

# Effect of Subluxation-Based Chiropractic Care on Quality of Life in a Patient With Major Depression

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## ABSTRACT

**Objective:** This report documents the chiropractic care of a 46-year-old man presenting with major depression, receiving specific chiropractic adjustments and suggests a relationship between subluxation correction and increases in quality of life and well-being.

**Clinical Features:** A 46-year-old male presented with major depression. He was suffering from his third bout of depression at the time of his first visit. He presented with many symptoms related to his depression, such as generalized bilateral neck and low back pain, anxiety, fatigue, and a small appetite. He presented with many symptoms associated with effects from his medication, including a decrease in sex drive, dizziness, overall muscle weakness, and insomnia. Initial chiropractic exam, including prone and supine leg length inequality, static and motion palpation, static surface electromyography, thermography and x-ray analysis, revealed vertebral subluxations.

**Intervention and Outcome:** The man received specific chiropractic adjustments for the correction of vertebral subluxations using Diversified Full Spine (contact specific, high velocity, low amplitude) and Palmer Toggle Recoil (contact specific, high velocity, low amplitude with recoil thrusts of the C1 vertebra) techniques. During the course of care, there was a significant increase in self-assessed quality of life and wellness indicators, including Global Wellness scale, Daily Living Health Questionnaire (SF36), and a retrospective Health, Wellness and Overall Quality of Life Self Assessment questionnaire.

**Conclusion:** The progress that has been documented with this man suggests a connection between the correction of vertebral subluxations and increased wellness and quality of life.

**Key words:** *Vertebral Subluxation, Chiropractic, Wellness, Self-reported quality of life, Depression*

## Introduction

Mood disorders affect 18.8 million American adults (9.5% of the population) in any given year<sup>1</sup>. Clinical depression is quite different than the “blues” that most everyone experiences, or even grieving for the death of a loved one. It is dangerous and can be debilitating. The most common types of mood disorders are: Major Depression, Dysthymia, and Bipolar Disorder. According to the National Institute of Mental Health (NIMH), some of the more common symptoms of these disorders are as follows:

### *Depression*

- Loss of interest or pleasure in hobbies and activities that were once enjoyed
- Decreased energy, fatigue, feeling “slowed down”

- Feelings of guilt, worthlessness, helplessness, hopelessness, pessimism
- Persistent sad, anxious, or “empty” mood
- Difficulty concentrating, remembering, making decisions
- Insomnia, early-morning awakening, or oversleeping
- Appetite and/or weight loss or overeating and weight gain
- Thoughts of death or suicide; suicide attempts

### *Mania*

- Abnormal or excessive elation
- Unusual irritability
- Decreased need for sleep

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- Grandiose notions
- Increased talking
- Racing thoughts
- Increased sexual desire
- Markedly increased energy
- Poor judgment
- Inappropriate social behavior<sup>2</sup>

The theories behind the causes of depression vary. There is evidence showing correlation between cervical trauma and onset of social disorders.<sup>3-43</sup> Although scientists still debate about the true causes of social and mood disorders, the final common pathways of depression, regardless of the initial triggers, involve biochemical changes in the brain.<sup>44</sup> There are many theories describing the roles of serotonin, GABA, dopamine, and opioid peptides as being the substances responsible, when imbalanced or deficient, for mood disorders. More recently, Blum describes a unifying theory to describe what is happening, which he refers to as Reward Deficiency Syndrome. This is based on his work on the Brain Reward Cascade, which is a scientific model that provides an explanation for the neurobiological and neurophysiological mechanism of how the body expresses a state of well-being.<sup>45</sup> He describes that when the cascade is interrupted or distorted, either by an imbalance or deficiency of neurotransmitters, well-being is replaced by anxiety, anger, or cravings for substances that mask or relieve those feelings, such as drugs and alcohol. This is what he describes as Reward Deficiency Syndrome.<sup>46</sup>

Diagnosis of major depression is made by testing positive to diagnostic criteria described by the American Psychiatric Association in the Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM-IV).<sup>47</sup>

Onset of depression is variable, usually developing over a period of days or weeks. It may also have a sudden onset, which is associated with a severe psychosocial stress or trauma.<sup>47</sup>

Medical treatment of depression includes the use of various antidepressants, such as Prozac and Paxil, psychotherapies, and electro-convulsive therapy (ECT).<sup>2</sup>

Vertebral subluxation was first described by D.D. Palmer in 1895. He defined vertebral subluxation as follows: "A (sub)luxation of a joint, to a chiropractor, means pressure on nerves, abnormal functions creating a lesion in some portion of the body, either in action, or makeup."<sup>48</sup> Since 1895, the model of vertebral subluxation has expanded, as Kent describes. He describes five neurobiological models, as well as three clinical operational models.<sup>49</sup> The Association of Chiropractic Colleges, in its position paper, defines subluxation as follows: "A subluxation is a complex of functional and/or structural and/or pathological articular changes that compromise neural integrity and may influence organ system function and general health."<sup>50</sup> Common to all those models of subluxation are kinesiology and neurologic dysfunction, according to Lantz.<sup>51</sup> The practice of chiropractic is the correction and development of spinal and neural integrity by the detection and correction of vertebral subluxation.<sup>52</sup>

## Case Report

A 46-year-old male with the occupation of software support engineer presented for chiropractic care with major depression and the intention of improving his overall health. He reported a previous history of major depression: one in 1987, and one in 1996. His current episode of depression had started five months prior and he was still suffering from it when he presented. He stated that his depressive episodes of 1996 and This most current one were work related, and were triggered by the high stress situation of his job. He had been on medical leave from his job because of this current episode for two months.

A life history was taken, and revealed many symptoms associated with his depression, such as loss of appetite, malaise, fatigue, joint stiffness, neck pain, low back pain, thoughts of suicide and anxiety. He related symptoms that he stated were attributed to the medication he had been prescribed (Paxil 40mg/day), and had an onset shortly after starting medication therapy, such as decreased libido, increased perspiration, weakness, and dizziness. His previous depressions were treated with anti-depressants. He had not received previous chiropractic care. His life history also revealed several significant physical traumas, including a hospitalization for a trauma induced hernia at the age of six from having a cinder block dropped on his stomach, many traumas from his participation in martial arts in the 1970s and 1980s, and a rear-end motor vehicle collision in March of 1990.

An initial chiropractic evaluation on revealed multiple findings of vertebral subluxations. Prone and supine leg length analysis revealed a right inequality in the prone position of ¼", and a left inequality in the supine position of ¼". Static palpation revealed muscle hypertonicity at the C1, C2, C5, T1, T6, T11, L2, and L5 spinal levels. Motion palpation revealed fixation at the C1, C5, T1, T6, and L5 spinal levels, as well as fixation of the right SI joint. Posture analysis demonstrated a left high ear of 3 cm, and a high left shoulder of 2 cm. Active cervical range of motion revealed no discomfort, and decreased right rotation, as well as decreased flexion. Lumbar range of motion revealed no discomfort, and was found to be within normal limits. Thermography studies using the neurocalometer (NCM) revealed a consistent break at the C4/C5 spinal level, and significant asymmetries throughout the spine. Static surface electromyography studies of the cervical spine were performed using the Insight 7000 Subluxation Station and revealed gross muscular imbalance throughout the cervical region. A grade 4 muscle weakness (some resistance) was noted at the left C5 and left S1 nerve root levels. Deep tendon reflexes were found to be within normal limits (+2) according to the Wexler Reflex Grading Chart. Pathological reflexes showed no abnormalities. Gait and ambulation were normal.

Upon self-assessment using the Global Wellness Scale, the man rated himself as a 3 on a scale of 1 to 10. The global wellness scale is a digital scale using 1-10 with 10 being the best score, and 1 being the worst. It is similar to the visual analog scale developed by Hawk et al. It is more sensitive to immediate changes in general health following chiropractic adjustments than the SF-36 that monitors a person over a 4

week period of care.<sup>53</sup> The SF-36 is a measure of general health status and has been widely used in social science research. It was developed at the RAND Corporation in 1992. It is composed of 36 questions, and provides information in the form of eight sub-scales:

1. Limitations in physical activities due to physical or emotional problems (PF)
2. Limitations in social activities due to physical or emotional problems (SF)
3. Limitations in usual role activities due to physical problems (RP)
4. Bodily pain (BP)
5. General mental health (MH)
6. Limitations in usual role activities due to emotional problems (RE)
7. Vitality (VT)
8. General health (GH)

The scales are then tallied into 2 summary scales, the physical (PCS) and Mental (MCS) Component Summary measures. The average score for the general U.S. population for both MCS and PCS is 50.<sup>54</sup> The SF 36 questionnaire was completed, and showed a score of 40 for physical component summary (PCS), and a score of 25 for mental component summary (MCS).

Urinalysis was performed, and was within normal limits.

A full spine radiographic series was taken including A-P and lateral lumbopelvic views, A-P and lateral thoracic views, A-P lower cervical view, lateral cervical view, A-P open mouth view, nasium and vertex. The x-rays were analyzed using Gonstead analysis of the subluxated segments and revealed a listing of AILP of the C1 vertebra, a listing of PRS-SP of C2, a listing of PLS-SP of T1, a listing of PLI-T of T6, a listing of PRI-T of T11, a listing of PRI-M of L2, a listing of PRI-M of L5, a listing of P-L of sacrum, and a listing of PLEX of the right ilium. Other radiographic findings noted were: a mild left cervical scoliosis, a mild left thoracic scoliosis, decreased disc height of the C4/5, C5/6, and C6/7 intervertebral discs, various stages of posterior osteophyte formation at the C4/5, C5/6, and C6/7 vertebral motion unit levels, lateral lipping and spurring of the T11/12 vertebral motion unit, and posterior cleft defect at the S1 level without knife clasp deformity.

After the man consented, chiropractic care began to correct vertebral subluxations. Diversified Full Spine (contact specific, high velocity, low amplitude) and Palmer Toggle Recoil (contact specific, high velocity, low amplitude with recoil thrusts of the C1 vertebra) techniques were used. He had a total of 34 office visits over the course of 11 months. Adjustments to correct vertebral subluxations were administered only when clinically indicated using the following parameters: static and motion palpation, leg length inequality, and thermography. After his first adjustment, he stated relief of his dizziness, and a decrease in the frequency and character of his neck and low back pain. After his third visit, he stated a decrease of anxiety and fatigue and an increase in muscle strength. Six reassessments were and the following parameters were assessed: leg length inequality, postural analysis, range of motion, muscle testing, Global Wellness Scale and SF-36. Outcomes of the re-assessments

and re-exams are found in Table 1.

Of note regarding the third reassessment the man was feeling extreme stress, and missed his scheduled appointment for that week. He suffered a manic episode just prior and was admitted to the emergency room. He was diagnosed with Bipolar Disorder, and was prescribed 1000 mg/day of Depakote to help stabilize his mood. That would account for the decrease in perceived wellness on the third re-evaluation.

On his final re-examination the following improvements were noted: His low back and neck discomfort had resolved. He no longer experiences dizziness. His depression improved considerably, according to his SF-36 scores and his Global Wellness Scale scores.

He also noted the following: He no longer experiences increased perspiration or muscle weakness. As of the date of the last exam, he was still under medical supervision for his depression, and was still taking his prescribed medicine. As a result, he occasionally experiences fatigue and a decrease in his sex drive, as an effect of the medication. His mood changes have been very minimal compared to when he started care. During the evaluation, full spine static electromyography studies to assess paraspinal muscle activity, according to guidelines described by Kent and Gentempo<sup>55</sup>, were performed and showed significant improvements.

A Health, Wellness and Overall Quality of Life Self Assessment questionnaire and a Self-Rated Health Scale questionnaire were also completed during the exam. The Health, Wellness and Overall Quality of Life Self Assessment questionnaire was adapted from the Network Spinal Analysis Levels of Care questionnaires, including Levels 1, 2, and 3<sup>56</sup>, and modified slightly. The patient noted the following improvements:

- He is more aware of his spine, and is aware of changes in the way he carries his body.
- He is more aware of when his body holds tension.
- He has been more able to listen to his bodies needs.
- He has changed his dietary habits, and is trying to eat healthier.

Other improvements are noted in Table 2.

The Self Rated Health Scale Questionnaire was developed by Blanks et al for the use in a retrospective self assessment study participated by over 2800 people, to document the quality of life changes in people under chiropractic care.<sup>57</sup> The questionnaire is separated into 4 sections: Physical State, Mental/Emotional State, Stress Evaluation, and Life Enjoyment. They are all scored, on a scale of 0-100, with 100 being optimal. The man's scores were as follows:

- Physical State: 72.5
- Mental/Emotional State: 52.5
- Stress Evaluation: 42.5
- Life Enjoyment: 45.45

An overall wellness index is calculated by taking the average of the four scores. The man's overall wellness index was 53.23.

## Discussion

A very important aspect of the man's life history is his history of physical traumas from martial arts, and from the cinder block falling on him as a child. As stated previously, there is a significant amount of medical literature describing physical trauma as a contributing factor in social disorders.<sup>3-43</sup>

Although historically, there has not been adequate scientific investigation into the effects of the vertebral subluxation relative to its ability to interfere with well-being, recent research and theories describe the correction of vertebral subluxation as having an impact on improving general health, brain function, quality of life and well-being.<sup>57-64</sup>

Blum's "Brain Reward Cascade" provides an understanding of how feelings of well-being get expressed.<sup>45</sup> The "reward" portion of the brain was discovered by accident by American psychologist James Olds in 1954. At the time, he was researching the rat brain's alerting process. By mistake, he placed the electrodes in a part of the limbic system. By wiring it so that the rats could stimulate the area of the brain by pressing a lever, he found that the rats began to press the lever almost non-stop, as much as 5000 times per hour. They would endure great pain for opportunities to press the lever. Olds research identifies that pleasure is a neurological process that is linked to a powerful reward system.<sup>65</sup>

There are two types of neurotransmitters: monoamines and neuropeptides. Monoamines are made of single amino acids derived from food and carried through the blood into the brain. Neuropeptides are neurotransmitters made from linked amino acids called peptides. Feelings of well-being are mediated in the limbic system portion of the brain and are expressed through the reward cascade of neurochemicals, including neuropeptides. Neurochemicals seek and attach to specific receptors on the neurons, their relationship being likened to that of "lock and key" mechanism. By doing so, they start and continue the complex process of the "reward cascade".

Five neurotransmitters and four areas of the brain have classically been shown to have a significant role in the neurological reward pathway:

1. Dopamine in the nucleus accumbens and the hippocampus;
2. Enkephalins in the ventral tegmental area and the nucleus accumbens;
3. Serotonin and norepinephrin in the hypothalamus; and
4. GABA - also in the ventral tegmental area and the nucleus accumbens.<sup>66</sup>

Pert and Dienstfrey have expanded the area in which these opioid neuropeptides function to include the amygdala, hypothalamus, dorsal roots and dorsal horn of the spinal cord. Pert states:

"The amygdala and hypothalamus are two such nodal points, of course. Moreover, they are particularly rich areas, because they contain receptors for essentially every neuropeptide we so

far have identified. If our reasoning is correct - that the presence of a heavy density of neuropeptide receptors identifies a part of the limbic system - our research suggests that the usual picture of the limbic system should be extended to include the spinal cord, for a third area enriched with neuropeptide receptors is the dorsal horn of the spinal cord."<sup>67</sup>

Burnstein and Potrebic have also shown neurons that have a direct projection from the spinal cord into the amygdala and orbital cortex.<sup>68</sup> Other literature also documents the link between the spinal cord and the limbic system.<sup>69, 70</sup>

When these neuropeptides and receptors are functioning properly, the reward cascade is then functioning properly, leading to feelings of well-being. When the reward cascade is impeded or altered, this puts the body into a state known as "Reward Deficiency Syndrome", and the feelings of well-being are exchanged for anger, anxiety, depression, or cravings for substances that will take away those emotions, such as drugs or alcohol.<sup>45</sup> This can be seen in milder forms, such as chain smokers, or more severe forms, as seen in people who suffer from mood and social disorders, and people with chemical dependence.

A review of the literature by Blum and Holder revealed that only vertebrates have an opiate receptor "brain reward cascade" mechanism. Even though opioid peptides are found in invertebrates, only vertebrates express a well-being state. The common denominator is the spine and spinal cord.<sup>46</sup> Vertebral subluxations play an integral role in the multi-factorial expression of Reward Deficiency Syndrome. If the spine as a unit is compromised by subluxation, then the reward cascade is altered or impeded, leading to mood or social alterations. Holder and Blum suggest: "Every level of the spine has an intimate relationship with the limbic system's ability to process and establish a balanced brain reward cascade."<sup>46</sup> The profound and important effect chiropractic has on a person's state of well being has been well documented in the literature<sup>62-64</sup>, including a self-reported retrospective study of 2818 people, the largest of its kind. It was shown that even after 3 years under chiropractic care, improvement in wellness and quality of life continued, and did not plateau.<sup>57</sup>

## Conclusion

This report details the life history and symptomology of a 46-year-old man suffering with major depression; the 11 months of chiropractic care; and the man's physical, social and mental response to correction of vertebral subluxations. This report supports the previous literature written regarding correction of vertebral subluxation, and its positive effect on physical, mental and social well-being.

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**Table 1 – Results of Re-examinations**

Base Line Parameters	Re-exam 1	Re-exam 2	Re-exam 3	Re-exam 4	Re-exam 5	Re-exam 6
Leg length inequality	Prone: Left ¼” Supine: Right ¼”	Prone: Right ¼” Supine: Right ½”	Prone: Right ¼” Supine: Left ¼”	Prone: Right ½” Supine: Right ½”	Prone: Right ½” Supine: Left ½”	Prone: Right ½” Supine: Left ½”
Postural analysis	High left shoulder 2cm and high Right hip 3cm	High right ear 3 cm	High left shoulder 3cm	High left ear 2cm	High right shoulder 3cm	High right shoulder 2cm
Range of motion	Decreased right cervical rotation	Decreased left cervical lateral flexion	Decreased right cervical lateral flexion	Decreased right C1/2 rotation	Decreased right C1/2 rotation	Decreased lumbar flexion and extension
Muscle testing	Grade 4 C5 and C6 nerve root on left and Grade 4 S1 nerve root on the left		Within normal limits	Grade 4 C5 nerve root on left and grade 4 S1 nerve root on left	Grade 4 S1 nerve root on left	Grade 4 C5 nerve root on left
Global Wellness scale	7/10	7/10	3/10	9/10	9/10	9/10
SF 36 questionnaire	PCS: 48 MCS: 32	PCS: 52 MCS: 44	PCS: 49 MCS: 22	PCS: 49 MCS: 49	PCS: 52 MCS: 56	PCS: 55 MCS: 53

**Table 2 - The patient was asked to note the changes in his body systems since the beginning of his care.**

Moderately less	Slightly less	Slightly more	Moderately more
1. Depression or lack of interest 2. Difficulty falling asleep 3. Over reactions to major life stresses 4. Moodiness or temper	1. Feeling of nervousness 2. Over reactions to minor life stresses	1. Musculature strength 2. Depth/Volume of respiration 3. Ease of breathing 4. Ease of breath during exercise 5. Desire for healthier foods 6. Ease in bowel movements 7. Experience release of spinal tension 8. Posture when sitting and standing 9. Increase in productivity 10. Feelings of ease and peace 11. Experience of gratitude	1. Muscular comfort 2. Ease of movement 3. Ease of recovery from injury 4. Awareness of breathing 5. Appetite