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Evaluation of swallowing and voice functions in children with different degrees of adenoid hypertrophy and after adenoidectomy

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MAIN POINTS

- Children with severe adenoid hypertrophy (>50% nasopharyngeal obstruction) exhibited significantly higher PEDI-EAT-10 and CVHI-10 scores, indicating greater self-reported severity of swallowing and voice-related symptoms.
- Self-reported dysphonia (CVHI-10 $\geq$9) and swallowing difficulties (PEDI-EAT-10 >3) were most prevalent in patients with severe adenoid hypertrophy, whereas such symptoms were rare or absent in controls.
- Adenoidectomy led to significant postoperative improvements in self-reported swallowing and voice symptoms, as assessed by questionnaire scores.

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ABSTRACT

Aim: To evaluate self-reported swallowing difficulties and voice-related symptoms in children with varying degrees of adenoid hypertrophy and in those who had undergone adenoidectomy.

Materials and Methods: Children aged 5–12 years diagnosed with adenoid hypertrophy were included in this prospective cohort study. Patients were categorized into three groups based on the degree of nasopharyngeal obstruction: no detectable adenoid hypertrophy (control), adenoid hypertrophy occupying less than $\leq$50% of the nasopharyngeal space, and adenoid hypertrophy occupying more than >50% of the nasopharyngeal space. Swallowing and voice functions were assessed using validated self-report screening questionnaires: the Children's Voice Handicap Index-10 (CVHI-10) and the Pediatric Eating Assessment Tool-10 (PEDI-EAT-10). For patients who underwent adenoidectomy, both questionnaires were re-administered one month postoperatively and compared with preoperative results.

Results: A total of 113 children (mean age 7.41 ± 2.00 years) were included. Group comparisons showed that PEDI-EAT-10 and CVHI-10 scores were significantly higher in Group 3 than in Group 1 (p<0.001). Adenoidectomy significantly reduced both scores postoperatively (p<0.001). Self-reported dysphonia was observed in 15% of patients, and self-reported swallowing difficulties in 25.7% of patients, with the highest prevalence in Group 3.

Conclusion: Severe adenoid hypertrophy was associated with greater patient-reported impairments in swallowing and voice function compared with controls. Adenoidectomy led to significant postoperative improvements in swallowing and voice symptoms, as assessed by screening tools.

Keywords: Adenoid hypertrophy, Swallowing, Voice, Self-reported symptoms, Pediatric otolaryngology

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INTRODUCTION

The adenoid is lymphoid tissue located on the roof and posterior wall of the nasopharynx [1]. Adenoid hypertrophy leads to prominent symptoms such as nasal obstruction, snoring, chronic oral breathing, and sleep-disordered breathing in children [2]. The tonsils and adenoids, situated within the vocal tract, can narrow the airway, hinder sound production, and alter voice quality [3]. Enlargement of these structures may result in nasal obstruction, subsequent oral breathing, and dehydration of the laryngeal mucosa. Indeed, it has been demonstrated that even 15 minutes of oral breathing in healthy adults increases phonation threshold and vocal effort [4]. Mucosal dryness elevates vocal fold friction, leading to vocal edema and fatigue. Furthermore, children with adenoid hypertrophy frequently present with speech disorders; hyponasality commonly occurs because nasal resonance is reduced by the adenoids [5].

Adenoidectomy, performed alone or with tonsillectomy, is a common procedure in pediatric otorhinolaryngology [6]. However, postoperative complications such as pain, bleeding, edema, nasopharyngeal stenosis, hypernasality, and velopharyngeal insufficiency may occur [7]. Velopharyngeal dysfunction arises from inadequate closure during speech and swallowing, resulting in hypernasality and nasal air escape or nasal regurgitation of food [8]. Adenoid hypertrophy may play a modulatory role in velopharyngeal closure, acting as a passive cushion that facilitates velar contact in some children; therefore, adenoid hypertrophy alone is not considered a direct cause of velopharyngeal insufficiency. Instead, velopharyngeal function appears to depend on the balance between upper airway anatomy and neuromuscular coordination, and latent velopharyngeal insufficiency may become evident following adenoidectomy. Moreover, effective velopharyngeal closure is relevant not only for speech but also for swallowing.

Incomplete nasopharyngeal closure may result in nasal air escape or, less commonly, nasal regurgitation of food [8]. Adequate velopharyngeal function is essential for normal speech development, and surgical interventions involving the oropharynx and nasopharynx, such as adenoidectomy, may alter the pharyngeal musculature and contribute to velopharyngeal insufficiency [9].

There is a close relationship among airway muscles, airway anatomy, and the coordination of respiration and swallowing. Chronic oral breathing may lead to muscle prolapse and positional changes in orofacial structures [10]. In mouth-breathing children, swallowing has been shown to involve altered tongue activity patterns, with delayed and less coordinated tongue–palate contact, reflecting impaired neuromuscular control during the oral phase of swallowing [10]. The primary function of the upper airway is to facilitate the passage of air and food from the oral cavity to the oropharynx; however, obstructive factors may disrupt this process, resulting in dysphagia during the pharyngeal phase [11]. Swallowing consists of the oral preparatory, oral transit, pharyngeal, and esophageal phases. During this process, food is chewed, mixed with saliva, and transported to the pharynx by the tongue, while the soft palate closes the choanae to prevent nasal regurgitation and the pharyngeal muscles transfer the bolus to the lower pharynx [12,13]. Effective swallowing requires precise coordination between breathing and deglutition, and studies have demonstrated that alterations in upper airway patency and nasal airflow can disrupt breathing–swallowing coordination, leading to reduced swallowing efficiency [14]. Dysphagia may arise from various factors that interfere with bolus transit or sensitivity at any stage of this sequence [15]. Radiological, endoscopic, and manometric methods used for definitive diagnosis are often invasive and costly.

The aim of this study is to identify pediatric patients with self-reported swallowing difficulties and voice-related symptoms among those with varying degrees of adenoid hypertrophy and after adenoidectomy, using two non-invasive screening questionnaires: the Children's Voice Handicap Index-10 (CVHI-10) and the Pediatric Eating Assessment Tool-10 (PEDI-EAT-10). Although swallowing and voice functions have been investigated in patients undergoing tonsillectomy, studies focusing exclusively on adenoid hypertrophy remain limited. Moreover, the evaluation of patient-reported swallowing and voice symptoms following adenoidectomy has received relatively little attention in the literature. Therefore, this study aims to provide additional data on the association between severity of adenoid hypertrophy and self-reported swallowing and voice symptoms in the pediatric population.

MATERIALS AND METHODS

This study was conducted on pediatric patients aged 5–12 years who presented to the Otorhinolaryngology (ENT) Outpatient Clinic of the University Faculty of Medicine Hospital and were diagnosed with adenoid hypertrophy. The age range of 5–12 years was selected because children under 5 might have difficulty understanding and completing the questionnaires, whereas children over 12 might exhibit voice changes related to developmental factors that could affect the results. Adenoidectomy was indicated for sleep-disordered breathing.

Exclusion criteria included craniofacial malformations (including cleft palate), prior adenotonsillar surgery, neuromuscular disorders, systemic diseases, candidacy for tonsillectomy, nasal septal deviation or hypertrophic obstructive turbinates, tonsillar hypertrophy (grades 3 and 4), or palatal anomalies.

The study protocol was approved by the Kırıkkale University Non-Interventional Research Ethics Committee (Date: 14.11.2024, Decision No: 2024.11.14). Written informed consent was obtained from the parents of all participants, and the principles of the Declaration of Helsinki were followed.

Assessment of adenoid size

All patients underwent flexible nasopharyngoscopy (Karl Storz, Tuttlingen, Germany), and the degree of adenoid obstruction was assessed based on the proportion of the nasopharyngeal airway occupied by adenoid hypertrophy. The "endoscopic adenoid percentage" was defined as the estimated percentage of choanal obstruction caused by the adenoid hypertrophy, visually determined during endoscopic examination. Each examination was independently evaluated by two experienced otorhinolaryngologists who were blinded to the questionnaire results. The adenoid size was categorized as causing $\leq$50% or >50% nasopharyngeal obstruction by consensus of the two observers. In cases of initial disagreement, the recorded endoscopic images were reviewed jointly, and a final decision was reached by consensus. This approach was used to minimize inter-observer variability and improve measurement reliability.

Study groups

All patients underwent a general ENT examination and flexible nasopharyngoscopy (Karl Storz, Tuttlingen, Germany). Based on the size of the adenoid hypertrophy in the nasopharynx, patients were categorized into three groups:

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- Group 1 (Control group): The control group consisted of patients who were referred for evaluation of nasal obstruction or snoring but were found to have no detectable adenoid hypertrophy on nasopharyngoscopic examination (Figure 1a).
- Group 2: Children with adenoid hypertrophy occupying ≤50% of the nasopharynx (Figure 1b).
- Group 3: Children with adenoid hypertrophy occupying >50% of the nasopharynx (Figure 1c) Most patients in this group were candidates for surgical treatment. Those who underwent adenoidectomy were reevaluated in the first postoperative month.

Demographic data (age and sex) for all patients were recorded. The participants were administered the Children's Voice Handicap Index-10 (CVHI-10) and the Pediatric Eating Assessment Tool-10 (PEDI-EAT-10) questionnaires. For Group 3 patients undergoing adenoidectomy, the same Questionnaires were re-administered at one month postoperatively, and the preoperative and postoperative results were compared. Validated parent- or self-reported questionnaires were used as non-invasive tools to assess symptom severity and functional impact related to voice and swallowing in the pediatric population. Both CVHI-10 and PEDI-EAT-10 are screening instruments and do not provide a definitive diagnosis of dysphonia or dysphagia.

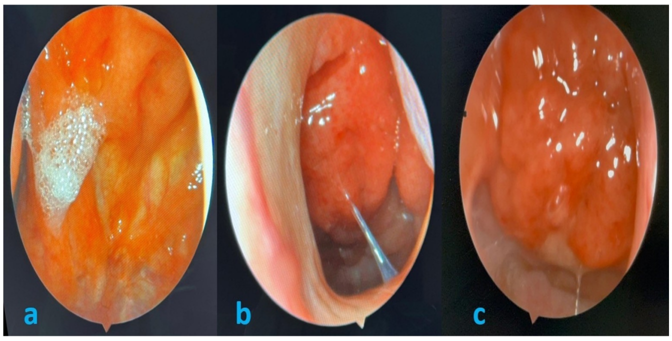

Figure 1. Nasopharyngoscopic images: (a) absence of adenoid hypertrophy; (b) adenoidhypertrophy occupying ≤50% of the nasopharyngeal space; (c) adenoid hypertrophy occupying >50% of the nasopharyngeal space.

Children's Voice Handicap Index-10 (CVHI-10)

The CVHI-10 is a self-assessment tool for pediatric dysphonia, completed directly by children. It was developed by Ricci-Maccarini et al. [16]. The scale consists of 10 items and assesses how dysphonia affects the child's daily life and their perception of their voice disorder. In younger children, particularly those aged 5–7 years, the questionnaire was completed with parental assistance to ensure comprehension and response accuracy. Responses are rated using a Likert scale ranging from 0 to 3. The Turkish version of the CVHI-10 has been validated as a reliable and sensitive instrument for evaluating children's perceptions of voice disorders [17]. The internal consistency of the Turkish-CVHI-10 was 0.87. The Cronbach's alpha coefficient is considered good. The cut-off point of the Turkish version of the CVHI-10 is 9, whereas in the original CVHI-10, it was 4. A CVHI-10 score of 9 or higher is considered indicative of dysphonia [17].

Pediatric Eating Assessment Tool-10 (PEDI-EAT-10)

The Eating Assessment Tool-10 (EAT-10) is a widely used, self-administered, symptom-specific outcome measure that has been validated for clinical use [18]. Beyond assessing the risk of dysphagia from the patients' perspective, it also serves as a valuable tool for identifying dysphagia symptoms and evaluating their prevalence in associated clinical conditions [19]. In children aged 5–7 years, the PEDI-EAT-10 was completed with parental assistance, whereas older children completed the questionnaire independently under supervision.

The PEDI-EAT-10 version consists of ten questions and is a valid and reliable symptom-specific instrument for children, with its validity demonstrated in Turkish pediatric populations [20,21]. An EAT-10 score greater than 3 was considered indicative of aspiration risk [18].

Surgical technique (Adenoidectomy)

All surgical procedures were performed under general anesthesia with oral endotracheal intubation. The child was positioned supine in the Rose position, and adenoidectomy was performed using the conventional curettage technique with

Figure 2. Conventional curettage technique performed using a Boyle--Davis mouth gag.

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Table 1. Patient demographics and clinical characteristics.

Parameter	Group 1 (No Adenoid) (n=36)	Group 2 (≤50% Adenoid) (n=36)	Group 3 (>50% Adenoid) (n=41)	p
Age	7.67±1.82	7.39±2.01	7.20±2.15	0.591
Gender (Female/Male)	14/22	22/14	8/33	**0.001**
Endoscopic Adenoid Size, %	0	42.2±9.29	73.54±10.62	**<0.001**

Bold values indicate statistical significance.

Table 2. PEDI-EAT-10 and CVHI-10 scores.

	Group 1 (No Adenoid) (n=36)	Group 2 (≤50% Adenoid) (n=36)	Group 3 (>50% Adenoid) (n=41)	p
PEDI-EAT-10	0.64±1.07	3.22±4.24	6.20±8.61	**<0.001**
CVHI-10	0.94±1.95	3.81±4.45	6.00±7.66	**<0.001**

All scores are given as mean±SD. Bold values indicate statistical significance.

Table 3. Pre- and Postoperative PEDI-EAT-10 and CVHI-10 scores in adenoidectomy patients.

	Group 3 (>50% Adenoid) (n=30 Undergoing adenoidectomy)
PEDI-EAT-10	
Preoperative	2.00 (0.00-10.25)
Postoperative	0.00 (0.00-1.25)
p	**<0.001**
CVHI-10	
Preoperative	2.50 (0.00-8.25)
Postoperative	0.00 (0.00-2.00)
p	**<0.001**

All scores are given as median (25^{th}-75^{th} percentile). P-values were obtained using the Wilcoxon signed-rank test. Bold values indicate statistical significance.

the aid of a Boyle-Davis mouth gag (Figure 2). A nasopharyngeal pack was placed for five minutes. After removal of the pack, hemostasis was achieved, and the procedure was completed. No serious intraoperative or postoperative complications occurred.

Statistical analysis

All statistical analyses were performed using IBM SPSS Statistics, version 21.0 (Armonk, NY: IBM Corp.). The distributions of the variables were assessed using both analytical (Kolmogorov–Smirnov test) and visual methods (histograms and probability plots). Categorical variables were compared using the chi-square test or Fisher's exact test, as appropriate. Continuous variables were analyzed by one-way analysis of variance (ANOVA) or the Kruskal–Wallis test, depending on their distributional characteristics. For within-group comparisons of preoperative and postoperative measurements in patients undergoing adenoidectomy, the Wilcoxon signed-rank test was used because the paired data were not normally distributed. Post-hoc pairwise comparisons were adjusted using the Bonferroni correction. Results are presented as counts and percentages for categorical variables, mean ± standard deviation for normally distributed continuous variables, and median with interquartile range (25^{th}–75^{th} percentiles) for non-normally distributed continuous variables. A post hoc power analysis was performed using the observed effect size (Cohen's d = 0.88) obtained from the comparison between Group 1 and Group 3 on both the PEDI-EAT-10 and CVHI-10 scores. At a two-tailed significance level of 0.05 (95% confidence), the achieved statistical power exceeded 0.95, indicating that the sample size was sufficient to detect clinically meaningful differences between groups.

RESULTS

A total of 113 pediatric patients with a mean age of 7.41 ± 2.00 years were included in the study. Of these, 44 were female (38.9%) and 69 were male (61.1%). The overall mean Children's Voice Handicap Index-10 (CVHI-10) score was 3.69 ± 5.72, and the overall mean Pediatric Eating Assessment Tool-10 (PEDI-EAT-10) score was 3.48 ± 6.15. Demographic and clinical characteristics of the patients are presented in Table 1. There were no significant differences in age among the groups (p>0.05). However, sex distribution differed significantly among groups (p = 0.001), with a higher proportion of females in Group 2 and of males in Groups 1 and 3. Endoscopic adenoid percentage also differed significantly among groups (Table 1). Group 2 had a mean adenoid percentage of 42.2 ± 9.29%, whereas Group 3 had a mean adenoid percentage of 73.54 ± 10.62%.

Group PEDI-EAT-10 and CVHI-10 scores are shown in Table 2. A significant difference was observed in PEDI-EAT-10 scores among the groups (p<0.001). Post hoc analysis revealed that this difference was attributable to higher scores in Group 3 than in Group 1 (p<0.001). The magnitude of this difference was large (Cohen's d = 0.88, 95% CI: 0.41–1.35). No significant differences were found between Groups 1 and 2 (p = 0.178) or between Groups 2 and 3 (p = 0.077). CVHI-10

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Table 4. Distribution of self-reported dysphonia and swallowing difficulties across the study groups.

Parameter	Group 1 (No Adenoid) (n=36)	Group 2 (≤50% Adenoid) (n=36)	Group 3 (>50% Adenoid) (n=41)	Total
Normal Voice/ Self-reported dysphonia symptoms (CVHI-10 ≥9) Percentage (%)	36/0 100%/0%	30/6 83.3%/16.7%	30/11 73.2%-26.8%	96/17 85.0%-15.0%
Normal Swallowing/ Self-reported swallowing difficulties (PEDI-EAT-10 >3) Percentage (%)	35/1 97.2%-2.8%	26/10 72.2%-27.8%	23/18 56.1%-43.9%	84/29 74.3%-25.7%

All values are presented as number (n) and percentage (%).

scores also differed significantly among the three groups. Post hoc analysis showed that the difference was driven by higher scores in Group 3 compared with Group 1 ($p<0.001$), with a large effect size (Cohen's d = 0.88, 95% CI: 0.41–1.35). No significant differences were observed between Groups 1 and 2 ($p = 0.078$) or between Groups 2 and 3 ($p = 0.230$).

In Group 3, 30 patients underwent adenoidectomy and 11 did not. Pre- and postoperative PEDI-EAT-10 and CVHI-10 scores for the surgical subgroup are presented in Table 3. Both PEDI-EAT-10 and CVHI-10 scores improved significantly after adenoidectomy ($p<0.001$), indicating that the procedure reduced the symptom burden.

The risk of dysphonia (CVHI-10 ≥9) was observed in 15% of patients (Table 4). The highest prevalence was noted in Group 3 (26.8%), whereas no patients in Group 1 exhibited this risk. In Group 3, four of the 11 nonsurgical patients and seven of the 30 surgical patients exhibited risk of dysphonia preoperatively. Among the surgical subgroup, 23 patients had normal voice, while 7 exhibited risk of dysphonia before surgery. At the first postoperative month, only one patient continued to exhibit risk of dysphonia.

A Risk of dysphagia (PEDI-EAT-10 >3) was identified in 25.7% of patients (Table 4). The highest prevalence was noted in Group 3 (43.9%), while Group 1 had the lowest prevalence (2.8%). In Group 3, five of the 11 nonsurgical patients exhibited a risk of dysphagia. Among the 30 patients who underwent adenoidectomy, 13 exhibited risk of dysphagia preoperatively, but only two continued to exhibit risk of dysphagia postoperatively.

DISCUSSION

Hypertrophic adenoids may facilitate velopharyngeal closure by narrowing the space between the soft palate and the posterior pharyngeal wall. Their removal during adenoidectomy suddenly enlarges this space, which can cause transient hypernasality, whereas hypertrophy itself may lead to hyponasality [5, 22-24]. Because the vocal tract acts as an acoustic resonator, any structural alterations of the oral or pharyngeal cavities can modify resonance characteristics and affect perceived voice quality [3,25].

In this study, larger adenoid size was associated with higher Children's Voice Handicap Index-10 (CVHI-10) scores and increased self-reported dysphonia symptoms. After adenoidectomy, CVHI-10 scores improved significantly, indicating a positive effect of surgery on voice-related quality of life. These findings suggest that mechanical obstruction and altered resonance due to adenoid hypertrophy predominantly influence patients subjective perception of voice, as reflected by patient-reported outcome measures. Although CVHI-10 scores were higher in Group 3 than in Group 2, the lack of a statistically significant difference between these two groups may suggest that once adenoid hypertrophy exceeds a certain threshold of nasopharyngeal obstruction, further increases in size do not proportionally worsen perceived voice-related symptoms. Previous research has yielded comparable findings. Salami et al. reported a significant improvement in Voice Handicap Index (VHI) scores after tonsillectomy and/or adenoidectomy [26]. Naraghi et al. observed postoperative improvements in Pediatric Voice Handicap Index (PVHI) and Pediatric Voice-Related Quality of Life (PVRQOL) scores among 86 children who underwent adenotonsillectomy [27]. Similarly, Karakurt et al. found improved PVHI scores among children with tonsillar hypertrophy after adenotonsillectomy, although objective acoustic parameters remained unchanged; this parallels our observation that symptom-based voice outcomes improve following relief of upper airway obstruction [28].

Abdel-Aziz et al. showed that children with severe adenoid hypertrophy frequently exhibited preoperative hyponasality and transient postoperative hypernasality, which typically resolved within three months, reflecting temporary resonance adaptation after surgery [29]. Pinto et al. also reported improved nasal resonance following adenoidectomy or adenotonsillectomy, without significant changes in acoustic parameters [3]. Together with the present results, these findings suggest that adenoidectomy may improve perceived voice quality, even in the absence of objective acoustic assessment in the present study.

Liu et al. found no significant differences in acoustic parameters after tonsillectomy with or without adenoidectomy. However, aerodynamic analyses demonstrated increased maximum phonation time and reduced subglottic pressure, suggesting improved phonatory efficiency postoperatively [30]. These physiological improvements may explain the postoperative reduction in CVHI-10 scores observed in our cohort.

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Brkic et al. evaluated 1,258 pediatric patients undergoing adenotonsillectomy, tonsillectomy, or adenoidectomy and observed transient postoperative increases in fundamental frequency and decreases in jitter and shimmer values, indicating voice-parameter fluctuations [31], which is consistent with the early postoperative improvement seen in our surgically treated patients.

Lundeborg et al. compared tonsillectomy plus adenoidectomy with tonsillotomy plus adenoidectomy in 67 children and reported preoperative hyponasality and altered acoustic parameters. Postoperatively, perceptual voice quality normalized, although minor acoustic differences persisted; these did not differ significantly between surgical methods [5]. This aligns with our findings that subjective voice outcomes improved following adenoidectomy. Inja et al. observed improvements only in subjective measures [32]. Furthermore, a meta-analysis by Wang et al., including 23 studies and 2,154 children, reported mild improvements in shimmer and the soft phonation index at one month postoperatively, but no significant changes at three months, suggesting that postoperative voice alterations are usually transient [33], indicating that the primary benefit of adenoidectomy may be symptom relief rather than sustained acoustic modification. In contrast, Lee et al. demonstrated significant postoperative reductions in both perceptual and acoustic voice parameters, including PVHI, jitter, shimmer, and noise-to-harmonic ratio, suggesting more sustained voice improvement following surgery [25]. These discrepancies may be attributable to heterogeneity among studies, including differences in patient populations, surgical procedures, follow-up duration, and outcome measures.

In the present study, self-reported swallowing difficulties (PEDI-EAT-10>3) were detected in 25.7% of all participants, with the highest prevalence observed in the group with severe adenoid hypertrophy (43.9%). This finding suggests that enlarged adenoids may contribute to swallowing difficulties in children by mechanically interfering with normal bolus passage and oropharyngeal coordination. Group 3, with the highest mean adenoid percentage (73.54 ± 10.62), also exhibited significantly higher PEDI-EAT-10 scores than Group 1 ($p<0.001$), indicating a dose–response relationship between adenoid size and symptom severity. The absence of a significant difference between Groups 2 and 3 may reflect compensatory swallowing mechanisms or symptom adaptation once moderate obstruction is present, limiting further symptom escalation despite increasing adenoid size. Furthermore, in Group 3 patients in patients who underwent surgery, postoperative evaluations revealed significant decreases in PEDI-EAT-10 scores ($p<0.001$), while the prevalence of self-reported swallowing difficulties decreased from 43.3% to 6.6%, indicating that adenoidectomy effectively alleviated swallowing-related symptoms. These results align with previous evidence demonstrating that adenotonsillar hypertrophy can impair oral motor and swallowing function.

Lundeborg et al., evaluated children using the Nordic Orofacial Test–Screening (NOT-S) and reported marked improvement in preoperative oral motor difficulties, such as chewing and swallowing, six months after adenotonsillar surgery [34]. This is consistent with our findings that relief of upper airway obstruction is associated with improvement in swallowing-related symptoms. Similarly, de Oliveira Branco et al., described persistent alterations in swallowing dynamics, including reduced labial seal and vallecular residue, even years after adenotonsillectomy, suggesting that subtle functional adaptations may persist [35], suggesting that although symptom-based improvement is common, subtle functional adaptations may persist beyond clinical recovery. Walsh et al. also demonstrated significant postoperative improvement in feeding behavior, assessed by the Pediatric Eating Assessment Tool, particularly in meal fatigue and avoidance of chewable foods, thereby confirming the beneficial impact of adenotonsillectomy on feeding efficiency [36]. This finding parallels the significant reduction in PEDI-EAT-10 scores observed in our surgical cohort.

Collectively, these findings indicate that adenoid hypertrophy is associated with measurable impairment in swallowing, which can be substantially reduced following adenoidectomy. However, the persistence of subtle or long-term orofacial motor adaptations, as reported by de Oliveira Branco et al., underscores the importance of postoperative follow-up, particularly in children with severe preoperative obstruction [35].

A major strength of this study lies in its prospective design and the inclusion of a relatively large pediatric cohort with clearly defined diagnostic criteria. The use of validated questionnaires (PEDI-EAT-10 and CVHI-10) allowed for the standardized assessment of swallowing and voice functions. Moreover, preoperative and postoperative comparisons provided valuable insights into functional recovery following adenoidectomy.

However, the absence of a phoniatric unit and a speech therapist limited the ability to perform objective acoustic and swallowing analyses. Although instrumental diagnostic methods such as videofluoroscopic swallowing study (VFSS) and fiberoptic endoscopic evaluation of swallowing (FEES) are considered the gold standard for detecting swallowing disorders, they were not included because they are invasive, costly, and often impractical in pediatric populations. In addition, the unequal gender distribution among the study groups and the relatively small number of patients undergoing adenoidectomy may limit the generalizability of the findings.

CONCLUSION

This study demonstrates that adenoid hypertrophy negatively affects self-reported swallowing difficulties and voice-related symptoms in children, particularly when nasopharyngeal obstruction exceeds 50%. Functional impairment was significant only in those with severe obstruction, compared with

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controls, as assessed using validated self-report screening questionnaires rather than by direct instrumental evaluation. Adenoidectomy led to marked improvements in patient-reported outcomes for swallowing and voice, emphasizing its role in alleviating symptom burden. Because these findings are based on screening tools (PEDI-EAT-10 and CVHI-10), they reflect perceived functional impact rather than objectively measured swallowing or voice function. Incorporating subjective tools such as the PEDI-EAT-10 and CVHI-10 as initial screening instruments may aid clinical evaluation; however, objective instrumental assessments (e.g., VFSS or FEES) should be considered in future studies to confirm and further characterize functional outcomes.

Ethics Committee Approval: The study protocol was approved by the Kırıkkale University Non-Interventional Research Ethics Committee (Date: 14.11.2024, Decision No: 2024.11.14).

Informed Consent: Written informed consent was obtained from the parents of all participants.

Peer-review: Externally peer-reviewed.

Availability of Data and Materials: The data used to support the findings of this study are available from the corresponding author upon reasonable request.

Conflict of Interest: No potential conflict of interest was reported by the authors.

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