



Short Communication

Stroke vs. toxin release after chiropractic spinal manipulation: A plausible hypothesis

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ARTICLE INFO

Keywords:

Chiropractic
Stroke
Dissection
Toxin release
Manipulation

ABSTRACT

Multiple chiropractors report that some patients experience symptoms of dizziness/vertigo, nausea/vomiting, neck pain, headaches, sweating, fatigue, diarrhea, and fever after spinal manipulation. These chiropractors attribute these symptoms to toxic release caused by spinal manipulation. However, a literature search of three electronic databases for research supporting this claim yielded no results. These symptoms may instead represent minor thromboembolic ischemic strokes due to cervical spine manipulation performed in the presence of undiagnosed cervical artery dissection. Cervical spine manipulation is contraindicated in the presence of cervical artery dissection. Increased education and training on cervical artery dissection and stroke is recommended for chiropractors.

Introduction

Numerous chiropractic physicians report on their public websites that some of their patients experience symptoms of dizziness, vertigo, nausea, vomiting, neck pain, headaches, sweating, fatigue, diarrhea, and fever following treatment with spinal manipulation. These chiropractors claim that these symptoms are the result of detoxification which is a result of spinal manipulative therapy. Spinal manipulation being a manual therapy in which a controlled, high-velocity, low-amplitude thrust is applied to the spine and induces a therapeutic stretch on the spinal joints.

On their websites, these chiropractors support the toxin release hypothesis with various versions of the same argument. They claim that metabolic waste products accumulated in the body tissues are released by spinal manipulation causing symptoms of detoxification that resemble the symptoms of cold, flu or allergies. Some claim that toxin bubbles form in the joints and spinal cord, and spinal manipulation releases these toxins into the blood stream by causing the toxin bubbles to burst. Some propose that the popping sound associated with spinal manipulation is the toxin bubbles bursting. These symptoms are compared to the symptoms of detoxification from drugs.

The objective of this study was twofold. First, to evaluate the research supporting the claim that these symptoms after spinal manipulation are the result of toxin release. Second, to propose a plausible alternative hypothesis for these symptoms of alleged toxin release.

PubMed, Index to Chiropractic Literature, and Google Scholar were

searched from inception to November 2024. The following keywords were searched: *chiropractic, spinal manipulation, adjustment, toxin release, nausea, dizziness*. All English language peer reviewed studies that supported or refuted spinal manipulation causing toxin release were included. Our search yielded no results.

The hypothesis

These symptoms of alleged toxin release are potential symptoms of brain ischemia. Dizziness and nausea are two of the classic symptoms of brain ischemia. These symptoms of alleged toxin release may instead be an adverse event, a minor thromboembolic ischemic stroke caused by performing cervical spine manipulation in the presence of an existing cervical artery dissection.

Not all strokes following neck manipulation are catastrophic. Strokes may be minor, moderate, severe or fatal [1]. A minor stroke being one that causes ischemic symptoms but minimal or no disability [2].

Patients with undiagnosed cervical artery dissection causing neck pain and/or headache may seek care from chiropractors [3,4]. 8.93 out of every 100,000 people suffer cervical artery dissection each year [5]. With 330 million people in the USA, this equates to 29,469 people in the USA every year. It is plausible that hundreds or thousands of them are seeking chiropractic care for neck pain and/or headache from undiagnosed vertebral or internal carotid artery dissection.

Thromboembolic stroke may be caused by performing neck manipulation in the presence of an undiagnosed cervical artery dissection [6].

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<https://doi.org/10.1016/j.mehy.2025.111629>

Received 30 November 2024; Received in revised form 26 February 2025; Accepted 22 April 2025

Available online 26 April 2025

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In a thromboembolic mechanism of causation, sudden neck movement from manipulation could dislodge a loosely adherent cervical artery thrombus [7]. The dislodged embolus may travel and occlude a smaller artery that supplies the brain, resulting in ischemic stroke. These strokes would likely be immediate, with the onset of ischemic symptoms within seconds or minutes of cervical spine manipulation [6,8].

Chiropractors report these symptoms resolve in a matter of hours, days or weeks after spinal manipulation. This is consistent with a minor thromboembolic stroke with subsequent fragmentation and disappearance of the embolus. If the embolus fragments and disappears before severe, permanent neurological damage occurs, the patient may not seek medical care and cervical arterial dissection and stroke may go undiagnosed. This process could happen as the body's natural fibrinolytic system, aided by blood flow, breaks down the embolus into smaller parts. These fragments might either dissolve through the action of plasmin or become small enough to pass through the vascular system without causing significant damage, thus leading to temporary, reversible symptoms of ischemia.

Evolution of the hypothesis

This is a novel hypothesis. No peer reviewed studies were found supporting or refuting the proposition that alleged toxin release following neck manipulation is instead a minor ischemic stroke.

However, the proposition that cervical spine manipulation can cause a thromboembolic stroke when performed in the presence of an existing undiagnosed cervical artery dissection is not novel. This mechanism of causation has been supported in 15 peer reviewed studies by researchers from neurology, chiropractic and physical therapy [6,9,10].

The hypothesis does not propose that cervical spine manipulation can cause dissection in an otherwise healthy cervical artery. There is no convincing evidence that neck manipulation can cause dissection [11]. The hypothesis proposes that cervical spine manipulation may cause minor stroke when performed in the presence of an existing undiagnosed vertebral or internal carotid artery dissection.

Testing of the hypothesis

Given the life-threatening nature of cervical artery dissection and stroke, evaluating the hypothesis by conducting randomized controlled trials is ethically unfeasible. Given the rarity of arterial dissection and stroke, epidemiological studies are difficult due to the scarcity of data.

The ideal method to evaluate the hypothesis would be for chiropractors to refer patients experiencing these potential symptoms of a minor ischemic stroke after cervical spine manipulation to medical emergency. Advanced imaging can be utilized to assess for arterial dissection or stroke, which can test the hypothesis by identifying or ruling out such events. However, by their own admission, chiropractors making claims of toxin release from spinal manipulation do not refer these patients to medical emergency.

Another method to evaluate the hypothesis would be to systematically evaluate multiple case reports of this phenomenon. However, chiropractors making claims of toxin release from spinal manipulation have never published a case report of these symptoms after neck manipulation.

Therefore, the most practical method to test the hypothesis involves analysis of case reports where more severe strokes occur after cervical spine manipulation [12]. These case reports suggest that a thromboembolic mechanism could also lead to minor strokes.

To meaningfully test this hypothesis, chiropractors should refer these patients to medical emergency and publish case reports of these occurrences. However, it is possible that patients with these symptoms post-manipulation will seek medical care and not tell the chiropractor. Therefore, there is a need for collaboration with emergency medicine specialists and neurologists to identify such cases.

Consequences of the hypothesis

Courses reviewing the body of research on the potential causal relationship between cervical spine manipulation and stroke should be mandatory for chiropractic students. Mandatory annual continuing education courses on the adverse effects of spinal manipulation, including stroke, are indicated for chiropractors.

Cervical spine manipulation should not be performed in the presence of an existing cervical artery dissection. Chiropractic, medical and physical therapy researchers have published clinical examination strategies to exclude dissection prior to performing neck manipulation [13,14]. Cervical arterial dissection has symptoms of characteristic neck pain and headache sometimes accompanied by nausea, tinnitus and vertigo [13–15]. The diagnosis of cervical artery dissection is challenging and requires a high degree of clinical suspicion, but it can be made with thorough history taking, physical examination, and advanced imaging of the vertebral and internal carotid arteries.

Conclusion

These symptoms of alleged toxin release after cervical spine manipulation may instead be an adverse event, a minor thromboembolic ischemic stroke caused by performing neck manipulation in the presence of an undiagnosed cervical artery dissection. More education and clinical training in arterial dissection and stroke are recommended for chiropractors.

Consent Statement/Ethical Approval

Not applicable.

Funding support

This work was not funded by grants from any university, company, nonprofit, organization, or agency.

CRediT authorship contribution statement

Steven Brown: Writing – review & editin, g, Writing – original draft, Conceptualization.

Declaration of competing interest

The author declares the following financial interests/personal relationships which may be considered as potential competing interests: The author provides consultation on medicolegal matters including cervical artery dissection and stroke diagnosed following cervical spine manipulation.

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