

# Long Haul COVID-19 and Subluxation: A case report

Charles S Masarsky and Marion Todres-Masarsky

**Abstract:** A 59-year-old photographer with a presumptive diagnosis of COVID-19 in December of 2019 experienced multiple long-haul symptoms including 'brain fog' (deficits in memory and attention), headache, and limited ability to read. These symptoms were exacerbated by COVID-19 vaccinations and booster. At presentation in January of 2022, her reverse digit span was 5, and testing was accompanied by frustration to the point of tears. Attempts at reading produced a headache, forcing her to rely on audiobooks. Recipes she had used for many years were now difficult to follow. She reported an increased intolerance to cold since her illness. After 3 chiropractic visits over a period of 18 days, reverse digit span was 6 and the testing provoked no tears or any apparent frustration. Reading tolerance was improved, and she had experienced one 2-day period during which she had been able to read an entire book without ill effects. Her ability to follow recipes had improved. The chiropractic visits included adjustment of vertebral subluxation at multiple levels, adjustment of cranial faults, reflex therapies, and breathing exercises. We discuss possible mechanisms including disturbed dural mechanics, ischemic penumbra, and hypothyroidism.

**Indexing Terms:** Chiropractic; Long Haul COVID; ischemic penumbra; hypothyroidism; dural mechanics.

## Introduction

A recent paper suggested that the case report will be the core approach to the chiropractic study of the COVID-19 long hauler (Masarsky, 2021). A more recent publication further discussed the role of chiropractic care in the management of COVID-19 long haul victims (Blum 2021).

During the final months of 2021, we sent a call for research volunteers to patients on our e-mail contact list (Appendix 1). In addition, we displayed this call on flyers in our reception area. This call invited long haulers who had not received chiropractic care for at least 30 days to have a case history and examination followed by a brief series of chiropractic adjustments. After this series of adjustments, a follow-up examination would be scheduled. Initially, we foresaw three adjustments, then the follow-up. However, it soon became clear to us that the treating doctor required leeway in terms of the number and frequency of visits. As this is unfunded research, no monetary payment is made to the volunteers. All chiropractic services during the research visits are free of charge.

*... Patients may not be aware that they have endured a COVID infection which means heightened vigilance by chiropractors to follow-through on newly reported signs and symptoms which may not fit a typical pattern. Chiropractors have sufficient approaches to care to offer effective management in such cases ...'*



The patient described in this study completed her follow-up examination in January of 2022. For this patient, the examiner was CSM, and the treating doctor was MT-M.

### Past History

The patient is a 59-year-old photographer. She has visited for episodic musculoskeletal pain problems since October of 2015. Her most recent chiropractic visit prior to the research study took place on February 25, 2019.

On 5 December 2019 she found vesicles on both hands which later traveled to her abdomen and buttocks. The skin on her fingers become bright red and raw, resembling for the hand what has since become known as '*COVID toes*' when that appearance is manifested on the toes. She suffered from headache and fatigue. Fever at that time reached 102.5°F/39.2°C and complete blood count revealed depressed levels of white blood cells. Her headache lasted for three months, during which time she lost 15 pounds.

A magnetic resonance image of her brain in April of 2020 revealed no apparent abnormalities. By this time, awareness of COVID-19 raised the index of suspicion that the December 2019 infection was in fact COVID-19. However, blood work performed in April of 2020 was equivocal regarding this diagnosis. Two blood draws performed by the National Institutes of Health for research purposes were performed soon after this, but the results have not been made available to the patient.

On March 24, 2021, she received her first COVID-19 vaccination (Pfizer mRNA). This was followed by a return of her headache, along with '*brain fog*' (inability to concentrate, with memory deficit), and fatigue. A second Pfizer mRNA vaccination on April 14, 2021 was followed by a less severe exacerbation of the same symptoms. After a booster vaccination (Pfizer mRNA) on 22 October 2021 there was a moderate exacerbation of the previously mentioned symptoms along with a new symptom of arthritic pain. These symptoms were still current at the time of chiropractic examination.

### Presentation and Examination

Responding to our call for research volunteers, the patient presented on 7 January 2022. Informed consent was obtained (Appendix 2).

On a scale of 0 = no brain fog and 10 = inability to think or concentrate at all, the patient rated the symptom as ranging from 2 to 5. She stated she could not hold multiple thoughts in her head at the same time, and any attempt to do so provoked a headache. Working with the '*brain games*' by the company *Luminosity Mind*™ in attempt to clear her brain fog, she found herself unable to do fairly simple games. She '*screwed up*' recipes that she had followed with no trouble for many years prior to her illness. Trying to think provoked a headache which sometimes lasted for several days. These headaches aggravated her brain fog. Reading created fatigue, so she was mostly using audiobooks. She had been monitoring her breathing capacity at home using a peak flow meter, and found no decline compared to her levels previous to her presumptive diagnosis of COVID-19.

Due to her sensitivity to reading, we tested visual middle (Padula and Argyrie, 1996) and ocular lock (Walther, 1988). Both tests were negative. However, during the testing for ocular lock, she stated gazing in the cardinal directions '*felt like work*'.

With brain fog as a major complaint, we tested her reverse digit span to gain an outcome measure related to attention span and short-term memory (Masarsky, 2015). Her reverse digit span was 5. Although this score is not clinically worrisome by itself, there was a great deal of hesitation in answering the test questions. Furthermore, the effort produced a slight headache, and the patient was frustrated to the point of tears.

When asked about temperature sensitivity, the patient noted an increased intolerance to cold since her 2019 illness.

### Intervention and Outcome

Damon, a gentle reflex technique that often helps the patient relax, was performed at the beginning of the first adjustment (Damon and Damon, 1939). Based on palpation and challenge according to Applied Kinesiology protocols, vertebral subluxation complex involving the occiput, C1, C2, C7, T9, and L1 were noted. These were adjusted with diversified technique modified to involve lighter than usual amplitude. On manual muscle testing, the left psoas major was inhibited. This was addressed with neurolymphatic reflex stimulation (Walther 1988). Hypertonicity of the costal diaphragm attachments was addressed with superior to inferior manual stretching.

During manual muscle testing, the patient noted a lag time between the command '*hold*' and actually executing the required muscle contraction, as if she needed extra time to mentally process what was required of her.

Following the first adjustment, the patient made the unprompted comment '*I feel a little better.*'

The next visit took place 3 days later (1-10-2022). Vertebral adjustments with light diversified technique as previously described were administered at C2, T10, and T12, and an anteriority adjustment was delivered with T7 at the base of the anteriority (Bergmann et al, 1989). Manual muscle testing revealed inhibition at the right *erector spinae* and right *teres minor* muscles, which were addressed with neurolymphatic reflex stimulation. A tender point at the origin of the right *teres minor* muscle was addressed with soft tissue manipulation. Challenge revealed a cranial fault involving superior malposition of the left wing and anterior malposition of the right wing of the *sphenoid*. This was addressed with respiratory assistance adjustment at both sites (Walther 1988).

To support recovery of cognitive function, the patient was advised to take at least 10 deep breaths every day, and to practice yogic alternate nostril breathing for at least 3 minutes each day (Garg et al, 2016).

At the patient's third visit, which took place on 24 January 2022 she remarked that for 2 days the previous week she was able to read without provoking a headache. In fact, she finished an entire book during a 24 hour period with no ill effects. She also felt capable of multi-tasking during these 2 days.

Following a Damon procedure, modified diversified adjustments were administered at C4, T4, T12, L5, the right proximal *ulna* and *radius*, and the left *first rib*. The patient was asked to perform yogic alternate nostril breathing for three minutes. While she was doing this, the *yin tang* acupuncture point (also known as the *extra one* point) was stimulated with fingertip pressure for approximately half the time (Young-Chang et al 2011). For the remaining time, the clinician's fingertips were gently curled under the supine patient's occiput to stretch the *suboccipital* muscles.

The follow-up interview was held on 26 January 2022. At this time, the patient rated her brain fog in a range as low as 1/10 with rare spikes of 7/10. She had not returned to her *Luminosity Mind™* games but reported improvement in playing another game, *Wordle*. She was still having trouble following long-familiar recipes, but '*not quite as bad*'. Reverse digit span was 6, and the patient reported no frustration, and no hesitation or tears were in evidence.

Weakness and tingling in her right hand was waxing and waning. She was unable to assess her cold sensitivity since the local weather had become much colder compared to earlier in the month.

The patient continued to feel fatigue when reading, with the exception of the two good days previously mentioned. However, this fatigue was '*not as bad*'.

Earlier during the day of the follow-up interview, she had visited her dentist. She had previously found listening to music while the dentist was drilling to be soothing, but on this occasion, the two together was too much stimulation.

Overall, she rated her progress at 15-20% improved in comparison to presentation levels.

## Discussion

When a patient improves under the care of a chiropractor – or any other health care provider – the diligent investigator must consider the possibility of a spontaneous remission rather than a bona fide physiological effect of the intervention. In this case, the patient remarked on some degree of improvement immediately following the first adjustment. Furthermore, the patient's ability to read an entire book within 24 hours, mentioned on her third visit, was entirely unlike any period of energy and mental focus the patient had experienced since her 2019 illness. Overall, her improvement in terms of symptoms that had plagued her for more than two years took place in less than three weeks of chiropractic care. The most plausible explanation for this time frame is a bona fide physiological response to chiropractic care.

There is a question in the current patient's case about whether or not her 2019 illness was actually COVID-19. The diagnosis was presumptive, not definitive. This is certainly understandable, as community transmission of the disease in the United States was not identified until February of the following year (*Center for Disease Control and Prevention, 2020*). There is undoubtedly a large population of COVID-19 victims whose infections were never diagnosed definitively or at all, due to lack of awareness and unavailability of testing prior to recognition of community transmission. In any event, chiropractic care plausibly alleviated symptoms caused by the current patient's exposure to COVID-19 antigens via vaccination, infection, or both.

The patient's care involved vertebral, cranial and extremity adjustments at multiple levels, reflex techniques, and breathing exercises to perform at home. One of the shortcomings of a single case report is whether one component, multiple components, or the entire package of interventions produced the benefit is not known. Perhaps future case reports and case series will help point out particularly relevant interventions.

While the mechanism or mechanisms underlying mutual exacerbation between the patient's subluxation complex and her long-haul symptoms are not known, several can be hypothesised. An attractive possibility involves dural mechanics.

In the 1990's a report appeared describing a connective tissue bridge between the *rectus capitis posterior* muscle and the cervical *dura mater* (Hack et al, 1995). Since that time, multiple myodural bridges have been identified in humans and non-human animals (Liu et al, 2018; Mitchell et al 1998). If vertebral subluxations and cranial faults transmit stressful mechanical forces to the pain-sensitive dural tissues via myodural bridges or other structures, headache is a very likely result. Furthermore, these dural forces could disturb circulation of cerebrospinal fluid.

At least one investigator has suggested that the myodural bridge may serve as a cerebrospinal fluid pump (Xu et al, 2016). Further derangement of dural mechanics and cerebrospinal fluid flow could also have been caused by her cranial faults. It has been proposed that COVID-19 may cause lingering cognitive deficit by interrupting the normal flow of cerebrospinal fluid (Wostyn, 2021). Disruption of cerebrospinal fluid flow due to a combination of cervical subluxations, cranial faults, and factors related to COVID-19 infection could have combined to cause and mutually aggravate the '*brain fog*' of our long haul COVID-19 patient. Correction of dural mechanics via vertebral and cranial adjustments could have corrected two of the three factors generating the

patient's cognitive problems via this mechanism. Furthermore, long-haul headache could have been aggravated by abnormal tensions on the pain-sensitive dural tissue.

### Ischemic penumbra

A number of years ago, Terrett proposed that cervical subluxation could provoke a sort of electrical storm spreading unpredictably through the sympathetic innervation of the cranial arterial tree (Terrett, 1993). The resulting vasoconstriction would cause ischemia in some portions of the brain. If this ischemia is not enough to cause cellular death, it could nevertheless render the affected neurons electrically silent, a condition known as '*ischemic penumbra*'. In effect, portions of the brain would be hibernating, but alive. Correction of the cervical subluxation complex and subsequent restoration of blood flow would reverse the process.

The now well-known cytokine storms that characterise severe COVID-19 infection could instigate vasoconstriction as well. The interaction between subluxation and infection in prompting vasoconstriction and subsequent ischemic penumbra provides another potential explanation for the brain fog experienced by our patient.

### Hypothyroidism

During the intake interview for this research, the patient mentioned increased sensitivity to cold. While a number of mechanisms could explain this symptom, it is often related to underlying hypothyroidism. Hypothyroidism would be expected to aggravate or possibly cause brain fog and headache.

Adding plausibility to this hypothesis is an emerging body of research that links COVID-19 infection to thyroid dysfunction (Whiting et al, 2021). These thyroid problems seem linked to an autoimmune problem generated by the COVID-19 infection by mechanisms not yet understood. Interestingly, the specific dysfunction is sometimes hyperthyroidism, and in other cases it is hypothyroidism.

That subluxation could aggravate hypothyroidism is indicated by at least four case reports in which hypothyroidism was ameliorated by chiropractic correction of subluxation (Reimer, 2020; Wallis and Cuvillo, 2020; Fuller and Douts, 2018; Bak and Engelhardt 2015).

Our patient mentioned a history of whiplash trauma the first time she presented at our practice (prior to the current research). What makes this fact relevant is published evidence strongly suggesting that whiplash trauma is a risk factor for hypothyroidism. For example, Sehnert and Croft found more than 86% of 101 consecutive whiplash patients to have lower than normal basal metabolic temperatures (Sehnert and Croft, 1996). Furthermore, the correlation between basal metabolic temperature and blood serum levels of the thyroid hormone triiodothyronine was found to be statistically significant.

If our patient's whiplash history left her with pre-existing or incipient hypothyroidism, it could have been exacerbated by COVID-19 exposure. Correction of vertebral subluxations, some of which may have been a chronic legacy of her trauma history, could have alleviated her hypothyroidism to some degree. This mechanism offers an additional potential explanation for the patient's positive response to chiropractic care.

### Conclusion

Headache and '*brain fog*' are common manifestations of the COVID-19 long haul syndrome. Several mechanisms are proposed by which vertebral subluxations and cranial faults could exacerbate these manifestations, including disturbed dural mechanics and ischemic penumbra. Our patient experienced relief from both headache and brain fog during a brief regimen of chiropractic care.



Furthermore, the patient's post-infection symptom of cold sensitivity could be indicative of post-COVID hypothyroidism. Several previous case reports indicate chiropractic care can allow thyroid function to normalise in some patients. If hypothyroidism does in fact explain some of our patient's symptoms, normalisation of her endocrine problem under chiropractic care could explain her encouraging symptomatic response. Her past history of whiplash injury may be relevant, since at least one study has found whiplash to be a risk factor for hypothyroidism.

We hope future case reports and case series will further elucidate the role of the chiropractic adjustment in the care of the COVID-19 long hauler. Surveys of patient history may reveal whether or not whiplash, or cervical-cranial trauma in general, is a risk factor for long COVID-19. The evidence derived from these forms of descriptive research can be invaluable in guiding chiropractic care during the post-pandemic era.

Furthermore, many patients who have never suffered from COVID-19 nevertheless suffer from symptoms similar to those exhibited by our patient. Our growing knowledge base concerning COVID-19 long haulers will undoubtedly amplify our competence in the care of patients with migraine, concussion, post-surgical confusion, so-called "chemotherapy brain", and many other maladies that may be exacerbated by vertebral subluxations and cranial faults.

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## Appendix 1: Call for Subjects

### **Call for Research Volunteers: Long Haulers (COVID)**

#### **What Is Our Hypothesis (Research Question)?**

It is not uncommon for COVID-19 survivors to have residual problems for weeks or months after the fever and acute symptoms are gone. These people are sometimes referred to as “long haulers”. Common long-haul symptoms include headache, fatigue, attention deficit, and difficult breathing.

We know from both published research and our own clinical experience that chiropractic adjustments often help people with these symptoms whether or not they are infection related. The possibility that chiropractic adjustments can help people with these same symptoms post-COVID seems reasonable.

In a previous newsletter, we provided a brief discussion of a COVID-19 survivor who had lost her sense of smell and seemed to regain it immediately after her adjustment.

**Our hypothesis:** *In some cases, chiropractic adjustments can reduce the severity of COVID-19 long-haul symptoms.*

#### **How Do You Qualify for the Project?**

We are calling for volunteers who are COVID-19 survivors with lingering symptoms who have had no chiropractic care for at least one month. We will need written documentation of your COVID-19 diagnosis. If you may still be contagious, we will delay your participation.

#### **What Can You Expect During Your Participation?**

If you are an established patient, we will perform a brief case history and exam focused on your long-haul symptoms as well as our usual chiropractic checkup. If appropriate, an adjustment will be performed. This visit will last approximately 30 minutes.

If you are a new patient, we will perform the same case history and examination that any other new patient would experience, along with specific questions related to long-haul symptoms. If appropriate, a chiropractic adjustment will be performed. This visit will last approximately one hour.

There will be two follow-up visits for additional chiropractic adjustments, lasting approximately 15 minutes each. At the fourth and final research visit, a progress exam will be conducted.

#### **What Will We Do with the Data?**

We hope to publish these cases in a peer-reviewed, indexed clinical journal. Published papers will not include your name or any information that can be used to identify you. Your privacy and your safety will always be our paramount consideration.

#### **Will There Be Payment?**

This research is not grant-funded, so we cannot offer cash payment. All chiropractic services received as part of your participation in this research will be free of charge.

#### **Contacting Us**

If you are interested in volunteering, or if you have a friend or family member who would like to, contact us by phone: 703-938-6441. Feel free to spread the word by forwarding this e-mail, or by copying and sharing this flyer.

Thank you!



## Appendix 2: Consent for Research Participation

### VIENNA CHIROPRACTIC ASSOCIATES, P.C.

243 Church Street NW, #300-B, Vienna, VA 22180

703-938-6441

Directors: Charles S. Masarsky, D.C. & Marion Todres-Masarsky, D.C.

Thank you for helping us investigate the chiropractic management of long-haul COVID-19 symptoms.

We will measure the severity of your symptoms before and after a brief series of chiropractic adjustments.

We are committed to your safety and well-being during your participation in this research, as we would be with anyone under our care. Nevertheless, you have the right to withdraw your participation at any time for any reason.

We hope this research leads to publication in a clinical journal. In compliance with standard rules for such publications, we will not reveal your name, initials, unique characteristics, or any other information that poses a foreseeable threat to your privacy.

***“I have read the above, asked any questions I have about the project described, and I understand the information presented. I consent to participate.”***

***Printed Name of Participant:*** \_\_\_\_\_

***Signature of Participant:*** \_\_\_\_\_

***Today's Date:*** \_\_\_\_\_