

DYSPHAGIA

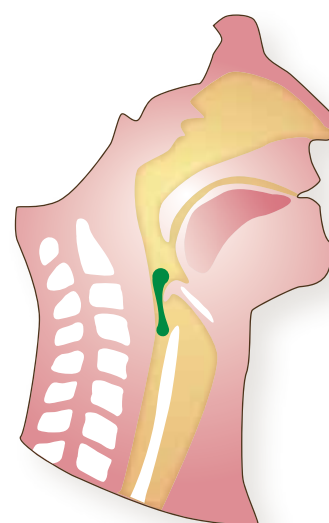
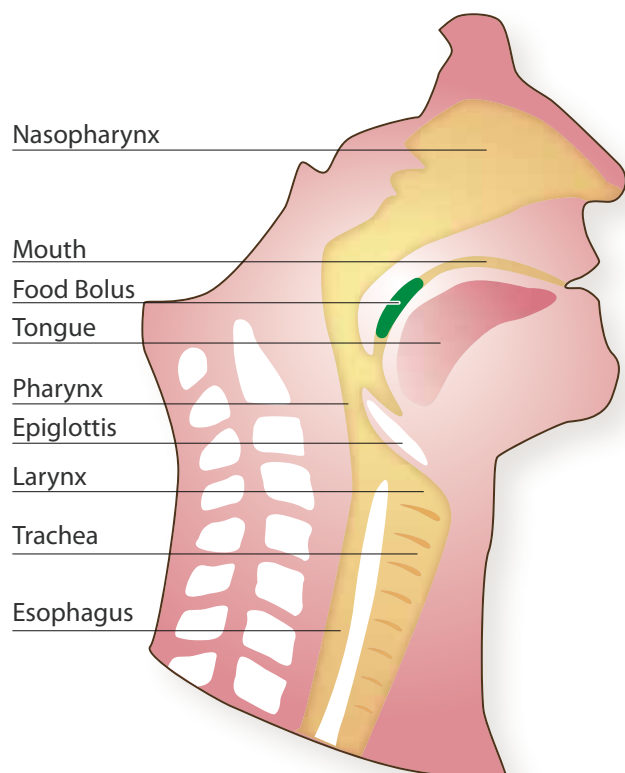
## Swallowing Disorders and TBI

Swallowing is one of the most complex neuromuscular interactions in the human body (American Speech Language Hearing Association, 2004). It involves the skilled coordination of nerves and 50 different pairs of muscles in the face, neck, and esophagus (National Institute on Deafness and Other Communication Disorders, 1988). Individuals who have sustained an acquired brain injury (ABI) are at high risk for swallowing disorders, known as dysphagia, due to the diffuse nature of the lesion(s), damage to cranial nerves, and/or damage occurring to the central nervous system. The incidence of swallowing problems following a traumatic brain injury (TBI) is generally pervasive throughout the early stages of recovery. Likewise, it is also not uncommon to find significant residual problems requiring long-term therapeutic intervention. Studies have reported an incidence rate as high as 80% with 16% of those individuals still needing assistance for eating one-year post injury (Duong, Englander, Wright, Cifu, Greenwald, & Brown, 2004). This article is intended to provide an abbreviated overview of the complex issues related to swallowing disorders in individuals who have sustained a brain injury, and specifically concepts related to anatomy and

physiology, complications, and warning signs.

A normal swallow has three basic phases: Oral (includes oral preparatory functions), pharyngeal, and esophageal. The **oral phase** includes both automatic reflexes and voluntary movements and involves the delivery of food to the mouth, mastication (chewing) with bolus formation (a soft mass of chewed food), and movement of the bolus towards the back of the throat (pharynx). Pressure from the bolus stimulates the pharyngeal trigger mechanism beginning the pharyngeal phase (Logeman, p.29). The entire sequence lasts about one second (Spieker, 2000). Common disorders in the oral phase include: abnormal muscle tone and/or sensation, abnormal/primitive reflexes, difficulty chewing food, forming a bolus, controlling the food bolus and propelling it to the back of the mouth.

The **pharyngeal phase** is reflexive, complex, and the shortest of the phases. It begins with sensory input from the oral cavity and the pharynx that initiates elevation and forward movement of the larynx. The epiglottis moves downward to cover the airway, while additional muscles trigger to close off the nose and to propel the food through the throat. The time taken for the bolus to move from the point when the



*Lateral view of bolus propulsion during the swallow.*

## Symptoms of SWALLOWING DIFFICULTY

Persons can have one or more type of dysphagia at the same time.

Warning signs of dysphagia include:

- Pain with swallowing
- Not able to swallow
- Choking or coughing during eating
- Coughing after swallowing
- Holding food in mouth
- Food leaking from the nose or mouth
- Slow eating
- Facial grimacing
- Reddening of the face
- Sensation of food getting stuck
- Pressure or pain in chest
- Vomiting
- Frequent heartburn
- Reflux
- Wet voice
- Unexpected weight loss
- Eye watering
- Throat clearing

pharyngeal swallow is triggered to the esophagus is normally one second or less (Logeman, p.35). The pharyngeal trigger activates twenty-nine muscle pairs during this process (Kelly & Buchholz, 1996). Common disorders in the pharyngeal phase include: delayed or absent trigger of the swallow, nasal regurgitation, poor coordination of the airway protection valves, and decreased tongue base retraction.

The pharyngeal phase is followed by the **esophageal phase** in which the bolus is propelled about 25 cm through the esophagus to the opening of the stomach. The esophageal phase is involuntary, resulting from peristalsis and gravity, and may take up to 20 seconds (Spieker, 2000). Common disorders in the esophageal phase include: motility disorders, mechanical obstructions, and complaints of food sticking in the throat or chest.

Disruption to any of the three phases of the normal swallow (oral, pharyngeal or esophageal) is serious and can be life threatening. Complications arise when food or liquid spills, penetrating the entrance of the airway, and is aspirated into the trachea and into the lungs. Aspiration pneumonia may develop due to the presence of foreign material in the lungs. Aspiration may occur silently and does so in about half of persons with dysphagia; thereby the signs are not detected until symptoms of pneumonia are observed (Agency for Health Care Policy and Research, 1999).

In addition to leaking or spilling food/liquid into the airway, food particles left behind in the mouth between the teeth and facial musculature or in spaces within the pharynx can lead to aspiration. The food may become dislodged and penetrate the airway and be aspirated. Esophageal complications may include the development of a pocket outside the esophagus caused by weakness in the esophageal wall. The abnormal pocket traps food being swallowed. While lying down or sleeping, the undigested food may be drawn back up into the pharynx. The esophagus may also be too narrow, causing food to stick and preventing other foods or liquid from entering the stomach.

When one or a combination of warning signs are noted, a consultation for a possible swallowing disorder is immediately warranted. The consultation from a physician or speech & language pathologist will include testing to look at the integrity of the swallowing mechanism. Following testing, recommendations and individualized treatment plans are created to address the specific impairments and to develop efficient and effective

## Swallowing Disorders and TBI *continued*

treatment. Research has indicated swallowing rehabilitation can be successful in reducing the risk of pneumonia and improving nutritional intake/status (Logeman, p.246).

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## National DYSPHAGIA DIET LEVELS

### NPO (nothing per oral)

- Patients on a NPO diet are considered unsafe to consume anything orally.
- All nutrition/hydration is through an alternative means.

### Level 1: Pureed Diet

- All solids need to be the consistency of pudding or yogurt. There should be no chunks of food present.
- This diet decreases the difficulty and exertion associated with:
  - Chewing
  - Manipulation

### Level 2: Mechanically Altered Diet

- This diet should contain moist, semi-solid foods including macaroni and cheese, meatloaf, bananas, scrambled eggs, etc.
- All meats should be ground and kept moist with gravy or sauce.
- This diet level requires some chewing.

### Level 3: Advanced Diet

- Soft moist foods that require more chewing ability.
- Clients at this diet level would be able to tolerate hamburger patties (no buns), fish, casseroles with small chunks, canned and cooked fruits and vegetables, etc.
- No hard or crunchy food.
- Foods should be cut into bite-size pieces.

### Level 4: Regular Diet

- All consistencies are allowed on this diet.
- No restrictions.