

## Biobehavioral Aspects of Oral Airway Dysfunction and Sleep Disorders in Children: Adopting a Multidisciplinary Approach to Treatment

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### OBJECTIVES:

- ***Explain normal sleep pattern in children and adolescents***
- ***Explain the anatomy and physiology of the upper airway and oral cavity***
- ***Delineate specific sleep disorders in children and how orofacial myofunctional disorders may contribute to the development of these disorders***
- ***Discuss how school performance and daytime behavior are affected by sleep disorders and improper patterns of respiration***
- ***Discuss the benefits of early identification, diagnosis, and multidisciplinary treatment of these disorders.***

Sleep is essential for the normal growth, development and mood regulation in children and adolescents. According to a poll by the National Sleep Foundation, sleep disorders are highly prevalent in the pediatric population. Greater than 2/3 of all children less than 10 years of age experience one or more sleep problem at least a few nights per week. Nearly 1/3 of these youngsters wake up at least once a night needing attention; 14% of school-aged children have similar patterns. Yet, greater than 50% of parents polled said their child's doctor did not ask about their child's sleep patterns! They noted that the older the child, the less likely a discussion about sleep occurred. However, frequent sleep problems are likely to occur in older children. The impact of these unresolved sleep issues may manifest as sleepy or overtired children in the daycare setting or classroom, which may actually present as inattention or hyperactivity.

One major underlying cause for sleep disruption in children and adolescents is sleep-disordered breathing (SDB). The prevalence for frank obstructive sleep apnea (OSA) in children is estimated to be between 1-3% of children, with a peak age of 2-5 years. The American Academy of Pediatrics recognizes that "OSA is a common condition in childhood and can result in severe complications if left untreated." Potential consequences of untreated sleep apnea in children are growth failure; learning, attention and behavioral problems; and cardiovascular complications.

The most current research demonstrates that even one apneic event per hour of sleep can result in measurable neurological changes in a child.

While tonsillectomy and adenoidectomy (T&A) can dramatically improve SDB in most children, and result in improved daytime behavior, it has been shown that SDB can relapse in teenage years. Other treatment modalities for pediatric SDB, include, but are not limited to positive airway pressure (PAP) therapy, oral appliance therapy, and other forms of orthodontic devices.

Moreover, a subset of pediatric patients may also have co-morbid craniofacial abnormalities, which puts them at increased risk for failure of the T&A to correct their breathing abnormality. These patients may be predisposed to having orofacial myofunctional disorders, which involve behaviors and patterns created by inappropriate muscle function and incorrect habits, (tongue, lips, jaw and face). Of the many possible myofunctional disorders, those involving the tongue and lips receive the greatest degree of attention. A tongue thrust is the most common orofacial myofunctional variation. During the act of swallowing, and/or during rest posture, an incorrect positioning of the tongue may contribute to improper orofacial development and maintenance of the misalignment of the teeth.

Oral myofunctional therapy (OMT) and proper tongue positioning within the oral cavity has been reported as early as 1918 to improve mandibular growth, nasal breathing, and facial contours. Guimares had proposed OMT as a treatment for SDB since the early 1990s. The exercises consist of isotonic and isometric exercises that target the oral and oropharyngeal structures.

According to a recent task force (Frey et al., 2014), a certified orofacial mycologist must be considered a necessary part of a comprehensive SDB screening protocol: for children, to aid proper oropharyngeal development and functional breathing patterns; for adults, to offer support for optimal health as part of a comprehensive treatment approach. A recent literature review conducted by Camacho et al. demonstrated that OMT reduced AHI by approximately 50% in adults and 62% in children. This lends support for the role of OMT for the treatment of SDB, and as adjuvant therapy for those patients undergoing ENT procedures, using PAP therapy, or other oral forms of orthodontic appliances.

## Risk factors for sleep-disordered breathing:

- **Enlarged tonsils and adenoids**
- **Craniofacial characteristics, including mid-facial hypoplasia, retrognathia, micrognathia, high arched palate, choanal atresia, craniofacial birth defects**
- **Cleft palate**
- **Asthma**
- **Obesity (not all with SDB are obese)**
- **Allergic rhinitis**
- **Down syndrome**
- **Sickle cell disease**
- **Spina bifida**
- **Cerebral palsy**
- **Neuromuscular conditions associated with hypotonia**
- **Gastroesophageal reflux disease**
- **Congenital heart disease**
- **Family history of SDB**

## Presenting nocturnal symptoms in children:

- **Snoring or snorting during sleep**
- **Choking or gasping**
- **Witnessed apneas**
- **Restless sleep**
- **Diaphoresis**
- **Enuresis**
- **Chronic mouth breathing during sleep**
- **Sleeping in abnormal positions (e.g., hyper-extended neck)**

## Presenting daytime symptoms:

- **Inattention or daydreaming**
- **Hyperactive behavior**
- **Learning difficulties**
- **Aggressive or oppositional-defiant behavior**
- **Morning headaches**
- **Tiredness**
- **Difficulty with AM waking**
- **Mood changes and irritability**
- **Cor pulmonale**
- **Pulmonary hypertension**
- **Failure to thrive (infants)**
- **Chronic mouth breathing**

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