

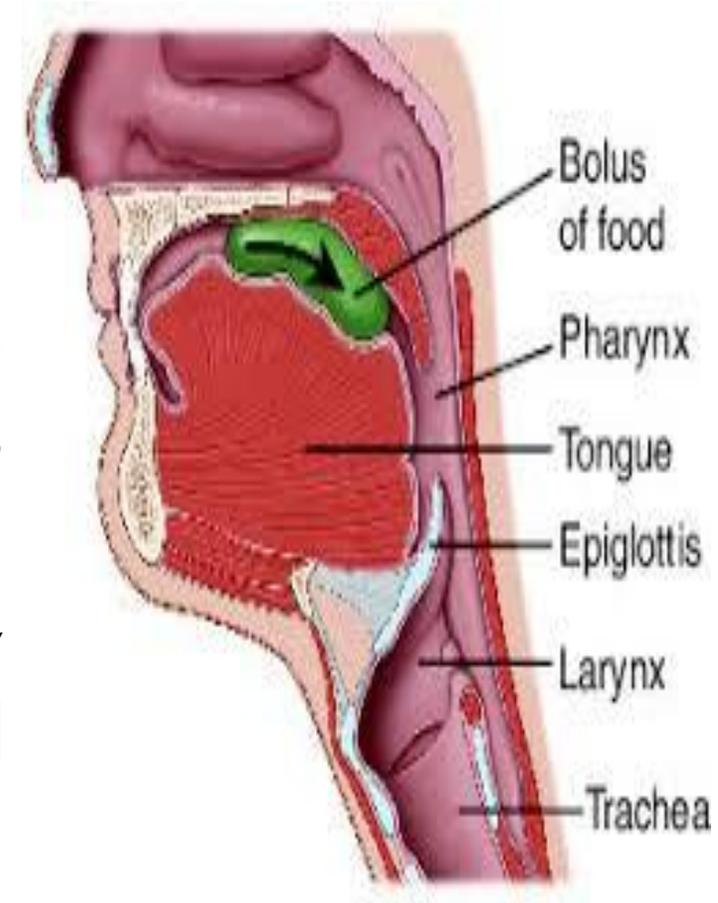


# **Deglutition (Swallowing)**

# Swallowing

**Swallowing** is an essential gastrointestinal function that is under strong cerebral control.

- **Development:** swallowing begins to develop in uterus as early as 15 weeks gestation.
- **Swallowing pathway shares** anatomy with the airway and serves as a vital protector of it.



- The reflex and voluntary actions of **over 26 groups of muscles and 5 cranial nerves** produce this coordinated movement.

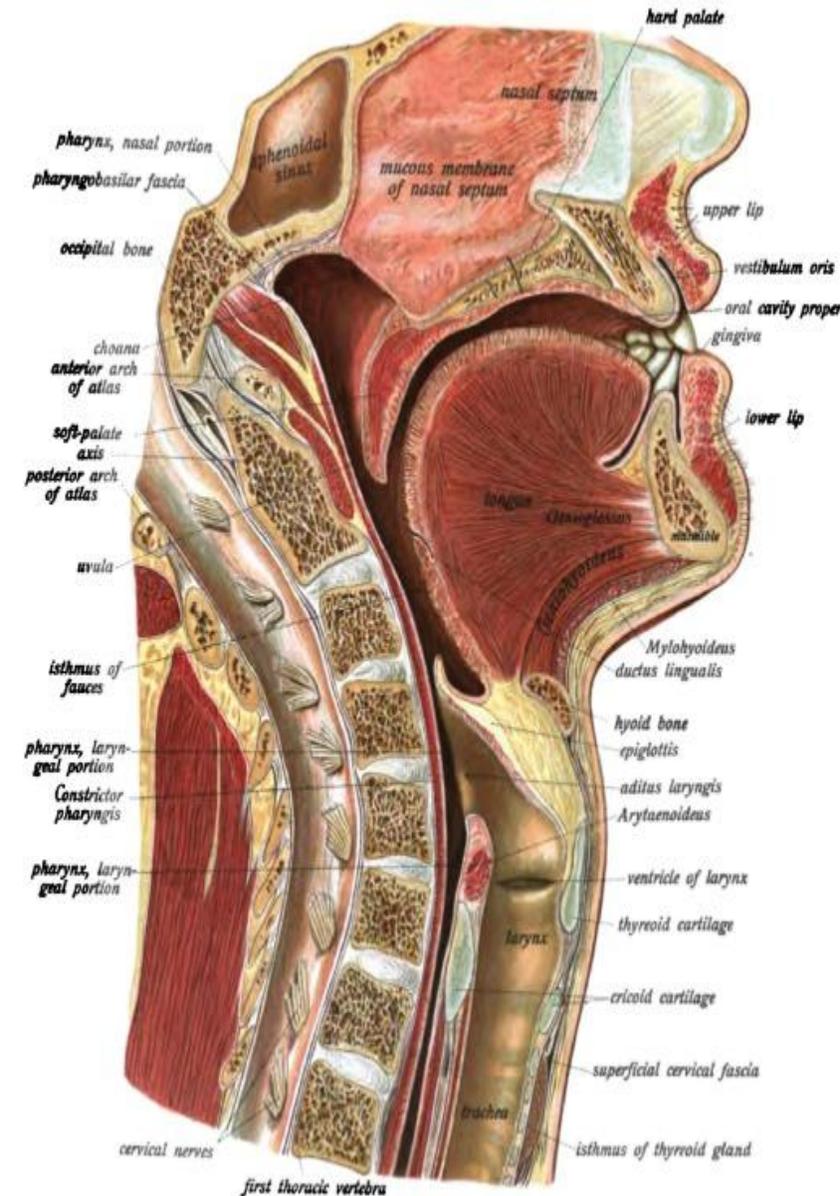
- Trigeminal

- Facial

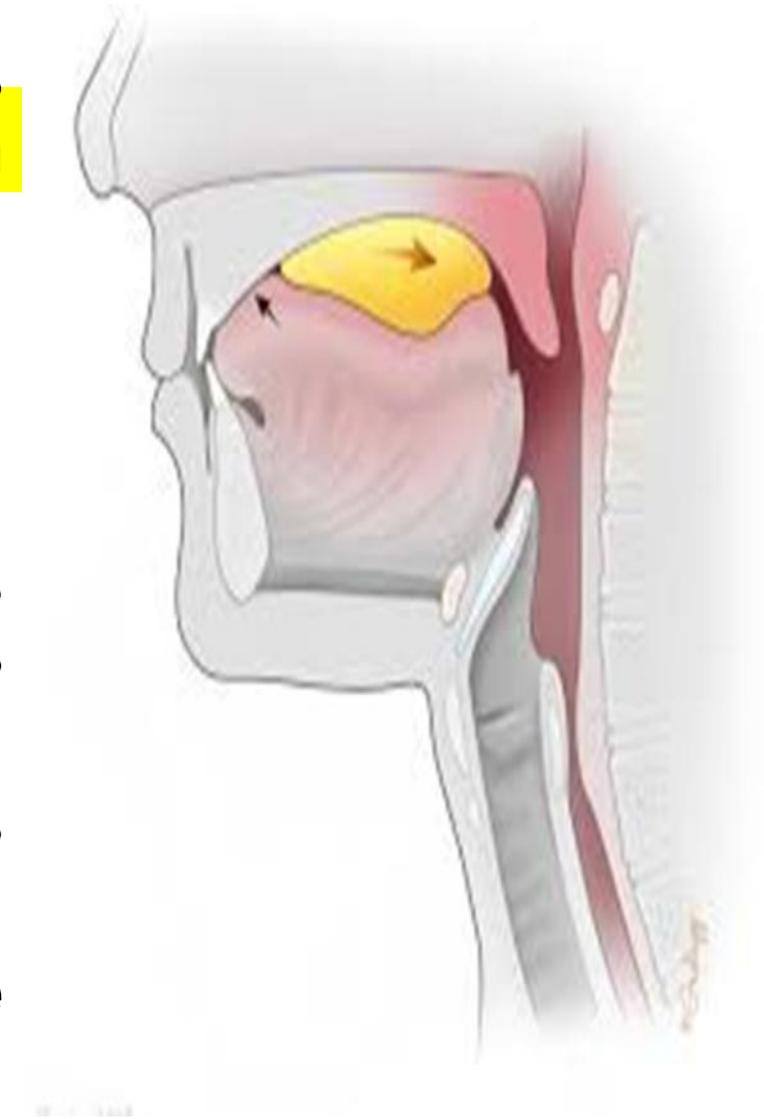
- Glossopharyngeal

- Vagus

- Hypoglossal

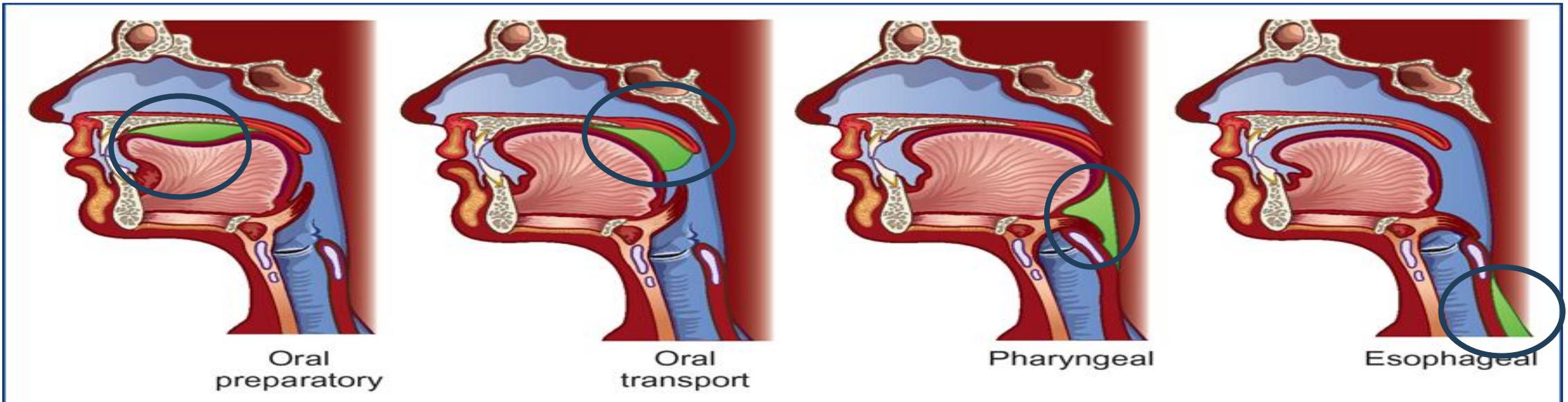


- ❑ A normal adult swallows unconsciously 1500-2000 times in a 24-hour
- ❑ three times an hour during sleep
- ❑ once per minute while awake and more during meals.
- ❑ The act of swallowing requires the passage of food and fluids from the mouth into the stomach:
  - **One third** of this distance consists of the mouth and pharynx
  - **Two-thirds** is made by the esophagus



**phases:** four phases process involving the coordinated action of muscles and nerves to move food and liquids from the mouth to the stomach. It includes:

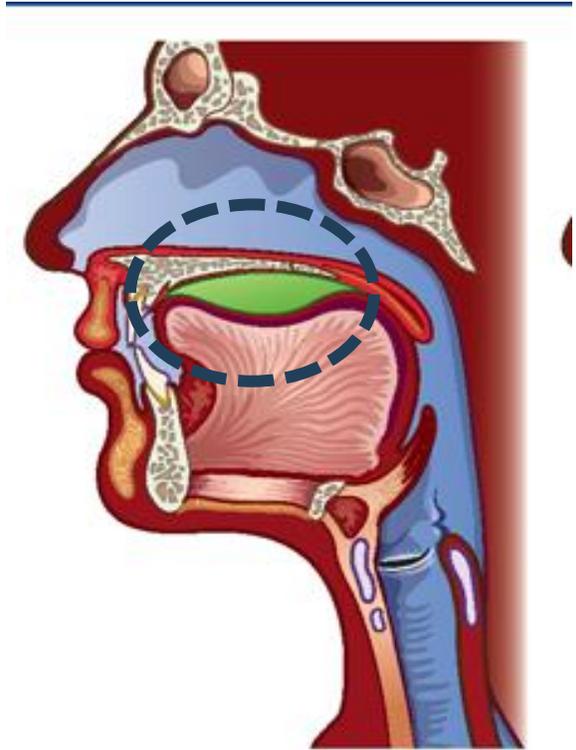
1. Preparatory phase
2. oral phase
3. pharyngeal phase
4. esophageal phase



# Preparatory phase

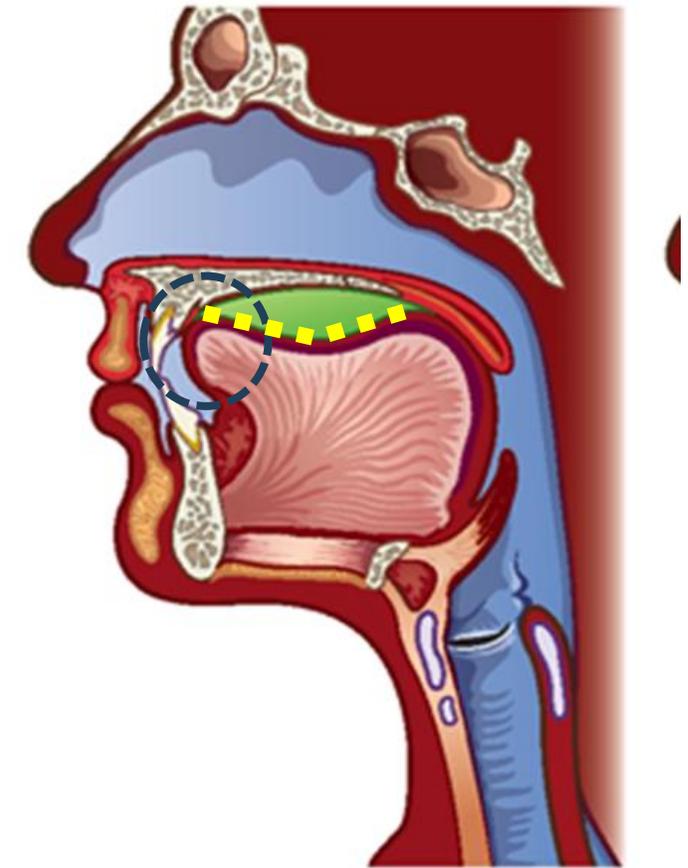
Starts as soon as liquids are taken into the oral cavity or after the bolus has been masticated.

- **In this stage, the food is chewed into smaller pieces and tasted.**
- **The liquid or bolus is positioned on a spoon like depression on the dorsum of the tongue, with the oral cavity sealed by the lip and the tongue.**



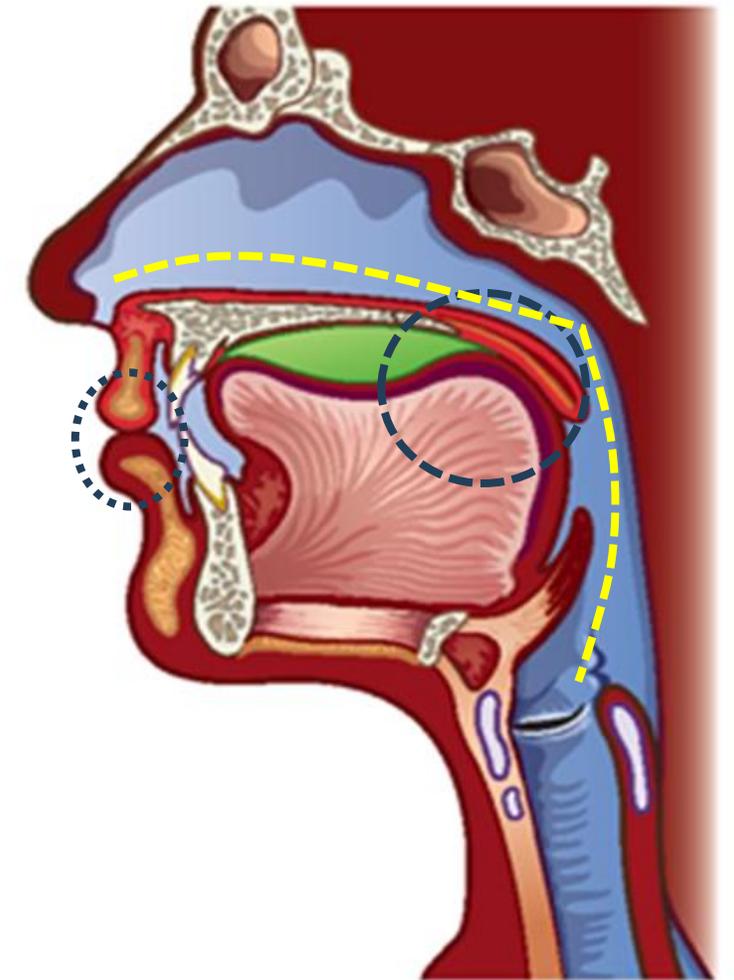
Oral  
preparatory

- **The tip of the tongue pressed against hard palate (anterior)**
- **laterally the tongue seals against the posterior teeth & palatal mucosa.**



Oral  
preparatory

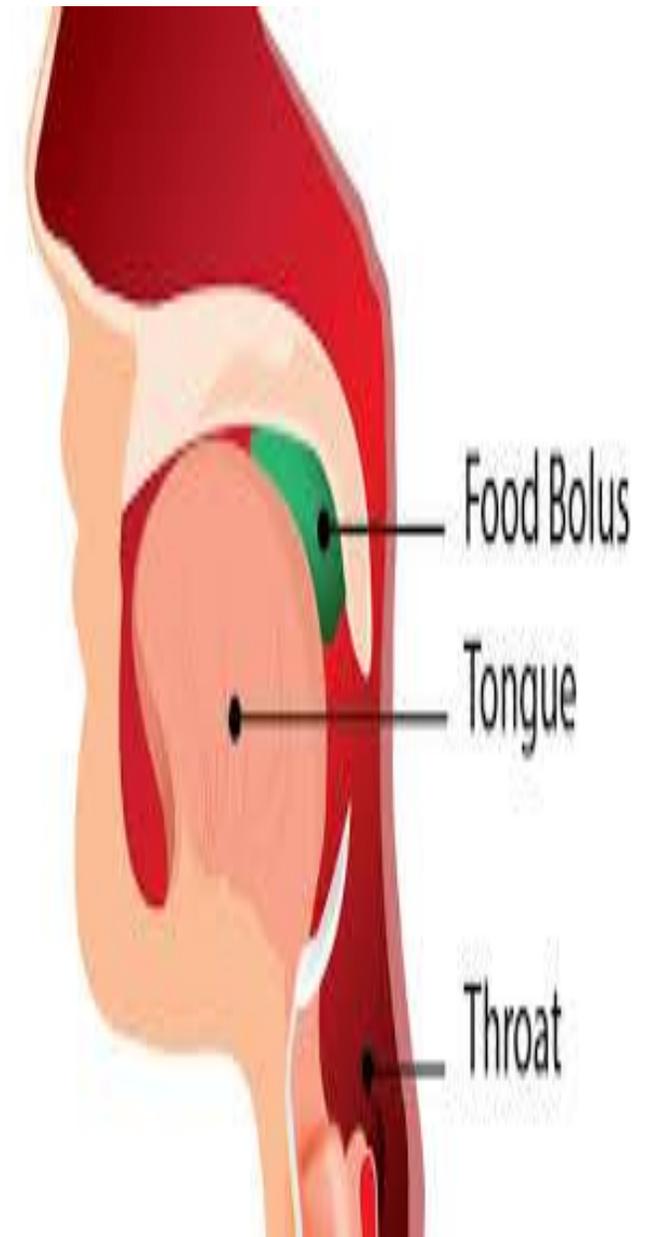
- **The pharyngeal part of the tongue elevated to meet the soft palate which pushed down forming seal called gloss palatal sphincter.**
- **The airway is open and nasal breathing continues during this phase.**
- **Labial seal is maintained to prevent food from leaking out of the mouth ( contraction of orbicularis oris).**



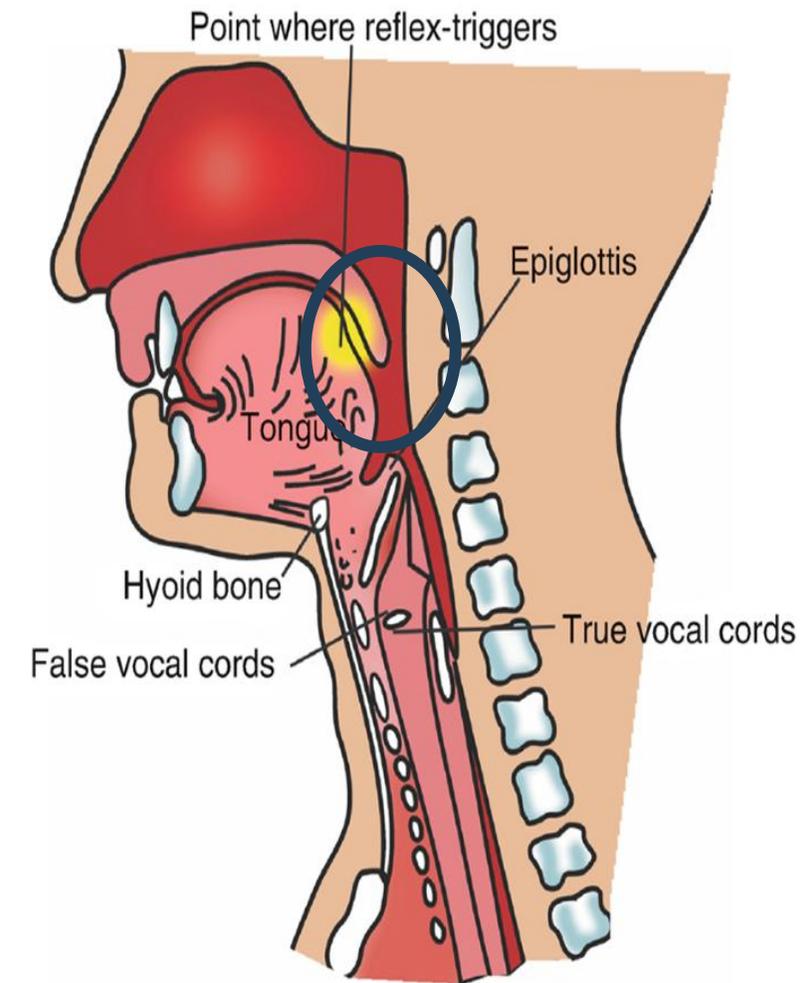
Oral  
preparatory

# Oral phase

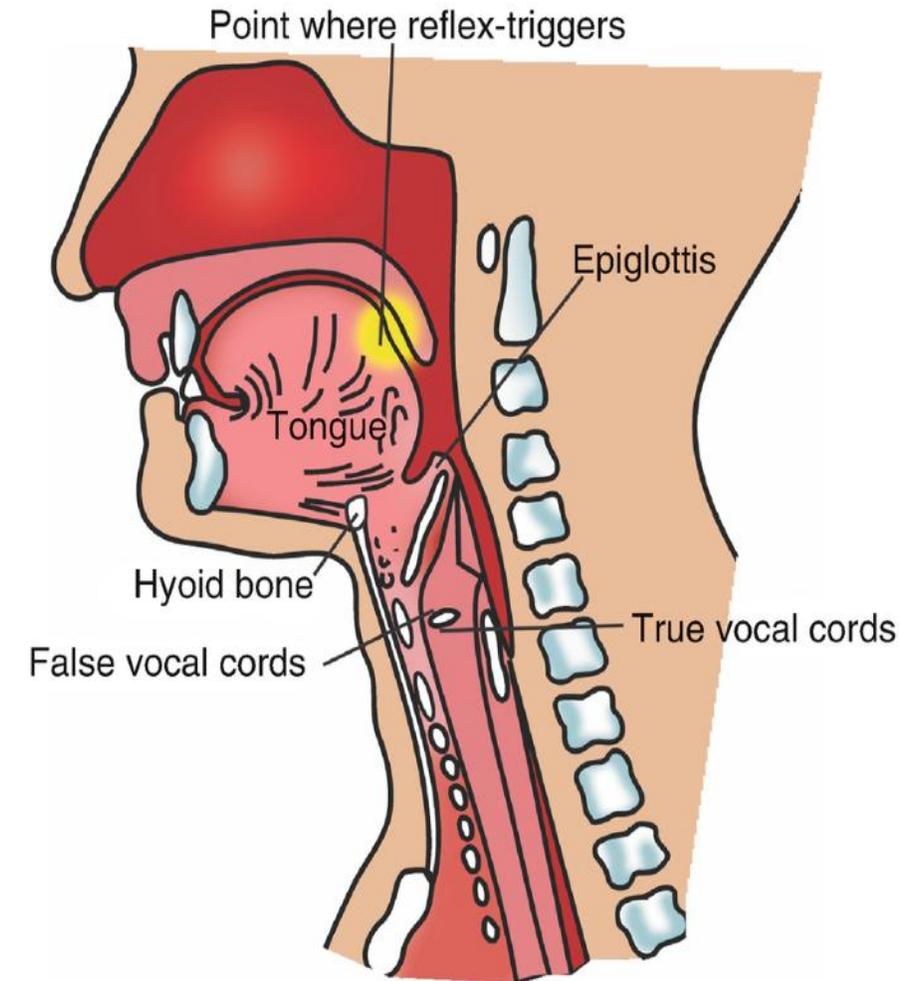
- During this phase there is **voluntary** transfer of material from the mouth to the pharynx.
- It take place **rapidly**; it lasts **approximately 0.5 seconds**.
- **Total swallow time** from oral cavity to **stomach is no more than 20 seconds**.
- It starts with the jaws and lips are closed
- the maxillary and mandibular incisors come together
- the tongue tip on the alveolar ridge.



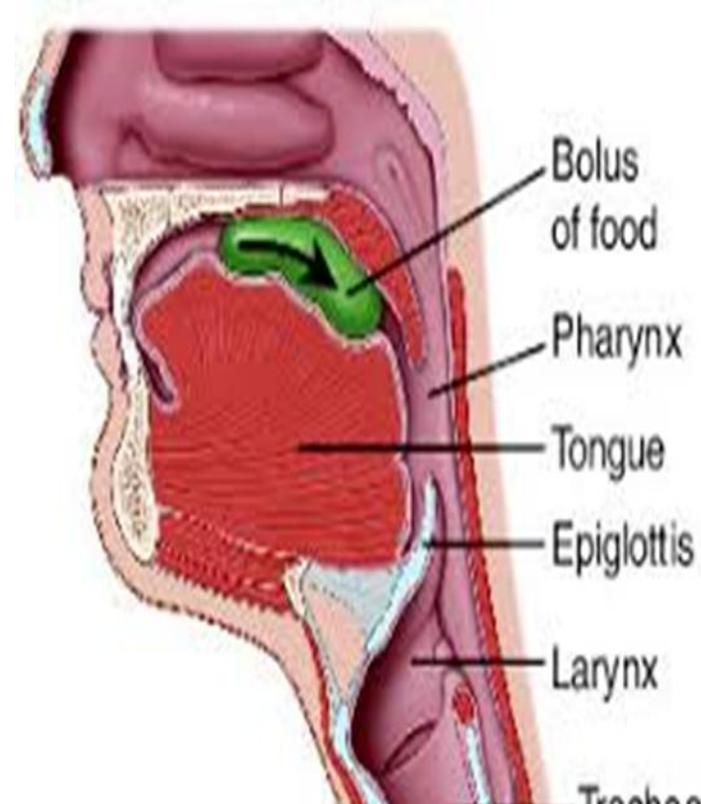
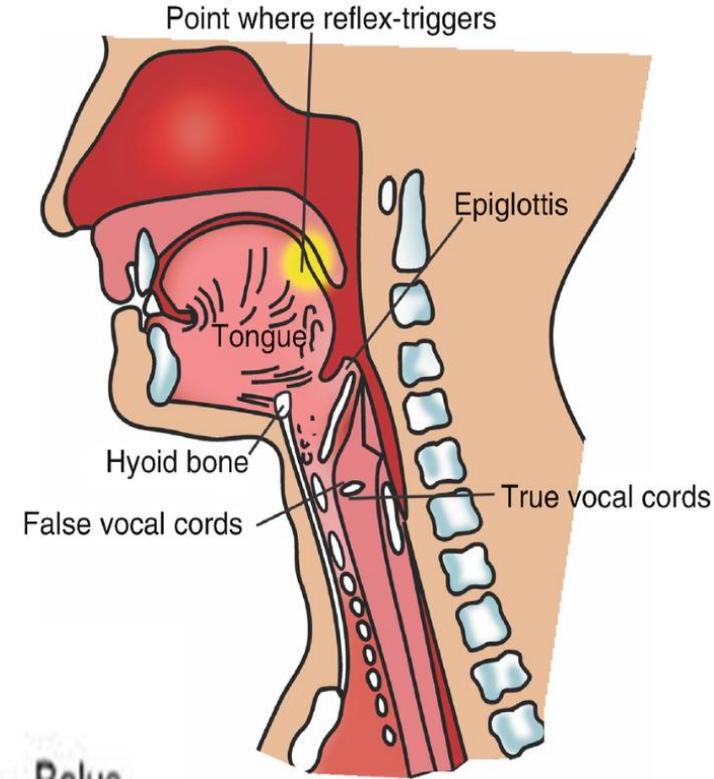
- **During this phase, the oral cavity maintains an anterior and lateral seal BY muscles of mastication.**
- **Opening of the Gloss palatal sphincter**
- **by moving the posterior part of the tongue downward and forward**
- **moving the soft palate upward to facilitate passage of the bolus to the pharynx.**



- **The elevated soft palate contacts the posterior pharyngeal wall.**
- **This seal prevent the penetration of the bolus into the nasal cavity.**
- **The inspiration is inhibited at the beginning of this stage**

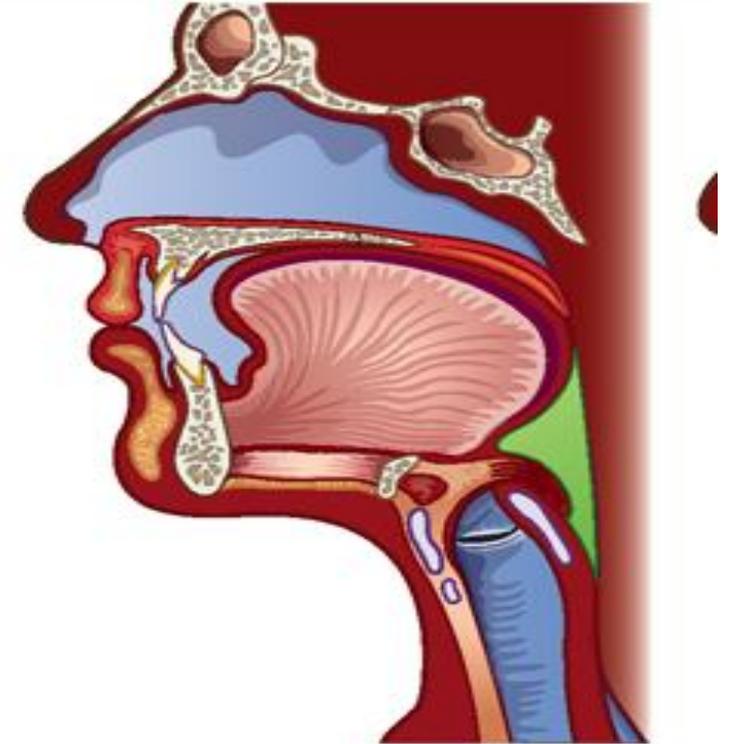


- The anterior 2/3 of the tongue pressed against the anterior hard
- palate pushing the bolus toward the pillars of the fauces.
- the bolus is pushed from the oral cavity by the peristaltic-like action of the tongue.



# Pharyngeal phase

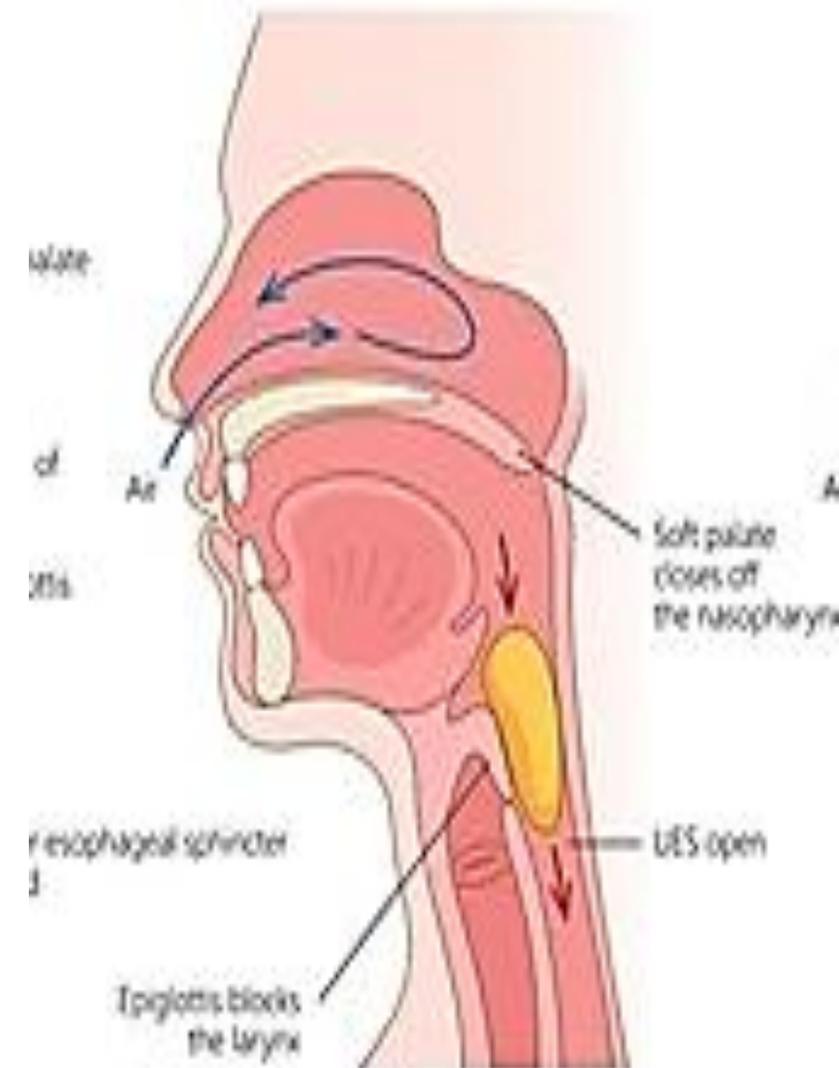
- ❑ The pharyngeal stage is the most critical stage; **it is involuntary** controlled.
- ❑ **the airway closure** must occur to prevent the bolus from entering the respiratory system.
- ❑ This phase begins as the bolus passes from the tongue through the fauces.
- ❑ **Respiration ceases**, the larynx elevates and the epiglottis retroflexes, driving the bolus around the opening of the larynx.



Pharyngeal

**During this phase:**

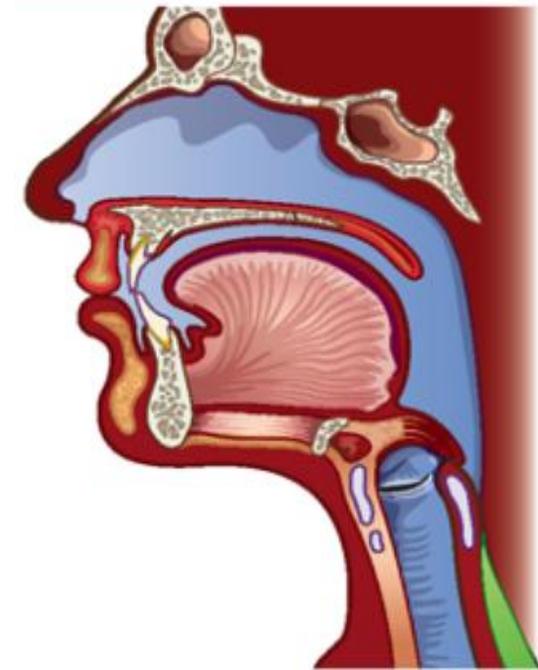
- The soft palate elevates and moves backward to seal off the nasal cavity, preventing the food from going up into the nose.**
- Elevation of the tongue, contraction of mylohyoid to squeeze the bolus downward into the esophagus.**
- the larynx must be closed to prevent aspiration of ingested material into the airway; this is accomplished by:**
  - **elevation of the larynx to be closed by epiglottis**
  - **apnea**
- Upper esophageal sphincter relaxation: relaxes and opens to allow the bolus to pass into the esophagus.**



**2. Pharyngeal Phase**

# Esophageal phase

- ❑ **it is involuntary stage**, food material transports along the esophagus till it reaches the lower esophageal sphincter to enter the stomach.
- ❑ The lower esophageal sphincter relaxes and the bolus moves into stomach.
- ❑ It takes **longer time** approximately **3 seconds for liquids and 9 seconds for solids**
- ❑ **This phase begins by creation of:**
  - primary peristaltic contraction at the cervical level of esophagus
  - Secondary peristalsis occur as an independent local reflex to clear the esophagus of ingested material left behind after the passage of the primary wave.
- ❖ This secondary contraction occurs without any movements of the mouth or pharynx



Esophageal

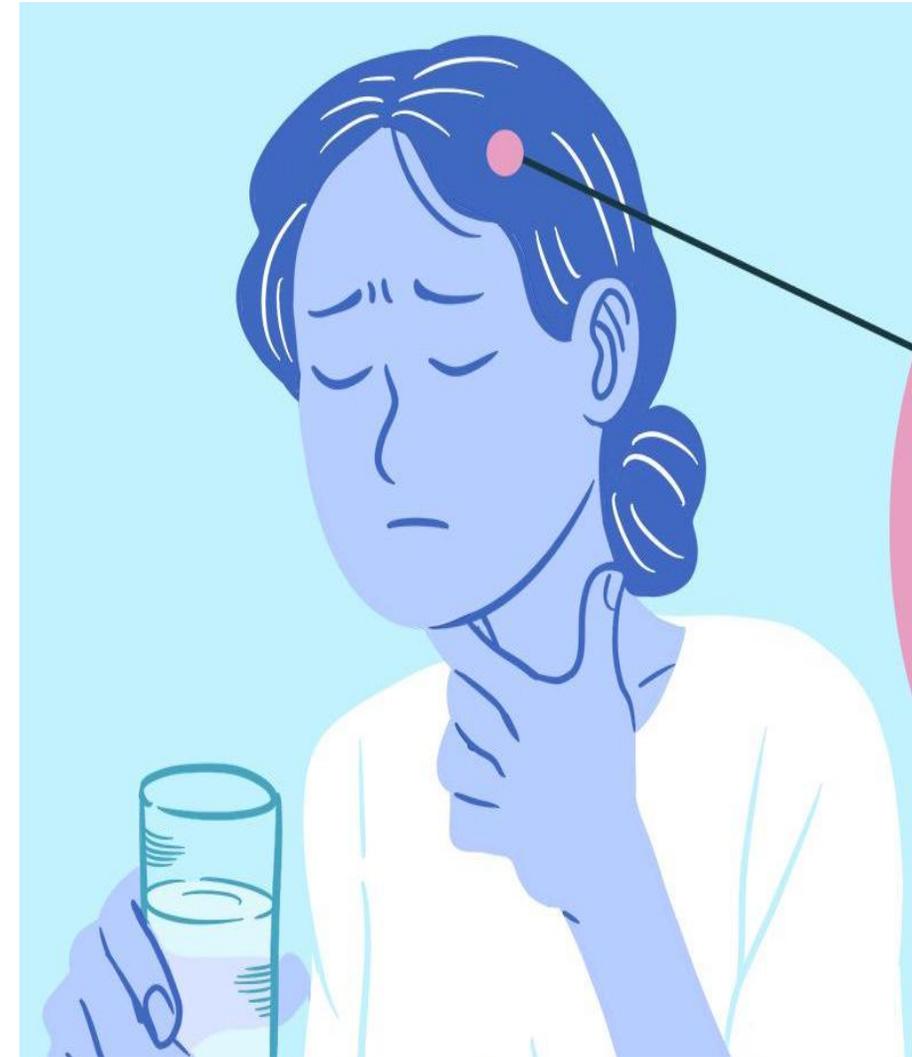
# functions of swallowing:

- **Transporting food** and liquids: Swallowing moves a chewed bolus from the mouth to pharynx, and into the esophagus, where it is then pushed to the stomach via peristalsis.
- **Protecting the airway:** During swallowing, the body takes specific actions to prevent food or liquid from entering the lungs.
- **Coordinating breathing and digestion:** The pharynx serves as a shared pathway for both breathing and swallowing, so the swallowing reflex must precisely coordinate with the respiratory cycle to prevent aspiration.
- Swallowing is extremely important since it plays a significant role of **the enjoyment of eating** and the adequate nutrition and hydration. Any deficiency to the process, negatively affect the quality of life

# CLINICAL SIGNIFICANCE

## Dysphagia

- **Dysphagia is the term for difficulty swallowing.**
- **It can affect swallowing of both solid and liquid substances**
- **it can be due to motility problems (an error of peristalsis) or obstruction of the tube.**
- ❖ **Common causes include:**
  - **Alzheimer's disease**
  - **Tumors**
  - **Xerostomia**
  - **Esophageal strictures**



Thank  
you!!!

