



# Improvement in Atrial Fibrillation, Vision, Blood Pressure, and Energy in an 80-year-old male under Chiropractic care: A case report

Sarah Kotlerman, Avery Martin, Amarjit Dhaliwa Jeffrey Clark Zach Scheunemann, Ruth Postlethwaite, Clare McIvor

Background: An 80-year-old male presented for Chiropractic care with a chief complaint of Atrial Fibrillation. He also suffered from hypertension, vision disturbances, and low energy. As a retired Chiropractor, he had been under care for most of his adult life. However, he felt concentrated Chiropractic care may be of benefit to regenerate some long-standing health issues from which he was still suffering.

Intervention: The patient underwent three separate weeks of concentrated chiropractic care, utilising the Averio Functional Neurological Protocol.

Outcomes: Having made no further lifestyle changes, the patient experienced resolution of tinnitus, vision disturbances, and hypertension, as well as a significant reduction in atrial fibrillation frequency and severity.

Conclusion: Further research into the impact of concentrated Chiropractic care on chronic or complex cases would be beneficial.

Indexing Terms: Chiropractic; subluxation; concentrated care; atrial fibrillation; AFib.

# Introduction

The Chiropractic perspective differs significantly from the pharmaceutical perspective in that Doctors of Chiropractic view interferences to the body's everyday functioning as the primary cause of most dysfunction and disease. In contrast, the pharmaceutical model assumes disease is age-related or a genetic normal outcome for a portion of the population.

... we need to be walking and living examples of the science we teach patients ...'

The Chiropractic view of the body as a self-healing, self-regulating organism is primarily held by vitalistic, subluxation-based Chiropractors who provide care to promote the body's optimal functioning, rather than a symptom-based model. Subluxation, a term specific to Chiropractic can also be defined as a loss of normal neurological tone or electrical conductivity within the body.



Within medicine it is well understood that severing the spinal cord will cause

a complete loss of electrical signals between the brain and the body, resulting in the full loss of function in those end-organ tissues. Within Chiropractic it is understood that there are spinal-neurological dysfunctions that exist between 100% function and 0% function, and these losses in function are often termed neurological dysfunction or, more specifically, vertebral subluxation based on the teaching and philosophy of the individual Doctor of Chiropractic. Interference with the spinal function also transcends merely physical damage, with deficiency and toxicity able to compromise spinal systems and cause subluxation.

Thus, defining the scope and reach of subluxation on health and disease processes becomes complex, as the brain and body's reaction to this breakdown is individual and based on environmental and epigenetic factors.

While research has explored and confirmed a relationship between Chiropractic care and improved blood pressure, larger studies examining vision changes, presentations such as Atrial Fibrillation, (AFib or AF) and self-reports of energy improvements are, to date, lacking. (1)

At present there are two Chiropractic case reports of Atrial Fibrillation resolving under Chiropractic care. In one case, that of a 68-year-old female, who also had comorbid hypertension and tachycardia as well as other signs of autonomic imbalance, all of which were reduced under upper cervical Chiropractic adjusting. (2) The second case was a 64-year-old man who presented with persistent AFib as well as fatigue and tachycardia, among other symptoms. (3) His Chiropractor used Diversified and Toggle Recoil techniques and the patient experienced complete resolution of symptoms.

This case report contributes to the growing body of evidence suggesting that Chiropractic care may support non-emergent cardiac function.

# Case details

An 80-year-old male presented for concentrated Chiropractic care with a primary concern of Atrial Fibrillation. He was a retired Doctor of Chiropractic, and thus very familiar with Chiropractic and had been under regular care. However, given the stubborn nature of his primary complaint, he felt a concentrated course of Chiropractic care may be beneficial. At the time of his presentation, he reported very little physical activity.

He reported a history of several severe (> than 50 mph/80 kph force) motor vehicle accidents. He also reported past use of tobacco, a full vaccination schedule, and a soy allergy. The patient reported that he had mercury amalgams removed before 2012 and extensive dental jaw work to improve Temporomandibular joint dysfunction over four to five years prior. In addition to this, he had undergone multiple surgeries, including open heart surgery in 2012 to place a swine valve, and ankle surgery in the early 2000s.

The patient had spent a number of years living in Africa as a missionary, during which time he had contracted malaria multiple times. In addition to all of the above, he reported a chronic history of 'low to nonexistent' libido as well as sexual dysfunction.

He had recently undergone a medical review, including an EKG, cardio stress test, and ultrasound of the heart, in April 2023, before seeking care with Averio Health Institute.

In addition to his complex medical history, relevant recreational activities included being a regular welder for approximately 25 years, which is an occupation with a high exposure risk specifically to heavy metals. (8 - 12)

While his main complaint was that of his recurrent AFib he also had a number of secondary complaints. These included severe memory loss with an onset approximately two years prior, chronic fatigue, hypoglycaemia, liver disease, tinnitus, and circulatory issues. He also reported balance and mobility issues, as well as frequent episodes of blurry vision such that he would be

unable to read the writing on a supplement bottle, and hearing difficulty. He had suffered from erectile dysfunction since 2008 (approximately fifteen years).

# **Clinical findings**

Averio Health Institute is a concentrated Chiropractic facility that provides weeklong programs of care where patients arrive on Monday morning for the start of their weeklong program and stay onsite through Friday afternoon. This model of care offers extensive educational classes, clinical observation, and extended hours of Chiropractic care along with supportive therapies. Averio Health Institute specialises in complex and chronic cases, rarely treating patients for musculoskeletal pain complaints alone.

The standard Averio Program testing includes:

- body composition testing
- spinal EMG
- modified CTSIB (clinical testing of sensory integration of balance)
- a vitals examination
- bilateral blood pressure measurement
- bilateral weight testing
- bilateral pulse oximetry
- a breath test
- a salivary nitric oxide test
- patient-reported symptom analysis, and
- a spinal radiographic review analysis.

These are used to ascertain detailed insights into the impacts of stress and subluxation on the body. Other measures used in this case included pre- and post-provoked urine analysis for total toxicity (i.e., heavy metals, environmental chemicals, and mycotoxins, a total of 96 individual toxins).

According to the Averio protocol, the patient underwent a battery of tests in September of 2023 upon presentation for his first week of concentrated care, including a review of analysed spinal radiographs taken in July 2023. The patient's analysed spinal radiographs revealed seven areas of ligament instability in the cervical, thoracic, and lumbar spine. Cervical instability was noted as a negative 3.9mm extension translation at C3-C4 and a negative 12.7° wedging instability. Thoracic instability was indicated as 4.0mm T3-T4 instability, negative 3.4mm T4-T5 instability, and 2.7mm T9-10 instability. Lumbar instability was noted as a -4.7mm instability at L1-L2. Radiographs were analysed using computer software. According to AMA guidelines, a single area of spinal ligament instability is assigned a 25-28% whole-body impairment rating. (13) These spinal damages were not previously known, as the patient's previous Chiropractic care did not involve computer-analysed spinal radiographs.

Severe abnormal head-to-neck alignments were noted in both lateral and anterior-to-posterior views. The patient also had abnormal calcification in the thyroid tissues, a notable abnormality in the alignment of the jaw on lateral cervical film, and severe abnormal alignment of the thoracic spine. Severe enlargement of the heart shadow was visible on the anterior-to-posterior thoracic radiograph, with multiple surgical artefacts visible from past open heart surgery. Mild scoliotic curves were noted in all three spinal regions.

The vitals examination revealed high blood pressure (140/98), low grip strength, abnormally high spinal sEMG temperature readings, and abnormal findings on a modified CTSIB (clinical test of sensory integration on balance) examination.

Provoked urinalyses revealed multiple clinical findings. The patient had a severely high presence of Glyphosate, as well as five very high mycotoxins, including

- Aflatoxin G2
- Dihydrocitrinone
- Nivalenol (NIV)
- Ochratoxin A (OTA)
- Verrucarin I, and
- abnormally high urinary creatine.

Glyphosate is one of the most prevalent herbicides used in the United States and internationally and is linked to the presentation of cognitive decline, cancer, gastrointestinal dysfunction and disease, cell death, systemic toxicity, and many other health concerns. (14 - 18) Mycotoxins are secondary metabolites of mould toxicity, often referred to as mould toxins, and have the ability to penetrate the human cell, causing neurotoxic and genotoxic effects. In recent literature, mycotoxins have been studied for their roles in causing and worsening neurodegenerative diseases such as dementia, Alzheimer's, Parkinson's Disease, and amyotrophic lateral sclerosis (ALS). (19 - 25)

Subluxation was found at every level of the spine, indicating physical, chemical, and nutritional deficiencies that were compromising normal function.

Clinical Note: Blood testing, undertaken in February of 2024, revealed severely high TSH, DHEA-S, FSH, LH, and Prolactin. Thyroid and hormone testing were done after the second weeklong program due to the patient's reporting of frequent focal seizures. The patient's wife was reporting frequent, often daily focal seizures that were not part of the patient's original symptomatic history.

# **Management**

Due to the concentrated nature of care at Averio Health Institute, a novel and innovative adjusting technique was developed from the fundamentals of upper cervical adjusting, Logan Basic, and other low-force, sustained-contact adjusting methodologies that have existed since the inception of chiropractic in the Western Hemisphere. However, still experimental ...

... this technique uses a friction coefficient to determine the area of adjustment. This assessment is done before every patient contact. Once the evaluation for the highest-priority subluxation is determined, the contact involves sustained pressure in a specific line of drive. The duration of the contact is dependent on the time required to clear the abnormal electromagnetic frequency, as determined by a friction coefficient. This technique has been named the Averio Function Neurological Technique (Averio FNT).

Using Averio FNT, each patient is checked and adjusted multiple times per day to increase the amount of input into the spine and increase clinical outcomes. This style of adjustment is safe to perform multiple times a day, as it involves no sudden stretching of the ligaments or muscles. The average pressure of the Averio FNT adjustment is between 2 and 8 ounces (56 to 225gm) of force.

There is substantial literature to support the idea that Chiropractic can enhance brain neural plasticity and improve brain-to-body communication. (26 - 33) It was initially hypothesised that if a patient could receive more specific Chiropractic care in a shorter duration, there could

potentially be a greater clinical outcome due to the increased stimulus to the brain and central nervous system through treating the spine.

This patient underwent five week-long programs at Averio Health Institute.

September 2023: 61 adjustments
December 2023: 51 adjustments
May 2024: 52 adjustments
December 2024: 61 adjustments
April 2025: 51 adjustments

Averio FNT sustained contact adjustment was the only form of Chiropractic intervention, with additional whole-system therapies and modalities to complement. Additional care recommendations included:

- A wholefood, anti-inflammatory diet
- Wholefood-specific nutritional supplementation
- Spinal and neurological exercises
- Active and passive motion therapies
- Hot and cold therapies include ice massage, hot water/cold plunge, and contrast therapy
- Photobiomodulation Class 2 laser protocols
- Nutritional therapy protocols include whole food and minimally processed supplementation.

The patient was recommended an Averio weeklong program every 4-6 months until his spinal damage was reversed to as near normal as possible. At various points in the case, customised whole-food nutritional protocols were employed to support neurological regeneration, normal hormone regulation, and/or individualised detoxification tailored to the patient's specific needs.

While subluxations were noted at every area of the spine and were duly checked and adjusted, specific areas of focus for subluxation-based care included C1, to remove the abnormal tilt and neurological subluxation on the vagus nerves and brainstem. Additionally, reversing the seven areas of ligament instability in the spine to support improved function of the central nervous system was a primary focus of care, as was removing the toxicity accumulated during decades of spinal and neurological compromise. Stabilising and blocking autoimmune responses to toxicity removal and severe hormonal imbalances that have lethal consequences was also an area of focus.

The aims of care, broadly, were to reverse the spinal damage in the patient's body, allowing the central nervous system to regulate normal function and regeneration, resulting in the reversal of the patient's AF, memory loss, hormonal imbalance, and other symptoms of a subluxated nervous system and damaged spinal system.

### **Outcomes**

The basic objective tests were repeated following each weeklong program. Numerous significant improvements were highlighted in the findings of said tests. Spinal sEMG results had drastically improved, decreasing from 403 to 228. (normal 100-150) This represented a significant decrease in the burden of inflammation, subluxation, and dysfunction.

The modified CTSIB showed changes in all areas, with improvements from 22% to 64% in standard brain testing, from 17% to 42% in proprioception, and from 3% to 59% in vision. Vestibular function did not change on CTSIB. A normal finding with digital modified CTSIB would be above 80% function, so while these changes show marked improvement, the patient did not achieve normal limits at the time of this case study publication.

Radiographic outcomes showed a 21% improvement in cervical curve as well as a 65% improvement in neck tilt towards normal limits. All areas of cervical ligament instability were non-surgically reversed and all areas of thoracic instability non-surgically reversed. No post-lumbar films have been taken at time of publishing. Significant improvements in throat shadow and jaw alignment were noted. There were also reductions in the patient's abnormal heart shadow on post-radiographic analysis and reductions in abnormal calcium in the patient's lung fields.

The patient's initial blood pressure in September 2023 was 140/98 with medication. The patient's blood pressure without medication in April of 2025 was 127/84.

The patient's post-provoked urinalysis showed a complete removal of the high levels of glyphosate as well as a significant reduction in all mycotoxins (still at a high level). Of interest, however, is that with the reduction of glyphosate, additional high-level mycotoxins were detected in the urine sample, indicating a more severe mycotoxin issue than was present at the initial test. The patient is still pursuing mycotoxin removal at the time of publishing.

Secondarily, there was a moment of about 4 months where the patient completely stopped their detox for reasons outside of their Chiropractic care. During this time, his focal seizures returned, and he had three grand mal seizures. Once the patient returned to his specific wholefood protocol for toxicity removal, the seizures stopped within two months and have not restarted.

In addition to the above objective findings, the patient provided several self-reports. These included an improvement in the quality of his energy (from 8/10 to 9/10), and the quantity of his energy improved from 6/10 to 9/10. He stated that his memory had improved and that he had started working in healthcare for the first time in 10 years. He further reported improved balance, improved hearing, reduced tinnitus, and enhanced vision (with no further episodes of blurry vision following his third week of concentrated chiropractic care).

He stated that, upon self-reflection, this 'had been life-changing care'.

# Discussion

Aging populations and extended life expectancies continue to pose challenges for healthcare providers. However, expectations for aging have not undergone significant changes in either the Chiropractic or non-Chiropractic arenas. (4) Although no direct comparisons have been made between these two populations, we do know that Chiropractic has been supportive of aging populations in terms of reducing fall risk, improving balance, enhancing cortical drive, increasing reaction time, and aspects of stroke recovery, among other aspects of health. (5, 6, 7)

At present, we do not have a culture of expecting people in their eighties to improve or get healthier. As long as this limiting expectation is shared among providers, there will be limited opportunity for innovation, which will hinder better clinical outcomes for aged populations.

Doctors of Chiropractic, with their unique perspective and philosophy on the human body, focus on regeneration rather than disease maintenance, making them the ideal providers to lead the medical and healthcare community to better outcomes for aging populations. It is critical in the coming generation that traditional Chiropractic values are maintained and that future generations of Chiropractors do not allow themselves to be influenced by the pharmaceutical culture of normalising disease, dysfunction, and cognitive decline with age.

One aspect that makes this case report novel is that the patient is a retired Chiropractor. This is someone who has lived in the Chiropractic paradigm all of his professional life, yet he was representative of what we estimate as a significant percentage of Chiropractors who do not seek Chiropractic care for their health; who may not do updated spinal radiographs on their spines, or undertake blood or toxicity analysis regularly to determine if their body has what it takes to regenerate and heal.

The Chiropractic paradigm encompasses the growing scientific consensus that we are self-regulating, self-repairing, and self-healing organisms when functioning in a state of optimal alignment and normal neurological function.

As Chiropractors, we need to be walking and living examples of the science we teach patients. A cognitive understanding about subluxation, how the nervous system can work within normal limits, and how the body is designed to heal and regenerate is one level of certainty. Lived experience is another.

It may be radical, but for the Chiropractic profession to survive, we must move beyond the one-adjustment model. We need to adopt a model of care that enables us to expect 80-year-olds to achieve higher levels of health, benefiting not just their spines but also their brains, vital organs, and tissue. If the body is self-healing and self-regulating, then it is 100% the time when interference is removed.

This case report presents further evidence that concentrated Chiropractic care enables the reversal of subluxation, ultimately leading to more normal central nervous system regulation.

# **Conclusion**

While case reports have suggested that this form of care is associated with the remission of significant health conditions, larger clinical trials would be beneficial to confirm the hypothesis that 'concentrated Chiropractic care may significantly impact health and regeneration outcomes in a cohort of patients with complex interferences to normal function'.

One of the limitations of the traditional one-visit adjustment model of Chiropractic is that it is difficult, if not impossible, for the doctor in that model to consider the numerous variables that are regularly considered in a case within the model applied at *Averio Health Institute*. The concentrated Chiropractic care model seeks to serve a demographic of patients who have waited too long, become too injured, and have too many physical, chemical, and nutritional disadvantages for their body to respond with one to three adjustments a week.

The model of concentrated Chiropractic care is one of humility towards the human body, in that it seeks to identify abnormalities and then address them from a Chiropractic perspective. The model of concentrated care acknowledges that more must be done to allow the body to heal.

The model of concentrated chiropractic care also recognises that interference with the central nervous system can result from physical injury to the spine, chemical injury to the body, or a deficiency in the nutritional aspects that facilitate tissue regeneration. The body is designed to heal and regenerate; removing interference from that design is the ultimate goal in healthcare.

The model of concentrated Chiropractic care may help save more lives, but further studies are needed to establish its efficacy and effect sizes, so that it may become a widely accepted model of healthcare worldwide.

Amarjit Dhaliwal BS, DC

Jeffrey Clark DC Zach Scheunemann DC
The Averio Institute

Avery Martin BS, DC CCEP

The Averio Institute

The Averio Institute

The Averio Institute

Ruth Postlethwaite BBiomedSc Writer, ASRF Clare McIvor BBus(Admin), GD Comms(ProfWrit,Edit), GD(Psych)(Cand) Writer, ASRF Sarah Kotlerman BS, DC, NTP The Averio Institute drkotlerman@averiohealth.com

Cite: Kotlerman S, Martin A, Dhaliwal A, Clark J, Scheunemann Z, Postlethwaite R, McIvor C. Improvement in Atrial Fibrillation, Vision, Blood Pressure, and Energy in an 80-year-old male under Chiropractic care: A case report. Asia-Pac Chiropr J. 2025;6.1. www.apcj.net/Papers-Issue-6-1/#KotlermanAFib

# References

- 1. Plaugher, G., Long, C. R., Alcantara, J., Silveus, A. D., Wood, H., Lotun, K., Menke, J. M., Meeker, W. C., & Rowe, S. H. (2002). Practice-based randomized controlled-comparison clinical trial of chiropractic adjustments and brief massage treatment at sites of subluxation in subjects with essential hypertension: pilot study. Journal of manipulative and physiological therapeutics, 25(4), 221–239. https://doi.org/10.1067/mmt.2002.123171
- Qualls, T., and Lester, C., (2012). Resolution of atrial fibrillation & hypertension in a patient undergoing upper-cervical chiropractic care (case report). J Upper Cervical Chiropractic Res. 2012 Winter; 2012(1):9-15, https:// vertebralsubluxationresearch.com/2012/02/22/resolution-of-atrial-fibrillation-hypertension-in-a-patient-undergoing-upper-cervical-chiropractic-care/
- 3. Saxon, R., and Saxon, A., (2024). Remission of persistent atrial fibrillation in a 64-year-old male following chiropractic care: A case study. Ann Vert Sublux Res. 2024 May; 2024(1): 41-47 https://vertebralsubluxationresearch.com/2024/02/10/1797-remission-of-persistent-atrial-fibrillation-in-a-64-year-old-male-following-chiropractic-care-a-case-study/
- 4. WHO. (2024, October). Ageing and health. Who.int; World Health Organization: WHO. https://www.who.int/news-room/fact-sheets/detail/ageing-and-health#:~:text=A%20longer%20life%20brings%20with, %2C%20ethnicity%2C%20or%20socioeconomic%20status
- 5. Holt, Kelly R et al, "Effectiveness of Chiropractic Care to Improve Sensorimotor Function Associated With Falls Risk in Older People: A Randomized Controlled Trial," Journal of Manipulative and Physiological Therapeutics.
- 6. Ling CW. Changes in gait parameters, muscle tone, and radiographic parameters in post-ischemic stroke patients following chiropractic care. Asia-Pac Chiropr J. 2023;3.4. URL apcj.net/Papers-Issue-3-4/#LingGait
- Navid Muhammad Samran, Niazi Imran Khan, Lelic Dina, Amjad Imran, Kumari Nitika, Shafique Muhammad, Holt Kelly, Rashid Usman, Drewes Asbjørn Mohr, Haavik Heidi (2022). Chiropractic Spinal Adjustment Increases the Cortical Drive to the Lower Limb Muscle in Chronic Stroke Patients, Frontiers in Neurology. 12. https://www.frontiersin.org/article/10.3389/ fneur.2021.747261
- 8. Khan K, Room SA, Bacha AU, Nabi I, Ahmad S, Younas M, Ullah Z, Iqbal A, Alrefaei AF, Almutairi MH, Chang JW, Chi KH. Assessment of heavy metals among auto workers in metropolitan city: a case study. Front Public Health. 2023 Nov 7;11:1277182. doi: 10.3389/fpubh.2023.1277182. PMID: 38026331; PMCID: PMC10662099.
- 9. Lotah HNA, Agarwal AK, Khanam R. Heavy metals in hair and nails as markers of occupational hazard among welders working in United Arab Emirates. Toxicol Res. 2021 Feb 17;38(1):63-68. doi: 10.1007/s43188-021-00091-4. PMID: 35070942; PMCID: PMC8748598.
- 10. Čargonja M, Mekterović D, Žurga P, Ravlić-Gulan J, Radović IB, Žauhar G. Deposition of heavy metals in biological tissues of workers in metal workshops. Environ Sci Pollut Res Int. 2023 Mar;30(13):36794-36806. doi: 10.1007/s11356-022-24746-3. Epub 2022 Dec 23. PMID: 36562973.

- 11. Moubarz G, Mohammed AMF, Saleh IA, Shahy EM, Helmy MA. Nephrotoxic effect of heavy metals and the role of DNA repair gene among secondary aluminum smelter workers. Environ Sci Pollut Res Int. 2023 Mar;30(11):29814-29823. doi: 10.1007/s11356-022-24270-4. Epub 2022 Nov 23. PMID: 36418822; PMCID: PMC9995418.
- 12. Wu L, Cui F, Zhang S, Ding X, Gao W, Chen L, Ma J, Niu P. Associations between multiple heavy metals exposure and neural damage biomarkers in welders: A cross-sectional study. Sci Total Environ. 2023 Apr 15;869:161812. doi: 10.1016/j.scitotenv.2023.161812. Epub 2023 Jan 24. PMID: 36706997.
- 13. The AMA Guides, 5th Edition: p. 378.
- 14. Martínez MA, Rodríguez JL, Lopez-Torres B, Martínez M, Martínez-Larrañaga MR, Maximiliano JE, Anadón A, Ares I. Use of human neuroblastoma SH-SY5Y cells to evaluate glyphosate-induced effects on oxidative stress, neuronal development and cell death signaling pathways. Environ Int. 2020 Feb;135:105414. doi: 10.1016/j.envint.2019.105414. Epub 2019 Dec 23. PMID: 31874349.
- 15. Gunatilake S, Seneff S, Orlando L. Glyphosate's Synergistic Toxicity in Combination with Other Factors as a Cause of Chronic Kidney Disease of Unknown Origin. Int J Environ Res Public Health. 2019 Jul 31;16(15):2734. doi: 10.3390/ijerph16152734. PMID: 31370256; PMCID: PMC6695815.
- 16. Ignácio ADC, Guerra AMDR, de Souza-Silva TG, Carmo MAVD, Paula HAA. Effects of glyphosate exposure on intestinal microbiota, metabolism and microstructure: a systematic review. Food Funct. 2024 Jul 29;15(15):7757-7781. doi: 10.1039/d4fo00660q. PMID: 38994673.
- 17. Rawat D, Bains A, Chawla P, Kaushik R, Yadav R, Kumar A, Sridhar K, Sharma M. Hazardous impacts of glyphosate on human and environment health: Occurrence and detection in food. Chemosphere. 2023 Jul;329:138676. doi: 10.1016/j.chemosphere.2023.138676. Epub 2023 Apr 11. PMID: 37054847.
- Chávez-Reyes J, Gutiérrez-Reyes CD, Hernández-Cuellar E, Marichal-Cancino BA. Neurotoxicity of glyphosate: Focus on molecular mechanisms probably associated with alterations in cognition and behavior. Environ Toxicol Pharmacol. 2024 Mar;106:104381. doi: 10.1016/j.etap.2024.104381. Epub 2024 Feb 2. PMID: 38311300.
- 19. Empting LD. Neurologic and neuropsychiatric syndrome features of mold and mycotoxin exposure. Toxicol Ind Health. 2009 Oct-Nov;25(9-10):577-81. doi: 10.1177/0748233709348393. PMID: 19854819.
- 20. Arce-López B, Alvarez-Erviti L, De Santis B, Izco M, López-Calvo S, Marzo-Sola ME, Debegnach F, Lizarraga E, López de Cerain A, González-Peñas E, Vettorazzi A. Biomonitoring of Mycotoxins in Plasma of Patients with Alzheimer's and Parkinson's Disease. Toxins (Basel). 2021 Jul 10;13(7):477. doi: 10.3390/toxins13070477. PMID: 34357949; PMCID: PMC8310068.
- 21. Lai MK, Chew WS, Torta F, Rao A, Harris GL, Chun J, Herr DR. Biological Effects of Naturally Occurring Sphingolipids, Uncommon Variants, and Their Analogs. Neuromolecular Med. 2016 Sep;18(3):396-414. doi: 10.1007/s12017-016-8424-8. Epub 2016 Jul 8. PMID: 27393119.
- 22. Spencer PS, Ludolph AC, Kisby GE. Neurologic diseases associated with use of plant components with toxic potential. Environ Res. 1993 Jul;62(1):106-13. doi: 10.1006/enrs.1993.1095. PMID: 8325256.
- 23. Reid WK. Mycotoxins causing amyotrophic lateral sclerosis. Med Hypotheses. 2021 Apr;149:110541. doi: 10.1016/j.mehy.2021.110541. Epub 2021 Feb 15. PMID: 33631494.
- 24. Manera U, Matteoni E, Canosa A, Callegaro S, Casale F, Marchis D, Vasta R, Moglia C, Chiò A, Calvo A. Mycotoxins and Amyotrophic Lateral Sclerosis: Food Exposure, Nutritional Implications and Dietary Solutions. CNS Neurol Disord Drug Targets. 2024;23(5):562-572. doi: 10.2174/1871527323666230817145434. PMID: 37592793.
- 25. French PW, Ludowyke R, Guillemin GJ. Fungal Neurotoxins and Sporadic Amyotrophic Lateral Sclerosis. Neurotox Res. 2019 May;35(4):969-980. doi: 10.1007/s12640-018-9980-5. Epub 2018 Dec 5. PMID: 30515715.
- 26. Niazi IK, Türker KS, Flavel S, Kinget M, Duehr J, Haavik H. Changes in H-reflex and V-waves following spinal manipulation. Exp Brain Res. 2015 Apr;233(4):1165-73. doi: 10.1007/s00221-014-4193-5. Epub 2015 Jan 13. PMID: 25579661.
- 27. Haavik H, Niazi IK, Jochumsen M, Uginčius P, Sebik O, Yılmaz G, Navid MS, Özyurt MG, Türker KS. Chiropractic spinal manipulation alters TMS induced I-wave excitability and shortens the cortical silent period. J Electromyogr Kinesiol. 2018 Oct;42:24-35. doi: 10.1016/j.jelekin.2018.06.010. Epub 2018 Jun 19. PMID: 29936314.
- 28. Gevers-Montoro C, Provencher B, Descarreaux M, Ortega de Mues A, Piché M. Neurophysiological mechanisms of chiropractic spinal manipulation for spine pain. Eur J Pain. 2021 Aug;25(7):1429-1448. doi: 10.1002/ejp.1773. Epub 2021 Apr 15. PMID: 33786932.
- 29. Holt KR, Haavik H, Lee AC, Murphy B, Elley CR. Effectiveness of Chiropractic Care to Improve Sensorimotor Function Associated With Falls Risk in Older People: A Randomized Controlled Trial. J Manipulative Physiol Ther. 2016 May;39(4):267-78. doi: 10.1016/j.jmpt.2016.02.003. Epub 2016 Apr 2. PMID: 27050038.

- 30. Lelic D, Niazi IK, Holt K, Jochumsen M, Dremstrup K, Yielder P, Murphy B, Drewes AM, Haavik H. Manipulation of Dysfunctional Spinal Joints Affects Sensorimotor Integration in the Prefrontal Cortex: A Brain Source Localization Study. Neural Plast. 2016;2016:3704964. doi: 10.1155/2016/3704964. Epub 2016 Mar 7. PMID: 27047694; PMCID: PMC4800094.
- 31. Kiani AK, Maltese PE, Dautaj A, Paolacci S, Kurti D, Picotti PM, Bertelli M. Neurobiological basis of chiropractic manipulative treatment of the spine in the care of major depression. Acta Biomed. 2020 Nov 9;91(13-S):e2020006. doi: 10.23750/abm.v91i13-S.10536. PMID: 33170171; PMCID: PMC8023121.
- 32. Haavik H, Niazi IK, Amjad I, Kumari N, Ghani U, Ashfaque M, Rashid U, Navid MS, Kamavuako EN, Pujari AN, Holt K. Neuroplastic Responses to Chiropractic Care: Broad Impacts on Pain, Mood, Sleep, and Quality of Life. Brain Sci. 2024 Nov 7;14(11):1124. doi: 10.3390/brainsci14111124. PMID: 39595887; PMCID: PMC11592102.
- 33. Haas A, Chung J, Kent C, Mills B, McCoy M. Vertebral Subluxation and Systems Biology: An Integrative Review Exploring the Salutogenic Influence of Chiropractic Care on the Neuroendocrine-Immune System. Cureus. 2024 Mar 15;16(3):e56223. doi: 10.7759/cureus.56223. PMID: 38618450; PMCID: PMC11016242.

# **Declarations**

Patient consent was documented and is held by the lead Author.

All data with appropriate clinical commentary were provided by the authors.

# About the Case Report project

This Case Report is a part of the ASRF Case Report Project, a project designed to gather client studies from chiropractors and transform them into much-needed case reports, focused on the effects of chiropractic care on clinical presentations highly relevant to chiropractic, such as stress, immunity and adaptability.

This valuable project is made possible by the generous fundraising and contributions of ASRF supporters.

# 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 authors

Dr Sarah Kotlerman BS DC NTP is the Clinical Director for Averio Health Institute.

Dr Avery N. Martin BS DC is the founder of Averio Health Institute, now retired, and helps train and mentor the next generation of Doctors of Chiropractic.

Dr Amarjit Dhaliwal BS DC is a Clinical Manager at Averio Health Institute, assisting in the recommendation of labwork, assessment, and protocols.

Dr Jeffrey Clark DC, and Dr Zach Scheunemann DC are Floor Doctors providing Chiropractic care and management of patients while onsite at Averio Health Institute.

# Also by Dr Kotlerman

Kotlerman S, Martin A, Pierce D, Postlethwaite R, McIvor C. Improvement in Hemiplegic Migraines, Drop Seizures, Sleep, and Quality of Life in a 23-year-old female undergoing concentrated Chiropractic care: A case report. Asia-Pac Chiropr J. 2024;5.2. apcj.net/Papers-Issue-5-2/#KotlermanAnxiety

Kotlerman S, Martin A, Pierce D, Postlethwaite R, McIvor C. Improvements in anxiety and suicidal ideation in a 14-year-old female undergoing a concentrated program of Chiropractic care. Asia-Pac Chiropr J. 2024;5.1. apcj.net/Papers-Issue-5-1/#Kotlermananxiety

Kotlerman S, Martin A, Carter M, Postlethwaite R, McIvor C. Improvement in sleep, mental health, heavy metal toxicity and adaptability concomitant with Chiropractic care in a 47-year-old female cancer-patient undergoing chemotherapy: A Case Report. Asia-Pac Chiropr J. 2024;4.4. apcj.net/Papers-Issue-4-4/#AverioChemotherapy

Kotlerman S, Martin A, Postlethwaite R, McIvor C. Chiropractic Management of an 18-year old female with lupus: A Case Report. Asia-Pac Chiropr J. 2021;2.3. URL apcj.net/paper-issue-2-5/#AverioLupus

Kotlerman S, Martin A, Postlethwaite R, McIvor C. Improvement in memory, balance and hearing in a 91-year-old male under chiropractic care: A Case Report. Asia-Pac Chiropr J. 2021;2.6. URL apcj.net/papers-issue-2-6/#AverioMemory

McIvor C, Postlethwaite R, Kotlerman S, Martin A. Depression, ligament Instability and chronic pain improvement concomitant with a course of concentrated Chiropractic Care: A Case Report. Asia-Pac Chiropr J. 2023;3.3 URL apcj.net/Papers-Issue-3-3/#AverioDepressionChronicPain

McIvor C, Postlethwaite R, Martin A, Kotlerman S. Improved fertility outcomes following multiple IVF failures in a patient with Chronic Fatigue Syndrome and Hashimoto's Disease: A Case Report. Asia-Pac Chiropr J. 2023;4.1 URL apcj.net/Papers-Issue-4-1/#AverioHashimoto

Kotlerman S, Martin A, Carter M, Postlethwaite R, McIvor C. Reversal of Cervical Artery Stenosis and improvement in physical functioning in a 78-year-old stroke survivor under concentrated Chiropractic care: A Case Report. Asia-Pac Chiropr J. 2024;4.3. apcj.net/Papers-Issue-4-3/#AverioStenosisReversal

