

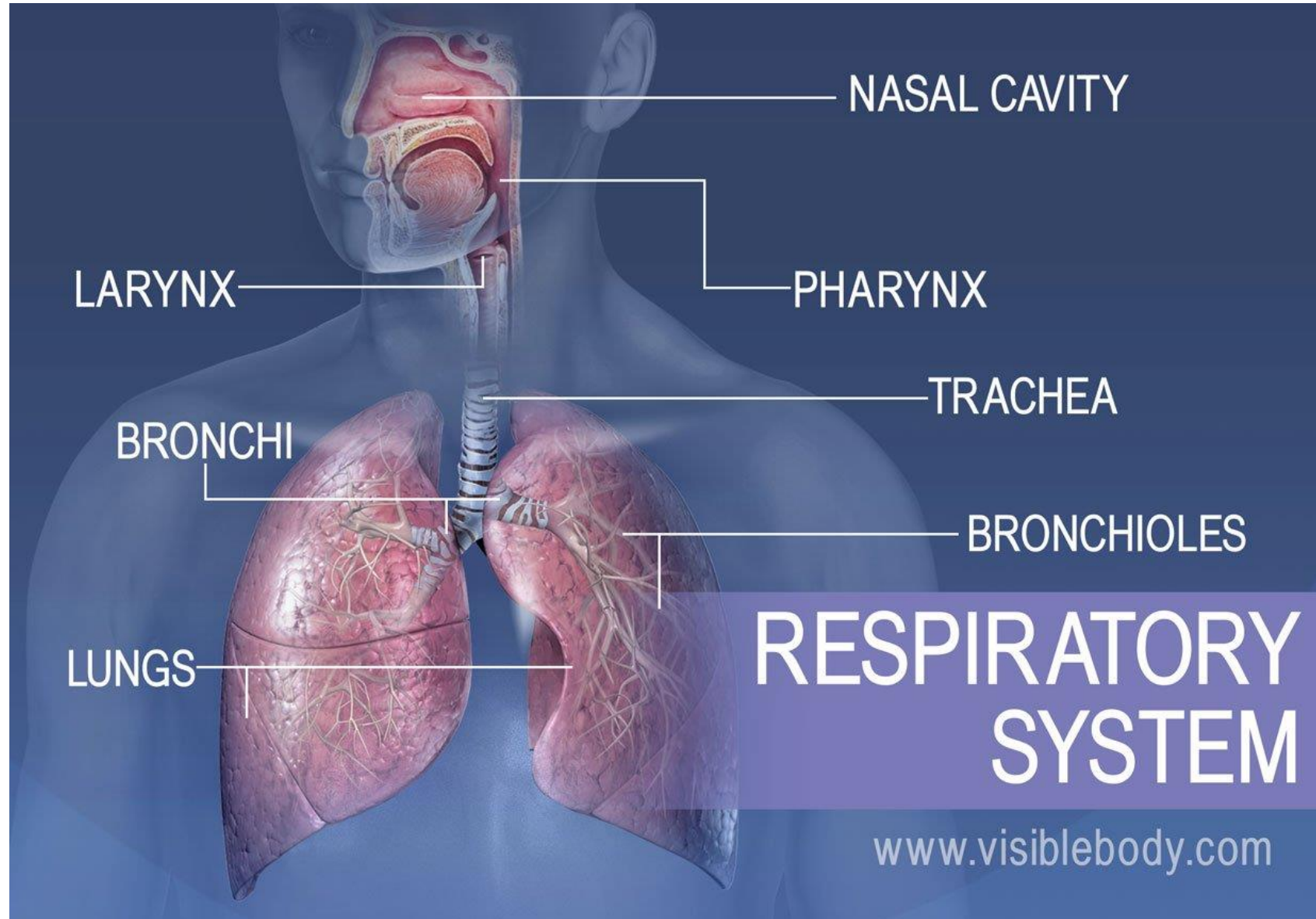
تم بواسطة :- عبد الودود الخفش

Respiratory system

(Part 1)

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• Functions of the respiratory system:

➤ Uptake of O₂ and elimination of CO₂ (pulmonary ventilation)

➤ Vocalisation →

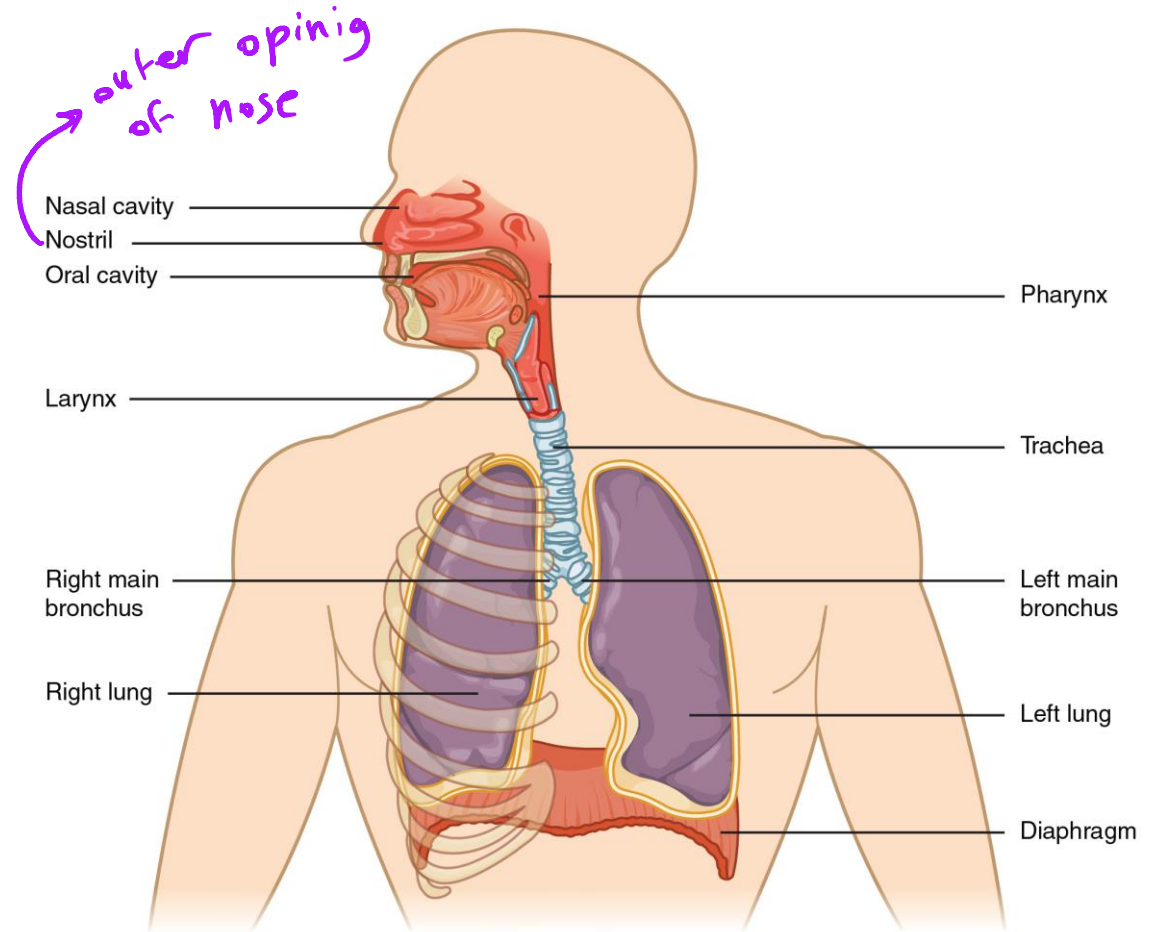
الصوت من خلال الأحبال الصوتية
vocal cords
وهي جزء من الـ Larynx

➤ Olfaction ←

النسج من خلال الـ olfactory nerve

Parts of the respiratory system:

- Nasal cavities
 - Pharynx
 - Larynx
 - Trachea
 - lungs
- } Passages
- } Organ



من محاضرة
ال skull

* Midline structures of the anterior cranial fossa:

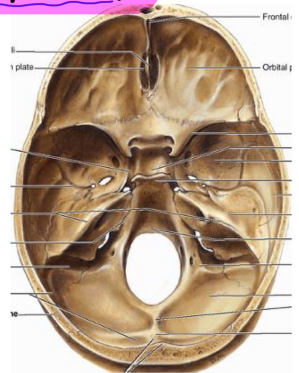
1. Frontal crest.
2. Foramen ^{سديك} caecum.
3. Crista galli.
4. Cribriform plate of ethmoid (gives passage to olfactory nerve).

عصب الشم

لے کر بڑے فورم (متقرب)



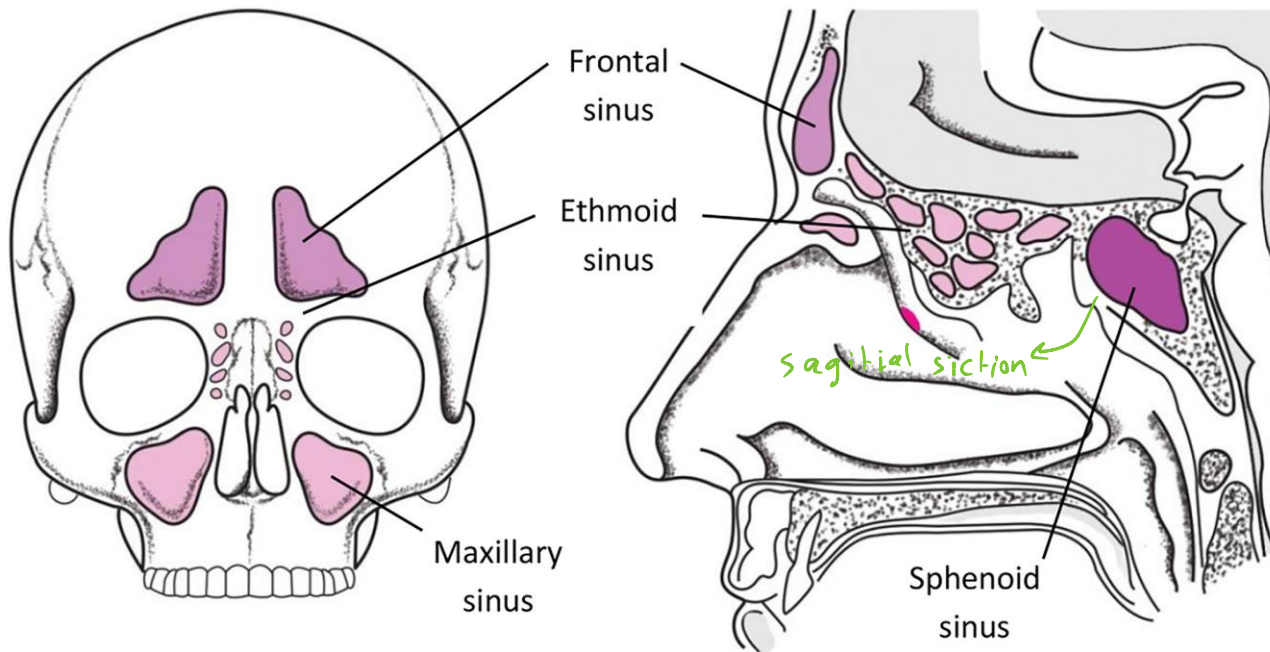
هذا Foramen جاي ما بين 1 و 3



Paranasal air sinuses

The paranasal sinuses are the **frontal**, **ethmoidal**, **sphenoidal** and **maxillary sinuses**, housed within the bones of the same name.

They all open into **the lateral wall of the nasal cavity by small apertures.**



Functions:

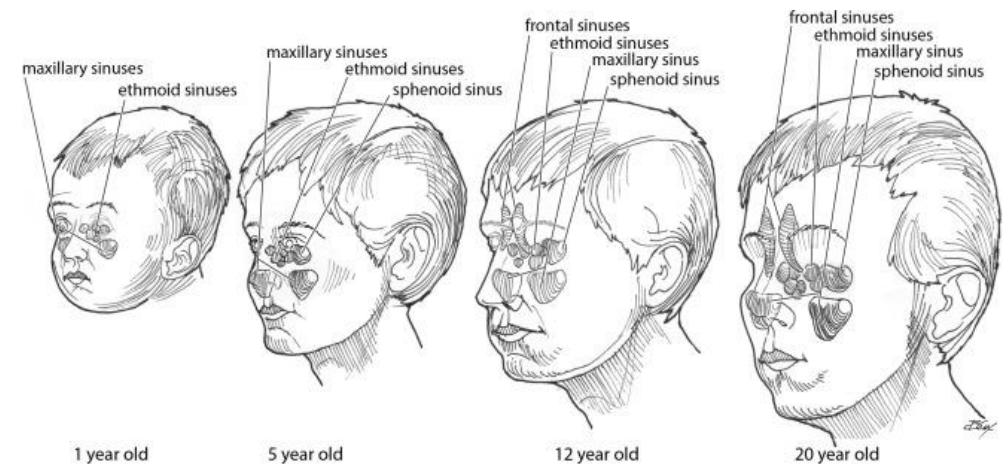
1. Add some resonance to the voice
2. Allow the enlargement of local areas of the skull without increase in bony mass.
3. Warming of air

Most sinuses are rudimentary or absent at birth, but enlarge during the eruption of the permanent teeth and after puberty.

completed in 20 age

← الأسنان الدائمة

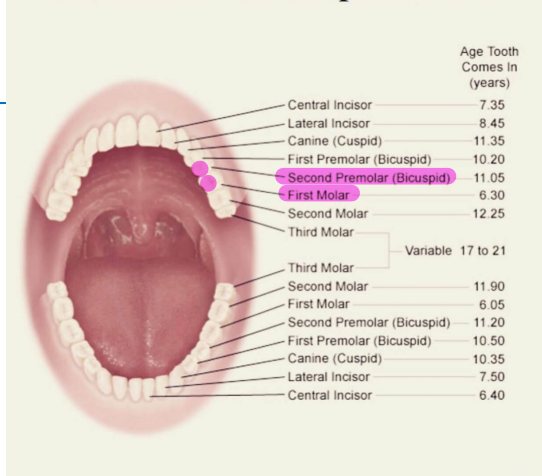
← بلوغ



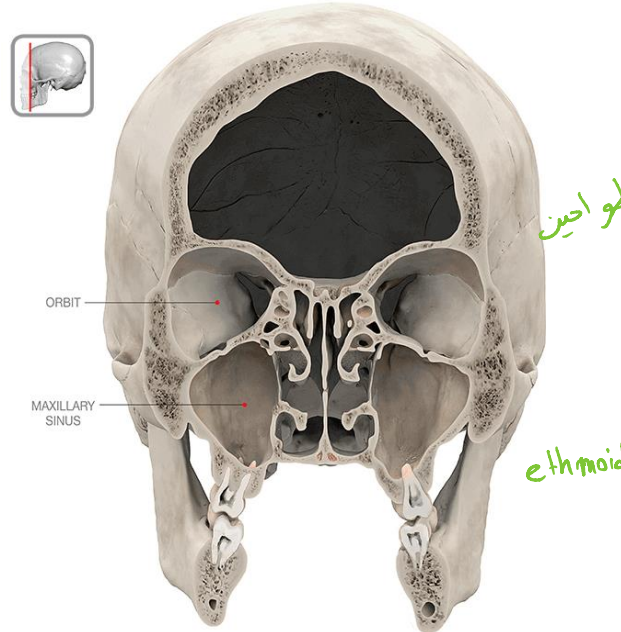
The maxillary sinus

- The **largest** of the paranasal sinuses.
- Fills the **body of the maxilla** and is **pyramidal in shape**.
- The base is medial and the apex is pointing toward the zygomatic process of maxilla.
- Related to the roots of the teeth, especially the second premolar and first molar.

Permanent Teeth Eruption Chart

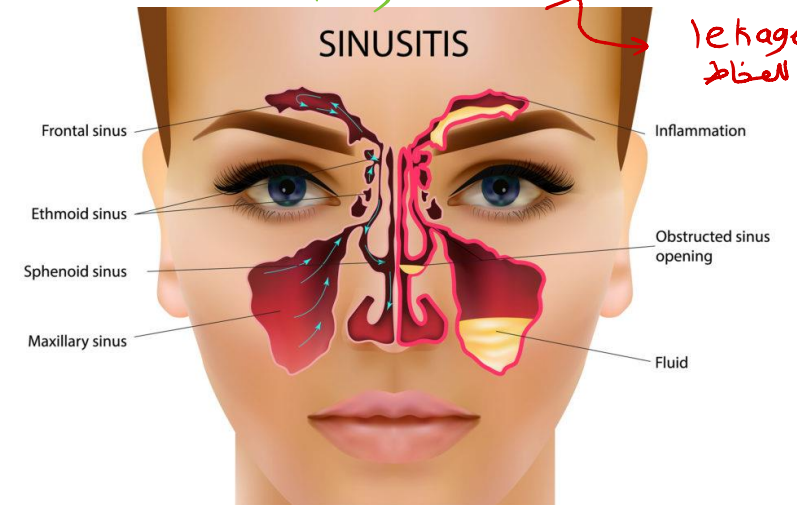


PARANASAL SINUSES



The most susceptible to infections because of its close anatomical relation to the upper premolars and molars and the frontal and ant. Ethmoidal sinuses.

انتقال العدوى :- leakage (تسرب)
 انتقال العدوى من السنه ينتقل لل sinus
 سبب نزول العظام من الـ Front و الـ ethmoid للـ maxillary
 leakage للعظام



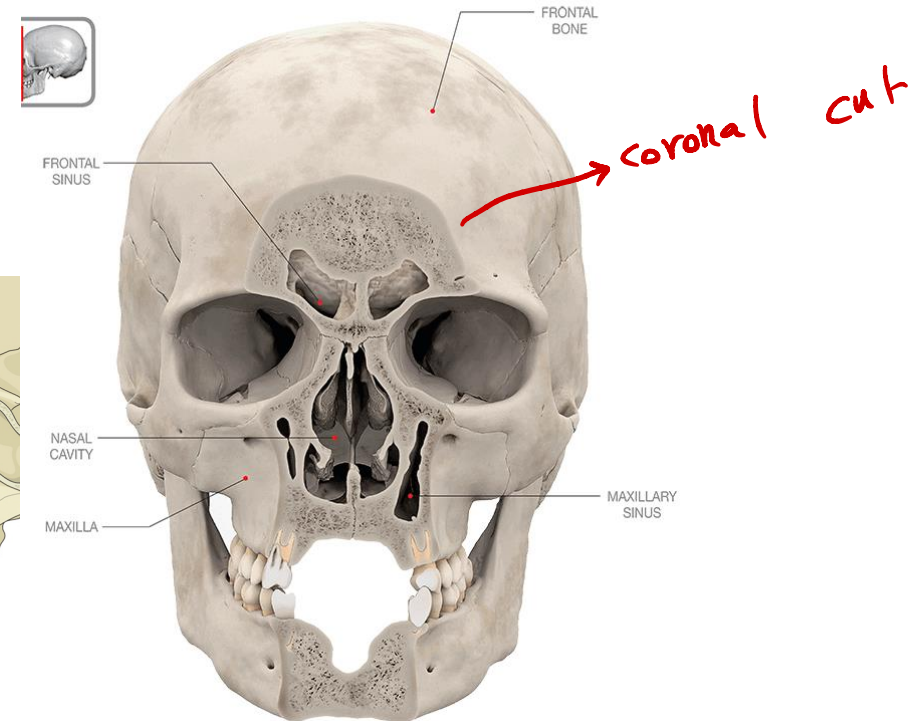
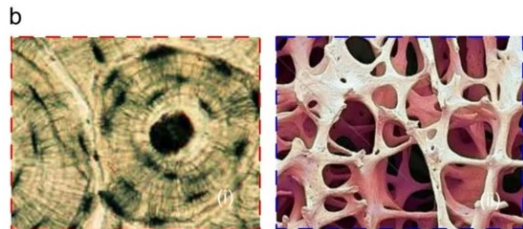
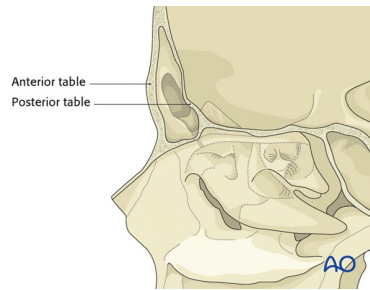
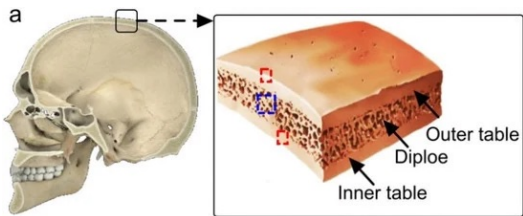
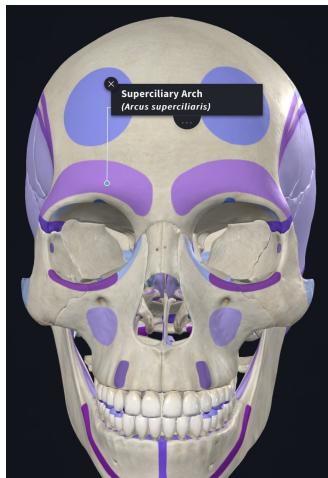
Frontal sinuses

2

- The paired frontal sinuses are posterior to the superciliary arches, between the outer and inner tables of the frontal bone.

سوپر سیلیکری آرک

- Separated from each others by septum



Ethmoidal air sinuses

جمع (د) نيم
double من multiple

- Can be divided into two groups; anterior and inferior.
- Lie between the upper part of the nose medially and orbits laterally

Anterior

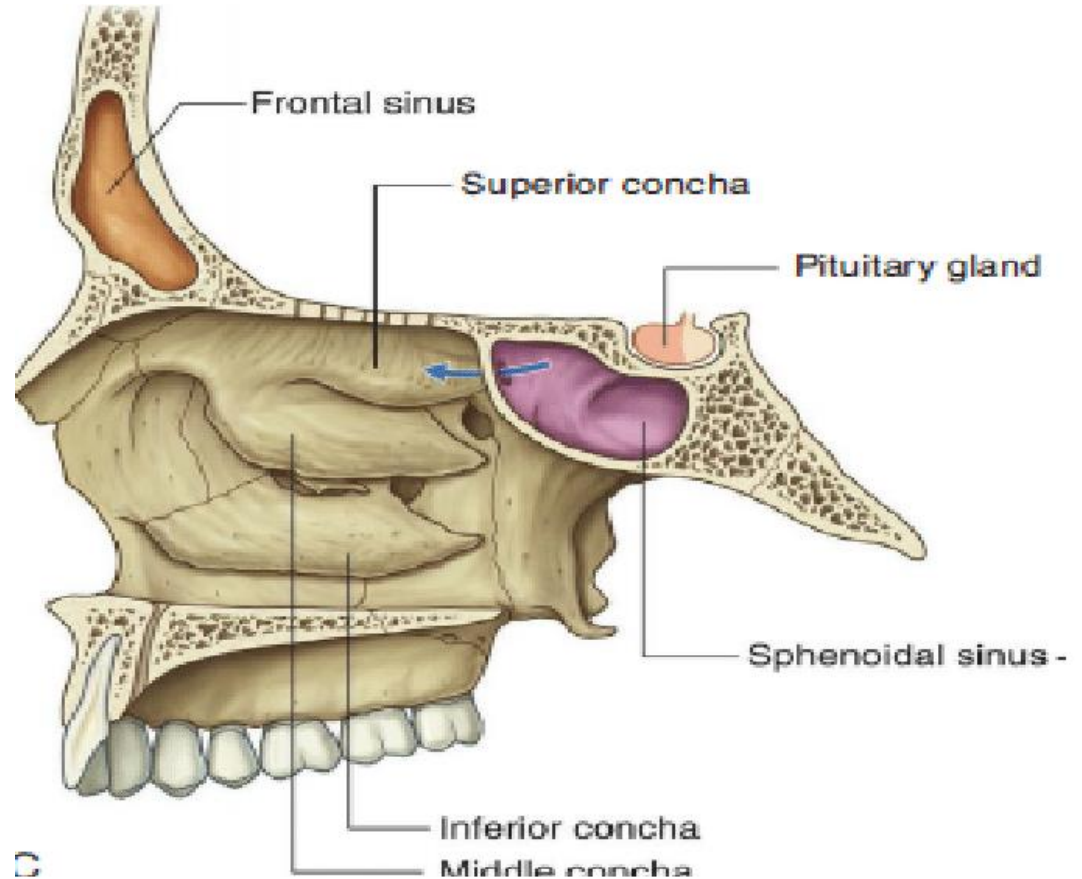


transverse section

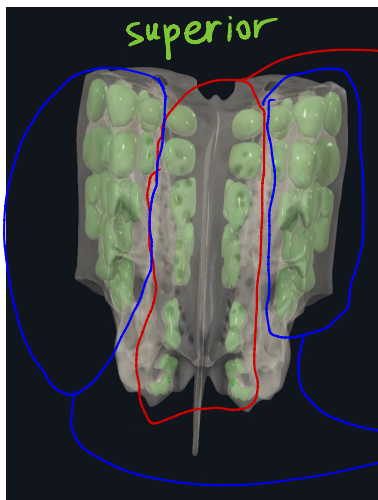
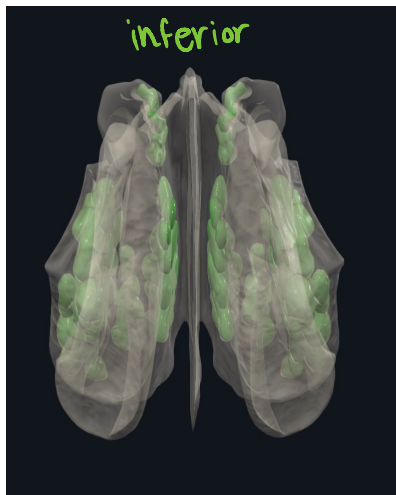
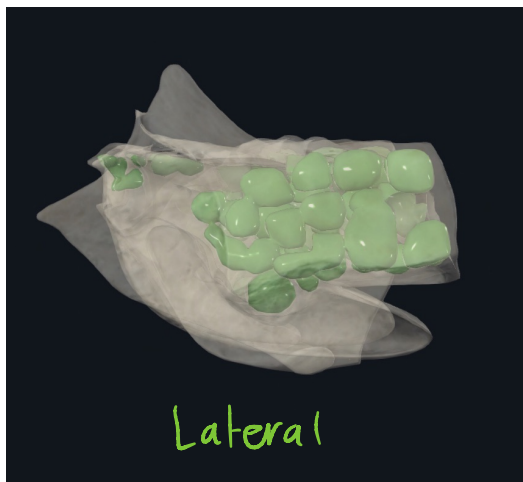
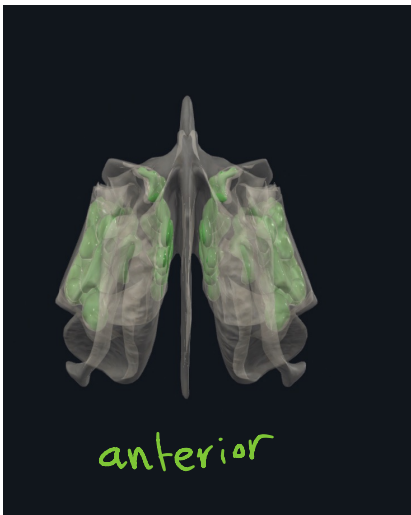
posterior

Sphenoid air sinus

- Paired sinuses
- In the body of sphenoid bone

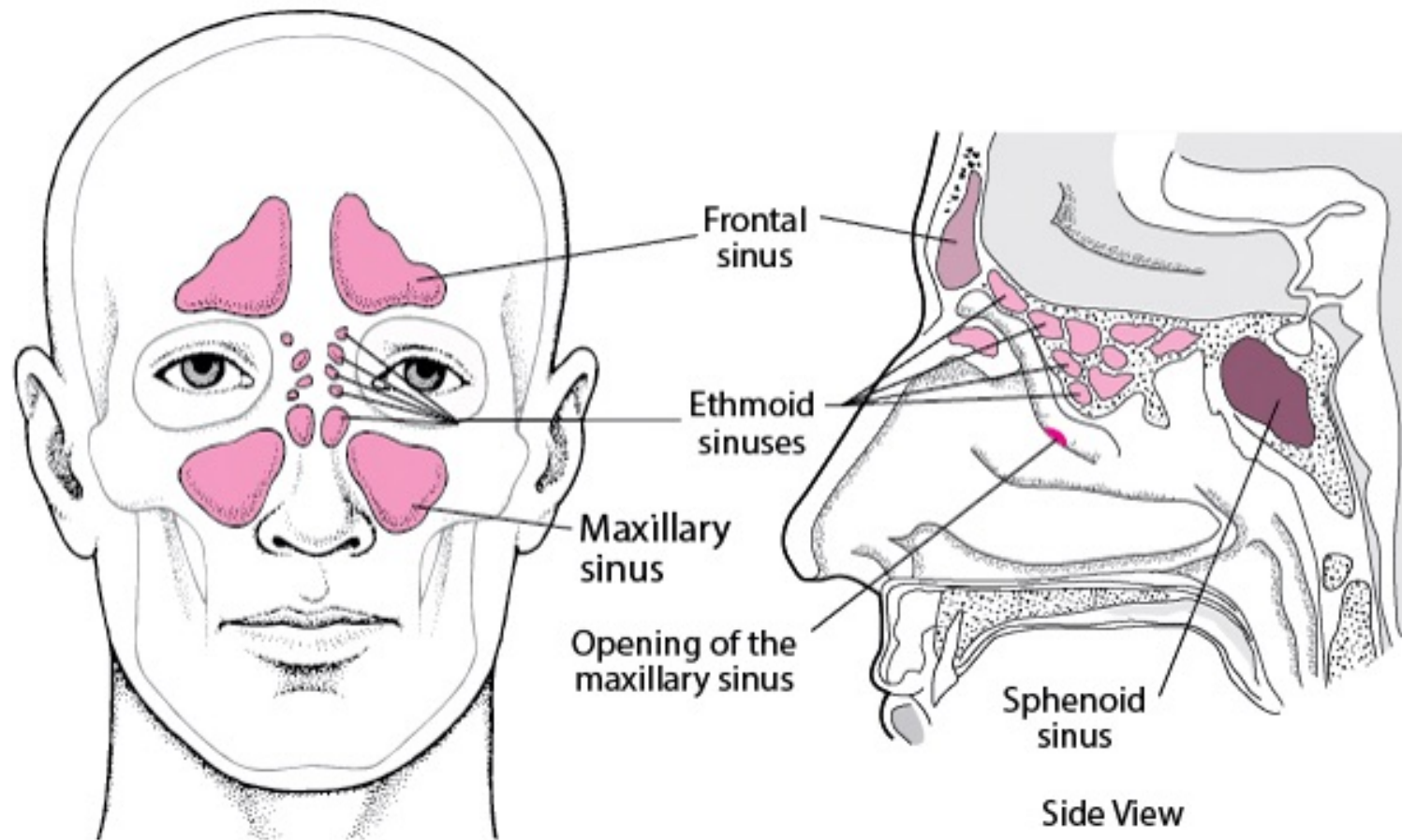


من اجابو
brain



→ upper part of the nose medially

→ orbits laterally



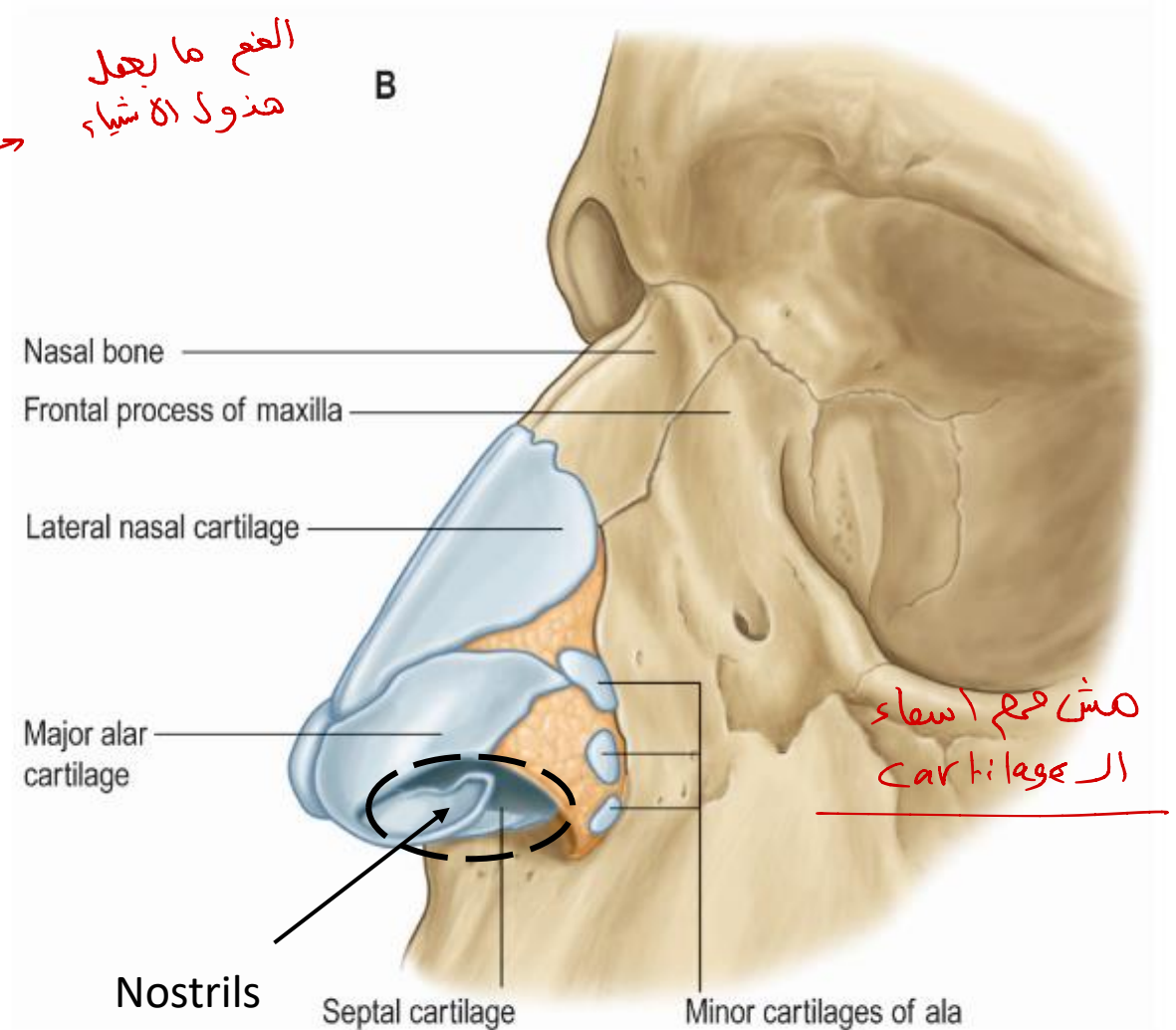
The nose

- The nose is the first part of the upper respiratory tract and is responsible for **warming, humidifying** and **filtering inspired air**

لے ترطيب الهواء

من خلال الـ hair
اسي داخل الـ nose

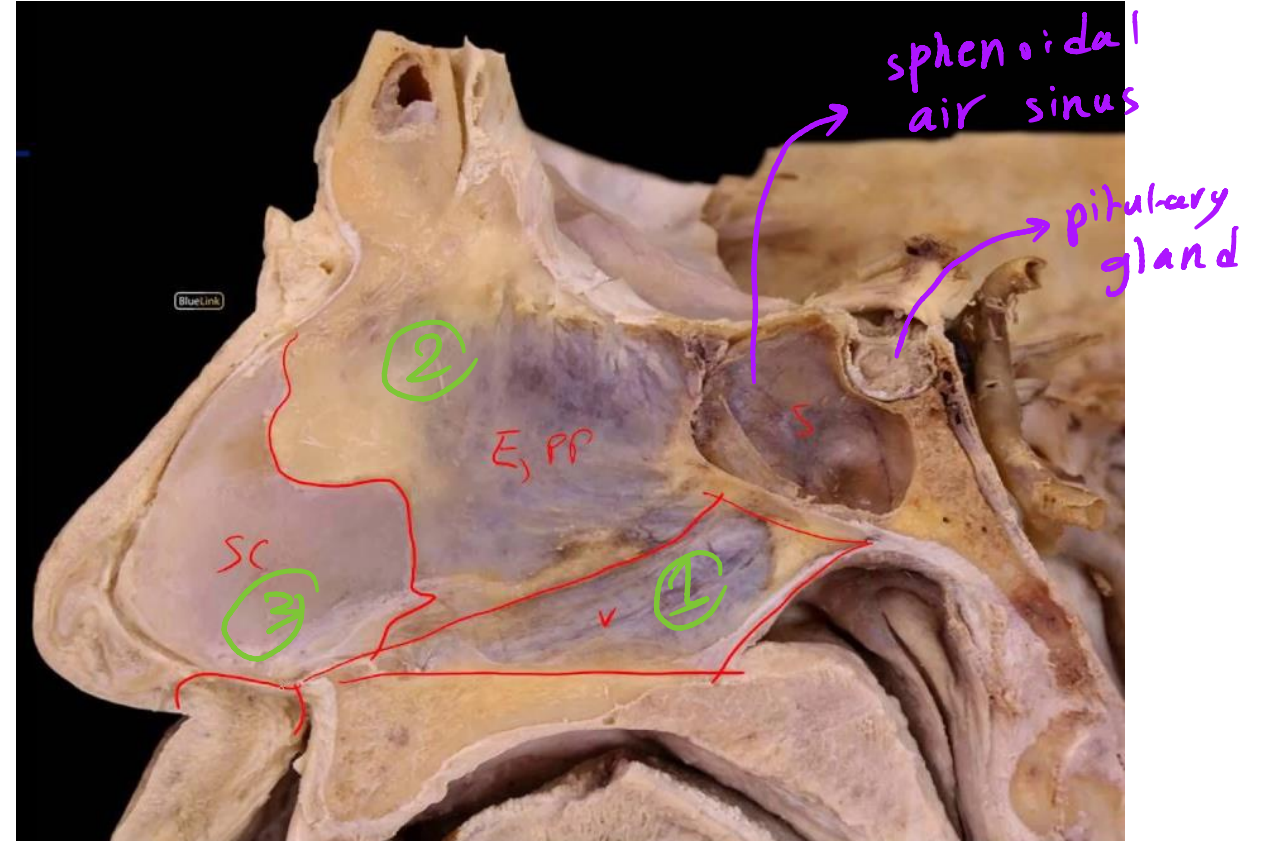
- Can be divided into **external nose** and **nasal cavity (internal chamber)**.
- First, external nose opens anteriorly at the **ant. Nasal apertures (or nostrils)**, and consists of:
 - Bony skeleton of the external nose** formed by nasal bones and maxilla
 - cartilaginous framework** consists of the **paired lateral and major cartilages** and **several minor alar nasal cartilages**



The nose

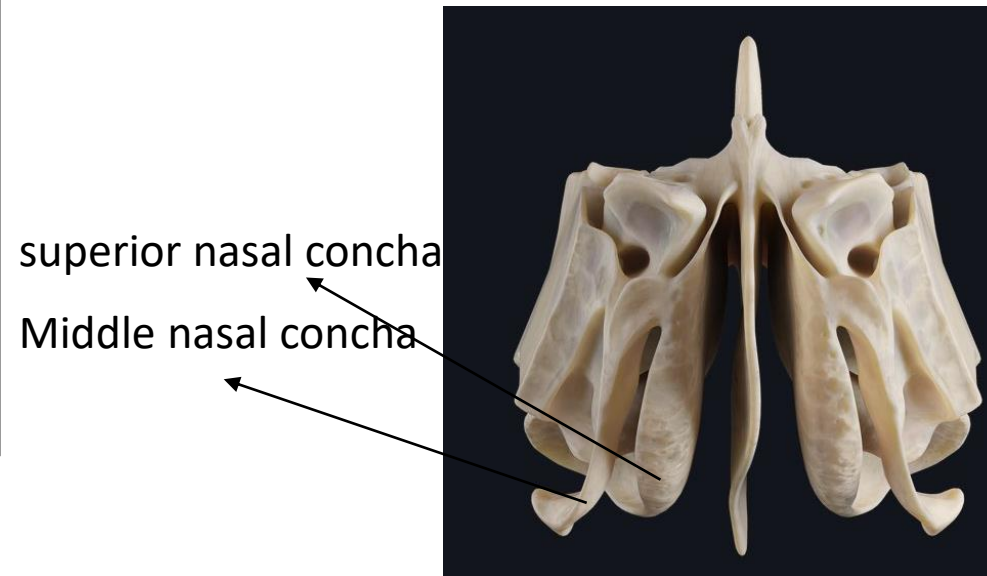
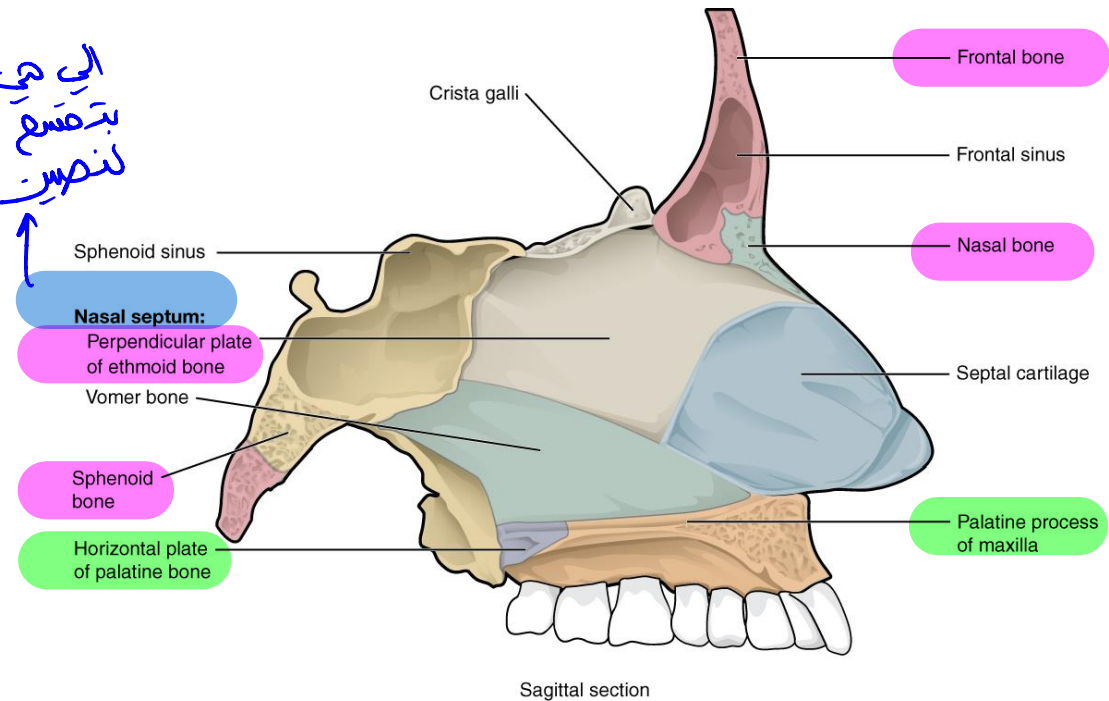
هذا المقطع اسه midd sagittal وتم أخذه في منتصف الـ midd line
لو أخذناه حوالي الـ midd line كان صار (اسه) coronal saggital
بس للاختصار بنحكي saggital

- The nasal cavity of the nose is divided into two cavities that are separated into **Rt** and **Lt** cavities by the nasal septum.
- Opens anteriorly at the ant. Nasal apertures and posteriorly into the **nasopharynx** by the post. Nasal apertures
- The septum consists of the :
 - 1• Vomer bone
 - 2• Perpendicular plate of the ethmoid bone
 - 3• Septal cartilage



- Boundaries of the nasal cavity:
- **1. roof:** made from nasal bone, frontal bone, ethmoid bone and body of sphenoid
- **2. floor:** hard palate
- **3. medial wall:** nasal septum
- **4. lateral wall:** The lateral wall contains three projections of variable size: **the inferior, middle and superior nasal conchae or turbinates.** And three meatuses, **superior, middle and inferior nasal meatuses.**
- **Sup. And middle nasal conchae are parts of ethmoid bone. The inferior nasal conchae are independent paired bones.**

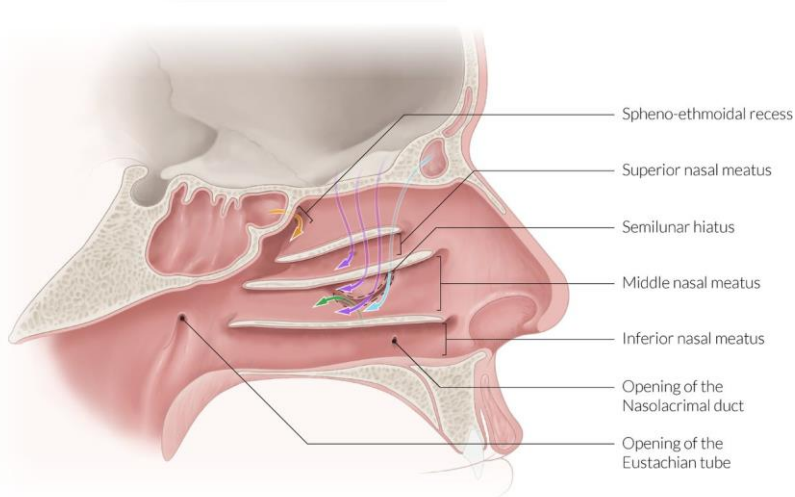
إلى هي يتوسع التجويف
لنفس



1. The superior meatus: received the opening of the posterior ethmoidal sinuses
2. The middle meatus: receives the openings of the maxillary, frontal and ant. Ethmoidal air sinuses
3. The inferior meatus: receives the opening of the nasolacrimal duct.

The sphenoidal recess receives the opening of the sphenoidal air sinus → above the superior concha

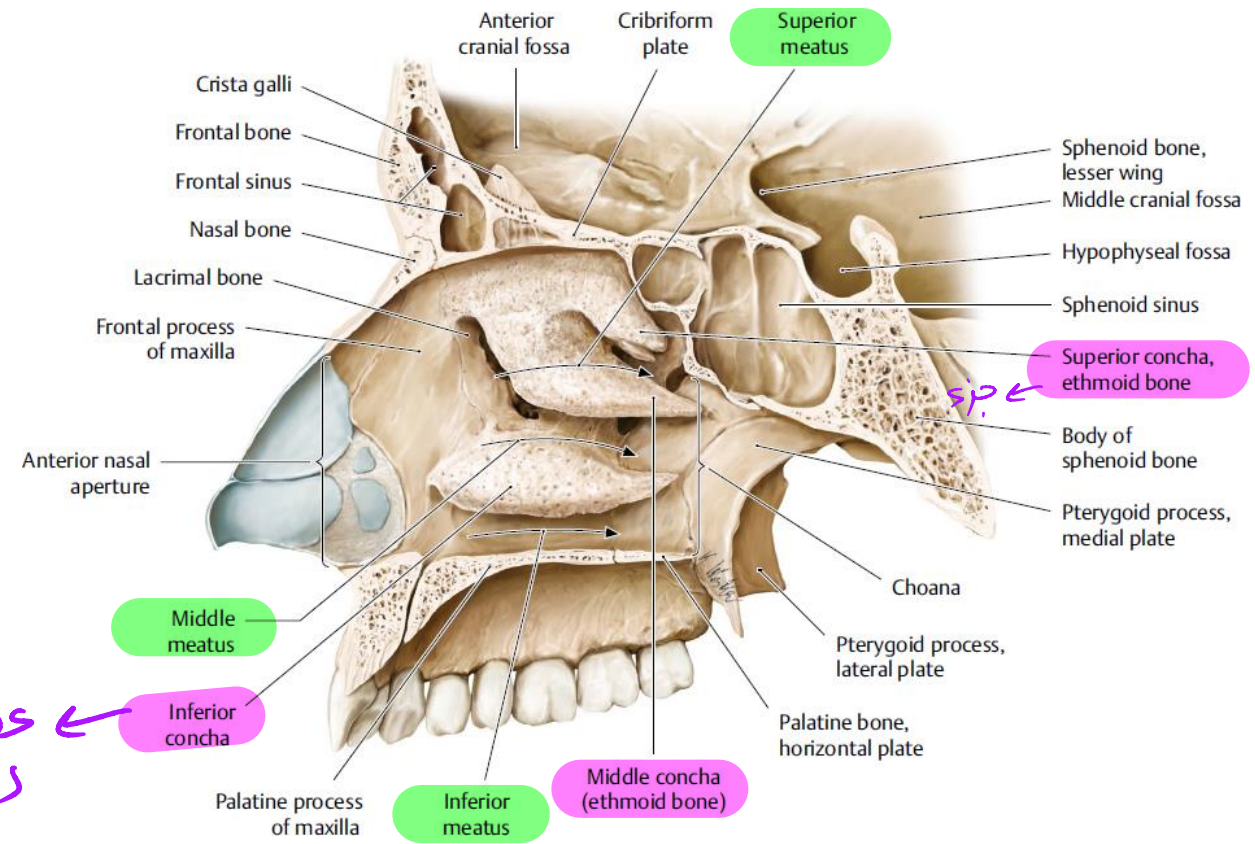
منه فتحة تتحيط المخاط من ال sphenoid sinus



Frontal sinus Ethmoid sinus Sphenoid sinus Maxillary sinus

وظيفة تسري مرور الهواء

كل ال paranasal sinuses يتفتح في ال lateral wall of nasal cavity وكذا mucous التي يتم انتاج بصير ال lateral wall of nasal cavity flow الى



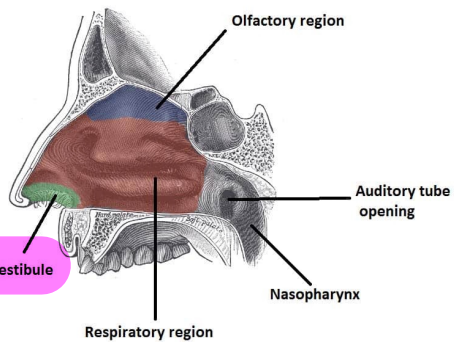
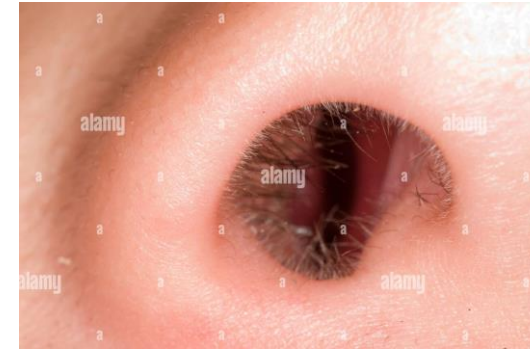
عظمة رطابها

Linings of the nasal cavity

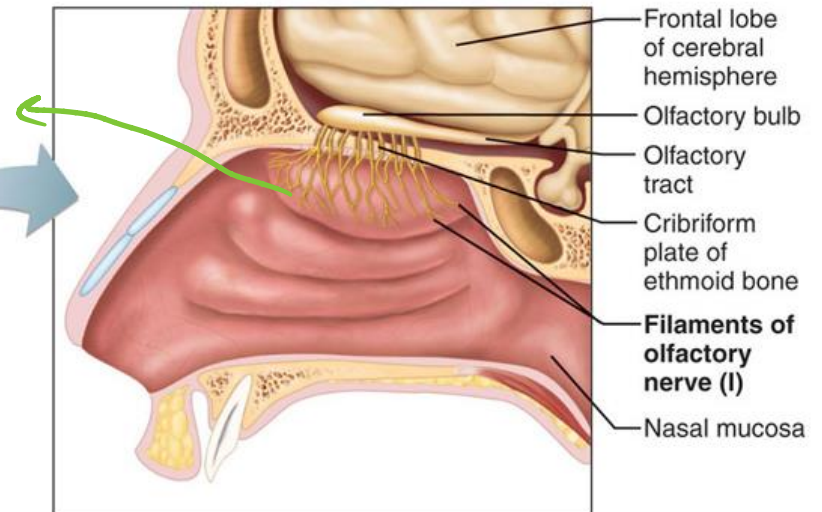
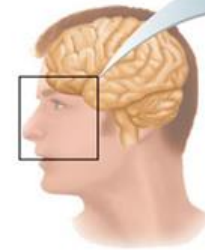
1. Modified skin with hair, lining of the **vestibule** (the vestibule is a small elevation above the nostrils)

1. Lining of the upper **1/3rd** of the nasal cavity is **olfactory mucous membrane**

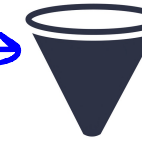
2. Lining of the remaining **2/3rd** of the nasal cavity is **respiratory mucous membrane**



upper 1/3



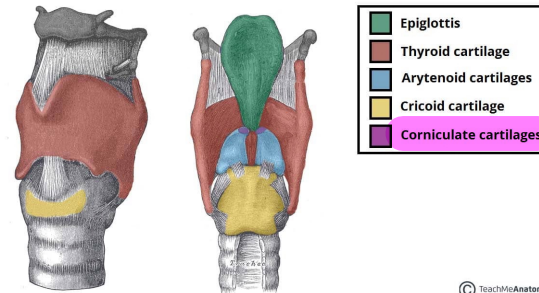
The pharynx is a 12–14 cm long Musculo-membranous tube shaped like an inverted cone. It extends from the cranial base to the lower border of the cricoid cartilage (at the level of C6), where it becomes continuous with the oesophagus.



INVERTED CONE
EDITABLE VECTOR ICON

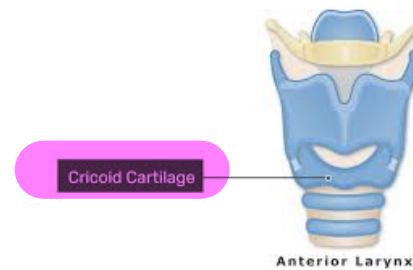
Is divided into three parts:

1. **Nasopharynx**
2. **Oropharynx**
3. **Laryngopharynx**

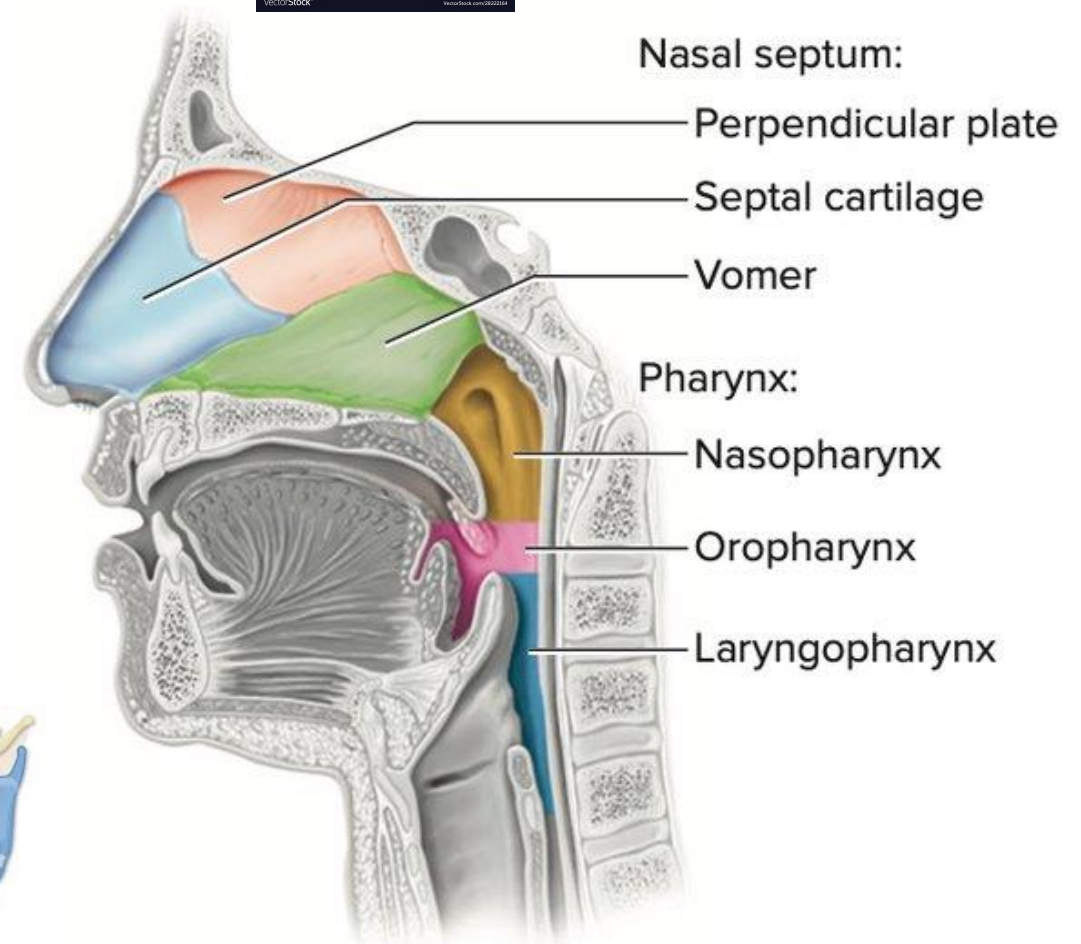


© TeachMeAnatomy...

It is important for the passage of food during swallowing and air during respiration >>>> it is part of the respiratory and digestive systems



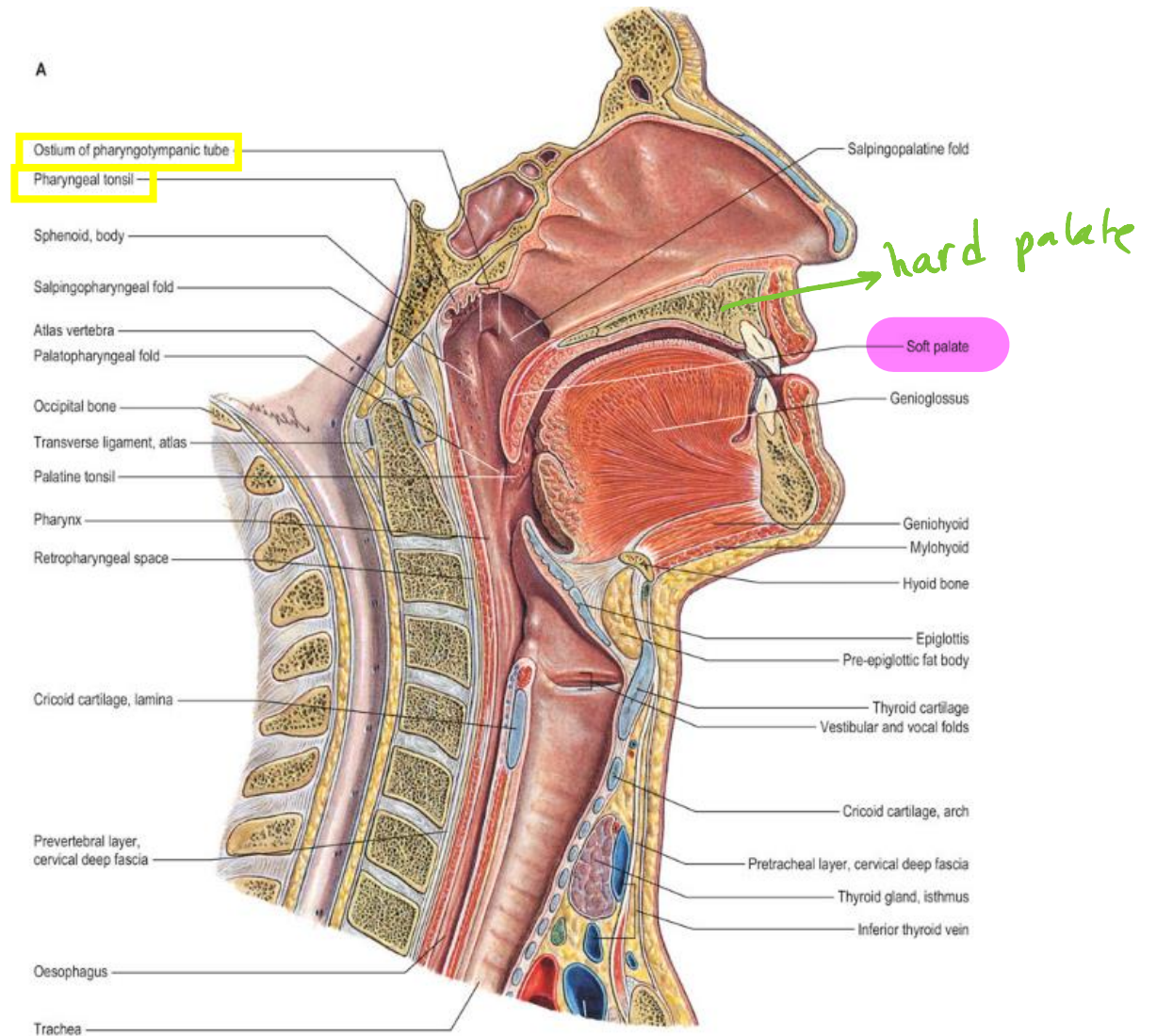
Anterior Larynx



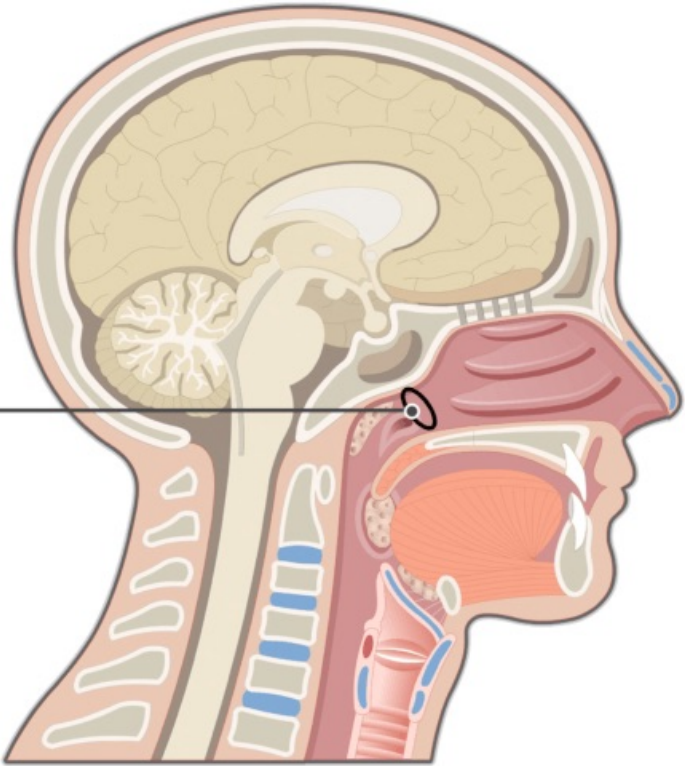
(c)

The nasopharynx

- lies above the soft palate and behind the posterior nares, which allow free respiratory passage between the nasal cavities and the nasopharynx.
- It becomes continuous with oropharynx inferiorly.
- **The auditory tube (pharyngotympanic tube)** opens at the lateral wall of the nasopharynx, through which the pharynx communicate with the middle air.
- The roof contains a collection of lymphoid tissue called the **pharyngeal tonsils (adenoid)**



Posterior Nares

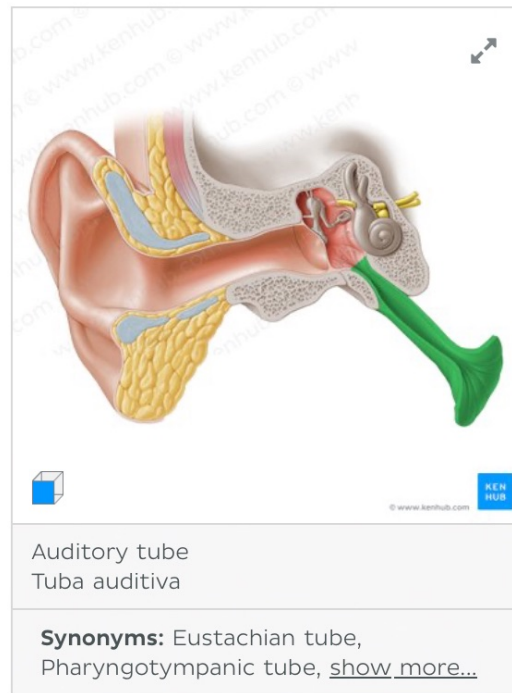


فوق الطول وظيفية

The **auditory tube**, more commonly known as the **Eustachian tube**, is a part bony, part fibrocartilaginous tube which connects the middle ear with the nasopharynx. It is also known as the **pharyngotympanic tube**.

It serves to equalize pressure within the tympanic cavity with ambient air pressure. It does this by opening during activities such as swallowing, yawning, or the Valsalva maneuver (i.e. an effort to breathe out forcibly with the mouth and nose firmly closed). Opening of the auditory tube may also occur during isolated changes in atmospheric pressure (e.g. 'popping' of the ears on ascent/descent in flight or crossing mountainous terrain etc.)

In this article, we will discuss the gross and functional anatomy of the auditory tube. We will also discuss the clinical relevance of the structure, including dysfunction of the auditory tube.



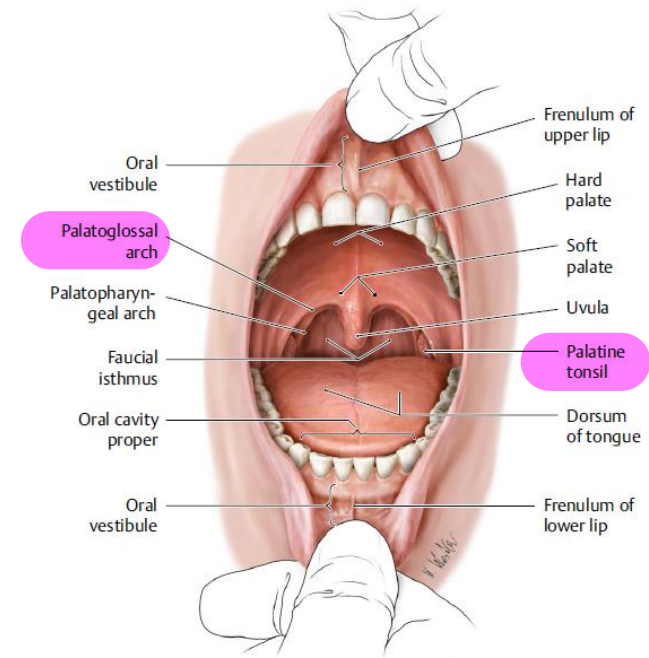
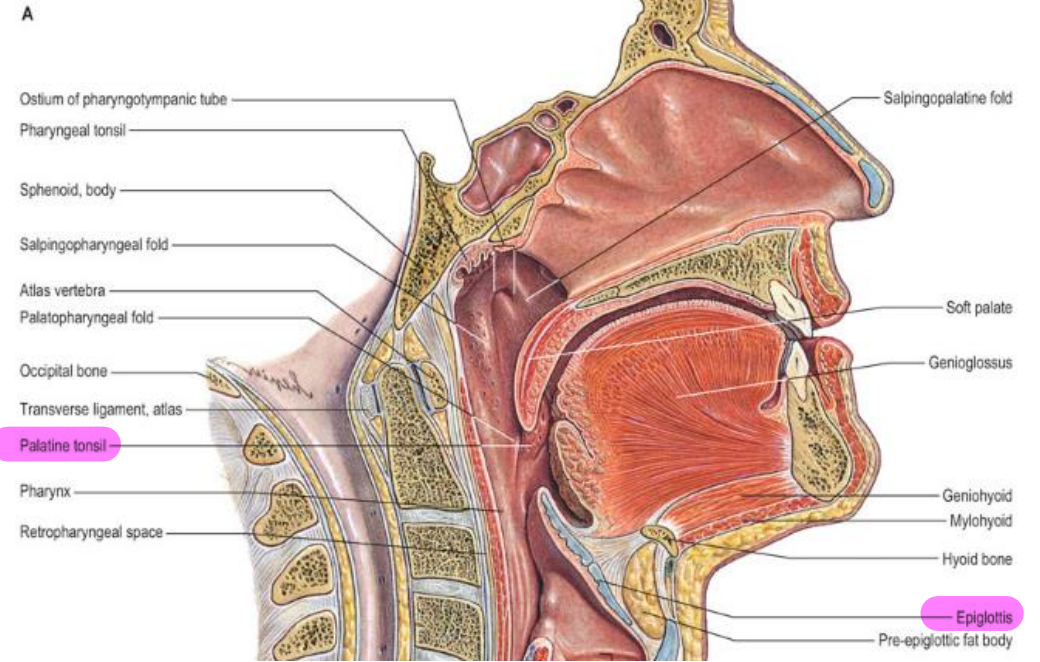
2. Oropharynx

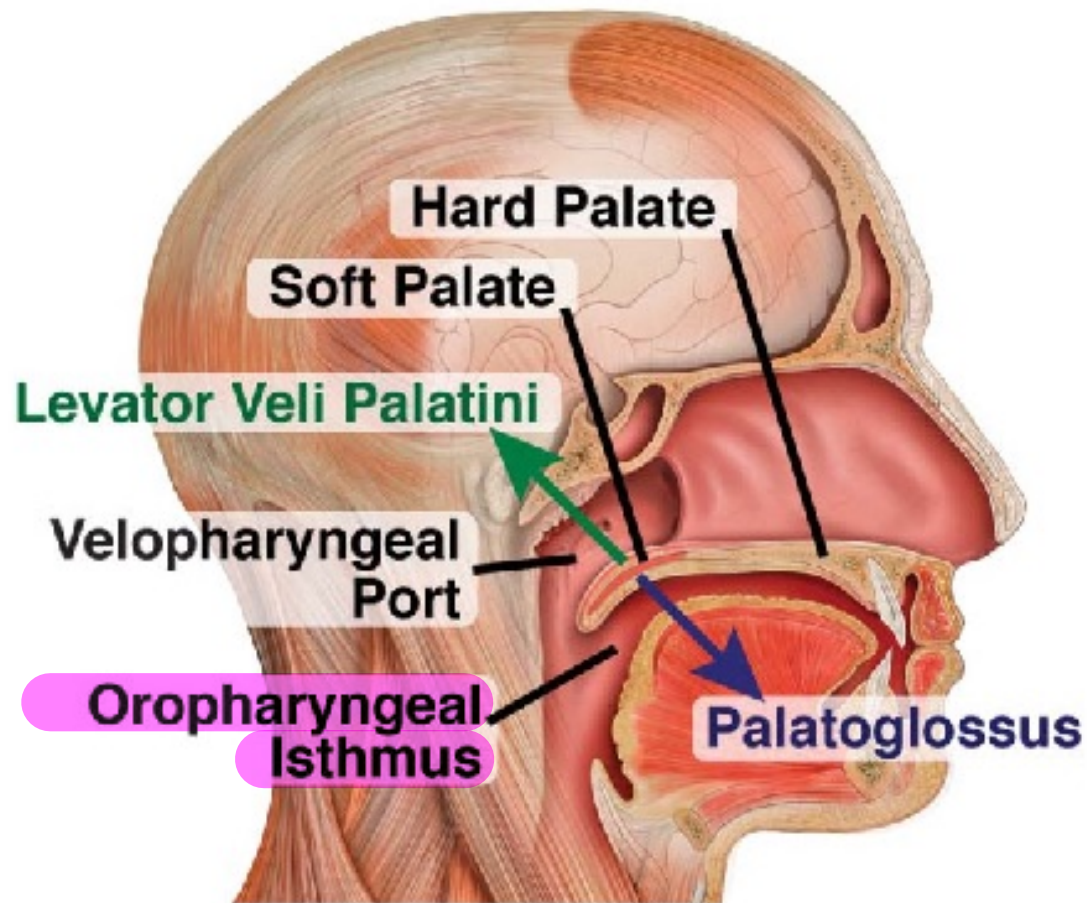
Extends from below the soft palate to the upper border of the epiglottis. It opens into the oral cavity through the **oropharyngeal isthmus**, demarcated by the palatoglossal arch, and faces the pharyngeal aspect of the tongue.

Its lateral wall consists of **the palatopharyngeal arch and palatine tonsil**

Posteriorly, it is level with the bodies of the second, and upper part of the third, cervical vertebrae.

The epiglottis stands up behind the posterior third of the tongue.

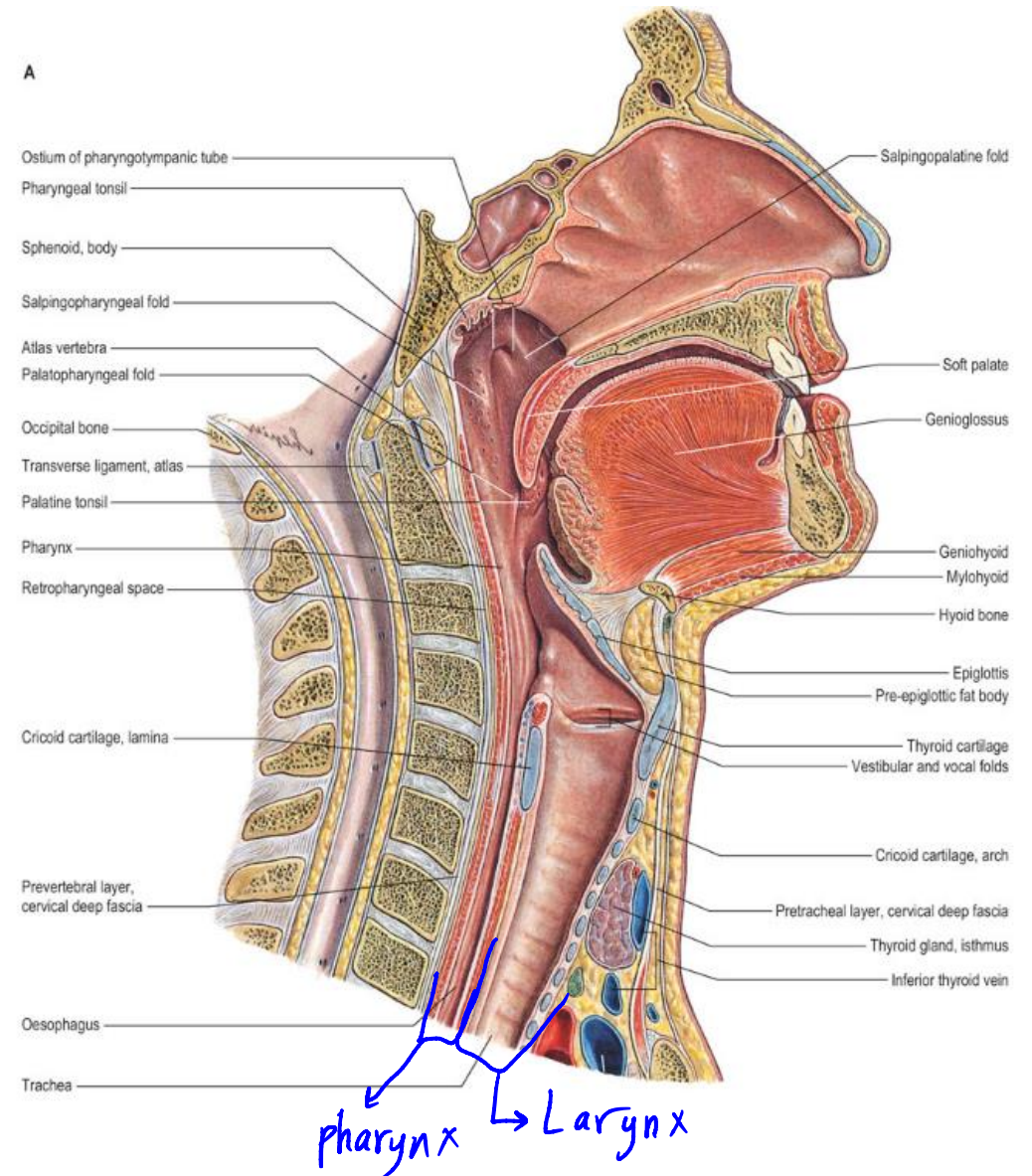




3. Laryngopharynx

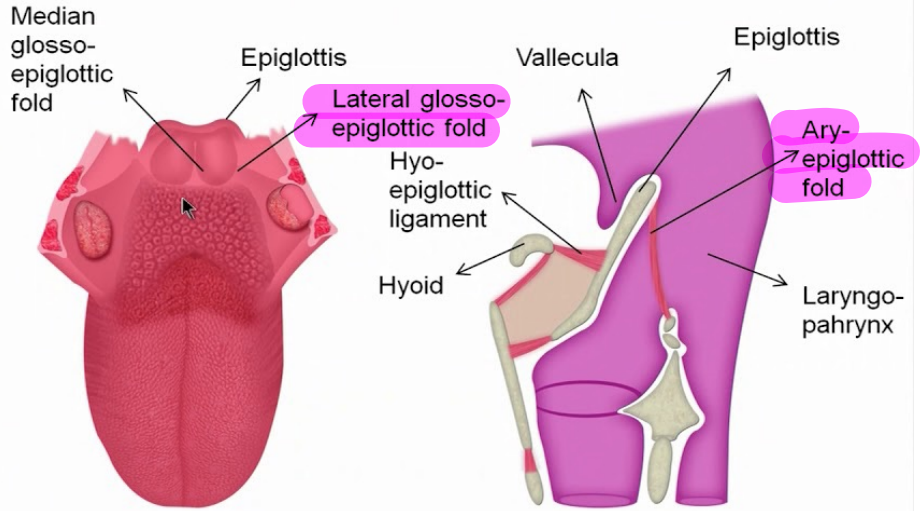
situated behind the entire length of the larynx and extends from the superior border of the epiglottis, where it is delineated from the oropharynx by the lateral **glossoepiglottic folds**, to the inferior border of the cricoid cartilage, where it becomes continuous with the oesophagus.

The laryngeal inlet lies in the upper part of its incomplete anterior wall, and the posterior surfaces of the arytenoid and cricoid cartilages lie below this opening.



Epiglottis

- Median & lateral glosso-epiglottic folds
- Vallecula
- Hyo-epiglottic ligament
- Piriform fossa

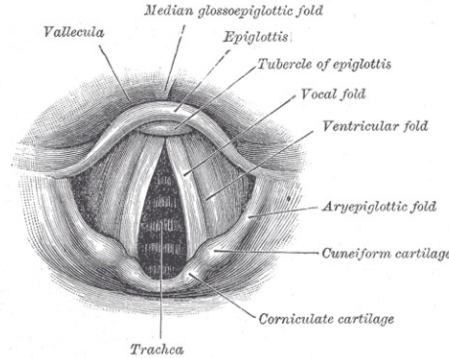


The laryngeal inlet lies in the upper part of its incomplete anterior wall, and the posterior surfaces of the arytenoid and cricoid cartilages lie below this opening.

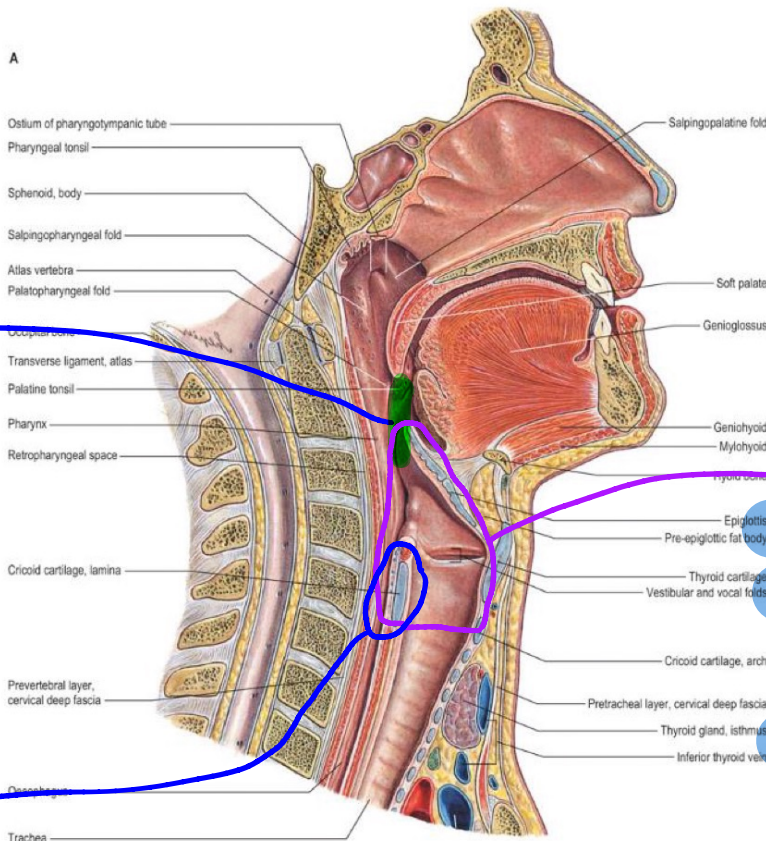
بالنسبة لهذه الفقرة :-

* هذه فتحة تربط ال Larynx مع pharynx ، وهذه

صورتها :-



⊗ بالنسبة لهو فتح هذه الفتحة :-



لاحظ كيف

anterior wall
pharynx

لكنه incomplete

يعني مش مسكر عشان
الفتحة

هذا ال cricoid cartilage
جاى تحت الفتحة

هذا المربع هياك

arytenoid

روال laryngeal inlet

تشكل ال

posterior surface

تاي

larynx

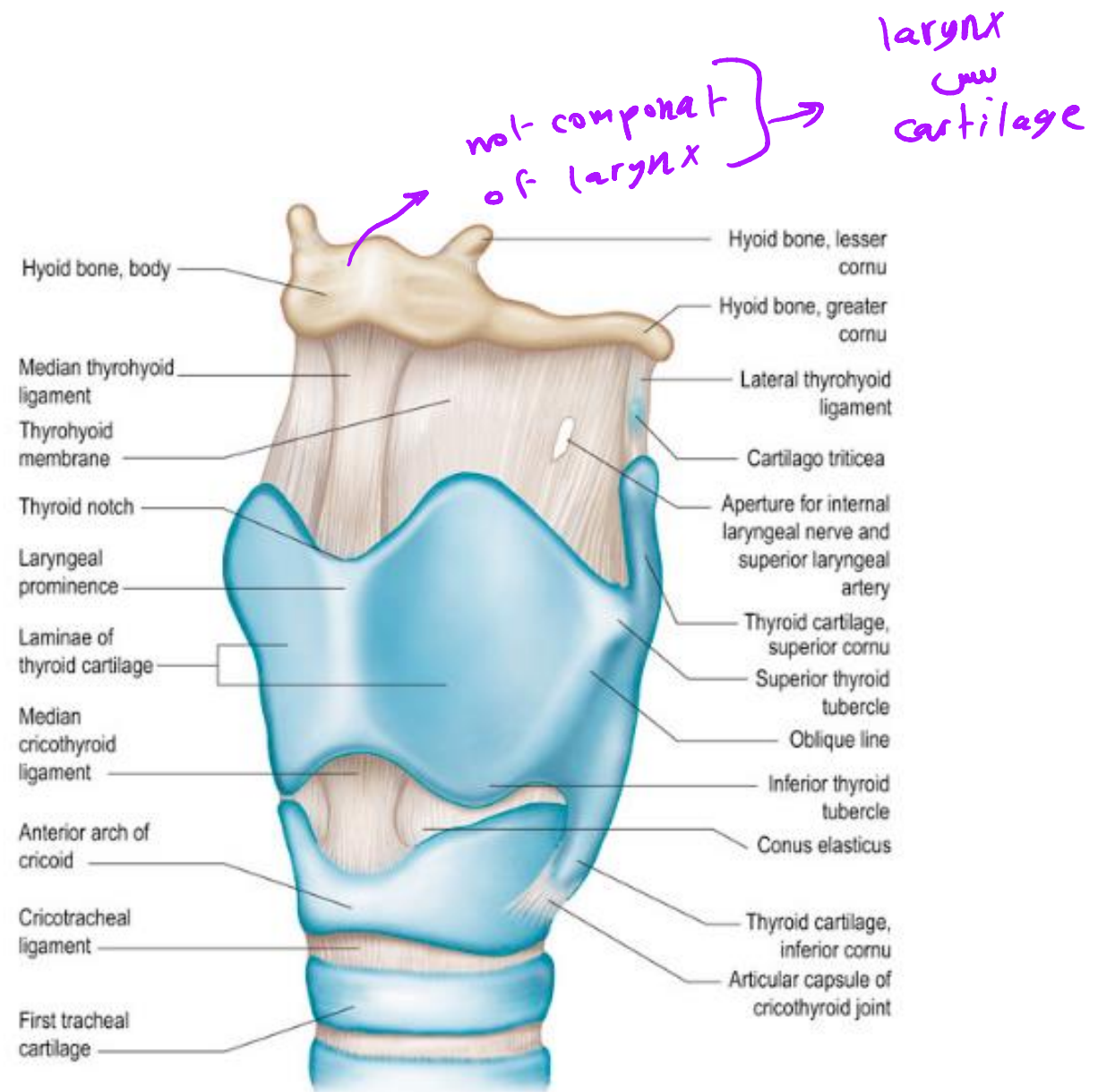
بعضى الحبال الصوتية

- The larynx is an air passage, a sphincter and an organ of phonation, that extends from the tongue to the trachea.

• Skeleton of the Larynx

The skeletal framework of the larynx is formed by a series of cartilages interconnected by ligaments and fibrous membranes and moved by a number of muscle).

The hyoid bone is attached to the larynx; it is usually regarded as a separate structure with distinctive functional roles



- Cartilage of the larynx

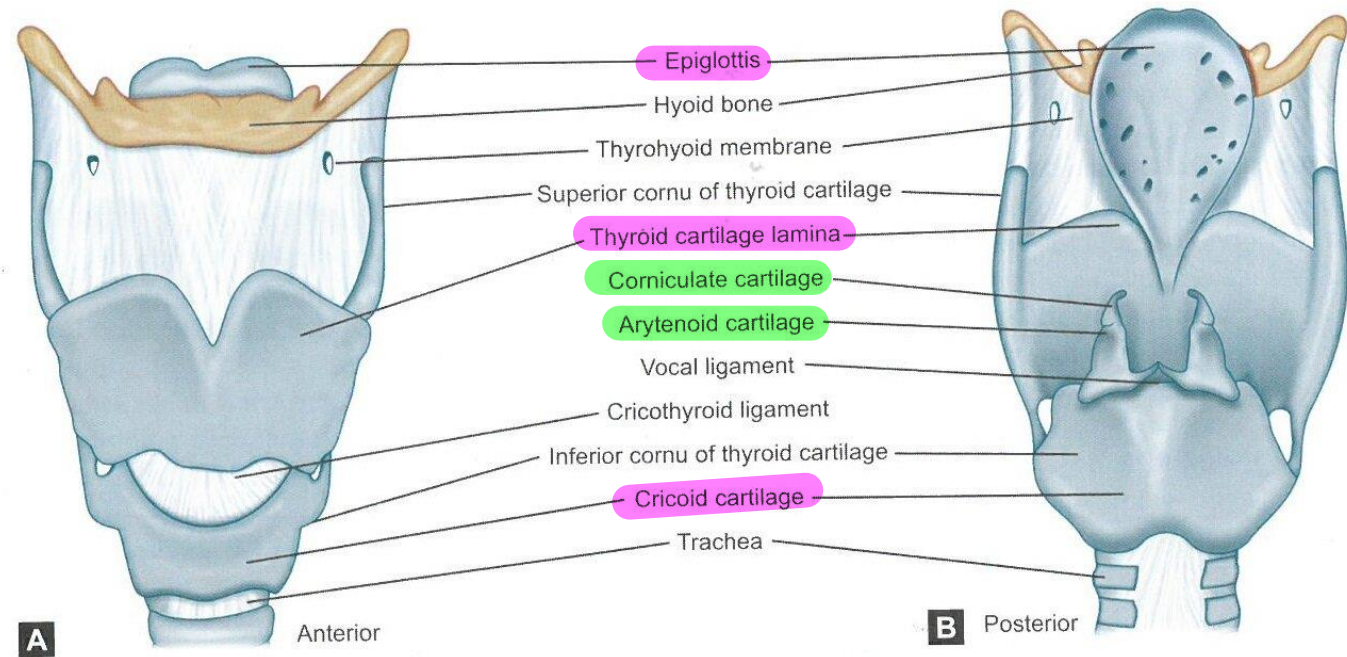
The laryngeal cartilages are the midline, single:

1. **thyroid,**
2. **cricoid** and
3. **epiglottic** cartilages, and the

paired cartilages:

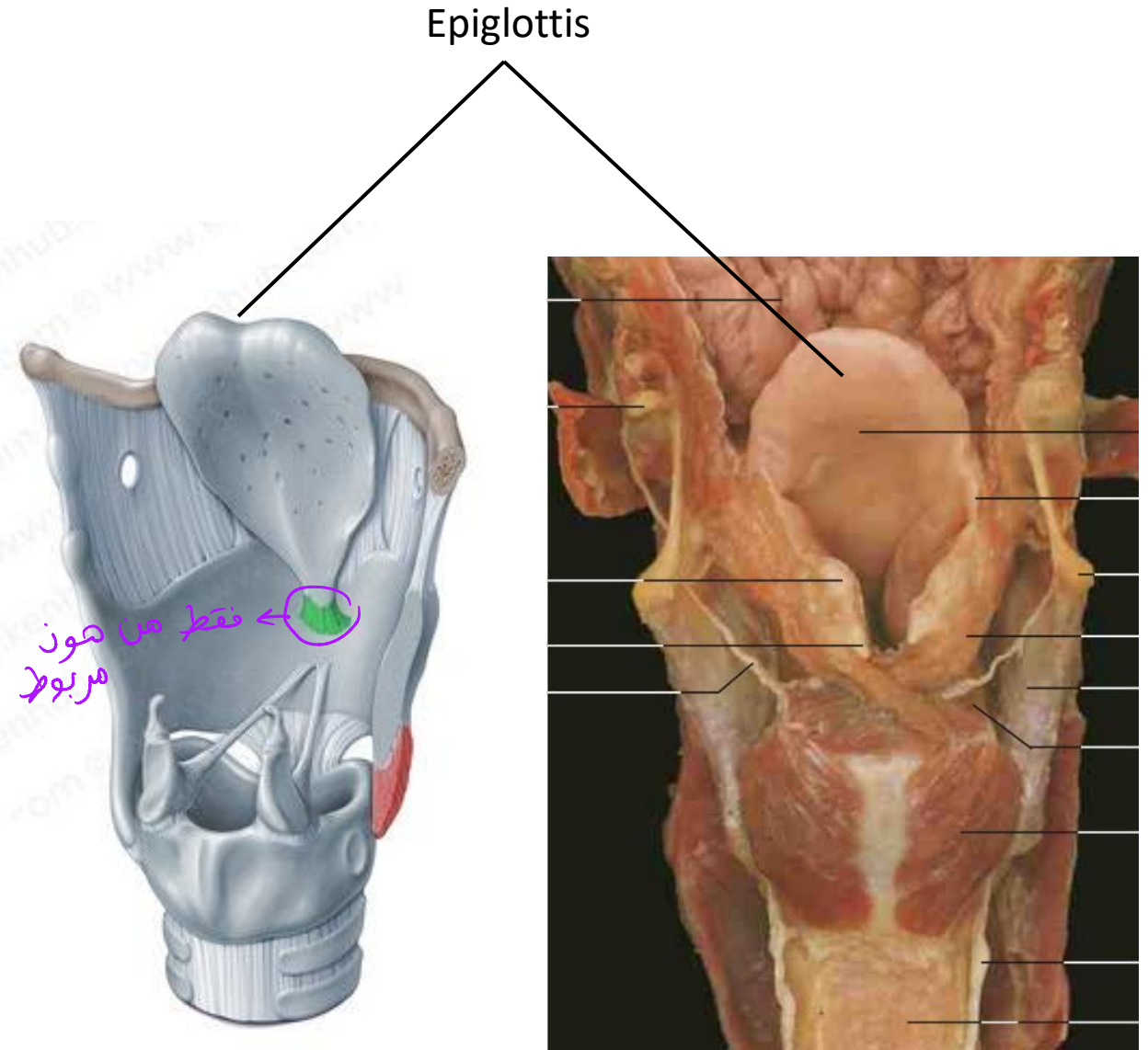
1. **arytenoid,**
2. **cuneiform, and**
3. **corniculate**

مش موجودة
بالصورة



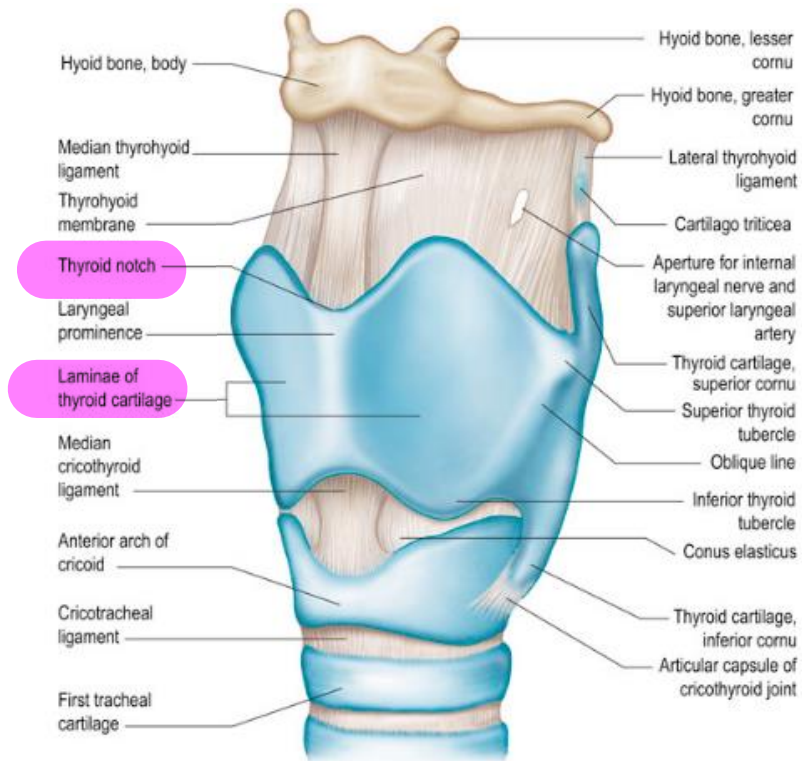
Epiglottis

- a thin, leaf-like plate of **elastic cartilage** that projects obliquely upwards behind the tongue and hyoid body, and in front of the laryngeal inlet. Its **free end**, which is broad and round, and occasionally notched in the midline, is directed upwards.
- Its attached part, or **stalk** is long and narrow and is connected by the elastic thyroepiglottic ligament to the back of the laryngeal prominence of the thyroid cartilage.
- During swallowing, the hyoid bone moves upwards and forwards, and the epiglottis is bent posteriorly



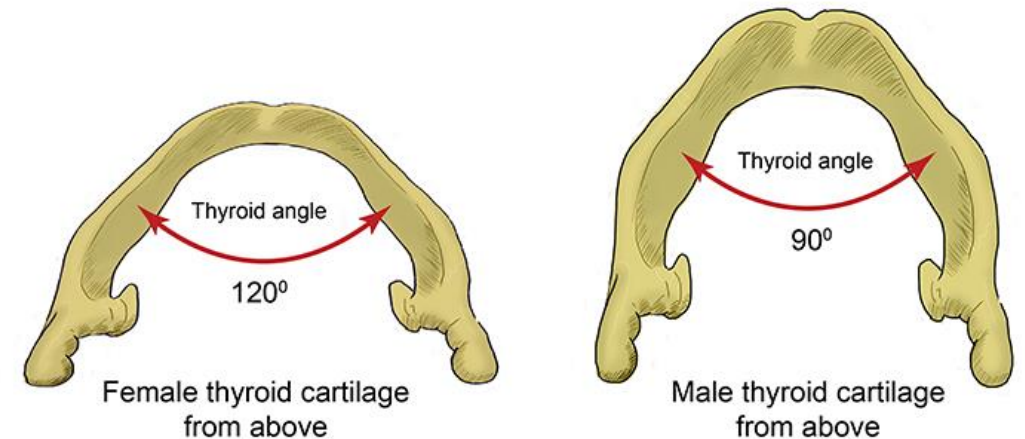
Thyroid cartilage

- The thyroid cartilage is the largest of the laryngeal cartilages.
- It has two **lamina** that unite anteriorly, but not posteriorly.
- The **thyroid notch** is at its upper border



Larynx

- The male larynx enlarges considerably in comparison with that of the female, the thyroid cartilage projects in the anterior midline of the neck creating what it is “Adam's apple”.
- The angle between the two lamina in females is 120, while it is 90 in males

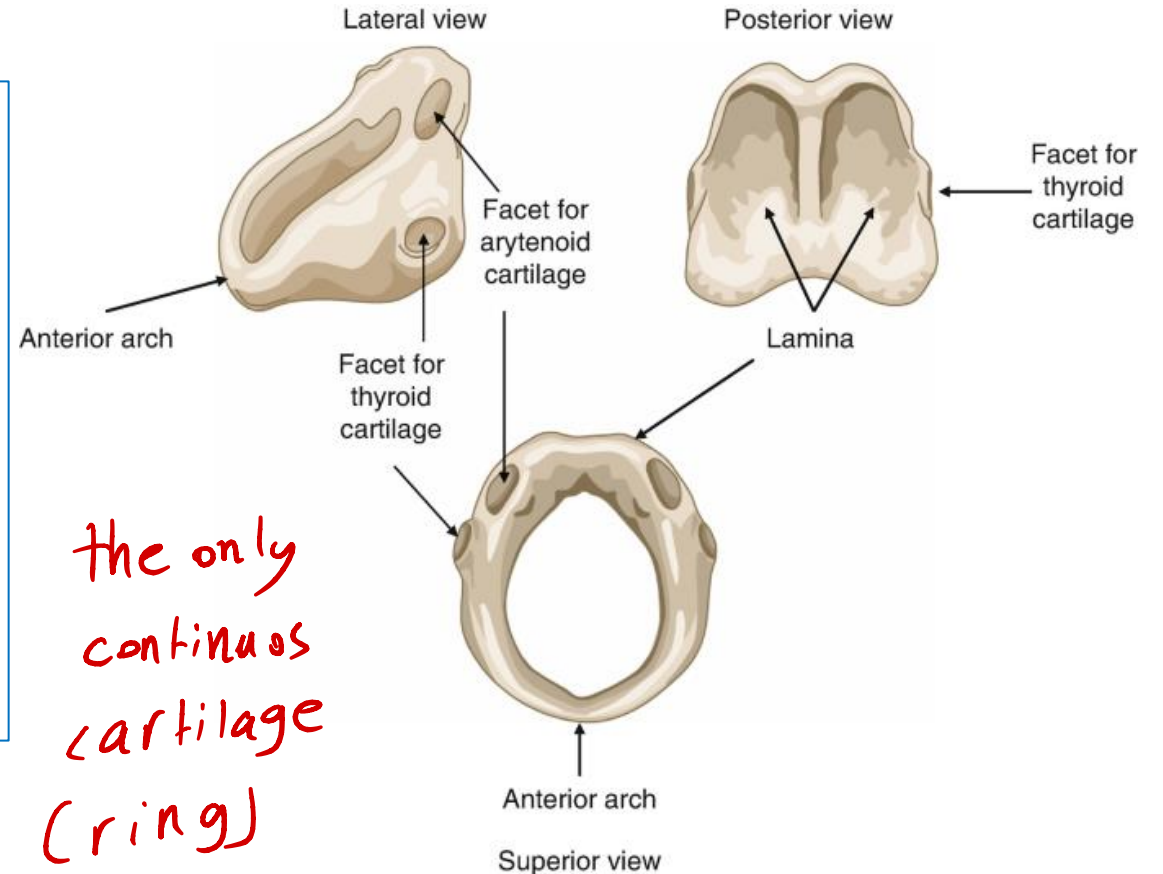


Cricoid cartilage

The **cricoid cartilage** is attached below to the trachea and articulates with the thyroid cartilage and the two arytenoid cartilages by **synovial joints**.

It forms a complete ring around the airway, the only laryngeal cartilage to do so.

It is smaller, but thicker and stronger, than the thyroid cartilage, and has a narrow curved anterior arch and a broad, flatter posterior lamina.

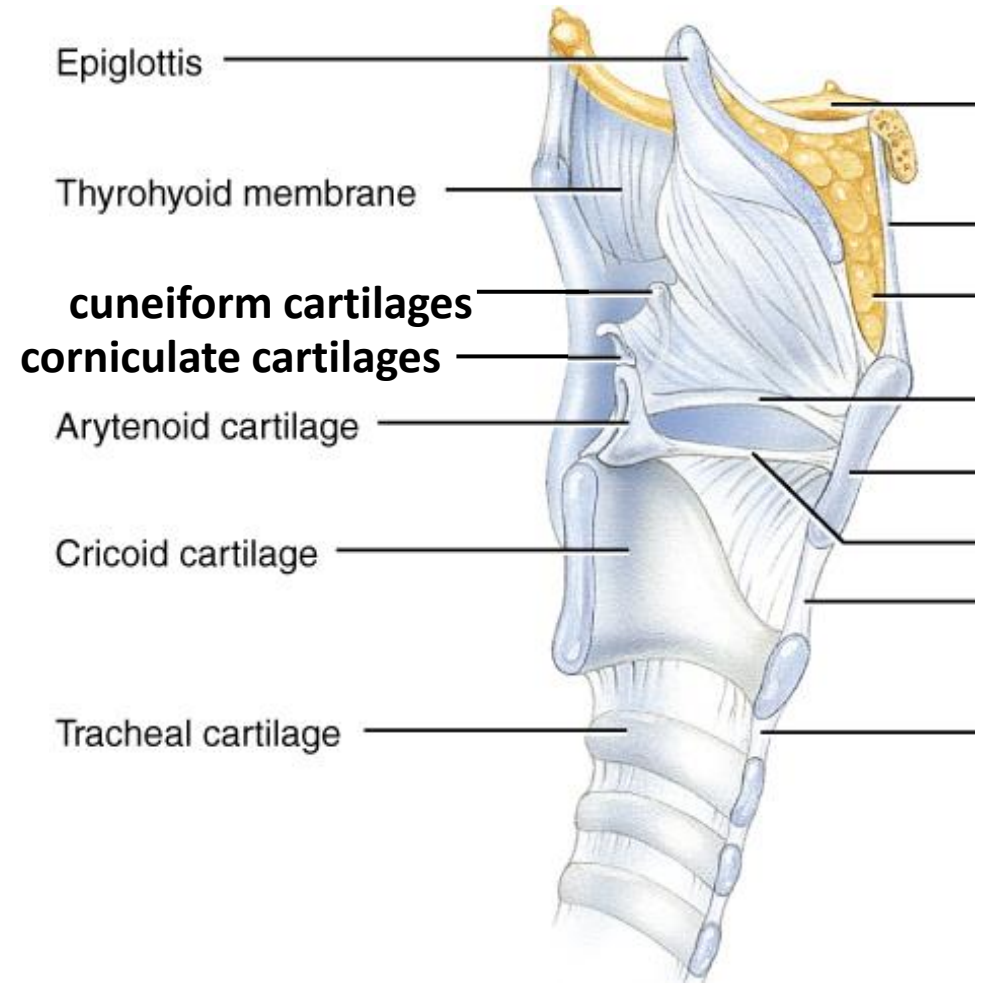


the only continuous cartilage (ring) connects thyroid cartilage

مش عہدیت

The paired laryngeal cartilages:

1. **arytenoid cartilages** articulate with the lateral parts of the superior border of the cricoid lamina, each is pyramidal and has three surfaces, two processes, a base and an apex.
2. **corniculate cartilages:** lie at the apex of the arytenoids cartilages
3. **Cuneiform cartilages**



- Thank you!