

Chiropractic care of the older person: developing an evidence-based approach

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Geriatric care has assumed a more dominant position in the health care delivery system. This article discusses the results of a literature search on geriatric chiropractic care with the ultimate goal of promoting a "best practice" approach. Fifty nine articles were found that discussed geriatric chiropractic education (N = 3), demographic and epidemiological studies (N = 9), case studies (N = 25), clinical trials (N = 4) and clinical guidelines (N = 18). The literature revealed that chiropractic pedagogy has recognized the importance of geriatric education, and epidemiological studies reported an increase in utilization rates of chiropractic care by older persons, along with greater acceptance within the medical community. Most older persons sought out chiropractic care for neuromusculoskeletal (NMS) conditions, with several studies reporting the successful resolution of these conditions with spinal manipulative therapy as well as an eclectic group of other treatment interventions. Many older persons enter a maintenance care program, which they believe to be important to their health. Although the results of this article are encouraging, it underscores the need for continued research, especially in the areas of chiropractic maintenance care and the management of non-NMS conditions.

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KEY WORDS: geriatric, chiropractic, evidence-based medicine.

La gériatrie prend désormais une position plus dominante dans le système de distribution des soins médicaux. Le présent article examine les résultats d'une recherche documentaire sur les soins chiropratiques gériatriques, dont l'objectif final consiste à promouvoir une démarche basée sur les « meilleures pratiques ». On a repéré 59 articles qui portent sur : la formation en chiropratique gériatrique (N = 3), les études démographiques et épidémiologiques (N = 9), les études de cas (N = 25), les essais cliniques (N = 4) et les guides de pratique clinique (N = 18). La documentation révèle que la pédagogie chiropratique a reconnu l'importance d'une formation en gériatrie, et les études épidémiologiques rapportent une augmentation des taux d'utilisation des soins chiropratiques par les personnes âgées, ainsi qu'une acceptation accrue de ce type de soins au sein de la communauté médicale. La plupart des personnes âgées ont recours à la chiropratique pour traiter les troubles du système neuromusculosquelettique, et plusieurs études rapportent la résolution de ces troubles grâce aux manipulations vertébrales et à un ensemble éclectique d'autres traitements. Un grand nombre de personnes âgées participent à un programme de soins légers qu'ils croient importants à leur santé. Bien que cet article présente des résultats encourageants, il souligne la nécessité de poursuivre la recherche, particulièrement dans les domaines des soins chiropratiques légers et de la gestion des troubles qui ne concernent pas le système neuromusculosquelettique.

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MOTS CLÉS : gériatrie, chiropratique, médecine fondée sur l'expérience clinique.

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INTRODUCTION

Evidence-based medicine (EBM) has emerged as a conceptual anchor term in health care. There is an expectation by health care stakeholders (patients, third party payers, and health care professionals) for an evidentiary foundation upon which health care decisions should be based. EBM has been defined by Sackett as the “conscientious, explicit and judicious use of the current best evidence in making decisions about the care of individual patients”.¹ He goes on to state that “evidence-based medicine means integrating individual clinical expertise with the best available external clinical evidence from systematic research ... especially from patient-centered clinical research”.¹ Thus, the current best evidence is not limited to randomized clinical trials, but it includes anecdotal evidence, case studies, practitioner experience, and practice-based studies. This implies that procedures and behaviors have been subjected to rigorous standards of scientific observation, experimentation and documentation.² Regrettably, this is not always the case and, in any event, little has been published to provide chiropractic clinicians with evidence-based guidelines for specific patient populations. This should not be seen as an opportunity to chastise the chiropractic profession. Indeed, using “evidence” to support practice patterns is a relatively new concept in health care, and it should be noted that only about 15% of the procedures used in mainstream medical practice have been studied using sound scientific methods.^{3,4} It should therefore not come as a surprise that “reasonable” patient care is often delivered in spite of the absence of evidence of effectiveness.⁴ As Altman and Bland opine, “absence of evidence is not evidence of absence”.⁵ Nevertheless, it is important to develop a body of evidentiary knowledge in order to promote a “best practice” approach to chiropractic geriatric care. This article is an attempt to promote an evidentiary basis for chiropractic care of older persons, and provide appropriate information to support this approach.

METHODS

A qualitative review of the literature was conducted, with interpretation and synthesis by the author. The search strategy involved accessing Mantis, Medline and CINAHL databases from 1993–2000 (English Language) with the key words chiropractic/chiropractors/manipulation and geriatric/older patients/elderly. The literature on related

topics is also discussed. This includes; geriatric demographics, utilization of complementary and alternative medical (CAM) services by older persons, attitudes within the medical community towards CAMs, and a comparison of the efficacy and safety of spinal manipulative therapy versus the use of NSAIDs for the treatment of spinal pain among older patients. Those therapeutic interventions that have been demonstrated to be efficacious for younger adults are cautiously applied towards the care of older adults, and a brief summary is also included of those chiropractic technique systems that may be preferentially utilized for the care of the older patient, as well as suggestions to modify the delivery of high-velocity low-amplitude (HVLA) manipulative “thrusting” type adjustments.

RESULTS

Fifty nine articles were found that discuss issues germane to chiropractic geriatric care within the search parameters. These articles were further separated into the following categories: chiropractic geriatric education ($N = 3$), demographic/epidemiological studies ($N = 9$), case studies ($N = 25$), clinical trials ($N = 4$), and clinical guidelines ($N = 18$). Those articles that were only commentaries on the importance of chiropractic geriatric care were not included in this summary.

DISCUSSION

Chiropractic geriatric education

The most significant articles on chiropractic geriatric education document the process by which a “model curriculum” for chiropractic educators was developed by Hawk and Killinger et al.^{6–8} With funding from the US Health Resources and Service Administration (HRSA), this process involved an interdisciplinary collaborative process to design, compile and develop curricular resources.⁶ Innovative strategies, up-to-date assessment tools and recommended readings were provided, as well as strategies to overcome barriers to the inclusion of chiropractors on interdisciplinary geriatric health care teams.^{6,7} This model curriculum has been implemented either in whole or in part at most chiropractic colleges.^{6,9}

Demographics and epidemiology

Population demographics

According to some authorities who specialize in the field, demographics can explain two thirds of everything.¹⁰ That is to say, if one understands the study of human populations one can explain past events, understand current trends and accurately prognosticate changes yet to come. The importance of geriatric chiropractic care is primarily due to the confluence of two demographic trends; the “rectangularization” of the population pyramid as the result of the Baby Boomers and technological advancements in health care, as well as the surge in utilization rates of complementary and alternative therapies (CAM) by patients.

One of the most significant demographic changes in this century has been the increase in human life expectancy. In 1900 the average life expectancy in the United States was 47 years; in 1990 it was 75 years.⁷ Currently, in Canada and the United States, those over the age of 65 years represent about 12% of the total population.^{10,11} However, by the year 2030, the number of those over the age of 65 is expected to increase to 20%. In real numbers, this amounts to a total projection of 70 million American seniors by the year 2030, more than twice the number in 1990.⁶

The Baby Boomers, those persons born between the years following the Second World War, from 1947 to 1966, represent the largest cohort group in many industrialized countries.¹⁰ In Canada, the Baby Boomers represent 34% of the population, or 10 million persons. America, Australia, New Zealand and Britain all have similar Baby Boomer groups, but none is proportionately as large as Canada's.¹⁰

Of greatest significance, the fastest growing segment of the population is the “old” old, those over the age of 85.¹² Indeed, the number of those over the age of 85 is predicted to double between the years 1995 and 2000,¹² and the number of those over the age of 100 is expected to increase 11-fold by the year 2050, when the number of American centenarians is predicted to exceed 800,000.¹³ Given that these groups of persons are more likely to experience complex morbid health profiles, the potential economic impact on health care expenditures is enormous.

Utilization of complementary and alternative medicines (CAMs)

Studies exploring utilization rates of chiropractic services by patients tend to be part of larger investigations into the utilization rates of complementary and alternative medical (CAM) therapies in general. Although the term CAM is somewhat fluid in its application, it has generally come to mean the health care practices and professions that do not easily fit into the culturally dominant medical, educational, and financial paradigms.¹⁴

A demographic study by Eisenberg et al. revealed that almost 50% of respondents had been to a CAM provider, an almost 50% increase from his original study of a decade earlier.^{15,16} The researchers calculated that this represented an increase from 427 million total visits in 1990 to 639 million visits (by 22 million people) in 1997, a number that exceed the total visits to all US primary care physicians.¹⁵ The total cost for CAM providers was conservatively estimated at \$21.2 billion in 1997, with \$12.2 billion paid for by the patient out-of-pocket. The total out-of-pocket expenditures of alternative therapies of all kinds was conservatively estimated to be \$27 billion.¹⁵

While certain therapies, such as herbal medicines, massage, mega-therapy, self-help groups, folk medicine, energy healing and homeopathy increased the most in the decade between Eisenberg's two studies, visits to chiropractors and massage therapists accounted for nearly half of all visits to CAM practitioners in 1997.^{15,16} Roughly 11% of respondents in the study sought out chiropractic care, and visits to chiropractors accounted for 30% of CAM total visits. An important finding was that less than 50% of the respondents told their medical doctor they were under the care of a CAM provider.¹⁵

The average demographic profile of a CAM user was Caucasian, age 25 to 45 years, of higher education and of higher income than non-users of CAM services.¹⁵ The age group of highest utilization encompassed the Baby Boomers, and utilization of CAM providers for individuals over the age of 50 remained at 35% during the two different studies, which represented the largest demographic age group of users.^{15,16} A more recent study by Shua-Haim and Ross¹⁷ also reported that utilization of CAM providers by older persons was increasing. According to Shua-Haim and Ross, the most common forms of alternative or unconventional therapies utilized included: relaxation therapy, chiropractic, acupuncture, massage

therapy and herbal/vitamin/mineral supplementation.¹⁷

The most common chief complaints that prompted patients to consult a CAM provider were, in descending order: chronic low back and neck pain, anxiety, depression, headaches, fatigue, insomnia, arthritis and sprains and strains.¹⁵ Patients with back problems, neck problems, headaches, and sprains and strains were most likely to seek chiropractic care¹⁵ and, according to a practice pattern analysis of Canadian chiropractors by Kopansky-Giles and Papadopoulos,¹⁸ chiropractors reported treating 86.3% of their patients for primary conditions of a neuromusculoskeletal nature.

Utilization of chiropractic services by older persons

Coulter et al. have reported that older persons are over-represented among chiropractic patients.¹⁹ In Canada (in 1994), the over 65 population comprised 14.1% of chiropractic patients while this group was only 8.7% of the total population.¹⁹ If this ratio between population numbers and chiropractic utilization were to remain constant, when older patients comprise 20% of the total population, they could represent 25% of a chiropractor's patient portfolio.

The prevalence of low back complaints among older patients, although less than those age 45–65, is still high. Bressler and Keyes et al.²⁰ concluded that, while there is a general under-reporting of the older population in the back pain literature, the prevalence of back pain in the elderly is between 13% and 49%, and cited a study of the rural elderly in Iowa that reported 22% of the respondents had experienced back pain during the past year. This is especially important when one remembers that neuromusculoskeletal impairments are the most common chronic condition causing activity limitation in the United States,¹⁹ and increasing age has been associated with an increase in musculoskeletal symptoms.²⁰ Consistent with these findings is the fact that the most significant increases in CAM use were for patients with musculoskeletal problems and arthritis.^{15,16,21}

Older patients with problems other than spinal pain also seek out CAM care. In a prospective study of patients with prostatic carcinoma undergoing radiation therapy, 39% were found to also use complementary health practices not prescribed by their medical practitioners.²² In contrast, physicians believed that only 4% of their patients used CAM providers. CAM treatment was continued even after initiation of definitive treatment for prostatic carcinoma.

Patients seeking out CAM care tended to have higher education and income. Herbal remedies were the most frequently utilized CAM (60%), followed by old-time remedies (47%), high-dose vitamins (41%), chiropractic, massage and relaxation techniques (18% each) and special diets (12%).²² More recent studies of rheumatology patients reported between 40.7% and 66% use of CAM.²³ Similarly, a survey of 103 patients referred for rehabilitation outpatient care revealed that 29.1% had used a CAM provider in the past 12 months.²⁴ The most common CAMs used were massage therapy, chiropractic, vitamins and mineral supplementation and acupuncture.²⁴

Medical attitudes about complementary and alternative medicine

Studies indicate there has been an increased interest in and acceptance of CAM within the medical community. For example, of the 117 (of 125) medical schools in the United States that responded to a survey documenting information about CAM education within their curricula, 64% offered some type of CAM instruction.¹⁴ Most classes offered were electives, although some institutions provided information within required courses. Common topics included chiropractic, acupuncture, homeopathy, herbal therapies, and mind-body techniques. In another study, when asked, 39% of medical physicians described chiropractic as a "legitimate medical practice".¹⁴

Contrary to popular opinion, studies indicate that patients are satisfied with the care they receive from medical physicians, and dissatisfaction with conventional medicine is not a predictor of CAM use.¹⁴ Lee and Kasper²⁵ sought to assess the level of satisfaction with medical care reported by older patients in the United States. Overall, older patients reported high rates of satisfaction with the quality of medical care they receive, and satisfaction rates approached 90% in areas such as overall quality of care, follow-up care, and information provided. Reported satisfaction rates exceeded 90% in areas such as levels of competence, understanding of patient's medical history, diagnostic abilities, and thoroughness. However, older patients were less satisfied with medical care in some areas, and some reported that physicians seemed to be in a hurry, that they did not explain or discuss the patient's problem with them, and some patients felt that the doctor was "doing them a favor" by examining them. One potentially important finding of this study was that there appeared to

be a negative association between the patient's age and a favorable assessment of medical care.²⁵

A practice pattern analysis by Ko and Berbrayer sought to describe the attitudes and behaviors of Canadian physicians with respect to CAM.²³ In this study, 98 Canadian physiatrists were surveyed. Seventy-two percent reporting referring to a CAM therapist (12.5% often), and 20% had training in and 20% practiced some form of alternative medicine. The therapists most highly rated in terms of usefulness were acupuncture (85%), biofeedback (81%) and chiropractic (80%). Sixty-three percent of respondents thought alternative medicine had ideas and methods that would be beneficial to physiatrists. Approximately 38.8% of respondents believed CAM worked by the placebo effect, but only 9% of this group thought CAMs were a threat to the public health. This contrasts with an earlier 1990 study of Canadian family physicians that found that 21% of respondents felt that CAM was a threat.²⁶ Of interest, CAM referrals and utilization appeared to be higher in younger, more recently graduated physiatrists.²³

Demographic profile of older patients seeking chiropractic care

A large practice-based research study by Hawk et al. sought to characterize patients over the age of 55 who presented for chiropractic care.²⁷ This practice based research study involved 121 chiropractors in Canada and the United States. A total of 8,312 patients participated in the study, 805 of whom were over the age of 55 years. The investigators reported that those patients in the study were predominately female (60.1%), white (94.7%), married (66.3%), high school graduates (54.0%) and retired (68.0%).²⁷

The most common chief presenting complaint was back pain, with 32.9% of patients reporting back pain in a single location, and 35.5% of patients citing multiple locations (such as "back and leg" or "neck and shoulder").²⁷ Most complaints were chronic, with 54.9% of patients having onset of symptoms more than 6 weeks before presenting to the practitioner. Using a Pain Disability Index scale, most patients reported their pain to be mild or moderate in intensity.²⁷

In this study 56.6% of patients were treated using an Activator, a mechanical manually-assisted instrument that generates a low-force high-velocity thrust (this finding is undoubtedly related to the participation of chiropractors

who use Activator technique in this study, which was the only professional organization who responded to the researcher's recruitment efforts). Spinal manipulative therapy (SMT) was the next most commonly used therapeutic intervention, with 23.5% of patients receiving this type of treatment. In addition to SMT, the most commonly administered procedures were recommendations for exercise at least 20 minutes three times per week (41.0% of patients), instruction on heat or cold application at home (24.5%), and recommendations on food supplements (24.5%). Other procedures used less often include: ice packs in office (13.5%) ultrasound (12.3%), hot packs (11.3%), electrical stimulation, massage therapy, corrective exercises and diet exercises (each used on under 10% but over 5% of patients). Procedures used on fewer than 5% of patients were: acupressure, traction, orthotic fitting, recommendation of bed rest, acupuncture, recommendations for weight loss and homeopathy. An important finding in this study was that pain medication use decreased after 4 weeks of care among the group of patients who were discharged by the clinician, but not among those who patients who either self-discharged or were continuing with care.²⁷

The researchers concluded that musculoskeletal complaints composed nearly the entire case load of the chiropractors in this study, a finding consistent with other demographic studies. Moreover, the researchers concluded that, based on the data collected, many patients (66.6%) seek chiropractic care for conditions related to only mild to moderate musculoskeletal complaints, whereas patients with more severe pain were more likely to seek both chiropractic and medical treatment.²⁷

While the literature indicates that older patients initially seek out chiropractic care for spinal pain, there is evidence that patients continue with chiropractic care for reasons other than symptom relief. Surveys by Rupert sought to investigate the primary care health promotion activities associated with what has been historically termed "maintenance care" in both chiropractors²⁸ and chiropractic patients over the age of 65 years.²⁹ Maintenance care can be defined as periodic visits that seek to prevent disease, prolong life, promote health and enhance quality of life.³⁰ Specific schedules of treatment are theoretically designed to provide for a patient's well-being or for maintaining their optimum state of health. Maintenance care is provided to a patient irrespective of clinical symptomatology.

Six hundred and fifty-eight chiropractors were surveyed, and their attitudes relating to the importance of maintenance care were compiled.²⁸ Notwithstanding the absence of any scientific proof, the majority of American chiropractors who responded to the survey believed in the value of maintenance care for patients of all ages for a variety of conditions ranging from stress to musculoskeletal and visceral conditions, with 79% of chiropractic patients receiving recommendations to enter a maintenance care program. Ninety percent of respondents (chiropractors) agreed or strongly agreed with the statement that the purpose of maintenance care was to optimize health, 88% stated it was to prevent conditions from developing, 86% reported they were providing palliative care and 95% believed they were minimizing recurrences or exacerbations.²⁸ Similar studies in England and Australia found that chiropractors in those countries also suggested maintenance care for a significant portion of their patients.²⁸

In a companion study, Rupert et al. sought to investigate the multiple health issues of those chiropractic patients age 65 and over who have had a long-term regimen of maintenance care.²⁹ The study reported that elderly patients receiving maintenance care did not rely solely on chiropractic care but instead utilized both medical and chiropractic services. The average number of visits to medical doctors by patients age 65 and over while under chiropractic maintenance care was 4.8 visits per year, which was approximately half the national average of 9 visits per year.²⁹ This finding differs from previous studies by Coulter et al.¹⁸ that concluded chiropractic care complemented rather than replaced medical care.

According to Rupert's study, most chiropractors utilized Diversified techniques (70.4%) for older patients receiving maintenance care.²⁹ Other techniques used included: Activator (28.3%), Thompson terminal point (21.9%), Nimmo/soft tissue techniques (20.6%), Applied Kinesiology (16.1%) and Sacro-Occipital technique (13.5%).²⁹ It should be noted, however, that chiropractic maintenance care did not solely consist of periodic visits for joint manipulation, but it included an eclectic group of interventions such as exercise, nutritional advice, relaxation, physical therapy and manipulation directed at both musculoskeletal and visceral conditions.²⁹

Thirty-eight percent of older patients were treated for chronic health problems, while 61.7% were not.²⁹ Eighty-

three percent of older patients were treated to control or prevent musculoskeletal conditions, 31.2% visceral problems and 73.3% for subluxations. Other trends reported by patients receiving maintenance care were a reduced need for hospitalization, as well as reduced health care costs. In fact, the total annual cost of health care services for older patients receiving maintenance chiropractic care was conservatively estimated at only one third the expenses required by American citizens of the same age who did not receive maintenance care. Lastly, there was a significant positive correlation between reduced use of nonprescription drugs and the number of years under chiropractic maintenance care.²⁹

One of the most important findings in this study was the response by older patients when asked: "How important do you feel chiropractic treatment has been in maintaining and promoting your health?". An overwhelming 95.8% of patients believed that maintenance care was either considerably or extremely valuable to their health.²⁹

With the exception of total annual visits to medical doctors, results from the studies by Rupert et al. closely parallel the findings of earlier studies by Coulter et al.¹⁹ In their studies, Coulter et al. reported that a small cohort of older chiropractic patients were less likely to have been hospitalized, less likely to have used a nursing care facility, more likely to report a better health status, more likely to exercise and were more likely to be mobile in their communities. In addition, chiropractic patients were less likely to use prescription medications.¹⁹ Of course, this may speak more to the general behavior of those patients who seek out chiropractic care rather than any benefits directly derived from chiropractic treatment.

Case studies

Twenty-five case studies discussing the management of 20 different clinical conditions were found within the literature search. Many studies detailed the successful resolution of various conditions affecting older persons while under chiropractic care. Conditions successfully treated included cervical spondylotic radiculopathy,³¹ diffuse idiopathic skeletal hyperostosis (DISH),³² dislocation of the sternal-clavicle joint,³³ rotator cuff tear,³⁴ vertigo and tinnitus,³⁵ thoracic outlet syndrome,³⁶ myasthenia gravis,³⁷ diabetic neuropathy with involvement of the tarsal joints,³⁸ spinal stenosis³⁹ and post surgical repair to the quadriceps muscle.⁴⁰ Two articles^{41,42} discussed the positive benefits

of chiropractic care for general rehabilitation of older persons following injury, such as a Colles' fracture.⁴¹ Another article discussed the successful management of an older patient with left hip, leg and low back pain attributed to osteoarthritis and a structural short leg using a heel lift and osteopathic manipulation.⁴³

Other studies described cases of older patients presenting with spinal pain that were later attributed to prostatic metastasis,^{44,45} bronchial carcinoma,⁴⁶ or abdominal aortic aneurysms.^{47,48} In each of these cases, the authors emphasized the importance of appropriate medical referral, and the importance of including such pathologies in any differential diagnosis when assessing older persons for presenting spinal pain. Other articles described the development of cerebellar infarct⁴⁹ and Jefferson's burst fracture⁵⁰ in older patients following motor vehicle accidents. One article described the development of a fracture of the femoral neck subsequent to radiation therapy,⁵¹ and two articles described cases of low back pain with radiculopathy eventually diagnosed as synovial facet joint cysts.^{52,53} Cases of older patients with chondrosarcoma and myositis ossificans⁵⁴ and thalamic pain syndromes⁵⁵ were also reviewed.

Clinical trials

Most clinical studies on chiropractic adjustive therapies exclude by design geriatric patients. It is therefore not surprising that only four clinical trials specifically involving older persons were found within the literature search.⁵⁶⁻⁵⁹ However, all four studies investigated the benefits of "osteopathic manipulation" on older patients. These studies sought to measure changes in bowel habits,⁵⁶ prevalence of falling,⁵⁷ or the effects on patients with pneumonia.^{58,59} Osteopathic manipulation differs from chiropractic manipulation in that the former is more of a mobilization (a low-velocity, low amplitude maneuver within the active range of motion), whereas a chiropractic manipulation (or spinal adjustment) is a high-velocity, low-amplitude thrust into the parapsychological space (Cooperstein R, personal communication). The introduction of osteopathic manipulation was not shown to have a measurable influence on the frequency of patient-falls compared to interdisciplinary assessments,⁵⁷ nor were changes in bowel habits recorded resulting from osteopathic manipulations.⁵⁶ However, those patients with pneumonia receiving both conventional medical treatment

and osteopathic manipulation had reduced antibiotic use and decreased length of hospital stay.^{58,59}

Clinical guidelines

Eighteen articles provided practitioners with clinical guidelines with respect to different health concerns confronting older patients. Topics discussed in the literature included: principles and challenges of assessing the older patient,⁶⁰⁻⁶⁴ the Five "I's" of geriatric care,⁶⁵ assessment of peripheral neuropathy,⁶⁶ issues pertaining to falls, injuries and trauma,⁶⁷ elder abuse,⁶⁸ exercise,⁶⁹ diet and nutrition,^{70,71} the importance of strength training,^{72,73} special considerations for spinal manipulative therapy⁷⁴ and other associated patient management issues as they pertained to older patients.⁷⁵ Other articles described special considerations concerning plain film radiography,⁷⁶ and one article discussed the presentation, diagnosis and management of abdominal aortic aneurysms.⁷⁷

Many of these articles stressed the importance of monitoring both quantitative and qualitative measures in older patients. Bowers has stressed that functional assessment is the cornerstone of geriatric assessment,⁶⁰ while Killinger has suggested that "whereas a provider must be desirous of facilitating the patient's progress in terms of improved scores on outcome assessments and return to normal ranges of motion, the [older] patient's goal may be much more straightforward- independence".⁶⁷ This concept is echoed by Hoffman⁷⁸ who suggested that a clinician orient a patient away from the exclusive goal of pain management, and instead should emphasize the importance of restoring a patient's functional ability. In this words, "patients should be made to understand that as function returns pain will decrease, rather than as pain decreases function will resume".⁷⁸ This follows earlier models developed by Waddell who posited that "treatment often fails when relying on too narrow a conceptual model of pain".⁷⁸ This shift away from a pain-based model to a functional-based model is nowhere more important than in the care of older patients, whose painful symptoms are often the result of degenerative, irreversible conditions.

Clinical trials of spinal manipulative therapy

A great deal has been written on the efficacy and effectiveness of spinal manipulative therapy for functional spinal pain. Mootz and Meeker have compiled an extensive body of evidence supporting the utilization of spinal manipula-

Table 1
Brief Overview of Research Findings
on Spinal Manipulation
(Mootz RD, Meeker WC)*

- Acute low back pain: 14 RCTs
 7 favored manipulation,
 4 found significance in subgroups,
 3 found no difference
- Subacute and chronic LBP: 13 RCTs
 5 favored manipulation over the other treatments
 3 reported no significant differences
 1 made no conclusion from the data
- Mixed LBP: 13 RCTs
 9 favored manipulations
 1 significant in subgroup only
 3 reported no difference
- Manipulation vs placebo: 11 RCTs (4 sham
 manipulation, 7 detuned modalities)
 8 favored manipulation (including 4 of the 5 best
 designed studies)
- Acute and chronic neck pain: 10 RCTs
 4 favored manipulation
 6 no statistical difference
 Statistical pooling of 5 better studies yielded a
 0.06 effect size favoring manipulation
 (a change of 16 on 100 pt. scale)
- Headache: 8 RCTs
 5 favored manipulation (muscle tension/
 cervicogenic)
 3 equivocal (migraine, chronic muscle tension)

Code: RCT: randomized clinical trials, LBP low back pain

* Adapted with permission from Mootz RD, Meeker WC. An evidence-based update on spinal manipulation with considerations for an aging population. Proceedings, National Symposium on Complementary and Alternative Geriatric Health Care and Geriatric Research and Clinical Center Symposium, St. Louis University School of Medicine and Logan College of Chiropractic. St. Louis, MO, April 2000 (public domain).

tive therapy for acute and chronic back pain (Table 1) (Mootz RD, Meeker, WC unpublished work). However, as previously mentioned, many of these clinical trials into the efficacy of SMT for back pain have been conducted on younger adults, and the extrapolation of the results from these studies to older patients must be done with caution. Older patients often have complex health histories, and typically exhibit equally complex physical findings. Nonetheless, the assumption that SMT should be as effective for spinal pain in an older patient as it is for younger patient is not arbitrary or unreasonable. Similarly, clinical trials support the use of SMT for tension and migraine headaches,^{79–82} fibromyalgia,⁸³ and cervical vertigo.⁸⁴ The judicious use of SMT for the successful management of these conditions, if encountered in an older individual, are likely to be as clinically effective.

Bronfort⁸⁵ has recently compiled the evidence for the use of SMT for headaches as well as acute and chronic neck and low back pain, and has reviewed the clinical guidelines from the United States, United Kingdom, Australia and Sweden (Table 2, 3). Taken as a whole, the clinical guidelines from these different countries advocate the use of SMT for acute and chronic low back pain, and chronic neck pain. The evidence also supports the use of SMT for chronic headaches. Recommendations for the use of SMT for acute neck pain are weaker as compared to the strength of the other recommendations.⁸⁵ It is noteworthy that a chiropractor was not part of the committee that developed the clinical guidelines in Australia or Sweden.⁸⁵

Adverse reactions to chiropractic therapeutic interventions

There is very little age-stratified data on the frequency of adverse reactions to spinal manipulative therapy. Senstead et al. conducted a practice-based survey to detail the frequency and characteristics of side effects of spinal manipulative therapy.⁸⁶ The information regarding unpleasant reactions after SMT was collected after 4,712 treatments on 1,058 new patients by 102 Norwegian chiropractors. The incidence of side-effects to SMT was 49% among patients age 47–64 years of age, and 60% among patients 27–46 years of age. At least one reaction was reported from 55% of patients at some time during the course of the maximum 6 treatments. Of reported reactions, the most common were local discomfort (53%), headache (12%), tiredness (11%), or radiating discomfort

Table 2
Summary of efficacy of SMT for Low Back Pain based on systematic reviews
and evidence-based national clinical guidelines (85)*

Study	Acute Low Back Pain	Chronic Low Back Pain
Anderson et al., 1992	+	+
Shekelle et al., 1992	+	?
US guidelines, 1994	+	N/A
Koes et al., 1996	?/+	?
Bronfort et al., 1997	+	+
van Tulder et al., 1997	(+)	+
Australia Guidelines, 1999	(+)	N/A
United Kingdom Guidelines, 1999	+	N/A
Swedish Guidelines, 2000	+	+
Code: + indicated recommended, (+) some evidence to suggest, N/A not commented/ not available, – not recommended.		

Table 3
Summary of efficacy of SMT for Neck Pain and Headaches based on systematic reviews
and evidence-based national clinical guidelines (85)*

Study	Acute Neck Pain	Chronic Neck Pain	Headache
UQTF-WAD, 1995	?/+	?/+	N/A
Aker et al., 1996	(+)	(+)	N/A
Hurwitz et al., 1996	+	+	+
Bronfort et al., 1997	?	+	+
Kjellman et al., 1999	(+)	+	+
Vernon et al., 1999	N/A	N/A	(+)
Swedish Guidelines, 2000	(+)	?	N/A
Code: + recommended, (+) suggested, N/A not available, ? undetermined			
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(10%). Reactions were either mild or moderate in 85% of cases. Sixty-four percent of reactions appeared within 4 hours of the treatment, and 74% disappeared with 24 hours. Uncommon reactions reported were: dizziness, nausea, hot skin or "other complaints", each accounting for 5% or less of reactions. These unusual symptoms typically commenced later than on the day of treatment, were of long duration, were reported as severe in intensity and resulted in reduced activities of daily living. There were no reports of serious injuries or complications during the study.⁸⁶ Lastly, it should be noted that not one of the several dozen randomized clinical trials of spinal manipulation has ever reported an experimental subject to have been injured, which would have been required if any injury had occurred.⁸⁷

Recently, Cooperstein and Killinger have reviewed the available literature pertaining to chiropractic technique in the care of the geriatric patient.⁸⁷ Based on their review, these authors concluded that older patients do not appear to suffer more adverse reactions to spinal manipulation than younger patients, and they may even suffer fewer. They opine this may be attributable to both patient-variables (perhaps the greater joint stiffness often found among older persons may in fact *protect* them from injury related to poorly-directed or excessive force), doctor-variables (perhaps greater reliance on low force techniques, and more prudence exercised by the clinician) or a combination of the two.⁸⁷

Spinal manipulative therapy is not without material risks, but the evidence suggests that such risks are rare and remote. Among the most serious outcomes is stroke following cervical manipulation, which is a tragic, yet fortunately rare event. The stroke is usually the result of a dissection of the vertebrobasilar artery. Current accepted estimates of the frequency of a stroke resulting in serious neurological complications or death following manipulation are between 1 and 3 million adjustments and 400,000 patients.^{88,89} The most commonly accepted estimate of the risk of stroke following manipulation is 1 in 1,000,000 patients.^{90,91} A study by RAND⁹¹ further estimated the rate of serious complications from spinal manipulation to be 5 to 10 in 10 million for vertebrobasilar reactions, 3 to 6 in 10 million for major impairments, and an incidence of less than 5 fatalities per 10 million manipulations.

An extensive review by Haldemann, Kohlbeck and McGregor⁸⁸ sought to identify the risk factors associated

with stroke following spinal manipulation. The authors of this article concluded they could not definitively state which of the factors were in and of themselves absolute risk factors for stroke. For example, strokes were found to occur more commonly among *younger* adults, but it is this group of persons that are most likely to receive chiropractic manipulation or to be exposed to major or minor trauma. Furthermore, the authors ultimately concluded that, because the event is so rare, and the literature reviewed is often lacking critical details, it is impossible to advise patients or practitioners about how to avoid the risk of stroke during manipulation, nor could they be specific as to which sports or exercise activities result in neck movements or trauma of greatest potential risk. Moreover, because chiropractors perform 90% of all therapeutic cervical manipulations, it is to be expected that the majority of these injuries are more commonly associated with chiropractors.⁸⁸

The literature provides examples of stroke following major traumas (motor vehicle accidents, falls, sports injuries and so on), minor traumas (walking, star gazing, yoga) and during such seemingly benign activities as kneeling at prayer, household chores and sexual intercourse.^{88,89} Thus, the age of the patient is not a relative or absolute contraindication to cervical manipulation. It should also be noted that, although aneurysm is invariably listed as an absolute contraindication to manipulation, there has yet to be a single documented case report of manipulation resulting in a bleeding event related to aneurysm.⁸⁷

Manipulative therapies are often modified in response to patient tolerance or circumstances, and specific considerations have been reported in chiropractic literature.^{74,78} In their article discussing manipulative care of the older person, Bergmann and Larson stated that "consideration can be given to the use of specific, high-velocity low-amplitude thrust technique in the care of the older patient".⁷⁴ Similarly, Winterstein commented that "manipulative management of the geriatric patient is rarely contraindicated, but use of any adjustive procedure must be tempered by age-related factors, such as the presence of compression fracture, use of anti-coagulant medication, osteopenia and other modifiers".⁹² Thus contraindications to SMT are predominately condition-specific rather than age-specific. The author refers the reader to the textbook by Bergmann, Peterson and Larson⁹³ for a comprehensive list of relative and absolute contraindications to SMT.

Cooperstein and Killinger have suggested that the issue surrounding the safe delivery of a manipulative thrust to an older person may be less one of *force* and more one of *pressure*.⁸⁷ For patients with osteopenic disease, the authors posit that a manipulative thrust should be delivered over as broad an area of the spine as possible. For example, a practitioner may deliver a Carver bridge adjustment (knife-edge or hypothenar contact on the patient's thoracic spine while the patient is prone) with ample force for therapeutic effect provided that several vertebral segments are contacted, as opposed to contacting only one vertebral segment. Similarly, leverage must also be considered during the delivery of thrusting-type adjustments, especially in the area of the costovertebral joints.⁸⁷

Several chiropractic technique systems provide alternatives to HVLA manipulative adjustments, which may be of particular benefit when treating a patient with advanced osteopenic or osteoarthritic diseases. Chiropractic techniques that may be efficacious for these patients include instrument-assisted techniques (i.e. Activator), blocking techniques (i.e. SacroOccipital Technique), drop-assisted techniques (i.e. Thompson Terminal Point), mechanically-assisted techniques (i.e. Cox Flexion) or upper cervical techniques (i.e. NUCCA).⁸⁷

Adverse reactions to medical therapeutic interventions

It is reasonable to compare the risks associated with chiropractic management of spinal pain to the risks associated with medical management of spinal pain. For the treatment of spinal pain among patients of all ages, medical physicians most commonly prescribe pharmacological agents as their primary therapeutic intervention. Medications such as non-steroidal anti-inflammatory drugs (NSAID) are among the most commonly prescribed drugs for spinal pain. The incidence of adverse reactions to these and other drugs is regrettably high, and the evidence suggests that the sequella of these adverse risks are not trivial.

An adverse drug reaction (ADR) is defined as any noxious, unintended, or undesirable effect of a drug, which occurs at doses used in humans for prophylaxis, diagnosis or therapy.⁹⁴ This definition excludes therapeutic failures, intentional and accidental poisoning (drug overdoses), errors in administration or non-compliance on the part of the patient.⁹⁴

Older patients are particularly vulnerable to adverse drug reaction because of the physiological changes associ-

ated with the normal aging process. As a person ages, there is a decline in both hepatic and renal function.⁹⁵ By age 80, there is a 30% (or more) decline in glomerular filtration rate, renal mass and blood flow and also a decline in hepatic mass, enzymatic activity and blood flow.⁹⁵ These physiological changes culminate in a decline in drug clearance and an increase in a drug's bioavailability.

Thirty percent of all prescription drugs, and forty percent of all over-the-counter drugs, are purchased by adults over the age of 65 years.^{96,97} Two-thirds of Americans over the age of 65 use at least one drug a day, with 45% of the elderly taking several prescriptions concurrently.⁹⁷

Risks of NSAID use include serious gastrointestinal (GI) complications such as gastritis, ulcers, perforation and bleeding.⁹⁸ Complications from NSAID use has been calculated at 0.04% fatality rate, accounting for 3,200 deaths annually,⁹⁹ and a 2.74% rate of serious GI events.¹⁰⁰ Other studies estimate 2,600 deaths and 20,000 hospitalizations annually are attributable to NSAID use, with an incidence rate of 390-3200 serious GI events per million.^{101,102} NSAIDs have other side effects such as hypertension, they may interfere with hypertensive therapy, and NSAID use is associated with an increased risk of renal insufficiency, especially if combined with medications such as diuretics and certain cardiac drugs.⁹⁸

About one half of all deaths attributable to ADRs occur in persons age 60 and over.⁹⁷ Between 10% and 17% of all hospital admissions in the elderly are the result of inappropriately used prescription medication.^{95,97} The annual national cost of drug-related morbidity and mortality has recently been estimated at \$76.6 billion, with the majority (\$47 billion) related to hospital admissions.¹⁰³ A prospective meta-analysis conducted by Lazarou et al sought to estimate the number and incidence of serious and fatal adverse drug reactions in hospitalized patients in the United States.⁹⁴ The researchers reviewed prospective data obtained over a 32 year period on two different groups; those admitted to hospital due to ADRs, and those experiencing ADRs while in the hospital. The authors estimated that, in 1994, 2,216,000 patients in the two groups studied had a serious ADR, and 106,000 had fatal ADRs, making these reactions between the fourth and sixth leading cause of death in the United States, a ranking higher than either pneumonia or diabetes.⁹⁴ Other studies have investigated the incidence of ADRs in hospitalized patients,¹⁰⁴⁻¹⁰⁷ and patients in nursing care facilities¹⁰⁸⁻¹¹²

with results that were as equally disturbing.

Cost-effectiveness of chiropractic care

There have been no studies specifically assessing the cost-effectiveness of chiropractic care for older patients. However, as previously described, Rupert²⁹ reported that the total annual cost of health care services for those older patients under chiropractic maintenance care was estimated to be only third the expense by American seniors not under maintenance care. Other studies, such as the one by Manga,¹¹³ concluded chiropractic care was a cost-effective, safe and effective treatment approach.

CONCLUSIONS

Based on the literature, several conclusions can be deduced. As a profession, chiropractic has recognized the importance of geriatric education, and the Model Curriculum has served as an important vehicle to standardize this education. As well, several articles have been written that provide clinicians with guidelines in many different areas of health care on the successful management of older patients. Other articles have alerted clinicians to the possibility that a seemingly uncomplicated case of low back pain may in fact be secondary to other pathological conditions that preferentially affect this group of persons, such as cancer or abdominal aortic aneurysms. These articles have emphasized that chiropractic clinicians must be vigilant to these possibilities, and that many pathological conditions are best primarily managed by experts in the medical profession.

Demographic projections indicate that the population is aging at an exponential rate. At the same time, patients in general, and older patients in particular, are more commonly seeking out complementary and alternative medicines. These findings have led Killinger to conclude that "our nation must recognize that health care is becoming primarily geriatric health care and will remain so for quite some time".⁶ The most common reason to seek out CAM is for spinal pain of mild to moderate intensity. The prevalence of back pain among the older adult population is high, and back pain has important negative ramifications both in terms of a person's health and the economic burden to the health care system. The most commonly consulted CAM provider for this condition is a chiropractor, although chiropractic and other CAMs are often a complement to rather than a replacement for medical care.

The perceptions held by medical practitioners as to the effectiveness of chiropractic care is becoming more positive, and medicine as a profession is becoming more and more interested in the field of CAM. This bodes well for the impetus towards an interdisciplinary approach to health care which depends on many different health care providers working together.

Older patients receiving chiropractic care tend to use fewer prescription medications, are less likely to have used nursing care facilities, and are more likely to report a better health status. Patients who seek chiropractic care tend to be members of the Baby Boomer demographic group and of higher income and higher education than those persons not under chiropractic care.

Although many patients initially present to a chiropractor with spinal pain, they often continue with treatment for reasons other than symptom relief. Such reasons include disease prevention, prolongation of life, health promotion and enhancement of quality of life. Even though there is no evidence to support that any of these benefits occur, almost all older patients receiving chiropractic maintenance care believed it to be important to their health.

The most common therapeutic intervention used by a chiropractor is spinal manipulative therapy. The best available research supports the use of SMT for acute and chronic low back pain, acute and chronic neck pain and certain types of headaches, and it is reasonable to extrapolate these findings to the treatment of older adults. The literature indicates that SMT is a safe and cost-effective treatment for spinal pain, with the risk of serious injury being remote. This is especially evident when the safety of SMT is compared to the incidence of adverse drug reactions associated with the use of NSAIDs, the most commonly used treatment modality by medical providers for the management of spinal pain. With regards to the administration of SMT, many authorities would agree that chiropractors are the best trained health care providers to safely and effectively deliver this form of manual therapy. The literature also indicates that chiropractic practitioners promote several healthful lifestyle choices for their older patients including nutritional advice, stretches, exercises and strengthening program recommendations. This holistic approach resonates well with current trends in health care promotion and prevention.¹¹⁴

Anecdotally, older patients have also been successfully

treated for a wide variety of conditions while under chiropractic care, ranging from neurological disorders to post-surgical rehabilitation and traumatic injuries. Surprisingly, patients with serious pathological conditions, such as prostatic cancer, often seek out chiropractic (and other CAM) care to augment the medical treatments they are receiving. In general, however, the evidence supporting any benefit derived from the use of spinal manipulative therapy for non-musculoskeletal conditions is much less robust as compared to the benefit of SMT for spinal pain.

While the results of this article are encouraging and indicate that many of the practice behaviors of chiropractic clinicians are rational, defensible and well-supported by the literature, continued research is necessary to further develop an evidence-based approach to chiropractic geriatric care, especially in the areas of maintenance care and the management of non-musculoskeletal disorders. It should be emphasized that by an evidence based approach the author is *not* advocating the use of only those procedures that have withstood the vigor of scientific scrutiny by randomized clinical trials, but should also include interpersonal experience and dynamic hermeneutic interactions between doctors and patients. This parallels the concepts posited by Buetow and Kenealy¹¹⁵ and Miles et al.,¹¹⁶ who each cautioned against an approach to evidence-based medicine (EBM) that is too reductionist in its design. For example, Buetow and Kenealy proposed EBM be comprised of scientific, theoretic, practical (clinical), expert, judicial and ethics-based evidence.¹¹⁵ Moreover, these authors, as well as Mootz,¹¹⁷ have emphasized the importance of a contextual approach to health care, which considers the entire person within his or her environmental, psycho-social, and cultural surroundings. Once developed, those treatment modalities supported by the evidence must be inculcated into clinical practice guidelines. Otherwise, as Coulter and Adams have warned the chiropractic profession: "What is clear is that if chiropractors do not develop [guidelines] for themselves, outside parties will do it for them".¹¹⁸

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