

Swallowing Patterns

Three types of positive and negative pressure variations impact the bolus and control of the swallow. These include the positive and negative pressures associated with the muscular forces of the mouth, pharynx and esophagus; the filling and emptying of the bolus in the tract; and the pressures of respiration, including subglottic pressure variations. Swallowing occurs in three stages. In the first stage, oral transit, (here defined as including oral prep) the tongue cups to position the food/ fluid/saliva for swallowing, and the front of the tongue elevates, followed by elevation of the middle and then the back of the tongue. The food is propelled into the pharyngeal esophageal (P-E) segment, which is the beginning of the second stage of swallowing, pharyngeal transit. The epiglottis comes down to protect the trachea as the hyoid bone elevates (carrying the thyroid cartilage and larynx upward) and then immediately returns to the pre-swallow position. The third stage, esophageal transit, then begins, with a peristaltic wave that propels the bolus down the esophagus into the stomach.

◆ Dysphagia

Is defined as difficulty in swallowing or the inability to swallow. This may be due to pressure imbalances, structural changes or abnormality in innervation of the pharyngeal or esophageal muscles. The ability to swallow may also be affected by more readily remediated oral mechanical problems. Dysphagia due to innervation problems or structural deviations at the second and third stages of swallowing should be differentiated from difficulty in the first stage (oral), which may be improved through positioning, handling techniques, techniques to control the flow and placement of food and fluids, and oral motor interventions.

Why Is It Important? As the above description indicates, swallowing difficulties may lead to short-term problems, such as coughing, and long-term problems, such as aspiration, pneumonia and scarring of the lungs. Knowledge of swallowing abilities will assist in determining strategies for controlling positioning and the flow and placement of food and fluids to encourage more efficient swallowing.

How is it Recognized? Normal swallowing includes primitive and mature patterns. During swallow, for best function, inhalation should be completed before or during the oral transit phase, after which the pharyngeal phase is completed, followed by exhalation. Inhalation prior to the pharyngeal phase enhances airway protection due to increased subglottic air pressure. Swallowing after exhalation is more dangerous, due to the decreased subglottic air pressure, making aspiration into the airway easier.

◆ In the primitive pattern, the person is able to complete only one suck/swallow sequence per inhalation/exhalation cycle. This may be due to rapid, shallow or irregular breathing patterns.

◆ In the mature pattern, the person can complete two or more swallows per breath (consecutive swallowing). But even for the normal population, there is a limit to the number of swallows per breath, usually not more than 5 to 7. When the brain stem registers a significant lack of oxygen, it tells the body to breathe now, even if food or fluid is in the pharynx.

Abnormal swallowing patterns include:

- ◆ No active swallowing, in which there is no discernible upward movement of the cartilage and larynx. Substances appear to flow into the pharynx via gravity. The head and neck may be hyperextended.

- ◆ Incoordination of suck/swallow/breathing in which the person breathes while food/fluids are in the pharyngeal-esophageal segment, or the bolus moves into the airway during the swallow, often resulting in coughing and possible aspiration into the lungs

Drooling (Sialorrhea or Ptyalism)

We typically produce between .75 and 1.75 liters of saliva a day. Loss of saliva from the mouth may occur for a variety of reasons including borderline dehydration, gum or tooth disease, reflux, upper respiratory infections, allergies, mouth breathing, body position, reduced level of activity or alertness, intensity of concentration, and impaired patterns of movement for the lips, cheeks, tongue and jaw may also result in drooling. Medications which increase drooling may include antipsychotics, particularly Clozapine, direct and indirect cholinergic agonists used to treat dementia and myasthenia gravis, heavy metal toxins (mercury and thallium), exposure to insecticides and nerve agents, yohimbine and mucosa-irritating antibiotics. If medications are used to reduce drooling, complications may include mucous plugs in the lungs. Programs emphasizing conscious control of saliva are typically not effective interventions to reduce drooling.

Gagging

Gagging is a protective reflex. It may be elicited by a number of different stimuli including olfactory (smell); visual; touch to the posterior third of the palate, inner gums or tongue; touch to the pharynx; stimulation of the vagal nerve in the gastrointestinal track; and stimulation of the semicircular canals in the inner ear following rapid movement of the head or body. Gagging may also occur if a more functional oral response, such as muscle contraction, chewing or swallowing, is not present due to oral motor impairment. By providing controlled pressure and movement on the face and within the mouth, an individual with oral motor impairment can develop those more functional responses, so that gagging is normalized. The goal is to normalize the gag, not to extinguish it. The gag is necessary for protection of the body from unfamiliar or harmful stimuli.