Management of Dysphagia in Stroke

An Educational Manual for the Dysphagia Screening Professional in the Long-Term Care Setting
Acknowledgements

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The Ontario Stroke System is a comprehensive stroke strategy with the goal of providing the best possible care to all individuals who suffer a stroke anywhere in the province. One important aspect of this strategy is improving the recognition and management of dysphagia, or difficulty swallowing.

Dysphagia is one of the most common sequelae following acute stroke, affecting as many as 55% of patients. Dysphagia may resolve within 14 days after stroke or it may persist for longer periods of time. In Canada in 1994, it was estimated that dysphagia was present in 15,000–21,000 new stroke patients older than 65 years of age, and that only half of these individuals would recover within the first week, with the other half living with dysphagia for months after the stroke. Also, as the Canadian population ages, the incidence of new stroke with dysphagia is expected to continue increasing over the next few years.

The presence of dysphagia in stroke survivors has been associated with increased mortality and morbidities such as malnutrition, dehydration and pulmonary compromise. However emerging evidence indicates that early detection of dysphagia in acute stroke survivors improves outcomes such as pneumonia, mortality, length of hospital stay and overall healthcare expenditures.

The Heart and Stroke Foundation of Ontario, as part of its commitment to realizing a comprehensive stroke strategy, convened an expert panel to develop a series of educational resources on the management of dysphagia in acute stroke. Management of Dysphagia in Acute Stroke: An Education Manual for the Dysphagia Screening Professional has been previously developed for acute stroke survivors. Subsequently, Management of Dysphagia in Stroke: An Education Manual for the Dysphagia Screening Professional in the Long-Term Care Setting was adapted for registered nurses (RNs), registered practical nurses (RPNs), occupational therapists (OTs), physiotherapists (PTs), and registered dietitians (RDs) caring for stroke survivors in long-term care facilities. These trained screeners work alongside a dysphagia expert in the community such as a speech-language pathologist (SLP).
# Table of Contents

I. **Dysphagia and Stroke Care** ................................................................. pg 5  
Dysphagia and the Stroke Survivor in the Long-Term Care Setting .......................... pg 5  
Vision for Dysphagia Management ....................................................................... pg 5  
Best Practice Guidelines for Managing Dysphagia in Long-Term Care ...................... pg 6  
Review Questions .............................................................................................. pg 8  

II. **Swallowing: Anatomy, physiology and pathophysiology** ................................. pg 9  
Normal Swallowing ......................................................................................... pg 9  
   Anatomy ....................................................................................................... pg 9  
   Physiology .................................................................................................... pg 10  
   Coordination of Swallowing, Speaking, and Breathing ........................................ pg 12  
Swallowing in the Elderly ................................................................................... pg 13  
Impaired Swallowing: Dysphagia ....................................................................... pg 13  
   Types of Dysphagia .................................................................................... pg 14  
   Complications of Dysphagia ....................................................................... pg 16  
   Dysphagia Risk Factors ............................................................................. pg 17  
Review Questions .............................................................................................. pg 19  

III. **Clinical Approach to Dysphagia** ............................................................... pg 20  
Interprofessional Dysphagia Care Team ................................................................ pg 20  
Dysphagia Screening ......................................................................................... pg 25  
   Toronto Bedside Swallowing Screening Test (TOR-BSST©) ................................. pg 26  
Dysphagia Assessment ..................................................................................... pg 27  
   Clinical Bedside Assessment ....................................................................... pg 27  
   Instrumental Assessment ............................................................................ pg 27  
Ongoing Monitoring .......................................................................................... pg 28
Table of Contents

Clinical Indicators of Possible Dysphagia ..........................................................pg 28
Dysphagia Management .......................................................................................pg 30
  Oral Hygiene .................................................................................................pg 30
  Oral and Non-Oral Intake ..............................................................................pg 33
  Safe Feeding Practices .................................................................................pg 37
  Education and Counselling .........................................................................pg 40
  The Continuum of Dysphagia Care ..............................................................pg 42
Review Questions .............................................................................................pg 42

IV. Dysphagia Case Studies ...............................................................................pg 43
  Case study #1 .............................................................................................pg 43
  Case study #2 .............................................................................................pg 44
  Case Study #3 ............................................................................................pg 44

V. Appendices
  1. The Dysphagia Care Team .................................................................pg 45
  2. Medications That Should Not be Crushed ..............................................pg 46
  3. Communication Strategies for Healthcare Professionals working with Residents with Aphasia .........................................................pg 47

VI. Glossary ....................................................................................................pg 48

VII. References ...............................................................................................pg 52
Implementation of optimal stroke care includes identifying and managing dysphagia. Dysphagia may be evident immediately after a stroke, or it may develop during the first few days after a stroke. Studies indicate that almost 50% of acute stroke patients have some degree of dysphagia within the first 72 hours after the stroke. Of those initially affected, approximately 50% continue to have dysphagia one week after the onset of the stroke. Those who remain affected after the first week experience much slower swallow recovery.

Undetected dysphagia may lead to potentially serious medical complications, including dehydration, malnutrition and aspiration pneumonia. Risk for pneumonia increases 3-fold for stroke survivors with dysphagia. Evidence supports the importance of identifying and managing dysphagia in stroke survivors as a strategy to reduce these complications. Dysphagia is also associated with an increased length of hospital stay, institutional care, and increased mortality. As a result, promptly detecting dysphagia and instituting appropriate management strategies is expected to shorten length of stay and reduce medical complications.

Few long-term care (LTC) facilities have a speech-language pathologist (SLP) dysphagia expert on staff. Access to this professional is limited to consultation from the community (e.g., Community Care Access Centre). As a result, it is important that staff who work in the LTC facility are trained to identify stroke survivors at risk for dysphagia to allow an appropriate and timely referral to the consultant SLP for a full swallowing assessment.

The Heart and Stroke Foundation has identified a vision for identifying and managing dysphagia in acute stroke survivors in Ontario. This vision has been maintained in the LTC adaptation. The vision states that:

- All stroke survivors will have access to rapid and timely [swallowing] screening to minimize the development of complications. Stroke survivors who have a positive result from screening will have access to a rapid and timely comprehensive dysphagia assessment by a [dysphagia expert]. Those stroke survivors found to have dysphagia will receive appropriate individualized and nutritional management that meets the best practice guidelines for managing dysphagia.

The Registered Nurses’ Association of Ontario (RNAO) has echoed this vision for stroke survivors in their best practice guidelines, Stroke Assessment Across the Continuum of Care, which were developed in collaboration with the Heart and Stroke Foundation of Ontario (HSFO). These guidelines focus on stroke assessment across the continuum of care. More specifically related to dysphagia these guidelines recommend:

- Nurses in all practice settings, who have appropriate training, should administer and interpret a dysphagia screen within
24 hours of the stroke client becoming awake and alert. This screen should also be completed with any changes in neurological or medical condition, or in swallowing status. In situations where impairments are identified, clients should be referred to a trained healthcare professional for further assessment and management.

Because Ontario has a shortage of dysphagia experts especially in the LTC setting, for example SLPs, achieving this vision requires the creation of interprofessional dysphagia care teams trained to identify dysphagia risk and collaborate with dysphagia experts to manage dysphagia in stroke survivors.

A pilot project completed in the Toronto West Stroke Network in 2005/2006 supported the establishment and training of interprofessional dysphagia care teams in LTC facilities. Educational support for the team related to dysphagia was provided through the SLP working within the Regional Stroke Network. The SLP dysphagia expert in the community provided the swallowing assessment for stroke survivors identified at risk for dysphagia. The Dysphagia Care Team was made up of two subgroups: screeners and feeders. Screeners included regulated healthcare professionals (e.g., nurse, dietitian) who were trained to screen stroke survivors for dysphagia and refer those survivors who fail screening for a full assessment by the SLP dysphagia expert. Feeders were unregulated healthcare professionals (e.g., personal support workers, activation staff) who were trained in safe feeding and swallowing strategies to allow successful implementation of the SLP recommendations post swallowing assessment.

The team could include a physician (MD), registered nurse (RN), registered practical nurse (RPN), occupational therapist (OT), registered dietitian (RD), physiotherapist (PT), personal support worker (PSW), health care aide (HCA), rehabilitation assistant (OTA/PTA), activation, restorative, pastoral care, environmental, housekeeping and food services staff, dietary aid, member of the management team (i.e., Director of Care, Administrator, Programs Director) and the offsite SLP consultant. The team members would be trained to:

- Screen all newly admitted and/or resident stroke survivors (by Screeners).
- Refer residents with a positive screen to the SLP (by Screeners).
- Practice safe feeding and swallowing care during meal times (by Feeders).
- Act as a contact/resource for family and staff. (by Screener and Feeders).

**Best Practice Guidelines for Managing Dysphagia in Long-Term Care**

The best practice guidelines for long-term care were adapted from the acute version. These guidelines provide a benchmark against which facilities with stroke survivors can measure their progress in improving the management of dysphagia post stroke.

1. Screen all stroke survivors for swallowing difficulties within 24 hours of admission to the long-term care facility. A Screener member of the Dysphagia Care Team trained to administer the swallowing screening test and interpret the results should perform the screening. If the stroke survivor is known to have a previously identified dysphagia, the Screener should abide by recommendations detailed in the admission notes and arrange follow-up SLP intervention as indicated.
2. If the stroke survivor has a positive result on the swallowing screening, the Screener will:
   - Complete a referral for a swallowing assessment by the consultant SLP dysphagia expert.
   - Notify the in-house dietitian of the failed swallowing screening.
   - Recommend the stroke survivor continues oral intake (PO – per os), with close monitoring for tolerance, on the diet consistency deemed to be safest until the swallowing assessment can be completed.
   - Notify the Feeder team members to closely monitor the survivor during eating and drinking since a swallowing assessment is pending.
   - Recommend the survivor be maintained nil per os (NPO) only in situations where continued PO safety is in question. NPO prohibits the administration of oral medications, water, and ice chips. Intravenous fluids may be required. As a result, this may necessitate transfer to the closest emergency department as a swallowing assessment by the consultant SLP is unlikely to be completed within 24 hours of the referral.

3. Assess the swallowing ability of all stroke survivors who have a positive result on swallowing screening. The assessment includes a clinical bedside examination and, if warranted by the clinical signs, an instrumental examination. An SLP dysphagia expert, in consultation with other team members, should:
   - Assess the stroke survivor’s ability to swallow food, liquid, and medications.
   - Determine the level of risk of dysphagic complications, including airway obstruction, aspiration of food and liquid and inadequate nutrition and hydration.
   - Identify associated factors that could interfere with adequate oral nutrition and hydration or lead to aspiration-related complications, such as impaired motor skills, cognition or perception.
   - Recommend appropriate individualized management, which may include changes in food or fluid consistency, feeding strategies, swallowing therapy, oral care regimens and possibly referral to other healthcare professionals.

4. Assess the nutrition and hydration status of all stroke survivors with a positive screening. The stroke survivor’s MD and RN/RPN may monitor hydration status and initiate appropriate laboratory investigations. An RD, in conjunction with other team members, should:
   - Assess energy, protein and fluid needs.
   - Recommend alterations in diet to meet energy, protein and fluid needs in accordance with allowable food texture and fluid consistency.

5. The Screener team member should communicate results and recommendations from the swallowing assessment to other team members (e.g., Food Services, RD, Activation, PSW/HCA and MD) to ensure continued safety and continuity of care with respect to oral intake.

6. Provide feeding assistance or mealtime supervision to all stroke survivors. Feeder team members or those trained in low-risk feeding strategies should provide this assistance or supervision. The Screener team member should moni-
tor mealtimes and provide assistance and support to the Feeder team members as needed.

7. Perform regular mouth-clearing or oral care procedures to prevent colonization of the mouth and upper aerodigestive tract with pathogenic bacteria. Minimal amounts of water can be used to wet utensils before inserting them into the survivor’s mouth.

8. Arrange for a reassessment of all stroke survivors receiving modified texture diets or enteral feeding for alterations in swallowing status regularly. Stroke survivors known to have dysphagia should be re-evaluated by an SLP dysphagia expert at minimum intervals of every two to three months during the first year after the stroke and then every six months thereafter. The severity of swallowing impairment and the rate of improvement may alter the reassessment schedule.

9. Provide the stroke survivor or substitute decision-maker with sufficient information to allow informed decision making about nutritional options. Consider the wishes and values of the stroke survivor and family concerning oral and non-oral nutrition when developing a dysphagia management plan.

10. Act as resource to all stroke survivors, family members and care providers regarding dysphagia and feeding difficulties post stroke. Explain the nature of the dysphagia and recommendations for management, follow-up and reassessment. Consult other team members as necessary.

Review Questions

1. At what point after admission to LTC is it appropriate to screen a newly admitted stroke survivor for dysphagia?
2. Who can complete the dysphagia screening for stroke survivors?
3. Who should be referred to an SLP dysphagia expert for a swallowing assessment?
4. When should stroke survivors known to have dysphagia have their swallowing status reassessed?
Swallowing: Anatomy, Physiology and Pathophysiology

Normal Swallowing

Efficient swallowing involves the combination of sensory information and motor activity in the mouth and surrounding anatomic structures. The sensory components include the perception of taste, viscosity, temperature, smell and tactile input from the teeth, oral mucosa and tongue. Eating involves two motor processes: feeding, which entails recognizing food and drink and transporting it to the mouth; and swallowing, which involves moving food from the mouth to the stomach, with no negative impact on breathing.

Anatomy

Swallowing is a complicated process that involves the oral cavity, pharynx, larynx and esophagus (Figure 1). This process is the product of a series of events that require an intact nervous system and adequate musculature for initiation, facilitation, and conclusion of a safe swallow.

Figure 1 Anatomy of swallowing
The oral cavity begins at the lips and includes the teeth, gums, tongue, hard palate and soft palate (velum), the uvula, faucial arches and cheek muscles. The oral and nasal cavities are connected at the back of the throat by a passage with a valving action that closes during swallowing. This valving action prevents food and liquid from entering the nasal cavity. Also, within the oral cavity are three pairs of salivary glands. Saliva produced by these glands maintains oral moisture, reduces tooth decay, assists with digestion, and neutralizes stomach acid.

The pharynx, or throat, is a muscular tube that is involved both in ingesting food and breathing. The base of the tongue forms the front of the pharynx, and the side and back muscular walls enclose the pharynx. The pharyngeal spaces include the valleculae and pyriform sinuses. Also, in the pharynx is a small piece of cartilage known as the epiglottis. The pharyngeal muscles help propel food through the throat toward the esophagus.

The larynx or voice box is located at the front of the neck, directly in front of the junction between the pharynx and esophagus and just above the trachea (i.e., airway). The larynx acts as a passageway for air to the lungs. Functions of the larynx are varied and include the following:

- Passage for inhaled and exhaled air.
- Role in voice production.
- Prevention of foreign objects, including food, from entering the trachea, and ejection of any inhaled foreign objects.
- Pressure-regulating valve allowing safe and efficient swallowing.

The esophagus is a collapsed muscular tube with sphincters at both ends; the upper esophageal sphincter (UES) and the lower esophageal sphincter (LES). The esophagus transports food from the pharynx to the stomach. Opening of the UES initiates the esophageal phase of swallowing. Esophageal peristalsis helps to push the food and drink toward the stomach. Closing of the LES completes the esophageal phase of swallowing and prevents regurgitation, or reflux, of stomach contents, including acid, into the esophagus.

**Physiology**

Effective swallowing depends on the coordinated action of 25 pairs of muscles. These muscles are controlled by 5 cranial nerves: the trigeminal (V), facial (VII), glossopharyngeal (IX), vagus (X) and hypoglossal (XII).

**Stages of swallowing**

Swallowing physiology can be divided into 4 stages: the oral preparatory stage, the oral propulsive stage, the pharyngeal stage, and the esophageal stage. The oral stages of swallowing involve voluntary actions, and the pharyngeal and esophageal stages of swallowing involve involuntary actions.

**Oral preparatory stage**

The oral preparatory stage involves the muscles of the lips, cheeks and mandible; the teeth, and the tongue. The teeth and muscles of the mouth chew the food and form it into a ball known as the bolus. Taste, temperature, and texture information stimulate production of saliva, which adds moisture to bind the bolus. Papillae on the tongue also provide sensory information that helps to prepare the bolus to the right size and consistency. The tongue holds the bolus against the front of the hard palate, while the lips and jaw close, sealing the mouth (Figure 2). Liquids are also formed into a bolus. The length of the oral preparatory stage varies, depending on the amount and texture of the food and individual
eating habits. During the oral preparatory stage of swallowing, the larynx and pharynx are at rest, the airway is open, and normal breathing continues. 22 This is the stage of swallowing from which most people derive the greatest pleasure.

**Figure 2** Oral preparatory stage of swallowing

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Oral propulsive stage

The oral propulsive stage of swallowing occurs when the tongue, the primary muscle in the oral stage, begins transporting the bolus from the oral cavity to the pharynx. The tongue elevates and moves from the front of the mouth to the back, with the surface of the tongue pushing against the hard palate and squeezing the bolus backwards until it reaches the pharynx (Figure 3). 23 This stage of swallowing typically takes 1-1.5 seconds. 22

**Figure 3** Oral propulsive stage of swallowing

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Pharyngeal stage

When the bolus reaches the area at the level of the tonsils, the pharyngeal stage of swallowing begins. This stage of swallowing is reflexive, and it occurs quickly, typically in less than two seconds. The soft palate elevates against the back of the throat triggering closure and preventing solids and liquids from entering the nasal cavity (Figure 4a). Within the larynx, the vocal cords close, preventing food and drink from entering the trachea or airway. This closure of the vocal cords results in a momentary pause in breathing. The airway is further protected by the backward movement of the epiglottis, which directs food into the esophagus and away from the larynx. The larynx elevates, assisting in opening the UES (Figure 4b). The bolus moves quickly and smoothly through the pharynx and its spaces, the valleculae and pyriform sinuses (Figure 4c). At the end of the pharyngeal stage, the bolus passes to the esophagus. 19, 23

**Figure 4** a) Soft palate elevates against the back of the throat triggering closure. b) Vocal cords close, epiglottis lowers, and larynx elevates. c) Bolus moves quickly and smoothly through the pharynx.

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Esophageal stage

During the esophageal stage of swallowing, the bolus is propelled down the esophagus by waves of peristaltic contractions. It takes 8-20 seconds for the bolus to travel from the UES to the LES, making the esophageal stage considerably longer than the pharyngeal stage (Figure 5). After the bolus enters the stomach, the LES
closes preventing gastroesophageal reflux.

**Figure 5** Bolus is propelled down the esophagus

Swallowing, speaking and breathing are three basic human functions that use many of the same anatomical structures. For example, the lips produce sounds, but they can also prevent food or liquid from leaking from the mouth during chewing. The tongue is involved in speech, and it also propels the bolus back into the pharynx and esophagus during swallowing. The larynx produces the voice, but it also seals the airway during swallowing, so that food and liquid do not enter the lungs.

An important reciprocal relationship exists between the functions of breathing and swallowing, as they use many of the same muscles. Air flows into and out of the lungs through the nasal passages and the pharyngeal cavity. The pharynx, however, is a shared passage for the movement of air and for the transport of food and liquid into the esophagus. The larynx also plays a dual role: it protects the airway from food and liquid during swallowing, and it maintains an open airway for effortless breathing. Breathing and swallowing cannot occur at the same time. During swallowing, the larynx closes the airway through a series of valving actions. The epiglottis deflects downward to direct food and liquid into the esophagus, and the vocal cords contract to close off the trachea.

Breathing therefore stops for a fraction of a second during the transition from the pharyngeal to the esophageal stage of swallowing. This pause in breathing, known as swallowing apnea, ensures airway protection. Swallowing apnea begins with airway closure when the bolus reaches the lower pharynx and finishes when the last of the bolus enters the esophagus. The length of the apneic period increases with bolus size. The timing of swallowing and breathing must be...
coordinated to prevent inhalation of food or liquid. Changes in muscle strength and timing can affect this coordination.

**Swallowing in the elderly: Presbyphagia**

Aging is a systemic process that affects physiologic functions to varying degrees. Age-related changes that can affect swallowing result from loss of muscle tone, loss of elasticity of connective tissue, decreased saliva production, changes in sensory function, and decreased sensitivity of the mucosa. In healthy individuals, age-related changes in swallowing are known as primary presbyphagia. Changes in muscle and nerve function begin around 50 to 60 years of age, but the most significant loss of muscle strength, approximately 30%, occurs between 50 and 80 years of age as muscle mass diminishes. These age-related changes reduce motility of the pharyngeal and esophageal muscles, changing the movements of the epiglottis, reducing closure of the vocal cords, and altering UES function. In addition to these physiologic changes, older adults have a higher rate of structural abnormalities that can also affect the pharyngeal and esophageal stages of swallowing, such as pharyngeal webs and diverticula; osteophytes; cervicothoracic kyphoscoliosis; and rheumatoid arthritis. In addition, poor dentition or poorly fitting dentures can impair the oral stages of swallowing.

Healthy elderly individuals can compensate for presbyphagia. However, dysphagia can result when presbyphagia is compounded by changes resulting from fatigue or weakness or from a concomitant disease process, such as stroke. The prevalence of dysphagia in healthy individuals 60 to 95 years of age is estimated to be 8 to 16%, and yet it is estimated to occur in more than 50% of acute stroke survivors.

**Did you know?** The gag reflex does not help with the process of swallowing. The purpose of swallowing is to ingest food and drink while the gag reflex functions to eject foreign objects. The absence of a gag reflex does not indicate that a resident will have dysphagia nor does the presence of a gag reflex exclude the possibility that the resident may have dysphagia.

**Impaired Swallowing: Dysphagia**

Dysphagia is defined as difficulty or discomfort in swallowing, and the term describes a set of symptoms or signs related to changes in swallowing. Any motor, sensory or structural changes to the swallowing mechanism can result in impaired swallowing. Dysphagia is one of the most common sequelae of acute stroke, affecting as many as 55% of acute stroke survivors. Individuals with stroke may have reduced cognitive abilities, advanced dementia, reduced ability to sequence swallowing patterns, or may not recognize the purpose of food. Stroke can affect any or all of the stages of swallowing, thus affecting an individual’s ability to eat and drink safely.
Types of Dysphagia

Oral Dysphagia

Oral dysphagia refers to dysphagia affecting the voluntary, or volitional, stages of swallowing, during which movement of the bolus can be controlled. Stroke can cause oral dysphagia through a variety of mechanisms. Post stroke changes to facial muscle strength and/or movement as well as oral motor movement and planning difficulties can affect this volitional control. Stroke can also affect underlying oral processes and sensations involved in swallowing, such as salivary flow and taste and temperature sensitivity.

Oral Preparatory Dysphagia

A stroke may reduce the strength, coordination and control of oral muscles involved in swallowing, decreasing the stroke survivor’s ability to manipulate food and form a bolus (See Fig 2 page 11). As a result, dysphagia in this stage of swallowing affects preparation of the bolus. Dysphagia is also present if the oral preparatory stage is prolonged.

If a stroke survivor is experiencing oral preparatory dysphagia you may notice the following:

- Drooling
- Spillage of food or liquid from the mouth.
- Difficulty drinking from a straw or taking food from a cup or spoon without spillage.
- Slow eating
- Dry mouth
- Food residue remaining in the mouth after swallowing.
- Food refusal or complaints of poor taste.

Oral Propulsive Dysphagia

During the oral propulsive (or transit) stage, the tongue transfers the bolus of food or liquid from the oral cavity to the pharynx, triggering the pharyngeal stage of swallowing (See Fig 3 page 11). Dysphagia in the oral propulsive stage affects the effectiveness of this movement of the bolus. Dysphagia is present if the oral propulsive stage is prolonged; taking more than 2 seconds to complete.

If a stroke survivor is experiencing oral propulsive dysphagia you may notice the following:

- Pocketing of food in spaces between the gums and cheeks.
- Food, liquid or saliva pooling at the front of the mouth.
- Food or drink running from the nose.
- Holding food in the mouth.
- Unusual tongue movements to start the swallow or attempt to move the bolus.

Pharyngeal Dysphagia

During the pharyngeal stage of swallowing, the bolus moves from the back of the mouth to the esophagus. Pharyngeal dysphagia can be harder to identify because the affected anatomical structures and processes are not easily seen. During the pharyngeal stage, a coordinated series of events, involving complex movements of the tongue and pharyngeal structures, propels the bolus into the esophagus while protecting the airway (See Fig 4 page 11). Stroke can affect the timing of the swallow, clearance of residue,
adequacy of airway protection and the flow of the bolus through the pharynx resulting in pharyngeal stage dysphagia. The pharyngeal stage of swallowing can be delayed if the bolus does not trigger a pharyngeal swallow. Because the signs can be subtle, caregivers may not suspect pharyngeal dysphagia, especially if the oral stages of swallowing are unaffected.

If a stroke survivor is experiencing pharyngeal dysphagia you may notice the following:

- Throat clearing, coughing, choking when eating or drinking.
- Difficulty swallowing — gulping.
- A wet or gurgly sounding voice when eating or drinking.
- Breathing difficulties — shortness of breath during meals.
- Late or no movement of the Adam’s apple with swallowing.
- Report of food sticking in their throat.
- A history of recurrent pneumonias.

Esophageal Dysphagia

Esophageal peristalsis propels the bolus from the UES, through the esophagus, and past the LES toward the stomach (See Fig 5 page 12). The LES relaxes, allowing the bolus to pass, but contracts again immediately after the entire bolus enters the stomach to prevent gastroesophageal reflux. Similar to the pharyngeal stage, the signs of esophageal stage dysphagia are more difficult to identify because the anatomical structures and processes are not easily seen. Stroke can affect the timing, effectiveness and clearance of residue in the esophageal stage. This stage of swallowing may be prolonged if the bolus takes longer than normal to travel to the stomach.

Esophageal dysphagia can also be characterized by retention of food in the esophagus caused by a mechanical obstruction, motility disorder, or impaired LES function.

If a stroke survivor is experiencing esophageal dysphagia you may notice the following:

- Reflux of food into the throat or mouth.
- Report of food sticking in the throat or chest.
- Heartburn
- Vomiting of undigested food.
- Report of sour taste in mouth, especially in morning.

Dysphagia can affect all four stages of swallowing. Your observations will vary depending on which stage(s) of swallowing is/are affected. If you observe difficulty, this suggests the presence of a swallowing problem and further investigation is required. As a result, the resident should be referred to an SLP dysphagia expert for a swallowing assessment.
Complications of Dysphagia

Aspiration

Aspiration occurs when food or liquid enters the trachea. Signs of aspiration include coughing, shortness of breath, difficulty breathing, and respiratory complications. The occurrence of aspiration with no observable signs (i.e., no coughing or throat clearing) is known as silent aspiration. Stroke can cause reduced laryngeal sensation, increasing the resident’s risk for silent aspiration. Silent aspiration can be undetected until a complete swallowing assessment is administered.

Malnourished individuals have a higher risk of aspiration, because muscles are weakened, reducing breathing strength, throat clearing, and coughing. Aging affects both breathing and swallowing, increasing the risk of aspiration. These normal changes are compounded by stroke, chronic obstructive pulmonary disease (COPD), and other medical conditions.

Aspiration Complications

Dysphagia is strongly associated with aspiration pneumonia, a chest infection caused by the entry of foreign substances and/or bacteria into the lungs. This common respiratory complication following stroke is associated with repeated entry of food or liquid into the lungs due to abnormal swallowing physiology. Not everyone who aspirates develops aspiration pneumonia.

The likelihood that someone will develop aspiration pneumonia is based on the following risk factors:

- Difficulty with oral hygiene – including dental caries.
- Decreased cognitive status and level of alertness.
- Poor baseline chest status.
- Inability to cough and clear secretions.
- Inability to sit upright.
- Inability to walk.
- Dependency on others for care (i.e., feeding).

The risk of developing aspiration pneumonia is also affected by what is aspirated, how much is aspirated, how far it travels into the respiratory system and the person’s ability to clear the aspirate from their lungs. For example, a bolus that is acidic (e.g., orange juice) when aspirated in large quantities is at greater risk of causing pneumonia.

Did you know? The cough reflex can be impaired or absent in residents with dysphagia, so silent aspiration may occur.

Malnutrition

Malnutrition is the result of an imbalance between a person’s caloric need and a person’s actual intake. Malnutrition is common among the elderly. Sixteen percent of individuals with acute stroke are malnourished on admission to hospital. Over time, malnutrition can develop or worsen in stroke survivors. Up to 50% of stroke survivors admitted to rehabilitation from acute care may be malnourished. Signs of malnutrition include:

- Weight loss
- Confusion
- Fatigue
- Dizziness
- Skin breakdown
 Decreased resistance to infection.

If you notice these signs and suspect that the resident may be suffering from malnutrition it is important to notify the registered dietitian (RD). The RD can assess the clinical indicators of malnutrition, such as weight loss, decreased body mass index (BMI) and evaluation of biochemical indices.4

Dehydration

Dehydration is a water and electrolyte disturbance resulting from either water loss or depletion of sodium with accompanying water loss. Dehydration can develop when metabolic water needs and losses exceed intake, for example, with vomiting and diarrhea. 51, 52 As elderly individuals may have a decreased sense of thirst, dehydration becomes more common with age. Almost 25% of individuals over 70 years of age are dehydrated on admission to hospital, and more than 33% of long-term care residents admitted to hospital are dehydrated. 50

Dysphagia is a risk factor for dehydration because it is associated with an inability to manage liquids safely. In older adults the risk for dehydration increases because of impaired cognition, reduced mobility and need for feeding assistance. 53, 54 Dehydration is an important predisposing factor in stroke reoccurrence.50, 55 Signs of dehydration include the following48:

- Confusion
- Dry mouth and tongue.
- Sunken eyes
- Dry loose skin (decreased skin turgor).
- Decreased urine output.

If you notice these signs of dehydration it is important to request that the physician (MD) and the RD assess the resident’s hydration level. If the hydration status cannot be improved by oral means the resident may require transfer to hospital for temporary intravenous fluids support.

Dysphagia Risk Factors

Stroke Location

Cerebral hemisphere stroke can affect motor and sensory responses of the swallowing mechanism. A left hemisphere stroke may also affect the stroke survivor’s ability to understand or use language, produce clear speech or effectively communicate information. It may affect the right side of the face, lips and tongue, resulting in asymmetry, weakness, and slow uncoordinated movement. A right hemisphere stroke may affect the left side of the face and reduce the ability to recognize and appreciate the extent of swallowing impairment.

The brainstem, the origin of most cranial nerves, is the main control especially for the pharyngeal stage of swallowing. Survivors of a brainstem stroke may or may not have any apparent weakness on either side of the face, mouth or throat, but they may have significant difficulties beginning or executing the pharyngeal stage of swallowing.

Comorbid Conditions

Comorbid conditions are physical or mental conditions that an individual developed before, during or after a stroke. Comorbidities may be present at birth or acquired during the course of maturation. Numerous conditions increase the risk of dysphagia, but not all individuals with these conditions have swallowing difficulties. When an individual with one or more relevant comorbid conditions experiences a stroke, the risk for dysphagia increases significantly.39, 46 It is therefore important to obtain a full medical his-
tory to identify comorbid conditions, the date of onset, and relation to swallowing history.\textsuperscript{22, 56}

The following comorbid conditions increase the risk of dysphagia:

**Progressive neurologic conditions**\textsuperscript{29}
- Parkinson’s disease
- Multiple sclerosis
- Huntington’s chorea
- Amyotrophic lateral sclerosis (ALS)
- Advanced dementia

**Neuromuscular disorders**\textsuperscript{29}
- Myasthenia gravis
- Polio and post-polio syndrome
- Brain injury

**Respiratory disorders**\textsuperscript{39, 44}
- Asthma
- COPD

**Systemic diseases**\textsuperscript{39, 44}
- Arthritis
- Diabetes mellitus
- Epilepsy
- Gastrointestinal reflux disease (GERD)
- Thyroid conditions

**Connective tissue diseases**\textsuperscript{57}
- Rheumatoid Arthritis
- Systemic lupus erythematosus (SLE)
- Scleroderma

**Cancer and its treatment**\textsuperscript{58}
- Ablation of oral, pharyngeal or esophageal structures.
- Radiotherapy to oral, pharyngeal or esophageal areas.

**Structural deficits**\textsuperscript{59, 60}
- Zenker’s diverticulum
- Achalasia
- Degeneration of cervical spine

**Medications**

Medications can contribute to or cause dysphagia by affecting fine motor function or by altering alertness or cognition.\textsuperscript{29, 61-63} Individuals weakened by stroke, dehydration, malnutrition, or comorbid conditions may be more susceptible to the side effects of medications, such as:

- Psychotropic agents (e.g., Fluoxetine, Risperidone), which can result in tardive dyskinesia.
- Neuropharmacology agent (e.g., Clonazepam), whose actions mimic neurotransmitters involved in swallowing muscle function.
- Anticholinergic agents that decrease salivation (e.g., antihistamines, antidepressants, antihypertensives), causing xerostomia (i.e., dry mouth), or those that increase salivation (e.g., Haloperidol, Clonazepam), affecting the resident’s management of their saliva.

Some required medications may be in a format that is difficult for those with dysphagia. For example, medications that cannot be crushed, sustained-release or liquid formulations. As a result, the format of the medication may need to be altered and/or a change in medications may be necessary. Consultation with the pharmacist and physician will be necessary if medication changes are required.\textsuperscript{56, 64}
1. How many stages does the normal swallow have? Give one anatomic and one physiologic landmark for each stage.

2. Name 3 changes that occur to the swallowing mechanism due to normal aging.

3. How is the gag reflex associated with swallowing?

4. Define dysphagia.

5. Provide 3 complications of dysphagia.

6. List the 3 most accurate clinical signs of aspiration.

7. Define silent aspiration. Why is it a concern for caregivers of stroke survivors?

8. What risk factors increase the likelihood of developing aspiration pneumonia?

9. Name 3 comorbid or pre-existing medical conditions with an increased risk of dysphagia.

10. Describe how medications can contribute to dysphagia.
Clinical Approach to Dysphagia

The clinical approach to dysphagia in stroke survivors involves initial screening, assessment, ongoing monitoring and management (Figure 6). Screening identifies the likelihood of dysphagia, but does not indicate the severity. Assessment identifies specific structural and physiological deficits and determines their severity. Ongoing monitoring involves regular observation of stroke survivors for clinical indicators that may be a sign of the development of dysphagia or changes in its severity. Management includes implementation of all strategies required to prevent complications of dysphagia, including oral hygiene, appropriate dietary modifications, and safe feeding strategies. An interprofessional dysphagia care team implements this approach according to the specific needs of an individual stroke survivor as determined by a complete assessment administered by an SLP dysphagia expert.

Interprofessional Dysphagia Care Team

The interprofessional dysphagia care team includes dysphagia experts (an SLP), dysphagia screeners (typically RD, RN, RPN), and dysphagia feeders (typically PSW, HCA, activation and restorative staff, food services staff) (see Appendix 1). All other professionals can, with proper training, participate in various roles with the support of the SLP dysphagia expert. And of course, the integral member is the stroke survivor him/herself and their family. Each trained member of the team plays an essential role in identifying the risk of dysphagia, preventing complications, and rehabilitating the stroke survivor with dysphagia.

Speech-Language Pathologist

The Speech-Language Pathologist (SLP) plays a central role in screening, assessing, treating and managing the stroke survivor with dysphagia. The College of Audiologists and Speech-Language Pathologists of Ontario (CASLPO) and the Speech-Language & Audiology Canada (SAC) have identified assessment and treatment of dysphagia as within the scope of practice of the SLP.65, 66 The SLP is also a resource to the dysphagia care team, stroke survivors, and the community. In the long-term care setting the SLP is typically involved in establishing and maintaining a system by which health care professionals can accurately and efficiently identify stroke survivors with an increased risk for dysphagia.

“A screening serves to identify patients at risk for dysphagia and initiate early referral for assessment, management or treatment for the purpose of preventing distressful dysphagia symptoms and minimizing risks to health.” 66

Adapted from Heart and Stroke Foundation of Ontario.13
The SLP is further responsible for assessing and developing a treatment and/or management plan for each stroke survivor presenting with dysphagia. The intervention must be customized to the specific swallowing impairment of each individual.

“The scope of practice includes screening, identification, assessment, interpretation, diagnosis, management and rehabilitation of disorders of the upper aerodigestive tract, including swallowing.”

Specifically, the SLP has the following role in addressing dysphagia among stroke survivors:

- Develop, educate and mentor dysphagia care teams.
- Conduct a clinical assessment in all stroke survivors with a positive dysphagia screen.
- Recommend and administer an instrumental assessment of dysphagia when necessary.
- Generate a report interpreting clinical and/or instrumental assessments.
- Recommend remedial programming to the physician and dysphagia care team.
- Provide swallowing treatment and/or management to stroke survivors, care providers and the dysphagia care team.
- Recommend an appropriate diet texture progression in consultation with other team members, i.e., RD.
- Provide recommendations, information, and education for families, care providers, LTC staff and stroke survivors.

It is rare for an SLP to be on staff in the long-term care setting. As a result, the SLP is often an external consultant that can be brought in as needed when a stroke survivor is identified as high risk for dysphagia. The SLP then completes the swallowing assessment and provides recommendations for management through visits to the stroke survivor at the LTC site. The on-site dysphagia care team members play a large role in implementation of the SLP recommendations and observation for tolerance of the recommended diet textures and strategies. Clear communication (i.e., written or verbal reports) between the SLP and the other team members is essential in providing the best possible care for the stroke survivor with dysphagia.

**Registered Dietitian**

The Registered Dietitian (RD) plays a key role in assessing and monitoring clinical indicators of nutritional status. This may include evaluation of biochemical indices, body weight, fluid and solid intake and route of nutrition administration (i.e., oral, enteral or parenteral). The RD also recommends types and route of administration of enteral feeding and dietary components. The RD is responsible for ensuring that the stroke survivor receives sufficient intake to maintain or achieve adequate caloric (micro and macro nutrients) and fluid balance. This is done working with the textures prescribed by the SLP dysphagia expert to achieve safe swallowing. Most often, the RD and SLP work collaboratively to monitor the stroke survivor and allow modification of the dysphagia treatment and management strategies as appropriate.

Both the roles of the SLP dysphagia expert and the RD are critical to proper management of the stroke survivor with dysphagia. They each provide separate but complementary approaches to dysphagia management.
Table 1. SLP and RD Roles in Dysphagia Management

<table>
<thead>
<tr>
<th>SLP</th>
<th>RD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete initial swallowing assessment and follow-up assessments as indicated</td>
<td>Assess and monitor nutritional adequacy</td>
</tr>
<tr>
<td>Recommend safest diet consistency, feeding and swallowing strategies</td>
<td>Recommend supplements, dietary treatment (e.g., no added salt) and/or tube feeding if needed</td>
</tr>
<tr>
<td>Educate stroke survivor, family and Dysphagia Care Team</td>
<td>Educate stroke survivor, family and Dysphagia Care Team</td>
</tr>
<tr>
<td>Work closely with the RD to monitor and modify dysphagia management as needed</td>
<td>Work closely with the SLP to monitor and modify dysphagia management as needed</td>
</tr>
</tbody>
</table>

Registered Nurse or Registered Practical Nurse

The Registered Nurse (RN) and Registered Practical Nurse (RPN) are key members of the dysphagia care team based on their essential role in resident care. The nurse is the central communicator on the team, relaying information regarding the resident stroke survivor to all other team members. As well, the nurse is responsible for the monitoring of stroke survivors at all times. 67

As a result, the RN or RPN is usually the individual providing screening when an institution implements universal dysphagia screening for stroke survivors. 68, 69 Optimally, to reduce accidental aspiration, screening should be performed immediately upon admission, or as soon as the resident is alert, and before any oral intake is administered. The use of a systematic screening approach or a standardized protocol is ideal, as this increases the accurate detection of dysphagia and provides better protection for the stroke survivor. 68 In the LTC setting the trained RN/RPN is responsible for dysphagia screening, making the referral for an SLP swallowing assessment and informing other team members of the stroke survivor’s need for an assessment and/or recommendations following the assessment.
Table 2. Collaborative Approach to Dysphagia and Nutrition Management Post Stroke

<table>
<thead>
<tr>
<th></th>
<th>SLP</th>
<th>RD</th>
<th>RN/RPN</th>
<th>Other Team Members</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screens for Dysphagia</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Screens Nutritional Status</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Completes Swallowing Assessment</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Completes Nutritional Assessment</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recommends Swallowing Treatment (i.e., diet texture changes, feeding and swallowing strategies, etc.)</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recommends Dietary Treatment (i.e., need for nutritional supplements, need for low salt, diabetic, etc.)</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monitors Dysphagia Management</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

*if trained

**Physician**

The doctor (MD) supervises the medical management of the stroke survivor, monitoring and managing pulmonary status and hydration, ordering appropriate investigations, consulting with the RD and SLP about the need for enteral or parenteral feeding, and reviewing dysphagia care team recommendations with the family as required. Policies vary between facilities, however, frequently the MD needs to approve the referral to the SLP for a swallowing assessment (i.e., telephone order) and the MD needs to be aware of recommendations after the assessment to approve any changes to diet texture.

**Personal Support Worker or Health Care Aide**

The Personal Support Worker (PSW) or Health Care Aid (HCA) assists the stroke survivor with completion of regular oral hygiene care and feeding during meal times. The PSW/HCA also plays an important role in monitoring for signs of dysphagia, ensuring that the survivor receives the appropriate diet texture and encouraging use of safe swallowing strategies. In keeping with stroke best practice guidelines the PSW/HCA should be educated in the use of safe feeding and swallowing strategies. Those trained become feeder members of the dysphagia care team. PSWs/HCAs should be familiar with the stroke survivor’s SLP recommendations post swallowing assessment and with the signs of dysphagia. They are responsible for reporting any difficulties noted to the resident’s RN/RPN.

**Restorative Care and Activation Staff**

Staff members working in restorative care or activation assist the stroke survivor in maximizing independence with eating and drinking. Similar to the PSW, these professionals are trained to provide assistance during meal times and monitor for signs of dysphagia and, when trained, also become feeder members of the dysphagia care team.

**Food Services Staff**

Individuals working in food services are responsible for preparation and supplying of food, drinks and mealtime equipment (i.e., plate, cups, spoons, etc.) to the residents. Together with the RD, the food services manager establishes the meal options, ensures the correct diet texture is
recorded and monitors for nutritional adequacy. These professionals ensure that the appropriate diet textures are properly prepared and served to the stroke survivor.

**Administration**

The Administrative Team includes any managers on-site. These professionals assist the dysphagia care team in implementation of new polices and procedures related to dysphagia care for stroke survivors. As well, they provide support in completion of training and problem solving around challenging clinical issues (i.e., resident choosing to take an unsafe diet consistency).

**Pharmacist**

The Pharmacist is responsible for medication management for the stroke survivor. They can assist the RN/RPN in determining safest mode of medication administration when an individual has dysphagia and can outline which medications cannot be given in crushed format (see Appendix 2).

**Occupational Therapist**

The Occupational Therapist (OT) is traditionally responsible for activities of daily living. The OT determines the types of adaptive equipment needed and ways to improve meal set-up and food transport to the mouth. Expertise of this discipline includes teaching stroke survivors with motor deficits to adapt to new feeding techniques and recommending adaptive feeding equipment and upper extremity positioning to assist with feeding. When an OT is not on staff at a LTC site, access to this consultant can occur through a community agency.

**Physiotherapist**

The Physiotherapist (PT) can assist with optimal positioning, such as bed and wheelchair positioning for safe feeding, and with implementing swallowing strategies that direct the bolus away from the airway and facilitate safer swallowing. When a PT is not on staff at a LTC site, access to this consultant can occur through a community agency.

**Other Dysphagia Care Team Members**

Other individuals working in the LTC facility can also be members of the dysphagia care team. These individuals can play an important role in balancing the resident care workload for other staff during mealtimes. It is important for safety reasons that these team members also receive training in safe feeding and swallowing strategies and that their assistance be limited to those individuals who have been identified as low risk for dysphagia.

**Stroke Survivor and Family**

The stroke survivor and their family are integral to the dysphagia care team. These individuals require support and education about dysphagia and its safe management as they move across the care continuum. Family members interested in assisting their loved one with feeding during meal times will benefit from dysphagia care team member guidance around use of safe feeding and swallowing practices.

Dysphagia education is best provided throughout the continuum of care. It is critical that the stroke survivor and family receive sufficient information about appropriate management and the potential negative outcomes to help them make informed decisions, especially about diet and nutritional issues. It is important to remember
that stroke survivors and their families may choose to follow personal dietary choices rather than team recommendations. Stroke survivors have the right to decline intervention, but they must be informed of the possible consequences of their decisions, and both the education and refusal should be well documented. 13, 66, 70

**Dysphagia Screening**

The trained screener member of the dysphagia care team is responsible for screening the stroke survivor for signs and symptoms that may suggest an increased risk of dysphagia. Regulated health professionals, such as RNs, RPNs, RDs, OTs, or PTs, can be trained to screen for dysphagia. However, the SLP dysphagia expert remains responsible for program development, referral criteria, and professional education. 66

Screening helps to identify the presence or absence of dysphagia and the risk of pulmonary, hydration, or nutrition complications that may exist with the individual’s current diet. However, screening does not provide information about pathophysiologic changes to the swallowing mechanism, which is determined by the SLP dysphagia expert during assessment. Screening may include an interview with the stroke survivor and family members about swallowing difficulties; a review of relevant medical history; direct observation of signs and symptoms of swallowing difficulties during routine or planned oral feeding, including a water swallowing test; and education and counselling about the need for further evaluation.

Screening should include a fast, safe and efficient test for identifying individuals who are at high risk for dysphagia. In addition, screening should determine the stroke survivor’s tolerance for evaluation and indicate changes in swallowing status during rehabilitation. A good screening test has the following attributes:

- Fast and easy to understand and use.
- Acceptable to the stroke survivor.
- Sensitive enough to provide a positive or negative result.
- Specific enough to rule out individuals without risk of swallowing difficulty.

All stroke survivors should be screened for dysphagia as soon as they are admitted, provided they are awake and alert. Screening should also occur before any oral intake is administered, including oral medications. 13

Stroke survivors with a negative screen result (pass) are unlikely to have difficulties with oral intake and may receive meals and medications. These individuals should be monitored during their first few meals to ensure safe and efficient swallowing.

Stroke survivors with a positive screen result (fail) are referred to the SLP for a full assessment. The individual should continue on the oral diet deemed to be safest for them until a full clinical bedside assessment has been completed by the SLP dysphagia expert. In situations where safety of any oral intake is in question, the individual should be kept NPO pending the swallowing assessment. This may necessitate transfer to the closest emergency room for supplemental hydration. Any time a resident is made NPO good oral hygiene practices are to be continued at the bedside to prevent colonization of the oral cavity by pathogenic bacteria. 13

These individuals should be monitored during their first few meals to ensure safe and efficient swallowing.
Several screening tools for swallowing difficulties have been evaluated. Most screening tools share common features, but some screening procedures are better predictors of dysphagia than others. The Toronto Bedside Swallowing Screening Test (TOR-BSST©) is the only screening tool that has been developed from a systematic review of the literature. The TOR-BSST© offers the greatest value as it is based on the best available evidence. The TOR-BSST© is a brief initial test that can accurately and reliably detect the presence of dysphagia, defined as the presence of aspiration or any physiological abnormality, in stroke survivors, regardless of time post stroke. Any regulated healthcare professional trained to administer the TOR-BSST© to individuals with a stroke diagnosis and interpret the results can use this dysphagia screening tool. The TOR-BSST© comprises 4 clinical tests (50-ml water test, impaired tongue movements, dysphonia and general muscle weakness), which together have the highest likelihood of predicting dysphagia. Evaluation of the TOR-BSST© tool is now completed.
Dysphagia Assessment

Assessment extends beyond the basic risk identified in the screen to determine the exact site of structural or physical involvement and the degree of impairment. The SLP dysphagia expert may use a variety of clinical and instrumental methods to assess the swallowing mechanism.

Clinical Bedside Assessment

A clinical bedside assessment is completed by the SLP dysphagia expert and includes a complete medical, developmental and swallowing history along with evaluation of the current medical, swallowing, and communication status. This portion of a swallowing assessment can be conducted in the LTC facility during routine or planned eating and drinking. Clinical assessment evaluates swallowing structure and function to determine the overall nature and cause of impaired oral swallowing physiology; it determines the severity of oral dysphagia and provides details about oral swallowing pathophysiology, while also predicting potential impairment of pharyngeal and esophageal swallowing physiology. Potential risks of medical complications and the impact of the dysphagia on functional and psychosocial aspects of daily living, such as feeding safety and mode, are also identified. A clinical assessment includes follow-up recommendations for further assessment and for treatment and discharge. If warranted, the SLP dysphagia expert recommends an instrumental assessment.

Instrumental Assessment

Instrumental assessment determines impairment in the structure and function of swallowing and identifies compensatory and/or treatment strategies to enhance the efficacy and safety of swallowing. Instrumental assessment, which is performed only after a clinical assessment, may include videofluoroscopy and endoscopy. 66

Videofluoroscopy

Videofluoroscopy, also known as a modified barium swallow, is the most common instrumental procedure administered to individuals with dysphagia. 73 It is the SLP dysphagia expert who conducts this assessment. Videofluoroscopy is a radiologic procedure to study the anatomy and physiology of swallowing and define management and treatment strategies to improve swallowing safety or efficiency. The resident stroke survivor will need to be temporarily transferred out to a hospital or other medical facility to have the videofluoroscopic procedure completed, as it requires a radiology suite, SLP, medical radiation technologist and possibly a radiologist. Videofluoroscopy is also a valuable educational resource to demonstrate to the stroke survivor and caregivers the importance of compensatory strategies in improving swallowing safety.

Endoscopy

Fiberoptic endoscopic evaluation of swallowing (FEES) uses a small fiberoptic camera placed in the nasopharynx or oral cavity to assess vocal fold function, especially closure, which protects the lungs from aspiration.
Ongoing Monitoring

Regular and careful monitoring of stroke survivors for dysphagia is critical. A stroke survivor’s physical status can fluctuate, directly affecting the ability to manage food and drink safely. The dysphagia care team must be observant enough to identify subtle changes and the potential impact of these changes on the safety of oral intake.

The dysphagia care team must monitor the stroke survivor’s level of consciousness and alertness, especially since the oral stage of swallowing involves voluntary and planned movement. Swallowing frequency is greatly reduced during sleep, and swallowing does not occur during unconsciousness. As a result, the stroke survivor with a reduced level of consciousness or alertness has an increased risk of aspiration from saliva or food residue moving into the pharynx where it cannot be controlled voluntarily.

The team also monitors stroke survivors without initial signs or symptoms of dysphagia for the clinical indicators of potential dysphagia. Dysphagia may develop with changes in physical status, and swallowing abilities may deteriorate in stroke survivors already diagnosed with dysphagia. All changes in an individual’s status should be discussed with the dysphagia care team and, if necessary, the SLP dysphagia expert should reassess the individual.

Feeding strategies should be reviewed regularly for stroke survivors receiving modified diets or enteral feeding, as swallowing function often changes. Best practice guidelines recommend that stroke survivors identified as having dysphagia receive regular reassessment to capture changes that may occur over time. Stroke survivors with dysphagia who are receiving modified diets or enteral feeding should be reassessed at minimum intervals of two to three months during the first year after the stroke, and every six months after that time. 13

Clinical Indicators of Possible Dysphagia

Numerous clinical indicators can alert health care professionals to potential dysphagia. Some clinical indicators are readily apparent, whereas others can only be identified through careful observation or screening. Finally, some indicators can only be determined through a clinical or instrumental dysphagia assessment by an SLP dysphagia expert. The likelihood of dysphagia increases with the presence of multiple indicators. Table 3 outlines some of the common clinical indicators of dysphagia.
Table 3 Dysphagia Red Flags: Clinical Indicators That Can Signify Dysphagia

<table>
<thead>
<tr>
<th>Stage of Swallowing</th>
<th>Clinical Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral Preparatory &amp; Propulsive</td>
<td>Drooling, Dry mouth, Poor oral hygiene, Facial droop and lip weakness, Missing or no teeth, or loose and poorly fitting dentures, Difficulty with or excessive chewing, Dysarthria — slurred speech, Difficulty moving the tongue, Pocketing of food in mouth, Difficulty initiating a swallow, slow or delayed swallow</td>
</tr>
<tr>
<td>Pharyngeal</td>
<td>Food or liquid coming from nose, Difficulty initiating a swallow, slow or delayed swallow, Audible or effortful swallowing — gulping with swallow, Multiple swallows to clear a single bite of food, Coughing or choking during or after eating, Shortness of breath and/or breathing difficulties that increase during the meal, Reports of food sticking in throat or chest, Changes in voice</td>
</tr>
<tr>
<td>Esophageal</td>
<td>Reports of food sticking in throat or chest, Vomiting of undigested food</td>
</tr>
<tr>
<td>All</td>
<td>Unexplained weight loss, Change in dietary habits, Recurrent respiratory infections, specifically pneumonia, Report or history of dysphagia signs and symptoms</td>
</tr>
</tbody>
</table>
Did you know? Silent aspiration is common in individuals with dysphagia. The cough reflex may be absent when food or fluid enters the airway, so it is important to know the others signs and symptoms of dysphagia.

Dysphagia Management

Individualized dysphagia management is based on history, findings of the clinical and instrumental assessment, and prognosis. The objectives of managing dysphagia are to protect the airway from obstruction, reduce the chance of food or drink entering the lungs, ensure adequate nutrition and hydration, and maintain quality of life. The primary areas of intervention in managing dysphagia in the LTC setting are the following:

- Oral hygiene.
- Restriction of diet textures.
- Feeding strategies.
- Ongoing education and counselling.

Dysphagia must be managed effectively, as the negative impact of dysphagia on nutrition and hydration can negate the benefit of other interventions. A compromised physical status resulting from malnutrition and dehydration can lead to a suboptimal rehabilitation process, affecting both the duration and completeness of recovery. Timely and coordinated care for the individual with dysphagia is best provided by a interprofessional dysphagia care team. The SLP dysphagia expert develops an appropriate and comprehensive individual plan for each stroke survivor in whom dysphagia has been identified, incorporating interventions such as the following:

- Modified diet texture.
- Compensatory swallowing strategies.
- Feeding and swallowing strategies to increase safety at mealtimes.
- Therapy or exercises to increase strength and coordination of swallowing muscles.
- Consultation with physician and RD about alternative feeding options if oral intake is unsafe.

Oral Hygiene

Oral Health

A healthy mouth enables an individual to speak and socialize comfortably and contributes to general well-being. The healthy mouth is colonized by a variety of nonpathogenic bacteria bathed in saliva. Saliva production, which is stimulated by chewing, maintains a neutral oral pH, prevents dental caries, and flushes bacteria out of the mouth, thereby suppressing oral colonization by pathogenic bacteria and fungi. Oral health depends on adequate fluid intake, nutrition, saliva production, oral hygiene, and chewing ability. The objectives of maintaining a healthy mouth are the following:

- Clean, debris-free teeth and/or dentures.
- Well-fitting dentures.
- Healthy pink and moist oral tissues and tongue.
- Moist smooth lips.
- Adequate salivary production.
- Reduced difficulties with swallowing or eating.

Oral health can change with age and illness. With age, teeth lose soft tissue attachments, and bone loss occurs, resulting in loose and brittle teeth. Changes to a softer diet consistency can cause disuse atrophy of the chewing muscles, and decreased chewing increases dental caries. Poorly
fitting dentures make chewing difficult, negatively affecting oral intake. Ill-fitting dentures may also cause mouth ulcers and sores and could be accidentally swallowed. Poor dental hygiene and continuous wear of dentures can cause oral infection (e.g., thrush) and changes to the oral tissues and/or structures (i.e., spongy gum) which are associated with complaints of pain, difficulties chewing and changes to denture fit.

Several medical problems that can be seen in stroke survivors can also affect oral health. Uremia associated with chronic renal failure can cause bleeding of the gums; a red, dry, ulcerated oral mucosa; complaints of a salty, metallic taste; and a urine-like or ‘fishy’ breath odour. Diabetes can decrease mucosal circulation, resulting in poor healing of oral ulcers.

Dependence on others for feeding and oral care as well as the presence of dental caries are predictors of aspiration pneumonia, because of increased oral colonization by pathogenic bacteria and pulmonary microaspiration of these organisms. 

**Impact of Stroke on Oral Health**

Stroke survivors experience numerous sources of stress that can adversely affect oral health and oral hygiene. These stressors include medications that cause dry mouth; decreased alertness and cognitive changes; depression; paresis or paralysis resulting in immobility; reduced fluid intake; mouth breathing; and poor oral hygiene. Poor oral hygiene negatively affects an individual’s ability to chew, swallow and digest food, possibly leading to malnutrition and weight loss. Stroke survivors, who are dependent on others for oral hygiene, have an increased risk of oral health problems. Depression, which is common after stroke, may result in lack of attention to personal care, negatively affecting dental health. After stroke, tongue and cheek weakness can also affect the way the dentures fit reducing chewing effectiveness. In addition, any loss of fine motor skills in the arms and hands, due to paresis, makes it more difficult for an individual to maintain good dental hygiene independently.

Poor oral hygiene can create a variety of problems. Xerostomia makes speaking difficult and painful and can make dentures difficult to wear. Decreased saliva production can cause swallowing difficulties, which can lead to reduced oral intake, adversely affecting health. Halitosis, bad breath, may lead to social isolation. Oral infections can result from a variety of causes and lead to potentially serious systemic infections. Oral plaque that is undisturbed for as little as three days provides an ideal environment for bacterial growth and can result in mucositis, xerostomia, and gingivitis. Because the oral cavity is highly vascular, oral hygiene problems must be addressed promptly. Delays in treating oral infection can lead to tissue destruction at the gum line or at the tooth base, allowing bacteria to enter the bloodstream and resulting in a potentially serious systemic infection.

The nurse and personal support worker are the primary caregivers for stroke survivors living in long-term care. Several oral hygiene assessment tools for nursing are available and can be used to determine whether assistance is required and what strategies are appropriate in an individual situation. Appropriate oral hygiene assessment is an important component of care, as incomplete assessment may lead to inadequate oral care, negatively affecting health status.

**Oral Hygiene Approaches**

The objective of oral hygiene is to maintain the mouth in a comfortable, clean, moist and infection-free state. Effective oral care requires cleaning the entire oral mucosa, the tongue, the teeth, and the sulci (spaces between the cheeks and gums) (Figure 8). Stroke survivors who have
impaired oral sensation, and those who are receiving enteral feeds, or eating and drinking minimally, require thorough and effective oral care to maintain a healthy oral environment. At minimum, oral care should be provided twice daily; however, individuals with dysphagia may require more frequent oral care as part of their safe dysphagia management approach.

Figure 8 Anterior and lateral lower sulci, or spaces between cheeks and gums

Numerous oral hygiene approaches have been evaluated, with the following results:

- Foam swab or toothette: Foam swabs are ineffective in removing plaque, which accumulates in sheltered areas, such as between teeth.

- Toothbrush: Soft or baby toothbrushes used appropriately are effective in removing dental plaque and minimizing mucosal injury. Hard adult toothbrushes cause mucosal damage and gingival bleeding.

- Gauze: Gauze, used with forceps, a tongue depressor or a finger is ineffective in cleaning teeth but beneficial in cleaning the oral cavity.

- Lemon and glycerine: Lemon and glycerine stimulates saliva production initially, but this effect rapidly disappears, resulting in xerostomia. In addition, the acidity of the lemon can cause breakdown of the teeth and oral irritation.

- Sodium bicarbonate and hydrogen peroxide: These agents are effective in removing debris, but they have an unpleasant taste and have been associated with fungal overgrowth and inflammation. In addition, concentrated solutions can burn the mucosa.

- Toothpaste: Toothpaste loosens debris, and fluoride prevents dental caries. However, incomplete rinsing can increase xerostomia.

- Mouthwash: Most mouthwashes contain alcohol, which can dry and irritate the mouth.

- Floss: Flossing should be done at least once per day. If flossing is difficult a rubber tipped stimulator, special toothpicks or small pointed toothbrush could be tried instead. Flossing reaches between the teeth where a toothbrush cannot. It is effective in removing food and plaque from between the teeth.

- Denture brush: Dentures should be removed at night, cleaned and placed in a cup of warm water overnight. Use of a denture brush to clean dentures daily will help to remove plaque that forms on the dentures which is a source of bacteria and can increase the risk of developing pneumonia. Oral structures (i.e., cheeks, tongue and palate) should also be cleaned daily with a soft toothbrush.

- Water: Water is the best oral moistening agent.
The following are the key implications for practice of these findings: 77

- Oral care approaches should be evidenced based.
- Nurses or personal support workers should assist stroke survivors to maintain good oral care.
- The equipment of choice should be a soft toothbrush.
- Drug therapy can negatively affect oral health.
- Baseline assessment of oral status can identify problems early.

**Oral and Non-Oral Intake**

After completing a swallowing assessment, the SLP dysphagia expert works with the dysphagia care team to develop a comprehensive strategy to ensure that the stroke survivor can manage oral intake (i.e., food, drinks and medications) as safely as possible. When oral intake is deemed to be unsafe the SLP dysphagia expert works with the dysphagia care team, including the MD and the RD, to determine an appropriate alternate route for nutrition and medications.

**Diet Consistencies**

Diet texture modification is one of the most frequently used interventions to compensate for dysphagia in hospitals and long-term care facilities. Efforts have been made to attempt to standardize the labels for diet textures across all healthcare facilities but at this time universal labels have not been approved by national professional associations. As a result, diet consistency label variations exist across different clinical settings and it is important for the dysphagia care team to be aware of how these variations may affect the stroke survivor’s oral feeding safety.

The number of different diet textures offered by facilities varies. Some facilities may offer three different textures (i.e., pureed, minced, regular) while others may offer four (i.e., pureed, minced, soft, regular). Still others may include bread products with the different diet textures while other facilities may exclude them. The availability of a variety of thickened fluids across different facilities may also vary. It is important that the dysphagia care team be alert to the various diet texture labels that exist. Collaboration with the SLP dysphagia expert should occur when there is uncertainty about the safest food or liquid consistency in an effort to avoid negative complications for the stroke survivor.

The following are the typical diet textures given to stroke survivors with dysphagia:

- Mechanically chopped or minced semisolids that require little chewing.
- Pureed solids with homogeneous, very cohesive, pudding-like consistencies that require bolus control but no chewing.
- Thickened, slower-moving liquids that compensate for slower-moving swallowing muscles.

A complete dysphagia assessment most often determines the appropriate dietary texture modifications. 13 These modifications, however, can reduce an individual’s enjoyment of food, decreasing oral intake, which can lead rapidly to dehydration and eventually to malnutrition. Also, starch-based fluid thickeners increase carbohydrate intake, which may produce a nutritional imbalance if the diet is not carefully monitored. Controlling dietary carbohydrates is especially important in individuals with diabetes.
A consultation with an RD is critical to ensure that the modified diet texture is nutritionally adequate and appropriate. Consultation with the stroke survivor or substitute decision-maker ensures that the modified diet texture is as appealing as possible. It may be possible to manipulate the texture of some favourite foods to make them safe for individuals with dysphagia.

Examples of common food diet texture labels are the following:

- **Pureed foods**: Pureed foods are smooth and homogenous, with a spoon-thick consistency. This food texture includes mashed or blenderized foods with a dense, smooth consistency, such as pudding, applesauce or mashed potatoes. Pureed foods should never be lumpy or runny.

- **Minced or ground foods**: This refers to foods that have been chopped to pea-sized particles and are moist enough to form a cohesive and easy-to-chew bolus. A ground/minced diet consistency allows the individual to eat with minimal chewing. Typical foods in this category include shepherd’s pie and cottage cheese.

- **Soft foods**: This refers to foods that are soft and easier to chew. Often these are the softer choices found in ‘regular’ foods. Examples of foods in this category include pasta, tuna sandwiches, and well-cooked vegetables.

- **Regular or hard foods**: This diet texture refers to foods found in their regular or ordinary format. The ability to chew is required. There are no foods excluded from this category. Examples of regular or hard foods include raw vegetables, nuts, and steak.

Examples of common liquid texture labels are the following:

- **Thickened fluids**: The purpose of thickening liquids is to slow the time it takes for the fluid to move through the mouth and esophagus. This allows better control of the swallow, and decreases the risk of aspiration pneumonia. The recommended thickness of thickened fluids varies. Thickened fluids can be nectar, honey or pudding consistency. The level of thickness required is determined individually. Is it important to note that when a stroke survivor requires thickened fluids this affects all liquids that they eat or drink (i.e., soup, nutritional supplements, juice, etc.). Thickened fluids reduce the risk of aspiration, but stroke survivors often find them unappealing, increasing the risk of malnutrition and dehydration.

- **Thin or regular fluids**: This refers to all liquids in their regular or unmodified format. Thin fluids include water, juice, milk, tea, coffee, broth, creamed or strained soups, soft drinks, commercial supplements and cold or frozen food items that liquefy at body temperature, such as ice cream, ice cubes and gelatin. Thin fluids can be difficult for the stroke survivor to swallow because they move very quickly through the swallowing mechanism and require good bolus control. Thin fluids may enter the pharynx prematurely and leak into the open airway resulting in aspiration.
Certain food textures may be difficult for stroke survivors with dysphagia to manage. As a result, recommendations from the SLP dysphagia expert may note the importance of excluding the following:

- **Dry particulates**: Dry particulates can be difficult for individuals with dysphagia to form into a bolus and control in the mouth. Dry particulates include dry, crumbly cheeses; raw fruit and vegetables; cooked vegetables, such as corn and peas; rice and noodles; cookies, crackers, pastries and dry cakes; dry cereal and snacks; dried foods, such as raisins; hard candies; and peanut butter. Some of these dry particulates, such as rice and corn, could be included in the diet texture if the preparation method moistens them and binds them together, for example, by incorporating them in puddings or casseroles.

- **Bread products**: Gummy bread products and foods made from these products can stick in the throat. This category includes fresh bread and rolls, muffins, cookies, cakes, pastries, toast, French toast, sandwiches and pancakes. In some situations, bread products can be moistened with sauces, butter, oil or cream, so that they form a relatively safe bolus. For example, adding liberal amounts of butter or margarine prevents fresh bread from sticking in the throat, and removing dry crusts facilitates swallowing. In this way, individuals with dysphagia can enjoy well-buttered crustless sandwiches with soft moist fillings, such as egg salad.

- **Mixed textures**: Foods that combine liquids and solids can be difficult for individuals with dysphagia to control in the mouth. Mixed textures require the stroke survivor to first separate the different consistencies and then manage them separately. Foods with mixed consistency include fresh fruits like watermelon and pineapple, canned fruit in syrup, cereal with milk, soups like vegetable or minestrone, and pills given with water. However, fresh and canned fruits and soups can be pureed for the individual with dysphagia.

- **Reflux-promoting foods**: Some food and liquids cause gastroesophageal reflux which can produce respiratory complications in some individuals with dysphagia. This category includes highly spicy and acidic foods, peppermint, spearmint, fried foods, coffee, tea, chocolate and cola.

**Did you know?** If thickened fluids are recommended it is extremely important that the stroke survivor with dysphagia receives the correct liquid thickness. If the liquid is thicker than necessary it can affect the stroke survivor’s hydration status and make drinks unappealing. If the liquid is runnier than necessary it can make swallowing unsafe and increase the risk of aspiration.

Liquids can be purchased pre-thickened (i.e., in boxes) or they can be thickened by adding a thickening agent (i.e., thickening power or gel). All of the following variables affect ‘desired thickness’ when preparing thickened fluids:

- **Amount of liquid** – a smaller amount of liquid will need less thickening agent
- **Liquid properties** – is the liquid hot or cold? Is it a milk product, juice or water? Each liquid mixes with the thickening agent differently.
- Time – thickening agents need time to work.
- Amount of thickening agent used – use a measuring spoon and follow the directions on the container. Each thickening agent has different instructions.
- Utensil used to make the thickened liquid – spoons often leave the drinks lumpy while a fork or whisk allows the thickener to blend better with the liquid.

**Medication Administration**

Most individuals with dysphagia must change the way they take their medications for safety reasons. An SLP dysphagia expert recommends the safest way to administer medications based on the stroke survivor’s swallowing ability. Consultation with the pharmacist to ensure that the medication form can be changed is very important. (see Appendix 2) Stroke survivors with dysphagia who have a recommendation for thickened fluids should never be given their pills with water. Recommendations might include the following:

- Pills should be taken with water, one at a time.
- Pills should be taken with thickened fluid, one at a time.
- Pills should be crushed (verify with pharmacist that the pill is crushable).
- Pills should be cut in half (verify with pharmacist that the pill can be cut).
- Medication should be given as a liquid (verify with the pharmacist that the medication can be dispensed in liquid form).
- Medication should be changed to liquid format and thickened (verify with pharmacist that medication can be dispensed in liquid form and that it can be thickened using specific parameters).
- Pills should be placed in a spoon of puree, such as applesauce or pudding.
- Pills should not be taken with water.

**Non-Oral Feeding**

If the stroke survivor’s dysphagia is more severe, the SLP dysphagia expert may recommend that the individual remain NPO for safety reasons. Using input about the swallowing prognosis from the SLP, the physician and the RD determine the most appropriate enteral nutrition route. Typically, either a percutaneous endoscopic gastrostomy (PEG) tube or a jejunostomy tube (J tube) is selected. Tube feeding ensures proper nourishment and hydration, but tubes that are improperly cared for or managed can increase the risk of aspiration pneumonia. Specifically, tube displacement, improper tube removal, or gastroesophageal reflux in stroke survivors who are improperly positioned during and after feeding may lead to pulmonary complications.

**Did you know?** Potential risks associated with gastrostomy tubes (i.e., PEG tube) include aspiration due to delayed gastric emptying and gastroesophageal reflux, tube displacement and tube removal. Potential risks associated with jejunostomy tubes (i.e., J tube) include clogging of small-bore tubes and infections due to poor stoma care. Mouth care is critical in individuals receiving tube feeding, because substantial volumes of secretions can accumulate, harbouring considerable numbers of pneumonia causing bacteria.
Safe Feeding Practices

Swallowing Recommendations

Swallowing recommendations are designed to increase safety; reduce fatigue; maintain adequate nutrition and hydration; and improve the stroke survivor’s quality of life during the feeding process. These recommendations address all aspects of therapeutic meal plans and safe swallowing strategies and have the following objectives:

- Reduce risk of aspiration, airway obstruction and pneumonia in stroke survivors.
- Assist staff on all shifts in caring for stroke survivors.
- Increase feeding safety and efficiency by posting information at bedside.

The SLP dysphagia expert develops the swallowing recommendations in collaboration with other team members to meet the needs of the individual stroke survivor and modifies it as physical status changes. These recommendations incorporate as many pictures or graphic instructions as possible to make it easy to interpret and implement.

Uniform implementation of the swallowing recommendations by everyone providing feeding assistance to the stroke survivor is a critical aspect of managing dysphagia. Therefore, it is important that the swallowing recommendations are communicated to all staff, family members or other caregivers that may be involved in feeding or providing food and drink to the stroke survivor. For example, it is important that the activity staff are aware of the swallowing recommendations so that a resident attending a program or special event receives the appropriate food and drink texture and the necessary level of feeding assistance. Likewise, it is important that family members are aware of the recommendations so that food brought in for the stroke survivor is in keeping with the safest diet consistency. Good communication between dysphagia care team members is essential for providing effective and efficient care for the stroke survivor.

In the long-term care setting it is often the nurse who functions as the team’s central communicator because all team members interact with and report to the nurse. It is critical that the nurse relay the swallowing recommendations to the other team members to ensure uniform implementation of these suggestions. Studies indicate that nurses who are not knowledgeable about an individual’s feeding and regard it as a nuisance or outside their role description may not implement swallowing recommendations. Lack of compliance may contribute to increased swallowing and feeding problems, thereby increasing the risk of aspiration pneumonia and other adverse sequelae.

The swallowing recommendations should be incorporated into the stroke survivor’s care plan and provided to the food services department. This will make it easier for all persons who assist with preparation and serving of meals and with feeding to refer to individual needs wherever necessary.

Swallowing recommendations can include the following specific information about the individual stroke survivor and environment:

Stroke survivor

- Physical status: reduced tolerance for eating, as a result of weakness, nausea, or loss of appetite.
- Cognitive status: reduced alertness, orientation, cooperation.
- Sensory deficits: deficits in vision, hearing, touch, taste or smell.
- Assistance levels: level of feeding assis-
tance or meal supervision required.

Environment
- Distractions and deficits: High noise or activity levels, inadequate lighting, difficulty reaching food/liquid.
- Environmental structures and restrictions.

Swallowing recommendations should also include the following types of information
- Positioning during and after mealtime.
- Safest diet textures.
- Assistive or adaptive equipment requirements.
- Need for special feeding techniques or swallowing strategies.
- Communication strategies.
- Recommendations for managing behaviours.
- After-meal care.

Safe Feeding Strategies
Family and other caregivers can assist with feeding to help maintain the stroke survivor’s enjoyment of eating and quality of life. It is important that dysphagia care team members educate family members or others wanting to assist with feeding regarding safe feeding strategies. Good feeding practices include observing the stroke survivor during feeding; encouraging strategies to improve oral intake, effective feeding techniques and maximizing the stroke survivor’s independence with eating and drinking.

Dysphagia care team members, including family and the stroke survivor, must address behavioural problems or sensory issues, such as the following, that can interfere with effective eating:
- Use of incorrect utensils preventing effective eating.
- Performance of repetitive feeding movements, such as stabbing but not securing food, or stopping with utensil in midair, that prevent food/liquid intake and cause fatigue.
- Serving very hot food/liquids that cause oral burns in individuals with loss of sensation.
- Visual field neglect, which results in untouched food on one side of plate.

Strategies to improve oral intake include the following:
- Time medications so that the stroke survivor is pain-free at meal times.
- Present high-protein, high-energy foods first if oral intake is low.
- Socialize during the meal to make eating more enjoyable.
- Ensure food/liquid is warm, and reheat it if necessary, as warm food/liquid is more palatable and increases sensory input and intake.

Effective feeding techniques include the following:
- Feed slowly.
- Identify food and drink items by name especially when the stroke survivor takes a modified diet texture.
- Allow adequate time between bites of food.
- Limit the amount of food presented to 1 teaspoon per bite.
- Place food on the strong side of mouth.
- Encourage the stroke survivor to take 2
or more swallows per bite, to clear residue and aid esophageal transit.

- Alternate liquids and solids, but never combine them in the same bite.
- Talk conversationally with the stroke survivor during mealtimes, but time responses so that the stroke survivor does not reply with food/liquid in mouth.
- Identify the food/drink being presented.
- Offer choice in terms of sequencing of food and drink items during the meal.
- Provide visual or verbal cues for opening mouth, chewing, and swallowing.
- Check for pocketing and residue after feeding and clear as needed.

Environment

The dining atmosphere and its set-up is very important for the individual with dysphagia. Consideration of the resident’s physical status and environment, sensory needs, social interaction and independence are all important for implementation of safe feeding practices.

Physical status and environment

Safety and quality of life of the stroke survivor are primary considerations in managing the physical environment, especially adjusting lighting, temperature and noise. The stroke survivor should be placed near a window or light source that provides adequate light to see the colour, texture and type of food/liquid. Lighting should be assessed at different times of day to minimize shadow, glare, and inadequate lighting. Shades and blinds can reduce light and glare. Temperature extremes, such as drafts and hot spots, can cause discomfort or increase fatigue and should be avoided. Unnecessary noise should be limited to allow the stroke survivor to focus on mealtimes. Turn off radios, televisions and limit the conversation between staff during mealtimes to only that necessary for serving the meal. Fatigue may result from the stroke, medications, stress, or completion of daily activities. Reducing fatigue is important to safety and health, as fatigue is associated with an increased risk of aspiration and a decreased ability to eat sufficient food/liquid to maintain nutritional requirements.

Sensory input

The senses — sight, hearing, smell, taste and touch — provide important information about the environment and increase eating safety and enjoyment. Therefore, adaptive devices that enhance sensory information should be in place before eating and drinking.

Dentures should be clean and conveniently located for the stroke survivor to insert before oral intake. Dentures and partial plates should fit properly. Denture adhesives can anchor dentures that have loosened because of oral changes related to the stroke. Dentures that do not fit properly can be a safety hazard for the resident trying to chew their food and choking may result.

Eyeglasses should be worn if needed to improve vision and depth perception and provide additional sensory input about food/liquid textures. Visual field deficits and neglect can create problems with eating, such as an inability to see food on part of the plate. In this situation, the SLP should work with the OT to ensure that appropriate instructions for managing visual problems are included in the swallowing recommendations. The person providing feeding assistance should move the plate or the food to ensure that the stroke survivor can see and eat the entire meal.

Hearing aids should be clean and properly placed in the stroke survivor’s ears, and batteries should be checked regularly.
Social aspect of meals

People generally associate eating and drinking with health and wellbeing. In addition, in most cultures, meals are important social events, and sharing meals with loved ones increases feelings of wellbeing. The decreased ability to eat and drink in social situations without coughing, choking or embarrassment contributes to depression in stroke survivors with dysphagia. Therefore, it is important to reduce feelings of isolation during eating without introducing distractions or creating sensory overload. Talking during eating and drinking and distractions, such as radio and television, place the stroke survivor with dysphagia at increased risk of aspiration and choking. Encourage the stroke survivor to talk between bites or between courses.

Meal independence

Meal independence is a primary objective for stroke survivors, as an increased dependency on others to provide feeding assistance is associated with an increased risk of aspiration, dehydration, and malnutrition. Many stroke survivors can feed themselves if the environment is adjusted to accommodate their physical impairments. The dysphagia care team can maximize meal independence by ensuring appropriate positioning, equipment, and food/liquid preparation and presentation.

The PT can assess trunk control. The safest posture for eating is sitting upright at 90°, with the body at midline and the head and trunk aligned. Paresis, spasticity and impaired cervical stability can reduce the ability of the stroke survivor to maintain this posture. Cushions, bolsters, and neck supports can stabilize the head and help the stroke survivor maintain an upright position.

The OT can suggest assistive or adaptive devices that can assist the stroke survivor with maximizing their independence with eating and drinking. Special cups, plates, weighted or shaped utensils, and materials such as dicem, that prevent dishes from sliding, are some of the devices which can be useful for stroke survivors. The SLP dysphagia expert or the OT may introduce the use of one of these devices to the stroke survivor during their assessment. Stroke survivors and their family members or caregivers require education in how to use these devices and their potential usefulness. Once use of these devices is established, consistency is essential as the stroke survivor will become dependent on their use to solve problems with food/liquid access and spillage, and will become accustomed to restored eating independence.

The RD can recommend alterations in food/liquid preparation and presentation to increase safety and meal independence. Finger foods, sandwiches and firm foods, which can easily be managed with one hand or one utensil, increase meal independence for individuals with hemiparesis.

Education and Counselling

The need for better information about stroke and its impact on stroke survivors and families has been identified, and many Heart and Stroke Foundation of Ontario initiatives have addressed this need. However, stroke survivors and caregivers still report that they have not received any information about their illness, despite discussions with health care professionals and the provision of written information. Up to 89% of stroke survivors are satisfied with their overall care, but only 50% are satisfied with the information received in hospital.

Information needs vary over time and circumstances, and may continue for several years after stroke. Too much information too early may be detrimental to recovery. Surveys conducted among individuals with a variety of conditions
show that education can influence behavioural changes that lead to better health outcomes and reduce stress in decision making. Stroke survivors and caregivers found that the most beneficial education met the following criteria:  

- Individualized and personalized.
- Delivered at appropriate times during the recovery process; for example, providing information about feeding options to a stroke survivor who is NPO.
- Provided in written form.
- Supported by functional examples and implementation.

Education about dysphagia can take place at the bedside by example or demonstration. Information can be given verbally, but it is more effective when provided in written form as often as possible. Processing auditory information is reduced when people are under stress, distracted or dealing with unfamiliar information. For the stroke survivor and caregivers, terms and concepts important for understanding dysphagia may be unfamiliar and overwhelming when first presented. Stroke survivors and caregivers may benefit from being made aware of the educational materials and approaches that are available to them, including the following:

- Brochures providing overviews of dysphagia information developed on site or obtained from standard sources.
- Booklets providing stroke- and dysphagia-specific information available through support groups.
- Support groups, through organizations such as the Heart and Stroke Foundation of Ontario and Stroke Recovery Network.
- Internet chat lines, special-interest Web pages, and general topic information.
- Local Libraries.

Did you know? The following practices may have significant clinical consequences, including aspiration or dehydration, for individuals with dysphagia:

- Feeding someone who is not fully alert
- Syringe feeding
- Feeding in a fully or partially recumbent position
- Giving pills with water to individuals on a ‘no thin fluids’ diet consistency
- Unnecessarily restricting a diet consistency to thickened fluids and pureed solids
- Feeding with a tablespoon rather than a teaspoon
- Giving anything not approved in the diet: tell the family, other staff members and visitors to check if specific food items are safe before giving them to the resident.
The Continuum of Dysphagia Care

This manual has been developed for the dysphagia care team screener working with stroke survivors in the long-term care setting. Most of this information also applies to individuals in rehabilitation and complex continuing care settings with persistent dysphagia.

When a stroke survivor is admitted to long-term care, it may already be known if they have dysphagia and swallowing recommendations from the SLP dysphagia expert that have been previously implemented. To ensure a smooth transition into the long-term care setting it is critical that all information about the individual’s swallowing status and their swallowing recommendations accompany them and get communicated to the dysphagia care team. If there are questions regarding the previously implemented SLP recommendations it would be appropriate to contact the SLP where possible. Occasionally, a stroke survivor may be admitted without any information pertaining to their swallowing or the information provided may be incomplete or unclear. It is vital that the transferring facility be contacted to request the dysphagia information and/or clarify any incomplete or unclear information.

Likewise, if a resident with dysphagia is transferred to hospital, another care facility or a day program, sending comprehensive information related to their dysphagia and swallowing recommendations will be important in preventing negative complications. Effective transitions between the various levels of care ensures continued successful management of the dysphagia and prevents consequences of unmanaged dysphagia, such as pulmonary, nutrition or hydration complications.

Review questions

1. List 3 different diet consistencies an SLP might prescribe for a stroke survivor with dysphagia.
2. Residents unable to eat by mouth are instead fed via a tube. Name one risk and one benefit of tube feeding.
3. Describe 3 purposes for a program of oral hygiene for residents with dysphagia.
4. Discuss 1 risk and 1 benefit for giving a stroke survivor only thickened fluids.
5. What is the role of the SLP in the care of the stroke survivor with dysphagia?
6. What is the role of the RD in the care of the stroke survivor with dysphagia?
7. What is the difference in purpose between a screening tool and an assessment tool?
8. Name 4 members of the interprofessional dysphagia care team and identify their roles.
9. What is the most common instrumental test for dysphagia and who typically administers it?
Dysphagia case studies

Case Study # 1

RS is a 71-year-old male who was admitted to hospital with right-sided weakness and garbled speech. RS was accompanied to hospital by his wife of 50 years, and she provided medical and social histories. His medical history includes Parkinson’s disease (1998), transurethral radical prostatectomy (1996), and appendectomy (remote). His wife, children and grandchildren are all actively involved in his care. RS worked as an electrician for 40 years and recently worked as a clerk in the local farmers’ supply store for 3 years until his Parkinson symptoms became pronounced. A CT scan done while in hospital showed a left sided lacunar infarct.

RS is admitted to the long-term care facility where you work 6 weeks after his stroke. Transfer notes indicate the following symptoms: right visual field neglect, right facial asymmetry, dense right-sided weakness in the arm and leg, unintelligible speech and drooling.

Speaking with Mrs. S. you learn that RS wears glasses, has one hearing aid and wears dentures. Further discussion with her indicates that she is eager to have RS resume oral feeding.

You are the nurse on shift when this resident is admitted to your facility.

For discussion

1. Based on best practice guidelines for dysphagia, how will the dysphagia screening process take place for this resident? That is:
   - Who will start the process?
   - What will or will not be done?
   - When will it occur?

2. Briefly describe how you should respond to the swallowing needs of this individual.

3. How will you address the wife’s concerns?
Case Study #2

DL is a 66-year-old male who presented in the emergency department after collapsing at home while digging in the garden. His wife found him unable to move his right arm or leg and unable to speak. A CT scan performed in the emergency department detected an early left middle cerebral artery (MCA) infarct.

Previously, DL had been independent and in good health, with no history of hypertension, diabetes, hypercholesterolemia or hospitalization. He did not take any medications and had stopped smoking 18 years ago. DL lived with his wife and 3 children.

You come in as the evening shift nurse. In report you learn that DL was admitted today at 2pm from the nearby rehabilitation facility. You learn that his stroke was 4 months ago.

Transfer notes indicate that DL has no gag reflex, left deviation of the eyes, and aphasia. Notes from the rehab SLP indicate that DL should have a dysphagia minced with honey thick fluids diet consistency, no thin fluids and oral medications with applesauce. The notes further indicate that he should use a chin tuck when drinking and that he pockets food in his right cheek.

His family members accompanied him to your facility. They are very anxious. They come to you asking for pain medications and a snack for DL because he is hungry.

For discussion

1. What are your most immediate concerns for this resident?
2. As a member of the dysphagia care team, briefly describe your role with this resident?
3. How will you best address the family’s concerns?

Case Study #3

HN is an 85-year-old Cantonese speaking woman living in the long-term care facility where you work. She had a right brain stroke nine months ago and had been living with her daughter until her long-term care admission two months ago. Her medical history includes steroid-dependent rheumatoid arthritis, atrial fibrillation and type 2 diabetes mellitus. Her residual deficits on admission included: left sided weakness, decreased pain and temperature sensation, facial droop, slurred speech, dry mucous membranes and an absent gag reflex.

On admission you screened HN for dysphagia. She failed the screen and was seen by the SLP dysphagia expert for a swallowing assessment. Recommendations after the swallowing assessment resulted in a change of diet texture from regular to minced. HN’s liquids remained nectar thick. There are no planned follow-up visits by the SLP.

Yesterday HN’s daughter came to you concerned about the food that her mother has been receiving and indicated that she feels that it is the cause of her mother’s recent weight loss. She continued by telling you that she gave her mother some tea and she swallowed it just fine.

For discussion

1. What are your most immediate concerns after this conversation with HN’s daughter?
2. How will you address the daughter’s concerns?
3. As a member of the dysphagia care team, what is your role with this resident?
THE DYSPHAGIA CARE TEAM

MDs

ACTIVITY STAFF
(Feeders)

PSWs
(Feeders)

DOC/ADMIN

RNs
(Screeners)

OTs

SLPs
(Dysphagia Expert)

RDs

RESIDENT & FAMILY

PTs

Information regarding presence of each professional (i.e., in house, off-site, consultant) at the LTC facility can be added to each box in addition to information regarding how these team members communicate (i.e., face to face, by phone, by pager, etc.).
Appendix 2: Medications that should not be crushed

The following medications should not be crushed: 93

- Adalat CC, XL, PA (nifedipine CC, XL, PA)
- Arthrotec (diclofenac/misoprostol)
- Asacol (5-aminosalicylic acid)
- Bayer Aspirin (ASA enteric coated)
- Cardizem CD, SR (diltiazem CD, SR)
- Cipro (ciprofloxacin)
- Cronovera (verapamil)
- Depakene (valproic acid)
- Enteric Coated Naproxen
- Effexor XR (venlafaxine XR)
- Flomax (tamsulosin)
- Imdur (isosorbide-5-monomitrate)
- Isoptin SR (verapamil)
- Isosorbide dinitrate SR
- Losec (omeprazole)
- MS Contin (morphine slow release)
- OxyContin (oxycodone slow release)
- Pantoloc (pantoprazole)
- Prevacid (lansoprazole)
- Proscar (finasteride)
- Prozac (fluoxetine)
- Sinemet CR (levodopa/carbidopa SR)
- Tegretol CR (carbamazepine)
- Theo-Dur (theophylline SR)
- Trental (pentoxifylline)
- Uni-Dur (theophylline SR)
- Uniphyl (theophylline SR)
- Wellbutrin SR (bupropion)
- Voltaren SR (diclofenac SR)
- Zyban (bupropion).
Residents who have aphasia after their stroke know more than they are able to say. Every person with aphasia is different. As their caregiver, it is important that you have patience and continue to try different strategies to make communication with the resident with aphasia as easy as possible. You will find that some strategies are effective with some residents while others are not. The following are some tools to assist your communicative interactions with the resident with aphasia.

**Tips to Increase the Resident’s Understanding of Your Message**

- Communicate face to face. Facial expressions help to clarify the message.
- Speak clearly in an appropriate tone for communicating with an adult.
- Communicate one idea at a time.
  - E.g., It is dinner time. (pause) First you will have soup. (pause) Next you can have macaroni and cheese or Sheppard’s pie. (Show examples, pause and wait for the resident’s choice.) I will help you to eat.
- Print key words on paper for the resident to see.
- Use gestures to clarify your message.
- Use yes/no questions.
  - E.g., “Would you like milk?” rather than “Would you like milk or water?”

**Tips to Help the Resident with Aphasia Get their Message Across**

- Communicate in a quiet, distraction-free environment.
- Encourage the resident to write key words or draw.
- Ask yes/no questions.
- Be patient. If you do not have time then explain this and return when you have time to finish the conversation.
- Help to clarify the topic when you aren’t sure.
  - E.g., “Are you talking about dinner?” “Do you wonder what is on the menu for dinner?”
- Encourage the resident to use gestures. Pay attention to facial expression.
Glossary

Achalasia: Failure of a ring of muscle, such as a sphincter, to relax. Achalasia occurring in the UES or LES can contribute to pharyngeal and/or esophageal dysphagia. The most common symptoms of achalasia are dysphagia, regurgitation, and chest pain. Although initially dysphagia may be for solids only, as many as 70-97% of patients with esophageal achalasia have dysphagia for both solids and liquids at presentation. 20

Apraxia: Motor programming deficit that can involve speech and the oral preparatory stage of swallowing but does not affect involuntary or automatic tasks.

Aspiration: Entry of food or liquid into the airway below the muscles that produce sound, that is, the vocal cords. 33

Aspiration pneumonia: Respiratory tract infection resulting from inhalation of oropharyngeal secretions, food or drink. 66

Assessment: Evaluation of the structural and physiologic details of a disorder and determination of the best intervention. Assessment of swallowing determines the overall nature and causal factors of impairment of oral swallowing stages and predicts impairment of pharyngeal, laryngeal and esophageal swallowing physiology. This is in contrast to screening (see definition below). 94

Clinical bedside swallowing assessment: A bedside assessment is carried out by an SLP during evaluation of an individual’s oral swallowing mechanism, vocal quality, productivity of cough, language and cognitive skills, self-feeding skills, and level of endurance. The findings determine recommendations for further investigation, including instrumental assessment; management; and education. 66

Comorbid conditions: Comorbid conditions are any congenital or acquired, physical or mental conditions, present independently of the onset of another medical condition, determined by taking a history.

Dehydration: A water and electrolyte disturbance resulting from either water loss or depletion of sodium with accompanying water loss, which develops when metabolic water needs and losses exceed intake. 53

Discharge planning: Process that directs interventions toward an ultimate goal of appropriate and timely discharge from current services or transfer to another setting. 66

Dysarthria: A group of speech disorders resulting from disturbances of muscular control due to damage to the peripheral or central nervous system, or both. Dysarthria is characterized by weakness, slowness, or lack of coordination of the speech mechanism. 96

Dysphagia: A swallowing disorder associated with difficulty moving food/liquid from the mouth to the stomach. 22, 56

Dysphagia diets: Diets modified in physical properties, such as texture or viscosity, to meet the needs of an individual with dysphagia. Opti-
Dysphagia diets are prescribed based on the results of a clinical and, possibly, an instrumental assessment to compensate for identified physiologic and/or structural swallowing abnormalities. Dysphagia diets are often prescribed in stages designed to gradually facilitate safe return to a regular diet.\(^9^4\)

**Dysphagia management**: Intervention prescribed by an SLP to compensate for impaired swallowing structure and neurophysiology to optimize safety, efficiency, and effectiveness of the oropharyngeal swallow and maintain nutrition and hydration.\(^9^4\)

**Dysphagia team**: A team with representation from different disciplines and/or specialties that acts together to screen and manage stroke survivors with swallowing and feeding disorders under the direction of an SLP.\(^1^3\)

**Enteral feeding**: Administration of nutritional preparations into the digestive tract orally or through a tube, using gravity, pump-controlled infusion, or a bolus with a syringe.\(^9^7\)

**Esophagus**: A collapsed muscular tube, approximately 23 to 25 cm in length, with a sphincter or valve at each end: the UES at the top and the LES at the bottom. Proximally, the esophagus is directly below the pharynx and distally it attaches to the stomach.\(^2^0\)

**Faucial arches**: Located bilaterally inside the oral cavity at the level of the tonsils along the sides of the throat.

**Feeding**: The act of transporting food/liquid toward the mouth in preparation for swallowing.\(^2^2\)

**Fiberoptic Endoscopic Evaluation of Swallowing (FEES)**: FEES is performed using a flexible scope inserted through the nose to the level of the soft palate or below to evaluate swallowing.\(^6^6\)

**Gingivitis**: Inflammation of the gums with redness, swelling and bleeding; often associated with mouth breathing, poorly fitting dentures and vitamin deficiencies.\(^9^6\)

**Instrumental assessment**: Various investigations, such as videofluoroscopy and FEES, which are adjunctive to clinical assessment. Instrumental assessment helps to determine impairment in the structure and function of oral, pharyngeal, laryngeal and upper esophageal swallowing physiology and identifies treatment or compensatory strategies that enhance the efficiency and safety of the swallow.\(^6^6\)

**Interdisciplinary dysphagia team**: A team of health care professionals who work together collaboratively to screen, assess, and manage dysphagia.\(^1^3\)

**Lower esophageal sphincter (LES)**: A muscular sphincter at the distal end of the esophagus that relaxes to open and constricts to close. The LES keeps food/liquid and digestive juices in the stomach and prevents reflux, or regurgitation, of food/liquid into the esophagus.\(^2^0\)

**Malnutrition**: Unintentional loss of usual body weight, during a period of less than 6 months.\(^4\)

**Mucositis**: Inflammation of the mucous membranes of the oral cavity that can cause pain, edema, ulceration and erythema.\(^9^6\)

**Nasal regurgitation**: Leakage of food or drink into the nasopharynx before swallowing due to reduced contraction of the posterior tongue and/or the reduced elevation of the soft palate to appose the posterior nasopharyngeal wall.\(^2^3\)

**Nasogastric (NG) tube**: The NG tube passes through the nose, pharynx and esophagus into the stomach. Liquid feed is passed through the NG tube for hydration and nutrition. The volume and number of feedings per day varies depending on the individual being fed and the setting. Having the person remain upright for 1 hour after feeding can minimize gastroesophageal reflux. A narrow tube reduces pharyngeal irritation.\(^9^8\)
**Oral cavity**: The oral cavity includes the lips anteriorly, 24 deciduous and 32 permanent teeth, hard palate, soft palate (velum), uvula, lower jaw (mandible), tongue, floor of the mouth, and the faucial arches.  

**Oral intake**: This term refers to food/liquid entering the mouth in preparation for swallowing. It includes meals, snacks, intake of medications, etc.

**Oral transit time**: The time for a bolus to travel through the oral cavity, beginning when the tongue starts to propel the bolus posteriorly and finishing when the bolus reaches the base of the tongue.  

**Osteophytes**: Bony outgrowths that can arise on the cervical vertebra and displace the posterior pharyngeal wall anteriorly. Surgical intervention may be considered if severe pharyngeal narrowing is present.  

**Palate**: Roof of the mouth, including the bony hard palate (the anterior two-thirds of the palate) and the muscular soft palate (the posterior one-third of the palate).

**Percutaneous endoscopic gastrostomy (PEG) tube**: The PEG tube is a long-term method of feeding using liquid feed delivered through a tube inserted through the abdomen into the stomach. Insertion of a PEG tube is a reversible surgical procedure performed under local anesthesia.

**Pharyngeal transit time**: The time for a bolus to travel through the pharynx, from the base of the tongue to the top of the esophagus.

**Pharyngeal webs**: Webs that occur in the esophagus or the pharynx and are usually composed of normal mucosal folds.

**Pneumonia**: see Aspiration pneumonia

**Pocketing**: Food residue in the upper or lower sulci, between the gums and cheeks, or under the tongue after swallowing.

**Postural change**: Adaptive swallowing technique incorporating changes in a client’s body positioning to alter bolus flow through the oropharynx to increase swallowing safety and/or efficiency. Turning the head to the weaker side to redirect the bolus flow through the stronger side of the pharynx is an example of postural change.

**Presbyphagia**: Changes to the swallowing mechanism due to the normal aging process.

**Risk indicators**: Measurable characteristics or circumstances associated with increased likelihood of a poor status or outcome, such as impaired swallowing, malnutrition, poor health, or death.

**Screening**: Procedure to identify individuals at risk of dysphagia and initiate earlier referral for assessment, management or treatment to prevent dysphagia complications and minimize health risks. This is in contrast to assessment, which evaluates the swallow in detail and provides information about severity and adequate intervention (see above).

**Silent aspiration**: Passage of material below the level of the true vocal cords in the absence of cough or alteration in vocal quality.

**Swallowing apnea**: Apnea, or cessation of breathing, occurring with airway closure during the pharyngeal stage of swallowing; duration of airway closure increases with bolus size.

**Swallowing strategy**: Adaptive swallowing technique incorporating changes to a client’s swallowing physiology, thus increasing swallowing safety and efficiency. The super-supraglottic swallow, a voluntary airway protection manoeuvre, is an example of a swallowing strategy.

**Swallowing treatment**: Intervention intended to change swallowing physiology or the developmental swallowing pattern to improve the safety, efficiency, and effectiveness of the oropharyngeal swallow and maintain nutrition and hydration. Procedures to improve laryngeal functioning.
and airway protection may also be involved. \textsuperscript{66}

**Tracheotomy**: A surgical procedure by which an opening is made in the wall of the trachea into which a tube is inserted to facilitate breathing.

**Upper esophageal sphincter (UES)**: The UES is located at the proximal end of the esophagus. The UES opens to allow the bolus to pass into the esophagus and closes to prevent food and drink from refluxing from the esophagus into the pharynx. \textsuperscript{20}

**Velum**: The posterior one-third of the palate, also called the soft palate, terminating at the finger-like uvula in the midline. \textsuperscript{96}

**Ventilator**: A machine that provides mechanical support for breathing and an appropriate mixture of gases for life support. Mechanical ventilation is used when spontaneous inhalation and exhalation are inadequate for effective respiration. \textsuperscript{100}

**Videofluoroscopic swallowing study**: A videotaped or digitized fluoroscopic evaluation of oral, pharyngeal, laryngeal and upper esophageal swallowing physiology that incorporates compensatory or treatment strategies. \textsuperscript{66}

**Viscosity**: A measure of the intrinsic ability of a fluid to resist shear force. Viscosity is quantified as the ratio of shear stress to shear rate or the rate of fluid deformation and is commonly referred to as texture. \textsuperscript{97}

**Vocal cords**: Two muscles within the larynx and positioned behind the thyroid lamina, primarily responsible for producing sound. During the swallow, they adduct to close off the airway and thereby help prevent aspiration of food or liquid. This is referred to as the period of swallow apnea.

**Xerostomia**: Oral dryness due to reduced salivary flow, which can occur due to dysphagia, mouth breathing, oral infection, radiation thera-

**Zenker diverticulum**: A pocket resulting from herniation of muscle in the area joining the lower pharynx and upper esophagus. \textsuperscript{56}
References


