

# Headaches in Children and Adolescents

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Headaches are common during childhood and become more common and increase in frequency during adolescence. The rational, cost-effective evaluation of children with headache begins with a careful history. The first step is to identify the temporal pattern of the headache—acute, acute-recurrent, chronic-progressive, chronic-nonprogressive, or mixed. The next step is a physical and neurologic examination focusing on the optic disc, eye movements, motor asymmetry, coordination, and reflexes. Neuroimaging is not routinely warranted in the evaluation of childhood headache and should be reserved for use in children with chronic-progressive patterns or abnormalities on neurologic examination. Once the headache diagnosis is established, management must be based on the frequency and severity of headache and the impact on the patient's lifestyle. Treatment of childhood migraine includes the intermittent use of oral analgesics and antiemetics and, occasionally, daily prophylactic agents. Often, the most important therapeutic intervention is confident reassurance about the absence of serious underlying neurologic disease. (*Am Fam Physician* 2002;65:625-32,635-6. Copyright© 2002 American Academy of Family Physicians.)

▶ A patient information handout on migraine headache in children and adolescents, written by the author of this article, is provided on page 635.

See editorial on page 554.

Headaches are common during childhood and become more common and more frequent during adolescence. An epidemiologic survey of 9,000 school children found that one third of the children who were at least seven years of age and one half of those who were at least 15 years of age had headaches.<sup>1</sup> "Frequent" headache was reported in 2.5 percent of children who were at least seven years of age and 15 percent of those who were at least 15 years of age. The prevalence of headache ranged from 37 to 51 percent in those who were at least seven years of age and gradually rose to 57 to 82 percent by age 15. Before puberty, boys are affected more frequently than girls, but after the onset of puberty, headaches occur more frequently in girls.<sup>2-4</sup>

## Evaluation

The medical evaluation of a child or adolescent presenting with headache requires a thorough history followed by a complete physical and neurologic examination. A headache

assessment (*Table 1*)<sup>5</sup> should generate sufficient information to make a diagnosis. The questions contained in this assessment can guide the physician in assigning a patient's symptom complex to the appropriate temporal pattern (*Table 2*)<sup>5</sup> and help identify patients who warrant further diagnostic testing.

The general physical examination must include determination of vital signs, including blood pressure and temperature. Careful palpation of the head and neck should be performed in a search for sinus tenderness, thyromegaly, or nuchal rigidity. Head circumference must be measured, even in older children, because slowly progressive increases in intracranial pressure cause macrocrania. The skin must be examined for signs of neurocutaneous syndrome, particularly neurofibromatosis and tuberous sclerosis, which are highly associated with intracranial neoplasms.

A detailed neurologic examination is essential. More than 98 percent of children with brain tumors have objective neurologic findings. Key features in children with intracranial disease include altered mental status, abnormal eye movements, optic disc distortion, motor or sensory asymmetry, coordination disturbances, and abnormal deep tendon reflexes.<sup>6</sup> Careful physical and neurologic examinations can enable the physician to exclude organic causes.

One third of children at least seven years of age and one half of adolescents at least 15 years of age have headaches.

TABLE 1

**Assessment of Children and Adolescents with Headache**


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How and when did your headache(s) start?

Was this a sudden first headache? Have you had headaches like this before?  
Do you get a headache every day? Are your headaches getting worse than they used to be?

Do you have the same kind of headaches all the time? Do you get more than one kind of headache?

How often do you get a headache? How long do your headaches usually last?

Can you tell that you will be getting a headache? Are there any signs that a headache is going to start?

Where do you feel the headache pain? How does the headache pain feel—pounding, squeezing, stabbing, or something else?

Do you get nausea, vomiting, dizziness, numbness, weakness, or other symptoms at the same time you have a headache?

What makes your headache feel better or worse? Is there anything you do that makes your headache worse? Does taking medicine or eating food give you a headache or make a headache worse?

What do you do when you get a headache? Do you have to stop whatever you are doing (playing, working, studying) when you get a headache?

Does anything special cause you to get a headache? Do you get headaches at any certain time?

Do you have other symptoms between headaches?

Are you taking any medicines for your headache or for any other reason?

Do you have any other health problems?

Does anyone else in your family get headaches?

What do you think might be causing your headaches?

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*Adapted with permission from Rothner AD. The evaluation of headaches in children and adolescents. Semin Pediatr Neurol 1995;2:109-18.*

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The role of neuroimaging is controversial. Computed tomographic (CT) scanning or magnetic resonance imaging (MRI) is indicated in patients with a chronic-progressive headache pattern and those who have abnormal findings in the neurologic examination (Table 3). In the majority of patients with acute-recurrent headache or chronic-nonprogressive headache patterns and normal findings from neurologic examinations, no imaging is warranted. The overwhelming majority of studies evaluating the role of neuroimaging in young patients with headache have demonstrated no diagnostic abnormalities or incidental (nonpathologic) findings.<sup>7</sup>

*Lumbar puncture to identify bacterial or viral meningitis is mandatory in a febrile patient with headache who has nuchal rigidity.*

Electroencephalography (EEG) is of limited use in the routine evaluation of headache in children. If the headache is associated with alteration of consciousness or abnormal involuntary movement, the differential diagnosis will include complex partial seizure disorders, and EEG may be required. Nonspecific abnormalities and benign epileptiform discharges are common findings that may be present in up to 10 percent of children with migraine, regardless of the diagnosis.<sup>8,9</sup>

Lumbar puncture to identify bacterial or viral meningitis is mandatory in a febrile patient with headache with nuchal rigidity and no alteration of consciousness, signs of increased intracranial pressure, or lateralizing features. If subarachnoid hemorrhage, acute or chronic meningitis, pseudotumor cerebri, or neuroborreliosis are suspected, lumbar puncture with measurement of the opening pressure and appropriate ancillary testing are indicated.

If the patient's mental status is altered or focal findings are evident, cranial imaging is warranted before lumbar puncture, although blood cultures should be drawn and antibiotic therapy empirically started before the patient is transported for neuroimaging. Sinus radiography may be indicated for the febrile patient with headache if the clinical history and physical examination suggest acute sinusitis, although clinical judgment may justify treatment without imaging.<sup>10,11</sup>

Psychologic evaluation may be of value in children and adolescents with chronic-daily and mixed-headache patterns to assess for stressful provocative influences and determine the role for psychologic therapies (e.g., biofeedback, stress management, relaxation techniques).

Referral for neurologic consultation depends on the physician's experience and confidence. Children younger than three years infrequently have primary headache syndromes, and the complete neurologic examination, including visualization of the fundus oculi, can be difficult. These younger patients

probably should be referred. Children with acute evolution of headache accompanied by focal neurologic symptoms or signs (i.e., morning vomiting, headaches that awaken the patient) should be referred, and neuroimaging should be performed. Children or adolescents with chronic-progressive headaches, a pattern associated with increasing intracranial pressure, also should be referred.

Most young patients with migraine can be successfully managed by the primary care physician and referred only if treatment fails. Chronic-daily and mixed-pattern headaches are extremely time-consuming to manage and often require a team approach with the help of the primary care physician, a neurologist, a psychologist, and a behavior therapist.

### Management of Specific Headaches in Children

Few, if any, drugs designed for treatment of headache are approved for use in children. Most of the drugs discussed here are used on an off-label basis in children.

#### ACUTE HEADACHE

Most acute, nontraumatic headaches in children are the result of self-limited, medically remediable conditions such as upper respiratory tract infection with fever, sinusitis, or migraine (Table 4).

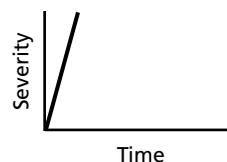
In emergency department–based studies of acute headache in children, all of the children with serious underlying conditions (e.g., intracranial hemorrhage, brain tumors, meningitis) had one or more objective findings on neurologic examination. These findings included alteration of consciousness, nuchal rigidity, papilledema, abnormal eye movements, ataxia, and hemiparesis.<sup>12,13</sup> Any of these abnormalities would be a principle indication for neuroimaging.

The most immediate therapeutic action should be to place the child in a quiet, dark room where he or she can rest with a cool, wet cloth on the forehead. Sleep is often the most effective treatment.

TABLE 2  
Five Temporal Patterns of Headache in Children

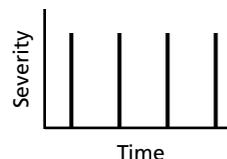
#### Acute headache

Single episode of head pain without history of previous events



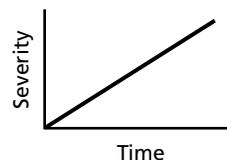
#### Acute-recurrent headache

Pattern of head pain separated by symptom-free intervals



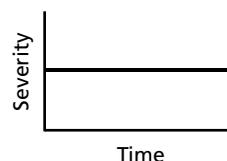
#### Chronic-progressive headache\*

Gradual increase in frequency and severity



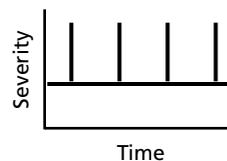
#### Chronic-nonprogressive (or chronic-daily) headache

Frequent or constant headache



#### Mixed headache

Acute-recurrent headache (usually migraine) superimposed on a chronic-daily background pattern (represents a variant of chronic-daily headache)



\*—Most ominous temporal pattern.

Adapted with permission from Rothner AD. The evaluation of headaches in children and adolescents. *Semin Pediatr Neurol* 1995;2:109-118.

TABLE 3  
Indications for Neuroimaging in Children with Headache

#### High priority

Acute headache  
Worst headache of life  
Thunderclap headache  
Chronic-progressive pattern (steadily worsening over time)  
Focal neurologic symptoms  
Abnormal neurologic examination  
Papilledema  
Abnormal eye movements  
Hemiparesis

Ataxia  
Abnormal reflexes  
Presence of ventriculoperitoneal shunt  
Presence of neurocutaneous syndrome (neurofibromatosis or tuberous sclerosis)  
Age younger than three years

#### Moderate priority

Headaches or vomiting on awakening  
Unvarying location of headache  
Meningeal signs

TABLE 4

**Causes of Acute Headache in Children**

Upper respiratory tract infection, with or without fever	Intoxicants (e.g., lead, carbon monoxide)
Sinusitis	Ventriculoperitoneal shunt malfunction
Pharyngitis	Brain tumor
Meningitis (viral or bacterial)	Hydrocephalus
Migraine	Subarachnoid hemorrhage
Hypertension	Intracranial hemorrhage
Substance abuse (e.g., cocaine)	
Medication (e.g., methylphenidate [Ritalin], oral contraceptives, steroids)	

**ACUTE-RECURRENT HEADACHE**

Migraine with or without aura is the most common form of acute-recurrent headache in children. The prevalence of migraine headache in children has been studied extensively by this author (*Table 5*)<sup>14,15</sup> and others. Commonly used diagnostic criteria for childhood migraine are shown in *Table 6*.<sup>16</sup>

Treatment of childhood migraine is divided into two phases: general measures and pharmacologic management. The first general measure of treatment is to confidently reassure the patient and caregivers of the cause of the headache and the absence of serious neurologic disease. This step, which is frequently omitted, may be the most important therapeutic intervention.

Other general therapeutic measures include identifying and removing headache triggers, regulating lifestyle, and instituting behavioral therapies. Common triggers in children include disrupted sleep, skipped meals, analgesic overuse, and stress. Behavior therapies such as relaxation techniques, stress management, and biofeedback have proved efficacious.

The role of diet in the management of acute-recurrent headache is controversial. It is

TABLE 6

**Criteria for Diagnosis of Migraine in Children**

- Five or more headache attacks that:
- Last 1 to 48 hours (compared with a shorter duration in adults)
  - Have at least two of the following features:
    - Bilateral or unilateral (frontal/temporal) location (compared with bilateral location only in adults)
    - Pulsating quality
    - Moderate to severe intensity
    - Aggravated by routine physical activities
  - Are accompanied by at least one of the following:
    - Nausea and/or vomiting
    - Photophobia and/or phonophobia (do not occur simultaneously in adults)

*Adapted with permission from Winner P, Wasiewski W, Gladstein J, Linder S. Multicenter prospective evaluation of proposed pediatric migraine revisions to the IHS criteria. Headache 1997;37:545-8.*

unrealistic to impose elimination diets in most children and even more so in adolescents. A rational approach is to provide caregivers with a list of potential dietary precipitants, including cheese, processed meats, chocolate, nuts, pickles, and monosodium glutamate, and ask them to watch for a possible temporal link between the child's headache and any of these dietary components. Banning any or all of these food items is unreasonable unless there is a clear association between a food item and the onset of headaches.

Caffeine, however, warrants special mention, and efforts should be made to moderate its use. If a child or adolescent is consuming many caffeinated soft drinks or several cups of coffee daily, consideration should be given to the possible role of caffeine as a contributing factor to headache. Caffeine abuse or withdrawal can precipitate headaches in adolescents. In addition, analgesic compounds with caffeine have a demonstrated association with rebound headache.<sup>17,18</sup>

Before beginning any pharmacologic treatment, the pattern, intensity, and cyclic nature of the patient's migraine must be clarified. The aggressiveness of management and choice of medications must be tailored to the patient's headache pattern, pain tolerance, and lifestyle. The daily use of prophylactic agents should be considered in patients with headaches that occur so frequently as to interfere with their

TABLE 5

**Prevalence of Migraine Headaches in Children**

Age	3 to 7 years	7 to 11 years	15 years
Prevalence (%)	1.2 to 3.2	4 to 11	8 to 23
Gender ratio	Boys > girls	Boys = girls	Girls > boys

*Information from references 14 and 15.*

normal lifestyle. Most young persons with migraine do not require daily medication; however, they do need access to reliable analgesia at home and at school.

**Sleep.** Once again, the best immediate therapeutic action is to place the patient in a quiet, dark room where he or she can rest with a cool, wet cloth across the forehead. Sleep is often the most effective treatment.

**Analgesics.** The mainstay of management of childhood migraine is the intermittent use of oral analgesics. Many children respond well to liquid ibuprofen (Children's Advil) in a dosage of 7.5 to 10 mg per kg. Children who fail to respond to the simple agents may require the use of other, more expensive agents (Table 7).

It is important that the patient remember to (1) take enough medication (often greater than antipyretic doses), (2) use the medication early in the course of the headache, and (3) have medication available at all times (especially at school).

Acetaminophen (Tylenol), ibuprofen and naproxen sodium (Anaprox), when taken as early in the course of the headache as possible, are usually effective. Ibuprofen, in a dosage of 10 mg per kg, is the most rigorously studied analgesic and shows more beneficial effects than acetaminophen.<sup>19</sup> Combination drugs containing isometheptene (Midrin) and butalbital (Fiorinal) are secondary choices if the initial agents fail. Butalbital contains aspirin along with sedating and potentially addictive barbiturates. Care must be taken to avoid the use of narcotics.

While none of the "triptan" agents are currently approved for use in children, extensive trials in adolescents have been completed, and early reports have demonstrated excellent safety profiles in patients 12 to 18 years of age.<sup>20</sup> Off-label use of sumatriptan (Imitrex), using 25-mg tablets or a 20-mg nasal spray, rizatriptan (Maxalt, Maxalt-MLT), in a dosage of 5 to 10 mg administered via tablets or oral dissolving wafers, and zolmitriptan (Zomig), in a dosage of 2.5 to 5 mg, may be considered for use in adolescents with moderate to severe

**TABLE 7**  
**Analgesics Used to Treat Migraine in Children**

<i>Drug</i>	<i>Dose</i>	<i>Forms used in children</i>
<b>Single agents</b>		
Acetaminophen (Tylenol)	10 to 15 mg per kg per dose	Chewable tablets: 80 mg Tablets: 160, 325 mg Elixir: 160 mg per 5 mL
Ibuprofen (Motrin)	10 mg per kg per dose	Syrup: 100 mg per 5 mL Chewable tablets: 50, 100 mg Tablets: 100, 200, 400, 600, 800 mg
Naproxen sodium (Anaprox)	2.5 to 5 mg per kg	Tablets: 220,* 250, 500 mg
<b>Combination preparations</b>		
Aspirin-butalbital-caffeine (Fiorinal)	1 to 2 capsules or tablets four times daily	Capsules: 325-50-40 mg Tablets: 325-50-40 mg
Isometheptene mucate-dichloralphenazone-acetaminophen (Midrin)	1 to 2 capsules; repeat hourly, up to 5 capsules per 12 hours	Capsules: 65-100-325 mg
<b>5-HT<sub>1</sub>-receptor agonists</b>		
Sumatriptan (Imitrex) <sup>†</sup>	1 as needed	Tablets: 25, 50, 100 mg Autoinjector: 6-mg vial Nasal spray: 5, 10, 20 mg
Zolmitriptan (Zomig, Zomig ZMT) <sup>†</sup>	1 as needed	Tablets: 2.5, 5 mg Dissolving wafers: 2.5 mg
Rizatriptan (Maxalt, Maxalt-MLT) <sup>†</sup>	1 as needed	Tablets: 5, 10 mg Dissolving wafers: 5, 10 mg

\*—Available over the counter as Aleve and as generic brands.

<sup>†</sup>—Not yet approved for childhood use (see text).

migraine headaches who are unresponsive to conventional analgesics.

**Anti-emetics.** Nausea and vomiting occur in up to 90 percent of children with migraines. Many children will identify vomiting as the most disabling feature of a migraine. In addition, vomiting and accompanying gastric stasis can inhibit the effectiveness of oral analgesics. Therefore, liberal use of anti-emetic agents provides substantial relief (Table 8).

*Successful use of analgesics in the management of acute recurrent headache includes (1) taking enough medication, (2) taking medication early in the course of the headache, and (3) making medication available to the child (especially at school).*

TABLE 8

**Anti-emetics Used in the Treatment of Nausea and Vomiting Accompanying Childhood Migraine**

Agent	Dosage in children	Forms used in children
Promethazine (Phenergan)	0.25 to 0.5 mg per kg per dose three times daily	Tablets: 12.5, 25, 50 mg Syrup: 6.25, 25 mg per 5 mL Suppositories: 12.5, 25, 50 mg
Trimethobenzamide (Tigan)	100 to 200 mg three times daily	Capsules: 100, 250 mg Suppositories: 100 mg
Prochlorperazine (Compazine)	0.25 to 0.5 mg per kg every 4 to 6 hours	Tablets: 5, 10, 25 mg Syrup: 5 mg per 5 mL Suppositories: 2.5, 5, 25 mg
Metoclopramide (Reglan)	1 to 2 mg per kg (<10 mg) every 4 hours	Tablets: 5, 10 mg Syrup: 5 mg per 5 mL
Hydroxyzine (Vistaril)	10 to 25 mg two to three times daily	Syrup: 10 mg per 5 mL Tablets: 10, 25, 50 mg

Often, anti-emetics alone are effective in eliminating all symptoms, including headache. A potential complication, dystonic reactions-oculogyric crisis, must be considered when prescribing anti-emetics.

*Prophylactic Agents.* As stated earlier, daily use of prophylactic agents should be reserved for children with frequent and/or disabling migraine headaches. To warrant use of a daily preventive medication, the headaches must occur with sufficient frequency, regularity, and severity, and must interfere with daily lifestyle and pose a functional disability. About one third of children with migraines require periodic courses of daily medication. When to begin use of daily medication and how long to continue its use are open to debate.

Very few of the drugs used to prevent migraine headache in children have been rigorously studied in children. Their use in this age group is based on anecdotal experience or reported usefulness in adult series.

In children younger than 10 to 12 years, cyproheptadine (Periactin), in a dosage of 2 to

8 mg at bedtime or divided twice daily, is a safe initial agent. If it fails to limit the frequency and severity of headaches in children in this age group, amitriptyline (Elavil), propranolol (Inderal), carbamazepine (Tegretol), or valproic acid (Depakene) can be used (Table 9).

In older adolescents, amitriptyline, propranolol, naproxen sodium, valproic acid, carbamazepine, and calcium channel blockers are effective. In addition, interest in the newer anticonvulsants, gabapentin (Neurontin) and topiramate (Topamax), is growing; however, no studies of these agents have yet been conducted in children or adolescents.

Other acute recurrent headache syndromes in children and adolescents have varied causes and management programs.

*Tension-Type Headache.* Tension-type headache clearly occurs during childhood but has not been rigorously studied.<sup>21</sup> In epidemiologic surveys, its reported frequency varies widely. The diagnostic criteria established by the International Headache Society<sup>22</sup> are quite specific; however, their age sensitivity has not been studied. Management of these headaches involves the use of intermittent analgesics coupled with behavior interventions such as stress management.

*Cluster Headache.* Cluster headache is rare in children and uncommon in adolescents. The clinical characteristics and treatment options are similar to those of adult patients.

*Temporomandibular Joint Disorder.* Temporomandibular joint (TMJ) disorder, infrequently presents as headache and more typically presents as unilateral jaw pain just anterior or inferior to the ear. The pain is aggravated by eating, gum chewing, teeth clenching, or yawning. Patients may describe a clicking or locking of the jaw. Family members may describe bruxism, and there may be antecedent jaw trauma. Examination reveals tenderness over the TMJ and limitation of mouth opening. Treatment includes use of non-steroidal anti-inflammatory drugs (NSAIDs) and muscle relaxation techniques, and avoidance of provocative processes like gum chew-

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ing or eating hard candy. Major oral surgery is rarely necessary.

**Paroxysmal Hemicrania.** Paroxysmal hemicrania is characterized by attacks of intense periorbital pain lasting 5 to 30 minutes and occurring up to dozens of times a day. While similar to cluster headaches, there is no accompanying lacrimation or rhinorrhea. Perhaps the most striking feature of paroxysmal hemicrania is its exquisite responsiveness to indomethacin (Indocin) in a dosage of 25 to 50 mg per day, which has prompted the use of an alternative term—"indomethacin-sensitive" headache.<sup>23</sup>

**Occipital Neuralgia.** Occipital neuralgia is characterized by a stabbing pain in the upper neck or occipital region that is often precipitated by neck flexion or head rotation. It may occur post-traumatically. Examination of the craniocervical region may disclose point tenderness, C2 distribution sensory changes, and limitation of motion. MRI of the craniocervical junction is warranted to exclude congenital or pathologic processes. Treatment includes the use of soft collars, NSAIDs, muscle relaxants, local injections, and physical therapy. The prognosis is generally good.

#### CHRONIC-PROGRESSIVE HEADACHE

The chronic-progressive headache pattern, the most ominous of the headache patterns, involves a gradual increase in the frequency and severity of pain over time. Intracranial pathology should be suspected (Table 10), especially when the headache is accompanied by altered mental status, abnormal eye movements, optic disc distortion, motor or sensory asymmetry, coordination disturbances, or abnormal deep tendon reflexes. Most patients with chronic-progressive headache warrant neuroimaging with MRI. Management is dependent on imaging results and diagnosis.

#### CHRONIC-NONPROGRESSIVE HEADACHE (CHRONIC-DAILY HEADACHE)

The prevalence of chronic-nonprogressive (or chronic-daily) headache during adolescence is 0.2 to 0.9 percent.<sup>24,25</sup> No specific

TABLE 9

### Options for Prophylactic Management of Frequent Migraine in Children and Adolescents

Agent	Dosage in children	Forms used in children
<b>Antihistamine</b>		
Cyproheptadine (Periactin)	0.25 to 1.5 mg per kg (2 to 8 mg daily)	Syrup: 2 mg per 5 mL Tablets: 4 mg
<b>Antidepressant</b>		
Amitriptyline (Elavil)	10 to 50 mg daily at bedtime	Tablets: 10, 25, 50 mg
<b>Beta blockers</b>		
Propranolol (Inderal)	2 to 4 mg per kg daily (10 to 40 mg three times daily)	Tablets: 10, 20, 40, 60, 80 mg Extended-release capsules: 60, 80, 120, 160 mg
Metoprolol tartrate (Lopressor)	2 to 6 mg per kg daily	Tablets: 50, 100 mg
<b>Anticonvulsants</b>		
Valproic acid (Depakene) (Depakote)	20 to 40 mg per kg per day (250 mg twice daily)	Syrup: 250 mg per 5 mL Capsules: 250 mg Sprinkles: 125 mg
Carbamazepine (Tegretol)	20 to 40 mg per kg per day (100 to 200 mg twice daily)	Suspension: 100 mg per 5 mL Chewable tablets: 100 mg Tablets: 200 mg
Topiramate (Topamax)	5 to 10 mg per kg per day	Sprinkles: 15, 25 mg Tablets: 25, 100, 200 mg
<b>NSAIDs</b>		
Naproxen sodium (Anaprox)	250 to 500 mg twice daily	Tablets: 250, 500 mg

NSAIDs = nonsteroidal anti-inflammatory drugs.

diagnostic criteria have been established, although ongoing studies in children define chronic-nonprogressive headaches as those lasting four or more hours and occurring 15 or more times a month for a period of four or more months.<sup>5</sup> Many adolescents have continuous, unremitting daily headache.

Management of headache in this population is challenging. In addition to the ques-

TABLE 10

### Causes of Chronic-Progressive Headache in Children and Adolescents

Brain tumor	Aneurysm and vascular malformations
Hydrocephalus (obstructive or communicating)	Medications (e.g., birth control pills, tetracycline, vitamin A [high doses])
Pseudotumor cerebri	Intoxication (lead poisoning)
Brain abscess	
Hematoma (chronic subdural hematoma)	

tions addressed in *Table 1*,<sup>5</sup> education and psychologic dynamics must be fully explored. Provocative or exacerbating influences must be identified. Confident reassurance of the absence of life-threatening disease must be provided to the patient and caregivers.

A comprehensive therapeutic plan must be established. Analysis of sleep and exercise habits, and dietary patterns should be conducted. A lifestyle routine, which includes regular school attendance, must be mandated. Counseling, stress management, and behavior therapies such as biofeedback should be strongly considered.

It is essential to avoid the use of narcotics in patients with chronic-daily headache. Use of acetaminophen, aspirin, and ibuprofen also should be minimized because of their potential for causing "rebound" headache. The use of naproxen sodium (230 to 500 mg twice daily) is not generally associated with rebound headache, and the agent has no potential for abuse. Judicious use of antidepressants such as amitriptyline (10 mg orally every day at bedtime) or valproic acid (250 mg orally twice daily) as daily prophylaxis may temper the frequency and severity of this headache.

### MIXED HEADACHE

A mixed-headache pattern implies migraine superimposed on a chronic-daily headache pattern. Treatment is the same as that for chronic-daily headache, combining psychologic and behavior therapies with the use of analgesic and prophylactic agents. The management of mixed headache can be challenging.

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