



# GIS

ANATOMY

# 2



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# The palate

Note: underlined information are written in the slides but NOT mentioned by the professor

- The palate forms the roof of the mouth and the floor of nasal cavity, so the palate (hard and soft) separates between the oral and nasal cavities.
- It is divided into 2 parts: the hard palate in front and the soft palate behind

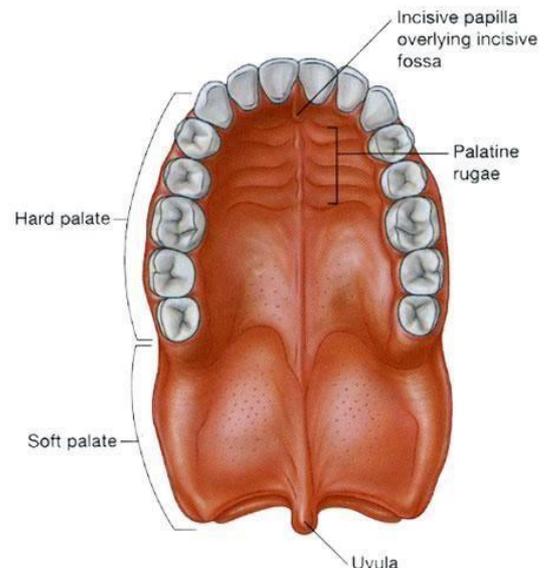
## • The hard palate:

- Is formed by the palatine process of the **maxilla** anteriorly and the horizontal plates of **palatine bones** posteriorly.
- Anteriorly, in the midline there is incisive foramen for the passage of incisive blood vessels and nerves from the palate to the nasal cavity and vice versa.
- Near the last molar teeth there is the greater and lesser palatine foramina for the passage of greater and lesser palatine blood vessels and nerve.
- The mucosa in the hard palate is "**tough mucosa**": adherent to the periosteum but still, it is non-keratinized stratified squamous epithelium - It is continuous posteriorly with the soft palate.

## Embryology :

The palate originates from the right and left maxillary processes and they meet each other at the midline .

If fusion didn't occur: palate or upper lip cleft



## • The soft palate:

-The soft palate is a **mobile** fold attached to the posterior border of the hard palate. - Its free posterior border presents in the midline a conical projection called the uvula. {The soft palate is continuous at the sides with the lateral wall of the pharynx}

- The soft palate is composed of mucous membrane, palatine aponeurosis, and muscles. Here it's "**soft**" mucosa.

## • Palatine aponeurosis:

- Is a fibrous sheet attached to the posterior border of the hard palate - It is the expanded tendon of the tensor veli palatini muscle.

## Histology

The lining epithelium for the soft palate

Upper surface: It follows the respiratory system so it's ciliated pseudo-stratified columnar epithelium

Lower surface: it follows GI so It's non-keratinized stratified squamous epithelium

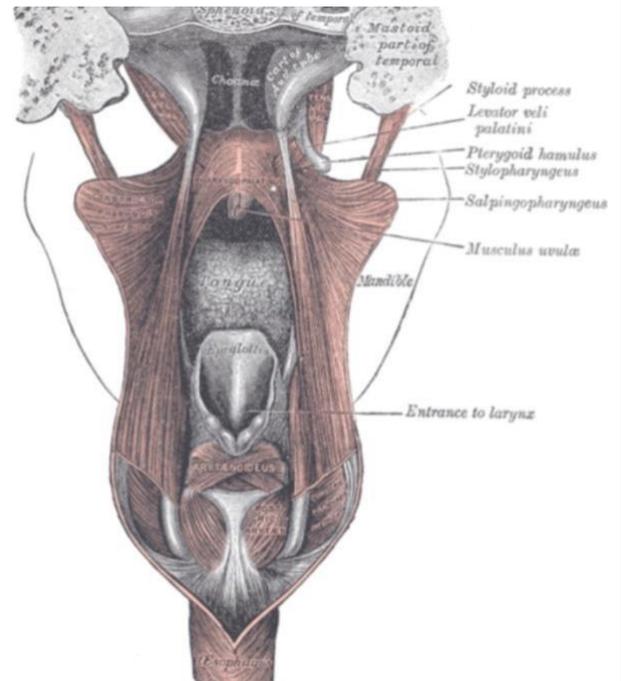
• **Muscles of the soft palate:**

-The muscles of the soft palate are the tensor veli palatini, the levator veli palatini, the palatoglossus, the palatopharyngeus, and the musculus uvulae

- The muscle fibers of the **tensor veli palatini** converge as they descend from their origin to form a narrow tendon, which turns medially around the pterygoid hamulus. -

The tendon of the muscle, together with the tendon of the muscle on the opposite side, expands to form **the palatine aponeurosis**

- When the muscles of the two sides contract, the soft palate is tightened so that the soft palate may be moved upward or downward as a tense sheet.



Muscle	origin	Insertion	innervation	Action	Notes
Levator veli palatini	Petrous part of temporal bone, auditory tube	Palatine aponeurosis	Pharyngeal plexus (formed by accessory and vagus nerves)	Raises (elevation) of the soft palate	
Tensor veli palatini	Spine of sphenoid, auditory tube	Palatine aponeurosis	<b>Nerve to medial pterygoid from mandibular nerve</b>	Tenses soft palate	With muscle of the other side, forms palatine aponeurosis

Palatopharyngeus	Palatine aponeurosis	Posterior border of thyroid cartilage	Pharyngeal plexus	Elevates wall of pharynx, pulls palatopharyngeal folds medially	Formed posterior to palatine tonsils
Musculus uvulae	Posterior border of hard palate	Mucous membrane of uvula	Pharyngeal plexus	Elevates uvula	covered by mucous membrane

## Movements of the soft palate

### 1) Backward and upward: closure of the nasopharynx

#### - During vomiting

(in children the soft palate is not well formed and the innervation is not well developed so the vomit could go out through the nose, and this could cause otitis media through the Eustachian tube which is found at the *lateral* wall of the nasopharynx and connected with the middle ear).

Remember: the Eustachian tube is for establishing equilibrium and balance across the tympanic membrane

- **During swallowing (deglutition)** the soft palate moves backward and upward to close the nasopharynx so that the bolus descends downward.

### 2) Downward and forward

During **mastication** the intraoral pressure increases, the posterior opening of the oral cavity (isthmus) closes by the movement of the soft palate.

□ **NOTE:** during **breathing** it doesn't move. That's why we can breathe from the mouth and the nose.

#### • How is the nasal part of the pharynx closed off from the oral part?

The pharyngeal isthmus (the communicating channel between the nasal and oral parts of the pharynx) is closed by raising the soft palate.

- Closure occurs during the production of explosive consonants in speech.

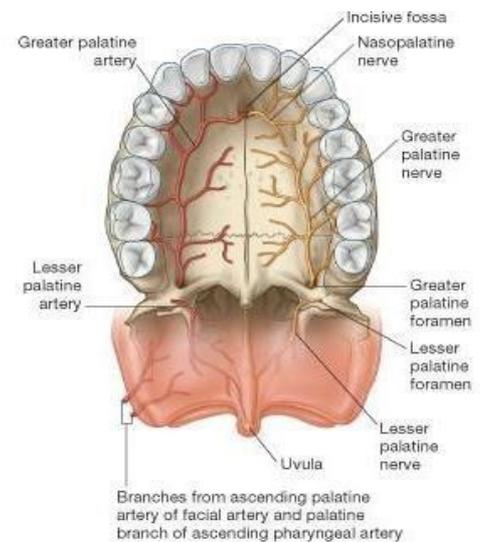
- The soft palate is raised by the contraction of the levator veli palatini on each side. - At the same time, the upper fibers of the superior constrictor muscle contract and pull the posterior pharyngeal wall forward

- The palatopharyngeus muscles on both sides also contract so that the palatopharyngeal arches are pulled medially, like side curtains

- By this means the nasal part of the pharynx is now closed off from the oral part.

- **Nerve supply:**

- The **greater** (for the hard palate) and **lesser** (for the soft palate) **palatine nerves**, branches from the maxillary division of the trigeminal nerve enter the palate through the greater and lesser palatine foramina, respectively.
- The **nasopalatine** nerve, also a branch of the maxillary nerve, enters the front of the hard palate through the incisive foramen.
- The **glossopharyngeal** nerve also supplies the soft palate.



- **NOTE:** the nasopalatine nerve goes to the nasal cavity first then through incisive foramen to the hard palate, while the greater palatine nerve supplies the hard palate first then to the nasal cavity.

- **Blood supply:**

The **greater palatine** branch of the maxillary artery (terminal branch of ECA in the parotid gland), the **ascending palatine** branch of the facial artery, and the **ascending pharyngeal artery** branch from external carotid artery.

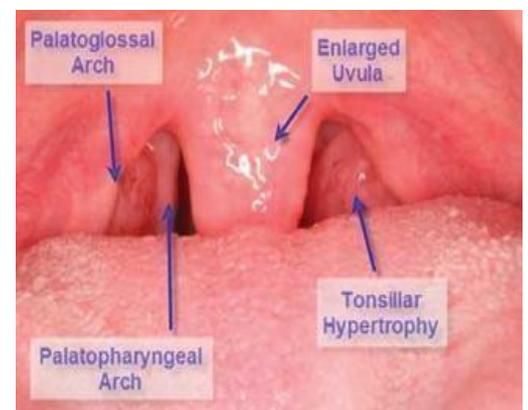
- **Venous drainage:**

- **greater palatine vein** to the maxillary vein, **ascending palatine vein** to the facial vein, **ascending pharyngeal vein**. At the end, all of them drain into the internal jugular vein.

- **Lymphatic drainage:** Deep cervical lymph nodes

⇒ **Some notes:**

- The palatoglossal arch is a fold of mucous membrane containing the palatoglossus muscle, which extends from the soft palate to the side of the tongue
- The palatoglossal arch marks where the mouth becomes the pharynx.
- The palatopharyngeal arch is a fold of mucous membrane behind the palatoglossal arch, it runs downward and laterally to join the pharyngeal wall. - The muscle contained within the fold is the palatopharyngeus muscle



**\*\* The palatine tonsils, which are masses of lymphoid tissue, are located **between the palatoglossal and palatopharyngeal arches.****

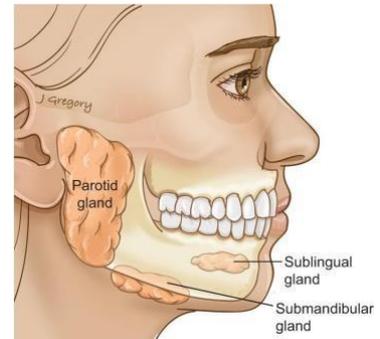
## The salivary glands

- We consider the salivary glands as association organs to the digestive tract, they secrete around 8 liters of saliva daily because the mouth should be kept moist, dryness of the mouth will cause an increased susceptibility to infections due to increase in the number of bacteria in the oral cavity.

● We have 2 types of salivary glands:

1. **Major salivary glands (our topic for this lecture):**  
*2 of each*

- Parotid: Over the ramus of the mandible
- Sublingual gland: Below the tongue
- Submandibular: Below the mandible



⇒ Note: any gland is surrounded by a capsule of connective tissue that divides the glands into lobes and lobules by septa, it provides protection and blood and nerve supply to the gland.

2. **Minor salivary glands:** the oral cavity is filled with minor glands and they're named according to the organ (labial, lingual, palatal) each one has its own small duct which opens directly into the oral cavity.

### † Parotid gland

- It's the **largest** salivary gland and is composed mostly of **serous** acini
- **Location:** lies in a deep hollow below the external auditory meatus, behind the ramus of the mandible (overlap) and in front of the sternocleidomastoid muscle.
- It is pyramidal in shape: with its base **superficial** and the apex: **deep**, directed towards the pharynx
- **Secretion:** **Serous** Secretion (rich in proteins and enzymes)
- **Capsule:** The gland is surrounded by **two** capsules (an exception):

- 1) The regular connective tissue capsule surrounding the gland which sends connective tissue septa dividing it into lobes and lobules.

Each lobule has its own duct, at the end they all unit to form one large duct → parotid duct

- 2) The outer capsule which is part of the deep fascia of the neck.

**Advantage** of the capsules: provide protection to the gland

**Disadvantage:** infections like mumps (viral) to the gland can cause it to swell and the capsules prevent expansion leading to severe pain in the gland.

- **Duct:** - 5 cm long

- It emerges from the anterior border of the gland and passes forward over the lateral surface of the masseter then turns medially to penetrate the buccinator muscle of the cheek.

- It enters the vestibule of the mouth upon a small papilla opposite the **upper second molar tooth**

- it can become obstructed by stones (tested by squeezing lemon onto the patient's tongue, if the parotid gland swells then the duct is obstructed due to inability to excrete the saliva)

- **Contents:**

- 1) Extracranial part of facial Nerve and its five branches.**

Stem of the facial nerve divides the parotid into superficial and deep parts  
Branches of facial nerve: Temporal, Zygomatic, Buccal, Mandibular, Cervical.

All provide *motor* to the muscles of the face (facial expression) and the platysma.

⇒ Note: a tumor in the parotid gland causes damage to the structures inside the gland and destroys the anatomy of the parotid.

Surgery is the most common treatment; it's a challenging surgery because **the facial nerve is the first structure the surgeon encounters (the most superficial structure)**, and he needs to be really cautious due to the branches of the facial nerve, as not to cause nerve injuries.

- *The first thing the doctor will do after surgery is to check the function of the facial nerve by the asking the patient to close his eyes (if one eye does not close it means the temporal nerve on that side is damaged) or to blow (tests the buccal nerve) or if there was dribbling of saliva during eating for example, if there is any issue in the previous actions, it means that one or more of the branches of the facial nerve was damaged (remember the function of the muscles above and their nerve supply).*

- 2) Retromandibular vein** (formed inside the parotid from maxillary vein and superficial temporal vein)

- 3) External carotid artery** (as its ascending upwards, it divides at the level of neck of mandible into maxillary artery and superficial temporal artery)

- 4) Auriculotemporal nerve**

- 5) Parotid lymph nodes**

- 6) Lymphatic vessels**

⇒Remember: the facial nerve does not innervate the parotid gland

• **Innervation:**

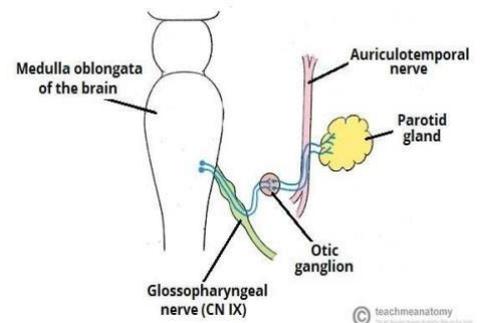
3 types (the doctor only elaborated about the parasympathetic)

1. Sensory
2. Parasympathetic (Secreto-Motor)
3. Sympathetic (no effect on secretions)

○ **Parasympathetic innervation**

From brain stem, **inferior** salivary nucleus, the glossopharyngeal nerve (#9) emerges along with parasympathetic fibers. These fibers reach the gland via the following pathway: the tympanic branch of cranial nerve #9 → lesser petrosal nerve → otic ganglia → auriculotemporal nerve ⇒ Notes:

- The otic ganglia is found in the infratemporal fossa directly below foramen ovale which is found in the base of the skull with the mandibular nerve emerging from it.
- Lesser petrosal nerve is a preganglionic parasympathetic nerve which means it synapses in the ganglia.
- Post-ganglionic parasympathetic fibers travel through **auriculotemporal** nerve which is also **SENSORY** to the gland (Auriculotemporal nerve is the one that transmits sensations like pain in case of mumps infection and swelling, it is also secreto-motor).



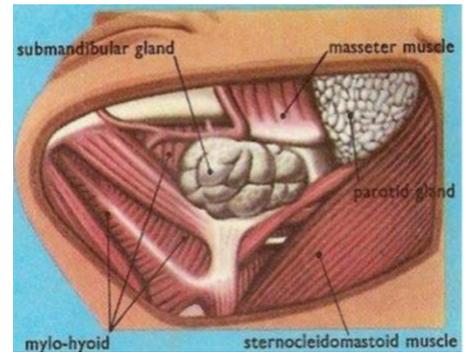
○ **Anatomical relations :**

- The parotid gland lies in the parotid bed that is formed by:  
Posteriorly, the sternocleidomastoid muscle and the posterior belly of digastric; anteriorly, the ramus of mandible; superiorly, the base of the trench is formed by the external acoustic meatus and the posterior aspect of the zygomatic arch; Medially, the carotid sheath and its contents (Vagus nerve, CCA, IJV)

It also formed by the facial nerve and the last 4 cranial nerve, styloid process, stylohyoid muscle

## ✚ Submandibular gland

- **Location:** it lies beneath the lower border of the body of the mandible (between anterior and posterior belly of digastric)
- Divided into superficial and deep parts by the mylohyoid muscle, the mylohyoid muscle also separates between the submandibular gland (**below**) and sublingual gland (**above**) • The deep part of the gland lies beneath the mucous membrane of the mouth on the side of the tongue.



- **Secretion:** Mixed (seromucous) • **Capsule:** Surrounded by one capsule
- **Duct:**

-It emerges from the anterior end of the deep part of the gland and runs forward beneath the mucous membrane of the mouth.

-It opens into the mouth on a small papilla, which is situated on the side of the frenulum of the tongue • **Innervation:**

### □ Parasympathetic (secreto-motor) via the facial nerve

Originate from **superior** salivary nucleus found in the medulla oblongata.

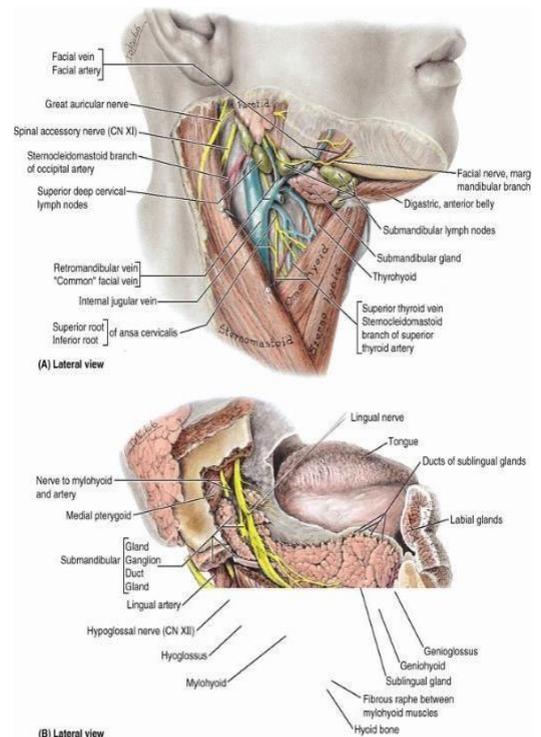
- Parasympathetic preganglionic fibers: **Chorda tympani** branch from facial nerve which also transmits taste fibers.
- In the infratemporal fossa, chorda tympani joins the lingual nerve which leads it to the submandibular ganglion (located in the submandibular triangle) where the preganglionic fibers synapse with the postganglionic fibers
- Parasympathetic postganglionic fibers: directly from the ganglia to the gland, **supplying both the submandibular and sublingual gland.**

⇒ Note: when chorda tympani joins the lingual nerve, it doesn't mean that the fibers get mixed together; because lingual fibers are sensory, and chorda tympani are parasympathetic, so the lingual nerve only carries chorda tympani fibers to the submandibular ganglia

### □ Sympathetic

Sympathetic branches along blood vessels like lingual artery □

**Sensory innervation** via the **lingual nerve.**



- the larger arm of the hook (superficial part) of the gland is directed forward in the horizontal plane below the mylohyoid muscle and is therefore outside the boundaries of the oral cavity-this larger superficial part of the gland is directly against a shallow impression on the medial side of the mandible (submandibular fossa) inferior to the mylohyoid line;
- the smaller arm of the hook (or deep part) of the gland loops around the posterior margin of the mylohyoid muscle to enter and lie within the floor of the oral cavity where it is lateral to the root of the tongue on the lateral surface of the hyoglossus muscle.

## ✚ Sublingual gland

- **Location:** The sublingual gland lies beneath the mucous membrane (sublingual fold) of the floor of the mouth, close to the frenulum of the tongue
- **Secretion:** has both **serous and mucous** acini, with the latter predominating (MUCOUS)
- **Ducts:** The sublingual ducts (8 to 20 in number) which opens directly in oral cavity or with submandibular duct
- **Innervation:** Same as submandibular gland (postganglionic parasympathetic fibers from submandibular ganglia)
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⇒ Notes:

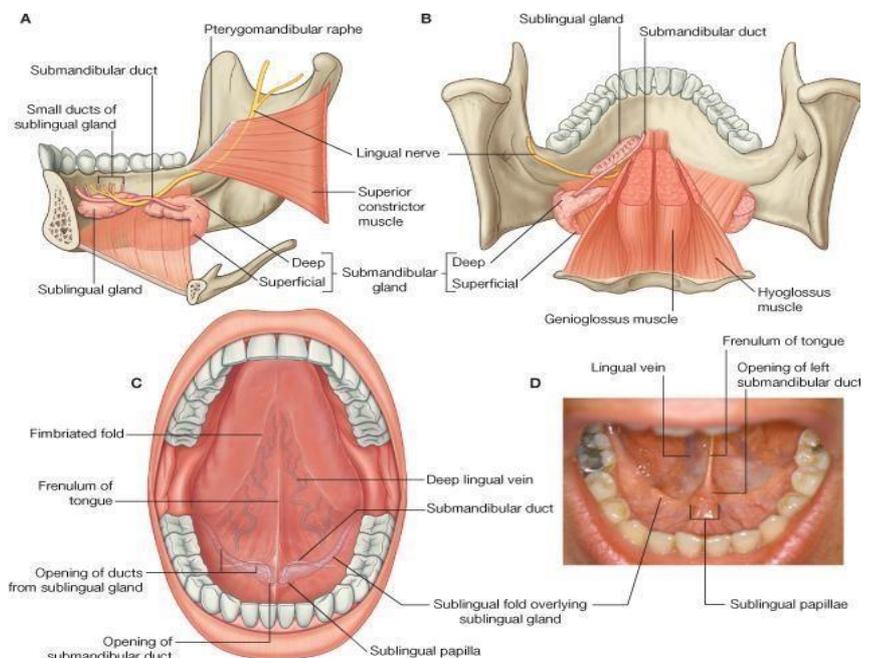
▪ When tongue is raised up, papilla is visible with an opening for the submandibular duct

▪ **Visible blue lines are the lingual veins** (picture C above) ▪ **Medial to lingual vein are the lingual artery and nerve.** ▪ **Important:**

-Lingual nerve has triple relations with the submandibular duct (picture A above)

**Lateral → below → anteromedially (deep)**

Then ascends into the tongue -  
Medial relations to the submandibular gland:  
**Submandibular duct, lingual nerve, lingual vessels, genioglossus muscle**



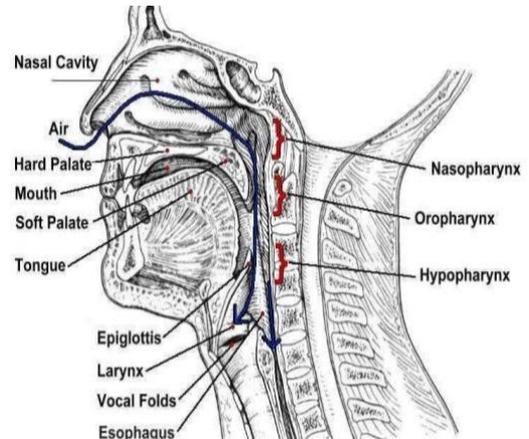
## The pharynx

- Muscular tube (5 inches long) with musculo-membranous wall which is *deficient* anteriorly. (open anteriorly). It's situated behind the nasal cavities, the mouth, and the larynx and may be divided into: nasal, oral, and laryngeal parts:

→ At the sides and posteriorly, it has a wall made of constrictor muscles with the inner surface of the wall made up of mucus membrane (musculo-membranous wall)

→ Anteriorly its open and is replaced by:

- ☆ the posterior openings into the nose (choanae) *into the nasopharynx*
- ☆ the opening into the mouth (Oropharyngeal isthmus) *into the oropharynx*
- ☆ the inlet of the larynx *into the laryngopharynx (hypopharynx)*



- The pharynx is funnel shaped, its upper **wider** end lying under the skull and its lower **narrow** end becoming **continuous with the esophagus** opposite the sixth cervical vertebra
- Difference between esophagus and pharynx Esophagus: a fingerlike structure, muscular tube
- By means of the auditory tube, the mucous membrane is also continuous with that of the tympanic cavity.
- Lined by mucosa interiorly: non-keratinized stratified squamous epithelium (like esophagus), then we find muscular layer (constrictor muscles), and externally it is surrounded by connective tissue which covers the wall of the pharynx and esophagus

## Sensory Nerve Supply of the Pharyngeal Mucous Membrane

- Nasal pharynx: **The maxillary nerve (V2)**

- Oral pharynx: **The glossopharyngeal nerve**
- Laryngeal pharynx (around the entrance into the larynx): **The internal laryngeal branch of the vagus nerve**

⇒ Note: the internal laryngeal nerve pierces the **thyrohyoid membrane** and passes between the **middle and inferior constrictor muscles**.

## Blood

### Supply of the Pharynx

- **Ascending facial and lingual**

## Venous

Veins that **vein**

## Lymph

Directly into the **deep cervical lymph nodes** or indirectly via the **retropharyngeal or paratracheal nodes** into the **deep cervical nodes**

## Muscles of the pharynx

-3 constrictors (Circular fibers)

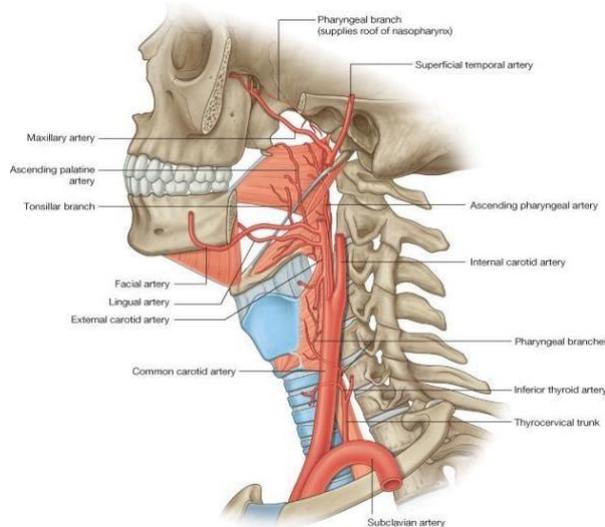
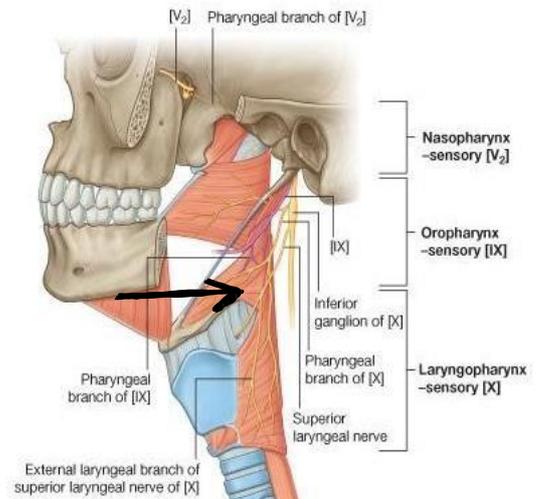
Superior constrictor, middle constrictor, Inferior constrictor

-2 oblique/longitudinal fibers

Salpingopharyngeus, Stylopharyngeus

The constrictor muscles overlap each other so that the middle constrictor lies on the outside of the lower part of the superior constrictor and the inferior constrictor lies outside the lower part of the middle constrictor muscles, *the 3* extend around the pharyngeal wall to be inserted into pharyngeal raphe. ⑦

**Pharyngeal raphe**: a fibrous band that extends from pharyngeal tubercle which is found in the basilar part of the occipital bone in front of the foramen magnum to the level of C6 vertebra where it blends with the posterior wall of the esophagus



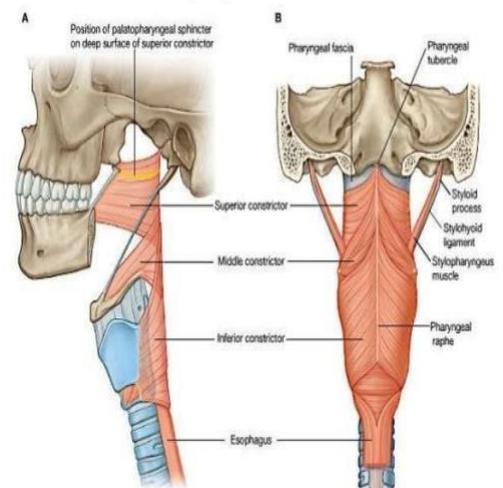
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**pharyngeal, tonsillar branches of arteries, and branches of maxillary arteries**

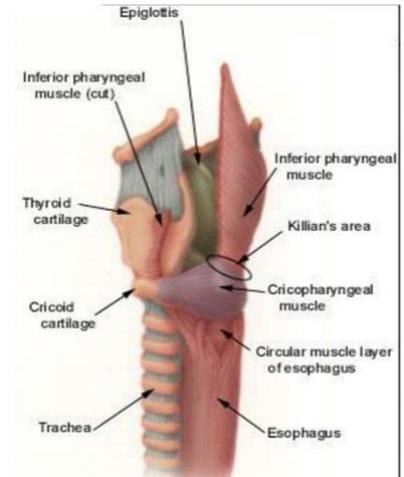
## drainage

also drain into **internal jugular**

## Drainage of the Pharynx



- The **lower** part of the inferior constrictor, which arises from the cricoid cartilage, is called the ***cricopharyngeus*** muscle (located above the esophagus). The fibers of the cricopharyngeus pass horizontally around the lowest and narrowest part of the pharynx and act as a sphincter, it is **always contracted and only opens by the stimulation of bolus of food.** 🕒 **Advantage:** prevents passage of air to the stomach Only little amount of air passes through and is collected in the fundus of the stomach



- **Kilian's dehiscence** is a very sensitive area located in the posterior pharyngeal wall between the upper propulsive part of the inferior constrictor and the lower sphincter part, the cricopharyngeus.

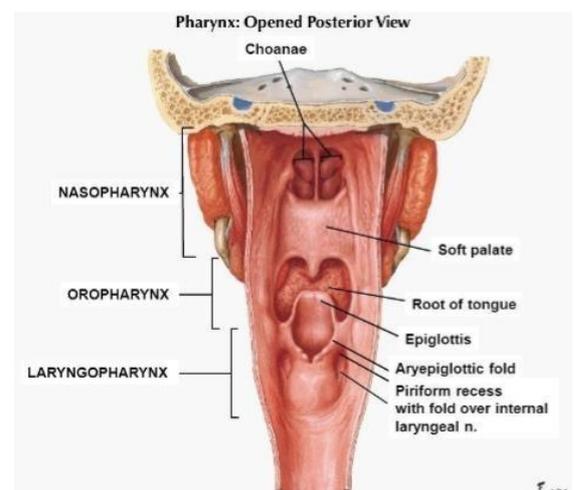
Muscle	Origin	Insertion	Innervation	Action
Superior constrictor	Medial pterygoid plate, pterygoid hamulus, pterygomandibular ligament, mylohyoid line of mandible	Pharyngeal tubercle of occipital bone, raphe in midline posteriorly	Pharyngeal plexus	Aids soft palate in closing off nasal pharynx, propels bolus downward
Middle constrictor	Lower part of stylohyoid ligament, lesser and greater cornu of hyoid bone	Pharyngeal raphe	Pharyngeal plexus	Propels bolus downward
Inferior constrictor	Lamina of thyroid cartilage, cricoid cartilage	Pharyngeal raphe	Pharyngeal plexus	Propels bolus downward

Cricopharyngeus (lowest fibers of inferior constrictor muscle)	Sphincter at lower end of pharynx			
Stylopharyngeus	Styloid process of temporal bone	Posterior border of thyroid cartilage	Glossopharyngeal nerve	Elevates larynx & pharynx during swallowing
Salpingopharyngeus	Auditory tube	Blends with palatopharyngeus	Pharyngeal plexus	Elevates pharynx
Palatopharyngeus	Palatine aponeurosis	Posterior border of thyroid cartilage	Pharyngeal plexus	Elevates wall of pharynx, pulls palatopharyngeal arch medially

## Interior of the Pharynx

### ○ Nasal Pharynx

- This lies above the soft palate and behind the nasal cavities
- In the submucosa of the roof is a collection of lymphoid tissue called the pharyngeal tonsil • The pharyngeal recess is a depression in the pharyngeal wall behind the tubal elevation
- The salpingopharyngeal fold is a vertical fold of mucous membrane covering the salpingopharyngeus muscle.



### ○ Oral Pharynx

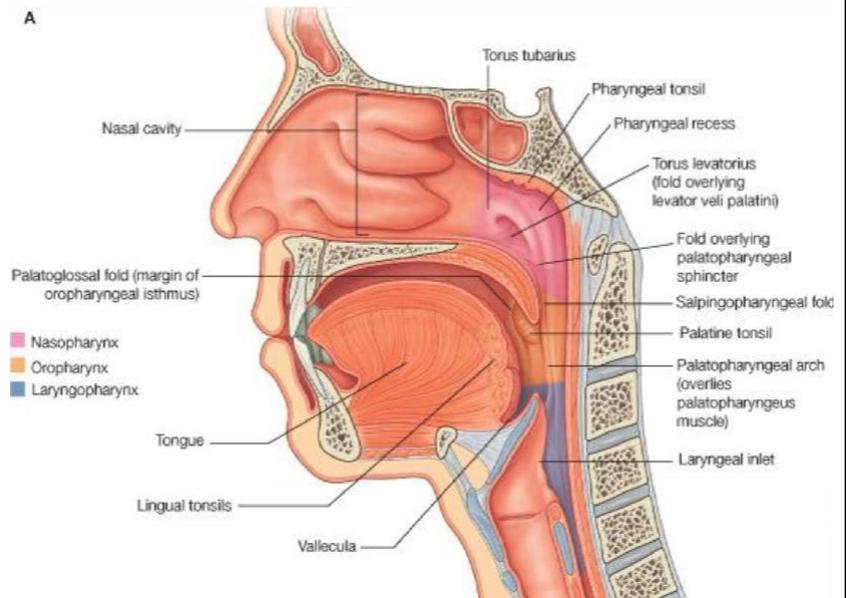


- This lies behind the oral cavity •  
The floor is formed by the posterior one third of the tongue and the interval between the tongue and epiglottis

- In the midline is the median glossoepiglottic fold and on each side the lateral glossoepiglottic fold.

- The depression on each side of the median glossoepiglottic fold is called the vallecula

- On the lateral wall on each side are the palatoglossal and the palatopharyngeal arches or folds and the palatine tonsils between them
- The interval between the two palatoglossal arches is called the oropharyngeal isthmus and marks the boundary between the mouth and pharynx.



### • Laryngeal Pharynx

- This lies behind the opening into the larynx
- The lateral wall is formed by the thyroid cartilage and the thyrohyoid membrane
- The piriform fossa is a depression in the mucous membrane on each side of the laryngeal inlet

### ✚ Piriform fossa (important)

- A depression, antero-lateral to laryngopharynx
- Foreign bodies such as fish bones are lodged into

## The Process of Swallowing (Deglutition)

- Masticated food is formed into a ball or bolus on the dorsum of the tongue and voluntarily pushed upward and backward against the undersurface of the hard palate • This is brought about by the contraction of the styloglossus muscles on both sides, which pull the root of the tongue upward and backward
- The palatoglossus muscles then squeeze the bolus backward into the pharynx.
- From this point onward the process of swallowing becomes an involuntary act.

- The nasal part of the pharynx is now shut off from the oral part of the pharynx by the elevation of the soft palate
- the pulling forward of the posterior wall of the pharynx by the upper fibers of the superior constrictor muscle, and the contraction of the palatopharyngeus muscles.
- All of this prevents the passage of food and drink into the nasal cavities
- The larynx and the laryngeal part of the pharynx are pulled upward by the contraction of the stylopharyngeus, salpingopharyngeus, thyrohyoid, and palatopharyngeus muscles
- The main part of the larynx is thus elevated to the posterior surface of the epiglottis, and the entrance into the larynx is closed by the epiglottis.
- The laryngeal entrance is made smaller by the approximation of the aryepiglottic folds, and the arytenoid cartilages are pulled forward by the contraction of the aryepiglottic, oblique arytenoid, and thyroarytenoid muscles.
- The bolus moves downward over the epiglottis, the closed entrance into the larynx, and reaches the lower part of the pharynx as the result of the successive contraction of the superior, middle, and inferior constrictor muscles
- Some of the food slides down the groove on either side of the entrance into the larynx, that is, down through the piriform fossae
- Finally, the lower part of the pharyngeal wall (the cricopharyngeus muscle) **relaxes** and the bolus enters the esophagus.

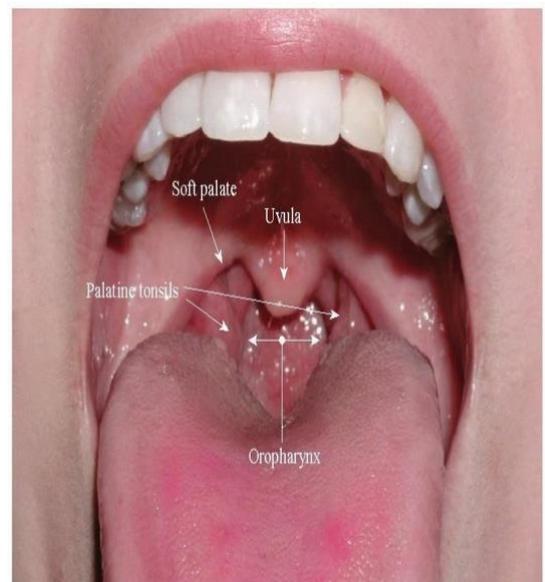
## Palatine Tonsils

The palatine tonsils are two masses of lymphoid tissue, each located in the depression on the lateral wall of the oral part of the pharynx between the palatoglossal and palatopharyngeal arches

- Each tonsil is covered by mucous membrane, and its free medial surface projects into the pharynx
- On the medial surface of the palatine tonsils, the surface is pitted by numerous small openings that leads into the Tonsillar crypts due to repetitive infection.

Mucosa at the medial side → **tough** (adherent to the palatine tonsil)

- The tonsil is covered on its lateral surface by a fibrous **loose** connective tissue capsule (through this capsule blood supply enters and venous drainage leaves the tonsil).



- It's important in immunity especially in children; Infection of tonsils is called tonsillitis and it frequently occurs in children (immune system not fully mature, they play with everything and put it in their mouths...) and if the child had tonsillitis more than 4 times, we do **tonsillectomy**, because the organism causing the infection is usually (streptococcus) which can spread to the joints (and cause arthritis) or the heart (pericarditis) or kidneys (glomerulonephritis)...etc.

⇒ Note: During tonsillectomy, surgeons enter through the oral cavity and cut the capsule on the **lateral side** (because it's **loose** CT) of the tonsil then they enucleate (remove) the tonsil. Also, **ligation** and cut of the tonsillar artery and the vein must be done to prevent bleeding.

⇒ Complications:

Always after the tonsillectomy operation, the patient is kept under observation for 24hrs. Why? Because the surgeon would be afraid from post-operative bleeding from the **vein** (external palatine vein which descends from the soft palate and pierces the superior constrictor muscle of the pharynx) -not the artery- due to the fact that the vein **pierces the superior constrictor muscle. Release of ligation of the vein may occur when the muscle contracts leading to bleeding.** This does not occur in the case of the artery. **Lateral relations to the tonsils that could be affected by the operation: Common carotid artery (any trauma can cause severe bleeding)**

-The capsule is separated from the superior constrictor muscle by loose areolar tissue and the external palatine vein descends from the soft palate in this tissue to join the pharyngeal venous plexus.

- Lateral to the superior constrictor muscle lie the styloglossus muscle, the loop of the facial artery, and the internal carotid artery.

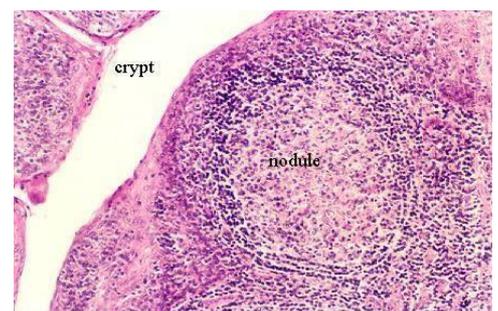
- The tonsil reaches its maximum size during early childhood, but after puberty it diminishes considerably in size.

#### ◇ Blood supply and venous drainage:

Blood supply of the Tonsils is from the **tonsillar branch** of the facial artery.

#### ◇ Venous drainage:

The veins pierce the capsule and the superior constrictor muscle and join the **external palatine vein, the pharyngeal or the facial vein (which drains into the internal jugular vein)**



◇ **Lymphatic drainage of the tonsils:** The **upper deep cervical lymph nodes** just below and behind the angle of the mandible

◇ **Innervation:** (sensation)

Branch from maxillary nerve

### † **Waldeyer's Ring of Lymphoid Tissue**

• The lymphoid tissue that surrounds the opening into the respiratory and digestive systems forms a ring

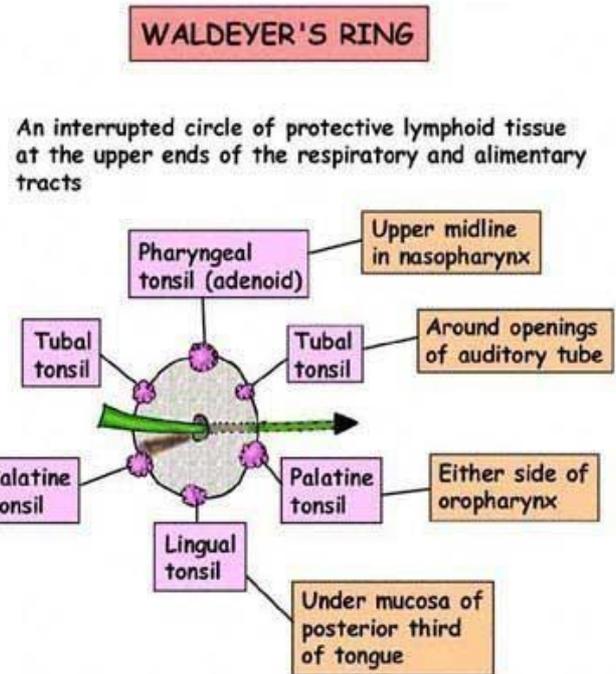
The oropharyngeal isthmus is surrounded by a ring of lymphoid tissue: Part of this lymphoid tissue is the

☆ **Pharyngeal tonsil (adenoid) (Roof)**

☆ **Lingual tonsil on the posterior third of the tongue (Floor)**

☆ **Palatine tonsil (On both lateral sides of oropharynx)**

☆ **Tubal tonsil (On both lateral sides at the beginning of Eustachian tube in the lateral wall of the nasopharynx).**



⇒ Adenoid enlargement: obstruction in nasal cavity ➡ breathing through the mouth instead (adenoid face)

**GOOD LUCK** ❤️