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## REVIEW ARTICLE

# CAUSES OF NASAL OBSTRUCTION AFTER ADENOIDECTOMY

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**ABSTRACT**

**Background:** Nasal obstruction after adenoidectomy and the need for second adenoidectomy operation i.e (Revision), put as under focus on nasal obstruction types after adenoidectomy. We should search and report the causes of nasal obstruction to improve outcomes of adenoidectomy. **Objectives:** To find out the causes of nasal obstruction after adenoidectomy. **Patients and Methods:** Comparative cross sectional study focus on causes of nasal obstruction after adenoidectomy operations which done in Al-FURATE general hospital, in a period between February 2015 to November 2017 to patients visit our outpatient clinic in determined days in a week. Eighty six paitents included in our study who complain from nasal obstruction and or decrease hearing and diagnosed clinically and by nasal endoscopy and imaging if needed to have adenoid enlargement, and planned for adenoidectomy. We entered data of each patient on questionnaire and follow up them in periods 1 week, 2 weeks, 1 month, 3months, 6months, 1year, to evaluate their nose, ear problems if founded. **Results:** Number of normal cases after adenoidectomy is 66 out of 86 i.e 76.74%, Nasal obstruction by adenoid regrowth is 8 out of 86 cases I,e 9.3% ,. while Nasal obstruction by inferior turbinate hypertrophy is 11 out of 86 i.e 12.79%, Males has the higher number of nasal obstruction by adenoid regrowth 62.5% of cases, while females has the higher number of nasal obstruction by inf. Turbinate hypertrophy 72.72%of cases. Nasal obstruction by adenoid regrowth is more common in (2-3 years) age group. Nasal obstruction by inferior turbinate hypertrophy is more common in age group (6-7 years).

**Conclusion**

1- Most common cause of nasal obstruction after adenoidectomy is inferior turbinate hypertrophy.
2-Second most common cause of nasal obstruction after adenoidectomy is adenoid recurrence.
3- Males has the higher number of nasal obstruction by adenoid regrowth.
4- Nasal obstruction by adenoid regrowth is more common in (2-3 years) age group.
5- Nasal obstruction by inferior turbinate hypertrophy is more common in age group (6-7 years).

**Recommendations**

1- We should try to decrease adenoidectomy operation as condition permits at least to after 4 years age.
2- Cases of adenoidectomy should follow up after operation as no any nasal obstruction mean adenoid recurrence.
3- Using endoscope during adenoidectomy may decrease recurrence.
4- We recommend more studies about nasal obstruction after adenoidectomy with more facilities

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## INTRODUCTION

**Definition of adenoid:** Santorini described the nasopharyngeal lymphoid aggregate or 'Luschka's tonsil' in 1724. Wilhelm Meyer coined the term 'adenoid' to apply to what he described as 'nasopharyngeal vegetations' in 1870. The adenoid forms part of Waldeyer's ring of lymphoid tissue at the portal of the upper respiratory tract. In early childhood this is the first site of immunological contact for inhaled antigens. Historically, the adenoid has been associated with upper airway obstruction, as a focus of sepsis, and more recently with the persistence of otitis media with effusion.

**Immune function of the adenoid:** The function of the lymphoid tissue of Waldeyer's ring is to produce antibodies. The adenoid produces B-cells, giving rise to IgG and IgA plasma cells. Exposure to antigens via the mouth and nose is an important part of natural acquired immunity in early childhood. The adenoid appears to have an important role in the development of 'immunological memory' in younger children. Removal of the adenoid in early childhood may be immunologically undesirable. Evidence supports the concern that early adenoidectomy produces a detectable negative effect.[1]

1 ) Peter J. Robb. The adenoid and Adenoidectomy, in: John C Watkinson and

**Pathological effects of the adenoid:** The adenoid may be implicated in upper respiratory tract disease due to partial or complete obstruction of the nasal choanae or as a result of sepsis. Pathological manifestations include rhinitis, rhinosinusitis, otitis media and otitis media with effusion. Adenoiditis, acute or chronic, is considered by some to be a related but distinct infective entity.[(2)]

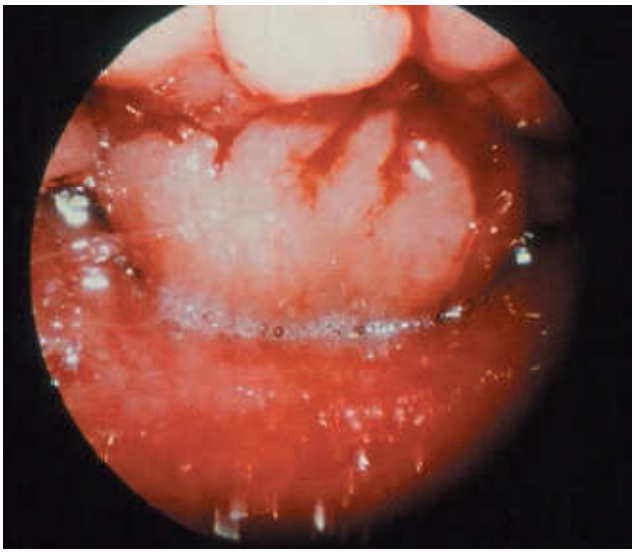
**Clinical grading of adenoid size[(3)]**

**TABLE 26.1** Clinical grading of adenoid size (reprinted from Clemens et al.,[47] with permission from Elsevier)

| Grade | Description |
|---|---|
| Grade I | Adenoid tissue filling one-third of the vertical portion of the choanae |
| Grade II | Adenoid tissue filling from one-third to two-thirds of the choanae |
| Grade III | From two-thirds to nearly complete obstruction of the choanae |
| Grade IV | Complete choanal obstruction |

**Examination of Nasopharynx[(4)]**

The nasopharynx extends from the skull base to the soft palate, and this can be a challenging area to examine. In the patient with a high posterior soft palate and small tongue base, the otolaryngologist may use a small dental mirror and a headlamp to visualize the nasopharynx. By having the patient sit upright in the chair, the physician may firmly pull the tongue forward while opening the patient's mouth to place the mirror just posterior to the soft palate. In a manner analogous to that used to view the larynx with a mirror, the structures in the nasopharynx are seen when the mirror is oriented upward. Another method utilizes the fiberoptic nasopharyngoscope, which allows excellent visualization of this area. The midline also should be inspected for any masses, ulcerations, or bleeding areas. Arguably, the best view may be obtained using a90-degree rigid scope in the oropharynx. By advancing the rigidscope through the mouth and placing the beveled edge posteriorto the soft palate, the nasopharynx may be seen in its entirety. Both sides of the nasopharynx may be compared for symmetry using this technique. Regardless of the technique used, the adenoids, Eustachian tube orifice, torus tubarius, and fossae of Rosenmuller should be inspected on each side. Whereas children have adenoid tissue present, adults should not have much adenoid tissue remaining in this area; presence of tissue should prompt consideration of lymphoma or human immunodeficiency virus (HIV) infection, which may manifest adenoid hypertrophy as part of the disease. All patients with unilateral otitis media should have their nasopharynx inspected for possible nasopharyngeal masses. Nasopharyngeal carcinoma most commonly presents in the fossa of Rosenmuller. In young male patients, nasopharyngeal angiofibromas are locally aggressive but histologically benign masses that most commonly occur in the posteriorchoana or nasopharynx. Cysts in the superior portion of the nasopharynx may represent a benign Tornwaldt cyst or a malignant craniopharyngioma.



Endoscopic view of the adenoids. (4)

**Clinical Evaluation of Adenoids [(5)]:** Obstructive adenoid hyperplasia is diagnosed by clinical evaluation Mouth breathing. Snoring, and hyponasal speech are common presenting complaints. Rhinorrhea, postnasal drip, and chronic cough are common and nonspecific findings. The aforementioned adenoid facies maybe present. Assessment of hyponasality is accomplished by having the child repeat words that emphasize nasal emission,. which are phonemes using the "m, • "n," or "ng• sound, such as milkman or mickey mouse and comparing them to words that do not, such as baseball or phrases such as "patty ate apple pie". Differentiating acute and chronic infections fromsinonasal disease can be challenging. Often, acute and chronic adenoiditis can be confused and misdiagnosed as "sinusitis." Most children under the age of 6 will have effective resolution of these symptoms with adenoidectomy. Parents should be made aware that if symptoms persist after adenoidectomy, further investigation and treatment of sinonasal disease may be necessary to fully address the appropriate etiology. A thorough physical exam includes at a minimum anteriorrhinoscopy, which is easily facilitated in the cooperative child, with the use of an otoscope and large ear speculum. This allows the clinician to distinguish possible sources of nasal obstruction within the anterior nasal cavity, such as turbinate hypertrophy, edematous mucosa, orforeign body and to differentiate these from sources within the nasopharynx. Palatal evaluation should also be undertaken, to ascertain the presence of submucousclefting, bifid uvula, orhistory of nasal regurgitation. This diminishes the possible complication of postoperative velopharyngeal insufficiency. Children with neuromuscular and central nervoussystem problems are also at increased risk for velopharyngeal insufficiency following adenoidectomy. Evaluation of the adenoids in an uncooperative childcan be difficult and can be accomplished using lateral neck radiographs, although these

Raymond W Clarke, *Scott-Brawn's Otorhinolaryngology, Head and Neck Surgery*, 8th edition, Taylor & Francis Group, LLC. 2018 ;vol 2, P. 285.

2 ) Peter J. Robb. The adenoid and Adenoidectomy, in: John C Watkinson and Raymond W Clarke, *Scott-Brawn's Otorhinolaryngology, Head and Neck Surgery,* 8th edition, Taylor & Francis Group, LLC. 2018 ; vol 2, P. 286

3 ) Peter J. Robb. The adenoid and Adenoidectomy, in: John C Watkinson and Raymond W Clarke, *Scott-Brawn's Otorhinolaryngology, Head and Neck Surgery*, 8th edition, Taylor & Francis Group, LLC. 2018 ; vol 2, P. 287

4 ) Ericka F. King | Marion Everett Couch, History, Physical Examination, and the Preoperative Evaluation, in: Paul W. Flint, Bruce H. Haughey,et al, *CUMMING'S Otolaryngology HEAD AND NECK SURGERY,* 6thedition,Saunders, of Elsevier Inc. 2015 ; P 52 .

5 ) Anita Jeyakumar, Sean Miller, Ron B. Mitchell, Adenotonsillar Disease in Children, in: JONAS T. JOHNSON, CLARK A. ROSEN, *Bailey's Head and Neck Surgery- OTOLARYNGOLOGY*, 5th edition, Lippincott Williams&. WJ.lkins, a Wolters Kluwer business. 2014 ; P 1434.

are often superfluous compliments to physical exam and history. More recently, an increasing number of children have been evaluated using office nasopharyngoscopy. This technique allows for direct visualization without radiation exposure. Nasopharyngoscopy offers an excellent view of the adenoids and adjacent structures. Parikh et al. have proposed a grading system for endoscopic examination of adenoid hypertrophy that is validated and user-friendly. Other methods such as video fluoroscopy have been shown to be effective at assessing adenoid size but are less commonly used and carry unnecessary radiation exposure.

**Adenoidectomy** [(6)]

Adenoidectomy with or without tonsillectomy and/or insertion of ventilation tubes is one of the most frequently performed surgical procedures in children. In the UK, blind curettage adenoidectomy continues to be the most used technique. Of these 79.2% use digital palpation and blind curettage, while only 8.1% use suction coagulation under direct vision. It is surprising that curettage remains so popular, give the disadvantages of a blind procedure with unpredictable bleeding, poor access to choanal adenoid and risk of trauma to the Eustachian cushions. In contrast, suction diathermy affords direct vision with minimal blood loss (mean 4 mL vs 50 mL), haemostasis and negligible risk of post-operative haemorrhage. Suction diathermy is also effective in performing partial adenoidectomy, leaving a ridge of adenoidal tissue at the inferior part of the nasopharynx, reducing the riskof velopharyngeal insufficiency in those children where this is likely after removal of the adenoid. Other direct vision techniques include Coblation R and microdebrider, which have the disadvantage of a high unit cost. KTP laseris associated with a high risk of nasopharyngeal stenosis. This serious complication has not been reported in a small series using gold laser for adenoidectomy. All single-use instrument techniques have the advantage of abolishing the potential risk of infection transmission. Of the direct-vision techniques, those with the largest clinical experience are the suction coagulator and the microdebrider.

In a randomized controlled trial, the microdebrider was 20% faster than the curettage technique, but the suction coagulator is significantly cheaper than the microdebrider. Coblation is also suitable for adenoidectomy, with less blood loss and more complete adenoid removal, but cost limits it application to adenoidectomy as a sole procedure, while it is not a cost issue when tonsillectomy is performed using the same Coblation R wand. A meta-analysis of suction coagulation adenoidectomy concluded that there was reduced intra-operative bleeding, reduced operative time, and a lower overall complication rate when compared to curette adenoidectomy. Where social and geographical factors allow, and with appropriate surgical and an aesthetic techniques, preemptive fluid replacement, antiemetics and analgesia, the majority of children may be safely discharged home on the same day of surgery. Safe discharge home following adenoidectomy using the laryngeal mask airway within 20 minutes of surgery may be feasible but not preferable.

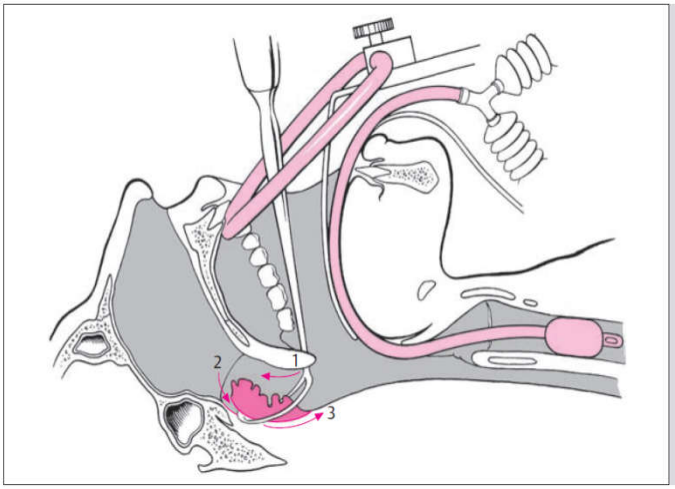



Figure of Adenoidectomy.[(7)] The ring knife is introduced behind the soft palate and moved upward (1), placed in position behind the margin of the vomer (2), and then drawn downward (3).

**Complications of adenoidectomy** [(8)]

- Bleeding
- Dental trauma
- Retained swab
- Nasopharyngeal blood clot
- Infection
- Non-traumatic atlantoaxial subluxation (Grisel syndrome)
- Velopharyngeal dysfunction
- Regrowth of the adenoid
- Death.

## PATIENTS AND METHODS

Comparative cross sectional study focus on causes of nasal obstruction after adenoidectomy operations which done in Al-FURATE general hospital, in a period between February 2015 to November 2017 to patients visit our outpatient clinic in determined days in a week. Eighty six paitents included in our study who complain from nasal obstruction and or decrease hearing and diagnosed clinically and by nasal endoscopy and imaging if needed to have adenoid enlargement, and planned for adenoidectomy. We entered data of each patient on questionnaire and follow up them in periods 1week, 2weeks, 1 month, 3months, 6months, 1year, to evaluate their nose, ear problems if founded.

**Inclusion criteria**

Patient underwent adenoidectomy by cold steel method, both sex.

**Exclusion criteria**

- Uncooperative patients
- Age below 2 years

6 ) Peter J. Robb. The adenoid and Adenoidectomy, in: John C Watkinson and Raymond W Clarke, *Scott-Brawn's Otorhinolaryngology, Head and Neck Surgery*, 8th edition, Taylor & Francis Group, LLC. 2018 ;vol 2, P. 288.

7) J. Theissing, Surgery of the Epipharynx_, in: JuergenTheissing, Gerhard Rettinger, Jochen A. Werner, *ENT—Head and Neck Surgery: Essential Procedures,* Thieme Stuttgart · New York, 2011 ; P 151.

8) Peter J. Robb. The adenoid and Adenoidectomy, in: John C Watkinson and Raymond W Clarke, *Scott-Brawn's Otorhinolaryngology, Head and Neck Surgery*, 8th edition, Taylor & Francis Group, LLC. 2018; vol 2, P. 288.

- Patients with another pathology like nasal mass otherwise adenoid or tumour.
- Other types of adenoidectomy

**Questionnaire**

**1- history**

Name :
Age :
Sex :
Address :
job :
Phone No. :

**Chief complain:**

Duration :
Nasal obstruction :
Decrease in hearing :
Any allergy hx :
Any heartburn :
Any disease :
Smoker :

Any nasal of ear surgery

**2- examinations**

Findings
Ear:
Nose:
Throat:

Follow up in (/1wk/2wk/1mo./3mo./6mo./ 1year)

| Adenoidectomy Patient | 1 wk | 2wk | 1month | 3month | 6month | 1year |
|---|---|---|---|---|---|---|
| No complain | | | | | | |
| Nasal obstruction by adenoid regrowth | | | | | | |
| Nasal obstruction by inferior turbinate hypertrophy | | | | | | |
| Decrease hearing by adenoid regrowth | | | | | | |
| Total | | | | | | |

## DISCUSSION

**Causes of nasal obstruction after adenoidectomy**

Number of normal cases after adenoidectomy is 66 out of 86 i.e 76.74%, This may reflect the operative outcome as good handling of instruments and patient has no allergy. While Nasal obstruction by adenoid regrowth is 8 out of 86 cases I,e 9.3%, which indicated the operative factor as poor technique or bas instruments. While Nasal obstruction by inferior turbinate hypertrophy is 11 out of 86 i.e 12.79% which reflect the allergy of patient as a factor for inf. Turbinate hypertrophy. only one case of decrease hearing 1.16% that reflect the otitis media with effusion that caused by injury of ostacheian tube or adenoid regrowth and in our case by adenoid regrowth.

**Sex distribution**

Males has the higher number of nasal obstruction by adenoid regrowth 62.5% of cases, while females has the higher number of nasal obstruction by inf. Turbinate hypertrophy 72.72%of cases. This may reflect that allergy more common in females.

## RESULTS

**Causes of nasal obstruction after adenoidectomy**

| Adenoidectomy Patients | Total | Percentage |
|---|---|---|
| No complain | 66 | 76.74% |
| Nasal obstruction by adenoid regrowth | 8 | 9.3% |
| Nasal obstruction by inferior turbinate hypertrophy | 11 | 12.79% |
| Decrease hearing by adenoid regrowth | 1 | 1.16% |
| Total | 86 | |

**Sex distribution**

| Adenoidectomy Patients | Male | percentage | Female | Percentage | total |
|---|---|---|---|---|---|
| No complain | 28 | 42.42% | 38 | 57.57% | 66 |
| Nasal obstruction by adenoid regrowth | 5 | 62.5% | 3 | 37.5% | 8 |
| Nasal obstruction by inferior turbinate hypertrophy | 3 | 27.27% | 8 | 72.72% | 11 |
| Decrease hearing by adenoid regrowth | 1 | 100% | 0 | 0 | 1 |
| Total | 37 | 43.02% | 49 | 56.97% | 86 |

**Age of distribution**

| Adenoidectomy Patients | 2-3 y And percentage | 4-5 And percentage | 6-7 And percentage | More than 7 | Total |
|---|---|---|---|---|---|
| No complain | 18(27.27%) | 32(48.48%) | 10(15.15%) | 6(9.09%) | 66 |
| Nasal obstruction by adenoid regrowth | 4(50%) | 3(37.5%) | 1(12.5%) | 0 | 8 |
| Nasal obstruction by inferior turbinate hypertrophy | 1(9.09%) | 2(18.18%) | 6(54.54%) | 2(18.18%) | 11 |
| Decrease hearing by adenoid regrowth | 1(100%) | | | | 1 |
| Total | 24 | 37 | 17 | 8 | 86 |

**Age of distribution**

Nasal obstruction by adenoid regrowth is more common in (2-3 years) age group this may reflect that early adenoidectomy is early recurrence. Nasal obstruction by inferior turbinate hypertrophy is more common in age group (6-7 years), this may reflect that this age is more common to subjected to allergy.

**Conclusion**

1. Most common cause of nasal obstruction after adenoidectomy is inferior turbinate hypertrophy.
2. Second most common cause of nasal obstruction after adenoidectomy is adenoid recurrence.
3. Males has the higher number of nasal obstruction by adenoid regrowth.
4. Nasal obstruction by adenoid regrowth is more common in (2-3 years) age group.
5. Nasal obstruction by inferior turbinate hypertrophy is more common in age group (6-7 years).

**Recommendations**

1. We should try to decrease adenoidectomy operation as condition permits at least to after 4 years age.
2. Cases of adenoidectomy should follow up after operation as no any nasal obstruction mean adenoid recurrence.
3. Using endoscope during adenoidectomy may decrease recurrence.
4. We recommend more studies about nasal obstruction after adenoidectomy with more facilities

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