



Adenoids

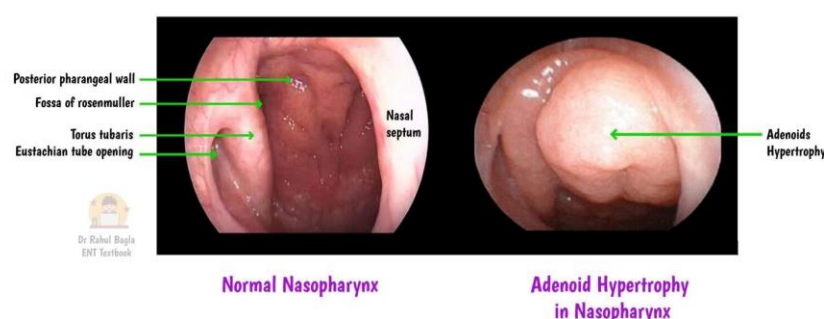
INTRODUCTION OF ADENOIDS

In **1724**, Santorini first described the nasopharyngeal lymphoid aggregate, initially terming it **Luschka's tonsil**. However, the term “**adenoids**” was later coined by Wilhelm Meyer in **1870**. Fundamentally, the adenoids are a group of subepithelial lymphoid tissue, often referred to as **mucosa-associated lymphoid tissue (MALT)**, situated in the nasopharynx. Importantly, they form an integral part of **Waldeyer's ring**, a crucial collection of lymphoid tissue strategically located at the entrance of the upper respiratory and digestive tracts.

FUNCTION OF ADENOIDS

The adenoids play a vital role in a child's developing immune system, serving as an important immunological organ. Therefore, understanding their functions is paramount.

1. **Immune System's First Line of Defence:** In young children, the adenoids act as an initial sentinel. They are the first point of contact for inhaled germs or allergens with the body's immune cells. This early interaction is crucial as it helps to initiate and accelerate the development of natural immunity.
2. **Antibody Production:** As a key component of Waldeyer's ring, the primary function of the adenoids is to produce important antibodies, particularly **IgG and IgA**. These antibodies are essential in protecting the body from various infections.
3. **Developing Immune Memory:** Early and repeated exposure to different pathogens through the nasal and oral cavities helps the adenoids “remember” these invaders. This process is critical for building a robust and lasting immune system, ultimately contributing to a child's long-term immunity.



ANATOMY OF ADENOIDS

The nasopharyngeal tonsil, commonly referred to as the “**adenoids**,” is **located where the roof and posterior wall of the nasopharynx meet**. It consists of vertical ridges of lymphoid tissue separated by deep clefts. Remember, among all the tonsils forming Waldeyer's ring (palatine, lingual, pharyngeal/adenoid, tubal), only the **palatine tonsils possess a true fibrous capsule and prominent crypts**. This is a frequently asked question in exams.

HISTOLOGY OF ADENOIDS

The surface of the adenoid is covered by three types of epithelium (mixed epithelium):

- Ciliated pseudostratified columnar: This is the predominant type, similar to the respiratory epithelium found elsewhere in the upper respiratory tract. It aids in mucociliary clearance.
- Stratified squamous
- Transitional.

PHYSIOLOGY OF ADENOIDS

Adenoid tissue is already present at birth and undergoes physiological enlargement until about 6-7 years of age. After this point, the size of the adenoids typically plateaus, but the nasopharynx itself continues to increase in size with age. Therefore, while the adenoids may not be actively growing larger, their proportion to the expanding nasopharynx makes them appear comparatively smaller. Subsequently, after the age of 7 years, the adenoid tissue begins a process of **atrophy**, continuing until puberty (12 years). Regression of this lymphoid tissue then accelerates rapidly after around twenty years of age in most individuals, eventually leading to its almost complete disappearance by the age of twenty. Clinical symptoms related to the adenoids are more common in younger children due to the smaller volume of the nasopharynx and the higher frequency of upper respiratory tract infections.

TABLE Clinical Grading of adenoid size

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

BLOOD SUPPLY, VENOUS DRAINAGE, LYMPHATICS & NERVE SUPPLY OF ADENOIDS

Blood supply. Adenoids receive their blood supply from:

1. Ascending palatine branch of facial artery.
2. Ascending pharyngeal branch of external carotid artery.
3. Pharyngeal branch of the third part of maxillary artery.
4. Ascending cervical branch of inferior thyroid artery of thyrocervical trunk.

Venous drainage is through the internal jugular and facial veins.

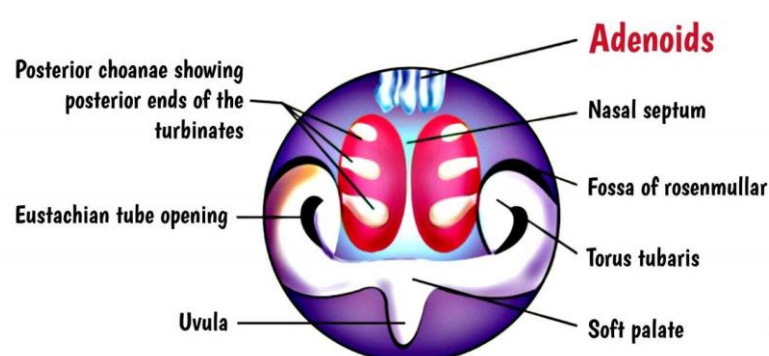
Lymphatics from the adenoids drain into upper jugular nodes directly or indirectly via retropharyngeal (nodes of Rouvier) and parapharyngeal nodes.

Nerve Supply: The adenoids receive sensory innervation from **Cranial Nerves IX (Glossopharyngeal) and X (Vagus)**. These nerves carry sensation, and importantly, referred pain to the ear due to adenoiditis is also mediated through them. Therefore, earache can be a presenting symptom of adenoid inflammation.

AETIOLOGY OF ADENOID HYPERTROPHY

Enlarged adenoids often result from repeated inflammation and infection. Several factors contribute to adenoid hypertrophy:

- Recurrent attacks of rhinitis
- Sinusitis
- Chronic tonsillitis.
- Allergy of the upper respiratory tract



Nasopharynx structures seen on posterior rhinoscopy

CLINICAL FEATURES

Symptoms and signs of adenoid enlargement are influenced not only by the absolute size of the adenoid mass but also by the available space in the nasopharynx. Enlarged and infected adenoids can cause nasal, aural (ear), or general symptoms.

Nasal Symptoms

1. **Nasal Obstruction:** The most common symptom, leading to **mouth breathing**. Nasal obstruction interferes with feeding or suckling in children, as respiration and feeding cannot occur simultaneously, causing **failure to thrive**.
2. **Nasal Discharge:** Partly due to choanal obstruction, preventing normal nasal secretions from draining into the nasopharynx, and partly due to associated chronic rhinitis. This often results in a **wet, bubbly nose**.
3. **Recurrent Sinusitis:** Chronic maxillary sinusitis is commonly associated with adenoids due to persistent nasal discharge and infection. Conversely, primary maxillary sinusitis can lead to infected and enlarged adenoids.
4. **Epistaxis:** Acute inflammation of the adenoids can cause nosebleeds with nose blowing.
5. **Voice Change:** Nasal obstruction leads to a hyponasal voice (rhinolalia clausa), which is devoid of its normal nasal quality. This is a tell-tale sign of nasopharyngeal obstruction.
6. **Olfaction:** Adenoidal hyperplasia may reduce olfactory sensitivity, particularly affecting retronasal smell and taste.

Ear Symptoms

1. **Tubal Obstruction:** An adenoid mass can block the eustachian tube, leading to a retracted tympanic membrane and conductive hearing loss.
2. **Recurrent Acute Otitis Media:** Infections can spread via the eustachian tube, causing recurrent episodes of acute otitis media.
3. **Chronic Suppurative Otitis Media:** This condition may persist in the presence of infected adenoids.
4. **Otitis Media with Effusion (OME) / “Glue Ear”:** Adenoids are a significant cause of OME in children. Fluctuating adenoid sizes can cause intermittent eustachian tube obstruction and, consequently, fluctuating hearing loss.

General Symptoms

1. **Adenoid Facies:** Chronic nasal obstruction and mouth breathing lead to a characteristic facial appearance known as adenoid facies. This is marked by an elongated face, a dull and vacant expression, a persistently open mouth, prominent and crowded upper teeth (prognathism), a hitched-up upper lip, and a pinched-in nose due to

disuse atrophy of the alae nasi. Furthermore, the hard palate becomes highly arched because the moulding action of the tongue is lost.

2. **Apneic Spells / Obstructive Sleep Apnea (OSA):** These may occur when there is total or near-total nasal obstruction due to severe adenoid hypertrophy. An apneic spell is clinically defined as the complete cessation of breathing for a minimum duration of 10 seconds. The diagnosis of OSA is often made if a child experiences 30 or more apneic spells in 7 hours of sleep or, more practically for screening, more than 5 apneic spells per hour of sleep (Apnea-Hypopnea Index > 5/hour). OSA due to adenoid hypertrophy can significantly impact a child's development, behaviour (e.g., hyperactivity, poor concentration), and cardiovascular health.
3. **Pulmonary Hypertension and Cor Pulmonale:** Long-standing nasal obstruction or obstructive sleep apnoea will lead to chronic hypoxia, causing pulmonary vasoconstriction. Over time, this can lead to pulmonary hypertension and, if left untreated, can lead to cor pulmonale.
4. **Aprosexia:** Lack of concentration due to daytime fatigue and irritability.

DIAGNOSIS OF ADENOID HYPERTROPHY

Accurate diagnosis is crucial for appropriate management. A multi-pronged approach is usually employed:

- **Clinical Examination:**
- **Rigid or Flexible Nasopharyngoscopy:** This is the **gold standard** for direct and detailed visualisation of the adenoids and the entire nasopharyngeal space, especially in a cooperative child. Flexible scopes are often preferred in younger children due to better tolerance.
- **Posterior Rhinoscopy:** Using a post-nasal mirror to visualise the adenoid mass directly is a classical method, though often challenging in young, uncooperative children.
- **Anterior Rhinoscopy:** May show signs of rhinitis or purulent discharge.
- **Radiological Examination:**
- **Soft tissue lateral view radiograph of the nasopharynx:** This is a valuable, non-invasive imaging modality. It can reveal the size of the adenoids and, more importantly, the extent of nasopharyngeal air space compromise.
- **Rule Out Other Causes:** A thorough nasal examination should always be conducted to meticulously exclude other potential causes of nasal obstruction, as they can mimic adenoid hypertrophy.

DIFFERENTIAL DIAGNOSIS

It is imperative to consider other conditions that can present with similar symptoms, particularly nasal obstruction. These include:

- **Choanal atresia:** A congenital condition where the posterior nasal passages (choanae) are blocked.
- **Foreign bodies in the nose:** Commonly seen in children, leading to unilateral nasal obstruction and foul-smelling discharge.
- **Nasopharyngeal angiofibroma:** A benign, highly vascular tumour predominantly seen in adolescent males, causing recurrent epistaxis and nasal obstruction.
- **Malignant tumours of the nasopharynx:** Particularly of mesenchymal origin (e.g., rhabdomyosarcoma) in children, or nasopharyngeal carcinoma (rare in children) which can cause unilateral nasal obstruction, ear symptoms, and cranial nerve palsies.
- **Dental causes:** Positional anomalies of the teeth and malocclusion, while often secondary to adenoid facies, can sometimes be part of a broader syndrome or have primary dental origins.

TREATMENT

Conservative Management

For **mild symptoms**, conservative approaches are often effective:

- **Breathing exercises:** To encourage nasal breathing.
- **Decongestant nasal drops (short-term):** To reduce nasal swelling and improve airflow. However, prolonged use should be avoided due to the risk of rhinitis medicamentosa.
- **Nasal saline irrigation:** Helps to clear mucus and reduce inflammation.
- **Antihistamines or intranasal corticosteroids:** For coexistent nasal allergy, these can significantly alleviate the condition by reducing allergic inflammation and associated adenoid swelling.

Surgical Management

Adenoidectomy is the indicated treatment for **marked symptoms** or when conservative measures fail.

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