

Obstructive Sleep Apnea (OSA) Screening in the Pediatric Dental Office

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OBJECTIVES

To describe the population of children who were referred from the Children's Health Dental Clinic to Otolaryngology due to a positive OSA screening and to determine the sensitivity of the screening form.

BACKGROUND

Sleep-disordered breathing (SDB) is a general term used to describe breathing difficulties that arise during sleep. SDB exists on a continuum of severity from partial obstruction of the upper airway that produces snoring to continuous episodes of complete upper airway obstruction, also termed obstructive sleep apnea (OSA). Underlying etiological factors associated with pediatric OSA include adenotonsillar hypertrophy, craniofacial anomalies with micrognathia, neuromuscular disorders, and obesity. More than 85% of patients with clinically significant OSA are undiagnosed despite OSA being a common medical condition¹. The effects of untreated OSA may include excessive daytime sleepiness, cardiovascular disease, depression, and may contribute to attention-deficit/hyperactivity disorder (ADHD) symptomatology². Treatments of OSA, including tonsillectomy and adenoidectomy, weight reduction, and trial of CPAP breathing, have shown favorable results in decreasing and resolving symptoms of OSA³.

OSA in the pediatric population presents peri-operative risks with various anesthesia modalities, including moderate and general anesthesia sedation. OSA has the potential to increase a patient's sensitivity to anesthetic effects and may cause difficulties with mask ventilation. Advanced sedation methods are utilized by pediatric dentists to provide care for patients with behavioral or medically compromising conditions. Children with undiagnosed OSA undergoing sedation may experience life-threatening breathing complications peri-operatively requiring potential hospital admission. To effectively determine a treatment plan for pediatric patients with advanced sedation modalities, the clinician must consider the possibility of undiagnosed OSA. Pediatric dentists and otolaryngology specialists at Children's Health in Dallas, Texas have formulated and implemented an OSA screening form requiring completion prior to scheduling patients for moderate or general anesthesia sedation.

MATERIALS AND METHODS

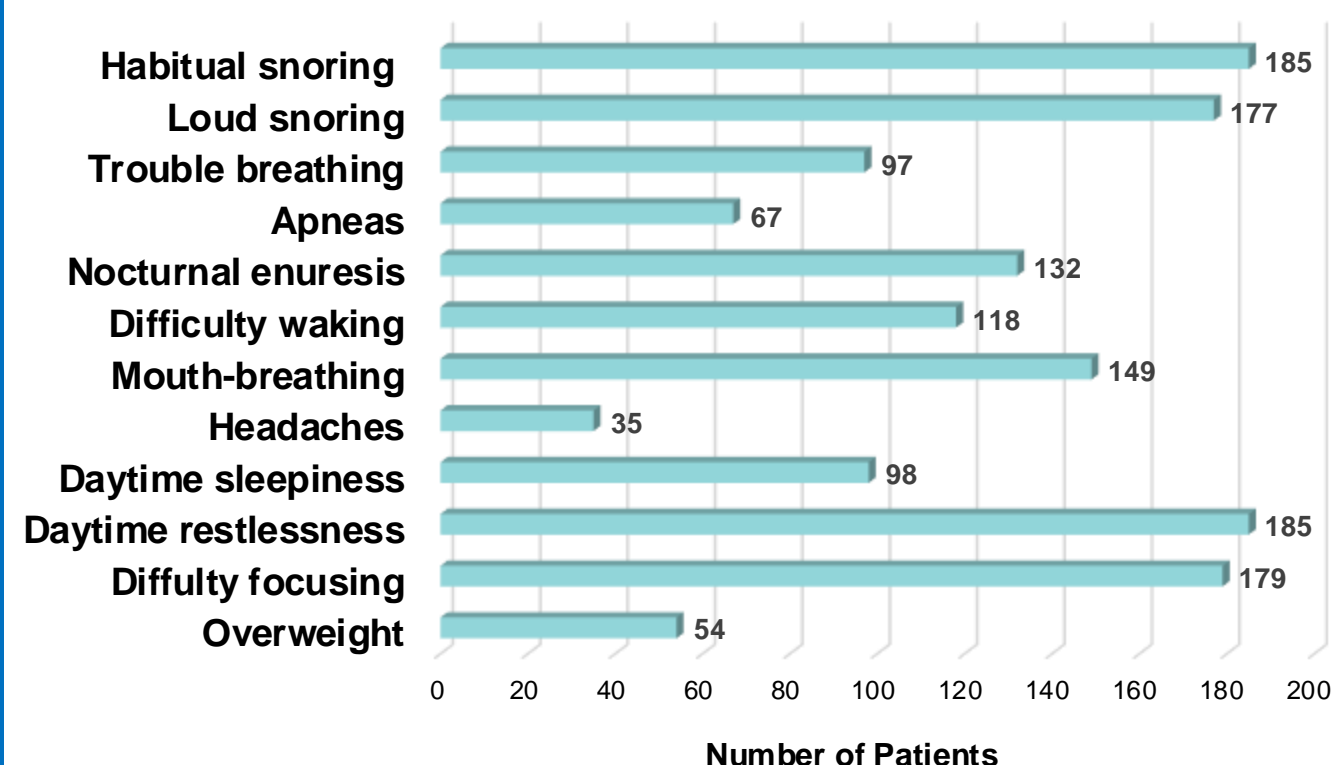
A prospective observational study was conducted between January 2016 and December 2020 on patients followed at Children's Health Dental Clinic who had been screened for OSA prior to dental surgery under general anesthesia. A 12-item screening form was completed by the parent prior to being scheduled for dental surgery. Children were excluded if they underwent polysomnography (PSG) in the previous 6 months, were on PAP therapy, had a known OSA diagnosis, or needed urgent dental surgery. Data was obtained from clinic notes and included age, gender, ethnicity, BMI Z-score, screening form score, ENT recommendations, and subsequent intervention or diagnosis of OSA.

The screening form asked caregivers if the child ever experienced: 1) habitual snoring, 2) loud snoring, 3) trouble breathing while sleeping, 4) apnea while sleeping, 5) nocturnal enuresis, 6) difficulty waking in the mornings, 7) daytime mouth-breathing, 8) morning headaches, 9) daytime sleepiness, 10) daytime restlessness, 11) difficulty focusing, 12) overweight. Any screening form with a score ≥ 6 resulted in surgery scheduling postponed and referral to the otolaryngology (ENT) clinic within 2 weeks.

The children were managed in accordance with the guidelines by the American Academy of Otolaryngology, Head and Neck Surgery for tonsillectomy and divided into 3 groups: (1) mild oSDB requiring observation only and can proceed to be scheduled for dental surgery; (2) requires T&A without PSG at time of dental surgery; (3) requires PSG before a decision about whether to proceed with T&A.

Data was analyzed by descriptive statistics and correlations.

Figure 1
Patients with Score ≥ 6 on Screening Form



RESULTS

A total of 216 patients scored ≥ 6 on the screening form and were referred for ENT evaluation. A total of 182 were evaluated by the ENT service (84.2% show rate).

- 46 of 182 children (25%) were in group 1 and scheduled for dental surgery with no ENT intervention.
- 41 (23%) were in group 2 and were recommended to have T&A.
- 95 (52%) were in group 3 and were recommended for PSG to determine presence and severity of OSA.
- Of the patients that had PSG, 32 (33.6%) were diagnosed with OSA. 21 of the 95 children (22.1%) had mild to moderate OSA (AHI 2-9) and 11 (11.5%) had severe OSA (AHI ≥ 10).
- There was no significant correlation between individual screening form questions and an OSA diagnosis.
- 73 (40.1%) were either recommended intervention (T&A) or received a diagnosis of OSA.
- The likelihood of OSA more than doubled in children who were obese versus not obese and who also scored greater than 6 points on the survey.

Figure 2
Patients Evaluated by ENT

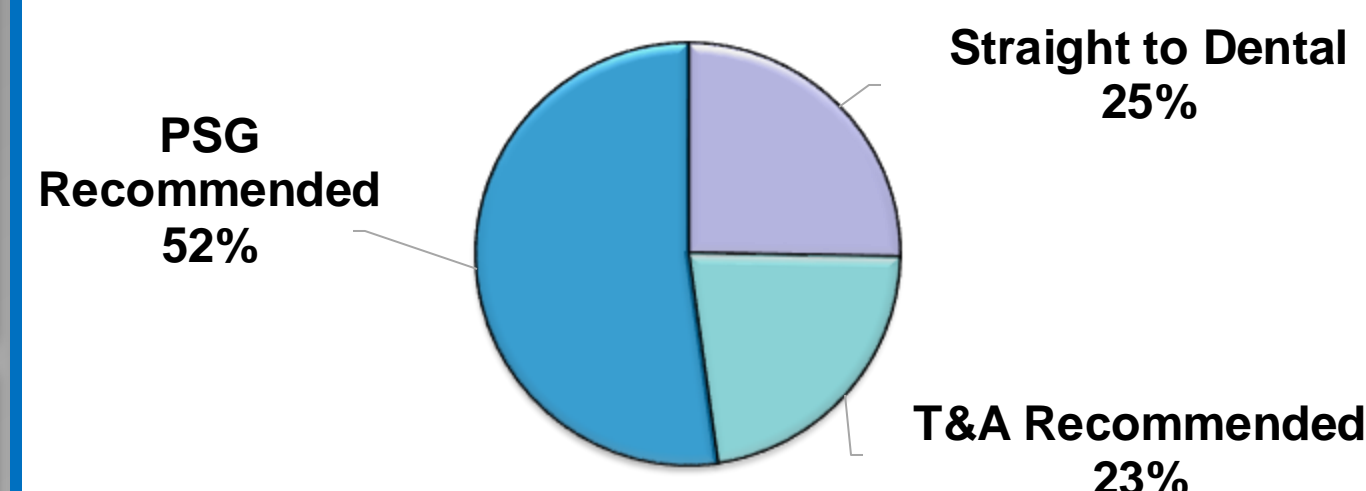
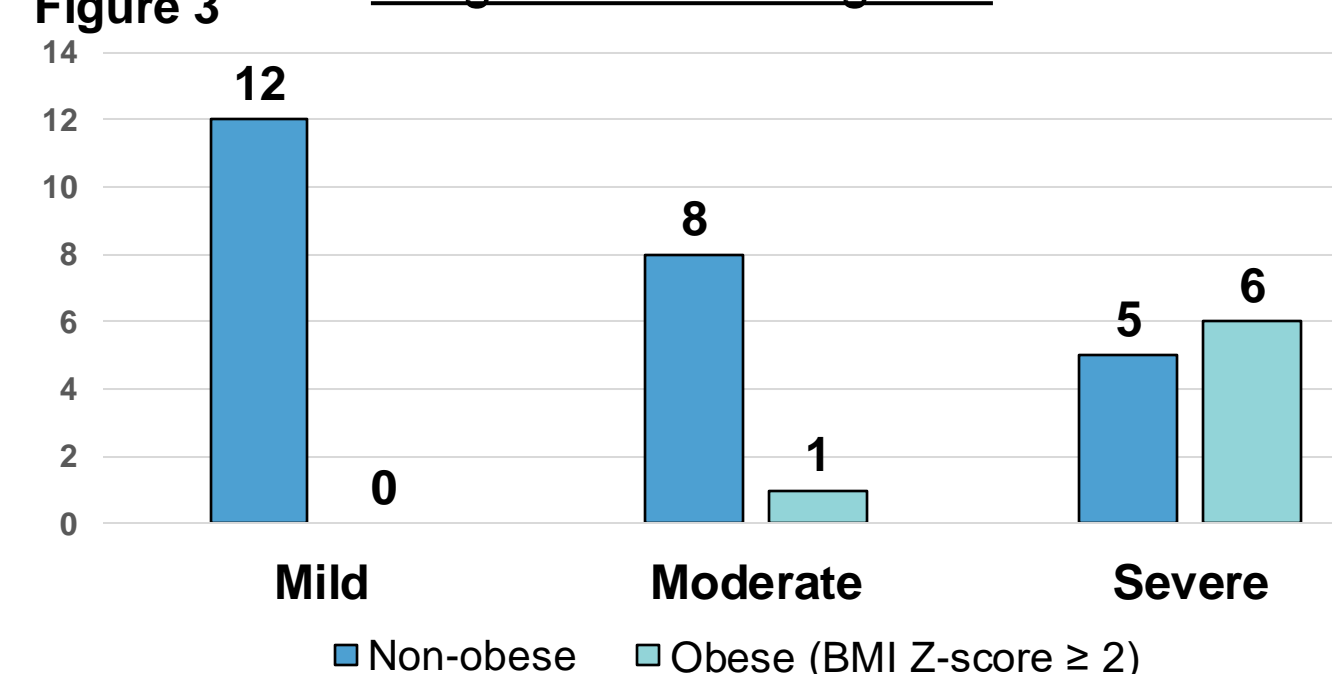


Figure 3
Weight vs. OSA Diagnosis



DISCUSSION

This study evaluated the use of a 12-item form to screen patients for OSA prior to undergoing general anesthesia for dental rehabilitation. The implementation of this simple and widely available tool has decreased post-operative admission rates as well as, in some cases, eliminated the need for multiple anesthetics by completing T&A at the time of dental surgery.

Several studies have reported on methods for identifying OSA in children prior to a surgical procedure. While PSG is the gold standard for a definitive diagnosis of OSA, a pre-operative screening PSG may not be completed given the associated costs, time, and staffing. Upon evaluation by ENT, some patients are recommended T&A without PSG for a formal diagnosis of OSA.

There are limitations to this study. There are patients who were recommended PSG but were lost follow-up. As a result, this missing data caused the reported outcomes to be lower than anticipated.

Children are increasingly undergoing general anesthesia for a variety of surgical and radiologic procedures. As obesity is becoming more common, identifying sleep disordered breathing is paramount. Screening for OSA in the pediatric dental office is important to risk stratify patients pre-operatively to maximize the safety of surgical procedures.

CONCLUSIONS

- This screening tool is able to identify patients at risk of OSA and provide the framework for referral and treatment guidelines prior to general anesthesia.
- There was no significant correlation between individual screening form questions and an OSA diagnosis.

REFERENCES

- Motamedi KK, McClary AC, Amedee RG. Obstructive sleep apnea: a growing problem. *Ochsner J.* 2009 Fall;9(3):149-53. PMID: 21603432; PMCID: PMC3096276.
- Umano GR, Rondinelli G, Luciano M, Pennarella A, Aiello F, Mangoni di Santo Stefano GSRC, Di Sessa A, Marzuillo P, Papparella A, Miraglia Del Giudice E. Pediatric Sleep Questionnaire Predicts Moderate-to-Severe Obstructive Sleep Apnea in Children and Adolescents with Obesity. *Children (Basel).* 2022 Aug 27;9(9):1303. doi: 10.3390/children9091303. PMID: 36138612; PMCID: PMC9497855.
- Slowik JM, Sankari A, Collen JF. Obstructive Sleep Apnea. [Updated 2024 Mar 21]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK459252/>