

Respiratory system :

Is essential system for exchange of gases between organism and environment . .there are 2 type of respiratory occurring within the body of higher animals

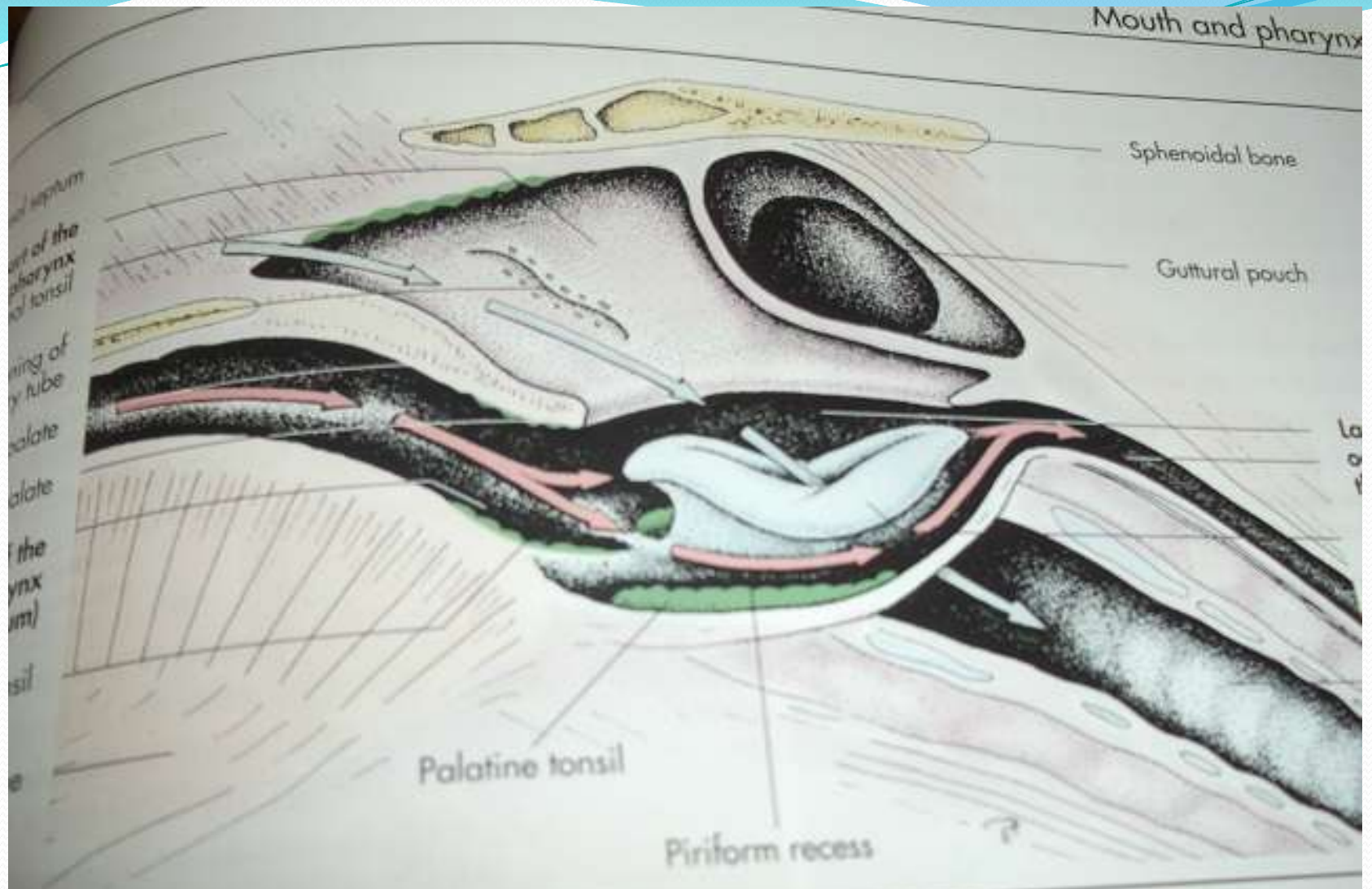
Respiratory system :

- External respiration involving the respiration organs and blood stream
- Internal respiration :which is an exchange of gasses between blood stream and the cells

The respiratory system consists of :

- 1-conducting part: is that part through which the air passes to reach the respiratory part where actual exchange of O_2 it is consist of :
- A-External nose .
- b-Nasal cavity .
- c-part of pharynx (nasopharynx)
- d-Larynx .
- c-trachea
- e- within lung
- -bronchi -bronchioles

Mouth and pharynx



of the pharynx of the horse, illustrating the crossing of the nasal and oral passages.

2-Respiratory part

- 2-Respiratory part which consists of :
- a-Respiratory bronchiole .
- b-Alveolar duct .
- c-alveolar sac .

3-pumping apparatus include

- two pleural sacs which envelop the lung form vacuum chambers around them .
- -skeleton of thorax and associated muscles.
- -Diaphragm

4-Paranasal sinuses :

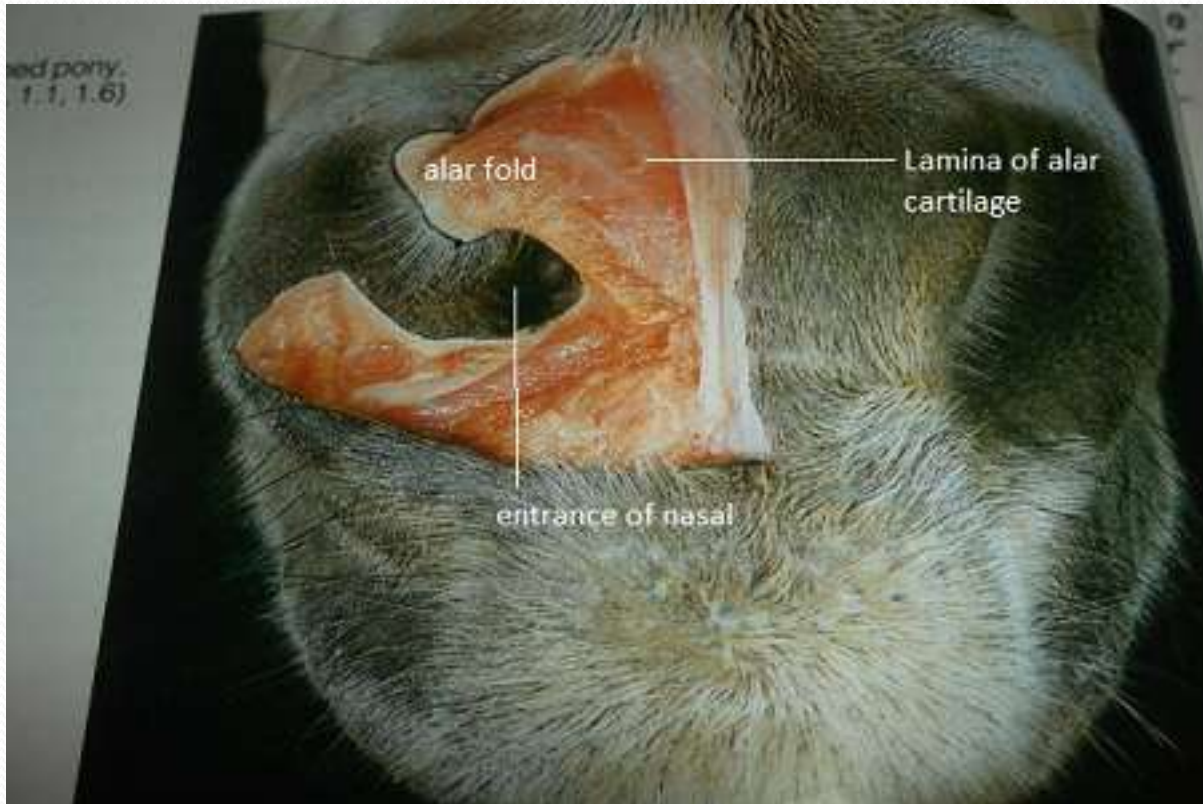
- They are cavities found with the maxillary ,frontal,sphenoid , bones with respiratory mucous membrane and they communicated either directly or indirectly with the nasal cavity .

Function of respiratory system :

- 1.respiratory function (gases exchange)
- 2-Respiratory system concerned with voice production , a role in.
- (part of nasal mucous membrane which larynx plays
- 3-the respiratory system is also associated with olfactory system brain contains sensory olfactory cells and is known as the olfactory region)

Nose (nostrils)

- Is the external (anterior) opening of the respiratory system which leads to the nasal cavity, in the horse the nostrils have alar cartilage which supports the nostrils dorsally, medially and ventrally and remain very mobile and allow the opening. the alar cartilage consists of:
 - Lamina (dorsally)
 - Cornu or horn (ventrally)



Shape of nostrils :

- 1-in the sheep and goat is narrow slits .
- 2-In the ox is oval .
- 3-In the horse the alar fold form a horizontal shelf which divided the nostrils into dorsal and ventral passage .
- The skin around and between nostrils appears different form and may be reach the upper lip.
- In the sheep ,goat ,dog and cat the skin is narrow shiny called **planum nasskin** is extends **ale**
- In ox the to the upper lip and form nasolabial plateIn
- In the horse it is normal skin area .



Philtrum :

- It is median groove which divides the upper lip .
- In sheep ,goat ,dog and cat is well developed deep extend dorsally to the planum nasale
- In ox and horse it is shallow and absent.

Nasal cavity

It extends from nostrils to the chouna (caudal or posterior nasal opening)

Boundaries of nasal cavity :

Dorsal wall (roof) formed from :

1-Nasal cartilage .

2-nasal bone

3-part of the frontal bone

Ventral wall (floor) formed from :

1-ventral cartilage of the nose

-2--part of incisive bone ..

3-Maxillary bone .

4- palatine bone

Lateral walls are irregular formed from

Lateral cartilage

Part of incisive bone.

3-Maxillary bone . 4-palatine bone . 5-Ethmoid bone . 6-

Lacrimal bone .

Topographic division of nasal cavity :

The nasal cavity can be divided into three parts

1-nasal vestibule (vestibular part)

Is the rostral part just inside the nostril , its narrow and lined with stratified squamous epithelium and has the opening of the nasolacrimal duct .

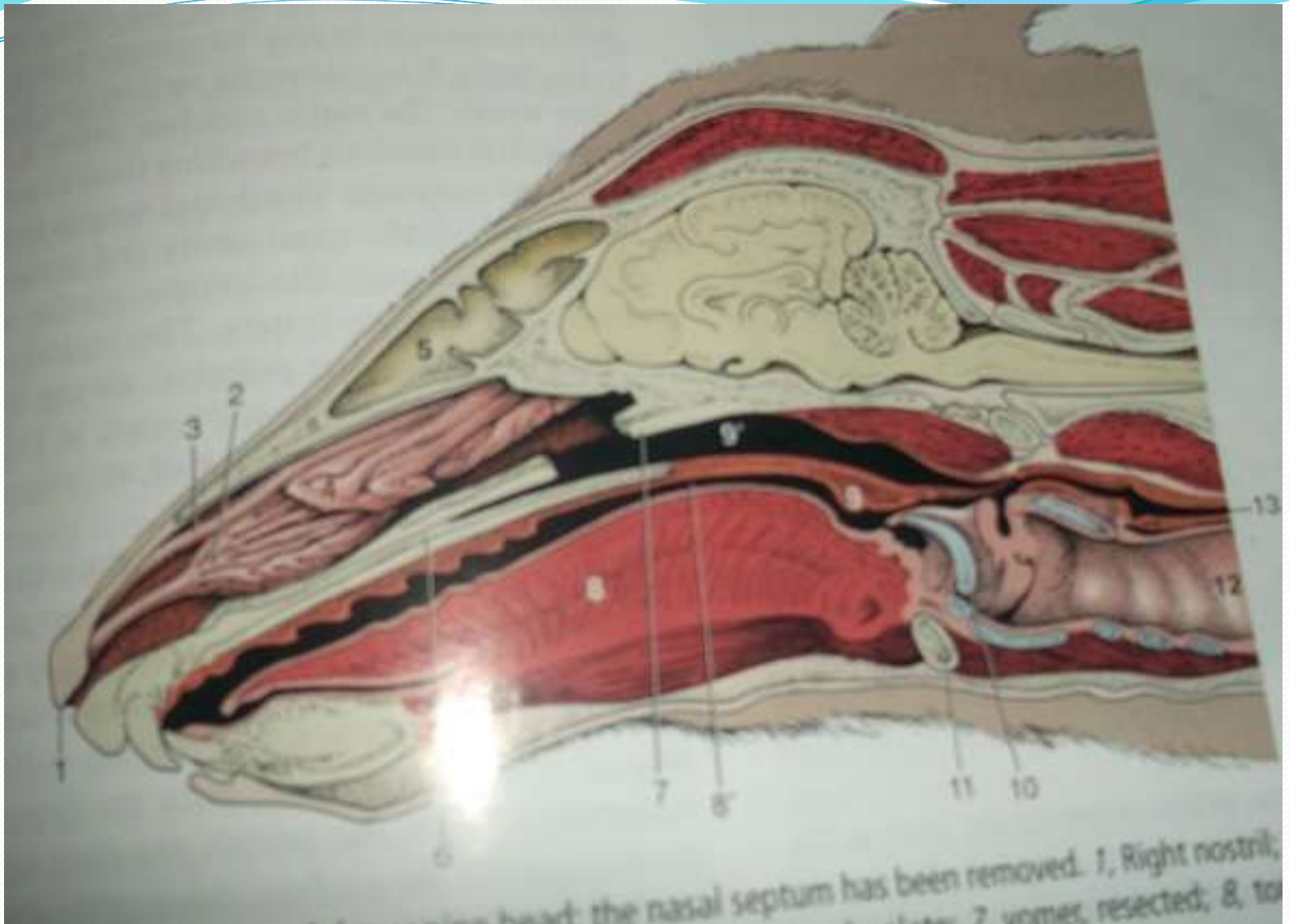
non ciliated pseudo stratified columnar epithelium.

NOTE

The nasal cavity is divided into right and left halves by median septum.

The caudal and ventral parts of the nasal septum are osseous and remainder part is hyaline cartilage .

The nasal cavity has nasal conchae (turbinate)



2-respiratory part (middle part :is the largest part of nasal cavity and filled with nasal conchea .lined with respiratory mucosa pseudo stratified columnar epithelium

3-olfactory part (caudal region)

Usually has ethmoid concha and lined with

The vestibular part of nasal cavity has number of folds

they are developed as outgrowth from nasal cavity

2-They are cavities found in the interior of some bone of skull

3-the wall of sinuses are composed of compact bones .and are lined by respiratory mucous) pseudo stratified columnar ciliated epithelium and continuous with mucous membrane of the nasal cavity the paranasal sinuses include:

I. maxillary sinus :

1-it is present in maxillary bone .

2-It is opened on the nasal cavity by nasomaxillary opening

3-in the dog and cat is small recess connected .

4-In the ruminant is communicated with the palatine sinus

5-in the horse it has cranial and caudal maxillary sinuses
,both are opened in to nasal cavity by nasomaxillary opening

Note: In horse the caudal maxillary sinus is subdivided
into :

1-ventrolatral part .

2-dorsomedial part.

II-Frontal sinus

1-in horse , small ruminant (sheep and goat)and dog the frontal sinus occupy the dorsal part of the skull .

2- in the ox it is extend caudally in to the parietal and interparietal ,occipital and temporal bone .

3-Frontal sinus opens in to ethmoidal meatus except in the horse .

4- Frontal sinus in ox is divided into

a-cranial sinus

b-caudal sinus

III. Palatine sinus

1-absent in the dog and cat

2-the sinus is separated from the nasal cavity by double layer of mucosa

3-palatine and maxillary sinuses are communicated through maxillopalatine opening




IV. Lacrimal sinus:

- It is present only in the ruminant and pig .
- 2- in ox the lacrimal sinus communication with the maxillary sinus .

V. Right and left sphenoid sinuses .

- 1- Absent in dog ,sheep and goat (small ruminant) .
- 2- in the cat is project into nasal cavity .
- 3- in ox the cranial part connected with ethmoidal meatus
- 3- in horse the sphenoid sinus is communicates with the palatine sinus forming sphenopalatine sinus .



-Sinuses	dog +cat	Ruminant	Horse
-Forntal	+	+	+
-Maxillary	+	+	+
Sphenoid	only cat	only ox	
Palatine	-	+	+
Lacrimal	-	+	-

Nasopharynx:

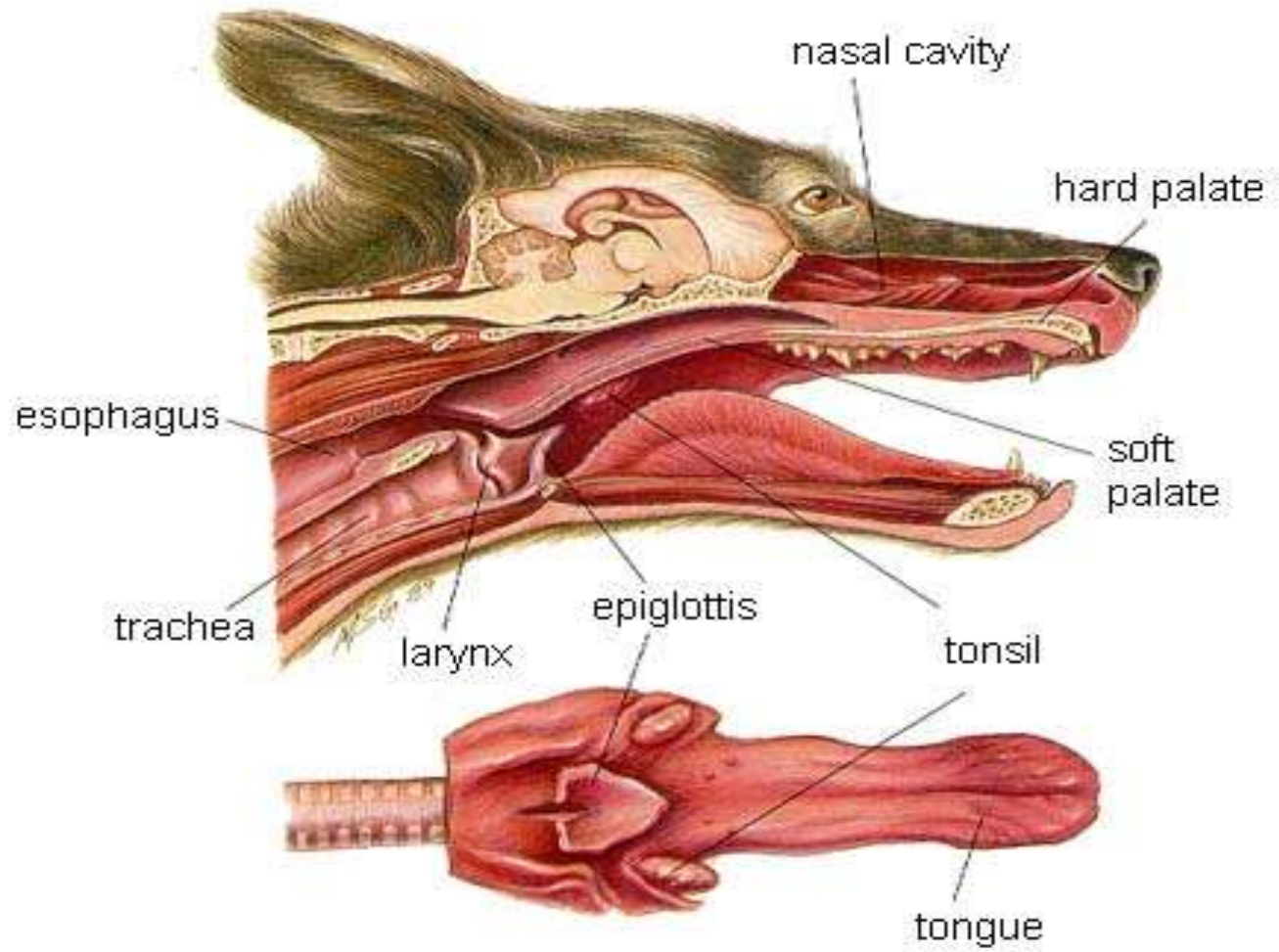
Nasopharynx :it is part pharynx which is located dorsal to soft palate and by which the air passes through it from the internal (caudal) nasal opening to the larynx.

Larynx:

It is short cartilaginous tube that connects the pharynx with trachea.

It is support the valvular apparatus (epiglottis) which regulates the passage of the air and prevents the aspiration (breathing) of food or foreign bodies

It is consist of many cartilages which are connected between them and with the hyoid bone and trachea by ligaments and muscles .



cartilage of larynx :

1-Unpaired cartilages these are :

Cricoids cartilage.

Thyroid cartilage.

Epiglottis cartilage.

2.paired cartilage. (arytenoids cartilage.)

1-Cricoids cartilage ..

1-it is most cartilage of larynx .

2-it is ring like shape .

It is consist of :

Dorsal plate lamina.

Ventral narrow arch .

III-Thyroid cartilage

- 1.it is shield shape :
- 2- it consists of 2 quadrilateral plates (left and right lamina)
- Which they are fused (united) ventrally to form the body (a dam s apple)
-
- Each lamina has :
- a-cranial cornuarticulates with hyoid bone .
- b-caudal cornu.....articulates with cricoid cartilage .

III. Arytenoid cartilage : (ladle shape)

- it is paired cartilage
- 2-It is pyramidal in shape (has 3 sided surface) .
- 3-it has vocal process ventrally and corniculate process dorsally .
- 4.it is located on each side of cricoids cartilage .
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IV. Epiglottis :mouth of wind

.it is the cranial cartilage of the larynx pipe .

2-it is located caudal to the root of the tongue and cranial to the arytenoid and thyroid cartilage .

3-it is consist of body and apex .

4-During the swallowing the epiglottis is pushed caudally to covers the glottis .

5-in the horse it has cuneiform process.

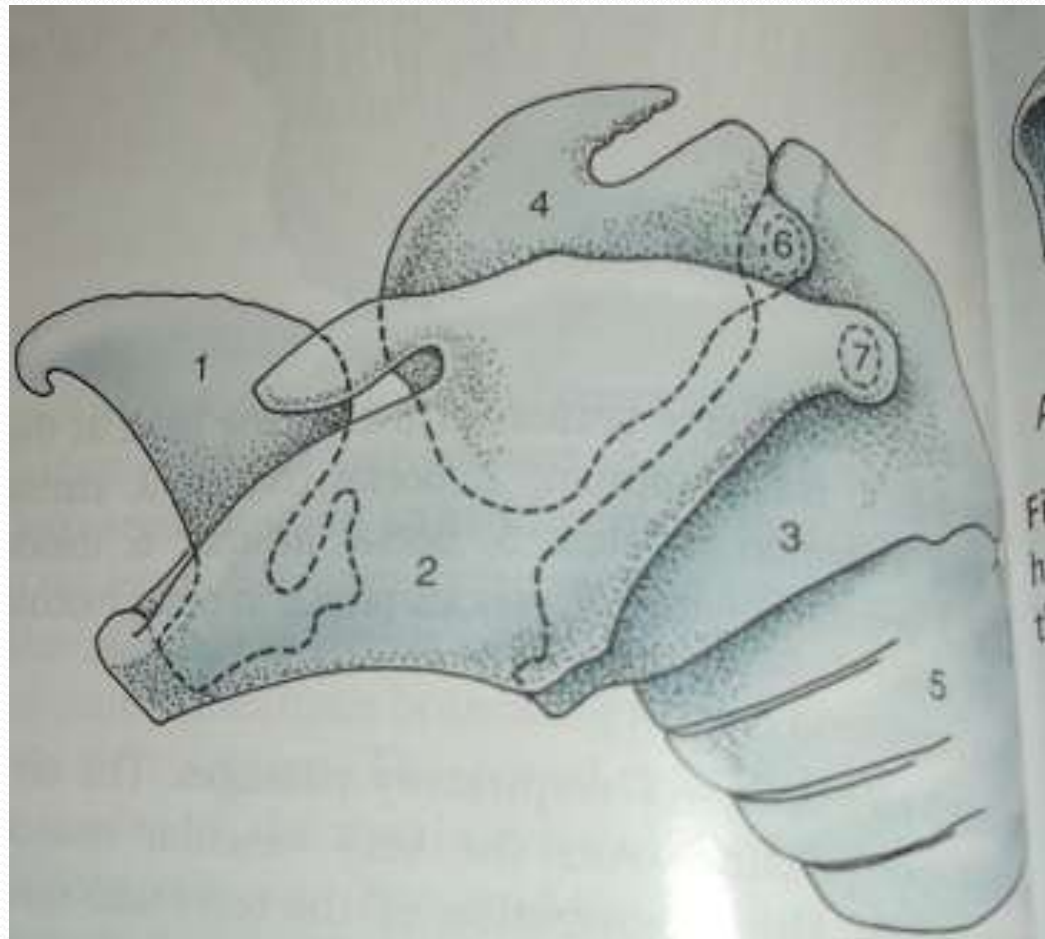


Figure 4-9 Lateral view of the equine laryngeal skeleton
outlines of cartilages

Laryngeal cavities (cavities of the larynx):

The larynx is divided into transverse segments (cavities):

1-Vestibule it is the cranial cavity of the larynx and extends from the laryngeal opening to the ventricular folds. The opening of the vestibule into the pharynx is called *aditus laryngis*.

2-Glottis : is the narrow middle part of the larynx, it consists of a pair of arytenoid cartilages.

3-infraglottic cavity (caudal part) : it is a cavity located caudal to the glottis and extends to the beginning of the cavity of the trachea.