

# PediatricsinReview®

## **Diagnosis and Management of Common Sleep Problems in Children**

Sumit Bhargava

*Pediatr. Rev.* 2011;32;91-99

DOI: 10.1542/pir.32-3-91

The online version of this article, along with updated information and services, is located on the World Wide Web at:

<http://pedsinreview.aappublications.org/cgi/content/full/32/3/91>

Pediatrics in Review is the official journal of the American Academy of Pediatrics. A monthly publication, it has been published continuously since 1979. Pediatrics in Review is owned, published, and trademarked by the American Academy of Pediatrics, 141 Northwest Point Boulevard, Elk Grove Village, Illinois, 60007. Copyright © 2011 by the American Academy of Pediatrics. All rights reserved. Print ISSN: 0191-9601. Online ISSN: 1526-3347.

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™



# Diagnosis and Management of Common Sleep Problems in Children

Sumit Bhargava, MD\*

**Author Disclosure**  
Dr Bhargava has disclosed no financial relationships relevant to this article. This commentary does not contain a discussion of an unapproved/investigative use of a commercial product/device.

**Objectives** After completing this article, readers should be able to:

1. Discuss the wide prevalence of sleep problems in children.
2. Recognize and manage common sleep problems in children.
3. Know the American Academy of Pediatrics guidelines for diagnosis and management of obstructive sleep apnea in children.

## Introduction

Sleep plays a vital and often underestimated role in the growth and development of children. Community surveys have discovered that sleep problems have a high prevalence throughout childhood and adolescence, with 25% to 50% of preschoolers and up to 40% of adolescents experiencing sleep-related problems. (1) Disruption of sleep due to a variety of sleep disorders may affect cognitive development and growth, and the child's sleep problems may become a significant family stressor. Studies have shown that sleep issues are usually not addressed adequately in pediatric practice. (2) This article describes the features of common sleep disorders that present to the pediatrician and provides strategies for effective management.

## Sleep in Infancy, Childhood, and Adolescence

Sleep architecture, sleep behaviors, and sleep problems change as children progress from infancy to adolescence. The ability to sleep through the night usually does not develop until at least 3 to 6 months of age. Sleep duration also varies by age (Table 1). Insufficient sleep and poor sleep quality may manifest as changes in mood, behavior, memory, and attention. Parents are usually quick to recognize any changes in their child's behavior and mood, and these observations should be ascertained during history taking. Younger children may develop symptoms of hyperactivity, poor impulse control, and neurocognitive dysfunction that includes attentional problems and impaired vigilance. Adolescents who are not getting sufficient sleep may have symptoms of excessive daytime sleepiness, such as falling asleep on the bus on the way to school or during class or not being able to wake up on time for school. It is important to keep in mind the substantial individual variation in the need for sleep as well as in the effects of sleep loss on daytime function in children. Therefore, advice for the optimal duration of sleep may vary from child to child. Optimal duration of sleep may best be estimated during vacation time, when sleep duration can be correlated with mood and daytime functioning.

## Approach to Pediatric Sleep Disorders

Pediatricians should screen for and recognize the symptoms of childhood sleep disorders in well children and specific vulnerable populations, such as children who have behavioral and developmental disorders, genetic syndromes, and chronic medical conditions. A screening tool (BEARS) (Table 2) has been developed to allow for comprehensive screening for the major sleep disorders in the pediatric age group. This screening tool has been shown to increase the likelihood of identifying sleep problems in the primary care setting. (3) It is divided into five major sleep domains, each with appropriate trigger questions: B: Bedtime problems, E: Excessive daytime sleepiness, A: Awakenings during the night, R: Regularity and duration of sleep, S: Snoring.

\*Assistant Professor of Pediatrics, Section of Pediatric Respiratory Medicine, Yale School of Medicine, New Haven, CT.

**Table 1. Appropriate Duration of Sleep by Age**

Age Category	Average Sleep Duration (Over a 24-hour Period)
Newborns	16 to 20 hours
Infants (0 to 1 year)	13 to 15 hours
Toddlers and Preschool Children (2 to 5 years)	11 to 12 hours total
School-age Children (6 to 12 years)	10 to 11 hours
Adolescents (13 to 18 years)	9 hours ideal

Used with permission from Mindell JA, Owens JA. *A Clinical Guide to Pediatric Sleep: Diagnosis and Management of Sleep Problems*. Philadelphia, PA: Lippincott Williams & Wilkins; 2003.

### Diagnosis and Management of Common Pediatric Sleep Problems

#### Insomnia: Behavioral Insomnia of Childhood

The essential diagnostic feature of this disorder is difficulty falling asleep, staying asleep, or both that is related to an identified behavioral abnormality (Table 3). Because children do not usually sleep through the night for the first 3 to 6 postnatal months, this diagnosis usually is made in toddlers and preschoolers. Behavioral insomnia of childhood can affect parental sleep and may lead to significant daytime impairment of the parents. Marital disputes may arise, and parents may develop negative feelings toward a child who repeatedly disrupts their sleep. The sleep difficulties of behavioral insomnia of childhood are due either to inappropriate sleep associations or to inadequate limit setting by the caregiver.

**SLEEP-ONSET ASSOCIATION TYPE.** This disorder presents typically as frequent night awakenings, with the child depending on a specific stimulus from the care-

**Table 2. BEARS Screening Tool**

	Toddler/Preschool (2 to 5 years)	School Age (6 to 12 years)	Adolescent (13 to 18 years)
<u>B</u> edtime Problems	Does your child have any problems going to bed or falling asleep?	Does your child have any problems at bedtime? (P) Do you have any problems going to bed? (C)	Do you have any problems falling asleep at bedtime (C)?
<u>E</u> xcessive daytime sleepiness	Is your child sleepy during the day or still taking naps?	Does your child have difficulty waking, seem sleepy during the day, or take a nap? (P) Do you feel tired a lot? (C)	Do you feel sleepy a lot during the day, in school, or while driving? (C)
<u>A</u> wakenings during the night	Does your child wake up a lot at night?	Does your child wake up a lot at night? (P) Do you wake up a lot at night and have trouble falling back asleep? (C)	Do you wake up a lot at night and have trouble falling back asleep? (C)
<u>R</u> egularity and duration of sleep	Does your child have a regular bedtime and wake time?	What time does your child go to bed and get up on weekdays/weekends? (P) Do you think your child gets enough sleep? (P)	What time do you go to bed on school days/weekends? How much sleep do you usually get? (C)
<u>S</u> norings	Does your child snore a lot or have difficulty breathing at night?	Does your child have loud or nightly snoring or difficulty breathing at night? (P)	Does your child snore loudly or nightly? (P)

(C)=child, (P)=parent  
Used with permission from Mindell JA, Owens JA. *A Clinical Guide to Pediatric Sleep, Diagnosis and Management of Sleep Problems*. Philadelphia, PA: Lippincott Williams & Wilkins; 2003.

### Table 3. Diagnostic Criteria of Behavioral Insomnia of Childhood

- A. The child's symptoms meet the criteria for insomnia based upon parental report or that of other caregivers.
- 
- B. The child shows a pattern consistent with either the sleep-onset association or limit-setting type of insomnia described below:
- 
- i. Sleep-onset association type includes each of the following:
1. Falling asleep is an extended process that requires special conditions.
  2. Sleep-onset associations are highly problematic or demanding.
  3. In the absence of the associated conditions, sleep onset is significantly delayed, or sleep is otherwise disrupted.
  4. Nighttime awakenings require caregiver intervention for the child to return to sleep.
- ii. Limit-setting type includes each of the following:
1. The individual has difficulty initiating or maintaining sleep.
  2. The individual stalls or refuses to go to bed or refuses to return to bed following a nighttime awakening.
  3. The caregiver demonstrates insufficient or inappropriate limit setting to establish appropriate sleeping behavior in the child.
- C. The sleep disturbance is not explained by another sleep disorder, medical or neurologic disorder, mental disorder, or medication use.
- 

Used with permission from American Academy of Sleep Medicine. *The International Classification of Sleep Disorders, 2nd Ed: Diagnostic and Coding Manual*. Westchester, IL: American Academy of Sleep Medicine; 2005

giver to fall back to sleep. Such stimuli may include being held or rocked to sleep or needing a specific object or a particular environment to fall asleep. Sleep-onset associations are widely prevalent in young children, and this phenomenon is defined as a disorder if sleep is significantly delayed or repeatedly disrupted in the absence of the desired stimulation, with intervention by the caregiver required to restore sleep.

Night wakings are a common phenomenon in young children, with a prevalence of 25% to 50% in the first postnatal year. Night wakings may be associated with cosleeping, breastfeeding, or other medical conditions

and other sleep-disrupting events. In toddlers, separation anxiety may manifest as increased night waking. Problematic night wakings may also be fostered by the child's temperament and poor parent-child interactions.

Management focuses on the establishment of a regular sleep schedule and bedtime routine. It is crucial for a successful treatment plan to be tailored specifically to the needs of the child and family. Parents should be advised to have a developmentally appropriate bedtime and a consistent bedtime routine that allows the child to obtain adequate sleep. A sleep-deprived child has more night wakings. The bedroom should be dark, cool, and quiet because this is the most conducive environment for sleep. It should be stressed to parents to put the child to bed drowsy but awake. The goal is to allow the child to learn to "self-soothe" and fall asleep easily after a night waking. Self-soothing at bedtime has been shown to generalize to other night wakings within 2 weeks. The behavioral approaches of extinction and fading can be discussed with parents as methods to teach their child to fall asleep independently. These techniques have been proven to be effective interventions for behavioral insomnia. (4)

Extinction involves putting the child to bed and systematically ignoring him or her until the next morning. This approach may not be acceptable to many families because parents may be concerned about the impact of this intervention on their child's emotional development. Graduated extinction may be more acceptable. In this method, the child is put to bed drowsy but awake, and the parents check on the child in progressively increasing intervals. On each night, the initial waiting period is increased by 5 to 10 minutes. The specific waiting period varies for each family and is dependent on the child's and the parents' tolerance for crying. To help parents try this approach, they can be told that instituting extinction at bedtime soon generalizes to the rest of the night. Parents should also be prepared for the "extinction burst," which is a worsening of the behavior, usually occurring on the second night.

"Fading" of the adult intervention, which is an option to the extinction approach, involves establishing a clear plan for gradually decreasing parental involvement in the child's falling asleep. An "exit plan" can be designed, with the parents first instituting a regular bedtime and sleep schedule and then gradually decreasing direct contact with the child as he or she falls asleep. The goal for the plan is for the parent to "exit" the room and allow the child to fall asleep independently.

**LIMIT-SETTING TYPE.** Stalling or refusing to go to sleep characterizes limit-setting disorder (Table 3). The

toddler does not respond to parental requests to get ready for bed. Once in bed, there are frequent demands for parental attention, resulting in delayed sleep onset. When limits are enforced, sleep onset is not delayed. This type of insomnia is perpetuated when caregivers set few or no limits or enforce limits inconsistently and unpredictably. The insomnia also may be affected by the child's temperament, the sleeping environment (sharing a room with a sibling or other relative), or by an inherent circadian preference.

Limit-setting disorder typically presents after 2 years of age, when children are sleeping in a bed or are capable of climbing out of the crib. Bedtime resistance is common, occurring in up to 10% to 30% of toddlers and up to 15% of school-age children, and may coexist with night wakings.

Management of limit-setting disorder is similar to that for recurrent night wakings. As with night waking, it is important to have a consistent bedtime routine and a sleep schedule that allows the child to sleep an adequate number of hours. Parents should establish clear bedtime rules and put the child to bed drowsy but awake. It is crucial for both parents to be persistent and consistent in behavior modification, and both parents must participate equally. It is not reasonable to allow children to sleep in the parent's bed on weekends as a reward for sleeping in their own bed during the week. Bedtime "fading" may be helpful initially, with bedtime temporarily set at the current sleep-onset time and then gradually advanced to the desired bedtime. Children who leave their beds should be taken back to their bedrooms gently but firmly. Parents should be strongly encouraged to use positive reinforcement so the child's compliance with the bedtime plan is rewarded.

### Circadian Rhythm Disorders: Delayed Sleep Phase Syndrome

Delayed sleep phase syndrome is a common disorder among adolescents and young adults, with a prevalence of 7% to 16%. The condition is characterized by habitual sleep/wake patterns that are delayed relative to conventional sleep times by 2 hours or more (Table 4). The essential issue with this disorder is the timing rather than the quality of sleep. Adolescents who have this disorder complain of sleep-onset insomnia and extreme difficulty waking in the morning. They make up for the short nighttime sleep period by afternoon naps or by extending sleep time on weekends. These behaviors serve to disrupt their circadian rhythm even more, and a vicious circle ensues.

Almost all individuals who have this disorder report

## Table 4. Diagnostic Criteria: Circadian Rhythm Sleep Disorder, Delayed Sleep Phase Type

- A. There is a delay in the phase of the major sleep period in relation to the desired sleep time and wake-up time, as evidenced by a chronic or recurrent complaint of inability to fall asleep at a desired conventional clock time together with the inability to awaken at a desired and socially acceptable time.
- B. When allowed to choose their preferred schedule, patients will exhibit normal sleep quality and duration for age and maintain a delayed but stable phase of entrainment to the 24-h sleep/wake pattern.
- C. Sleep log or actigraphy monitoring (including sleep diary) for at least 7 days demonstrates a stable delay in the timing of the habitual sleep period.  
*Note: In addition, a delay in the timing of other circadian rhythms, such as the nadir of the core body temperature rhythm or dim light melatonin onset (DLMO), is useful for confirmation of the delayed phase.*
- D. The sleep disturbance is not explained by another sleep disorder, medical or neurologic disorder, medication use, or substance use disorder.

Used with permission from American Academy of Sleep Medicine. *The International Classification of Sleep Disorders, 2nd Ed: Diagnostic and Coding Manual*. Westchester, IL: American Academy of Sleep Medicine; 2005.

themselves to be evening types, with optimal functioning during afternoon, evening, and late evening. This natural predisposition is exaggerated by the normal phase delay in circadian rhythm of about 2 hours that occurs in adolescence. A positive family history is found in up to 40% of patients, and polymorphisms in the clock gene *per3* have been discovered in this disorder.

Exact pathophysiologic mechanisms remain unknown. Patients who have this disorder have an abnormal relationship between their endogenous circadian rhythm and the homeostatic process that regulates sleep and wakefulness.

Sleep logs are useful for demonstrating the habitually delayed sleep onset and late awakening. Afternoon naps may also be noted, as well as late rise times on weekends. Polysomnography is not routinely indicated for these patients unless they also have other symptoms of sleep-disordered breathing, such as snoring or apneas. Behavioral assessment is important because this syndrome may

be associated with depression, anxiety, school refusal, and school phobia.

The aim of treatment is to realign the sleep schedule to a more conventional and socially acceptable pattern and to maintain the realigned sleep schedule. Treatment involves improving sleep hygiene by avoiding naps and caffeinated beverages and decreasing bright light exposure in the evening. Therapy includes restricting television viewing in the late evening. Television sets and computers should be removed from the child's room and cell phones switched off. Other techniques such as chronotherapy or bright light therapy are best undertaken in consultation with a pediatric sleep medicine specialist. Successful outcomes are dependent on a highly motivated patient and family.

Maintenance of the sleep schedule is extremely important, and frequent relapses may occur. Any comorbid psychiatric issues must be addressed for the child to continue to maintain the new schedule successfully. Continued good sleep hygiene is essential. The patient may be allowed to sleep a little longer on weekends after a few months of strict compliance. However, weekend oversleep time should not extend more than 2 hours beyond the desired wake time. Close contact with the patient and the family during the maintenance phase is helpful in ensuring compliance with the sleep plan. This monitoring may be via telephone or regularly scheduled visits. Patients should be encouraged to continue to maintain a sleep log, so deviations from the sleep maintenance plan may be detected early.

### Common Parasomnias of Childhood

Parasomnias are undesirable physical events that occur during entry into sleep, within sleep, or during arousal from sleep (Table 5). These are important clinical disorders of which the pediatrician should be aware because they occur commonly during childhood.

**NIGHT TERRORS.** Night terrors (*pavor nocturnus*) are arousals from deep (slow wave) sleep, usually in the first one third of the night and invariably accompanied by behavioral manifestations of intense fear. Tremendous autonomic system discharge occurs, with tachycardia, tachypnea, flushing of the skin, diaphoresis, and increased muscle tone. The child is found sitting up in bed and unresponsive; if awakened, the child is confused and disoriented. Vocalization occurs frequently. Amnesia for the episodes is usually the case when the child is questioned the next morning.

Prevalence rates vary from 1% to 6.5% in early childhood, with a relatively stable prevalence of 2.5% from the

## Table 5. Diagnostic Criteria: Sleep Terrors and Nightmare Disorder

### Night Terrors

- A. A sudden episode of terror occurs during sleep, usually initiated by a cry or loud scream that is accompanied by autonomic nervous system and behavioral manifestations of intense fear.
- B. At least one of the following associated features is present:
  - i. Difficulty in arousing the child.
  - ii. Mental confusion when awakened from an episode.
  - iii. Amnesia (complete or partial) for the episode.
  - iv. Dangerous or potentially dangerous behaviors.
- C. The disturbance is not explained by another sleep disorder, medical or neurologic disorder, mental disorder, medication use, or substance use disorder.

### Nightmare Disorder

- A. Recurrent episodes of awakening from sleep with recall of an intensely disturbing dream, usually involving fear or anxiety, but also anger, sadness, disgust, and other dysphoric emotions.
- B. Full alertness on awakening, with little confusion or disorientation; recall of dream is immediate and clear.
- C. At least one of the following features is present:
  - i. Delayed return to sleep after the episode.
  - ii. Occurrence of episodes in the latter half of the habitual sleep period.

Used with permission from American Academy of Sleep Medicine. *The International Classification of Sleep Disorders. 2nd ed: Diagnostic and Coding Manual.* Westchester, IL: American Academy of Sleep Medicine; 2005.

age of 15 years onward. Night terrors are usually seen between 4 and 12 years of age. Genetics may play a role in night terrors. There is usually a family history of night terrors in one or both parents. There is no association of night terrors with psychopathology in young children. Night terrors also may be associated with sleep walking.

The diagnosis of night terrors is usually based on a typical history. History taking should focus on discovering if there is any sleep disorder that could result in disrupted sleep, such as obstructive sleep apnea (OSA), restless legs syndrome/periodic limb movement syndrome, or seizures. Polysomnography is not routinely indicated, although it may be helpful in distinguishing night terrors from nocturnal complex partial seizures or frontal lobe seizures. In addition, polysomnography can help to rule out OSA in a snoring child. OSA can lead to

recurrent arousals and shifts in sleep stage and may be associated with increased night terrors.

Management of night terrors is focused primarily on parental reassurance and education. Parents should be informed of the essentially self-limited nature of these episodes. Most children cease to have them after the onset of puberty due to the dramatic decrease in slow-wave sleep.

Scheduled awakening may be considered for the child who is having nightly episodes. In this approach, the parents identify the time of the episodes and wake the child to the point of arousal 15 to 30 minutes before that time. This can be done for 2 to 4 weeks, until the episodes stop occurring, and can be repeated if the episodes start again.

Short-acting benzodiazepines may be considered in the rare child who has frequent severe episodes that are excessively violent and place him or her at high risk of injury. Treatment can be considered for 3 to 6 months, until the episodes cease completely. Benzodiazepines should be slowly tapered because abrupt discontinuation results in slow-wave sleep rebound and a return of the nocturnal episodes.

**NIGHTMARES.** Nightmares are characterized by disturbing dreams that usually occur in rapid eye movement (REM) sleep in the latter half of the night and result in awakening. There is significant post-awakening anxiety and difficulty in returning to sleep. This symptomatology is especially common in younger children, who cannot distinguish between dreams and reality and may refuse to return to sleep.

Approximately 10% to 50% of children between the ages of 3 and 5 years experience nightmares severe enough to disturb their own and their parents' sleep. Nightmares can be precipitated by stress or traumatic events. They also are associated with sleep deprivation, anxiety disorders, and medications, including antidepressants, antihypertensive agents, and dopamine agonists. The proportion of children experiencing nightmares peaks between the ages of 6 and 10 years and subsequently declines.

Pediatricians should assess both the chronicity and severity of nightmares because unusual severity has been related to psychopathology. Nightmares can be distinguished from night terrors by their occurrence in the latter half of the night, when REM sleep predominates. Also, the child experiences no confusion or disorientation with nightmares and can recall the event. Finally, unlike night terrors, return to sleep is significantly delayed.

Management of nightmares focuses on maintaining good sleep hygiene. Exposure to frightening or overstimulating television shows and movies should be avoided before bedtime. Children may respond well to parental reassurance or the use of security objects such as blankets. A low-level night light may be helpful. For the child who is excessively disturbed by these events, referral to a developmental-behavioral pediatrician should be considered. Affected children respond well to relaxation strategies or systemic desensitization.

**SLEEPWALKING.** Sleepwalking consists of a series of complex behaviors that are related to arousal from slow-wave sleep and culminate in walking around with an altered state of consciousness and impaired judgment (Table 6). The sleepwalking child may appear confused, dazed, or occasionally agitated. The eyes are usually open during the episode. Children may perform bizarre acts, such as urinating in inappropriate locations or leaving the house.

About 15% to 40% of children sleepwalk at least once. The prevalence of frequent sleepwalking is low (3% to 5%). Peak occurrence is between 4 and 8 years of age, and there may be a family history of sleepwalking. Sleep deprivation, OSA, and a febrile illness may precipitate sleepwalking.

Diagnosis is made by the typical history. Polysomnography may be helpful if there are associated symptoms of

### Table 6. Diagnostic Criteria: Sleepwalking

- A. Ambulation occurs during sleep.
- B. Persistence of sleep, an altered state of consciousness, or impaired judgment during ambulation is demonstrated by at least one of the following:
  - i. Difficulty in arousing the person.
  - ii. Mental confusion when awakened from an episode.
  - iii. Amnesia (complete or partial) about the episode.
  - iv. Routine behaviors that occur at inappropriate times.
  - v. Inappropriate or nonsensical behaviors.
  - vi. Dangerous or potentially dangerous behaviors.
- C. The disturbance is not explained by another sleep disorder, medical, or neurologic disorder, mental disorder, medication use, or substance use disorder.

Used with permission from American Academy of Sleep Medicine. *The International Classification of Sleep Disorders. 2nd ed. Diagnostic and Coding Manual.* Westchester, IL: American Academy of Sleep Medicine; 2005

snoring or restless sleep and typically shows arousal from deep sleep in the first half of the night.

Treatment is focused primarily on protecting the child from harm. The child's room should be in a safe location, not close to stairs. Alarms such as bells may be placed on the doorknob to alert parents to the child's waking. Parents should be reassured that there is no significant association between childhood sleepwalking and psychopathology. They should be encouraged to maintain good sleep hygiene, with a regular sleep/wake schedule. For the rare child who has nightly events or a history of injury, treatment with benzodiazepines may be considered for a period of 3 to 6 months, with slow tapering. Most sleepwalking episodes resolve by puberty with the age-related diminution in slow-wave sleep.

### Sleep-related Breathing Disorders: Pediatric OSA

OSA is characterized by intermittent complete or partial obstruction of the upper airway that leads to obstructive apnea or hypopnea, which disrupts normal ventilation during sleep and may be associated with hypoventilation and oxyhemoglobin desaturation. OSA must be distinguished from primary snoring, which is snoring without associated obstructive events or gas exchange abnormalities.

The prevalence of this disorder has been reported to vary from 2% to 4% in healthy children. The disorder can occur at any age but is most common in the preschool age group (2 to 6 years) and adolescents. In prepubertal children, the disease occurs equally in boys and girls. A higher prevalence has been reported in African-American children. OSA appears to run in families, with a family history of the disorder usually being present. However, the relative role of genetic versus environmental factors has not yet been determined.

The exact pathophysiology of the disorder in children is unknown. It appears to result from a combination of upper airway narrowing and upper airway hypotonia. The primary predisposing factor for OSA in young children is adenotonsillar hypertrophy, although size of the tonsils and adenoids does not predict disease in individual patients. Obesity appears to be a risk factor in older children. In many children, both factors may be relevant. Other children at high risk of OSA include those born with craniofacial abnormalities, specifically midface hypoplasia and micrognathia, and associated hypotonia. Among these patients are children who have Down syndrome, neuromuscular disease, and cerebral palsy.

Early diagnosis and treatment of OSA is important because the untreated condition has been associated with

cor pulmonale, pulmonary hypertension, and systemic hypertension as well as poor learning, behavioral problems, and attention-deficit/hyperactivity disorder (ADHD).

Typical of OSA is a history of loud nightly snoring with observed apnea spells. Parents may note that the child is a restless sleeper or that he or she sweats substantially while sleeping or sleeps in an abnormal position with the neck extended. Daytime symptoms can include chronic mouth breathing with chronic nasal congestion or morning headaches. Excessive daytime sleepiness is more common among older children. OSA may present with subtle neurobehavioral signs, including mood changes, ADHD-like symptoms involving inattention and easy distractibility, or academic problems due to difficulty concentrating. Findings on physical examination may include characteristic adenoidal facies as well as signs of atopy or nasal congestion such as "allergic shiners," nasal septal deviation, or enlarged turbinates. Oropharyngeal examination may reveal enlarged tonsils or a redundant soft palate with a long uvula. The rare child may present with cor pulmonale or systemic hypertension.

In April 2002, recognizing the significant impact of OSA on children, the American Academy of Pediatrics issued an evidence-based clinical practice guideline with recommendations for the diagnosis and management of OSA in children (Table 7). (5)

### Table 7. Recommendations for the Diagnosis and Treatment of OSA (5)

1. All children should be screened for snoring.
2. Complex, high-risk patients should be referred to a specialist. These patients include infants and patients who have craniofacial disorders, genetic syndromes, neuromuscular disorders, chronic lung disease, sickle cell disease, and central hypoventilation syndromes.
3. Thorough diagnostic evaluation should be performed. History and physical examination cannot distinguish between primary snoring and OSA. Polysomnography is the diagnostic test of choice.
4. Adenotonsillectomy is the first line of therapy for most children. Continuous positive airway pressure is an option for those who are not surgical candidates or who respond poorly to surgery.
5. High-risk patients should be monitored as inpatients postoperatively.
6. Patients should be reevaluated postoperatively to determine if additional treatment is required. All patients should undergo clinical evaluation. High-risk patients should undergo polysomnography.



## Summary

- Based on community surveys, sleep disorders in children are widely prevalent and preventable.
- Based on strong research evidence, behavioral treatment of insomnia of childhood is safe and effective.
- Based on strong research evidence, all children should be screened for snoring. Pediatricians are encouraged to follow evidence-based guidelines for diagnosis and management of OSA, as specified by the American Academy of Pediatrics in its clinical practice guideline.

## References

1. Mindell JA, Owens JA. *A Clinical Guide to Pediatric Sleep: Diagnosis and Management of Sleep Problems*. Philadelphia, PA: Lippincott Williams & Wilkins; 2003
2. Owens JA. The practice of pediatric sleep medicine: results of a community survey. *Pediatrics*. 2001;108:e51
3. Owens JA, Dalzell V. Use of the 'BEARS' sleep screening tool in a pediatric residents continuity clinic: a pilot study. *Sleep Med*. 2005;6:63–69
4. Morgenthaler TI, Owens J, Alessi C, et al. Practice parameters for the behavioral treatment of bedtime problems and night wakings in infants and young children. *Sleep*. 2006;29:1277–1281
5. American Academy of Pediatrics. Clinical practice guideline: diagnosis and management of childhood obstructive sleep apnea syndrome. *Pediatrics*. 2002;109:704–712

## Suggested Reading

- American Academy of Sleep Medicine. *The International Classification of Sleep Disorders. 2nd Ed. Diagnostic and Coding Manual*. Westchester, IL: American Academy of Sleep Medicine; 2005
- Schechter MS; Section on Pediatric Pulmonology, Subcommittee on Obstructive Sleep Apnea Syndrome. Technical report: diagnosis and management of childhood obstructive sleep apnea syndrome. *Pediatrics*. 2002;109:e69

### HealthyChildren.org Parent Resources from AAP

<http://www.healthychildren.org/English/ages-stages/baby/sleep/Pages/default.aspx>

## PIR Quiz

Quiz also available online at <http://pedsinreview.aappublications.org>.

1. The R in the BEARS screening tool explores:
  - A. Duration and regularity of sleep.
  - B. Need for rousing from deep sleep.
  - C. Rapid eye movement sleep disturbances.
  - D. Risk for significant sleep apnea.
  - E. Sleep rituals.
2. An otherwise healthy 2<sup>1</sup>/<sub>2</sub>-year-old-boy refuses to go to bed in the evening. Every night at bedtime, he cries until he is permitted to sleep in his parent's bed. Once asleep, he does not snore. The *most* appropriate first step toward effective management is:
  - A. Consistent limit-setting.
  - B. Disrupting all naps in the afternoon.
  - C. Scheduling of a sleep study.
  - D. Trial of a short-acting benzodiazepine.
  - E. Use of extinction.
3. An otherwise healthy 16-year-old boy complains of difficulty falling asleep at night and extreme difficulty awakening in the morning. A sleep log documents a normal duration of sleep on weekends. He does well in school and denies either depression or anxiety. He has eliminated caffeine from his diet. There is no TV in his bedroom, and he does not use the computer or phone or text at night. He does not snore. The *most* appropriate first step toward effective management is:
  - A. Avoiding naps in the afternoon.
  - B. Scheduling of a sleep study.
  - C. Trial of a central alpha agonist.
  - D. Trial of a selective serotonin reuptake inhibitor.
  - E. Trial of a short-acting benzodiazepine.
4. An otherwise healthy 12-year-old boy sleepwalks almost every night. His sleep hygiene is appropriate. He does not snore at night. The home has been made as safe as possible for him. There is a combination lock on the front door at night and there are no stairs to fall down. However, although no serious injury was sustained, he did trip and hit his head on a sink last week. The *most* appropriate next step toward effective management is:
  - A. Avoiding naps in the afternoon.
  - B. Consistent limit-setting.
  - C. Locking him in his bedroom at night.
  - D. Scheduling of a sleep study.
  - E. Trial of a short-acting benzodiazepine.
5. An otherwise healthy 4-year-old boy snores loudly every night. His snoring disrupts the sleep of other family members, but his mother has not noted any apnea. His body mass index is appropriate for age. His tonsils protrude slightly from behind the anterior tonsillar pillars. The remainder of his examination findings are otherwise unremarkable. The *most* appropriate first step in effective and efficient management is:
  - A. Periodic rousing him from sleep.
  - B. Prescription ear plugs for other members of the family.
  - C. Reassessment in 1 year.
  - D. Referral for tonsillectomy.
  - E. Scheduling of a sleep study.

## Diagnosis and Management of Common Sleep Problems in Children

Sumit Bhargava

*Pediatr. Rev.* 2011;32;91-99

DOI: 10.1542/pir.32-3-91

### Updated Information & Services

including high-resolution figures, can be found at:  
<http://pedsinreview.aappublications.org/cgi/content/full/32/3/91>

### Subspecialty Collections

This article, along with others on similar topics, appears in the following collection(s):

#### **Preventive Pediatrics**

[http://pedsinreview.aappublications.org/cgi/collection/preventive\\_pediatrics](http://pedsinreview.aappublications.org/cgi/collection/preventive_pediatrics)

#### **Respiratory Disorders**

[http://pedsinreview.aappublications.org/cgi/collection/respirator](http://pedsinreview.aappublications.org/cgi/collection/respiratory_disorders)

#### **Ear, Nose and Throat Disorders**

[http://pedsinreview.aappublications.org/cgi/collection/ear\\_nose\\_throat\\_disorders](http://pedsinreview.aappublications.org/cgi/collection/ear_nose_throat_disorders)

### Permissions & Licensing

Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at:

<http://pedsinreview.aappublications.org/misc/Permissions.shtml>

### Reprints

Information about ordering reprints can be found online:

<http://pedsinreview.aappublications.org/misc/reprints.shtml>

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™

