

PEDIATRIC SLEEP PROGRAM

The Pediatric Sleep Program at
Sleep HealthCenter of Framingham
is now open and accepting pediatric patients!



Pediatric Sleep Program Locations:

Sleep HealthCenter of Framingham
125 Newbury Street, Suite 200
Framingham, MA 01701

Sleep HealthCenter at
Massachusetts Eye and Ear Infirmary
243 Charles Street, Suite 107
Boston, MA 02114



Sleep HealthCenters is a network of sleep medicine centers staffed by experts in the field of sleep medicine. Our integrated care system provides all the services needed to diagnose and treat patients with the entire array of sleep disorders including obstructive sleep apnea, insomnia, narcolepsy and restless legs syndrome.

In this issue of the Sleep HealthCenters Newsletter...

- ▶ Pediatric Sleep Disordered Breathing by Sandra Horowitz, MD
- ▶ Blue Cross/Blue Shield of Massachusetts New Regulations for Sleep Studies
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 - North Dartmouth Center Expansion
 - Future of Clinical Sleep Medicine 2009 and North East Sleep Society 2010 dates announced
- ▶ Research Activities

Massachusetts Affiliations: Beth Israel Deaconess Medical Center, Brigham and Women's Hospital, Faulkner Hospital, Hallmark Health, Marlborough Hospital, Massachusetts Eye and Ear Infirmary, McLean Hospital, New England Sinai Hospital, Southcoast Hospitals Group; *New York Affiliations:* Beth Israel Medical Center

Massachusetts Locations: Bedford, Beverly, Boston, Brighton, Framingham, Jamaica Plain, Marlborough, Medford, North Dartmouth, Stoughton, Weymouth, Worcester; *New York Locations:* Manhattan; *Rhode Island Locations:* Cumberland

For more information, please contact us at: 1-877-SLEEPHC (1-877-753-3742) or visit our website at www.sleephealth.com.

Requisition forms are available on our website.

Sleep HealthCenters® Newsletter

Lawrence J. Epstein, MD, Editor.....

Summer 2009

Dear Colleague:

In this issue of the Sleep HealthCenters Newsletter, Sandra Horowitz, MD, writes our feature article about Pediatric Sleep Disordered Breathing. This topic is becoming more important as we recognize the increasing frequency of sleep and breathing problems in children and as we learn more about how childhood sleep problems influence adult sleep and disease. However, pediatric sleep apnea is different in presentation and consequences from that seen in adults. Dr. Horowitz describes the differences between pediatric and adult sleep apnea and explains how to diagnose and treat this problem in children.

The field of sleep medicine and interest in sleep research and sleep disorders continues to grow. The number of educational opportunities about sleep medicine and sleep science is also growing to satisfy this desire for more information. Just recently, the majority of our sleep specialists attended SLEEP 2009, the largest national sleep meeting, in Seattle to learn about the latest trends. Locally, there are also opportunities. In the fall, Sleep HealthCenters will host its annual Future of Clinical Sleep Medicine forum and next spring Sleep HealthCenters has been asked to host the North East Sleep Society meeting.

Details on these meetings can be found in the CEO Section of this newsletter. Also in this section, Paul Valentine, Sleep HealthCenters' CEO, recaps the SLEEP 2009 meeting and talks about the expansion of our North Dartmouth location.

Effective May 1, 2009, Blue Cross/Blue Shield of Massachusetts issued new regulations regarding preauthorization of sleep studies. These regulations detail a specific process to be followed in order to approve your patients getting a sleep study. Please see the Insurance Bulletin section of this newsletter for details on how to assist your patient in getting necessary testing and treatment in a timely fashion.

If you have any questions about sleep disorders, our services, our affiliations or our locations, please feel free to contact us.



Sincerely,
Lawrence J. Epstein, MD
Medical Director
Sleep HealthCenters LLC



Pediatric Sleep Disordered Breathing

By Sandra Horowitz, MD, FRCP(C)

Dr. Horowitz is the Regional Medical Director of Sleep HealthCenters and the Medical Director for the Sleep HealthCenter of Framingham. She is board certified in Sleep Medicine, Neurology and Neurophysiology and is an Associate Professor of Neurology at the University of Massachusetts and Instructor in Medicine at Harvard Medical School.

My child snores! What is happening? Is it different from adult snoring, is it serious, what therapies are available, and do they work? These are questions we are often asked as physicians and probably have posed ourselves as parents.

Sleep disordered breathing constitutes a spectrum of obstructive breathing disorders determined by the degree of collapse of the upper airway. Although recognized as a serious health risk in adults, with higher rates of hypertension, stroke and cardiovascular disease, the negative impact on children's health and development has only more recently been recognized and received greater attention.

The snoring child is not rare, with recent studies reporting that 10-12% of children are habitual snorers and 1-5% have sleep disordered breathing (SDB). The incidence is only slightly lower than in adults. Preschool children, age 2-5, with adenotonsillar hypertrophy are at greatest risk. Children may present with snoring, labored breathing, tiredness and fragmented sleep, especially when they have upper respiratory infections. However, they may have few objective symptoms to raise suspicion of SDB. Children rarely complain of excessive daytime sleepiness, often presenting instead with behavior and learning problems. Children with Down syndrome, cerebral palsy, craniofacial abnormalities, sickle cell disease and neuromuscular disease are at particular risk for SDB (ref).

The clinical impact of SDB in children can be serious, with growth retardation, failure to thrive, obesity, systemic hypertension, cor pulmonale, heart arrhythmias, and the metabolic syndrome reported in various studies (ref). Long term consequences include neurocognitive deficits, with lower IQ reported in untreated SDB in children (ref). Sleep fragmentation and hypoxemia predispose to poor school performance, aggressive behavior, hyperactivity and psychiatric syndromes of depression and anxiety (ref). Treatment of SDB leads to significant but sometimes not complete resolution of the behavioral problems, and this has led to a call for earlier treatment. Long term studies suggest there may be a return of symptoms at the time of puberty requiring reassessment (ref).

Definitions - Children are Different

Primary Snoring

Snoring is present but it has no effect on sleep architecture, alveolar ventilation, sleep oxyhemoglobin or carbon dioxide (CO₂) levels.

Obstructive Sleep Apnea (OSA)

Because children breathe faster, only 2 missed breaths (adult apnea is defined as no breath for 10 seconds) despite continued inspiratory effort constitutes an apneic event. Oxygen saturation is >94% in sleeping children and desaturation events of 3-5% are abnormal. Children may not arouse with apneic events, allowing preservation of sleep architecture, while adults have fragmented sleep with decreased rapid eye movement (REM) and slow wave (N3) sleep.

Arousal Threshold

In adults, 83% of obstructions end in arousal. In children, however, only 50% of non REM and 35% of REM obstructive events end with an arousal, and this rate is even lower in infants. The lack of arousal can lead to long periods of hypoventilation with hypercapnea and increased upper airway inspiratory load. The elevated arousal threshold to respiratory events occurs despite a normal arousal response to auditory stimuli. Pediatric apneic events may end with a movement or autonomic response, rather than an EEG-apparent electrocortical arousal.

Obstructive Hypopnea

Hypopneas are due to partial collapse of the airway and result in a 50% or greater decrease in flow for at least 2 breaths and an electrocortical arousal or 3% desaturation.

Obstructive Hypoventilation

Continuous partial airway obstruction results in decreased minute ventilation with snoring, hypercapnea and tachypnea. Esophageal pressure may also be decreased. To be considered abnormal, end tidal or transcutaneous CO₂ must be elevated to >50 mm Hg for > 25% of total sleep time.


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Sleep HealthCenters® Newsletter

Upper Airway Resistance Syndrome (UARS)

The UARS is caused by the smallest amount of airway narrowing. Flow limitation from partial airway collapse causes respiratory effort related arousals (RERAs). Esophageal pressures are more negative in affected children.

Threshold for Abnormal in Children

Apnea Index = 1.5 or Apnea/Hypopnea index of 5 is considered abnormal in a child; associated findings are, CO₂ > 50 mm Hg for >25% total sleep time and arousal index >15/hour. Pediatric scoring rules are used for children up to 18 years of age.

Evaluation

“A history of loud snoring alone has not been shown consistently to have sufficient diagnostic sensitivity upon which to base a recommendation for surgery” – ATS Consensus statement AJRCCM 1996; 53:866. “A polysomnogram (PSG) is necessary to discriminate between primary snoring and OSAS” – AAP Guidelines, 2002; 109:704. The data supports a full baseline PSG and discourages split night studies and portable studies in children. A specially trained sleep technician tends to the comfort of children and their parents, with parents usually sleeping in a nearby bed.

Treatment

Adenotonsillectomy T&A is curative in 80-90% of patients. Mitchell studied 79 children with pre and post op PSG and found all symptoms improved and the AHI improved to <1.0/hour. Cure rates are lower in obese children, however, obese children have been found to improve with T&A even without large tonsils, AHI decreasing from 31 to 6/hour in one series. Surgical risks are greater and cure rates lower in children under 3 years old, and in those with pre morbid conditions such as Down syndrome, cerebral palsy, asthma, muscle disease and severe sleep apnea with AHI >10/hour. Pre operative dexamethasone and caffeine help prevent surgery related complications, most commonly bleeding and airway obstruction.

Continuous positive airway pressure (CPAP)

is effective and has improved since early pediatric use in the 1990s. Mask styles have been modified for children's delicate and growing facial structures. CPAP is generally well tolerated but there may be a time delay of up to 2 months to habituate. CPAP compliance improves when children and parents receive cognitive behavioral therapy (CBT) specifically directed toward CPAP acceptance.

Mandibular expansion and advancement is a new orthodontic frontier in pediatric sleep management, with rapid maxillary expansion improving AHI from 5.8 to 1.5 in a 2007 study. Guilleminault reviewed children with high arched narrow palates and found maxillary expansion worked best in combination with adenotonsillectomy. Mandibular advancement can be effective in children with retrognathia.

Dental devices that advance the mandible or tongue may be built by a specially trained dentist.

Nasal Steroids may help children with adenoid hypertrophy.

Obesity: A Special Case that is Now Epidemic

Forty years ago 4% of children were obese and four years ago 19% of children and 17% of adolescents fit criteria for obesity. Obese children are 10 times more likely to have SDB.

A vicious circle: analysis of pooled data from 696 studies notes that obesity is associated with short sleep duration and, in 17 studies, short sleep duration is associated with obesity. Persistent short sleepers are at higher risk for obesity and thus SDB. Obese children are sleepy with shorter mean sleep latencies on multiple sleep latency tests; 12 versus 18 minutes.

Children with obesity and the metabolic syndrome were studied by PSG and 25 of 34 had an AHI >1.5. Leptin and norepinephrine were higher in the SDB group, but 11 children treated with CPAP for 3 months lowered their leptin levels.

Mackenzie found restless sleep, reported apnea or adenotonsillar hypertrophy predicted clinically significant sleep apnea in 41 of 158 obese children 95% of the time.

Mitchel reported obese children with OSA improved following tonsillectomy; AHI 31 dropping to 6 post operative, but obese children had more perioperative complications.

Bixler reported in Sleep in 2009 on a large group of elementary school children with a prevalence of 1.2% for moderate SDB (AHI >5), finding waist circumference was more predictive than tonsil size. Mild SDB was also related to nasal obstruction from rhinitis and sinusitis supporting initial therapy of those conditions.

CURRENT RECOMMENDATIONS

- **Always optimize weight and sleeping position since SDB is more severe in the supine position.**
- **If tonsils are enlarged and the child is low risk, consider surgery.**
- **CPAP is effective, instead of, or while waiting for surgery.**
- **Consider nasal steroids post surgery.**
- **If tonsils are small and the child is CPAP resistant, consider orthodontic and/or dental evaluation.**

Future trends include screening children based on status of the parents, as there is a higher incidence of sleep apnea in offspring of parents with sleep apnea and early recognition may help prevent cognitive dysfunction and behavioral symptoms.

We also need more large scale studies with uniform criteria and definitions to advance our understanding of sleep disordered breathing in children. ☺

For references to this article, please go to www.sleephealth.com

CASE STUDY

John was an eight year old boy referred by his pediatrician because his mother observed brief pauses in his breathing while sleeping during his frequent strep infections. She was experienced at recognizing sleep apnea because her husband has used CPAP for his sleep apnea for years. On most nights, John snored loudly enough to disturb the cocker spaniel that usually shared his bed. The appearance of a whimpering dog at the door signified a more severe snoring night and a need for parental attention.

John did not complain of daytime tiredness and did not fall asleep inappropriately. He had been a strong student but his teacher recently complained of lapses in attention and some acting out behavior in class. He did not participate in sports teams and arrived late for school on a few occasions because of difficulty waking up. John was toilet trained at 2.5

years old and rarely had accidents, but nighttime incontinence, occurred 4 times in the previous month, mostly when John was congested and snored loudly.

On examination, the patient looked his age of eight years old and was engaging, ready to discuss the latest Red Sox game, but pertinent medical history came mostly from his mother. John was fidgety, and needed encouragement to be examined.

Vital signs were within normal limits with the exception of his BMI of 30. He had a typical adenoid facies with a long distance between his nose and upper lip. Chin was small, mildly retrognathic and speech was breathy and mildly nasal. He had a high arched, long, narrow palate and his uvula was long, hanging behind the base of his tongue. Tonsils were enlarged. His nose was mildly congested but the septum was not deviated.

He had a polysomnogram that revealed obstructive sleep apnea, with an apnea hypopnea index of 3 events/hour of sleep. There was moderate sleep disruption, with 18 arousals per hour, but sleep stages were relatively well maintained. Expired CO₂ was 51-53 for 30% of the night.

John was prescribed a saline then a steroid nasal spray and was evaluated by an otolaryngologist for consideration of tonsillectomy. Three months after tonsils and adenoids were removed, John's parents reported the snoring was much reduced, school performance had improved and John was now on the t-ball team at school. Speech was less nasal and he graciously thanked me for arranging for him to live on ice cream for 2 weeks. A repeat sleep study, performed because snoring was not completely gone and he was overweight, showed resolution of the sleep apnea.



CEO CORNER

Paul S. Valentine
President and
Chief Executive Officer

This past June, we had the pleasure of attending the SLEEP conference, which is the largest annual U.S. event in the world of sleep medicine. The SLEEP conference is a joint venture of the AASM (American Academy of Sleep Medicine) and the SRS (Sleep Research Society).

During the conference our own Dr. David White received the William C. Dement Academic Achievement award, recognizing him for his exceptional contributions in the areas of sleep education and academic research. Also at the conference, a number of Sleep HealthCenters medical staff were welcomed onto AASM committees for the next program year. Other items of interest included the following:

- A poster by one of our medical staff on "CPAP masks: a source of microbial contamination".
- A symposium on sleep and pregnancy: the evidence presented suggested that the sleep field, in conjunction with the obstetrical field, should be more aggressive about identifying and treating sleep apnea in pregnant women.
- Endothelial dysfunction may be a key link between OSA and its health consequences.
- A discussion about using data we already acquire to provide indices which more closely correlate with daytime symptoms than the apnea-hypopnea index.

- Discussion about how to continue to attract quality physicians and researchers into the sleep medicine field. In addition to increasing the number of fellowship programs, it is important to attract physicians from all fields and to improve the pipeline of physicians interested in an academic career. One method is to increase physicians' exposure to sleep medicine in medical school and residency programs. Another is to increase funding for sleep-related research projects. Current proposals are also under discussion to integrate sleep fellowships into other specialty programs, such as pulmonary/critical care and neurology.
- For patients who have concerns about CPAP, due to claustrophobia or other issues: begin by emphasizing the psychological issues which may be improved such as memory and fatigue, then discussing how sleep disturbances may affect daytime function, and finally reviewing how sleep apnea may be a potential cause. One possible consideration would be to bring the patient into the sleep lab during the day for a "PAP habituation". The patient can later have a full overnight PSG if appropriate.
- Heavy smokers can have an artificially high oximetry reading from inactivated hemoglobin that becomes permanently fixed to carbon monoxide.
- An emphasis on sleep as a "local" vs. "global" phenomenon, explaining cortical columns in the brain sleeping independently, utilizing different types of neurotransmitters for homeostatic sleep drive than what is seen in the brainstem regions that modify the circadian rhythms. This research may help explain the benefits of extending sleep time to optimize all parts of the brain working at peak performance.
- Patients with atrial fibrillation have more central-type breathing events due in part to the reduced cardiac output to the baroreceptors, responsible for the chemical control of respiration.

• Sleep deprivation can decrease appreciation of humor!
We look forward to capitalizing on the relationships, opportunities and knowledge we gained at the SLEEP conference to maintain our leadership position in sleep medicine

In terms of local Sleep HealthCenters updates:

- The Sleep HealthCenter affiliated with the Southcoast Hospitals Group has expanded its 84 Faunce Corner Road location in North Dartmouth, MA, to a four bed, fully comprehensive sleep program. We have enjoyed growth in the Southcoast region, due in part to our relationship with the Southcoast Hospitals Group, which includes St. Luke's Hospital in New Bedford, Tobey Hospital in Wareham and Charlton Hospital in Fall River.
- We are proud to announce that we will once again be hosting the North East Sleep Society's annual meeting, at the Marriott Boston-Newton. Please mark your calendars for March 26 - 27, 2010.
- The 3rd Annual Future of Clinical Sleep Medicine Forum is being held September 17, 2009 at the Hilton Boston-Dedham. If you are interested in attending this invitation-only event, please contact Maria Natapov at maria_natapov@sleephealth.com or 617-783-1441, x136. Final speaker details will be available on our website by the end of summer.

We are happy to continue to provide sleep medicine services to your patients. Please do not hesitate to contact us if you have any questions. For more information about Sleep HealthCenters, please visit www.sleephealth.com.

We hope you are enjoying your summer!



Insurance Bulletin

Blue Cross/Blue Shield of Massachusetts NEW SLEEP STUDY REQUIREMENTS

Effective May 1, 2009, Blue Cross/Blue Shield of Massachusetts is requiring that all requisitions referring patients to Sleep HealthCenters **MUST INCLUDE either a patient's HISTORY AND PHYSICAL (H&P) or CONSULT NOTES** indicating specific symptoms that can be attributed to a sleep disorder in order to support the need for a sleep study. To review the policy, please visit www.bluecrossma.com/providers.

Another option is to request a consult by a Sleep HealthCenters' sleep specialist who can provide an evaluation to determine if criteria are met for a sleep study and take care of the pre-authorization process.

We appreciate your cooperation in providing this information at the time the requisition is submitted so that we can make this a smooth process and prevent unnecessary delays in scheduling your patients.

If you have any questions regarding this new policy, please contact our reimbursement department at 978-774-7243.

Research Activities

Sleep HealthCenters is proud to work with some of the premier sleep researchers in the country. The following research studies are currently underway in conjunction with our partners. To take part in a study or for more information, please contact us toll free at 877-SLEEPHC (877-753-3742). For a full listing of our research activities, please visit www.sleephealth.com/research-studies.

DO YOU SNORE?

Sleep HealthCenters is looking for people who have never had an overnight sleep study. Is that you? The purpose of this research study is to see how well devices called portable monitors work for diagnosing Obstructive Sleep Apnea at home. Participants will wear a portable monitor for two consecutive nights at home and will wear a portable monitor during their scheduled overnight sleep study.

If interested, please contact Nicole at Sleep HealthCenters by calling 617-783-1496 x117 or emailing SleepResearch@sleephealth.com.

DO YOU GET OUT OF BED TO EAT AT NIGHT, AFTER YOU HAVE GONE TO SLEEP?

Do episodes of repetitive eating at night feel out of your control? You may have Sleep-Related Eating Disorder, which can disrupt your sleep and health. The Sleep HealthCenter associated with Brigham and Women's Hospital in Brighton is conducting a research study on an investigational med-

ication for Sleep-Related Eating Disorder. Qualified participants can receive study medication and medical evaluation at no cost.

If interested, please call Kate at the Sleep HealthCenter associated with Brigham and Women's Hospital by calling 617-783-1496 x115 or emailing SleepResearch@sleephealth.com.

DO YOU HAVE DIFFICULTY FALLING OR STAYING ASLEEP?

Is your difficulty sleeping interfering with your life? You may have insomnia, which can disrupt your sleep and health. The Sleep HealthCenter associated with Brigham and Women's Hospital is conducting a research study on the brain chemistry of insomnia.

Qualified participants can receive up to \$200 for 4 visits over 2 months.

If interested, please call Kate at 617-783-1496 x115 or email SleepResearch@sleephealth.com.