

An update on practice guidelines for primary care treatment of pediatric migraine

Abstract: Headaches are a frequent reason for children and adolescents to seek healthcare, and such visits include pediatric ED visits. Headache-related school absences can affect academic performance. Diagnosing and treating headaches in this population can be challenging for the primary care NP. This article reviews recent management and treatment guidelines.

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Headaches are a common complaint in older children and adolescents and frequently lead to visits to the primary care provider for further evaluation. Headaches constitute the third most common cause of pediatric ED visits.¹ Additionally, headaches are one of the main causes of school absences, affecting overall school performance. A variety of systemic illnesses can present with headache symptoms. Headaches can be a sign of increased intracranial pressure and can occur with trauma, concussion, and severe infections, such as meningitis.¹ Consequently, a detailed history and physical exam are essential to determine a management plan and identify potential life-threatening conditions requiring immediate medical intervention.

Though uncommon, a new-onset severe headache can indicate increased intracranial pressure along with other ominous symptoms, necessitating immediate neuroimaging and referral to a neurosurgeon.

Over the last 3 decades, there has been an increase in the incidence of childhood migraine and headache.¹ Chronic, nonprogressive headaches in children that are not associated with an acute self-limiting condition are considered migraines, and are one of the leading causes for referral to a pediatric neurology specialist. The overall prevalence of migraine in children is 9.1%, and prevalence increases with age.² Headache symptoms can begin as young as 5 years of age. Approximately 10% of children between the ages 5 and 15 and up to 28% of

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adolescents experience migraines.³ A thorough history and focused neurologic exam can help differentiate between primary headache disorders, such as migraines and tension headaches, and secondary headache disorders, such as brain tumors and hypertension.

Recently, the American Academy of Neurology (AAN) and American Headache Society updated their practice guideline for the acute treatment of migraine in children and adolescents.⁴ The updated guideline has been endorsed by the American Academy of Pediatrics.⁵ The practice guidelines for the acute treatment of migraine with updated recommendations are highlighted in this article.

■ Pathophysiology

Migraine is a complex neurovascular disorder involving the brain, blood vessels, and serotonin. The brainstem, which may be the starting point, inputs to the trigeminal nucleus, which innervates intracranial blood vessels and receives nerve signals.⁶ Pain fibers are located in the trigeminal nerve within the brain.⁶ Activation of the trigeminal nerve triggers release of neurotransmitters such as neuropeptides (calcitonin gene-related peptide).⁶ Serotonin may also play a role in migraine pathophysiology—low levels may inflame cerebral vasculature, which irritates the nerves causing pain.⁷ Susceptibility to migraine is highly hereditary; most pediatric patients present with a family history of migraine. Numerous environmental and internal factors can trigger migraines, which can vary with age. Common triggers in children and adolescents include poor sleep hygiene, hormonal changes, menstruation, oral contraceptives, skipping meals, changes in eating patterns, caffeine intake, substance use/misuse, alcohol consumption, weather changes, travel, motion sickness, food additives, changes in routine, bullying, family issues, school issues, stress, anxiety, lack of exercise, overexertion, and medications such as those used for treatment of attention-deficit disorder and asthma.⁶

■ Clinical presentation

The main characteristic of migraine in children is pulsating or pounding unilateral or bilateral pain of moderate or severe intensity affecting the front or sides of the head. Children may describe the headache as feeling like their heart beating in their head or like a hammer.² Episodes can last for 2 to 72 hours and often improve with sleep. Nausea and/or vomiting, dizziness, photophobia, phonophobia, anorexia, and

blurred vision often occur with migraine headaches.² The migraine pain can be severe enough to prevent the child from going to school or participating in physical activity.

Migraines can occur with or without aura. Approximately one-third of older children and adolescents with migraines have a preceding aura occurring 5 to 60 minutes prior to the headache.⁴ Migraine auras are typically visual and may include flashes of light, dark spots, diplopia, or other visual patterns. Other aura signs and symptoms associated with migraines include numbness, weakness, confusion, paresthesias, dysarthria, vertigo, tinnitus, and ataxia.^{2,4}

Chronic nasal congestion can present along with migraine symptoms especially involving facial and frontal lobe discomfort. Seasonal allergies and post-nasal drip are associated with sinus infections; however, in many cases, the sinus infection can trigger migraine headaches.⁶ In the case of sinus infection and migraine occurring concurrently, management would involve the treatment of both conditions. Other types of headaches should be considered, such as recurring headaches that are not migraines in children with asthma and tension headaches in adolescents caused by lifestyle issues such as inadequate sleep, poor nutrition, and lack of exercise, depending on the age of the patient, history, and physical exam.

■ Evaluation History

A comprehensive history should be obtained from parents or guardians, caregivers, and patients regarding onset, duration, quality, intensity, frequency, and location of headache symptoms including any associated signs or symptoms occurring before, during, or after initial onset of headache as well as alleviating and aggravating factors. If possible, the child should be asked to describe a typical headache episode. When obtaining the history, the clinician should remain aware of red flags such as early-morning headache with vomiting, worsening headache symptoms, worsening of headache when supine, pain with Valsalva maneuver, rapid onset, or mental status changes that would warrant immediate medical attention.² It is important to ascertain where and when the headaches occur in order to determine possible triggers. In addition, other factors such as nutrition, sleep patterns, school performance, missed school days, major life changes, family history, history of anxiety

or depression, family stress, friendships/bullying, medications, and complementary and integrative medicine usage need to be determined. The circumstances surrounding the onset of migraine will help to identify triggers, and the degree to which the episodes affect the child's quality of life will guide the management plan.⁶

Physical exam

Height, weight, and vital signs including temperature, heart rate, respiratory rate, and BP should be measured. Although primary hypertension is an uncommon cause of headaches in children, an accurate BP is a key measurement needed to determine the cause of headaches in children and adolescents and should not be overlooked. Any growth abnormalities, neurocutaneous findings, or signs of trauma should be considered significant and in need of further evaluation.⁶ A complete physical exam should be performed with a focused detailed neurologic exam including motor strength, symmetry, balance, and coordination.² A comprehensive neurologic exam is critical to determining if findings are suggestive of an emergent issue such as a brain tumor that would require immediate medical intervention. A funduscopic exam should be performed to assess for papilledema associated with increased intracranial pressure. Pupillary response to light and extraocular motility should be included as part of the neurologic exam.² Certainly, if focal deficits, papilledema, early morning headaches with vomiting, or any other red flags are noted, the patient must be advised to obtain immediate medical attention for further evaluation, which should include neuroimaging and a thorough physical exam by a neurologist or neurosurgeon.

Labs and imaging

Headaches in children are not uncommon. It is incumbent on the NP to determine if neuroimaging is indicated. A 2018 study reinforced prior thinking that imaging should be performed only in children with abnormal findings on physical exam.⁸ Neuroimaging is commonly ordered, and the authors of the 2018 study found that 88.9% of MRI and 75.7% of CT scans performed on children with headaches were normal. Two issues with this are 1) there is always a chance that a brain lesion may be found even in the setting

of a normal physical exam, and 2) incidental findings may be noted, obligating the NP to discuss these findings with the patient and family and develop a plan. The American College of Radiology Appropriateness Criteria are evidence-based guidelines for specific conditions, including headaches in children. An extensive analysis of current medical literature from peer-reviewed journals ultimately concluded that initial imaging is usually not appropriate for evaluation of primary headaches in children. If there is any question or if the physical exam is equivocal, expert opinion or consultation may supplement the available evidence to recommend imaging or treatment.⁹ Finally, MRI is preferred over CT imaging (when

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neuroimaging is indicated) due to exposure to ionizing radiation from the latter. Children are at greater risk of cancer development after repeated exposure to radiation and CTs should be avoided unless alternatives are unavailable.

Management and summary of practice recommendations

As recommended by the clinical practice guideline, treatment of migraine in children and adolescents focuses on eight specific recommendations that will be discussed here (see *Summary of guideline recommendations for acute treatment of pediatric migraine*).⁴ Additionally, a second companion update summary offers updated evidence-based recommendations for migraine management, including prevention with pharmacologic treatment and, in some cases, cognitive behavioral therapy in the pediatric and adolescent populations.¹⁰ It must be emphasized repeatedly that preventive medications for pediatric migraine generally do not demonstrate superiority to placebos, with a few specific exceptions. Acute and chronic headache treatments must be chosen and implemented based on an individual's headache pattern, frequency, severity, and disability, in addition to their expectations and treatment goals. Ultimately, the goal of any recommendations for migraine management is reduction in pain and symptoms, and freedom from headaches.

Summary of guideline recommendations for acute treatment of pediatric migraine⁴

Recommendation 1	Determine specific headache diagnosis. Criteria for pediatric migraine includes: <ul style="list-style-type: none"> • At least five headaches over the past year that last 2 to 72 hours when untreated (which can include time asleep). • With two of four additional features that may include pulsating quality, unilateral, worsening with activity or limiting activity, and moderate to severe intensity. • Associated with nausea, vomiting, photophobia, and/or phonophobia, and aura may or may not precede headache.
Recommendation 2	Achieve fast and thorough pain relief with a minimum of adverse reactions. <ul style="list-style-type: none"> • Acute migraine treatment with nonprescription/OTC analgesics (acetaminophen, naproxen, ibuprofen) in children and adolescents can be beneficial. • Avoid analgesic overuse, defined as acetaminophen or ibuprofen use on more than 14 days in a month.
Recommendation 3	<ul style="list-style-type: none"> • Individuals may respond differently to the same medication. • The best medication for an individual is the one that provides the best pain relief with the fewest adverse reactions, paired with patient preference.
Recommendation 4	<ul style="list-style-type: none"> • Pair a triptan with a NSAID (ibuprofen or naproxen) if the triptan alone does not give sufficient headache relief.
Recommendation 5	<ul style="list-style-type: none"> • Antiemetics should be offered to those patients whose migraines are accompanied by nausea or vomiting.
Recommendation 6	<ul style="list-style-type: none"> • Reinforces the role of the NP as educator to patients and families in aspects of self-care and lifestyle modification to remove or reduce triggers and aggravating factors.
Recommendation 7	<ul style="list-style-type: none"> • Do not prescribe triptans to those with a history of ischemic vascular disease or accessory conduction pathway disorders due to the pharmacology of triptans and their effect on vascular muscle.
Recommendation 8	<ul style="list-style-type: none"> • A triptan (or any medication) will likely be more effective if taken at headache onset.

List is not inclusive of all considerations. Please refer to guideline for complete details.⁴

■ Acute migraine and symptom management

Via a rigorous analytic process, authors of the practice guideline included randomized controlled trials (RCTs) on the acute pharmacologic treatment of migraine in children younger than 12 years old and adolescents 12-17 years old.^{4,5,10} Outcome measures were reduction of headache pain and associated symptoms at time points 30 minutes to 2 hours after pharmacologic intervention. The Grading of Recommendations Assessment, Development and Evaluation (GRADE) process was used to develop conclusions, and confidence in the evidence was indicated and could be up- or down-graded based on other domains studied.¹¹ The guideline sought to answer the following clinical question: *In children and adolescents with migraine, do acute self-administered treatments, compared with placebo, reduce headache pain and associated symptoms (nausea, vomiting, photophobia, and phonophobia) and maintain headache freedom?* Eight recommendations and rationales from the practice guidelines are described here.

Recommendation 1 underscores the importance of determining a specific headache diagnosis. Diagnostic criteria for pediatric migraine include at least five headaches over the past year that last 2 to 72 hours when untreated (which can include time asleep), with two of four additional features that may include pulsating quality, unilateral, worsening with activity or limiting activity, and moderate to severe intensity. These are also associated with nausea, vomiting, photophobia, or phonophobia, and may also include headaches with or without aura.^{4,12,13} Additionally, diagnostic specificity should include the specific headache type (primary, secondary, or other), and assess prodrome, aura, all aspects of headache character, and pain-related disability so that the patient and family can be advised appropriately.

Recommendation 2 proposes that the aim of migraine treatment is to achieve fast and thorough pain relief with a minimum of adverse reactions. Vomiting, nausea, and other associated symptoms should also be addressed and treated with appropriate medications

or other interventions. As with adults, treatment of headache/migraine symptoms within 1 hour after onset improves pain-free rates. Acute migraine treatment with nonprescription/over-the-counter (OTC) analgesics (acetaminophen, naproxen, ibuprofen) in children and adolescents can be beneficial when used early in the migraine when pain is mild, and as long as patients and families are educated to avoid analgesic overuse. Certain triptans may be used in children 6 years of age and above; however, OTC analgesics should be tried first.

Recommendation 3 reiterates that people respond differently to the same medication. In many cases, migraine management is via a “trial and error” method, determining which treatment choice and delivery route works best for a particular individual’s symptoms and lifestyle. For example, if a child or adolescent experiences nausea and/or vomiting as an initial symptom, a nonoral treatment may be recommended. A series of medications may need to be tried, one triptan may be more effective than another triptan, nonoral routes may be advantageous for certain patients, and a second dose of medication for a headache that reoccurs within 24 hours may be indicated. Finally, the best medication for an individual is the one that provides the best pain relief with the fewest adverse reactions, paired with patient preference.

Recommendation 4 clearly offers the alternative of pairing a triptan with a nonsteroidal anti-inflammatory drug (NSAID—ibuprofen or naproxen) if the triptan alone does not give sufficient headache relief. Because of the different mechanisms of action in triptans and NSAIDs, improved pain response and pain-free status may result. This method is inexpensive, and the combination has been shown to be more effective than monotherapy in adults.

Recommendation 5 simply states that antiemetics should be offered to those patients whose migraines are accompanied by other symptoms such as nausea, vomiting, phonophobia, and photophobia. Medications such as triptans and NSAIDs may be effective in treating migraine pain but have no demonstrated efficacy against nausea and vomiting. Photo- and phonophobia are responsive to some triptans.

Recommendation 6 is perhaps the key recommendation in that it reinforces the role of the NP as educator to patients and families in aspects of self-care and lifestyle modification to remove or reduce triggers and aggravating factors. A headache diary, monitoring

medication type and frequency, and individualized counseling on lifestyle issues affecting migraines are important components of care.

Recommendation 7 informs the NP not to prescribe triptans to those with a history of ischemic vascular disease or accessory conduction pathway disorders due to the pharmacology of triptans and their effect on vascular muscle. If questions arise regarding prescribing triptans to a patient with cardiovascular or other types of vascular disease, the NP should consult with a cardiologist.

Recommendation 8 advises that adolescent patients and families should receive counseling that taking a triptan will likely be more effective if taken at headache onset rather than during a headache aura. In adults, a concern exists that the use of triptans during early phase migraine may interfere with differentiating early stroke symptoms. Taking triptans during the aura phase may be contraindicated in children with complex aura presentations, and the use of triptans at all may be contraindicated for those with a history of hemiplegic or brainstem auras.

It cannot be overemphasized that lifestyle modifications, often termed “headache hygiene,” and some acute pharmacology treatments are the keys to effective and sustainable migraine management (see *Treatment methods*). Simply put, headache hygiene refers to basic elements of self-care including food and nutrient intake, hydration, elimination of caffeine, stress management, and sleep. In many cases, improving these elements decreases headache frequency and severity with minimal additional intervention. Moreover, a higher placebo response in children and adolescents may be noted along with lower therapeutic gain in some clinical trials. Finally, most, if not all, migraine treatment trials in children follow those that have proven efficacy in adults, which may also exacerbate the placebo effect. Further investigation of alternate delivery routes for acute treatments in children such as transdermal patches is warranted for several reasons, primarily because absorption of oral medications can be poor in children and adolescents with nausea and vomiting. Treatment plans must be individually tailored to the child or adolescent and family, and include education about migraine prevention strategies.

■ Pharmacologic treatment for migraine prevention

In addition to the guideline regarding acute pharmacologic treatment of migraine in children as discussed




above, the AAN also asked and investigated the following question: *In children and adolescents with migraines, do preventive pharmacologic treatments, with or without cognitive behavioral therapy (CBT), compared with placebo, reduce headache frequency?*¹⁰ The guideline examined various drug classifications and specific medications, including antiepileptics (topiramate), antidepressants (amitriptyline), beta-blockers (propranolol), and a neurotoxin (onabotulinumtoxinA), and offered six comprehensive practice recommendations. Ultimately, guideline authors postulate that many children respond to migraine treatment with pharmacologic intervention, but caution providers that identifying a therapeutic response from pharmaceutical agents is more challenging. Simply put, high placebo response rates in children and adolescents make it difficult to determine cause and effect. Finally, the use of CBT alone or combined with pharmacologic treatments was examined, with the need for further RCTs to determine efficacy and access to its use.

Recommendation 1: The NP must take the lead in educating children and adolescents and their families on ways to identify and eliminate or modify contributing factors. In children, and especially in adolescents,

lifestyle and behavioral factors play a large role in migraine mitigation. Female adolescents and those with a family history of migraines are at increased risk, along with other factors including overweight, caffeine and/or alcohol use, lack of physical activity, insufficient sleep due to poor sleep hygiene, and tobacco use.¹³ Additionally, depression is often present in adolescents with migraines, although it is unclear if it is a cause or effect.

Recommendation 2: Despite the lack of data on this, it is presumed that children and adolescents with frequent migraines follow the same trajectory as adults; migraines on more than 6 days per month is associated with progression to chronic migraine. Anecdotally, it is clear that the same factors of frequent headaches and medication overuse may lead to progression of chronic migraine. The use of analgesics such as acetaminophen and ibuprofen for more than 14 days in a month is a strong indicator of medication overuse. The NP should clearly educate the family and patient on the role of analgesics, analgesic overuse, and resulting consequences. Additionally, the NP must reinforce the lifestyle and behavioral factors that contribute to the prevention of migraine onset.

Treatment Methods

Non-Medication Treatment	Rescue Medications	Daily Medications
 <p>KEEP CALM and BREATHE EAT A HEALTHY SNACK SLEEP EXERCISE DRINK WATER MEDITATE</p> <p><u>Water</u> <u>Oxygen (Breathe)</u> <u>Wait (10 min)</u> WOW! (WOW author unknown)</p>	<p>Ibuprofen (Advil, Motrin) Acetaminophen (Tylenol) Naproxen (Aleve, Naprosyn)</p>  <p>Caffeine?</p>	<p>Rx:</p> <p>Non-Rx: Magnesium Oxide Vitamin B2 (Riboflavin)</p> 

Recommendation 3: According to this recommendation, the majority of RCTs studying migraine showed that preventive medications failed to demonstrate superiority to placebo in children and adolescents. The two possible exceptions to this are topiramate and propranolol, both of which have a weak or possible correlation with more than a 50% reduction in headache frequency. Notably, patients receiving amitriptyline combined with CBT compared with those receiving amitriptyline combined with headache education are more likely to have decreased headache frequency greater than 50% and, in turn, are probably more likely to decrease migraine-associated disability.¹⁴ While rare, the provider should be aware of the potential for worsening depression and the risk of suicide among children, adolescents, and young adults taking amitriptyline or other antidepressants. When prescribing preventive medications, the NP must review with the child and family that the best way to treat migraines is to prevent their onset via lifestyle and behavioral interventions. Finally, all medications should be given for a minimum of 6 to 8 weeks to determine efficacy, unless the patient displays unacceptable adverse reactions.

Recommendation 4: As a corollary of Recommendation 3, the NP must counsel patients and families regarding the use of various medical treatments and balance risk and benefit. Topiramate and valproate are noted to be teratogenic, and the latter has an associated black box warning regarding fetal risk. Topiramate at doses of 200 mg/day or less does not interact with oral contraceptives but titrating to a higher dose may cause such interactions, including decreased efficacy of the contraceptive. Contraception methods and daily folic acid supplementation must be discussed with females of childbearing age who are taking valproate or topiramate.

Recommendation 5: This recommendation reiterates that little information exists regarding the duration of treatment, when preventive treatment should be stopped, and the likelihood of relapse following discontinuation. Simply put, patients and families must be counseled regarding risks and benefits of stopping medication once migraine control has been achieved.

Recommendation 6: This recommendation evaluated mental illness in children with migraines and found that children with anxiety, depression, or mental

distress are not at greater risk for recurrent headaches; however, the presence of these diagnoses in children with headaches is moderately correlated with increased headache persistence in those who already have recurrent headaches. Therefore, patients with these comorbid mood or anxiety disorders may merit more aggressive management options. Additionally, patients with these disorders must be reminded that prevention of a migraine is preferable to treatment and that preventing migraines may possibly reduce (though not eliminate) comorbid mood or anxiety disorders.

When prescribing preventive medications, the NP must review with the child and family that the best way to treat migraines is to prevent their onset via lifestyle and behavioral interventions.



Nonpharmacologic approaches to migraine prevention. A discussion of pharmacologic treatment of migraine in children is not complete without nonpharmacologic approaches. Broadly, in addition to lifestyle modifications or “headache hygiene” discussed in the next section, these include “nutraceuticals” and neuromodulation. Some commonly used nutraceuticals that have shown some element of migraine prevention are riboflavin (vitamin B2), coenzyme Q10 (CoQ10), magnesium, butterbur root extract (*Petasites hybridus*), and feverfew (*Tanacetum parthenium*).¹⁵ Further discussion of these is beyond the scope of this article.

Relaxation, thermal and electromyographic biofeedback, and CBT are used in migraine therapy with the goal of teaching patients to identify and manage symptoms and recognize potential triggers for headache. Newer, noninvasive techniques include transcutaneous cranial nerve stimulation, noninvasive vagus nerve stimulation, single-pulse transcranial magnetic stimulation, and transcranial direct current stimulation, among others, in addition to various methods of invasive neuromodulation.

■ Patient engagement and care collaboration

The goal of preventive headache treatment is twofold: reduce headache treatment and disability. For most children, headache disability translates to school attendance and participation in typical activities such as sports. Achieving adequate migraine control requires child/adolescent and family adherence to lifestyle changes and medications, if medications are indicated.

Lifestyle modifications, rather than prescription medications or even OTC analgesics, are the cornerstone of migraine management. Lifestyle modifications can also be called *nonpharmacologic methods*, or *headache hygiene*. Depending on the age of the child or adolescent, parental involvement may be expected at different levels. Children and adolescents, as well as their parents, must understand and have realistic expectations for clinically meaningful outcomes, in addition to the knowledge that (in most cases) they can control or change outcomes by their consistency and actions.

It is significant to note that, apart from a few medications noted above, most preventive medications do not produce clinically meaningful outcomes beyond those obtained by placebo. The NP must be aware of this evidence and make treatment recommendations accordingly. An example of this is to try a maximum of two preventive headache medications, and if relief is not obtained, reiterate lifestyle modifications and possibly CBT.

Diet and hydration, exercise/activity, sleep, and caffeine use are four of the major components of lifestyle modifications. Migraine triggers may be more easily determined in adults. In children and adolescents, a “trial and error” process can be implemented, with some never finding the offending food or trigger. Foods including cheese, chocolate, tomatoes, and lunch meats have been identified; however, this is not an inclusive list of food triggers. Monosodium glutamate was previously implicated in causing headaches, but this theory was more recently discredited by nutrition experts.¹⁶ Nevertheless, if an offending food is identified as causing headaches in an individual, it should be eliminated for the time being. Often, it is not a specific food but irregular and insufficient meal habits that cause headaches, such as, skipping breakfast or not eating all day. Hydration possibly has a greater impact than food. The NP should conduct a thorough daily food history including hydration with water and caffeinated drinks. Most children and adults are mildly dehydrated. By the time one feels thirsty, the need for hydration has likely been present for several hours. Patients must be encouraged to drink water throughout the day and be given a school note allowing them a water bottle on their desk and a restroom pass as needed due to the increased fluid intake.


Children and adolescents must be encouraged to keep active. Overweight and lack of physical activity is associated with recurrent migraine in adolescents.

Losing weight may be associated with headache reduction, although the direct cause—the weight loss itself or the physical activity and improved dietary habits—is unclear. Regardless, reduced headache frequency is achieved. Caffeine and sleep are important factors. Counseling for a child with frequent headaches should include a hiatus from all forms of caffeine, with information on expectations as caffeine is reduced. Caffeine and sleep may be related. Many adolescents already have poor sleep hygiene due to many reasons, and caffeine, while helpful in the short term, ultimately exacerbates the problem. Sleep deprivation can lead to migraines. Children, teens, and parents must be educated on sleep hygiene including keeping electronics out of the sleeping area if possible, going to bed at a reasonable time, and not operating on a sleep deficit throughout the week.

■ Implications and conclusions

The 2019 clinical practice guidelines provide updates and strategies regarding the acute treatment of migraine in children and adolescents and pharmacologic treatment for migraine prevention.^{4,10} NP understanding and adherence to evidence-based clinical practice guidelines is vital to appropriately assessing and treating migraine in children and adolescents. Lifestyle modifications and some acute pharmacologic treatments are the mainstays of migraine management in this population, with lifestyle modifications and self-care being key, even in very young children. Pediatric migraine classification and improved measures of outcome and disability have enhanced our understanding of pediatric migraine. However, it is important to remember that most treatment trials in children follow those that have proven efficacy in adults. Additionally, the placebo effect in children and adolescents is considerable and should be in the NP's thought process when caring for this population. An exciting development, yet one that needs further study, is the use of CBT alone and in combination with medications (at the time of writing, only amitriptyline in combination with CBT has been studied).¹⁴ The effect of mood disorders such as anxiety and depression as factors that contribute to migraine frequency and resulting disability must be investigated via RCTs, investigating pathophysiologic pathways and biomarkers.^{4,10}

Finally, new therapeutics, mechanisms of action, and medication delivery mechanisms must be investigated

and added to the NP's treatment armamentarium as they undergo study and become available to children and adolescents. It cannot be overemphasized that counseling on lifestyle and behavioral factors is the cornerstone of treatment. The NP should encourage shared decision-making with children and adolescents and their parents to develop a mutually acceptable plan of care to decrease migraine frequency, severity, and associated disability. 

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