

## A Comparative Study of Radiological and Endoscopic Methods for Assessing Adenoid Tissue in Chronic Adenoiditis

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Conflict of interest: Nil

### Abstract:

**Introduction:** The superior and posterior borders of the nasopharynx include a lobulated mass of lymphoid tissue called the adenoid, sometimes referred to as the pharyngeal or Luschka's tonsil. After birth, it grows quickly at first, but between the ages of 8 and 10, it typically experiences some atrophy and involution.

**Aims:** This study compares the diagnostic effectiveness of nasoendoscopy and X-ray soft tissue nasopharynx lateral view in assessing adenoid size in individuals with chronic adenoiditis.

**Materials & Methods:** A prospective observational comparative study was done in Medica Super specialty Hospital Kolkata. Period of study 1 year and total sample size were 70

**Result:** In our study, using the Cohen Konak radiological method, a statistically significant association was observed between radiological grading and clinical severity ( $p = 0.0006$ ). Among patients with moderate-severe clinical symptoms, 20 (33.3%) had moderate-severe radiological findings and 40 (66.6%) had mild findings. Conversely, in the mild clinical group, 50 (62.5%) showed moderate-severe radiological findings, while 30 (37.5%) had mild findings.

**Conclusion:** We came to the conclusion that nasal endoscopy is a good screening tool and a more accurate way to measure the size of adenoids in patients with chronic adenoiditis because it has a greater sensitivity of 87.10%, according to our study. The X-ray soft tissue lateral view of the nasopharynx is inexpensive, easily accessible, non-invasive, and comfortable for the youngster.

**Keywords:** Nasoendoscopy, Cohen Konak Method, Nasopharyngeal Radiography, Adenoidectomy and Diagnostic Imaging.

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### Introduction

The superior and posterior borders of the nasopharynx include a lobulated mass of lymphoid tissue called the adenoid, sometimes referred to as the pharyngeal or Luschka's tonsil [1]. After birth, it grows quickly at first, but between the ages of 8 and 10 years, it typically experiences some atrophy and involution [1]. Growth peaks between the ages of 2 and 14 after continuing at a rapid pace during infancy. Most children see rapid adenoid regression after the age of 15. However, because of the nasopharynx's relatively small volume and the higher incidence of upper respiratory tract infections, clinical symptoms are more prevalent in younger age groups [2]. Among the most prevalent issues affecting youngsters are adenoid diseases. An upper respiratory tract infection can infect the adenoid tissue, resulting in fever, cough, purulent rhinorrhea, nasal blockage, and postnasal

discharge. Both sinusitis and respiratory tract infections can cause these nonspecific symptoms [3]. In affluent nations, the most frequent reason for adenotonsillectomy is chronic adenotonsillar hypertrophy, which can cause varying degrees of airway blockage in children [4]. Evaluation of adenoid tissue is much more challenging since it is not readily accessible on physical examination, even though diagnostic assessment of the tonsils is evident with oral examination [5]. Therefore, we are comparing the diagnostic effectiveness of the two most often used techniques—X-ray nasopharynx and nasoendoscopy—in order to determine the size of adenoids. Assessing adenoid hypertrophy may benefit from lateral neck radiography. The adenoid's size was assessed using Cohen & Konak's grading scheme [6]. To determine the adenoid/nasopharyngeal ratio, another X-ray

technique—the Fujiokas method—was employed [7]. The evaluation of adenotonsillar disease may potentially benefit from flexible endoscopic nasopharyngoscopy. We evaluated the adenoid size on nasoendoscopy using Clemens classification.

### Materials and Methods

**Study Design:** A prospective observational comparative study.

**Place of Study:** Department ENT Medica Super specialty Hospital Kolkata.

**Period of Study:** 1 year Jan 2024 to Dec 2024.

**Sample Size:** 70.

### Inclusion Criteria

- Patients aged 3 to 15 years diagnosed clinically with chronic adenoiditis.
- Patients presenting with symptoms such as nasal obstruction, mouth breathing, snoring, or recurrent upper respiratory tract infections.
- Patients who were able to undergo both lateral nasopharyngeal X-ray and diagnostic nasal endoscopy.
- Patients whose guardians provided informed consent for participation in the study.

### Exclusion Criteria

- Patients with acute upper respiratory tract infections at the time of evaluation.
- Patients with craniofacial anomalies, cleft palate, or nasal polyps.
- History of previous adenoidectomy or nasal surgery.
- Patients with bleeding disorders or those unfit for endoscopic examination.

- Uncooperative children in whom proper endoscopic assessment could not be performed.

### Statistical Analysis

For statistical analysis, data were initially entered into a Microsoft Excel spreadsheet and then analyzed using SPSS (version 27.0; SPSS Inc., Chicago, IL, USA) and GraphPad Prism (version 5).

Numerical variables were summarized using means and standard deviations, while categorical variables were described with counts and percentages. Two-sample t-tests, which compare the means of independent or unpaired samples, were used to assess differences between groups. Paired t-tests, which account for the correlation between paired observations, offer greater power than unpaired tests. Chi-square tests ( $\chi^2$  tests) were employed to evaluate hypotheses where the sampling distribution of the test statistic follows a chi-squared distribution under the null hypothesis; Pearson's chi-squared test is often referred to simply as the chi-squared test. For comparisons of unpaired proportions, either the chi-square test or Fisher's exact test was used, depending on the context. To perform t-tests, the relevant formulae for test statistics, which either exactly follow or closely approximate a t-distribution under the null hypothesis, were applied, with specific degrees of freedom indicated for each test. P-values were determined from Student's t-distribution tables. A p-value  $\leq 0.05$  was considered statistically significant, leading to the rejection of the null hypothesis in favour of the alternative hypothesis.

### Result

**Table 1: Association between comparison of Cohen Konak method: endoscopic grading (Clemens classification)**

Cohen Konak method (Radiological)	Grade 1	Grade 2	Grade 3	P value
Small	10(33.3%)	5(25.0%)	5(25.0%)	0.1212
Moderate	5(16.6%)	10(50.0%)	5(25.0%)	
Large	15(50.0%)	5(25.0%)	10(50.0%)	

**Table 2: Association between Agreement between Cohen Konak method: endoscopic grading (Clemens classification)**

Cohen Konak method (Radiological)	Mild	Moderate-severe	P value
Moderate-severe	20(33.3%)	50(62.5%)	0.0006
Mild	40(66.6%)	30(37.5%)	

**Table 3: Association between Agreement between Endoscopic grading: Cohen Konak method**

Endoscopic grading	Mild	Moderate-severe	P value
Moderate-severe	20(40.0%)	50(55.5%)	0.0777
Mild	30(60.0%)	40(44.44%)	

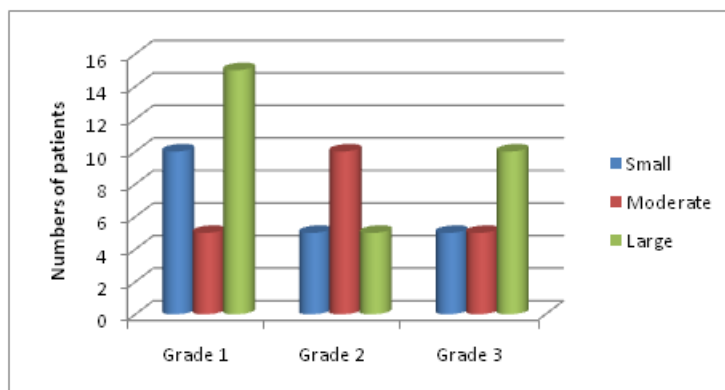


Figure 1: Association between comparison of Cohen Konak method: endoscopic grading (Clemens classification)

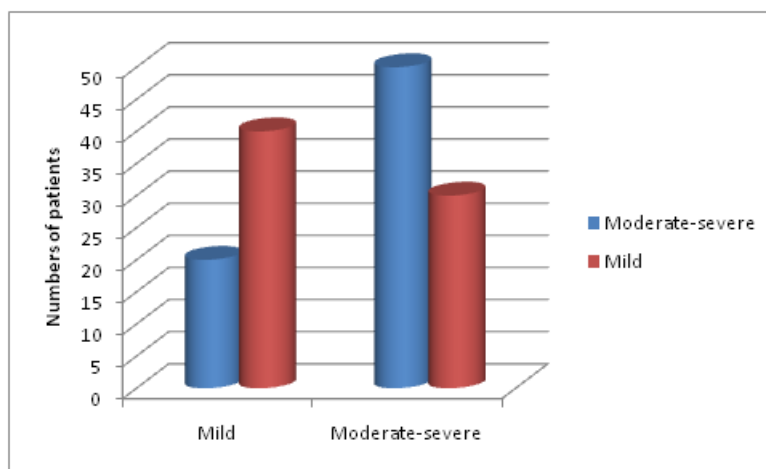


Figure 2: Association between Agreement between Cohen Konak method: endoscopic grading (Clemens classification)

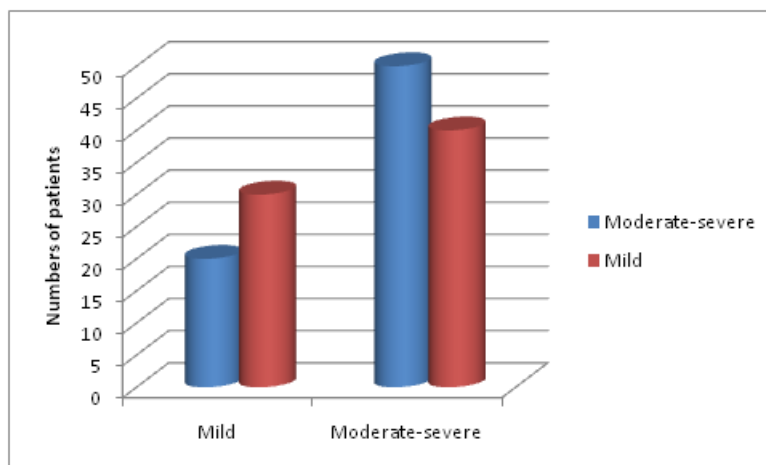


Figure 3: Association between Agreement between Endoscopic grading: Cohen Konak method

In our study, based on the Cohen Konak radiological method, adenoid size distribution across grades showed no statistically significant difference ( $p = 0.1212$ ). Among those with small adenoids, 10 (33.3%) were Grade 1, 5 (25.0%) Grade 2, and 5 (25.0%) Grade3. In the moderate group, 5 (16.6%) were Grade 1, 10 (50.0%) Grade 2, and 5 (25.0%) Grade3. For large adenoids, 15 (50.0%) were Grade 1, 5 (25.0%) Grade 2, and 10

(50.0%) Grade3. In our study, using the Cohen Konak radiological method, a statistically significant association was observed between radiological grading and clinical severity ( $p = 0.0006$ ). Among patients with moderate-severe clinical symptoms, 20 (33.3%) had moderate-severe radiological findings and 40 (66.6%) had mild findings. Conversely, in the mild clinical group, 50 (62.5%) showed moderate-severe

radiological findings, while 30 (37.5%) had mild findings. In our study, based on endoscopic grading, there was no statistically significant association with clinical severity ( $p = 0.0777$ ). Among patients with moderate-severe clinical symptoms, 50 (55.5%) had moderate-severe endoscopic findings, while 40 (44.44%) had mild findings. In the mild clinical group, 20 (40.0%) showed moderate-severe endoscopic grades, and 30 (60.0%) had mild grades.

### Discussion

In similar study by Wormald PJ et al [8] (2011) found that 33.3% of the patients who had tiny adenoids on radiography out of all those tested had Grade 1 severity, which denotes a milder clinical presentation. On radiographs, however, big adenoids were more closely associated with Grade 3 severity (50.0%). Using the Cohen Konak radiological approach, we found no statistically significant correlation between the distribution of adenoid size across classes ( $p = 0.1212$ ). Patients with big adenoids were more likely to have Grade 1 (15 cases, 50.0%), whereas the moderate group was more likely to have Grade 2 (10 cases, 50.0%). The large adenoid group also had the highest grade 3 (10 instances, 50.0%). The changes were not statistically significant, despite the fact that some patterns were noted. In others study by Saeed SR et al [9] (2013) showed that There was a significant connection between mild clinical severity and 40 cases (66.6%) among patients with light radiological results. Clinical severity and radiological grading using the Cohen Konak approach were found to be statistically significantly correlated ( $p = 0.0006$ ). Patients with moderate-severe clinical symptoms were more likely to have moderate-severe radiological findings (50 cases, 62.5%), whereas patients with mild symptoms were more likely to have mild radiological abnormalities (40 instances, 66.6%). This suggests that radiological severity and clinical presentation are strongly correlated. In similar study by Celenk F et al [10] (2013) showed that Forty cases (44.44%) of mild grading were observed in patients with moderate-severe symptoms, whereas thirty cases (60.0%) of mild endoscopic grading were linked to mild clinical symptoms. We found no statistically significant correlation ( $p = 0.0777$ ) between endoscopic grading and clinical severity. Mild endoscopic results were more common in patients with mild symptoms (30 cases, 60.0%), despite the fact that moderate-severe endoscopic findings were more common in patients with moderate-severe clinical symptoms (50 cases, 55.5%). Although this did not achieve statistical significance, it does indicate a trend toward correlation.

### Conclusion

We concluded that nasal endoscopy is a good screening tool and a more accurate way to measure the size of adenoids in patients with chronic adenoiditis because it has a greater sensitivity of 87.10%, according to our study.

The X-ray soft tissue lateral view of the nasopharynx is inexpensive, easily accessible, non-invasive, and comfortable for the youngster. In impoverished nations without access to sophisticated equipment, this is one of the best instruments for determining the size of adenoids. Our research indicates that the X-ray approach has a 75% higher specificity. Based on our research, we can conclude that these two approaches complement one another because they have a good agreement of about 78%. children, whether or not they have an adenoid, who exhibit the typical signs of upper respiratory tract blockage.

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