Upper Cervical Chiropractic Care as a Complementary Strategy for Depression and Anxiety: A Prospective Case Series Analysis

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ABSTRACT

Objective: To evaluate a 12-session upper cervical chiropractic intervention for individuals presenting with anxiety and depression symptoms.

Methods: This is a prospective case study of 6 adults with (1) at least mild to moderate anxiety and/or depression symptoms based on pre-treatment interview and scores on the Generalized Anxiety Disorder-7 (GAD-7) and Patient History Questionnaire-9 (PHQ-9), and (2) the presence of upper cervical subluxation. Participants received care as usual at the community practice of a board-certified chiropractor with extensive post-graduate training in upper cervical specific chiropractic who was blind to patient psychological data. Participants completed the Symptom Checklist-90-Revised (SCL-90-R) pre- and post-treatment, and completed anxiety and depression measures weekly throughout treatment. A numeric chiropractic care outcome measure tracked stability and effectiveness of weekly chiropractic visits. A post-treatment interview conducted by a psychology researcher evaluated subjective effectiveness and effects on other domains (e.g. pain). Repeated measures and paired ANOVAs evaluated change on the psychological measures.

Results: Five of six patients completed all 12 recommended chiropractic visits. Repeated measures ANOVA detected significant decreases in both GAD-7 and PHQ-9 scores across treatment (p<.01). The SCL-90-R General Symptoms Index significantly decreased from pre- to post-treatment (p<.05). Four of five study completers expressed satisfaction with the outcome and that they would recommend similar care to others with anxiety or depression. Participants also reported decrease in muscle tension and pain and increase in mental clarity and physical energy.

Conclusion: The results provide tentative support for the effectiveness of upper cervical chiropractic care for anxiety and depression symptoms. Limitations of the study are discussed. Follow-up research should use randomized controlled blinded designs with samples of sufficient size to evaluate the relationship between the extent of upper cervical subluxation, the extent of resolution of psychological concerns and the extent of change in any concurrent physical concerns (e.g., pain).

Keywords: Chiropractic, upper cervical chiropractic, subluxation, mental health, spinal manipulation, spinal adjustment, complementary care, depression, anxiety

Introduction

Chiropractors are trained to consider the physical, mental, and social well-being of their patients, understanding that each component is essential to ensure positive outcomes. A survey of 2818 patients who completed chiropractic care showed that patients reported positive changes in mental/emotional status, stress and life enjoyment that are retained over a period of
several months following treatment and that 76% of patients reported mental/emotional state improvement of greater than .5 standard deviations (Blanks, Schuster, & Dobson, 1997). Although positive findings exist regarding improvement in wellbeing in general chiropractic patient samples, there is need for research that specifically evaluates the benefits of chiropractic care for individuals with mental health problems. Currently, only a limited body of research exists that supports the use of chiropractic care for depression, anxiety, attention deficit disorder and a number of other mental health concerns (e.g., Bastecki, Harrison, & Haas, 2004; Elster, 2003; Genthner, Friedman, & Studley, 2005; Holder, Duncan, Gissen, Miller, & Blum, 2001; Zauderer & Noel, 2012).

In two historical accounts of the use of chiropractic to treat mental illness, W. Heath Quigley described the management of mental illness through chiropractic work at the Chiropractic Psychopathic Sanitarium, established in 1922 in Iowa, and the Clear View Sanitarium, which was acquired in 1926 by the Palmer School of Chiropractic (Quigley, 1990, 1992). Practitioners at the chiropractic facility claimed that a high percentage of patients with schizophrenia were able to ultimately function safely in society with a success rate considerably higher than could be claimed by state mental institutions of the time (Eriksen, 2004). Unfortunately, longitudinal data and treatment records are inaccessible to scientific scrutiny because patient files were destroyed when the facilities were closed (Quigley, 1992).

One edited text during the 1970’s, Mental Health and Chiropractic: A Multidisciplinary Approach, focused on the positive effects of chiropractic care on mental health and mental illness (Schwartz, 1973). In this volume, which included submissions by Linus Pauling and Thomas Szasz, authors advocated greater attention to mental health problems through chiropractic care as well as strengthening of professional collaborations with mental health providers. Their discussions suggested that improvement in mental health through chiropractic care could take place indirectly through resolution of other medical concerns such as pain or hypertension, or directly via biochemical influence on systems underlying mood.

In their 1996 text, The Reward Deficiency Syndrome: a Biogenic Model, chiropractors Kenneth Blum and Jay Holder presented a model of the impact of chiropractic care on mental illness and addiction. According to the model, brain mesolimbic dopaminergic pathways that are responsible for reward, pleasure and states of wellbeing can be compromised by a misaligned spine, creating vulnerability to mood disorders and addictive behaviors. They argue that the vertebral motor unit and the dorsal horn are intimately connected with “the brain reward cascade,” and that addressing spinal subluxation through spinal manipulation can thereby address both mood and addictive disorders.

An increasing number of Americans with mental health problems seek complementary medical approaches (CAM), including chiropractic care. A secondary analysis of the 2007 National Health Interview Survey (NHIS) showed that among a sample of 13,018 women, 22.3% (n=2905) utilized some form of chiropractic or osteopathic manipulation, making it the second most common CAM treatment after herbal supplements (Petrigrew, 2011). Among the subsample of women with target mental health problems such as anxiety, bipolar disorder and depression, the likelihood of seeking chiropractic or osteopathic care was statistically significantly higher than in the general sample, with 31.1% (n=563) of those with depression, 33.1% (n=566) of those with anxiety and 35.5% (n=86) of those with bipolar disorder having utilized chiropractic or osteopathic care (Petrigrew, 2011). Although it could not be ascertained from the data the extent to which women sought chiropractic and osteopathic treatment specifically for their mental health problems, their high use of these services suggests a need for clinical research to understand the impact of CAM on mental health (cf. Russinova, Wewiorski, & Cash, 2002).

In one of the few randomized controlled trials evaluating the use of subluxation-based chiropractic care for a mental health problem, Holder and colleagues (Holder et al., 2001) reported a randomized, placebo-controlled single blind study to explore the influence of chiropractic care on anxiety and depression among individuals receiving treatment for polysubstance abuse. Ninety-eight participants were assigned to either an active treatment including a daily subluxation-based chiropractic regimen called the Torque Release Technique, a placebo control technique using zero force, or usual care with no chiropractic intervention.

Participants completed the Spielberger State Anxiety Inventory and the Beck Depression Inventory-II (BDI-II) at baseline and at 4 weeks, and extent of completion of addiction treatment was recorded. The researchers reported that 100% of participants in the active treatment, 75% of placebo subjects, and 56% of the usual care group completed the 28-day residential treatment program. At four weeks after onset of chiropractic care, anxiety decreased to a significantly greater extent for those receiving active treatment relative to those receiving placebo. Results for the depression measure were not reported. These findings supported the idea that chiropractic care can benefit individuals undergoing treatment for substance abuse in terms of both reduced anxiety and enhanced treatment retention.

A non-controlled study that systematically evaluated the effects of upper cervical chiropractic on depression utilized a single session of chiropractic adjustment of the occito- atlantoaxial subluxation complex among 15 individuals with clinical depression and upper cervical subluxation (Genthner et al., 2005). Participants completed the Beck Depression Inventory – II prior to and two weeks following a chiropractic adjustment, with the authors reporting significant post-treatment reduction in depression symptoms (t = 3.96, p <0.001). They reported that two participants’ depression worsened, two showed minor improvements and 11 showed marked improvement. The authors noted the need for continued research on the factors that accounted for their findings.

In sum, a number of researchers assert that subluxation and pressure in upper cervical areas can cause or exacerbate mental health concerns, suggesting the value of upper cervical adjustment (Eriksen, 2004). The aim of the current study was to contribute to the body of literature on chiropractic care for mental disorders by providing systematic evaluation of a six-
week, 12-session upper cervical chiropractic intervention for six individuals with at least mild to moderate symptoms of depression and anxiety. To maximize ecological validity (in which the study parameters approximate typical practice), there was an attempt to recruit patients who are similar to those who would present to a chiropractic practice, some of whom would have both mood disorder and comorbid physical problems. To maximize validity of the data, patients completed weekly validated measures of anxiety and depression and a pre- and post-treatment psychological symptom inventory, and post-treatment interviews conducted by a psychology researcher gathered data on subjective perceived effectiveness and other effects of the chiropractic care.

**Methods**

**Design.** This is a prospective multiple case study of the use of upper cervical chiropractic care for six individuals with symptoms of depression and anxiety. Participants received upper cervical chiropractic care for 12 visits over a period of six weeks. Prior to and following treatment they completed a validated measure of mental health and participated in a psychological interview and they also completed weekly validated measures of depression and anxiety. The chiropractor was blind to scores on mental health measures throughout the study.

**Participants.** Participants were six individuals who responded to posted flyers and internet advertisements announcing a study of upper cervical chiropractic intervention for individuals with depression and anxiety. Inclusion criteria included age between 18 and 65, scores of at least mild to moderate depression or anxiety as indicated by the Generalized Anxiety Disorder – 7 scale (GAD-7, Spitzer, Kroenke, & Williams, 2006) and the Patient Health Questionnaire – 9 scale (PHQ-9, Kroenke, Spitzer, & Williams, 2001), having no current psychotherapy, anticipating no changes in medication if currently using medication for depression or anxiety, and having no prior history of upper cervical chiropractic care.

To determine eligibility for upper cervical chiropractic care interested respondents also participated in a consultation and evaluation for the detection of upper cervical subluxation with a board-certified chiropractor with extensive post-graduate training in upper cervical specific chiropractic. Informed consent and experimental procedures were approved by the Institutional Review Board of Alliant International University.

Eleven individuals responded to recruitment efforts indicating a number of reasons for interest in the study including dissatisfaction with psychiatric care for their mood problems and positive reviews of chiropractic care from friends or family. Six of the eleven respondents met inclusion criteria. Of the five who did not, three did not meet criteria for depression or anxiety symptoms, one had just begun a new psychiatric medication, and one had an additional serious psychiatric condition. Of the six participants who entered treatment, one dropped out after six visits, citing a family emergency.

Two participants were male and four were female. They identified as Caucasian - American (3), African American (1), Latino American (1) and Caucasian – Portuguese (1). Five of the six were currently employed, and one was on temporary medical leave due to anxiety and depression. Five of six were married. Mean age was 45.33 (SD= 14.73, range of 28 to 63 years of age) and mean level of education was 14.33 years (SD=1.51). Mean reported years since onset of initial depression symptoms was 10.80 (SD= 4.21, range from 5 to 15 years) and mean reported years since onset of initial anxiety symptoms ranged was 7.71 (SD=6.44, range from .50 to 15 years).

At the outset of the study one participant had used a selective serotonin reuptake inhibitor (SSRI) medication with no dosage change for four months, and one participant had used both an over-the-counter intervention for depression (SAM-e) and a homeopathic remedy for anxiety (Naja tripudia) for one month prior to the study. Neither of those participants changed their medication regimen during the study.

Participants reported a number of comorbid pain and related conditions. Participant 1 reported moderate pain in the neck, knee, shoulder and lower back, Participant 2 reported low back tension, mild knee pain and headaches two or three times a week, Participant 3 currently used medication for asthma, heart disease and hypertension. Participant 4 complained of chronic shoulder pain. Participant 5 reported sleep and gastrointestinal problems. Participant 6 reported muscle tension in the neck and minor body tension and aches that he attributed to his anxiety.

**Procedure.** The chiropractor provided customary service in her office, with the exception that treatment was limited to a six-week, 12-session period, and was provided free of charge to participants. The initial upper cervical chiropractic appointment consisted of a brief discussion of health history, gathering of thermographic scans to determine the presence of neuropathophysiology and multiple x-rays of the cervical spine to determine presence and extent of biomechanical misalignment.

A combination of neuropathophysiology and biomechanical misalignment of the upper cervical spine made participants candidates for chiropractic care, and a plan of 12 visits over
the course of 6 weeks ensued. On each visit, the chiropractor would take a scan of the participant’s cervical spine to determine if neuropathophysiology was present. If so, the participant would receive a knee-chest upper cervical specific adjustment, which involved the chiropractor positioning the participant in a kneeling posture with his/her head and neck on a knee-chest chiropractic table parallel with the waist, with his/her head turned to one side (as determined by the misalignment noted from the x-rays). The chiropractor then delivered a manual adjustment with her hands by contacting specific points on either the first or second bone of the neck (again as determined by the misalignment noted from the x-rays).

A quick, gentle force was applied to make the adjustment, after which the participant would rest for approximately 20 minutes in a zero-gravity chair to begin the healing process and to integrate the adjustment. Another thermographic scan was taken post-rest to ascertain that physiological change was accomplished by the adjustment. On subsequent visits, additional scans were taken to determine if additional adjustments would be made. Based on the scans, an adjustment was given, or it was determined that an adjustment was not necessary. As the participants’ spines stabilized, the presence of neuropathophysiology (as evidenced by the thermographic scans) decreased thereby decreasing the need for additional adjustments.

Measures

Chiropractic Rating Scales: Removal Factor and Holding Factor. These measures were created by the researchers for the purpose of this study. At the beginning of each visit, the chiropractor assigned each patient’s thermographic scan a rating from 1 to 5, with 1 = worse, 2 = no change, 3 = slight improvement, 4 = moderate improvement and 5 = much improvement. These ratings were averaged over the 12 sessions to yield a single outcome measure that was called the Removal Factor. In addition, each patient received a score based on how many visits during which no adjustments were deemed necessary, from 1 (needed readjustment for all subsequent visits) to 11 (needed adjustment only for the first visit). This score was called the Holding Factor. For example, if a patient required 8 adjustments over the 11 visits after the initial visit, they would receive a Holding Factor score of 3.

Generalized Anxiety Disorder Assessment – 7 (GAD-7) (Spitzer et al., 2006). The GAD-7 is a validated diagnostic instrument that assesses the severity of a person’s anxiety symptoms, based on Diagnostic and Statistical Manual of Mental Disorders 4th edition (DSM-IV) criteria. Participants rate each of the seven items on a scale between 0-3 where 0 = not at all, and 3 = nearly every day. A score of 5, 10, and 15 or greater, represents mild, moderate, and severe anxiety, respectively. Based on these cut-points, three participants met criteria for mild anxiety and three participants met criteria for severe anxiety. The GAD-7 measure was completed by participants during the pretreatment interview and once per week thereafter until their final visit.

Patient Health Questionnaire-9 (PHQ-9) (Kroenke et al., 2001). The PHQ-9 is a self-administered validated diagnostic instrument designed to assess the severity of a patient’s depression symptoms based on DSM-IV criteria. Each item is rated on a scale between 0 and 3 where 0 = not at all and 3 = nearly every day. A score of 5, 10, 15, and 20 represents mild, moderate, moderately severe, and severe depression, respectively. Based on these cut-points, two, one and two participants met criteria for mild, moderate and severe depression, respectively, and one did not meet criteria for depression (this participant met criteria for severe anxiety on the GAD-7). This measure was completed by participants during the pretreatment interview and once per week thereafter until their final visit.

Symptom Checklist 90-revised (SCL-90-R) (Derogatis, 1977). The SCL-90-R is a validated self-administered inventory designed to assess psychological problems and symptoms of psychopathology within the past 7 days. The 90-item measure has a five-point rating scale that ranges from 0, indicating not at all, to 4, indicating extremely. The measure yields scores on 9 symptom scales and a Global Severity Index (GSI); the current study analyzed changes in the Anxiety (ANX), Depression (DEP) and GSI scales. Participants completed this measure on the day of their first adjustment and one week following their final visit.

Pre- and post-treatment interview. A pre-treatment interview with a psychology researcher gathered mental health and mental health treatment history, information on current symptoms, stressors and social support, and inquired about participants’ attitudes and expectations about chiropractic care. A post-treatment interview asked participants to evaluate the overall effectiveness of the treatment, their satisfaction with various aspects of the treatment, and the degree to which they would recommend similar treatment to other individuals with depression or anxiety. They were also asked about any significant changes in life circumstances over the course of the study.

Data Analyses. Descriptive statistics (mean and standard deviation) for the Release Factor and Holding Factor scores, SCL-90-R scales, GAD-7, and PHQ-9 measures were calculated. Pre versus post-treatment-paired ANOVA’s were conducted for SCL-90-R scales GSI, ANX, and DEP (overall psychological distress, anxiety and depression). Within-subjects repeated measures ANOVAs were conducted for GAD-7 and PHQ-9 data over the six weeks of treatment. Due to non-completion of the study by one individual, only five participants provided pre and post-treatment data. Data from the post-treatment interview including patient treatment satisfaction and effectiveness ratings are reported.

Results

Chiropractic Treatment Outcomes. Release Factor scores range from 2.67 to 3.92 for the five participants who completed treatment, with a mean of 3.17 (SD=.51), which places the mean value at just above slight improvement (a score of 3). Holding Factor scores ranged from 3 to 5, which indicate that across the sample, between 3 and 5 of the 11 post-introductory visits did not require chiropractic adjustment.

Depression (PHQ-9) across treatment. Figure 1 presents PHQ-9 data across the study for all patients. A within-subjects
repeated measures ANOVA showed that there was a significant decrease in depressive symptom ratings across time for the five participants who completed the study \((F(6,24) = 9.41, p < .001)\). The partial eta indicates that 70% of the variance is related to change over time.

**Anxiety (GAD-7) across treatment.** Figure 2 presents GAD-7 data across the study. A within-subjects repeated measures ANOVA showed that there was a significant decrease in anxiety symptom ratings across time for the five participants who completed the study, \(F(6,24) = 5.158, p < .01\). The partial eta indicates that 56% of the variance is related to change over time.

**SCL-90-R scores across treatment.** Figures 3, 4 and 5 present pre- and post-treatment SCL-90-R scores for the ANX, DEP and GSI scales. Paired ANOVAs detected significant differences across treatment only for the GSI, \(F(6,24) t = 2.947, p < .05\). However, means for the 5 participants decreased numerically (less at post-treatment) on the ANX and DEP scales, suggesting that statistically significant findings may have been detected with a larger sample.

**Post-treatment Satisfaction.** Three of the five participants who completed treatment reported that their symptoms of depression and anxiety reduced after beginning care and continued to decrease throughout the study. Their numeric questionnaire data was consistent with their reports. All participants expressed comfort with the chiropractor and faith in the credibility of the practice. Four of the five participants who completed the study indicated that they would recommend this kind of treatment to someone with symptoms of anxiety or depression. The fifth treatment completer indicated that he would not recommend this care to someone else with similar symptoms because he experienced minimal improvement. Four of the five treatment completers reported satisfaction with the changes they experienced from the treatment, and three of the five completers indicated that they would choose this care again.

**Post-treatment reports of co-morbid conditions.** Participants described a number of additional positive physical changes over the period of treatment. Participant 1 reported a decrease in shoulder pain and increase in clarity of thinking. Participant 2 did not complete the study. Participant 3 reported a considerable decrease in his chronic hypertension over the course of the study but he did not attribute it to study participation (he also indicated that he would not recommend the intervention to others). Participant 4 reported cessation of shoulder pain. Participant 5 reported reduction in insomnia, improvement in digestion, and increased energy. Participant 6 reported no physical changes during the study period.

**Discussion**

This small prospective case series study investigated the effects of upper cervical chiropractic care on symptoms of anxiety and depression. Upper cervical chiropractic care is a specialized and unique form of chiropractic that focuses solely on the top two bones in the neck, the atlas and axis, and their relationship to the brainstem. These two bones are primarily important because they cradle and protect the brainstem, which is the origin point of a number of neurons releasing biogenic amines that are known to influence mood and are held in place just by muscles and ligaments. Upper cervical chiropractors maintain that subluxation of these vertebrae can create inflammation around the brainstem which can interfere with neuronal transmission (Eriksen, 2004), suggesting that adjustment can potentially lead to direct benefits to mood and indirect benefits via resolution of other symptoms such as pain.

The present study found reduction in anxiety and depression symptoms and reduction in overall psychological distress among individuals with mild to severe depression, anxiety or both. One of six participants dropped out of treatment, and four of the five treatment completers indicated satisfaction with the treatment, confidence in its effectiveness, and willingness to recommend others with anxiety and depression to this treatment.

The present study did not use a controlled, randomized, or large sample design. A key strength of the study is that it systematically explored the impact of a standardized treatment using both validated measures of mental health status and consistent biweekly chiropractic outcome measures. Another strength of the design was that the chiropractor was blind to patient psychological outcome measures and interviews were conducted by someone other than the chiropractor, which may have reduced patient tendency to exaggerate treatment effectiveness. Naturalistic empirical evaluation of customary treatments is challenging for community-based practitioners and there is a need for similar experimental models that make such research both viable and valid.

It is important to interpret these data conservatively, and as preliminary, due to a number of experimental limitations. Non-controlled studies are inherently subject to placebo and demand effects. The findings may therefore reflect participants’ expectations of improvement, motivation and desire to feel better, desire to please the researcher or positive effects in the therapeutic ritual not related to chiropractic adjustment. For example, lying in a zero gravity chair in the presence of a respectful and credible practitioner may have been a source of relaxation in itself, contributing to a decrease in report of anxiety or depression symptoms.

Furthermore, although symptoms decreased across the entire treatment period, visual inspection of the GAD-7 and PHQ-9 scores shows that the most profound decrease in symptoms occurred between the pretreatment consultation and the assessments after the first week of treatment, suggesting the possibility that participants may have consciously or unconsciously inflated pretreatment mood disturbance ratings to acquire access to the research study. Finally, although depression and anxiety symptoms decreased, patients reported other symptom alleviation such as reduced pain and muscle tension. Therefore, it cannot be ascertained whether resolution of mood problems was a direct effect of chiropractic adjustment or indirectly related to other symptom relief.

**Conclusions**

This prospective case series study provided tentative support for the effectiveness of a 12-session upper cervical chiropractic intervention for individuals presenting with...
anxiety and depression symptoms and upper cervical subluxation. The study also provides one model for naturalistic research in an office setting using standardized assessment procedures, validated assessment devices and external parallel evaluations of effectiveness. An ideal future study of this nature would utilize a sham upper cervical adjustment control group (Vernon, MacAdam, Marshall, Pion, & Sadowska, 2005), a larger sample, and more than one chiropractic professional.

The chiropractic rating scale (Holding Factor & Removal Factor) was created for the purpose of this study; future research might attempt to formally validate this measure of chiropractic effectiveness and to utilize a large enough sample size to permit correlation of extent of chiropractic adjustment with extent of resolution of anxiety or depression symptoms and other symptom change, such as pain reduction. In sum, there are undoubtedly multiple limitations to the interpretation of these findings; nevertheless, it represents an important first step towards what could be a larger, randomized controlled trial.

References


**Figures**

**Figure 1.** PHQ-9 data over time for 6 participants. ¹Participant two dropped out of study.

**Figure 2.** GAD-7 data over time for 6 participants. ¹Participant two dropped out of study.
Figure 3. SCL-90-R anxiety scale T-scores, by participant. ¹Participant two dropped out of study

Figure 4. SCL-90-R depression scale T-scores, by participant. ¹Participant two dropped out of study

Figure 5. SCL-90 GSI scale T-scores, by participant. GSI = global severity index ¹Participant two dropped out of study.
Examples of Scans and X-Rays Used

Anterior-posterior open mouth, or APOM, x-ray, one of five x-rays taken to analyze the misalignment component of the upper cervical subluxation complex.

Base posterior x-ray, one of five x-rays taken to analyze the misalignment component of the upper cervical subluxation complex.
Lateral cervical x-ray, one of five x-rays taken to analyze the misalignment component of the upper cervical subluxation complex.

Left lateral bending APOM, one of five x-rays taken to analyze the misalignment component of the upper cervical subluxation complex.
Right lateral bending APOM, one of five x-rays taken to analyze the misalignment component of the upper cervical subluxation complex.

An example of pre and post thermographic scans. The blue lines represent a scan taken before an adjustment was made, the green lines taken afterward.