WHO guidelines on basic training and safety in chiropractic

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Introduction

Chiropractic is one of the most popularly used forms of manual therapy. It is now practised worldwide and regulated by law in some 40 national jurisdictions.

As a health care service, chiropractic offers a conservative management approach and, although it requires skilled practitioners, it does not always need auxiliary staff and therefore generates minimal add-on costs. Therefore, one of the benefits of chiropractic may be that it offers potential for cost-effective management of neuromusculoskeletal disorders (1, 2, 3).

The World Health Organization (WHO) encourages and supports countries in the proper use of safe and effective medication, products and practices in national health services. In the light of the situation described above, there is a need to develop guidelines on chiropractic education and safe practice, including information on contraindications for such care.

Regulations for chiropractic practice vary considerably from country to country. In some countries, e.g. the United States of America, Canada and some European countries, chiropractic has been legally recognized and formal university degrees have been established. In these countries, the profession is regulated and the prescribed educational qualifications are generally consistent, satisfying the requirements of the respective accrediting agencies.

However, many countries have not yet developed chiropractic education or established laws to regulate the qualified practice of chiropractic. In addition, in some countries, other qualified health professionals and lay practitioners may use techniques of spinal manipulation and claim to provide chiropractic services, although they may not have received chiropractic training in an accredited programme.

With the rapid growth in demand for chiropractic services, other health care practitioners may wish to gain additional qualifications in chiropractic. Conversion programmes have been developed to enable persons with substantial basic medical training to acquire the additional necessary education and skills to become chiropractors, and these could be further expanded. Such programmes should be flexible in order to take account of different educational backgrounds and previous medical training.

In countries where no regulatory legislation currently exists, there may be no educational, professional or legal framework governing the practice of chiropractic. The minimum educational requirements needed to encourage practitioners to register and to protect patients are outlined in this document. The recognition and implementation of these minimum requirements will depend on individual country situations.

In some countries with educational limitations, lack of financial resources or unsatisfactory integration of indigenous communities into mainstream society, primary health care workers specifically trained in myotherapy may help to enhance health care services. This may also form the basis for introducing some chiropractic principles of health care and therapeutic interventions into national health systems which would otherwise be unavailable for the management of common musculoskeletal conditions and the optimization of health. Such programmes are identified in Part 1, Section 9 below.

Objectives

In order to facilitate qualified and safe practice of chiropractic as well as to protect the public and patients, the objectives of these guidelines are:

- to provide minimum requirements for chiropractic education
- to serve as a reference for national authorities in establishing an examination and licensing system for the qualified practice of chiropractic
- to review contraindications in order to minimize the risk of accidents and to advise on the management of complications occurring during treatment and to promote the safe practice of chiropractic.

How to use this document

Part I of the guidelines covers basic requirements for different training programmes, each one designed for trainees with various educational backgrounds, including nonmedics, physicians wishing to use chiropractic and primary health care workers. This part provides a reference for the establishment of various training programmes, particularly where no formal education degree has been established. If national health authorities wish to evaluate the training programme, they may consult Councils on Chiropractic Education International (CCEI – www.cceintl.org). This organization does not function as an accrediting agency, but promotes an understanding of the variations between recognized accrediting bodies through dialogue and communication.

A system of examination and licensing may be established or adapted on the basis of this training programme to ensure the competence of the trainees and to avoid the practice of chiropractic by unqualified persons. It is to be hoped that this will deter commercial exploitation of chiropractic education and practice, which is a significant and growing problem in some countries.

Part II of the guidelines deals with the safety of spinal manipulative therapy and the contraindications to its use.

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Glossary

The terms used in these guidelines are defined as follows.

Adjustment
Any chiropractic therapeutic procedure that ultimately uses controlled force, leverage, direction, amplitude and velocity, which is applied to specific joints and adjacent tissues. Chiropractors commonly use such procedures to influence joint and neurophysiological function.

Biomechanics
The study of structural, functional and mechanical aspects of human motion. It is concerned mainly with external forces of either a static or dynamic nature, dealing with human movement.

Chiropractic
A health care profession concerned with the diagnosis, treatment and prevention of disorders of the neuromusculoskeletal system and the effects of these disorders on general health. There is an emphasis on manual techniques, including joint adjustment and/or manipulation, with a particular focus on subluxations.

Fixation
The state whereby an articulation has become fully or partially immobilized in a certain position, restricting physiological movement.

Joint manipulation
A manual procedure involving directed thrust to move a joint past the physiological range of motion, without exceeding the anatomical limit.

Joint mobilization
A manual procedure without thrust, during which a joint normally remains within its physiological range of motion.

Neuromusculoskeletal
Pertaining to the musculoskeletal and nervous systems in relation to disorders that manifest themselves in both the musculoskeletal and nervous systems, including disorders of a biomechanical or functional nature.

Palpation
(1) The act of feeling with the hands. (2) The application of variable manual pressure through the surface of the body for the purpose of determining the shape, size, consistency, position, inherent motility and health of the tissues beneath.

Posture
(1) The attitude of the body. (2) The relative arrangement of the parts of the body. Good posture is that state of muscular and skeletal balance that protects the supporting structures of the body against injury or progressive deformity irrespective of the attitude (erect, lying, squatting, stooping) in which the structures are working or resting.

Spinal manipulative therapy
Includes all procedures where the hands or mechanical devices are used to mobilize, adjust, manipulate, apply traction, massage, stimulate or otherwise influence the spine and paraspinal tissues with the aim of influencing the patient's health.

Subluxation[1]
A lesion or dysfunction in a joint or motion segment in which alignment, movement integrity and/or physiological function are altered, although contact between joint surfaces remains intact. It is essentially a functional entity, which may influence biomechanical and neural integrity.

Subluxation complex (vertebral)
A theoretical model and description of the motion segment dysfunction, which incorporates the interaction of pathological changes in nerve, muscle, ligamentous, vascular and connective tissue.

Thrust
The sudden manual application of a controlled directional force upon a suitable part of the patient, the delivery of which effects an adjustment.

[1] This definition is different from the current medical definition, in which subluxation is a significant structural displacement, and therefore visible on static imaging studies.

Part 1: Basic training in chiropractic

1. General considerations

1.1. Historical information

Although spinal manipulation dates back to Hippocrates and the ancient Greek physicians (4), the discovery of chiropractic is attributed to D.D. Palmer in 1895 (5), with the first school for the training of chiropractors commencing in the United States of America in Davenport, Iowa in 1897 (6).

Palmer developed the chiropractic theory and method from a variety of sources, including medical manipulation, bonesetting and osteopathy, as well as incorporating unique aspects of his own design. The term "chiropractic", derived from Greek roots to mean *"done by hand"*, originated with Palmer and was coined by a patient, the Reverend Samuel H. Weed (7).

Chiropractic developed in the United States of America during a period of significant reformation in medical training and practice. At the time, there was a great variety of treatment options, both within conventional medicine and among innumerable other alternative health care approaches (8).

1.2 Philosophy and basic theories of chiropractic

Chiropractic is a health care profession concerned with the diagnosis, treatment and prevention of disorders of the neuromusculoskeletal system and the effects of these disorders on general health. There is an emphasis on manual techniques, including joint adjustment and/or manipulation, with a particular focus on the subluxation.

The concepts and principles that distinguish and differentiate the philosophy of chiropractic from other health care professions are of major significance to most chiropractors and strongly influence their attitude and approach towards health care.

A majority of practitioners within the profession would maintain that the philosophy of chiropractic includes, but is not limited to, concepts of holism, vitalism, naturalism, conservatism, critical rationalism, humanism and ethics (9).

The relationship between structure, especially the spine and musculoskeletal system, and function, especially as coordinated by the nervous system, is central to chiropractic and its approach to the restoration and preservation of health (9, 10:167).

It is hypothesized that significant neurophysiological consequences may occur as a result of mechanical spinal functional disturbances, described by chiropractors as subluxation and the vertebral subluxation complex (9, 10:169-170, 11).

Chiropractic practice emphasizes the conservative management of the neuromusculoskeletal system, without the use of medicines and surgery (10:169-170, 11). Biopsychosocial causes and consequences are also significant factors in management of the patient.

As primary-contact health care practitioners, chiropractors recognize the importance of referring to other health care providers when it is in the best interests of the patient (10).

1.3 Administrative and academic considerations

The training of chiropractors involves certain administrative and academic considerations, for example:

- who could be trained?
- what would be the practitioner's role and responsibilities?
- what education would be required?
- where would such education be provided, and by whom?
- would suitable programmes have to be developed from scratch, or could existing substandard courses be strengthened or appropriately modified?
- are suitably qualified chiropractic educators available, or would they have to be trained?
- what would be the mechanisms for official recognition of practitioners, programmes, educators and institutions?

1.4 Monitoring and evaluation

In order to introduce qualified practice and proper use of chiropractic, systems are needed to monitor the entire profession, the performance of practitioners and the education and training of practitioners.

Most countries that regulate the profession use national, regional, state or provincial examinations. Alternatively, health authorities may delegate to professional associations the right to regulate themselves and to ensure the competence of individuals.

As has been the case in a number of countries or regions in the past, prior to the legislative recognition of chiropractic, a government may wish to evaluate both the positive and negative consequences of including it within the health care service (12, 13, 14, 15, 16, 17).

1.5 Further education and career possibilities

It is recognized that, as an interim measure prior to the establishment of a full chiropractic programme, it may be necessary to provide "limited" programmes to supplement existing health care education, in order to begin to register chiropractors in these countries and ensure qualified practice of chiropractic. How countries will recognize chiropractors with "limited" programmes will vary according to individual country situations.

Practitioners with limited or no formal chiropractic education, practising as "chiropractors", should upgrade their education to meet the requirements laid down by their government when regulations are put into place. In this way such personnel can be effectively incorporated into the domestic professional workforce.

2. Acceptable levels of education and retraining

Summarizing various training programmes in different countries, these guidelines address two levels and four different settings for chiropractic education, each preparing health care practitioners to practise in the health care system as a chiropractor. These options are available to countries to meet their individual needs.

2.1 Category I - full chiropractic education

- for students with no prior health care education or experience
- as the supplementary education required for medical doctors or other appropriate health care professionals to acquire a recognized qualification as a chiropractor

2.2 Category II - limited chiropractic education

- ***A limited training programme for medical personnel and other appropriate health care professionals in countries or regions introducing chiropractic where no current legislation governing the practice exists; it does not lead to full qualification.***
  Such training should be conducted as a temporary measure to establish a provision of chiropractic and/or as the first stage in the development of a full chiropractic programme. Such a course is established as a minimum registerable requirement and courses of this type should be replaced by appropriate full-time programmes as soon as it is practical to do so.

- ***The training required to attain a minimally acceptable level of competency for students who represent existing providers of chiropractic in countries or regions without regulations but intending to introduce legislation governing the practice of chiropractic.***
  This provision does not lead to a full qualification, but to a minimal registerable standard. Courses of this type are a temporary measure, and should be replaced by appropriate full-time programmes as soon as it is practical to do so.

3. Models of chiropractic education

3.1 Category I(A)

There are many slight variations on the following models: however, in general, there are three major educational paths involving full-time education:

- A four-year full-time programme within specifically designated colleges or universities, following 1-4 years of suitable pre-chiropractic training in basic sciences at university level; for an example, see Annex 2.
- A five-year bachelor integrated chiropractic degree programme offered within a public or private university, with student entrance based upon the applicant's matriculation status and the university's admission requirements and quota restrictions.
- A two or three-year pre-professional Masters programme following the satisfactory completion of a specifically designed bachelor degree programme in chiropractic or a suitably adapted health science degree.

3.2 Category I(B)

Programmes for persons with prior medical or other health care professional education. Such courses would vary in length and subject requirements, depending on the applicant's previous educational background. For an example, see Annex 3.

3.3 Category II(A)

Conversion programmes for persons with prior medical or other health care professional education to obtain a "limited" chiropractic educational qualification should be conveniently structured, of a part-time nature, satisfying at least all the minimum requirements though not leading to a full qualification. For an example, see Annex 4.

3.4 Category II(B)

In these programmes, the course content and length may also vary greatly depending upon the applicant's previous training and experience. On completion of the programmes, students will have met the requirements of a first bachelor-level programme in chiropractic through part-time study and acquired the necessary knowledge and skills to provide safe, if basic, chiropractic care. Such courses do not lead to a full chiropractic qualification. For an example, see Annex 5.

4. Full chiropractic education – category I(A)

This refers to the training programme for persons without previous medical or other health care professional education.

4.1 Objective

The aim at this level is to provide an education consistent with the requirements established in those countries where government regulations have been enacted. Based upon this education, chiropractors practise as primary-contact health care providers, either independently or as members of health care teams at the community level within health care centres or hospitals.

4.2 Entrance requirements

An acceptable applicant would have completed secondary schooling, university entrance or its equivalent with appropriate training in basic sciences, as required by the particular programme.

4.3 Basic training

Irrespective of the model of education utilized, for those without relevant prior health care education or experience, not less than 4200 student/teacher contact hours are required, or the equivalent, in four years of full-time education. This includes not less than 1000 hours of supervised clinical training.

4.4 Core syllabus

4.4.1 Educational objectives

Competence in the practice of chiropractic requires the acquisition of relevant knowledge, understanding, attitudes, habits and psychomotor skills. The curriculum and the student evaluation processes should be designed to ensure that the chiropractic graduate demonstrates the following skills.

He/she should possess a comprehensive understanding and command of the skills and knowledge that constitute the basis of chiropractic in its role as a health care profession, as follows:

- achieve a fundamental knowledge of health sciences, with a particular emphasis on those related to vertebral subluxation and the neuromusculoskeletal systems;
- achieve a comprehensive theoretical understanding of the biomechanics of the human locomotor system in normal and abnormal function and, in particular, possess the clinical ability needed for an expert assessment of spinal biomechanics;
- appreciate chiropractic history and the unique paradigm of chiropractic health care;
- achieve a level of skill and expertise in the manual procedures emphasizing spinal adjustment/manipulation regarded as imperative within the chiropractic field;
- possess the ability to decide whether the patient may safely and suitably be treated by chiropractic or should be referred to another health professional or facility for separate or comanaged care.

He/she should perform at the clinical level expected of a primary-contact health care practitioner, as follows:

- competently perform a differential diagnosis of the complaints presented by patients;
- achieve particular expertise in diagnostic imaging, orthopaedics, pain management and rehabilitation of the neuromusculoskeletal system and/or diagnosis and management of vertebral subluxation;
- achieve competence in interpreting clinical laboratory findings;
- acquire the ability to appraise scientific and clinical knowledge critically:
- understand and apply fundamental scientific/medical information, and be capable of consulting with and/or referring to other health care providers;
- generally possesses the necessary knowledge and skill to serve and communicate with members of the public in an effective and safe manner.

He/she should be able to:

- apply fundamental scientific knowledge of the human body
- understand the nature of normal and abnormal biomechanics and posture, as well as the pathophysiology of the neuromusculoskeletal system and its relationship to other anatomical structures
- establish a satisfactory rapport with patients
- gather and record clinical information and communicate such information
- accurately interpret clinical laboratory findings and diagnostic imaging of the neuromusculoskeletal system
- establish an accurate clinical diagnosis
- accept responsibility for the patient's welfare
- apply sound judgment in deciding on appropriate care
- provide competent treatment
- provide competent continuing health care
- understand the application of contemporary methods and techniques in wellness care
- accept the responsibilities of a chiropractor
- appreciate the expertise and scope of chiropractic and other health care professions in order to facilitate intradisciplinary and interdisciplinary cooperation and respect
- select research subjects, design simple research projects, critically appraise clinical studies and participate in multi-disciplinary research programmes
- commit to the need for lifelong learning and ongoing professional development.

4.4.2 Basic science components

Recognized programmes either require essential basic science components as prerequisites, or include necessary units of chemistry, physics and biology within the first-year curriculum.

4.4.3 Preclinical science components

The preclinical science components within chiropractic programmes generally include:

anatomy, physiology, biochemistry, pathology, microbiology, pharmacology and toxicology, psychology, dietetics and nutrition, and public health.

4.4.4 Clinical science components

Clinical science components would include or cover:

history-taking skills, general physical examination, laboratory diagnosis, differential diagnosis, radiology, neurology, rheumatology, eyes, ears, nose and

throat, orthopaedics, basic paediatrics, basic geriatrics, basic gynaecology and obstetrics, and basic dermatology.

4.4.5 Chiropractic sciences and additional subjects

These generally include:

- ***applied neurology and applied orthopaedics;***

- ***clinical biomechanics, including, specific chiropractic/biomechanical patient assessment by methods such as:***
    - gait and postural analysis;
    - static and motion palpation of joints and bony structures;
    - assessment of soft-tissue tone and function;
    - diagnostic imaging and analysis;

- ***history, principles and health care philosophy pertinent to chiropractic;***

- ***ethics and jurisprudence pertaining to the practice of chiropractic;***

- ***background studies of traditional medicine and complementary/alternative healthcare.***

4.4.6 Patient management interventions

Including:

- manual procedures, particularly spinal adjustment, spinal manipulation, other joint manipulation, joint mobilization, soft-tissue and reflex techniques;
- exercise, rehabilitative programmes and other forms of active care;
- psychosocial aspects of patient management;
- patient education on spinal health, posture, nutrition and other lifestyle modifications;
- emergency treatment and acute pain management procedures as indicated;
- other supportive measures, which may include the use of back supports and orthotics;
- recognition of contraindications and risk management procedures, the limitations of chiropractic care, and of the need for protocols relating to referral to other health professionals.

4.4.7 Documentation and clinical record-keeping

Including:

- recording of the primary complaints, health history, physical examination findings, assessment, diagnosis and treatment plan;
- accurate documentation of every patient encounter;
- re-examination findings and documentation of any modifications to care plans;
- appreciation of confidentiality and privacy issues;

- consent obligations;
- insurance and legal reporting.

4.4.8 Research

Including:

- basic research methodology and biostatistics;
- interpretation of evidence-based procedures/protocols and best-practice principles;
- an epidemiological approach to clinical record-keeping, encouragement to document particular case-studies and participate in field research projects;
- development of a critical-thinking approach in clinical decision-making, the consideration of published papers and relevant clinical guidelines;
- development of the necessary skills to keep abreast of the relevant current research and literature.

5. Full chiropractic education – category I(B)

Full chiropractic education, including entrance requirements, generally requires from four to seven years' full-time tertiary study. The curriculum includes a study of the basic and preclinical sciences similar in duration and quality to that found in a medical education.

Medical doctors and other health care professionals may complete the requirements for a full chiropractic education over a shorter period because of credits granted in view of their prior education.

5.1 Objective

The objective of such an educational programme is to enable suitable health care practitioners to qualify as chiropractors.

5.2 Special courses

Such programmes may be full-time or part-time, depending upon the educational experience and circumstances of the student cohort. Programmes are designed to cover those subjects not addressed in previous health care education. This would include the specific chiropractic subjects and those medical science subjects where the training has been inadequate for the requirements of a chiropractor.

5.3 Basic training

The duration of the training depends upon the credits received from previous education and experience, but should not be less than 2200 hours over a two- or three-

year full-time or part-time programme, including not less than 1000 hours of supervised clinical experience.

6. Limited chiropractic education – category II(A)

In some countries, it has not been practicable to adopt the models outlined in Category I, particularly when chiropractic education is first introduced and where significant numbers of students exist who have prior medical and other health care education and experience. As has been done already in certain jurisdictions, such students may obtain basic clinical skills for the delivery of chiropractic services with a more limited supplementary course, of full-time or part-time education, depending on the extent of their previous training.

This approach should be employed as an interim measure to establish the availability of chiropractic services. A full chiropractic educational programme for students choosing chiropractic as their primary career should be implemented as soon as it is practicable to do so.

6.1 Objective

The objective of such an educational programme is to qualify suitable and available health care professionals to practise as chiropractors in the health care system.

This type of programme could be developed to facilitate an early introduction of chiropractic at a safe and acceptably effective level.

Programmes of this type should strongly consider the value of having an accredited chiropractic programme as a collaborative partner providing educational guidance.

6.2 Special courses

The programme is designed to cover those subjects which are important for the practice of chiropractic and which have not been covered appropriately in previous health care education.

Part-time courses have been designed to be convenient for practitioners maintaining their current employment, extending appropriate credits to persons depending upon their level of health care training. For an example, see Annex 4.

6.3 Basic training

Although dependent upon the human resources available for health care, the entrance requirement would normally be completion of university-level training as a health care practitioner.

The duration of training would be not less than 1800 hours over a two- or three-year full-time or part-time programme, including not less than 1000 hours of supervised clinical experience.

7. Limited chiropractic education – category II(B)

This refers to the programmes necessary for persons with limited training, who identify themselves as "chiropractors", to obtain minimum requirements for safe practice. In many countries, no formal requirements exist for minimum chiropractic education. This leads to the unqualified practice of chiropractic, which is undesirable for patient safety. These programmes prepare graduates to attain the minimal acceptable requirements for the safe practice of chiropractic.

7.1 Objective

To upgrade the knowledge and skills of existing practitioners utilizing some form of chiropractic, for the purpose of ensuring public safety and provision of adequate chiropractic service. This approach should be employed as an interim measure only.

7.2 Special courses

As the existing training of practitioners varies greatly, the educational models adopted to address these situations also vary. Past experience suggests that the development of courses may require specific needs-assessment studies.

The example used in Annex 5 is a basic three-year, part-time programme designed to meet or exceed the minimum requirements. The applicant practitioners are offered credits or considerations based upon their previous training or existing qualifications. Admission requirements for such programmes have been the completion of a qualifying local programme and an adequate period of clinical experience, typically 2-3 years.

Programmes of this type should strongly consider the value of having an accredited chiropractic programme as a collaborative partner providing educational guidance.

7.3 Basic training

The duration of training is not less than 2500 hours in a full-time or part-time programme, including not less than 1000 hours of supervised clinical experience. For an example, see Annex 5.

8. Assessment and examination of students in chiropractic

In order to ensure patient safety and the qualified practice of chiropractic, a system of independent examination and licensing is necessary. On completion of the full period of training, the student's theoretical knowledge and clinical competence in chiropractic should be independently evaluated through official examinations.

Continuing professional development should be encouraged for maintenance of licensing.

9. Primary health care workers and chiropractic

9.1 Primary health care workers - myotherapists

Training has been developed by individual chiropractors within multidisciplinary settings, with programmes that meet national requirements. These courses introduce basic musculoskeletal soft-tissue techniques, massage and other management skills for indigenous nurses and community health workers who apply chiropractic health care principles and basic interventions without employing spinal manipulative techniques. Such training should be sensitive to existing cultural and ethnic issues and should explore and embrace, where practical, local traditional practices.

Certain techniques to alleviate pain and address musculoskeletal dysfunction, as well as the constructive management of musculoskeletal factors amenable to change, may be taught to primary health care workers, particularly community health workers, increasing the quality of life for people in rural or remote areas (18).

Such workers may have a valuable role in community health education in various ways. These may include counselling on healthy lifestyles, prevention of musculoskeletal disorders and other public health issues.

9.2 Objective

The objective of such courses is to create a category of primary health care worker to provide a first level of treatment and education in a community setting as an adjunct to other community health care measures.

9.3 Course components

Courses contain a combination of flexible, compulsory and elective units that address various competencies to meet existing requirements on-site. These may include:

- remedial massage;
- specific myotherapy techniques;
- culturally appropriate health and lifestyle advice;
- addressing modifiable musculoskeletal risk factors, such as maintaining ideal weight and physical activity, smoking cessation and injury prevention;
- musculoskeletal assessment;
- trigger-point techniques;
- myofascial tension technique;
- deep tissue stimulation technique;
- stretching techniques;
- sports injury first aid (including taping and bracing techniques).

Joint adjustment/manipulation is excluded from these training programmes. Indications warranting this type of care would require attention by a chiropractor or other suitably qualified practitioner.

9.4 Method and duration of training

Training involves workshops, interactive demonstrations, clinical applications and assignments.

The duration (supervised) of such a training programme would be not less than 300 hours.

Part 2: Guidelines on safety of chiropractic

1. Introduction

When employed skilfully and appropriately, chiropractic care is safe and effective for the prevention and management of a number of health problems. There are, however, known risks and contraindications to manual and other treatment protocols used in chiropractic practice.

While it is beyond the scope of these guidelines to review the various indications for chiropractic care and the supportive research evidence, this part will review contraindications to the primary therapeutic procedures used by chiropractors – techniques of adjustment, manipulation and mobilization, generally known as spinal manipulative therapy.

Contrary to the understanding of many within health care, chiropractic is not synonymous with, or limited to, the application of specific manipulative techniques. The "adjustment" and various manual therapies are central components of a chiropractor's treatment options: however, the profession as an established primary contact health service has the educational requirements and respects the responsibilities associated with such a status.

Chiropractic practice involves a general and specific range of diagnostic methods, including skeletal imaging, laboratory tests, orthopaedic and neurological evaluations, as well as observational and tactile assessments. Patient management involves spinal adjustment and other manual therapies, rehabilitative exercises, supportive and adjunctive measures, patient education and counselling. Chiropractic practice emphasizes conservative management of the neuromusculoskeletal system, without the use of medicines and surgery.

2. Contraindications to spinal manipulative therapy

Spinal manipulative therapy is the primary therapeutic procedure used by chiropractors, and because spinal manipulation involves the forceful passive movement of the joint beyond its active limit of motion, chiropractors must identify the risk factors that contraindicate manipulation or mobilization (19, 20, 21).

Manipulations can be classified as either nonspecific, long-lever techniques or specific, short-lever, high-velocity, low-amplitude techniques (the most common forms of chiropractic adjustment) which move a joint through its active and passive ranges of movement to the paraphysiological space (22).

Mobilization is where the joint remains within a passive range of movement and no sudden thrust or force is applied.

Contraindications to spinal manipulative therapy range from a nonindication for such an intervention, where manipulation or mobilization may do no good, but should cause no harm, to an absolute contraindication, where manipulation or mobilization could be life-threatening. In many instances, manipulation or mobilization is contraindicated in one area of the spine, yet beneficial in another region (23). For example, hypermobility may be a relative contraindication to manipulation in one area of the spine, although it may be compensating for movement restriction in another where manipulation is the treatment of choice (24, 25). Of course, the chiropractor's scope in manual therapy extends beyond the use of manipulation or mobilization and includes manual traction, passive stretching, massage, ischaemic compression of trigger points and reflex techniques designed to reduce pain and muscle spasm.

Successful spinal mobilization and/or manipulation involves the application of a force to the areas of the spine that are stiff or hypomobile, while avoiding areas of hypermobility or instability (26).

There are a number of contraindications to joint mobilization and/or manipulation, especially spinal joint manipulation, which have been reviewed in practice guidelines developed by the chiropractic profession (27, 28) and in the general chiropractic literature (29, 30, 31). These may be absolute**,** where any use of joint manipulation or mobilization is inappropriate because it places the patient at undue risk (23, 32:290-291), or relative, where the treatment may place the patient at undue risk unless the presence of the relative contraindication is understood and treatment is modified so that the patient is not at undue risk. However, spinal manipulative therapy, particularly low-force and soft-tissue techniques, may be performed on other areas of the spine, depending upon the injury or disease present. Clearly, in relative contraindications, low-force and soft-tissue techniques are the treatments of choice, as

both may be performed safely in most situations where a relative contraindication is present.

Conditions are listed first by absolute contraindications to spinal manipulative therapy. Absolute and relative contraindications to spinal manipulative therapy generally are then outlined as they relate to categories of disorders.

2.1 Absolute contraindications to spinal manipulative therapy

It should be understood that the purpose of chiropractic spinal manipulative therapy is to correct a joint restriction or dysfunction, not necessarily to influence the disorders identified, which may be coincidentally present in a patient undergoing treatment for a different reason. Most patients with these conditions will require referral for medical care and/or comanagement (33).

1. anomalies such as dens hypoplasia, unstable os odontoideum, etc.
2. acute fracture
3. spinal cord tumour
4. acute infection such as osteomyelitis, septic discitis, and tuberculosis of the spine
5. meningeal tumour
6. haematomas, whether spinal cord or intracanalicular
7. malignancy of the spine
8. frank disc herniation with accompanying signs of progressive neurological deficit
9. basilar invagination of the upper cervical spine
10. Arnold-Chiari malformation of the upper cervical spine
11. dislocation of a vertebra
12. aggressive types of benign tumours, such as an aneurismal bone cyst, giant cell tumour, osteoblastoma or osteoid osteoma
13. internal fixation/stabilization devices
14. neoplastic disease of muscle or other soft tissue
15. positive Kernig's or Lhermitte's signs
16. congenital, generalized hypermobility
17. signs or patterns of instability
18. syringomyelia
19. hydrocephalus of unknown aetiology
20. diastematomyelia
21. cauda equina syndrome

NOTE: In cases of internal fixation/stabilization devices, no osseous manipulation may be performed, although soft-tissue manipulation can be safely used. Spinal manipulative therapy may also only be absolutely contraindicated in the spinal region in which the pathology, abnormality or device is located, or the immediate vicinity.

3. Contraindications to joint manipulation by category of disorder

3.1 Articular derangement

Inflammatory conditions, such as rheumatoid arthritis, seronegative spondyloarthropies, demineralization or ligamentous laxity with anatomical subluxation or dislocation, represent an absolute contraindication to joint manipulation in anatomical regions of involvement.

Subacute and chronic ankylosing spondylitis and other chronic arthropathies in which there are no signs of ligamentous laxity, anatomic subluxation or ankylosis are not contraindications to joint manipulation applied at the area of pathology.

With degenerative joint disease, osteoarthritis, degenerative spondyloarthropathy and facet arthrosis, treatment modification may be warranted during active inflammatory phases.

In patients with spondylitis and spondylolisthesis, caution is warranted when joint manipulation is used. These conditions are not contraindications, but with progressive slippage, they may represent a relative contraindication.

Fractures and dislocations, or healed fractures with signs of ligamentous rupture or instability, represent an absolute contraindication to joint manipulation applied at the anatomical site or region.

Atlantoaxial instability represents an absolute contraindication to joint manipulation at the area of pathology.

Articular hypermobility and circumstances where the stability of a joint is uncertain represent a relative contraindication to joint manipulation at the area of pathology.

Postsurgical joints or segments with no evidence of instability are not a contraindication to joint manipulation but may represent a relative contraindication, depending on clinical signs (e.g. response, pre-test tolerance or degree of healing).

Acute injuries of joint and soft-tissues may require modification of treatment. In most cases, joint manipulation at the area of pathology is not contraindicated.

Although trauma is not an absolute contraindication to manipulation, patients who have suffered traumatic events require careful examination for areas of excessive motion, which may range from mild heightened mobility to segmental instability.

3.2 Bone-weakening and destructive disorders

Active juvenile avascular necrosis, specifically of the weightbearing joints, represents an absolute contraindication to joint manipulation at the area of pathology.

Manipulation of bone weakened by metabolic disorders is a relative contraindication because of the risk of pathological fractures (34, 35). Demineralization of bone warrants caution. It represents a relative contraindication to joint manipulation at the area of pathology. The spine and ribs are particularly vulnerable to osteoporotic fracture, and those patients who have a history of long-term steroid therapy, those with osteoporosis, and women who have passed menopause are most susceptible (19:229, 36). Benign bone tumours may result in pathological fractures and therefore represent a relative-to-absolute contraindication to joint manipulation at the area of pathology. Tumour-like and dysphasic bone lesions may undergo malignant transformation or weaken bone to the point of pathological fracture, and therefore represent a relative-to-absolute contraindication to joint manipulation at the area of pathology.

Malignancies, including malignant bone tumours, are conditions for which joint manipulation at the area of pathology is absolutely contraindicated.

Infection of bone and joint represents an absolute contraindication to joint manipulation at the area of pathology.

Severe or painful disc pathology, such as discitis or disc herniations, are relative contraindications and nonforceful, non-high-velocity and nonrecoil manipulative techniques must be employed.

3.3 Circulatory and haematological disorders

Clinical manifestations of vertebrobasilar insufficiency syndrome warrant particular caution and represent a relative-to-absolute contraindication to cervical joint manipulation at the area of pathology. This would include patients with a previous history of stroke (37).

When a diagnosis of an aneurysm involving a major blood vessel has been made, a relative-to-absolute contraindication may exist for joint manipulation within the area of pathology.

Bleeding is a potential complication of anticoagulant therapy or certain blood dyscrasias. These disorders represent a relative contraindication to joint manipulation.

3.4 Neurological disorders

Signs and symptoms of acute myelopathy, intracranial hypertension, signs and symptoms of meningitis or acute cauda equina syndrome represent absolute contraindications to joint manipulation.

3.5 Psychological factors

It is important to consider psychological factors in the overall treatment of patients who seek chiropractic care. Certain aberrant behaviour patterns represent relative contraindications to continued or persistent treatment. Failure to differentiate patients with psychogenic complaints from those with organic disorders can result in inappropriate treatment. Moreover, it can delay appropriate referral. Patients who may need referral include malingerers, hysterics, hypochondriacs and those with dependent personalities (25:162).

4. Contraindications to adjunctive and supportive therapies

4.1 Electrotherapies

Adjunctive therapies in chiropractic practice may include electrotherapies such as ultrasound, interferential current and transcutaneous electrical nerve stimulation (TENS). The equipment for these modes of treatment needs to be properly maintained and used in accordance with appropriate specifications and clinical indications, but in these circumstances such therapeutic methods pose only a very limited risk of causing harm (38, 39, 40).

4.2 Exercises and supplementary supportive measures

A wide range of rehabilitative exercises and supportive measures are used in chiropractic practice. These should be prescribed in accordance with each patient's individual requirements, and the dosage or level of exercise should be specifically designed to address the individual's limitations and needs, being generally conservative at first and then increasing over time. In these circumstances, there are no significant contraindications which could not be addressed by common sense and the practitioner's professional knowledge (41).

5. Accidents and adverse reactions

5.1 Causes of complications and adverse reactions

See Henderson (42):

- lack of knowledge
- lack of skill
- lack of rational attitude and technique.

5.2 Examples of inappropriate practices

See Henderson (42):

- inadequate diagnostic habits
- inadequate diagnostic imaging evaluation
- delay in referral
- delay in re-evaluation
- lack of interprofessional cooperation
- failure to take into account patient tolerances
- poor technique selection or implementation
- excessive or unnecessary use of manipulation.

5.3 Serious adverse consequences

Manipulation is regarded as a relatively safe, effective and conservative means of providing pain relief and structural improvement of biomechanical problems of the spine. As with all therapeutic interventions, however, complications can arise. Serious neurological complications and vascular accidents have been reported, although both are rare (43).

5.3.1 Cervical region

- vertebrobasilar accidents (see part 2, section 3.3 above)
- Horner's syndrome (44)
- diaphragmatic paralysis (45)
- myelopathy (46)
- cervical disc lesions (25:66)
- pathological fractures (47, 48)

5.3.2 Thoracic region

- rib fracture and costochondral separation (49)

5.3.3 Lumbar region

- an increase in neurological symptoms that originally resulted from a disc injury (50)
- cauda equina syndrome (51, 52)
- lumbar disc herniation (52)
- rupture of abdominal aortic aneurysm (53)

5.4 Vascular accidents

Understandably, vascular accidents are responsible for the major criticism of spinal manipulative therapy. However, it has been pointed out that "critics of manipulative therapy emphasize the possibility of serious injury, especially at the brain stem, due to arterial trauma after cervical manipulation. It has required only the very rare reporting of these accidents to malign a therapeutic procedure that, in experienced hands, gives beneficial results with few adverse side effects" (43).

In very rare instances, the manipulative adjustment to the cervical spine of a vulnerable patient becomes the final intrusive act which, almost by chance, results in a very serious consequence (54, 55, 56, 57).

5.4.1 Mechanism

Vertebrobasilar artery insufficiency is the result of transient, partial or complete obstruction of one or both of the vertebral arteries or its branches. The signs and symptoms of vertebral artery syndrome arising from that compression include vertigo, dizziness, light-headedness, giddiness, disequilibria, ataxia, walking difficulties, nausea and/or vomiting, dysphasia, numbness to one side of the face and/or body, sudden and severe neck/head pain after spinal manipulative therapy (43:579).

Most cases of arterial thrombosis and infarction generally occur in the elderly and are spontaneous and unrelated to trauma.

5.4.2 Incidence

Vertebral artery syndrome attributed to cervical manipulation occurs in younger patients. The average age is under 40, and it occurs more often in women than men. In 1980, Jaskoviak estimated that five million treatments had been given at National College of Chiropractic clinics over a 15-year period, without a single case of vertebral artery syndrome associated with manipulation (58).

While it is understood that the actual incidence of cerebral vascular injury could be higher than the number of reported incidents, estimates from recognized authorities in research in this area have varied from as little as one fatality in several tens of millions of manipulations (59), one in 10 million (60) and one in one million (61) to the slightly more significant "one important complication in 400 000 cervical manipulations" (62).

Serious complications are very rare, and it would seem unlikely that the adverse occurrences have been solely attributable to the therapeutic intervention.

5.5 Prevention of complications from manipulation

Incidents and accidents that result from manipulative therapy can be prevented by careful appraisal of the patient's history and examination findings. Information must be sought about coexisting diseases and the use of medication, including long-term steroid use and anticoagulant therapy. A detailed and meticulous examination must be carried out. The use of appropriate techniques is essential, and the chiropractor must avoid techniques known to be potentially hazardous (19:234-235).

6. First aid training

All recognized programmes in chiropractic contain standard courses in first aid, either taught within the institution or required to be taken from such authorities as Red Cross. This is the case in all training programmes, whether they are full-time, conversion or standardization programmes. Also, within risk management courses, time is spent on procedures to minimize the possibility of injuries and the appropriate action to follow should an incident occur.

Annex 1: List of participants

WHO Consultation on Chiropractic
2 - 4 December 2004, Milan, Italy

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Annex 2: A sample four-year, full-time accredited programme

Category I(A) Subjects taught in a typical semester-based chiropractic programme, by year and number of hours.

DIVISION	FIRST YEAR (HOURS)	SECOND YEAR (HOURS)	THIRD YEAR (HOURS)	FOURTH YEAR (HOURS)
Biological Sciences	Human Anatomy (180) Microscopic Anatomy (140) Neuroanatomy (72) Neuroscience I (32) Biochemistry (112) Physiology (36)	Pathology (174) Lab Diagnosis (40) Microbiology & Infectious Disease (100) Neuroscience II (85) Nutrition (60) Immunology (15)	Lab Diagnosis (32) Toxicology (12)	Clinical Nutrition (26) Community Health (40)
Clinical Sciences	Normal Radiographic Anatomy (16) Radiation Biophysics and Protection (44)	Intro. Diagnosis (85) Intro Bone Pathology (48) Normal Roentgen, Variants & Roentgenometrics (40)	Orthopaedics & Rheumatology (90) Neuro. Diagnosis (40) Diagnosis & Symptomatology (120) Differential Diagnosis (30) Radiological Technology (40) Arthritis & Trauma (48)	Clinical Psychology (46) Emergency Care (50) Child Care (20) Female Care (30) Geriatrics (20) Abdomen, Chest & Special Radiographic Procedures (40)
Chiropractic Sciences	Chiropractic Principles I (56) Basic Body Mechanics (96) Chiropractic Skills I (100)	Chiropractic Principles II (60) Chiropractic Skills II (145) Spinal Mechanics (40)	Chiropractic Principles III (42) Clinical Biomechanics (100) Chiropractic Skills III (145) Auxiliary Chiropractic Therapy (60) Introduction to Jurisprudence & Practice Development (16)	Integrated Chiropractic Practice (90) Jurisprudence & Practical Development (50)
Clinical Practicum	Observation I (30)	Observation II (70)	Observation III (400)	Internship (750) Clerkships: Auxiliary Therapy (30); Clinical Lab (20) Clinical X-ray: Technology (70); Interpretation (70) Observer IV (30)
Research			Applied Research & Biometrics (32)	Research Investigative Project
Totals	914	962	1207	1382
TOTAL HOURS Full-time study over four years:	**4465 plus research project**			

Annex 3:
A sample full (conversion) programme

Category I(B) Essentially, conversion programmes are dependent upon assessment of the medical training of the student cohort. They are then designed so as to complete satisfactorily all requirements of a full chiropractic programme.

DIVISION	FIRST YEAR (HOURS)	SECOND YEAR (HOURS)	THIRD YEAR (HOURS)
Biological Sciences	Spinal Anatomy (45) Laboratory Diagnosis (30) Pathology (60) Physiology (45)	Pathology (120)	Clinical Nutrition (45)
Clinical Sciences	Radiology (90) Neuromusculoskeletal Diagnosis (30)	Radiology (90) Neurology (45) Physical Diagnosis (30) Neuromusculoskeletal Diagnosis (30)	Paediatrics (45) Geriatrics (30)
Chiropractic Sciences	Chiropractic History (30) Principles & Philosophy of Chiropractic (20) Spinal Biomechanics (60) Static & Dynamic Spinal Palpation (30) Chiropractic Skills (180)	Principles & Philosophy of Chiropractic (20) Static & Dynamic Spinal Palpation (60) Chiropractic Skills (120)	Principles & Philosophy of Chiropractic (20) Chiropractic Skills (60)
Clinical Practicum	Supervised Clinical Practicum (120)	Supervised Clinical Practicum (225)	Supervised Clinical Practicum (500)
Research			Research (25)
TOTALS	740	740	725
TOTAL HOURS Full-time or part-time study over three years	**2205**		

Annex 4:
A sample limited (conversion) programme

Category II(A) Suitable for persons with a solid medical education to attain minimal registerable requirements to practise safely and relatively effectively as chiropractors.

DIVISION	FIRST YEAR (HOURS)	SECOND YEAR (HOURS)	THIRD YEAR (HOURS)
Biological Sciences	Spinal Anatomy (45) Pathology (60) Physiology (45)	Pathology (60)	Clinical Nutrition (30)
Clinical Sciences	Diagnostic Imaging (45) Neurology (45) Neuromusculoskeletal Diagnosis (30)	Diagnostic Imaging (45) Neurology (45) Physical Diagnosis (30) Neuromusculoskeletal Diagnosis (30)	Paediatrics (45) Geriatrics (30)
Chiropractic Sciences	Chiropractic History (30) Principles & Philosophy of Chiropractic (20) Spinal Biomechanics (60) Static & Dynamic Spinal Palpation (30) Chiropractic Skills (90)	Principles & Philosophy of Chiropractic (20) Static & Dynamic Spinal Palpation (60) Chiropractic Skills (90)	Principles & Philosophy of Chiropractic (20) Chiropractic Skills (60)
Clinical Practicum	Supervised Clinical Practicum (100)	Supervised Clinical Practicum (220)	Supervised Clinical Practicum (420)
TOTAL	600	600	605
TOTAL HOURS Part-time study over three years	**1805**		

Annex 5:
A sample limited (standardization) programme

Category II(B) Addresses deficiencies identified through assessment of a student's existing knowledge and skills and enables graduates to attain safe and minimal registerable standards as chiropractors.

DIVISION	FIRST YEAR	DL	IR	CP	SECOND YEAR	DL	IR	CP	THIRD YEAR	DL	IR	CP
Biological Sciences	Anatomy	56	24									
	Biochemistry	56	4									
	Physiology	56	4		Laboratory Diagnosis	42	8					
	Pathology	70	12									
	Public Health	56	4									
	Clinical Nutrition	56	4									
Clinical Sciences					Physical Diagnosis	56	14		Head/Cervical Spine Care	70	20	
					Orthopaedics/ Neurology	56	14		Thoracic/Lumbar Spine & Pelvis Care	70	20	
					Radiology	56	16		Hip/Knee/Ankle/ Foot Care	70	20	
					Clinical Diagnosis	56	9		Shoulder/Elbow/ Wrist/Hand Care	70	20	
									Special Population Care	56	24	
Chiropractic Sciences	Biomechanics	56	16		Patient Management Procedures	42	18		Record Keeping, Documentation & Quality Assurance	42	16	
	Principles of Chiropractic	42	3									
Clinical Practicum				400				400				400
Research	Computer Skills Workshop			6	Research Methodology	50						
					First Aid/Emergency Care	28	24					
Totals		448	71	406		486	103	400		378	100	400
TOTAL HOURS Part-time study over three years	2790		DL = Distance Learning (Self Directed Learning); IR = In Residence (Lectures & Workshops); CP = Clinical Practicum (Supervised)									

References

Introduction

1. Meade TW et al. Low back pain of mechanical origin: randomised comparison of chiropractic and hospital outpatient treatment. *British Medical Journal*, 1990, 300(6737):1431-37.

2. Meade TW et al. Randomised comparison of chiropractic and hospital outpatient management for low back pain: results from extended follow up. *British Medical Journal*, 1995, 311(7001):349-351.

3. Baldwin ML et al. Cost-effectiveness studies of medical and chiropractic care for occupational low back pain: A critical review of the literature. *Spine*, 2001, 1(2):138-147.

Part 1

4. Withington BT. *Hippocrates, with an English translation*. Cambridge, MA, Harvard University Press, 1928.

5. Palmer DD. *The chiropractor's adjustor.* Portland, OR, Portland Printing House, 1910.

6. Gibbons RW. Medical and social protest as part of hidden American history. In: Haldeman S, ed. *Principles and practice of chiropractic*. East Norwalk, CT, Appleton Lang, 1992:17.

7. Palmer DD. *Three generations: a history of chiropractic*. Davenport, Iowa, Palmer College of Chiropractic, 1967:29.

8. Ehrenreich B, English E. *For her own good*. New York, Anchor/Doubleday, 1978:16.

9. Coulter ID. What is chiropractic? In: McNamee KP. *The chiropractic college directory, 1997-98*, 5th ed. Los Angeles, CA, KM Enterprises, 1997.

10. World Federation of Chiropractic. *Consensus statements and the ACC position paper on chiropractic: The chiropractic paradigm* (Proceedings of the conference on Philosophy in Chiropractic Education). Fort Lauderdale, FL, World Federation of Chiropractic Toronto, 2000.

11. Gatterman MI, Hansen DT. Development of chiropractic nomenclature through consensus. *Journal of Manipulative and Physiological Therapeutics*, 1974, 17(5):308.

12. Guthrie HN. *Report of the Honorary Royal Commission to Inquire into Provisions of the Natural Therapists Bill in Western Australia*. Perth, Western Australian Government Printer, 1961.

13. Lacroix G. *Report of the Royal Commission on Chiropraxy and Osteopathy*. Quebec, Government of Quebec, 1965.

14. Teece J. *Report of the New South Wales Health Commission Inquiry into the Question of Registration of Chiropractors*. Sydney, New South Wales Government Printer, 1975.

15. Webb EC. *Report of the Committee of Inquiry into Chiropractic, Osteopathy, Homeopathy and Naturopathy*. Canberra, Australian Government Publishing Service, 1977.

16. Inglis BD, Fraser B, Penfold BR. *Chiropractic in New Zealand report: Commission of Inquiry into Chiropractic*. Wellington, New Zealand Printer, 1979:105-106.

17. Bingham T. *Report of the Kings Fund Working Party on Chiropractic*. London, King's Fund, 1993.

18. Vindigni D, Perkins J. Identifying musculoskeletal conditions among rural indigenous peoples. *Australian Journal of Rural Health*, 2003, 11(4):187-192.

Part 2

19. Gatterman M. Standards for contraindications to spinal manipulative therapy. In: Vear HJ, ed. *Chiropractic standards of practice and quality of care*. Gaithersburg, MD, Aspen Publishers Inc, 1992.

20. Vear HJ. Standards of chiropractic practice. *Journal of Manipulative and Physiological Therapeutics*, 1985, 8(1):33-43.

21. Gatterman MI. Indications for spinal manipulation in the treatment of back pain. *Journal of the American Chiropractic Association*, 1982, 19(10):51-66.

22. Haldeman S. Spinal manipulative therapy in the management of low back pain. In: Finneson GE, ed. *Low back pain*, 2nd ed. Philadelphia, PA, JB Lippincott, 1980:260-280.

23. Gatterman MI. Contraindications and complications of spinal manipulation therapy. *Journal of the American Chiropractic Association*, 1981, 15:575-586.

24. Palmer DD. *The science, art and philosophy of chiropractic*. Portland, OR, Portland Printing House, 1910:101.

25. Gatterman MI. *Chiropractic management of spine related disorders*. Baltimore, MD, Lippincott, Williams & Wilkins, 1990.

26. Cassidy JD, Potter GE. Motion examination of the lumbar spine. *Journal of Manipulative and Physiological Therapeutics*, 1979, 2(3):151-158.

27. Haldeman S, Chapman-Smith D, Petersen DM, eds. *Guidelines for chiropractic quality assurance and practice parameters.* Gaithersburg, MD, Aspen Publishers, 1992.

28. Henderson DJ et al., eds. Clinical guidelines for chiropractic practice in Canada. *Journal of the Canadian Chiropractic Association*, 1994 (Suppl.), 38(1).

29. Singer KP. Contraindications to spinal manipulation. In: Giles LGF, Singer KP, eds. *The clinical anatomy and management of low-back pain*. Oxford, Butterworth-Heinemann, 1997:387-391.

30. Giles LGF. Diagnosis of thoracic spine pain and contraindications to spinal mobilization and manipulation. In: Giles LGF, Singer KP, eds. *The clinical anatomy and management of low-back pain*. Oxford, Butterworth-Heinemann, 1997:283-297.

31. Terrett AGJ. Contraindications to cervical spine manipulation. In: Giles LGF, Singer KP, eds. *The clinical anatomy and management of low-back pain*. Oxford, Butterworth-Heinemann, 1997:192-210.

32. Stoddard A. *Manual of osteopathic medicine*, 2nd ed. London, Hutchinson, 1983.

33. Haynes-Mazion LM. *Contraindications to chiropractic manipulation with specific technique alternatives*. Phoenix, AZ, K & M Printing, 1995.

34. Stoddard A. *Manual of osteopathic practice*. London, Hutchinson, 1969:279.

35. Maitland GD. *Vertebral manipulation*, 3rd ed. London, Butterworth, 1973:4.

36. Bohannon AD, Lyles KW. Drug-induced bone disease. *Clinics in geriatric medicine*, 1994, 10(4):611-623.

37. Walker B, ed. *Risk Management Continuing Education Module. Chapter 1 Neck manipulation and vertebrobasilar stroke, Chapter 5 Musculoskeletal complications of spinal manipulation.* Chiropractic and Osteopath College Australasia, Ringwood, Victoria, 2002.

38. Belanger A. *Evidence-based guide to therapeutic physical agents*. Baltimore, MD, Lippincott, Williams & Wilkins, 2003.

39. Low J, Reed A. *Electrotherapy explained*, 3rd ed. Oxford, Butterworth-Heinemann Ltd, 2000.

40. Robertson V et al. *Guidelines for the clinical use of electro-physical agents*. Melbourne, Australian Physiotherapy Association, 2001.

41. Kleynhans AM. Complications and contraindications to spinal manipulative therapy. In: Haldeman S, ed. *Modern developments in the principles and practice of chiropractic.* New York, NY, Appleton-Century-Crofts, 1980:133-141.

42. Henderson DJ. Vertebral artery syndrome. In: Vear HJ, ed. *Chiropractic standards of practice and quality of care*. Gaithersburg, MD, Aspen Publishers, 1992:137-138.

43. Kleynhans AM, Terrett AG. Cerebrovascular complications of manipulation. In: Haldeman S, ed. *Principles and practice of chiropractic*, 2nd ed. East Norwalk, CT, Appleton Lang, 1992.

44. Grayson MF. Horner's syndrome after manipulation of the neck. *British Medical Journal*, 1987, 295:1382-83.

45. Heffner JE. Diaphragmatic paralysis following chiropractic manipulation of the cervical spine. *Archives of Internal Medicine*, 1985, 145:562-563.

46. Kewalramani LS et al. Myelopathy following cervical spine manipulation. *American Journal of Physical Medicine*, 1982, 61:165-175.

47. Mann T, Refshauge K. Causes of complication from cervical spine manipulation. *Australian Journal of Physiotherapy*, 2001, 47(4):255-266.

48. Brynin R, Yomtob C. Missed cervical spine fracture: chiropractic implications. *Journal of Manipulative and Physiological Therapeutics*, 1999, 22(9):610-614.

49. Grieve GP. Incidents and accidents of manipulation. In: Grieve GP, ed. *Modern manual therapy.* New York, NY, Churchill Livingston, 1986:873-889.

50. Bromley W. National Chiropractic Mutual Insurance Company: stronger than ever. *Journal of the American Chiropractic Association*, 1989, 26:52.

51. Laderman JP. Accidents of spinal manipulation. *Annals of the Swiss Chiropractors' Association*, 1981, 7:162-208.

52. Gallinaro P, Cartesegna M. Three cases of lumbar disc rupture and one of cauda equina associated with spinal manipulation (chiropraxis). *Lancet*, 1983, 1(8321):411.

53. Kornberg E. Lumbar artery aneurysm with acute aortic occlusion resulting from chiropractic manipulation – a case report. *Surgery,* 1988, 103(1):122-124.

54. Haldeman S, Kohlbeck F, McGregor M. Unpredictability of cerebrovascular ischemia associated with cervical spine manipulation therapy: a review of sixty-four cases after cervical spine manipulation. *Spine*, 2002, 27(1):49-55.

55. Rothwell D, Bondy S, Williams J. Chiropractic manipulation and stroke: a population-based case-controlled study. *Stroke*, 2001, 32:1054-60.

56. Haldeman, S et al. Clinical perceptions of the risk of vertebral artery dissection after cervical manipulation: the effect of referral bias. *Spine*, 2002, 2(5):334-342.

57. Haldeman S et al. Arterial dissections following cervical manipulation: the chiropractic experience. *Journal of the Canadian Medical Association*, 2001, 2, 165(7):905-906.

58. Jaskoviak PA. Complications arising from manipulation of the cervical spine, manipulation and head/neck movement. *Journal of the Canadian Chiropractic Association*, 1985, 29:80-89.

59. Maigne R. Manipulations vertebrales et les thromboses vertebrobasilares [Vertebral manipulations and vertebrobasilar thromboses]. *Angéiologie*, 1996, 21:287.

60. Haldeman S. *Testimony, Mason H v Forgie D, Judicial district of Saint John, New Brunswick, December 1984* (S/C1569/82).

61. Gutmann G. Verletzungen der arteria vertebralis durch manuelle Therapie [Injuries to the arteria vertebralis from manual therapy]. *Manuelle Medizin,* 1985, 2:1-4.

62. Dvorak J, Orelli F. How dangerous is manipulation of the cervical spine? *Manuelle Medizin,* 1982, 20:44-28.