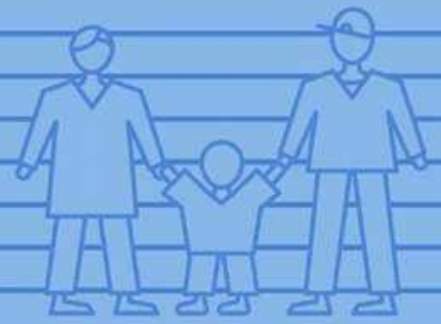
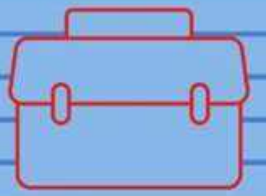




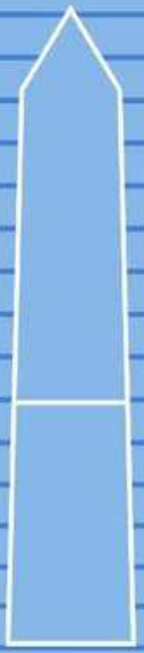


Future of Pediatrics

Pediatric Health Network

Children's National

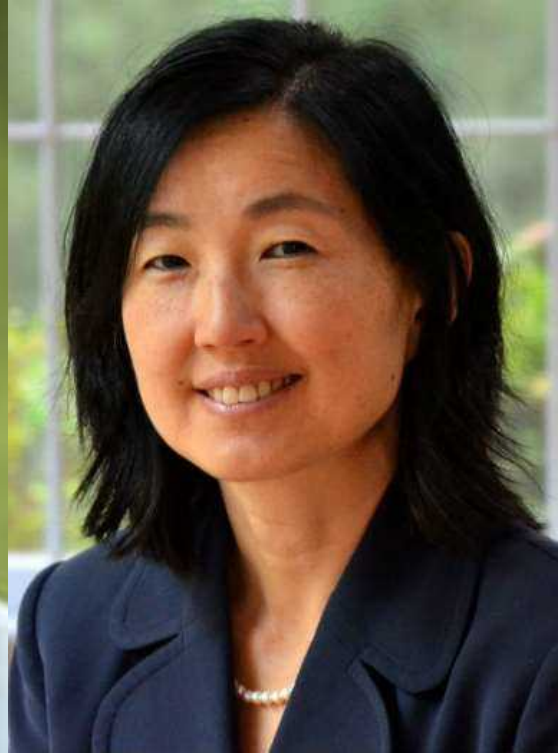






Headache Co-Management with Primary Care and Neurology



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Disclosures

- Clinical trial support from Amgen erenumab, Pfizer rimegepant, Lilly lasmitidan clinical trials

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Objectives

- Define characteristics of primary headache
- Identify indications for ordering neuroimaging tests in headache patients
- Discuss co-management of primary headache disorders

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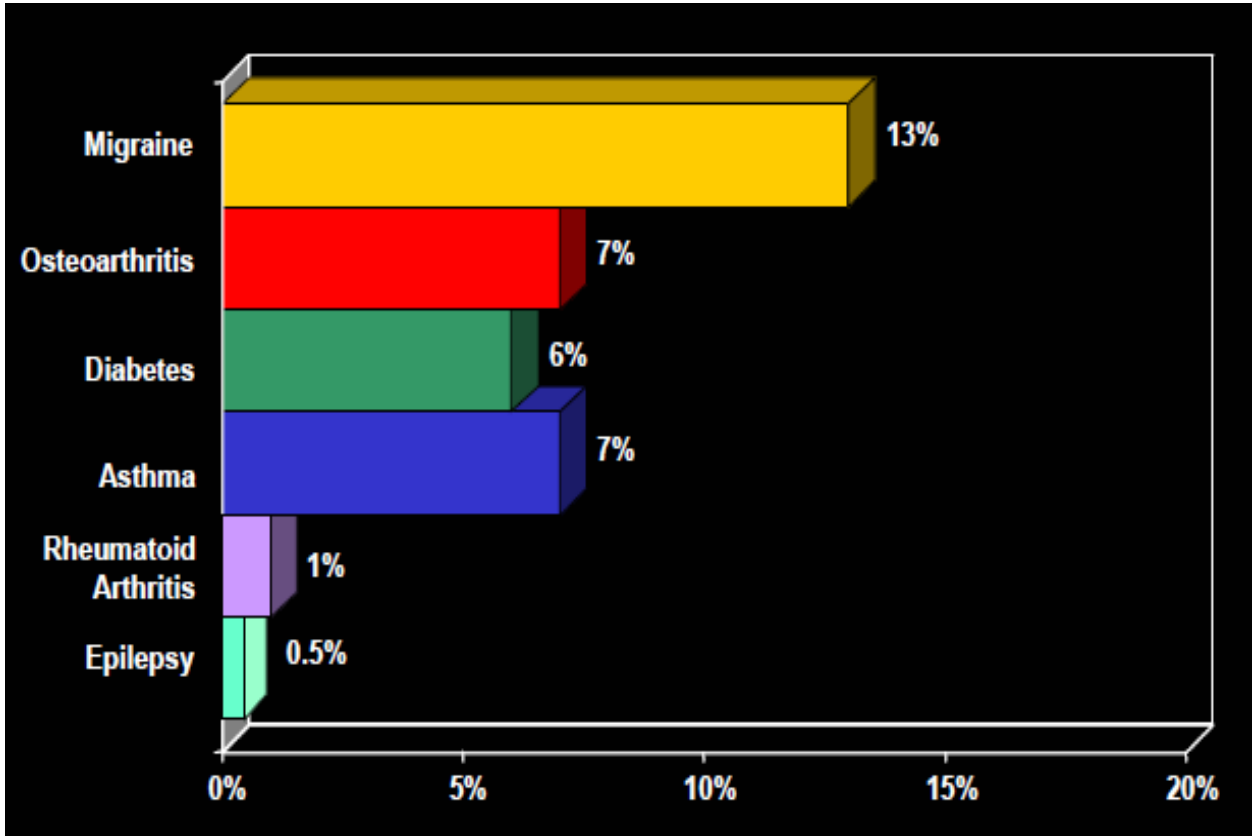
Migraine Is the Most Common Neurologic Disorder

CDC Population Data

- Migraine affects 27.9 million Americans or 13% of the population
- Diabetes affects 17 million Americans, or 6% of the population
- Asthma affects 13 million Americans, or 7% of the population
- Migraine prevalence equals that of asthma and diabetes combined



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Pediatric Headache Is Common

Migraine without aura – 20-28% of adolescents

- ICHD-III definition
  - Neurol Clin. 2009; 27: 481–501

Chronic migraine - 1% of adolescents

- Defined as >15 migraines per month > 3months
  - Headache. 2011 May;51(5):693-706.

New daily persistent headache - 3% of adolescents, 14% of headache patients referred

- Defined as daily unremitting headache > 3mos
  - Arch Pediatr. 2008 Dec;15(12):1805-14

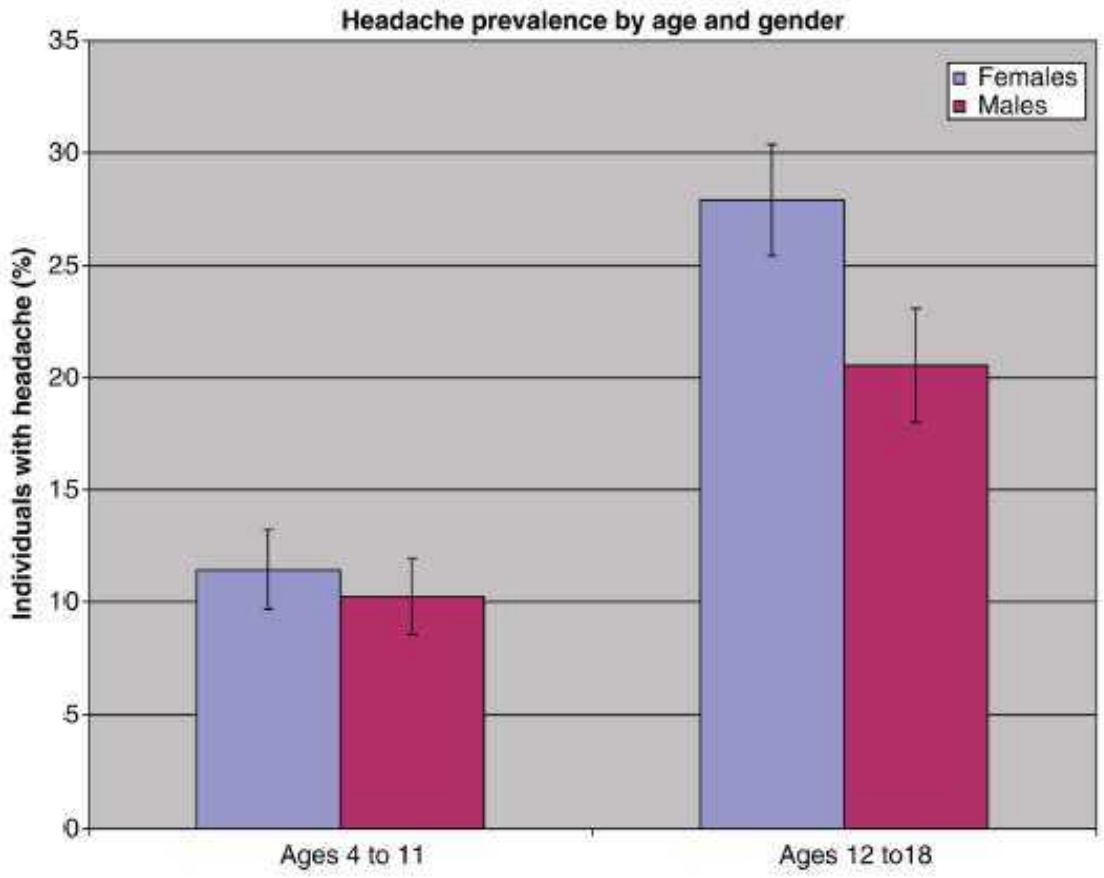

Figure 1.
The effect of puberty on headache prevalence among males and females.

J Child Neurol. 2009 May ; 24(5): 536–543.

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Headache History

- Obtain an accurate headache history
- Ask child, not parent
- Establishing an accurate history is key to diagnosis and management plan
- Start with basic pain characteristics
    - Location – "Point to where it hurts most"
    - Severity – "1 to 10, with 10 being most intense pain in the universe"
    - Quality – "Throbbing, pressing, tightening, aching, shooting, sharp"
    - Exacerbating or relieving factors – "What do you do when you have a headache?"
    - Associated symptoms – "Do you prefer a dark and quiet space? Do you feel sick to your stomach or vomit?"

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Primary Headache Types

Migraine Headache

Major Criteria At least 2 of the following symptoms	Minor Criteria At least one of the following
Frontal or unilateral	Light sensitivity
Throbbing, pounding, pulsating	Sound sensitivity
Moderate to severe	Nausea
Worsened by activity or relieved with rest	Vomiting

Tension-Type Headache

Major Criteria At least 2 of the following symptoms	Minor Criteria Both of the following
Bilateral, diffuse, or band-like	No more than one of light or sound sensitivity
Pressing, tightening, or non-throbbing	No nausea
Mild to moderate	No vomiting
No change with activity	

Trigeminal Autonomic Cephalalgia

Severe or very severe orbital (peri or supra) or temporal pain with 1 or both of:	
Conjunctival tearing or injection	Restlessness, agitation, or pacing
Ptosis or eyelid edema	
Miosis	
Rhinorrhea	
Fullness in ear	
Facial Flushing	
Facial sweating	

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Episodic versus Chronic versus Intractable

- **Episodic** = less than 8 days per month (2 days per week)
- **Acute** = less than 3 months
- **Chronic** = 15 or more days per month or more than 3 months
- **Intractable**/Resistant/Refractory = failed at least 3 preventative medications

- Key Codes:
  - Tension type headache
    - Duration –infrequent (<12d/yr) or frequent (>12 and < 180 days/yr) or chronic (≥ 15d/mos for >3mos)
    - Frequency – episodic (1-14 days) or chronic (≥15 days > 3 months)
    - Response to therapy – not intractable (trialed ≤3 meds) or intractable (failed > 3meds)
  - Migraine
    - Frequency – episodic (no code) or chronic (≥15 days > 3 months)
    - Response to therapy – not intractable (trialed ≤3 meds) or intractable (failed > 3meds)
    - Associated neuro symptoms – with aura or without aura
    - Status migrainousus – with or without status migrainosus

Acute **tension-type** headache (G44.209)

TTH (**tension-type** headache) (G44.209)

Chronic **tension type** headache (G44.229)

Chronic **tension-type** headache (G44.229)

Episodic **tension type** headache (G44.219)

Episodic **tension-type** headache (G44.219)

Intractable **tension-type** headache (G44.201)

Chronic **tension-type** headache, intractable (G44.221)

Episodic **tension-type** headache, intractable (G44.211)

Chronic **tension-type** headache, not intractable (G44.229)

Episodic **tension-type** headache, not intractable (G44.219)

Migraine without aura (G43.009)

Migraine without intractability (G43.009)

Migraine without aura, intractable (G43.019)

Migraine without status migrainosus (G43.909)

Migraine without aura, not refractory (G43.009)

Migraine with aura (G43.109)

Migraine with aura, intractable (G43.119)

Migraine with aura, not intractable (G43.109)

Migraine with aura with status migrainosus (G43.101)

Migraine with aura and **with** status migrainosus (G43.101)

Migraine with aura and **with**out status migrainosus (G43.109)

Migraine with aura, intractable, **with** status migrainosus (G43.111)

Migraine with aura, intractable, **with**out status migrainosus (G43.119)

So Who Needs Imaging?

"It's Not a Tumor" – Arnold Schwarzenegger

- Pediatric brain tumor incidence 3-5 per 100,000
    - Less than one brain tumor for every 50,000 patients with headache
- Tumor most likely to present with ataxia, double vision, weakness, visual field deficits
- Tumors only cause headache if obstruction or compression on meninges
- 20% of pediatric patients have incidental findings on MRI

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Does the Patient Require Neuroimaging to Rule Out Secondary Causes of Headache?

NEUROLOGY 2002;59:490–498

Table 5 Results of neuroimaging testing in children with headaches

HA type	n	Class	Age, y	M:F ratio	CT/MRI, n	Findings	Patients in whom neuroimaging affected management, n
Mixed	133	3	3–18	1.2:1	27/45	11 abnormal, 7 sinus disease, 4 cerebral abnormalities*	0/78
Mixed	315	3	3–20	1:1	69/315	53 abnormal, 13 had surgical lesions	17/315
Mixed	157	3	NA	NA	7/0	5 normal, 1 dilated L vent, 1 choroid plexus papilloma†	1/7
Mixed	429	2	5–18	0.85:1	0/96	79/96 normal, 17 abnormal‡	0/96
Mixed	104	3	0.2–6.9	1.1:1	23/7	25 normal, 5 abnormal§	0/30
Mixed	137	3	6–18	NA	59/20	3.7% of patients with migraine and 16.6% of chronic daily headache patients had abnormal scans	0/79

- **605 total children had neuroimaging for headache**
- **14 (2.3%) had relevant space occupying lesions**
- **All 14 had abnormal neurologic exams**

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Recommendations for MRI in Headache

• Patients with recurrent headache and a normal neurologic exam generally do not require additional testing

• Brain imaging studies must be completed for patients who have:
  - Headaches associated with abnormal neurologic exam findings, especially papilledema, nystagmus, gait or motor changes

• Brain imaging studies may be considered for patients who have:
  - Absent family history of headache
  - Headaches associated with substantial confusion or emesis
  - Headaches that awaken a child from sleep repeatedly
  - A family history or disorders that predispose child to central nervous system lesions such as brain tumors or cerebral aneurysms

• Specific testing for children with other systemic complaints including arthralgias, rash, sleep complaints

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What Basic Treatment Should be Recommended for all Primary Headaches?




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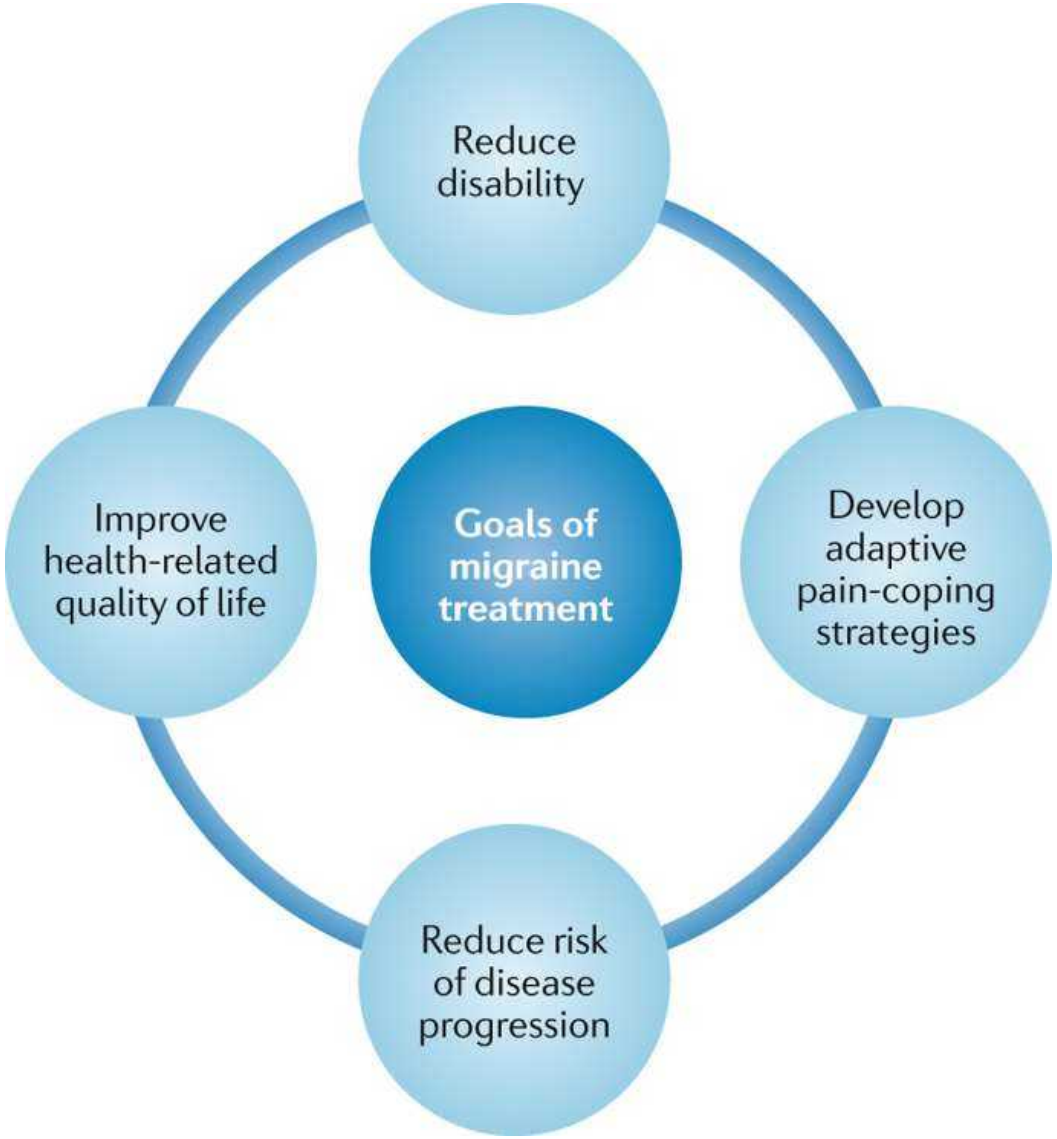
Headache Treatment Approach



Nature Reviews Neurology: 14:515–527 (2018)

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Shared Headache Treatment Plan Built into EMR

Children's National | Pediatric Specialists of Virginia | Children's National INOVA

My Headache Treatment Plan

Diagnoses: Migraine with aura Migraine without aura Chronic Migraine Status Migrainosus
Basilar-Type Migraine New Daily Persistent Headache Medication Overuse Headache
POTS/Orthostatic Intolerance Amplified Pain Syndrome Post Concussive Headache
Tension Type Headache Cluster Headache Trigeminal Neuralgia

Preventative Treatment – Do these every day to prevent headaches

- ❑ Fluids -_____ ounces per day, none with caffeine or artificial sweeteners
- ❑ Exercise - 5 times a week for 30 minutes of aerobic activity (running, biking, swimming)
- ❑ Sleep - _____ hours each night, with no more than 2hrs change (do not stay up or sleep in)
- ❑ Diet - 3 healthy meals a day plus snacks if needed
- ❑ Screens – Take rest breaks with prolonged use (i.e. 30 min on, 10 min break)
- ❑ Participate - Do not avoid activities because of headache
- ❑ Distract yourself - When you have pain do something you enjoy
- ❑ Desensitize - Work through pain to teach your brain to ignore amplified pain signals
- ❑ Don't ask or talk about pain - Avoid focusing on pain and do not "check-ins" about pain

- ❑ **Take the following medication every day to prevent headache:**
  - ❑ _____ _____ mg AM ____ mg PM
  - ❑ _____ _____ mg
  - ❑ Riboflavin 200mg once daily for four consecutive months

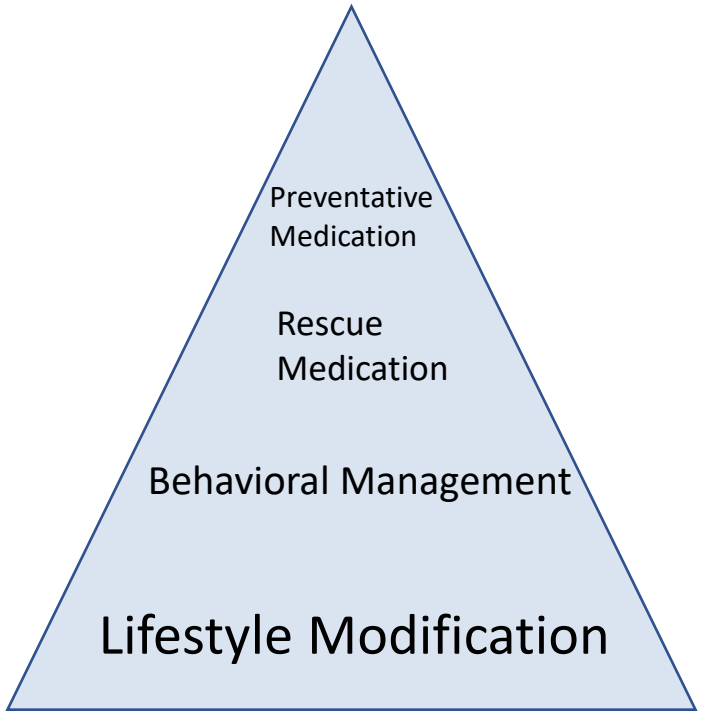
Week	# Pills AM	# Pills PM
1		
2		
3		
4		

Acute Treatment – Do this immediately at the first sign of headache (<1 hour from onset)

- ❑ Fluids (sports drink) _____ oz. Drink quickly every time you get a headache. Avoid G2/Propel.
- ❑ _____ _____ mg at headache onset. Do not take more than ___ days/week.
- ❑ _____ _____ mg
- ❑ If your child has a headache longer than 3 days and the above treatment failed, go to the nearest Emergency Department for the migraine protocol on the back of this sheet.

Diagnostic Testing - Email your provider once completed to notify them the test was done for results.

- ❑ Neuroimaging MRI Brain MRV Brain MRA Brain
- ❑ Other Testing _____



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Ped Migraine Action Plan in EMR for School Plan and Accommodations

Headache: The Journal of Head and Face Pain doi: 10.1111/head.13681

Headache Toolbox

Pediatric Migraine Action Plan (PedMAP)

Pediatric Migraine Action Plan (PedMAP) Date: _____

Name _____ Date of Birth _____

Treating Provider: _____ Phone: _____

Emergency Contact: _____ Phone: _____

Headache Information

My diagnosis is: _____ Describe aura (if any): _____

Place Logo here

Green Zone – Prevent more headaches

Do or take this every day to help prevent YOUR headaches:

- Get enough sleep; keep a regular schedule
- Eat healthy foods; don't skip meals
- Drink enough water; avoid caffeine
- Get regular exercise; manage your weight
- Learn ways to relax; manage your stress

Directions to provider: Set 1-2 healthy lifestyle goals. Consider a daily medicine or vitamin/supplement if >1 headache per week. Consider Cognitive Behavior Therapy (CBT) if PedMIDAS > 10. To download PedMIDAS, visit https://www.cincinnatichildrens.org/service/h/headache-center/pedmidas

It may take 4-6 weeks to see a big change, so stick with it!
Visit www.headachereliefguide.com to manage your headaches

Yellow Zone – Don't wait. Act fast to treat your headaches

☐ Go to school nurse or health office right away. Take your **quick-relief** medicine as soon as your headache starts:

Take _____ Dose _____
Route _____ May repeat after ____ hours.

Take _____ Dose _____
Route _____ May repeat after ____ hours.

Let your provider know if you need to take your quick relief medicines 3 or more days a week or if this plan isn't working.

- Drink some water or sports drink if you can
- Rest in a dark, quiet place for 30 minutes and practice your relaxation exercises (e.g., deep breathing, guided imagery), if you can
- You may need a different PE activity, dark glasses, or a quiet place to work for a while

Directions to provider: Goal is pain-free within 1-2 hours for intermittent headaches and back to baseline for constant headaches. Consider NSAID +/- antiemetic, a triptan or a combination of medications.

☐

Directions to provider: Optional section for other scenarios, step 2 or a "backup" plan. Home "backup" plan: Consider dopamine blocker +/- diphenhydramine +/- NSAID.

Red Zone – Time to get more help

Contact your **provider's office** if:
- Your headache is much worse, lasting much longer than usual

Go to the **Emergency Room** if:
- You have new and very different symptoms like loss of vision, unable to move one side of your face or body, trouble walking or talking, very confused or unable to respond

- Call 9-1-1 if child loses consciousness or has stroke-like symptoms

Directions to provider: Avoid giving aspirin to children < 18 years old. Avoid giving opioids or butalbital for pain.

I authorize the quick-relief medication(s) listed in the Yellow Zone:

Provider's Signature _____ Date _____
Parent/Guardian's Signature _____ Date _____

☐ *to be administered by school personnel*
☐ *to be self-administered by student*
☐ *to be administered only by parent*

Pediatric Migraine Action Plan (PedMAP): Headache Toolbox

Tools for life	
Children and adolescents with headaches need to learn how to manage life with headaches at home, at school and with friends.	
Cognitive Behavior Therapy (CBT)	CBT teaches you new ways of thinking about pain and new ways of responding to it by setting goals, pacing activity, and using your brain to turn down your body's pain response. Visit http://www.findcbt.org/FAT/ to learn more about CBT and find a therapist.
Biofeedback	A machine uses sensors to measure your stress level and a computer screen shows you how your stress level changes as you practice different stress-reducing exercises. Visit https://www.bcia.org to learn more about biofeedback and find a therapist.
Tools for home	
Your brain works best when it knows what to expect. Keeping your brain in balance can prevent more migraines. Visit https://www.healthychildren.org for advice on healthy living and www.headachereliefguide.com to make a plan.	
Hydration	Drink enough water to make your urine pale. Drink more water when it's hot outside and before, during and after you exercise. Avoid drinks with caffeine and added sugar.
Food	Don't skip meals. Choose fresh fruits, vegetables, whole grains, and lean protein when you can. Avoid foods high in salt, sugar or corn syrup, or with many chemicals listed on the label.
Sleep	Teens need 8-10 hours and pre-teens need 9-12 hours of sleep each night. Keep a regular schedule. No electronics 30 minutes before bedtime. Report snoring or breathing difficulty.
Exercise	Try to exercise every day. To lose weight, you need 20-30 minutes of activity strong enough to make you sweat. Be sure to warm up first and don't exercise past the point of pain.
Emotions	Stress is part of life and learning to deal with it is important for growth. Learn and practice positive coping strategies. Avoid over-scheduling and allow some downtime to de-stress.
Tools for school	
Students with headaches can struggle to focus and may take longer to finish their schoolwork. This added stress can lead to more headaches and even more frequent absences. Ask school officials to create an **Individualized Health Plan** or **504 Plan** using some of these strategies to combat the specific migraine symptoms that are preventing a student from functioning properly at school.	
Trigger Management:	• Allow student to keep a water bottle at his/her desk • Allow student to use restroom when needed • May need to eat a mid-morning and/or mid-afternoon snack • May need access to a quiet place to eat lunch with a companion • May need an anti-glare screen filter or paper copies of assignments • May need to use a rolling backpack or obtain a second/digital copy of books for home • Other: _____
Symptom Management:	• Allow student to go to nurse/health office as soon as his/her headache or aura starts • Allow student to rest for 30 minutes before returning to class • Allow light-sensitive student to wear dark glasses for a few hours when pain is severe • Allow noise-sensitive student to work in a quiet place (i.e., library) for a few hours when pain is severe • Allow a PE alternative (e.g., walking, stretching, yoga) when pain is severe • Other: _____
Workload Management:	• May need extended time to take tests or complete work when headache is severe • May need a copy of class notes/homework packet when absent or unable to concentrate • May need extra time to make up exams or assignments missed due to severe headache • Consult school psychologist to evaluate for suspected learning problems • Consider modifying assignments (fewer problems, test of mastery) or class schedule (half days, rest breaks, fewer classes) if returning to school after an extended absence • Other: _____

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Lifestyle and Behavioral Recommendations

- Lifestyle Modification (CHAMP)
  - Hydration
    - Typically 60-100 oz fluids per day
    - Avoid caffeine and artificial sweeteners
  - Exercise
    - Goal of 5-7 days per week of 30-60 mins aerobic activity
  - Sleep Hygiene
      - 8-12 hours per night based on AAP guidelines
      - Maintain consistent sleep/wake schedule (vary no more than 2 hours)
      - Avoid naps
  - Diet
    - Balanced diet with at least 3 healthy meals
    - No fasting more than 3-4 hours while awake, including breakfast

- Behavioral Strategies
  - Participate
    - 504 plan, Not Homebound
    - Accommodations: take short breaks, access to water/snacks, etc.
    - Pain is NOT a reason to miss school
  - Distract
  - Desensitize
  - Don't ask or talk about pain
    - Diaries may improve accuracy however may amplify frequency
    - Focus on disability and QOLD not intensity and frequency

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Rescue Medications in Pediatric Headache – NSAID/Analgesics

NEUROLOGY 1997;48:103-107

- Ibuprofen 10mg/kg
  - No established superiority to doses over 400mg
- Early use considered more effective
- Do not use more than 3 days per week to avoid medication overuse
- Superior to acetaminophen two-fold after two hours

- Tylenol 15mg/kg
- Do not use more than 3 days per week to avoid medication overuse
- Superior to ibuprofen at one hour but then reduced efficacy thereafter

- Naproxen 15mg/kg
- Do not use more than 3 days per week to avoid medication overuse
- Evidence lacking as monotherapy, combination with sumatriptan likely effective

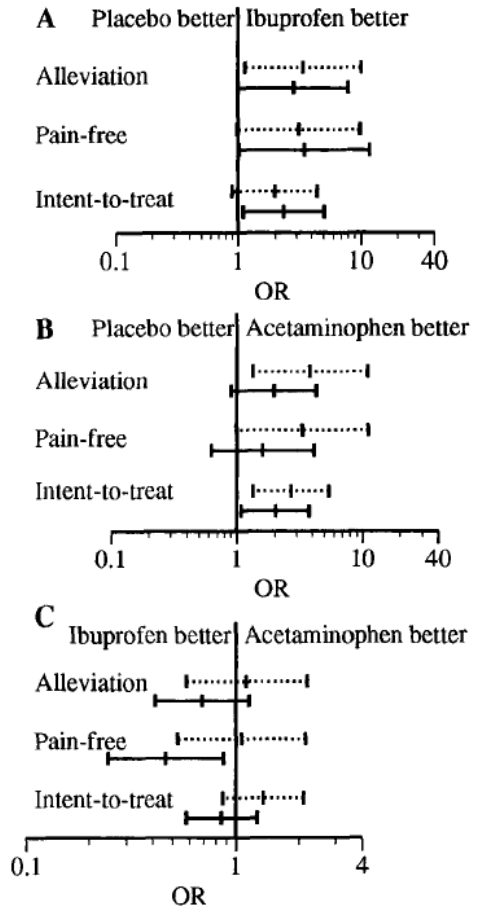

Figure. Odds ratios (OR) and their 95% confidence intervals for differences between (A) ibuprofen and placebo, (B) acetaminophen and placebo, (C) acetaminophen and ibuprofen, after 1 hour (dashed line) and after 2 hours (solid line).

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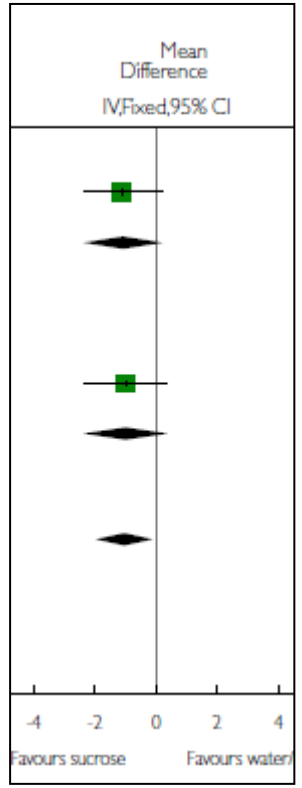
Why Sports Drinks - Sucrose for Pain Reduction and Analgesia

Cochrane Database of Systematic Reviews 2016, Issue 7. Art. No.: CD001069.

Sucrose (24% to 33%) (sucrose or sucrose + NNS) compared with water (or water + NNS) for pain/distress associated with retinopathy of prematurity (ROP) examination

Patient or population: neonates
Settings: hospital
Intervention: sucrose (24% to 33%) (sucrose or sucrose + NNS)
Comparison: water (or water + NNS)

Outcomes	Illustrative comparative risks* (95% CI)		No of participants (studies)	Quality of the evidence (GRADE)	Comments
	Assumed risk	Corresponding risk			
	Water (or water + NNS)	Sucrose (24% to 33%) (or sucrose + NNS)			
PIPP score during eye examination Range of scale 0-21 for infants < 28 weeks PMA and 0-18 for infants > 36 weeks PMA A lower score = less pain (Stevens 1996; Stevens 2014a)	The mean PIPP score ranged across control groups from 11.4 to 16.4	The WM PIPP score in the intervention groups was lower than in the control group: -2.15 (95% CI -2.86 to -1.43)	134 (3)	⊕⊕⊕○ **moderate**	Bias: there were some concerns about risk of bias in these studies for random sequence generation and allocation concealment Consistency: the findings were consistent with each other; I^2 = 46% (low heterogeneity) Precision: this was a moderately sized meta-analysis and the CI was narrow around the typical point estimate Directness: the studies were conducted in the target population - no concerns about indirectness



- 74 studies of 7049 infants with mean reduction in pain scores of -2, mean duration of crying, and reduction of post procedure tachycardia
- Procedures included ROP, heel stick, venipuncture, bladder catheterization

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Rescue Medications in Pediatric Headache - Triptans

Triptan	Form & Starting dose (<40kg, >40kg)	Onset of action	Duration (half-life)	Pediatric Use/Evidence
Sumatriptan (Imitrex)	Subcutaneous (0.1mg/kg, 6mg) Oral (0.1mg/kg, 50mg) Intranasal (0.1mg/kg, 20mg)	10-60min 1-2hr 60min	2hr	• Not FDA labeled for peds • Studied down to age 6yrs • No efficacy in PO • Efficacy in nasal
Zolmitriptan (Zomig)	Oral (2.5mg, 2.5mg) Oral disintegrating (same) Intranasal (5mg)	Within 1hr	2.5-3hr	• Nasal spray FDA approved 12-17yo. • Tablet is studied in 12-17yo • Efficacy in nasal
Almotriptan (Axert)	Oral (12.5mg, 12.5mg) Subcutaneous	1-2hr 1-2hr	3-4hr	• FDA approved 12-17yo • Efficacy established
Naratriptan (Amerge)	Oral (1mg, 2.5mg)	1hr	5-6hr	• Not FDA labeled for peds
Eletriptan (Relpax)	Oral (20mg, 40mg)	Within 1hr	4-5hr	• Limited data showing efficacy at 40mg in adolescents
Rizatriptan (Maxalt)	Oral (5mg, 10mg)	30min	2-3hr	• FDA approved 6-17yo • Efficacy established
Frovatriptan (Frova)	Oral (2.5mg, 2.5mg)	2hr	25hr	• No data

****KEY MED: RIZATRIPTAN 5-10mg safe to 6yo and covered by most insurances**

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Trial of Amitriptyline, Topiramate, and Placebo for Pediatric Migraine – CHAMP

N Engl J Med 2017; 376:115-124

- No patients had improvement in migraine during initial month
- 61-68% of patients had a 50% reduction in headache frequency after one month enrollment and one month on placebo
  - All were performing lifestyle modification
- Psychologic expectation that you will improve on a headache medication more important than its biologic effect
  - Riboflavin 100mg BID for at least 4 months
    - J Headache Pain. 2009;10(5):361–5. Epub 2009 Aug 1
  - Coenzyme Q10 100mg BID for at least 4 months
    - Cephalalgia. 2011 Jun;31(8):897-905
- If lifestyle and nutraceuticals fail after 4 months then consider a prescription preventative
  - Amitriptyline 1mg/kg for at least 4 wks on goal
    - N Engl J Med 2017; 376:115-124
  - Topiramate at 2mg/kg for at least 4-8 wks on goal
    - N Engl J Med 2017; 376:115-124

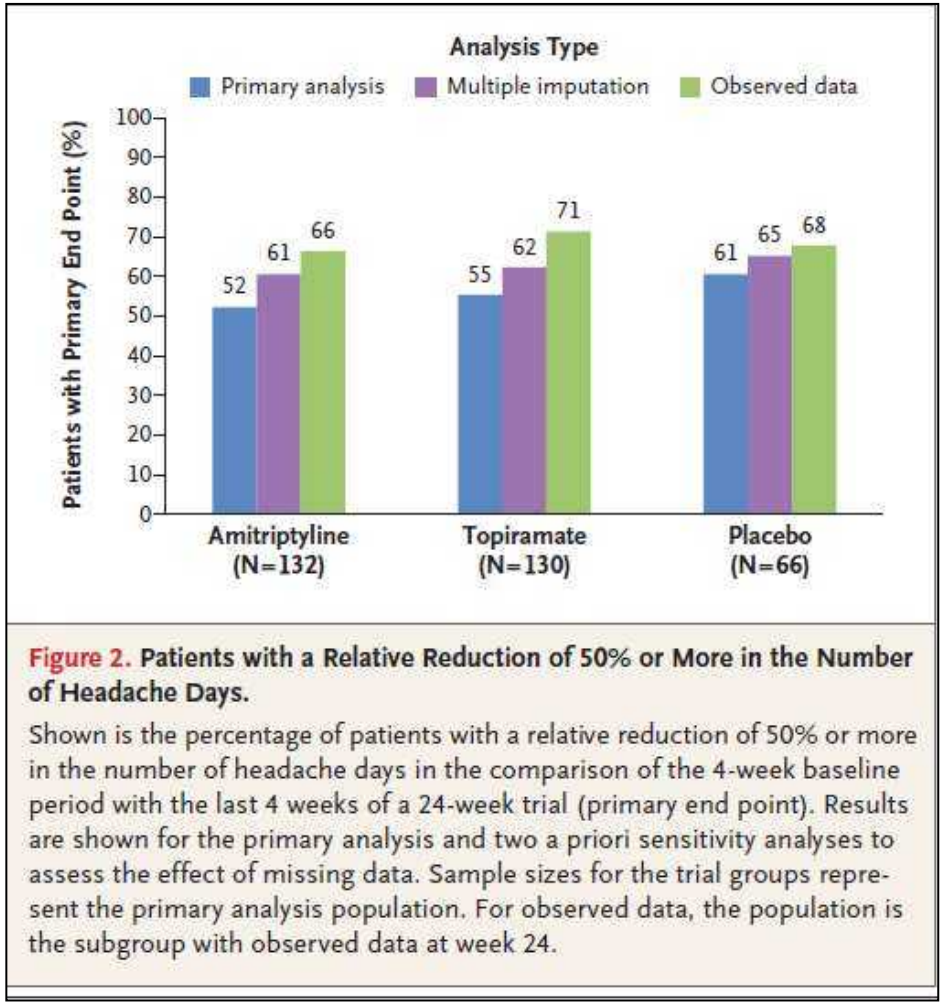

Figure 2. Patients with a Relative Reduction of 50% or More in the Number of Headache Days.

Shown is the percentage of patients with a relative reduction of 50% or more in the number of headache days in the comparison of the 4-week baseline period with the last 4 weeks of a 24-week trial (primary end point). Results are shown for the primary analysis and two a priori sensitivity analyses to assess the effect of missing data. Sample sizes for the trial groups represent the primary analysis population. For observed data, the population is the subgroup with observed data at week 24.

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Preventative Medications in Pediatric Headache

Medication Name	Most Used Form	Titration	Goal dose (mg/kg)	Potential side effects
Amitriptyline	10mg, 25mg tabs	5-12.5mg starting dose Titrate by 5-12.5mg increments to 1mg/kg	1mg/kd	Lethargy, prolonged QTc, serotonin syndrome, mood changes, dry mouth
Topiramate	25mg tabs, 25mg sprinkle caps	12.5-25mg starting dose. Titrate by 12.5mg-25mg increments to 100mg or 2mg/kg.	100mg 2mg/kg (CHAMP)	Cognitive slowing (8%), tingling, reduced OCP effectiveness, weight loss, kidney stones, reduce sweating
Valproic acid	250/5ml liquid (TID), 125mg spinkle tabs, 250 and 500mg ER tabs	10mg/kg starting dose. Titrate by 10mg/kg to 20mg/kg.	10-20mg/kg	Weight gain, PCOS, teratogen, leukopenia, reduced ANC, reduced platelets, bruising
Coenzyme Q10	100mg, 200mg, 400mg tabs	100-400mg Qday to BID	100mg BID best studied	None but may have adverse effects from impurities especially in gummies
Riboflavin	100mg, 200mg	200-400mg	200mg Qday if under 18yo. 400mg Qday if over 18yo.	Orange urine, sulfur smell

Children's National

AAN Practice Guidelines: Pharmacologic Treatment for Pediatric Migraine Prevention

Neurology 2019

- Counseling
  - Lifestyle and behavioral factor education
    - Obesity, caffeine, tobacco and alcohol use, lack of exercise, poor sleep
- Starting Preventative Treatment
  - Headache more than 4-6 days per month, hx of MOH, or PedMIDAS > 30 should prompt discussion about daily medications to prevent migraine
  - Placebo is as effective as medication in most trials
  - Amitriptyline (with CBT), topiramate, and propranolol may be effective and side effects should be understood
  - If child-bearing potential, topiramate and valproic acid are teratogenic and may alter hormonal contraception effects, may benefit from folic acid supplementation
- Monitoring and Stopping Medication
  - Regular visits to monitor effectiveness and side effects are recommended
  - Counsel on risks and benefits of stopping preventative medications once adequate control is achieved
- Mental Illness
  - Anxiety and mood disorders do not increase the risk of developing migraine however those with comorbid emotional disorders have an increased risk of headache persistence

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Practical Steps to Managing a Headache Disorder

Scientific American 2017 – DiSabella, Langdon

1. Ask targeted headache questions to determine the diagnosis
2. Perform a thorough neurologic exam including funduscopic exam, extraocular movements, pupillary exam, visual fields, facial sensation, muscle strength and tone, reflexes, finger nose finger testing, and gait to determine if MRI is indicated
3. Instruct patient on lifestyle modification goals including hydration, exercise, sleep, diet AND provide a nutraceutical (riboflavin, coenzyme Q10) at a minimum
4. Provide a rescue plan for headache including sports drinks and abortive medication, typically ibuprofen 10mg/kg, while instructing on how to avoid medication overuse
5. Provide a triptan rescue including nasal sumatriptan or zolmitriptan, or oral zolmitriptan, rizatriptan, or almotriptan, while instructing on how to avoid medication overuse
6. Provide specific follow-up timing, typically 2-4 months, for plans to be effective
7. Provide school medication forms so rescue plan can be enacted at school
8. If not responding to lifestyle modification and a trial of at least 3 rescue and 3 prophylactic agents refer to a headache specialty program

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Conclusions

- Headache is common and disabling
- Establish the most accurate diagnosis including migraine, tension-type, and trigeminal autonomic cephalalgias
- Instruct all patients on healthy habits including hydration, exercise, sleep, and diet goals
- Provide every patient with a rescue plan
- Provide a preventative pill, starting with riboflavin or Coenzyme Q10, then proceed to amitriptyline or topiramate if it fails

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Headache Co-Management: PCP Perspective

H. Holly Kim, MD
May 16, 2024

Goals

- Streamline and improve care of patients with headaches
  - Readily available headache guideline at PCP visit
  - Easily provide up to date treatment options and patient resources
  - When and how to refer to Neurology/ Children's National Headache Clinic

- Improve communication with specialists
  - Efficient communication
  - How do we refer urgently to the headache team?

"HPI" template/dot phrase as guideline

Headache history:
_year old _ presents for headache for approximately _ months.

Headaches are located in the _ head region. The headache is described as ranging between _ and _ in intensity on a scale of 10. Headache quality is described as _. Headache is _ associated with a need for decreased activity. Headache is _ associated with increased sensitivity to light and sound. Headache is _ associated with nausea, is _ associated with vomiting.

Headache frequency is _ times per _ on average in the past two months. Headaches typically last between _ and _ hours. The headache does _ have a clear temporal pattern.

Aura or secondary headache symptoms:
The headache is associated with:
visual changes - _
focal weakness - _
sensory changes - _
speech changes - _
tinnitus - _
vertigo - _

Red flag symptoms:
Headache is _ associated with unilateral symptoms of redness of the eye, tearing, runny nose, ptosis, or smaller pupil. Headache does _ wake the patient out of sleep repeatedly, is _ associated with substantial periods of confusion, is _ associated with excessive vomiting, and is _ associated with a change in balance. The headache is _ of progressive frequency.

Medications for headache:
Current headache abortive plan: _
Medication overuse: _
Prior abortive medications include: _

Current headache preventative plan: _
Prior preventative medications include: _

Current complementary therapies: _
Prior complementary therapies: _
_

Family History
There is _ a family history of headaches in the following relatives - _
There is _ history of brain tumor, inherited clotting disorders, or multiple cerebral brain aneurysms

Social History
The patient is in _ grade.
The patient lives with _.

MRI recommendation:
Assoociated with abnormal neurologic findings, esp papilledema, nystagmus, gait or motor changes
Consider in those with absent family history, associated with confusion or emesis, repeatedly awkens from sleep, FHx or disorder that predisposes child to CNS lesions like tumor or cerebral aneurysms

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“Plan” template/ dot phrase

Migraine in Children and Adolescents

o Migraine is one of the most common forms of headache seen in children and adolescents, affecting between 15-25% of children and adolescents.
3 out 4 patients with migraine have a family member that also has headache.

What to do every day to reduce my headaches

- Fluids - _ ounces per day, none with caffeine or artificial sweeteners
- Exercise - 5 times a week for 30 minutes of aerobic activity (running, biking, swimming)
- Sleep - 8-10 hrs each night, no more than a 2hr shift, avoid handheld screens within 1-2hrs of bed, no scheduled naps
- Diet - Eat or drink calories at least 3 times per day, including something within an hour of waking up, and no periods of daytime fasting longer than 4 hours.

- Participate - Do not avoid activities because of headache
- Distract yourself - When you have pain do something you enjoy
- Desensitize - Work through pain to teach your brain to ignore amplified pain signals
- Don’t ask or talk about pain - Avoid focusing on pain and do not "check-ins" about pain

Take the following medication every day to prevent headache:

- Coenzyme Q10 - 100mg twice daily for at least 4 months (amazon.com)
- Riboflavin 100mg bid for at least 4 months

If lifestyle and nutraceuticals fail after 4 mo, consider preventative meds

- Amitriptyline 1mg/kg for at least 4 wks
- Topiramate 2mg/kg for at least 4-8wks

What to do when a headache is just starting or increasing in intensity

- For all headaches drink a sports drink like gatorade or powerade. Drink 8-12oz quickly every time you get a headache.
  Do not buy sports drinks with artificial sweeteners and reduced calories like G2, Propel, or Zero.
- During the first hour of headache onset, or upon awakening with a headache - _ _mg. Do not take more than 10 days/month or 2 days/week.

- Ibuprofen 10mg/kg (max 400mg, superior to tylenol)
- Tylenol 15mg/kg

- Sumatriptan intranasal (0.1mg/kg, 20mg), not FDA labeled for peds
- Zolmitriptan oral (2.5mg tab and disintegrating)), intranasal (5mg), nasal is FDA approved 12-17yrs
- Rizatriptan oral (5mg. 10mg), FDA approved 6-17yrs

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When to Refer to a Pediatric Neurologist or Headache Program

- Intractable headache disorder – not responding to preventatives as expected
- Parent or patient interest in clinical trials or other modalities for treatment
- Complexity or Time Constraints
    - Need for additional time and counseling
    - Parent or patient reluctance to use medications
    - Inability to comply w recommendations
    - Co-morbid conditions (anxiety/depression, pregnancy, sickle cell, pain syndrome)

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Refer to Children's National Headache Team

202-476-HEAD or headache@childrensnational.org

Urgent Headache Team

- 6 Attending Physicians
- 50-100 Urgent Access Appointments Weekly
  - Annapolis, DC, Fairfax, Lanham, Friendship Heights, and Rockville

Comprehensive Headache Team

- Behavioral Pain Medicine
- Pain Medicine
- Physical Therapy
- Neurosurgery
- Clinical Coordinator
- Headache Nurse
- Research Assistant

Clinical Research

- Outpatient infusion outcomes
- Botox in headache outcomes
- Nerve block outcomes
- New daily persistent headache outcomes
- Melatonin for post-concussive syndrome

Clinical Trials Enrolling

- Erenumab for episodic and chronic migraine prevention 6-17yo
- Rimegepant for migraine rescue 6-17yo
- Eptinezumab for migraine prevention 12-17yo
- Lasmiditan for migraine rescue 6-17yo

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Thank You!

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