

Cefaleia na Infância e Adolescência atualização terapêutica



Marco Antônio Arruda

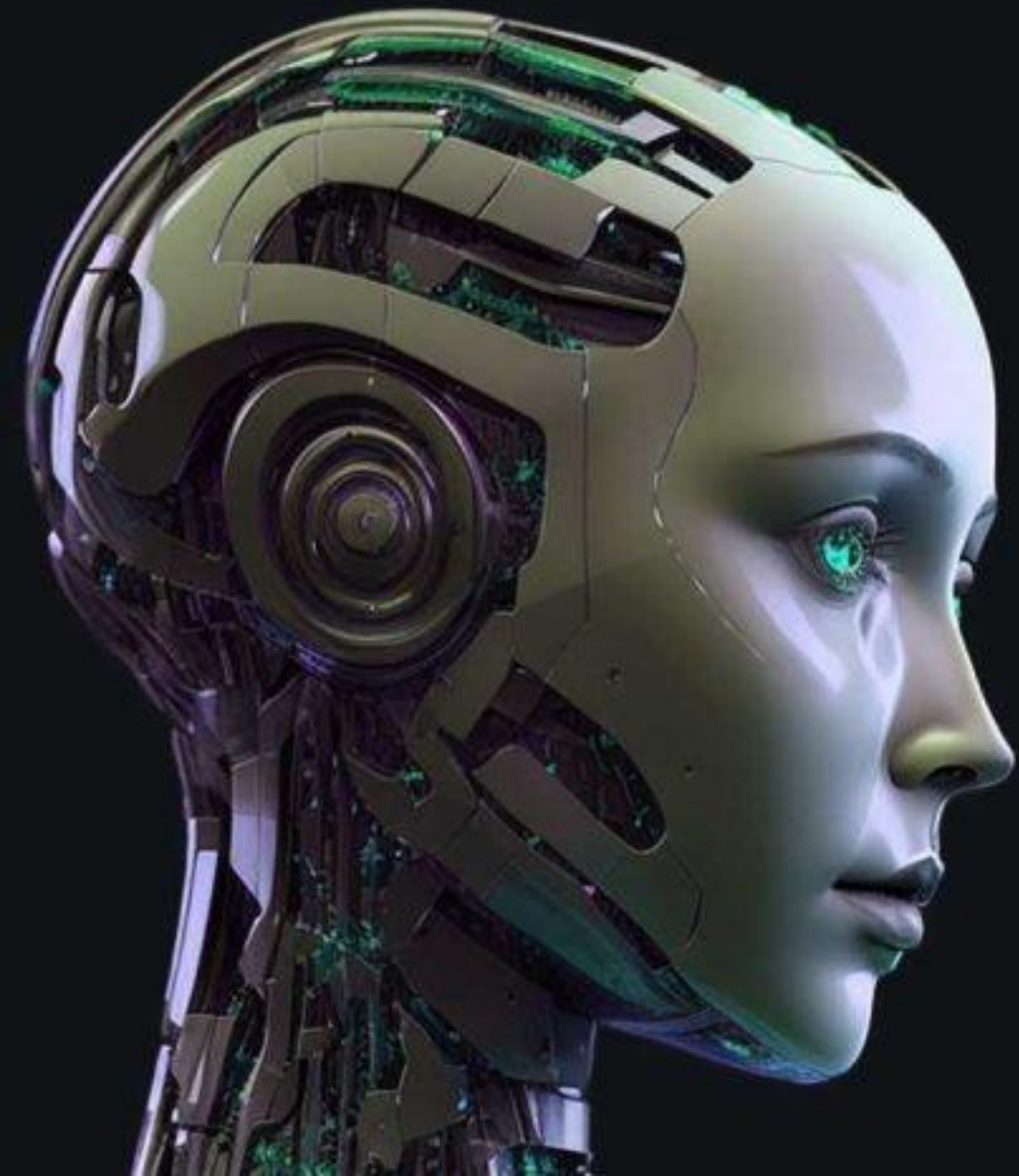
Neurologista da Infância e Adolescência
Mestre e Doutor em Neurologia pela FMRP-USP
Professor visitante do Depto. Neurologia da UNICAMP
Membro Titular da Academia Brasileira de Neurologia
Membro do Comitê de Cefaleias na Infância da
International Headache Society
Diretor do Instituto Glia de Ribeirão Preto

arruda@institutoglia.com.br

www.institutoglia.com.br

Conflito de interesses

Farmacêutica	Consultor	Advisory Board	Ações	Speaker	Recursos Pesquisa	Material divulgação científica
Abbvie	-	-	-	+	-	-
Sandoz	-	-	-	+	-	-
Takeda	-	-	-	-	-	+
Cellera	-	-	-	-	-	+
Cristália	-	-	-	-	-	+



 OpenAI



GPT-4

Child headache challenge!



ChatGPT



Cite the most important red flags of headache in children



When it comes to headaches in children, certain "red flags" or warning signs may indicate the need for immediate medical attention. These red flags suggest that the headache may be secondary to an underlying condition that requires further evaluation. Here are some important red flags associated with headaches in children:

1. Sudden onset of severe headache: A sudden, severe headache that develops rapidly and reaches its maximum intensity within seconds to minutes can be a cause for concern.
2. Change in headache pattern: If a child's headache pattern changes significantly, such as a sudden increase in frequency, intensity, or duration of headaches, it may be a red flag.
3. Neurological symptoms: Presence of neurological symptoms alongside a headache, such as seizures, weakness, numbness, visual changes, difficulty speaking, or loss of consciousness, should be taken seriously.
4. Worsening headache with exertion: If a headache worsens with physical activity or exertion, it may indicate an underlying issue that needs evaluation.
5. Headache upon awakening: Headaches that occur upon awakening from sleep or are associated with morning vomiting can be concerning.





ChatGPT



Which are the possible diagnoses of a 9 years-old child with excruciating unilateral headache attacks lasting 15–180 minutes and associated with ipsilateral conjunctival injection, lacrimation, nasal congestion, rhinorrhoea, forehead and facial sweating.



The symptoms you described in a 9-year-old child with excruciating unilateral headache attacks lasting 15–180 minutes and associated with ipsilateral conjunctival injection, lacrimation, nasal congestion, rhinorrhea, forehead, and facial sweating are highly suggestive of a condition called cluster headache. Cluster headache is a primary headache disorder that primarily affects adults, but it can also occur in children and adolescents.

Cluster headaches are characterized by recurrent episodes of severe, unilateral (one-sided) pain, typically focused around the eye or temple area. The attacks often occur in clusters, hence the name, with multiple attacks happening in a day or over several weeks to months, followed by a remission period. The pain is usually described as excruciating and sharp.

In addition to the intense pain, cluster headaches are associated with autonomic symptoms, which include:





ChatGPT



Please, which are the life prevalence of headache in children and adolescents?

< 1/2 >



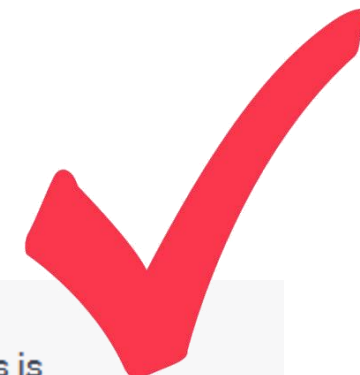
The prevalence of headaches in children and adolescents can vary depending on the specific type of headache and the population being studied. However, headaches are relatively common in this age group. Here are some estimates of the prevalence rates for different types of headaches:

1. **Tension-type headache:** Tension-type headaches are the most common type of headache in children and adolescents. The prevalence rates vary, but studies have reported rates ranging from 10% to 30% in this population.
2. **Migraine:** Migraine headaches are also quite common in children and adolescents. The prevalence rates for migraine vary depending on the age group and the diagnostic criteria used. Generally, the prevalence rates range from 5% to 10% in school-aged children and increase during adolescence, affecting about 10% to 20% of adolescents.
3. **Chronic daily headache:** Chronic daily headache refers to headaches that occur on more than 15 days per month for at least three months. The prevalence of chronic daily headache in children and adolescents is estimated to be around 1% to 2%.

network error



ChatGPT



< 2 / 2 >



Apologies for the confusion. The prevalence of headache in children and adolescents is indeed similar to the life prevalence. As mentioned earlier, the prevalence rates can vary depending on the specific type of headache and the criteria used for diagnosis. Here are some estimates of prevalence rates for different types of headaches:

1. Migraine: Migraine is one of the most common types of headache in children and adolescents. The prevalence of migraine in this population is estimated to be around 7% to 10%, with some studies reporting rates as high as 12% to 15%. Migraine headaches tend to increase in frequency and severity during adolescence.
2. Tension-type headache: Tension-type headaches are also common in children and adolescents. The prevalence of tension-type headaches in this population ranges from 20% to 30%. Tension-type headaches are often described as a mild-to-moderate, pressing or tightening pain that is not aggravated by routine physical activity.



ChatGPT



Based on scientific evidences and randomized clinical trials, what is the most efficient prophylactic treatment for migraine in children?



The prophylactic (preventive) treatment of migraine in children is an area of ongoing research, and the choice of treatment can depend on several factors, including the severity

It's important to note that the choice of prophylactic treatment should be individualized based on the child's specific needs and medical history. The decision should be made in consultation with a healthcare professional experienced in pediatric migraine management. They will consider the available evidence, the child's response to previous treatments, potential side effects, and other factors to determine the most appropriate and effective treatment option for the child.

4. Cyproheptadine: Cyproheptadine, an antihistamine with serotonergic effects, has been used in pediatric migraine prophylaxis. It has shown some effectiveness in reducing migraine frequency in children.
5. Flunarizine: Flunarizine, a calcium channel blocker, has demonstrated efficacy in reducing migraine frequency and severity in some studies involving children and adolescents.
6. Cognitive Behavioral Therapy (CBT): CBT, a form of psychotherapy, has been shown to be



“Pediatric clinical practice guidelines for
migraine treatment are
consensus based
rather than
evidence based”...

Practice guideline update summary: Acute treatment of migraine in children and adolescents

Report of the Guideline Development, Dissemination, and Implementation Subcommittee of the American Academy of Neurology and the American Headache Society

- Ibuprofen
- Triptans^{FDA}:
 - Sumatriptan (>12 years)
 - Almotriptan (>12 years)
 - Rizatriptan (6–17 years)
 - Zolmitriptan (>12 years)

Practice guideline update summary: Pharmacologic treatment for pediatric migraine prevention

Report of the Guideline Development, Dissemination, and Implementation

Subcommittee of the American Academy of Neurology and the American Headache Society

- Amitriptylin + CBT
- Topiramate
- Propranolol

- There is insufficient evidence to judge the independent effectiveness of amitriptyline on migraine prevention in children and adolescents.²⁰ A Food and Drug Administration (FDA) black box warning regarding risk of suicidal thoughts and behavior with amitriptyline use especially in children, adolescents, and young adults is in effect at the time of this guideline.
- It is possible that CBT alone is effective in migraine prevention,¹⁰ and individual barriers to access may exist.¹²
- There is insufficient evidence to evaluate the effects of flunarizine,²⁵ nimodipine,²⁷ valproate,²³ and onabotulinumtoxinA²⁸ for use in migraine prevention in children and adolescents.
- Although there is evidence that cinnarizine²⁶ is probably more effective than placebo for migraine prevention, this medication is not available in the United States or Canada.



Guidelines ↑

← FDA



“Topiramate is the **Only**
FDA-approved medication
for migraine prevention
in children and adolescents aged 12–17 years”



Guidelines



FDA

Publicações



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ESTABLISHED IN 1812

JANUARY 12, 2017

VOL. 376 NO. 2

Trial of Amitriptyline, Topiramate, and Placebo for Pediatric Migraine

Scott W. Powers, Ph.D., Christopher S. Coffey, Ph.D., Leigh A. Chamberlin, R.D., M.Ed.,
Dixie J. Ecklund, R.N., M.S.N., Elizabeth A. Klingner, M.S., Jon W. Yankey, M.S., Leslie L. Korbee, B.S.,
Linda L. Porter, Ph.D., and Andrew D. Hershey, M.D., Ph.D., for the CHAMP Investigators*

VIEWPOINT

Pediatric Migraine Prevention—First, Do No Harm

Amy A. Gelfand, MD William Qubty, MD Peter J. Goadsby, MD, PhD

JAMA Neurol. 2017 Aug 1;74(8):893-894

JAMA Neurology | Review

The Changing Landscape of Pediatric Migraine Therapy A Review

Carlyn Patterson-Gentile, MD, PhD; Christina L. Szperka, MD, MSCE

JAMA Neurol. 2018;75(7):881-887

Guest Editorial

The Childhood and Adolescent Migraine Prevention (CHAMP) Study: “What Do We Do Now?”

Scott W. Powers, Andrew D. Hershey, Christopher S. Coffey

Headache. 2017 Feb;57(2):180-183



Better evidence needed for preventing paediatric migraine



Migraines are the most common disabling type of headache among children and adolescents. Globally, of all and Drug Administration (FDA)-approved medication for migraine prevention in those aged 12–17 years, but

Without better-quality evidence, the prevention of migraine will remain an intractable challenge for too many children and adolescents. ■ *The Lancet*

of migraine see <https://vizhub.healthdata.org/gbd-compare/>

For the new prevention guidelines see <https://n.neurology.org/content/early/2019/08/13/WNL.0000000000008105>

For the new treatment guidelines see <https://n.neurology.org/content/early/2019/08/13/WNL.0000000000008095>

acute migraine attacks, finding the right approach for preventing migraines remains a challenge.

For relieving pain during a migraine attack, ibuprofen and paracetamol in children and adolescents, and triptans in adolescents only, are now deemed effective. By contrast, the evidence base for reducing the frequency and severity of attacks is far less robust, with the benefits of preventive medications not exceeding those of placebo in most trials to date. Topiramate is the only US Food

overweight, low physical activity, poor sleep, and exposure to tobacco, alcohol, and caffeine. But the evidence here is also poor, making this an area for much needed research—not just into whether targeting associated factors might be effective but also into the use of CBT alone, new therapeutics, and improved trial designs. Without better-quality evidence, the prevention of migraine will remain an intractable challenge for too many children and adolescents. ■ *The Lancet*

EDITORIAL

Can We Really Stop Pediatric Migraine?

Using Network Meta-analysis to Remove the Guess Work

Boris Zernikow, PhD, MD

- Reconsider recommendations and rewrite your guidelines. Pharmacological prophylactic treatment in childhood migraine should be the exception and not the rule.
- Recommend nonpharmacological approaches of migraine prophylaxis.¹⁴
- Be extremely careful with new and modern but perhaps—in childhood—unnecessary approaches, such as the calcitonin gene-related peptide antibodies.¹⁵

EDITORIAL

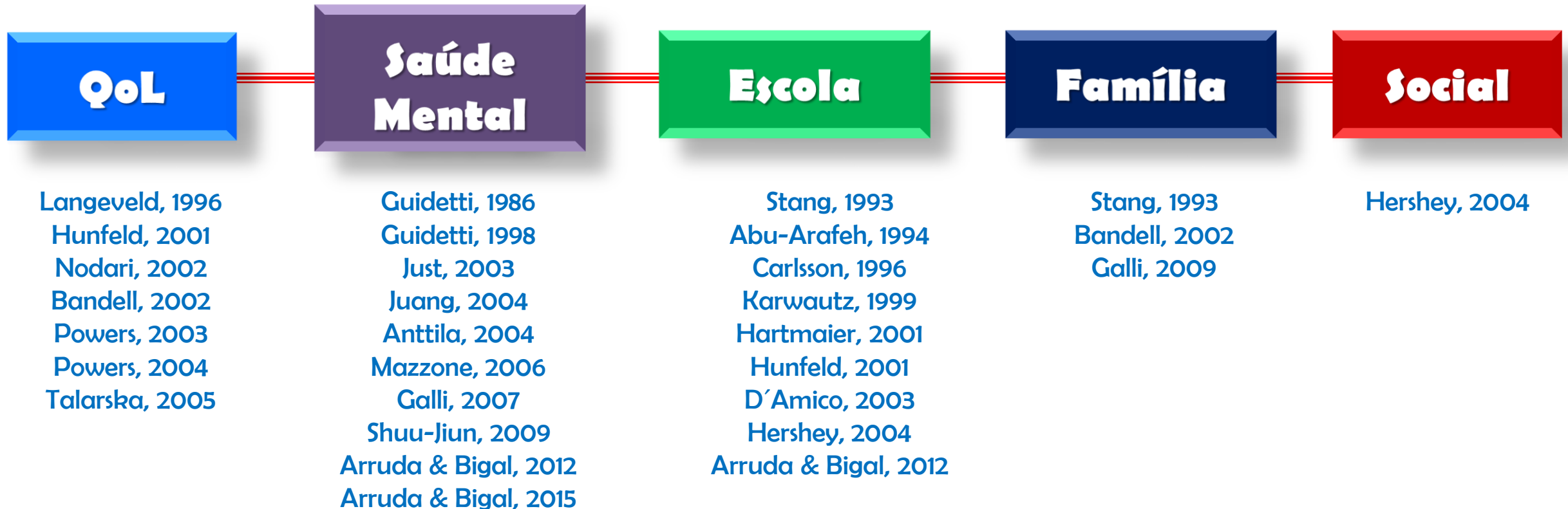
Can We Really Stop Pediatric Migraine?

Using Network Meta-analysis to Remove the Guess Work

Boris Zernikow, PhD, MD

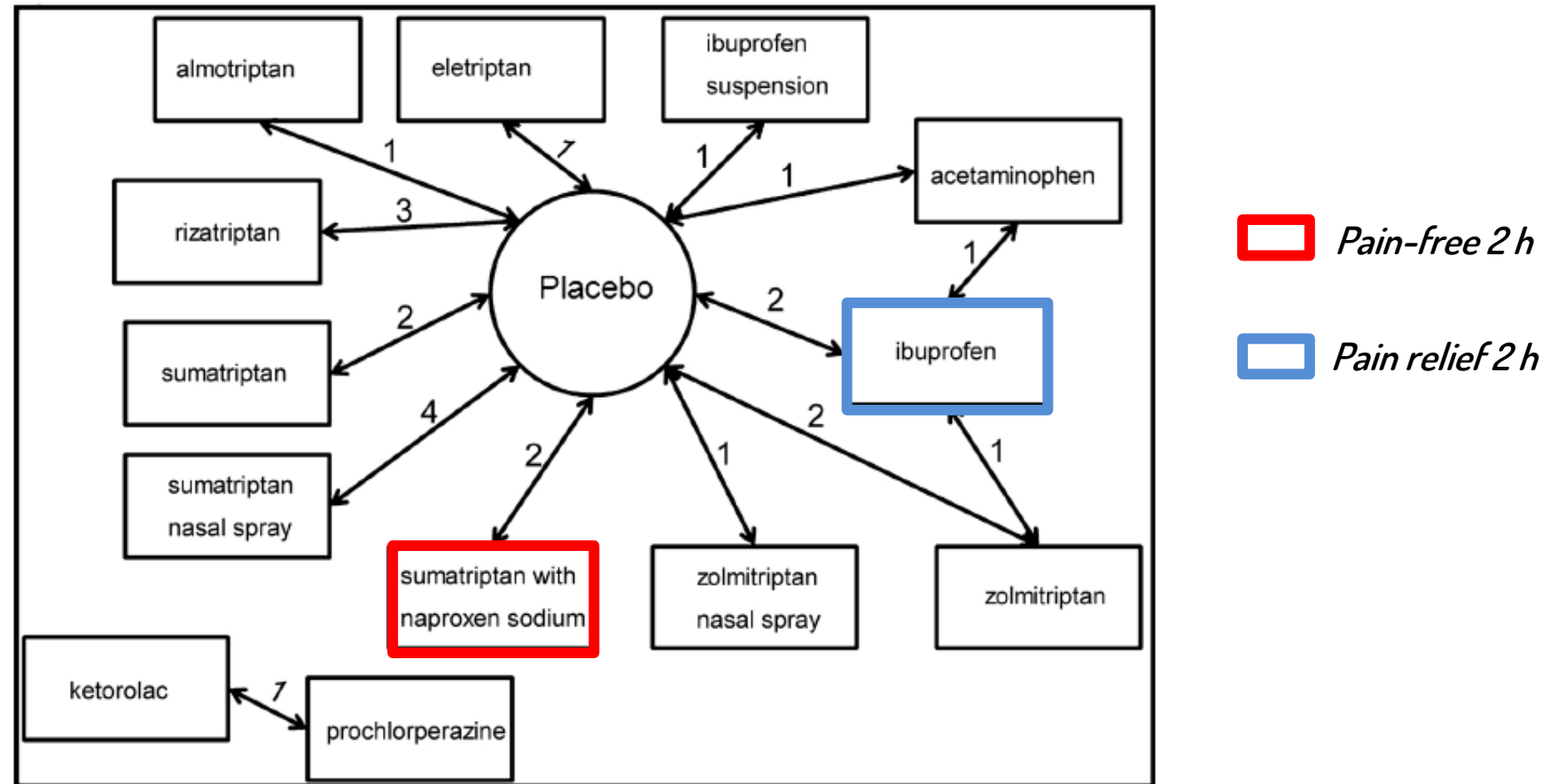
- Because the placebo effect is heightened in children and the proof of a true pharmacological association is weak, use non-pharmacological approaches for migraine prophylaxis.
- Using abortive migraine medication early on in the attack and not using migraine medication for other headaches like tension-type headaches.
- Becoming active in sports to reduce the number of migraine attacks.
- Getting enough sleep (although this may be more difficult during adolescence and young adulthood because of shifts in circadian rhythms at this stage of development).

IMPACTO



Drugs for Acute Attack of Pediatric Migraine: A Network Meta-analysis of Randomized Controlled Trials

Guihua Wang^a, Tianlin Tan^b, Yao Liu^b, Peiwei Hong^{a,*}



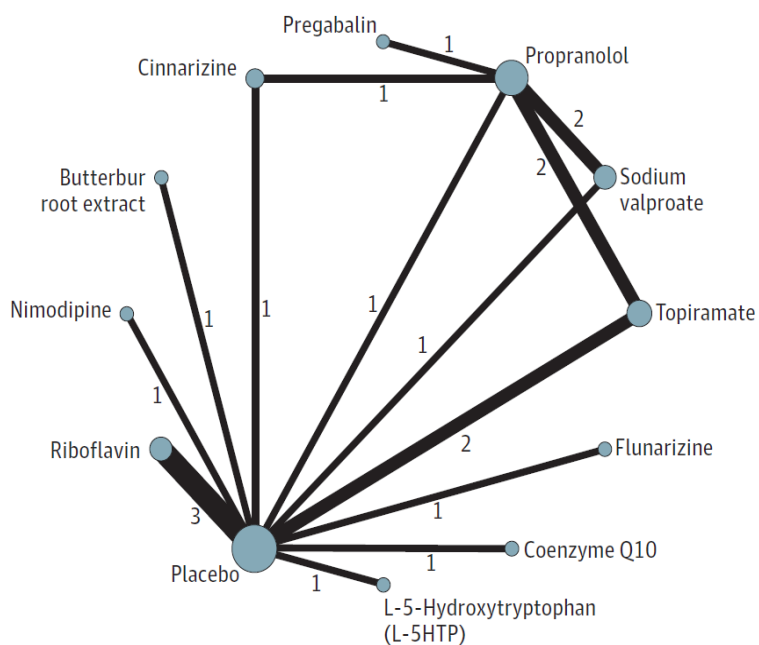


JAMA Pediatrics | Original Investigation

Efficacy, Safety, and Acceptability of Pharmacologic Treatments for Pediatric Migraine Prophylaxis

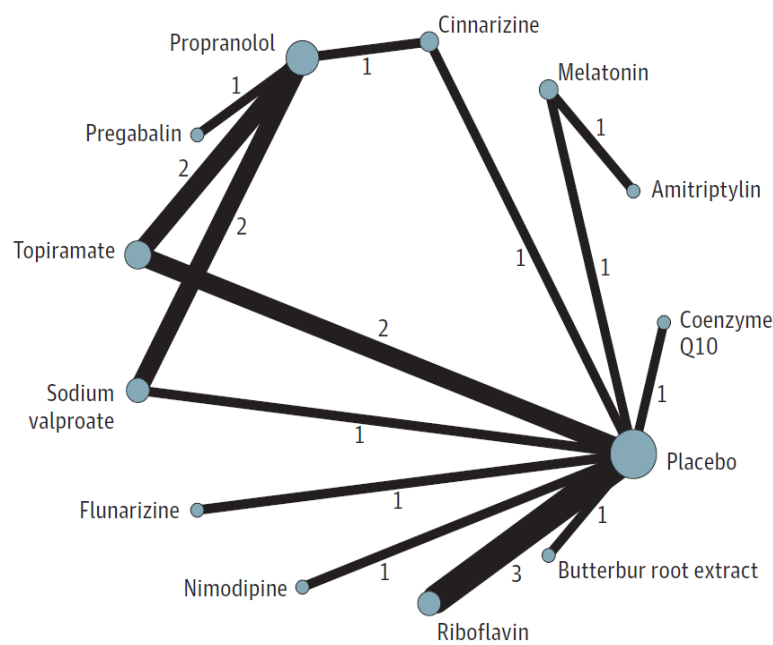
A Systematic Review and Network Meta-analysis

A Network meta-analysis of eligible comparisons for efficacy



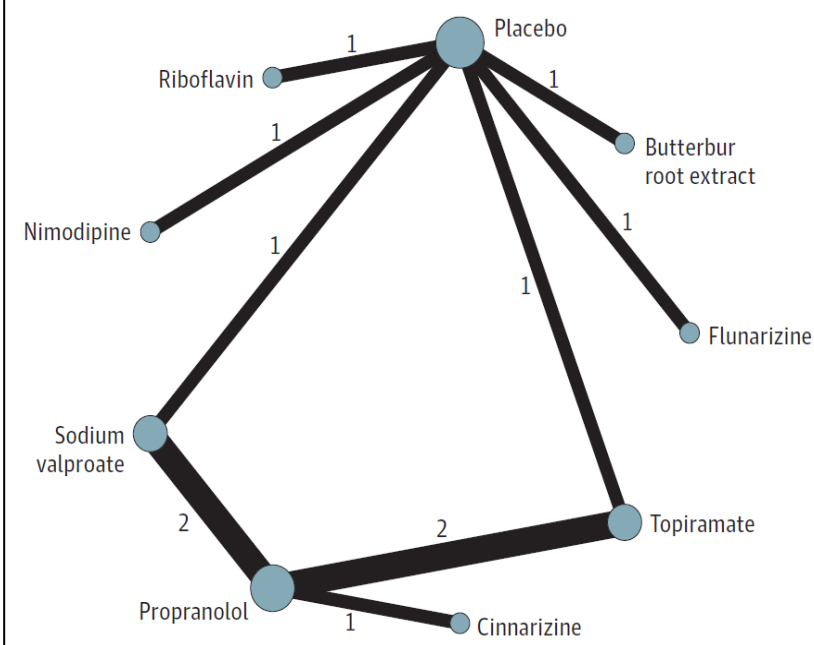
EFICÁCIA

B Network meta-analysis of eligible comparisons for acceptability



TOLERABILIDADE

C Network meta-analysis of eligible comparisons for safety



SEGURANÇA

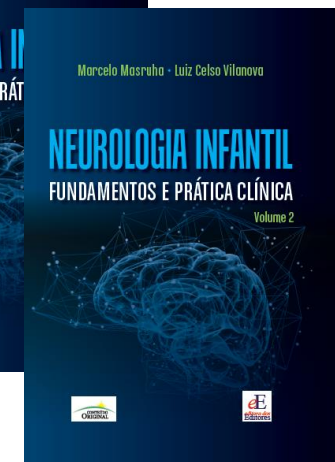
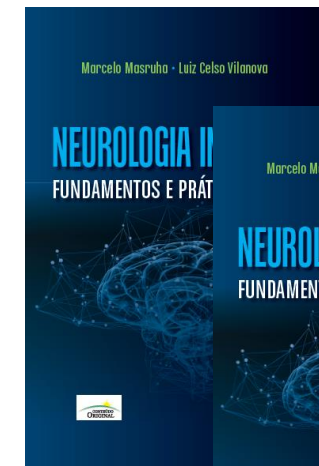
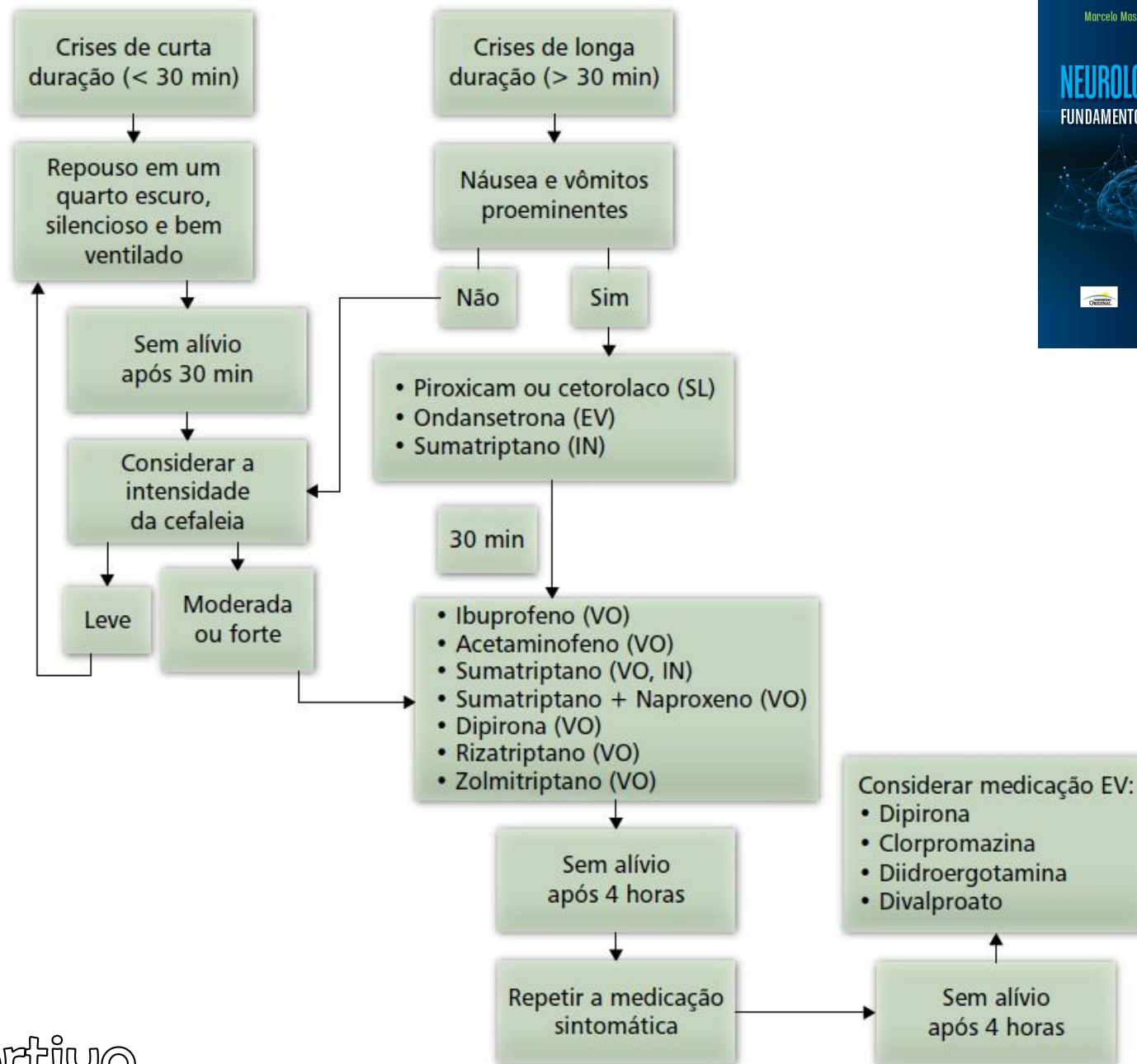
Carência de estudos RCT

Limitações metodológicas dos estudos

Alto efeito placebo em crianças com migrânea

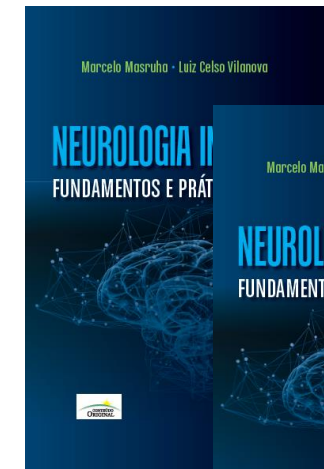
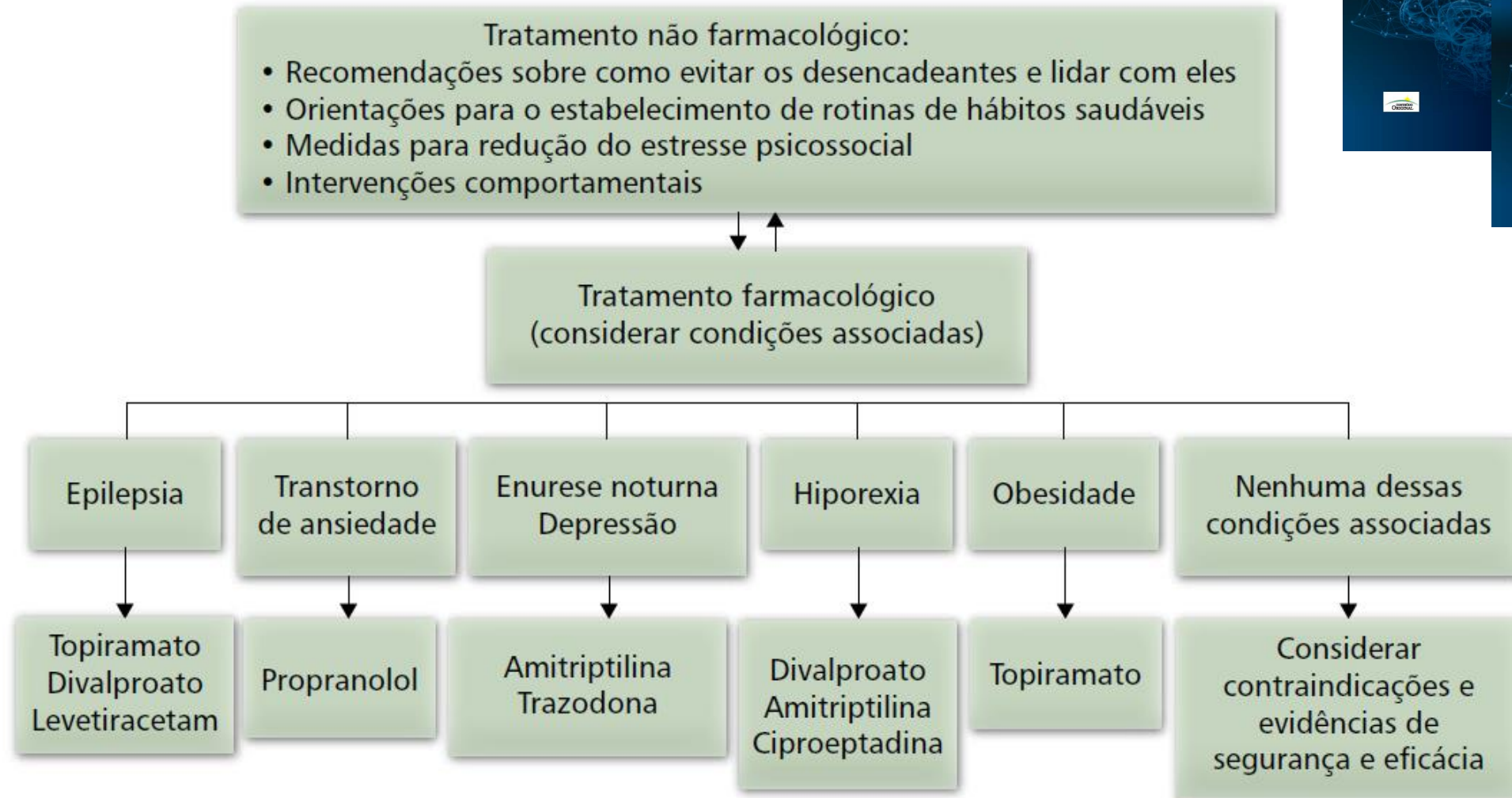
Estudos não refletem a experiência
clínica diária





Tratamento abortivo

Tratamento profilático farmacológico



Tratamento profilático não-farmacológico - TCC

A Systematic Review and Meta-Analysis of the Efficacy of Cognitive Behavioral Therapy for the Management of Pediatric Migraine

Qin Xiang Ng, MBBS; Nandini Venkatanarayanan, BMedSci, BMBS; Lakshmi Kumar, MBBS

Headache
2017;57:349-62

Trajectory of Improvement in Children and Adolescents with Chronic Migraine: Results from the Cognitive Behavioral Therapy and Amitriptyline Trial

John W. Kroner; James Peugh; Susmita M. Kashikar-Zuck; Susan L. LeCates; Janelle R. Allen; Shalonda K. Slater; Marium Zafar; Marielle A. Kabbouche; Hope L. O'Brien; Chad E. Shenk; Ashley M. Kroon Van Diest; Andrew D. Hershey; Scott W. Powers

J Pain
2017;18:637-44



**Cochrane
Library**

Cochrane Database of Systematic Reviews

Psychological therapies (remotely delivered) for the management of chronic and recurrent pain in children and adolescents (Review)

Fisher E, Law E, Dudeney J, Eccleston C, Palermo TM

Cochrane Database Syst Rev
2019;4:CD011118



What is new in migraine management in children and young people?

Ne Ron Loh,^{1,2} William P Whitehouse ,³ Rachel Howells⁴

Table 1 Oral nutraceuticals: doses+evidence

	Dose and practical aspects	Evidence
Riboflavin (vitamin B ₂)	50–400 mg/day Well-tolerated, dark urine and rare mild GI symptoms.	Shortened migraine attacks and reduced frequency in children as young as 6 years.
Vitamin D	Well tolerated.	Reduced symptom severity and migraine-related disability. Children randomised to topiramate 2 mg/kg/day plus vitamin D ₃ had fewer migraine attacks and less migraine-related disability compared with those on topiramate alone.
Magnesium	Up to 9 mg/kg/day as magnesium oxide. Well-tolerated, rare mild diarrhoea.	More paediatric RCTs of oral prevention and acute intravenous treatment are needed.
Melatonin	4–8 mg or 0.3 mg/kg Well-tolerated, daytime sleepiness.	For acute treatment, 4–8 mg was more effective than 1–2 mg. For prevention, 0.3 mg/kg/day can reduce migraine frequency and severity and improve quality of life. However, melatonin was less effective than amitriptyline: responder rate 62% compared with 82%.
For references, please see the text. GI, gastrointestinal; RCT, randomised controlled trial.		

The Evidence for the Role of Nutraceuticals in the Management of Pediatric Migraine: a Review

Serena L. Orr¹

11 observacionais, 7 RCTs, 3 revisões sistemáticas

Vitamina D, coenzima Q10, Mg, butterbur e ác. graxos polinsaturados

Recent Findings Twenty-one studies were reviewed, of which 11 were observational studies, 7 were randomized controlled trials, and 3 were systematic reviews. Six different nutraceuticals were included in the review: vitamin D, riboflavin, coenzyme Q10, magnesium, butterbur, and polyunsaturated fatty acids. All but three of the studies assessed the role of nutraceuticals in migraine prevention, while three studies evaluated the role of intravenous magnesium for acute migraine management. Overall, the quality and size of the studies were limited.

Summary Due to low quality evidence and limited studies, no definite conclusions can be drawn on the efficacy of nutraceuticals for the treatment of pediatric migraine. Future studies are warranted in order to establish evidence upon which to define the role of nutraceuticals in this patient population.

Effectiveness of low-dose riboflavin as a prophylactic agent in pediatric migraine

Gaku Yamanaka^{*}, Shinji Suzuki, Mika Takeshita, Soken Go, Natsumi Morishita, Tomoko Takamatsu, Atsuro Daida, Shinichiro Morichi, Yu Ishida, Shingo Oana, Shonosuke Nara, Masaru Shimura, Shigeo Nishimata, Hisashi Kawashima

Brain Dev 2020;42:523–8

Vitamin D status in children with headache: A case-control study

A. Donmez^a, E. Orun^b, F.M. Sonmez^{c, *}

Clin Nutr ESPEN 2018;23:222–7

Efficacy of Topiramate Alone and Topiramate Plus Vitamin D3 in the Prophylaxis of Pediatric Migraine: A Randomized Clinical Trial

Fallah R^{iD}, Sarraf Yazd S, Sohrevardi SM^{iD}


Iran J Child Neurol 2020;14:77–86

Intravenous Migraine Treatment in Children and Adolescents

Klaus G. Werner¹ ^{iD} • Sharoon Qaiser² • Marielle A. Kabbouche³ • Beverly Murphy⁴ • Ian Maconochie⁵ • Andrew D. Hershey³

Curr Pain Headache Rep 2020;24:54

Melatonin for Acute Treatment of Migraine in Children and Adolescents: A Pilot Randomized Trial

Amy A. Gelfand, MD; Alexandra C. Ross, PhD; Samantha L. Irwin, MBBS 
Kaitlin A. Greene, MD; William F. Qubty, MD; I. Elaine Allen, PhD

Headache 2020;60:1712–21

Safety and Efficacy of Melatonin in Pediatric Migraine Prophylaxis

Razieh Fallah, Fatemeh F. Shoroki and Farzad Ferdosian

Curr Drug Saf 2015;10:132–5

A Randomized Clinical Trial Comparing the Efficacy of Melatonin and Amitriptyline in Migraine Prophylaxis of Children

Fallah R, Fazelishoroki F, Sekhavat L.

Iran J Child Neurol 2018;12:47–54





What is new in migraine management in children and young people?

Ne Ron Loh,^{1,2} William P Whitehouse ,³ Rachel Howells⁴

Table 2 CGRP monoclonal antibodies for migraine

CGRP monoclonal antibody	Erenumab (<i>Aimovig</i>)	Fremanazumab (<i>Ajovy</i>)	Galcanezumab (<i>Emgality</i>)	Eptinezumab (<i>Vyepti</i>)
Indication	Prevention	Prevention	Prevention	Prevention
Target	CGRP receptor	CGRP	CGRP	CGRP
Administration	Subcutaneous	Subcutaneous	Subcutaneous	Intravenous
Frequency	Monthly	3 monthly	monthly	3 monthly
Percentage with >50% reduction in headache days	50% (27% with placebo) ⁴⁴	41% (18% with placebo) ⁴⁵	27% (15% with placebo) ⁴⁶	61% (39% with placebo) ⁴⁷
Responder rate				
Paediatric trials	OASIS (CM) (EM)		REBUILD-1	PROSPECT 2
CGRP, calcitonin gene-related peptide.				

www.clinicaltrials.gov/ct2/show/NCT03832998

www.clinicaltrials.gov/ct2/show/NCT03432286

www.clinicaltrials.gov/ct2/show/NCT05164172



What is new in migraine management in children and young people?

Ne Ron Loh,^{1,2} William P Whitehouse ,³ Rachel Howells⁴

Table 3 CGRP antagonists: GPANTS for migraine

CGRP antagonist	Rimegepant (Nurtec)	Ubrogepant (Ubrovelvy)	Atogepant	Vazegepant aka Zavegepant
Current indication	Acute treatment and prevention	Acute treatment	Prevention	Acute treatment and prevention
Formulation	Tablet	Tablet	Tablet	Nasal spray and tablet
Regime	Up to once a day	Up to twice a day	Undergoing phase III trials	Undergoing phase III trials
2-hour pain free	20% (placebo 12%)	21% (placebo 11%)		23% (placebo 15%)
2-hour pain relief	58% (placebo 42%) ⁴⁸	61% (placebo 48%) ⁴⁹		
Paediatric trials	NCT04649242 NCT04743141	Deferred 2019	Deferred 2019	

CGRP, calcitonin gene-related peptide.

www.clinicaltrials.gov/ct2/show/NCT04649242

Early clinical experience with a monoclonal antibody against the calcitonin gene-related peptide receptor in adolescents with migraine: A case series

Yi Jing Zhao ¹, King-Hee Ho², and Pei Shieen Wong³

Proc Singapore Healthc. 2020, 29:212-4

CGRP Monoclonal Antibody use for the Preventive Treatment of Refractory Headache Disorders in Adolescents.

Kaitlin A. Greene¹, Carlyn Patterson Gentile², Christina L. Szperka², Marcy Yonker³, Amy A. Gelfand⁴, Barbara Grimes⁵, Samantha L. Irwin⁴

Pediatr Neurol. 2021, 114:62-7

Monoclonal Antibodies Against the Calcitonin Gene-Related Peptide and Its Receptor in Japanese Adolescents With Migraines

Masahito Katsuki¹, Kenta Kashiwagi², Shin Kawamura¹, Akihito Koh¹

Cureus. 2023 Jan 12;15(1):e33689

Pharmacokinetics, Safety, and Tolerability of Lasmiditan in Pediatric Patients with Migraine

Max Tsai¹ · Emel Serap Monkul Nery¹ · Lisa Kerr¹ · Rashna Khanna⁴ · Mika Komori² · Ellen B. Dennehy^{1,3} · Darren Wilbraham⁴ · Paul Winner⁵

Clinical Pharmacokinetics (2021) 60:819–828

 U.S. National Library of Medicine

ClinicalTrials.gov

A Study of Lasmiditan (LY573144) Treatment in Children Aged 6 to 17 With Migraine (PIONEER-PEDS1)

www.clinicaltrials.gov/ct2/show/NCT04396236

Outcomes of Greater Occipital Nerve Injections in Pediatric Patients With Chronic Primary Headache Disorders

Amy A. Gelfand MD ^{a,b,*}, Amanda C. Reider MD ^c, Peter J. Goadsby MD, PhD ^a

Pediatric Neurology, 2014; 50 (2): 135-139

Patterns of Use of Peripheral Nerve Blocks and Trigger Point Injections for Pediatric Headache: Results of a survey of the American Headache Society Pediatric & Adolescent Section

Christina L. Szperka, MD^{1,2}, Amy A. Gelfand, MD³, and Andrew D. Hershey, MD PhD^{4,5}

Headache (2016); 56(10): 1597-1607

Treatment of disabling headache with greater occipital nerve injections in a large population of childhood and adolescent patients: a service evaluation

Francesca Puledra^{1*} , Peter J. Goadsby¹ and Prab Prabhakar²

J Headache Pain 2018;19:5

A Randomized Trial to Evaluate OnabotulinumtoxinA for Prevention of Headaches in Adolescents With Chronic Migraine

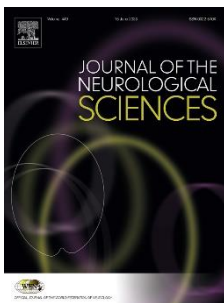
Paul K. Winner, DO, FAAN, FAAP, FAHS; Marielle Kabbouche, MD; Marcy Yonker, MD, FAHS;
Veronica Wangsadipura, MS; Arlene Lum, PMP; Mitchell F. Brin, MD, FAAN, FANA, FAHS

Headache 2020;60:564–75


The Efficacy of Botulinum Toxin in Pediatric Chronic Migraine: A Literature Review

Raymundo Marcelo, MD¹ , and Brin Freund, MD^{1,2}

Journal of Child Neurology. 2020;35(12):844–851



Evaluation of the effect of topical chamomile (*Matricaria chamomilla* L.) oleogel as pain relief in migraine without aura: a randomized, double-blind, placebo-controlled, crossover study

Arman Zargaran^{1,2}  • Afshin Borhani-Haghighi^{3,4} • Mohammad Salehi-Marzijarani⁵ • Pouya Faridi⁶ • Saeid Daneshamouz⁷ • Amir Azadi⁷ • Hossein Sadeghpour⁸ • Amirhossein Sakhteman⁸ • Abdolali Mohagheghzadeh^{1,6}



Anvisa portaria nº 335/99

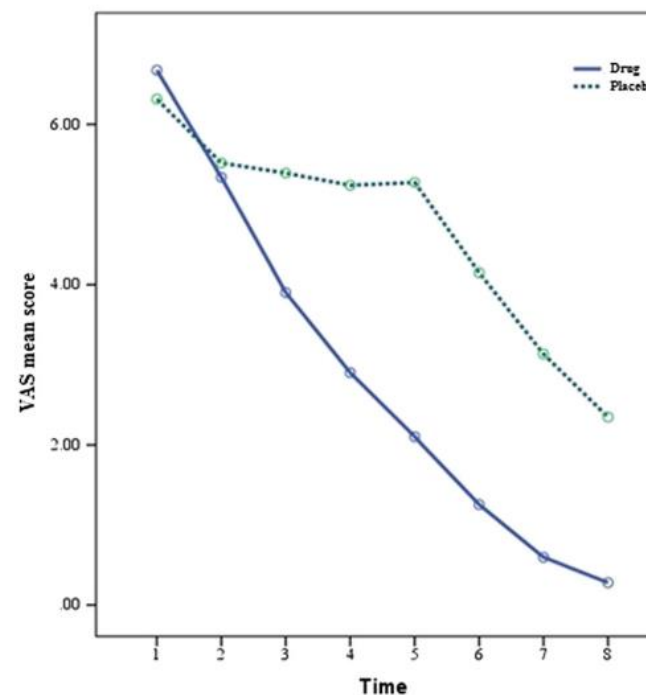


Fig. 2 Changes of VAS score for chamomile oleogel and placebo groups during the time (1 = 0; 2 = 15 min; 3 = 30 min; 4 = 45 min; 5 = 1 h; 6 = 2 h; 7 = 6 h; and 8 = 24 h after coetaneous application of chamomile oleogel [drug] or placebo). There were significant differences between drug and placebo after 30 min; p value < 0.05)

REVIEW

The TRPA1 channel in migraine mechanism and treatment

S Benemei^{1,2}, C Fusi¹, Gabriela Trevisan¹ and Pierangelo Geppetti²

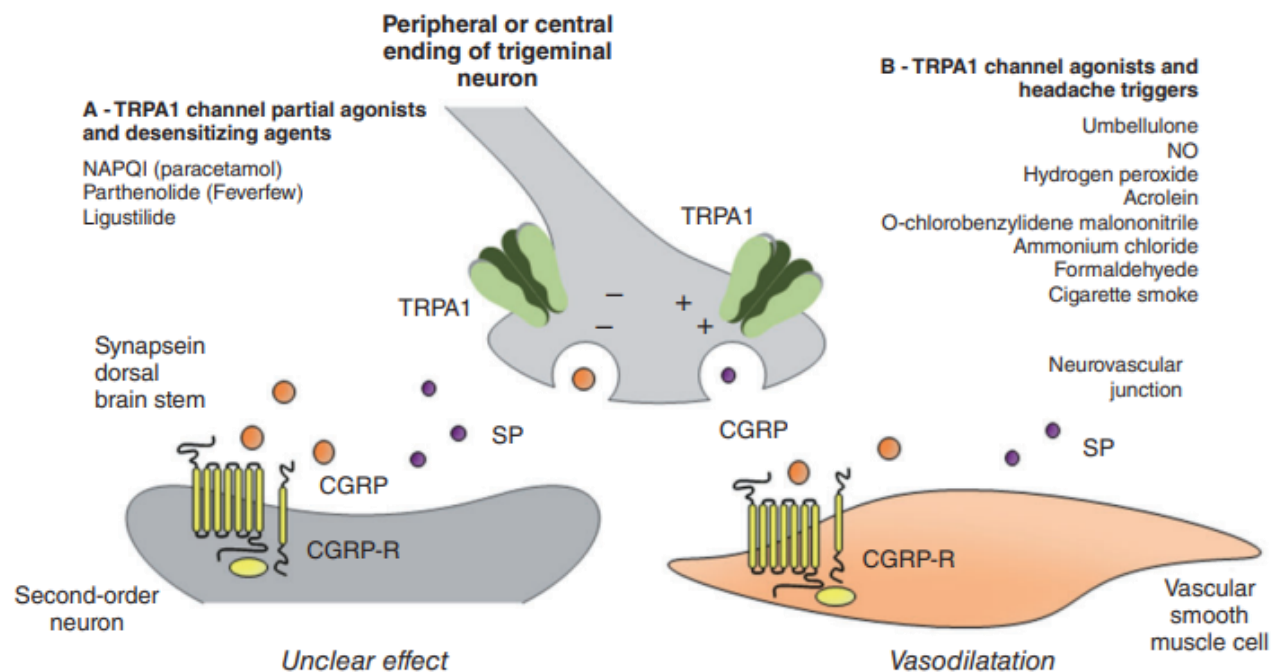


Figure 1

Schematic representation of the activity of several agents (drugs, herbal medicines, endogenous and exogenous compounds), which, by targeting the TRPA1 channel, may positively or negatively affect the migraine attack *via* the release of CGRP and SP from peripheral and central endings of trigeminal neurons. (A) Some agents may behave as partial agonists or after an initial activation may lead to a profound and enduring channel desensitization. Both mechanisms by inhibiting CGRP release may eventually ameliorate migraine and cluster headache attacks. (B) In contrast, agonists of the TRPA1, by channel stimulation and the ensuing release of neuropeptide, may trigger migraine and cluster headache attacks.



What is new in migraine management in children and young people?

Ne Ron Loh,^{1,2} William P Whitehouse ,³ Rachel Howells⁴

Table 4 Current electroceuticals for migraine

Device	e-TNS	nVNS	sTMS	REN
Example	<i>Cefaly</i>	<i>gammaCore</i>	<i>sTMS mini</i>	<i>Nerivio</i>
Age marketing authorised (years)	>8	>12 (in USA)	>12	>12
Mechanism of action	Trigeminal nerve stimulation	Suppresses glutamate in trigeminal nucleus	Increases threshold of occipital cortex	Induced peripheral pain modulation
Method of application	Electrode placed on forehead	Placed on neck near vagus nerve	Placed on occiput	Attached to arm and controlled by an app
Acute treatment 2-hour pain free	17% (sham 7%)	30% (sham 20%)	39% (sham 22%)	37% (sham 18%)
Acute treatment 2-hour pain relief	65% (sham 52%)	41% (sham 28%)	N/A	67% (39% sham)
Preventative treatment Responder rate	38% had >50% decrease in migraine attacks (sham 12%)	31% had >50% decrease in migraine days (sham 25%)	46% had >50% decrease in headache days	N/A

For references, please see text.

e-TNS, external trigeminal nerve stimulation; nVNS, non-invasive vagus nerve stimulation; REN, remote electrical neuromodulation; sTMS, single pulse transcranial magnetic stimulation.



EDITORIAL

ONLINE FIRST

No Evidence of Efficacy or Evidence of No Efficacy

Marco A. Arruda, MD, PhD

Os avanços no tratamento foi desproporcional

aos avanços no conhecimento

(Diagnóstico, Epidemiologia e Impacto)

Falta de Evidência Eficácia

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Falta de Evidência Eficácia



EDITORIAL

ONLINE FIRST

No Evidence of Efficacy or Evidence of No Efficacy

Marco A. Arruda, MD, PhD

What should we do? (1) Keep in mind the incredible burden of migraine to affected children; (2) when possible, avoid withdrawal by using appropriate drugs; and (3) when no evidence is available, or when first-line therapies have failed, select a drug based on probability of efficacy and solid evidence of proven safety of the drug in children. Lack of evidence associated with lack of good reasoning to navigate the lack of evidence is likely an ominous combination to children with migraine.

“Falta de evidências aliada à falta de bom senso para lidar com a falta de evidências é uma perigosa combinação para crianças que sofrem de migrânea”



www.institutoglia.com.br
arruda@institutoglia.com.br