



College of Audiologists and
Speech-Language Pathologists of Ontario

Ordre des Audiologistes et
des Orthophonistes de l'Ontario

PRACTICE STANDARDS AND GUIDELINES FOR DYSPHAGIA INTERVENTION BY SPEECH-LANGUAGE PATHOLOGISTS

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EXECUTIVE SUMMARY

1. Providing service for swallowing disorders (dysphagia) is within the speech-language pathologist's (SLP) scope.
2. The SLP assesses swallowing function as well as develops, implements and monitors dysphagia management programs in collaboration with the patient/client and other members of the health care team.
3. SLPs must follow infection control protocols appropriate for circumstances.
4. SLPs must have the required competencies to provide services for swallowing disorders.
5. In the course of providing service for swallowing disorders the SLP must;
 - a. Obtain and document informed consent from the patient/client for each component of service for swallowing disorders.
 - b. Determine the patient's/client's needs.
 - c. Determine the nature of the risks associated with any service provided and take steps to minimize those risks.

The types of risks to be considered include:

 - i. Risks of aspiration and blocked airway
 - ii. Risks associated with swallowing liquid or food
 - iii. Risks associated with radiation exposure
 - iv. Risks which may arise when managing the swallowing disorder. These risks may arise when:
 1. Changing the texture of the food or liquid to be swallowed
 2. Changing posture while swallowing
 3. Controlling breathing patterns when swallowing
 4. Using electrical stimulation therapy techniques
 - v. Risks associated with nourishment by tube or other non-oral methods in cases of significant swallowing impairment.
 - d. Follow the necessary mandatory procedures:
 - i. Determine if the patient/client is ready for assessment.
 - ii. Assess swallowing using clinical, non-instrumental techniques.
 - iii. Provide treatment or recommendations to decrease the swallowing disorder and or its impact on the patient/client. The techniques used may:
 1. Assist the patient/client in compensating for the swallow disorder
 2. Result in permanent changes by improving function in the muscles used for swallowing.
 - iv. Provide education and counselling to assist the patient/client in understanding the swallowing disorder and how to minimize its impact.
 - v. Ensure that the results of all techniques are evaluated to ensure that swallowing is not made worse by the methods used.
 - e. Consider which optional procedures should be utilized such as:
 - i. Screening for swallowing disorders
 - ii. Use of instrumentation for assessment
 - f. Initiate the involvement of others when appropriate.
 - g. Discharge the patient/client.
6. All components of swallowing disorder service delivery must be documented.

A) PREAMBLE

Practice Standards and Guidelines (PSGs) are necessary to ensure quality care by speech-language pathologists (SLPs) to the people of Ontario who require services for dysphagia (swallowing disorders). The skills and competencies outlined in this PSG are an important component in the provision of quality care for swallowing disorders. It is the intent of this PSG to provide SLPs in Ontario with an overview of the swallowing assessment and management process and to provide some of the knowledge necessary to make responsible decisions regarding dysphagia service delivery. This PSG is meant to be used as a decision-making framework. It is not intended to be a tutorial or to provide SLPs with all the information required to practice in the area of dysphagia. SLPs are ethically responsible to ensure competence in the assessment and management of dysphagia and to ensure that their patients/clients are safe during the performance of these services. Specialized competencies are required for specific populations (such as infants, children, tracheotomized and medically fragile patients/clients). It is essential that SLPs working with these populations (in which the risk of harm may be amplified) have the necessary expertise, resources and equipment to competently provide dysphagia services.

This PSG incorporates both “*must*” and “*should*” statements. “*Must*” statements establish standards that members must always follow. In some cases, “*must*” statements have been established in legislation and/or CASLPO documents. In other cases, the “*must*” statements describe standards that are established for the first time in this PSG. “*Should*” statements incorporated into this PSG describe best practices. To the greatest extent possible, members should follow these best practice guidelines. The inclusion of a particular recommendation in these standards and guidelines does not necessarily indicate that the practice is supported by high level research evidence (i.e., evidence from randomized clinical trials), but rather that the guideline is grounded in current best evidence derived from a broad review of the research literature (ranging from single case reports to larger trials) and/or expert opinion. SLPs should exercise professional judgment, taking into account the environment(s) and the individual patient’s/client’s needs when considering deviating from these guidelines. SLPs must document and be prepared to fully explain departures from this PSG.

CASLPO’s original Preferred Practice Guideline for Dysphagia was developed in 2000. The current document represents a revision of the original guidelines document, with a change in emphasis to Standards and Guidelines for speech-language pathologists working in the area of dysphagia.

B) DEFINITION OF SERVICE

Swallowing is a behaviour that healthy individuals carry out effortlessly more than 1000 times per day[1]. Swallowing is essential for nourishment and hydration, yet also affords us pleasure and is central to social events in our daily lives.

Dysphagia is the term used to refer to an impairment or disorder of the process of deglutition (swallowing) affecting the oral, pharyngeal and/or esophageal phases of swallowing. Dysphagia in itself is not a disease but rather a secondary consequence of one or more underlying pathologies[2], including those of neurogenic, oncologic, structural, psychogenic, surgical, congenital or iatrogenic origin. Dysphagia places individuals at risk for negative nutritional and respiratory sequelae (e.g. pneumonia) [3, 4]. The economic consequences of dysphagia for the health-care system are considerable; the cost of treating pneumonia in Canada has been estimated at \$1,000 per day of hospitalization[5]. Besides being a physiological impairment, dysphagia can have significant negative consequences for quality of life and overall well-being[6-10].

In the United States, it has been estimated that oropharyngeal dysphagia occurs in approximately 10 per cent of all acute hospital inpatients/clients [11], 30 per cent of patients/clients in rehabilitation centres, and half of patients/clients in nursing home facilities [12]. In new acute stroke patients/clients alone, the incidence approximates 30 to 65 per cent [13-16]. Of those initially affected, approximately 50 per cent do not recover functional swallowing by six months after the onset of the stroke event[17]. Dysphagia secondary to stroke is estimated to affect up to 20,000 new Canadians per year[18].

Although the literature to date focuses on dysphagia due to stroke, dysphagia is also common in other diseases. One retrospective chart review identified dysphagia to occur in 27 per cent of traumatic brain injury patients/clients admitted to a rehabilitation hospital [19]. Dysphagia is also a common feature of progressive neurological diseases [20-24]. For example, it is estimated that approximately 50 per cent of individuals diagnosed with Parkinson's disease will develop dysphagia [25-31]. Patients/clients who suffer various forms of cancer (e.g. head and neck, gastrointestinal, central nervous system, lung, breast, hematologic, systemic) may develop dysphagia, either as a symptom of their disease or as a consequence of surgery, chemotherapy, radiation or a combination of approaches [32-48]. Dysphagia can also occur following thoracic surgery or surgery to the cervical spine and/or cervical structures [49-51], and dysphagia may occur in patients/clients with cardiovascular conditions [52-55].

Apart from being caused by known neurological and mechanical disease processes, other factors can also cause dysphagia. For example, dysphagia can occur due to iatrogenic reasons such as a side-effect of neuroleptic medications [56] or the insertion of a tracheostomy tube [57]. Furthermore, dysphagia affects people of all ages from infancy [58] to geriatrics [59]. One Canadian study reported visible signs of swallowing difficulty to be present in as many as 80 per cent of individuals residing in a Home for the Aged [60].

Children develop dysphagia as a consequence of the same diseases and injuries that affect swallowing in adults [61-66]. However, children's swallowing function can also be impaired from congenital conditions[67] and craniofacial abnormalities such as cleft lip or palate, which have been documented to occur in newborns at approximate rates of 1 in 1,000 and 1 in 2,000 respectively[68]. Premature infants frequently exhibit swallowing and feeding

difficulties, and difficulty co-ordinating respiration and swallowing [61]. Chronic neurological and developmental disorders such as cerebral palsy commonly involve dysphagia and feeding difficulties [69].

In total, it is likely that more than 200,000 people suffer from dysphagia in Canada at any given time. Patients/clients diagnosed to have dysphagia have poorer health outcomes than similar patients/clients without dysphagia. The presence of oropharyngeal dysphagia in recovering stroke patients, in particular, has been associated with malnutrition, dehydration, pulmonary compromise, increased length of hospital stay and institutional care[4, 17, 70-74].

The philosophy of PSGs is intended to be consistent with the World Health Organization's (WHO) International Classification of Functioning (ICF), Disability and Health[75] to support the use of unified terminology across health-related disciplines[75-78]. Discussion of the purpose of intervention for swallowing disorders is framed using WHO terminology as illustrated below.

The overall objective of speech-language pathology dysphagia services is to optimize individuals' ability to swallow, and thus improve their quality of life. This objective is best achieved through the provision of services that are integrated into meaningful life contexts. The WHO's established health classification system, the ICF, offers service providers an internationally-recognized conceptual framework and common language for discussing and describing human functioning and disability[75]. This framework can be used to describe the role of speech-language pathologists in enhancing quality of life by providing intervention for dysphagia.

Dimension	Definition	Examples
Impairment	Problems in body structures and/or body functions such as significant deviation or loss	Examples of specific impairments that may affect swallowing: decreased tongue strength, delayed onset of the pharyngeal swallow, reduced laryngeal or hyoid excursion, incomplete or mistimed airway closure (leading to penetration or aspiration), weak pharyngeal contraction or incomplete upper esophageal sphincter opening (leading to pharyngeal residues).
Activity/ Participation	Aspects of functioning from an individual or societal perspective	Examples of limitations and restrictions: difficulty maintaining adequate nutrition and hydration, respiratory complications secondary to aspiration, decreased ability to enjoy favourite foods, frequent need to spit secretions.
Contextual Environmental Factors	Factors that impact disability ranging from the individual's immediate environment to the general environment	Examples of difficulties imposed by the environment: inability to engage in eating as a social activity, difficulty obtaining specific required foods in some environments, social isolation due to need to spit or reliance on tube feeding.
Contextual Personal Factors	Individual factors that influence performance in the environment	Examples of relevant individual factors: race, gender, age, lifestyle, habits, upbringing, coping styles, social background, education, past experiences, character style, behaviour, food preferences.

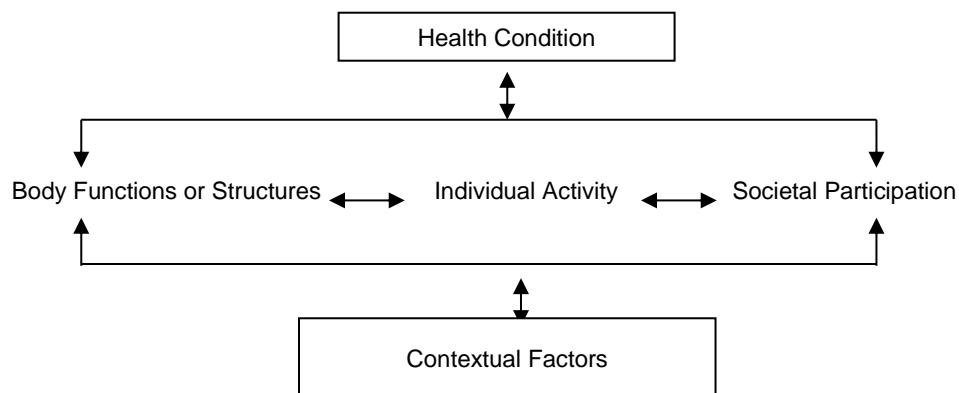


Figure 1: WHO Model (taken from Eadie^[79])

Services offered by SLPs to individuals with dysphagia encompass all components and factors identified in the WHO framework. That is, SLPs work to improve quality of life by reducing impairments to oral-motor functions and structures; lessening limitation to activity and participation and/or modifying the environmental barriers of the individuals they serve. They serve individuals with known impairments, delays or disorders of swallowing and those experiencing activity limitations or participation restrictions secondary to dysphagia. The role of SLPs includes identification, assessment and management of swallowing function.

C) SCOPE OF PRACTICE

The [*Audiology and Speech-language Pathology Act, 1991*](#), states: "The practice of speech-language pathology is the assessment of speech and language functions and the treatment and prevention of speech and language dysfunctions or disorders to develop, maintain, rehabilitate or augment oral motor or communicative functions." Although dysphagia is not specifically stated within the scope of practice statement in the *Audiology and Speech-language Pathology Act*, its inclusion is implied by the term "oral motor functions." This interpretation concurs with current scope of practice definitions for speech-language pathology in Canada, the United States, Britain and Australia among other jurisdictions [80-83]. As well as providing direct dysphagia service, CASLPO members are expected to act as a resource for patients/clients, the dysphagia team and the community at large. This may involve education of the public, where this is within the member's mandate, regarding indicators of dysphagia and general awareness of strategies.

CASLPO requires that all potential registrants show evidence of in-depth study of dysphagia in order to become registered. Dysphagia has specifically been included in the recommendations for Canadian graduate school curricula in speech-language pathology since 1998, and has been included in the mandatory content covered in the CASLPA certification examination for newly qualified clinicians since 1998.

Since their introduction in the early 1980s[84], dysphagia services have grown to constitute a substantial portion of the speech-language pathology caseload. Recent surveys by the American Speech-Language-Hearing Association (ASHA) indicate that over 45 per cent of speech-language pathology services to adults in health care settings in the United States are devoted to the assessment or treatment of dysphagia [85]. Dysphagia also accounts for 16 per cent of all paediatric services provided by SLPs in U.S. health care settings [85]. Similar evidence has not been published for Canadians, however these figures are in line with those reported in workload measurement summaries across acute care and complex continuing care facilities in Ontario where approximately 66 per cent of clinical caseloads was devoted to dysphagia services[86].

D) TARGET PATIENT/CLIENT POPULATION

These practice standards and guidelines apply to the delivery of services by a SLP to any patient/client with dysphagia, regardless of age, gender, ethnicity, aetiology or the setting in which the service is provided.

E) RESOURCE REQUIREMENTS

A variety of different tools and instruments may be needed for dysphagia service delivery. Where a CASLPO member directly operates these tools or instruments, the member should make sure that the equipment is in working order and calibrated as required prior to use.



Standard
F.i

SLPs must ensure availability of appropriate equipment and supplies for dysphagia assessment and management.

The adoption of standardized assessment protocols is strongly encouraged, including standardized methods for stimulus preparation.

Guide
E.i

SLPs should use standardized methods for dysphagia assessment whenever possible.

F) COLLABORATION REQUIREMENTS

A client-centred approach is fundamental to effective dysphagia service delivery. SLPs must strive to provide client-centred dysphagia services, respecting the patient's/client's dietary, language, cultural, ethnic and personal needs at all times.



Standard
F.i

SLPs must strive to provide client-centred dysphagia services, respecting the patient's/client's dietary, language, cultural, ethnic and personal needs at all times.

Patients/clients stand to receive the greatest benefit when a variety of health-care professionals collaborate, each bringing his/her own particular expertise to the provision of dysphagia services. The SLP brings an in-depth understanding of interactions between dysphagia and anatomy, physiology, respiration, voice, motor speech and structurally related disorders, as well as expertise in intervention. It is for these reasons that SLPs typically assume a key role on the dysphagia team.

Any regulated health professional trained in the clinical assessment of patients/clients (e.g. nurses, physicians, dietitians, physiotherapists, and occupational therapists) may conduct swallowing screening. SLPs, however, can play a fundamental role in devising dysphagia screening programs and educating those who conduct screening regarding the appropriate interpretation of findings.

SLPs not only assess swallowing function but develop, implement and monitor dysphagia management programs. Collaboration with other health care personnel is strongly recommended and is likely to occur in a wide variety of activities including stimulus preparation and texture modification; patient/client positioning, transfer and transport; suctioning; decision-making regarding dietary route; performance and interpretation of instrumental swallowing assessments; enforcement of recommendations; etc. Collaborators will likely include, but not be limited to, physicians, dietitians, nurses, respiratory therapists, medical radiation technologists, occupational therapists, physiotherapists, pharmacists, bioethicists, pastoral care staff, personal support workers, social workers, families and others as appropriate.

There may be situations where two or more professionals from different disciplines will be providing care to the same patients/clients. It is also possible that two or more SLPs may be concurrently involved in addressing a patient's/client's swallowing needs. The CASLPO Code of Ethics requires that members "maintain positive professional relationships with their colleagues, students and other professionals." Furthermore, when more than one SLP is involved in the care of a patient/client at the same time, these members must adhere to the terms outlined in [CASLPO's Position Statement on Concurrent Intervention Provided by CASLPO Members](#). In the event that disagreements arise between professionals concurrently involved in the care of a patient's/client's swallowing, CASLPO members must make reasonable attempts to resolve the disagreement directly with the other professional, and take such actions as are in the best interests of the patient/client. The [CASLPO Position Statement on Resolving Disagreements Between Service Providers](#) must be followed.



Standard
F.ii

SLPs must endeavour to collaborate in a constructive manner with others involved in the care of a patient's/client's dysphagia. SLPs must adhere to the [CASLPO Position Statements on Concurrent Intervention by CASLPO Members](#) and [Resolving Disagreements Between Service Providers](#).

G) HEALTH AND SAFETY PRECAUTIONS

During the execution of any dysphagia service component, the SLP should make every effort to minimize risk and ensure the safety of the patient/client, caregiver(s) and themselves as the clinician. Infection control measures must be taken to prevent and limit the spread of infection, as outlined in [Infection Control for Regulated Health Professionals, CASLPO Edition](#). SLPs are reminded that dysphagia assessment and management involves contact with oral secretions, which can be a vector for the transmission of infectious disease. Additionally, clinicians may come into contact with non-intact mucosa or skin in the context of providing dysphagia services. SLPs must adhere to standard practices for handwashing and glove use in order to ensure that precautionary measures for blood and fluid-borne pathogens are taken.



Standard
G.i

SLPs must adhere to standard practices for hand washing and glove use as outlined in [Infection Control for Regulated Health Professionals, CASLPO Edition](#).

Any equipment used in dysphagia intervention is considered semi-critical due to contact with mucous membranes or non-intact skin, as defined by the Spaulding Classification for disinfection as outlined in [Infection Control for Regulated Health Professionals, CASLPO Edition](#). This would require high-level disinfection of any equipment to be reused. An acceptable alternative would be single-use disposable equipment. Additional precautions may be necessary where specified by the practice setting or the patient's/client's health care providers and these would take precedence.



Standard
G.ii

Any equipment used in dysphagia intervention must be disinfected using high-level procedures before reuse or be discarded. Additional precautions as specified by the practice setting or health care providers take precedence.

H) COMPETENCIES

Any CASLPO member involved in dysphagia service delivery must:

1. Demonstrate knowledge of normal swallowing anatomy and neurophysiology;
2. Demonstrate the ability to obtain a relevant case history from the patient/client;
3. Demonstrate skill in the performance of oral mechanism examinations, conducting trial swallows, and recognizing clinical signs of aspiration or other swallowing-related difficulties;
4. Demonstrate skill in evaluating speech functions related to the swallowing mechanism including voice and motor speech function;
5. Understand the relationship between respiration and swallowing;
6. Know the indications for specific compensatory and rehabilitative management techniques for dysphagia;
7. Demonstrate the ability to develop and maintain constructive, collaborative working relationships with other professionals involved in swallowing service delivery;
8. Understand the quality of life implications of swallowing disorders and related ethical issues, and be able to collaborate with the other health care professionals to support patients/clients and families in decision-making regarding nutrition and hydration, non-oral feeding, and end-of-life care;
9. Understand the indications for and limitations of using technology and instrumentation in dysphagia assessment and management;
10. Demonstrate skill in developing clear and effective methods for educating patients/clients and their caregivers regarding selected swallowing management techniques;
11. Know when to refer patients/clients to other health care professionals, and when to engage other health care professionals in the collaborative care of dysphagia and its sequelae;
12. Stay current with the literature and knowledge regarding best practice and evidence-based practice in dysphagia assessment and management through mechanisms such as journal article reading and discussion, interest group attendance, conference/workshop attendance, or research.
13. Be able to apply knowledge regarding best practice in dysphagia service delivery to his/her own clinical practice.

Specific competencies are required of SLPs working with specialized caseloads, for example (but not limited to):

14. Demonstrate knowledge of principles of neural recovery when working with patients/clients with neurogenic swallowing impairment;
15. Demonstrate knowledge of special procedures required for patients/clients with tracheostomy or altered oropharyngeal anatomy following surgery;
16. Demonstrate knowledge of both normal and disordered developmental trajectories when working with children with dysphagia.

Additionally, SLPs who participate directly in videofluoroscopic swallowing assessments require the following additional competencies:

17. Demonstrate knowledge of and compliance with radiation safety procedures;

18. Demonstrate skill in the performance and interpretation of standardized videofluoroscopic swallowing assessments, with the ability to modify and tailor the procedure to the individual patient/client as needed.



Standard
H.i

SLPs must have the required competencies to provide dysphagia services.

I) COMPONENTS OF SERVICE DELIVERY

1. INFORMED CONSENT

The patient/client must be informed of the outcomes, benefits and risks associated with dysphagia assessment and management services before these services are provided as specified by the [Health Care Consent Act](#) (S.O. 1996 c.2 Sched. A.). This discussion must be documented by the member.



Standard
J.1.i

SLPs must obtain and document informed consent from patients/clients (or their substitute decision-maker) prior to the initiation of each dysphagia service component.

Some dysphagia assessment and management procedures involve the use of medical instruments (e.g. videofluoroscopy, endoscopy, electromyography, ultrasound). Given the potential for these techniques to be invasive, specific consent must be obtained prior to initiating the procedure.



Standard
J.1.ii

SLPs must obtain specific consent from patients/clients (or their substitute decision-maker) for the use of instrumentation in the assessment or management of dysphagia.

2. DETERMINATION OF NEED

Identification of a patient/client who may require the services of a SLP related to swallowing difficulty may occur by one of four possible mechanisms:

- a) Self-identification by the patient/client;
- b) Identification of a concern by a person known to the patient/client (family member, caregiver or acquaintance);
- c) Identification by a SLP or another health care professional through a swallowing screening process;
- d) Referral by a physician.

3. RISK MANAGEMENT DETERMINATION

A. RISK OF ASPIRATION AND AIRWAY OBSTRUCTION

The oropharynx is a common physiological pathway for the functions of breathing and swallowing[87]. Dysphagia is therefore recognized to constitute a risk of harm, with specific risk of airway obstruction or choking related to aspiration (entry of food or liquid into the

airway, below the level of the true vocal folds)[88-89]. Swallowing assessment and management usually involves the oral administration of liquid or food stimuli; under these circumstances, the risk of choking and aspiration cannot be completely eliminated. SLPs must make every effort to maximize patient/client safety when administering swallowing assessment and management procedures.



Standard
J.3.a.i

SLPs must make every effort to maximize patient/client safety when administering swallowing assessment and management procedures.

SLPs should be adequately trained and have current knowledge to provide emergency assistance to patients/clients who are choking. Current CPR (cardio-pulmonary resuscitation) certification is strongly recommended.

Guide

J.3.a.i

SLPs should be adequately trained and have current knowledge to provide emergency assistance to patients/clients who are choking.

When the risk of choking is judged by the SLP to be extremely high, it may be suitable to obtain the advice and assent of the primary health care provider prior to proceeding with the oral administration of liquid or food stimuli. If this is not possible, then the SLP should ensure that the appropriate medical assistance is available should choking occur.

Guide

J.3.a.ii

SLPs should ensure that the appropriate medical assistance is available when the risk of choking is extremely high.

When patients/clients are registered as inpatients of a health care facility or program, SLPs must follow site-specific procedures when feeding anything to a patient/client who has been designated NPO (*nil per oris*, or nothing by mouth).



Standard

J.3.a.ii

SLPs must follow site-specific procedures when feeding anything to a patient/client who has been designated NPO.

Aspiration serves as the physiological mechanism by which harmful substances are transported into the lungs [90]. Aspiration pneumonia is a serious health condition that may arise when a patient's/client's immune and respiratory function is insufficient to remove pathogenic bacteria from the respiratory system[91]. Aspiration pneumonitis is a related serious health condition that develops following the aspiration of acidic material (such as gastroesophageal reflux) [91]. SLPs should take steps to minimize risk of respiratory compromise when evaluating and treating patients/clients. These steps may include

arranging for pre-assessment mouth care to minimize the presence of harmful bacteria in oropharyngeal secretions and arranging for the patient/client to remain in an upright posture following assessment-related oral intake to promote gastric emptying and reduce the risk that gastroesophageal reflux might be aspirated.

Guide

J.3.a.ii
i

SLPs should take steps to minimize the harmful consequences of aspiration that may occur during or after swallowing service delivery.

B. RISKS ASSOCIATED WITH INGESTION OF LIQUID OR FOOD STIMULI

Swallowing assessment and management often involve the administration of liquid or food stimuli to the patient/client. In cases where there is a medical order to keep the patient/client NPO, SLPs must communicate with the primary health care provider to make sure that this does not constitute a contraindication for proceeding with swallowing assessment.



Standard
J.3.b.i

SLPs must communicate with the patient's/client's primary health care provider prior to administering liquid or food to individuals who are NPO by medical order.

Certain food or liquid stimuli used in swallowing assessment may pose greater risk of harm than others:

- Radiographic contrast media come in the form of barium sulphate or iodine preparations. Barium preparations are the most commonly used contrast medium for radiographic swallowing assessment. Iodinated contrast may be preferred when the swallowing assessment includes questions regarding the structural integrity of the upper esophagus or a surgical anastomosis.
- Food colouring may be added to assessment stimuli to aid visual detection of aspiration. Concerns have been raised in the medical literature regarding the safety of blue food dye, particularly when administered in large volumes, or to medically fragile patients/clients at risk for sepsis[92, 93]. SLPs should consider the safety of food dyes for the individual patient/client before using these products in swallowing assessment.
- Highly acidic stimuli may contribute to an elevated risk of aspiration pneumonitis in patients/clients who aspirate. SLPs should avoid the use of highly acidic stimuli in swallowing assessment.
- Patients/clients may have known allergies or other medical conditions (e.g. brittle diabetes) that make it medically inadvisable for them to swallow some stimuli. SLPs should be aware of such conditions prior to performing a swallowing assessment and should take these into account when selecting stimuli for use in assessment.



Standard

J.3.b.ii

SLPs must carefully consider the safety of and rationale for any liquid or food products selected for use in swallowing service delivery prior to asking the patient/client to swallow them.

C. RISKS ASSOCIATED WITH RADIATION EXPOSURE

Radiological swallowing assessment (videofluoroscopy) involves the use of X-rays and is therefore subject to regulation under the Healing Arts Radiation Protection Act (H.A.R.P.) (1990). SLPs must be aware of this legislation in order to comply with the requirements that are specified.



Standard

J.3.c.i

SLPs who perform videofluoroscopic swallowing assessments must comply with all applicable sections of the Healing Arts Radiation Protection Act.

Radiation exposure involves a risk of biohazard to both the patient/client and to workers who are exposed during the performance of their duties. In both cases, steps should be taken to avoid unnecessary or excessive exposure.

Guide

J.3.c.i

SLPs who perform videofluoroscopic swallowing studies should endeavour to perform the assessment in the most efficient manner possible, balancing the need to obtain information regarding the patient's/client's swallowing with the radiation exposure involved.

According to the X-ray regulations of Ontario's Occupational Health and Safety Act (O. Reg 861/90), persons who remain in a room during the operation of a fluoroscopic X-ray machine must be considered as X-ray workers. This applies to speech-language pathologists who remain with their patients/clients during fluoroscopic procedures, especially when assisting with feeding during the study. X-ray workers who remain in the room must receive radiation protection awareness training, must wear personal protective equipment including leaded gowns and thyroid collars, and must have personal radiation dosimeters worn on their person during these procedures. By law, each institution providing medical X-rays must designate a local Radiation Protection Officer who is in charge of radiation protection measures for occupationally exposed workers. The Radiation Protection Officer can advise SLPs regarding appropriate procedures and measures for limiting and monitoring radiation exposure.



Standard
J.3.c.ii

SLPs who are involved with videofluoroscopy must make sure that their employers classify them as X-ray workers.

Guide
J.3.c.ii

SLPs who are classified as X-ray workers should consult with their institutional Radiation Protection Officer to ensure that they are in compliance with acts regarding X-ray workers and to make sure that appropriate radiation protection measures are in place.

D. RISKS ASSOCIATED WITH DYSPHAGIA MANAGEMENT

Certain dysphagia management techniques carry additional risk of harm. These must be carefully considered by clinicians, and discussed with the patient/client during the pre-treatment consent process.

Diet Texture Restriction or Modification

Diet texture restrictions and modifications are the most common form of compensatory management recommended for dysphagia. This does not involve a direct risk of medical or physical harm to the patient/client. However, recent research suggests that elderly patients who are known to aspirate are at a higher risk for pneumonia and may experience a more complicated course of pneumonia when liquids are restricted to a honey-thick consistency compared to a nectar-thick consistency [Logemann & Robbins, in press]. Additionally, the recommendation to avoid certain liquids or food textures in the diet has potential to adversely affect quality of life. Patients on texture modified diets are also at heightened risk for malnutrition and dehydration, particularly if they dislike the products provided. Therefore, the SLP should strive to make certain that diet texture modifications are necessary and effective prior to implementation. When dealing with diet texture modifications, collaboration with dietitians is strongly recommended.

Guide
J.3.d.i

SLPs should strive to make certain that diet texture modifications are necessary and effective prior to implementation.

Postural Modification

Postural modifications are another common form of compensatory swallowing management, in which the patient/client is instructed to swallow with the head or body in a specified position (e.g. with the chin tucked, with the head turned, etc.). The literature suggests that postural modifications may be beneficial for reducing aspiration in approximately 75 per cent of cases[94]. However, because postural modifications alter the physical configuration of the oropharynx, they also have the potential to increase the risk of aspiration or pharyngeal

residues. Consequently, postural modifications should be used judiciously, keeping in mind that they can be either beneficial or detrimental.

Guide

SLPs should strive to make certain that postural modifications are necessary, beneficial and not harmful prior to implementation.

J.3.d.ii

Breath-Control Techniques

Two breath-control techniques have been described as potentially beneficial for patients/clients with pre-swallow aspiration: the supraglottic swallow and super-supraglottic swallow[95-98]. In these techniques, patients/clients are taught to volitionally hold their breath prior to the swallow and then perform airway clearance techniques (cough, throat clearing) following the swallow. In the super-supraglottic swallow, additional effort is applied to the breath-hold, using a Valsalva manoeuvre. Recent literature suggests that both of these techniques have the potential to contribute to cardiac arrhythmia in some patients/clients[99]; SLPs must therefore obtain approval from the patient's/client's primary health care provider prior to implementing these manoeuvres in treatment.



Standard
J.3.d.i

SLPs must obtain approval from the patient's/client's primary health care provider prior to implementing the supraglottic or super-supraglottic swallow as dysphagia management techniques.

Electrical Stimulation Techniques

A recent development in the field of dysphagia is the introduction of electrical stimulation as a form of management. Electrical current may be applied either for the purposes of eliciting muscle contraction[100-104] or for the purposes of stimulating a sensory neurological pathway[105-108]. Relatively little research exists regarding electrical stimulation of swallowing at this point. However, the literature does suggest that in some cases electrical stimulation may be detrimental for swallowing. When electrical current is applied to elicit contraction of the infrahyoid and strap muscles of the neck, this has been shown to lower the anatomical position of the hyoid and may contribute to an elevated risk of pharyngeal residues and aspiration[109]. When electrical current is applied to oropharyngeal sensory pathways, different frequencies of stimulation have been shown to yield different results. At some frequencies, electrical stimulation applied to these sensory pathways can induce a delayed swallow in otherwise healthy individuals[105, 106]. At this point, therefore, electrical stimulation is a dysphagia management technique that should be considered an alternative approach to treatment and used with extreme caution.



Standard

SLPs who are considering the use of electrical stimulation as a management technique for dysphagia must comply with [CASLPO's Position Statement on Alternative Approaches to Treatment](#).

Maladaptation

Many swallowing treatment techniques are designed to alter the physiology of a patient's/client's swallowing. Clinicians should remain alert to the fact that alterations in swallowing physiology have the potential to either benefit or further impair swallowing function. In some cases, it may be necessary to reverse the effects of a previously-taught swallowing technique in order to achieve optimal swallowing function.

E. RISKS ASSOCIATED WITH NON-ORAL NUTRITION

When a patient/client is determined to be unable to swallow any liquid or food safely, or when dysphagia compromises their ability to obtain adequate nutrition and/or hydration orally, total or supplementary non-oral nutrition may be recommended. The choice to proceed with non-oral nutrition is difficult for patients/clients and their families and should be discussed with the entire dysphagia team. In these discussions, SLPs should remember that the primary indications for non-oral nutrition are: 1) to optimize nutrition and/or hydration; 2) when used in lieu of oral routes of nutrition, to limit the occurrence of aspiration. Non-oral feeding has not been shown to be an effective means of preventing aspiration pneumonia[110-115]. The risks associated with non-oral nutrition are more appropriately discussed by the physician or dietitian.

4. PROCEDURES

This document divides dysphagia services into the following components:

- a. Screening
- b. Assessment
 - i. Determination of Readiness
 - ii. Clinical (non-instrumental)
 - iii. Instrumental
- c. Management
 - i. Compensatory Techniques
 - ii. Rehabilitative Techniques
 - iii. Education

Of these components, the determination of readiness for assessment, clinical (non-instrumental assessment) and management are considered mandatory.



Standard
J.4

Swallowing service delivery by an SLP must include, at a minimum, a) a determination of the patient's/client's readiness for assessment, b) clinical (non-instrumental) assessment, and c) management.

A. SCREENING

Screening is a process used only to determine the need for a speech-language pathology assessment. Screening may be conducted by a member or supportive personnel. Interpretation and communication of the results of a screening are limited to advising the individual on whether or not there may be a need for speech-language pathology assessment and must not be used for treatment planning.

In the context of swallowing, screening is considered an optional component of swallowing service delivery and may or may not involve the services of a SLP. Although a process for swallowing screening may be established within a healthcare institution, medical referral is not a prerequisite. Where institutional policy exceeds these standards and a physician's referral is required for swallowing screening, institutional policy takes precedence.

SLPs are strongly encouraged to become involved in the design and implementation of swallowing screening or pre-assessment programs in order to facilitate the appropriate referral of individuals with suspected dysphagia for further assessment.

Guide

J.4.a.i

SLPs are strongly encouraged to become involved in the design and implementation of swallowing screening or pre-assessment programs in order to facilitate the appropriate referral of individuals with suspected dysphagia for further assessment.

Wherever possible it is recommended that swallowing screening be conducted by a trained and regulated health care provider, and should minimally involve at least one of the following activities:

- Recognition of risk for dysphagia through review of medical chart, diagnosis or medical history
- Recognition of overt signs of swallowing difficulty (e.g. coughing, choking, inability to swallow) during the routine or planned oral administration of medications, water or meals
- Confirmation of the presence of specific clinical observations that are indicators of risk for dysphagia during the physical examination of a patient/client

Guide

J.4.a.ii

Screening should include at least one of the activities listed which would identify the likelihood of risks, signs or indicators of dysphagia.

Swallowing screening is not sufficient to assess the nature or severity of dysphagia, but provides an indication of the likelihood of:

- The presence or absence of dysphagia;
- Pulmonary, hydration or nutrition risks associated with continuation of the current feeding method;
- Candidacy/need for further assessment by either a SLP or another health care professional.

Research suggests, but does not definitively conclude, that screening benefits the outcomes of health, function and cost in adults with dysphagia secondary to stroke. Two specific screening tests (the 50-ml water test and pharyngeal sensation) have been shown to be reasonably sensitive and specific to the risk for aspiration (entry of material into the airway), as confirmed by videofluoroscopic assessment in adults with stroke. To date, there is no available direct evidence for the benefit of dysphagia screening with paediatric and adult patients/clients with aetiologies other than stroke[116, 117].

B. ASSESSMENT OF SWALLOWING

Swallowing assessments come in two major forms: clinical (otherwise known as “non-instrumental” or “bedside” swallowing assessments) and instrumental.

i. Determination of Readiness for Swallowing Assessment

A patient’s/client’s eligibility and readiness for swallowing assessment must first be determined on the basis of medical history review and current medical status. These steps serve to identify patients/clients who are more suitably referred to other professionals (such as in the case of primary esophageal complaint) or for whom medical status concerns (such as reduced consciousness) suggest that assessment of swallowing should be temporarily deferred. In some institutions, policy may mandate that a physician’s referral be received prior to initiating swallowing assessment.



Standard

J.4.b.i

Swallowing assessments (both clinical and instrumental) must be preceded by a determination of the patient’s/client’s suitability and readiness on the basis of medical history and current medical status review.

Once eligibility and readiness have been confirmed, swallowing assessment may proceed; it is most common to begin this process with a clinical (non-instrumental) assessment.

ii. Clinical Swallowing Assessment

The clinical assessment of swallowing function serves to evaluate both the structure and function of the oropharyngeal swallowing mechanism. Clinical swallowing assessment:

- Enables the clinician to form clinical impressions regarding the overall nature, severity, and causal factors of oral, pharyngeal, laryngeal and esophageal swallowing impairment;
- Enables the clinician to judge the risk of potential medical complications secondary to swallowing impairment, such as pulmonary, nutritional or hydrational compromise;
- Enables the clinician to judge the impact of dysphagia on functional and psychosocial aspects of daily living;
- Enables the clinician to determine immediate recommendations for management of the dysphagia
- Enables the clinician to determine the need for further assessment using instrumentation, or for referral to another health care professional.

The clinical swallowing assessment should involve:

- inspection of the oral cavity to determine structural integrity of the teeth, lips, tongue, hard and soft palates and visible oropharyngeal mucosa;
- evaluation of the sensory and motor function of oral cavity structures involved in swallowing (jaw, lips, tongue, hard palate, soft palate and cheeks);
- non-instrumental evaluation of the timing and range of thyroid cartilage movement during saliva, liquid and/or food swallows;
- evaluation of alterations in laryngeal or respiratory behaviours (e.g. coughing, throat clearing, voice quality) following saliva, liquid and/or food swallows;
- inspection of the oral cavity for residue following liquid and/or food swallows;
- inquiry regarding the patient's/client's experience of any swallowing difficulty during saliva, liquid and/or food swallows;
- where appropriate, evaluation of the impact of compensatory swallowing manoeuvres on swallowing signs and symptoms.

Guide

J.4.b.i

Clinical swallowing assessment should involve inspection and evaluation of sensory and motor function of the oral cavity, the thyroid cartilage, laryngeal and respiratory behaviours during swallowing, the effect of compensatory manoeuvres and consideration of the patient/client experience. Instrumental procedures may also be considered.

In addition to the core content of a clinical swallowing assessment, listed above, certain adjunct instrumental procedures may be included at the SLP's discretion. These include (but are not necessarily limited to):

- 1) *Cervical auscultation* refers to the use of a stethoscope, laryngeal microphone or accelerometer to evaluate the acoustics or vibratory characteristics of swallowing. To date, there is insufficient evidence to support the use of this technique for detecting the presence or absence of aspiration during swallowing [118]. Research suggests that perceptual judgment of swallowing acoustics should be interpreted with caution [119-121].
- 2) *Pulse oximetry* refers to the monitoring of peripheral blood oxygenation through a fingertip device that detects hemoglobin levels in the blood. It has previously been suggested that aspiration events might lead to desaturation events that could be readily detected using this technique. Research, however, suggests that desaturation events cannot be directly linked to specific aspiration events; consequently the relationship between pulse oximetry events and swallowing events must be interpreted with caution [122-131]. However, since desaturation is an indication of overall medical stress, when this information is available to clinicians who are working with medically fragile patients/clients, it can be used to monitor the appropriateness of continuing a patient/client assessment.
- 3) Respiratory events associated with swallowing may be measured using either nasal cannula (airflow) or respiratory inductance plethysmography (thoracic wall movements). Research suggests that these techniques can aid in the identification of the timing of swallowing within the respiratory cycle [132-134]. To date, there is no evidence that aspiration can be clearly detected in respiratory signals.

- 4) *Surface electromyography (sEMG)* can be used to measure the timing and amplitude of muscle contraction during swallowing [135-138]. This is most commonly used to obtain information regarding the contraction of the submental suprahyoid muscles. Members who utilize sEMG should remember that extraneous factors such as electrode placement, facial hair and oral movement unrelated to swallowing might affect the quality and appearance of the sEMG signal.

iii. Instrumental Swallowing Assessment

Instrumental assessment is an adjunct to clinical assessment and serves to determine the nature and severity of impairment in the structure and function of the oral, pharyngeal, laryngeal and upper esophageal stages of swallowing, and to evaluate the impact of treatment strategies that may enhance the safety and efficiency of the swallow.

Candidacy for instrumental assessment is determined on the basis of the clinical assessment. An instrumental assessment is indicated when:

- Inconsistent or incomplete findings are obtained on the clinical assessment;
- Compromised safety and efficiency of the oropharyngeal swallow is suspected;
- Oropharyngeal swallow function requires further description and analysis in order to plan appropriate management;
- Cognitive or communicative deficits preclude completion of a valid clinical assessment;
- Confirmation of a change in swallow function from a previous assessment is needed;
- There is a need to confirm a suspected medical diagnosis and/or contribute to a differential diagnosis;
- Nutritional or pulmonary compromise is thought to be the possible result of oropharyngeal dysphagia;
- The patient/client has a medical condition or a diagnosis that is associated with a high risk for dysphagia (such as neurologic, pulmonary or cardiopulmonary, gastrointestinal problems; immune system compromise; surgery and/or radiotherapy to the head and neck; cranio-facial abnormalities, etc.)[139].

There may also be contraindications for instrumental assessment. Instrumental assessment may be judged inappropriate when:

- The patient/client is too medically unstable to tolerate the procedure;
- The patient/client is unable to co-operate or participate in the procedure;
- Due to patient/client non-compliance, medical status and/or care preference, results from instrumental assessment will not alter the management plan;
- The patient/client cannot be adequately positioned for the procedure [139].

Instrumental assessment is not a required component of dysphagia service delivery. If an instrumental assessment is indicated but unavailable due to limited resources and despite reasonable efforts to obtain the assessment, the SLP may rely on findings from the clinical assessment. When instrumental assessments cannot be obtained, this may limit the clinician's ability to determine the suitability of some specific compensatory or rehabilitative management techniques for the patient/client.

There are two major forms of instrumental swallowing assessment: videofluoroscopy and endoscopy. Each will be discussed in turn.

Videofluoroscopic Swallowing Assessment

The videofluoroscopic swallowing study (VFSS) is currently the most commonly utilized instrumental swallowing assessment procedure in Canada[140]. This procedure may be referred to by one of a variety of names, each describing the radiographic evaluation of oropharyngeal swallowing: Videofluoroscopic (Special) Swallowing Study (VFSS); Videofluoroscopic Evaluation of Swallowing (VFES); Modified Barium Swallow (MBS); Cookie Swallow; Cine-esophagram; Palatopharyngeal Analysis.

A videofluoroscopy involves exposure of the patient/client to ionizing radiation. Radiation is a form of energy; its application therefore falls under the controlled act provisions of the Regulated Health Professions Act. SLPs must collaborate with a regulated health professional properly trained and authorized to operate fluoroscopic equipment.



Standard

SLPs must collaborate with appropriate radiological personnel in the performance of videofluoroscopic swallowing examinations. Performance of a videofluoroscopy without radiological personnel present is not permitted.

J.4.b.ii

Upon receipt of a medical order for videofluoroscopy, the procedure should be completed in a timely manner, as permitted by practice setting restrictions and availability, in relation to priority of need identified during the prior determination of readiness for assessment.

Guide

SLPS should complete a videofluoroscopic procedure in a timely manner upon receipt of a medical order.

J.4.b.i.i

A videofluoroscopy is a videotaped or digitized dynamic fluoroscopic image that focuses on the oral, pharyngeal, laryngeal and upper esophageal swallow physiology and incorporates compensatory treatment strategies (such as various textures, patient/client positioning, swallowing manoeuvres, etc). Videofluoroscopic swallowing assessments enable the clinician to:

- Identify the presence, nature and severity of any abnormalities in oropharyngeal, laryngeal and upper esophageal swallow physiology, compared to the normal physiology expected for an individual of the same age and gender as the patient/client;
- Collaborate with the physician to identify and describe the impact of apparent structural abnormalities (such as cricopharyngeal bar, Zenker’s diverticulum, cervical osteophytes, etc.) or structural changes (such as those that occur following surgical revisions or radiation therapy) on oropharyngeal swallowing;
- Determine the safest and most efficient route (oral versus non-oral) for nutritional and hydrational intake;

- Identify and describe the effectiveness of various compensatory manoeuvres for improving swallowing function;
- Determine the suitability of specific swallowing rehabilitative treatment techniques for the patient/client.

A standardized protocol for videofluoroscopic examination is strongly recommended. This protocol should include the administration of stimuli of different consistencies and volumes. The collimator (zoom function) of the radiographic image should be adjusted to permit viewing of the oral, pharyngeal, laryngeal and upper-esophageal structures. It is conventional to begin the examination with a lateral view and to optionally include anterior or oblique views towards the end of the protocol. Where appropriate, the protocol should include evaluation of the impact of selected compensatory manoeuvres. The SLP should strive to limit radiation exposure to the lowest reasonably achievable amount, while seeking to obtain sufficient information to define the nature of the patient’s/client’s swallowing difficulties.

Guide

J.4.b.iii

SLPs should follow a standardized protocol for videofluoroscopic swallowing examinations.

Imaging of the esophagus (an “esophageal sweep”) may optionally be included in a videofluoroscopic swallowing examination. The SLP is not qualified to interpret esophageal motility on the basis of this procedure, but may reflect the physician’s comments regarding esophageal findings in his/her report. In addition, the SLP is not qualified to interpret any type of anatomical finding on videofluoroscopic. When an anatomical abnormality is suspected, The SLP must refer the study to a physician for interpretation.



Standard
J.4.b.iii

SLPs must refer videofluoroscopic examinations which show potential esophageal and/or anatomical abnormalities to a physician for interpretation.

Videofluoroscopy recordings must be captured either on a videotape or using a digital capture device to allow post-examination replay for analysis by the SLP and other professionals such as the radiologist.



Standard
J.4.b.iv

SLPs must have access to recordings of the videofluoroscopy to allow post-examination replay for analysis.

The radiographic image should have a minimum spatial resolution (raster) of 400 lines. The temporal resolution (i.e. pulse rate) of videofluoroscopy should be determined in consultation with radiological personnel, balancing issues of radiation exposure with the need to capture a comprehensive dynamic recording of swallowing. Although current

research evidence has not definitively identified the minimum temporal resolution necessary for imaging of the oropharyngeal swallow, it is suggested that pulse rates below 15 pulses per second may be insufficient to capture important events in swallowing. The video or digital recording of the dynamic swallowing study should be captured and archived at a minimum temporal resolution of 30 frames per second without compression so that adequate information regarding the swallow is available for later review. In the case where a Picture Archiving Communication System (PACS) is used to store radiographic images, it may be necessary to use a downscanner and supplementary recording device to capture the recording of the study from the fluoroscope at full temporal resolution without compression. It is recommended that the original videofluoroscopic recordings be retained in a secure location for a period of at least one year prior to destruction. This time frame should be sufficient to allow for review of the recording for comparison with subsequent videofluoroscopies of the same patient/client.

Guide J.4.b.iv	SLPs should consult with radiological personnel to ensure that the temporal resolution (i.e. pulse rate) used in videofluoroscopy is sufficient to capture important events in swallowing.
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Guide J.4.b.v	SLPs should ensure that recordings of videofluoroscopic swallowing examinations are captured and archived at a minimal temporal resolution of 30 frames per second.
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Guide

J.4.b.vi

SLPs should retain recordings of videofluoroscopic swallowing examinations for a period of at least one year following the examination.

A videofluoroscopy requires careful analysis to ensure correct interpretation. The literature suggests that inter-rater agreement is poor for videofluoroscopy [141-143]. The literature also suggests that training and group practice in reviewing videofluoroscopy can improve inter-rater agreement and consensus. [144] It is therefore suggested that SLPs who are beginning to practice in the area of swallowing should complete a number of reviews under the direct mentorship of a more experienced clinician until the SLP has the competence to engage in independent practice. The number of reviews required will vary across clinicians, however the determination that a clinician has achieved sufficient competency to begin independent practice should be made jointly by the mentee and mentor. Methods for evaluating competency might include comparison of independently formed interpretations of videofluoroscopic swallowing recordings between the mentor and mentee.

Guide

J.4.b.vii

SLPs should complete a number of mentored reviews of videofluoroscopic swallowing recordings prior to beginning independent practice in videofluoroscopy interpretation.

Furthermore, it is strongly recommended that SLPs who perform videofluoroscopy on a regular basis find opportunities to review interpretation of videofluoroscopy with other experienced SLPs to confirm and enhance competency.

Guide

J.4.b.viii

SLPs should find opportunities to review videofluoroscopy interpretation with other experienced SLPs.

Fiberoptic Endoscopic Examination of Swallowing (FEESTM)

The Fiberoptic Endoscopic Examination of Swallowing is an instrumental procedure, in which an endoscope and camera are passed transnasally into the upper pharynx to allow direct visualization of the pharynx and larynx during swallowing. This procedure can be used to determine the nature and severity of swallowing impairment and to evaluate the effect of compensatory or therapeutic strategies intended to enhance the safety and efficiency of the swallow.

FEES requires the insertion of an endoscope through the nares into the upper pharynx, and therefore qualifies as a controlled act under the *RHPA* Section 27 (2) (6ii), which restricts "putting an instrument beyond the point in the nasal passages where they normally narrow." Furthermore, topical or spray anaesthetics and nasal decongestants are commonly offered to patients/clients prior to endoscope insertion. SLPs are prohibited by law from performing FEES unless this controlled act is formally delegated to them by a physician (usually an otolaryngologist). SLPs may accept the delegation of this controlled act according to the CASLPO position statement on [Acceptance of Delegation of a Controlled Act](#).



Standard
J.4.b.v

SLPs may only perform FEES examinations in collaboration with or under delegation from a physician.

When performing FEES assessments, SLPs should be familiar with risks such as epistaxis, mucosal injury, gagging, allergic reaction to topical anaesthetic, laryngospasm, vasovagal response, etc.

Guide

J.4.b.
ix

SLPs should be familiar with risks when performing FEES.

Appropriate equipment and personnel must be available on-site to respond to any adverse events arising during FEES examinations.



Standard

J.4.b.vi

Appropriate equipment and personnel must be available on-site to respond to any adverse events arising during FEES examinations.

Following scope insertion, a FEES examination involves observation of events inside the oropharynx during swallowing. Food colouring is commonly added to liquid and food stimuli to aid visualization and discrimination from other bodily fluids. As for videofluoroscopy, a standardized protocol should be followed for FEES examinations.

Guide

J.4.b.x

SLPs should follow a standardized protocol when performing FEES examinations.

Specific infection control procedures must be developed and documented for FEES equipment.



Standard
J.4.b.vii

SLPs must ensure that appropriate infection control and cleaning procedures are developed and followed for equipment that they use in FEES examinations.

Other Forms of Instrumental Swallowing Assessment

From time to time, it may be desirable to obtain other forms of instrumental assessment to delineate the nature of a patient's/client's swallowing impairment. These methods of instrumental assessment are not within the common scope of practice for clinically trained SLPs and are likely to be located only in university-affiliated teaching hospitals or research facilities. They include, but are not limited to: ultrasound, radio-nucleide scintigraphy, intraluminal pharyngeal manometry, intramuscular electromyography, electromagnetic articulography, esophageal manometry and the use of electrical or transcranial magnetic stimulation to elicit swallowing evoked potentials.

C. MANAGEMENT

Management is the generic term encompassing all recommendations or techniques applied with the intention of optimizing a patient's/client's swallowing function. Three subcategories of management will be discussed: education; compensatory techniques; and rehabilitative techniques.

SLPs must develop a management plan for each patient/client with dysphagia, according to assessment results. This management plan must minimally include education to patients/clients or their caregivers, and optionally includes recommendations for compensatory or rehabilitative management techniques.



Standard
J.4.c.i

SLPs must develop a management plan for each patient/client with dysphagia.

The management plan should be developed in collaboration with patients/clients, their family, and other appropriate team members.

Guide

J.4.c.i

The SLP should develop the management plan in collaboration with patients/clients, their family, and other appropriate team members.

The SLP should take into consideration the cultural background and preferences of the patient/client when developing the management plan. In the determination of recommendations for management, the perspective of the patient/client should be

considered wherever possible. Provision of dysphagia services should strive to preserve the patient's/client's dignity, autonomy, choice and independence.

Guide

J.4.c.ii

The SLP should consider the patient's/client's perspective, including cultural background and preferences, when determining management recommendations.

The management plan should take into account available environmental resources, as well as the current medical and cognitive-communication status of the patient/client.

Guide

J.4.c.iii

The SLP should consider available environmental resources, as well as the current medical and cognitive-communication status of the patient/client when determining management recommendations.

The management plan should be regularly monitored and updated on a time frame determined by patient/client needs, degree of risk of harm inherent in the management plan and other individual contributing factors.

Guide

J.4.c.iv

The SLP should regularly monitor and update the management plan.

The patient's/client's active participation in dysphagia intervention must be encouraged at all times.



Standard
J.4.c.ii

SLPs must encourage the patient's/client's active participation in dysphagia intervention at all times.

In the case where a patient/client chooses not to comply with the SLP's recommended management plan, the patient/client must be informed of the risks of proceeding as desired and then counselled in the safest course of action, given the circumstances. When the patient/client makes an informed decision to discontinue services, this must be respected. Wherever possible, the SLP must support the patient/client and identify an alternative management plan which may be more acceptable to the patient/client and his/her family. All aspects of the discussion regarding a patient's/client's decision to proceed with or discontinue swallowing intervention must be documented.



Standard
J.4.c.iii

SLPs must respect and support a patient's/client's informed decision not to follow the recommended management plan and document all aspects of this discussion.

i. Compensatory Techniques

Compensatory techniques are defined as techniques, which, when implemented, have an immediate but typically transient effect on the efficiency or safety of swallowing. These techniques compensate for, but do not remediate, abnormalities of swallowing. Compensatory management techniques fall into several subcategories:

- Behavioural techniques for enhancing bolus control (e.g. the 3-second oral hold; chin-tuck posture);
- Behavioural or stimulation techniques for eliciting timely initiation of the swallow (e.g. thermal tactile stimulation; sour or carbonated boluses);
- Behavioural techniques for enhancing airway protection (e.g. the supraglottic and super-supraglottic swallow manoeuvres; chin-tuck posture);
- Behavioural techniques for enhancing bolus propulsion (e.g. the effortful swallow; the Masako manoeuvre; head tilting or turning);
- Behavioural techniques for enhancing bolus clearance (e.g. cyclic ingestion or texture alternation; the effortful swallow; dry clearance swallows; the Mendelsohn manoeuvre; head turning);
- Prosthetic techniques for normalizing oropharyngeal pressures (e.g. palatal obturators or bulbs to assist with velopharyngeal closure; one-way valves to restore airflow through the larynx in tracheotomised patients/clients);
- Environmental techniques to limit risks associated with swallowing, such as feeding assistance or texture restriction and modification (e.g. thickening liquids to nectar-thick or honey-thick consistency);

SLPs must have the requisite knowledge to select, teach and monitor the use of behavioural and environmental compensatory management techniques for dysphagia. SLPs must also have the knowledge to recognize indications for prosthetic, surgical and pharmaceutical compensatory treatments (e.g. Teflon® injection, vocal cord medialization procedures; Botox® injection) that require referral to another health-care professional.



Standard
J.4.c.iv

SLPs must have the requisite knowledge to select, teach and monitor the use of behavioural and environmental compensatory management techniques for dysphagia. SLPs must also have the knowledge to recognize indications for prosthetic, surgical and pharmaceutical compensatory treatments.

ii. Rehabilitative Techniques

Rehabilitative techniques are defined as treatment techniques, which, when provided over the course of time, result in permanent changes in the physiology of the swallowing mechanism. These may be further divided into the following subcategories:

- Exercises to improve swallowing-related function of the orofacial musculature;
- Exercises to improve tongue pressure generation ability and strength;
- Exercises to improve bolus propulsion and clearance (e.g. the effortful swallow; the Masako manoeuvre; the Mendelsohn manoeuvre; the Shaker exercise);
- Exercises to improve airway closure (e.g. laryngeal adduction exercises).

Various forms of instrumental biofeedback (e.g. EMG, oral pressure measurement) may be useful for optimizing a patient's/client's performance of rehabilitative exercises. SLPs should, however, obtain training in the collection and interpretation of biofeedback signals prior to utilizing such tools in treatment.

Guide

J.4.c.v

The SLP should obtain training in the collection and interpretation of biofeedback signals prior to utilizing such tools in treatment.

Functional electrical stimulation may prove to be a useful tool for optimizing rehabilitative exercise of the swallowing and orofacial musculature. SLPs must obtain training in the use of functional electrical stimulation prior to utilizing this tool in treatment.



Standard
J.4.c.v

SLPs must have training in the use of functional electrical stimulation prior to utilizing this tool in treatment.

SLPs must have the requisite knowledge to select, provide, supervise and evaluate courses of rehabilitative swallowing exercise therapy, and to recognize indications for permanent surgical rehabilitative treatment techniques (e.g. epiglottopexy; laryngectomy; cricopharyngeal myotomy) that require referral to another health-care professional.



Standard
J.4.c.vi

SLPs must have the requisite knowledge to select, provide, supervise and evaluate courses of rehabilitative swallowing exercise therapy, and to recognize indications for permanent surgical rehabilitative treatment techniques.

iii. Education

Education and counselling of the patient/client and/or caregiver regarding the results of a swallowing assessment is a mandatory component of the management plan. This education must be provided including an explanation to the patient/client and/or caregiver about the nature of the swallowing problem in terms that are easily understood. Communication regarding the nature of a swallowing problem must endeavour to make the patient/client and caregivers fully aware of any risks of harm that have been determined to exist, both in terms of swallowing safety and nutritional adequacy. Patients/clients and their caregivers must be educated to recognize and respond to signs and symptoms that reflect a risk of harm.



Standard
J.4.c.vii

SLPs must provide education to the patient/client and/or caregiver on the swallowing problem including risk factors and ways to recognize and respond to symptoms which may indicate a risk.

Education of the patient/client should include all recommendations for management, and where these might be offered if the SLP is unable to provide these to the patient/client due to funding constraints or lack of competencies, equipment or resources required for specialized techniques.



Standard
J.4.c.viii

SLPs must provide education on all recommendations for management and where these services might be offered if the SLP is unable to provide them.

D. CONTINUUM OF CARE:

The continuum of care for swallowing service delivery (with mandatory steps identified by an asterisk) is as follows:

1. A patient/client is identified as having possible dysphagia through one of 4 possible mechanisms: self-identification; identification by a layperson; identification through a screening process performed by a regulated health care professional; referral by a physician.
2. The assessment process begins with a mandatory review of the patient's/client's medical history and current medical status to confirm suspicion of possible dysphagia and confirm readiness for assessment. *

3. Provided that the patient/client is deemed ready, the assessment process continues with a clinical (non-instrumental assessment). *
4. Pending the results of the clinical (non-instrumental) assessment, an instrumental assessment may be performed to further delineate the nature of the patient's/client's dysphagia.
5. A management plan must be formulated. This must, at minimum, include education to the patient/client and/or caregivers regarding the assessment findings and any risks of harm that are judged to exist. *
6. The management plan may include instruction in the performance of compensatory techniques.
7. The management plan may include courses of treatment in which rehabilitative techniques are used with the intention of remediating disordered swallowing physiology.
8. The management plan must be regularly monitored and evaluated, to determine whether refinement and or discharge are appropriate. *
9. When the patient/client is judged to have completed or declined the agreed-upon management plan, he or she will either be transitioned to a new management plan or be discharged from the dysphagia service. *

The Figure 2, on the next page illustrates this continuum of care for swallowing service delivery. Mandatory steps are outlined in solid lines, with text in bold font. Optional components are outlined in dashed lines.

5. INITIATING THE INVOLVEMENT OF OTHERS

As discussed in section F, patients/clients with dysphagia are best served by a team.

Within this context it is appropriate to discuss the usual boundaries of a speech-language pathologist's knowledge, expertise and competency.

SLPs' training equips them to assess and treat physiological abnormalities of the oral cavity, nasopharynx, pharynx, larynx and pharyngo-esophageal segment, as they pertain to speech or swallowing.

The SLP is qualified to evaluate the impact of bolus texture on swallowing physiology; as such, any SLP recommendation regarding diet should be restricted to the specification of recommended textures. The composition of the diet itself is most likely to be formulated by a dietitian.

SLPs may provide input into the recommendation that alternative routes of feeding be considered, but are not qualified to make determinations regarding route of feeding independently. Similarly, if a SLP considers that supplemental non-oral feeding is indicated, this recommendation should be forwarded to the health care team. In the event that the SLP judges oral intake to be unsafe, he or she provides information regarding the physiology of the swallow and the risks and benefits of alternative feeding methods to the dysphagia team and the patient/client and caregivers. The patient/client and health care team should be guided to consider factors such as cultural, behavioural social and quality of life issues as well as cognitive and communication status.

feeding, if indicated, including rationale and the patient's/client's perspectives.

J.5

The SLP has sufficient knowledge to understand pharyngeal-esophageal inter-relationships, but is not qualified to evaluate or interpret abnormalities of esophageal motility. When an SLP assessment extends to the esophagus, interpretation will most commonly be performed by a physician.

Components of a swallowing management plan may be assigned by the SLP to other health care team members, supportive personnel, or volunteers, provided that the SLP provides appropriate training and maintains adequate supervision according to the principles set out in the CASLPO *Position Statement: [Guidelines for the Use of Supportive Personnel](#)*.

6. DISCHARGE CRITERIA

Discharge planning serves to direct intervention toward the ultimate goal of appropriate and timely discharge from the current service or transfer to another setting.

Ideally, the SLP determines, based on achievement of goals or completion of a management plan, the appropriate time and conditions of discharge from speech-language pathology service or transfer of speech-language pathology service to another setting. In circumstances where the criteria for discharge or transfer of a patient/client are beyond the SLP's control, the SLP should make recommendations for discharge based on clinical findings. This should include reasonable efforts to secure appropriate resources for the patient/client, especially if discharge occurs before the achievement of goals.

Guide

The SLP should make recommendations for discharge based on clinical findings and make reasonable efforts to secure appropriate resources for the patient/client.

J.6

Discharge planning may include:

- Prognosis for recovery and potential timeline for recommended management following assessment results.
- Ongoing review of the progress, or lack thereof, in management.
- Education, training and counselling to the patient/client and/or caregiver regarding risk factors and danger signs in terms that are understood and will facilitate early detection of worsening dysphagia and, therefore, early referral for reassessment.
- Co-ordinated transfer of speech-language pathology service, if deemed necessary, to an appropriate outside source.
- A statement that no further intervention is indicated based on assessment findings or when a patient/client is unavailable to the SLP where reasonable efforts have been made.

J) DOCUMENTATION

All documentation by SLPs regarding dysphagia service delivery must conform to the regulations on record-keeping set out by CASLPO.



Standard
K.i

SLPs must document all aspects of dysphagia service delivery according to the regulations on record-keeping set out by CASLPO.

Documentation of findings should be completed in a timely fashion reflecting the acuity of the situation.

Guide

K.i

The SLP should complete documentation in a timely fashion, reflecting the acuity of the situation.

In addition to including identifying, historical, assessment and management information, a dysphagia report should also include interpretation of findings regarding observed abnormalities in swallowing function with reference to available data on normal function.

Guide

K.ii

The SLP should include identifying, historical, assessment and management information, as well as interpretation of findings regarding observed abnormalities in swallowing function with reference to available data on normal swallowing.

Informed consent for swallowing assessment must be documented, including risk management procedures.



Standard
K.ii

SLPs must document informed consent for swallowing assessment as well as risk management procedures.

A management plan should be completed prior to the initiation of any dysphagia management component. Discussions with the patient/client regarding this plan and any anticipated risks or benefits must be documented.



Standard
K.iii

SLPs must document the management plan prior to initiation of dysphagia management including the discussion with the patient/client regarding anticipated risks and benefits.

Communication and collaboration with other health care professionals in the planning or delivery of dysphagia services must be documented. This includes specific documentation of the discussion with the primary health care provider in cases where the oral administration of foods or liquids for swallowing assessment is considered for patients/clients who are NPO.



Standard
K.iv

SLPs must document communication and collaboration with other health care professionals including the oral administration of foods or liquids in the assessment of patients/clients who are NPO.

K) GLOSSARY

Clinical Assessment	The clinical assessment serves to evaluate both the structure and function of the swallow to determine the overall nature and causal factors of impairment at the oral swallowing stage and to predict impairment of the pharyngeal, laryngeal and oesophageal swallowing physiology.
Intervention	Includes any speech-language pathologist or supportive personnel involvement in the provision of speech-language pathology services to patients/clients, including but not limited to screening, assessment, treatment and management.
Management	Management is the generic term encompassing all recommendations or treatment techniques applied with the intention of optimizing a patient's/client's swallowing function. Management may include: education; compensatory techniques; and rehabilitative techniques.
Patient/Client	Refers to the individual receiving the service. Where appropriate, the patient/client may also encompass family, significant others, caregivers, teachers, etc.
Penetration	Bolus entry into the airway to the level of the laryngeal vestibule, but not below the vocal folds.
Screening	<p>Screening is a process where a member applies certain measures that are designed to identify patients who may have a hearing, balance, communication, swallowing or similar disorder[s], for the sole purpose of determining the patient's need for a speech-language pathology assessment, an audiological assessment, or both. This does not include:</p> <ol style="list-style-type: none">Inadvertently noticing possible hearing, balance, communication, swallowing or similar disorder[s], orConsidering information that is shared about an individual's possible hearing, balance, communication, swallowing or similar disorder[s], for the purpose of providing general educational information and/or recommending a referral for a speech-language pathology screening or assessment, an audiological screening or assessment, or both." <p>Interpretation and communication of the results of a screening are limited to advising the individual on whether or not there may be a need for a speech-language pathology assessment and/or an audiological assessment and must not be used for treatment planning.</p>

Treatment

An intervention which has as its goal to enhance the communication and/or swallowing skills of the patient/client.

L) REFERENCES

1. Pehlivan M, et al.: An electronic device measuring the frequency of spontaneous swallowing: Digital phagometer. *Dysphagia* 11(4):259-264, 1996.
2. Murry T, Carrau R, and Eibling D, *Epidemiology of swallowing disorders.*, in *Comprehensive management of swallowing disorders*, Carrau R and Murry T, Editors. 1999, Singular: San Diego. p. 3-9.
3. Martino R, et al.: Dysphagia after stroke: Incidence, diagnosis, and pulmonary complications. *Stroke* 36(12):2756-2763, 2005.
4. Schmidt J, Holas MA, Halvorson K, and Reding MJ: Videofluoroscopic evidence of aspiration predicts pneumonia and death but not dehydration following stroke. *Dysphagia* 9:7-11, 1994.
5. Feagan BG, et al.: Treatment and outcomes of community-acquired pneumonia at canadian hospitals. *CMAJ* 162(10):1415-1420, 2000.
6. Batjer DD, *The patient's perspective*, in *Management of adult neurogenic dysphagia*, Huckabee ML, Pelletier, Cathy A., Editor. 1999, Singular Pub. Group: San Diego. p. 271-278.
7. Bennett JW and Steele CM: The impact of dysphagia on quality of life. *Perspectives (Newsletter of the American Speech-Language Hearing Association Special Interest Division 13 (Swallowing and Swallowing Disorders)* 14(3):24-27, 2005.
8. Gustafsson B and Theorell T: Adaptedness and coping in dysphagic students. *Dysphagia* 10:86-92, 1995.
9. Huckabee ML and Pelletier CA: *Management of adult neurogenic dysphagia*. San Diego, CA: Singular Publishing Group, Inc., 1999
10. Gillespie MB, Brodsky MB, Day TA, Lee FS, and Martin-Harris B: Swallowing-related quality of life after head and neck cancer treatment. *Laryngoscope* 114(8):1362-1367, 2004.
11. Groher ME and Bukatman R: The prevalence of swallowing disorders in two teaching hospitals. *Dysphagia*. 1:3-6, 1986.
12. Logemann JA: Dysphagia: Evaluation and treatment. *Folia Phoniatr.Logop.* 47(3):140-164, 1995.
13. Daniels SK, et al.: Aspiration in patients with acute stroke. *Arch Phys.Med Rehabil* 79(1):14-19, 1998.
14. Mann G: Review of reports on relative prevalence of swallowing disorders after acute stroke. *Dysphagia* 17(1):81-82, 2002.
15. Mann G, Dip PG, Hankey GJ, and Cameron D: Swallowing function after stroke: Prognosis and prognostic factors at 6 months. *Stroke* 30:744-748, 1999.
16. Mann G and Hankey GJ: Initial clinical and demographic predictors of swallowing impairment following acute stroke. *Dysphagia* 16(3):208-215, 2001.

17. Barer DH: The natural history and functional consequences of dysphagia after hemispheric stroke. *Journal of Neurology, Neurosurgery & Psychiatry* 52(2):236-241, 1989.
18. Heart and Stroke Foundation of Canada. *Stroke statistics*. 2002. Available from: <http://ww2.heartandstroke.ca>.
19. Winstein CJ: Neurogenic dysphagia: Frequency, progression and outcome in adults following head injury. *Physical Therapy* 63:1992-1996, 1983.
20. Bushman M, Dobmeyer SM, Leeker L, and Perlmutter JS: Swallowing abnormalities and their response to treatment in parkinson's disease. *Neurology* 39:1309-1314., 1989.
21. Edwards LL, Quigley EM, Harned RK, and Pfeiffer RF: Characterization of swallowing and defecation in parkinson's disease. *American Journal of Gastroenterology* 89:15-25, 1994.
22. Fuh JL, et al.: Swallowing difficulty in parkinson's disease. *Clin Neurol Neurosurg* 99(2):106-112, 1997.
23. Horner J, Alberts MJ, Dawson DV, and Cook GM: Swallowing in alzheimer's disease. *Neurology* 8:177-189, 1994.
24. Mayberry JF and Atkinson M: Swallowing problems in patients with motor neuron disease. *Journal of Clinical Gastroenterology* 8:233-234., 1986.
25. Bine JE, Frank EM, and McDade HL: Dysphagia and dementia in subjects with parkinson's disease. *Dysphagia* 10(3):160-164, 1995.
26. Clarke CE, Gullaksen E, Macdonald S, and Lowe F: Referral criteria for speech and language therapy assessment of dysphagia caused by idiopathic parkinson's disease. *Acta Neurol Scand.* 97(1):27-35, 1998.
27. Coates C and Bakheit AM: Dysphagia in parkinson's disease. *European Journal of Neurology* 38(1):49-52, 1997.
28. Hunter PC, Cramer J, Austin S, Woodward MC, and Hughes AJ: Response of parkinsonian swallowing dysfunction to dopaminergic stimulation. *J Neurol Neurosurg Psychiatry* 63(5):579-583, 1997.
29. Johnston BT, Li Q, Castell JA, and Castell DO: Swallowing and esophageal function in parkinson's disease. *Am J Gastroenterol* 90(10):1741-1746, 1995.
30. Leopold NA and Kagel MC: Pharyngo-esophageal dysphagia in parkinson's disease. *Dysphagia* 12(1):11-18, 1997.
31. Wintzen AR, et al.: Dysphagia in ambulant patients with parkinson's disease: Common, not dangerous. *Can J Neurol Sci* 21(1):53-56, 1994.
32. Lazarus CL: *The effects of radiotherapy on tongue strength and swallowing in oral and oropharyngeal cancer patients*. Doctoral Dissertation, 1997. Northwestern University.
33. Ekberg O and Nylander G: Pharyngeal dysfunction after treatment for pharyngeal cancer with surgery and radiotherapy. *Gastrointest.Radiol.* 8(2):97-104, 1983.

34. Lazarus CL, et al.: Swallowing and tongue function following treatment for oral and oropharyngeal cancer. *Journal of Speech Language & Hearing Research* 43(4):1011-1023, 2000.
35. Logemann JA, et al.: Effects of xerostomia on perception and performance of swallow function. *Head Neck* 23(4):317-321, 2001.
36. Martin RE, et al.: Oropharyngeal dysphagia in esophageal cancer before and after transhiatal esophagectomy. *Dysphagia* 16(1):23-31, 2001.
37. Pauloski BR, et al.: Speech and swallowing function after anterior tongue and floor of mouth resection with distal flap reconstruction. *J Speech Hear.Res.* 36(2):267-276, 1993.
38. Pauloski BR, et al.: Speech and swallowing function after oral and oropharyngeal resections: One-year follow-up. *Head Neck* 16(4):313-322, 1994.
39. Pauloski BR, Rademaker AW, Logemann JA, and Colangelo LA: Speech and swallowing in irradiated and nonirradiated postsurgical oral cancer patients. *Otolaryngol.Head Neck Surg.* 118(5):616-624, 1998.
40. Dworkin JP, Hill SL, Stachler RJ, Meleca RJ, and Kewson D: Swallowing function outcomes following nonsurgical therapy for advanced-stage laryngeal carcinoma. *Dysphagia* 21(1): 66-74, 2006.
41. Gorsky M, et al.: Carcinoma of the tongue: A case series analysis of clinical presentation, risk factors, staging, and outcome. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontics* 98(5): 546-52, 2004 Nov;.
42. Shiley SG, Hargunani CA, Skoner JM, Holland JM, and Wax MK: Swallowing function after chemoradiation for advanced stage oropharyngeal cancer. *Otolaryngology - Head & Neck Surgery* 134(3):455-459, 2006.
43. Claus F, et al.: Intensity modulated radiation therapy for oropharyngeal and oral cavity tumors: Clinical use and experience. *Oral Oncol* 38(6):597-604, 2002.
44. Pauloski BR, et al.: Swallow function and perception of dysphagia in patients with head and neck cancer. *Head & Neck* 24(6):555-565, 2002.
45. Camidge DR: The causes of dysphagia in carcinoma of the lung. *J R Soc Med* 94(11):567-572, 2001.
46. Martin RE, et al.: Oropharyngeal dysphagia in esophageal cancer before and after transhiatal esophagectomy. *Dysphagia* 16(1):23-31, 2001.
47. Jacobs JR, et al.: Failure of cricopharyngeal myotomy to improve dysphagia following head and neck cancer surgery. *Archives of Otolaryngology -- Head & Neck Surgery* 125(9):942-946, 1999.
48. Shames D and Sheinbaum R: Neuromuscular oropharyngeal dysphagia secondary to bone metastases. *Conn Med* 62(8):451-453, 1998.
49. Daniels SK, Mahoney MC, and Lyons GD: Persistent dysphagia and dysphonia following cervical spine surgery. *Ear Nose Throat J* 77(6):470, 473-470, 475, 1998.
50. Kronenberger MB and Meyers AD: Dysphagia following head and neck cancer surgery. *Dysphagia* 9:236-244., 1994.

51. Martin RE, Neary MA, and Diamant NE: Dysphagia following anterior cervical spine surgery. *Dysphagia* 12(1):2-8, 1997.
52. Kohr LM, et al.: The incidence of dysphagia in pediatric patients after open heart procedures with transesophageal echocardiography. *Ann Thorac Surg* 76(5):1450-1456, 2003.
53. Ferraris VA, Ferraris SP, Moritz DM, and Welch S: Oropharyngeal dysphagia after cardiac operations. *Ann Thorac Surg* 71(6):1792-1796, 2001.
54. Rousou JA, et al.: Risk of dysphagia after transesophageal echocardiography during cardiac operations. *Ann Thorac Surg* 69(2):486-490, 2000.
55. Kress S, Martin WR, Benz C, and Riemann JF: Dysphagia secondary to left atrial dilatation. *Z Gastroenterol* 35(11):1007-1011, 1997.
56. Sokoloff LG and Pavlakovic R: Neuroleptic-induced dysphagia. *Dysphagia* 12(4):177-179, 1997.
57. Nash M: Swallowing problems in the tracheotomized patient. *The Otolaryngologic Clinics of North America*. 21:701-709, 1988.
58. Rogers B: Neurodevelopmental presentation of dysphagia. *Seminars in Speech and Language* 17:269-280., 1996.
59. Nilsson H, Ekberg O, Olsson R, and Hindfelt B: Quantitative aspects of swallowing in an elderly nondysphagic population. *Dysphagia* 11(3):180-184, 1996.
60. Steele CM, Greenwood C, Ens I, Robertson C, and Seidman-Carlson R: Mealtime difficulties in a home for the aged: Not just dysphagia. *Dysphagia*. 12(1):43-50, 1997.
61. Arvedson JC, Rogers, B. T.: Pediatric swallowing and feeding disorders. *Journal of Medical Speech-Language Pathology* 1(4):203-221, 1993.
62. Arvedson JC and Brodsky L: *Pediatric swallowing and feeding: Assessment and management*. (2nd Edition ed). Albany, NY: Singular Publishing, 2002
63. Arvedson JC and Lefton-Greif M: Anatomy, physiology and development of feeding. *Seminars in Speech & Language* 17:261-268, 1996.
64. Arvedson JC and Rogers B: Pediatric swallowing and feeding disorders. *Journal of Medical Speech-Language Pathology* 1:203-221, 1993.
65. Arvedson JC, Rogers B, and Brodsky L, *Anatomy, embryology and physiology.*, in *Pediatric swallowing and feeding: Assessment and management*, Arvedson JC and Brodsky L, Editors. 1993, Singular Publishing Group, Inc.: San Diego, CA.
66. Reau NR, Senturia YD, Lebailly SA, and Christoffel KK: Infant and toddler feeding patterns and problems: Normative data and a new direction. *Journal of Developmental and Behavioral Pediatrics* 17:149-153, 1996.
67. Eicher PS, et al.: Dysphagia in children with a 22q11.2 deletion: Unusual pattern found on modified barium swallow. *J Pediatr* 137(2):158-164, 2000.
68. Kosko JR, Moser JD, Erhart N, and Tunkel DE: Differential diagnosis of dysphagia in children. *The Otolaryngologic Clinics of North America*. 31:435-451, 1998.

69. Gisel EG, Alphonse E, and Ramsay M: Assessment of ingestive and oral praxis skills: Children with cerebral palsy vs. Controls. *Dysphagia* 15:236-244, 2000.
70. Finestone HM, Greene-Finestone LS, Wilson ES, and Teasell RW: Malnutrition in stroke patients on the rehabilitation service and at follow-up: Prevalence and predictors. *Archives of Physical Medicine & Rehabilitation*. 76(4):310-316, 1995.
71. Finestone HM, Greene-Finestone LS, Wilson ES, and Teasell RW: Prolonged length of stay and reduced functional improvement rate in malnourished stroke rehabilitation patients. *Arch.Phys.Med.Rehabil.* 77(4):340-345, 1996.
72. Gordon C, Hewer RL, and Wade DT: Dysphagia in acute stroke. *British Medical Journal* 295:411-414., 1987.
73. Kidd D, Lawson J, Nesbitt R, and MacMahon J: The natural history and clinical consequences of aspiration in acute stroke. *QJM*. 88(6):409-413, 1995.
74. Smithard DG, O'Neill PA, Parks C, and Morris J: Complications and outcome after acute stroke. Does dysphagia matter? *Stroke* 27(7):1200-1204, 1996.
75. World Health Organization, *The international classification of functioning, disability and health*. 2001: Geneva, Switzerland.
76. Threats TT: The world health organization's revised classification: What does it mean for speech-language pathology? *Journal of Medical Speech-Language Pathology*. Vol. 8(3)(pp xiii-xviii), 2000.
77. Threats TT and Worrall L: Classifying communication disability using the ICF. *Advances in Speech-Language Pathology* 6(1): 53-62, 2004.
78. Reed GM, et al.: Operationalizing the international classification of functioning, disability and health in clinical settings. *Rehabilitation Psychology* 50(2): 122-31, 2005.
79. Eadie TL: The ICIDH-2: Theoretical and clinical implications for speech-language pathology. *Journal of Speech-Language Pathology and Audiology* 25(4):181-200, 2001.
80. ASHA: *Preferred practice patterns for the profession of speech-language pathology*. American Speech Language Hearing Association, 2004.
81. CASLPA (Canadian Association of Speech-Language Pathologists and Audiologists), *Scopes of practice in speech-language pathology and audiology in Canada*. 1998.
82. Speech Pathology Australia, *Position paper: Dysphagia*. 2004.
83. Royal College of Speech-Language Therapists: *What is a speech and language therapist?* 2004.
84. Logemann JA: *Evaluation and treatment of swallowing disorders*. (2nd ed). Dysphagia. San Diego, CA: College Hill Press, Inc., 1997
85. ASHA, *ASHA SLP health care survey 2005: Caseload characteristics report*. 2005, American Speech-Language Hearing Association: Rockville, MD.
86. OSLA, *Averages for communication versus swallowing in adults*. 1999, Ontario Speech-Language-Hearing Association.

87. Miller AJ: Neurophysiological basis of swallowing. *Dysphagia*. 1:91-100, 1986.
88. Rosenbek JC, Robbins JA, Roecker EB, Coyle JL, and Wood JL: A penetration-aspiration scale. *Dysphagia* 11(2):93-98, 1996.
89. Robbins J, Coyle J, Rosenbek J, Roecker EB, and Wood JL: Differentiation of normal and abnormal airway protection during swallowing using penetration aspiration scale. *Dysphagia* 14:228-232, 1999.
90. Langmore SE, et al.: Predictors of aspiration pneumonia: How important is dysphagia? *Dysphagia* 13(2):69-81, 1998.
91. Marik PE: Aspiration pneumonitis and aspiration pneumonia. *N.Engl.J Med* 344(9):665-671, 2001.
92. Maloney JP, et al.: Systemic absorption of food dye in patients with sepsis. *N.Engl.J.Med.* 343(14):1047-1048, 2000.
93. Metheny NA and Clouse RE: Bedside methods for detecting aspiration in tube-fed patients. *Chest*. 111(3):724-731, 1997.
94. Rasley A, et al.: Prevention of barium aspiration during videofluoroscopic swallowing studies: Value of change in posture. *AJR. American Journal of Roentgenology*. 160(5):1005-1009, 1993.
95. Bülow M, Olsson R, and Ekberg O: Videomanometric analysis of supraglottic swallow, effortful swallow, and chin tuck in healthy volunteers. *Dysphagia* 14(2):67-72, 1999.
96. Lazarus CL, et al.: Effects of bolus volume, viscosity, and repeated swallows in nonstroke subjects and stroke patients. *Archives of Physical Medicine and Rehabilitation Arch.Phys.Med.Rehabil* 74(10):1066-1070, 1993.
97. Logemann JA, Roa Pauloski B, Rademaker AW, and Colangelo LA: Speech and swallowing rehabilitation for head and neck cancer patients. *Oncology* 11(5):651-664, 1997.
98. Ohmae Y, Logemann JA, Kaiser P, Hanson DG, and Kahrilas PJ: Effects of two breath-holding maneuvers on oropharyngeal swallow. *Ann.Otol.Rhinol.Laryngol.* 105(2):123-131, 1996.
99. Chaudhuri G, et al.: Cardiovascular effects of the supraglottic and super-supraglottic swallowing maneuvers in stroke patients with dysphagia. *Dysphagia* 17(1):19-23, 2002.
100. Burnett TA, Mann EA, Cornell SA, and Ludlow CL: Laryngeal elevation achieved by neuromuscular stimulation at rest. *J Appl Physiol* 94(1):128-134, 2003.
101. Burnett TA, Mann EA, Cornell SA, and Ludlow CL: Self-triggered functional electrical stimulation during swallowing. *Journal of Neurophysiology* 94(6):4011-18, 2005.
102. Freed ML, Freed L, Chatburn RL, and Christian M: Electrical stimulation for swallowing disorders caused by stroke. *Respiratory Care* 46(5):466-474, 2001.
103. Leelamanit V, Limsakul C, and Geater A: Synchronized electrical stimulation in treating pharyngeal dysphagia. *Laryngoscope*. 112(12):2204-2210, 2002.

104. Ludlow CL, Humbert I, Saxon K, Sonies B, and Crujido L. Effects of surface electrical stimulation both at rest and during swallowing in chronic pharyngeal dysphagia. *Abstracts of the 13th Annual Meeting of the Dysphagia Research Society*. 2004. Montreal, QC.
105. Fraser C, et al.: Differential changes in human pharyngoesophageal motor excitability induced by swallowing, pharyngeal stimulation, and anaesthesia. *American Journal of Physiology. Gastrointestinal, Liver Physiology*. 285(1):G136-144., 2003.
106. Fraser C, et al.: Driving plasticity in human adult motor cortex is associated with improved motor function after brain injury. *Neuron* 34(5):831-840, 2002.
107. Power M, et al.: Frequency effects of faucial pillar stimulation on cortical excitability and swallowing in healthy subjects. *Dysphagia* 17(2):175, 2002.
108. Power M, et al.: Changes in pharyngeal corticobulbar excitability and swallowing behavior after oral stimulation. *Am J Physiol. Gastro Liver Physiology* 286:G45-50, 2004.
109. Ludlow CL, et al.: Effects of surface electrical stimulation both at rest and during swallowing in chronic pharyngeal dysphagia. *Dysphagia (Online first)*:1-10, 2006.
110. Ciocon JO: Indications for tube feedings in elderly patients. *Dysphagia*. 5(1):1-5, 1990.
111. Meyers RM and Grodin MA: Decisionmaking regarding the initiation of tube feedings in the severely demented elderly: A review. *Journal of the American Geriatrics Society*. 39(5):526-531, 1991.
112. Sitzmann JV: Nutritional support of the dysphagic patient: Methods, risks, and complications of therapy. *Journal of Parenteral & Enteral Nutrition*. 14(1):60-63, 1990.
113. Fellows LS, Miller EH, Frederickson M, Bly B, and Felt P: Evidence-based practice for enteral feedings: Aspiration prevention strategies, bedside detection, and practice change. *Medsurg.Nurs*. 9(1):27-31, 2000.
114. Mitchell SI, Kiely DK, and Lipsitz LA: Does artificial enteral nutrition prolong the survival of institutionalized elders with chewing and swallowing problems. *Journal of Gerontology.Series A, Biological Sciences & Medical Sciences*. 53(3):M207-M213, 1998.
115. Mitchell SI and Lawson FM: Decision-making for long-term tube-feeding in cognitively impaired elderly people. *CMAJ*. 160(12):1705-1709, 1999.
116. Martino R, Pron G, and Diamant NE: Screening for oropharyngeal dysphagia in stroke: Insufficient evidence for guidelines. *Dysphagia* 15:19-30, 2000.
117. Perry L and Love CP: Screening for dysphagia and aspiration in acute stroke: A systematic review. *Dysphagia* 16(1):7-18, 2001.
118. Leslie P, Drinnan MJ, Finn P, Ford GA, and Wilson JA: Reliability and validity of cervical auscultation: A controlled comparison using videofluoroscopy. *Dysphagia* 19(4):231-240, 2004.
119. Cichero JA and Murdoch BE: The physiologic cause of swallowing sounds: Answers from heart sounds and vocal tract acoustics. *Dysphagia* 13(1):39-52, 1998.

120. Cichero JA and Murdoch BE: Detection of swallowing sounds: Methodology revisited. *Dysphagia* 17(1):40-49, 2002.
121. Cichero JA and Murdoch BE: Acoustic signature of the normal swallow: Characterization by age, gender, and bolus volume. *Ann.Otol.Rhinol.Laryngol.* 111(7 Pt 1):623-632, 2002.
122. Collins MJ and Bakheit AM: Does pulse oximetry reliably detect aspiration in dysphagic stroke patients? *Stroke* 28(9):1773-1775, 1997.
123. Colodny N: Comparison of dysphagics and nondysphagics on pulse oximetry during oral feeding. *Dysphagia.* 15(2):68-73, 2000.
124. Colodny N: Effects of age, gender, disease, and multisystem involvement on oxygen saturation levels in dysphagic persons. *Dysphagia* 16(1):48-57, 2001.
125. Edwards SJ, *Detection of small volume pulmonary aspiration using pulse oximetry.* 2002, Saint Louis University.
126. Exley C: Pulse oximetry as a screening tool in detecting aspiration. *Age Ageing* 29(6):475-476, 2000.
127. Leder SB: Use of arterial oxygen saturation, heart rate, and blood pressure as indirect objective physiologic markers to predict aspiration. *Dysphagia* 15(4):201-205, 2000.
128. Sellars C, Dunnet C, and Carter R: A preliminary comparison of videofluoroscopy of swallow and pulse oximetry in the identification of aspiration in dysphagic patients. *Dysphagia* 13(2):82-86, 1998.
129. Sherman B, Nisenbom JM, Jesberger BL, Morrow CA, and Jesberger JA: Assessment of dysphagia with the use of pulse oximetry. *Dysphagia* 14(3):152-156, 1999.
130. Smith HA, Lee SH, O'Neill PA, and Connolly MJ: The combination of bedside swallowing assessment and oxygen saturation monitoring of swallowing in acute stroke: A safe and humane screening tool. *Age Ageing* 29(6):495-499, 2000.
131. Zaidi NH, et al.: Oxygen desaturation on swallowing as a potential marker of aspiration in acute stroke. *Age Ageing* 24(4):267-270, 1995.
132. Hiss SG, Treole K, and Stuart A: Effects of age, gender, bolus volume, and trial on swallowing apnea duration and swallow/respiratory phase relationships of normal adults. *Dysphagia* 16(2):128-135, 2001.
133. Hiss SG, Treole K, and Stuart A: Effect of age, gender, and repeated measures on intraoral air pressure in normal adults. *J Voice* 15(2):159-164, 2001.
134. Tarrant SC, Ellis RE, Flack FC, and Selley WG: Comparative review of techniques for recording respiratory events at rest and during deglutition. *Dysphagia* 12(1):24-38, 1997.
135. Crary MA: Surface electromyographic characteristics of swallowing in dysphagia secondary to brainstem stroke. *Dysphagia* 12:180-187, 1997.
136. Crary MA & Groher, ME: Basic concepts of surface electromyographic biofeedback in the treatment of dysphagia. *American Journal of Speech-Language Pathology* 9:116-125, 2000.

137. Ding R, Larson CR, Logemann JA, and Rademaker AW: Surface electromyographic and electroglottographic studies in normal subjects under two swallow conditions: Normal and during the mendelsohn manuever. *Dysphagia* 17(1):1-12, 2002.
138. Vaiman M, Eviatar E, and Segal S: Evaluation of normal deglutition with the help of rectified surface electromyography records. *Dysphagia* 19(2):125-132, 2004.
139. ASHA, *Clinical indicators for instrumental assessment of dysphagia*. 1998, American Speech Language Hearing Association: Rockville, MD.
140. Martino R, Pron G, and Diamant NE: Oropharyngeal dysphagia: Surveying practice patterns of the speech-language pathologist. *Dysphagia* 19(3):165-176, 2004.
141. Ekberg O, et al.: Interobserver variability in cineradiographic assessment of pharyngeal function during swallow. *Dysphagia* 3(1):46-48, 1988.
142. Kuhlemeier KV, Yates P, and Palmer JB: Intra- and interrater variation in the evaluation of videofluorographic swallowing studies. *Dysphagia*. 13(3):142-147, 1998.
143. Stoeckli S, J., Thierry AGM, Huisman M, and Seifert B: Interrater reliability of videoflouroscopic swallow evaluation. *Dysphagia* 18:53-57, 2003.
144. Logemann JA, Lazarus C, Keeley SP, Sanchez A, and Rademaker AW: Effectiveness of four hours of education in interpretation of radiographic studies. *Dysphagia* 15(4):180-183, 2000.