

Review of Normal Swallow and Aspiration

Carla Fedor, RN, CDDN
Continuum of Care
University of New Mexico
School of Medicine

Normal Adult Swallow Physiology

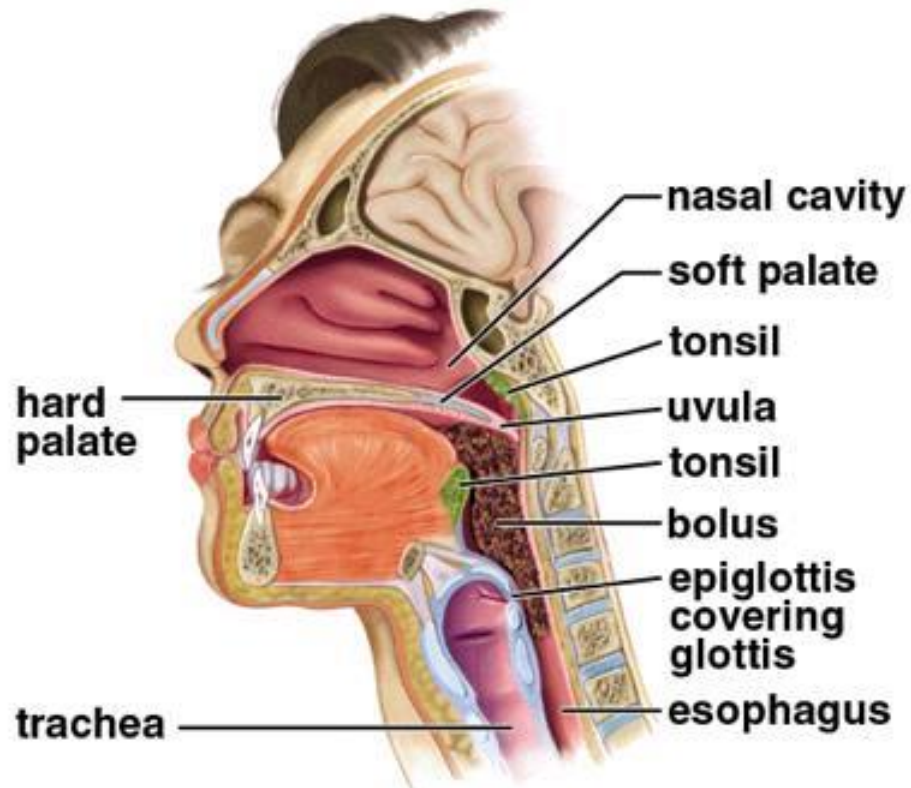
The normal adult swallowing process includes four phases:

- Oral Preparatory Phase
- Oral Transit Phase
- Pharyngeal Phase
- Esophageal Phase

Anatomy

Copyright © The McGraw-Hill Companies, Inc. Permission required for reproduction or display.

Swallowing

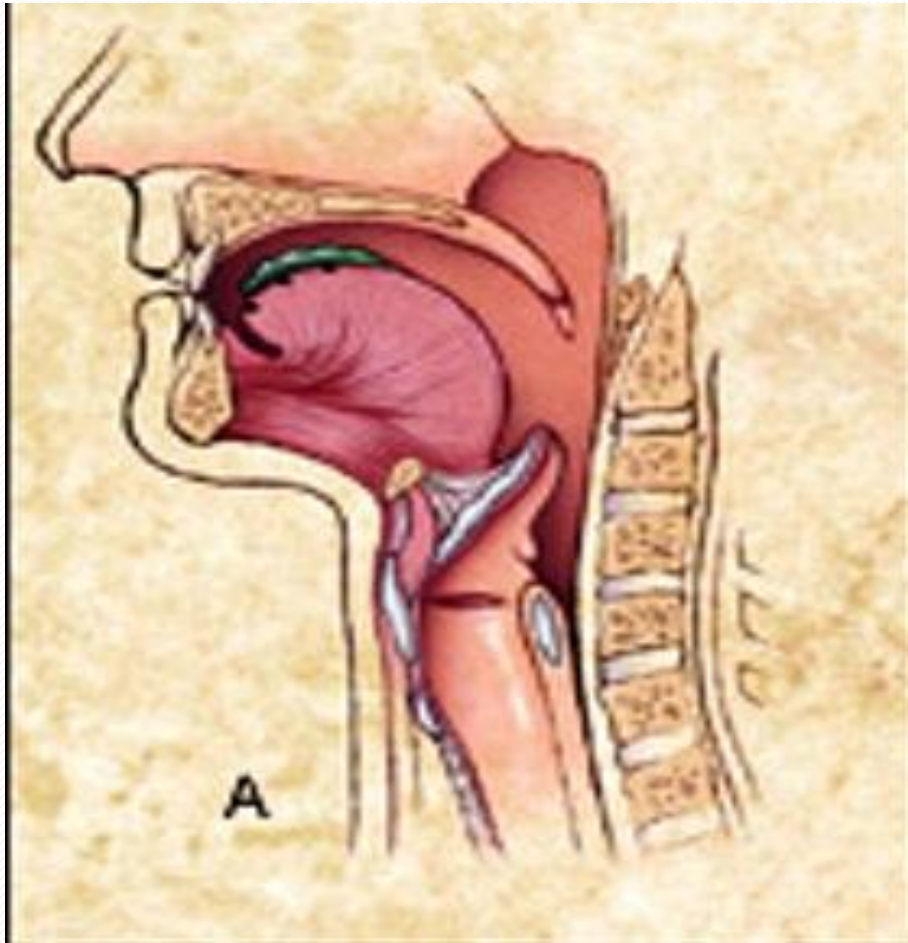


Phase 1

Oral Preparatory Phase of the Swallow

- The food is manipulated (masticated if a solid) into a cohesive unit (referred to as a bolus) in preparation for the remaining phases of the swallow
- Food is chewed and mixed with saliva to form a bolus
- Bolus is positioned on the tongue for transport
- “Chipmunk Swallow or Pocketing”, when a large bolus is partially held in the cheeks and the patient then swallows several times to clear the oral cavity-food left in the cheek is a sign of weak musculature

Phase 1: Oral Preparatory (Bolus Formation) Phase



Food (*shown in green*) has been softened and mixed with saliva and is sitting on the dorsum of the tongue

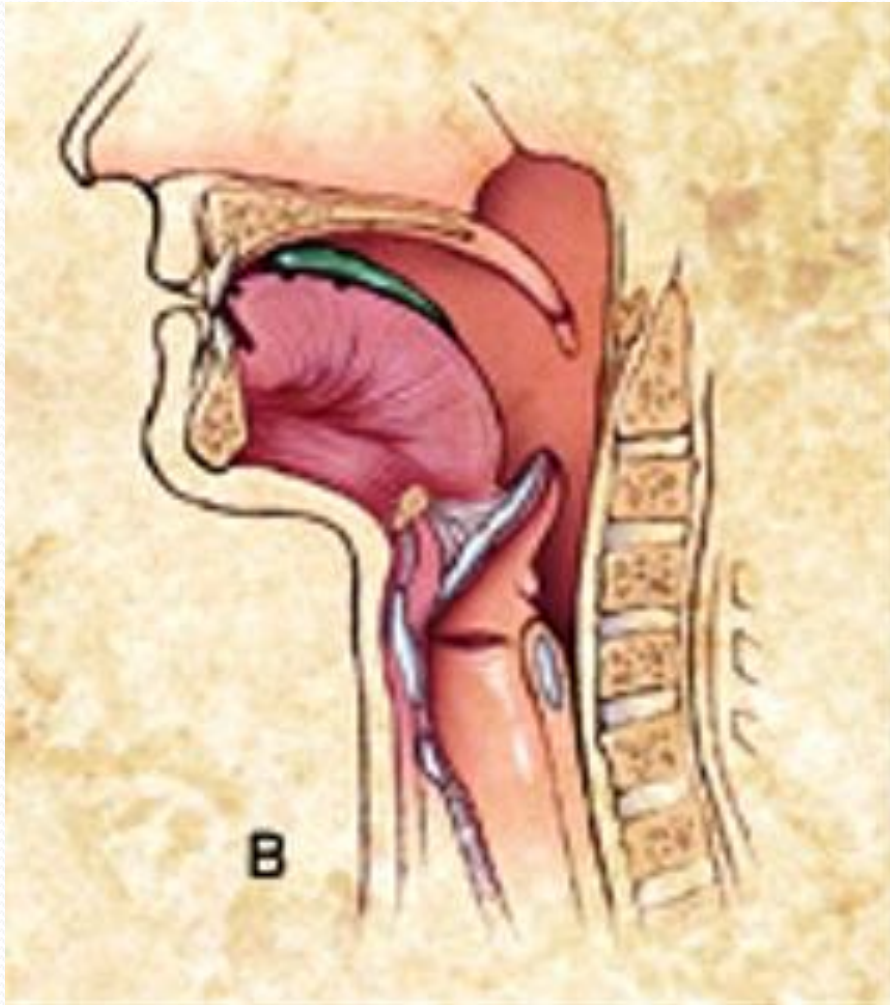
Phase 2

Oral Transit Phase of the Swallow

- Also known as the oral propulsion or transit stage
- The food is moved back through the mouth with a front-to-back squeezing action
- Performed primarily by the tongue
- In healthy individuals, this takes approximately 1 second

Phase 2

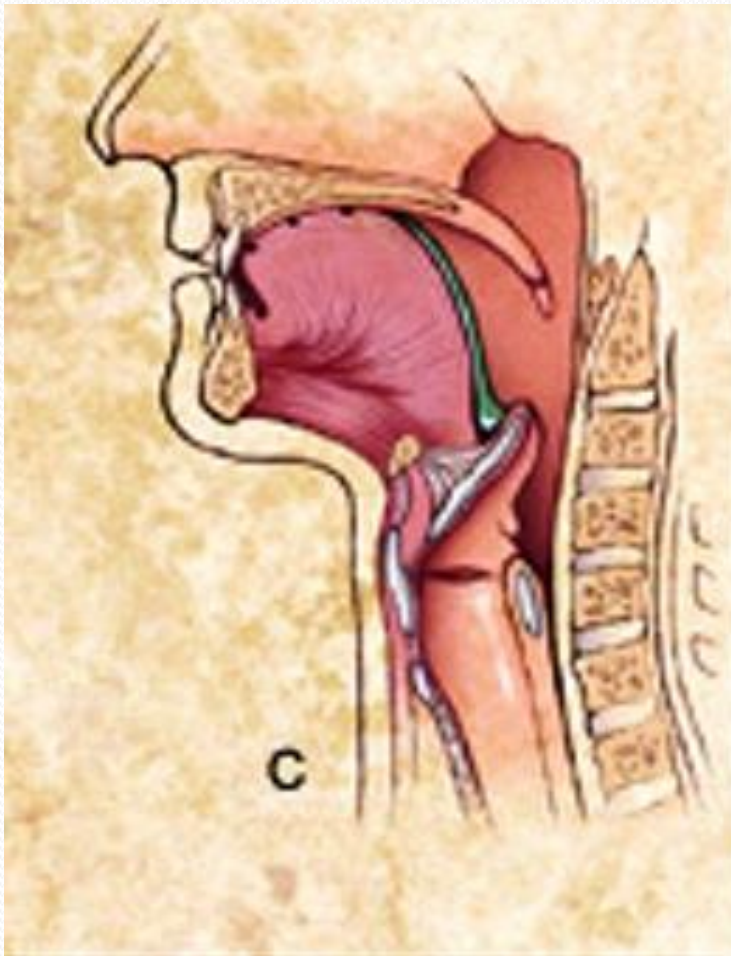
Oral Transit Phase of the Swallow



Moving upward and forward, the tip of the tongue comes into contact with the hard palate anteriorly

Phase 2

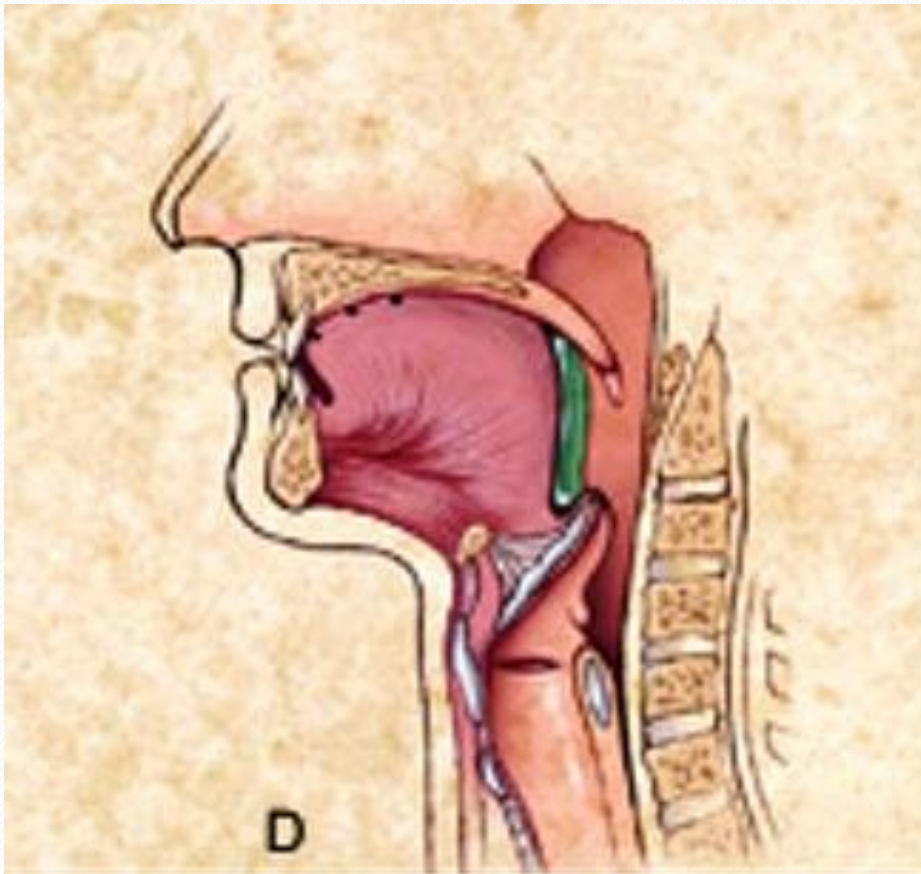
Oral Transit Phase of the Swallow



The area of tongue-palate contact expands posteriorly, which pushes food into the oropharynx

Phase 2

Oral Transit Phase of the Swallow

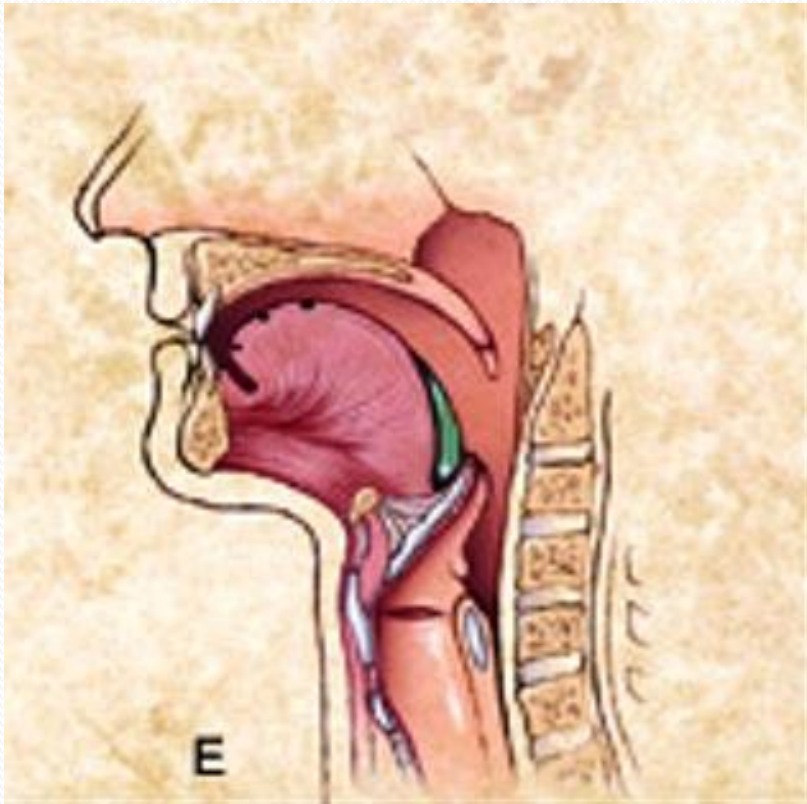


The area of tongue-palate contact continues to increase as a portion of the food collects in the valleculae (one vallecula* on each side of the mouth)

*Vallecula: space between the epiglottis and the back of the tongue

Phase 2

Oral Transit Phase of the Swallow



The jaw reaches its maximum downward position and the tongue drops away from the palate. A portion of food remains in the valleculae.

Phase 3

Pharyngeal Phase of the Swallow

- Pharyngeal Stage, which begins with the pharyngeal swallowing response:
 - The food enters the upper throat area (above the voice box)
 - The soft palate elevates
 - The epiglottis closes off the trachea, as the tongue moves backwards and the pharyngeal wall moves forward
- These actions help force the food downward to the esophagus
- Breathing is reinitiated
- This takes 1 second

Phase 3

Pharyngeal Phase of the Swallow



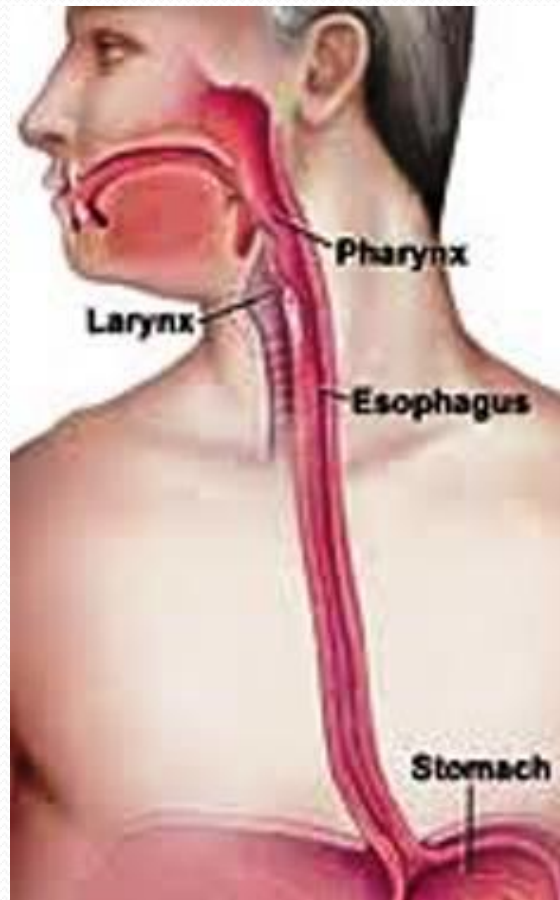
Phase 4

Esophageal Phase of the Swallow

- The food bolus enters the esophagus (the tube that transports food directly to the stomach)
- The bolus is moved to the stomach by a squeezing action of the throat muscles

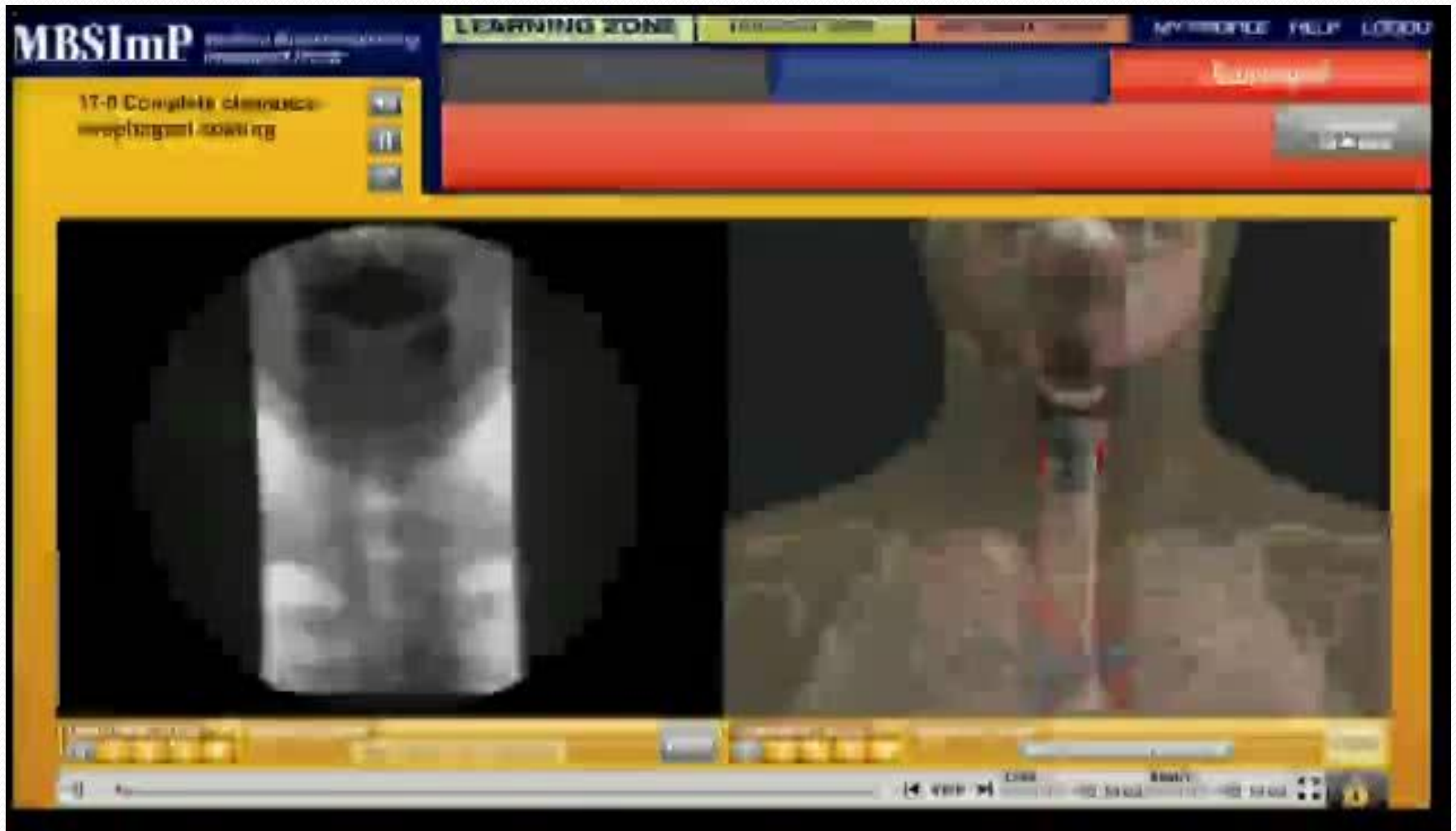
Phase 4

Esophageal Phase of the Swallow



Normal Versus Abnormal Swallow

Anterior View



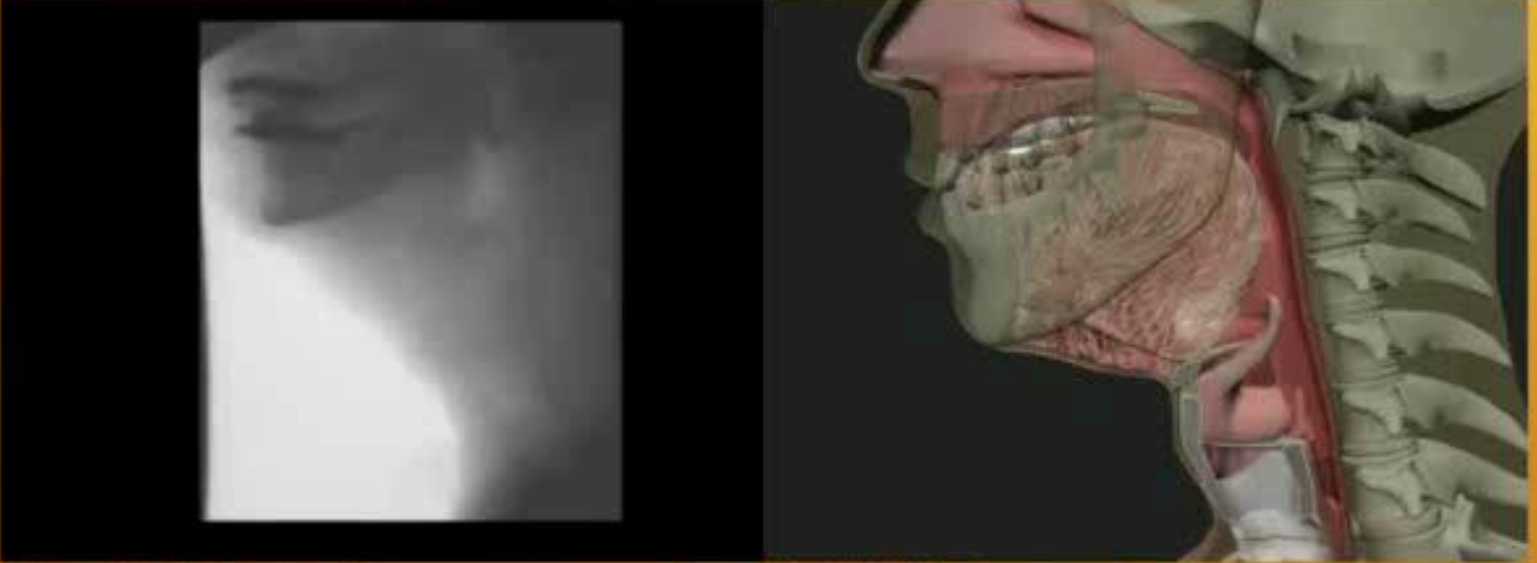
Tracheal Aspiration Video Fluoroscopy

MBSImP Modified Barium Swallowing Impairment Profile

LEARNING ZONE TRAINING ZONE RELIABILITY ZONE MY PROFILE HELP LOGOUT

14-3 No distension with total obstruction of flow

Nasal		Pharyngeal		Esophageal	
Soft Palate Elevation	Laryngeal Elevation	Anterior Hyoid Excursion	Epiglottic Movement	Laryngeal Vestibular Closure	Pharyngeal Stripping Wave
Pharyngeal Contraction	PES Opening	Tongue Base Retraction	Pharyngeal Residue		



COMPONENT SCORE ANIMATED VIEWS VIDEO

COMPONENT SCORE ANIMATED VIEWS VIDEO

LEFT: 00:00:03 / 00:05:24 RIGHT: 00:00:03 / 00:05:24

Definition of Aspiration

- Results from inhalation of stomach contents or secretions into the lungs
- In many healthy adults, very small quantities of aspiration occur frequently but the normal defense mechanisms (cough, lung cilia) remove the material with no ill effects

Signs of Aspiration

- Choking
- Coughing
- Watery eyes
- Wheezing
- Throat clearing
- SOB
- Unexplained low grade fever
- Unexplained weight loss
- Foul breath odor
- Wet/Gurgly voice
- Bluish tinged skin
- Respiratory changes/chest congestion
- Fatigue
- Refusal to eat or finish meal
- Prolonged eating times
- Pocketing food
- Drooling while eating

Symptoms of Aspiration

- Frequent cough-may have foul-smelling phlegm that may contain streaks of blood. May be greenish in color. May cough up frothy or bubbly fluid.
- Shortness of breath. Breathing is usually noisy. Their heartbeat or breathing while resting may seem faster than normal.
- Fever or chills accompanied with sweat.
- Pain in the chest, while coughing or when taking a deep breath.
- May exhibit confusion, feels dizzy, faint, or is unusually upset or anxious.
- Feeling of suffocation, their skin and fingernails may attain a bluish tinge due to lack of oxygen.
- Fatigue, wheezing and breath odor may also occur.

Symptoms of aspiration pneumonia may take several days to appear, do not ignore them!

Conclusion

- Normal swallow is a very complex function which includes multiple body systems including the nervous system, musculoskeletal system, GI system and respiratory system
- The signs and symptoms of aspiration pneumonia can quickly get worse, if it is not properly diagnosed and treated
- **Aspiration pneumonia can be life-threatening and should be considered an emergency**