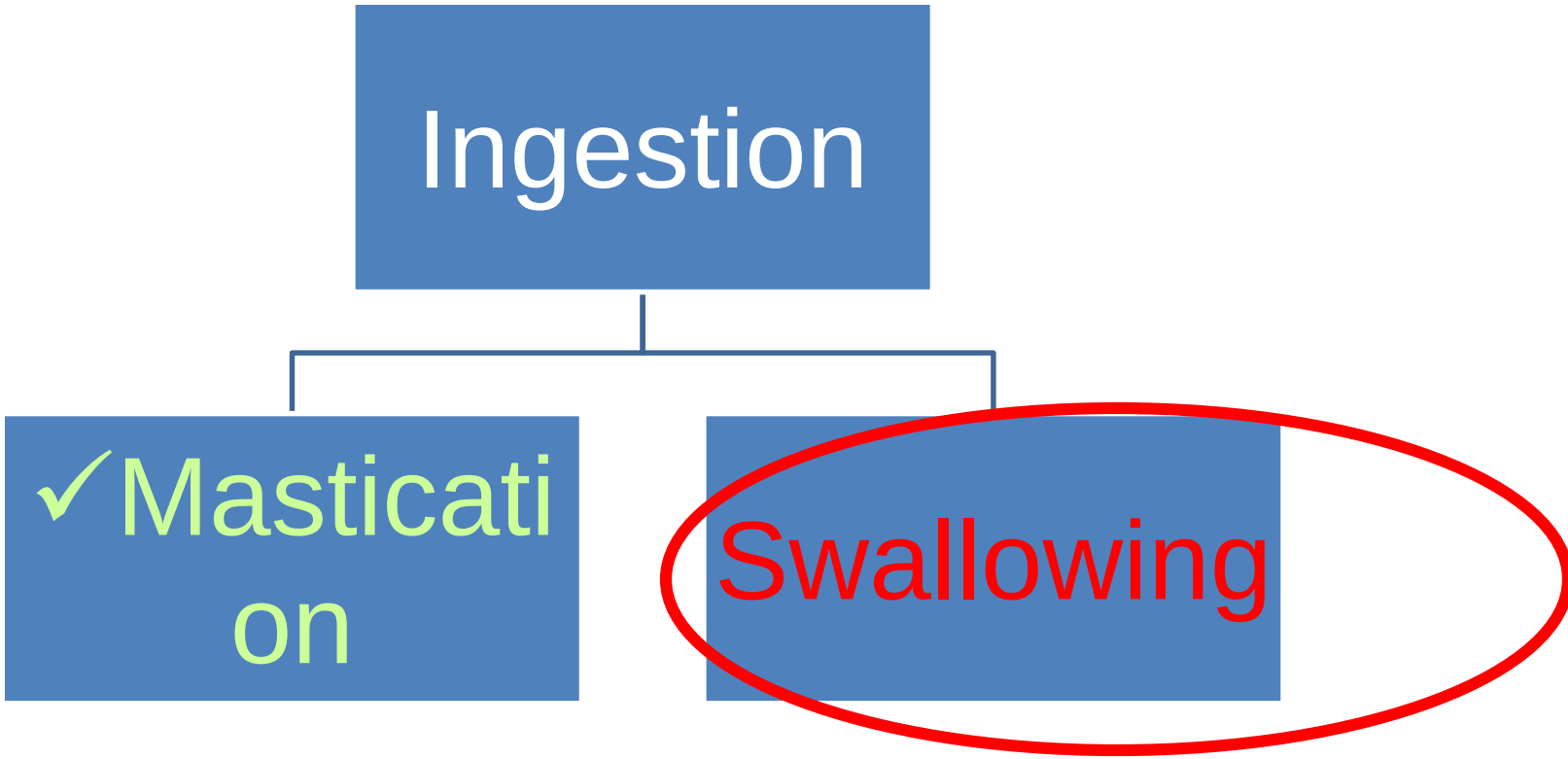
Movements of GIT

Ingestion of food

Ingestion of food

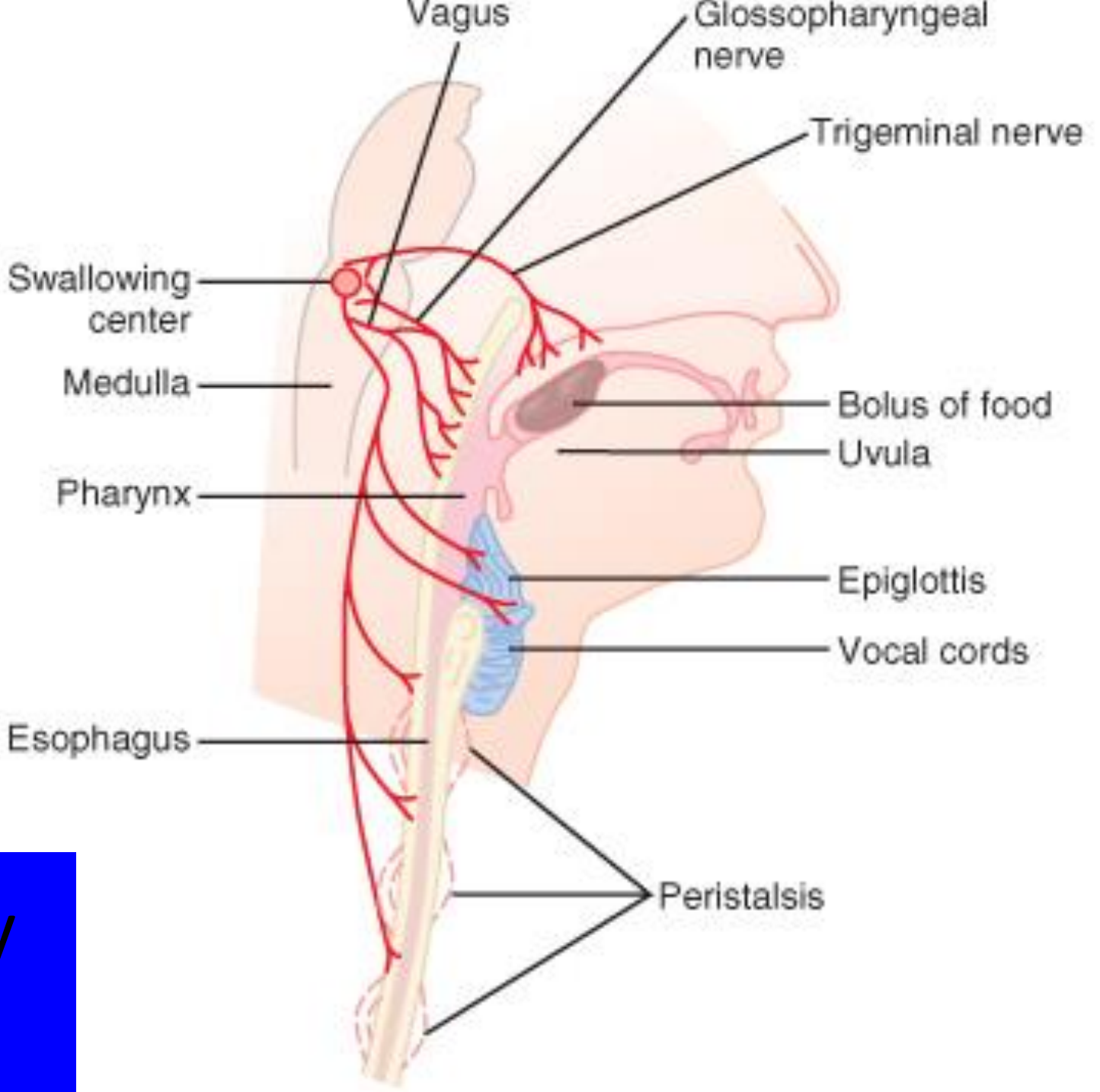


Swallowing (Deglutition)

- Pharynx (Respiration → Swallowing)
- Three stages;
  - –Voluntary Stage
  - –Pharyngeal Stage (Involuntary)
  - –Esophageal Stage (Involuntary)

Voluntary Stage

- Voluntarily Squeezed or Rolled Posteriorly
- Pressure of Tongue Upward and backward
- From here onward: Automatic



Voluntary Stage

Swallowing (Deglutition)

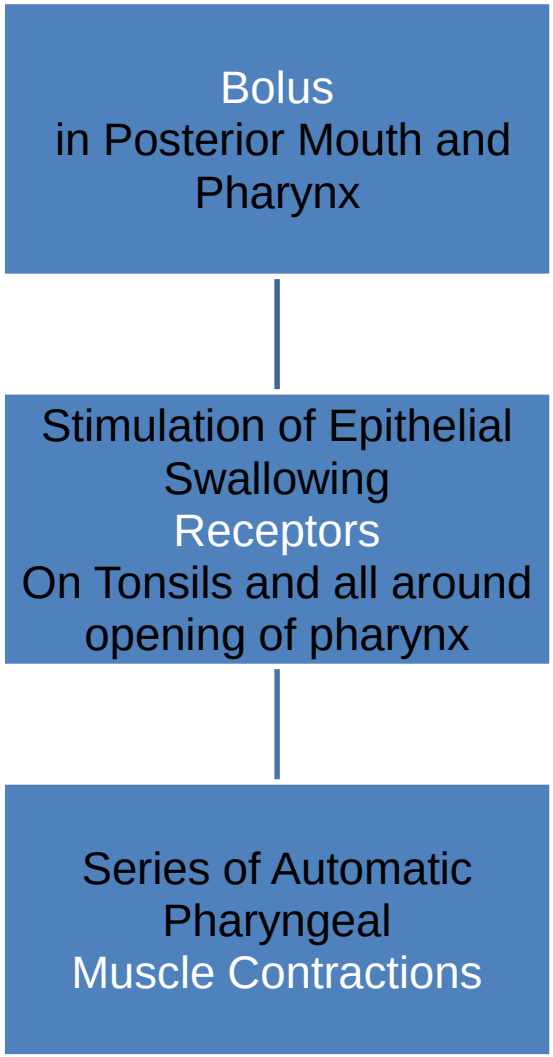
- Three stages;

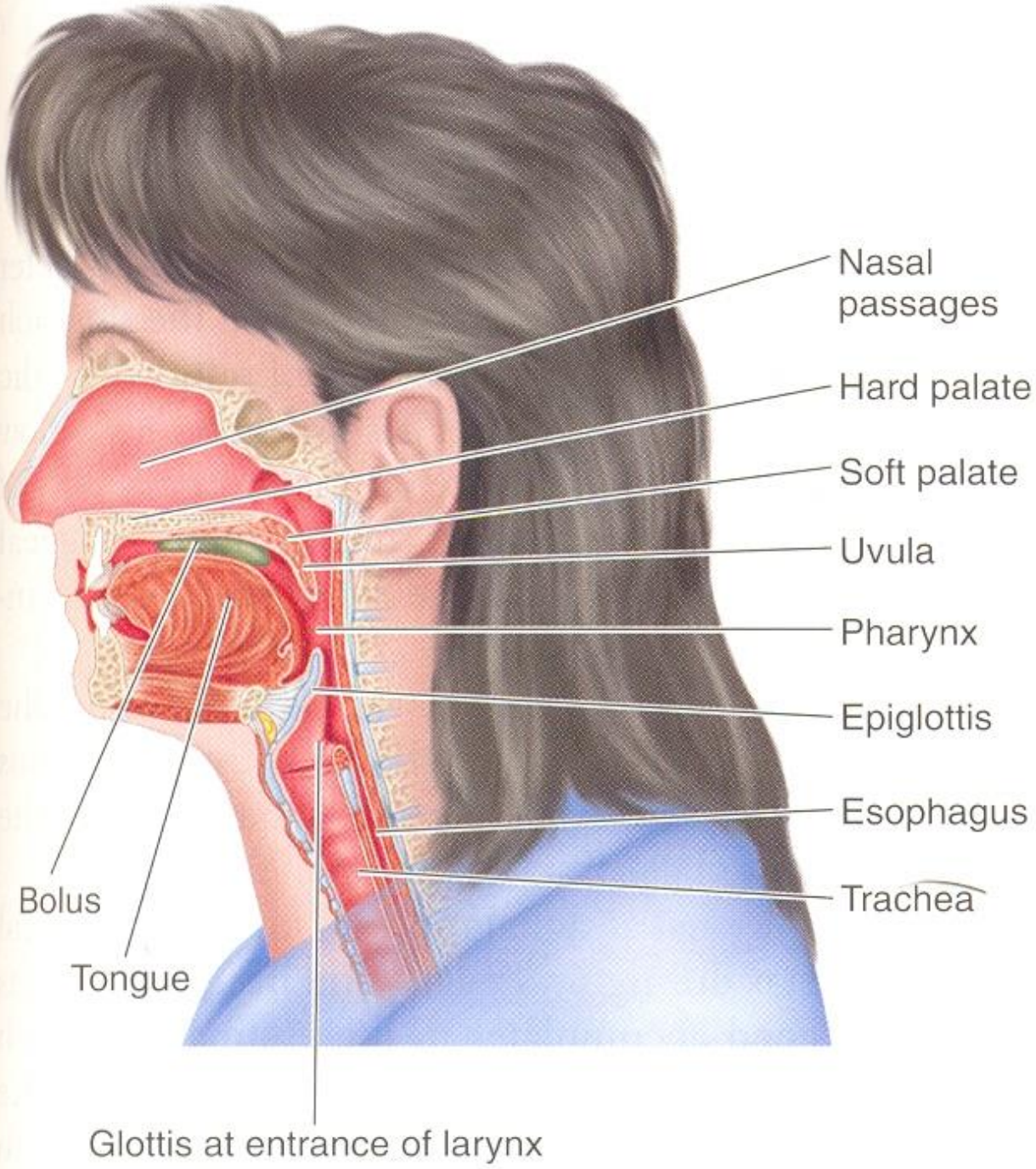
  Voluntary Stage

  –Pharyngeal Stage (Involuntary)

  –Esophageal Stage (Involuntary)

Pharyngeal Stage (Involuntary)




Nasal passages
Hard palate
Soft palate
Uvula
Pharynx
Epiglottis
Esophagus
Trachea
Bolus
Tongue
Glottis at entrance of larynx

Resting

Oropharyngeal stage of swallowing

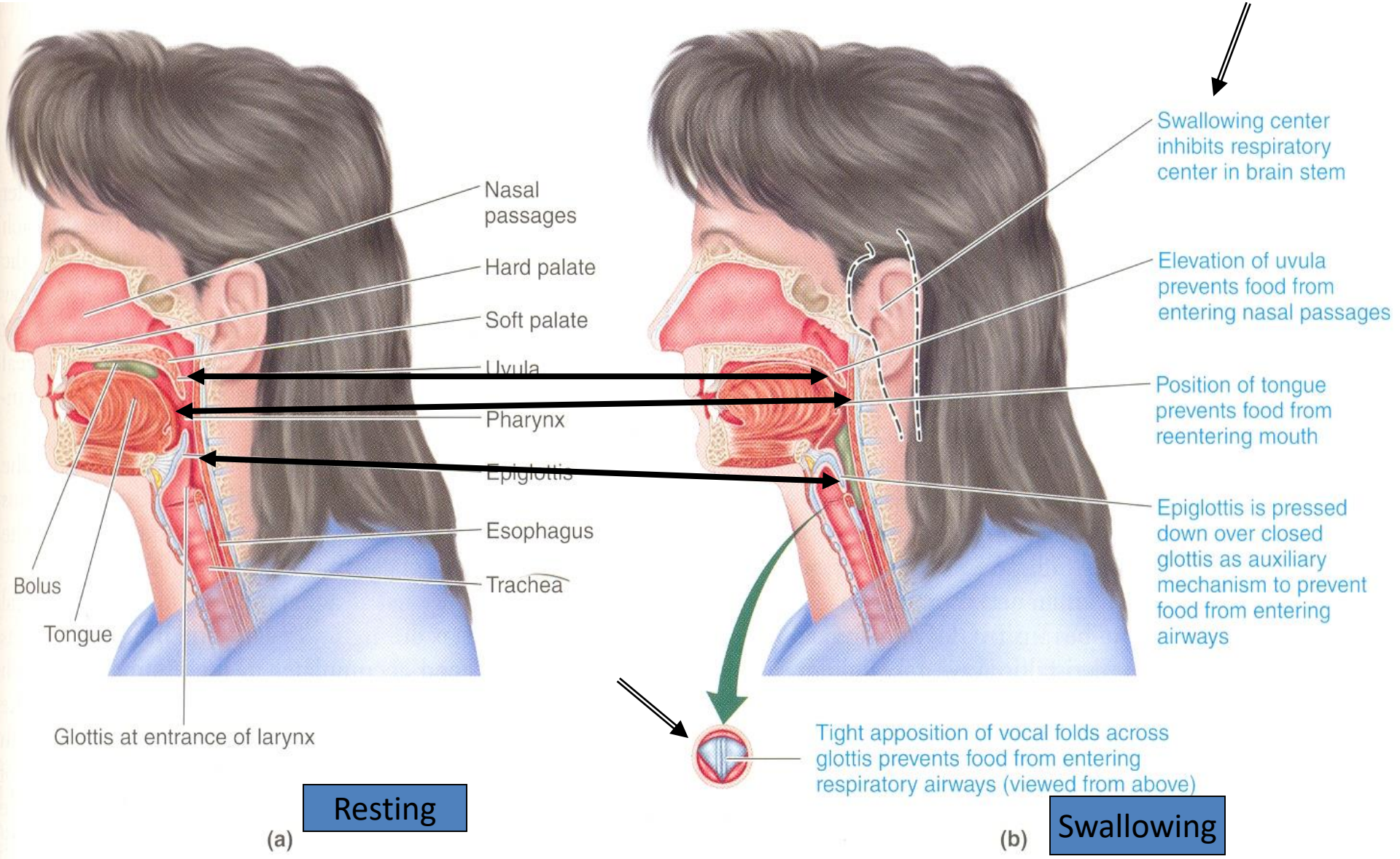
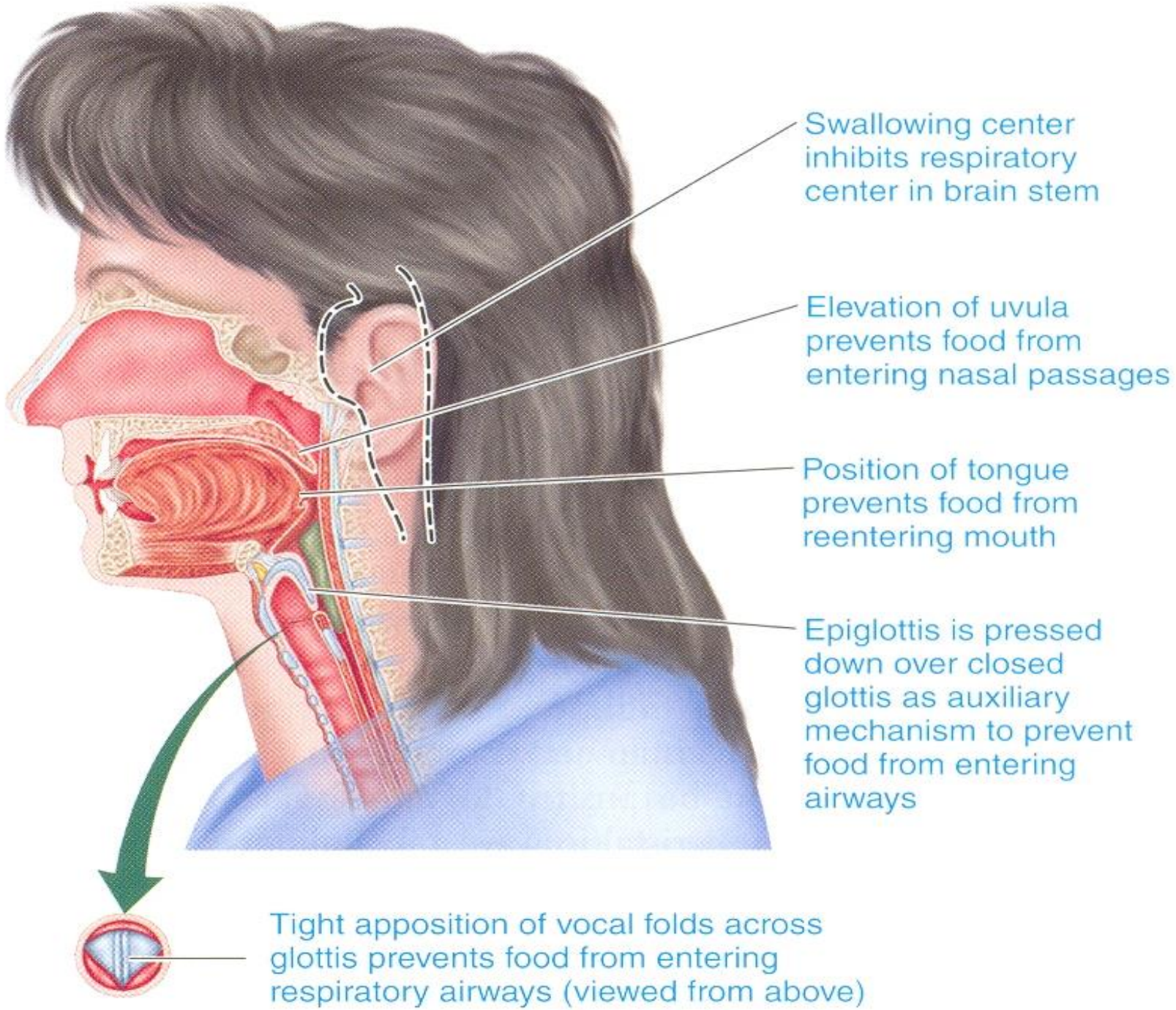


FIGURE 16.7


Swallowing center inhibits respiratory center in brain stem
Elevation of uvula prevents food from entering nasal passages
Position of tongue prevents food from reentering mouth
Epiglottis is pressed down over closed glottis as auxiliary mechanism to prevent food from entering airways
Tight apposition of vocal folds across glottis prevents food from entering respiratory airways (viewed from above)

Series of Automatic Pharyngeal Muscle Contractions

1. Soft Palate pulled upward

↓

Posterior Nares Closed

↓

Prevents Reflux of food into Nasal Cavities

Series of Automatic Pharyngeal Muscle Contractions

2. Palatopharyngeal folds pulled Medially

↓

Selective Slit

Series of Automatic Pharyngeal Muscle Contractions

3. Vocal Cords strongly approximated

+

Larynx pulled upward & anteriorly

+

(Ligaments prevent upward movement of Glottis)

↓

Epiglottis swings backward over opening of Larynx

↓

Prevent Passage of food into Trachea

Series of Automatic Pharyngeal Muscle Contractions

4. Upward movement of Larynx

↓

Opening of esophagus enlarged

+

Relaxation of Upper Esophageal Sphincter

↓

Easy movement of food

Series of Automatic Pharyngeal Muscle Contractions

5. Muscular wall of Pharynx contracts (Peristalsis)

Time taken by pharyngeal stage:

< 6 seconds

Pharyngeal Stage (Contd --------)

- Nervous Initiation (Reflex)
  - Most sensitive tactile area:
    - Ring around pharyngeal opening; Greatest sensitivity on Tonsillar Pillars
  - Effect on Respiration:
    - Swallowing centre inhibits Respiratory centre of Medulla

Pharyngeal Stage swallowing reflex (Contd --------)

1. **Stimulus→ Touch**
2. **Receptors→ Tactile**
3. **Afferent Nerve→ 5,9**
4. **CNS→ Swallowing Centre (Medulla & Lower Pons)**
5. **Efferent Nerve→ 5,9,10,12**
6. **Effector→ Muscles of Pharynx & Upper esophagus**
7. **Response → Contraction**

Esophageal Stage (Involuntary)

Objectives

- Function: Conduction of food
- Peristalsis: 2 types
  - Primary
  - Secondary
- Musculature of Esophagus
  - Striated
  - Smooth

Peristalsis of Esophagus

- Primary Peristalsis:

  Continuation of Peristaltic wave of Pharynx

  8-10 seconds

  ↓

  Stomach

  Upright: 5-8 seconds

Peristalsis of Esophagus

- Secondary Peristalsis

  If Primary Peristalsis fails

  distension→

  1.vagal afferent fibers

  ↓

  medulla

  ↓

  vagus +glossopharyngeal nerve

  2. simulation of intrinsic neuronal circuits

Esophageal Stage (Involuntary)

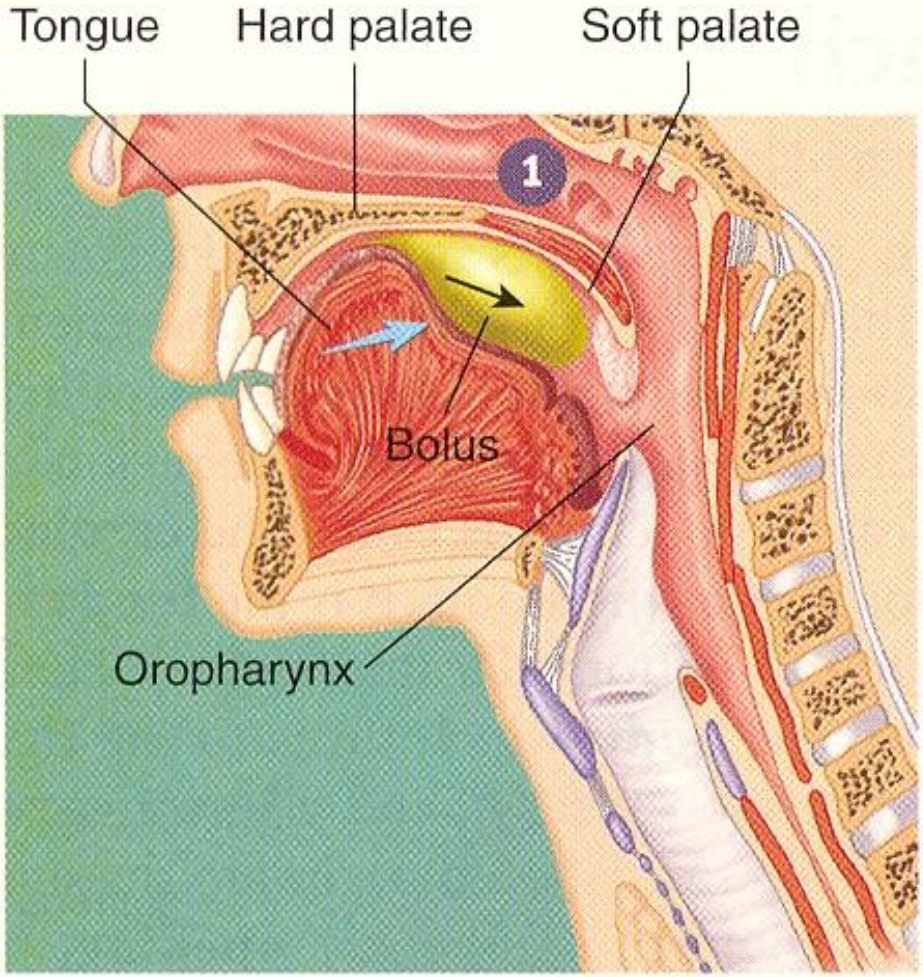
- ✓ Function: Conduction of food
- ✓ Peristalsis: 2 types
  - ✓ Primary
  - ✓ Secondary
- Musculature of Esophagus
  - Striated
  - Smooth

Musculature of Esophagus

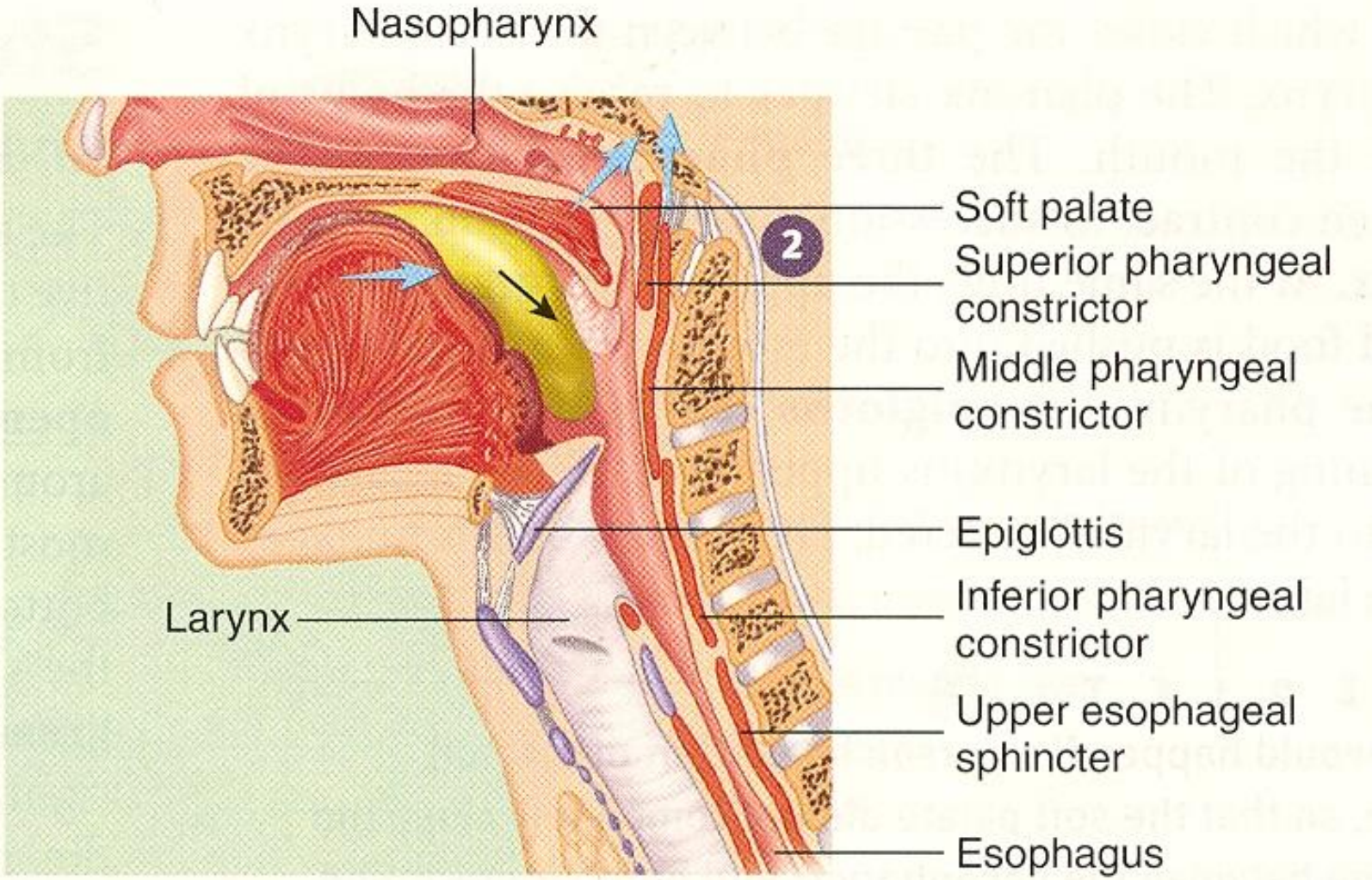
- Striated
  - Pharyngeal wall and upper third of esophagus
  - Skeletal nerve fibers in 9^{th}, 10^{th} cranial nerves
- Smooth
  - Lower $2/3^{rd}$ of esophagus
  - Vagus nerve → Myenteric Nervous System

Summary of stages of swallowing

1. Voluntary stage



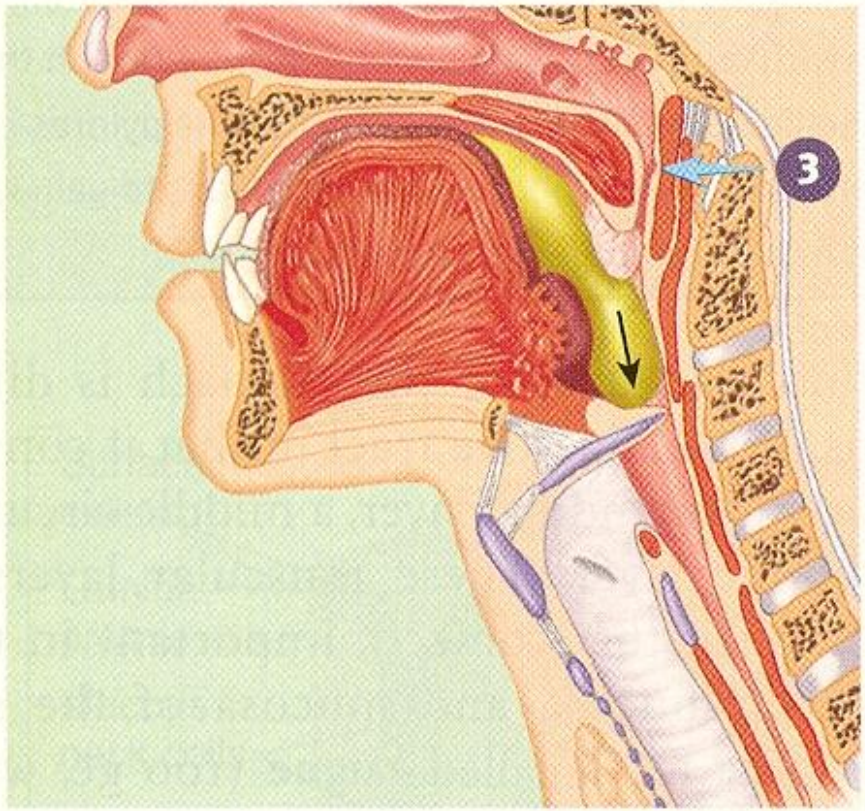
1. During the voluntary phase, a bolus of food (*yellow*) is pushed by the tongue against the hard and soft palates and posteriorly toward the oropharynx (*blue arrow* indicates tongue movement; *black arrow* indicates movement of the bolus). *Tan*: bone, *purple*: cartilage, *red*: muscle.

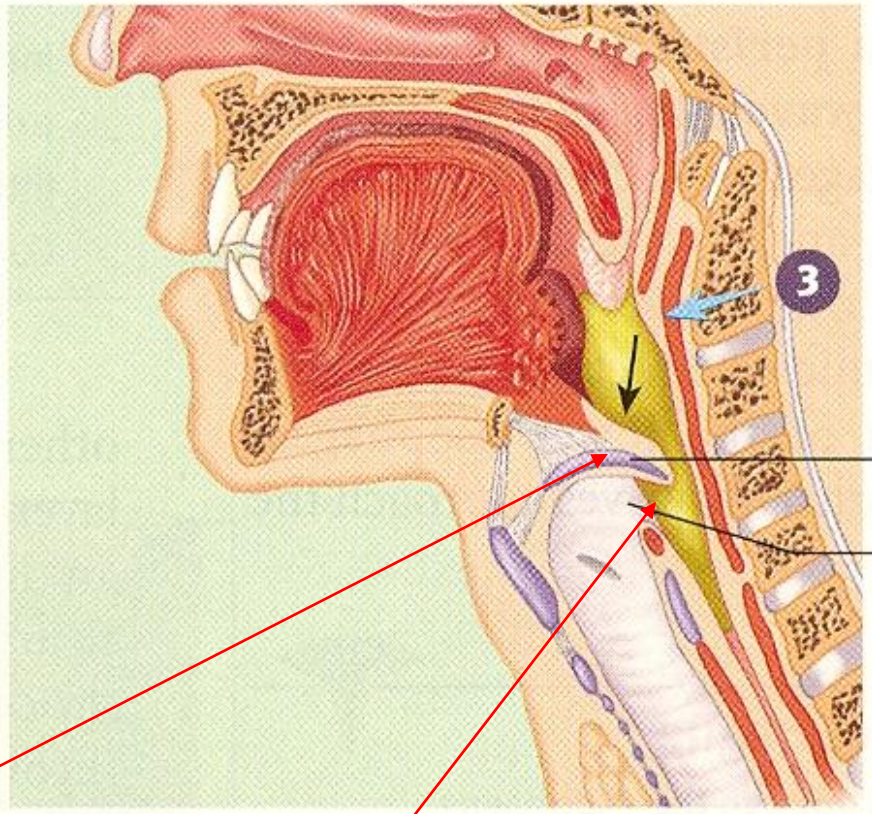


2. During the pharyngeal phase, the soft palate is elevated, closing off the nasopharynx. The pharynx and larynx are elevated (*blue arrows* indicate muscle movement).

2. Pharyngeal stage

2. Pharyngeal stage (Contd....)



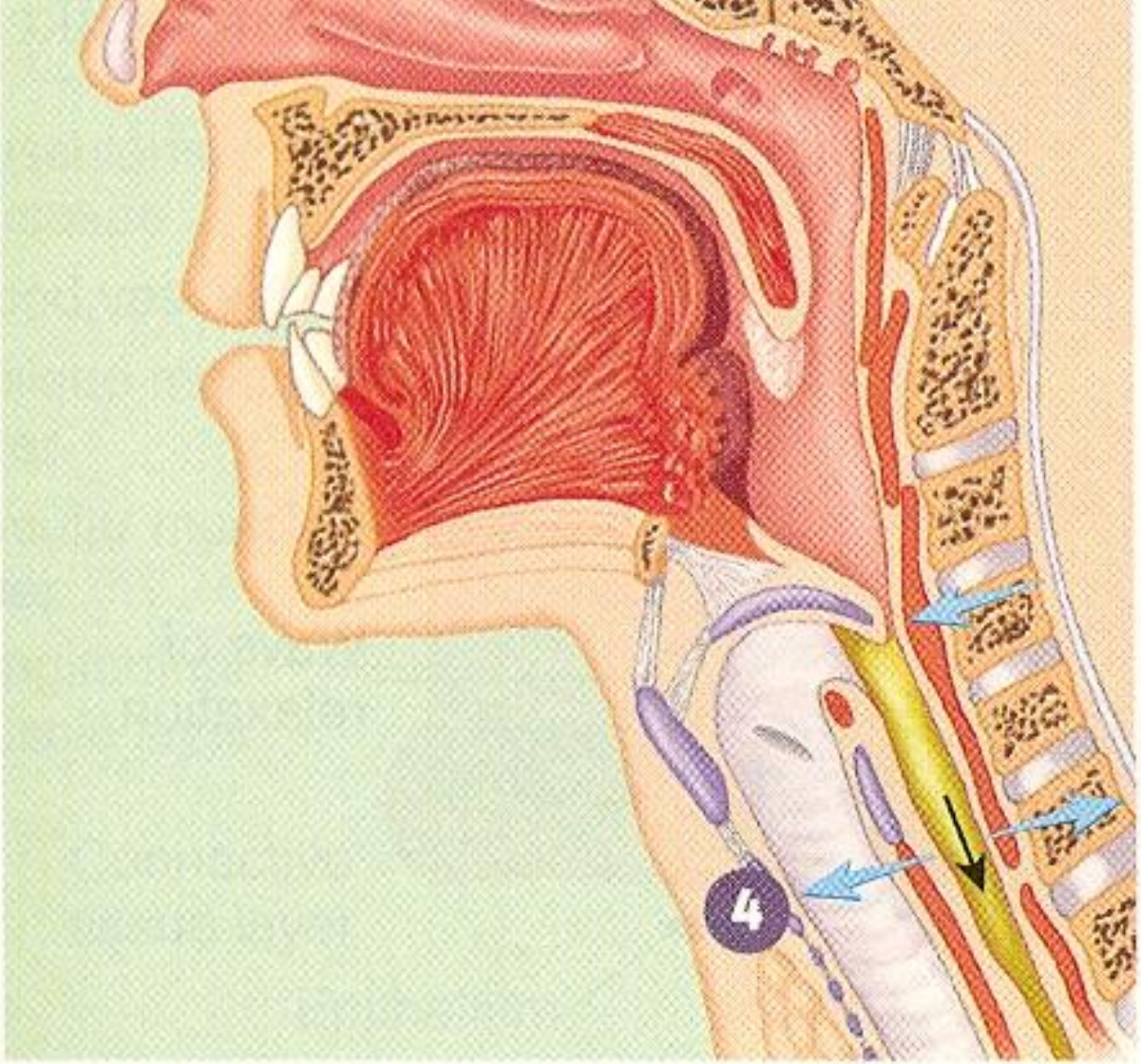


3. Successive constriction of the pharyngeal constrictors from superior to inferior (*blue arrows*) forces the bolus through the pharynx and into the esophagus. As this occurs, the epiglottis is bent down over the opening of the larynx largely by the force of the bolus pressing against it.

Pharyngeal stage

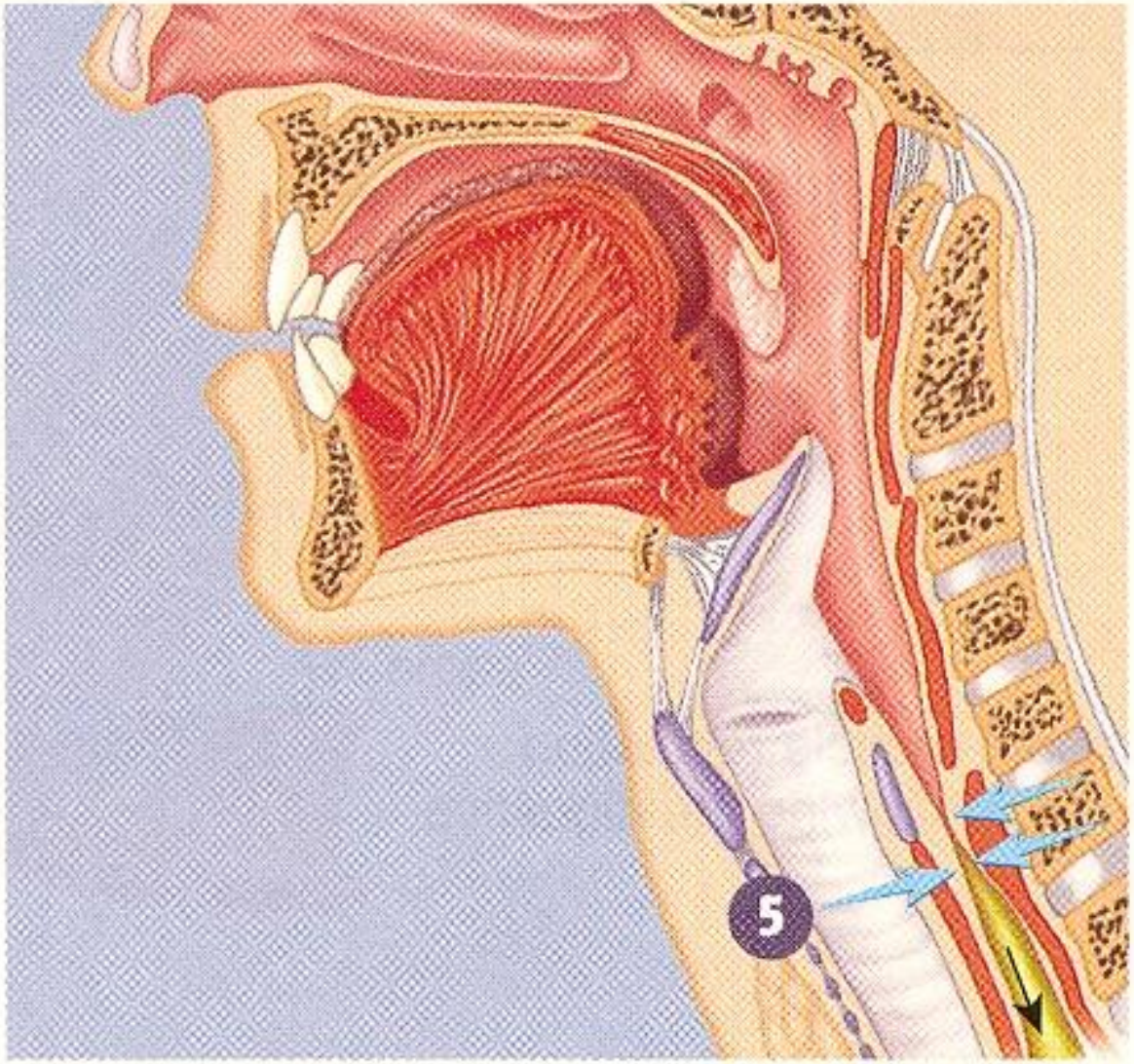
↓

Esophageal stage



4. As the inferior pharyngeal constrictor contracts, the upper esophageal sphincter relaxes (outwardly directed *blue arrows*), allowing the bolus to enter the esophagus.

Esophageal stage



5. During the esophageal phase, the bolus is moved by peristaltic contractions of the esophagus toward the stomach (inwardly directed *blue arrows*).

I'm not a bird expert

but I guess there are
4 females & 1 male

DYSPHAGIA….

30 years old lady with Hx of repeated abortion and menstual disorder having fatigue, pallor, spoon shaped nails and difficulty in swalloing specially for solids.

Whats the cause?

Plummer vinson syndrome..

25 years old young man having difficulty in swallowing for both solds and liquids , he is also having chronic regurgitation of food and heart burn , he usually manage his swallowing by adapting special posture. His barrium swallow shows esophageal dilatation…

Cause?

Achalazia

50 years male presenting with hx of dysphagia, nasal regugitation why swallowing. He is also having nasal tone ,difficulty in walking and muscle weakness and wasting both upper and lower limbs.

BULBAR PALSY

60 years old man presenting with history of dysphagia for solids but he can swallow liquids, he is having chronic GERD and now also having wt loss

Ca Esophagus

Disorders of esophagus.

Achalazia of esophagus.

GERD.

Ca esophagus

Paralysis of swallowing mechanism

1. Damage to 5^{th}, 9^{th}, or 10^{th} nerve
2. Damage to swallowing center in brain stem
   Poliomyelitis
   Encephalitis
3. Paralysis of swallowing muscles
   Muscle Dystrophy
4. Failure of Neuromuscular Transmission
   Myasthenia Gravis
   Botulism
5. Deep anesthesia