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HYPOTHESIS

Hypothesis: Chiropractic adjustments reduce the risk of stroke in Long COVID

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Narrative: The hypothesis that Chiropractic adjustments reduce the risk of stroke in long COVID victims gains initial plausibility from the existing evidence of the effect of Chiropractic adjustments on at least two modifiable risk factors for stroke. These factors are depressed pulmonary function and sedentary lifestyle.

In addition to evidence that Chiropractic adjustments can ameliorate these risk factors generally, case reports suggest that depressed pulmonary function and sedentary lifestyle are ameliorated by Chiropractic adjustments in Long COVID victims specifically.

Approaches to future research to confirm or not confirm the hypothesis are discussed.

Indexing terms: Chiropractic; hypothesis; adjustment; stroke risk; Long COVID.

Introduction & Background

COVID-19 infection was identified as a risk factor for stroke during the 2019-2023 pandemic. (Endres et al, 2022) It soon became apparent that patients with lingering symptoms after the acute infection (long COVID) were also at increased risk for stroke. (Wang et al, 2022) Reducing the risk of stroke among long COVID sufferers is an issue of clinical interest now that COVID-19 is endemic in the world population.

> In particular, it seems reasonable for those who care for long COVID patients to address modifiable risk factors for stroke.

> *'... Studies to directly confirm or not confirm the hypothesis would include prospective and retrospective data analysis comparing the stroke incidence of long COVID victims under Chiropractic care to those not under Chiropractic care ...'*

Two modifiable risk factors for stroke

A number of studies have identified depressed pulmonary function as a risk factor for stroke. A 1995 study found an inverse relationship between forced vital capacity (FVC) and stroke incidence. (Wannamethee et al, 1995) An inverse relationship was likewise found between forced expiratory volume in one second (FEV-1) and stroke incidence. These relationships between depressed pulmonary function and stroke risk have since been verified by several research teams. (Agnarsson et al, 1999; Guo, et al 2006; Hozawa et al, 2006)

In all of these studies, the inverse relationship was maintained when smokers were excluded from the data, strongly suggesting depressed pulmonary function is an independent risk factor for stroke.

A second modifiable risk factor is sedentary lifestyle. Epidemiological evidence dates to at least the Framingham study. (Kiely et al, 1994) The relationship between sedentary lifestyle and stroke has been verified multiple times since the 1994 Framingham report, including studies by *Harvard University, Albert Einstein College of Medicine*, and the *Cumming School of Medicine.* (Lee and Paffenbarger, 1998; McGinn et al 2008; Joundi et al, 2021) In at least one of these studies, the inverse relationship between activity level and stroke risk remained significant when obese and hypertensive subjects were excluded from the data, strongly suggesting that sedentary lifestyle is an independent risk factor for stroke.

If chiropractic adjustments ameliorate these modifiable risk factors for stroke, a role for this intervention in the care of long COVID victims seems reasonable.

Hypothesis

Chiropractic adjustments reduce the risk of stroke in Long COVID victims

Preliminary support for the hypothesis

Depressed pulmonary function: Evidence of amelioration under Chiropractic care

A 79-year-old woman with multiple problems related to long COVID experienced relief from memory loss, pharyngitis, and dyspnea after four weeks of chiropractic care. (Masarsky and Todres-Masarsky, 2023) Interventions included six visits for Chiropractic adjustments and instruction in oropharyngeal exercises. At presentation, her FVC was 1.7 litres. After four weeks of care, her FVC was 2.3 litres.

This case report specific to the issue of long COVID is joined by previous papers indicating improved pulmonary function under chiropractic care. In a retrospective study, FVC and FEV-1 improved in a sample of 50 consecutive new chiropractic patients after one to three chiropractic adjustments. (Masarsky and Weber, 1986) The change from initial examination to progress examination was statistically significant for the group as a whole. The majority of these patients had no current pulmonary complaints or significant pulmonary history at the initiation of care. Furthermore, the FVC and FEV-1 were within normal limits for the age and height of most of the patients within this group at initial examination, yet these volumes had improved by the progress examination.

- A later study demonstrated similar results. A sample of 55 consecutive new patients received Chiropractic care for the correction of upper cervical subluxation. (Kessinger, 1997) Improvements in FVC and FEV-1 were statistically significant for the group as a whole. The results were also statistically significant for the subset of 33 patients with depressed lung volumes at the initial visit and for 22 patients with initially normal lung volumes.
- An additional instance of improved FVC and FEV-1 in a patient with initially normal readings was reported in a small case series. (Masarsky and Weber, 1989)
- Morningstar and Jockers found that improved lung volumes were accompanied by increased cervical lordosis and reduction in forward head posture after 3-6 months of chiropractic care. (Morningstar and Jockers, 2009)
- A 2022 study noted statistically significant differences between chronic neck pain patients and pain-free controls. (Dag et al, 2022) FVC and FEV-1 were both lower in the chronic neck pain group.
- A randomised control trial explored the interaction between Chiropractic care and exercise in relation to FVC and FEV-1. (Engel and Vemulpad, 2007) Healthy, non-smoking subjects

were randomly allocated into exercise only, Chiropractic manual therapy only, exercise and Chiropractic manual therapy combined, and a control group. Subjects in the Chiropractic manual therapy group demonstrated statistically significant improvement, and some improvement (although not statistically significant) was demonstrated by the subjects in the combined intervention group. Controls and exercise only subjects did not improve.

As a whole, the published literature suggests that chiropractic care can ameliorate depressed pulmonary function, a modifiable risk factor for stroke for a significant sector of the population, including long COVID victims. This is supportive of the hypothesis.

Chiropractic and sedentary lifestyle

A 66-year-old retired military officer suffered from multiple symptoms of long COVID, including fatigue with frequent bouts of exertional malaise. (Masarsky and Todres-Masarsky, 2025) After less than three months of Chiropractic care, he noted improvement in energy and activity levels, with fewer episodes of exertional malaise. He was measuring his steps every day, thereby providing a measure of his activity levels. He had progressed from an average of 3,000 steps per day at presentation to an average of 5,000 steps per day at the time of publication. Care included 16 Chiropractic adjustments and instruction in exercises for cervical range of motion and oropharyngeal tone.

This case report is joined by literature more generally indicating the benefit of Chiropractic care for physical activity level. For example, work-related injuries often render their victims relatively sedentary while they recover. Patients with musculoskeletal pain from job-related injuries often find themselves in their local Worker's Compensation system. The long-term record-keeping procedures of these systems have proven useful in a number of studies.

- A Florida study found the average length of disability for injured workers was 39 days under Chiropractic care, compared to 58 days under medical care. (Wolk, 1988)
- An Iowa study found that patients with work-related back strain or sprain returned to work in less than 12 days under Chiropractic care, compared to more than 14 days under medical care. (Johnson, 1989)
- A Utah study of 3,062 workers with job-related back injuries noted that injured workers under chiropractic care had one-tenth the lost time compared to those under medical care. (Jarvis et al, 1991)
- In their study of 1,471 workers compensation claims, Coster and Ebrall found a low progression of injured workers to paid compensation days under Chiropractic care (Coster and Ebrall, 1993). In addition to being an important indicator of Chiropractic cost-effectiveness, it undoubtedly correlates with prompt return to work and the physical activity that implies.

Victims of sports injuries frequently experience long periods of reduced activity as they recover. To the extent that Chiropractic care can speed up this return to activity, it has the effect of countering sedentary lifestyle. In a survey of National Football League trainers, 77% reported that they refer their injured players to chiropractic practitioners (Stump and Redwood, 2002).

- Informal participation in the U.S. Olympic team has been going on for decades, but official participation began when George Goodheart was appointed the first Doctor of Chiropractic on the U.S. Olympics Sports Medicine Team in the 1980 winter games at Lake Placid, New York. (Perle, 2003)
- Chiropractic has a long history of involvement with major league baseball. Babe Ruth, Joe DiMaggio, and Lou Gehrig all depended on Erle Painter for rapid recovery from injuries. (Dintenfass, 1987 and Rehm, 1992) Painter was a Doctor of Chiropractic, but New York did not license Chiropractors until 1963, long after the era of Ruth and company. Officially, the

New York Yankees hired Erle Painter as a 'trainer'. However, the players all knew what his real background was, and referred to him as 'Doc Painter'.

Competitive athletes are among the most active people in industrialised societies. The ability of Chiropractic care to return the injured athlete to competition strongly implies that such care gets the ordinary person past his or her own injuries and back into the activities of daily living. This is supported by evidence of return to activity by low back pain patients under Chiropractic care.

A British study compared Chiropractic care of low back patients to hospital-based physiotherapy. (Meade et al, 1990 and 1995) At six months, the patients under Chiropractic gave their care higher ratings than those in hospital based physical therapy. Follow-up at one year and three years was carried out by mailing subjects the Oswestry questionnaire. This pencil-and-paper instrument deals with more than just pain, questioning the patient about daily activities such as walking, lifting, washing, dressing, traveling and housekeeping. Average Oswestry scores of Chiropractic patients were 29% better than average scores of physiotherapy patients. The authors concluded '*At three years, the results confirm the findings of an earlier report that when chiropractic or hospital therapists treat patients with low back pain as they would in day to day practice, those treated by chiropractic derive more benefit and long term satisfaction than those treated by hospitals*'.

More recently, a collaborative study between *Parker College of Chiropractic* and the *University of North Texas* analysed health related behaviours from a 2005 survey of 31,248 adults in a CDC database. (Ndetan, et al, 2009) Respondents who saw Doctors of Chiropractic only were compared to respondents who saw medical doctors only for their health care needs.

One of the variables was frequency of physical activity lasting for at least 10 minutes. If such activities occurred at least monthly, they were categorised as 'frequent'. Chiropractic-only respondents were significantly more likely to report frequent physical activity than medical-only respondents.

The above data strongly suggests that chiropractic adjustments can facilitate physical activity, thereby ameliorating sedentary lifestyle, a modifiable risk factor for stroke in long COVID as well as within the general population. This supports the hypothesis.

Discussion

The effect of Chiropractic adjustments on pulmonary function and activity level constitutes preliminary plausibility for the hypothesis. Studies to directly confirm or not confirm the hypothesis would include prospective and retrospective data analysis comparing the stroke incidence of long COVID victims under Chiropractic care to those not under Chiropractic care.

Resources required to carry out such studies on the appropriate scale may be hard to come by in the immediate future. In the meantime, clinical trials exploring the effect of Chiropractic care on modifiable stroke risk factors can be conducted with samples of long COVID patients. The factors discussed here, pulmonary function and activity level, are obvious choices for outcome measures in such studies. Additional outcomes may be worth examining, such as arterial blood pressure, serum lipid levels, blood markers of inflammation, the use of non-steroidal anti-inflammatory drugs, and measures of immunocompetence.

Conclusion

If emerging evidence continues to support the hypothesis that chiropractic adjustments reduce the risk of stroke among long COVID victims, a more inclusive hypothesis should be considered. This more general hypothesis would be: Chiropractic adjustments reduce stroke risk in the global population.

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Dr Charles Masarsky has been in the private practice of chiropractic with Dr. Marion Todres-Masarsky since 1983. Their office is located in Vienna, Virginia, USA in the suburbs of Washington, DC. He also offers continuing education programs for chiropractic colleges and associations and teaches at the Northern Virginia Community College. For information about his practice or his CE programs, please e-mail viennachiropractic@verizon.net.

Citations for Dr Masarsky's published papers are available at his website under '*about the doctors*': www.viennachiropractic.com.

Dr Masarsky also writes a frequent feature in the *Journal* called '*The Wide Angle Lens*' in which he takes a broader than usual perspective on one issue or another, and has contributed much on clinical aspects of COVID.

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