Oral cavity

The entrance to **the oral cavity** (*cavum oris*) is the **oral slit** (*rima oris*). The oral cavity is bounded by the following structures:

- ***labium superius et inferius*** (upper and lower lip; their transition = ***angulus oris***).

Grooves

- ***sulcus nasolabialis***;
- ***philtrum***;
- ***sulcus mentolabialis***.

The furrows arise from the original embryonic two paired projections and one unpaired frontal projection → formation of the maxilla and filter in the middle. The projections fuse and thus give rise to the hard palate. Developmental anomalies may occur:

> ***Clefts:***
>
> - ***lip*** *(cheiloschisis);*
> - ***maxilla*** *(gnathoschisis);*
> - ***hard palate*** *(palatoschisis);*
> - ***complete*** *(cheilognathopalatoschisis);*

- this creates communication between the upper and lower floors, the child cannot suck milk, has breathing problems and, at a later age, difficulties with articulation;
- hereditary disorder;
- deals with plastic surgery;
- cleft of the lower jaw (symphysis menti does not develop) is not so common, rather the bone base is completely missing (only muscles develop).

Vestibulum oris

It is bounded by the face, lips and dental arches.

- ***gingiva*** = gum;
- ***glandula parotis*** (mouth at the 2nd uppermolar – ***ductus parotideus*** on the ***parotid papilla***).

Cavitas oris propria

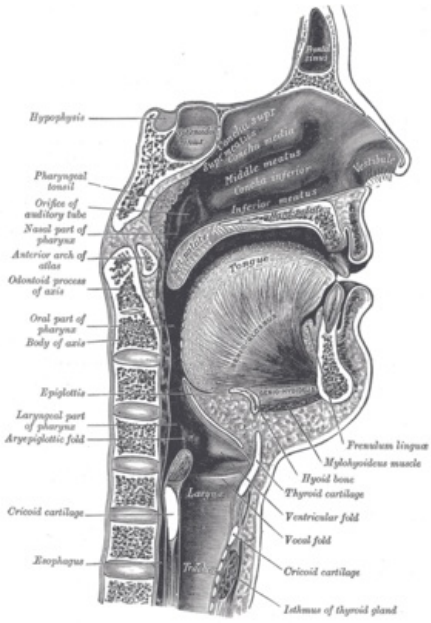
- Practically entirely filled with tongue.

Hard palate (palatum durum)

- ***Praemaxilla***, ***proc. palatinus maxillae***, ***lamina horizontalis ossis palatini***;
- connective: val = ***torus palatinus***;
- all covered with a soft palate.

Soft palate (palatum molle)

- Rostral: mucosa, ligament, blood vessels, nerves.
- Dorsally:
  - ***m. tensor veli palatini***;
    - wraps around the *hamulus pterygoideus*;
    - acts as a pulley through which the muscle stretches the soft palate;
    - inenrvation: *n. trigeminus* (n. V);
  - ***m. levator veli palatini***;
    - it attaches to the aponeurotic plate of the tensor;
    - helps raise the soft palate;
    - innervation:*n. vagus* (n. X);
  - ***m. palatopharyngeus***;
    - expansion of the soft palate;
    - innervation:*n. vagus* (n. X);
  - ***m. palatoglossus***;
    - expansion of the soft palate;
    - innervation:*n. vagus* (n. X);
  - ***m. uvulae***;
    - innervation:*n. vagus* (n. X).

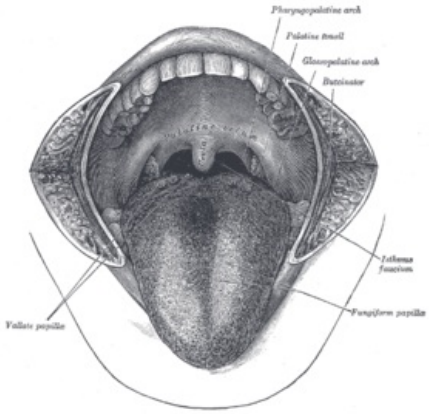


The oral cavity

Functions of the soft palate:

1. fonation;
2. the septum between nasopharynx and the rest of the alimentary canal when swallowing;
3. somatosensory function (swallowing reflex).

If the mouthful does not stimulate it sufficiently, the soft palate does not close the nasopharynx. Therefore, when drinking champagne, which turns into a little stimulating foam in the oral cavity, some of it may flow out through the nose.



The oral cavity

Oral function

The oral cavity is the place of first contact of the digestive system with the ingested food. It includes specialized organs (tongue, teeth, salivary glands, etc.), that participate not only in processing food, but can also participate in other processes, such as the production of sounds. We can therefore describe the oral cavity as a very multifunctional space, which is particularly involved in:

1. Mechanical grinding of food using the teeth and tongue.
2. Wetting the bite with saliva and thus facilitating its passage to other parts of the GIT.
3. Initiation of digestive processes. The α-amylase contained in saliva is involved in the breakdown of starches.
4. Perception of taste and quality of food using different types of receptors ([[taste receptors[[, mechanoreceptors, thermoreceptors).
5. Signaling to the distal parts of the GIT by coupling the lingual enteric system (LENS) and the enteric nervous system (ENS).
6. Defensive reflexes that prevent swallowing a bite.
7. Immune defense against infectious agents. Lysozyme, lactoferrin and IgA antibodies contained in saliva eliminate bacterial or viral infections in particular.
8. Speaking (articulation).
9. Breathing in case of increased ventilation.

Processes in the oral cavity

Suction

is the primary form of food intake. The contraction of the muscles of the lips together with the movement of the tongue creates a negative pressure by which the food is sucked into the oral cavity. At a certain level, the bite is swallowed and the suction is repeated. The sucking reflex in infants is one of the unconditioned reflexes. In the course of life, it becomes a conditioned reflex and in the final stage it is a voluntary activity. If it appears during life at a stage other than infancy, it is usually a CNS pathology.

Chewing (masticatio)

is a rhythmic automatism, sometimes referred to as the *masticatory reflex*. These are stereotypically repeated movements that lead to grinding food and mixing it with saliva, which facilitates swallowing and subsequent digestive processes. The chewing control center is located in the brainstemand receives afferent mainly from the frontal and temporal parts of the cerebral cortex. The reflex action itself is initiated by mechanical irritation of the oral cavity with a bite. There is a relaxation of the tone of the masticatory muscles and a drop of the lower jaw (stretching of the masticatory muscles). A classic monosynaptic reflex follows = the stretched muscle contracts and the bite is pressed against the surface of the teeth and oral cavity. The reflex action is repeated several times with a frequency of 1.2 - 1.4 Hz.[1]

Swallowing

Swallowing (deglutition) is a complex mechanism that serves to transport food from the oral cavity through the pharynx to the esophagus. We can define the swallowing reflex as a nerve impulse from the medulla oblongata that causes food to move into the pharynx. The mechanism of displacement is esophageal peristalsis. We can divide it into three phases:

- will *controlled*
- *pharyngeal*,
- *esophageal*.

Will controlled phase

In the first phase, the tongue moves the bite back towards the soft palate, thereby stimulating the mechanoreceptors in the area of the pharyngeal isthmus (*isthmus faucium*). This initiates the automatic, uninterrupted swallowing phase.

Pharyngeal phase

The signal from the mechanoreceptors of the palatal arches is carried by afferent fibers of the *trigeminal nerve*, *glossopharyngeus* nerve and *vagus nerve* to the *nucleus tractus solitarii* and *nucleus ambiguus* and then by efferent fibers of the *trigeminal nerve*, *glossopharyngeus nerve,* vagus nerve *and* hypoglossus nerve *(n. V, n. IX, X, n. XII) back to the pharynx.*

The pharyngeal phase takes place in the following steps:

1. **The soft palate is pulled up**, closing the entrance to the nasal cavity. (At the same time, opening the entrance to the Eustachian tube equalizes the pressure on both sides of the eardrum.)
2. **The palatopharyngeal arches** are brought closer to each other by contraction of the *palatopharyngeus muscle*, so that they create a slit through which only sufficiently chewed food can pass, while larger bites cannot reach the pharynx.
3. A **reflexive cessation of breathing** occurs (at any stage of the respiratory cycle). **The vocal cords come closer to each other** and seal the glottis. At the same time, the **larynx is lifted upwards and ventrally** by the pull of the suprahyoid muscles. This leads to the **overturning of the epiglottis**, which is held in place by ligaments, through **the entrance to the larynx** (*aditus laryngis*), which **closes**. These mechanisms prevent food from entering the respiratory tract.
4. At the same time, the elevation of the larynx leads to a widening of the entrance to the esophagus. At the same moment, the **upper esophageal sphincter** is relaxed (strongly contracted between swallows so that air is not sucked into the esophagus during breathing) and the morsel is moved into the esophagus by a peristaltic wave of the pharyngeal muscles.

Summary: during the pharyngeal phase, the trachea is closed, the esophagus is open, and a rapid peristaltic wave moves the food into the upper esophagus. The entire pharyngeal phase lasts 1–2 seconds.

Esophageal phase

In the final esophageal phase, peristalsis continues through the esophagus and moves the morsel into the stomach within 8–10 seconds. This event is controlled by the *vagus nerve*. If a morsel becomes lodged in the esophagus, the distension of its wall induces a **secondary peristaltic wave**. In addition, during the progress of the peristaltic wave, there is a **receptive relaxation of the stomach** (preparation to accept a bite). At the same time, it also **relaxes the lower esophageal sphincter**, which is closed at rest to prevent reflux of stomach contents. Insufficient relaxation of the lower esophageal sphincter can cause achalasia.

Links

Related articles

- Tongue
- Teeth
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External links

- SVÍŽENSKÁ, Ivana, et al. *Anatomická pitva hlavy 1 : Multimediální podpora výuky klinických a zdravotnických oborů* [online]. Portál Lékařské fakulty Masarykovy univerzity [online], ©2010. The last revision 27.9.2011, [cit. 2011-11-27]. <http://portal.med.muni.cz/clanek-516-anatomicka-pitva-hlavy-1.html>.

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- JAN, Štros. *Poznámky k modulu I.A* [online]. [cit. 2011-04-25]. <http://trimed.lf3.cuni.cz/files/poznamky_IA.zip>.
- TROJAN, Stanislav, et al. Lékařská fyziologie. 4. vydání. Praha : Grada, 2003. 772 s. ISBN 80-247-0512-5.
- KITTNAR, Otomar, et al. Lékařská fyziologie. 1. vydání. Praha : Grada, 2011. ISBN 978-80-247-3068-4

References

1. TROJAN, Stanislav – ET AL.,. *Lékařská fyziologie.* 4. edition. Grada, 2003. 772 pp. pp. 323. ISBN 978-80-247-3068-4.