

Indian Academy of Pediatrics (IAP)



# STANDARD TREATMENT GUIDELINES 2022



## Pediatric Headache

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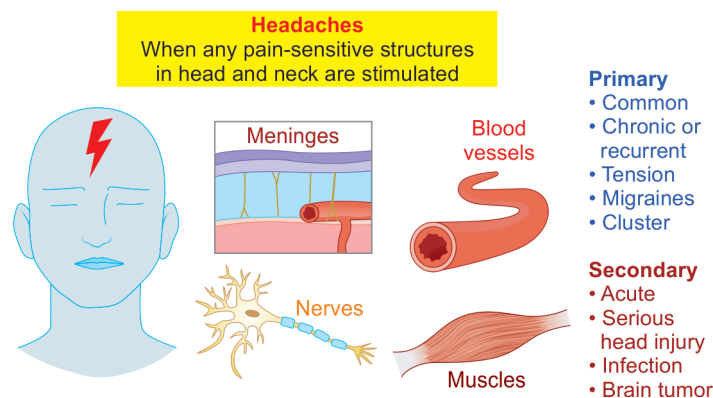
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# Pediatric Headache

## Introduction

- ✓ Pediatric headache is one of the most common complaints encountered in a pediatric office practice.
- ✓ It is usually not associated with serious medical conditions, however, it can be a source of parental anxiety.
- ✓ Chronic recurrent headache in children is associated with poor academic performance and school absenteeism.

It is referred as pain over forehead, orbit, temples, or scalp and does not include isolated facial and neck pain. It occurs due to stimulation of pain-sensitive intracranial or extracranial structures. Intracranial pain carrying structures include arteries of circle of Willis and proximal dural arteries, dural veins, and venous sinuses and meninges (**Fig. 1**). Headache can also be a referred pain from extracranial structures such as orbits, ears, sinuses, teeth, and temporomandibular joint.



**Fig. 1:** Headache.

International classification of headache disorders third edition (ICHD-3) has classified headache into three main types (**Table 1**).

1. Primary headache (Pain modulating system)	2. Secondary headache (Pain sensitive structure)	3. Painful cranial neuropathies and facial pain (Nerve fiber)
<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Migraine</li> <li><input checked="" type="checkbox"/> Tension-type headache (TTH)</li> <li><input checked="" type="checkbox"/> Cluster</li> </ul>	<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Trauma</li> <li><input checked="" type="checkbox"/> Vascular disorders</li> <li><input checked="" type="checkbox"/> Primary angiitis</li> <li><input checked="" type="checkbox"/> Idiopathic ICH, low CSF pressure, HaNDL</li> <li><input checked="" type="checkbox"/> Infection</li> <li><input checked="" type="checkbox"/> Inflammatory disorder</li> <li><input checked="" type="checkbox"/> Drug withdrawal</li> </ul>	<ul style="list-style-type: none"> <li>II, III, IV, V, VI, VII, IX</li> </ul>

(CSF: cerebrospinal fluid; HaNDL: headache and neurologic deficits with cerebrospinal fluid lymphocytosis—migraine-like headache associated with aphasia, sensory, and motor deficit. It is a rare self-limiting disease with single to multiple episodes; ICH: intracranial hypertension)

Headache due to an identifiable cause is called as secondary headache. Viral upper respiratory infection is a common cause of secondary headache both in emergency and outpatient settings. Other causes include brain tumor, meningitis, intracranial hemorrhage, and secondary or idiopathic intracranial hypertension.

Primary headache is typically a diagnosis of exclusion after ruling out secondary causes. Migraine without aura is the most common primary headache in emergency, while tension type headache is more common in office practice. The definition of migraine is given in **Box 1**.

**BOX 1:** International classification of headache disorders third edition (ICHD-3) diagnostic criteria.

<b>Migraine without aura</b>
<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> At least five attacks fulfilling criteria B-D</li> <li><input checked="" type="checkbox"/> Headache attacks lasting 4–72 hours (untreated or unsuccessfully treated)</li> <li><input checked="" type="checkbox"/> Headache has at least two of the following four characteristics:                             <ul style="list-style-type: none"> <li>– Unilateral location</li> <li>– Pulsating quality</li> <li>– Moderate or severe pain intensity</li> <li>– Aggravation by or causing avoidance of routine physical activity (e.g., walking or climbing stairs)</li> </ul> </li> <li><input checked="" type="checkbox"/> During headache at least one of the following:                             <ul style="list-style-type: none"> <li>– Nausea and/or vomiting</li> <li>– Photophobia and phonophobia</li> </ul> </li> <li><input checked="" type="checkbox"/> Not better accounted for by another diagnosis</li> </ul> <p><i>Points:</i></p> <ul style="list-style-type: none"> <li>– In children and adolescents (aged under 18 years), attacks may last 2–72 hours</li> <li>– When a child sleeps during migraine headache and wakes up even without headache, whole sleep duration is counted as headache duration</li> <li>– Headache tends to be bilateral in children rather than unilateral</li> </ul>

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**Migraine with aura**

- At least two attacks fulfilling criteria B and C
- One or more of the following fully reversible aura symptoms:
  - Visual
  - Sensory
  - Speech and/or language
  - Motor
  - Brainstem
  - Retinal
- At least three of the following six characteristics:
  1. At least one aura symptom spreads gradually over  $\geq 5$  minutes
  2. Two or more aura symptoms occur in succession
  3. Each individual aura symptom lasts 5–60 minutes
  4. At least one aura symptom is unilateral
  5. At least one aura symptom is positive
  6. The aura is accompanied, or followed within 60 minutes, by headache
- Not better accounted for by another diagnosis

*Points:*

- For example, three symptoms occur during an aura, the acceptable maximal duration is  $3 \times 60$  minutes. Motor symptoms may last up to 72 hours
- Aphasia is always regarded as a unilateral symptom; dysarthria may or may not be
- Scintillations and pins and needles are positive symptoms of aura

## Epidemiology

Prevalence of headache increases through childhood to reach a peak at 11–13 years of age in both sexes. Migraine is the most common primary headache with overall prevalence of 9% (1.2% in young to 23% in adolescents). It is more common in boys in the prepubertal age group; the mean age of onset is 7.2 years in boys and 10.9 years in girls.

Common causes of headache in pediatric office practice:

- Migraine
- Tension type headache
- Functional headache
- Secondary causes [upper respiratory tract infection (URTI), sinusitis, dental, refractory errors, etc.]
- Conditions with raised intracranial pressure (ICP) [intracranial space-occupying lesion/central nervous system (ICNSOL/CNS) infections]

Careful clinical evaluation gives the maximum yield and help planning investigations.

The salient points in history are:

- ☑ *Headache characteristics:*
  - Duration of illness
  - Pattern
  - Frequency of attacks
  - Duration of each attack
  - Severity of pain (interference with activities)
  - Location of maximal pain (frontal, temporal, occipital, sinus, periorbital)
  - Quality of pain (throbbing, stabbing, squeezing)
- ☑ *Trigger factors:* Caffeine, hunger, noise, smell, stress, sleep, change in altitude, travel, etc.
- ☑ Warning symptoms
- ☑ *Symptoms during attacks:* Anorexia, nausea, vomiting, light intolerance, noise intolerance, and pallor
- ☑ Relieving factors
- ☑ Symptoms between attacks
- ☑ Family history of migraine

Patterns of Headache

- ☑ *Acute:* URTI, trauma, systemic infection, and hemorrhage
- ☑ *Acute recurrent:* Migraine, cluster headaches, and tension type headache
- ☑ *Chronic progressive:* Brain tumor, chronic meningitis, and pseudotumor cerebri
- ☑ *Chronic nonprogressive and mixed:* Chronic migraine, malingering, and medication overuse

It is a simple, yet important tool to identify the triggers of headache, especially for primary headache. It objectively documents headache duration with associated symptoms and severity. Medication use can be monitored closely. It includes date, duration, severity, triggers, and list of medication use.

Headache Diary

**TABLE 2:** Clues from clinical evaluation.

Symptom	Etiology
Fever	Upper respiratory tract infections, sinusitis/otitis media, and systemic infections
Weight loss	Central nervous system (CNS) malignancy/tuberculosis
Neck rigidity	Meningitis and meningoencephalitis
Scalp artery tenderness	Giant cell arteritis
Hypertension	Renal/adrenal cause
Injuries	Trauma and nonaccidental injury
Organomegaly/bleed/petechiae	Systemic/hematologic malignancy

Any symptom which is suggestive of neurological involvement such as change in behavior, sensorium, vision abnormality, progressive course, change in character of headache, severe headache, features of raised ICP, and any neurologic deficits are concerning.

Mnemonic “SNOOPY” can be used to remember the red flags:

- S: Systemic signs and symptoms
- N: Neurologic signs and symptoms
- O: Sudden onset
- O: Occipital location
- P: Previous headache history with new, worst, or different character of headache
  - Progressive nature
  - Precipitated by pressure and Valsalva maneuver
  - Postural component to headaches
- Y: Age <6 years

Indications of Neuroimaging in Children (Table 3)

- ☑ Abnormal neurological examination, coexistence of seizures, or both
- ☑ Recent onset of severe headache
- ☑ Change in the type of headache, or if there are associated features that suggest neurologic dysfunction

Neuroimaging is not indicated routinely in children with recurrent headaches and normal examination.

TABLE 3: Investigations in specific conditions.	
Investigation	Indications
CT brain	Trauma/acute intracranial bleed, fractures, sinus pathology
MRI brain	Neuroimaging of choice for most intracranial pathology, especially post fossa
Cerebral angiography	Nontraumatic SAH, arterial dissection, and small vessel vasculitis
CSF examination	CNS infections, malignant cells, and subarachnoid bleeds
EEG	Not needed routinely, needed in paroxysmal seizure presentations as headache, i.e., benign occipital epilepsy
Myelography	CSF leaks

(CNS: central nervous system; CSF: cerebrospinal fluid; EEG: electroencephalogram; SAH: subarachnoid hemorrhage)

- Headache education:** Patient and family should be *reassured* that there is no serious underlying disorder. It is helpful for the patient to keep a *headache diary* to identify patterns and triggers and to evaluate treatment response.
- Lifestyle modification: SMART headache management:**
  - **Sleep:** Regular and sufficient sleep
  - **Meals:** Regular and sufficient meals, caffeine avoidance, and good hydration
  - **Activity:** Regular aerobic exercise
  - **Relaxation:** Stress reduction and relaxation exercises
  - **Trigger avoidance:** Avoid sleep deprivation, fasting, and identifiable triggers
- Acute management:** It is advisable to prevent overuse of analgesics to prevent chronic and intractable headaches termed *analgesic rebound headache*. In case the patient still has prolonged headache in spite of use of nonsteroidal anti-inflammatory drug (NSAID), a triptan should be introduced to manage headache. It is important to start treatment of the migraine component of the headache as soon as it starts, using an appropriate medication at an adequate dose. The goal is to abort the headache within 1–2 hours. Rehydration with fluids during the period of acute headache is an additional abortive measure (**Table 4**).

TABLE 4: Medications for acute headache.		
Drug	Dose	Remarks
Analgesics	Oral	Use should be restricted to three headaches/week to prevent analgesic rebound headache
Acetaminophen	15 mg/kg/dose q4–6 hourly	
Ibuprofen	10 mg/kg/dose q6 hourly	
Naproxen sodium	5–7 mg/kg q8–12 hourly	
Triptans (5-HT <sub>1</sub> receptor agonists)	Oral, subcutaneous, and intranasal	<input checked="" type="checkbox"/> Restrict uses to six headaches/month <input checked="" type="checkbox"/> Contraindicated in cerebrovascular disease, uncontrolled hypertension, basilar migraine, and hypersensitivity reaction
Rizatriptan	Route: Oral Dose: 5–10 mg at onset; may repeat in 2 hours; not to exceed 30 mg/24 hours	Approved in children aged 6–17 years
Almotriptan	Route: Oral Dose: 6.25–12.5 mg at onset; may repeat in 2 hour; no more than two doses in 24 hours	Approved for children >12 years age

Note: Sumatriptan has not been approved for pediatric use.



- ☑ *Complementary treatment:* Biobehavioral techniques that may be successful include biofeedback therapy
  - Relaxation techniques
  - Hypnosis
  - Acupuncture
  - Massage therapy
- ☑ *Preventive treatment:* Preventive therapy should be restricted to those children who experience:
  - Headache frequency at least one headache/week or more than three headaches/month
  - Prolonged and severe headaches, even if infrequent
  - Headache in which abortive treatment fails, overused or is contraindicated in the child

It typically takes at least 8–12 weeks to cause a recognizable effect; hence, switch over to other preventive drugs every few weeks is not advisable. The target is to reduce headache frequency to three or less/month sustained for 4–6 months after which preventive therapy should be gradually weaned. The details of medications which can be used for prophylaxis is given in **Table 5**.

Choice of drug depends on comorbid conditions associated with migraine. Following drugs are preferred in certain situations as following:

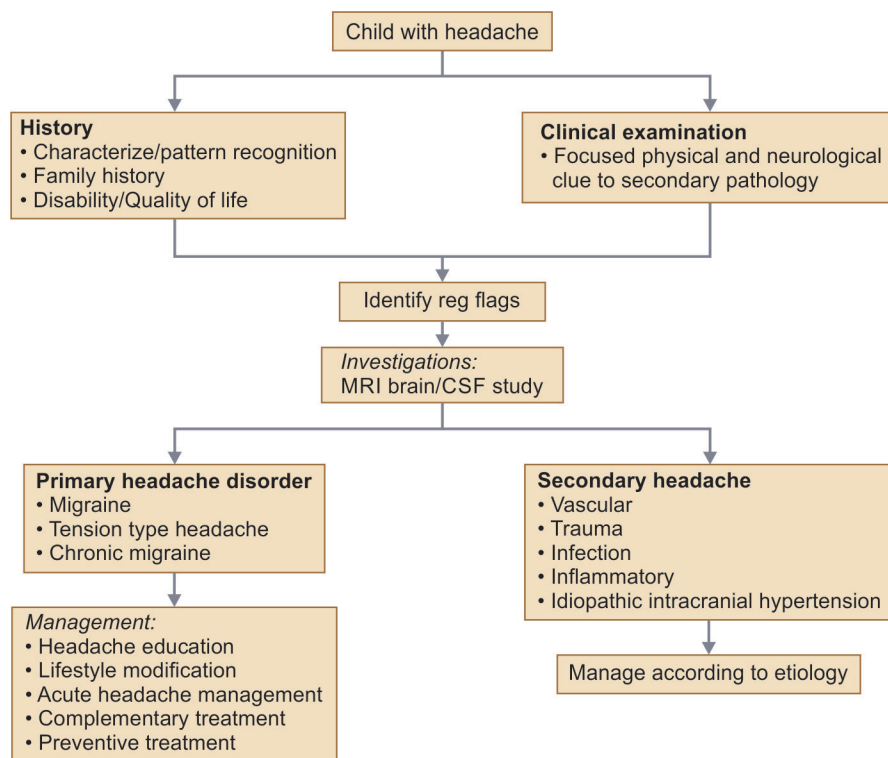
- ☑ *Topiramate:* Preferred in obese child, avoided in child with renal stone (approved in children >12 years)
- ☑ *Valproate:* Thin built child, child having epilepsy (approved in adults)
- ☑ *Amitriptyline:* Teenager with sleep problems
- ☑ *Propranolol:* Not good for asthmatic and competitive athlete
- ☑ *Cyproheptadine:* In younger children, syrup available, child with allergic disorder

**TABLE 5:** Drugs for migraine prophylaxis.

Agent	Dose	Preparation	Common adverse effects
<i>Antiepileptics</i>			
Topiramate	1–10 mg/kg/day	Tablet: 25, 50, and 100 mg	Paresthesia, somnolence, metabolic acidosis, and cognitive dysfunction
Valproic acid	15–30 mg/kg/day	Tablet ER: 200, 300, and 500 mg Liquid: 5 mL/200 mg	Somnolence, tremor, alopecia, weight gain, hyperammonemia, and polycystic ovary syndrome (PCOS)
<i>Antihistaminic</i>			
Cyproheptadine	0.25–1.5 mg/kg/day	Tablet: 4 mg Liquid suspension: 2 mg/5 mL	Drowsiness, fatigue, increased appetite, and weight gain
<i>Antihypertensives</i>			
Propranolol	2–4 mg/kg/day	Tablet: 10, 20, and 40 mg Liquid suspension: 20, 40/5 mL	Fatigue, dizziness, constipation, hypotension, depression, and exercise-induced asthma
Flunarizine	5–10 mg HS	Tablet: 10 mg	Sedation and weight gain

Children with headache need good history and meticulous examination to classify between primary and secondary headache. Red flags should be identified and further investigated (**Flowchart 1**). Avoiding triggers and lifestyle modifications play an important role in primary headache.

**Flowchart 1:** Approach to headache in children.



(CSF: cerebrospinal fluid)

- ☑ History and detailed clinical examination provide clues toward primary or secondary headache.
- ☑ Migraine is a clinical diagnosis after ruling out secondary headache.
- ☑ Neuroimaging is advisable in cases of suspected secondary headache.
- ☑ Headache education to avoid triggers and lifestyle modifications are important aspects in migraine management.
- ☑ Preventive therapy is advisable in case of frequent and disabling headaches more than three headaches/month.
- ☑ Choice of preventive therapy depends on the associated comorbid conditions.
- ☑ Avoid switching over prophylactic agents frequently as effect of drug would be appreciated usually after 8–12 weeks.

## Further Reading

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