

ADENOIDS

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Embryology

- The **formation of the adenoids begins in the 3rd month of fetal development.** This starts with glandular primordia in the posterior nasopharynx becoming associated with infiltrating lymphocytes.
- In the **5th month sagittal folds are formed** which are the beginnings of pharyngeal crypts. The surface is covered with pseudostratified ciliated epithelium.
- By the **7th month** of development the **adenoids are fully formed.**

Anatomy

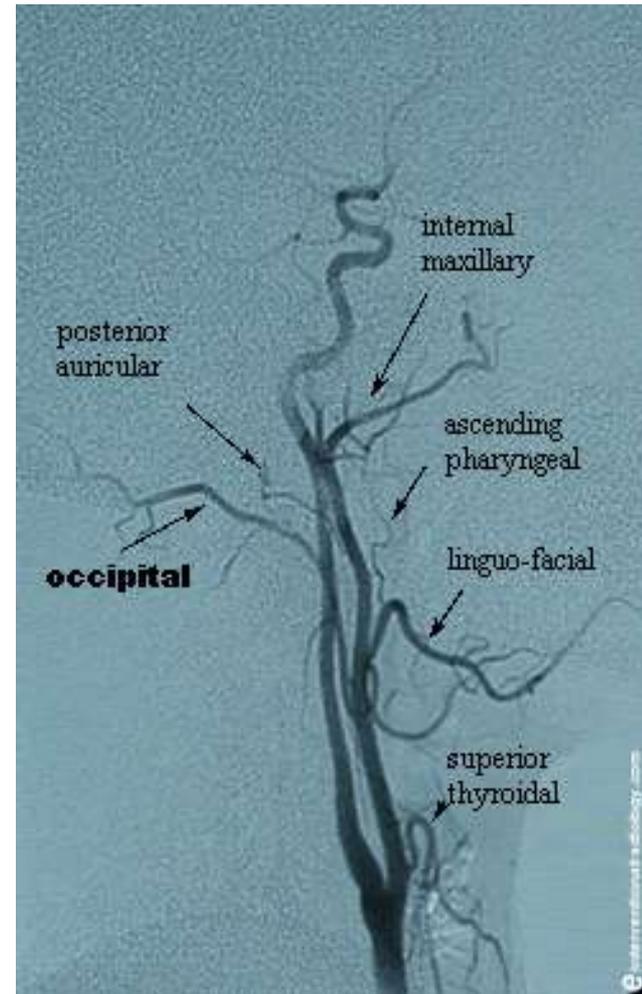
- The lymphoid tissue of the nasopharynx and oropharynx is composed of the adenoids, the tubal tonsils, the lateral bands, the palatine tonsils, and the lingual tonsils.
- There are also lymphoid collections in the posterior pharyngeal wall and in the laryngeal ventricles.
- These structures form a ring of tissue named **Waldeyer's ring** after the German anatomist who described them.

The adenoids or pharyngeal tonsil

- It is a **single mass** of pyramidal tissue with its **base on the posterior nasopharyngeal wall** and its **apex pointed toward the nasal septum**.
- The surface is invaginated in a series of folds.
- The **epithelium is pseudostratified ciliated epithelium** and is infiltrated by the lymphoid follicles.

Blood supply is from the:

- **Ascending palatine** branch of the facial artery
- **Pharyngeal branch** of the internal maxillary artery
- Artery of the pterygoid canal
- Ascending cervical branch of the thyrocervical trunk.



- **Venous drainage** is through the pharyngeal plexus and the pterygoid plexus flowing ultimately into the **facial and internal jugular veins**.
- **Innervation** is derived from the **glossopharyngeal** and **vagus** nerves.
- **Efferent lymphatics** drain to the **retropharyngeal** nodes and the **upper deep cervical nodes**.

Function and Immunology

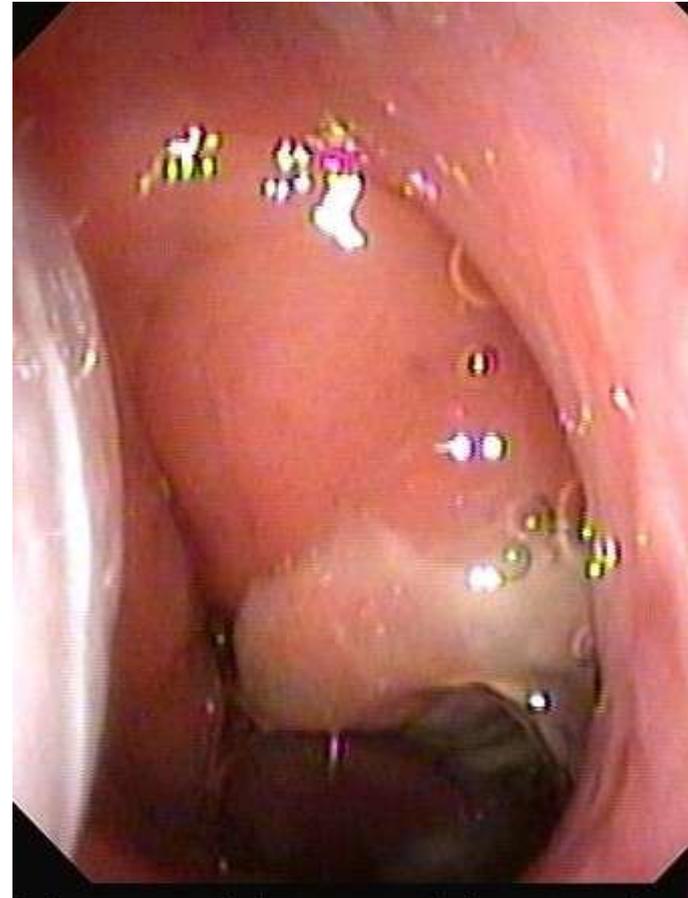
- The **tonsils and adenoids** are part of the **secondary immune system**.
- **Without afferent lymphatics** the lymphoid nodules in these structures are exposed to antigen only in the crypts of the palatine tonsils and the folds of the adenoids where it is transported through the epithelial layer.
- These are involved in the production of mostly **secretory IgA**, which is transported to the surface providing **local immune protection**.

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- This can be difficult to differentiate from an acute upper respiratory infection but tends to have a longer and more severe course.

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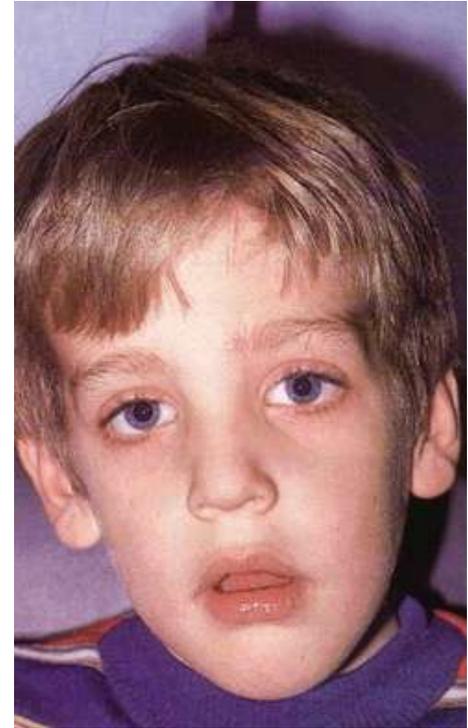
- **Recurrent acute adenoiditis** is 4 or more episodes of acute adenoiditis in a **6-month** period with intervening periods of wellness.
- **Chronic adenoiditis symptoms** include persistent **rhinorrhea**, **postnasal drip**, **malodorous breath**, and **associated otitis media** or extra esophageal reflux lasting at least 3 months.



- **Obstructive adenoid hyperplasia** includes symptoms of **chronic nasal obstruction, rhinorrhea, snoring, mouth breathing,** and a **hyponasal voice.**
- **Obstructive sleep apnea** in children is clinically marked by loud **snoring, apneic episodes** while sleeping, **daytime somnolence,** behavioral problems, and **enuresis**

Adenoid facies or “long face syndrome”.

- It is the **long, open-mouthed**, face of children with adenoid hypertrophy.
- The mouth is always open because upper airway congestion has made patients **obligatory mouth breathers**.
- The most **common presenting symptoms** are chronic mouth breathing and snoring.
- The **most dangerous** symptom is **sleep apnea**



The characteristic facial appearance consists of:

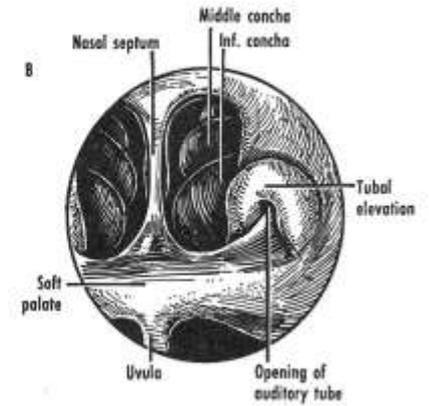
- Underdeveloped thin nostrils
- Short upper lip
- Prominent upper teeth
- Crowded teeth
- Narrow upper alveolus



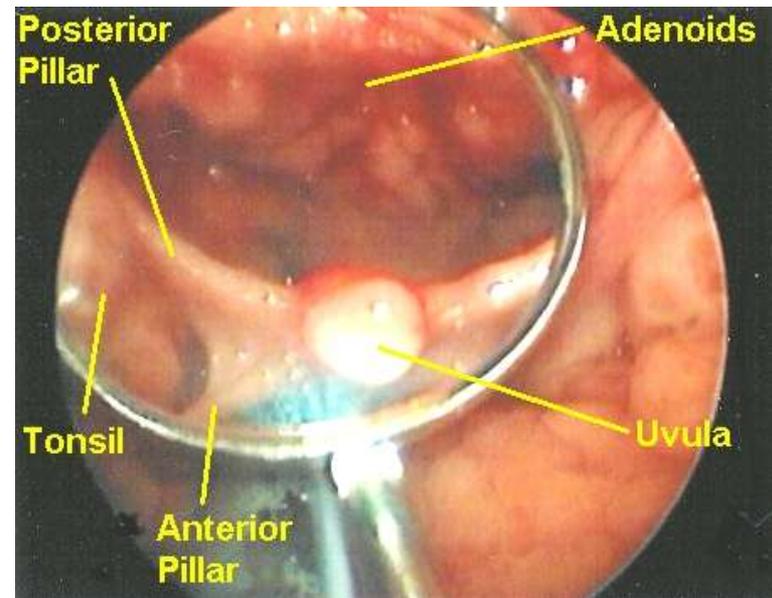
- **High-arched palate**
- **Hypoplastic maxilla**
- Eustachian blockage causing glue **ear-deafness**
- The deafness and inattentiveness interferes with the learning
- Child grows with **lowered intelligence** and understanding



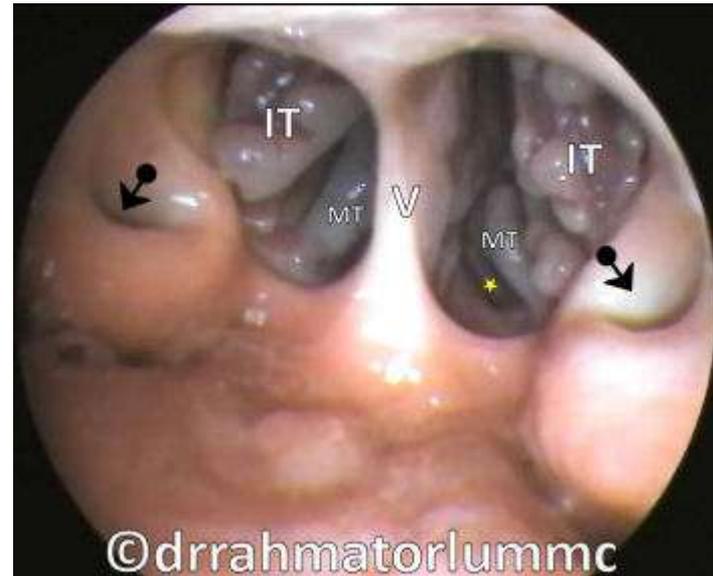
Diagnosis



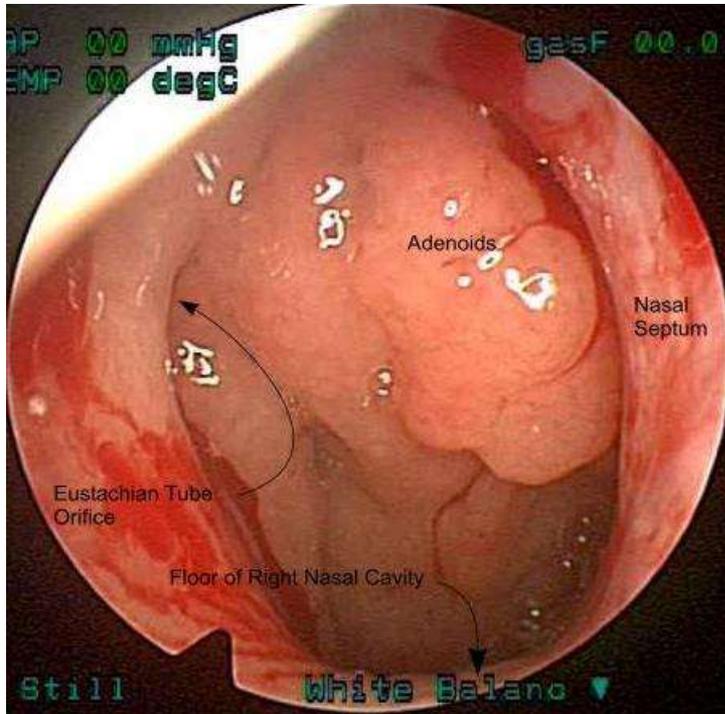
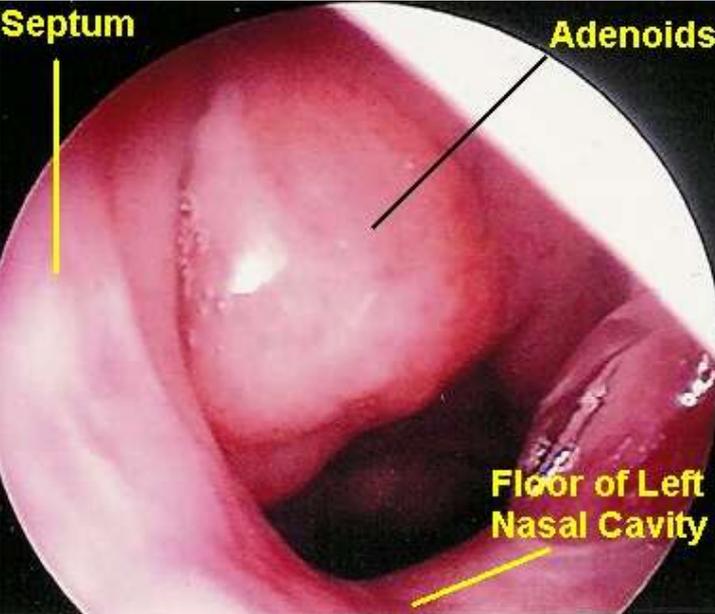
Posterior Rhinoscopy



Nasopharyngoscopy



Nasopharyngoscopy



Nasopharyngoscopy



X-Ray soft tissue nasopharynx- lateral view



X-Ray soft tissue nasopharynx- lateral view



CT Scan



Adenoidectomy-Indications

- **Four or more episodes of recurrent purulent rhinorrhea in prior 12 months in a child <12.** One episode documented by intranasal examination or diagnostic imaging.
- **Persisting symptoms of adenoiditis** after 2 courses of antibiotic therapy.
- **Sleep disturbance** with nasal airway obstruction persisting for at least 3 months.
- **Hyponasal** or nasal speech

Adenoidectomy-Indications

- **Otitis media with effusion** >3 months or second set of tubes
- **Dental malocclusion** or orofacial growth disturbance documented by orthodontist.
- **Cardiopulmonary complications** including cor pulmonale, pulmonary hypertension, right ventricular hypertrophy associated with upper airway obstruction.
- **Otitis media with effusion** over age 4.

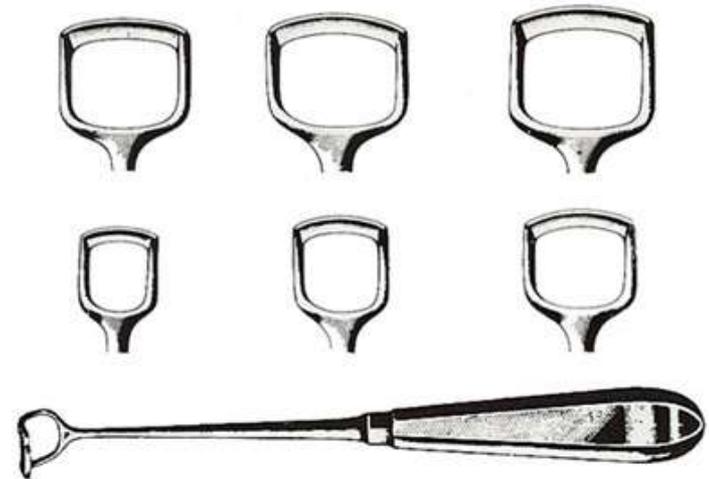
Contraindications

- **A submucous cleft palate** which may lead to velopharyngeal insufficiency after surgery. If the adenoid obstruction is severe enough, then only superior half adenoidectomy is performed.
- Avoid surgery in patients with **hemoglobin less than 10**.
- Perform surgery at least **2 weeks after the last attack of acute tonsillitis**.
- Wait at least **6 weeks after polio vaccination**.
- Avoid surgery in patients with **uncontrolled systemic diseases (ie. leukemia)**.

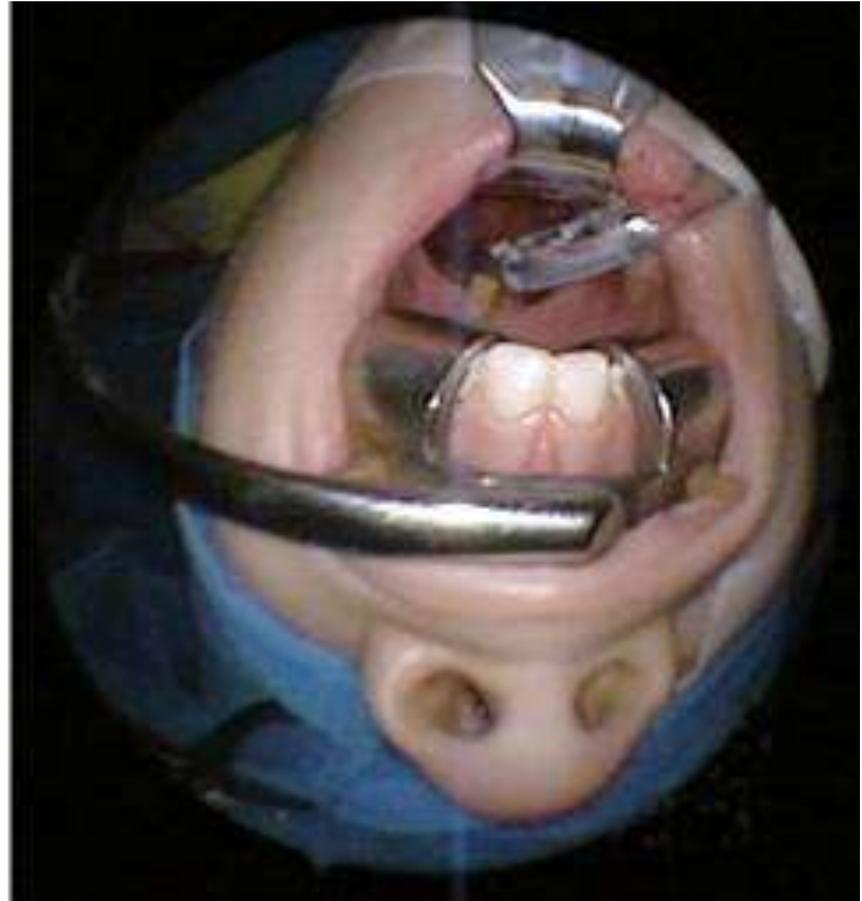
Jennings's Mouth Gag



St. Claire Thomson Adenoid Curette



Position for Adenoidectomy



Adenoidectomy



Adenoidectomy Specimen



Complications

- The incidence of **mortality** from adenotonsillar surgery ranges from **1 in 16,000 to 1 in 35,000 cases**.
- Anesthetic complications and hemorrhage cause the majority of deaths.
- **The prevalence of hemorrhage ranges from 0.1% to 8.1%.**
- It is divided into **primary bleeding**, in the first 24 hours, and **secondary bleeding**, around 7-10 days post operatively.

- Other risks include:
 - Vomiting
 - Dehydration
 - Airway obstruction due to edema
 - Pulmonary edema
 - Fever, velopharyngeal insufficiency
 - Dental injury
 - Burns
 - Nasopharyngeal stenosis.

- **Atlantoaxial subluxation** can occur in patients with Down syndrome.
- **Atlantoaxial joint laxity** because of **Grisel's syndrome**. This is vertebral body decalcification and laxity of the anterior transverse ligament between the atlas and the axis from inflammation or infection in the nasopharynx.
- **Spontaneous subluxation** occurs about 1 week post operatively with pain and torticollis.