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Resolution of Neck Pain and Headaches in a 13-year-old Female with Dandy Walker Syndrome & Vertebral Subluxations

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Introduction:
A common motivation for chiropractic care among adults is to address complaints associated with spinal pain and headaches. The same may be true for the pediatric population given that lifetime prevalence rates increase steadily with age and approximate adult levels by the age of 18 years. In the interest of evidence-informed practice, we report on the care of an adolescent suffering from spinal pain, headaches and the consequences of Dandy Walker Syndrome. A 13-year-old Caucasian female presented to the clinic with unspecified unilateral right-sided headaches and neck pain. The patient's history revealed that she suffered from Dandy Walker Syndrome since birth; and currently has a cerebral shunt running from her right fourth ventricle to the left atrium of her heart. A cerebrovascular accident at age 9 caused the patient to have right-sided hemiplegia and has since improved to approximately 80% following a strict physical therapy regimen between the years of 2009-2011. Over the last 6 months she has been experiencing neck pain and debilitating headaches around the placement of her shunt.

Results:
A C1 subluxation was found with a vertebral body right posterior rotational listing which was corrected utilizing a cervical drop piece on the lowest resistance setting achievable with care to avoid cervical spine rotation. Standing on the right side with the patient in the prone position, a right distal lateral index contact was used on the right posterior lateral lamina of C1. A left hand hypothenar stabilization was utilized on the patient's left mastoid process. Three HVLA thrusts were applied with the right contact hand in a posterior to anterior line of drive to correct the right posterior rotational listing. The right lateral listing was corrected utilizing the same technique except the segmental contact point was the right lateral transverse process of C1 and the line of drive was lateral to medial.

Discussion:
The Neck Bournemouth Disability Index was utilized. On the very first visit, the patient scored a 24/70 which falls into the intermediate pain category. This score was then used as a baseline for each and every re-examination. Over the course of 5 weeks, the patient's pain decreased from the baseline of 24/70 to a pain free 0/70, signifying resolution of her neck pain.

During the patient's initial visit, she had a baseline score on her Headache Disability Index (HDI) of 27/100 (27%) indicating that her headaches caused her moderate disability. Over the course of 5 weeks, the patient's disability scoring decreased to an entire category from 14/100 (14%), defined as mildly disabled.

Conclusion:
We described the course of chiropractic care in an adolescent patient with Dandy Walker Syndrome. The implementation of chiropractic treatment was able to drastically reduce the patient's headaches and neck pain. Utilizing low force, non-invasive techniques, the patient's quality of life improved significantly over a period of 42 days. Further research should examine the neurophysiological effects of chiropractic protocol and Dandy Walker Syndrome.

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Quantitative assessment of changes in brain activity after a chiropractic adjustment

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Introduction:
Chiropractic is based on a concept of nervous system interference and it is thought chiropractic adjustments can affect brain function. However, chiropractic effects on brain function remains an understudied area of the profession. This may be due to the limited availability of cost effective, objective measures representing changes in brain function.

Quantitative electroencephalography (qEEG) allows for an in-depth objective analysis of brain activity, and may provide a cost-effective method for studying the effects of chiropractic intervention on the brain.[1]

There are two published studies in peer-reviewed journals on spinal manipulation and brain imaging that involve a chiropractor; both use methods that look at the brain after neurological events have occurred[2, 3]. qEEG allows for real-time analysis of brainwave activity representing function in the brain[1].

The purpose of this study was to determine the feasibility of using qEEG to assess brain electrical activity before and after a chiropractic adjustment.

Methods:
A female patient aged 33 years received a preliminary qEEG assessment with no intervention being performed. One week later, a follow up qEEG was conducted before and after receiving a chiropractic adjustment. Two comparisons were made: week 1 vs week 2 prior to the adjustment and week 2 before vs after the adjustment.

A Cadwell® EASY II system on 19-channels using the 10/20 system with a linked-ears montage was used. Neural functioning was evaluated via qEEG using Neuroguide™

Surface qEEG was analyzed using raw qEEG values Low Resolution Electromagnetic Tomography (LORETA) and connectivity measures were compared with a normative database[4,5,6,7,8,9].

Analysis and intervention was based on Sacro Occipital Technique® (SOT®)[10]. An Activator® II instrument was used for adjusting non-pelvic segments.

Results:
The subject was found with a Category II right leg short and PS occiput-right and left sacroiliac joint involvement. A PS-occiput adjustment was performed first using an Activator® instrument. Supine Category II blocking in the right leg short position was then done.

Analysis of brainwave activity before and after the chiropractic adjustment using LORETA z-scores showed a 2.27 standard deviation reduction in values in the delta (1 Hz) band. Significant increases ($P<0.001$) in raw values were seen in more sites after adjustment compared with the preliminary assessment. Delta band phase reset showed statistically significant change in 41/177 measures before and after adjustment as compared to 0/177 between week 1 and week 2.

Source localization of the greatest change was on the same side of the brain as the short leg and occiput listing; left sacroiliac involvement was contralateral to said source localization. Connectivity measures demonstrated changes both intra- and inter-hemispherically.

Conclusion:
Changes in qEEG were markedly more clinically significant as a result of chiropractic adjustment as compared to variability within one week.

qEEG appears to be a viable method to document whether chiropractic affects brain function. A study using a larger sample size (including active, sham and control groups) is currently underway: *Effects of chiropractic adjustments on brain function using quantitative electroencephalography*, NCT01953614.

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The Improvement of a 40 year-old Male Patient Exhibiting Anxiety and Depression Disorder Following Blair Upper Cervical Chiropractic Care: A Case Study

Charmaine A. Herman, MA, DC

Introduction

This case study describes the use of subluxation-based chiropractic care in the management of a 40-year-old male with depression and anxiety disorder, as well as neck pain and low back pain who sought specific upper cervical chiropractic care. Past history revealed long-time depression, anxiety, a motor vehicle accident, and hockey injuries. The patient has also been experiencing nervousness, problems sleeping, and limits time with his family, all due to depression. He has been taking medications for 10 years for depression and anxiety.

Methods

The initial exam included: vital signs, cervical and lumbar range of motion (ROM), Shoulder Depressor Test, Foraminal Compression Test, Bakody's Sign, Kemp's Test, Trendelenburg Test and Advancement Sign were performed. In addition, Blair UC chiropractic examination protocol was performed which included infra-red thermal scan of the cervical spine (C7-C1), soft tissue and motion palpation of the neck; Thompson cervical syndrome check, Derifield leg length insufficiency check and modified Prill leg check. Next, challenges and stress tests at the first cervical vertebrae (C1) indicated a probable C1 anterior superior right misalignment. Next, Blair upper cervical spinographic x-ray series were taken and confirmed that the first cervical vertebrae (C1) had a ASR 42 degree misalignment and the second cervical vertebrae (C2) presented with a double posterior misalignment at 52 degrees/56 degrees. Patient received a Blair technique C1 adjustment using a 180º toggle torque on second visit and was rested for 20 minutes. Post adjustment thermal infra-red scan revealed significant cervical heat reduction and Prill leg check showed no misalignment in the cervical spine. Low back pain was addressed using Thompson technique and Activator Methods protocol as needed.

Results

The patient was seen for 28 visits over a 3-4 month period using Blair upper cervical technique to address vertebral subluxations when indicated. Improvements regarding depression and anxiety were documented. Patient was removed from depression and anxiety medication by medical doctor during treatment period.

Conclusion

The progress documented in this case suggests that upper cervical chiropractic adjustments decreased the patient's symptomatology of depression and anxiety.

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NUCCA Board Certification: A Model for creating best practice guidelines for subluxation-based chiropractic with research implications

Jonathan Chung B.S., D.C., Tymothy Flory, DC

Introduction:

The introduction of the Affordable Care Act has placed increased demands on all healthcare models to practice within an evidence-based model. This has catalyzed the trend of chiropractic factions to increasingly adopt an allopathic model of care that includes prescriptive rights for controlled substances. Historically, the subluxation-based faction of the profession has been apathetic and confrontational towards research and establishing practice guidelines. The current environment in healthcare may threaten a subluxation-based model of healthcare that rejects evidence-based research and practice guidelines.

The National Upper Cervical Chiropractic Association (NUCCA) has developed rigorous and strict guidelines for its members to achieve Board-Certification Status. The NUCCA's Board Certification process may serve as a viable model for subluxation-based chiropractors that has implications for establishing practice guidelines and producing practice-based research.

Discussion:

Most chiropractic techniques base certification requirements on attendance to seminars, scholarly knowledge about the technique, and the ability to model an adjustive thrust correctly.

NUCCA's Board Certification process is broken up into three parts. The first part requires the doctor to consistently take x-rays that meet NUCCA's x-ray standards. The second part requires that the doctor can consistently perform an accurate and reliable analysis of the x-ray. The third part is a rigorous test that requires doctors to submit 10 consecutive x-rays with a maximum reduction of the atlas subluxation complex. The process of getting Board Certified has only been attained by approximately 10-15% of its membership.

NUCCA's certification process is unique in that it requires doctors to quantify the subluxation, and it sets a standard that a doctor must be able to reduce a subluxation consistently to be recognized as Board Certified. By quantifying and setting standards for its membership, NUCCA has created a system that can help guidelines for subluxation-based practice, and there is a pool of doctors that be reliably studied in a practice-based research model.

This type of model can help answer two of the most common critiques of subluxation-based practice. The first critique being that a patient can step into the offices of any two chiropractors and will likely get conflicting recommendations for the correction of the patient's subluxation. The second critique is that subluxation is a pseudo-scientific concept because it is unmeasurable, and therefore the correction of such is unmeasurable.

By establishing standards for measuring and correcting subluxation amongst its membership, chiropractic associations and technique groups can more easily perform research that can lead to evidence-based guidelines of practice.

Radiological changes in lateral cervical spinal curves seen across a retrospective case series of chiropractic patients utilizing Network Spinal Analysis care

Daniel Knowles D.C., Richelle Knowles, D.C., Karen Feeley, D.C.

Abstract:

This retrospective case series describes changes in spinal and neural integrity as reflected in increasing lateral cervical curves. These results are an important addition to a growing data base revealing significant improvements in lateral cervical curves following chiropractic adjustments, without using head weights or traction

Objective: To present radiological changes in lateral cervical spinal curves seen across a retrospective case series of chiropractic patients utilizing Network Spinal Analysis care.

Methods: A retrospective study of the pre and post lateral cervical x-rays of a series of 268 patients in a chiropractic office were analyzed for changes after a course of Network Spinal Analysis care. All subjects had evidence of spinal subluxation patterns at their initial evaluation. Statistical analysis of the data collected was applied to determine degree of spinal reorganization based on measurements of Jackson's (C2-C7) stress lines.

Results: The study revealed evidence of increasing lateral cervical spinal curves over a 3 year period. Results indicated a positive change of 6.16 degrees after 1 year, 6.98 degrees at 2 years and 9.2 degrees at 3 years of chiropractic care.

Conclusions: The results reflect significant changes in lateral cervical spinal curves in patients receiving Network Spinal Analysis care, over a 3 year period of ongoing chiropractic care, indicating reorganizational structural change of the passive subsystem of the spine. Network Spinal Analysis care provides an effective means of increasing spinal and neural integrity, as well as effecting positive changes to spinal curvature and the body's self-regulation of spinal subluxation.

Utilization of the chiropractic profession in the United States: A review of the current literature.

Justin Philemon Schütrumpf D.C.

Objective:

The goal of this paper is to analyze the current published studies and most recent data on the utilization of chiropractic in the United States population.

Methods:

A literature search of peer reviewed journals was performed using the term *chiropractic utilization*. The most recent data was obtained from 2012 National Health Interview Survey performed by the National Center for Health Statistics and Centers for Disease Control.

Results:

Results vary from paper to paper due to the different methods and analytics used. Data ranges demonstrate utilization rates at 4%-12% depending on the source. Many of these sources come from within the chiropractic profession using questionable data. The most recent data from the National Health Interview Survey found that 34,525 subjects polled received "chiropractic or osteopathic manipulation" in the previous 12 months. Subjects surveyed report that only 0.07% see a Doctor of Chiropractic as a personal health care provider. Those who admitted to routine care under a chiropractor, acupuncturist, or naturopath totaled 0.01% of the entire group surveyed. Chiropractic utilization has experienced a decline since the start of statistical analysis in 1985.

Conclusion:

There is a declining trend of utilization of the chiropractic profession by the United States population. To properly assess utilization a profession wide survey of patients currently under chiropractic care should be done to ascertain a definitive result.

Keywords: *chiropractic, utilization, chiropractic utilization, public perception, Complementary Alternative Therapy, CAM, NHIS*.

Resolution of Fascial Neuralgia Following Reduction of Atlas Subluxation Complex: A Case Study

Tymothy Flory, D.C., Jonathan Ozner, B.A, Jonathan Chung, D.C.

Objective:
The purpose of this case study is to provide a detailed report on the symptomatic improvement of a patient diagnosed with both trigeminal and glossopharyngeal neuralgia while undergoing upper cervical chiropractic care using the NUCCA protocol.

Clinical Features:
A ten-year-old male presented with a previous diagnosis of trigeminal neuralgia (TN) from a pediatric neurologist. The patient's mother took him to a chiropractor after unsatisfactory progress under the care of the neurologist. His history shows that he suffered for nearly 4 months with intense bouts of headaches, earaches, neck pain and extreme facial pain. He was prescribed medications by a neurologist with no overall relief. He was further diagnosed by the chiropractor with glossopharyngeal neuralgia (GPN).

Interventions and Outcome:
The chiropractic care consisted of upper cervical care through the technique of the National Upper Cervical Chiropractic Association (NUCCA). During the patient's initial phase of care, the upper cervical subluxation as well as his symptoms improved significantly. After 7 months the patient reported complete resolution of his main complaint, as well as significant reduction in the associated symptoms. Follow up appointments done 1.5 years after the initial exam show that the patient was still symptom free.

Conclusion:
This case demonstrates the reduction and eventual remission of trigeminal and glossopharyngeal neuralgia associated symptoms following the reduction of the Atlas Subluxation Complex. This case adds further evidence to the literature demonstrating the effectiveness of upper cervical chiropractic care for facial neuralgias. Cohort studies and clinical trials should be performed to study the impact that upper cervical chiropractic may have on facial neuralgias.

Key Words: *Chiropractic; Subluxation; Pediatric; Trigeminal Neuralgia; Glossopharyngeal Neuralgia; NUCCA; Upper Cervical*

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Statistical analysis of resting pulse rate as a neurological indicator in subluxation-centered care: A case study

John Hart, DC, MHSc

Introduction: Correct timing of a chiropractic adjustment has been of great interest to many subluxation-centered chiroprac*tors* for many decades.[1] Resting pulse rate (RPR) is a user-friendly neurological assessment[2-3] that may assist the subluxation-centered chiropractor in deciding when his or her patient needs an adjustment.[4] The present descriptive report takes this research to the next level – to the individual patient in practice. Description of its use, along with application of basic statistics for individual patient RPR data in *pre* versus *post* adjustment comparison is provided. Such an approach would seem to add objectivity to neurological analysis in subluxation-centered chiropractic practice.

Methods: Comparisons of pre- versus post-adjustment RPR measurements were made using line graph, correlation, and inter-quartile outlier detection analyses for a patient receiving maintenance type chiropractic care.

Results: Pre-adjustment measurements showed a trend of increasing RPR ($r = 0.945$) while post-adjustment measurements showed a decreasing trend ($r = -0.934$). A high RPR outlier was detected in the pre-adjustment readings while a low RPR outlier was detected in the post-adjustment readings.

Conclusion: Statistical analysis of resting pulse rate appears to be a feasible method of objectively analyzing the patient's own individual neurological data. Such an approach helps to objectively determine when the patient needs an adjustment, and whether the adjustment was successful from a neurological standpoint.

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The PROMIS perspective of parents with children under chiropractic care: a practice-based research network study

Joel Alcantara, DC, Jeanne Ohm, DC and Junjoe Alcantara, DC

Background: The chiropractic care of children is popular and highly utilized.

Objective: In an exploratory study, we examined the quality of life children presenting for chiropractic care in PBRN.

Methods: This study received IRB approval from Life University (Marietta, GA). In addition to socio- demographic information, we obtained clinical correlates and quality of life measures using the PROMIS parent proxy questionnaires for pediatric quality of life.

Results: A total of 89 parents/guardians reported on similarly numbered children. The majority of parents wanted to promote general health, relieve symptoms and improve the quality of life of their child. The domain T scores were: anxiety (45.85), depressive symptoms (44.05), fatigue (44.71), pain interference (46.83), peer relationships (51.95) and physical function (52.92). These quality of life scores indicate that parents over-estimate the quality of life of their children. This becomes important when one considers that parents decide the frequency and type of healthcare their children receive.

Discussion: To the best of our knowledge, this is the first implementation of PROMIS parent-proxy instruments in the chiropractic setting.

Conclusion: The use of the PROMIS parent-proxy was successfully implemented in a Chiropractic PBRN. We encourage further research in this area to examine the impact of chiropractic care to health outcomes.

Case Report of a seventeen-year-old post-concussive male receiving chiropractic functional neurology care

Stephanie Sullivan, D.C., Michael Longyear, D. C., Jonathan Vestal, D.C., Dan Tuttle, M.S.W., Ron Hosek, D.C., Ph.D., Michael Hall, D.C.

Introduction:

Sports related concussions among high school athletes are increasing, with mild traumatic brain injury becoming one of the leading reasons for childhood hospital admissions.[1-2] Approximately 10% of young athletes who receive a concussion will experience protracted recovery of symptoms.[3] Symptoms that commonly remain include fatigue, impaired memory, decreased reaction time, headache, depression, anxiety, dizziness, sensitivity to light, and slowed information processing. [2-4] This host of symptoms is commonly referred to as post-concussive syndrome. 2-4

Emerging therapies in the care and rehabilitation of post-concussive syndrome (PCS) include vestibular, oculomotor, and prescriptive physical activity; however, to date, there is little evidence to support any therapeutic intervention that provides rapid recovery of chronic PCS. [5] The purpose of this study is to report on the recovery of a 17-year-old male experiencing chronic PCS (6 months) who received chiropractic adjustments as a primer for chiropractic functional neurology treatment.

Methods:

A 17-year-old male presented to the Life University Functional Neurology Center for post-concussive syndrome subsequent to a Grade 3 concussion 6-months prior. The patient was experiencing lack of focus, headaches, change in personality, balance difficulty, fatigue, excessive sweating, and difficulty in school. Clinical exam revealed inability to maintain gaze, intermittent dystonia, lack of accommodation, and breakdown in eye and motor coordination. Cognitive assessment (Cambridge Cognition, Cantab Research Suite) demonstrated diminished ability in reaction time, attention switching, executive function, spatial working memory, and visual learning.

Approval from the Life University IRB was received, and patient consent was obtained prior to onset of care.

Foundational neurologic priming was provided through specific chiropractic adjustments followed by chiropractic functional neurology care, including whole body rotation.

Results:

Patient reported improvement across all diminished domains following one-week of care. Personality and affect returned to pre-concussion state, ability to focus and succeed in school returned, fatigue resolved, accommodation returned, eye and motor coordination improved, and cognitive assessment scores transitioned from considerably below normal to well above healthy age matched individuals.

Conclusion:

Following chiropractic and functional neurology care the patient experienced rapid recovery of symptoms associated with post-concussive syndrome. Further, symptom resolution was observed clinically and through assessment with gold standard computerized cognitive assessment technology.

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Establishing reliable analysis software for digital orthogonal radiographs

H. Charles Woodfield, III, BPhm, DC

Introduction:

With the advent of digital radiography, marking, measuring, and analysis of the digital image for subluxation presents a challenge. Several analysis software packages exist that can analyze the digital radiograph for the presence of an atlas subluxation. The question arises determining which software package is comparable to the established standard the National Upper Cervical Chiropractic Association (NUCCA) protocol, in line drawing analysis of plain-film radiographs (1). Furthermore, one must determine which software package is more accurate in reproducing analysis findings obtained from traditional pencil-to-film radiographic assessment. Given a plain-film radiograph marking and analysis system with demonstrated interexaminer reliability, determining comparable digital analysis software appears feasible (2, 3).

Methods:

Evaluated programs included Dr. Ben Kuhn's DicomAnalyzer and Viztek's Chiropractic PACS Tool-Set software for orthogonal analysis of radiographs. Two Board Certified NUCCA practitioners, proficient in analysis with the software under consideration, assessed five random sets of digitized plain-film radiographs. Obtaining random numbers utilized MS Excel (Microsoft Corporation, Redmond, WA), with film-sets chosen based on that list. Each analyzed films set consisted of one nasium film to obtain atlas laterality and one vertex film to establish atlas rotation. The randomly selected film-sets originated from 254 NUCCA Board Certification quality film-sets originally evaluated by three Board Certified Doctors to within 0.5 (+ 0.25) degrees in agreement of Atlas misalignment. These X-ray interexaminer reliability study plain-film radiographs with a known subluxation analysis were scanned at 300 DPI. Using a defined scanned area that included all required anatomy, when digitizing the reliability plain-film sets, allowed for easy calibration when using the software package under consideration. Establishing an agreement tolerance of 0.5 ($\pm$ 0.25) degrees between baseline readings from the reliability study films to those analyzed by software allowed for an acceptable comparison of pencil-to-film to computerized analyses.

Results:

Atlas laterality determined by the two software package analyses achieved almost perfect agreement within 0.07 degrees. However, two of these analyses did not agree with the previous plain-film x-ray reliability readings. Atlas rotation readings showed much variability between each assessment, yet all were with-in the agreement tolerance of 0.5 (+ 0.25) degrees.

Discussion and Conclusion:

There may be some limitation created in film quality when scanning plain-films into digital form creating the differences observed in the two computer analyses to plain-film findings. While it appears that both software programs used provided acceptable with in tolerance analyses, the number of film-sets considered limits the study results. Evaluating fifty film-sets will lead to stronger conclusions in establishing which software produces the most consistent analysis when compared to the traditional pencil to film procedure.

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Educating, Mentoring and Nurturing Chiropractic Practitioner/Scientists: The Development and Implementation of a Research Track within a Doctor of Chiropractic Program

Matthew McCoy DC, MPH, Christie Kwon DC, MS

Objective: To describe the development and implementation of a Research Track within a Doctor of Chiropractic program. The future of the profession rests with the ever new generation of chiropractors we train. In order to grow and develop the next generation of chiropractic researchers, and practitioner-scientists, the College of Chiropractic at Life University is committed to supporting those students who have a desire to nurture their knowledge and skill in this very vital area of professional growth.

Curricular Development: A proposal was developed through a work group made up of faculty and administrators. The proposal was submitted to the curriculum committee and approved.

Discussion: Within the graduation requirements for the Doctor of Chiropractic degree, there is an opportunity for those students who are interested in participating in research focused on vertebral subluxation to do so while completing their DC degree. In addition to actively completing a research project there is the opportunity for additional graduation acknowledgement and graduating with that distinction being noted on transcripts and during the graduation ceremony. This is done by completing "Research Track" academic requirements. Tuition scholarships are also tied to participation in the Track.

Conclusion: We describe the development and implementation of a Research Track within a Doctor of Chiropractic program. We encourage other institutions to develop and implement similar programs to support the development of subluxation centered researchers.

Subluxation: Medicare Compliance Vs. Classical Chiropractic Definition

Luke Henry, DC

Introduction

Medicare's definition of a chiropractic subluxation commonalities with the traditional chiropractic concept of joint dysfunction and neurological aberration. Various hypotheses have been proposed to explain the vertebral subluxation as well as numerous names to describe a "manipulative lesion". The concept of subluxation continues as a central tenet of the chiropractic profession, evidenced by the Association of Chiropractic Colleges Paradigm. There are, however, significant differences between the traditional chiropractic concept and subluxation as defined by Medicare.

Discussion / Conclusion

Chiropractors have been identified by the Office of Inspector General (OIG) at Centers for Medicare and Medicaid Services (CMS) as having a lack of compliance. A 2009 study by the OIG, "Inappropriate Medicare Payments for Chiropractic Services" found inappropriate Medicare payments for chiropractic services and poor documentation, specifically claims lacked an initial date for treatment episodes and documentation was missing required elements. There has been substantial effort by chiropractic organizations to offer improved training on Medicare documentation. Part of the problem may be explained by differences in the operational definition of subluxation by Medicare compared to the traditional chiropractic definition.

The chiropractic profession's founder, D.D. Palmer, made use of the existing medical term subluxation to describe a slightly displaced vertebra resulting in nerve root impingement at the intervertebral foramen, differing from the medical definition in the degree of anatomical displacement. B.J. Palmer further developed his father's concept with the introduction of the Meric System, the concepts of majors and minors and ultimately upper cervical (HIO) analysis and technique. Stephenson's classic definition, "A subluxation is the condition of a vertebra that has lost its proper juxtaposition with the one above or the one below, or both; to the extent less than a luxation; which impinges nerves and interferes with the transmission of mental impulses." continues to be used at subluxation focused chiropractic colleges. Traditional chiropractic defines a vertebral subluxation as misalignment, occlusion of an opening, pressure on nerves and interference with the transmission of mental impulses. The vertebral subluxation complex (VSC) includes the components: kinesiopathology, neuropathology, histopathology, myopathology, and pathophysiology.

In the past, Medicare required demonstration of a subluxation by x-ray. Presently, diagnosis of subluxation is based on a PART physical examination: Pain, Asymmetry, Range of motion, and abnormal tissue Tone. The doctor must document at least 2 of the 4 components, one of which must be either asymmetry or restriction. In contrast to classical chiropractic, Medicare requires that a subluxation be associated with a painful musculoskeletal condition. For Medicare, subluxation may be acute or chronic. Chiropractic maintenance care is a non-covered service. Care for non-musculoskeletal conditions is also not covered.

Improving Doctors of Chiropractic education on Medicare documentation and compliance will likely reduce "inappropriate reimbursement". Those in the profession who wish to discontinue the use of the term subluxation, or relegate it to chiropractic history should seriously reconsider as Medicare, Medicaid and many state scope-of-practice laws are based on the concept of chiropractic care to correct subluxation. Medicare has provided an operational definition of subluxation that may be of use for chiropractic research.

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Review of the literature and comparison of two practice-based research network (PBRN) recruitment techniques: onsite event recruitment and affiliation recruitment

Stephanie G. B. Sullivan, D.C., Edward F. Owens, Jr., M.S., D. C. , Ronald S. Hosek, D.C., Ph.D., Lucia Paolucci

Introduction:

Practice-based research has been around since clinicians began observing and reporting the care of patients.[1] In the 1970s, the medical profession began to establish formal networks dedicated to improvement of patient care through study of clinical practice.[1] Practice-based research in the field of chiropractic began to emerge in the published literature in 1997.[2-3]

For all practice-based research networks recruitment is a great hurdle to success. Examination of the methods used by researchers to encourage field doctors to participate in a practice-based research network would be of benefit to the development of future practice-based research studies. Therefore, the purpose of this study was to review the chiropractic PBRN literature to identify successful recruitment strategies and describe the feasibility of on-site event recruitment compared to institutional-affiliation recruitment.

Methods:

A review of the literature and article references was conducted in Pubmed and the Index to Chiropractic literature using the keywords: practice-based research network, chiropractic, and spinal manipulation

Two methods of recruitment were tested:

1. Event. A table was set up at a chiropractic event. Individuals expressing interest in the PBRN completed a sign-up sheet and received 4 follow-up emails, one for registration and the additional emails for registration and completion of a practice characteristics survey.
2. Affiliation. Emails and social media announcements providing basic PBRN information, with requests for registration and completion of a practice characteristics survey were sent to chiropractors affiliated with the PBRN host institution.

Results:

The review of the literature produced twenty-one relevant articles. Only 8 of these (38%) listed the methods used by the investigators to recruit clinicians for a PBRN study. The recommended recruitment methods were: emails to affiliation members, articles in chiropractic publications, word-of-mouth, extension of educational workshops, presentations at professional conferences, recommendations from leaders in an organization, and chiropractic groups on the internet.

Neither recruitment method produced tremendous results. The onsite event recruitment required a large time commitment (approximately 32 hours) with little return. At the event 53 chiropractors expressed interest, 5 registered (registration rate of 0.16 registrations/hour) and 8 completed the practice characteristics survey (survey response rate of 0.25 surveys/hour). The affiliation recruitment through email and social media required a small time investment (5 hours), yet produced 15 registrations (registration rate 3.0/hour) and 6 surveys (survey response rate 1.2 surveys/hour).

Conclusion:

Use of email and social media recruitment through an institution affiliated with the PBRN exhibited a greater return on time for registration of field chiropractors and completion of a survey instrument by the chiropractors than for the event recruitment method.

Further, just over 1/3 of the articles in the practice-based literature for chiropractors demonstrated reporting of the methods for recruiting field chiropractors. Greater detail on recruiting methods in the published literature could be beneficial to the establishment of additional chiropractic practice-based research networks.

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Inter-examiner reliability of the detection of vertebral subluxations using continuous measures and confidence levels

Kelly Holt, David Russell, Robert Cooperstein, Morgan Young, Matthew Sherson, Heidi Haavik

Introduction

The elusive vertebral subluxation is the chiropractic professions central defining clinical principle, yet there is still little consensus regarding the nature of the vertebral subluxation or its associated neurological manifestations.[1] Some members of the chiropractic profession even argue that there is no credible evidence that vertebral subluxations exist.[2] One issue that has led to this paradox is that the profession has struggled to demonstrate that they can reliably identify vertebral subluxations.[3,4] Some methods of subluxation assessment, such as pain provocation at segmental levels, have been shown to be reliable and valid,[4] however many other common spinal assessment methods used by chiropractors have limited reliability.[4] Several studies have shown better agreement for the site of care when multiple assessment methods are used,[4,5] but it remains unclear whether multidimensional approaches contribute more than their component elements when deciding where to adjust the spine.[4]

Recently it has been demonstrated that a continuous measures system combined with an assessment of examiner confidence can lead to improved levels of inter-examiner reliability for spinal motion palpation assessment.[6,7] In this study our objective was to use a similar approach to determine whether a multidimensional approach to subluxation assessment was reliable at detecting the level of subluxation and whether a multidimensional approach provided greater reliability than an assessment of motion palpation alone.

Methods

The study was conducted at the Chiropractic Centre of the New Zealand College of Chiropractic. Public patients attending the Chiropractic Centre during study sessions were asked if they would like to participate in the study. Patients who consented to participation exposed their spines and marks were placed over the inferior tips of the C7 and T12 spinous processes. They were then examined, in random order, by one of two faculty clinicians (registered chiropractors with over 10 years of experience). The first examiner entered the room, accompanied by a research assistant, and assessed motion palpation of the lumbar, thoracic, and then cervical regions of the spine. The examiner noted which segment they believed to be 'most' restricted in posterior to anterior glide and the research assistant measured to the segment from either the mark placed at C7 or T12 depending which region of the spine was being assessed. The examiner then completed the chiropractic examination using a predefined protocol that included leg length checks, soft tissue palpation, and joint play assessment. When the examination was complete the segment in each region of the spine that the examiner found to have the most subluxation indicators was recorded using a similar approach to that described above for the motion palpation recordings. The examiner was also asked to indicate whether they were confident or not confident about their findings. The second examiner then entered the room within five minutes, and while remaining blind to the findings of the first examiner, repeated the assessment.

Results were then assessed for agreement between examiners using intraclass correlation coefficient (ICC) analyses with two way mixed models, with consistency as the type and single measurements. Previously it has been shown that reliability of subluxation indicators is reduced in patients who had recently been adjusted.[8] For this study a subgroup analysis was therefore performed on patients who had not been adjusted for at least 7 days to see whether that influenced the results.

Results

70 patients were assessed during the study. The table below summarises the results of the study:

Included	n	Lumbar Motion Palpation (ICC)	Thoracic Motion Palpation (ICC)	Cervical Motion Palpation (ICC)	Lumbar Vertebral Subluxation (ICC)	Thoracic Vertebral Subluxation (ICC)	Cervical Vertebral Subluxation (ICC)
All	70	0.40	0.68	0.21	0.60	0.56	0.57
Confident Only	53-65	0.50 (n=53)	0.68 (n=65)	0.20 (n=61)	0.69 (n=58)	0.57 (n=62)	0.59 (n=65)
Not Adjusted in the last 7 days (All)	22	0.33	0.77	0.61	0.71	0.69	0.76
Not Adjusted in the last 7 days (Confident only)	18-22	0.41 (n=18)	0.78 (n=20)	0.69 (n=19)	0.75 (n=20)	0.77 (n=19)	0.78 (n=22)

Moderate levels of reliability were obtained for all motion palpation and multidimensional assessments apart from the cervical motion palpation assessment which was poor (0.21). Examiner confidence did not significantly alter the results for the overall assessment. When patients adjusted within the previous 7 days were excluded reliability increased in all categories apart from lumbar motion palpation and reached good levels of agreement for all multidimensional assessments when the examiners were also confident of their findings. The multidimensional assessment resulted in better levels of agreement than motion palpation alone in the cervical and lumbar regions but not the thoracic region.

Conclusion

In this study acceptable levels of reliability were observed in each region of the spine when a multidimensional approach to detect vertebral subluxations was used. In the cervical and lumbar regions the multidimensional assessment was more reliable than motion palpation alone. When examiners were confident of their findings good levels of agreement were observed in patients who had not been adjusted in the previous seven days.

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Survey of upper cervical practitioners in the Upper Cervical Chiropractic Procedures Diplomate program

Philip R. Schalow, D.C.

Introduction

There is much discussion about what diagnostic and correction tools an upper cervical doctor requires in order to establish an effective practice. Among the upper cervical techniques, there is a tendency to focus on the differences between the procedures. These surveys were undertaken to determine common patterns of practice within the upper cervical community. The main question pondered is how a practitioner regardless of the upper cervical technique, determines the presence or absence of the atlas subluxation complex? A secondary question is probing to see how individual practitioners benefitted from the first Diplomate in upper cervical chiropractic procedures.

Methods

A survey was developed and distributed in September, 2013 to the entire first class of the Diplomate program in upper cervical chiropractic procedures. Results were tallied and relative frequency figures were computed. Based on this survey, a more thorough survey was developed in April 2015 with more questions. The same class, although a smaller group, was given this survey and the results tallied.

Results

The group surveyed consisted of NUCCA, Blair, Knee Chest, Palmer upper Cervical, and Orthospinology practitioners. 73% of the respondents use thermography, up from 67%. 84% use postural distortion checks, up from 56%. 100% use some form of leg check, up from 96%. 95% use palpation, up from 88%. For 89% the region of focus is the neck. 57% use detailed neurological tests such as cranial nerve exam, eye exam, cerebellar function tests, and gait observation. 58% use digital machines, and 11% use both. 79% of the practitioners have a separate resting room for patients after the adjustment. Practitioners (84%) have patients rest an average of 28.6 minutes after a correction, ranging from 10 minutes to two hours. 100% of the Blair practitioners use thermography and none of the NUCCA/Orthospinology practitioners in this group surveyed use thermography. All practitioners responded positively in answering how they have benefitted. Answers included “increased confidence,” “better knowledge of how to read the subluxation,” Better knowledge of reading MRI and how to talk with other health care practitioners.”

Discussion

It is clear that this group surveyed use a number of diagnostic tools to establish the presence of the atlas subluxation complex. Palpation for pain and tenderness, thermography, supine and prone leg length checks all show fair to moderate reliability. Ten studies show marginal or poor reliability with regard to palpation for alignment. The fact that every single one of the doctors surveyed use the leg check reveals the importance that the upper cervical community places on the relation between the upper cervical spine and the ability of the body to maintain balance. Whether the variety of diagnostic tools reflects the complexity of the expressions of the distressed nervous system or reflects doctor preference is unknown. Continuing education in the upper cervical spine, also referred to as the cranio-cervical junction, through the diplomate program has been unanimously beneficial to this group of practitioners.

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The PROMIS perspective of children under chiropractic care: a practice-based research network study

Joel Alcantara, DC, Jeanne Ohm, DC and Junjoe Alcantara, DC

Background: The chiropractic care of children is popular and highly utilized.

Objective: In an exploratory study, we examined the quality of life children presenting for chiropractic care in PBRN.

Methods: This study received IRB approval from Life University (Marietta, GA). In addition to socio-demographic information, we obtained clinical correlates and quality of life measures using PROMIS- 25 for pediatric quality of life.

Results: Our ongoing efforts thus far have recruited a total of 73 children (39 males; 34 females). Their average age is 12.21 years (median =12 years; range = 7-17 years; SD=2.73). The domain T scores were: anxiety (45.85), depressive symptoms (44.05), fatigue (44.71), pain interference (46.83), peer relationships (51.95) and physical function (52.92).

Discussion: To the best of our knowledge, this is the first implementation of PROMIS-25 instruments in the chiropractic setting for children. Given the novelty of our findings, no comparative measures exist in chiropractic. However, these quality of life scores are comparable to children suffering from active renal disease, a debilitating illness for children.

Conclusion: The use of PROMIS-25 was successfully implemented. We encourage further research in this area to examine the impact of chiropractic care to health outcomes.

12th Annual International Research and Philosophy Symposium
Subluxation: More than just a historical term.
Commentary Abstract
The Chiropractic Paradox
Is Chiropractic Specific, or is it Not and Therefore Nothing?

Andy Roberts

INTRODUCTION

BJ Palmer, D.C., Ph.C. said, "Chiropractic is specific, or it is nothing." [1] Since Chiropractic is a philosophy, science and art one can reason that all would need to be "specific" to satisfy BJP's declaration. Were we able to show that any one of this triad be non-specific, we would negate this concept held so sacred by the majority of the profession. The obvious one of the three to investigate is the art as it is the application of the other two and encompasses them both. There is a prevailing thought that instruments are the only way to be specific within the Chiropractic art because they can produce controlled and consistent forces as compared to the human-generated adjustic thrust, which is constantly variable. Both science and philosophy are employed to make the simple argument that an instrument is not preferable over manual adjusting; that the very nature of the cause of the vertebral subluxation and the cause of its correction (elicit a Chiropractic adjustment) make the singular advantage (consistent and repeatable) of instrument adjusting a moot point.

DISCUSSION

Proposition 1 - a human regardless of their training, practice and experience is unable to consistently repeat the exact same force as regards the adjustic thrust. Proposition 2 - conversely, an instrument can reproduce a force exactly the same from time in to time out. There are so many variables that would render it close to if not impossible to reproduce with exactitude any single physical action of the body let alone one requiring movement and force generation.

There are instruments today that have demonstrated the ability to produce a consistent and repeatable excursion and/or force every time. Furthermore, even though with intense and extended practice, a manual thrust can attain a tight range of excursions and forces produced, it will still not be as precise and accurate as an instrument.

The cause of the vertebral subluxation was an unbalanced force, generated by the concussion between the Universal external invasive force and the Innate internal resistive force; the Universal force overwhelmed the Innate force not due to an insufficiency in Innate Intelligence but to the limitations of matter in which it resides. [2]

Every single person that has existed, does exist and will exist into the future is different. We know that the limitation of matter is the mitigating factor in the ability of Innate Intelligence to adapt a Universal invasionary force and so as we stated above, the same exact Universal force applied to any number of different persons will yield very different results; from successful adaptation to vertebral subluxation to fracture.[3] As in its cause, the correction of the vertebral subluxation from person to person is also mitigated by matter and so the force required to entice Innate Intelligence to be successful achieving the Chiropractic adjustment will be different from person to person.

CONCLUSION

We have demonstrated that we cannot know at any given time the force needed by Innate Intelligence to correct a vertebral subluxation and so the one advantage the instrument has over the manual method (namely consistent reproducibility) becomes completely moot and so offers Innate Intelligence no advantage when compared to manual adjusting to make the necessary force to correct vertebral subluxation.
Since Chiropractic by definition is the philosophy, science and art inclusive, and since the Chiropractic art has been shown to not be specific then we must accept that Chiropractic is NOT specific. It is my opinion that this does not imply that Chiropractic is nothing due to the fact that life is a dynamic system and as such is an applied science and cannot be held to the same measures as an exact science.

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Arcuate Foramen; A descriptive observational study

Philip R. Schalow, D.C.

Introduction

Arcuate foramen is considered an anomaly of the posterior arch of the atlas involving a bony arch between the lateral mass and the posterior arch. Also called Kimmerle's variant and ponticulus posticus, among other names, this anomaly covers over the vertebral artery, to which it is attached.[1] One adverse health effect of this structure is vertigo, a component of vertebra-basilar insufficiency. However, there is evidence that the upper cervical subluxation can also be associated with vertigo. In this observational study, 383 consecutive patients over a 25-month period were evaluated for this variant and the upper cervical subluxation to find out if the arcuate foramen could be contributing to the symptom. Of the 383 patients entering the practice, five had vertigo. One had no sign of arcuate foramen.

Methods

Each of 383 consecutive patients was evaluated for the presence of subluxation misalignment of the upper cervical spine. Included were postural distortion tests with an inclinometer and supine leg check.[2,3] All patients showed abnormal tests, and radiographic study was performed to confirm the presence of misalignment of the atlas and adjacent structures. Of those, 122 also had arcuate foramen demonstrated. Radiographs taken were lateral cervical, vertex, and nasium, according to protocol established by the National Upper Cervical Chiropractic Association (NUCCA). Reduction of the misalignment was achieved by a low-force, low velocity adjustment with the patient lying on the side as indicated by the radiographs. Statistical analysis is performed to clarify the significance of the arcuate foramen in causing vertigo.

Results

All postural distortions reduced, and inter-procedural radiographs were obtained to verify appropriate reduction of the atlas subluxation complex. Of the 122 patients with arcuate foramen, four had vertigo (3.27%). Of that group, half found complete relief (50%), the others (50%) had no relief. The relative frequency of patients with vertigo and the arcuate foramen was .8. The relative frequency of patients with vertigo, arcuate foramen and the atlas subluxation complex was .013. One patient without the arcuate foramen has had moderate relief.

Discussion

Subluxation of the cranio-cervical junction can be associated with neurovascular syndromes. The presence of the arcuate foramen could be responsible for failure to resolve vertigo in some patients. Common examination strategies may not show other morphological changes to the vasculature. CT images clarify the amount of ossification of the posterior atlanto-occiptal membrane, and Digital Subtraction Angiography (DSA) clarifies atresia of the vertebral artery in the region.[4] One patient whose vertigo failed to resolve displayed Bowhunter's syndrome in earlier stages of care. Bowhunter's syndrome is the clinical sign of posterior circulation ischemia caused by compromise of the dominant vertebral artery. It can be caused by a hypertrophic osteophyte, typically arising from the uncinate processes, or thickened atlanto-axial membrane or the arcuate foramen. This observational study shows that arcuate foramen is not a strong predictor of vertigo, but when vertigo is present, the arcuate foramen could be contributing substantially to the problem. This study also shows that subluxation of the upper cervical spine can be associated with vertigo and that reduction of the subluxation can resolve a percentage of patients with arcuate foramen. Further investigation is suggested to clarify the role the arcuate foramen has in producing symptoms and the role of other definable neurovascular phenomena.[5,6,7]

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The impact of chiropractic Activator adjustments on memory, analytical abilities and reaction time task performance: a pilot study

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Background:
One individual's memory differs from the next, some can remember scores of random characters, facts, figures, and prose that has been set in no certain order and others will struggle with "the magical number 7, plus or minus 2" as described by Miller in his studies on memory (1). Young adults can recall only 3 or 4 longer verbal chunks, such as idioms or short sentences (2). The difference in memory from one person to another provides an opportunity for potential intervention. A review of the literature revealed that there has been no studies to date that particularly focus on chiropractic and its relation to memory.

The purpose of this study is to evaluate preliminary data assessing the impact that chiropractic adjustments have on memory, analytical ability and reaction time through initial assessment and testing in a healthy population.

Methods:
The study was approved by the Life University Institutional Review Board. Twelve healthy individuals (5 males and 7 females) aged 18 to 65 were recruited for the study. The participants arrived at the facility and were given a history/physical exam. The participants were then randomized using computer randomization software, six were randomized to a sham group, six were randomized to an adjustment group. All participants were put through baseline tests using the analytical abilities test, simple reaction time, and simple memory task. Using activator methods protocol the participants received a specific adjustment. The sham adjustment group utilized standard methodology using a setting to zero at a specific spinal segment. Post adjustment/sham the participants tested again in the baseline tests using the analytical abilities test, simple reaction time, and simple memory task. Participants that were in the sham group were offered the opportunity to have an adjustment. All participants were thanked for their time.

Results:
Simple Memory Task:

Memory had no remarkable results to present. Post memory percentage correct was 100% for both groups.

Analytical Abilities Test:

The adjustment group demonstrated statistically significant improvements in the response time for the pre and post analytical abilities test ($p=0.01$). There was no significant difference found within the sham analytical abilities group ($p=0.07$). The response time for the analytical abilities demonstrated greater percent change in the adjustment group (41.68%) compared to the sham group (30.87%). Based on the preliminary data a recommended sample size for further assessment of the analytical abilities test would be 32 with a (0.80 power, alpha 0.05).

Simple Reaction Time Task:

Neither the adjustment or sham groups demonstrated statistically significant improvements in the response time for the pre and post reaction time test ($p=0.19$, adjustment; 0.31, sham) There was no significant difference found between groups for the simple reaction time test. There was a trend toward improvement in response time for the chiropractic adjustment group (.(27.58% change) compared to the sham group (7.70% change).

Conclusion:
While the results are preliminary, the trend is improved in the reaction time and analytical abilities tests with application of chiropractic care. Data reflects that the memory task was insignificant. This was a good exercise in analyzing the preliminary data, as it sets up the framework to recruit additional participants to continue the study using a more appropriate sample size.

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The Quantitative Effects of Chiropractic Adjustment on Infant Suckling Ability

Katrice Angel Shannon, B.S. (Life University, D.C. 2016)

Introduction: With a breastfeeding infant, one cause of poor latch-on capability may be birth induced cervical subluxation(s) or facial asymmetry which presents as an imbalance of the bones and features of the face. Facial asymmetry can result from the use of forceps, vacuums, and the compression and stress of birth itself. Within facial asymmetry, quite often the mandible is misaligned which can lead to sucking, swallowing, chewing, and speech problems. Inadequate nursing may also lead to nutritional voids and subsequent developmental issues.

The bones of a child's skull do not fuse until approximately age two. Since chiropractors specialize in properly aligning bones, chiropractic intervention should be considered as the therapy of choice for resolving most congenital craniofacial cases that hinder infant feedings-- especially due to its non-invasive nature. Previous qualitative case studies have shown chiropractic methods to be effective at handling facial asymmetry in infants from four days to four months old (McCoy, Grande, and Roy, 2008 / Généreux & Alcantara, 2011).

Methods: This study is to be tackled in two phases: 1) a pilot project, and 2) a larger cohort with a control group. The study population receiving chiropractic intervention will be comprised of infants who have feeding problems for which prompt surgery is not required, such as presenting with a cleft palate.

Variables measured include how many times the infant feeds per day, length of each feeding time, age range in weeks (the maximum age being fifty-two weeks old), how many diapers changed per day on average (urine only, and bowel movements), cranial measurements, and the weight of the infant (i.e. in pounds and ounces). Data is also collected using a breastfeeding comfort questionnaire regarding the mother's pain and stress levels associated with breastfeeding--assessed both pre and post chiropractic intervention.

Results: Phase I has been completed with data from 7 study subjects. Preliminary results show that there was 97% change in the mothers' comfort when the baby latched-on, and a 97% difference in the mother's self-reported stress levels related to breastfeeding. Non Parametric Related-Samples Wilcoxon Signed Rank Test were run with SPSS for assessment of this tiny cohort.

Phase II of this study aims to recruit a minimum of 60 participants (30 treated infants and 30 matched controls). For the statistical analyses, an $n > 30$ is usually best so that the Central Limit Theorem is applicable such that normal theory approximations can be used for various measures such as the standard error of the mean. Optimally, 100 valid (i.e. completion of all paperwork and follow-up visits) study group participants and 100 control group participants will have been enrolled by the conclusion of Phase II. For data analysis, SPSS computer software will run statistical analysis of both nominal and ordinal data obtained. Likely Partial Least Squares Regression (PLS) analyses will be run.

Conclusion: The 97% change in mothers' comfort while breastfeeding likely reflects positive structural changes in the hard palate, facial asymmetry, and/ or cervical range of motion for infants as a direct result of chiropractic intervention.

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The Effects of Cervical Spine Alignment on Balance Performance: A Pilot Study

Jeremy A Miller, Dr. Ronald Hosek and Dr. Robert Rectenwald

Introduction:

The premise of this research project is that abnormal alignment and of the cervical spine, principally the upper cervical subluxation complex, can alter proprioceptive signals to and from the cerebellum, particularly the spinocerebellar tract[4], and alter a subject's balance. Previous research has established that neck pain, fatigue of the neck muscles, and abnormal neck positioning effects joint position sense, proprioception, and balance[3, 8, 10, 11, 14, 15, 16 , 21, 25, 26 ,27, 28, 29]. Currently in the literature there is evidence that chiropractic can have a positive effect on a person's balance[1, 2, 6, 7, 9, 12, and 31]. Dr. Haavik-Taylor proposes that an adjustment of dysfunctional cervical joints may alter specific central corticomotor facilitatory and inhibitory motor pathways and somatosensory input [5, 24]. Her research provides insight on a possible mechanism for pain-relief and restoration of functional ability that contributes to restores the normal proprioceptive ability of the neck. Based on the evidence in previous research it is the hypothesis of the authors that a definitive correlation between cervical spine alignment and balance performance exists and that correcting cervical misalignment and subluxations by a chiropractic adjustment can result in a positive change in a person's balance and proprioception.

Methods:

The study authors hope to initially recruit 30 subjects for a pilot study. The subjects would undergo the normal analytical procedures of the Advanced Orthogonal chiropractic technique. Subjects will have pre-adjustment x-rays of the cervical spine taken (Lateral, Vertex, Nasium, and APOM). These x-rays will be measured for various cervical alignment criteria. The patient will also have a pre-adjustment baseline posturographic assessment taken using the CAPS® Professional System. Subjects will go through a series of balance and posture tests on a hard and soft surface with varied head poisoning, and eyes open and closed. The subjects will be adjusted by the Advanced Orthogonal device and post x-rays will be taken to assess if a correction has been made. The subjects will then undergo a post adjust balance test identical to the pre-adjustment balance test. The quantitative data gathered from the pre and post balance and posturographic assessment tests using the CAPS® unit will be compared to the changes in cervical spine alignment from pre-adjustment to post-adjustment.

Results:

This study is still being evaluated by the Institutional Review Board at Life University and is pending approval. As is such, no data has been gathered.

Conclusion:

The conclusion will be written after the appropriate data has been gathered and analyzed. It is the hyposthesis of the authors that a definitive correlation between cervical spine alignment and balance performance exists. If this is indeed the case, future research on the effects of chiropractic and falls prevention would be a logical step. A proposed full study with more subjects and tests is in the works depending on the outcome of the current pilot study.

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Physiological Effects of Reducing the Vertebral Subluxation Complex with Bio-Energetic Synchronization Technique

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Introduction

Bio-Energetic Synchronization Technique (B.E.S.T.) is a non-force technique employed by clinicians to remove interference from the autonomic nervous system and return it to a state of homeostasis for the purpose of promoting optimum healing conditions. B.E.S.T. has a forty year clinical history, but its effect on physiology and the vertebral subluxation complex has not been studied. In 2005, a study published in the Journal of Manipulative and Physiological Therapeutics showed treatment with B.E.S.T. resulted in an improvement of patient's self- reported quality of life but physiological measurements were not assessed.1

Methods

Patients were seen for six visits over a period of 6-8 weeks. Pre and post treatment measures of cervical range of motion, bilateral blood pressure, heart rate variability, full spine thermal scan and surface electromyography, postural sway and chiropractic evaluation with Thompson protocol were recorded. Self-described quality of life was recorded at the beginning and the end of their participation via the SF-36. The control group received a random series of instructions to hold their breath or hold their eyes in various positions while the examiner touched random points on their cranium. The treatment group was evaluated and treated with B.E.S.T2

Paired t-tests were used to perform pre-post comparisons of the SF-36 scales averaged across participants and across controls. For blood pressure, eight trend lines consisting of six points each were computed using Excel by averaging bilateral systolic and diastolic pressures pre and post adjustment for each visit for both participants and controls. A comparable analysis was performed for autonomic index variables. Data analysis of range of motion, thermal scan and sway data were not available for this publication.

Results

Data were analyzed for six participants (3M/3F) and two controls (1M/1F). Participants averaged 48 years of age, 66 inches tall and 157 lbs. Controls averaged 50 years of age, 70 inches tall and 225 lbs. For the six indexes assessed on the SF-36, no significant pre-post changes were seen for participants or controls. Small changes were noted for individuals but none were remarkable. Blood pressure pre-post trend line slopes were compared using t-tests with pooled variance. While none of the differences were statistically significant, all trend line slopes except for the left diastolic showed negative values for participants but not for controls. The autonomic index showed a consistent 10-point increase pre-to-post across all six visits, a value significant with $p<0.001$. The trend line slopes for both pre and post values were approximately -0.6, and thus not suitable for statistical testing. Control values were inconsistent and not significant.

Conclusions

While significant changes were not seen for the variables measured, differences were seen between participants and controls. These differences were seen in blood pressure measurements, taking the form of downward trends as the study progressed. The most striking difference was seen in the autonomic index which is interesting, given that B.E.S.T. purports to remove autonomic interference. Although this study was limited by numbers of participants and missing data, the results were encouraging enough to warrant further work.

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