Mallampati and Brodsky Classification and Children's Risk for Sleep Related Breathing Disorder

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Objective: *To evaluate associations between Mallampati and Brodsky classification and children's risk for sleep related breathing disorder (SRBD).* ***Study Design:*** *This study recruited well-children 2-11 years old and legal guardians over 18 years from a community dental clinic. Modified Mallampati classification (I-IV) and Brodsky grade (0-4) were classified by a single dentist. Guardians completed the validated 22-item pediatric sleep questionnaire (PSQ) to identify children at risk of SRBD. Associations between Mallampati and Brodsky classifications with risk for SRBD as defined by PSQ were determined by Chi-square, Kruskal-Wallis, and simple logistic regression models.* ***Results:*** *Of 150 children included (M=5.9 years), 76 (51%) female, 108 (72%) Latino/Hispanic, 82 (55%) were classified as Mallampati class I or II, 68 (45%) class III or IV, 119 (79%) were identified as Brodsky grade 0, 1, or 2, and 31 (21%) grade 3 or 4. Children with Mallampati class III and IV and Brodsky grade 3 and 4 collectively had a 5.24-fold and 2.8-fold increase in SRBD risk per PSQ compared to children with class I and II and grade 1 and 2, respectively.* ***Conclusion:*** *Mallampati classification may be a quick, non-invasive screening tool to improve identification and timely intervention for children at risk of SRBD.*

Keywords: *Sleep apnea syndromes; Oropharynx; Snoring*

Abbreviations*: (***PSQ***) Pediatric Sleep Questionnaire,* **(SDB),** *Sleep-disordered breathing,* **(SRBD)** *Sleep Related Breathing Disorder,* **(UARS)** *Upper Airway Resistance Syndrome ,* **(OSA)** *Obstructive Sleep Apnea ,* **(BMI)** *Body mass index,* **(PSG)** *Polysomnography,* **(dmft/DMFT)** *Decayed, missing, or filled teeth,* **(CDC)** *Center for Disease Control*

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INTRODUCTION

Sleep-disordered breathing (SDB) is defined by a range of breathing abnormalities and dysfunctions including primary snoring, upper airway resistance syndrome (UARS), and obstructive sleep apnea (OSA) syndrome. Pediatric sleep-disordered breathing is understood to be relatively common, though reported prevalence rates range widely likely due to variation in assessment methodologies employed. Prevalence estimates suggest SDB affects between 0.7%–15.0% of the population, with a peak incidence between the ages of 2 and 8 years [1,2]. However, prevalence is likely much higher, as 90% of people who suffer from SDB are thought to be undiagnosed according to the American Osteopathic Association [3]. Delays in diagnosis of pediatric SDB may lead to significant morbidity, as it is associated with deficits in neurocognitive ability, cardiovascular impairments (i.e., systemic hypertension, right and left ventricular dysfunction), lack of proper growth and development, behavioral issues and school performance challenges, to name a few [4-6]. Several comorbidities have been identified with SDB, including increased body mass index (BMI), adenotonsillar hypertrophy, dental malocclusion, and craniofacial and/or airway abnormalities

According to the American Academy of Pediatrics, polysomnography (PSG) is the gold standard for diagnosis of SDB. Unfortunately, this diagnostic study does not come without significant

limitations for use in the general population, including cost, accessibility, and compliance of patients to undergo this overnight sleep study even when indicated [7]. The 22-item pediatric sleep questionnaire (PSQ) is a survey that was specifically designed to address the limitations of PSG in helping to identify at risk patients who may be suffering from underlying obstructive sleep related breathing disorders (SRBD) [8]. This questionnaire concentrates on three primary symptom complexes of SRBD: snoring, excessive daytime sleepiness, and inattentive/hyperactive behavior. The PSQ has been previously shown to be a reliable and valid tool, with a sensitivity of 0.85 and specificity of 0.87, to identify SRBD in clinical research when PSG is not practical or feasible [8,9]. While the 22-item PSQ has been validated as a useful SRBD risk screening tool, the presence of an easily identifiable clinical characteristic that could quickly and non-invasively forecast a patient's risk of SRBD would be a beneficial tool for clinicians to employ in practice. Sleep-disordered breathing and obstructive SRBD occur with narrowing or closing of a patient's airway. This constriction results in increased resistance or intermediate cessation of a patient's breathing. The muscles and soft tissues partially responsible for airway patency and upper airway collapse include the pharyngeal muscles, which help to control the movement of the tongue, soft palate, uvula, hyoid bone, and pharynx and function during respiration, phonation, deglutition, and coughing [10].

Developed in 1985, the Mallampati scale classification system was created as a predictive indicator of endotracheal intubation risk based on the anatomical and morphological features of patient's oropharynx. The modified Mallampati scale described by Samsoon and Young (1987), which differs from the original Mallampati scale in the number of classes and anatomical landmarks used for airway assessment and order of concealment of the structures by the tongue base, assesses many of the same pharyngeal muscles thought to contribute to a patient's diagnosis of SRBD and SDB [11]. However, the utility of Mallampati scale classification in SRBD risk detection has not been adequately assessed in this multifactorial disorder.

The aim of this study is therefore to evaluate the utility of the modified Mallampati scale (Class I-IV) as a quick, non-invasive clinical tool for identifying pediatric patients who may be at increased risk of SRBD as defined by a positive PSQ. The present study will additionally relate the modified Mallampati scale classification to the Brodsky classification scale (Grade 0-4), which is an already familiar and known associated risk factor for SRBD and SDB. In so doing, we will be able to assess and compare the associated risk factors of SRBD with the distinct anatomical airway characteristics and features in the pediatric population. The Brodsky classification of tonsil size (1989) was developed to assess tonsillar tissue size to improve OSA diagnosis and treatment recommendations. Adenotonsillar enlargement, as defined by the Brodsky classification, is a recognized etiologic factor contributing to OSA in otherwise healthy children [12]. Thus, assessment of a patient's Brodsky grade was included as an additional screening tool for pediatric SRBD for consideration in this study. Implementation of this valid clinical assessment method in the dental setting may help lead to greater detection and awareness of SRBD and SDB to reduce associated comorbidities in the pediatric population.

MATERIALS AND METHOD

A convenience sample of male and female well-children ranging in age from 2–11 years who were patients of record at the Columbia University community dental clinic in New York City and their parent/caregiver ("parents") over 18 years were targeted for enrollment. Participants were recruited by a single dental practitioner among patients who met the inclusion criteria presenting for regularly scheduled dental visits between July 2020 and November 2020. Exclusion criteria included non-English speaking parents, patients younger than 24 months or older than 11 years of age, and patients who had previously been diagnosed with a medical (other than obesity), psychosocial, or emotional condition or had previously undergone any form of surgery. Eligible parents who were interested in participating were verbally informed by the study dentist of the study background, objectives, risks, and voluntary nature, and were guaranteed that participation, or lack thereof, would not alter or interfere with their child's dental care and written informed consent was obtained. Ethical approval for the study protocol and procedures was obtained by the Columbia University Irving Medical Center Institutional Review Board (IRB-AAAS9471).

Mallampati scale and Brodsky Grade Classification

Clinical assessment of the patient's airway was completed at the beginning of the patient's dental examination. Determination of a patient's Mallampati scale class and Brodsky grade were conducted as clinic standard of care. Modified Mallampati classification was assessed by the single study dentist who utilized the technique described by Samsoon and Young (1987) [13]. In accordance with this technique, the patient was instructed to sit in an upright position in the dental chair with the head in a level position parallel to the floor. The patient was then asked to open his/her mouth and to protrude the tongue without phonation. For proper evaluation of the patient's airway, the dental clinician sat at eye level across from the study participant and with a light examined the patient's pharyngeal structures. Assessment of the modified Mallampati class was based on the visualization of specific structures in this position and was classified as follows[10].

Mallampati Class (Figure 2):

I–Visualization of the patient's soft palate, fauces, uvula, and tonsillar pillars

II–Visualization of the patient's soft palate, fauces and uvula

III–Visualization of the patient's soft palate and base of the uvula

IV –Inability to visualize the soft palate with exclusive visualization of the hard palate alone

Brodsky grades for evaluating tonsillar tissue size in relation to the patient's oropharynx was also completed at the time of oropharyngeal assessment by depressing the tongue while the patient's mouth was open with a protruded tongue for adequate visualization. Brodsky grade classification was classified as follows:

Brodsky Grade:

0–Tonsils completely concealed within the tonsillar pillar or previously removed

1–Tonsils occupy less than 25% of the oropharyngeal width

2–Tonsils occupy 26-50% of the oropharyngeal width

3–Tonsils occupy 51-75% of the oropharyngeal width

4–Tonsils occupy greater than 75% of the oropharyngeal width

Patients were then dichotomized for statistical analyses into Mallampati Group A (Mallampati class I and II) or Group B (Mallampati class III and IV). Likewise, patients were dichotomized by Brodsky grade into Brodsky Group A (Grades 0, 1 and 2) or Brodsky Group B (Grades 3 and 4).

Intrarater Reliability

Intrarater reliability was completed by the single study dentist who scored 20 photographs of patients' airway for Mallampati class and Brodsky grade. One week after initial scoring of each photograph's Mallampati class and Brodsky grade, the same study dentist scored the photos an additional time, in order to compare both scores and obtain the intrarater reliability.

Survey Data Collection

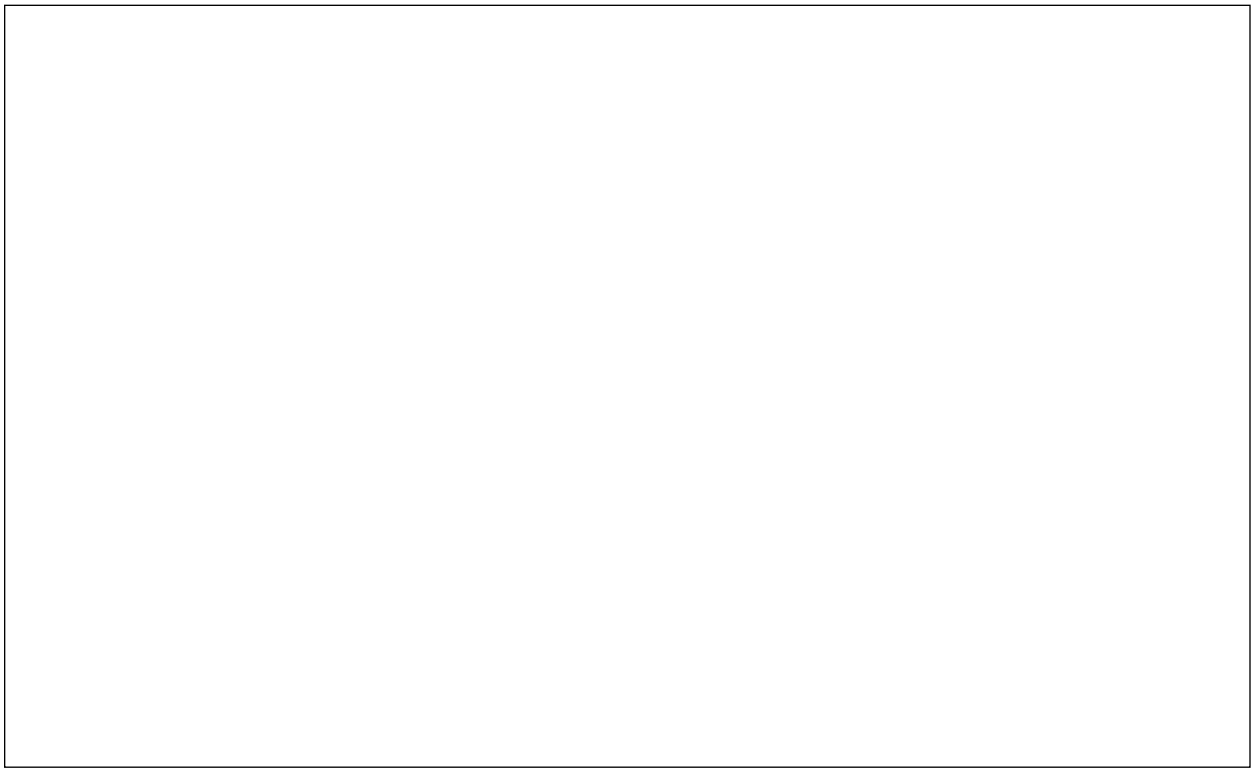
The 22-item PSQ includes questions designed to identify patients at-risk of underlying obstructive SDB by assessing SRBDs including daytime sleepiness and inattentive or hyperactive behavior. Following the dental examination and designation of the patient's airway classifications, the study dentist verbally administered the PSQ survey instrument to parents. The patient's parent answered each PSQ question using a simplified nominal scale (with responses, "yes," "no," or "don't know") (Figure 1). The number of symptom-items reflected positively ("yes") was divided by the number of PSQ survey questions that were answered positively or negatively, thus excluding items with missing responses where the parent responded "don't know." As described by Chervin *et al* (2000), the creators of the PSQ, scores greater than 0.33 were considered to be positive and indicative of patient's at "high risk" for SRBD.

Health Record Data Collection

Additional data points were collected from each patient's electronic health record, including caries experience using the decayed, missing, or filled teeth (dmft/DMFT) index status based on standard clinical and radiographic evaluation, patient age (in months), sex (male, female), height (in inches), weight (in pounds) and insurance status and type (Medicaid, third-party insurance, uninsured). Height and weight were used to calculate BMI percentile using the Centers for Disease Control and Prevention (CDC) growth charts [14].

Statistical Analysis. Patients who were determined to be "at risk" for pediatric SRBD were identified based on the results of the PSQ. Associations between Mallampati scale classification, Brodsky grade, and BMI with SRBD risk as defined by the PSQ were evaluated by Chi-square, Fisher-exact, Kruskal-Wallis tests, and simple logistic regression models, as appropriate. All statistical analyses were completed with the significance level set at P=0.05.

Figure 1 – This twenty-two question Pediatric Sleep Questionnaire (PSQ) concentrates on 3 primary symptom complexes: snoring, excessive daytime sleepiness, and inattentive/hyperactive behavior. The PSQ has been validated against polysomnography and was developed for clinical research purposes.



RESULTS

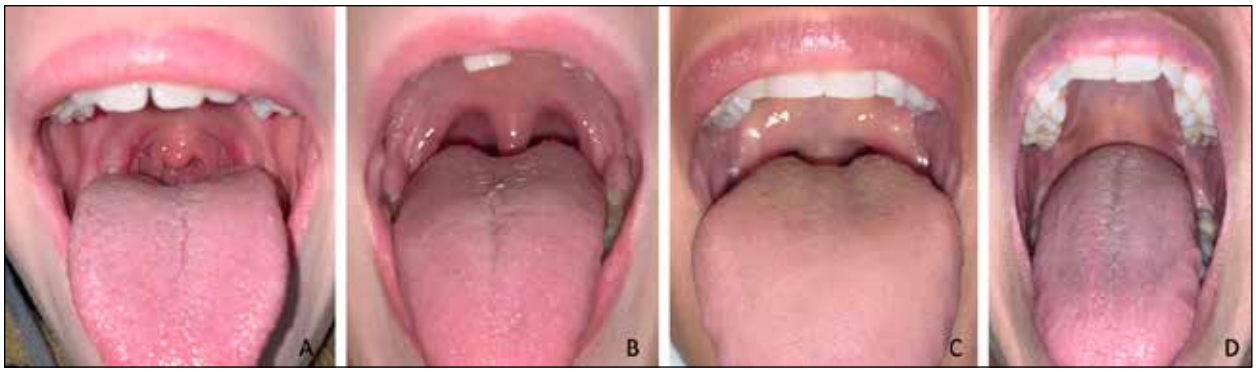
A total of 150 parent/child dyads (i.e., 300 participants) participated in this study. The average age of children was 5.9 years (range: 2.5–10.08 years), 76 (51%) were female, 107 (71%) identified as Latino/Hispanic, 43 (28.7%) were classified as obese, and 143 (95%) had Medicaid insurance. Approximately half (55%, n = 82) were identified as Mallampati class I or II (i.e. "Mallampati Group A") and 68 (45%) had Mallampati class III or IV (i.e. "Mallampati Group B"). Roughly four out of five patients (79%, n = 119) were identified as Brodsky grade 0, 1, or 2 (i.e. "Brodsky Group A"), and 31 (21%) had Brodsky grade 3 or 4 (i.e. "Brodsky Group B"). (Table 1). Intrarater reliability was found to be 0.85 for Mallampati class and 0.80 for Brodsky grade. The proportion (31%) of patients identified as Mallampati Group B who were also classified as Brodsky Group B was also significantly higher (P = 0.0049) than the proportion (12.2%) of patients in Mallampati Group B who were classified as Brodsky Group A.

Twenty-four (16%) of the children evaluated in this study were deemed to be at high risk for SRBD as defined by PSQ (range: 0.35 to 0.76). Seventy-nine percent of those children belonged to Mallampati group B. Patients' age (P=0.91), sex (P = 0.053), and dmft/DMFT index (P = 0.91) did not vary significantly between Mallampati groups. Increased SRBD risk as defined by the PSQ was also positively associated with BMI percentile (P=0.011) among children in Mallampati Group B. Variables within the PSQ for elevated nighttime snoring/heavy or loud breathing (P≤0.0001), difficulty waking in the morning (P=0.0002), and daytime inattentive or hyperactive behavior (P≤0.0001) were also each strongly associated with patient's in Mallampati Group B. Of the 22-item PSQ, table 2 depicts the 13 PSQ items that were found to be statistically significantly associated with Mallampati Group B. As table 2 demonstrates, associations exist between Mallampati Group B study subjects and those who were reported as snoring half the time or more at night (P=0.0095), having dry mouth on waking up (P=0.0014), wetting the bed (P=0.0018), being unrefreshed in the morning (P=<0.0001), being sleepy during the day per their teacher (P=0.0372), being hard to wake up in the morning (P=0.0039), being overweight (0.0037), having difficulty listening (0.0004), having difficulty organizing (P=0.0016), being easily distracted (P<0.0001), fidgeting with their hands or feet or squirming in their seat (P=0.0001), being on the go (P=0.003), interrupting others (P=0.001) (Table 2).

Table 1. Child Characteristics

	N	(%)
Age (years)		
2	3	(2.00)
3-4	44	(29.33)
5-6	54	(36.00)
7-8	44	(29.33)
9-10	5	(3.33)
Child's Sex		
Girl	76	(51.00)
Boy	74	(49.00)
Child's Race/Ethnicity		
Latino/Hispanic	107	(71.33)
African American	25	(16.67)
Mixed	8	(5.33)
White	6	(4.00)
Other	4	(2.67)
Mallampati Classification		
Class I	25	(16.67)
Class II	57	(38.00)
Class III	64	(42.67)
Class IV	4	(2.67)
Brodsky Grade		
Grade 0	0	(0.00)
Grade 1	17	(11.33)
Grade 2	102	(68.00)
Grade 3	31	(20.67)
Grade 4	0	(0.00)
Insurance		
Medicaid	128	(85.33)
Third-Party Insurance	19	(12.67)
Uninsured	3	(2.00)

Figure 2 – A) Mallampati Class 1 with visualization of the patient's soft palate, fauces, uvula and tonsillar pillars. B) Mallampati Class 2 with visualization of the patient's soft palate, fauces and uvula. C) Mallampati Class 3 with visualization of the patient's soft palate and base of the uvula. D) Mallampati Class 4 with visibility of the patient's hard palate alone.



Odds ratio estimates demonstrated that children in Mallampati Group B collectively had a 5.24-fold increase in SRBD-risk by PSQ compared to patients in Mallampati group A, when adjusted for BMI percentile with a 95% CI [1.81, 15.15]. Further, the odds of having increased risk for SRBD in patients with Brodsky Group B was 2.8 times the odds compared to the risk for patients with Brodsky Group A, with 95% CI [1.10, 7.30] (Table 3).

DISCUSSION

Sleep-disordered breathing in the pediatric population is a serious, prevalent, and underdiagnosed medical condition that is related to significant morbidity in those affected. While PSG sleep study remains the gold standard for diagnosis, easily obtainable and non-invasive screening tools are needed in order to ensure timely and appropriate intervention. The PSQ, a tool to help identify SRBD inclusive of upper airway resistance syndrome and OSA, has been utilized in place of PSG. Although previous studies found the PSQ to be a valid tool for children 2 to 18 years, its validity in this largely low-income minority population may differ. While PSQ is a supported screening tool, the time constraints inherent to a periodic examination appointment limits the feasibility of its utilization in a clinical setting, as the PSQ takes approximately five minutes to complete on average (representing roughly 17% of a standard 30-minute routine care appointment, which typically includes an in-depth clinical and radiographic examination as well as a dental cleaning).

Enlarged soft tissues in children, secondary to adenotonsillar hypertrophy, obesity and craniofacial abnormalities are known to have a positive correlation with SRBD and SDB because the conditions involve extensive soft tissue enlargement and partial obstruction of the upper airway [4]. By identifying a non-invasive physical marker of enlarged soft tissue that could be quickly and easily performed to help identify young patients with potential increased risk of SRBD and SDB, this study provides an alternative to the PSQ that may be more feasible for dental providers to implement and adopt in busy clinical practice. Furthermore, the study sample was limited to healthy patients devoid of medical, psychosocial, or emotional conditions with any history of past surgical procedures so as to limit undue psychological stress on the study subjects and to minimize the risk of additional variables that could complicate the results of this study's assessment on associations of SRBD with study subjects' anatomical airway findings.

Nearly all of the patients included in this study (87%) identified as either Latino/Hispanic or African American and over one quarter (28.7%) were found to be obese with a BMI percentile 95% or greater. This is just slightly higher than the national prevalence of childhood obesity reported by the CDC among Hispanic children (25.6%) and non-Hispanic Black children (24.2%). Childhood obesity is known to be a serious medical condition in and of itself, with its own series of serious medical comorbidities. Consistent with current research, elevated BMI percentile was found in this study to be independently associated with patients determined to be

Table 2. Positive responses to PSQ and Association with Mallampati Scale Classification

Questionnaire Item (N)	Total Responded "Yes" N (%)	Class I/II N (%)	Class III/IV	P-value
Snore half time more (146)	25	8 (9.88)	17 (26.15)	0.0095*
Dry mouth on waking up (144)	35	11 (13.92)	24 (36.92)	0.0014*
Wet the bed (149)	28	8 (9.76)	20 (29.85)	0.0018*
Unrefreshed in morning (148)	19	2 (2.44)	17 (25.76)	<.0001*
Teacher says sleepy during day (147)	12	3 (3.8)	9 (13.24)	0.0372*
Hard to wake child in morning (149)	38	13 (16.05)	25 (36.76)	0.0039*
Overweight (149)	25	7 (8.64)	18 (26.47	0.0037*
Doesn't listen (148)	26	6 (7.41)	20 (29.41)	0.0004*
Difficulty organizing (149)	24	6 (7.41)	18 (26.47)	0.0016*
Easily distracted (147)	45	12 (14.63)	33 (50.77)	<.0001*
Fidgets/squirms (149)	37	10 (12.35)	27 (39.71)	0.0001*
On the go (148)	36	12 (14.81)	24 (35.82)	0.003*
Interrupts others (148)	56	21 (25.93)	35 (52.24)	0.001*

* Chi-squared test

Table 3. Odds Ratio Estimates of Association with "high-risk" PSQ Score

Effect	Point Estimate	95% Wald Confidence Limits		P-value
Mallampati Group B vs Group A	5.971	2.093	17.034	0.0008*
Brodsky Group B vs Group A	2.84	1.102	7.303	0.0307*

* Wald Chi-Square test, $p < 0.05$.

at increased risk of SRBD by PSQ (P=0.011). In a study completed in 2009 by Dayyat *et al*, Mallampati classification was found to be significantly increased on average in obese children when compared to non-obese children [15]. The results of the present study adjusted for elevated BMI percentile when evaluating for associations between patients with increased Mallampati classifications and SRBD as determined by PSQ, thus allowing for generalization of these study results to non-obese patients as well.

The same parameters that are thought to suggest difficulty of endotracheal intubation are believed to be similarly suggestive of increased risk of SRBD and SDB due to limited patency of the oropharyngeal airway. Though recent studies have begun to look more closely at the association between Mallampati scale and OSA, definitive associations between SDB with Mallampati scale have yet to be clearly supported in the pediatric population, lending strength to the present study.

The finding in the present study that elevated Mallampati classification and Brodsky grade were associated with SRBD-risk by PSQ is consistent with prior research. Patients in Mallampati Group B and Brodsky Group B were over 5 times and 3 times, respectively, to be at increased risk of suffering from SRBD per the PSQ when adjusted for increased BMI. These results are consistent with those of a 2014 retrospective study that utilized PSG to diagnose pediatric patients with OSA. This study by Kumar *et al*, (2014) concluded that for every one-point increase in Mallampati class, the odds of having OSA increases by more than six-fold. Likewise, every one-point increase in tonsillar size was associated with a two-fold increase in odds of having OSA [16]. In alignment with these studies, a 2020 study completed by Kljajic *et al*, which used overnight PSG, determined modified Mallampati class, tonsillar size, and adenoid size were the most predictive factors of pediatric OSA diagnosis with a sensitivity of 0.84 and specificity of 0.74 [17]. Similarly, a 2006 study by Nuckton *et al* explored associations between 137 adult patients' Mallampati class with their respective apnea/hypopnea indices based on overnight PSG results. Though this study focuses on adult patients alone, it found Mallampati score to be an independent predictor of both presence and severity of OSA and concluded that each one-point increase in Mallampati class corresponded with a more than two-fold increase in odds of OSA [18]. Yagi *et al*, (2009) similarly reports a statistically significant correlation between modified Mallampati class and apnea and hypopnea index in 141 adult patients [19]. Hiremath *et al*, (1998) also supports the statistically significant association of greater Mallampati class and endotracheal intubation difficulty with presence of OSA while recognizing the shared anatomical features which act to reduce the skeletal confines of the tongue [20]. Though OSA is only one condition included in SRBD, which also includes upper airway resistance syndrome, these studies do support the present study's findings that a patient's Mallampati classification is associated with risk for SRBD.

In contrast, however, a previous retrospective study failed to find a clinical relevance between Mallampati class and apnea-hypopnea index as determined by PSG in the adult population. While Hukins *et al*, (2010) acknowledges an association between adult patients' Mallampati class with apnea-hypopnea index utilizing PSG, it questions the clinical relevance, suggesting that this association does not significantly modify the likelihood of severe OSA or absence of OSA [21].

The modified Mallampati classification's conventional use by anesthesiologists to determine the expected difficulty of endotracheal intubation relies on evaluation of the relative size of the tongue and the soft tissue intra-oral structures that are able to be visualized on opening and protrusion of the tongue. When the base of the tongue is disproportionately large, or the oropharyngeal cavity is disproportionately small, the tongue masks the visibility of the fauces pillars and uvula [10]. These factors could also apply to the risk of SRBD and SDB. Despite Hukin's suggested lack of clinical relevance for the association between elevated Mallampati class and the likelihood of severe OSA in the adult population, the varying soft tissue, respiratory, and anatomical features in the pediatric population may indicate differences in the predictive nature of Mallampati class with SRBD and SDB in children.

Brodsky classification is known to be a clinically significant factor in the diagnosis and treatment of patients with pediatric SRBD and SDB. This is assumed to be due to obstruction of a patient's oropharynx as a result of the lymphoepithelial enlargement common to children. A 2007 study by Guilleminault *et al*, however suggests that resolution of a patient's adenotonsillar hypertrophy is not the only factor necessary for resolution of a child's OSA. Among other factors (retrognathic mandible, enlarged nasal inferior turbinates and deviated septum), this study (2007) found increased Mallampati classification scores of III and IV to be significantly associated with persistent abnormal PSG for children previously diagnosed with OSA who had completed adenotonsillectomies [22]. The positive association found for patients with elevated modified Mallampati scores and SRBD per PSQ in the present study support the impact that patient's pharyngeal muscles, which help to control the movement of the tongue, soft palate, and uvula, can play in a pediatric patient's airway patency and risk for SRBD and SDB as well.

The findings of this study are encouraging to support the utility of Mallampati classification in identification of children at risk of SRBD. However, findings should be taken within the context of several study limitations. As this study was conducted in one community dental clinic within the New York metropolitan area and lacked significant diversity among participants, the results of this study may not be generalizable to other pediatric populations. Another potential limitation of this study is the lack of blinding for the practitioner who assessed and identified each patient's oropharynx and then administered the PSQ to participating parents. However, to minimize risk of bias the dentist followed a standardized protocol to administer the survey in as consistent a manner across participants as possible. Another potential limitation of this study includes the inability to obtain a definitive diagnosis of SDB as confirmed by PSG for the recruited patients. Though the PSQ has been previously validated in the diagnosis of SRBD to an extent useful for research, the sensitivity of 0.85 and specificity of 0.87 leaves room for error and may be further limited by its use in this particular study population.

Despite these limitations, this study suggests that evaluation of a patient's Mallampati classification may serve as an additional, quick, and non-invasive screening tool that can be readily incorporated in clinical practice to help in early identification of patients at risk of SRBD and SDB. As delayed diagnosis of pediatric SDB is associated with significant morbidity in children this easily implemented clinical tool may help promote earlier recognition and

treatment, which may help to mitigate these associated sequelae. The associations that were identified in this study between Mallampati classification and SRBD-risk by PSQ support its use by dental practitioners as a quick, non-invasive screening tool to identify children's risk of SRBD. Dental practitioners, in particular, pediatric dental practitioners, are well-positioned to complete a high-level examination of a patient's oropharynx, including Mallampati class and Brodsky grade, to identify patients with increased risk for SRBD and facilitate recognition/anticipatory guidance, referral for early diagnosis, and age-appropriate early intervention. Additional prospective studies are required to validate the predictive nature of Mallampati classification with diagnosis of pediatric SDB.

Pediatric dentists have an instrumental role in the identification of patients at increased risk of pediatric SRBD. In addition to an in-depth evaluation of a patient's oropharynx, it is similarly essential to assess those patients with corresponding or independent signs of dental malocclusion. Airway obstruction is known to be an important cause of malocclusion. Posterior crossbite and anterior open bite for example were associated with SDB in a 2020 study that evaluated this in 390 patients 7 to 8 years of age [23]. Such information as part of a patient's comprehensive examination emphasizes the essential role that pediatric dentists play in early diagnosis and intervention to minimize adverse effects in patients with undiagnosed SRBD and SDB.

CONCLUSIONS

Based on this study's results, the authors conclude the following:

Mallampati classification scale and Brodsky grading scale are associated with pediatric SRBD-risk as defined by the PSQ.

Further research is warranted to determine if the association between Mallampati scale classification and SRBD-risk by PSQ is clinically relevant.

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