

SleepSheet



Sequoia Hospital
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News from the Sequoia Sleep Disorders Center

FALL 2010

Dear Colleagues, Obstructive sleep apnea (OSA) in children is becoming increasingly common. In the past, this disorder in children was associated most often with craniofacial abnormalities and tonsillar hypertrophy. Today, obesity in children carries with it the associated health risks not unlike those seen in adults, including OSA. Moreover, obese pediatric sleep apnea patients may not achieve as great a benefit from tonsillectomy and adenoidectomy—the typical first-line therapy in children—compared to non-obese patients.

We hope you enjoy this issue of the *SleepSheet*. As always, thank you for supporting your patients with sleep disorders, and let us know if there is anything we can do to assist you.

Warm regards,

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Not Just for Grown-Ups! What you should know about OSA in children

Melissa S. Lim, M.D., FAASM

Obstructive sleep apnea (OSA) in children is an increasingly common medical problem, and is associated with many complications, including metabolic, cardiovascular, and neurocognitive changes.

The prevalence of OSA in children has not been precisely determined since the diagnostic criteria have not been firmly established, but may be increasing in association with the rise in childhood obesity. Estimates of OSA in children range from 1–4%. Strict numerical criteria for the diagnosis are unsatisfactory, however, and the International Classification of Sleep Disorders Second Edition (ICSD-2) proposes using a combination of signs and symptoms, the AHI and supporting polysomnogram (PSG) abnormalities such as respiratory effort related arousals, oxygen desaturation, increased end tidal carbon dioxide, or swings in esophageal pressure.

Despite these nosological challenges, studies of OSA in children reveal special features of the disease. For example, snoring is very common, particularly in children ages 2–8. Nasal obstruction, tonsillar hypertrophy, obesity, craniofacial abnormalities, bed-wetting, daytime mouth breathing, daytime somnolence or hyperactivity are common as well. The dental exam may reveal

malocclusion, retrognathia, macroglossia, or a long or high arched palate.

A laboratory-based PSG is the gold-standard diagnostic test and is generally recommended, but often skipped, before consideration of tonsillectomy and adenoidectomy. PSG rules for scoring apneas and hypopneas in children are unique, so the scoring technologist must be made aware that the patient is a child. Based on American Academy of Sleep Medicine task force guidelines, the number of apneas and hypopneas per hour (apnea hypopnea index, or AHI) considered abnormal for adults is greater than five. Studies in children have concluded that one or more apnea per hour is abnormal. Esophageal pressure monitoring may be added to detect swings in intrathoracic pressure, thus improving the test's ability to detect respiratory efforts. [CONTINUES ON BACK](#)

Article Resources Hoban, T.F. and Chervin, R.D., Sleep-related breathing disorders of childhood: description and clinical picture, diagnosis, and treatment approaches, *Sleep Med Clin*, 2007; 2: 445-462

Katz, E.S. and D'Ambrosio, C.M., Pediatric obstructive sleep apnea syndrome. *Clin Chest Med*, 2010, 31:221-234.

Bixler, E.O., et al. Sleep disordered breathing in children in a general population sample: prevalence and risk factors. *Sleep*, 2009; 32(6):731-736

Take Home Points

- + Obstructive sleep apnea affects approximately 1–4 % of children.
- + OSA in children is increasing along with the rise in childhood obesity (close to 20% of 6–19 year olds are obese according to CDC 2008 data).
- + Tonsillectomy and adenoidectomy are the most common first-line treatments of OSA in children. Diagnostic study is recommended to ensure alleviation of sleep disordered breathing.
- + Treatment, sometimes with a combination of methods, produces not only a decrease in the AHI but may also result in improvement in neurocognitive functions and cardiovascular abnormalities.

Medicare Rule Change for PAP Devices Medicare rules regarding the prescription for positive airway pressure (CPAP, BilevelPAP, etc.) have changed. Providers who prescribe PAP devices must conduct an office follow-up on their patient 60–90 days after initiation in order to document compliance (4 hours of usage or more per night on average) and benefit. If the patient has been using their CPAP regularly and with benefit, then a “renewal” prescription authorizing continued usage must be sent to the durable medical equipment (DME) provider.

Medicare dictates that CPAP orders are written by the treating physician. Sleep center physicians may facilitate a CPAP order for a referring physician but cannot sign the order unless the patient is seen in consultation.


Health risks associated with OSA in children are similar to that in adults:

- cognitive behavioral effects
- hypertension
- arrhythmias
- left ventricular dysfunction
- pulmonary hypertension
- metabolic derangements (e.g., insulin resistance, reduced growth factor and insulin-like growth factor)

Several inflammatory markers are increased as well in children with OSA.

Treatment of OSA in Children

Tonsillectomy and adenoidectomy are generally considered the first-line treatment if clinically appropriate. Other modalities—often used in combination—successfully alleviate residual OSA in children:

- continuous positive airway pressure (CPAP)
- nasal corticosteroid sprays
- weight loss programs
- orthodontic intervention 



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At a Glance: Two Recently Published Studies Cardiovascular Changes in Children with Sleep Disordered Breathing (SDB) Conducted in Victoria, Australia, this study tested the hypothesis that BP and heart rate are increased during obstructive events in children equivalent to levels reported in adults. The study employed beat-by-beat BP and HR analyzed over the course of obstructive events during NREM and REM sleep. Results showed that BP and HR did increase significantly from late to post event in both sleep states. The study concluded that:

- Children with SDB experience significant changes in HR and BP during obstructive events with magnitudes that are similar to levels reported in adults.
- These changes are more pronounced during NREM sleep and with arousal.
- These acute cardiovascular changes may have important implications for poor cardiovascular outcome, possibly contributing to development of hypertension.

Read the Article: O’Driscoll, D.M. et al, Acute cardiovascular changes with obstructive events in children with sleep disordered breathing, *SLEEP*, 2009; 32 (10):1265-1271

Adenotonsillectomy (AT) impact on Blood Pressure (BP) in Children with OSA This study, conducted by the Department of Pediatrics, Kwong Wah Hospital, Hong Kong assessed the impact of AT surgery on 24-hour ambulatory BP in children with OSA. Methodology consisted of a retrospective review of records of 44 OSA children who had undergone AT and a repeated PSG after AT. Analysis showed that mean AHI dropped after AT. Twenty participants (45%) were cured of OSA. After AT surgery, six out of eight (75%) previously hypertensive children became normotensive. For the pre-AT hypertensive group, both systolic and diastolic BP decreased significantly during sleep after AT. However, eight children who were normotensive before AT became hypertensive after AT (but were more likely to have post-AT AHI >1). The study concluded that:

- 45% were cured of OSA and a significant decrease in BP was achieved after AT.
- Hypertension may persist or occur in previously normotensive children with OSA after AT.
- Cure of OSA should not be assumed after AT and follow-up PSG should be performed together with 24-hour BP monitoring.

Read the Article: Ng, D. K. et al, Ambulatory blood pressure before and after adenotonsillectomy in children with obstructive sleep apnea, *Sleep Medicine*, 2010; 11 (7): 721–725 

SleepSheet

IN THE NEXT ISSUE:

**Getting all the sleep you need:
the challenges of insomnia**

Calendar

A.W.A.K.E. Meetings for patients with obstructive sleep apnea take place the second Wednesday of every month in the Sequoia Room Rotunda at 2940 Whipple Ave., Redwood City, CA 94062. **RSVP:** Call Al Reichert at 650-367-5137 to confirm, as the location may vary.

Wednesday October 13, 6:30–8pm