


# Letter to the Editor: Cervical Spinal Manipulative Therapy Unlikely Cause of Spontaneous Internal Carotid Artery Dissection

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## Keywords

Chiropractic, spinal manipulation, internal carotid artery dissection, cerebrovascular disorders, adverse effects, protopathic bias, cervical spine

With great interest, we read Chen et al's presentation of 2 cases of unilateral internal carotid artery dissection (ICAD) and ischemic stroke that were identified within 1-2 days of each patient receiving cervical spinal manipulative therapy (cSMT).<sup>1</sup> In their conclusion, the authors assert that chiropractic spinal manipulation is a potential cause of ICAD and stroke. However, we highlight several issues with this conclusion based on potential biases in the reporting of these cases and inadequate appraisal of recent literature.

First, as the authors stated, the chiropractic profession is not regulated in China. The authors present details which suggest the practitioner rendering cSMT in their reported cases was not actually a chiropractor. Chiropractic is a health care profession in which clinicians both examine and treat patients, rather than simply an intervention. In addition, cSMT is utilized by various non-chiropractic practitioners around the world (e.g., osteopaths, physical therapists, tuina practitioners). Historically, the term "chiropractic" has been misrepresented in case reports, particularly when adverse events occur in temporal relation to cSMT.<sup>2</sup> The authors' definition of "chiropractic" appears most consistent with the traditional Chinese medicine practice of *tuina*, in which "clients" rather than patients seek care to "relax the body." We request that the authors clarify the credentials of the cSMT provider in their reported cases so it may be determined if, in fact, a duly trained, licensed chiropractor appropriately examined each patient and rendered cSMT.

Second, the authors fail to reference the most recent and relevant scientific literature on the topic of ICAD and cSMT. Importantly, in a recent large, population-based case-crossover study no causative association was found between chiropractic cSMT and cervical artery dissection, including ICAD.<sup>3</sup> This study suggested ICAD was temporally associated with visits to both chiropractors and primary care physicians, yet likely due to patients seeking care for early, prodromal ICAD symptoms of headache and neck pain. In

addition, the authors' statement that "...mechanical forces may contribute to cervical artery dissections" is unsupported and contrary to the available evidence. In one in-vivo study, simulated cSMT did not adversely affect blood flow through the internal carotid artery as measured by sonography.<sup>4</sup> In another study using unembalmed cadavers, cSMT did not cause internal carotid artery strains in excess of those experienced during normal everyday movements.<sup>5</sup>

Third, the authors do not report why either patient presented to the practitioner who rendered cSMT. Symptoms such as neck pain and/or headache can be early signs of ICAD<sup>3,6</sup> and may be the catalyst for a patient to present for cSMT before the ICAD results in stroke.<sup>3</sup> As such, the authors potentially demonstrate a protopathic bias, a phenomenon of misattributing an early therapeutic agent (i.e., cSMT) as the cause of disease (i.e., ICAD and stroke).<sup>3</sup> Additional case information would be valuable in determining if each patient presented to the cSMT provider with prodromal symptoms suggestive of an active ICAD. We request that the authors report each patient's symptoms motivating them to present for cSMT.

Fourth, the authors' focus on cSMT as the cause of ICAD may have led to a premature closure bias and thus we present an alternative explanation for both cases. One large observational study reported patients most at risk of spontaneous ICAD were older (age  $46 \pm 10$ ) and males (in 60% of cases).<sup>6</sup>

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The 2 patients presented by Chen et al match these components typical for a spontaneous ICAD. Moreover, a retrospective analysis of cervical artery dissections at a single academic center categorized patients with ICAD or vertebral artery dissections and found spontaneous and cSMT-associated cases shared similarities among clinical variables (high prevalence of diabetes, hypertension) thus supporting the hypothesis that early-stage spontaneous ICAD may prompt patients to seek care for prodromal symptomatology.<sup>7</sup>

Although the profession of chiropractic has not been shown to increase the risk of ICAD,<sup>3</sup> we agree with the authors that clinicians, including those rendering cSMT, should have a high index of suspicion for ICAD in appropriate clinical context, and accordingly refer these patients for medical care. Considering ICAD may occur spontaneously, has dire consequences, and may prompt those with early symptoms of neck pain and/or headache to seek cSMT,<sup>3</sup> we also agree that all clinicians should be appropriately trained to identify patients with evolving cerebrovascular signs and symptoms. Additionally, more research should be conducted to examine factors, such as genetic and environmental, that contribute to increased risk of spontaneous ICAD. We advocate for heightened awareness of ICAD features as to support early detection and timely medical management.

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### Author Contributions

C.J.D, R.J.T, and Z.A.C. developed the design. Z.A.C. wrote the initial manuscript draft, which was revised and edited by C.J.D and R.J.T. All the authors contributed to, critically revised, and approved of the final manuscript.

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