

## Case Study

# Subluxation Based Chiropractic Care in the Management of Cocaine Addiction: A Case Report

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### Abstract

**Objective:** This is a case study of a 63 year old male free base and crack cocaine addict who was court mandated to the Exodus Addiction Treatment Center for residential addiction treatment following a conviction for cocaine possession along with a record of multiple felony arrests over a 40 year period.

**Clinical Features:** The patient was court mandated to the Exodus Addiction Treatment Center after failing to retain recovery or successfully complete eleven previous medical model/disease concept residential addiction treatment programs for free base and crack cocaine addiction. A comprehensive case history, psychosocial, neurological and addiction assessments, along with chiropractic examinations were performed in order to better understand the patient's previous and current state of well-being and establish a treatment plan. Subluxations were detected after chiropractic examination.

**Intervention and Outcomes:** Torque Release Technique (a non-linear tonal model), P300 Wave testing, EMG, thermography and residential addiction treatment were combined for evaluation and application of care. Adjustments were performed with the Integrator adjusting instrument and were limited to Primary Subluxation. P300 Wave testing was performed with the Enigma P300.

**Conclusions:** Although subluxation based chiropractic care is not recognized as the main course of treatment for addiction, it is postulated that improvement of spinal neural integrity and neural dopaminergic pathway efficiency through chiropractic adjustments may contribute to improved homeostasis, Brain Reward Cascade and Reward Deficiency Syndrome thus allowing the body to express a greater state of well-being and human potential as an outcome. Additional outcomes such as increased addiction treatment retention rates and decreases in relapse are also postulated after combining non-linear tonal chiropractic care with standard addiction treatment and behavior modification.

**Key Words:** *Torque Release Technique (TRT), Integrator, Enigma P300, P300 Wave, Chiropractic, Primary Subluxation, Vertebral Subluxation, Brain Reward Cascade (BRC), Addiction Treatment, Cocaine Addiction, EMG, Thermography, Cranio-spinal Meningeal Functional Unit, Reward Deficiency Syndrome (RDS).*

### Introduction

The purpose of chiropractic is to optimize human potential and state of well-being. This objective is primarily realized by the successful adjustment of vertebral subluxation allowing the brain and spinal cord to effectively communicate to the rest of the body creating improved overall nervous system function.<sup>1</sup>

Subluxation and its association with improvements in quality of life has been anecdotally reported by chiropractors since 1895 beginning with DD Palmer, but has remained ignored in

the scientific literature until 2000. Current research is being presented suggesting that chiropractic not only helps with musculoskeletal complaints like neck pain and headaches, but more importantly that subluxation correction allows for greater fulfillment of human potential and state of well-being thereby explaining why it has been shown to improve outcomes in addiction treatment and relapse prevention.<sup>2,3</sup>

Drugs of abuse produce widespread effects on the structure and function of neurons throughout the brain's reward circuitry, and these changes are believed to underlie the long



lasting behavioral changes that characterize addiction.<sup>4</sup> Research by Pert and Dienstfrey (1988) suggest the spinal cord has more limbic system than the brain, where emotion is mediated and the subconscious mind may be.<sup>5</sup> Additionally these emotions are expressed through the Brain Reward Cascade.<sup>6,7</sup> Brain circuitry and addictions directly relate to the dopaminergic system with the A1 allele of the dopamine D2 receptor being implicated in reward mechanisms in particular.

The Brain Reward Cascade includes the release of serotonin (5HT) in the hypothalamus which stimulates methionine enkephalin release which in turn inhibits GABA at the substantia nigra which in turn competes with the amount of dopamine (DA) released at the ventral tegmental region. The net effect of neurotransmitter interaction in the mesolimbic (brain) region induces "reward" when DA is then received at the nucleus accumbens and amygdala in normal concentration.<sup>7</sup> It is well known that when this linear cascade is manifest without neural interference, DA works to maintain our normal state of well-being, drives and pleasure "reward". In fact, DA has come to be known as the "pleasure molecule" and/or the "anti-stress molecule."

When DA is released into the synapse, it stimulates a number of DA receptors (D1-D5) which result in increased feelings of well-being and stress reduction.<sup>7</sup> Early chiropractic literature suggests the cord tension subluxation is the major component of vertebral subluxation and causes greater neurological insult as opposed to the cord pressure subluxation.<sup>8</sup> Excessive cord tension has been described as a source of dysfunction in the Brain Reward Cascade causing a hypo-dopaminergic trait.<sup>9</sup>

The brain of that person requires an increase in dopamine in order to feel good. This trait leads to multiple drug-seeking behaviors such as impulsive and compulsive behavioral disorders including the five addictions: work, food, sex, gambling and drugs and the compulsive and affective disorders such as: ADHD, Tourette's Syndrome, Asperger's Syndrome, autism, dyslexia, chronic violence, post-traumatic stress disorder, schizoid/avoidant cluster, conduct disorder and antisocial personality disorder, to name a few.<sup>7</sup>

The central problem facing any addiction treatment program is multiple relapse. Drug addiction is now being recognized as an act of associative learning causing repeated stimulation from external stimuli.<sup>10,11</sup> Repeated drug interactions are thought to cause a conditioned response leading to brain reward mechanisms that trigger ongoing drug cravings.

Repeated cocaine exposure has been shown to increase dendritic sprouting in the nucleus accumbens, pre-frontal cortex, and caudate-putamen.<sup>10</sup> Dendritic sprouting not only increases synaptic sensitivity, but also increases craving and relapse risk. This ongoing cycle of repeated exposure not only evokes expectations of drug availability from repeated euphoria, but also makes it increasingly difficult for addicts to abstain from their drug of choice.<sup>10</sup>

Torque Release Technique (TRT), developed by Jay Holder, D.C, is a model and technique developed out of human population randomized clinical trial involving subluxation-centered chiropractic in a residential addiction facility.<sup>2,3</sup> TRT utilizes a 9 category non-linear testing priority protocol to

make a differential diagnosis for Primary Subluxation along with 15 diagnostic indicators promulgated from 7 techniques: Palmer Upper Cervical, DNFT (Van Rumpft), SOT, Tofness, Thompson, Logan, and Network to create a non-linear tonal model.

Because the nervous system is suggested to record and memorize everything it perceives, a non-linear adjusting procedure from one visit to the next is needed to ensure listing changes rather than pattern the patient's subluxations.<sup>12</sup>

TRT utilizes the Integrator adjusting instrument which delivers three-dimensional toggle recoil with straight axial, right and left torque directions. The Integrator is the first chiropractic adjusting instrument to receive an FDA 510K Class II medical device designation for the adjustment of vertebral subluxation.<sup>2</sup>

The Integrator delivers toggle recoil thrusts at 1/10,000 of a second, has a pre-cocking pressure sensitive pisiform tip with an automatic release mechanism for the purpose of delivering thrusts with true intraprofessional reproducibility at a constant Hertz frequency.<sup>2,12</sup> Thrusts by the Integrator are expressed at 64 Hz to match the primary subluxation. The basic premise underlying Hz frequency is the notion that intrinsic mechanical behavior of the human spine can be determined by the quantification of the frequency-dependent motion response of various portions of the spine to a known force input.<sup>13</sup>

## Case Study

### History

A 63 year old white male presented at the Exodus Treatment Center with a 50 year history of poly substance abuse. Patient was court ordered to Exodus Treatment Center after a felony conviction for cocaine, violation of probation and eleven failed traditional addiction treatment programs. Cocaine addiction started at age 21 with previous use of alcohol, cannabis, and amphetamines as early as age ten. Psychosocial assessment indicates daily use of cocaine since the age of 21.

Cocaine addiction became uncontrollable resulting in decades of multiple felonies and incarcerations. Secondary health characteristics included low back pain, emphysema, chronic obstructive pulmonary disease (COPD), high blood pressure, coronary artery disease, gastritis, benign prostate hypertrophy, obesity, venous insufficiency and significant cognitive impairment. Patient sought medical care often for heart, lung and gastrointestinal complaints. Medication during current addiction treatment included: Lisinopril, Prevacid, Aspirin, Hydrochlorothiazide, Potassium Chloride, ProAir inhaler, Spiriva, Symbicort, Flomax, Finasteride, and Seroquel.

The patient had a history of severe emotional and behavioral conduct problems. Patient experienced depression and anxiety over his mother's poor medical health and break-up with significant other. Cocaine and sex addiction has also led to financial unmanageability and dangerous liaisons.

Due to patient's long criminal and drug history he was court ordered to 24 hour residential staff monitoring care to cope with recovery related environmental problems. Patient was



provided with a full-schedule of reality and relapse prevention groups, coping skills sessions, psychotherapy and individual lifestyle modification sessions. A wellness recovery plan including Alcoholics Anonymous 12 step fellowship program was implemented to monitor uncomfortable and distressing signs and symptoms related to addiction. Patient was required to attend AA and NA meetings seven days per week.

Continual relapse in spite of eleven addiction treatment programs led to multiple felony convictions and incarcerations for many violations including sales and possession of cocaine and other illicit drugs. Exodus Addiction Treatment Center performed a P300 wave analysis with the Enigma P300 unit after approximately five months of their traditional addiction treatment protocol. The P300 assesses attention, cognitive function, cognitive awareness, cognitive ability and decision making as well as other aspects affecting CNS pathology.<sup>14</sup>

The P300 wave (Auditory Evoked Potential) is the most widely used ERP in psychiatry.<sup>15</sup> The patient was not reaching therapy goals and performing poorly in treatment. Therefore, three P300 wave assessments were performed during the 6<sup>th</sup>, 7<sup>th</sup> and 8<sup>th</sup> month at Exodus and prior to chiropractic care. Results indicated that traditional addiction treatment at Exodus was failing to improve cognitive function and or increase the P300 wave amplitude. This was reported to the court. The judge then required the patient to remain in Phase One of treatment at Exodus Addiction Treatment Center and complete a neurophysiologic evaluation to develop a more aggressive and comprehensive treatment plan. Therefore, TRT was added to the treatment plan for an additional eight months to improve addiction treatment outcomes, neurological and behavioral function and to make the care more comprehensive.

#### *Examination*

An initial Addiction Severity Index (ASI) was introduced to explain and monitor seven potential problem areas associated with the patient's current cocaine addiction. The ASI is an assessment instrument designed to be administered as a semi-structured interview to patients who present for substance abuse treatment. This instrument gathers information about seven areas of a patient's life: medical, employment/support, drug and alcohol use, legal, family history, family/social relationships, and psychiatric problems.<sup>16</sup>

Using a four point scale from 0 to 4, the interviewer severity ratings indicate the degree of patient problems in each of the seven problem areas based on historical and current information. Composite scores are based entirely on current information and are indicators of the present status of the patient; they are thus useful for treatment outcome studies since successive composite scores can be used to summarize changes in patient status.<sup>16</sup>

Paraspinal surface electromyography was performed by the Insight Subluxation Station during the initial TRT evaluation. Both EMG amplitude and asymmetry were measured on a monthly basis for seven months. Surface EMG is a scanning procedure employing hand-held electrodes which are placed over the skin of muscle tissue. It is used to collect and record electrical potential associated with muscle activity while the patient is in the seated position in a relaxed posture.

The muscular activity of various spinal segments are then analyzed and compared to a normative database. A comparative analysis of the left and right side of the spine, which reveals muscular imbalances from cord tension, is made. Surface EMG, has been shown to be an objective measure of change in the assessment of the patient's progress.<sup>17</sup>

Thermal scan analysis was also performed for initial TRT analysis. Thermography was recorded and compared to normative data throughout the entire eight months of care. The use of thermography has been used since the early days of chiropractic as an assessment for the neurological component of the vertebral subluxation.<sup>14</sup> Thermal scans use infrared technology to measure heat emission given off from the surface of the skin. The use of computer-interfaced infrared devices makes possible more objective digital analysis methods of thermographs using mathematical algorithms.<sup>18</sup>

The differences in peripheral skin temperature have been taken to be a correlate of changes in peripheral vasoconstriction associated with the sympathetic nervous system. Thus, tissues tend to warm and cool as the immediate vascular bed below the skin constricts and dilates. This relationship is based on the physiological ramifications of vasoconstriction and vasodilation of paraspinal tissues.<sup>19,20</sup> Changes seen in thermal scans when properly done not only show high intra examiner reliability, but changes seen are also most likely due to actual physiological changes rather than equipment error.<sup>18</sup>

Palpation by TRT's STIM protocol was performed prior to TRT's functional leg length reflex (FLLR). STIM, an acronym, stands for scanning palpation, tissue palpation, intersegmental palpation, and motion palpation. Tissue palpation revealed increased congestive tissue tone at the anterior neck and kidney regions indicating the subluxation's etiology as chemical, from poor diet, cocaine and other drug use. Motion palpation revealed decreased ROM and hypertonic musculature at the upper cervical and lower lumbar segments of the subject's spine.

Torque Release Technique protocol was utilized with adjustments made by the Integrator. Functional leg length reflex (FLLR) and the pressure test are other standard procedures utilized by TRT in order to detect the primary subluxation and its lines of drive (LOD). Pressure tests (PT) involve digital skin contact applied to the suspected subluxation with a three dimensional direction of correction. The pressure test is applied to temporarily reflex the dynamic dyskinesia or dysponesis of the subluxation's LOD.

Many chiropractic techniques use functional leg length inequality, not FLLR, with the aim to even the leg length after adjusting in aegis with a challenge as opposed to the pressure test.<sup>21</sup> However, only TRT uses the FLLR and only before the adjustment is made. By abrupt foot dorsiflexion the Achilles DTR is utilized while the patient is in the prone position to determine the FLLR. TRT does not aim to balance leg length.

Functional leg length inequality is a controversial phenomenon and is thought to result from physiological adaptations to distorted biomechanics anywhere along the



kinetic chain, such as asymmetric muscle contraction or bony misalignment and is theorized to offer information that may be of help in making the leg length even or balanced including clinical decisions about the nature of the vertebral subluxations detected and the type of corrections that should follow, again with the aim to make the legs even or balanced, and to stop adjusting when the leg length becomes even or balanced.<sup>22,23,24</sup>

### *Interventions & Outcomes*

After eight months at Exodus and under the court's direction, Torque Release Technique, P300 wave testing, surface EMG and thermography by Insight Subluxation Station were added to the existing treatment regimen as the patient continued residential addiction treatment receiving counseling, group therapy, psychotherapy Narcotics Anonymous and Alcoholics Anonymous meetings daily. The Addiction Severity Index and Psychosocial assessments were again administered to the patient to track both behavioral and psychological progression.

During the second eight month period following the 3rd P300 wave analysis, a specific chiropractic adjustment regimen for the adjustment of vertebral subluxation was delivered to the patient three times per week. This consisted of a series of adjustments using the Torque Release Technique (TRT) protocol combined with the use of the Integrator adjusting instrument. The main focus of TRT is to promulgate a differential diagnosis to rule out secondary subluxations and rule in the primary subluxation for the purpose of improving quality of life, state of well-being and human potential.<sup>12</sup>

Due to decades of chronic behavioral, psychological and physical dependence for cocaine and other drugs, the patient was seen three times a week for subluxation management. The care plan was modified in accordance to outcome measures. Psychosocial assessments measuring chemical dependency, financial stability, sexual addiction, and legal problems were measured pre and post care and recorded to track patient compliance and progress. During this period the patient exhibited a substantial increase in quality of life ratings and a considerable decrease in presenting symptomatology.

Initial patient presentation data showed scores of 4 out of 4 on the ASI index in the psychological and emotional categories. In the family and social problem section the patient scored himself 3 out of 4. The patient also scored 4 out of 4 on his willingness to undergo treatment for psychological and emotional problems, a very poor prognosis for recovery.

However, after introducing TRT into the residential addiction treatment program milieu, considerable improvement in the Addiction Severity Index (ASI) scores occurred. Data revealed a continual decrease in both depression and anxiety scores. ASI index scores decreased to 1 out of 4 in the psychological and emotional categories. Family and social problem scores decreased to a 1 out of 4. Patient's willingness to receive treatment continued with a score of 4 out of 4. These improved ASI scores not only showed better patient compliance but is suggestive of decreased relapse potential.

Patient P300 wave potentials at initial phase of care showed steady decrease in cognition, attention, cognitive function, and

decision making ability. P300 amplitude in drug-dependent patients is influenced by a complex interaction between CNS pathology that predates and promotes the onset of drug dependence and CNS pathology that should resolve during the process of recovery from drug dependence.<sup>25,14</sup>

The initial patient P300 wave testing trials performed over a period of eight month's previous to the introduction of TRT are shown in Appendix I. Figure 1 shows a continual decrease in P300 amplitude before chiropractic care was administered. Amplitudes remained extremely low with no change in latency. Figure 1 suggests damage to frontal and parietal loci as sequelae of chronic cocaine dependency. Figure 2 shows P300 wave progression after chiropractic care was added to patient's treatment plan. Figure 2 shows improvement in P300 amplitude scores after eight months of TRT.

Comparable thermal and EMG scans were taken at the onset of TRT and new scans were retaken every 30 days. Post EMG amplitude and asymmetry scans show improvement in overall asymmetry and severity of paraspinal muscle activity. Post thermal scans show not only a decrease in overall absolute temperature but side to side differentials as well. Appendix II shows pre and post EMG amplitude and asymmetry scans and Appendix III shows pre and post thermal scans. Both EMG and thermal readings were taken while under subluxation based chiropractic care and traditional residential addiction treatment. There was a substantial improvement in overall EMG amplitude and asymmetry, as well as thermal readings.

### **Discussion**

The purpose of this case study was to document outcomes that occurred when combining traditional addiction treatment methods with TRT chiropractic care. This case study objectively documents the positive effects on the patient's quality of life and CNS cognitive function as measured by the Addiction Severity Index scores and P300 wave analysis.

For decades addiction treatment programs have strived to find an answer for continued drug relapse in patients suffering from a multitude of addictions. There has been a major effort in recent years to determine the cellular and molecular changes that occur during the transition from initial drug use to compulsive intake. We now know many naturally occurring brain and spinal cord substances play a role in both emotions and pain reduction, leading to an increased sense of wellbeing.<sup>2,3,7</sup>

For decades scientists have been looking at the brain and spinal cord as separate entities. Today science is proving that the body is a tensegrity structure and all parts are continuously dependent on one another for proper function. In this regard, Pert and Dinstfrey (1988) and Lewis and colleagues (1981) suggested the limbic system should include not only the amygdala and hypothalamus, but also the dorsal horns of the spinal cord. In fact they point out that a number of neuropeptide receptors having psycho-physiological effects can be found in the dorsal horn of the spinal cord.<sup>56</sup>

It has also been stated that among many types of drug-induced adaptations, it has been proposed that changes in brain-derived neurotrophic factor (BDNF), or related neuro-trophins, and



their signaling pathways alter the function of neurons within the ventral tegmental area (the cell body region of the mesolimbic dopamine system) and the nucleus accumbens (a terminal region of the mesolimbic system). Together this system works to modulate the motivation to take drugs like cocaine.<sup>4,6,14</sup> Chronic cocaine use also increases dopamine reuptake eventually leading to an unrelenting urge for dopamine to feel good. If dopamine reuptake is not produced the body goes into a state of withdrawal increasing drug hunger and the risk of relapse. Results from studies using systemic drug injections indicate that dopamine neurotransmission mediates cocaine-induced re-instatement.<sup>27</sup>

Continual cocaine reinforcement can also be linked back to the rate at which the drug is intravenously injected into the bloodstream. Studies are now showing that increased speeds of transmission in monkeys enhance the ability of cocaine and nicotine to support self drug administration behavior.<sup>28</sup> These observations have led to the proposal that the drug induced neuroplastic changes that underlie psycho-motor and/or incentive sensitization might also contribute to addiction.<sup>28</sup>

Historically there has not been adequate scientific evidence supporting the effects that subluxation based chiropractic care have on addiction treatment. However, recent studies describe how brain reward circuitry and the reduction of vertebral subluxation may have a huge impact on the improvement of neural interference, RDS, brain and spinal cord function, addiction relapse, addiction program retention rates, depression, anxiety and overall health and state of well-being.<sup>29, 2, 3, 6, 7, 17</sup>

### Conclusion

This case study outlines the history, symptomatology and treatment associated with a 63 year old white male addicted to free base and crack cocaine over the past 40 years and who has attended 11 addiction treatment programs unsuccessfully. The patient suffered from severe depression, anxiety, and many other secondary health characteristics and multiple life threatening medical conditions as a consequence of long term drug abuse.

After approximately eight months of Torque Release Technique at the Exodus Addiction Treatment Center, while being co-managed with traditional drug addiction treatment professionals in a residential setting, the patient has seen improvement in health and vitality as revealed with P300 wave results, Thermal/EMG scans, and ASI scores. The patient is currently living on his own in a 3/4 way house and has been free from cocaine addiction for over two years. The patient has chosen to continue chiropractic care.

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**APPENDIX I:** Figure 1 and 2 show pre/post P300 Event Related Potential (ERP) used to measure cognitive function providing an objective measure of brain activity that is very sensitive to central nervous system (CNS) disruptions.<sup>21</sup>

**Figure 1.** P300 Wave Assessment (Traditional Addiction Treatment Only)

Date	Type	Outcomes
<b>11/3/2009</b>	Target N100 Amplitude	-5.94
	<b>Target P300 Amplitude</b>	<b>4.39</b>
	Target N100 Latency	89.06
	Target P300 Latency	378.13
<b>12/3/2009</b>	Target N100 Amplitude	-5.54
	<b>Target P300 Amplitude</b>	<b>3.25</b>
	Target N100 Latency	92.97
	Target P300 Latency	374.22
<b>7/1/2010</b>	Target N100 Amplitude	-3.14
	<b>Target P300 Amplitude</b>	<b>3.03</b>
	Target N100 Latency	116.41
	Target P300 Latency	339.06

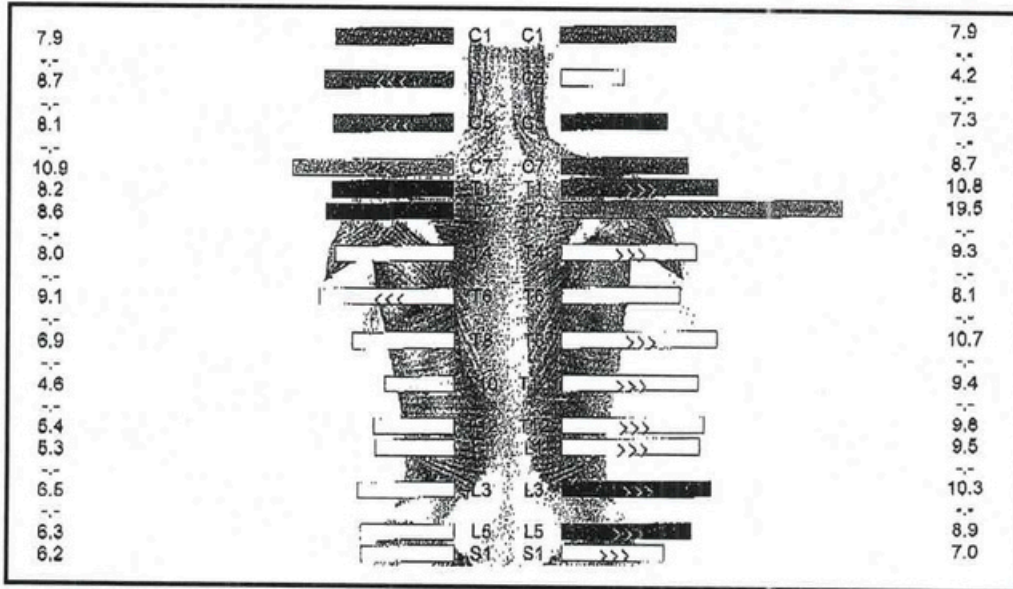
**Figure 2.** P300 Wave Assessment (Traditional Addiction Treatment & Chiropractic Care)

Date	Type	Outcomes
<b>9/3/2010</b>	Target N100 Amplitude	-2.4
	<b>Target P300 Amplitude</b>	<b>6.09</b>
	Target N100 Latency	98.05
	Target P300 Latency	340.71
<b>12/3/2010</b>	Target N100 Amplitude	-1.62
	<b>Target P300 Amplitude</b>	<b>7.2</b>
	Target N100 Latency	98.97
	Target P300 Latency	335.44
<b>3/3/2011</b>	Target N100 Amplitude	-1.01
	<b>Target P300 Amplitude</b>	<b>9.1</b>
	Target N100 Latency	101.16
	Target P300 Latency	320.18

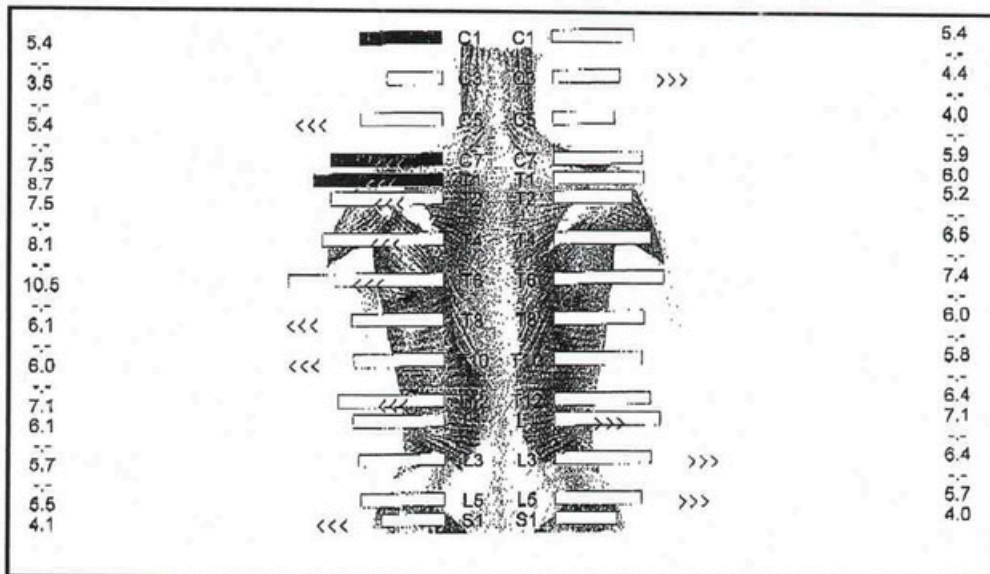


APPENDIX II

Static EMG Amplitude 1



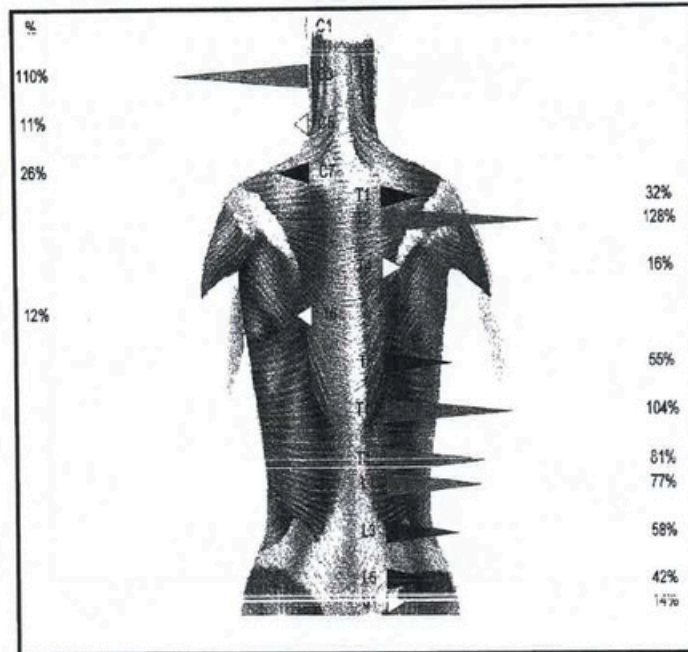
Static EMG Amplitude 7



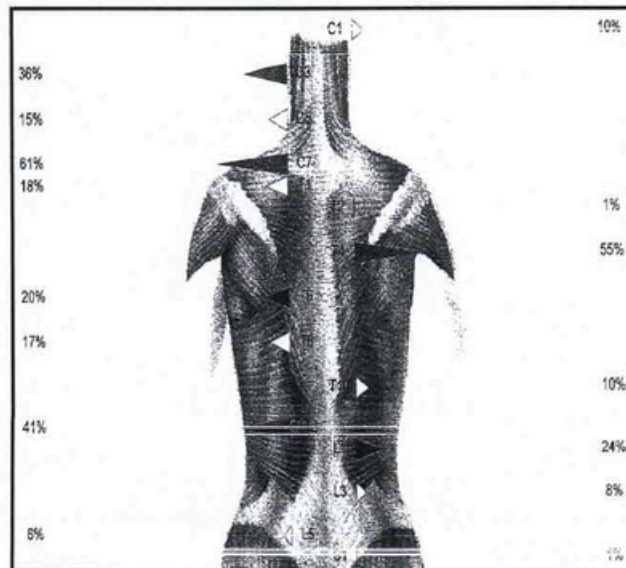


APPENDIX III

Static EMG Asymmetry I

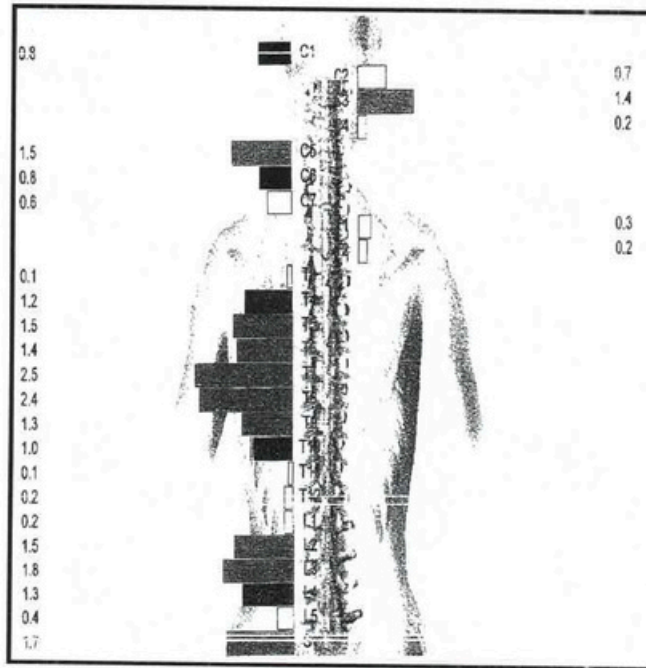


Static EMG Asymmetry 7

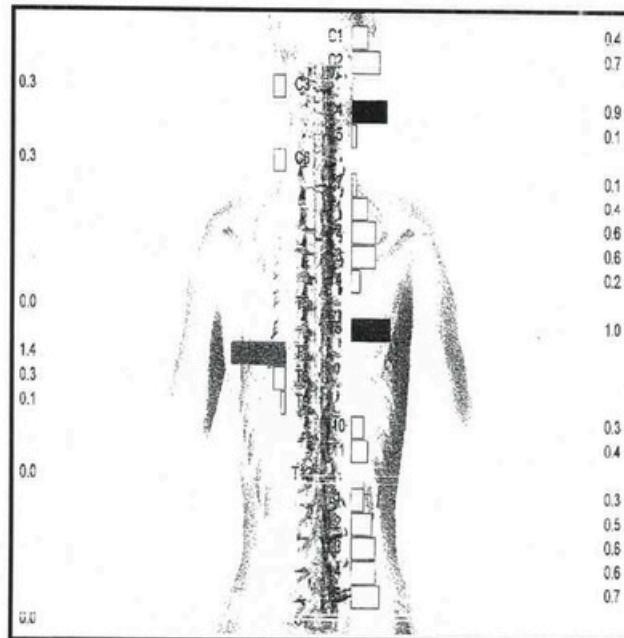




Thermal Scan 1



Thermal Scan 8





## Pilot Study, Results of Reorganizational Healing Meta Model Applied to Adult Females During In-Residence Addiction Recovery

Dominic Smorra DC

**Objective:** This is a retrospective study of the data collected while clinically utilizing the Reorganizational Healing Meta model with a group of recovering in-residence, adult, female drug addicts. The objective data collected reflects the effects on the recovering addict's overall health, wellness and quality of life.

**Methods:** The Reorganizational Healing applications utilized were Network Spinal Analysis entrainments and Somato Respiratory Integration lecture workshops and hands on exercises. A total of eleven adult women, who were student members of Integrity House, completed the program. Physical examinations, surface electromyography, and spinal thermography exams were performed with each student member, as well as quality of life questionnaires and drawings done by each student member prior and at the completion of this study. The program lasted 9 weeks with a total of 15 care sessions.

**Results:** Each of the 11 student members exhibited the decreased occurrence of vertebral subluxation and increasingly complex neurologically mediated somato-sensory strategies pertaining to both NSA and SRI Levels of Care parameters. Spinal thermography revealed an overall increase in the symmetry of the temperatures from the spine. Improvements reflected from the quality of life questionnaire were statistically significant in all domains evaluated. Eleven out of eleven student members reported at the end of the program that they felt better prepared to handle life's stresses and that they were more capable of continuing positive lifestyle changes.

**Conclusion:** The findings in this pilot study support a hypothesis that ROH has, at minimum, a short-term positive effect on the health, wellness and quality of life of adult females in residence at an early stage addiction recovery program. Further research is warranted, with the inclusion of control subjects of each gender and also to provide for tracking of the student's progress over time to determine any potential long-term ROH benefits.



## Inter and Intra Reliability of Heel Tension Scale

Karen Feeley DC & Edward Owens DC

**Background:** Neurodynamic tests are used to assess the nervous system's mechanosensitivity through monitoring the response to movements that are known to alter the mechanical stresses acting on the nervous system. In Chiropractic these tests are often used to assess the neurological component of the vertebral subluxation. Many of the tests used today stem from Alf Brieg's extensive work in the 1970's developing the concept of adverse mechanical cord tension (AMCT). In Network Spinal Analysis clinical assessments, adverse mechanical cord tension is considered through an evaluation of tension at the ankle, while performing the leg check protocols involved with Network Spinal Analysis.

**Objective:** To test inter and intra reliability of the measurement of adverse mechanical cord tension, using measurements of the flexion extension aspect of passive ankle movement, (termed heel tension).

**Methods:** Three experienced Network Spinal Analysis (NSA) practitioners examined 21 individuals, right and left ankles; at two different times. The examinees were lying prone on a table with the ankles over the edge of the table. The practitioners tested levels of tension while passively putting the ankle thru flexion extension. The amount of tension was graded from 1-mild, to 5-severe. The tension was also noted to be at the beginning of the maneuver or towards the end. Statistical analysis consisting of inter-class correlation coefficient (ICC) was applied to the heel tension data. Area of spinal tension data was analyzed using the Kappa statistics.

**Results:** We observed strong agreement with intra-reliability and moderate to strong correlation for inter reliability tests done for this data on measuring heel tension. The findings for assessing the area of spinal cord tension were fair for intra reliability and weak for inter reliability on this assessment of heel tension.

**Conclusion:** Intra and inter rater reliability are important characteristics that document the potential of a scale to produce stable results within and across assessors. Test – retest reliability is a pre requisite for scales that are to be used in a follow up situation, such as with Chiropractic care, and help to document its objectivity. Further research is warranted to validate changes in heel tension after subluxation centered chiropractic care and its relation to changes in quality of life and well-being.



# Case Study & Review of the Literature

## Resolution of Anxiety, Depression, Insomnia, Scoliosis & Cluster Headaches, in a Patient with Opioid Addiction Undergoing Chiropractic Care to Reduce Subluxations: A Case Study & Review of the Literature

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### Abstract

**Objective:** To report the results of subluxation-based chiropractic care in a patient complaining of anxiety, depression, insomnia, and cluster headaches while undergoing treatment and recovery from substance abuse.

**Clinical features:** A 21-year-old male patient presented into a chiropractic office complaining of anxiety, depression, insomnia, and cluster headaches. Patient stated he was also undergoing substance abuse treatment. X-ray radiographs revealed a 21-degree thoracic dextroscoliosis, along with cervical hypolordosis, thoracic hypokyphosis, and lumbar hyperlordosis.

**Intervention and Outcome:** Initial postural and radiographic examinations were performed. After being put on an appropriate care plan, the patient was assessed and adjusted when necessary for subluxation using Gonstead Chiropractic Technique (GCT), along with Chiropractic Biophysics (CBP) mirror imaging technique. Patient was also prescribed cervical traction and therapeutic exercises. Upon completion of the care plan, the patient had a 10-degree reduction in the thoracic dextroscoliosis measurement and obtained restoration of normal cervical, thoracic, and lumbar curvature. Patient decreased and eventually stopped all medication usage and has not experienced a relapse in 4½ years.

**Conclusion:** Subluxation-based chiropractic care played a role in the resolution of the patient's complaints. The patient was able to stop all medications and leads a productive life symptom free.

**Keywords:** cluster headache, anxiety, depression, insomnia, chiropractic, subluxation, adjustment, Gonstead, Chiropractic Biophysics, substance abuse

### Introduction

#### Anxiety

Of all the psychiatric disorders, anxiety disorders are some of the most commonly diagnosed in the population, affecting around 18.1%.<sup>1</sup> Initially, patients who suffer from symptoms of one of the many different anxiety disorders will first contact their primary care physician who will then make the appropriate referral to a mental health professional. Upon referral, most anxiety disorders are successfully treated in the outpatient setting.<sup>2</sup> Research shows that anxiety disorders cause

significant functional impairment to the patient, and are often co-morbidly diagnosed with other psychiatric diagnoses such as depression, substance abuse, and other anxiety disorders.<sup>3</sup> According to the DSM-IV-TR (Diagnostic and Statistical Manual of Mental Disorders, 4<sup>th</sup> edition, Text Revision), there are 12 different diagnoses that fall under the heading of an anxiety disorder. Each disorder has a specific set of identifiers that the patient must meet in order to receive the diagnosis.<sup>4</sup>



Allopathically, the standard method of treatment for anxiety symptomatology is pharmacological intervention with long half-life benzodiazepines.<sup>5</sup> Benzodiazepine medications are classified as sedatives, in that they work to facilitate the action of inhibitory neurotransmitter GABA (gamma-aminobutyric acid) in the synapses in the brain similar in mechanism to that of alcohol. Since these medications sedate the patient, they are sometimes used for those suffering from insomnia. These medications are to be used with caution however, because they have a high abuse potential due to their ability to cause euphoria. These medications are also not advised to be used for long periods since they can cause significant withdrawal symptoms upon cessation of use.<sup>6</sup> Though medication is readily available, a majority of people in the United States reported using alternative or complimentary therapies to help with anxiety rather than conventional medical treatments. Alternative methods utilized included yoga, massage, chiropractic care, osteopathic treatment, naturopathic treatment, relaxation techniques, acupuncture, laugh therapy, and cognitive feedback techniques.<sup>7</sup>

### Depression

The lifetime incidence of depression worldwide has been measured at nearly 20% of the population. There is a strong female bias in depression, with a 5:2 ratio compared to men.<sup>8</sup> Due to the complex nature of depression, the many facets of the diagnosis, and range of presentation, it can be difficult to treat. Per the DSM-IV, diagnostic criteria include: depressed mood for most of the day, fatigue for most of the day, inability to sleep, weight loss when not dieting, inability to concentrate, feelings of hopelessness, and suicidal ideation. These symptoms must cause significant distress as reported by the patient or someone close to the patient for more than two weeks.<sup>9</sup> Depression can be a debilitating illness for those who suffer, as well as friends and family members due to the large effect it has on the lives of those involved. Theories on the pathophysiology range from significant life events such as the loss of a loved one, genetic predisposition, to neurochemical deficiencies, and synaptic transmission inhibitions. Allopathically, depression is treated with pharmacological intervention via antidepressant medications. TCA's (tricyclic antidepressants), MAOIs (mono-amine oxidase inhibitors), and SSRI's (selective serotonin reuptake inhibitors) are commonly employed. Though these medications may be somewhat effective in relieving the symptoms of depression, the side effects that typically accompany them can be severe, and in some cases make the depression worse.<sup>8</sup> Alternative treatments shown to be effective in improving depression are regular exercise, supplementation with Saint John's Wort, SAM-e, and Omega-3 fatty acids.<sup>10</sup>

### Insomnia

People who have trouble sleeping, difficulty falling and staying asleep, experience multiple awakenings throughout the night, and experience non-restorative or non-restful sleep despite having ample opportunity, are referred to as having insomnia. Since these individuals have had the opportunity to sleep but cannot achieve it, they are distinguished from those who suffer from sleep deprivation, which is its own separate entity with unique symptoms and problems.<sup>11</sup> The DSM-IV definition of insomnia includes the specifiers of the symptomatology lasting

for three nights a week, and occurring for three consecutive months. Also, those diagnosed cannot have another co-occurring sleep disorder and this disorder cannot be explained by another diagnosis.<sup>12</sup> Most of the time the symptoms of insomnia are related to other disorders. According to Ohayo a primary insomnia diagnosis, meaning insomnia symptoms were not attributed as being caused by another disorder was made in only 1.3% of cases when using the DSM-IV classification, whereas 18.6% of those studied reported general insomnia symptomatology.<sup>13</sup> The use of sedative medications for short periods of time such as BZRA's (benzodiazepine receptor agonists) combined with psychological interventions such as relaxation methods, sleep restriction, and practicing better sleep hygiene have been shown to produce the best outcome in patients with chronic insomnia.<sup>14</sup>

### Scoliosis

Derived from the Greek word *skolios* meaning "crooked, bent," scoliosis quite literally means bent or crooked spine.<sup>15</sup> This condition has been described in literature back to the time of Hippocrates (460-370 BC), who studied the human body in detail. In his text *On Nature of Bones* he states, "one should first get a knowledge of the spine; for this is also a requisite for many diseases." Hippocrates work was later expanded upon by Galen who studied the human body in greater detail some 500 years later.<sup>16</sup> Current estimates per the literature put the incidence of adolescent idiopathic scoliosis at 0.47-5.2% of the population. The male-female incidence is strongly favored toward the female side, with females also tending to have higher Cobb-Lipmann angle measurements of scoliosis.<sup>17</sup>

When measuring scoliotic curvature, the Cobb-Lipmann method of mensuration is most commonly utilized. Classically, when the Cobb-Lipmann angle of measurement exceeds 10-degrees on the A-P (anterior to posterior) radiograph the patient is considered to have a clinically significant scoliosis.<sup>18</sup> Early detection is key in the diagnosis of scoliosis; it is common for 10-14 year old school children to be screened using the forward bending test (Adam's) for early diagnosis. The earlier the curvature is discovered and addressed, the less likely spinal surgery will be needed to correct it in the future.<sup>19</sup> The Cobb-Lipmann method is widely considered to be the "gold standard" when it comes to the mensuration of scoliotic curvature. However, there are those who claim that this method is flawed, citing that trying to describe a three dimensional curvature via drawing lines on a two dimensional radiograph is invalid.<sup>20</sup> Typically, if the Cobb-Lipmann angle is greater than 45-degrees in an adolescent, surgery is indicated, with the goal of retarding further progression of the curve and to improve the alignment and balance of the spinal column. Wires, rods, screws and hooks are grafted into the vertebrae of the patient in order to straighten out the spine. In patients whose curve is less than 45-degrees but has a high risk of progression to the surgical stage, bracing is utilized to halt the progression. Bracing has been shown to be effective when the brace is worn properly for the recommended amount of time.<sup>21</sup>

### Cluster Headaches

Cluster headaches are a relatively rare and severe form of headache that severely impacts the lives of those who suffer from them. Classified as the most severe form of primary



headache, they have been dubbed “the suicide headache” due to the severity of their symptomatology.<sup>22</sup> Cluster headache symptomatology includes specifiers of “severe unilateral, orbital, supraorbital and/or temporal pain lasting 15 to 180 minutes untreated.” The headache must also have at least one associated ipsilateral symptom including “1.lacrimation 2. nasal congestion 3. rhinorrhea 4. forehead and facial sweating 5. miosis 6. ptosis 7. eyelid edema. The attacks must occur from once every other day up to eight times a day.” These symptoms must also not be found to be diagnostically related to another disorder or condition.<sup>23</sup> One study found the prevalence rate of cluster headaches to be about .15% of the population in a 12-month study.<sup>24</sup> Although classified in the trigemino-autonomic headaches, the exact pathogenesis of cluster headaches remains unknown. However, the posterior pituitary is thought to play a central role.<sup>25</sup> The most effective treatments of cluster headaches has been shown to be subcutaneous sumatriptan injections along with the inhalation of 100% pure oxygen. Oxygen inhalation is the most preferred, with no contraindications and zero side effects.<sup>26</sup>

### *Substance abuse*

Substance abuse is a complicated issue. People turn to drugs for all sorts of reasons including the avoidance of pain, for pleasure, to rebel, to expand consciousness. Some people will use drugs recreationally and never cross the line into abuse and addiction. When looked at through the eyes of neurology and psychology, this line is the result of “pathological learning.” Steven Hyman in the American Journal of Psychiatry states, “Addiction represents a pathological usurpation of the neural mechanisms of learning and memory that under normal circumstances serve to shape survival behaviors related to the pursuit of rewards and the cues that predict them.”<sup>27</sup> In other words, the process of addiction actually reshapes the brain’s own neural circuitry to promote further drug use. This relationship seems to coincide with the self-medication hypothesis.<sup>28</sup> Unfortunately, treatment for those suffering from substance abuse disorders is largely inadequate. McLellan et al. notes the inadequacy likely stems from too few centers offering care, insurance barriers, lack of qualified personnel, and lack of overall funding for recovery centers.<sup>29</sup>

### **Case Report**

#### *Patient history*

A 21-year-old male presented into a chiropractic office with chief complaints of cluster headaches, anxiety, depression, and insomnia. The patient was also recovering from treatment for substance abuse of opioid painkillers. These complaints had been present for 14 months prior to entering the chiropractic office. The patient rated the cluster headaches at a 10/10, though with prescribed medication (propranolol 10mg, 3x/day), the complaint was a 0/10. The patient rated the anxiety complaint at a 10/10 without medication, though with prescribed medication (clonazepam 1mg, 3x/day), the complaint was a 2/10. The patient rated the insomnia complaint at a 10/10, though with prescribed medication (trazodone 100mg, 1x/nightly), the complaint was a 0/10. The patient was also on the following medications: Viibryd (vilazodone HCL) (40 mg, 1x/ day) for depression, and Suboxone (buprenorphine and naloxone) (8mg, 2x/day) for opiate withdrawal. Patient reported

that earlier in the presenting year he was in a motor vehicle accident, in which he sustained a concussion after hitting his head on the steering wheel. Patient also reported he had successfully completed an inpatient stay at rehabilitation center for substance abuse of opioid pain killers, but was still in the early recovery process. Patient stated that he had dropped out of college 11 months prior due to the complaints affecting his daily life as well as the destructive coping mechanisms he had turned to.

### *Chiropractic Examination*

In order to discover if a vertebral subluxation complex (VSC) was present, the chiropractor performed a specific chiropractic examination. Cervical and lumbar ranges of motion were determined. Palpation of the patient revealed hyper-tonicity of the following muscle groups: splenius capitis, trapezius, superior and inferior obliquus capitis, semi-spinalis capitis, rectus capitis posterior minor and major, intertransversarii, scalenes, levator scapulae, splenius cervicis, rhomboids, serratus posterior superior, multifidus, rotatores, erector spinalis, latissimus dorsi, piriformis, gluteus maximus, gluteus medius, and gluteus minimus. A-P (anterior to posterior) and lateral full-spine (14x36”) radiographs of the patient were taken (Figures 1.1a, 1.1b). The A-P radiograph revealed a 21-degree thoracic dextroscoliosis from T3 to L1, with the apex of the curvature at T7 using the Cobb-Lipmann method. A 14mm un-leveling of the pelvis on the patient’s right side compared with the left, when comparing the height of the right to the left ASIS (anterior superior iliac spines) was measured. Lateral radiographs revealed an 11-degree cervical lordosis; a 74% loss of normal curvature. Thoracic kyphosis was noted as a 98% loss of normal curvature, and lumbar lordosis was measured at 60-degrees; 50% excessive compared to normal. After the chiropractic and radiographic examinations were performed, the patient was determined to have VSC’s present in the cervical, thoracic, and lumbar regions of the spine. Associated abnormal posture, abnormal leg length, myospasm, late effect sprain/strain, muscular incoordination, and cervical/cranial syndrome were present per ICD-9 classification.

### *Chiropractic Care*

Due to the results of the chiropractic examination of the patient, the chiropractor initiated an initial care plan of three times a week for 12 weeks along with home traction and therapeutic exercises. A re-assessment and progress radiographs were performed upon the conclusion of the initial care plan. After the re-assessment the patient decreased care down to two times a week for 12 weeks with home traction and therapeutic exercises with a 2<sup>nd</sup> reassessment. After this, the patient decreased care to one time a week for 28 weeks along with home traction and therapeutic exercises. After completion of the care plan, progress radiographs were performed. Upon each visit the patient was assessed for VSC(s) and adjusted when necessary using the Gonstead Chiropractic Technique (GCT), along with Chiropractic Biophysics (CBP) mirror imaging technique. The chiropractic adjustment is a specific impulse, along a specific line of correction (LOC) into an abnormally functioning spinal segment with the intention of restoring normal neuro-biomechanical integrity to the affected area.



Gonstead Chiropractic Technique (GCT) is a technique that involves delivering a specific high velocity, low amplitude (HVLA) thrust into an abnormally functioning spinal segment, with the intention of restoring normal neural-biomechanical integrity. The GCT analysis involves 7 aspects: patient history, inspection, physical examination, static and motion palpation, radiographic studies, and thermographic instrumentation readings using the nervoscope. A nervoscope is an instrument that measures heat differences side to side in a patient's spinal column. Adjusting thrusts in GCT are mainly given in the posterior to anterior (P-A) line of correction (LOC), with other vectors such as right to left (R-L) and vice versa, as well as inferior to superior (I-S) and vice versa.<sup>30</sup> Segmental "listings" are central to the GCT, a vertebral "listing" describes the position of a vertebrae in relation to the vertebrae below.<sup>31</sup> Per the specific listing system used in GCT, the patient's listings adjusted were: T12 PRI-L adjusted in side posture (Figure 1.2),<sup>31</sup> T5 PRS adjusted using single hand (Figure 1.3),<sup>31</sup> and C2 PRS adjusted in the cervical chair (Figure 1.4).<sup>31</sup> There is evidence to support the effectiveness of GCT in the subluxation-based care of patients with VSC. For example, after receiving subluxation-based care using GCT, a 29-year-old female who presented into a chiropractic office complaining of infertility, lower back and left leg pain saw a reduction in symptomatology and also achieved pregnancy.<sup>32</sup> In another case study, an 11 week old male who presented with constipation received subluxation-based chiropractic care using GCT and saw complete resolution of symptomatology after 10 weeks.<sup>33</sup>

### Chiropractic Biophysics (CBP)

CBP is a technique of analyzing and adjusting the spine modeled after the theorem of linear algebra, postulating that there is a true "normal" vertical alignment of the spine when viewed on the A-P radiograph. The equations of linear algebra, when applied to the spine, dictate the center of mass through the middle of the skull, center of the thoracic cage, middle of the vertebral bodies, and center of pubic symphysis. There is also evidence to suggest that a normal degree of curvature for the cervical lordosis, thoracic kyphosis, and lumbar lordosis exists (Figure 1.5).<sup>34-35</sup> Considering this, then when measured, any deviations away from this normal curvature will result in an abnormal postural load on the spine. Research has indicated that abnormal postural loads distributed through the spinal column cause interrupted parasympathetic and sympathetic efferent signals, spinal cord tethering, and ischemic blood flow to the spinal cord.<sup>35</sup> CBP care is focused on "global" subluxation reduction, and those who use it are considered to be "structuralists" when assessing the spine.<sup>36</sup> In order to correct abnormal postural loads, CBP utilizes the concept of mirror-image adjusting, in which the patient is placed in the mirror opposite of the abnormal posture when the adjusting force is applied in order to stimulate mechanoreceptors to bring about a new normal for the spine (Figure 1.6).<sup>35</sup> CBP also heavily incorporates cervical traction, of which this patient was prescribed. The goal of traction is to decrease the loss of cervical curvature. The hypothesis that causing tension and lengthening of the anterior elements of the spinal column, namely the anterior longitudinal ligament, anterior discal, and anterior cervical muscular structures will increase cervical lordosis is utilized in cervical traction.<sup>37</sup>

After one month of subluxation-based chiropractic care the patient revealed that he had re-enrolled in college and would be attending in the spring semester. After 4 months of receiving subluxation-based chiropractic care, A-P and lateral radiographs were taken again (Figure 2.1a, 2.1b). The patient's A-P radiograph demonstrated a 10-degree improvement in thoracic dextroscoliosis, reducing from 21 degrees to 11-degrees, as well as a 4 mm reduction in the un-leveling of the pelvis (Figure 2.1a). Lateral radiographs revealed an improvement of 10-degrees in the cervical lordosis; a 24% improvement compared to initial radiographs. Lateral radiographs revealed a 4-degree improvement in the hyperlordotic curvature; a 10% improvement compared to initial radiographs, as well as a 16% improvement in the hypokyphosis of the thoracic spine (Figure 2.1b). At this time the patient reported that the cluster headaches reduced in severity and the patient had reduced his medication. After 12 months of subluxation-based chiropractic care the patient stated he was completely off the medication for cluster headaches, and the complaint was a 0/10. Patient stated the anxiety and insomnia complaint had drastically improved, and he had lowered all his medications. A-P and lateral radiographs were retaken one year after care began (Figure 2.2a, 2.2b). The A-P radiograph showed a maintenance of the 10-degree reduction in the patient's thoracic dextroscoliosis, along with maintenance of the 4 mm reduction of the un-leveling of the right side of the pelvis compared to the left (Figure 2.2a). Lateral radiographs revealed a cervical curvature of 32-degree; a 50% improvement compared to initial radiographs. Thoracic hypokyphosis had reduced to a 36% loss of normal curvature; a 62% improvement when compared to initial radiographs. Lumbar lordosis was measured at 51-degrees; a 36% improvement from initial radiographs (Figure 2.2b). The patient continued to be assessed and adjusted for VSC when necessary weekly after the initial care plan had terminated. After 20 months of regular subluxation-based chiropractic care the patient was off all medications except for small amounts of anxiety medication as needed. The patient entered chiropractic school and reported changes in all aspects of his life since starting subluxation-based chiropractic care. A 4½ follow up with the patient revealed no reoccurrence of symptomatology and was still completely medication free.

### Discussion

#### Terminology of Subluxation

The words "subluxation" and "adjustment" occur far more prevalently in the historical annals of chiropractic literature than in modern chiropractic literature.<sup>38</sup> Unfortunately, it seems that modern day language and the push into more "evidence-based medicine" has resulted in these hallmark terms of chiropractic become replaced. Terms like "manipulation," "mobilization", "restriction", and "fixation" have been used in an effort to conform to modern health-care language.<sup>38-39</sup> A survey conducted on North American chiropractic students reported, "Approximately half (51.9%) of the respondents strongly agreed (21.6%) or agreed (30.3%) that contemporary and evolving scientific evidence is more important than traditional chiropractic theory."<sup>39</sup> However, those familiar with the philosophy of chiropractic, and the detrimental effects of the



vertebral subluxation hold true to the weight of what the words “subluxation” and “adjustment” carry. This paper will refer to adjustment, subluxation, and subluxation-based chiropractic care per the historical definition whenever possible in an effort to support the philosophy of subluxation-based chiropractic.

### *Vertebral Subluxation*

As B.J. Palmer described;

“A Chiropractic subluxation is a partial dislocation, slightly separated from its articulating surfaces. This condition does not necessarily involve a fracture. The subluxation partially occludes the intervertebral foramen; the dislocation completely. It is the subluxation that produces pressures upon nerves as they emanate through these openings, hence, impulses are hindered, disease its result.”<sup>40</sup>

According to Lanz, “Common to all concepts of subluxation are some form of kinesiologic dysfunction and some form of neurologic involvement.” His definition of the vertebral subluxation complex includes the following components: kinesiology, neurology, myology, connective tissue physiology, angiology, inflammatory response, anatomy, physiology, and biochemistry. His attempt to incorporate all of these aspects is in hopes of creating the “unified field theory of chiropractic.” Other models put forth of the subluxation are the Dysafferentation model, the Subluxation-Degeneration Model, Nerve Compression Model, the Segmental Facilitation Model, and the Neurodystrophic Model.<sup>41</sup> The chiropractic models incorporated in the subluxation-based chiropractic care of this patient were the “Segmental Model,” in which the subluxation is described by abnormal biomechanics between the articulations of two vertebrae. The Gonstead Chiropractic Technique utilizes this model. As well as the “Postural Model,” which looks at the effect of postural distortions and their “global” effect on the spine and its functions. Chiropractic Biophysics utilizes this model.

A review of the literature revealed that this is the first case study in which a subluxated patient was seen for concomitant anxiety, depression, insomnia, headaches, recovering substance abuse, and scoliosis in a chiropractic office. However, when viewed separately, there is case study evidence to suggest subluxation-based chiropractic care is helpful for each of the mental health aspects of this case as well as the musculoskeletal aspect.

### *Mental Health and Chiropractic*

What can be determined about the effect of subluxation-based chiropractic care on mental health? There is case-study evidence to suggest that subluxation-based chiropractic care can help with the symptomatology of mental health diagnoses. A study by Roth et al. was conducted wherein six participants who had at least mild to moderate anxiety and/or depression received a course of 12 upper cervical adjustments. Upon completion, four of the five patients who completed the study reported improvement in their symptomatology, as well as increased mental clarity.<sup>42</sup> In another case reported by Behrendt, a 19-year-old female who presented into a chiropractic office with the diagnosis of generalized anxiety disorder (GAD) reported an 80% reduction in symptoms after 4 months of

subluxation-based chiropractic care.<sup>43</sup> Similar results have been reported on improvements in anxiety and depression following subluxation-based chiropractic care by Desaulniers, Kenamer, and Tetylbaum.<sup>44-46</sup>

The literature on insomnia and subluxation-based chiropractic is minimal at best. Jamison conducted a retrospective study in which questionnaires filled out by both the doctor and the patient inquiring about their opinions about the effect of chiropractic and insomnia were completed. Though nearly one-third of patients noted improvement in their sleep following chiropractic care, the results were deemed inconclusive.<sup>47</sup> A review of the literature performed by Kingston et al. cited reports of positive sleep affect following osteopathic manipulation of the cervical spine, using a technique known as CV4, though no direct correlation could be established.<sup>48</sup> Nonetheless, we do have case study evidence to support the efficacy of subluxation-based chiropractic care and insomnia. Elster reported a case in which a 9-year-old male who presented into a chiropractic office complaining of Tourette’s syndrome, ADHD, depression, asthma, insomnia, and headaches saw a complete resolution of symptomatology following subluxation-based chiropractic care. The patient was able to discontinue almost all medication.<sup>49</sup>

Substance abuse tendencies improving with subluxation-based chiropractic care have been documented in the literature as well. Holder et al. cites a study in which a 46-year-old male treated for cocaine addiction and subluxation using torque release technique (TRT), a technique founded partly on addiction research, saw improvements in his score on the Addiction Severity Index (ASI) while under subluxation-based chiropractic care.<sup>50</sup> The efficacy of subluxation-based chiropractic care and improved outcomes in addiction treatment was postulated using evidence from a study in which patients receiving treatment for drug addiction and who were also adjusted for subluxation had a better outcome and were less likely to relapse.<sup>51</sup>

When taking these studies separately into account it would seem that there is evidence that subluxation-based chiropractic care can aid in those individuals diagnosed with a broad range of mental health diagnoses. Historically, the concept of assessing patients with mental health issues and diagnoses with subluxation-based chiropractic care is not a new one. To quote BJ Palmer;

“Insanity is *always* the result of nerve impingement, derangement of quantity of mental transmission. The anastomosis of blood vessels prevents serious injury to the organs or parts to which they extend, even if compressed. The Chiropractor and the machinist are the ones to adjust the human mechanism when the functions are not normal; and the engine, when the fire, water and steam are not as desired.”<sup>52</sup>

In his textbook on chiropractic physiology, Harvey E. Vedder states,

“We must here take cognizance of the fact that the educated brain cells before they are able to perform their functions of sending out impulses to



the tissue cells, must first be supplied with transformed energy from the Innate brain cells. It then is essential in order that the educated brain as a whole shall be normal, that it be supplied by a normal quantity and quality of impulses from the Innate. It is only when this supply is cut off so that it does not reach the educated brain that we have any of the varied forms of insanity."<sup>53</sup>

According to Kent, in the early days of the chiropractic profession there were quite a few inpatient mental facilities in which subluxation-based chiropractic adjustments were routinely administered to patients, some reporting more favorable outcomes than the state mental hospitals.<sup>54</sup> Williams et al. found, after conducting a systemic review looking at the psychological effect of spinal manipulation techniques, that there appeared to be "improved psychological outcomes compared to verbal interventions."<sup>55</sup> Yannick reports a case study showing the improvements in the quality of life reported by a patient undergoing subluxation-based chiropractic care.<sup>56</sup> When viewed from this perspective, from the early days to the present day it is clear that subluxation-based chiropractic care can have a positive impact on one's mental health. However, more research must be conducted in order to further solidify the connection.

#### *Chiropractic and the musculoskeletal system*

The use of subluxation-based chiropractic care and musculoskeletal complaints has been well documented.

#### *Scoliosis*

Can subluxation-based chiropractic care help in the correction of scoliosis? Well, according to Lantz and Chen, no. They found that after assessing 42 patients with scoliotic curves who were adjusted for a one year period using osseous full spine technique that, "Full-spine chiropractic adjustments with heel lifts and postural and lifestyle counseling are not effective in reducing the severity of scoliotic curves."<sup>57</sup> Interestingly, however, scoliotic curve improvement with subluxation-based chiropractic has been reported. Morningstar conducted a 24-month retrospective study in which 28 patients received chiropractic care using the Pettibon Weighting system with scoliosis measurements of >30 degrees noted reduced Cobb-Lipmann angle measurements, as well as decreased pain and disability ratings.<sup>58</sup> Jasewski et al. measured a 62% Cobb-Lipmann angle reduction in a 7-year-old girl who received subluxation-based chiropractic using the Pierce Results Technique.<sup>59</sup> Jones reported an improvement of 4-degrees in the Cobb-Lipmann angle measurement of a 14-year-old girl following subluxation-based chiropractic care using the CBP and Thompson Technique protocols.<sup>60</sup> Chung et al. also reported similar findings of reduced Cobb-Lipmann angle measurements.<sup>61</sup>

#### *Cluster Headaches*

There is evidence in the literature that subluxation-based chiropractic care improves headaches, and that it is both safe and effective in doing so.<sup>62</sup> A search through the literature on specifically "chiropractic" and the "cluster headache" through the ICL database revealed only two studies that evaluated

chiropractic's efficacy. Foley and Tew detailed the resolution of complaints in a 47-year-old female presenting into a chiropractic office complaining of cluster headaches who experienced resolution of her complaint after five months of subluxation-based chiropractic care using KST (Koren Specific Technique).<sup>63</sup> Swain et al. reported the improvement in the cluster headaches of a 61-year-old male who suffered from Cluster-Tic syndrome, when treated with a multi-modal therapy plan including thoracic and cervical spinal manipulation.<sup>64</sup>

#### *Tying it Together*

Can we relate mental health complaints, the aberrant functioning of the musculoskeletal system, and the specific chiropractic adjustment of a subluxation? As D.D. Palmer remarked,

"If, as Analysis states...that grave occlusions of any of the spinal trunks will cause abnormality in brain tissue, causing some degree of insanity; ..it affirms that it is the duty of the Chiropractor to locate the principal occlusion causing insanity no matter under what name it may be classified. This being the case, why not correct the mental aberrations of children by adjusting displaced vertebrae? Why state "This can only be accomplished by suggestion?" Why not adjust the kid?"<sup>65</sup>

In the Journal of Neuroscience letters, Wada et al. stated that, "we have clearly provided an evidence that state anxiety affects the postural maintenance by reconstructing frequent components of the antero-posterior body sway in the health population." In other words, high anxiety leads to decreased ability to maintain proper posture.<sup>66</sup> Payne et al. reported that the presence of scoliosis increased the risk of suicidal thoughts.<sup>67</sup> Videman, a medical researcher, reported that prolonged immobilization in a joint left uncorrected not only led to a predisposition to degenerative osteoarthritis, but delayed the process of overall healing.<sup>68</sup> It has been established as fact that "Spinal manipulation evokes changes in the musculoskeletal system," namely by affecting the afferent neurons from associated tissues surrounding the spinal column.<sup>69</sup> It was postulated in the research regarding CBP that abnormal postural loads interfere with nervous transmission, and that relieving such interference will allow the return of proper functioning to the spinal column.<sup>35</sup> D.D. Palmer writes,

"Do not forget for one moment that, all vital and intellectual forces depend upon the condition of the nervous system for their expression, that there is a vital principle which distinguishes organized matter from inorganic, that when associated with matter of organized bodies controls its manifestation... Displaced bones are the direct cause of a larger percent of diseases. Any pressure upon or against nerves excites and creates abnormal tension."<sup>70</sup>

A.E. Homewood adds that, "A Structural problem, brought about by a mechanical or chemical cause, may so disturb the mental balance of the individual that he is no longer capable of coping with his environment."<sup>71</sup> Banks et al. took this concept and showed that it applied to the global well being of the patient after retrospectively surveying over 2,000 patients from over



150 different chiropractic offices who were under Network Spinal Analysis (NSA) care. Banks et al. reported a high correlation between subluxation-based chiropractic care and improved self-reports of wellness and quality of life. The patients not only felt better, but were also actively taking more steps to improve their lives.<sup>72</sup> This highlights the need for more research in the area of subluxation-based chiropractic, mental health, and the interplay with the function of musculoskeletal system.

In closing, to quote B.J. Palmer once more,

“CHIROPRACTIC succeeds in getting sick people well because IT recognizes *constants of law* IN living man, corrects interferences of those *constants* IN living man, and *then* allows THE LAW itself IN LIVING MAN to re-establish its health *constant* IN LIVING MAN. We are told “NATURE heals, NATURE cures, give NATURE time.” Can any man from *outside-in, below-up*, the “scientific researchers”, stimulate or inhibit “NATURE” and cause a cure to come *artificially* thus changing the pattern of the cause of constants of law in living man? The reverse of this is embodied in the chiropractic philosophy, science and art.”<sup>73</sup>

#### Limitations

This case study, while reporting improvements, was not free of limitations of which we need to consider before drawing conclusions. This case relied very heavily on the self-report of the patient. No universally accepted OAT's (outcome assessment tools) were used in this case to chart progress. The patient was also concurrently on medications to relieve symptoms, as well as receiving psychiatric counseling, so one is not able to say subluxation-based chiropractic care by itself contributed to the reduction of symptoms in the patient.

#### Conclusion

The results that this patient experienced while under subluxation-based chiropractic care suggest that such care can help improve the areas of mental health, as well as musculoskeletal complaints. Subluxation-based chiropractic care has been shown here and elsewhere in the literature to help improve scoliotic curve measurements, reduce severity of headaches, as well as improve aspects of mental health and well-being. However, furthering the body of research on these aspects and subluxation-based chiropractic care is highly recommended, as case studies like these do not prove a causal link. Many randomized, clinical controlled trials are needed to document relationships properly.

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a. A-P Radiograph

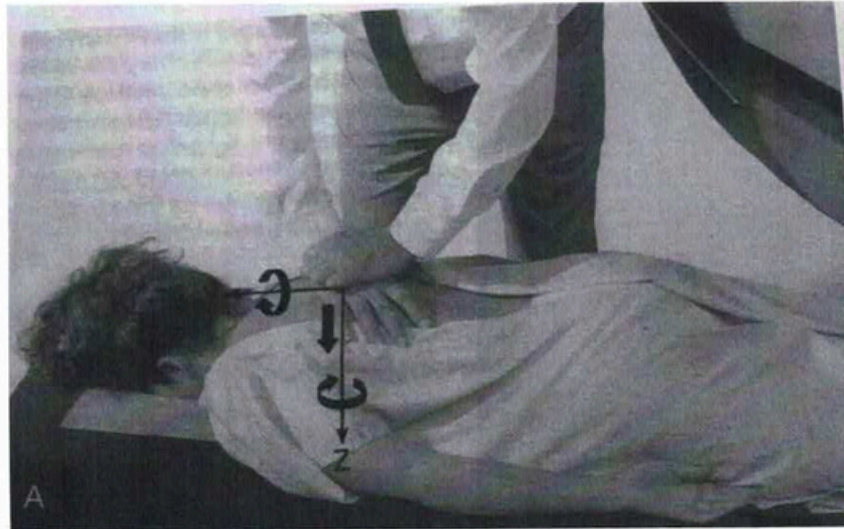
b. Lateral Radiograph

**Figure 1.1** Radiographs taken during the initial chiropractic examination.



**Figure 1.2** Chiropractor delivering a side posture adjustment.



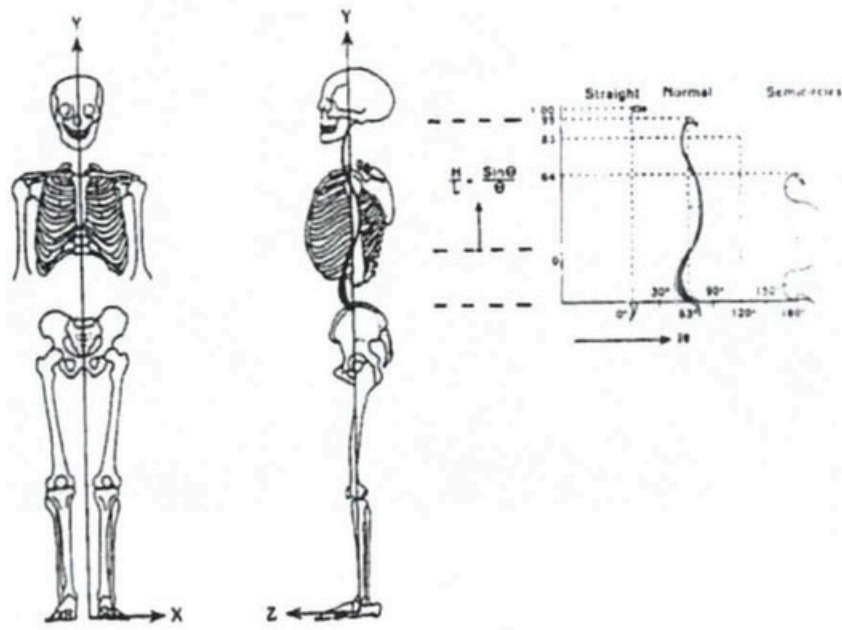


**Figure 1.3.** Chiropractor delivering a single-hand adjustment.

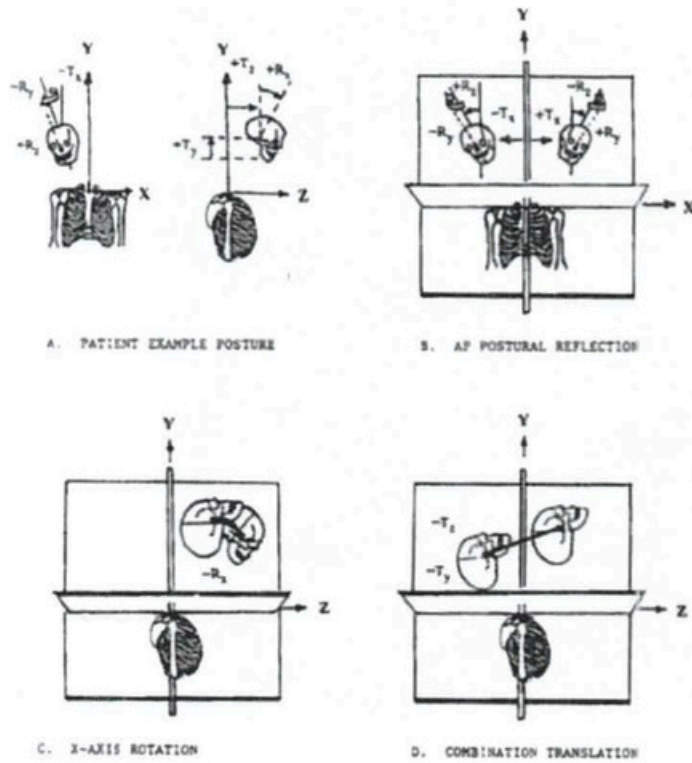


**Figure 1.4** Chiropractor delivering a cervical chair adjustment.





**Figure 1.5** The center axis in the spine, utilized in CBP.



**Figure 1.6** Example of the vectors used and accomplished with a mirror image adjustment.