (46.6%) have used CAM during their lives. This was a geographically representative but otherwise random survey of 5,010 adults with a 59% response rate.

The survey asked about use of 6 “more established therapies” — acupuncture, chiropractic, homeopathy, hypnotherapy, medical herbalism and osteopathy, two “less established therapies” — reflexology and aromatherapy, and other therapies or herbal and homeopathic over-the-counter remedies.

The most used practitioner-based disciplines were osteopathy (4.3% in past 12 months, 13% lifetime) and chiropractic (3.6% in last 12 months, 10.3% lifetime), a strong showing for chiropractic (1400 practitioners) since it has always been a smaller profession than osteopathy (approximately 2,500 practitioners) in the UK. (This compares with approximately 12-15% usage in the last 12 months in North America where the ratio of chiropractors to the population is much higher). There was less use of acupuncture (1.6% in last 12 months, 7% lifetime). Use of herbal remedies was 19.8% in last 12 months, 31.4% lifetime.

71% of visits to practitioners in the six established therapies were for musculoskeletal problems, 5% for “general health maintenance”. As in other studies there was greater use of CAM by women than men, and less use of all types of CAM in older age groups. Estimated average number of visits for each chiropractic patient was 5 to 6. Of the estimated 22 million visits to practitioners in the six more established disciplines in 1998, the National Health Service paid for 10%. Annual out-of-pocket expenditures for the 90% of services purchased privately was £450 million. It is concluded that there is “substantial use” of practitioner-provided complementary therapies which are “making an important contribution to first contact primary care.” (Thomas KJ, Nicholl JP, Coleman P. *Use and Expenditure on Complementary Medicine in England: A Population Based Survey*. *Comp Therapies in Med* 2001; 9:2-11)

some patients with subacute or chronic neck pain, and all three treatments are probably superior to usual medical care.” However the evidence for manipulation is not as strong as with back pain and headache, and they note that more high-quality research is needed. This comment, as the Quebec Task Force warns, applies to all current treatments for neck pain.

11. These reviews considered the evidence to 1995. Since that time two studies have strengthened the evidence supporting chiropractic manipulation for chronic neck pain. Khan, Cook et al., in a study from the University of Bristol in the UK report on 100 consecutive patients with chronic neck pain from road traffic whiplash injuries (average duration of pain — 12.7 months) referred for chiropractic manipulation.<sup>22</sup> Patients received an average of 19 treatments (range — 1 to 53 treatments) over an average period of 4 months (range — 1 to 48 months).

There was significant improvement in patients with restricted range of neck movement, both with and without neurological signs and symptoms, but not in patients with neck pain but no limited neck movement or neurological signs or symptoms. This seems intuitively right, and the latter group of patients commonly described “an unusual complex of symptoms indicating psychosocial factors”. The researchers conclude that “chiropractic manipulation is proven effective” for those in this population of chronic neck pain patients with restricted neck movements. On one hand this was not a controlled trial, on the other hand assessment was by an independent orthopedic surgeon and results were consistent with earlier research published by this interdisciplinary research team.

Recently a randomized controlled trial from Giles and Muller at Townsville General Hospital, Queensland, Australia<sup>23</sup> compared medical needle acupuncture, chiropractic manipulation and non-steroidal anti-inflammatory medication (NSAIDs — tenoxicam with ranitidine) in patients suffering chronic back or neck pain (average duration 6 years — i.e. a truly chronic pain population) — this time not a road traffic injury group of patients. Neck pain patients experienced significant improvement after chiropractic manipulation on all outcome measures (Neck Disability Index, Pain Scale, and fitness for discharge from care), but no significant improvement after acupuncture or medication. Manipulation, as with acupuncture, comprised 6 treatments over a 4 to 6 week period.

## F. EFFECTIVENESS — OTHER

12. Chiropractic cervical adjustment or manipulation is given most frequently for patients with neck pain and headache, but for completeness other indications should be mentioned. In summary:

a) Prospective case series from Canada<sup>24</sup> and Brazil<sup>25</sup> report the effectiveness of chiropractic manipulation, given in conjunction with supportive therapies and exercises, for patients with acute and chronic cervical vertigo or dizziness. Lewit, a neurologist who practises manipulation, reports similar results and comments “it is important to stress that a cervical factor may be present in all forms of vertigo and dizziness . . . in no field is manipulation more effective than in the treatment of disturbances of equilibrium.”<sup>26</sup>

b) In patients found to have cervical joint dysfunction or chiropractic subluxation, a range of visual, respiratory and other disorders may be relieved by manipulation. This is reported by chiropractic, medical and osteopathic researchers. Presently the

research evidence comes from case reports and case series rather than controlled trials, and is therefore preliminary only.<sup>27</sup>

c) Two theoretical concepts deserve mention. The first is that the primary indication for treatment is cervical joint dysfunction/chiropractic subluxation, not a specific condition. The second is that the spine functions as one organ. This means that joint dysfunction at one level typically causes compensatory dysfunction elsewhere — either in adjacent joints or other regions of the spine. A cervical spine dysfunction may be the primary cause of restricted joint movement in the lumbar spine or vice versa. As a result, in appropriate cases cervical manipulation may be a necessary and effective treatment for back pain.

## G. SAFETY

13. The safety of a treatment can be measured in terms of minor and major complications. In both respects neck manipulation has been documented to be very safe by any standard:

a) **Minor complications.** The most common adverse effect, minor stiffness after the first treatment, is comparatively infrequent. In the Bolin et al. headache trial already mentioned 82% of patients taking amitriptyline had adverse effects (46 of 56 — dry mouth, drowsiness, weight gain) as opposed to 4% of patients receiving chiropractic manipulation (3 of 70 — neck stiffness after the first treatment).

b) **Major complications.** The risk of serious injury is of greater importance. There is now good chiropractic and medical data on this from insurance, hospital and survey sources in Europe and North America. Serious complications of manipulation may arise from vertebral stroke (VBS) also described in the literature as cerebrovascular accidents (CVAs). Typically there is injury to the wall of one of the two vertebral arteries which leads to clotting and subsequent release of an embolus that then lodges in or near the basilar artery obstructing blood supply to the brain. Symptoms develop over a period of hours or days. Alternately there is an immediate stroke, and in most of these cases it is thought there is prior injury to the artery, causing the neck pain for which treatment is sought. Manipulation dislodges part of the thrombus already formed. Terrett’s new book,<sup>3</sup> supported by over 500 references, gives a thorough review of all aspects of these complications — mechanisms, risk rates, important clinical aspects of patient history, examination and treatment, and emergency care.

For some years the most commonly quoted risk rate for CVA has been 1 in 1 million treatments (.0001%), and this is substantially consistent with the two most authoritative recent reviews of the evidence, namely:

- By Haldeman et al. in *Spine* in 1999<sup>28</sup> who placed the potential risk “somewhere between 1 in 1.3 million treatment sessions to 1 in 400,000.”

- By Terrett who this year, on the basis of the most recent evidence, indicates a risk rate of “less than 1 stroke per 2 million cervical manipulations” or “about 1 in 25 chiropractic practitioners during (their) 40 year practising careers.”<sup>3</sup> This rate is supported by extensive recent US malpractice insurance data. Similar Canadian data quoted by Terrett supports the lower risk rate of 1 per 3.8 million treatments.

14. How does this compare with medical and surgical treatments for neck pain and headache? As all physicians will know, by any comparison this makes neck manipulation extremely safe. As examples:

a) As Terrett explains, many patients who would receive manipulation from a chiropractor for chronic neck pain are medically diagnosed as having cervical arthritis or spondylosis and are given NSAIDs. Best estimates of hospitalization and death amongst these patients from gastrointestinal ulcers caused by these medications are 40,000 per million (4%) and 4,000 per million (.4%) respectively. In the US this amounts to 32,000 hospitalizations per annum, 3,200 deaths.

b) Surgery carries even greater risk. Serious complications from cervical spine surgery for neck pain are 15,600 cases of paralysis or stroke per 1 million, and the mortality rate is 6,900 per million.<sup>19</sup>

## H. INFORMED CONSENT

15. With serious complications being so rare following manipulation by all practitioners, is this a risk of which the patient should be informed? Or, as Terrett puts it, “does the potential risk of a CVA that most practitioners will never see in their practising careers warrant routine implementation of informed consent?” This is both a legal and an ethical question, addressed more fully elsewhere.<sup>29</sup> Leaders in medical manipulation in North America<sup>30</sup> and Europe<sup>31</sup> have suggested not because the risk is so small and raising it may make the patient unnecessarily apprehensive and therefore less amenable to effective treatment.

As a matter of law, in many US state jurisdictions, where the legal test for informed consent is based on the prevailing professional standard, there is no legal requirement. In Canada, where the legal test is based upon the expectations of the reasonable patient, there is a legal requirement of disclosure — which extends to any known risk of serious harm however remote that harm may be. As a matter of ethics national chiropractic practice guidelines in both the US<sup>32</sup> and Canada<sup>33</sup> recommend disclosure to the patient and completion of a written consent form.

## I. PREVENTION

16. To quote Terrett once more, “it is very difficult to lessen a risk that is virtually nil,” and little can be done. Patients who suffer CVAs after neck manipulation are generally healthy, young adults with few or no risk factors for stroke who cannot be identified by clinical or radiological examination.

It was once thought that there were predisposing factors (e.g. history of migraines, and/or use of contraceptive pills) but Haldeman et al.<sup>28</sup> explain that reported cases merely reflect socio-demographic factors in the wider community. It was once thought that certain manipulative techniques, specifically the combined use of rotation and extension, placed a patient at higher risk. In fact cases involve a representative range of techniques, and rotation is more commonly involved because it has been more commonly used. Two points here are:

- CVAs from vertebral artery injury in healthy young adults have been reported following many forms of vigorous and trivial trauma — in sporting activities, leisure activities (walking, kneeling at prayer, household chores) sustained rotation or extension (e.g. wallpapering, painting ceilings, archery, yoga),

short-lived rotation or extension (backing the car, looking up), sudden movements (coughing, sneezing, fair rides) and medical procedures (radiography, receiving anesthetics before surgery, dental work, emergency resuscitation).

- All such CVAs, despite many millions of unexpected neck movements in the population daily, are extremely rare. They give rise to 1.3 in 1000 cases of stroke and “a major medical center cannot expect to see more than 0.5 to 3 cases in a year, a number of cases that is simply insufficient for a detailed analysis of risk factors and precipitating events.” Unsubstantiated opinions on these matters have been “the result of extrapolation or generalization from single case reports or small case series.”<sup>28</sup>

Finally, a variety of premanipulative techniques have been used to test for vertebrobasilar insufficiency but these are now known to have both false negative and false positive problems and are discredited. Perhaps the most important step in prevention involves trying to recognize cases where a patient’s neck pain arises from a vertebral artery dissection that has already occurred.

Terrett’s ‘clinical pearl’ here is that practitioners should look for the patient who describes severe head and/or neck pain, worse than they have ever suffered, who also have dizziness/vertigo and other symptoms of brainstem ischemia. Their pain may or may not result from a musculoskeletal lesion. The cautious practitioner will limit early treatment of the upper cervical spine. If after 1 or 2 visits the pain is substantially diminished, this indicates pain of musculoskeletal origin and safety to proceed with manipulation. If the patient had a prior case of vertebral artery dissection the pain will be undiminished or worse and vascular or other non-musculoskeletal origins should be considered.

## J. CONCLUSION

17. If the scientific evidence is that manipulation is a safe, effective and appropriate treatment for patients with many common forms of neck pain and headache, why are there so many reports of potential harm in the media? Why do so many family physicians express reservations about a treatment that is far safer than medications they would prescribe with little warning and no signed consent? There will be a number of reasons, but two should be addressed frankly:

a) **Misrepresentation.** The first is that there has been a wholly remarkable pattern of misrepresentation in the medical literature — both as to the number of cases of complications following neck manipulation and as to the involvement of chiropractors. Terrett’s dispassionate new analysis of the facts makes compelling reading. His Appendices 1 and 2 review every reported case. In numerous instances, often where treatment was given by physicians or physiotherapists, medical case reports refer to chiropractors and chiropractic manipulation where no chiropractor was involved. Conversely, there is not a single incident where chiropractic manipulation is wrongly ascribed to a medical practitioner. In 1992 the Australian physician Winer wrote:

“Some 430 cerebrovascular catastrophes following cervical manipulation have been reported in the English-speaking literature. The majority of these tragedies have been caused by chiropractors. This is not a political statement; it is a statement of fact.”<sup>29</sup>

Winer was impressively wrong. As Terrett demonstrates, defining the word *catastrophe* very broadly to include any residual neurological deficit, at that time there had been 78 cases, 50 involving chiropractic treatment — less than 1 per annum worldwide.

**Orders: Duke Evidence Report and Terrett Book:**  
Both are available from the Foundation For Chiropractic Education and Research. Details at [www.fcer.org](http://www.fcer.org)

**b) Use of anecdotal evidence.** A second reason is the ready use of anecdotal, unscientific evidence. A patient exhibits symptoms of stroke some days or weeks after seeing a chiropractor, that fact is discovered by hospital emergency staff, and shortly thereafter medical specialists are giving media interviews explaining that one caused the other. Or, as in the case of the recent survey by Carlini et al. in the US,<sup>34</sup> neurologists are asked informally to recollect how many cases of stroke following chiropractic manipulation they have seen and this combined anecdotal recall evidence generates an Associated Press article warning of the risks of chiropractic manipulation — interestingly, not medical manipulation or manipulation in general — in newspapers in Tokyo, Paris, Toronto and worldwide the next day.

In summary, as Terrett concludes, at present there is “an unwarranted negative public opinion” concerning the appropriateness of neck manipulation generally and chiropractic cervical adjustment in particular. Hopefully this review, with the research evidence of the safety and effectiveness of neck manipulation that it presents, will be helpful in closing the gap between perception and reality — especially for patients and their family physicians. Many will be interested in a non-pharmacological approach to relieving chronic headache and/or neck pain — one that addresses a previously undiagnosed cause of pain in the cervical spine, a cause that may now be treated with confidence by means of skilled manipulation. **TCR**

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