Case Study

Resolution of Anxiety and Depression Along with Decreased Medication Usage in a 30-Year-Old Female Undergoing Chiropractic Care: Case Report & Review of Literature

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Abstract

Objective: The purpose of this case study is to describe the outcomes following chiropractic care in a patient suffering from anxiety and depression.

Clinical Features: 30-year-old female patient with a clinical diagnosis of depression and anxiety presented to a chiropractic office for care.

Interventions and Outcomes: The patient was assessed for vertebral subluxations and managed using Diversified technique. Radiographs and thermal scanning were utilized to characterize vertebral subluxation. A loss of the normal cervical curve along with anterior head carriage and dysautonomia were found. Under chiropractic care the patient's anxiety and depression resolved, her sleep, energy and quality of life improved and she was able to cease taking medications. Her cervical curve improved, anterior head carriage and dysautonomia reduced

Conclusion: The woman reported on in this case experienced positive mental health outcomes following chiropractic care coupled with a reduction in vertebral subluxation and related dysautonomia. Further study on the relationship of vertebral subluxation and clinically diagnosed anxiety and depression are recommended.

Key Words: *chiropractic, depression, anxiety, subluxation, adjustment, mental health, dysautonomia*

Introduction

Anxiety

The Diagnostic and Statistical Manual, 5th ed. defines anxiety as the anticipation of future threat. Generalized anxiety disorder (GAD) is twice as likely to affect women as it is to affect men, with the peak of prevalence to be in the middle aged population. In regards to anticipation, anxiety is seen associated with muscle tension and vigilance in preparation for future danger and cautious or avoidant behavior.[1] It is suggested that anxiety disorders affect up to 40 million Americans 18 years or older, or 18% of the population.[2] Females are twice as likely to experience GAD than males, especially women that are of European descent compared to those of non-European descent.[1] Physical symptoms that are involved in anxiety include: restlessness or on edge, easily fatigued, difficulty concentrating, mind going blank, irritability, muscle tension and sleep disturbance. Due to the nature of GAD, it has a high correlation when it comes to overlap with those diagnosed with major depressive disorder (MDD) and panic attacks.[3,4]

Anxiety disorders are the most prevalent of psychiatric disorders, with one third of the population being affected an anxiety disorder at some point in their lifetime.[5] In 1990 alone, treatment of anxiety disorders cost Americans $42.3 billion, accounting for one-third of America's clinical treatment debt.[5] Clinical treatment for anxiety includes pharmacological drugs, such as selective serotonin reuptake inhibitors (SSRI), or cognitive behavior therapy, with long term therapy to prevent relapse.[6]

Panic Attacks and Relationship with GAD

Panic attacks, also known as anxiety attacks, are an abrupt surge of intense fear or intense discomfort that reaches a peak within minutes of onset.[7] Panic attacks can occur while a patient is in either a calm or anxious state. Those that occur in an anxious state are known as expected panic attacks, as the person experiencing anxiety knows it is leading into a panic

attack. In order for someone to be having a panic attack, they must be experiencing at least four of thirteen symptoms, which include, but are not limited to, heart palpitations, sweating, trembling, shortness of breath, chills and dizziness.[7]

Panic attacks affect twice as many females as it does males, and is most prevalent in women of European Caucasian descent. Lifetime prevalence of anxiety attacks are estimated to be 22.7% without agoraphobia.[8] Much like anxiety, there is no direct pathophysiological cause for anxiety attacks, but theories involving the amygdala and emotional regulation centers of the brain have been established. Traditional treatment for panic attacks involves pharmaceutical intervention with antidepressants and benzodiazepines, much like the treatment for GAD.[9]

Depression

The Diagnostic Statistical Manual, 5th ed. defines major depressive disorder (MDD) as the presence of sad, empty, or irritable mood accompanied by somatic and cognitive changes that significantly affects the person's capability to function. Depression is diagnosed when the patient has five symptoms that occur within a 2-week time period. The symptoms involved in depression include the following: depressed mood most of the day, diminished interest or pleasure in activities throughout the day, significant weight loss, insomnia or hypersomnia nearly every day, psychomotor agitation or retardation nearly every day, fatigue or loss of energy approximately every day, feelings of worthlessness or excessive guilt every day, diminished ability to think or indecisiveness nearly every day, and recurrent thoughts of death (not just fear of dying).[10]

About 16% of the population is estimated to be affected by MDD, with women being 1.7 times more likely to being diagnosed with MDD when compared to men.[1,11,12] The World Health Organization (WHO) has ranked depression as the fourth leading cause of disability worldwide, and projects depression will be the second leading cause by 2020.[13] While there is no definite pathophysiological diagnosis when it comes to the cause of depression, correlations of neuroanatomy and somatic diseases have been linked to the development of MDD.[14-16]

Case Report

History

A 30-year-old female presented to a chiropractic office with primary complaints of anxiety and depression with a secondary complaint of infertility. Prior to visiting a chiropractor, the patient was treated with Lexapro and Clonazepam as treatment for anxiety and depression. The patient was prescribed Paxil for 8 years, until being taken off during attempts to become pregnant for the course of one year. At the physical examination, the patient was taking Clonazepam prescribed as needed, along with daily doses of Lexapro for two weeks. Patient stated that she needed to take her prescribed Clonazepam "too often lately," on her patient intake form. She reports being diagnosed with anxiety and depression 8 years prior to her initial chiropractic exam. Paxil and Lexapro are known as Selective Serotonin Reuptake Inhibitors (SSRI) to treat depression and GAD, while Clonazepam is known as a sedative that is used for seizures, panic attacks, and anxiety.

Chiropractic Examination

The patient was analyzed for vertebral subluxation and pathology of the cervical spine with radiograph examination and thermographic examination. Posture analysis was also included on the physical exam to analyze the distribution of bilateral shoulder and hip height, along with relation of the positioning of the head in comparison to the shoulders by having the patient stand against a grid wall to determine the differences in height when comparing right to left. Orthopedic examination findings were unremarkable. Posture analysis showed abnormalities involving lowered right shoulder, lowered left iliac crest, and anterior head carriage. Radiograph analysis showed a cervical lordosis measuring at 25-degrees along with anterior head carriage measuring at 10 millimeters (Figure 1). Dropped shoulders have been shown to have a relationship with lower cervical radiculopathy, while anterior head carriage has a relationship with tension headaches and reduced mobility of the cervical spine.[17,18] A difference in height of the iliac crests indicate pelvic torsion, which can lead to symptoms such as low back pain, facet pathology, and nerve root pathology.[19] All bone, cartilage, and soft tissue findings were unremarkable. Progress evaluation forms were used to determine subjective measures of patient care over the course of care.

Thermography imaging was performed using Chiropractic Leadership Alliance (CLA) Insight™ thermal reading technology to measure the temperature differentials of the paraspinal musculature of the cervical spine. Paraspinal thermal scanning has been shown to have good to excellent reliability for technique use and is useful in the evaluation of vertebral subluxation.[20] Thermography performed showed mild heat distribution favoring right aspect of the atlas, with severe heat distribution favoring the left aspect of the neck from vertebral segments C2-C5 (Figure 2).

Outcomes

The patient was initially placed on an 18-week care plan consisting of four chiropractic adjustments per week for the first ten weeks of care. Patient was then seen twice a week for the next eight weeks. Chiropractic adjustments were performed using objective findings from the initial chiropractic examination. Adjustments performed consisted of segmental low-force, high amplitude thrusts in order to reduce subluxation, normalize postural distortions, increase flexibility and joint mobility and increase range of motion.

After two weeks of subluxation based chiropractic care, patient had a decrease in frequency of panic attacks from seven times per week to less than one per week. Patient also stated that she was sleeping better and had an increase in energy. Subjective patient progression forms were completed once a month for the first four months of care. By the fourth month of care, patient stated that she had no depression or anxiety and that she has an increased quality of life due to the ability to be happy and having an increase in energy. After long-term wellness care of two years, the patient ceased all

medication for anxiety and depression.

Objective Measures

Objective measurements of radiograph evaluation demonstrated a decrease of anterior head carriage by 7mm, along with a 5-degree increase in atlas angle, from 23-degrees to 28-degrees (Figure 3). Cervical curve increased 9 degrees, from an initial 25 degrees to a normal 34 degrees. According to McAviney, the normal cervical curve measurement range is between 31 and 40 degrees, and it should be the goal of chiropractic treatment to maintain the cervical spine in this range.[21] Thermography readings decreased from highly severe readings favoring the left cervical paraspinal musculature to severe within one month of care (Figure 4). A follow up thermography scan was not performed at re-evaluation due to the use of radiographs, but was performed approximately two months after reassessment (Figure 5). The cervical spine had readings demonstrating a more balanced nervous system, as severe and mild readings were on both the right and left side six months after starting care.

Diversified Technique

Diversified technique is identified as the approach to the management of functional disorders of motion segments, and attempts to apply the most ideal technique in clinical procedure.[22] Any adjustments performed with this chiropractic technique has the specific goal of reducing vertebral subluxation by using a high velocity, low amplitude thrust on the segmental contact point of which a chiropractic delivers the adjustment.[23] Diversified technique generally uses radiographs to determine vertebral subluxation, motion palpation, and other modalities and objective measures to achieve goals set by the doctor.[24]

Discussion

Depression - Allopathic Treatment

Depression is currently treated with pharmaceutical drugs. Drugs used are tricyclic antidepressants (TCAs), monoamine oxidase inhibitors (MAOIs), and SSRIs. MAOIs are the least prescribed, as it has concerns about safety.[25] Side effects of SSRIs are dependent on dosage, as it affects a variety of normal body functions, such as gastrointestinal organs leading to dysfunction.[26] Treatment for major depressive disorder in 2010 cost $210.5 billion with 45-47% attributable to direct costs, 5% to suicide related costs, and 48-50% of workplace costs.[27]

Depression - CAM Therapy

Due to costs and effectiveness of drugs used for treatment of depression, complementary and alternative medicine (CAM) has been explored for those who suffer from MDD. A literature review published in "Neuropsychiatric Disease and Treatment" underwent research in four categories of CAM therapies for depression.[28] Categories involved in the literature review included homeostatic, conventional, mind-body, and spiritual. CAM therapies involved with treatment of depression are dependent on the severity of the diagnosis. For mild to moderate cases of depression, herbs such as St. John's wort, rhodiola rosea, and saffron are deemed useful. Vitamins such as vitamin B, vitamin D, and folate have also shown potential in treating depression, as these vitamins are essential to proper function of neurons.

Anxiety - Allopathic Therapy

Allopathic treatments of anxiety involve serotonin-norepinephrine reuptake inhibitors (SNRI), benzodiazepines, anti-seizure medications, and TCAs. These medications have potential side effects such as increase suicidality, inhibit memory coding, impaired cognition and coordination, and death, respectively.[11] Consistent lab findings and autonomic patterns of generalized anxiety disorder seem to be unknown today, although there have been theories that have been proposed. Theories suggested being responsible for GAD include the autonomic nervous system having a role in emotion regulation and the relationship of anxiety with the adrenal glands.[14,29]

Anxiety - CAM Therapy

With severity of potential adverse side effects caused by pharmaceutical treatment for anxiety, CAM therapies for anxiety have been searched. Herbal remedies for GAD involve, but are not limited to, borage, lavender, mimosa, roseroot, saffron and brahmi.[30] While some herbs have unknown mechanisms when it comes to treatment of anxiety as a CAM therapy, other herbs have effects on the hypothalamic-pituitary-adrenocortical (HPA)-axis, gamma-aminobutyric acid (GABA) production, and monoamine inhibition.

Studies regarding alternative herbal use for anxiety have shown positive results, but the conclusions are limited due to bioequivalence of the herbs used. Soil quality, environment, and other growing factors, as well as poor reporting of data in some studies performed, limit the reproducibility of previous studies performed using a greater population .[31] In vivo evidence of the herbs used can also not be measured properly in human trials, as it affects the clinical efficacy of the study being performed.[30]

Vertebral Subluxation

The vertebral subluxation complex consists of nine categories, which explain how the subluxation affects the body. According to Charles Lantz, the categories consist of kinesiology, neurology, myology, connective tissue physiology, angiology, inflammatory response, anatomy, physiology and biochemistry.[32] According to the neurodystrophic model, subluxation is associated with exaggerated sympathetic firing of the autonomic nervous system, which leads to altered organ and tissue response to adapting.[33] The effect of vertebral subluxation on the sympathetic nervous system (SNS) is due to the relationship that subluxation affects the psychoneuroendocrine axis which leads to the adrenal glands to be affected, causing an unbalanced release of hormones that affect the SNS.[34]

While under stress, the body signals the adrenal glands to release a hormone called cortisol. Cortisol is the end product of the HPA-axis, which is activated when a person is

confronted with uncertain, unpredictable and stressful situations.[35] The release of cortisol allows the body to maintain a state of homeostasis while in stressful situations, inhibiting the parasympathetic nervous system (PNS) and upregulating the SNS as an adaptive response.[36] The inability of maintaining a balance between the SNS and PNS has been identified in those that suffer from anxiety and depression.[37,38] Constant firing of the SNS in those that suffer from chronic anxiety and depression leads to an insensitivity of the adrenal glands, which will eventually result in a decrease in cortisol release. This is considered to be produced by desensitization of the HPA-axis caused by chronic stress, which, in theory, can be due to neurodystrophic model caused by vertebral subluxation.[39]

Removal of vertebral subluxation can remove nervous system interference leading to a decrease of the neurodystrophic effect on the HPA-axis. Sanctioning the HPA-axis to regulate properly gives the body the opportunity to balance out the SNS and PNS, thus having a positive effect on the adrenal glands. With a balance in SNS and PNS, it can lead to increased sensitivity of the adrenal glands, which will permit an increase in cortisol levels, letting the body to return to optimal function with proper cortisol release. Removing vertebral subluxation allows the patient to self-regulate their hormone system involving the HPA-axis, potentially leading to a decrease, and possible resolution, of depression and panic attacks.

Parasympathetic Nervous System Measurements

The PNS arises from the cell bodies of the motor nuclei of cranial nerves III, VII, IX, X, and XI in the brainstem and from the second, third, and fourth sacral segments of the spinal cord.[40] A popular mechanism of measuring PNS stimulation has been through Heart Rate Variability (HRV). HRV as a process involving two related but distinct self-regulatory mechanisms of vagal modulation of cardiac activity; tonic (resting) vagal tone and phasic regulation in response to environmental task.[41] Heart rate variability analysis determines the balance between PNS and SNS using time and frequency domain measurements, as increased heart rate is a measurement of vagal withdrawal, as shown in anxiety and depression.[33,42,43]

Several chiropractic studies have been measuring parasympathetic activity post adjustment using HRV. A study that involved heart rate variability measurements post chiropractic adjustment has been shown to decrease overall sympathetic activity, allowing for a decrease of blood pressure and increase activation of the PNS.[44] A study performed by Zhang establishes an increase of heart rate variability after an adjustment, showing an increase in vagal tone post chiropractic treatment.[42]

Subluxation and Neurological Effects of the Central Nervous System

With antidepressants being effective in less than 50% of patients, further research for alternative treatment for anxiety and depression should be explored as it has been shown that the prefrontal cortex, amygdala, and cingulate gyrus are involved in those that suffer from depression and are affected directly through chiropractic care.[14] By increasing parasympathetic activity, the HPA-axis will receive relief with the inactivation of the SNS, along with patients obtaining neuroplastic changes in the prefrontal cortex and cingulate gyrus through chiropractic adjustments.[45] It has also been documented that parasympathetic stimulation occurs after a chiropractic adjustment is performed, along with amygdala modulation with PNS stimulation through the vagus nerve.[40,45,46]

Review of Literature

A review of literature was performed for this topic by using multiple peer reviewed sources regarding chiropractic, anxiety, and depression.

Prater-Manor performed a case study on a patient with hypertension and anxiety. The patient in the study underwent Thompson Technique for a time period of six months with the frequency of twice per week.[2] After six months, the patient underwent a re-evaluation. At the re-evaluation, blood pressure of 170/110mmHg normalized to 120/80mmHg, and the medical doctor of the patient took the patient off of all medications. The patient also underwent stress management skills and counseling during treatment. The conclusion of the study shows resolution of anxiety and hypertension under chiropractic care.

Teytelbaum performed a case study on a 58-year-old male patient with anxiety and depression accompanied with shoulder and neck pain.[47] Diversified full spine technique was used for 3 months for a total of 39 visits. A Short Form Health History (SF-36) was taken at the beginning of treatment in which the patient scored a 20 under the Mental Health subcategory. The same test was given to the patient at the reassessment after three months of care where the patient scored a 56 under the Mental Health subcategory of the SF-36.

Vaden and Pratt performed a case study on a patient complaining of depression, insomnia, pre-menstrual syndrome, and dysautonomia using Torque Release Technique.[48] The patient presented with "moderate" symptoms of depression at initial physical exam. After three months of care, the patient presented with a decrease in depression symptoms by reducing from "moderate" to "mild."

Behrendt and Olsen published a case study of a 19-year-old female that suffered from anxiety that underwent chiropractic care.[49] The patient was under pharmaceutical intervention as treatment for her anxiety when beginning care. Objective measures involved thermography and EMG scan of the patient at the initial exam. After four months of care, the patient was able to discontinue pharmaceutical intervention and reduce her anxiety by 80%.

Limitations

Limitation of this study involves not having a large population of participants, as it is a case study. Daily stressors involved in the patient's day-to-day life were not assessed, so a change of lifestyle could have played a role in the results. Patient was taken off of Paxil antidepressant medication 11 months prior to seeing a chiropractor, in attempts to get pregnant, which can

also play a role in the severity of the chief complaint at the first visit. Although the patient was taken off of Paxil 11 months prior to care, she was prescribed Lexapro two weeks before beginning care, as well as Clonazepam when needed. This change in antidepressant medication can also play a role in treatment. Patient was taking Lexapro and Clonazepam early in her care. Thermography scan not performed on date of re-evaluation is another limitation, as it takes away an objective measure for the case at that point in the care plan.

Conclusion

The patient involved in this case study states that she had no anxiety or depression after four months of chiropractic care on subjective patient progression forms. After long term care of two years, the patient ceased all medication for anxiety and depression. The results obtained in this case study shows positive improvement in mental health when chiropractic care was implemented. Further research in the mental health outcomes following chiropractic care is needed.

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Appendix

Figure 1

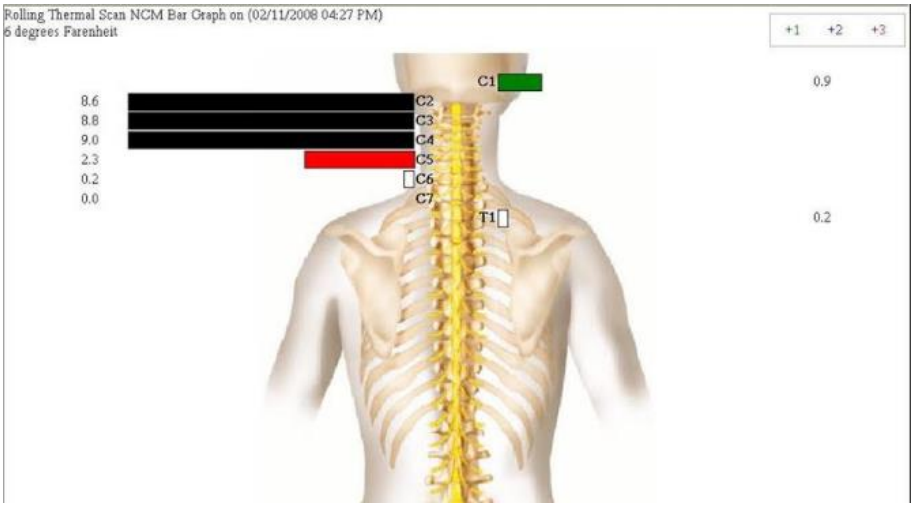

Figure 2

Figure 3

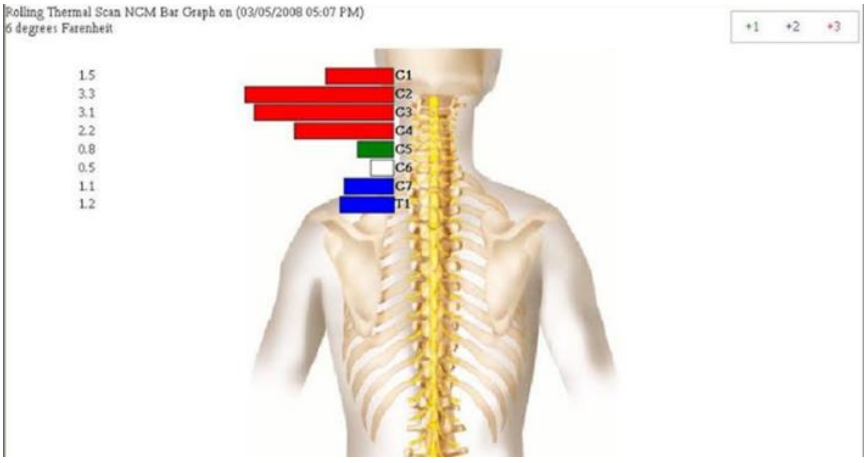

Figure 4

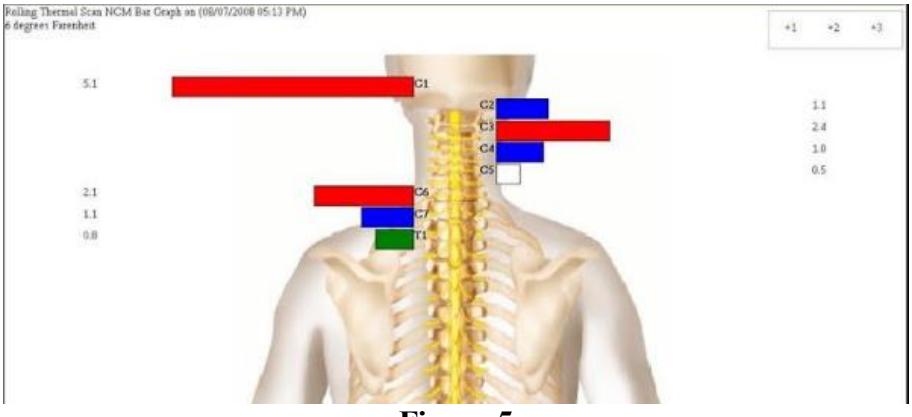

Figure 5