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Lecture title: Digestive System / The soft palate:

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The soft palate:

Mobile musculo-membranous shelf, represent the caudal continuation of the hard palate beyond the choanal margin. In repose the soft palate lies on the tongue, but when the animal swallows, the soft palate is raised into a more horizontal position and then more obviously divides the pharynx into dorsal nasopharynx and ventral oropharynx. Two pairs of arches connect the soft palate to adjacent structures:

1-The palatopharyngeal arches pass onto the lateral wall of the pharynx and may be long enough to meet above the entrance to the esophagus. Together these arches with the free margin of the palate they marks the separation of the pharynx into dorsal and ventral compartments. The dorsal compartment is known as the nasopharynx.

2 The palatoglossal arches(rostrally) pass onto the sides of the tongue at its root; they demarcate the passage from the mouth to the oropharynx(isthmus faucium) form the caudal continuation of the hard palate. **Soft palate consist of striated muscle covered by mucous membrane from both sides.

The soft palate in horse is long and the rostral face of epiglottis correspond with the dorsal face of the soft palate , so that , horse is

unable to raise his soft palate, so that, unable to breath from the mouth and unable to enter the stomach tube through the mouth .

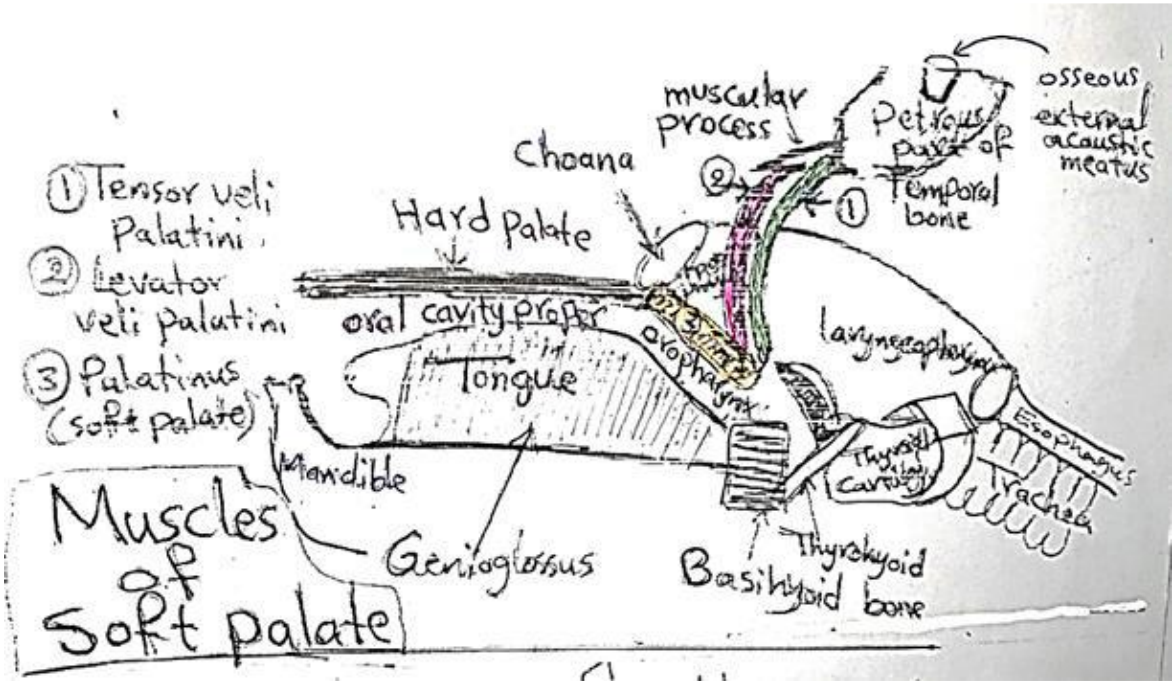
The muscles of the soft palate:-

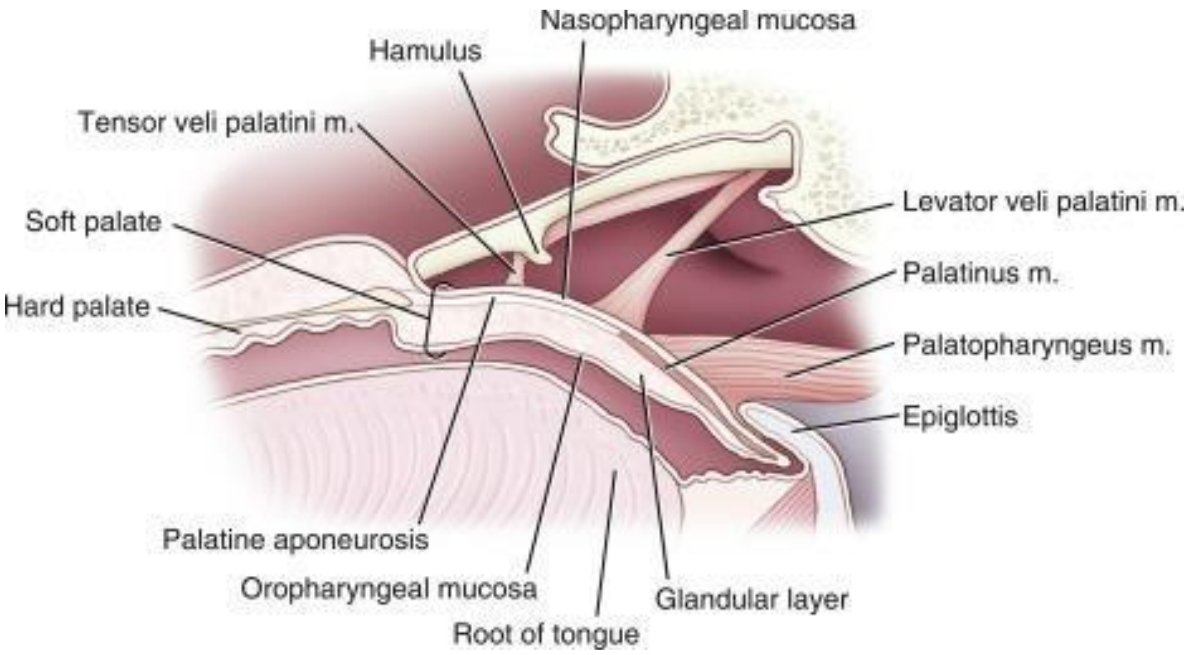
1-Palatinus (median palatinus muscle): originate from the free border of palatine bone and extend to the caudal border of the soft palate, act to shorten the soft palate.

2-Tensor veli palatini : arises from the muscular process of tympanic part of temporal bone, pass rostroventrally accompanied with the auditory tube. Its tendon reflected around the humulus of the pterygoid bone and turns medially to expand into aponeurosis of the soft palate.

3-Levator veli palatini: originate with the tensor veli palatini from the muscular process of the temporal bone, lies medial to the tensor veli palatini. It enters the soft palate from the lateral wall of the nasopharynx.

Both tensor veli palatini and levator veli palatini muscles raise the soft palate toward the cranium.



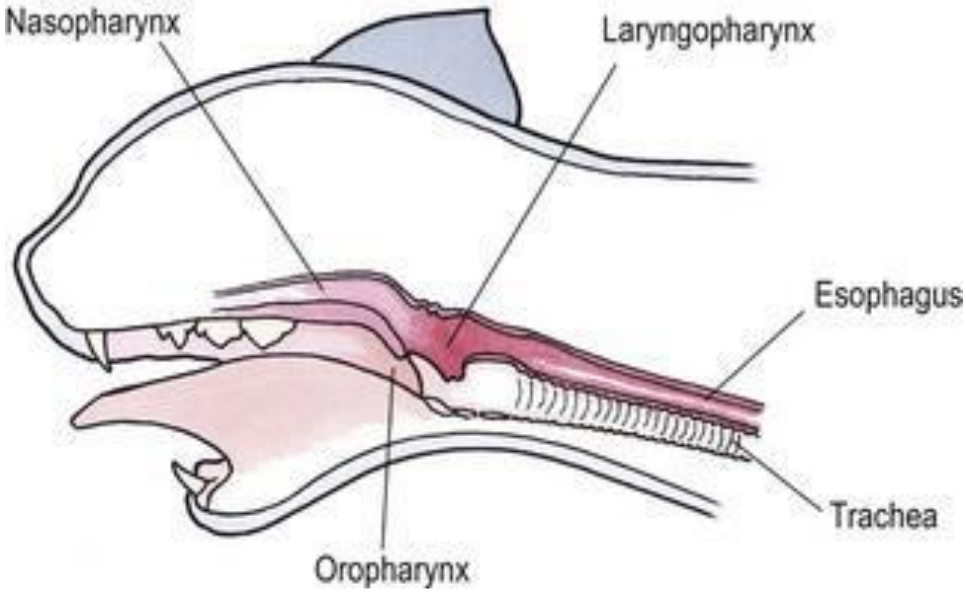


soft palate of horse

The pharynx:

The pharynx lies behind the mouth and continues into the esophagus. It is a funnel-shaped chamber contained between the base of the skull and the first couple of cervical vertebrae dorsally, the larynx ventrally, and the pterygoid muscles, the mandible, and the dorsal part of the hyoid apparatus laterally. Musculo-membranous tube belong to both digestive and respiratory systems.

The pharynx is the crossroads where the ventrally located oral cavity can pass food to the dorsally located esophagus while the dorsally located nasal cavity can conduct air to the ventrally located larynx and trachea, "pharynx connect between oral cavity and esophagus (digestive connection) and between the nasal cavity and larynx (respiratory connection)".



The greatest risk of this design of the upper aerodigestive tract is flooding of the respiratory tract with ingested food and fluid, and the pharynx has a number of mechanisms to avoid this. The pharynx is equipped with valves to direct the flow of food, it is distensible so it can receive large boluses of food, and it can move the boluses on quickly, because it is muscular organ.

The walls and roof of the pharynx: are lined by an elastic mucous membrane, beneath which sit **three sets of horseshoe-shaped constrictors**, with the muscles on each side meeting the contralateral muscle at a median raphe. These muscles arise from the hard palate, hyoid, and larynx and are known as the **rostral, middle, and caudal** constrictors. The caudal constrictor muscle is subdivided into the cricopharyngeal and thyropharygeal muscles**.** The pharynx is surrounded by loose connective tissue, which allows it to dilate when needed. Vessels, including the common, internal and external carotid arteries, and nerves, including the glossopharyngeal, vagus, hypoglossal, and cervical sympathetic nerves, run in this tissue. Adjacent structures

include the retropharyngeal and mandibular lymph nodes, the mandibular, sublingual and molar salivary glands, and the hyoid apparatus.

The rostral part of the pharynx is divided by the soft palate into dorsal nasopharynx and ventral oropharynx, while the caudal part of the pharynx is called the laryngeopharynx**.**

1/ Nasopharynx: lie dorsal to the soft palate, extend from the chonae (caudal nasal opening) to the intrapharyngeal opening (opening between nasopharynx and laryngeopharynx). The roof of the nasopharynx is concave like a fornix.

The pharyngeal tonsil locate in the roof of nasopharynx, while the openings of the auditory tubes are located in the lateral wall of the nasopharynx.

2/ Oropharynx: extend from the pharyngeal entrance till the epiglottis. The soft palate represent its roof, while the root of the tongue represent its floor.

When the animal breaths by the nose, the soft palate become in contact with the root of the tongue and the lumen of the oropharynx is closed, while during swallowing process, the soft palate lift and the bolus pass through the oropharynx.

3/ Laryngeopharynx: common digestive & respiratory channel, extend from the base of epiglottis to the level of cricoid cartilage.

The wall of the pharynx consist of mucous membrane with respiratory epithelium (Pseudo stratified columnar ciliated epithelium) in the nasopharynx and stratified squamous epithelium in the other parts of the pharynx.

The openings of the pharynx:

1=Paired chonae: rostrodorsally; connect the nasopharynx with the nasal cavity.

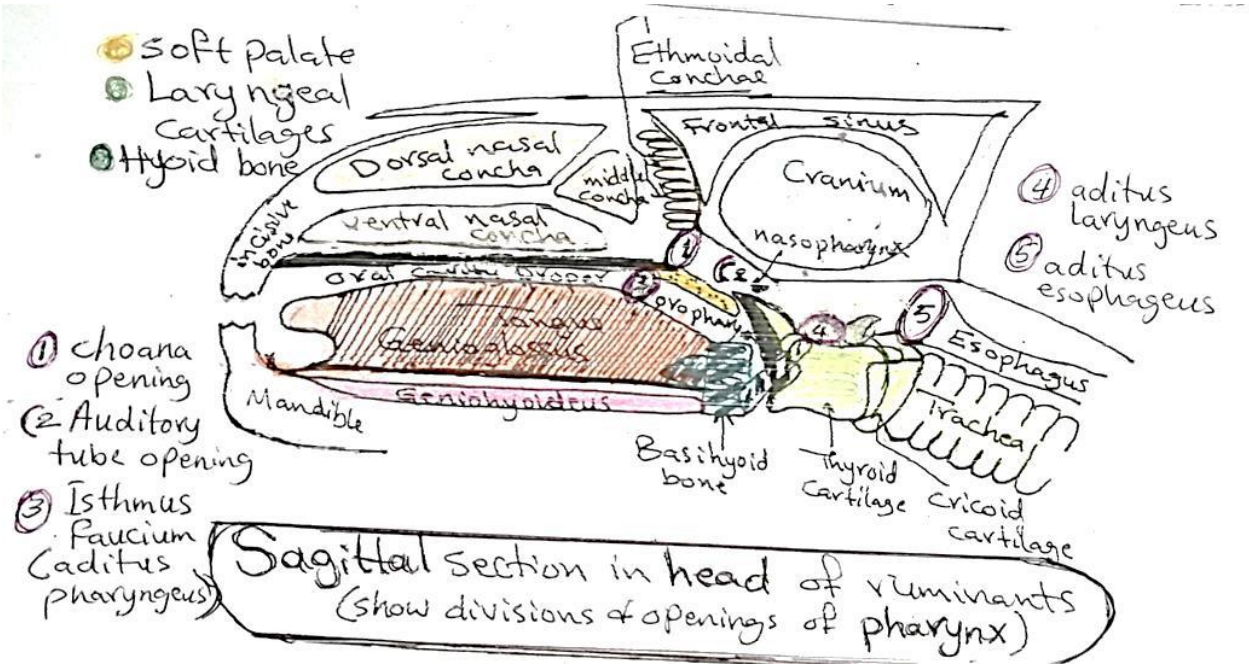
2=Paired openings of auditory tubes (Eustachian tube openings) dorsolaterally; connect the nasopharynx with the middle ear, allow air pressure on the eardrum to be equalized

3=Aditus pharyngeus (isthmus faucium): connect the oral cavity with the oropharynx.

4=Aditus laryngeus: caudoventrally, opened in the respiration and closed in the

Swallowing.

5=Aditus esophageus: at the caudal end of the laryngopharynx; connect oropharynx with the esophagus.



Lymphatic organs of the pharynx:

1-Lingual tonsil: present in the mucosa of the root of the tongue. 2-Palatine tonsil: in or on the lateral wall of the oropharynx. 3-Pharyngeal tonsil: in the roof of the nasopharynx. 4-Paraepiglottic tonsil: on the base of the epiglottis. 5-Tubal tonsil: in the lateral wall of the auditory tube opening.