

Pediatric Sleep-Disordered Breathing



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KEYWORDS

- Pediatric sleep-disordered breathing • Pediatric obstructive sleep apnea • Snoring
- Tonsillectomy • Adenotonsillectomy • Polysomnography • Tonsillar hypertrophy
- ADHD

KEY POINTS

- Pediatric sleep-disordered breathing has replaced throat infections as the predominant indication for adenotonsillectomy in the United States.
- Sleep-disordered breathing has been associated with a negative impact on daytime alertness, emotional lability, attention, school performance, stature/failure to thrive, enuresis, and cardiopulmonary morbidity.
- Sleep-disordered breathing should be considered in the investigation of several common pediatric conditions, including attention-deficity/hyperactivity disorder and other mood disorders, enuresis, and failure to thrive, among others.
- Polysomnography is the gold standard in diagnosis of pediatric obstructive sleep apnea, but its use is not always practical and it is, therefore, not as widespread as might be expected.
- Tonsillectomy shows clear benefits for sleep-disordered breathing and its sequelae as well as for throat infections in the first year after surgery, but longer-term benefits of the surgery are less clear.

INTRODUCTION

Frequently a concerned parent or caregiver may ask a practitioner in a primary care or pediatric office setting, conceivably on a daily basis, “Does my child need tonsils removed?” With more than 500,000 tonsillectomies performed per year, this is a common inquiry.¹ Despite the frequency of this procedure, evidence exists showing the indications for this surgery and the potential benefits are underestimated by health care providers.¹ Although historically tonsils were frequently removed for recurrent infection, today the primary indication for tonsillectomy, with or without adenoidectomy, is sleep-disordered breathing (SDB). The American Academy of Otolaryngology–Head and Neck Surgery (AAO-HNS) has reported that SDB currently accounts for approximately 80% of all adenotonsillectomies (ATs) done in children, whereas throat infections account for approximately 10%.² This article reviews SDB, its sequelae, and

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the impact on children's health. Current trends in the clinical evaluation of SDB and options for management, namely AT, are discussed.

SLEEP-DISORDERED BREATHING DEFINED

The AAO-HNS defines SDB as a condition that encompasses a spectrum of disorders ranging in severity from snoring to obstructive sleep apnea (OSA) and characterized by "an abnormal respiratory pattern during sleep that includes snoring, mouth breathing, and pauses and gasps." They further delineate disordered breathing in sleep by noting that the prevalence of SDB in children is 10% to 12%, whereas the prevalence of OSA in children is 1% to 3%.³ Therefore, every child with OSA has SDB, but not every child with SDB has OSA. Specifically identifying where a patient lies on this spectrum from snoring to OSA facilitates the selection of optimal treatment, discussed later. A meta-analysis showed that overall prevalence of snoring was 7% and further demonstrated that SDB is more common among boys than girls, in obese youth, and among African American children.⁴

In *Cummings Pediatric Otolaryngology*,⁵ the pathophysiology of SDB is attributed to narrowing of the airway at multiple levels and it is often multifactorial. The primary factors contributing to this narrowing include adenotonsillar hypertrophy, craniofacial abnormalities (eg, micrognathia), laryngeal airway abnormalities (eg, laryngomalacia), and pharyngeal muscular hypotonicity, because it is found in several neuromuscular conditions (eg, cerebral palsy). In syndromic children (eg, Down syndrome), more than 1 of these factors may be encountered, making them a higher-risk population. The authors in Cummings notes that no single factor accounts for all cases, including adenotonsillar hypertrophy. They summarize by stating

*The current view is that children with OSA have an underlying abnormality of upper airway motor control or tone that, when combined with enlarged tonsils and adenoids, results in dynamic airway obstruction during sleep.*⁵

IMPACT OF SLEEP-DISORDERED BREATHING

SDB is associated with significant negative impact on quality of life (QOL) and overall health. The spectrum of this impact ranges from behavioral to cognitive and from social to cardiopulmonary. Evaluation of SDB should be considered in the following and other related pediatric disorders.⁶

Behavior

Likely the most common behavioral problem associated with SDB is attention-deficit/hyperactivity disorder (ADHD). More specifically, a range of externalizing behavioral issues have been linked to SDB from hyperactivity and inattention to rebelliousness and aggression.⁷ The connection between behavior and SDB is strong, with up to one-third of children with loud snoring and/or OSA showing symptoms of ADHD.⁸ Furthermore, there has been shown to be improvement in ADHD symptoms after AT indirectly, indicating a connection between the 2 disorders.⁹ The sleepiness/hypersomnia resulting from SDB is commonly thought to manifest through inattention and hyperactivity as externalized behaviors in children. This is in contrast to the more familiar symptoms of sleep deprivation seen in adults, such as yawning and drowsiness.^{7,10} No concrete mechanisms to explain the association between ADHD and SDB have been found, however. Currently, probable mechanisms are believed intermittent hypoxia and, to a lesser extent, chronic sleep restriction, fragmentation, or some combination of both.⁷

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