

Physio cns lec7

❖ Mouth & esophagus:

▪ Mastication (chewing reflex):

- Rhythmic opening & closing of mouth :
 - 1) Food is in mouth
 - 2) Inhibition of mastication muscles
 - 3) Dropping of lower jaw (عشان العضلات بطلت تشتغل)
 - 4) Stretch of muscles
 - 5) Muscle contraction (when muscles are stretched they contract)
 - 6) This process is repeated
- **Force of chewing:**
 - 55 pounds on incisors
 - 200 pounds on molars
- **Importance of chewing:**
 - Breaking of food (large → small pieces)
 - Stimulates salivary secretion
 - It's important for taste sensation which stimulates satiety center in cerebral cortex (مركز الشبع)

❖ Salivary glands:

▪ There are 3 pairs of glands:

- 1) Parotid gland
 - 2) Submandibular gland
 - 3) Sublingual gland
- #### ▪ There are 2 types of secretory cells:
- 1) **Serous cells:** which secrete watery serous secretion containing ptyalin (inactive amylase enzyme → starts starch digestion)
 - 2) **Mucous cells:** which secrete viscous mucous (mucin)

Salivary gland	location	secretion	Cranial nerve	Para-sympathetic ganglion	Contribution to salivary volume
Parotid gland	Near the ear	serous	Cranial nerve IX (glossopharyngeal nerve)	Otic (ear جنب ال)	25%
Sublingual gland	Underneath The Tongue	Mixed Mostly mucous	CN VI (facial nerve)	Submandibular	5%
Submandibular Gland	Ramus of mandible	Mixed Mostly serous	CN VI (facial nerve)	submandibular	70%
Ebner's gland	Surrounding circumvallate	serous	-	-	-

1. Primary secretion:

- from plasma with similar ionic concentration. (isotonic)
- ptyalin (amylase) is added by acini

2. Secondary secretion:

Primary secretion is modified in the ducts:

- Sodium** is actively reabsorbed
- Chloride** is passively reabsorbed
- Potassium** is actively secreted in exchange with sodium.
- HCO₃ (bicarbonate) is also secreted.
- the secondary secretion contains **more K⁺** and **less Na⁺** than primary secretion
- this modification is **produced by: Aldosterone hormone**

N.B: Xerostomia: dryness of the mouth (absence of salivary secretion)

• Functions of saliva:

1- **Articulation of speech:** it facilitates lip and tongue movements during talking.

- 2- **Buffer (معادل) effect:** keeps oral pH at 7.0 (بيحمي الاسنان)
- 3- **Cleaning effect:** washes food particles and has an antibacterial effect.
- 4- **Cooling of hot food & warming of cold food**
- 5- **Digestive function:** ptyalin enzyme starts starch digestion.
- 6- **Degultition:** helps swallowing by food lubrication.
- 7- **Dissolving food:** helps taste sensation (لازم الاكل يذوب عشان نحس بطعمه)
- 8- **Thirst sensation:** mouth dryness (لما اللعاب بينشف بنحس بالعطش)
- 9- **Teeth care:** cleans teeth and prevents teeth calcium loss by its high Ca⁺⁺ content.

▪ **Control of salivary secretion:**

1-Sympathetic control:

- **Viscid saliva rich in mucin** (لزج وقت الخوف)

- Vasoconstriction of blood supply

2-Parasympathetic:

- **Watery salivary secretion rich in electrolytes** (سائل وقت الراحة)

- Vasodilatation of blood supply.

This control is mediated through conditioned (زبي الصوت و الريحة) and unconditioned (وجود الاكل في الفم) reflexes. (Lec6)

- Other factors that increase salivary secretion:

- 1) presence of irritants in stomach
- 2) tactile (باللمس) and thermal stimuli (dental instruments)
- 3) sour taste (lemon)

❖ **Swallowing: (Deglutition)**

- It is a reflex with a center in the **medulla**
- It starts voluntary and is completed involuntary, it consists of 3 phases:

1-Buccal phase: (Voluntary)

- Elevation of the anterior part of the tongue pushes food bolus backwards
- Contraction of **mylohyoid** muscle forces the food bolus into pharynx

2-Pharyngeal phase: (Involuntary)

#Helper_team

-Pharyngeal muscles contract forcing food through the pharynx to esophagus (peristalsis حركة دودية)

-Food is prevented from passing into: لازم نمنع الاكل من انه يدخل الاماكن دي

a-nose: by elevation of soft palate

b-mouth: by elevation of tongue

c-Larynx: by:

-elevation of larynx to be covered by epiglottis.

-closure of larynx (approximation of vocal cords (الاحبال الصوتية بتقرب

-inhibition of respiration مبنقدرش نتنفس و احنا بنبلع

3-Esophageal phase: (involuntary)

Esophagus is a muscular tube with 2 sphincters:

- upper esophageal sphincter (UES)
- lower esophageal sphincter (LES)

A- UES:

- is always closed except during swallowing.

B- LES:

- it is tonically closed to prevent HCL regurgitation (return) into esophagus بيمنع الحمض من انه يرجع للمريء
- decreased tone causes reflux esophagitis (heart bum)
- it opens only during swallowing
- **Gastrin** hormone increases its tone عشان الاكل ما يرجعش للمريء
- Fats, caffeine, chocolate & CCK decrease its tone الي بيشرش منبهات كتير

C- Esophageal movements (peristalsis حركة دودية):

Primary peristalsis:

- it is a **continuation** of pharyngeal contractions متصلة مع الانقباضات في البلعوم
- it allows food to reach the stomach in **5-8 secs**

Secondary peristalsis:

- It starts in the esophagus if primary peristalsis fails to move all food to stomach يعني بتشتغل لما الآلية الاولى ما تقدرش توصل الاكل زي لما نبلع من غير مضغ
- it is initiated by reflexes within the esophageal wall

NB: Dysphagia (عسر البلع) means difficulty in swallowing