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Clinical Risk Management
Cervical Artery Dissection

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Diplomate, American Board of Chiropractic Orthopedists

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Clinician
- DC - NYCC
- Diplomate, American Board of Chiropractic Orthopedists
- Fellow, International Academy of Neuromusculoskeletal Medicine

Educator
- Post-graduate educator since 2000
- NCMIC Speakers' Bureau for>10 years
- Northeast College of Health Sciences
- CEO - PostGradDC.com

Honors
- Academy of Chiropractic Orthopedists Distinguished Service and Fellow Awards
- American College of Chiropractic Orthopedists Outstanding Achievement Award

Publications
- Over 31 Peer-Reviewed chiropractic journal articles.
- Many Contributions to NCMIC Examiner and Chiropractical Podcast

Editorial
- Editorial Reviewer for journals Spine, Annals of Internal Medicine, and Clinical Anatomy
- Former Managing Editor of Journal of Chiropractic Orthopedists

Community
- Lower Cape Fear Hospice, Board Member
- Founder, Past-President Wilmington Autism Society

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Disclaimer

- The views and opinions expressed in this presentation are solely those of the author.
- **NCMIC and Dr. Demetrious do not set practice standards.**
- **Research offered in this presentation does not represent practice standards.**
- We offer this only to educate and inform.

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Purpose…

History taking is the single most important factor for detecting subtle symptoms of CAD.

Chaibi A, Russell MB. A risk-benefit assessment strategy to exclude cervical artery dissection in spinal manual-therapy: a comprehensive review. *Ann Med.* 2019;51(2):118-127.

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CAD

MAYO CLINIC

CONCISE REVIEW

Craniocervical Artery Dissections: A Concise Review for Clinicians

Zafer Keser, MD; James F. Meschia, MD; and Giuseppe Lanzino, MD

- Craniocervical artery dissection (CAD) is a sudden tear in the intimal layer with subsequent bleeding into the subintimal space.
- This causes progressive vessel wall incursion into the lumen and narrowing, which at times proceeds to occlusion.1
- The site of dissection becomes thrombogenic because of turbulent blood flow and exposure of thrombogenic factors (Figure 1A).
- Enlargement of the vessel wall can also lead to compression on surrounding structures like cranial nerves.2
- If the intramural hematoma grows into the adventitia, it can lead to pseudoaneurysm formation (Figure 1B).
- Rupture of a pseudoaneurysm can cause subarachnoid hemorrhage (SAH) if the site of dissection extends to the intracranial vasculature.

Mayo Clin Proc. ■ April 2022;97(4):777-783 ■ https://doi.org/10.1016/j.mayocp.2022.02.007
www.mayoclinicproceedings.org ■ © 2022 Mayo Foundation for Medical Education and Research

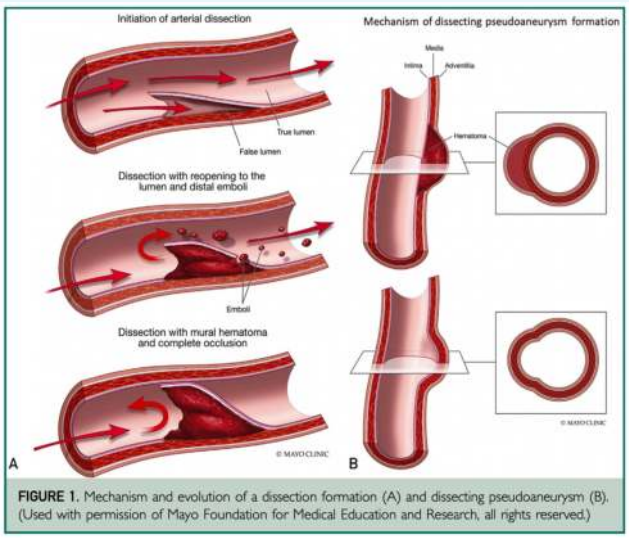

FIGURE 1. Mechanism and evolution of a dissection formation (A) and dissecting pseudoaneurysm (B). (Used with permission of Mayo Foundation for Medical Education and Research, all rights reserved.)

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Incidence

The Spine Journal
Volume 2, Issue 5, September–October 2002, Pages 334-342

Clinical studies

Clinical perceptions of the risk of vertebral artery dissection after cervical manipulation: the effect of referral bias ☆

Scott Haldeman DC, MD, PhD, FRCP(C) [a], Paul Carey DC [b], Murray Townsend BSc, DC [c], Costa Papadopoulos MHA, CHE [d]

- Based on the survey, an estimated 134,466,765 cervical manipulations were performed during this 10-year period.
- This gave a calculated rate of vertebral artery dissection after manipulation of 1:5,846,381 cervical manipulations.

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A Lack of Causality

ANNALS OF MEDICINE
2019, VOL. 51, NO. 2, 118–127
https://doi.org/10.1080/07853890.2019.1590627

Taylor & Francis
Taylor & Francis Group

REVIEW ARTICLE

OPEN ACCESS Check for updates

A risk–benefit assessment strategy to exclude cervical artery dissection in spinal manual-therapy: a comprehensive review

Aleksander Chaibi[a,b] and Michael Bjørn Russell[a,b]

[a]Head and Neck Research Group, Research Centre, Akershus University Hospital, Oslo, Norway; [b]Institute of Clinical Medicine, Akershus University Hospital, University of Oslo, Nordbyhagen, Norway

Manual therapy does not result in an increased risk of CAD.

- Cassidy et al. Risk of vertebrobasilar stroke and chiropractic care: results of a population-based case-control and case-crossover study. Spine. 2008;33(4 Suppl):S176-83.
- Church et al. Systematic review and meta-analysis of chiropractic care and cervical artery dissection: no evidence for causation. Cureus. 2016;8(2):e498.
- Cassidy et al. Risk of carotid stroke after chiropractic care: a population-based case-crossover study. J Stroke Cerebrovasc Dis. 2017;26(4):842-850.

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Bad Science – A Lack of Causality

Case report

A near-fatal consequence of chiropractor massage: massive stroke from carotid arterial dissection and bilateral vertebral arterial oedema

Timothy Yap,[1] Li Feng,[2] Dan Xu ,[1,3,4] Jian Zhang[2]

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Accepted 27 July 2021

SUMMARY

A 35-year-old Chinese man with no risk factors for stroke presented with a 2-day history of expressive dysphasia and a 1-day history of right-sided weakness. The presentation was preceded by multiple sessions of neck, shoulder girdle and upper back massage for pain relief in the prior 2 weeks. CT of the brain demonstrated an acute left middle cerebral artery infarct and left internal carotid artery dissection. MRI cerebral angiogram confirmed left carotid arterial dissection and intimal oedema of bilateral vertebral arteries. In the absence of other vascular comorbidities and risk factors, massage-induced internal carotid arterial dissection will most likely precipitate the near-fatal cerebrovascular event. The differential diagnosis of stroke in a younger population was consequently reviewed and discussed.

BACKGROUND

Internal carotid artery dissection, the separation of the tunica media and tunica intima of the internal carotid artery, can lead to cerebral infarction in up to two-thirds of patients,[1] accounting for up to in a healthy man, in which symptom onset coincided solely with massage and neck manipulation. We propose that massage and neck manipulation is an independent risk factor for developing internal carotid artery dissection in healthy individuals. Furthermore, our case highlights the importance of including internal carotid artery dissection in the differential diagnosis of cerebral vascular events in younger patients.

CASE PRESENTATION

A 35-year-old Chinese man was brought to the emergency department by a friend, from home alone with a 2-day history of expressive dysphasia and 1 day of right-sided weakness. On collateral history, the presentation was preceded by multiple sessions of neck, shoulder girdle and upper back massage for pain relief in the prior 2 weeks while he was away on a business trip. He denies having any associated fever, headache, nausea, vomiting, palpitations, syncope, incontinence and neck stiffness. His medical history was unremarkable and was not on any medications or herbal remedies.

- This study has demonstrated that the literature infrequently reports useful data toward understanding the association between cSMT, CADs and stroke.
- Improving the quality, completeness, and consistency of reporting adverse events may improve our understanding of this important relation.

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What Happened?

yahoo!

Rebecca Barlow won a $1.1 million jury verdict for injuries caused by routine chiropractic adjustments.Jan. 28, 2023

By a 9-3 vote, the jury awarded her **$1,030,900**, including **$380,000** in medical expenses and **$750,000** for pain and suffering.

- **Error of Commission?:**
  - Treatment failure:
    - Excessive force?
    - Incorrect or poor technique?
- **Error of Omission?**
  - Failure to diagnose?
    - Failure to identify symptoms or signs?
    - Failure to identify risk factors including pre-existing genetic or acquired connective tissue disorders?
    - Failure to identify arteriopathy?
    - Exercised poor clinical acumen?
    - Failure to refer to MD?
    - Failure to Inform?

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Strain Mechanisms NOT Proven

ELSEVIER
Journal of Electromyography and Kinesiology
Volume 22, Issue 5, October 2012, Pages 740-746

Vertebral artery strains during high-speed, low amplitude cervical spinal manipulation

W. Herzog, T.R. Leonard, B. Symons, C. Tang, S. Wuest

- VA strains obtained during SMT are significantly smaller than those obtained during diagnostic and range of motion testing, and are much smaller than failure strains.
- We conclude from this work that cervical SMT performed by trained clinicians does not appear to place undue strain on VA, and thus does not seem to be a factor in vertebro-basilar injuries.

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How to Identify the Developing CAD

Annals of Medicine

ISSN: 0785-3890 (Print) 1365-2060 (Online) Journal homepage: https://www.tandfonline.com/loi/iann20

A risk–benefit assessment strategy to exclude cervical artery dissection in spinal manual-therapy: a comprehensive review

Aleksander Chaibi & Michael Bjørn Russell

To cite this article: Aleksander Chaibi & Michael Bjørn Russell (2019) A risk–benefit assessment strategy to exclude cervical artery dissection in spinal manual-therapy: a comprehensive review, Annals of Medicine, 51:2, 118-127, DOI: 10.1080/07853890.2019.1590627

- In a comprehensive review of the literature published in the Annals of Medicine, Chaibi and Russell concluded, **"Manual therapy does not result in an increased risk of CAD." Additionally, the authors state, "...there is no firm scientific basis for direct causality between cervical spinal manipulative therapy and CAD."**

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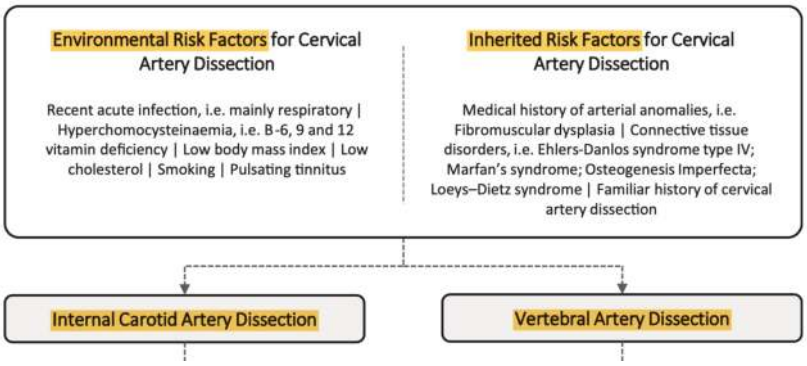
Chaibi and Russell's CAD Assessment Tool



- **Other Risk Factors?:**
  - Age <45
  - Prior incident
  - Fluoroquinolone antibiotics
  - Arteriopathies
  - ?

Chaibi A, Russell BR. Annals of Medicine. 2019; 51 (2)118-127.

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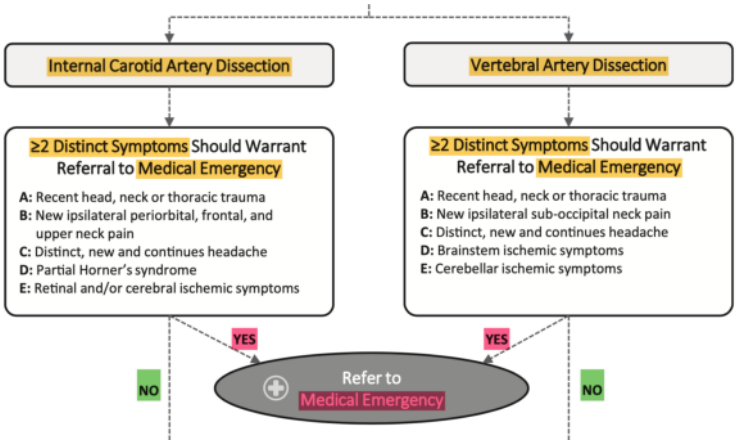
Chaibi and Russell's CAD Assessment Tool



- **Other Symptoms?:**
  - Severity/location
  - Cranial Nerves
  - CNS
  - Bladder/Bowel
  - Gait
  - ?

Chaibi A, Russell BR. Annals of Medicine. 2019; 51 (2)118-127.

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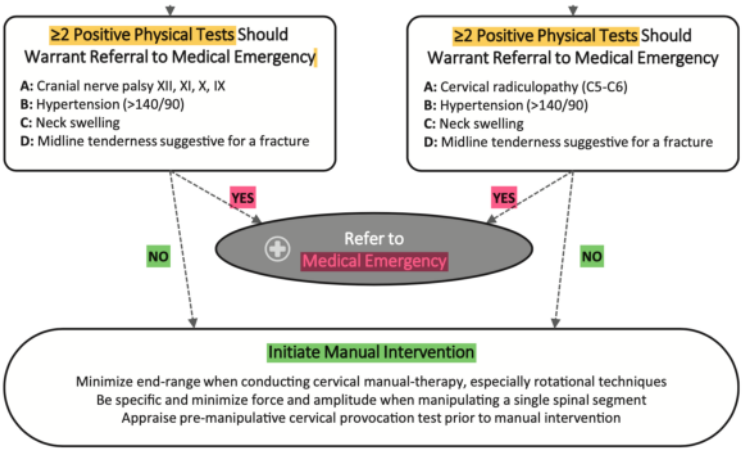
Chaibi and Russell's CAD Assessment Tool



- **Exams:**
  - Neuro exam
  - Connective tissue / Joint Hypermobility Syndrome exam
  - Other Tests?:
    - ~~Provocative tests~~
- **Evidence?**
  - Lacking

Chaibi A, Russell BR. Annals of Medicine. 2019; 51 (2)118-127.

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Connective Tissue / Joint Hypermobility Syndrome Examination

Brighton criteria for JHS

Major criteria

Beighton score ≥4/9
Arthralgia for >3 months in >4 joints

Minor criteria

Beighton score 1–3
Arthralgia in 1–3 joints
History of joint dislocations
Soft tissue lesions >3
Marfan-like *habitus*
Skin *striae*, hyperextensibility, or scarring
Downslanting palpebral fissures, lid laxity, myopia
History of varicose veins, hernia, visceral prolapse

Agreement: both major, or 1 major and 2 minor, or 4 minor criteria. Criteria major 1 and minor 1 are mutually exclusive as/are major 2 and minor 2.

Source: Grahame et al., [2000] and subsequent modifications (see, for example, Tinkle et al., [2009]).

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A Medical Intragenic Cause of CAD


Demetrious *Chiropractic & Manual Therapies* (2018) 26:22
https://doi.org/10.1186/s12998-018-0193-z

Chiropractic & Manual Therapies

HYPOTHESIS Open Access

Spontaneous cervical artery dissection: a fluoroquinolone induced connective tissue disorder?

James S. Demetrious

Dr. Demetrious was the first person to ever publish that medication can weaken the cervical arteries and cause strokes. His hypothesis has been confirmed by three independent researchers.


> Eur J Neurol. 2019 Jul;26(7):1028-1031. doi: 10.1111/ene.13917. Epub 2019 Mar 5.

Use of fluoroquinolones and the risk of spontaneous cervical artery dissection

E Del Zotto [1], A Pezzini [1 2]


Case Reports > Intern Med. 2021 Sep 1;60(17):2863-2865.
doi: 10.2169/internalmedicine.6736-20. Epub 2021 Mar 22.

Vertebral Artery Dissection after Exposure to Levofloxacin: A Report of Two Cases

Taku Harada [1 2], Yukinori Harada [2], Taro Shimizu [2]


Archives of Cardiovascular Diseases Supplements

Fluoroquinolone use preceding medium-size artery dissection: A case series

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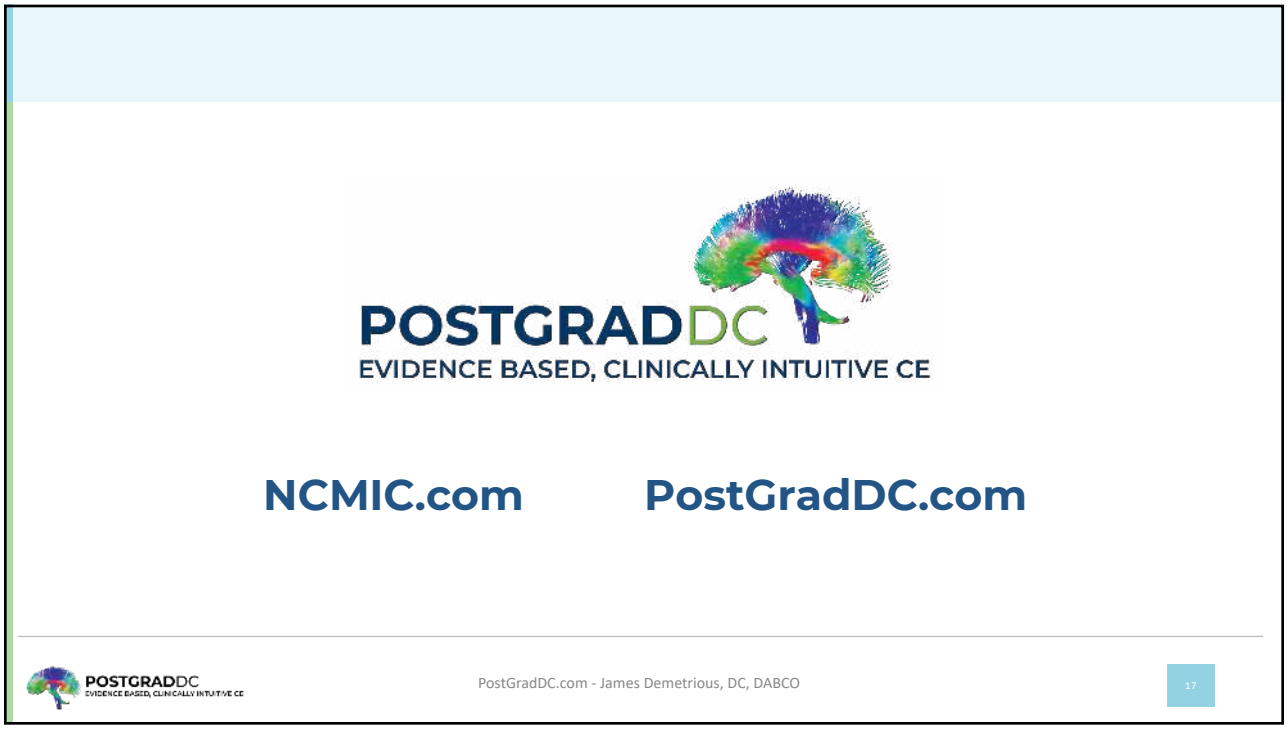
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