

# Cervicogenic Migraine



## Dr Peter Tuchin

Associate Professor (retired),  
Macquarie University

Past President, COCA

[Wahroonga Chiropractor | Located opposite Knox Grammar!](#)

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## Dr Peter Tuchin

(BSc, GradDipChiro, DipOHS, PhD, FACC)

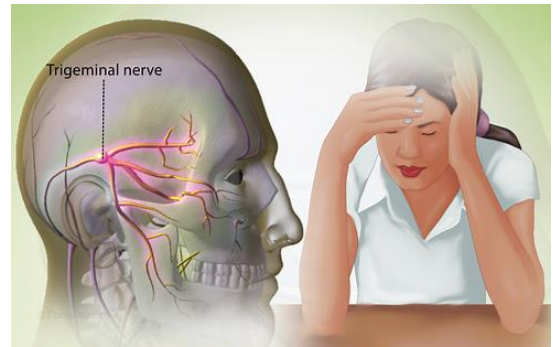
- Associate Professor, Macquarie University (27 years)
  - Neck pain, HA, migraine, OHS, LBP, chronic pain
- Private Practice (35 years)
- 60 papers in peer reviewed, international journals
- Past President, Chiropractic & Osteopathic College of Australasia (Life-member – COCA)
- Disability and Rehabilitation Committee, World Federation of Chiropractic
- Workers compensation and OHS consultant
- Board of Directors, Lifeline Harbour to Hawkesbury

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# GOALS AND OUTCOMES

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- Review headache and migraine
- Causes, treatments, research
- Highlight important issues in chronic pain
- Review evidence on manual therapy and HA/migraine



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# Migraine

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- Migraine is a common, costly, debilitating headache, which often does not respond well with treatment
- Research is constantly finding new treatment approaches
- Migraine sufferers often want other solutions for help and to decrease their reliance on pharmaceuticals



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## Global Burden of Diseases Study (GBDS)- Lancet 2012

	Prevalence (both sexes)		Male prevalence		Female prevalence	
	Total (thousands)	Proportion of population (%)	Total (thousands)	Proportion of population (%)	Total (thousands)	Proportion of population (%)
Dental caries of permanent teeth	2431636	35.29%	1194051	34.37%	1237585	36.23%
Tension-type headache	1431067	20.77%	655937	18.88%	775131	22.69%
Migraine	1012944	14.70%	371072	10.68%	641873	18.79%
Fungal skin diseases	985457	14.30%	516167	14.86%	469291	13.74%
Other skin and subcutaneous diseases	803597	11.66%	417129	12.01%	386468	11.32%
Chronic periodontitis	743187	10.79%	378407	10.89%	364780	10.68%
Mild hearing loss with perinatal onset due to other hearing loss	724689	10.52%	386147	11.11%	338543	9.91%
Acne vulgaris	646488	9.38%	311349	8.96%	335140	9.81%
Low back pain	632045	9.17%	334793	9.64%	297252	8.70%
Dental caries of baby teeth	621507	9.02%	352085	10.13%	269421	7.89%
Moderate iron-deficiency anaemia	608915	8.84%	269596	7.76%	339319	9.93%
Other musculoskeletal disorders	560978	8.14%	262779	7.56%	298199	8.73%
Near sighted due to other vision loss	459646	6.67%	235052	6.77%	224593	6.58%
Mild iron-deficiency anaemia	375438	5.45%	152523	4.39%	222915	6.53%
Asthma	334247	4.85%	160346	4.61%	173901	5.09%
Neck pain	332049	4.82%	135134	3.89%	196915	5.77%

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## Cost of headache

- Australia estimated \$3-4 billion per annum.
- USA headache, is \$25 billion in lost productivity, with 156 million full time work days being lost each year.(5)
- Recent information has suggested figures above are still current, but underestimated, due to many sufferers not stating their problem due to a perceived poor social stigma.(6)

### Brain Foundation in Australia notes:

- 23% of households contain at least one migraine sufferer
- nearly all migraine sufferers and 60% of those with TTH experience reductions in social activities and work capacity
- the direct and indirect costs of migraine alone would be about \$1 billion pa. (3)

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Check for updates

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ICHD-3

**Headache Classification Committee of the International Headache Society (IHS)**

**The International Classification of Headache Disorders, 3rd edition**

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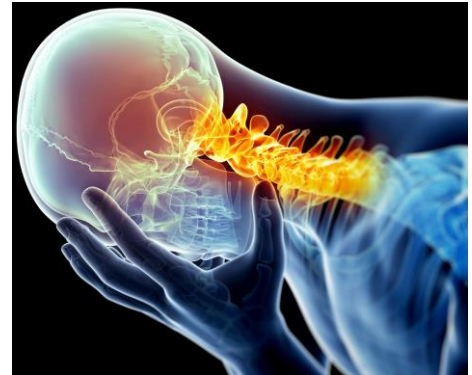
Cephalalgia  
2018, Vol. 38(1) 1-211  
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DOI: 10.1177/0333102417738202  
journals.sagepub.com/home/cep  
SAGE

- Over 300 types of headache
- Primary and secondary headaches

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## Migraine classification

- 1.1 Migraine without aura
- 1.2 Migraine with aura
- 1.3 Chronic migraine
- 1.4 Complications of migraine
- 1.5 Probable migraine
- 1.6 Episodic syndromes that may be associated with migraine



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Category	Name	Synonym/ previous terms
1.1	Migraine without aura	Common migraine; Hemicrania simplex
1.2	Migraine with aura	Classic; classical; ophthalmic; hemiparesthetic; hemiplegic; aphasic; migraine accompagnee
1.2.1	Migraine with typical aura	Ophthalmic; hemiparesthetic; aphasic ; hemiplegic; migraine accompagnee
1.2.2	Migraine with prolonged aura	Complicated migraine ; hemiplegic migraine
1.2.3	Familial hemiplegic migraine	
1.2.4	Basilar migraine	Basilar artery migraine; Bickerstaff's migraine; syncopal migraine
1.2.5	Migraine aura without headache	Migraine equivalents; acephalgic migraine
1.2.6	Migraine with acute onset aura	
1.3	Ophthalmoplegic migraine	
1.4	Retinal migraine	
1.5	Childhood periodic syndromes that may be precursors to migraine	Migraine equivalents
1.5.1	Benign paroxysmal vertigo	
1.5.2	Alternating hemiplegia	
1.6	Complications of migraine	
1.6.1	Status migrainous	
1.6.2	Migrainous infarction	Complicated migraine
1.7	Migraine not fulfilling above criteria	

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## Migraine with aura

- A. At least two attacks fulfilling criteria B and C
- B. One or more of the following fully reversible aura symptoms:
  - 1. visual 2. sensory 3. speech and/or language 4. motor 5. brainstem 6. retinal
- C. At least two of the following four characteristics:
  1. at least one aura symptom spreads gradually over 5 minutes, and/or two or more symptoms occur in succession
  2. each individual aura symptom lasts 5-60 minutes<sup>1</sup>
  3. at least one aura symptom is unilateral<sup>2</sup>
  4. the aura is accompanied, or followed within 60 minutes, by headache

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## Chronic migraine

- A. Headache (tension-type-like and/or migraine-like) on 15 days per month for >3 months<sup>2</sup> and fulfilling criteria B and C
- B. Occurring in a patient who has had at least five attacks fulfilling criteria B-D for 1.1 Migraine without aura and/or criteria B and C for 1.2 Migraine with aura
- C. On 8 days per month for >3 months, fulfilling any of the following :
  1. criteria C and D for 1.1 Migraine without aura
  2. criteria B and C for 1.2 Migraine with aura
  3. believed by the patient to be migraine at onset and relieved by a triptan or ergot derivative
- D. Not better accounted for by another ICHD-III diagnosis.

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## 1.6 Episodic syndromes that may be associated with migraine

- 1.6.1 Recurrent gastrointestinal disturbance
  - 1.6.1.1 Cyclical vomiting syndrome
  - 1.6.1.2 Abdominal migraine
- 1.6.2 Benign paroxysmal vertigo
- 1.6.3 Benign paroxysmal torticollis
- A 1.6.6 Vestibular migraine

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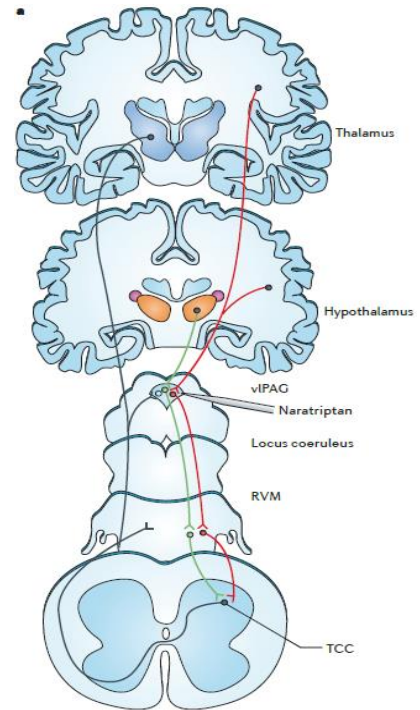
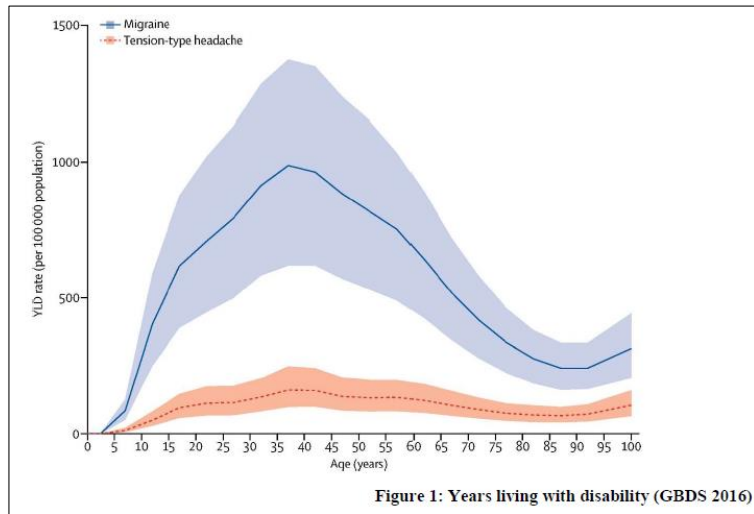
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### Migraine summary

Type	Duration	Site	Aura	Nausea	Visual Change	Aggravating Factors	Other Features
1.1 (1)	4-72 hrs	U/L	NIL	+ve	Photo-phobia	Stress, weather	Less photophobia, phonophobia than migraine with aura; cease physical activity
1.2	4-72 hrs	U/L	0-60 min	+ve	+ve	Stress	Phonophobia, osmophobia, numerous aura signs
1.2.1	4-72 hrs	U/L	0-60 min	+ve	+ve		Aura usually last for a few minutes
1.2.2	4-72 hrs	U/L	> 60 min	+ve	+ve		Aura last more than 1 hour
1.2.3	4-72 hrs	U/L	0-60 min	-	-		Hemiparesis, usually children
1.2.4	4-72 hrs	occipital	0-60 min	unclear	+ve	Light & noise	Dysarthria, disequilibrium, young adults(2)
1.2.5	variable	nil	0-60 min		+ve		No headache
1.2.6	4-72 hrs		0-60 min	-	-		DD- TIA's
1.3	-	usually U/L	-	-	-		DD- subarachnoid haemorrhage, intra-cranial aneurysm, and Tolosa-Hunt Syndrome
1.4	4-72 hrs	U/L	NIL	+ve	Scotoma	physical activity	Young adults
1.5	-	-	-	vomiting	-		Severe vertigo, 5-10 yr olds
1.6.1	> 72 hrs	variable	NIL	+ve	-	physical activity	Cerebral oedema or hyperemia, psychological
1.6.2	variable	-	not fully reversible	vomiting	-		Cerebral infarct on MRI

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## Migraine history



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## Prodrome

- “prodrome” which is translated as a “sense of impending dome”.
- prodrome or pre-warning symptoms are often the same as their aura symptom(s),
- however, they can also be different or even absent.

### Common premonitory (warning) symptoms

Depression	Photophobia	Stiff neck
Hyperactivity	Phonophobia	Food cravings
Euphoria	Yawning	Cold feelings
Talkativeness	Dysphasia	Anorexia
Irritability	Hyperosmia	Sluggishness
Drowsiness	Difficulty	Diarrhoea or
Restlessness	concentrating	constipation
Thirst	Urination	Fluid retention

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## Common triggers

Psychological	Physical
Stress	Exercise
Tension	Fatigue
Anxiety	Sexual activity
Letdown	High altitude
Neurological and Medical	Dietary factors
Bright lights or glare	Missed or delayed meals
Odours	Certain foods or types
Changes in sleep pattern	Alcohol
Hormonal changes	Changes in weather or temperature

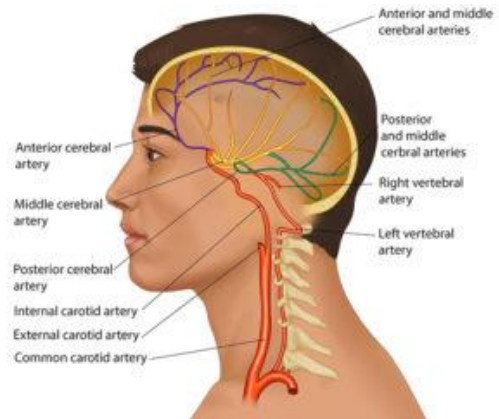
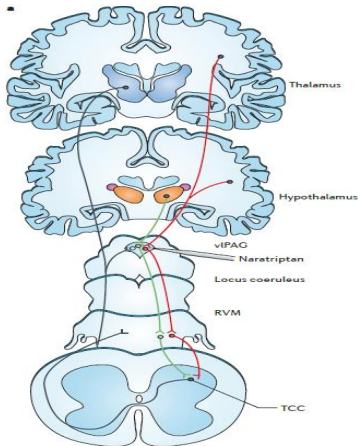
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## Dietary triggers

<ul style="list-style-type: none"> <li>Alcohol: Red wine, beer, whiskey, and champagne</li> </ul>	<ul style="list-style-type: none"> <li>Caffeine foods: chocolate and cocoa; coffee, tea and cola</li> </ul>
<ul style="list-style-type: none"> <li>Food additives or preservatives, nitrates and nitrites,</li> </ul>	<ul style="list-style-type: none"> <li>Aspartame and other artificial sweeteners</li> </ul>
<ul style="list-style-type: none"> <li>Ice cream and other cold foods.</li> </ul>	<ul style="list-style-type: none"> <li>Potato chips</li> </ul>
<ul style="list-style-type: none"> <li>Peanuts, peanut butter, other nuts and seeds</li> </ul>	<ul style="list-style-type: none"> <li>Cured/processed meats, Hot dogs, Ham, Sausage, Pepperoni, Bacon, deli-style meats</li> </ul>
<ul style="list-style-type: none"> <li>Monosodium glutamate, Oriental foods, and some packaged foods.</li> </ul>	<ul style="list-style-type: none"> <li>Bread, crackers and desserts containing cheese</li> </ul>
<ul style="list-style-type: none"> <li>Pizza</li> </ul>	<ul style="list-style-type: none"> <li>Yeast baked goods</li> </ul>
<ul style="list-style-type: none"> <li>Chicken livers and other organ meats</li> </ul>	<ul style="list-style-type: none"> <li>Smoked or dried fish</li> </ul>
<ul style="list-style-type: none"> <li>Certain fresh fruits including ripe bananas, citrus fruits, papaya, red plums, raspberries, kiwi, pineapple</li> </ul>	<ul style="list-style-type: none"> <li>Cheeses: Blue, Brie, Stilton, Feta, Mozzarella, Gorgonzola, Parmesan, Swiss, Cheddar, and processed</li> </ul>
<ul style="list-style-type: none"> <li>Dried fruits (figs, raisins, dates)</li> </ul>	<ul style="list-style-type: none"> <li>Cultured dairy products, sour cream, buttermilk, yogurt</li> </ul>

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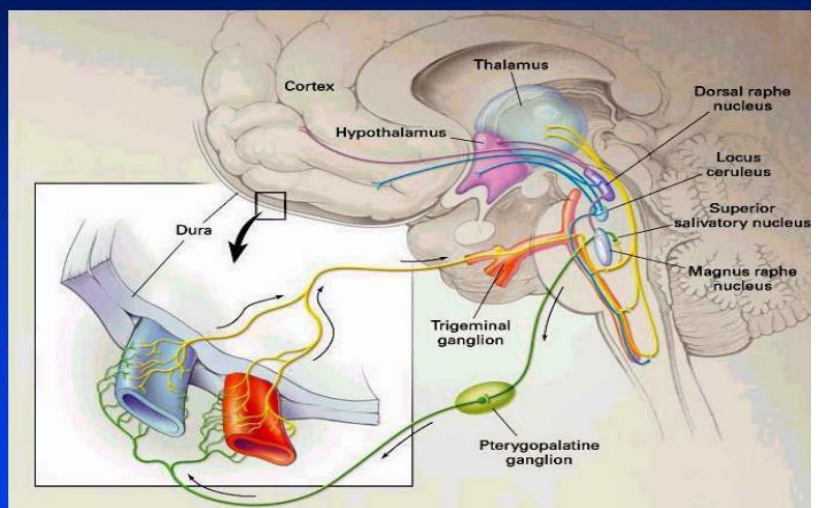
# Causes of Migraine



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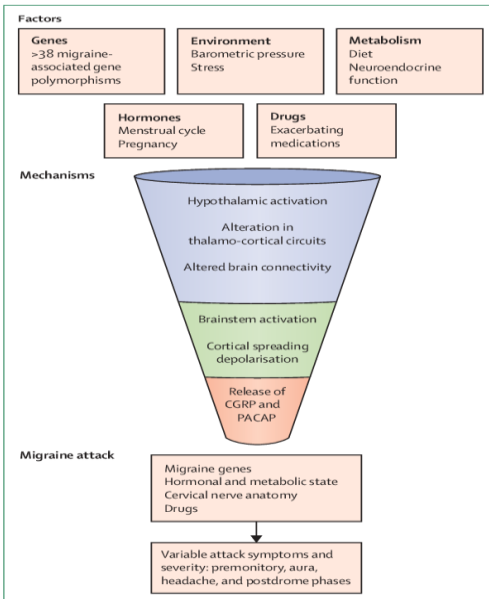
## Migraine Pathophysiology

- Migraines are triggered by internal (dehydration, lack of sleep, stress) or external stimuli (smell, light, food)
- Deep nuclei in the brainstem begin to malfunction (trigeminal nucleus and Magnus raphe nucleus)
- Energy failure allows the nerves surrounding vascular structures in the brain (which are part of the trigeminal nerve) to propagate the problem and malfunction (throbbing pain)
- These malfunctioning nerves trigger thalamic dysfunction (nausea, severe pain)



Goadsby PJ et al. *N Engl J Med.* 2002.

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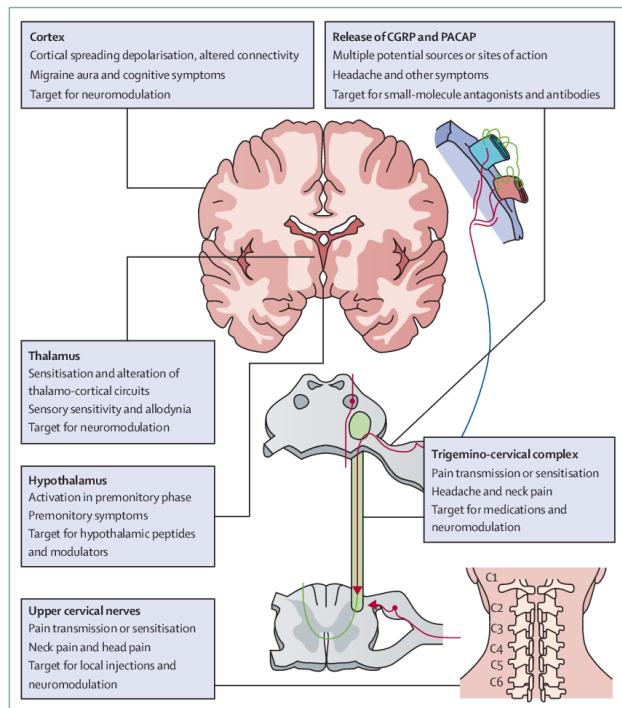


**Figure 1: Contributing factors and mechanisms of a migraine attack**  
A wide range of factors can contribute to the initiation of an attack, with variable mechanisms leading to a migraine attack. The clinical features of a migraine attack then diverge on the basis of genetic, anatomical, and other factors. CGRP=calcitonin gene-related peptide. PACAP=pituitary adenylate cyclase-activating peptide.

- Genetic
- Environmental
- Metabolic
- Hormonal
- Chemical
- Stress
- Physical

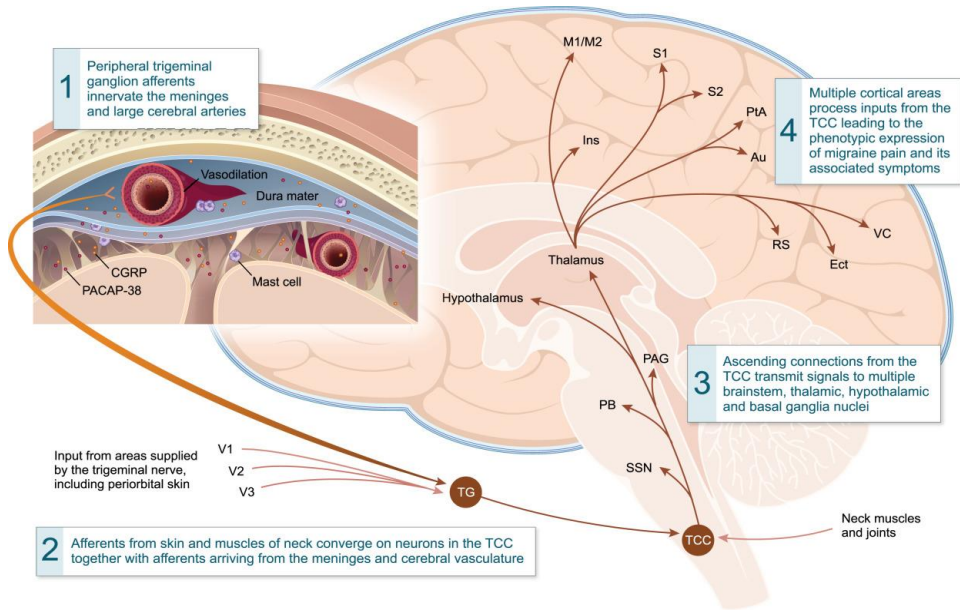
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- Multiple neural pathways and neurotransmitters or peptides



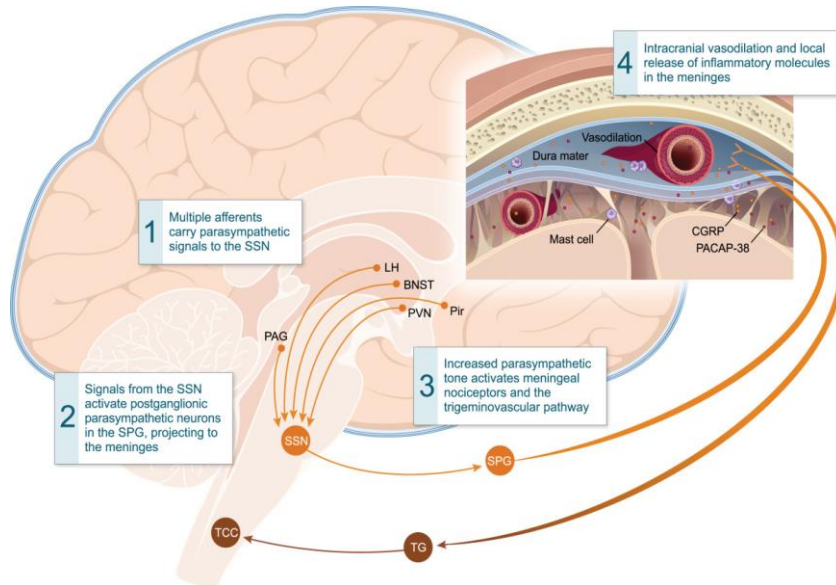
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Headache, Volume: 58 : 4-16, 2018, DOI: (10.1111/head.13300)



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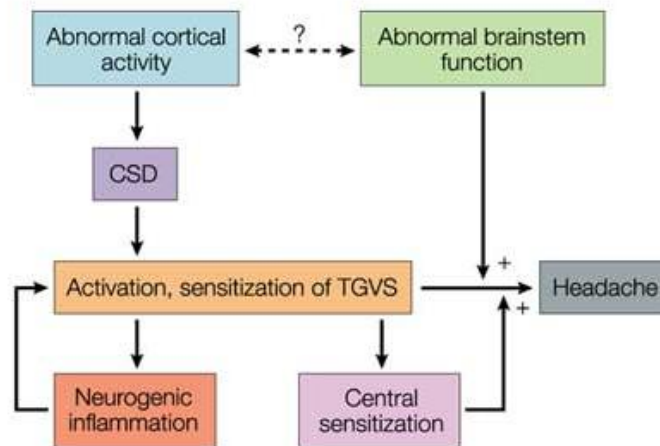
### A Phase-by-Phase Review of Migraine Pathophysiology



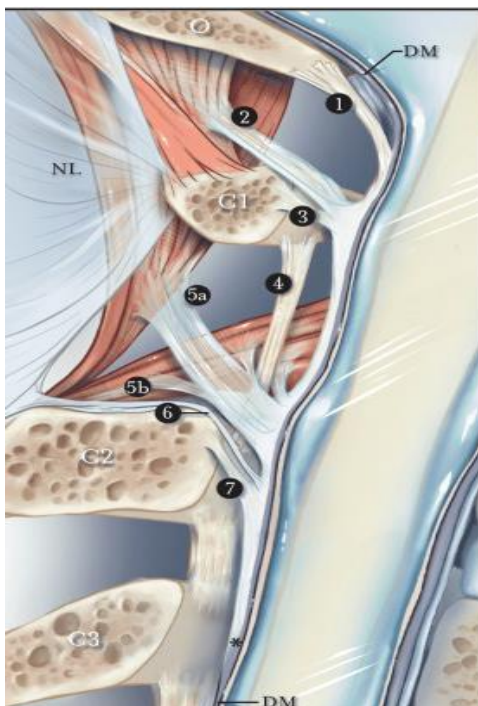
Headache, Volume: 58, Issue: S1, Pages: 4-16, 2018, DOI: (10.1111/head.13300)

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## Physical Mechanism?



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## Scali 2022

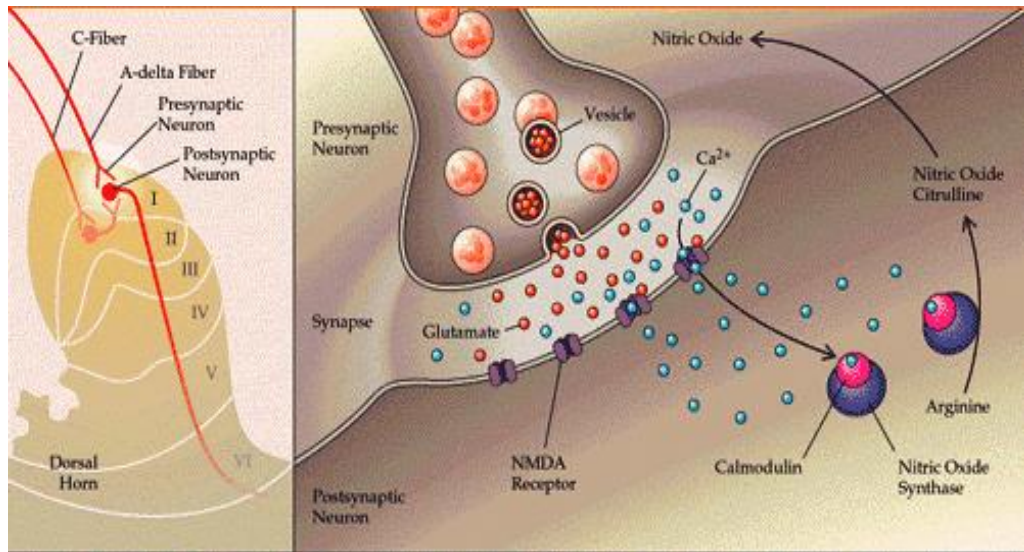
Posterior atlantooccipital membrane (1) extends from the occiput and coalesces with the dura mater at the cerebrospinal junction. The superior myodural bridge (2) merges with the superior vertebrodural ligament (3) of the atlas and fuses with the PAOM at the level of the atlantooccipital interspace.

The inferior myodural bridge comprised of the rectus capitis posterior major fascia (5a) and obliquus capitis inferior fascia (5b) courses between the atlantoaxial ligamentum flavum (4) as bundles of dense fibers. The inferior myodural bridge fuses with the PAOM. The nuchal bridge (6) merges with the inferior vertebrodural bridge (7) and attaches to the PAOM.

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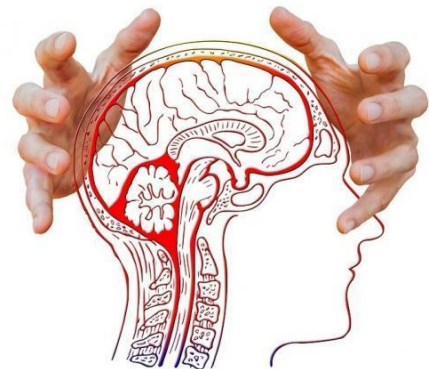
## Treatments



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## Key features for patients

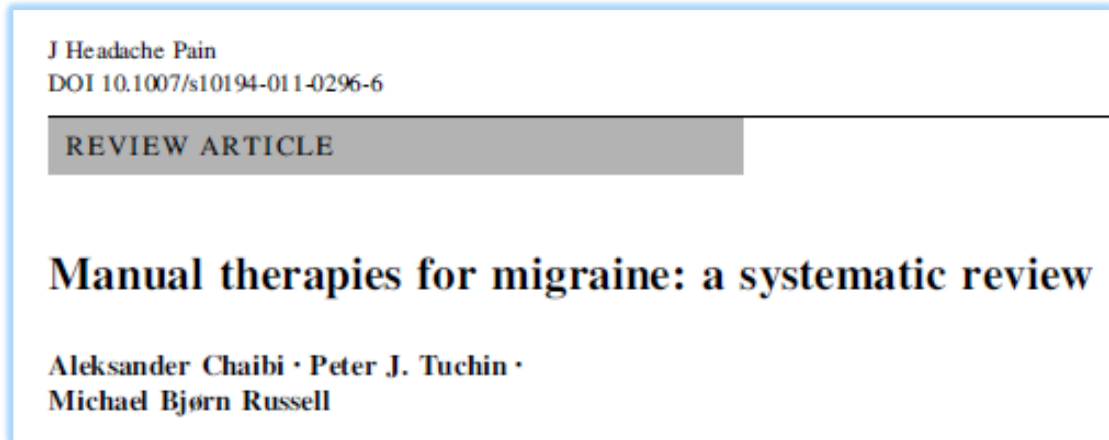
- Involvement in decisions
- Explanation of all side effects
- Reduction in reliance of drugs
- Non pharmaceutical options



- Rozen 2006. Headache

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## Manual therapies



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## RCTs of manual therapy for migraine

<b>Conclusion</b>	
Current RCTs suggest that massage therapy, physiotherapy, relaxation and chiropractic spinal manipulative therapy might be equally efficient as propranolol and topiramate in the prophylactic management of migraine. However, a firm conclusion requires, in future, well-conducted RCTs without the many methodological shortcomings of the evaluated RCTs on manual therapies. Such studies should follow clinical trial guidelines from the International Headache Society [21, 22].	
<b>Table 2</b>	<b>Qu</b>
<b>Study</b>	<b>Total</b>
Hernandez [8]	39
Lawler [9]	55
Marcus [10]	50
Parker [11, 12]	45
Nelson [13]	53
Tuchin [14]	59

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## Voigt 2011- Osteopathy

- Minimum of 3 migraine attacks per month defined by ICD-10 - 18-65 year old - Female	42 participants (21 in treatment group) Mean age: 45.1, Female 100%	10 week RCT, 1 treatment, 6 month follow-up 2 arms: 1. OMT - 5x50min over 10 weeks + questionnaires 2. Control – questionnaires only	Manual, visceral or cranial work	Significant reduction in total MIDAS score ( $p<.05$ ): decrease in pain, number of days with migraine and disability in OMT group
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## Cerritelli 2015- Osteopathy

Inclusion Criteria	Study population	Method	Manual Therapy Intervention	Results
- Chronic migraine diagnosis according to ICHD-II criteria, >15 days or >3months - 18-60 year old	105 participants (35 each arm) Mean age 38.7, Female 65.7%	6 month RCT - 8 treatments 3 arms: 1. OMT + Medication 2. Sham OMT + Medication 3. Medication only	Myofascial release, balanced ligamentous tension, balanced membranous tension and cranial-sacrum adjustments	OMT decreased migraine frequency ( $p<.001$ ), reducing HIT ( $p<.001$ ), Quality of life ( $p<.001$ ) improved in OMT group

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## Chaibi et al, 2016

Open Access

Protocol

## BMJ Open Chiropractic spinal manipulative therapy for migraine: a study protocol of a single-blinded placebo-controlled randomised clinical trial

Aleksander Chaibi,<sup>1,2</sup> Jūratė Šaltytė Benth,<sup>2,3</sup> Peter J Tuchin,<sup>4</sup>  
Michael Bjørn Russell<sup>1,2</sup>

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## ORIGINAL ARTICLE

### Chiropractic spinal manipulative therapy for migraine: a three-armed, single-blinded, placebo, randomized controlled trial

A. Chaibi<sup>a,b</sup>, J. Š. Benth<sup>b,c</sup>, P. J. Tuchin<sup>d</sup> and M. B. Russell<sup>a,b</sup>

<sup>a</sup>Head and Neck Research Group, Research Centre, Akershus University Hospital, Lørenskog; <sup>b</sup>Institute of Clinical Medicine, Akershus University Hospital, University of Oslo, Nordbyhagen; <sup>c</sup>HØKH, Research Centre, Akershus University Hospital, Lørenskog, Norway; and <sup>d</sup>Department of Chiropractic, Macquarie University, Sydney, NSW, Australia

**Keywords:**

chiropractic, headache, migraine, randomized controlled trial, spinal manipulative therapy

Received 30 June 2016  
Accepted 29 August 2016

*European Journal of  
Neurology* 2016, **0**: 1–11

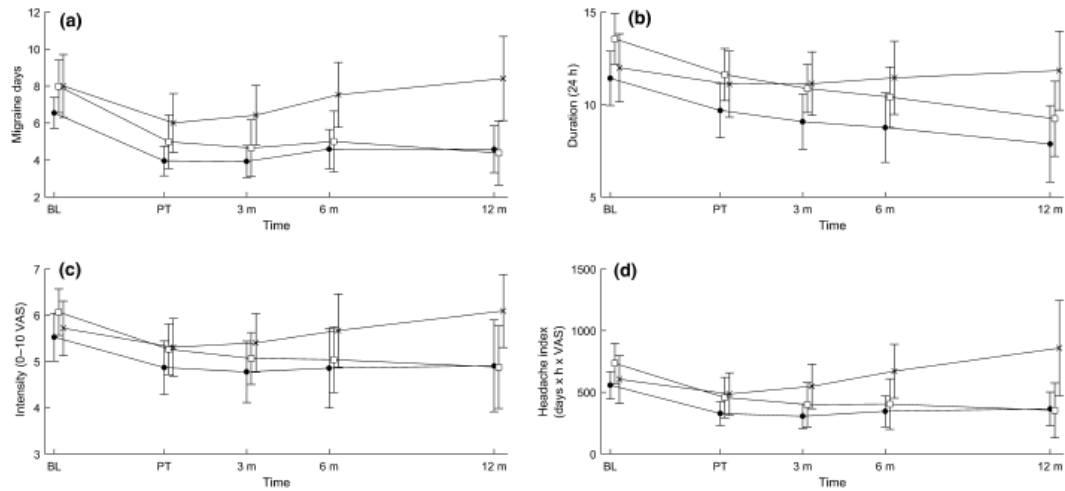
doi:10.1111/ene.13166

**Background and purpose:** To investigate the efficacy of chiropractic spinal manipulative therapy (CSMT) for migraineurs.

**Methods:** This was a prospective three-armed, single-blinded, placebo, randomized controlled trial (RCT) of 17 months duration including 104 migraineurs with at least one migraine attack per month. The RCT was conducted at Akershus University Hospital, Oslo, Norway. Active treatment consisted of CSMT, whereas placebo was a sham push manoeuvre of the lateral edge of the scapula and/or the gluteal region. The control group continued their usual pharmacological management. The RCT consisted of a 1-month run-in, 3 months intervention and outcome measures at the end of the intervention and at 3, 6 and 12 months follow-up. The primary end-point was the number of migraine days per month, whereas secondary end-points were migraine duration, migraine intensity and headache index, and medicine consumption.

JOURNAL OF NEUROLOGY

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**Figure 2** (a) Headache days; (b) headache duration; (c) headache intensity; (d) headache index. Time profiles in primary and secondary end-points, means and error bars represent 95% confidence intervals. BL, baseline; control, control group (x); CSMT, chiropractic spinal manipulative therapy (●); placebo, sham manipulation (□); PT, post-treatment; 3 m, 3-month follow-up; 6 m, 6-month follow-up; 12 m, 12-month follow-up; VAS, visual analogue scale.

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## Research Submission

### The Impact of Spinal Manipulation on Migraine Pain and Disability: A Systematic Review and Meta-Analysis

Pamela M. Rist, ScD; Audrey Hernandez, MS; Carolyn Bernstein, MD; Matthew Kowalski, DC; Kamila Osypiuk, MS; Robert Vining, DC; Cynthia R. Long, PhD; Christine Goertz, DC, PhD; Rhayun Song, RN, PhD; Peter M. Wayne, PhD

**Background.**—Several small studies have suggested that spinal manipulation may be an effective treatment for reducing migraine pain and disability. We performed a systematic review and meta-analysis of published randomized clinical trials (RCTs) to evaluate the evidence regarding spinal manipulation as an alternative or integrative therapy in reducing migraine pain and disability.

**Methods.**—PubMed and the Cochrane Library databases were searched for clinical trials that evaluated spinal manipulation and migraine-related outcomes through April 2017. Search terms included: migraine, spinal manipulation, manual therapy, chiropractic, and osteopathic. Meta-analytic methods were employed to estimate the effect sizes (Hedges'  $g$ ) and heterogeneity ( $I^2$ ) for migraine days, pain, and disability. The methodological quality of retrieved studies was examined following the Cochrane Risk of Bias Tool.

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## Rist 2019

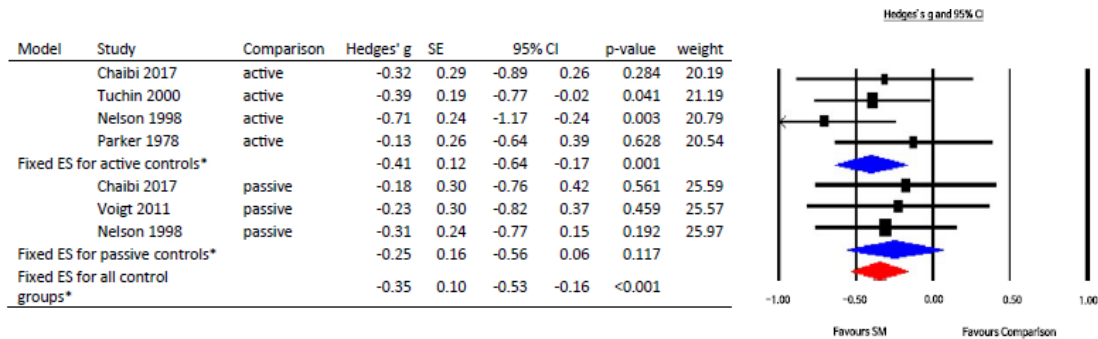


Fig. 2.—Results of meta-analysis evaluating spinal manipulation for migraine days. ES = effect size; SE = standard error; CI = confidence interval; SM = spinal manipulation. \*These effect estimates exclude the study by Cerritelli et al. Effect estimates including that study can be found in the Supporting Information. [Color figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]

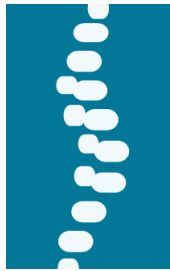
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## CONCLUSION

Results from this preliminary meta-analysis suggest that spinal manipulation may reduce migraine days and pain/intensity. However, variation in study quality makes it difficult to determine the magnitude of this effect. Methodologically rigorous, large-scale RCTs are warranted to better inform the evidence base for the role of spinal manipulation in integrative models of care provided by chiropractors, physical therapists, and osteopathic physicians as a treatment for migraine.

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Tuchin 2022



Ontario  
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## CHIROPRACTIC CARE FOR MIGRAINE

Funded by the Ontario Chiropractic Association

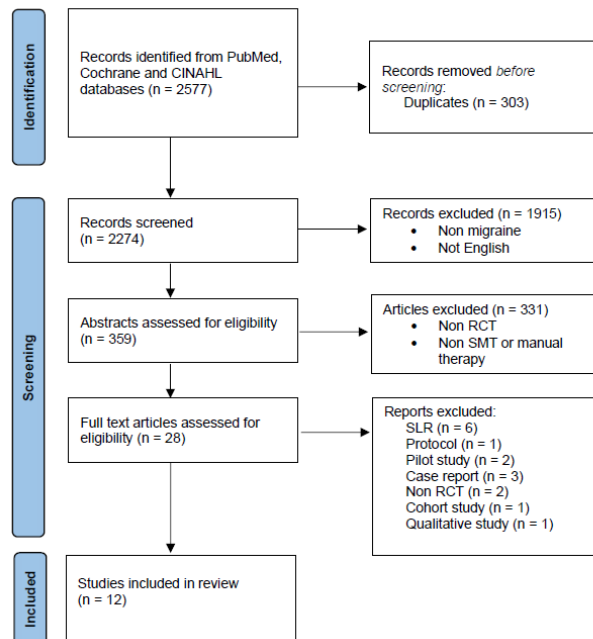
Author:

**Associate Professor Peter Tuchin**

BSc GradDipChiro DipOHS PhD

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### Search strategy



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**Table 3. Randomized controlled trials of chiropractic or manual therapies for migraine**

Author	Year	No. of Participants	Treatment	No. of Treatments (Duration)	Overall Effect of Intervention
Chaibi	2017	104	Chiropractic	12	+ve for CSMT
Bevilaqua	2016	50	Physiotherapy	8 (4 weeks)	+ve for PT
Cerritelli	2015	105	Osteopathy	8	+ve for OMT
Garrigos-Pedron	2013	45	PT + TMD	6	+ve for MT
Voigt	2011	42	Osteopathy	5 (10 weeks)	+ve for OMT
De Hertogh	2009	37 (10 = migraine)	MT for HA		+ve for MT
Lawler	2006	48	Massage		+ve for MS
Tuchin	2000	123	Chiropractic	16	+ve for CSMT
Nelson	1998	218	Chiropractic	14	SMT same as amitriptyline
Hernandez	1998	26	Massage		+ve for MS
Marcus	1998	73	Physiotherapy		+ve for PT
Parker	1978	85	Chiropractic	8-16	+ve for SMT

CSMT = chiropractic SMT; OMT = osteopathic SMT; MS = massage; PT = physiotherapy; CST = craniosacral therapy; MT = manual therapy; +ve = positive effect

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## Tuchin 2022

- This scoping review identified twelve studies where the modalities of chiropractic care (SMT, manual therapy, massage, exercise, advice, etc) were found to be associated with a reasonable level of evidence that chiropractic care could benefit migraine headaches. In addition, further non-RCT studies were also identified, which added further support for this finding. Also, several studies were identified that concluded cervical conditions contribute to the severity of migraine episodes.[14, 20]
- Clinicians should feel confident recommending a trial of chiropractic care for migraine patients, where no contraindications for manual therapy exist. The evidence for chiropractic care and migraine is limited, however, the existing evidence supports a trial of therapy. Further large, high quality RCTs are important, and clinicians should take a multimodal approach to care for migraine.

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## Warning signs - Red flags

- Headache pattern changes
- A new headache (especially if > 50 years)
- Patient has fever, neck stiffness, change in behavior, significant vomiting (projectile), weakness, change in sensation
- Pain wakes the patient from sleep
- Patient experience the “worst headache in your life”
- Patient’s headache started after some recent physical event/trauma (NB Stroke in children)



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## Management

1. Migraine diary- freq, VAS, duration, triggers, other?
2. MIDAS or HIT-6
3. Simple pharmaceuticals
4. Specialist
5. Non – pharmaceutical treatments
  - SMT
  - ACPT
  - HEAT/ICE
  - Supplements – Vit B (complex) : B6, B12
  - Feverfew,

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SYSTEMATIC REVIEW

Open Access

# The global summit on the efficacy and effectiveness of spinal manipulative therapy for the prevention and treatment of non-musculoskeletal disorders: a systematic review of the literature



Pierre Côté<sup>1,2,3,4\*</sup> , Jan Hartvigsen<sup>5,6</sup>, Iben Axén<sup>7,8</sup>, Charlotte Leboeuf-Yde<sup>9</sup>, Melissa Corso<sup>1,2</sup>, Heather Shearer<sup>2,4</sup>,

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## Cote, et al. 2021 - Conclusion

- Our systematic review included six randomized clinical trials (534 participants) of acceptable or high quality investigating the efficacy or effectiveness of SMT for the treatment of non-musculoskeletal disorders. We found no evidence of an effect of SMT for the management of non-musculoskeletal disorders including infantile colic, childhood asthma, hypertension, primary dysmenorrhea, and **migraine**.
- This finding challenges the validity of the theory that treating spinal dysfunctions with SMT has a physiological effect on organs and their function. Governments, payers, regulators, educators, and clinicians should consider this evidence when developing policies about the use and reimbursement of SMT for non-musculoskeletal disorders

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Discuss your case?

HA/M expert group

**Thank you!**