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Life Care Planning Issues for Adult Swallowing Disorders

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Editor's Note: *This is the second in a two-part series on life care planning issues for individuals with swallowing disorders. The first article, published in the Journal, volume 4, numbers 2 & 3, addressed pediatric swallowing disorders.*

Abstract. *Swallowing disorders occur in adults as a result of congenital, acquired, and aging issues. Life care planners who work with adults with swallowing disorders should have a basic understanding not only about the complexity of swallowing problems and the potential impact of oral and pharyngeal dysphagia (swallowing disorders) on future care planning, but also on swallowing anatomy and physiology, assessment, and treatment. This is the second article of a two-part series discussing oral and pharyngeal swallowing disorders across the continuum of life care planning. The first article (Higdon, 2005) addresses pediatric swallowing disorders and the current article addresses adult swallowing disorders including how to locate a speech-language pathologist qualified to evaluate, treat, and participate in your life care plan, as well as the components of the plan that relate to swallowing disorders. The article also addresses therapeutic interventions and implications for the life care plan.*

Introduction

Definition, Epidemiology and Treatment

Dysphagia can be defined in several different ways, but, most frequently, is referred to as a difficulty with the movement of food from the mouth to the stomach, or, more simply put, "difficulty swallowing" (Murray & Carrau, 2001). This can include chewing food, swallowing solids and/or liquids, coughing or choking when eating, and/or food sticking in the throat or chest after eating. It is estimated that more than 15 million adults in the United States have dysphagia (ASHA, 2005). Dysphagia may be associated with many medical conditions; however, the most common include head and neck cancer, cerebral palsy, stroke, head injury, Parkinson's Disease (PD), Multiple Sclerosis (MS), Amyotrophic Lateral Sclerosis (ALS), spinal cord injury, other forms of cancer, and dementias.

Normal swallowing occurs in four dynamic and overlapping phases: 1) oral preparatory phase, 2) oral phase, 3) pharyngeal phase, and 4) esophageal phase. These phases allow food and liquid to move from the mouth into the stomach efficiently and safely. The oral preparatory phase includes the anticipation of eating, bringing food to the mouth both through biting off the food and taking it from a utensil, the manipulation of food in the mouth by chewing

and mixing it with saliva, and preparing it to be swallowed. Liquids are sipped or sucked through a straw in this phase. The oral phase is the phase in which the food is collected and sealed between the roof of the mouth and the tongue, and the tongue propels food posteriorly with a stripping wave motion into the back of the throat (pharynx) until the actual swallow is triggered (Logemann, 1998). During the pharyngeal phase, the soft palate elevates, the tongue base moves back to contact the pharyngeal wall, the larynx (voice box) moves up and forward, and the epiglottis (top part of the larynx) is tilted down and back to guide the food past the airway. The vocal folds adduct, or close, and the soft palate or velum elevates to prevent food from going into the trachea and nose during this phase of swallowing (Yorkston, Miller, & Strand, 2004). In the final stage of swallowing, the esophageal phase, breathing momentarily stops; vocal folds come together to further protect the airway; muscles of the pharynx contract, moving the food towards the esophagus (tube leading to the stomach) with the upper esophageal sphincter relaxing; and the food is carried through the esophagus. Peristalsis (a wave contraction) moves the food through the esophagus with the lower esophageal sphincter muscle relaxing to allow the food to pass into the stomach. There can be a breakdown in swallowing at any one or more of these four phases of swallowing (Logemann, 1998).

Epidemiology

Dysphagia can occur in persons of all ages, from infants (Higdon, 2005) to the elderly, and results from a variety of different etiologies. When referring to adult dysphagia, some of the most common etiologies are cerebrovascular accidents (CVAs), neurological degenerative diseases like ALS or MS, and traumatic brain injury (TBI). Cerebrovascular accidents, in particular, have a high prevalence of dysphagia, with incidence as high as 41.7% in the first month after a CVA (Murray & Carrou, 2001). Dysphagia associated with traumatic brain injury has been estimated to be present in as many as 65% of these patients (Murdoch & Theodoros, 2001). For purposes of this article, "patient" is used to refer to the individual with a disability and can be used interchangeably with the term "client."

Further, it has been estimated that swallowing problems occur in 10 percent of elderly populations not living in an acute hospital setting and between thirty and sixty percent of those who are in the hospital setting (Lieu, Chong, & Seshadri, 2001). Swallowing disorders have also been shown to cause an increase in the mortality and morbidity rate in elderly patients. Swallowing problems in the elderly occur for multiple reasons including poor posture, cognitive problems, poor oral intake or a weakness in the neurologic pathways of swallowing (Carrau & Murray, 1999). These patients may also have sensory problems in the oral cavity, changes in food preferences due to decreased smell and increased taste, and decreases in saliva causing swallowing to be painful and uncomfortable (Lieu, et al., 2001). Many times the causes of the symptoms described above are due to stroke, dementia, gastro-esophageal reflux disease (GERD), and medication side effects. Many medications such as antihistamines and tricyclic antidepressants may cause a decrease in saliva production, thus making swallowing painful. Other drugs may cause toxic myopathy affecting the pharyngeal muscles and weakness in the muscles used in swallowing (Lieu, et al., 2001). Elderly patients also have a high frequency of "pill dysphagia" or difficulty swallowing pills. These patients take more medicine than other age groups due to health reasons; therefore the ability to swallow medications is critical. Chewing abilities may also become a problem for elderly patients due to overall weakness (Rubin, Broniatowski, & Kelly, 2000). Further, some of the dietary restrictions that can accompany dysphagia may adversely affect other conditions such as diabetes and high

cholesterol. Finally, older individuals often exhibit varying degrees of dementias and patients with dementias have been shown to need more assistance with feeding than those who do not have a dementia (Lieu, et al., 2001). For the above reasons, elderly patients should be carefully monitored for any possible signs of dysphagia.

Many times dysphagia can be in the form of silent aspiration, which occurs when material falls below the level of the vocal folds and without obvious symptoms that aspiration has happened. Aspiration, when material falls into the larynx below the vocal folds and enters the lungs, can also occur in patients before, after, or during a swallow (Hardy & Robinson, 1999). Some possible complications of dysphagia are pneumonia, malnutrition, and dehydration caused by swallowing that is either unsafe or inefficient (Logemann, 1998). Untreated pneumonia caused by aspiration can lead to death in many cases.

Treatment

An interdisciplinary approach to dysphagia is the most efficient approach to treatment. Improved swallowing resulting in patient health improvements can lead to shorter hospital stays (Hardy & Robinson, 1999). Patients, families, nurses, physicians, speech-language pathologists, occupational therapists, and dieticians should all be involved in the identification and treatment of dysphagia. These individuals should be knowledgeable about the signs, symptoms, and risk factors of dysphagia, and should be able to recommend that presenting symptoms consistent with dysphagia be seen by a speech-language pathologist for a thorough evaluation.

Sign, Symptoms, and Risk Factors

It is important to look for possible signs of dysphagia in all patients. These signs include: unexplained weight loss; slowed eating; difficulty chewing; drooling or inability to control saliva secretions in the mouth; coughing and/or choking before, during, or after swallowing; recurring pneumonia; wet or gurgly vocal quality; increased secretions in the pharyngeal cavity; and a pattern of multiple swallows (Logemann, 1998; Carrau & Murry, 1999; Yorkston, Miller, & Strand, 2004). Obvious signs of oral stage of dysphagia in adults include extra effort needed to chew or swallow, inability to eat specific food types, loss of food or liquids from the mouth, and/or food sitting in the mouth long after a meal. Typical signs of pharyngeal phase of dysphagia include coughing, choking or gagging during or right after a meal, "wet" or "gurgled" voice and/or breath sounds after eating or drinking, and/or sensation of food "sticking" in the throat. Pharyngeal phase difficulties may exist without any signs or symptoms. The esophageal phase of dysphagia is often characterized by frequent episodes of regurgitation, reflux, or spitting up after a meal, difficulty managing solid food, sensation of food sticking in the throat or chest area, and/or complaints of dysphagia without overt coughing or choking. All types of dysphagia may be associated with frequent respiratory problems or infection.

Types of Dysphagia

The stages of dysphagia include swallowing problems in the oral (and oral peripheral) area, the pharyngeal area, and the esophageal area. The oral stage of dysphagia consists of difficulty manipulating food and liquids in and through the mouth, chewing difficulty with solid foods, weakness and discoordination of tongue movements, and/or the tongue does not propel

the food towards the throat efficiently. The food may sit in the mouth and not move efficiently to the next stage.

In the pharyngeal phase, there may be a decreased ability to "trigger" the actual swallow, the muscles of the throat may become weak, and foods or liquids may not move through the pharynx well and may be left behind after the swallow. In the pharyngeal phase there may be problems closing the vocal folds (which help protect the airway) and food or liquid may be mis-directed into the airway during the swallow and pass through the vocal folds which is referred to as aspiration. Aspiration may occur with food, liquids, and/or saliva. The absence of coughing is not necessarily a sign that aspiration is not present. Undiagnosed or long-term aspiration may lead to aspiration-related pneumonia. Both the oral and pharyngeal stage swallowing problems can impact upon safe and efficient eating, and both the oral and pharyngeal stage dysphagia is seen in many conditions including head and neck cancer, stroke, and other neurological conditions.

Esophageal stage dysphagia involves the transport of food and liquids through the esophagus. Individuals with problems in the esophageal phase also frequently have pharyngeal phase complaints. Typically, in esophageal dysphagia, food does not move well through the openings at the top and bottom of the esophagus. There is dysfunction of peristalsis (contraction wave) which normally squeezes food from the esophagus into the stomach. Individuals feel food "stuck" at some level. Reflux (i.e., the movement of foods, liquids, and stomach acids back up the esophagus) is a common complaint. Esophageal stage dysphasia can be related to neurological disorders, mechanical problems (obstructions such as cancer or strictures) or specific motility problems with the esophageal muscles. These same issues are also seen with aging.

Evaluation of Dysphagia

Once signs or symptoms of dysphagia are noted, the physician makes a referral to the speech-language pathologist for an evaluation of the swallowing mechanism. The speech-language pathologist then uses multiple means to determine if a swallowing disorder is present. Speech-language pathologists are the professionals most appropriately trained to assess and treat dysphagia in the oral and pharyngeal stages and to screen for dysphasia in the esophageal stage. Techniques include, but are not limited to, a clinical evaluation, videoendoscopy and/or videofluoroscopy (modified barium swallow) evaluation.

A careful examination of the patient's history should be done to determine the etiology of the dysphagia. A determination of the patient's cognitive abilities as it pertains to swallowing and possible therapy should also be ascertained at the beginning of the evaluation. Considerations include whether the patient can follow directions and commands necessary to benefit from therapy, and whether therapy should take place during meals (which is often referred to as therapeutic feeding). Additional questions include, "Does the patient have supportive and able caregivers who can carry through with recommendations and techniques for the patient's benefit?" "How do the swallowing difficulties and possible therapy affect respiratory status?" Finally, "Is the patient motivated and interested in improving his or her swallowing abilities?" The speech-language pathologist will look at medications to determine if the patient is receiving any medications with a secondary effect of dysphagia. The 2005 Physician's Desk Reference lists approximately 200 medications with the secondary side effects of dysphagia (Medical Economics, 2004). During the clinical evaluation, the speech-language pathologist is seeking information on the patient's medical history, medical diagno-

sis and conditions, the oromotor mechanism, respiratory functions, and may observe a meal to evaluate labial control (lip movement during swallowing), lingual control (tongue movement during swallowing), pharyngeal contractions, laryngeal control, cognitive skills (following directions, etc.), and how the patient reacts to attempts to swallow (Logemann, 1998). Various textures and thicknesses of food and liquids are given to the patient during the screening to determine difficult food consistencies. The function of the mouth, throat, and sometimes the esophagus may then be carefully examined with instruments.

An x-ray procedure, called a videofluoroscopic swallow study or modified barium swallow evaluation, consists of imaging the swallowing process by following food/liquids through the mouth and throat into the esophagus. This study is used to define the abnormalities in anatomy and physiology causing the patient's symptoms and to identify and evaluate treatment strategies that may immediately enable the patient to eat safely and/or efficiently (Logemann, 1998). Three consistencies are typically used with this study: thin liquid, paste, and a food requiring mastication (chewing), usually a cookie. All three consistencies of food are either mixed with barium or coated with it. The barium materials are distributed in increasing amounts to the patient. If a patient is determined to be at risk to swallow more than 10% of a bolus, or bite of food, of a particular consistency or texture, he or she will be restricted from eating foods of that consistency. Patients may also be asked to change positions or to try various therapy techniques during the study in order to determine if a particular technique or position would be beneficial to them (Logemann, 1998). Problems can be examined, the reasons behind the swallowing problems identified, and a course of treatment planned. Significant esophageal problems may warrant additional x-rays and tests.

Another test, the fiberoptic endoscopic evaluation of swallowing (FEES) uses a small camera on a small scope to look at the throat while swallowing foods and liquids. The narrow tube is inserted into the nose and positioned to view the throat. Pictures are taken as the foods and liquids move through the throat. An otolaryngologist may collaborate with the speech-language pathologist during this testing. An advantage of a FEES study is that the equipment is portable, and the study can be done bedside or in a physician's office.

Dysphagia Treatment Planning

Based upon the results of the evaluation, the speech-language pathologist will determine the safest diet and best therapy techniques to help the patient with the identified swallowing problems. Whether the patient should continue to receive food orally or be switched to a nasogastric tube or some other form of non-oral feeding is often an issue at this time. Patients who aspirate more than 10% of every bolus given to them, despite consistency, should not be allowed to feed orally (Logemann, 1998). If the decision is made to feed by non-oral means, the physician determines the type of non-oral feeding that will be used (e.g., nasogastric, gastrostomy, jejunostomy, or esophagostomy). Gastrostomy, jejunostomy, and esophagostomy feedings require surgical insertion of a tube into the stomach, intestine, or esophagus, respectively. The decision for non-oral feeding is based upon multiple factors including medical and clinical diagnoses, funding sources, and behavioral considerations.

Treatment Strategies

Whether or not a patient will be eligible for treatment and whether or not treatments will be included in the life care plan is determined by the etiology of the disorder, cognition, moti-

vation, and support systems of the patient (Lieu, et al., 2001). Each patient is examined carefully and the diagnostic and evaluation information is reviewed by the speech-language pathologist to determine eligibility (Huckabee & Pelletier, 1999). Dysphagia treatments should be constantly monitored and adjusted by the speech-language pathologist, and the ongoing nature of treatment is a consideration for the life care plan. It is also important to remember that when working with a patient who has a swallowing disorder, interaction, support, and prompting are key components in treatment (Chadwick, Jolliffe, & Goldbart, 2002).

Depending on the cause of the problem, any of the following treatment strategies may be used to correct or improve the condition:

- Dysphagia therapy
- Medical intervention
- Surgical intervention
- Dietary modifications

Medical interventions include medications and/or dilation of a narrow area of the pharynx or the esophagus. Surgical interventions include removal of tumors, relaxing muscles, and tightening muscles. Dietary modifications include modifying the consistency of food so that it is easier to chew or swallow, modifying the consistency of liquids so that they can be swallowed easily and safely, and assuring that nutritional needs are met. Costs for each of the treatment approaches vary a great deal from state to state, region to region, and type of facility. The basic cost is determined by the current Medicare guidelines; however, this does not cover the entire cost. As is true with most costs included in a life care plan, the life care planner should check with the local facilities and professionals to determine current costs for the different procedures.

Food Consistencies

Changes in food consistencies are another compensatory strategy used with patients who exhibit dysphagia. In a study done by Garcia, Chambers, and Molander (2005) thickened liquids were found to be effective in the treatment of dysphagia. Generally, the speech-language pathologist determines the consistencies of food allowed a patient and the appropriate consistencies are typically identified during the videofluroscopic evaluation (modified barium swallow) study. Solid food modifications include pureed/liquefied, mechanically altered, and soft. Liquid modifications are thin, thick, and thickened. Thin liquids consist of milk, tea, coffee, and clear liquids and broths. Thick liquids have the consistency of milkshakes or nectars. Thickened liquids may require a thickening agent to achieve the appropriate level of thickness. The three consistencies of thickened liquids that are used with patients who have dysphagia are nectar, honey, and pudding.

There are four levels of food consistencies used in dysphagia. The first level consists of puree food and thickened liquids. This level is the most conservative of the four levels of diets. In this level all foods are blended to a smooth consistency, with no chewing required (foods will drop from a suspended spoon). Liquids are thickened with multiple agents such as cornstarch, unflavored gelatin, and commercial thickeners. The second level of diet is mechanically altered with all meats and vegetables finely chopped and moistened to remain cohesive. Minimal chewing is needed and this consistency may include fork mashed foods. These foods include cottage cheese, milkshakes, and macaroni and cheese. The third level is made up of

soft to chew foods with normal consistency and low fiber content. Foods at this level require moderate chewing. Examples are pancakes, bananas, pasta, poached chicken, poached fish, potted beef, cheese cake and pies. Liquids may also be added at a slow pace to this level. The fourth and final level of diet is a regular diet to include all liquids and soft foods. Food with rough or coarse texture should not be included in this level of diet. Meats may need to be cut into smaller pieces, and all food should require minimal amounts of chewing (Carrau & Murry, 1999). Once the consistency of food and liquids has been determined, the patient's caregiver will largely be responsible for preparing the patient to eat and feeding the patient if needed (Groher, 1994).

In addition to food modifications, dysphagia therapy includes other compensatory strategies to control symptoms. There are four other types of compensatory strategies that are used including postural changes, increased sensory input, modification of amount and speed of food presentation, and the introduction of intraoral prosthetics. These strategies will be described below.

Postural Changes

There are multiple postural changes that will improve swallowing in specific types of patients. Patients should be seated upright with their hips and legs flexed at a ninety degree angle. Hospital beds should be adjusted to elevate the head of the bed and pillows placed behind the patient's back may be necessary to achieve the correct upright position. Wheelchairs should also be adjusted to the appropriate seating position for eating. Patients should remain in this posture for several minutes after eating to ensure that food remaining in the throat or mouth is drained through the esophagus and not aspirated. The chin-down posture is one type of postural compensatory strategy. During this technique, the patient tilts the neck downward to allow the chin to touch the neck during the swallow. This technique causes a narrowing of the airway, widens the vallecula, causes more epiglottic closure and is beneficial to patients who may have trouble protecting their airway. Patients may also be taught to use the chin-up posture in which the chin is tilted upward in order to allow gravity to drain the food from the oral cavity, facilitating oral transit. This technique may be helpful with patients who have difficulty with tongue control.

Other postural compensatory strategies include movements of the head, such as head rotation, where the head is twisted toward the damaged side, closing the damaged/weaker portion of pharynx to allow movement of food down the stronger side, reducing residue or stasis. Both the chin down and head rotation postures may be combined to achieve optimal airway protection. A head tilt may also be used as a compensatory strategy and involves tilting the head toward the stronger side to allow food to drain on the stronger side. The last postural technique is lying down or side lying. This technique is not as common, and should only be used with patients who are at minimal risk of aspiration. In this posture, the patient is laid on his or her side, with the upper part of the bed tilted to 30 degrees. Pillows are placed under the patient's head and behind the back to provide support. Patients are only allowed to take food in through a straw while in this position (Logemann, 1998; Hardy & Robinson, 1999; Yorkston, Miller, & Strand, 2004; Rubin, Broniatowski, & Kelly, 2000). Combinations of these postures are often used such as the chin down, then head back when there is reduced oral control, and the head turn and chin down for the best airway protection, used typically when there is unilateral weakness.

The speech-language pathologist will determine the actual postural changes that are used after he or she has viewed the videofluoroscopy information. Each patient will use different

postural changes to compensate for their individual swallowing problems. Patients will need to be reminded of these techniques until they are able to use them automatically (Carrau & Murray, 1999).

Increased Sensory Input

Logemann (1998) suggests using techniques to improve sensory input prior to swallowing. These techniques, which are useful for patients with agnosia (impairment of the ability to recognize the touch of objects or sensory input), apraxia (inability to make skilled or purposeful movements, using oral mechanism or upper and lower extremities), or other sensory disorders, include increasing the size, taste, temperature of the bolus; adding downward pressure to the spoon; and thermal-tactile stimulation. Changing the bolus volume, taste or temperature include using sweetners to enhance, pepper to stimulate, Butter Buds or dry baby cereals (rice or oatmeal) to increase the bolus volume, and "shocking" the system with hot or cold temperatures. Thermal-tactile stimulation is designed to increase awareness in the oral cavity and to cause the swallow reflex to be triggered more rapidly (Logemann, 1998). Other ways to improve sensory input are through oral exercises of the lips, tongue, palate, and mandible; presenting the spoon with small amount of food in certain positions in the oral cavity/mouth; increasing the patient's ability to self-feed so that he or she is using the cortical areas of the brain to send sensation information to the brain saying the "food is coming, I have to swallow;" and stimulating the cranial nerves of the brainstem by chewing. These exercises allow the patient to achieve the awareness that food or liquid is present in the oral cavity and seek to improve tongue strength so that food is moved more easily (Carrau & Murray, 1999).

Amount and Speed of Food Presentation

Actual food amounts and the speed in which they are placed in a patient's mouth can also affect his or her ability to swallow safely. The speech-language pathologist determines the appropriate amount of food that should be given per swallow during the swallow study. A larger bolus may be appropriate for patients who have trouble triggering a pharyngeal swallow. Other patients may require a smaller bolus size (one-third to one-half a teaspoon) in order to swallow safely. Various types of spoons may also be used when feeding patients in order to maintain better control of the bolus size. As a general rule, the slower the rate of intake, the greater the likelihood that the patient will swallow more efficiently (Huckabee & Pelletier, 1999), and patients should be monitored to always finish one bolus of food before another is placed in their mouth. Patients may also need to swallow more than once to clear any residue left after the original swallow. Drinking through a straw may also be a problem in persons with dysphasia. Patients may have difficulty controlling the amount of liquid taken in when using a straw. They may also have problems with coordination and timing of suction and inhalation (Hardy & Robinson, 1999).

Patients may also be "non oral feeding status" or NPO. This status means that the patient should be given no food orally. All nutrition and hydration should be given through an alternate means, such as a nasogastric tube (NG), gastrostomy tube (G-tube), jejunostomy (J-tube), or esophagostomy tube discussed earlier in this article. Data has shown that tube feeding may not prevent aspiration pneumonia which is due to the fact that patients still produce secretions or saliva and may also regurgitate food, both mechanisms that a feeding tube cannot control (Finucane, Christmas, Travis, 1999).

The speech-language pathologist using other strategies, such as thermal-tactile stimulation, may still work on swallowing abilities while the patient is unable to feed orally. "No liquids by mouth" is another food modification that may be made. This patient is able to tolerate solid foods in various consistencies, but is still at risk for aspirating on liquids of any consistency. These patients should not receive any liquids orally, including water, ice chips, etc. (Hardy & Robinson, 1999).

Intraoral Prosthetics

Intraoral prosthetics may be prescribed for patients who have paralysis of the tongue or pharyngeal area. There are multiple types of prosthetics used to aid in speech and swallowing which consist of the palatal lift prosthesis, palatal obturator, palatal augmentation device, and palatal reshaping prosthesis (Logemann, 1998).

A palatal lift prosthesis lifts the soft palate into an elevated (closed) position in patients with velar paralysis. A palatal obturator can be used in oral cancer patients with significant resection of the soft palate. A palatal augmentation or reshaping prosthesis can be extremely effective in patients with significant tongue resections or bilateral tongue paralysis (Davis, Lazarus, Logemann, & Hurst, 1987; Logemann, Kahrilas, Hurst, Davis, & Krugler, 1989). The palatal reshaping prosthesis recontours the hard palate to interact with the remaining tongue, filling in the areas of the hard palate where the patient's tongue cannot make contact postoperatively and enabling the patient to control and propel the bolus more efficiently. After resection of part of the tongue, patients often indicate that it feels as if their tongue fits their mouth again with the prosthesis in place. Without the prosthesis, the patient has a large oral cavity and a very small tongue that is incapable of controlling food in the mouth for chewing and swallowing. These intraoral prosthetics are usually constructed by a maxillofacial prosthodontist in cooperation with the speech-language pathologist. Construction should begin within the first four to six weeks postoperatively to prevent the patient's development of poor habits for swallowing that will need to be dishabituated when he or she receives the prosthesis. Costs for the prostheses are again dependent on the region, professional, and type of facility. Life care planners are encouraged to call prosthodontists for specific prices. Life care planners should note that the patient frequently will need the prosthesis replaced from wear and tear at least once and sometimes multiple times in the course of treatment, growth, or recovery. Patient specific information should be gathered from the speech-language pathologist making the recommendation (in conjunction with the attending physician and prosthodontist).

Direct Dysphagia Therapy Approaches

Direct dysphagia therapy treatment depends on the cause, symptoms and type of swallowing problem, and include the use of food and liquid during therapy. Therapy may include exercises, changes in head or body position, teaching strategies to improve eating, and techniques to heighten the sensation of food and enhance a safe and efficient swallow (see Table 1).

After the introduction of compensatory strategies, the patient may be taught several other techniques to aid in proper swallowing. These techniques are the Mendelsohn Maneuver, Supraglottic Swallow, Super-Supraglottic Swallow, and the Effortful Swallow. In addition to these techniques, oral motor exercises may be introduced to help strengthen and improve the range of motion of the muscles used in swallowing.

Table 1. General Suggestions for a Safe and Efficient Swallow

Patient should have a quiet and relaxed atmosphere at mealtime.
Patient dentures should fit well, with adhesives used if needed.
Foods should be kept soft and moist if needed.
Patient should sit upright when eating, drinking, and taking medications.
Patient should be encouraged to chew well.
Patient should be encouraged to swallow before taking another bite.
Patient should be encouraged, when drinking, to swallow each sip before taking another one.
If the patient needs to be fed, the person feeding should know if: • The feeder is going too fast • The feeder is giving too large an amount • The feeder is not putting food into the patient's mouth correctly
The patient should sit upright for at least an hour after eating to allow food to be digested.
If the patient has weakness on one side of his/her mouth, check to be sure that no food remains on weaker side.
The patient should do oral care after each meal.

Mendelsohn Maneuver

This technique is used to prolong the elevation of the larynx during swallowing to allow a larger amount of the bolus to enter the esophagus. Patients are instructed to hold their "Adam's apple" upward and to not let it drop for several seconds (Logemann, 1998; Murray & Carrau, 2001; Hardy & Robinson, 1999).

Supraglottic Swallow

This swallowing technique is designed to close the vocal folds before and during a swallow to prevent food or liquid from entering the trachea. During this maneuver, patients are told to take a deep breath and hold it, take a bite of food or sip of liquid and swallow, cough when exhaling, swallow, and breathe. These steps should be repeated with every swallow. Patients who have a tracheostomy tube can also use this technique. They are instructed to, in addition to the above steps, cover their tracheostomy tube (Logemann, 1998; Hardy & Robinson, 1999).

Super-Supraglottic Swallow

This method of swallowing is used to close the airway before a swallow. Patients are told

to inhale and hold their breath very tightly, bearing down, swallowing hard "like you swallow down a lump when you don't want to cry, keep holding your breath and bearing down as you swallow. Cough when you are finished" (Logemann, 1998, p. 220).

Effortful Swallow

This technique increases the posterior movements of the base of the tongue, thus causing more effective clearance of the bolus from the valleculae. Patients are instructed to squeeze with the neck and upper chest muscles during a swallow (Logemann, 1998).

Oral Motor Techniques

Oral motor techniques are used to improve the strength and range of motion in the labial, facial, mandibular, and lingual muscles. Exercises include range-of-motion tongue exercises, resistance exercises, bolus control exercises, bolus propulsion exercises, and range-of-motion exercises for pharyngeal structures. In range-of-motion tongue exercises, patients are taught to move their tongue to various positions (i.e., elevate the front, move to the side of the mouth, etc.) and hold it there for a minimum of one second. Logemann (1998) recommends that each of the exercises be repeated five to ten times, around four to five minutes each session and that the set of exercises be repeated five to ten times per day. Resistance exercises improve tongue strength. Patients are instructed to push their tongue against a tongue blade or finger in various positions for one second. In bolus control exercises, patients are taught to manipulate various objects, such as gauze or a paste like bolus, in their mouths. The manipulative movements mimic those found in chewing and swallowing. Bolus propulsion exercises use a piece of gauze, rolled to be long and narrow, in which half has been soaked in fruit juice. The end of the gauze that is soaked in juice is placed in the patient's mouth while the clinician holds the other end. The patient is instructed to push upward and backward with his or her tongue to drain the liquid from the gauze. This technique mimics a swallow. Patients may also be taught range-of-motion exercises for pharyngeal structures that involve voluntarily closing the airway, producing a "glottal attack" in order to aid in vocal fold adduction, strengthening the tongue base, and using a falsetto voice to elevate the larynx (Logemann, 1998; Hardy & Robinson, 1999).

Labial (lip) exercises are also done to increase strength and range of motion. Exercises to improve range of motion include lip retraction (smile), protrusion (pucker), and a combination of the two (smile then pucker). Each of these is held in the given position for five seconds. Labial closure exercises include pressing the lips together, pressing the lips together around an object such as a tongue blade, and puffing the cheeks out with air (Murry & Carrau, 2001; Hardy & Robinson, 1999; Murdoch & Theodoros, 2001).

Jaw strength is also targeted through exercises such as opening the mouth and holding it for five seconds, moving the jaw side to side for five second intervals, and moving the jaw in a circular motion (Murry & Carrau, 2001; Hardy & Robinson, 1999; Murdoch & Theodoros, 2001).

Special Topics

Four topics that deserve special attention are deep pharyngeal nerve stimulation (DPNS), neuromuscular electrical stimulation (NMES), the Frazier Water Protocol, and the use of alter-

native feeding methods when the patient may not receive nourishment by mouth because of the dysphagia risks. Each of these topics require additional time from the speech-language pathologist, additional equipment, and thus, will necessitate additional costs added to the life care plan.

According to Stefanakos (1993), DPNS is presented as a therapeutic program that restores the pharyngeal reflexes within the pharynx for efficient swallow function. DPNS is a systematized therapeutic program which stimulates "directly" the pharyngeal musculature. DPNS concentrates on three reflex sites (tongue base and bitter taste buds for improving the tongue base retraction reflex, soft palate musculature for improving the palatal reflex and velopharyngeal closure, and superior and medial pharyngeal constrictor musculature). Although DPNS has been reported to have a dramatic effect upon restoration of the swallow function, improving quickly the re-directive cough and improving vocal quality through efficient vocal fold adduction function, consistent objective evidence to support this procedure is not available at the time of this publication (Sullivan, 2005).

The use of NMES to aid dysphagia has gained increasing attention within clinical and research arenas of speech-language pathology. With recent advances in technology, the use of NMES is becoming more widely available to speech-language pathologists and may be incorporated as a tool in dysphagia rehabilitation along with behavioral therapy in the future. NMES is reported to be most effective when applied to an intact system of nerves and muscles in patients who have lost the central nervous system control of movement due to brain injury, including stroke. When NMES is applied to the nerve endings in the muscle or to nerves innervating the muscles to produce muscle contractions, it is referred to as neuromuscular stimulation. When NMES is applied to the skin (surface stimulation), it will activate sensory fibers in the skin and only those muscles immediately below the skin surface, if enough intensity is applied. Most applications use electrodes inserted into the muscles (intramuscular) and an indwelling controller like a pacemaker to provide the stimulation either under patient or automatic control. Neuromuscular stimulation is used in rehabilitation of patients with spinal cord injury to control hand movements and bladder function, and is now being developed for sleep apnea and dysphagia (Leslie, Carding, & Wilson, 2003). Dysphagia, as a result of brain disorders, may be alleviated by direct stimulation of the muscles that are no longer receiving the correct signals from the brain. When the patient can no longer produce the muscle activity necessary to elevate the larynx, for example, NMES could control muscles to produce movements that the patient cannot control. Intramuscular stimulation using electrodes inserted into these muscles has been shown to produce laryngeal elevation similar to that which occurs during normal swallowing (Shapiro & Downey, 2004). On the other hand, neuromuscular electrical stimulation over the surface of the skin will provide stimulation of the skin but has not been shown to elicit movement to control laryngeal elevation (Freed, Freed, Chatburn, & Christian, 2001).

Neuromuscular electrical stimulation for the treatment of dysphagia continues to be controversial. Humbert and Ludlow (2004) suggested the technique is more efficacious than research confirms and their article featured ongoing research at the National Institutes of Health comparing intramuscular electrical stimulation with surface electrical stimulation to determine benefit in reducing aspiration for those with delayed or reduced laryngeal elevation, and/or reduced upper esophageal opening. Some argue that the evidence to support the majority of current medical and clinical practice across all professions is weak or lacking. Others contend that advances in clinical practice would be nonexistent if speech-language pathologists withheld novel or new treatment procedures until every bit of evidence was available to

support their usefulness. However, it is difficult for professionals in the Communicative Sciences and Disorders field to embrace and utilize electrical stimulation at this time as currently there is no peer-reviewed efficacy data demonstrating its value for oropharyngeal dysphagia (Sullivan, 2004). Some questions that need to be answered include: "What muscles are being stimulated?" "Does stimulation activate neural fibers and neural circuits?" "If so, is there the potential of neural deactivation as a result of stimulation?" "Where should electrodes be placed?" "What stimulation intensity should be applied?" "What is the optimum dose-the number of repetitions per session and day and for how long?" "What patients or populations benefit?" "Are the effects immediate or long-term?" Logemann (as cited in Sullivan, 2004), confirms that, at this time, there is no published evidence in peer-reviewed journals indicating that electrical stimulation improves swallowing, stating that spontaneous recovery is the usual result. Further, she suggests that the anecdotal evidence is that electrical stimulation to the external neck can sometimes worsen swallow.

To further guide speech-language pathologists and the Communicative Sciences and Disorders profession, it is critical that clinicians wait for evidence regarding the efficacy of NMES. If speech-language pathologists prematurely embrace this procedure by recommending inclusion in a life care plan, the risks to patients and the profession are far-reaching and costly. Risks include slowing progress by delaying use of or reduced use of supported techniques, potential health risks, false hope, not being reimbursed for clinical services, and loss of credibility.

The Frazier Rehabilitation Center's Water Program was put into place in 1984 at the Frazier Rehabilitation Center in Louisville, KY and continues to be used today in many facilities around the country who work with patients with dysphagia (Prather, 2005). The protocol was developed because of concern over patient and family non-compliance with thin liquid restrictions both within the rehabilitation facility and after discharge. The use of this protocol allows patients to have water for hydration purposes, possibly being restricted to water taken under supervision. Medications are never given with water but with applesauce or pudding or thickened liquids. Family education always includes the rationale for allowing water intake. The guidelines for this program are repeated by the speech-language pathologist (and often by the dietician and nurse) during the education process.

Alternative methods of feeding may be in place or need to be put into place during rehabilitation of the patient's swallowing. These include intravenous feeding (an IV to give the patient hydration and electrolytes), an nasogastric (NG) tube which is a temporary solution, typically used in the hospital, a percutaneous endoscopic gastrostomy (PEG) tube with an external opening into the stomach to use pureed table foods for nourishment, or a jejunostomy (J) tube which requires an external opening into the digestive tract and specially prepared nourishment. Alternative feeding methods may be reduced or withdrawn as the patient's swallowing abilities improve or when they improve to the point of being able to support themselves nutritionally with oral intake of some consistency of table foods. It should be noted that the consistencies may still need to be modified (puree, mechanical soft, soft, regular, or thickened liquid) when the patient returns to oral intake.

Coding for Billing

Speech-language pathologists must decide which codes to use for various procedures which, in turn, allows the life care planner to cost out the recommended procedure or service. Life care planners should remember that the American Speech-Language Hearing Association

(ASHA) is continually working with the American Medical Association (AMA) to add new codes and to improve the description and fees attached to existing codes. Thus, it is important for life care planners to remain current, year by year, with available codes, description of services that define the codes, and the dollar value attached to each code. Table 2 lists the Current Procedural Terminology (CPT) codes used for the procedures described in this article, as well as for the procedures described in the earlier article addressing pediatric swallowing disorders (Higdon, 2005). Please note that this is not a comprehensive list of all the CPT codes that speech-language pathologists or audiologists use. The codes in Table 2 are for procedures described in this article, and in the earlier pediatric article.

Table 2. Selected Current Procedural Codes (AMA, 2006)

CPT Code	Descriptor	Special Rules
92506	Evaluation of speech, language, voice, communication, auditory processing, and/or aural rehabilitation status	Aural rehabilitation limited to speech reading.
92507	Treatment of speech, language, voice, communication, and/or auditory processing disorder (includes aural rehabilitation); individual	Includes training & modification of voice prosthetics. Aural rehabilitation limited to speech reading.
92508	Group, two or more individuals	Generally limited to 4 individuals. Limit of 25% of total SLP treatment (tx) sessions is applicable to Part B patients in some intermediary Local Coverage Determinations. (For Skilled Nursing Facility Part A residents, up to 25% of each discipline's rehabilitation tx minutes per week.)
92526	Treatment of swallowing dysfunction and/or oral function for feeding	There is no dysphagia group tx code. Use 92508.
92597	Evaluation for use and/or fitting of voice prosthetic device to supplement oral speech	Under Medicare, applies to tracheoesophageal prostheses, artificial larynges, as well as voice amplifiers. Use 92507 for training and modification of voice prostheses.
92610	Evaluation of oral and pharyngeal swallowing	

Table 2 cont'd

	function	
92611	Motion fluoroscopic evaluation of swallowing function by cine or video recording	Should be billed with radiology procedure 74230. 92610 is usually reported prior to this procedure.
92612	Flexible fiberoptic endoscopic evaluation of swallowing by cine or video recording (FEES)	This is the complete endoscopic procedure. Level of physician supervision varies by state. Use 92700 if performed without cine or video recording.
92613	Physician interpretation and report	Optional procedure by physician.
92614	Flexible fiberoptic endoscopic evaluation, laryngeal sensory testing by cine or video recording	This is not a swallow evaluation; sensory testing only.
92615	Physician interpretation and report	Optional procedure by physician.
92616	Flexible fiberoptic endoscopic evaluation of swallowing and laryngeal sensory testing by cine or video recording (FEESST)	This is the complete endoscopic procedure for swallowing and sensory testing combined. Level of physician supervision varies by state.
92617	Physician interpretation and report	Optional procedure by physician.

How to locate a speech-language pathologist who is qualified to evaluate and treat oral and pharyngeal swallowing disorders?

Identification of a "qualified" speech-language pathologist to assess swallowing disorders begins with the fact that the individual must hold a master's degree, at a minimum, the certificate of clinical competence (CCC) from the ASHA and state licensure, in states where licensure is required. At the time of this writing, fifty (50) states and the District of Columbia require licensure for speech-language pathologists to practice. The ASHA has ProSearch, an online directory of more than 5000 programs that employ speech-language pathologists (and audiologists) who hold the CCC from ASHA. This is a searchable data base for consumers to locate individuals in their specific geographic area. Speech-language pathologists must sign up to be listed in this data base so not every qualified speech-language pathologist may be listed. Beyond that, it is up to the life care planner or case manager to ask questions to further deter-

mine if the speech-language pathologist's experience and training fits the patient's needs. The ASHA website is (http://www.asha.org). An additional website that consumers may find useful is the Dysphagia Resource Center (http://www.dysphagia.com). Additional help is available through the ASHA Specialty Board on Swallowing and Swallowing Disorders at www.swallowingdisorders.org or email to brss@wismed.org.

Questions for life care planners and case managers to ask speech-language pathologists to determine if the speech-language pathologist is correctly matched to the life care planner's case include the following:

1. An explanation of their credentials.
2. A discussion of the types and numbers of swallowing disorders the person may have had an opportunity to assess. It is wise to note, at this point, that although some speech-language pathologists with doctorates may be presumed to have the best training or experience, many times these Speech-language pathologists have held administrative academic positions without much clinical experience. The master's level speech-language pathologist with a special interest in swallowing disorders may have completed many assessments of complex etiologies. So, the experience is essential in identifying the correct speech-language pathologist .
3. An understanding of behavioral assessment techniques as well as instrumental assessment techniques.
4. An understanding of team assessments, as well as an understanding of life care planning. Again, note that many Speech-language pathologists may not have knowledge or an understanding of the area of life care planning or case management. However, the person will have an understanding of medical and educational team models and will be willing and able to furnish the needed information.

What to Include in a Life Care Plan for Oral and Pharyngeal Swallowing Disorders

In life care plans of adults, the following information should be included for an adult with a swallowing disorder. Costs are for informational purposes for the article only and are not to be used in individual life care plans. In all cases, life care planners are to consult with the providers in the specific geographic areas.

1. Referral to a qualified (masters or doctoral level) speech-language pathologist for a complete oral and pharyngeal assessment. Include time for intake information and review of clinical records, face to face assessment of the individual as well as meeting with the caregivers, instrumental assessment, interpretation of results, and recommendations for treatment, follow-up, and family and caregiver education as well as discussion with physician and other team members. Cost for this assessment is difficult to project because some facilities have a flat fee for a swallowing assessment and other facilities include the swallowing assessment in the full Communicative Disorders (speech-language pathology and audiology) assessment. Life care planners should contact local health care facilities to obtain an accurate cost for this procedure as well as any listed below.

2. Referral to a qualified speech-language pathologist for a complete swallowing treatment plan, following the swallowing diagnosis, with the appropriate time and resources to complete the treatment plan. Life care planners should be very clear to include the need for the treatment plan, the probable time lines, and the needed resources when requesting this information from the speech-language pathologist. Clinical professionals often will have some difficulty in determining, over time, what is needed for a person with a swallowing disorder. It is often helpful to the treating professional to explain the purpose and the format of life care plans, since this may still be a fairly new concept to some educational and healthcare professionals.
3. Referral to radiologist to participate in videofluroscopic evaluations, if these are needed. Cost of this testing varies according to the geographic region and could range between $250.00 to as much as $500.00. Again, the life care planner should contact local health care facilities to obtain an accurate cost for this procedure.
4. Referral to an otolaryngologist to participate in specific instrumentation assessment, if needed. (Otolaryngologist is needed if fiberendoscopic (FEES) assessment is to be completed. In some states, speech-language pathologists do the FEES testing, and otolaryngologists interpret the medical results of the FEES. Cost of this testing varies according to the geographic region and the role of the otolaryngologist in the procedure (whether he/she performs the complete FEES or just interprets the results).
5. Referral to appropriate facility for the radiographic study, such as the videofluroscopic study. Facility costs will be separate from physician or technician costs.
6. If there is an existing swallowing disorder, the instrumentation assessment (videofluroscopic and/or FEES) should be repeated on a biannual or annual basis, depending on recommendations of the speech-language pathologist. This will also include reassessment with the physicians. Typically, if the treatment plan is in effect, speech-language pathologists and respiratory therapists will be included under the daily, weekly, etc. treatment/therapy costs. In extreme situations, this writer has recommended repeated instrumentation studies on a quarterly basis, however, this is rare and should not be done on an ongoing basis. Life care planners may find that facilities will charge less for the re-evaluation than for the initial evaluation.
7. Referral to a pulmonologist if there is evidence of respiratory problems. Physician costs vary a great deal within states and from state to state and the life care planner is encouraged to contact qualified physicians to obtain accurate costs.
8. Referral to a respiratory therapist if there is evidence of respiratory problems, tracheostomy, or etiologies with possible respiratory complications. Typically, this referral requires a physician referral to initiate respiratory therapy.
9. Referral to a gastroenterologist for assessment of gastroesophageal reflux, frequently present in older adults with swallowing disorders. Similar to #7 above, physician costs vary a great deal within states and from state to state and the life care planner is encouraged to contact qualified physicians to obtain accurate costs.
10. Include costs of oral feedings versus insertion of tubes and tube feedings, as well as modified or adaptive feeding utensils. In these cases, consideration for offsets related to normal food and utensil costs should be made in the life care plan.
11. Typically, when an adult has a swallowing disorder, he or she may also have a com-

munication disorder, requiring a speech-language pathology assessment and intervention. This part of the process can be accomplished by the same qualified speech-language pathologist but should be identified in the plan as a separate item with separate costs and frequencies. A speech-language pathologist can and does complete a swallowing assessment without administering a communication disorders assessment and vice versa, and the life care planner should develop a separate recommendation for the communicative disorders assessment (speech-language pathology and/or audiology) if needed.

Conclusions

Swallowing and feeding disorders occur with multiple medical diagnoses across the age spectrum from premature infants to geriatric adults. Incidence and prevalence vary among diagnostic groups and morbidity related to dysphagia can be a major concern. For example, dysphagia resulting from stroke is considered to be a major cause of morbidity due to respiratory complications (Gordon, Hewer, & Wade, 1987; Gresham, 1990). Further, the mortality for hospitalized elderly patients with pneumonia is 43% (Logemann, 1995). In addition, the cost of the consequences of feeding and swallowing disorders must be taken into account.

The literature shows that medical costs can be calculated per episode of pneumonia (Fein, 1999) and an average hospitalization cost for treating pneumonia is $13,790 (University of Miami/Jackson Memorial Medical Center, Miami, FL, 1999). For the typical patient receiving home enteral nutrition, the annual cost of therapy was $18,000, but ranged from $5,000 to $50,000, based on 1996 data (Reddy & Malon, 1998). The cost of lifestyle alterations and caregiver burden is more difficult to determine, but can have enormous impact on individuals and others in their environment.

Speech-language pathologists are trained to evaluate and treat individuals with swallowing disorders, and can be an excellent source of information for life care planners to incorporate relevant recommendations and services into their life care plans. It is hoped that the information presented in this article will allow planners to adequately provide appropriate services and devices for swallowing disorders for their clients in the present as well as into the future.

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