

Depression, ligament instability and chronic pain improvement concomitant with a course of concentrated Chiropractic Care: A Case Report

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Abstract: *Introduction:* A 65-year-old female presented for care with a primary concern of worsening depression and chronic pain. Further investigation revealed cervical ligament instability, hypertension, abnormally high surface spinal EMG readings and a multiple subluxations.. She commenced a course of concentrated chiropractic care whereby she received 41 spinal adjustments and a number of other supports via the Averio Functional Neurological Technique.

Outcomes: Following one week of concentrated care, the patient self-reported significant decreases in negative thinking and depressive symptoms. Post-care tests revealed normalisation of Fakuda's and King Devick's tests and reductions in subluxations coinciding with a reduction in patient-reported pain levels.

Conclusion: Chiropractic care may be of value in the management of depression and chronic pain. Further research is required to determine the mechanisms.

Indexing Terms: Chiropractic; Subluxation; low-force; concentrated care; depression; ligament instability

Introduction

Chronic pain

It has long been acknowledged that chronic pain and mental health issues have a high level of comorbidity. Once the correlation between the two was established, the investigation into the causal factors underpinning the relationship gained importance. Some questions have been considered in recent research: which one comes first? Does one always precede the other? Why do some people have one and never the other? While the answers to these questions remain elusive, research has provided some reasoning as to why these two conditions are frequently observed in tandem.

The most common mental illness associated with chronic pain is major depressive disorder (MDD). (1) Major depressive disorder can be described as a state of persistent low mood and decreased interest in pleasurable activities,

... A 65y female executive reporting depression and chronic pain was admitted to a 5-day concentrated care program. Both qualitative and quantitative post-care measures showed clinically significant improvements ...!



that is often accompanied by feelings of guilt, a lack of energy and concentration, appetite and weight change, agitation, sleep disturbance, and suicidal thoughts. (2)

Clinical studies have identified that chronic pain is linked with an elevated prevalence of MDD. The percentage of the population that at some point in their life has experienced major depression in Australia, also known as the lifetime prevalence, of MDD is 11.6%. It is 1.6 times higher, however, in those with arthritis. (1) In Canada, the prevalence of depression is 3 times higher in those with chronic back pain. (1) Clinical studies have identified that up to 85% of patients with chronic pain are also affected by severe depression, in some cases the pain was reported to have induced the depression. (3) These patients with comorbid depression tend to have a poorer prognosis than those experiencing only chronic pain.

Inflammation, depression, and subluxation

Inflammation is likely to be a key factor for both conditions. When considered from both a brain region and neurological function approach, pain and depression are closely correlated. This is particularly true for inflammatory response-mediated pain. Inflammation has been identified as the mediator of both depression and chronic pain, activating pathways responsible for the transition of acute to chronic pain, and sickness to depression. Additionally, a genetic predisposition for suppression of the inflammatory process in response to stress has been associated with improved coping and resistance to stress-related pathology. The exact mechanisms underpinning the convergence of these conditions has not yet been determined, but there remain many possibilities to investigate. (3, 4, 5)

While new studies emerge with the intention of exploring the relationship between pain and depression with the goal of more effective pharmacologic treatments, chiropractors are sensible to turn their eyes to the resolution of both conditions through support (including proper diagnosis and treatment) of the central nervous system and correction of vertebral subluxation. (3)

The *Australian Spinal Research Foundation* defines vertebral subluxation as 'A diminished state of being, comprising a state of reduced coherence, altered biomechanical function, altered neurological function, and altered adaptability.' (6)

The following case report documents the presentation, management, and resolution of both chronic pain and depression following an intensive (concentrated care) course of regenerative chiropractic care.

History and Examination

A 65-year-old female presented for chiropractic care with a primary presenting concern of chronic depression and chronic pain that was worsening. She was a novice to subluxation focused chiropractic care and maintained a moderate activity level due to her occupation as a warehouse manager.

The patient's medical history did not feature any car accidents, notable concussions or traumatic brain injuries, sports injury, or a history of any activities that might cause whiplash or traumatic ligament stress injury. However, the patient did report a past use of tobacco, current use of marijuana for pain management, current use of alcohol, past opioid use for pain management, and past use of street drugs. The patient-reported current antidepressant/SSRI use was also notable in the case. She also reported *Tylenol*/Non-Steroidal Anti-inflammatory Drug use. She had a full schedule of vaccination and reported a history of extended mental/emotional stress and/or abuse.

The patient reported struggling with chronic depression for several years, and that it was getting worse despite medication. She also reported that her chronic pain was increasing in severity as well. The patient's pain was radiating from her low and mid-back into her Left hip and foot (her Right hip had already been surgically replaced due to pain). In addition to these concerns, the patient also noted that she was *'addicted to the consumption of white sugar and would like help with her brain so that she can have control over her diet and mental health moving forward.'*

Her predominant complaints were of chronic depression (greater than 30 years since original diagnosis), a self-reported addiction to white sugar, and self-reported daily memory loss. Her minor concerns were chronic, severe pain in her lower back, Left hip and foot, arthritis, and balance issues.

Upon first presentation, a micronutrient panel was run. This revealed deficiency in serine - high AA/EPA ratio (The patient tested at 55.4, the highest that ratio should be in an adult is 10.9 which shows significant abnormal inflammation in the patient's blood). She also had high omega 6, high arachidonic acid and deficient omega 3 fatty acids. Initial tests also revealed:

- ▶ Borderline Hypertension
- ▶ Abnormally high surface spinal EMG
- ▶ Positive Fukuda's Test - noting abnormal vestibular function in the patient with a 10° rotation to the right and 4 feet forward motion. Normal is no rotation or forward or backward movement during the test.
- ▶ Positive King Devick's Test - patient tested at 56.90 seconds and normal is estimated at 45 seconds for an adult with normal cognitive brain function. With this test, the smaller the number the better left hemisphere brain function.
- ▶ Subluxation findings: multiple layers of subluxations were present in all regions of the body
- ▶ Cervical ligament instability of 3.43mm at C4-C5 on a standing lateral cervical film (note: no motion in the spine)

Averio Health Institute uses analysed digital radiographs that are computer-analysed using *PostureRay* software. Cervical ligament instability is an often-undiagnosed issue that can cause significant increases in inflammation and irritation in the central nervous system. The *American Medical Association* has created a standard of diagnosing cervical ligament instability of 3.5mm as a permanent medical disability which causes a 25-28% full body impairment rating for the patient. This standard has existed in the AMA guidelines in the 3rd, 4th, 5th and 6th editions.

Within the American medical system, cervical ligament instability is often used as justification for surgical intervention due to the damage to the central nervous system, patient health, and overall patient quality of life. Surgery poses significant risks. Chiropractic care, when approached with specific and technical training, does not pose the same risks and in this case, the patient's ligament instability was resolved within a concentrated care plan of 41 low-level force spinal chiropractic adjustments. In this case these were delivered within a 5-day period of time. This case shows a life-changing regeneration of ligamentous and disc tissue, neurological function, and overall quality of life for the patient.

Treatment

The initial aims of care were to regenerate the patient's ligament instability in the mid-cervical spine. The secondary aims of care were to restore normal spinal positioning and structure through the improvement of the patient's brain function and central nervous system regulation.

There is a significant body of research that supports that chronic pain is located in the abnormal regulation of the brain. There is also research that supports that depression is located in the abnormal regulation of the central nervous system.

The patient undertook a course of concentrated care at the *Averio Institute* which is detailed below.

Management

The *Averio Functional Neurological Technique* (Averio FNT) was the primary chiropractic technique utilised over the course of the patient's care. Averio FNT is a proprietary technique that used friction coefficients to assist in the detection and correction of neurological subluxation through sustained contact directional adjusting.

The patient was seen for one Averio 5-day concentrated care program where 41 low-level force chiropractic adjustments were administered. The patient also reviewed seventeen, 20 minute photobiomodulation treatments to areas of the brain, spine, and gut. Various other complementary therapies were also administered, as well as a focus on patient education in the areas of chiropractic, functional neurology, plant-based eating, and positive self-care.

The patient was treated for 5 days. Pre-testing and care started on Monday and post-testing was done on Friday of the same week. Results presented were gained in that time period.

Outcomes

The following are given on a scale of 1-10, with 10 indicating the best the patient could expect to experience and 1 indicating the worst the patient could expect to experience.

The patient self-reported an increase in 2 hours of sleep per night by the end of the week and noted that her quality of sleep improved from a 7/10 to a 10/10. She also reported that, instead of 30 mins of 'wind-down' time required for sleep, she was now only requiring 10 mins before she could sleep. Her energy in the morning also improved from a 5/10 to an 8/10 by the end of the week.

Concerning her mental health, the patient reported that at the beginning of the week that she was experiencing 60% of her thoughts as negative. At the end of the week she reported only 10% of her thoughts were negative. The patient also reported that at the beginning of the week 30% of her day she felt depressed and at the end of the week that number had also dropped to 10% of her day. This is a significant self-reported change in mental health observed within the space of 5 days of concentrated regenerative chiropractic care.

At the beginning of the week, the patient reported 7/10 pain in her left leg, left hip/buttock, left shoulder, left-sided neck, and left mid-thoracic. At the end of the 5 days of concentrated care, the patient-reported no pain in any of the above-mentioned areas. There was a complete reversal of her chronic pain symptomatology. Her blood pressure, Fukuda's tests, and King Devick's tests had also normalised.

Other notable findings included complete regeneration of the ligament instability at C4-C5 and the reabsorption of abnormal calcium (ie DDD / DJD) at C4-C5, C5-C6, C6-7. There is also noticeably more disc space on the posterior edges of the above noted areas, which is suggestive of disc regeneration or rehydration in those areas. It is important to note that both sets of imaging (ie pre and post) were taken on the same equipment, with the same KvP and MAs, and at the same time of day with the patient standing in normal posture. The patient's posture is not adjusted or modulated by the radiographic operator (Please see attached radiographic images); the patient's spinal EMG also improved.

Discussion

Chronic pain and mental health appear to be closely linked, in both molecular and clinical studies. With more than half of the patients presenting to primary care with chronic depression also report some form of pain, finding effective and feasible resolutions is vitally important. (2)

This case documented the restoration of pain-free function, controlled eating habits, and mental health following an intensive course of regenerative chiropractic care.

A particularly novel aspect of this case report is the inclusion of a micronutrient panel prior to the commencement of care. While many chiropractors approach care with a holistic view, and with consideration of the patient's lifestyle as a whole, this is not always well documented in studies.

All noteworthy micronutrient findings are indicative of chronic inflammation in the patient's whole body system. The *Eicosapentaenoic acid* (EPA) and *Arachidonic acid* (AA) ratio is used as a predictor of inflammation, due to their competitive nature. EPA is an anti-inflammatory fatty acid while AA is a precursor to a number of pro-inflammatory mediators. EPA competes with AA at the active site of important enzymes to generate less inflammatory products. Thus the ratio of the two acids can be used to indicate chronic inflammation, with higher levels of AA to EPA corresponding to higher levels of inflammation. The EPA:AA ratio has been researched in connection with other inflammatory-related illnesses, being found to be a valuable predictor of cardiovascular disease risk. (7)

Similarly, the ratio of omega 3 and omega 6 essential fatty acids can also be an indicator of ongoing inflammation and a higher risk of developing various illnesses. The western diet typically has higher levels of omega 6 and deficient levels omega 3, which is discordant with our evolutionary diet and physiological needs. (8)

Serine deficiencies are more obscure, but a lack of D-serine has been linked to the aetiology of schizophrenia. (9) Research has also revealed the antidepressant-like effects of D-serine in animal models of depression, and the negative correlation of D-serine levels in CSF and severity of depression in human patients. (10, 11, 12) A lack of D-serine in the brain has been reported to impair long-term potentiation, a process crucial for learning and memory. Cognitive deficits such as this, are present in a number of psychiatric disorders, including MDD. Although the serine deficiency reported in the case report above does not specify a lack of D-serine, it is fair to conclude an overall deficit in serine would impair the production of D-serine and may be contributing to suboptimal mental wellbeing. (9)

This case demonstrates the efficacy of concentrated chiropractic care in resolving cervical ligament instability. AMA guidelines state a 3.5mm tear in the cervical spine is evaluated as a 25-28% whole body impairment due to damaged neurological communication. (13) This level of injury is considered a severe impairment and is often the basis for surgical intervention for the patient. The inherent risks of surgery are well understood, although overlooked at times. Recovery can also take a significant toll on an individual's health, particularly if they are already experiencing mental health concerns and chronic pain. Depression is a frequent complication following surgery and is again linked to chronic post-surgical pain. (14) As yet, the effect of experiencing depression prior to surgery on recovery and ongoing pain has not been thoroughly investigated. (15)

If chiropractic care can be utilised as an effective alternative to surgery to reverse cervical ligament tears, this would provide patients with an invaluable treatment option, that is currently not made available to them.

Multiple published case reports documenting the positive outcomes following chiropractic care in individuals experiencing mental health issues, support the improvement in psychological

symptoms noted in the current case. (16, 17, 18) Additionally, a case study published in 2017 supported the safety of conservative chiropractic care for patients with alar ligament instability. (19)

It is worth highlighting the patient's denial of any physical trauma at any stage of life that may have led to the ligament instability. This included denying car accidents, concussions, falls, sports activities, and even a history of participating in activities that may have caused a physical incident. Traditionally, cervical ligament instability is assessed in cases of whiplash, particularly in car accidents, or significant physical injury. This case suggests ligament degeneration can develop from non-traumatic stresses, such as chemical, mental, or emotional stresses affecting the nervous system. Cases such as this will be vital in forming the foundation for future research determining the mechanisms by which this occurs, and additionally, how support of the nervous system through subluxation correction may restore stability.

Limitations

Case reports provide an opportunity to illustrate a detailed picture of a patient's progression, including factors such as lifestyle and full medical history. It must be noted, however, that findings from case reports are unable to be generalised to a broader population. As such, while the outcomes of this case report raise questions and provide insight into the management of cervical instability, further controlled research is needed to validate the results of this case.

Conclusion

This case report presents insights into what may occur under concentrated regenerative chiropractic care and highlights the potential for concentrated regenerative chiropractic care to be utilised for people with complex needs who may not usually seek out chiropractic. It also presents unique insight into the use of low-level force techniques due to the duration and magnitude of the subluxation complex the patient is suffering from.

This case opens a door for potentially a whole new understanding of degenerative ligament instability and the abnormal inflammatory conditions it causes. Future research may shed more light on the benefits of regenerative chiropractic care and low-force chiropractic methods.

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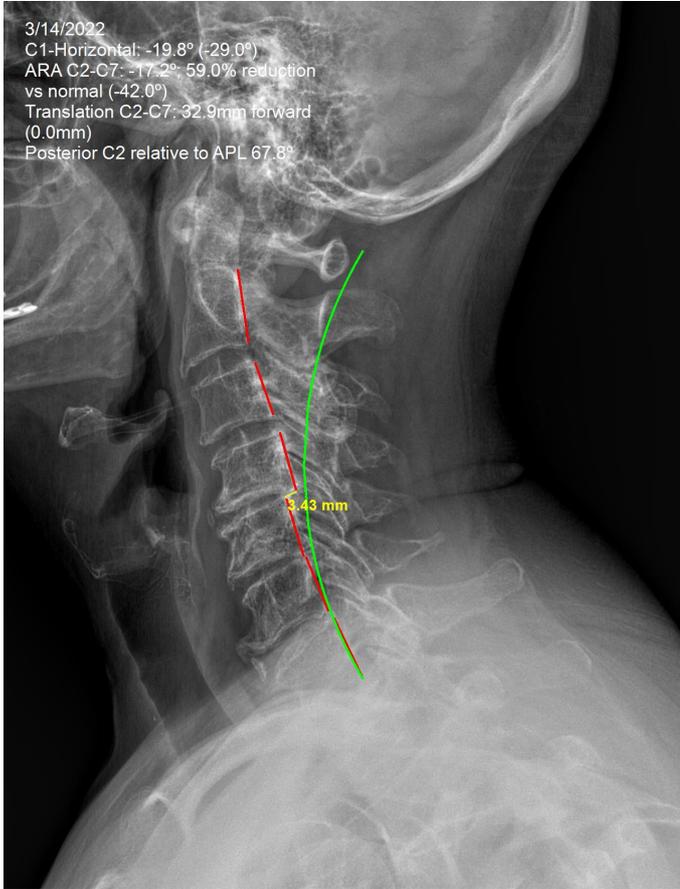
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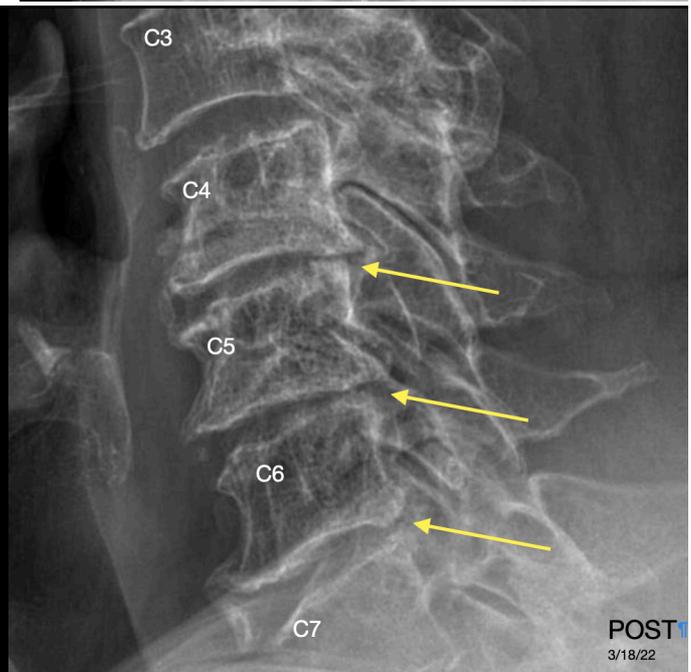
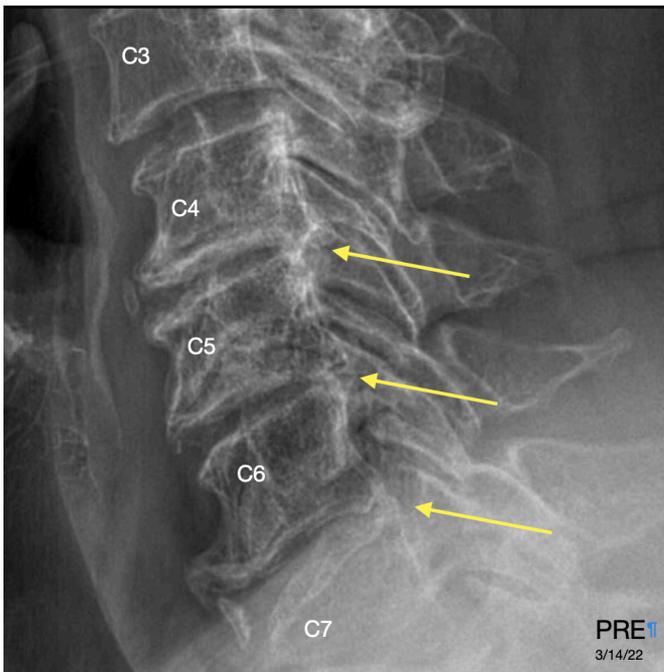
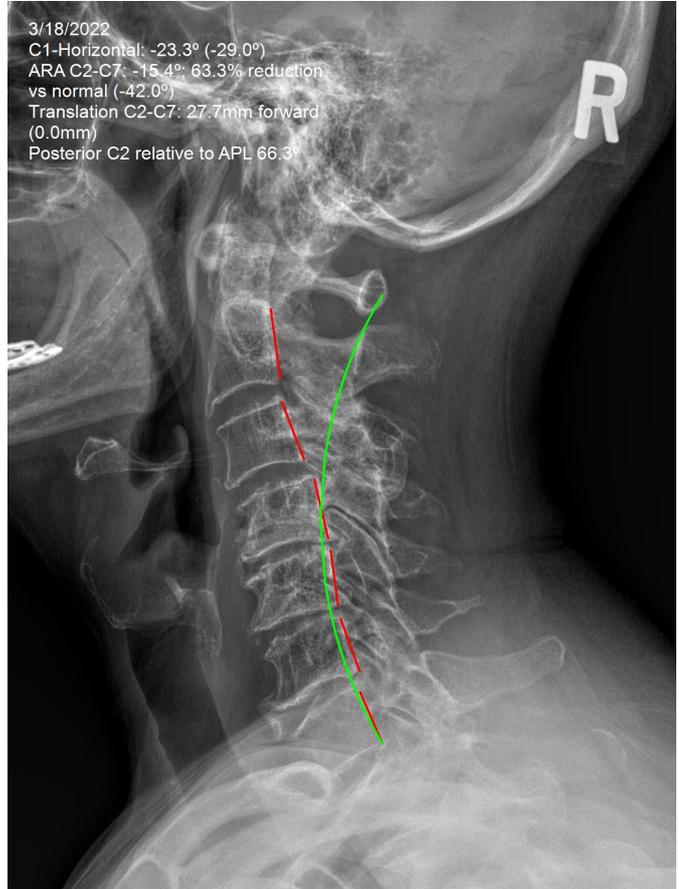
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[#AverioDepressionChronicPain](https://twitter.com/AverioDepressionChronicPain)

Images

Pre-care



Post-care



Declaration

The writing of this case report was funded by the *Australian Spinal Research Foundation* as part of the '*ASRF Case Report Project 2021*', a project designed to gather clinical studies from chiropractors and transform them into case reports focused on the effects of chiropractic care on clinical presentations highly relevant to chiropractic, such as stress, immunity and adaptability. The objective is to build the evidential value of case reports for informing both the clinical practice of others with similar patients, and the ASRF Board when consideration is given to funding research activities.

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Patient consent was documented and is held by the *Journal*.

All data with appropriate clinical commentary were provided by authors Kolterman and Martin.

ASRF definition of subluxation

'A vertebral subluxation is a diminished state of being, comprising a state of reduced coherence, altered biomechanical function, altered neurological function and altered adaptability.'

About the Institute

The *Averio Institute* is a neurologically focused, multimodal health care facility that offers regenerative therapies alongside chiropractic care, nutritional support, rest, exercise and other functional neurological interventions in a five day concentrated care program tailored to individual guests.

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Also by these authors

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