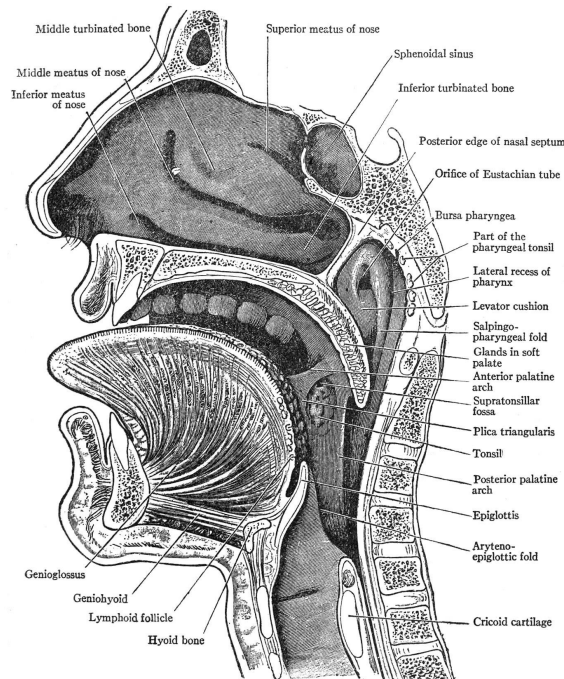


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ABDULAZIZ ALSAIF



Pharynx I-II

Presented by Prof. Khalid Almazrou

★ Lecture Objectives:

- 1st: Anatomy & physiology of the pharynx-Pharyngitis Dr. Khalid
- 2nd: Pharyngeal diseases Dr. Khalid

Color Index:

Important Original content Doctor's notes⁴³⁹ Doctor's notes⁴⁴¹ Golden Notes Extra

Pharynx :

- It extend from the base of the skull to the level 6 cervical vertebra at the lower border of cricoid cartilage.
- Funnel shaped, 10 cm length

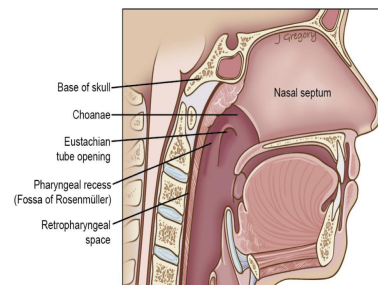
Parts of the pharynx :

01

Nasopharynx

Open anteriorly to the nose

- **Above:** the base of skull
- **Below:** soft palate
- **Laterally** :opening of the eustachian tube, torus tuberosus, Pharyngeal recess (fossa of rosenmuller common site for nasopharyngeal carcinoma*very important to examine Nasopharynx in smoker adult complaining of nasal obstruction + spitting blood), Adenoid, Nasopharyngeal isthmus
- In patients with a large adenoid blocking the eustachian tube, they would develop otitis media with effusion (fluid in middle ear). Adenoid is in nasopharynx. not the the nose

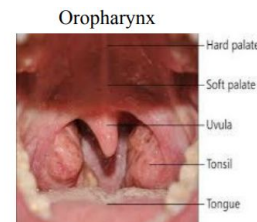


02

Oropharynx

Open anteriorly to the mouth

- **Above:** soft palate
- **Below:** the upper border of epiglottis
- Palatine tonsils between the ant pillars and post pillars, tonsils are located between 2 arches palatoglossal arch (1st) and palatopharyngeal arch (2nd).
- How to measure the grade of the tonsils? put imaginary line in uvula, if the tonsils are within the fossa then this is grade 1 (45%) if it extends more then 50% if more then 75% if they are touching each other this is grade 4 (kissing tonsils)



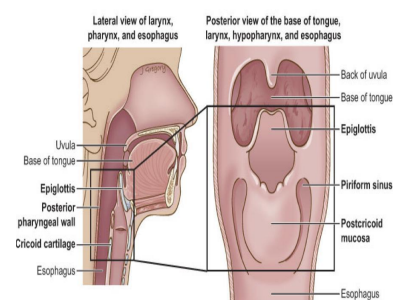
03

Laryngopharynx (hypopharynx)

Open anteriorly to the larynx

- **Above:** the upper border of the epiglottis
- **Below:** lower border of cricoid
- **Three parts :**
 - Pyriform fossa
 - Posterior cricoid area
 - Posterior pharyngeal wall

Laryngopharynx



● Structure of the pharynx :

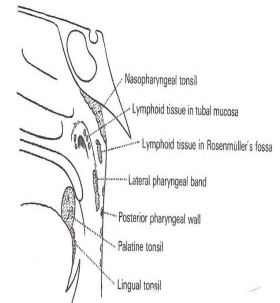
- Fibromuscular tube: Four layers. From internal to external :
Mucous membrane , Pharyngeal aponeurosis , Muscle coat , and Buccopharyngeal fascia

Mucous membrane:

- Ciliated epithelium
- Stratified squamous epithelium
- Transitional epithelium
- Subepithelial lymphoid tissue of the pharynx (waldeyer's ring) **scattered in pharynx includes the (adenoid, palatine tonsils, lingual tonsils)**

- Structures of Waldeyer's Ring:

- Adenoid (no capsule) high chance of reoccurrence
- Lingual tonsils
- Tubal tonsils (around EU in fossa of rosenmuller)
- Lateral pharyngeal bands
- Discrete modules
- Palatine tonsils

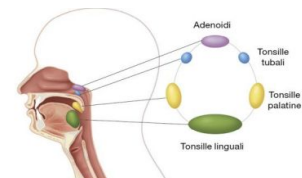


- Palatine tonsils:

- 12-15 crypt a lot of patients complain from white cheese like pieces coming out from the nose this is tonsil liths which is cause by accumulation of food in the crypts and it causes bad smell
- The deep surface is separated from the constrictor muscles of the pharynx by connective tissue' capsule'



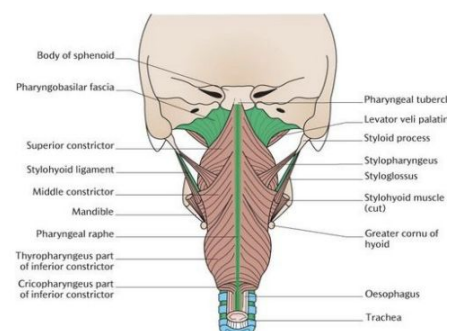
Palatine tonsils



Waldeyer's ring

Pharyngeal aponeurosis

- Incomplete connective tissue coat in the lateral and posterior walls of the pharynx between the muscular layers
- **Starts from the pharyngobasilar fascia**
- **Gives more strength to the structures**



Muscular coat

External

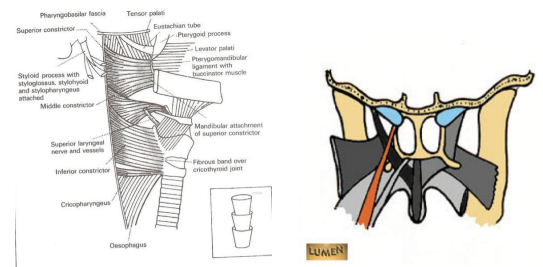
Three constrictor muscles:

1. **Superior constrictor:** arise from pterygoid , pterygomandibular ligament post end of mylohyoid fibers
2. **Middle constrictor:** arise from the hyoid bone and stylohyoid ligament
3. **Inferior constrictor:** has insertions in thyroid and cricoid. Thyropharyngeus, Cricopharyngeus.

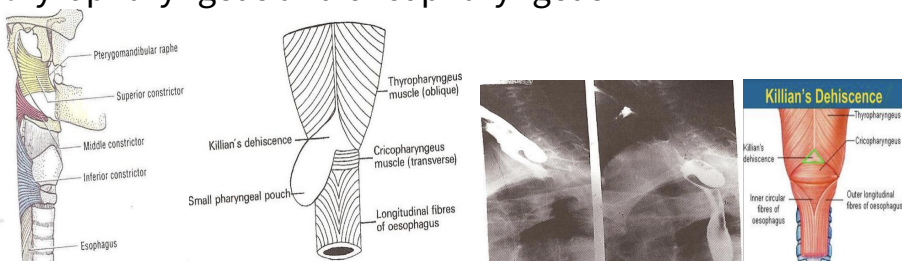
Internal

Three muscles:

1. **Stylopharyngus**
2. **Salpingopharyngus**
3. **palatopharyngus**



Killian's dehiscence: potential gap between thyropharyngeus and cricopharyngeus

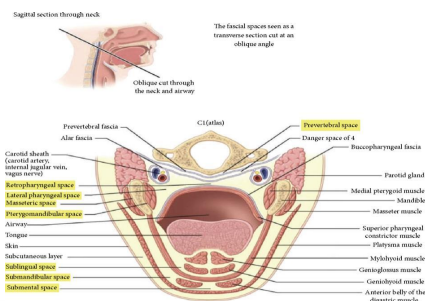


Buccopharyngeal fascia

- Thin layer covers the muscular layer of pharyngeal wall.

• Relation of the pharynx :

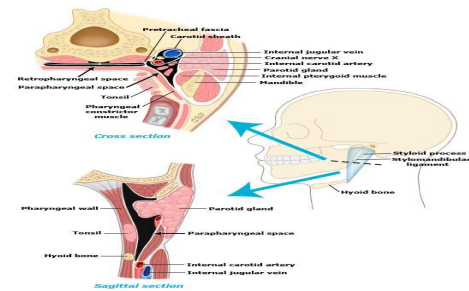
- **Posteriorly:** prevertebral fascia (behind prevertebral fascia we have cervical spine)
- **Anteriorly:** Parapharyngeal space



● Parapharyngeal space :

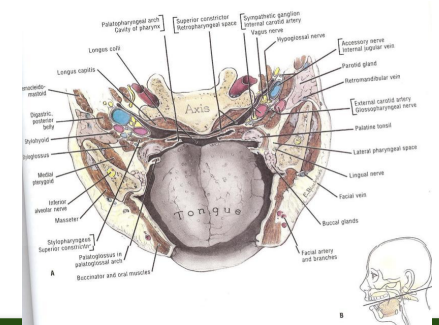
- Potential space lies outside the pharynx -
 - Triangular in cross section , it extend from the base of the skull above to the sup mediastinum and apex of hyoid bone
 - **Anteromedial wall:** buccopharyngeal fascia
 - **Posteromedial wall:** cervical vertebrae, prevertebral muscle and fascia
 - **Lateral wall:**
 - **(up)** the mandible, pterygoid muscle, parotid gland
 - **(Lower)** sternomastoid muscle
 - **Compartment : divided by styloid process**
1. **Prestyloid** is anterior: internal maxillary artery, fat, inferior alveolar, lingual, and auriculotemporal nerves.
 2. **Poststyloid:** neurovascular bundle (carotid artery, internal jugular vein, sympathetic chain, CN IX, X and, XI). **Vital structures (infection in this space may lead to cranial nerve paralysis or carotid rupture)**
 *(If a child has tonsillitis and on examination you found a bulge in the posterior wall (in front of you) you do a CT scan. It might be an abscess. an adult with a posterior bulge without acute infection, think of TB).

Potential space for tumors because of the collection of arteries and lymphoid tissue



● Retropharyngeal space : IMP⁴³⁹

- Posterior space
- It extend from the base of skull to super mediastinum.
- Lies behind the pharynx
- **Anterior:** posterior pharyngeal wall and its covering buccopharyngeal fascia
- **Posterior:** cervical vertebrae and muscles and fascia
- **Contents:** Retropharyngeal lymph nodes
- The retropharyngeal space is actually comprised of two potential spaces, separated by the alar fascia:
 - Anterior, the 'true' retropharyngeal space
 - Posteriorly, the 'danger space'.
- The RPS communicates laterally with the parapharyngeal spaces. Clinically, the retropharyngeal space is important, **because it represents a potential pathway for metastasis of disease between the head & neck and the thorax**, specifically by means of the "danger space", which can connect the retropharyngeal space with superior mediastinum of the thorax.



TEAM 433

Nerve Supply

Sensory : Each of the three sections of the pharynx have a different innervation:

- The nasopharynx is innervated by the maxillary branch of the trigeminal nerve (CN V).
- **The oropharynx by the glossopharyngeal nerve (CN IX).**
- **The laryngopharynx by the vagus nerve (CN X).**

Motor: All the muscles of the pharynx are innervated by the vagus nerve (CN X), except for the stylopharyngeus which is innervated by the glossopharyngeal nerve (CN IX). Also the Sympathetic fibers of the superior cervical ganglia play a role in the innervation.

Arterial Supply from the external carotid

- Artery: *
 - **Ascending pharyngeal (Mainly)**
 - The lingual artery
 - The facial artery
 - The maxillary artery
- Venous drainage:
 - To the internal jugular
- Lymphatics:
 - Retropharyngeal nodes.
 - Deep cervical (jugular) nodes.

● Physiology of the pharynx

01

Functions of the subepithelial lymphoid tissue

- Protective functions :
 - Formation of lymphocytes
 - Formation of antibodies-
 - Acquisition of immunity
 - Localization of infection
 - Salivation

02

Functions of the pharynx

- Respiration
- Speech
- **Resonating cavity** (like people with cleft palate their voice is distorted because of air coming out of the nose so pharynx is important for resonance, while originating speech is from the larynx)
- Articulation
- Taste: taste buds

03

Deglutition (Swallowing)

- Three stages

A

Oral stage

- voluntary you can stop it
- closure of mouth
- cessation of respiration
- raising of larynx
- sudden elevation of the tongue to mixes food with saliva
- press the tongue against the palate, and pushes it backwards towards the oropharynx
- (soft palate closes against posterior pharyngeal wall to prevent food and water from coming out of the nose, in people with cleft palate or short palate everything comes out of the nose)

B

Pharyngeal stage

- Reflux
- Contraction of nasopharynx sphincter
- Larynx rises more
- Laryngeal inlet closure
- Epiglottis (closes the airway) diverts the food into cricopharyngeal sphincter (upper esophageal sphincter)
- Contraction of constrictor muscles
- Relaxed cricopharyngeal sphincter (cricopharyngeal spasm causes choking)
- Cessation of respiration

C

Esophageal Stage

● Sleep Apnea and Snoring

- Snoring is common in children but obstructive sleep apnea is not “my kid snores then suddenly stops and then he takes a deep breath”
- **Snoring** is a sign of partial obstruction of the upper airway during sleep
- Snoring is always present during type of sleep apnea
- **Sleep apnea:** Cessation of airflow at the mouth and nostrils lasting 10 seconds for at least 30 apnoeic episodes. (7 seconds for children)

Types:

- **Central sleep apnea:** failure of respiratory drive from the brain
- **Obstructive sleep apnea (OSA):** due to anatomical narrowing of the upper airway
- **Mixed**

Stages of sleep:

- **Slow wave sleep:** brain waves are slow deep restful sleep, and there is a decrease in the vascular tone and respiratory rate and basal metabolic rate
- **Rapid eye movement:** brain quite active, and active dream

Pathophysiology of OSA:

1. During REM or deep sleep, obstruction occurs resulting in decrease arterial oxygen and increased arterial carbon dioxide pressure.
2. Nocturnal desaturation arouses patient and causes increase pulmonary artery, systemic arterial pressure.
3. Lead to hypersomnolence
4. Usually worse when the patient is lying flat, improve when laying on stomach.

Investigations:

- **Sleep study:** to know how frequent the patient is having OSA and for how long
- EEG, EKG, EOG, pulse oximeter, respiration rate, nasal and oral air flow.
- Desaturation would be significant if it's less than 90% for adults or less than 92% for children.

Treatment :

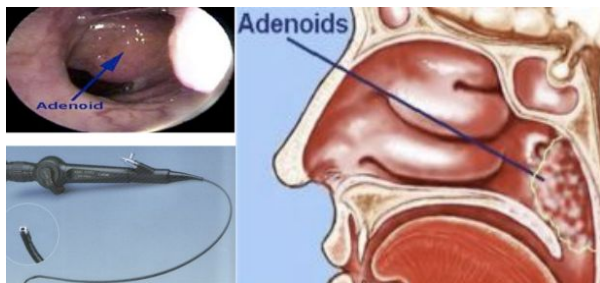
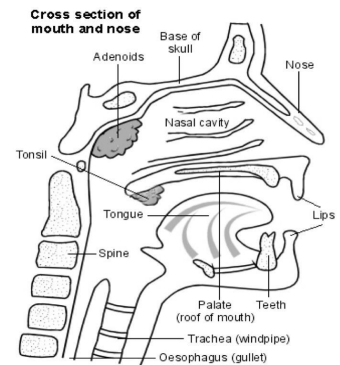
- Nonsurgical:
 - behavior modification, reduce weight
 - medical treatment
 - CPAP continuous positive airway pressure
- Surgical: remove nasal polyp, reduction of big tongue
 - UPPP (uvulopalatopharyngoplasty remove tonsils and uvula to widen oropharynx if they are big)

To evaluate obstruction: If a pt came to you with no apnea only snoring and mouth breathing for 1 month with no other sx of adenotonsillar enlargement:

- first thing it's better to do nothing just observe or its because of allergy (give nasal steroid)
- if sx worsen (witnessed apnea, gasping for air, cyanotic, his sleep is bad, he is getting slimmer) and you examine him and found adenotonsillar enlargement then suggest tonsillectomy
- if the physical exam is -ve, and there is no obvious reason (small adenoid, no septal deviation) or if he has down syndrome, request a sleep study ----> if it showed abnormal parameters then we can do CPAP or UPPP.
- Usually we preserve sleep study after adenotonsillectomy if the pt still complains of OSA.

● Adenoid اللحمية

- A hypertrophy of the nasopharyngeal tonsil to produce symptoms, most commonly between the age of 3-7 years -
- Pathological types:
 - Simple inflammatory
 - Tuberculosis
- Clinical features
 - Mouth breathing
 - Snoring
 - Hyponasality
 - Adenoid face
 - Nasal discharge
 - Eustachian tube obstruction (eustachian tube dysfunction and fluids accumulation, so the child presents with otitis media with effusion)
- Main adverse effects: nasal obstruction - pharyngitis "due dry mouth" - otitis media - rhinosinusitis - recurrent upper respiratory tract infection - obstructive sleep apnea.
- Diagnostic: x-ray (head fully extended to visualize the adenoid), flexible fiberoptic (nowadays instead of x-ray)
- Treatment: Conservative (if small), Surgical: adenoidectomy
- Insert flexible fiberoptic and grade the adenoid (25% ,50% ,75% ,complete grade 4)
- If flexible fiberoptic is not available → do an x-ray (lateral neck) -
- How to read the x-ray? white → bone / black → air / grey → soft tissue



- Q: What do you see?
Lateral Head Neck x-ray showing enlarged adenoid (IMP)

● Acute and Chronic Pharyngitis

Acute : The patient complains of dysphagia and malaise; on examination, the pharyngeal mucosa is hyperaemic and there may be some swelling and tenderness in the neck glands.

Infectious cases:

1. Viruses 40%-60%
 - Rhinovirus : commonest
 - Coronavirus
 - Adenovirus: **more severe and symptomatic**
 - Herpes simplex virus (HSV) 1 and 2
 - Influenza A and B
 - EBV, HIV, CMV, parainfluenza virus, human herpesvirus.
2. Bacteria :
 - GABHS

Non-infectious:

- persistent cough
- post nasal drip
- GERD
- Acute thyroiditis
- Neoplasm
- Allergie
- Smoking

● Acute and Chronic Pharyngitis cont

- In viral cases, patients mainly complain of fever (>38C°), coughing, and runny nose unlike in bacterial cases which causes fever and sore throat with the absence of cough. So this is one way to differentiate between bacterial and viral. Be careful because of resistance :)
- Good **analgesia**. Paracetamol is usually adequate but in severe cases consider a short course of Non Steroidal Anti Inflammatory agents or Codeine.
- Plenty of oral **fluids**. Encourage the patient to drink to prevent dehydration.
- Give **antibiotics in severe cases**. Simple viral sore throats do not warrant antibiotics, which are ineffective. If there is evidence of bacterial infection – e.g. pus, severe pain on swallowing or prolonged unresponsive symptoms **penicillin** remains the treatment of choice. If the child cannot swallow, you may need to give intravenous antibiotics. **If you can do a STREP test (rapid antigen test) it's better; it takes 2 hours max. Throat culture is not usually done because it takes a long time 2 days- 3 days.**

Chronic pharyngitis

Pathogenesis

- Dry pharyngeal mucosa or secretions
- Swelling of mucosa with prominences of islets or strips of lymphatic tissue
- Secretion leading to cough (esp in the morning)
- Postnasal drip
- Irritant (dust, dry heat, smoking, alcohol) or allergies
- **Reflux esophagitis**
- **Chronic mouth breathing**
- Granulomatous disease, Connective tissue disease, Malignancy
- ask about mouth breathing (hair in the nose cleans the air from the dust and humidifies, this doesn't occur when we breath through the mouth)

Dx & DDX

Dx: clinically **DDx:** Sjögren disease, Specific pharyngitis

Signs & symptoms

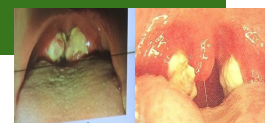
- Constant mouth clearing, dry throat, pharyngeal crusting, thick granular wall, **no fever just dry and red**. If pt presents with no fever think of inflammatory causes or allergy.

Treatment

- Symptomatic, Fluids, Steam inhalation, Local antiseptic

● Acute infection of the oropharynx

Infectious mononucleosis (young adults)



Pathogen

- Epstein barr virus , or CMV (transmitted through oral contract)

Signs & symptoms

- **Fever, lymphadenopathy**, malaise, exudative tonsillitis, **hepatosplenomegaly, membranous tonsillitis.**
- Present with acute obstruction
- **Characterised by the classic triad of fever, pharyngitis, and lymphadenopathy. Often subclinical in young children.**

Diagnosis

- Monospot test. (low accuracy)
- Paul bunnell test (heterophile antibodies in serum) 80% mononuclear and 10% atypical lymphocytes on smear. **To give us a hint like rapid antigen test (IgM)**

Complication

- Cranial nerves involvement, meningitis, autoimmune hemolytic anemia, splenic rupture

Treatment

- Hydration, analgesia oral hygiene, (if the tonsils causing airway obstruction we can give steroids to reduce the edema) “Don't give ampicillin or amoxicillin to avoid SJS in these patients”

Acute tonsillitis 438 Female

Causes

- Viral (60% and mostly adenovirus), bacterial (group A B-hemolytic streptococcus, moraxella, H. influenza, bacteroides).

Signs & symptoms

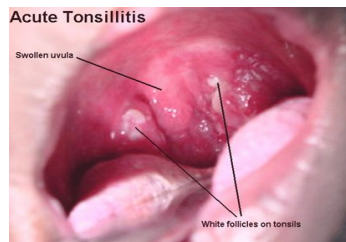
- **Fever**, **sore throat**, odynophagia, **trismus**(difficulty to open mouth), halitosis, **Enlarged jugulodigastric lymph nodes are also commonly found.**
- **Phases:** erythema, exudative, **follicular tonsillitis**

Complication

- **Peritonsillar abscess**, parapharyngeal abscess (abscess may go to parapharyngeal space (post styloid) which contains cranial nerves) or **retropharyngeal abscess**, rheumatic fever, glomerulonephritis (if patient is not treated well), **otitis media**. untreated? abscess

Treatment

- Antibiotics, bed rest, hydration, analgesia.
- **Always ask about frequency of tonsillitis**



Follicular tonsillitis
(not membranes)

Scarlet fever

Cause

- Endotoxin produced by by type A B-hemolytic streptococcus (GABHS) streptococcus can cause : **Glomerulonephritis, mitral valve disease**

Signs & symptoms

- Red pharynx, **strawberry tongue (glossitis)**, perioral skin erythema and desquamation (peeling of skin), dysphagia, malaise, severe cervical lymphadenopathy, **diffuse skin rash (sandpaper rash)** .

Diagnosis

- Rapid antigen test (strep test) (if the test came +ve, it'll help us to differentiate between scarlet fever and Kawasaki's disease)
- Throat culture
- **Dick test** a test to determine susceptibility or immunity to scarlet fever by an injection of scarlet fever toxin.

Treatment

- Penicillin



Kawasaki's disease is an important differential diagnosis, as the symptoms are very similar to those of scarlet fever. However, Kawasaki disease is associated with **conjunctivitis** and **does not respond to antibiotics**.

Management:

1. IV immunoglobulin (IVIG)
2. High single-dose oral aspirin to reduce the risk of coronary artery aneurysms

● Tonsillectomy

Indications:

- Recurrent tonsillitis (7 times per year for 1 year or 4 times per year for 2 years or 3 times per year for 3 years)
- **Hypertrophied tonsils** causing obstructive sleep apnea “grade 3 or 4 tonsils”
- Asymmetric tonsillar enlargement suspicious of malignancy + smoker > you have to remove it to take biopsy
- Peritonsillar abscess or quinsy (risk of parapharyngeal abscess)



This is grade 4 tonsils (kissing tonsils), they will have Obstructive sleep apnea

● Tonsillectomy complications:

- Hemorrhage:
 - Primary
 - Reactionary
 - Secondary
- Respiratory obstruction. (because of uvular edema, hematoma, aspirated material).
- Injury to nearby structures.
- Pulmonary and distant infections.



We have to remove asymmetrical tonsils in adults because it could be cancerous

Primary hemorrhage:

Bleeding occurring during the surgery

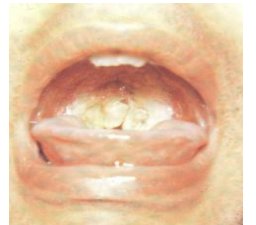
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|---------------------|-----------------------------------|
| ● Causes: | ● Management: |
| ○ Bleeding tendency | ○ General supportive measures |
| ○ Acute infections | ○ Diathermy, ligature or stitches |
| ○ Bad technique | ○ Packing |



Reactionary hemorrhage:

Bleeding occurring within the first 24 hours postoperative period

- | | |
|--|---------------------------------------|
| ● Causes: | ● Treatment: |
| ○ Bleeding tendency | ○ General supportive measures |
| ○ Slipped ligature (slipped suture) | ○ Take patient back to OR |
| ● Diagnosis: | ○ Control like reactionary hemorrhage |
| ○ Rising pulse & dropping blood pressure | |
| ○ Rattle breathing | |
| ○ Blood trickling from the mouth | |
| ○ Frequent swallowing | |
| ○ Examination | |



Secondary hemorrhage:

- Occur 5-10 days postoperatively
- **Due to infection**
- Treated by antibiotics
- May need diathermy or packing
- Notes:
 - Encourage eating/drinking after tonsillectomy to reduce slough tissue
 - Slough tissue is a good media for infection this is why it's important to reduce it
 - It usually takes children 1 week to heal after tonsillectomy. Adults → 2 weeks.

Paradise Criteria for Tonsillectomy (extra) IMP⁴³⁹

Minimum frequency of sore throat episodes

- At least seven episodes in the previous year, at least five episodes in each of the previous two years, or at least three episodes in each of the previous three years

Clinical features

- Sore throat plus at least one of the following features qualifies as a counting episode:
 - Temperature of greater than 100.9°F (38.3°C)
 - Cervical adenopathy (tender lymph nodes or lymph node size greater than 2 cm)
 - Tonsillar exudate
 - Culture positive for group A β -hemolytic streptococcus

Treatment

- Antibiotics administered in the conventional dosage for proved or suspected streptococcal episodes

Documentation

- Each episode of throat infection and its qualifying features substantiated by contemporaneous notation in a medical record
- If the episodes are not fully documented, subsequent observance by the physician of two episodes of throat infection with patterns of frequency and clinical features consistent with the initial history*

*-Allows for tonsillectomy in patients who meet all but the documentation criterion. A 12-month observation period is usually recommended before consideration of tonsillectomy.

Diphtheria 438 Female

Cause

- *Corynebacterium diphtheria*

Signs & symptoms

- Sore throat, fever, **green** (book: gray) **plaques friable membrane**
- **same picture as infectious mononucleosis both have membranes over tonsils**

Diagnosis

- Culture

Complication

- Nephritis
- airway obstruction
- death

Treatment

- Antibiotics (penicillin or erythromycin), antitoxin



Moniliasis: Oral thrush, immunocompromised, steroid inhaler 438 Female

Signs & symptoms

- White patches caused by candida albicans fungus

Treatment

- Nystatin **antifungal**



Vincent's angina 438 Female

Cause

- Acute **ulcerative** lesion in oral cavity
- Gram negative **fusiform bacillus** and a **spirillum** with anaerobic

Signs & symptoms

- Sudden in onset:
 - Pain
 - Fever
 - cervical adenitis
- the base of the deep ulcers bleeds when the membranous slough is removed
- the symptoms subside in 4–7 days

Treatment

- Metronidazole
- antiseptic
- mouthwash

Ludwig's Angina 438 Female

Definition

- **Bilateral cellulitis of submandibular and sublingual spaces**, occurs due to extraction of a tooth that has an abscess without putting him under antibiotic coverage first.

Signs & symptoms

- Wooden floor of the mouth, neck swelling, indurations, drooling, respiratory distress, swollen tongue, dysphagia, trismus

Complications

- Airway distress , sepsis

Treatment

- Tracheotomy (can't intubate because of the tongue)
- External drainage
- IV antibiotics



Submandibular swelling that extended below the tongue, pushing to tongue against the soft palate making the patient unable to breath.



Zenker's diverticulum 439

Definition

- Herniation of the mucosa at Killian's triangle due to increased intraluminal pressure when cricopharynx is closed

Signs & symptoms

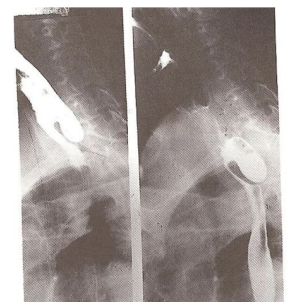
- Dysphagia
- Regurgitation of undigested food, aspiration
- Bad breath

Diagnosis

- Barium swallow

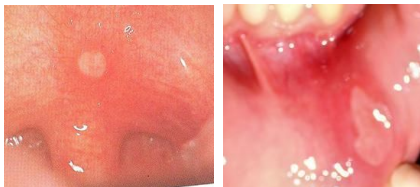
Treatment

- Cricopharyngeal myotomy (the sphincter) to give relaxation
- Diverticulectomy



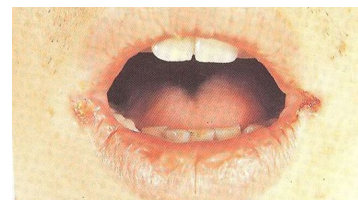
Aphthous ulcer: 438 Female

- Unknown cause (viral? related to vitamin deficiency?), unknown cause could be due to stress or food. Usually due to stress (exam week), stays for a few days and spontaneously resolves.
- Disappears after a few days, طحينة can be used



Angular Stomatitis: 438 Female

- Common in young females
- Iron deficiency anemia (coffee, tea decreases iron absorption)
- Dry lip



Chronic adenotonsillar Hypertrophy : IMP⁴³⁹

(common in young adults)

- Most common indication for adenotonsillectomy

Etiology:

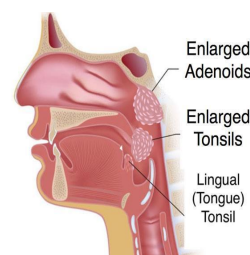
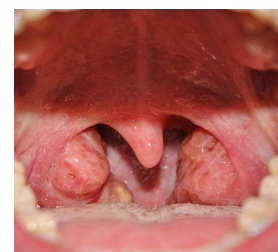
- increased immunologic activity: repeated upper respiratory infections cause pathological adenoidal enlargement
- Loads of pathogenic bacteria, especially β -lactamase producer.
- The biofilm theory: bacteria in the adenoids can form a protective matrix shielding their colonies from host immune system and from abx penetration, this causes repeated upper respiratory infections, in particular rhinosinusitis and otitis media.

Important to ask for how long the symptoms persisted to assess treatment options

It causes **Airway obstruction** and possibly **obstructive sleep apnea** which is the most common indication for tonsillectomy in the paediatric population.

- paediatric obstructive sleep apnea incidence of 1% to 3%
- worse in supine and asleep (gravity) and the relaxation of surrounding soft tissue.
- snoring, apnea and oxygen desaturation (<95% in adults , <92% in children).
(apnea is pausing of breathing for more than 7 seconds in children, and more than 10 seconds in adults)

Kissing tonsils



Symptoms:

- Pulmonary hypertension and cor pulmonale. (end stage)
- failure to thrive, and developmental delay.
- Loud "heroic" breathing
- Diaphoresis
- Apnea
- Gaspings
- Mouth-breathing
- restless sleep
- Enuresis (bedwetting b/c of relaxation of muscles)
- Drooling
- night terrors, and sleepwalking.
- Daytime sleepiness
- morning headache
- dry mouth
- Halitosis
- swallowing difficulty
- hyponasal speech.
- behavioural difficulties
- Hyperactivity
- inattentiveness in the classroom
- problems with academic performance
- rebellious or aggressive behaviour
- attention deficit Hyperactivity disorder (ADHD). decrease O₂ saturation affect the brain. Affects the frontal lobe

Tonsillar Hypertrophy grading (extra)

Grade	DEFINITION
Grade 0	<ul style="list-style-type: none"> Tonsils are found confined to the space between the anterior and posterior pillars
Grade 1	<ul style="list-style-type: none"> Tonsils are enlarged and is just seen coming out of the anterior pillar. (cover 25% of the space between the pillars)
Grade 2	<ul style="list-style-type: none"> The enlarged tonsil reaches to about half the distance of uvula. (cover 50% of the space between the pillars)
Grade 3	<ul style="list-style-type: none"> The enlarged tonsil comes into contact with the uvula. (cover 75% of the space between the pillars)
Grade 4	<ul style="list-style-type: none"> The enlargement of tonsil is so much that both tonsils lie virtually in contact with each other i.e. kissing tonsils

● Recurrent adenotonsillitis :

Etiology:

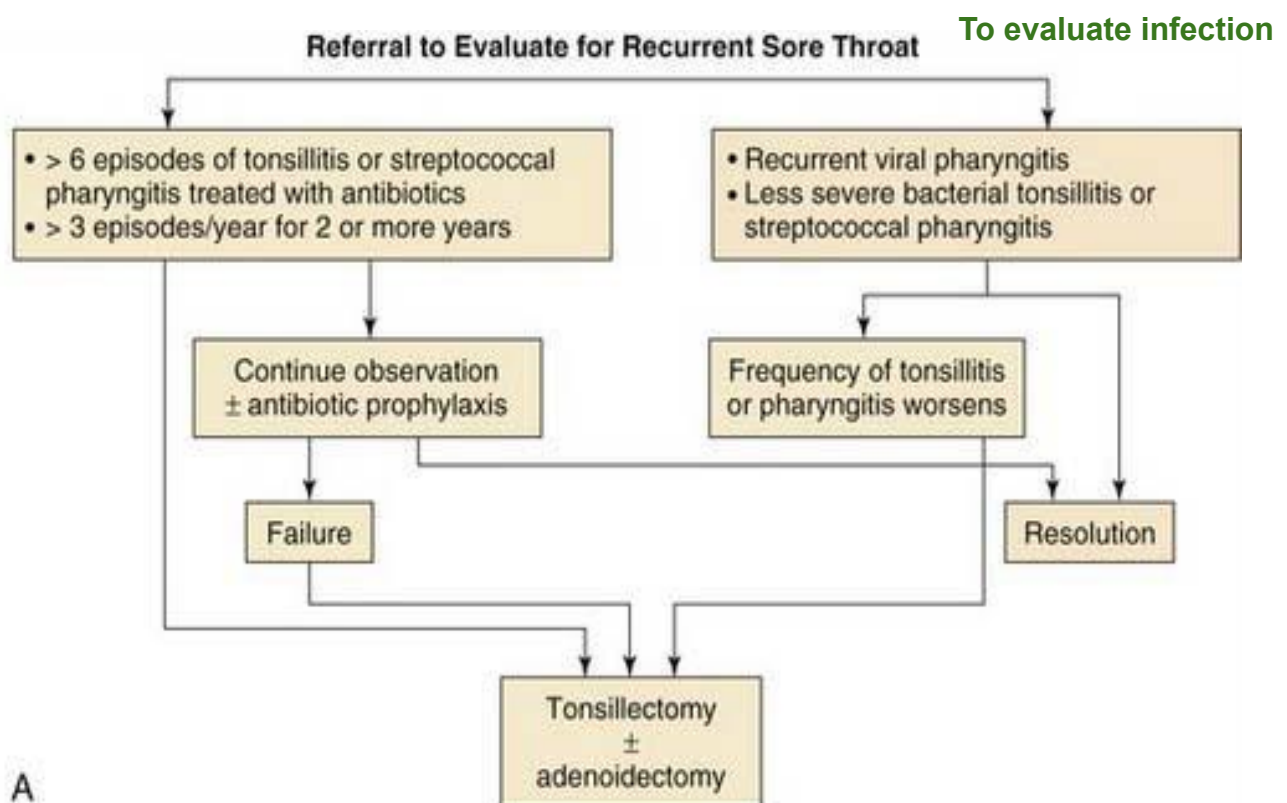
- **Most common is viral**
- 5-30% bacterial
- of these 39% are beta lactamase-producing (BLPO). Anaerobic BLPO.
- **GABHS (Group A Beta-Hemolytic Streptococci) most important pathogen because of potential sequelae (RHF, glomerulonephritis)**

Diagnosis:

- Throat culture.

Treatment:

- Penicillin is first line, even if throat culture is negative for GABHS.
- For acute Upper airway obstruction : NP airway, steroids, IV abx and immediate tonsillectomy for poor response.



- The commonest and absolute indication of tonsillectomy is the enlargement causing OSA.
- The recurrent adenotonsillitis is a relative indication, so it is not a must.

● Adenotonsillectomy :

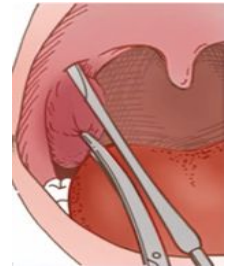
Indications:

Absolute

- malocclusion, Upper Air Obstruction; OSA
- Quinsy unresponsive to Rx or (2nd Quinsy) (we do hot tonsillectomy for these patients)
- Halitosis
- Asymmetry, suspicious for malignancy (Unilateral Tonsillar enlargement)
- If we need to reach a specific area eg; styloid process diseases then we do adenotonsillectomy

Complications:

- Pain is the most common complication
- postoperative hemorrhage (most drastic)
- sore throat
- Otalgia (referred pain by glossopharyngeal)
- uvular swelling
- respiratory compromise (in OSA patients they might get it immediately after surgery)



Relative

- 3 or more episodes per year
- Halitosis (dead tissue & remnant of food in crypta magna causing foul smell) 60% of causes are due to bad oral hygiene so you need to see a dentist first. 20-30% of halitosis are because of sinusitis(post nasal drip) and tonsils, remaining 10% is because of the stomach.
- individual considerations

- Dehydration
- burns and iatrogenic trauma (during cauterization)
- velopharyngeal insufficiency
- nasopharyngeal stenosis
- atlantoaxial subluxation
- grisel's syndrome (regrowth)
- Eustachian tube injury
- Laceration of ICA/pseudoaneurysm of ICA

● Adenoidectomy :

Indications:

Obstruction:

- chronic nasal obstruction or obligate mouth breathing (breathing difficulty and swallowing because of enlarged adenoid; mother complaining her child can't hold the bottle in his mouth correctly)
- OSA with failure to thrive (FTT), cor pulmonale
- dysphagia
- speech problems (hyponasalty)
- severe orofacial/dental abnormalities (Adenoid facies: long nose, short upper lip)

Infection:

- Recurrent/chronic adenoiditis (3 or more episodes/year) (comes with nasal discharge)
- Recurrent / chronic OME: large adenoids can obstruct the Eustachian tube so that the middle ear is poorly ventilated and fluid accumulates (acute otitis media with effusion and snoring = remove the adenoid and put the tube again)
- recommended to remove the adenoids in a pt above the age of 4 with OM with effusion
- Recurrent sinusitis; children with sinusitis that took ABx 3 times in 6 months or 4 times in 1 year and no improvement 2nd step is adenoidectomy. (children is diff from adults in Tx of sinusitis)



● Adenoidectomy Cont :

Complications:

- **Haemorrhage:** this usually occurs in the first 24 hours. Do not delay in setting up a drip, getting blood cross-matched and returning the child to theatre.
 - Otitis media
 - Regrowth of residual adenoid tissue.
 - **'Rhinolalia aperta'**. This is a disorder of speech characterized by escape of air from the nose during articulation. Removal of large adenoids in a child with a short soft palate may result in palatal incompetence. Resolution usually occurs without treatment, but if not, speech therapy is advisable
-
- Primary hemorrhage: within the first 24 hours after surgery.
 - Secondary hemorrhage: from 24 hours and beyond (10d for example).
 1. In primary hemorrhage if active bleeding you need to take the patient to the OR to control the bleeding, also do CBC and coagulation profile.
 2. In secondary or delayed hemorrhage they usually come after 7-10d, if no active bleeding remove the clot and observe them, but if there is active bleeding take him to the OR to control it and do CBC and coagulation profile.
 3. In recurrent bleeding we do angiogram to make sure there is no abnormal vessel at the area.
 4. In uncontrollable bleeding, if exploration is not possible, we can do angiogram embolization

● Unilateral tonsillar enlargement : IMP⁴³⁹

Apparent enlargement vs true enlargement:

- While examining the child, when you put the tongue depressor he will squeeze to counteract the tongue depressor so the lateral wall will come medially that will show if the tonsil is big, so you have to make sure it is true enlargement of one side of tonsil.

Non-neoplastic:

- Acute infective
- chronic infective
- Hypertrophy
- Congenital
- Neoplastic
- in children usually it is because of infection or congenital.

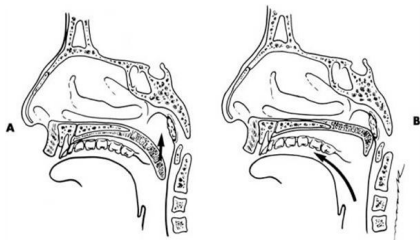
Neoplastic:

- in adults, it is a red flag, think of malignancy, do excisional biopsy by tonsillectomy (both sides) to rule out lymphoma (commonest) or SCC.

● Bifid uvula Extra from 437

Clinical Scenario:

- A mother brought a child that snores and has noisy breathing and we decided to remove the adenoid but we didn't exam the oral cavity. The child had a bifid uvula and submucosal cleft.
- after adenoid removal surgery the mother brought the child that is now complaining of water coming out of his nose and hypernasality.
- Signs & symptoms: snoring and mouth breathing
- We **MUST examine the oral cavity** when the child is complaining of noisy breathing and snoring because he may have a bifid uvula or heart shaped uvula, and palpate the soft palate for a hidden submucosal cleft. **The adenoid was helping in closing the soft palate against the posterior pharyngeal wall** (bridging the gap between the soft palate and pharynx) during swallowing. **So be careful you can't book all patients for adenoidectomy.**
- Sometimes they have this pathology and a big adenoid so we can do something called **partial adenoidectomy** (we remove the upper part and keep the part that is forming the bridge to prevent hypernasality and velopharyngeal insufficiency).
- Velopharyngeal insufficiency (VPI) is a disorder resulting in the improper closing of the velopharyngeal sphincter (soft palate muscle in the mouth) during speech, allowing air to escape through the nose instead of the mouth which results in hypernasality.
- If the velopharynx is not closed, snort sound may be produced through the nose or you may hear air coming out of the nose during speech.
- Improper function of this structure also produce a nasal tone in the voice (hypernasality).

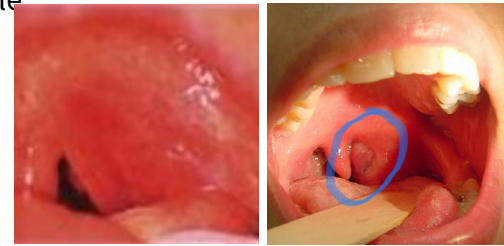
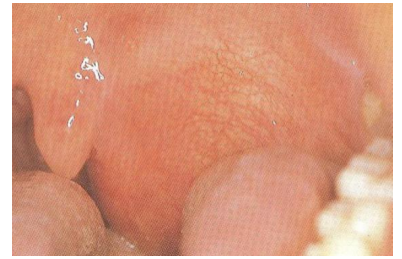


Complications of pharyngeal

● **Peritonsillar abscess (quinsy) : IMP⁴³⁹**

Complication of pharyngeal diseases

- An abscess between the tonsil capsule and the adjacent lateral pharyngeal wall.
- common in patients with recurrent tonsillitis or in those with chronic tonsillitis that has been inadequately treated. **Took 3 courses of antibiotics with no improvement**
- Pus formation between the tonsil bed and the tonsillar capsule
- Unilateral and the pain is severe, with referred otalgia to the ipsilateral ear a few days after the onset of tonsillitis
- Drooling is caused by odynophagia and dysphagia.
- Trismus is frequently present.



Symptoms :

- **Fever**
- Ootalgia
- **Odynophagia**
- **Uvular deviation.**
- Trismus
- Drooling of saliva
- **Hot potato voice**
- On one side

Treatment:

- needle aspiration (**to relieve pressure and you give ABx if pt improved no further Tx, if failed we do I&D**) followed by incision and drainage
- **IV ABx**
- when there is extension of infection of the peritonsillar abscess, CT with contrast may be indicated
- if there has been a previous history of tonsillitis, a Quinsy tonsillectomy may be quite effective **and if the abscess comes again we do tonsillectomy**

After I&D:

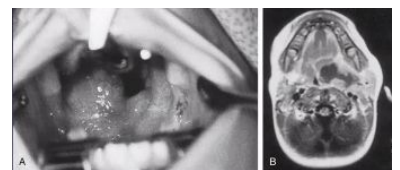
- Wait 6 weeks: do tonsillectomy (avoid risk of bleeding, cold tonsillectomy)
- If Pt not responding to abx and incision/drainage so we take it out right away, Hot tonsillectomy (less blood loss)

Diagnosis:

- cultures show a polymicrobial infection

Complications:

- Para and retropharyngeal abscess
- Aspiration pneumonia

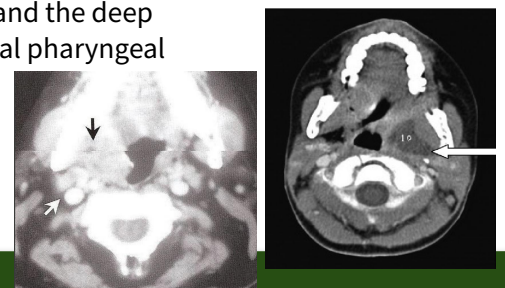


● **Parapharyngeal abscess : IMP⁴³⁹**

Source of the infection:

- Odontogenic, tonsils, parotid.
- Pus drains from either tonsils or from peritonsillar abscess **Through the superior constrictor muscle.**
- The abscess is located between the superior constrictor muscle and the deep cervical fascia and causes displacement of the tonsil on the lateral pharyngeal wall toward the midline.
- May spread to the mediastinum.

Torticollis: a twisting of the neck that causes the head to rotate and tilt at an odd angle



● Parapharyngeal abscess CONT:

Sign and symptoms:

- Pain
- Leukocytosis
- **Trismus**
- fever
- muffled voices (**hot potato voice**)
- **intraoral bulge** (lateral).
- Neck mass

on examination: Swelling of the lateral pharyngeal wall, behind posterior tonsillar pillar.
Neurologic deficits (IX, X, and XII)

Complications: Aspiration, cranial nerve palsy, airway compromise, septic thrombophlebitis, carotid blowout, endocarditis.

Investigations: Laboratory and bacteriology, CT (best modality), MRI

Treatment :

- **Aggressive IV ABX, fluid and close observation.**
- **Surgical intervention with external approach is often needed (EXTERNAL drainage) (to avoid injuring carotid) (if its huge pus more than 3 cm collection then surgery is needed otherwise ABx is the choice)**
- **Airway management** You have to mention all three

● Retropharyngeal abscess: IMP⁴³⁹

- More common in children
- Cranial base to the mediastinum, Unilateral
- Lymph nodes receive drainage from the nose, paranasal sinuses, pharynx, and eustachian tube.
- **common in children younger than 2 years.**
 - Signs & symptoms: irritability, **fever**, dysphagia, muffled speech, hot potato voice, drooling, noisy breathing (stridor), **stiff neck**, **Odynophagia**, and cervical lymphadenopathy.

Physical examination:

- **unilateral posterior pharyngeal swelling.**
- Sometimes we can't see the swelling because of young age so we use a flexible scope from the nose and if it's an abscess or something else

Complications:

- Mediastinitis
- respiratory distress
- rupture abscess

Diagnosis:

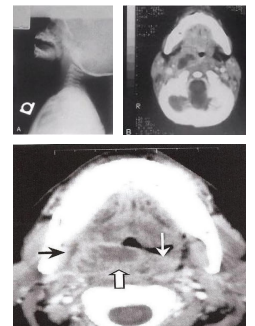
- Lateral neck radiography/CT with contrast
- U/S

Treatment : (MENTION ALL 3!)

- **Surgical drainage: A transoral approach is recommended for incision and drainage of abscesses.**
 - **if the abscess extends inferiorly below the hyoid bone, an external approach should also be used.**
- IV ABx
- Secure Airway



pic: Thickness of prevertebral fascia, and sometimes you can see gas bubbles in the abscess



● **Clinical practice guideline Tonsillectomy in children :** doctor said not imp for exam Doctor 439 said IMP

- Clinicians should recommend watchful waiting for recurrent throat infection if there have been any of the following
 - fewer than 7 episodes in the past year
 - fewer than 5 episodes per year in the past 2 years
 - fewer than 3 episodes per year in the past 3 years.
- Clinicians may recommend tonsillectomy for recurrent throat infection with a frequency of at least 7 episodes in the past year or at least 5 episodes per year for 2 years or at least 3 episodes per year for 3 years with documentation in the medical record for each episode of sore throat one or more of the following:
 - temperature > 38.3
 - cervical adenopathy
 - tonsillar exudate
 - positive test for GABHS.
- Clinicians should assess the child with recurrent throat infection who does not meet criteria in statement 2 for modifying factors that may nonetheless favor tonsillectomy, which may include but are not limited to
 - multiple antibiotic allergy/intolerance
 - PFAPA (periodic fever, aphthous stomatitis, pharyngitis, and adenitis)
 - history of peritonsillar abscess.
- Clinicians should ask caregivers of children with sleep-disordered breathing and tonsil hypertrophy about comorbid conditions that might improve after tonsillectomy, including
 - growth retardation
 - poor school performance
 - enuresis
 - behavioral problems.
- Clinicians should counsel caregivers about tonsillectomy as a means to improve health in children with abnormal polysomnography who also have tonsil Hypertrophy and sleep-disordered breathing.

● **Clinical practice guideline Tonsillectomy in children :**

- Clinicians should counsel caregivers and explain that SDB may persist or recur after tonsillectomy and may require further management
- Clinicians should administer a single, intraoperative dose of intravenous dexamethasone to children undergoing tonsillectomy.
- Clinician should advocate for pain management after tonsillectomy and educate caregivers about the importance of managing and reassessing pain.
- Clinician who perform tonsillectomy should determine their rate of primary and secondary post tonsillectomy hemorrhage at least annually.

Tonsillectomy and oSDB Caregiver Counseling Summary

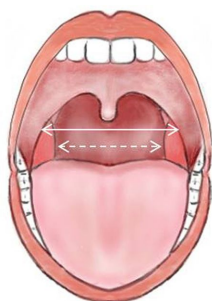
1. Enlarged tonsils are the most common reason that children develop oSDB.
2. oSDB is not solely due to enlarged tonsils; muscle tone also plays a role.
3. Obesity plays a major role in oSDB.
4. PSG is considered the best test to confirm that a child has OSA that would benefit from surgery. It also provides baseline information in case there are persistent symptoms after surgery.
5. PSG is not necessary in all cases, and access may be limited by availability of sleep laboratories and willingness of insurers and third party payers to cover the cost of testing. For an otherwise healthy child with a strong history of struggling to breathe with daytime symptoms and enlarged tonsils, PSG is typically not performed unless the parents want to confirm the diagnosis.
6. The success of tonsillectomy is variable. The age, weight, ethnicity, OSA severity, and associated medical conditions all affect the success. Younger, normal-weight, non-African American children may have a resolution of oSDB of 80%.
7. For obese children, tonsillectomy produces complete resolution of oSDB \50% of the time.
8. Caregivers need to be aware that their children may require additional interventions to cure their oSDB, which can vary from weight loss, medications, or wearing a special mask while sleeping that will keep their airway open. Some children may be candidates for more advanced sleep surgery procedures.

- Clinical practice guideline Tonsillectomy in children :**

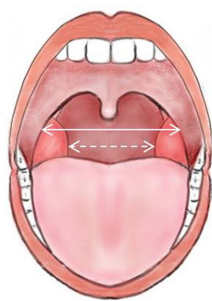
Gradation of Tonsillar Enlargement

Table 6. Gradation of Tonsillar Enlargement⁹⁰

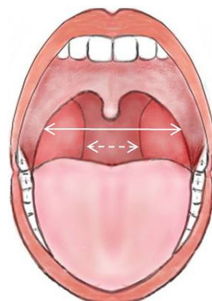
Grade	Definition	Description
0	Not visible	Tonsils do not reach tonsillar pillars
1+	Less than 25%	Tonsils fill less than 25% of the transverse oropharyngeal space measured between the anterior tonsillar pillars
2+	25% to 49%	Tonsils fill less than 50% of the transverse oropharyngeal space
3+	50%-74%	Tonsils fill less than 75% of the transverse oropharyngeal space
4+	75% or more	Tonsils fill 75% or more than the transverse oropharyngeal space



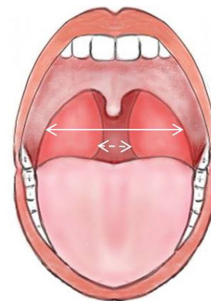
Stage I
(<25%)



Stage II
(>25% <50%)



Stage III
(>50% <75%)



Stage IV
(>75%)

THANK YOU!

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