

## Network Spinal Analysis Care - Literature Review

*The following is a list of peer-reviewed publications involving Network Spinal Analysis Care. Further information regarding Network Spinal Analysis Research currently in process or programs where information on Network Spinal Analysis Research has been presented is available at [www.wiseworldseminars.com](http://www.wiseworldseminars.com)*

### **The Network Spinal Wave as a Central Pattern Generator**

Senzon S, Epstein D, Lemberger D. The Journal of Alternative and Complementary Medicine. July 2016, 22(7): 544-556. doi:10.1089/acm.2016.0025.

**Objectives:** This article explains the research on a unique spinal wave visibly observed in association with network spinal analysis care. Since 1997, the network wave has been studied using surface electromyography (sEMG), characterized mathematically, and determined to be a unique and repeatable phenomenon.

**Methods:** The authors provide a narrative review of the research and a context for the network wave's development.

**Results:** The sEMG research demonstrates that the movement of the musculature of the spine during the wave phenomenon is electromagnetic and mechanical. The changes running along the spine were characterized mathematically at three distinct levels of care. Additionally, the wave has the mathematical properties of a central pattern generator (CPG).

**Conclusions:** The network wave may be the first CPG discovered in the spine unrelated to locomotion. The mathematical characterization of the signal also demonstrates coherence at a distance between the sacral to cervical spine. According to mathematical engineers, based on studies conducted a decade apart, the wave itself is a robust phenomenon and the detection methods for this coherence may represent a new measure for central nervous system health. This phenomenon has implications for recovery from spinal cord injury and for reorganizational healing development.

### **Stationary regime for Standing Wave Central Pattern Generator**

Martin del Campo R, Jonckheere E. GlobalSIP 2015 -- Symposium on Signal Processing and Mathematical Modeling of Biological Processes with Applications to Cyber-Physical Systems for Precise Medicine. Orlando, Florida, USA December 14–16 2015

The purpose of this research is to show that the spatio-temporal analysis on surface Electromyographic (sEMG) signals that originally confirmed existence of a standing wave Central Pattern Generator (CPG) along the spine are reproducible under less than ideal conditions and despite evolution of the entrainment technique, different hardware and data collection protocol. This analysis reveals a coherence at a distance between sEMG signals, which because of its large scale reproducibility could become a test for properly functioning Central Nervous System.

### **Reorganization of the Cervical Curve & Improved Quality of Life Following Network Spinal Analysis Care: A Case Study**

Knowles D, Knowles R, Burnier B. Annals of Vertebral Subluxation Research. December 7, 2015. pp 217-225

**Objective:** The objective of this study is to report on the reorganization of the cervical curve in a patient undergoing Network Spinal Analysis chiropractic care.

**Clinical Features:** The patient is a 31-year-old male who presented for Network care with complaints of arthritis in his neck, stabbing pain in ribs and numbness/tingling in both hands. Radiographs were taken which demonstrated an Atlas Plane Angle measurement of 14.7° indicating loss of cervical lordosis.

**Intervention and Outcomes:** Chiropractic care plan consisted of Network Spinal Analysis care. Based on initial spinal assessment, low force spinal adjustment contacts were applied to enhance spinal and neural integrity and increase somatic awareness. The patient received a total of 61 adjustments over a period of 6

## Network Spinal Analysis Care - Literature Review

months. After 6 months surface electromyography, thermal scan, radiology and patient's subjective assessment demonstrated significant improvement. Lateral cervical film showed increase in Atlas Plane Angle to 30° and the restoration of the patient's lordotic cervical curve.

**Conclusion:** This case study reports on the increase of the cervical lordosis in a patient undergoing Network Spinal Analysis care. Improvement in the patient's objective outcomes indicates that while under Network care, the patient's body has undergone reorganization. This case study adds to subluxation-based chiropractic research focused on the restoration of the cervical curve. Further research is warranted to determine the relationship between Network Spinal Analysis adjustments and improvement in the cervical curvature.

### **Resolution of Abdominal Migraines & Improvements in Concentration & Learning in a 6-Year-Old Girl Following Network Spinal Analysis Care: A Case Study**

Lucks C, Lucks L. J. Pediatric Maternal & Family Health – Chiropractic. Volume 2015, Issue 4. pp 140-148

**Objective:** To report on the improvements in a child with difficulties in concentration, learning, and abdominal migraines while receiving Network Spinal Analysis (NSA) chiropractic care.

**Clinical Features:** A 6-year-old girl presented with difficulties in concentration and learning since beginning school more than twelve months earlier. She also suffered from severe stomach pain for over two months diagnosed as abdominal migraines. She received NSA care over a period of six weeks. Spinal and neural integrity (SNI) was assessed and measured weekly through palpation, visual postural analysis, and heel tension scales.

**Results:** Improvements were seen in concentration and learning along with a complete resolution of abdominal migraines. These improvements were consistent with greater SNI (including the reduction of adverse mechanical cord tension (AMCT) and vertebral subluxation) achieved through NSA care.

**Conclusion:** The results documented in this case suggest comorbidity between difficulties in concentration, learning, and abdominal migraines. NSA chiropractic care was found to be of clinical benefit in this case by improving SNI. Further research is needed to investigate the relationships between SNI and co-occurring stress related conditions.

### **12th International Research and Philosophy Symposium (IRAPS) Sherman College of Chiropractic Spartanburg, SC October 10-11, 2015**

Various Authors. Annals of Vertebral Subluxation Research. November 27, 2015. pp 184-212.

Includes:

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

### **Improvements in Mood, Posture and Balance in an Older Patient Receiving Chiropractic Care: A Case Study**

Bredin M, Putt K. Annals of Vertebral Subluxation Research ~ May 21, 2015 ~ Pages 125-129

**Objectives:** To report on and discuss the changes in a 72 year old male who presented for chiropractic care suffering from multiple health complaints.

**Case History:** A 72 year old male presented to a private chiropractic practice in Auckland, New Zealand suffering from severe postural alterations, mild depression, low back pain, balance disturbances, perpetual tiredness and mild depression.

**Interventions and Outcomes:** Over a nine week period, a specific and conservative chiropractic care plan was provided to the patient. The care plan involved Network Spinal Analysis (NSA) adjustments and the frequency of care was altered throughout this period based on both subjective and objective measures. A complete health history and physical examination was completed prior to care. A full posture analysis (Posture Pro 8 posture analysis system), and surface electromyography (sEMG) scans were performed at

## Network Spinal Analysis Care - Literature Review

baseline and were then monitored regularly over the nine week period. Subjective measures were also monitored during each adjustment visit. Significant improvements were noted in postural and sEMG findings as well as in subjective measures of health over the 9 week period.

**Conclusions:** While under chiropractic care, improvements in both self-reported subjective and objective measures were noted in a patient with severe postural alterations, low back pain, balance disturbances, perpetual tiredness and a mildly depressive state of mind. These improvements include overall physical, mental, and emotional well-being of the patient.

### **11th International Research and Philosophy Symposium (IRAPS) Sherman College of Chiropractic Spartanburg, SC October 16-19, 2014**

Various Authors. *Annals of Vertebral Subluxation Research* ~ April 24, 2015 ~ Pages 48-98

Includes:

- Pilot Study, Results of Reorganizational Healing Meta Model Applied to Adult Females during In-Residence Addition Recovery
- Inter and Intra Reliability of Heel Tension Scale
- The Network Spinal Wave as a Central Pattern Generator
- Improvement of a Functional Movement Disorder in a Patient Receiving Network Spinal Analysis and Somato Respiratory Integration Care: A Case Report
- The Effects of Short-term Network Spinal Analysis Care on Stress, Anxiety, and Quality of Life in College Students: A Prospective Pilot Study

### **Improvement of a Functional Movement Disorder in a Patient Receiving Network Spinal Analysis and Somato Respiratory Integration Care: A Case Report**

Lucks C, Lucks L. *Annals of Vertebral Subluxation Research*. April 9, 2015. pp 26-33

**Introduction:** A 36 year-old female presented to a wellness based chiropractic clinic suffering from uncontrollable hyperkinesia, featuring myoclonic jerks and tics. A neurologist made the diagnosis of a functional (nonorganic) movement disorder and referred the patient to a psychiatrist for treatment of a suspected psychogenic movement disorder. She chose not to see a psychiatrist and instead began chiropractic care.

**Methods:** Network Spinal Analysis (NSA) and Somato Respiratory Integration (SRI) care was delivered over a period of twenty weeks. The patient was evaluated for indicators of Adverse Mechanical Cord Tension (AMCT), including vertebral subluxation and spinal defense patterns, according to the NSA protocol. Spinal and neural integrity (SNI) was assessed through static and motion palpation, postural and neurological assessments, and surface electromyography.

**Results:** Significant improvements in SNI were achieved, as were other wellness based outcomes of NSA and SRI care as reported by the patient. These improvements coincided with the steady improvement of all signs and symptoms of a FMD, with a complete resolution of all hyperkinetic movement, myoclonic jerks, and tics by 20 weeks of care.

**Conclusion:** NSA and SRI care was found to be of promise for restoring neurological function in a patient with a FMD. The findings in this case could support further research into the relationships between SNI, vertebral subluxation, and FMD's.

### **The Seasons of Wellbeing as an Evolutionary Map for Transpersonal Medicine**

Epstein D, Senzon S, Lemberger D. *International Journal of Transpersonal Studies*, 33(1), 2014, pp. 102-130.

The four Seasons of Wellbeing (Discover, Transform, Awaken, and Integrate) refer to distinct rhythms, periods, and factors that influence the accessibility of an individual's resources during the journey of life. Each season is explicitly and implicitly related to an individual's experience, focus, and capacity for self-

## Network Spinal Analysis Care - Literature Review

organizational states. Each can be used to understand, organize, and foster behavior change, positive growth, transformation, and human development. A genealogy of the seasons is described, emphasizing the empirical and theoretical foundations of Reorganizational Healing and its roots in models such as Grof's Systems of Condensed Experiences (or COEX Systems) and Wilber's Integral Theory and Pre/Trans Fallacy. In the context of transpersonal medicine, the seasons offer a framework through which various levels and states associated with an individual's growth can be mapped and utilized for personal evolution. In this context, seasons are applicable for practitioners and clients who have used transpersonal states to avoid painful emotions or difficult actions. The seasons can guide transpersonal medical clients on a path towards transpersonal being and integration of various states leading to a higher organizational baseline. As a practical tool, the seasons have pertinence in the development of "transpersonal vigilance," a term defined in this article. The seasons offer resources to practitioners to support clients toward transpersonal being, in a reorganizationally informed or reorganizational way.

### **Improved Language Development Following Network Spinal Analysis in Children Diagnosed with Autism Spectrum Disorder**

*Lumb K, Feeley K. J. Pediatric, Maternal & Family Health - November 3, 2014. pp 70-75*

**Objective:** To describe the care of two children diagnosed with Autism Spectrum Disorder and the documented changes in their language skills while receiving Network Spinal Analysis (NSA) chiropractic care.

**Clinical Features:** Two children, under the age of 4 diagnosed with autism spectrum disorder, received NSA care for one year. The specific outcome that was measured was the Preschool Language Scale-4 (PLS-4). The PLS-4 was given four times over a one year period.

**Results:** Expressive and receptive language delays were assessed before, during, and after NSA care. These children saw an average increase of 24 months of language development in one year, while under NSA care.

**Conclusions:** The progress documented in this report suggests that NSA care may have positively affected the language development of these children. We support further research in this field.

### **Improvement in Meniere's Disease, Balance, Coordination and Quality of Life Following Network Spinal Analysis Care**

*Feeley K, Kemp A. Annals of Vertebral Subluxation Research. November 25, 2013. pp 107-119*

**Objective:** To report on multisystem health changes of a patient diagnosed with Meniere's disease while under a long term chiropractic care program utilizing Network Spinal Analysis (NSA).

**Clinical Features:** A 56 year old white male presented to a chiropractic clinic with a complaint of bilateral carpal tunnel symptoms, numbness in both feet after sitting, and pain and fullness in the left ear. The left ear pain and fullness was also accompanied by dizziness and progressive hearing loss experienced over the past twenty years. Physical examination revealed significant structural and neurological imbalances. Spinal subluxations were identified at multiple levels of the spine. The patient had been managing his symptoms with ten different medications prescribed for various complaints including: blood pressure, anxiety, muscle spasms and fluid retention. Auditory evaluations had shown progressive degeneration of hearing in his left ear, along the whole range of frequencies tested.

**Intervention and Outcomes:** The patient received NSA care, basic workshop style education about stress, simple range of motion exercises, and beginning Somato-Respiratory Integration exercises. The first re-evaluation showed positive changes in symptomatology and lifestyle. His auditory exam four months from the start of care showed improvements especially with lower frequencies. These changes in hearing continued to improve, and then were maintained over the course of treatment.

**Conclusions:** In this case, an individual diagnosed with Meniere's disease had improved hearing as well as reduction of other symptoms while enrolled in an NSA care program.

## Network Spinal Analysis Care - Literature Review

### **Reduction of a Lumbar Scoliosis & Improved Cervical Curve in a Geriatric Patient Following Network Spinal Analysis™ Care: A Case Study**

Ray K, Knowles D, Knowles R. Annals of Vertebral Subluxation Research. June 10, 2013. pp 18-28

**Objective:** This case describes the reduction of a lumbar scoliosis and improvement in the cervical curve in a 75 year old male patient under Network Spinal Analysis™ (NSA) care. Possible mechanisms for structural change through a low-force, tonal chiropractic adjustment technique are discussed.

**Clinical Features:** The patient was a 75 year old male who presented for wellness based chiropractic care. He also had a complaint of mild to moderate shoulder pain. A lumbar scoliosis with a Cobb Angle of 11 degrees was found on a standing radiograph, as well as a kyphotic cervical curve and reduced atlas plane line.

**Intervention and Outcomes:** The patient received NSA care under standard protocols for a two year period. The patient was also asked to do two rehabilitative stretches for home care. The Cobb Angle reduced to three degrees at one year, and less than one degree at two years. The atlas plane angle increased from 6 degrees to 22 degrees. The patient's subjective findings reflect these changes.

**Conclusions:** Network Spinal Analysis™ care, and other low force techniques, may be effective in reorganizational change by addressing structural deformities in the spine and in restoring normal spinal curves. More research is needed in this area.

### **9th Annual International Research and Philosophy Symposium Sherman College of Chiropractic Spartanburg, South Carolina October 20-21, 2012**

Various Authors. Journal of Philosophy, Principles & Practice of Chiropractic ~ December 31, 2012 ~ Pages 55-111

Includes:

- The Effects of Network Spinal Analysis on Children Diagnosed with Autism Spectrum Disorder with Accompanying Speech and Language Deficits
- Restoration of the Cervical Curve and Improvement in Neurological Function in a Patient Following Network Spinal Analysis

### **Improvement in Vision in a Patient with Diabetic Retinopathy Following Network Spinal Analysis Care**

Irastorza M, Knowles D, Knowles R. Annals of Vertebral Subluxation Research. February 16, 2012. pp 25-30

**Objective:** To describe the reorganization and reduction of intraocular pressure (IOP) in a chiropractic patient with diabetic retinopathy and concurrent loss of vision undergoing Network Spinal Analysis (NSA) care.

**Clinical Features:** A 46-year-old male with type I insulin dependent diabetes presented for chiropractic care. His complaints included numbness in both arms and fingers of the left hand, and diabetic retinopathy with total loss of vision for the past five years.

**Intervention and Outcomes:** The patient received NSA care 221 times over three years. After 8 months of care, he reported seeing shapes and colors through his left eye only for the first time in 5 years. He also reported a drop in intraocular pressure from an initial 50 mm Hg down to 18 mm Hg.

**Conclusion:** The patient in this case experienced improved intraocular pressure and vision following Network Spinal Analysis care. More research is warranted to better understand this link between Network Spinal Analysis care, chiropractic and the diabetic patient.

### **Reorganizational Healing as an Integrally Informed Framework for Integral Medicine**

Senzon S, Epstein D, Lemberger D. Journal of Integral Theory and Practice, 2011 6(4), 113-133.

Reorganizational Healing (ROH) is explored as an integrally informed methodological framework to be

## Network Spinal Analysis Care - Literature Review

utilized within the emerging field of Integral Medicine. ROH assists individuals to discover who they are in their current situation, symptom, life challenge, or life evolution. Transformation and awakening are accessed in ROH in terms of the individual's readiness to change as well as various energetic typologies of change and resource availability (biological, emotional, mental, and spiritual). Developing an ROH map assists both healer and patient in understanding how they change; what energetic intelligences are available as resources; and what "season" one is in, in terms of discovery, transformation, awakening, or integration. The history of ROH, which has developed over the past 30 years, is also recounted.

### **Restoration of the Cervical Curve and Improvement in Neurological Function in a Patient Following Network Spinal Analysis**

Rohrbach T, Knowles D, Knowles R. *Annals of Vertebral Subluxation Research*. September 15, 2011. pp 99-103

*Objective:* To describe the restoration of a cervical curve following Network Spinal Analysis™ (NSA) chiropractic care in a patient with neck pain.

*Clinical Features:* The patient presented with a chief complaint of neck pain. Radiographs were taken and demonstrated an Atlas Plane Angle measurement of 12° and a cervical Absolute Rotation Angle (ARA) of 10°, representing a cervical kyphosis.

*Intervention and Outcomes:* The patient received NSA care that consisted of Network adjustments entailing light contact to specific regions of the patient's spine. Follow up radiographs were taken after one year of care. The radiographs demonstrated significant sagittal curve improvement with an Atlas plane line measurement of 32° and an Absolute Rotational Angle (ARA) of -27°.

*Conclusion:* Successful chiropractic care was described in this case by improved measurements in the cervical curve. The Atlas plane line improved by 18° and the Absolute Rotation Angle improved by 37°. More research is warranted in this area.

### **Editorial: Seeds of Meaning, Transformations of Health Care, and the Future**

Senzon SA. *Journal of Alternative and Complimentary Medicine*. December 2010;16(12):1239-1241. DOI: 10.1089/acm.2010.0785

*No Abstract Available.*

### **On a standing wave Central Pattern Generator and the coherence problem**

Jonckheere E, Lohsoonthorn P, Musuvathy S, Mahajan V, Stefanovic M. *Biomedical Signal Processing and Control* 5 (2010) 336–347. doi:10.1016/j.bspc.2010.04.002

An electrophysiological phenomenon running up and down the spine, elicited by light pressure contact at very precise points and thereafter taking the external appearance of an undulatory motion of the spine, is analyzed from its standing wave, coherence, and synchronization-at-a-distance properties. This standing spinal wave can be elicited in both normal and quadriplegic subjects, which demonstrates that the neuronal circuitry is embedded in the spine. The latter, along with the inherent rhythmicity of the motion, its wave properties, and the absence of external sensory input once the phenomenon is elicited reveal a Central Pattern Generator (CPG). The major investigative tool is surface electromyographic (sEMG) wavelet signal analysis at various points along the paraspinal muscles. Statistical correlation among the various points is used to establish the standing wave phenomenon on a specific subband of the Daubechies wavelet decomposition of the sEMG signals. More precisely, ~10 Hz coherent bursts reveal synchronization between sensory-motor loops at a distance larger, and a frequency slower, than those already reported. As a potential therapeutic application, it is shown that partial recovery from spinal cord injury can be assessed by the correlation between the sEMG signals on both sides of the injury.

## Network Spinal Analysis Care - Literature Review

### **Improvement in Cystic Fibrosis in a Child Undergoing Subluxation-Based Chiropractic Care: A Case Study**

Warhurst C, Warhurst R, Gabai A. Journal of Pediatric, Maternal & Family Health - Chiropractic ~ Volume 2010 ~ Issue 4 ~ Pages 172 -180

**Objective:** The objective of this report is to retrospectively document subluxation-based chiropractic care provided to an 8 year old male who was seen for a year and a half.

**Clinical Features:** An 8 year old male presented for care with complains of recurring infections, inability to sleep, and inability to participate in age-appropriate sports. He was diagnosed with cystic fibrosis at birth.

**Intervention & Outcomes:** The course of care involved chiropractic spinal adjustments, Network Spinal Analysis care, and trigger point therapy. Improvements were observed in the patient's resistance to recurrent infection, activity level, sleep ability, and overall quality of life.

**Conclusion:** With previous studies examining the relationship between subluxation reduction and autonomic function, immune function and somatovisceral reflexes, this case suggests that more research is needed to examine the short and long-term impact of subluxation-based care for those children with cystic fibrosis.

### **Reorganizational Healing: A Paradigm for the Advancement of Wellness, Behavior Change, Holistic Practice, and Healing**

Epstein DM, Senzon SA, Lemberger D. Journal of Alternative and Complimentary Medicine. May 2009;15(5):461-64. PMID: 19450165

Reorganizational Healing, (ROH), is an emerging wellness, growth and behavioral change paradigm. Through its three central elements (the Four Seasons of Wellbeing, the Triad of Change, and the Five Energetic Intelligences) Reorganizational Healing takes an approach to help create a map for individuals to self-assess and draw on strengths to create sustainable change. Reorganizational Healing gives individuals concrete tools to explore and use the meanings of their symptoms, problems, and life-stressors as catalysts to taking new and sustained action to create a more fulfilling and resilient life.

### **Editorial: Reorganizational Healing: A Health Change Model Whose Time Has Come**

Blanks RH. Journal of Alternative and Complimentary Medicine. May 2009;15(5):461-64. PMID: 19450161

*No Abstract Available.*

### **Letter to the Editor: Network Spinal Analysis**

Jonckheere EA. Journal of Alternative and Complimentary Medicine. May 2009;15(5):469-70. PMID: 19450163

*No Abstract Available.*

### **Improvement in Attention in Patients Undergoing Network Spinal Analysis: A Case Series Using Objective Measures of Attention**

Pauli Y. Journal of Vertebral Subluxation Research, August 23, 2007; 1-9

Objective: Anecdotal preliminary evidence suggests that chiropractic care may be of benefits for individuals suffering from ADHD. This case series presents the improvement in attention experienced by 9 adult patients undergoing Network Spinal Analysis.

## **Network Spinal Analysis Care - Literature Review**

**Methods:** Nine adult patients are presented (4 male, 5 female) with a mean age of 40.4 years (range 22 – 58 years old). All patients were evaluated with the Test of Variable of Attention (TOVA) before receiving Network Spinal Analysis (NSA) care and at 2 months into care. The nine patients received level 1 NSA care for two months, as taught by the Association for Network Care. Neurospinal integrity was evaluated with palpation, as well as surface electromyography. Cognitive process of attention was objectively evaluated using a continuous performance test, the Test of Variables of Attention (TOVA).

**Results:** We evaluated our patient cohort before and after Network care using sEMG and variables from the continuous performance test (TOVA). Before care, all patients had an abnormal ADHD score with a mean of -3.74 (range: - 8.54 to -1.89). After 2 months of care, all patients had a significant change in ADHD score ( $p=0.08$ ) and 88% completely normalized the ADHD score. 77% and 66% of patients experienced significant change in reaction time and variability score, respectively. All patients experienced a significant reduction in sEMG pattern of activation ( $p=0.08$ ). We discuss possible mechanisms by which spinal care may have enhanced the function of the prefrontal cortex, thereby resulting in improved attentional capacities

**Conclusion:** In this case series the nine adult patients experienced significant improvement in attention, as measured by objective outcomes, after receiving two months of Network Spinal Analysis. The progress documented in this report suggests that NSA care may positively affect the brain by creating plastic changes in the prefrontal cortex and other cortical and subcortical areas serving as neural substrate for the cognitive process of attention. These findings may be of importance for individuals suffering from attention deficit. Further research into this area is greatly needed.

### **Quality of Life Improvements and Spontaneous Lifestyle Changes in a Patient Undergoing Subluxation-Centered Chiropractic Care: A Case Study**

Pauli Y. Journal of Vertebral Subluxation Research, October 11, 2006; 1-15

**Purpose of Study:** This case study is to report the improvement in quality of life experienced by a patient undergoing subluxation-centered chiropractic care.

**Clinical Features:** A 36 year old male presented with primary health concerns of stress, eye pain and left leg pain of 14 years duration radiating to the foot and secondary complaints of gastritis, ulcers, nervousness, depression, lack of concentration and general loss of interest in daily life. The patient also smokes, does not exercise, eats a sub-optimal diet and rated his family and friends support, as well as job satisfaction as sufficient.

**Intervention and Outcome:** We discuss the various analyses employed to evaluate vertebral subluxations, including paraspinal surface electromyography and thermography. Adjustive care included a combination of Network Spinal Analysis, Torque Release Technique and diversified structural adjustments to correct vertebral subluxations over a six month period. We used visual analog scales, open-ended questions and selected items from the Self-Rated Health and Wellness Instrument to monitor health changes, as well as the positive improvements in quality of life as perceived by the patient himself.

**Conclusion:** This case study demonstrates that the correction of vertebral subluxations over an 11 month period was associated with significant improvements in the quality of life of the patient.

### **Chiropractic Care of a Battered Woman: A Case Study**

Bedell L. Journal of Vertebral Subluxation Research, July 20, 2006; 1-6

**Objective:** This case study documents the chiropractic care of battered woman struggling with Intimate Partner Violence (IPV). Chiropractic offers battered women a unique service, it is the only profession trained and licensed to detect and correct vertebral subluxations. The relationship between the stresses of abuse

## Network Spinal Analysis Care - Literature Review

and vertebral subluxation, as well as the subsequent changes during chiropractic care, are described.

**Clinical Features:** A Caucasian, 23-year old female presented with headaches, neck pain, and upper back pain. The initial complaint noted sharp, knife-like pains into the medial scapular borders, worse on the right side. Tingling extended into the right hand, most severe in the 2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> fingers.

**Chiropractic care and outcome:** Protocols of both Torque Release and Activator techniques were utilized to evaluate vertebral subluxations. Subjective quality of life issues were evaluated through a Network Spinal Analysis (NSA) Health Status Questionnaire. After commencing chiropractic care, this woman suffered a cervical spine hyper-extension/hyper-flexion type injury from an automobile accident. For the first 30 days after, adjustments were applied twice weekly. Acute exacerbations of symptoms unrelated to the original complaints were displayed and progress became irregular. During the next 60 days, there were various unexplained falls and severe flare-ups of painful symptoms, and she finally admitted to being battered by her husband. Referrals to counselors and programs dealing with domestic violence were provided. Once the physical battering stopped, consistent progress was noted in both clinical symptoms and quality of life issues.

**Conclusion:** As a battered woman must receive emotional and social support to improve her situation, it is important for chiropractors to recognize the "red flags" of IPV. Chiropractors re-evaluate regularly for changes in vertebral subluxation patterns and can recognize inconsistent responses. They may also be the first caregivers to offer a vitalistic approach; considering a woman's physical, chemical, and emotional quality of life; a perspective that offers significant connection and trust. This article serves as a foundation on the topic of IPV and chiropractic, for use in both communities.

### **Wellness lifestyles II: Modeling the dynamic of wellness, health lifestyle practices, and Network Spinal Analysis.**

Schuster TL, Dobson M, Jauregui M, Blanks RH. *Journal of Alternative and Complimentary Medicine*. April 2004;10(2):357-67.  
PMID: 15165417

**OBJECTIVE:** Empirical application of a theoretical framework linking use of Network Spinal Analysis (NSA; a holistic, wellness-oriented form of complementary and alternative medicine [CAM]), health lifestyle practices, and self-reported health and wellness. **DESIGN:** Cross-sectional self-administered survey study. **RESPONDENTS:** Two thousand five hundred and ninety-six (2596) patients from 156 offices of doctors who were members of the Association for Network Chiropractic (currently titled Association for Network Care); estimated response rate was 69%. **MEASURES:** Exogenous variables entered into the structural equation model include gender, age, education, income, marital status, ailments, life change, and trauma. A wellness construct consisted of calculated difference scores between two referents, "presently" and "before Network" care, for self-reported items representing wellness domains of physical state, mental-emotional state, stress evaluation, and life enjoyment. Positive reported change in nine items assembled into dietary practices, health practices, and health risk dimensions serve as indicators of the construct of changes in health lifestyle practices. The NSA care construct consisted of duration of care in months, awareness of energy and awareness of breathing since beginning Network care. **RESULTS:** Of the exogenous variables only gender, age, and education remain in the final parsimonious structural equation model in these data. Reported wellness benefits accrue to individuals along a direct path from both self-reported positive lifestyle change (0.22), and from NSA care (0.43). The path (0.65) from NSA care to positive health lifestyle changes indicates that NSA care also has an indirect effect on wellness through changes in health lifestyle practices.

**CONCLUSIONS:** The Structural Equation model tested in these analyses lends support to our theoretical framework linking wellness, health lifestyles, and CAM. This study provides further evidence that our measurements of health and wellness are particularly appropriate for investigating wellness-oriented CAM. There is a positive relationship between the experience of NSA care and self-reported improvements in

## Network Spinal Analysis Care - Literature Review

wellness as well as self-reported changes in lifestyle practices. NSA care users tend toward the practice of a positive health lifestyle, which also has a direct effect on reported improvements in wellness. These empirical links are discussed relative to the sociodemographic characteristics of this population and show that use of NSA care is an aspect of a wellness lifestyle.

### **Wellness lifestyles I: A theoretical framework linking wellness, health lifestyles, and complementary and alternative medicine.**

Schuster TL, Dobson M, Jauregui M, Blanks RH. *Journal of Alternative and Complimentary Medicine*. April 2004;10(2):349-56.

PMID: 15165416

Scholarship concerning complementary and alternative medicine (CAM) practices within the United States could benefit from incorporating sociological perspectives into the development of a comprehensive research agenda. We review the literature on health and wellness emphasizing definitions and distinctions, the health lifestyles literature emphasizing issues of both life choices and life chances, and studies of CAM suggesting utilization as an aspect of a wellness lifestyle. This review forms the foundation of a new theoretical framework for CAM research based on the interrelationship of CAM with health promotion, wellness, and health lifestyles. To date, few studies have sought to bring these various elements together into a single, comprehensive model that would enable an assessment of the complexity of individual health and wellness in the context of CAM. We argue that attention to literatures on health measurement and health lifestyles are essential for exploring the effectiveness and continuing use of CAM.

### **The Transition of Network Spinal Analysis Care: Hallmarks of a Client-Centered Wellness Education Multi-Component System of Health Care Delivery**

Epstein D. *Journal of Vertebral Subluxation Research*, April 5, 2004; 1-7

Network Spinal Analysis TM (NSA) care has been transitioned from a health care system with the objective of correction of two types of vertebral subluxation, to a multi-component system of health care delivery with emphasis on wellness education for participating clients. NSA care is now delivered and communicated in discrete Levels of Care with emphasis on client participation through self-evaluation. Emphasis on wellness education will be introduced into NSA practice through training via a Certificate Program currently under development. This paper considers some hallmarks that delineate a wellness education, patient (client)-centered practice. The concepts presented relative to this wellness model of health care delivery are believed to be applicable to any approach with similar practice objectives. The perspective presented considers that the major aspects of a patient-centered, wellness education health care delivery system is multi-dimensional. Hallmarks include differentiating terms, and establishing a wellness mentality. Substantiation of the discipline must be established through credible published research regarding its efficacy and safety as well as a consistent and valid means of measuring progressive outcomes derived from the care received. The relationship of NSA to other disciplines is discussed.

### **Successful In Vitro Fertilization in a Poor Responder While Under Network Spinal Analysis Care: A Case Report**

Senzon SA. *Journal of Vertebral Subluxation Research*, September 14, 2003; 1-6

Objective: This case report describes the successful in vitro fertilization (IVF) of a 34 year old female who had one previous aborted IVF attempt prior to Network Spinal Analysis (NSA) care. This case report is being presented to add to other case reports that show positive physiological changes in patients receiving NSA care.

Clinical Features: The IVF was attempted due to her partner's azoospermia. The first IVF attempt was on 3/26/02. The patient had a poor follicular growth after the standard hyper-stimulation process of the

## Network Spinal Analysis Care - Literature Review

ovaries, including pre-treatment with Mircette (birth control pills) and 1mg/0.2ml of Lupron (a gonadotropin releasing hormone agonist), and 3-6 amps of Gonal-F (a recombinant fsh) starting on cycle day 3. Her baseline day 3 estradiol and LH levels were only 21.2pg/me and 5.0 I.U./L respectively. On cycle day 8, estradiol was only 56% and LH was 6.6 I.U./L. The Gonal-F was increased to 6amps. This first attempt was canceled due to the poor follicle growth. Only 3-4 follicles of insufficient size between 10-14mm each were found.

Chiropractic Care and Outcomes: On 4/11/02, the patient commenced regular NSA care. The second IVF attempt began on 6/6/02. The change in IVF protocol was the addition of Repronex (also a gonadotropin a combination of LH and fsh). The total increased dose of Gonal-F and Repronex was 6amps, compared to the first attempt of only 3amps which was then increased to 6amps of Gonal-F only.

Conclusion: On the second IVF attempt, estradiol was 1001pg/ml on day 8, and 2019pg/ml on day 11, with LH at 9.3. The Oocyte retrieval after the second attempt was 10 eggs, each approximately 18mm. A successful aspiration of eggs was completed on 6/17/02, and a successful pregnancy followed. The patient is still under NSA care, and is now in her second trimester with normal fetal heart sounds. The possible role of NSA care in the vigorous follicular growth and other health benefits is discussed.

### **Insult, Interference and Infertility: An Overview of Chiropractic Research**

Behrendt M. Journal of Vertebral Subluxation Research, May 2, 2003; 1

Objective: Infertility is distinct from sterility, implying potential, and therefore raises questions as to what insult or interference influences this sluggish outcome. Interference in physiological function, as viewed by the application of chiropractic principles, suggests a neurological etiology and is approached through the mechanism of detection of vertebral subluxation and subsequent appropriate and specific adjustments to promote potential and function. Parental health and wellness prior to conception influences reproductive success and sustainability, begging efficient, effective consideration and interpretation of overall state and any distortion. A discussion of diverse articles is presented, describing the response to chiropractic care among subluxated infertile women.

Clinical Features: Fourteen retrospective articles are referenced, their diversity includes: all 15 subjects are female, ages 22-65; prior pregnancy history revealed 11 none, 2 successful unassisted, 1 assisted, 1 history of miscarriage. 9 had previous treatment for infertility, 4 were undergoing infertility treatment when starting chiropractic care. Presenting concerns included: severe low back pain, neck pain, colitis, diabetes, and female dysfunction such as absent or irregular menstrual cycle, blocked fallopian tubes, endometriosis, infertility, perimenopause and the fertility window within a religiousbased lifestyle, and a poor responder undergoing multiple cycles of IVF.

Chiropractic Care and Outcome: Outcomes of chiropractic care include but are not limited to benefits regarding neuromuscular concerns, as both historical and modern research describe associations with possible increased physiological functions, in this instance reproductive function. Chiropractic care and outcome are discussed, based on protocols of a variety of arts, including Applied Kinesiology (A.K.), Diversified, Directional Non-Force Technique (D.N.F.T.), Gonstead, Network Spinal Analysis (N.S.A.), Torque Release Technique (T.R.T.), Sacro Occipital Technique (S.O.T.) and Stucky-Thompson Terminal Point Technique. Care is described over a time frame of 1 to 20 months.

Conclusion: The application of chiropractic care and subsequent successful outcomes on reproductive integrity, regardless of factors including age, history and medical intervention, are described through a diversity of chiropractic arts. Future studies that may evaluate more formally and on a larger scale, the effectiveness, safety and cost benefits of chiropractic care on both well-being and physiological function are suggested, as well as pursuit of appropriate funding.

## Network Spinal Analysis Care - Literature Review

### **Chaotic Modeling in Network Spinal Analysis: Nonlinear Canonical Correlation with Alternating Conditional Expectation (ACE): A Preliminary Report**

Bohacek S, Jonckheere E. Journal of Vertebral Subluxation Research, December 1998; 2(4): 188-195

Abstract - This paper presents a preliminary non-linear mathematical analysis of surface electromyographic (sEMG) signals from a subject receiving Network Spinal Analysis (NSA). The unfiltered sEMG data was collected over a bandwidth of 10-500 Hz and stored on a PC compatible computer. Electrodes were placed at the level of C1/C2, T6, L5, and S2 and voltage signals were recorded during the periods in which the patient was experiencing the "somatopsychic" wave, characteristic of NSA care. The intent of the preliminary study was to initiate mathematical characterization of the wave phenomenon relative to its "chaotic," and/or nonlinear nature. In the present study the linear and nonlinear Canonical Correlation Analyses (CCA) have been used. The latter, nonlinear CCA, is coupled to specific implementation referred to as Alternating Conditional Expectation (ACE). Preliminary findings obtained by comparing canonical correlation coefficients (CCC's) indicate that the ACE nonlinear functions of the sEMG waveform data lead to a smaller expected prediction error than if linear functions are used. In particular, the preliminary observations of larger nonlinear CCC's compared to linear CCC's indicate that there is some nonlinearity in the data representing the "somatopsychic" waveform. Further analysis of linear and nonlinear predictors indicates that 4th order nonlinear predictors perform 20 % better than linear predictors, and 10th order nonlinear predictors perform 30% better than linear predictors. This suggests that the waveform possesses a nonlinear "attractor" with a dimension between 4 and 10. Continued refinement of the ACE algorithm to allow for detection of more nonlinear distortions is expected to further clarify the extent to which the sEMG signal associated with the "somatopsychic" waveform of NSA is differentiated as nonlinear as opposed to random.

### **Reduction of Psoriasis in a Patient under Network Spinal Analysis Care: A Case Report**

Behrendt M. Journal of Vertebral Subluxation Research, December 1998; 2(4): 196-200

This case report describes the progress of a 52 year old male with chronic psoriasis, first diagnosed in April of 1992. After the condition exacerbated over a five year period, he was placed on 12.5 mg/week methotrexate, and oral immunosuppressant medication in October of 1997. After commencing the medication, the condition reduced from 6% body coverage, with flares of 15-20%, to a body coverage of 5%. Following a cessation of the oral medication in February, 1998, the condition recurred at the previous uncontrolled level within one month. The patient was again placed on 12.5 mg/week methotrexate, and subsequently the condition reduced to 5% body coverage. The patient's dose was reduced to 10 mg/week, and later to 7.5 mg/week, with the psoriasis remaining at 5% coverage. On 5/18/98, the patient commenced regular NSA care. He reported a reduction in the psoriasis condition on 6/3/98, and was taken off the oral medication on 6/25/98. The reduction continued, and the patient was advised by his medical physician on 7/01/98 to continue the cessation of oral medication. As of 9/30/98 the psoriasis had decreased to 0.5% to 1.0 % of coverage, and prior plans to initiate ultraviolet-A therapy were canceled. As of 11/98, a five month period since cessation of methotrexate, the patient has remained under regular NSA care, with no recurrence of psoriasis body coverage greater than 1%, the only medication being a topical ointment. This is contrasted to the recurrence after one month, following the patient's first cessation of methotrexate, and prior to NSA care. The possible role of NSA care in the reduction of the patient's psoriasis, and other health benefits is discussed.

### **Changes in Digital Skin Temperature, Surface Electromyography, and Electrodermal Activity in Subjects Receiving Network Spinal Analysis Care**

Miller E, Redmond P. Journal of Vertebral Subluxation Research, June 1998; 2(2): 87-95

A preliminary study was conducted to evaluate changes in digital skin temperature (DST), surface electromyography (sEMG), and electrodermal activity (EDA) in a group of twenty subjects receiving Network Spinal Analysis (NSA) care. Data, simultaneously derived from all three parameters, were considered to be

## Network Spinal Analysis Care - Literature Review

indirect correlates of sympathetic nervous system activity. Subjects, including a group of five controls, were assessed for a period of 17 minutes. The continuous assessment period included a baseline interval of 4.5 minutes, followed by a 12.5 minute period which was divided into five 2.5 minute intervals. Care was administered to the NSA recipient group immediately after the baseline period, whereas controls received no intervention following baseline. Results revealed no significant differences in DST either within or between the two groups. Surface EMG readings were relatively constant over the five intervals following baseline in the NSA group, while controls showed significant ( $p < 0.05$ ) increases in sEMG at the second through fifth intervals relative to the first interval following baseline activity. Electrodermal activity was significantly decreased ( $p < 0.01$ ) in the NSA group in the second through fifth intervals compared to baseline. Moreover, decreases varied between intervals, but exhibited a leveling from the third through fifth interval. Control subjects, alternatively, exhibited an increase in EDA in all intervals following baseline. The extent of increase resulted in EDA activity significantly greater than the NSA group at the third through fifth intervals. It was concluded that the increase in EMG activity in the control groups may have reflected an increasing level of anxiety due to the duration of the recording period. Since the NSA group expressed constancy in sEMG activity during the same period, coupled to significant decreases in EDA, a "sympathetic quieting effect" was postulated to occur in subjects receiving NSA care. This conclusion is consistent with hypothesized neurological pathways linked to responses observed during NSA care, as well as other reports of self-reported improvements in mental/emotional state and stress reduction in patients receiving Network Chiropractic Care.

### **Functional Magnetic Resonance Imaging: About the Cover (cover picture)**

Journal of Vertebral Subluxation Research, 1998; 2(1): Cover

About the Cover: Functional Magnetic resonance Imaging (fMRI), which measures the relative presence of oxy-hemoglobin, has gained attention as a non-invasive medium through which high resolution images of the brain and other tissue may be acquired. This technology may provide a useful assessment of cortical changes following chiropractic intervention. Images of the patient depicted on the cover, on the left, reflect cortical activity (lighted areas in the parietal cortex, frontal cortex areas 9, 10; visual association areas 19, 37, and 39) associated with the learning process of a "novel" muscular maneuver of the foot. Images on the right reflect cortical activity following a Network Spinal Analysis (form of chiropractic) adjustment session, taken approximately 20 minutes after the first set of images, involving the same activity. The decrease in "lighted" areas before and after the adjustment session suggests that less cortical "planning" or "activity" is associated with the "novel" foot maneuver. Thus, the ability of fMRI to visualize changes in cortical activity may play a significant role in elucidating the consequences of vertebral subluxation correction on neurological function.

### **An Impairment Rating Analysis Of Asthmatic Children Under Chiropractic Care**

Graham R, Pistolese R. Journal of Vertebral Subluxation Research, 1997; 1(4): 41-48

A self-reported asthma-related impairment study was conducted on 81 children under chiropractic care. The intent of this study was to quantify self-reported changes in impairment experienced by the pediatric asthmatic subjects, before and after a two month period under chiropractic care. Practitioners, representing a general range of six different approaches to vertebral subluxation correction, administered a specifically designed asthma impairment questionnaire at the appropriate intervals. Subjects were categorized into two groups; 1-10 years and 11-17 years. Parents/guardians completed questionnaires for the younger group, while the older subjects self-reported their perceptions of impairment. Significantly lower impairment rating scores (improvement) were reported for 90.1% of subjects 60 days after chiropractic care when compared to the pre-chiropractic scores ( $p < 0.05$ ) with an effect size of 0.96. As well, there were no significant differences across the age groups based on parent/guardian versus self rated scores. Girls reported higher (less improvement) before and after care compared to boys, although significant decreases in impairment ratings were reported for each gender. This suggested a greater clinical effect for boys which was supported by effect sizes ranging from 1.2 for boys compared to 0.75 for girls. Additionally, 25 of 81 subjects (30.9%) chose to voluntarily decrease their dosage of medication by an average of 66.5% while

## Network Spinal Analysis Care - Literature Review

under chiropractic care. Moreover, information collected from patients revealed that among 24 patients reporting asthma "attacks" in the 30 day period prior to the study, the number of "attacks" decreased significantly by an average of 44.9% ( $p < .05$ ). Based on the data obtained in this study, it was concluded that chiropractic care, for correction of vertebral subluxation, is a safe nonpharmacologic health care approach which may also be associated with significant decreases in asthma related impairment as well as a decreased incidence of asthmatic "attacks." The findings suggest that chiropractic care should be further investigated relative to providing the most efficacious care management regimen for pediatric asthmatics.

[Note: NSA care was one of the chiropractic approaches used in this study supported by the Michigan Chiropractic Council]

### **A Retrospective Assessment of Network Care Using a Survey of Self-Rated Health, Wellness and Quality of Life**

Blanks RH, Schuster TL, Dobson M. Journal of Vertebral Subluxation Research, 1997; 1(4): 15-31

The present study represents a retrospective characterization of Network Care, a health care discipline within the subluxation-based chiropractic model. Data were obtained from 156 Network offices (49% practitioner participation rate) in the United States, Canada, Australia, and Puerto Rico. Sociodemographic characterization of 2818 respondents, representing a 67-71% response rate, revealed a population predominately white, female, well-educated, professional, or white collar workers. A second objective of the study included the development and initial validation of a new health survey instrument. The instrument was specifically designed to assess wellness through patients' self-rating different health domains and overall quality of life at two "time" points: "presently" and retrospectively, recalling their status before initiating care ("before Network"). Statistical evaluation employing Chronbach's alpha and theta coefficients derived from principle components factor analyses, indicated a high level of internal reliability in regard to the survey instrument, as well as stable reliability of the retrospective recall method of self-rated perceptions of change as a function of duration of care. Results indicated that patients reported significant, positive perceived change ( $p < 0.000$ ) in all four domains of health, as well as overall quality of life. Effect sizes for these difference scores were all large ( $>0.9$ ). Wellness was assessed by summing the scores for the four health domains into a combined wellness scale, and comparing this combined scale "presently" and "before Network." The difference, or "wellness coefficient" spanning a range of -1 to +1, with zero representing no change, showed positive, progressive increases over the duration of care intervals ranging from 1-3 months to over three years. The evidence of improved health in the four domains (physical state, mental/emotional state, stress evaluation, life enjoyment), overall quality of life from a standardized index, and the "wellness coefficient," suggests that Network Care is associated with significant benefits. These benefits are evident from as early as 1-3 months under care, and appear to show continuing clinical improvements in the duration of care intervals studied, with no indication of a maximum clinical benefit. These findings are being further evaluated through longitudinal studies of current populations under care in combination with investigation of the neurophysiological mechanisms underlying its effects.

### **Network Spinal Analysis: A System of Health Care Delivery Within the Subluxation-Based Chiropractic Model**

Epstein, D. Journal of Vertebral Subluxation Research, August 1996; 1(1): 51-59

The theoretical basis and clinical application of Network Spinal Analysis (NSA) is described. NSA delivers health care within the subluxation-based chiropractic model and seeks to contribute to the distinction of the various techniques and methods within the profession by describing and discussing its major characteristics. In this regard, clinical observations relative to the application of the Network Protocol have been described in relation to the monitoring of patient and practitioner outcomes. Relevant research from a separate Network Care retrospective study, which impacts on its characterization, profiles the patient population as predominantly female. Other data indicates that Network Care is widely and consistently practiced. Additionally, patients report significant, positive changes in health-related quality of life measures linked to certain clinical components of Network Care.

## Network Spinal Analysis Care - Literature Review