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Editorial Staff

A survey of practice patterns and the health promotion & prevention attitudes of U.S. chiropractors: Maintenance care: Part 1. Ronald L. Rupert, DC

Objective: To investigate the primary care health promotion activities associated with what has historically been called "maintenance care" as employed in the practice of chiropractic in the United States. This includes such issues as investigating the purpose of maintenance care; what conditions and patient populations it best serves; how frequently it is required; what therapeutic interventions constitute maintenance care; how often it is recommended; and the percent of patient visits for such prevention and health promotion services. It also investigates the economic impact of these services.

Design: Postal survey of a randomized sample of practicing U.S. chiropractors. The questionnaire was structured using a five-point ordinal Likert scale (28 questions) and brief fill-in questions (12 questions). The forty-question survey was mailed to 1,500 chiropractors who were selected at random from the pool of DCs with active practices in the United States. The National Directory of Chiropractic database was used as the source of actively practicing chiropractors from which doctor selections were made. The sample was then derived by using the last numbers composing the zip codes which are assigned by the U.S. Postal Service. This sampling method assured potential inclusion of chiropractors from all 50 states, from rural areas as well as large cities, and assured a sample weighting based upon population density that might not have been afforded by a simple random sample.

Results: Six hundred and fifty-eight (44%) questionnaires were completed and returned. United States chiropractors agreed or strongly agreed that the purpose of MC was to optimize health (90%), prevent conditions from developing (88%), provide palliative care (86%), and minimize recurrence or exacerbations (95%). Maintenance care was viewed as helpful in preventing both musculoskeletal and visceral health problems. There was strong agreement that the therapeutic composition of MC placed virtually equal weight on exercise (96%) and adjustments/manipulation (97%), and that other interventions, including dietary recommendations (93%) and patient education related to lifestyle changes (84%), shared a high level of importance. Seventy-nine percent of chiropractic patients have MC recommended to them, and nearly half of those (34%) comply. The average number of recommended MC visits was 14.4 visits per year and the total revenue represents an estimated 23% of all practice incomes.

Conclusions: Despite educational, philosophical and political differences, United States chiropractors have a strong consensus related to the purpose and composition of maintenance care. Notwithstanding the absence of scientific support, they believe that it is of value to all age groups and a variety of conditions ranging from stress to musculoskeletal and visceral conditions. This strong belief in the preventive and health promotion value of MC motivates them to recommend this care to most patients. This, in turn, results in a high level of preventive services

and practice income averaging an estimated \$50,000 per chiropractic practice in 1994. The data suggest that the amount of services and income generated by preventive and health-promoting services may be second only to those from the treatment of low back pain. The response from this survey would also suggest that the level of primary care health promotion and prevention activities of chiropractors surpasses that of other physicians.

Key Indexing Terms: Chiropractic; Health Promotion; Physician's Practice Patterns; Primary Health Care; Primary Prevention; Attitude of Health Personnel.

Maintenance care: Health promotion services administered to U.S. chiropractic patients age 65 and older: Part 2. Ronald L. Rupert, DC, Donna Manello, DC and Ruth Sandefur, PhD, DC

Objective: Health promotion and prevention services provided by the chiropractic profession historically have been referred to as maintenance care (MC). The primary objective of this investigation was to obtain information regarding multiple health issues of patients age 65 and over who have had a long-term regime of chiropractic health promotion and preventive care. The study also sought to explore the nature of the interventions and methods that were most commonly used by chiropractors when administering MC, and to determine if there were differences between patients who have had long-term exposure to these preventive services versus those who have not.

Design: This descriptive study was accomplished by selecting chiropractic patients (age 65 and over) who had received health promotion and prevention services for at least five years (with a minimum of four visits per year). To enhance the probability of securing a more representative patient sample, selection was made through the participation of chiropractors from six diverse geographic locations across the United States. Doctors from each of the six sites were called using a scripted protocol and asked if they would participate in the study. Doctors who met the specified inclusion criteria created a pool from which participants were selected by random drawing of names. The selected doctors completed a survey related to their MC attitudes and practice patterns which permitted comparison with a previously conducted national survey. The site managers at each of the six study sites conducted training and support for each participating doctor. These doctors and their staff became the portal of access to MC patients and also provided information regarding the frequency and duration of treatment, as well as details about what specifically constituted treatment for each patient. Because there are no studies or known practice patterns that would suggest that MC patients make office visits based on age, sex, race, etc., it was assumed that patients are scheduled randomly as the patient or doctor deems necessary. For that reason, doctors were asked to enroll the first ten consenting patients who met the inclusion criteria. A battery of diverse assessment instruments were completed by each patient to provide a patient health profile. Information related to each patient included the SF-36D, patient health habits, expenditures of health services, frequency of use of health providers, and perceived value of chiropractic prevention and health promotion services.

Results: A total of 73 chiropractors participated in this investigation from the six study sites. Most doctors reported using a variety of treatment interventions for the management of the elderly MC patients investigated. In addition to an average of 1.9 manual procedures used per patient, it was common to recommend stretching exercises (68.2%), aerobic exercises (55.6%), dietary advice (45.3%), and a host of other prevention strategies. Results from the SF-36D reflected favorable attitudes regarding overall health status which were positively correlated ($p < .05$) to the years of MC. MC patients who had extended years of MC were also significantly less likely ($p < .05$) to consider themselves a "nervous person" based on their response to the SF-36D. The smoking and alcohol consumption of MC patients was similar to or slightly lower than non-MC patients upon

intake. There was a significant ($p < .01$) decrease in smoking with increased years of MC. Forty-six percent of MC patients tended to participate in aerobic exercise often or very often; 62% took vitamins often or very often; and 60% found time to relax often or very often. Only 36% reported frequently using non-prescription drugs, and there was a significant correlation ($p < .05$) relative to the number of years a patient had received MC and a decrease in the use of non-prescription drugs. Screening for major depression and dysthymia using the SF-36D was positive for only 16.3% of MC patients. The patients investigated in this study reported making only half the annual number of visits to medical providers (4.76 visits per year) as compared to the national average (nine visits per year) for individuals age 65 and over.

Conclusions: Based on the response of participating chiropractors, this study describes the therapeutic components of MC for the elderly patient. For these patients, MC does not simply consist solely of periodic visits for joint manipulation, but rather involves an eclectic host of interventions (e.g., exercise, nutrition, relaxation, physical therapy, manipulation) which are directed at both musculoskeletal and visceral conditions.

Key Indexing Terms (MeSH): Chiropractic; Health Promotion; Physician's Practice Patterns; Primary Health Care; Preventive Health Services; Primary Prevention.

Standardized initial head position in cervical range of motion assessment: Reliabilities and error analysis. Alan B. Solinger, PhD, Jasper Chen, DC and Charles A. Lantz, DC, PhD

Objective: To assess the clinical reliability and precision of the OSI CA-6000 Spinal Motion Analyzer for measurement of ranges of motion (ROM) in cervical spines of pain-free subjects using a novel procedure designed to minimize variabilities and quantitatively evaluate sources of errors.

Methods: 20 asymptomatic volunteer subjects were evaluated twice by each of two trained examiners in one session. Subject position was carefully standardized. Rotation, lateral-bending, and flexion/extension were evaluated in repeated movements (cycles) from extreme to extreme.

Analysis: Descriptive statistics and reliability coefficients (ICCs) were calculated for all full- and half-cycle motions. Possible sources of systematic errors were evaluated and random errors were estimated.

Results: ICCs indicate that the instrument performs very reliably for rotation and lateral-bending (0.93-0.97) and acceptably for flexion/extension (0.75-0.93) measurements. Differences in instrument placement and/or subject posture in different trials correlate neither with differences in measured values nor variances. Within-trial errors did not correlate with ROMs. Standardizing head position resulted in increases in reliabilities of from 3% to 15% for AR and LB, but actually decreased the ICC's for FE (up to 14%) compared to data collected under a less stringent protocol. Errors in clinical use are estimated at $\pm 4.5^\circ$.

Conclusions: Using our modifications to the accessories and standardization of subject position, the CA-6000 is a highly precise and reliable instrument for measuring active cervical motion about the three Cartesian axes. Individuals can repeat the same patterns of motion in sequential trials on the same day with very little variation. Ease of repetitious measurement without examiner intervention contributes to the instrument's ability to obtain highly reliable data. Changes in instrument placement or subject body posture between trials do not give rise to systematic errors. Design of the instrument for flexion/extension could be improved.

Key Indexing Terms: Range of Motion; Intra-Class Correlation Coefficients; Reliability; Cervical Spine; Errors.

Sitting biomechanics Part II: Optimal car driver's seat and optimal driver's spinal model. Donald D. Harrison, DC, PhD, Sanghak O. Harrison, DC Arthur C. Croft, DC, Deed E. Harrison, DC and Stephan J. Troyanovich, DC

Background: Driving has been associated with a multitude of signs and symptoms especially caused by vibrations. It is known that sitting causes the pelvis to rotate backward, the lumbar lordosis and lumbar support to reduce; and armrests reduce disc pressure and EMG recorded values. However, the ideal driver's seat and an optimal seated spinal model have not been described.

Objective: To determine an optimal automobile seat and an ideal spinal model of a driver.

Data Sources: Information was obtained from peer-reviewed scientific journals and texts, automotive engineering reports, and National Library of Medicine.

Conclusion: Driving predisposes vehicle operators to low back pain and degeneration. The optimum seat would have an adjustable seat back incline from horizontal of 100°; a changeable depth of seat back to front edge of seat bottom; adjustable height; an adjustable seat bottom incline; firm (dense) foam in the seat bottom cushion; adjustable lumbar support both horizontally and vertically, adjustable bilateral arm rests; adjustable head restraint with lordosis pad; seat shock absorbers to dampen frequencies in the 1-20 Hertz range; and linear front back travel of the seat, enabling drivers of all sizes to reach the pedals. The lumbar support should pulsate in depth to reduce static load. The seat back should be damped to reduce rebounding of the torso in rear-end impacts. The optimum driver's spinal model would be the average Harrison model in a 10° posterior inclining seat back angle.

Key Indexing Terms: Sitting; Biomechanics; Lordosis; Ergonomics; Spinal Model; Motor Vehicles; Whiplash Injury; Chiropractic.

An alteration in arterial compliance associated with elevated aerobic fitness. Thomas J. Terenzi, DO, EdD, DC

Objective: To identify a non-pharmacological method of enhancing arterial compliance, a correlate of atherogenesis, to determine the relationship between aerobic fitness levels and arterial compliance, and to identify a characteristic Doppler analog waveform associated with elevated levels of aerobic fitness.

Design: A cross-sectional design was utilized to compare the Doppler studies of sedentary subjects and aerobically-trained subjects. The trained subjects were divided into a moderately trained group and a highly trained group.

Setting: University-based.

Participants: 100 subjects consisting of 50 sedentary controls and 50 aerobically trained subjects. The mean age of the total group of subjects was 36.0 ± 8.6 years. Each group had an equal number of male and female subjects. Control subjects were sedentary with normal vascular risk factor

profiles and a mean aerobic capacity (VO₂ max) of 25.8 - 3.0 ml _ kg-1 _ min-1. Trained subjects were divided into a moderately trained group and a highly trained group. The mean aerobic capacity for the moderately trained group was 46.0 - 4.4 ml _ kg-1 _ min-1 and 63.3 - 6.7 for the highly trained group. A standard Doppler examination including ankle pressure index (API) was performed on each subjects.

Main Outcome Measure: Arterial compliance measurements were recorded by A-mode Doppler ultrasound and analyzed by diastolic flow analysis.

Results: Control subjects had a mean arterial compliance level of 21.1 - 2.5%. The moderately trained subjects had a mean compliance level of 34.8 - 4.9% and the highly trained 46.0 - 6.7%. An analysis of variance was utilized for this comparison and was significant at the level of ($p < 0.01$).

Conclusion: These results demonstrate that elevated aerobic fitness levels are associated with an augmentation in arterial compliance. A linear relationship existed in our data between aerobic fitness levels and arterial compliance. This study suggests that enhanced arterial compliance is another beneficial cardioprotective effect associated with aerobic training.

Key Indexing Terms: Aerobic Exercise; Doppler Ultrasound.

Stress management: An exploratory study of chiropractic patients. Jennifer R. Jamison, MB, BCh, PhD, EdD

Background: Stress is a recognized variable in the diagnosis, management and prognosis of musculoskeletal conditions, and chiropractic care is reputed to be successful in the management of a number of stress-related visceral conditions. It may be useful for chiropractors to include stress management as a clinical care option.

Objective: To explore screening tools to aid stress self-assessment, investigate patients' perceptions of stress management as a chiropractic care option, and examine which stress management strategies chiropractic patients perceive as most useful.

Design: A multiphase qualitative study using purposive sampling of chiropractic clinics to maximize the diversity of the patient population. Convenience sampling of patients was undertaken in a Western Australian case study, an inner city and a national exploratory study. Data for the case study were collected by semistructured interview. Questionnaires and a self-assessed stress management task were used to collect data from the inner city and national studies. Data was thematically analyzed. Results were triangulated.

Results: The sample size of chiropractic patients in the case study was 48, 15 in the Western Australia exploratory study, and 36 in the national study. A number of chiropractic patients participating in this study perceive themselves to be stressed and would appreciate having stress management strategies included in their chiropractic care. Individual patients prefer different stress management options. This qualitative study found little justification for routinely using a stress assessment technique more complex than asking the patient to rate their stress level as absent, minimal, moderate or severe. Exercise, particularly walking, was found to be a prevalent pastime amongst participants in the case study.

Conclusion: This study was too small to warrant statistical analysis; nonetheless, the results of this study are relevant to chiropractors as some of their patients would appreciate and believe they would benefit from chiropractic care that includes information about stress management

strategies.

Key Indexing Terms: Stress Management; Chiropractic; Patient Perceptions.

Pelvic stress fracture: Assessment and risk factors. Jeanne M. Lapp, DC

Tortuosity of the vertebral artery resulting in vertebral erosion. Deborah D. Brahee, DC and Gary M. Guebert, DC, DACBR

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