

Pharynx I-II

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Lecture Objectives:

- ★ Pharynx I
 - Anatomy of the pharynx and deep neck spaces (retro and parapharyngeal)
 - Physiology of pharynx (in brief).
 - Acute and chronic pharyngitis (nonspecific and specific) e.g scarlet fever, infectious moniliasis, fungal, Vincent angina, diphtheria.
 - Zenker diverticulation (in brief).
- ★ Pharynx II
 - Adenoid and tonsil diseases.
 - Complication of pharyngeal diseases (Quinsy, para and retropharyngeal, Ludwig's angina) + Radiological illustrations).
 - Adenotonsillectomy (indications, complication and management).
 - Differential diagnosis of membranous tonsil (in brief).

Color Index:

Important Original content **Doctor's notes**
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

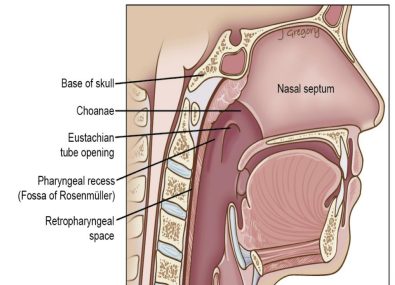
Parts of the pharynx :

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

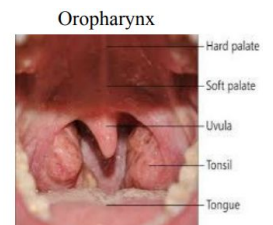


02

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)



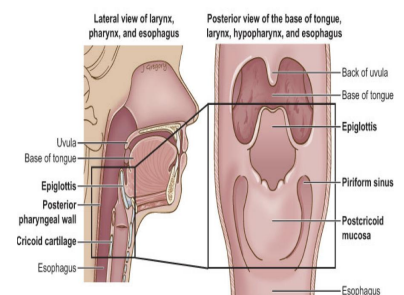
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Laryngopharynx (hypopharynx)

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

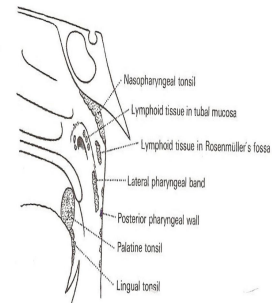


● Structure of the pharynx :

- 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 Rosenmüller)
 - 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 caused 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'



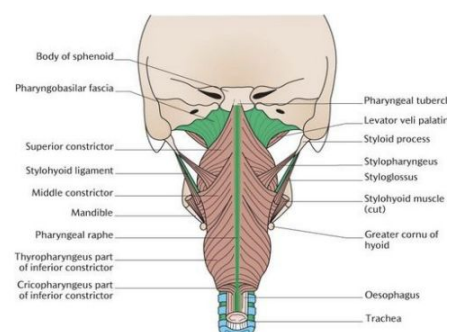
Palatine tonsils



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

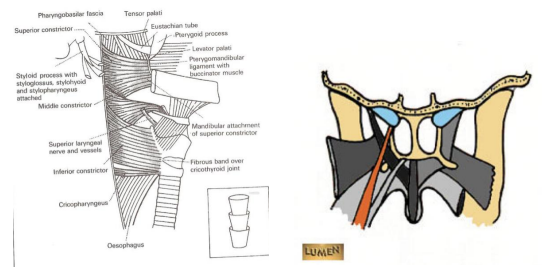
Three constrictor muscles:

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

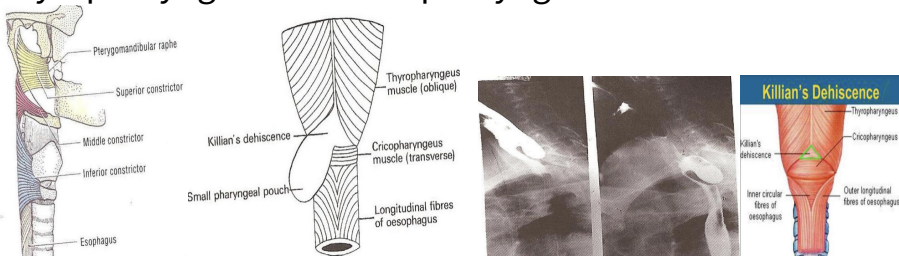
Internal

Three muscles:

- Stylopharyngus**
- Salpingopharyngus**
- palatopharyngus**



Killian's dehiscence: potential gap between thyropharyngeus and cricopharyngeus

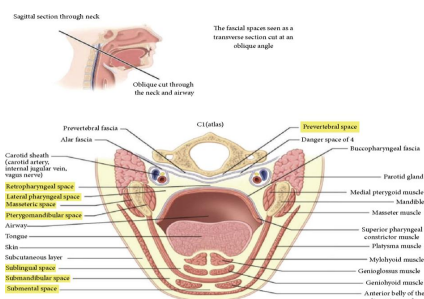


Buccopharyngeal fascia

- 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



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
- Articulation
- Taste: taste buds

03

Deglutition

- 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:

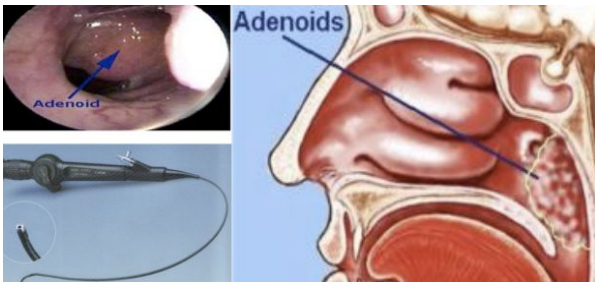
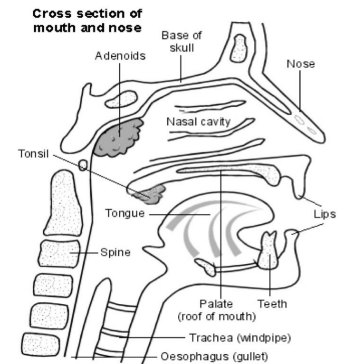
- **Sleep study:** to know how frequent the patient is having OSA and for how long
- EEG, EKG, EOG, pulse oximeter, respiration rate, nasal and oral air flow.
- Desaturation would be significant if it's less than 90% for adults or less than 92% for children.

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)

● 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
- Herpes simplex virus (HSV) 1 and 2
- Influenza A and B

2. Bacteria :

- GABHS
- Group C beta-hemolytic streptococci
- Neisseria gonorrhoeae
- Corynebacterium diphtheriae
- Mycoplasma pneumoniae
- Chlamydia pneumoniae
- Fusobacterium necrophorum

● Acute and Chronic Pharyngitis cont

- 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.

Chronic pharyngitis

Note

- 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)

Pathogenesis

- Postnasal drip
- Irritant (dust, dry heat, smoking, alcohol) or allergies
- Reflux esophagitis
- Chronic mouth breathing
- Granulomatous disease
- Connective tissue disease
- Malignancy

Signs & symptoms

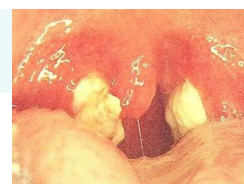
- Constant mouth clearing, dry throat, pharyngeal crusting, thick granular wall, no fever just dry and red

Treatment

- Address underlying etiology

● Acute infection of the oropharynx

Infectious mononucleosis



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.

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

Causes

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

Signs & symptoms

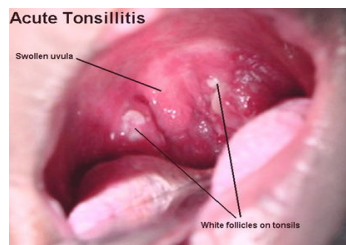
- Fever, sore throat, odynophagia, trismus, halitosis, Enlarged jugulodigastric lymph nodes are also commonly found.
- **Phases:** erythema, exudative, follicular tonsillitis

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, streptococcus can cause : Glomerulonephritis, mitral valve disease

Signs & symptoms

- Red pharynx, strawberry tongue, perioral skin erythema and desquamation, dysphagia, malaise, severe cervical lymphadenopathy.

Diagnosis

- Rapid antigen test (strep test)
- Throat culture
- Dick test a test to determine susceptibility or immunity to scarlet fever by an injection of scarlet fever toxin.

Treatment

- Antibiotics: Penicillin



● 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)

● Tonsillectomy complications:

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

Primary hemorrhage:

Bleeding occurring during the surgery

- | | |
|---------------------|-----------------------------------|
| ● 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

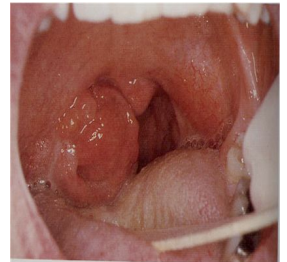
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| ● Causes: | ● Treatment: |
| ○ Bleeding tendency | ○ General supportive measures |
| ○ Slipped ligature (slipped suture) | ○ Take patient back to OR |
| ● Diagnosis: | ○ Control like reactionary hemorrhage |
| ○ Rising pulse & dropping blood pressure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

Secondary hemorrhage:

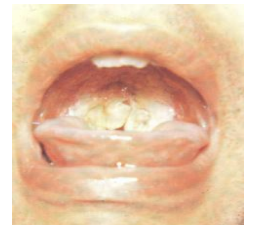
- Occur 5-10 days postoperatively
- Due to **infection**
- Treated by antibiotics
- May need diathermy or packing
- Notes:
 - Encourage eating/drinking after tonsillectomy to reduce slough tissue
 - Slough tissue is a good media for infection this is why it's important to reduce it
 - It usually takes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



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



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



Paradise Criteria for Tonsillectomy (extra)

Minimum frequency of sore throat episodes	<ul style="list-style-type: none"> 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	<p>Sore throat plus at least one of the following features qualifies as a counting episode:</p> <ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Antibiotics administered in the conventional dosage for proved or suspected streptococcal episodes
Documentation	<ul style="list-style-type: none"> 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

Cause	<ul style="list-style-type: none"> Corynebacterium diphtheria
Signs & symptoms	<ul style="list-style-type: none"> Sore throat, fever, green (book: gray) plaques friable membrane same picture as infectious mononucleosis both have membranes over tonsils
Diagnosis	<ul style="list-style-type: none"> Culture
Complication	<ul style="list-style-type: none"> Nephritis airway obstruction death
Treatment	<ul style="list-style-type: none"> Antibiotics (penicillin or erythromycin), antitoxin



Moniliasis: Oral thrush, immunocompromised, steroid inhaler

Signs & symptoms	<ul style="list-style-type: none"> White patches caused by candida albicans fungus
Treatment	<ul style="list-style-type: none"> Nystatin antifungal



Vincent's angina

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

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

Definition

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

Signs & symptoms

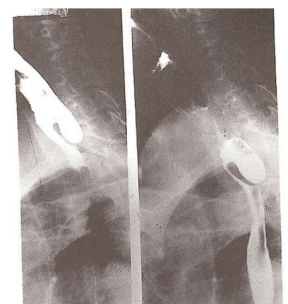
- Dysphagia
- Regurgitation of undigested food, aspiration
- Bad breath

Diagnosis

- Barium swallow

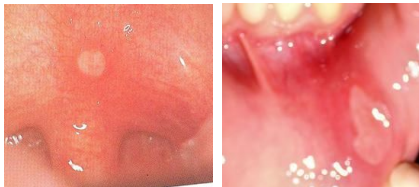
Treatment

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



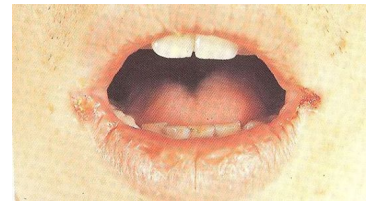
Aphthous ulcer:

- 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:

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



Chronic adenotonsillar Hypertrophy :

(common in young adults)

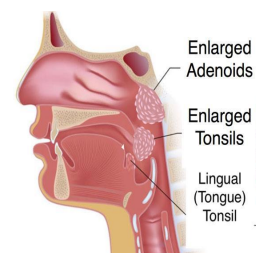
- Most common indication for adenotonsillectomy

Etiology:

- increased immunologic activity: repeated upper respiratory infections cause pathological adenoidal enlargement
- 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.

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. (apnea is pausing of breathing for more than 7 seconds in children, and more than 10 seconds in adults)



Symptoms:

- Pulmonary hypertension and cor pulmonale.
- **failure to thrive, and developmental delay.**
- Loud "heroic" breathing
- Diaphoresis
- Apnea
- Gasping
- **mouth-breathing,**
- restless sleep
- Enuresis
- 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

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:

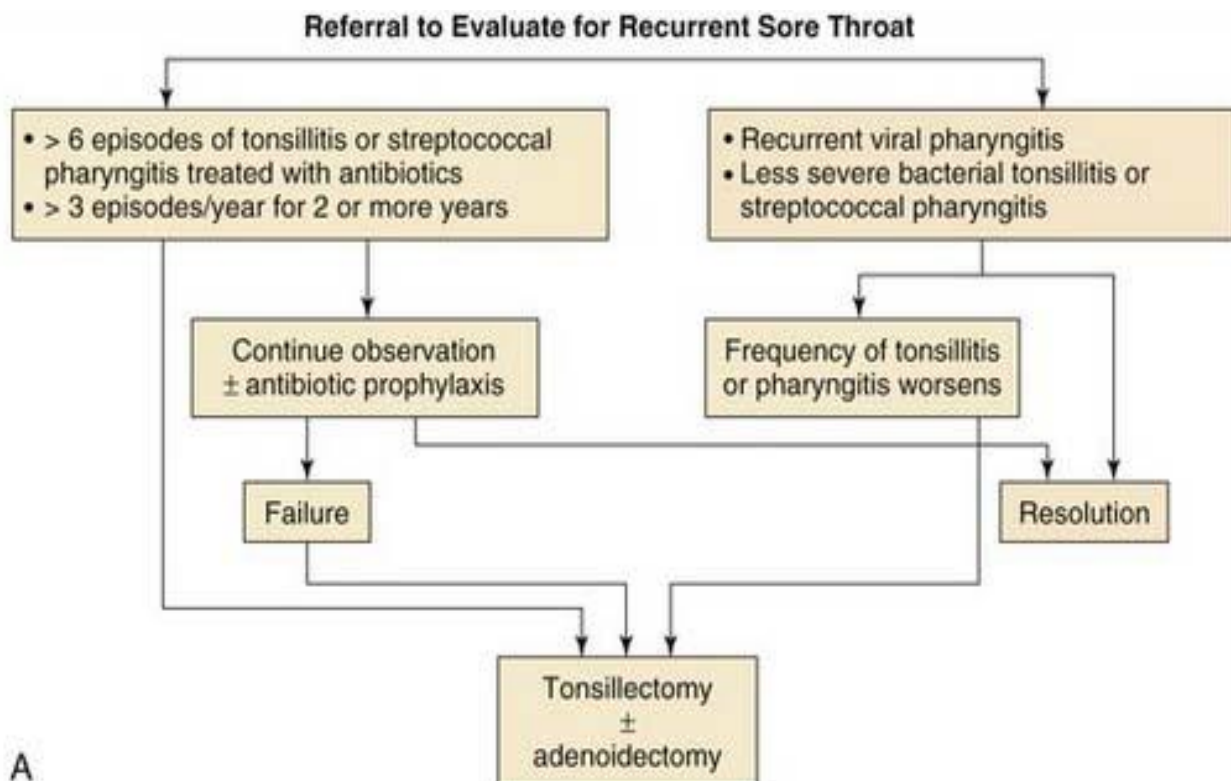
- 5-30% bacterial
- of these 39% are beta lactamase-producing (BLPO). Anaerobic BLPO.
- **GABHS (Group A Beta-Hemolytic Streptococci) most important pathogen because of potential sequelae**

Diagnosis:

- Throat culture.

Treatment:

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



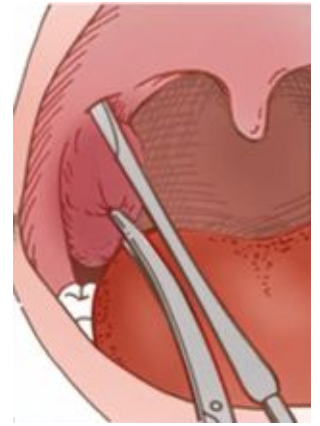
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- The commonest and absolute indication of tonsillectomy is the enlargement causing OSA.
- The recurrent adenotonsillitis is a relative indication, so it is not a must.

● Adenotonsillectomy :

Indications:

- 3 or more episodes per year
- malocclusion, Upper Air Obstruction; **OSA**
- **Quinsy unresponsive to Rx** (we do not tonsillectomy for these patients)
- Halitosis
- Asymmetry, suspicious for **malignancy**
- individual considerations



Complications:

- postoperative hemorrhage (most drastic)
- sore throat
- Otalgia
- uvular swelling
- respiratory compromise (in OSA patients they might get it immediately after surgery)
- 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
- OSA with failure to thrive (FTT), cor pulmonale
- dysphagia
- speech problems
- severe orofacial/dental abnormalities (Adenoid facies: long nose, short upper lip)

Infection:

- Recurrent/chronic adenoiditis (3 or more episodes/year)
- 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)
- recommended to remove the adenoids in a pt above the age of 4 with OM with effusion



● 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 :

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
- in children usually it is because of infection or congenital.

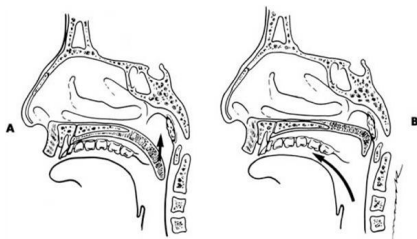
Neoplastic:

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

● Bifid uvula Extra from 437

Clinical Scenario;

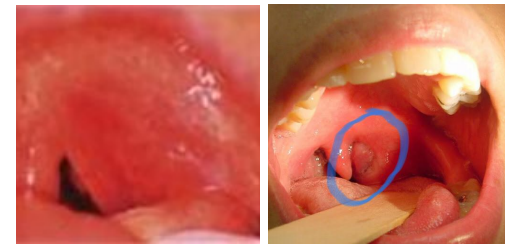
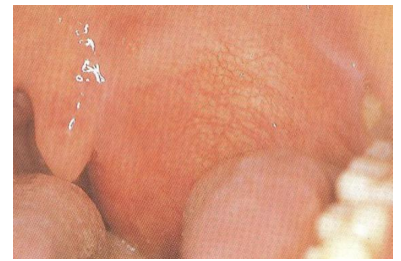
- A mother brought a child that snores and has noisy breathing and we decided to remove the adenoid but we didn't exam the oral cavity. The child had a bifid uvula and submucosal cleft.
- after adenoid removal surgery the mother brought the child that is now complaining of water coming out of his nose 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).



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● Peritonsillar abscess (quinsy) :

- 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.
- 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
- Otalgia
- Odynophagia
- Uvular deviation.
- Trismus
- Drooling of saliva
- Hot potato voice
- On one side

Treatment:

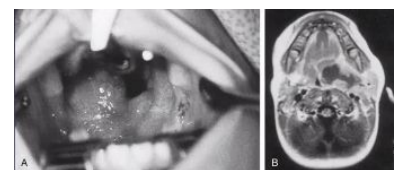
- needle aspiration followed by incision and drainage
- IV ABx
- when there is extension of infection of the peritonsillar abscess, CT with contrast may be indicated
- if there has been a previous history of tonsillitis, a Quinsy tonsillectomy may be quite effective
- After I&D:
 - Wait 6 weeks: do tonsillectomy (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:

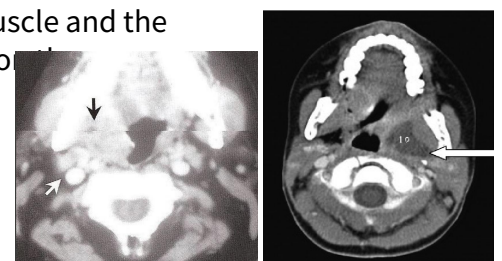
- Para and retropharyngeal abscess
- Aspiration pneumonia



● Parapharyngeal abscess :

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.



● 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)**
- **Airway management** You have to mention all three

● Retropharyngeal abscess:

- 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.



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

Physical examination:

- **unilateral** posterior pharyngeal swelling.

Diagnosis:

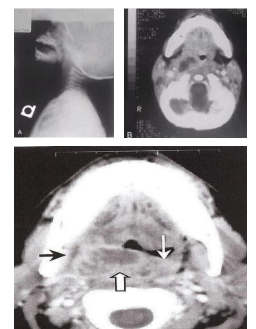
- Lateral neck radiography/CT
- U/S

Complications:

- Mediastinitis
- respiratory distress
- rupture abscess

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 be used.**
- IV ABx
- **Secure Airway**



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

- 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.

THANK YOU!

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