

2. Clinical Evaluation of Patients with Dysphagia: Importance of History Taking and Physical Exam

Gary H. McCullough and Rosemary Martino

Abstract Assessment of dysphagia may include instrumental or non-instrumental measures—frequently both. The clinical evaluation is a collection of, largely, non-instrumental measures, which may include a comprehensive history, a detailed oral motor and sensory physical exam, and trial swallows of liquids and foods. Each aspect of the clinical evaluation serves a unique purpose yet contributes to a more comprehensive understanding of the swallowing problem. The findings from the clinical evaluation provide information about a patient's functional feeding and swallowing behaviors and determine the need for therapeutic intervention and/or additional instrumental testing. Patients at risk for dysphagia, and thus in need of a clinical evaluation, can be determined from screening. This chapter will describe each aspect of the clinical evaluation and screening and provide the value of each.

Introduction

Clinical assessment of swallowing should be considered an essential part of intervention for all patients with confirmed or likely dysphagia. There are several elements that comprise a clinical swallow evaluation (CSE), including a comprehensive medical history, a physical exam of oral and motor function, and assessment of food intake. In patients with confirmed dysphagia, the CSE serves to refine and update the course of intervention as the dysphagia ameliorates or potentially worsens over time. Alternatively, in patients who are suspected to have dysphagia, a CSE serves to confirm the presence of dysphagia and plan the most appropriate next steps: such as, further testing with instrumental swallow tests, consultation with other medical specialists, or tailored treatment.

Suspicion of dysphagia can be garnered from screening using the patient's presenting etiology and, more objectively, the clinician's findings from a standardized screening test.

Identifying Dysphagia Risk

The presence of dysphagia is highly suspect in patients with etiologies that impact the structural, neurological, or muscular aspects of the head and neck. These etiologies might include stroke [1], head and neck cancer [2], cervical spine abnormality [3], or a progressive neurological disease [4–6]. Furthermore, medical interventions aiming to maintain airway patency [7] or treat head and neck cancer [8] can also increase the risk for dysphagia. Patients with these known diseases or medical treatments should be considered high risk for dysphagia. Ideally, a Speech-Language Pathologist using a standardized CSE would assess all of these patients. Unfortunately, hospital resources are often limited and this specialized care is not available. Hence, validated screening tools serve as the next most feasible method by which to triage those patients with highest risk to a comprehensive CSE. Screening can be completed by any trained person using a brief bedside clinical test.

A brief bedside clinical test, also called a screen, differs from a CSE in purpose and scope. As previously mentioned, the CSE aims to identify possible site, severity, and prognosis of the swallowing impairment. An expert in dysphagia, typically a speech-language pathologist, administers the CSE. Information from a CSE directs the speech-language pathologist to prescribe the most appropriate dysphagia management, including further testing with instrumentation. In contrast, a nurse or other clinician not specialized in evaluation, management, and treatment of dysphagia but trained to screen administers the dysphagia screening [9]. Screening serves to identify those patients with the greatest risk of having dysphagia so that they may be referred to a dysphagia expert for a comprehensive CSE. Most importantly and unlike a CSE, screening provides no information about dysphagia severity or best management. Screening results are useful only in directing patients at greatest risk for further assessment.

The brief bedside clinical test, or screen, further differs from the CSE in accuracy. The initial swallow assessment is a two-step process whereby the screen is administered first and the CSE second. Psychometrically, a screening test aims only to identify those at greatest risk for dysphagia thus requiring a high sensitivity [10]. The sensitivity of a screen is defined

as the proportion of patients with the dysphagia who are correctly identified by the screen, also known as the true positive value. The CSE is administered next and thus serves to validate the presence of dysphagia and to determine its severity as well as identify the need for further management with instrumental testing. This comprehensive assessment requires high specificity [10]. The specificity of the CSE is defined as the proportion of patients without dysphagia who are correctly ruled to not have dysphagia, also known as the true negative value. The combination of this two-step process generates an efficient and accurate way to identify dysphagia in the clinical setting.

With emerging evidence that early detection of dysphagia from screening reduces subsequent pulmonary complications, length of hospital stay, and overall health care costs for at least stroke patients [11], stroke guidelines have been developed in Canada [12], the United States [13], the United Kingdom [14], Australia [15] and elsewhere, stressing the importance of early detection of dysphagia with validated screening tools. These guidelines require that a trained clinician screen individuals admitted with stroke or suspicion of stroke for dysphagia as soon as they are alert and able. A standardized tool must be used. Those patients with a positive dysphagia screen should be kept “nil by mouth” (NPO) and seen for a CSE by a speech language pathologist within 24 h.

Several authors have systematically reviewed the literature for a properly standardized screening tool without success [16–18]. In response to the identified gap in the literature relating to availability of accurate screening tools and an effort to standardize care for stroke patients across all settings, the Toronto Bedside Swallowing Screening Test (TOR-BSST_©) was developed [9]. The TOR-BSST_© is a brief screening tool, administered by a health care professional trained by a speech-language pathologist, that predicts the presence of dysphagia in stroke survivors. Its items include assessment of voice quality, lingual movement, and ability to manage water by teaspoon and cup. These items were derived using the best available evidence from a systematic review [16]. The TOR-BSST_© is unique in that it has proven high reliability and validity with stroke patients in both acute and rehabilitation settings. This tool has yet to be validated with etiologies other than stroke in studies currently underway. Other screening tools that are available in the literature for review include those for patients with Parkinson’s disease [19] and mixed etiologies [20–22].

In summary, although screening is limited to the identification of increased risk for dysphagia, there is evidence that it reduces complications such as pneumonia, tube dependency, and possibly even death [11, 16].

Needless to say, screening alone does not ensure these health benefits. Instead, the benefit is achieved from a series of events that a positive screen result initiates; namely, earlier comprehensive assessment such as that with CSE, instrumental evaluation, and, if required, earlier treatment [16].

Standardized Clinical Evaluations

Despite the high prevalence of dysphagia in patients with acute stroke [1], progressive neurological diseases such as Parkinson [23], as well with prolonged intubation [24] or head and neck carcinoma [25], there are few properly standardized dysphagia assessment tools specific for clinical evaluation [26]. Currently, there are two such swallowing clinical measures standardized with dysphagia patients, namely the Mann assessment of swallowing ability (MASA) [27] and the Functional Oral Intake Scale (FOIS) [28]. The psychometric features of these clinical swallowing measures are detailed in Table 2.1 below. The benefit of using standardized measures for aspects of the CSE is twofold; first, it ensures a systematic and more accurate capture of the targeted clinical features (detailed later in this chapter) and second, it provides an objective comparison of change over time or after therapeutic intervention.

Although these standardized measures are common in research, the literature suggests practicing clinicians do not utilize them regularly [29]. Several authors have explored the clinical assessment practice behaviors of speech language pathologists. McCullough et al. identified little consensus on what clinicians believed was most or least important; however, they reportedly had high utilization of most test maneuvers—perhaps adhering by the everything and the kitchen sink approach [30]. Likewise, Mathers-Schmidt and Kurlinski identified variability with how clinicians defined food consistencies used for the CSE [31]. Martino et al. also found variability in clinicians' reported practice and opinion of importance for a large variety of test maneuvers [29]. In this study, test maneuver utilization was greatest with the less experienced clinicians and with those working in teaching institutions. These clinicians were more likely to execute a series of bedside test maneuvers that focused on oral (e.g., lip movement and strength, drool, mastication) and pharyngeal swallowing (e.g., repeat swallows, airway protection), both with and without food. Therefore, unlike nurse screeners, speech language pathologists reportedly thoroughly assess the safety and efficiency of the swallow. In so doing, they gather useful information for proper diagnosis and individualized treatment planning.

Table 2.1 Standardized clinical assessment tests that measure swallowing impairment in patients with stroke.

Tools	Outcome	Domains (themes)	Validation population	Score	Test-retest reliability	Validity
Mann assessment of swallowing ability (MASA) [27]	Swallow physiology (impairment)	Dysphagia probability Aspiration probability	128 first-ever acute stroke patients	4-point ordinal scale for each domain	Dysphagia (k)=0.82, Aspiration (k)=0.75	Dysphagia SN=73% SP=89% Aspiration SN=93% SP=67%
Functional oral intake scale (FOIS) [28]	Oral intake (function)	Oral intake of food and liquid	302 acute stroke patients	7-point ordinal scale	Kappa from 0.86 to 0.91	Concordance (k)=0.90

Clinical Swallow Evaluation: Patient History

Evaluation of a patients' medical history is a necessary precursor of the CSE. The information garnered from the patient history helps direct and tailor the rest of the clinical assessment. A comprehensive history for patients with dysphagia needs to include the following; namely, patient symptoms, past and current medical history, any previous swallowing assessments and socio-cultural status. Ideally, this information is obtained directly from the patient and validated by the family or caregivers and/or the patient's medical team. In some cases when the patient is not able due to limited cognitive status or language restrictions, these additional sources become critical to obtaining history of the swallowing problem.

Recently, properly standardized tests have been developed to systematically capture patient reported symptoms with proven accuracy. For example, the Sydney Swallow Questionnaire (SSQ) is a symptom inventory that has been developed with a neurological patient population and validated with patients pre- and post-surgery for Zenker's diverticulum [32]. It targets symptoms related to pain or discomfort during swallowing along with texture-specific restrictions. Similarly, the EAT-10 is a self-administered survey targeting patient burden from dysphagia [33]. This tool consists of ten items that, collectively, inquire about effort and pain during swallowing as well as feelings of stress and isolation. This EAT-10 has been validated broadly with a varied patient population. As with the standardized CSE tools discussed above, both the SSQ and the EAT-10 ensure a systematic and valid method by which to obtain symptom information from the perspective of the patient, and thus provide a baseline for comparison at a later point in time. The comparison over time, or after therapy intervention, will enable the clinician to ascertain functional gains in the patient's swallowing status.

There is additional patient symptom information not captured by either SSQ or EAT-10 that needs to be targeted as part of the history taking [34]. For example, it is important to inquire about the site and timing of the dysphagia symptoms. Discomfort that is reportedly experienced in the neck immediately after food intake suggests impairment at the level of the oropharynx. In contrast, symptoms that are reported to occur seconds later in the retrosternum area may suggest impairment in the esophagus. Also important is information pertaining to onset, frequency, and progression of the symptoms because it might shed light on etiology especially if it is yet unknown. Sudden onset of symptoms typically relate to etiologies such as stroke or trauma. A patient who cannot recall the start of the swallowing problem typically would suggest

a slow progressive etiology such as ALS [35] or MS [36]. Details about the course of the symptoms help determine the course of the etiology, that is, typically worsening for progressive disease. However, intermittent symptoms or problems with select textures may suggest an esophageal cause [34]. The patient who indicates that the symptoms worsen only at the end of meal or end of the day, and has heightened dysphagic symptoms with “cold” temperature may suggest a neurologic dysphagia such as Myasthenia Gravis [37]. In summary, it is clear that obtaining patient symptoms is complicated, multidimensional, and somewhat exploratory. There is no one script that could be followed; hence, it requires the skill, training, and background of a dysphagia expert.

In addition to patient symptomology, a comprehensive history also includes information related to past and current medical history, previous swallowing assessments, and sociocultural status. In planning treatment it is critical to know if the etiology potentially causing the dysphagia is of neurological, structural, systemic, iatrogenic, or psychogenic origin [37]. An ameliorating etiology, such as stroke, will suggest an improvement in the swallow [38]. Likewise, a worsening disease such as ALS will suggest a poor prognosis of swallow over time [35]. Part of the medical history includes a detailed review of the patient’s medications noting those that are known to cause xerostomia, GI upset, or even drowsiness [39]. Also, details from any previous swallowing assessments are useful to note if the patient has experienced change over time and determine if this change aligns with what is expected due to the presenting etiology or intervention provided. Lastly, capturing information about the patient’s cultural background and environmental support will ensure that any future therapies prescribed are culturally feasible, acceptable, and appropriate given the patient’s support and living situation.

Clinical Swallow Evaluation: The Physical Exam

General Observations

The physical examination begins when the clinician enters the patient’s room and begins making observations [40]. Cues to three major concerns in a CSE—mental status, nutritional status, and respiratory status—can often be visually derived and may or may not concur with historical information gathered in the medical record. It is also important to draw connections between historical/medical information and the physical

examination. For example, a clinician can immediately begin making observations about alertness (i.e., wakefulness and initial communication attempts) and posture of the patient. The presence of a feeding tube would indicate at least partial alternative nutritional support. The presence of suctioning equipment and/or drooling trigger concerns regarding secretion management. If the patient has a tracheostomy tube or labored breathing patterns, respiratory status is a concern. Pulse oximetry and respiratory rate may or may not be monitored for confirmation. If any concerns regarding respiratory status, nutritional status, or mental status are noted in the history and visually confirmed, the physical examination must proceed with caution; and trial swallows may not be advised.

Assessing Oral Motor and Vocal Function

When performing the physical examination, it is important to assess both structure and function. Structures at rest may provide visual clues to underlying physiologic and/or neurologic pathologies, such as lower motor neuron flaccidity. Likewise, movement of structures yields information regarding strength and speed of critical aspects to swallowing and involvement of specific cranial nerves. Most critical to deglutition are cranial nerves V, VII, IX, X, and XII. Table 2.2 provides a list of these cranial nerves and sensorimotor sites for assessment along with appropriate physical aspects to examine.

1. The face and jaw.

Observations of the facial muscles at rest and during movement can provide information on muscle strength, tone, and mobility. For the oral stage of deglutition, we are primarily concerned with viability of the lips and cheeks for anterior bolus containment and buccal tension during bolus manipulation. These can be grossly examined by having the patient purse and retract the lips. Comparison of these muscles to upper facial muscles (i.e., raising eyebrows) can help determine and differentiate upper and lower motor neuron damage, if present, to cranial nerve VII.

Mastication is difficult to directly assess during a physical exam as the mouth is, necessarily, closed. Jaw muscle strength and mobility as well as cranial nerve V function can be assessed by opening and closing the jaw against resistance and moving the lower jaw from side to side. Exaggerated open-mouth chewing without a bolus may also provide this information. One study [41] reported reduced bilateral

Table 2.2 Major clinical measures to assess in physical examination.

Initial observations

Posture: upright/able to sit upright	Respiratory Tracheostomy tube/ventilator Pattern of respiration Monitor: rate and SpO ₂
Nutritional	Mental status
Presence of feeding tube	Alertness
Type of feeding tube	Cooperation Communication Orientation
<i>Structural/cranial nerve assessment</i>	
CNV	Jaw mobility Strength open/close against resistance Exaggerated chewing
CNVII	Lips purse/retract Raise eyebrows
CNIX/CNX	Gag reflex—palatal/pharyngeal Cough strength Cough quality—wet/dry Voice—sustained phonation/speech
CNXII	Tongue mobility Strength—protrude/lateralize against resistance Pressure—Iowa oral performance instrument, Madison oral strength training device, other devices
<i>Structural</i> : note for all above structural appearance, muscle tone and laterality of deviations	
<i>Sensation</i> : all structures can be grossly assessed with cotton-tip applicator (left/right discrimination)	
<i>Trial swallows</i>	
Consistency/bolus size	Thin: 5 mL—3 oz Puree or pudding 5 mL Solid: bite
Observations	Laryngeal palpation Timing/completeness/number of swallows Pre–post voice quality Coughing/clearing Oral residue
Additional observations (often best with meal)	Need for assistance Effects of compensations Amount of nutritional intake

jaw strength as one of the most robust signs of aspiration with a specificity of 99% and a positive likelihood ratio of over 17. While robust, this finding is tempered by the mere five patients who exhibited bilaterally weak jaws. In terms of being able to chew and prepare a bolus for swallowing, it would seem absurd to ignore when a patient has a weak jaw. It would seem, likewise, absurd to look at it as an exclusive clinical measure of impairment.

2. Lingual function.

Lingual function (CN XII) has been included in most clinical swallowing assessments in some form for obvious reasons. The tongue is required to not only move the bolus about and form a cohesive mass but also sequentially press the bolus through the oropharynx and into the upper esophageal segment. Lingual swallowing pressures are critical to swallowing success, and both the anterior and posterior tongue must be evaluated.

Visual observation of the tongue at rest should be conducted first. Patients with a history of oral cancer may have a partial or total glossectomy. Unilateral or bilateral atrophy and fasciculations can indicate lower motor neuron disease to cranial nerve XII, and spasticity can indicate upper motor neuron disease [42].

Clinical examination of lingual function has been accomplished with tools as crude and simple as visualization of tongue protrusion against a tongue depressor, retraction, and lateralization upon protrusion or into the cheeks. More recently, instrumental devices have been developed to assist with clinical evaluation, as well as promote rehabilitation through biofeedback. These include the Iowa Oral Performance Instrument (IOPI) [43, 44] and, more recently, the Madison Oral Strength Training device (MOST) [45], as well as a device developed in Japan—which reportedly correlated well with dysphagic tongue movements and incidence of cough [46]. The MOST measures isometric and swallowing pressures while the others are more geared toward isometric alone.

While traditional measures using a tongue blade have provided limited value in assessing for aspiration [47], measuring tongue pressures with instrumentation can differentiate individuals by age [45, 48] and separate normals from patients with disorders related to head and neck cancer [49] and stroke [50]. It has also been associated with poor lingual transfer with resulting food sticking in the pharynx [46, 51] and increased incidence of coughing. Mann and Hankey [52] reported that in conjunction with palatal weakness, tongue weakness was strongly correlated with dysphagia.

3. Oral health and dentition.

A recent review of literature [53] provides substantial reason to assess oral health and dentition in institutionalized elderly. Their review suggests strong evidence for an association between poor oral hygiene and respiratory pathogens as well as a decrease in the incidence of respiratory pathogens when oral care intervention is provided. While clinical assessment of swallowing is not exclusive to such institutions, the principles remain important. During the physical exam, clinicians should note, minimally, the number of decayed teeth and evidence of consistent or inconsistent teeth brushing [54].

Additionally, the tongue should be inspected for milky white patches which could indicate fungal infection, thrush, which could lead to oral pain [55]; and amount of saliva production should be noted, as xerostomia (dry mouth) can impair taste and swallowing function [56, 57].

4. The palate and pharynx.

The palate should be observed at rest for symmetry of structure and signs of atrophy. Palatal movement for speech and swallowing are different tasks, and palatal closure during the swallow cannot be observed without instrumentation. Regardless, having the patient repeat short “ah”s will, at least, demonstrate neuromotor ability of the palate to close. Palatal weakness and asymmetry was reported as a major predictor of dysphagia by Mann and Hankey [52].

Palatal and pharyngeal gag reflexes can be assessed. The role of assessing a gag reflex (CN IX and X) has been and remains controversial. Research by Horner and colleagues in the 1980s pointed to the absence of a pharyngeal gag reflex in stroke patients as a significant predictor of aspiration [58, 59]. Later research provided mixed results. While Daniels et al. [60] found good sensitivity and specificity for the gag reflex as a sign of aspiration, Leder [61], Linden et al. [62], and McCullough et al. [41, 47] did not. Daniels et al. [63] provided further support for the measure and suggested that the gag—as one of six signs, of which two or more had to be positive—held predictive utility for not only aspiration post-stroke but also dysphagia. Logemann et al. [64] reported observation of the absence of pharyngeal wall contraction on gag as a good sign of pharyngeal dysphagia. Even the most ardent critics of the value of testing the gag reflex rarely resist the temptation to poke their patients’ soft palate and tongue base/posterior pharyngeal walls with a cotton-tip applicator. Perhaps more important than the presence or absence of the gag reflex is the patient’s sensory ability to perceive “touch” on the posterior pharyngeal wall. Davies and Kidd

[65] reported that while a gag reflex was absent in 37% of healthy participants, only one demonstrated reduced pharyngeal sensation as rated by left/right distinction to touch.

Pharyngeal muscle function (CN X/Pharyngeal Plexus) is also difficult to assess during a physical exam. Endoscopy and videofluoroscopy provide better images for contraction of constrictor muscles. During the trial swallow portion of an exam, multiple swallows for small volume puree or solid boluses may indicate weak pharyngeal muscle contraction and consequential difficulty clearing the bolus [64].

5. Laryngeal Function.

Clinical measures for laryngeal function (CN X), volitional cough and a basic rating of voice quality, have received compelling yet mixed results in the literature. The clinical sign of “dysphonia” was observed to correlate with dysphagia after stroke in 1988 by Horner et al. [58]. Since then it has been associated with bilateral stroke [59] and brainstem stroke [66]. It has been reported as one of six signs, two or more of which indicate a problem, in the detection of aspiration [60] and more severe outcomes with dysphagia [63]. Most research investigating clinical signs of dysphagia cite a rating of vocal quality as useful, and rating the voice as the patient phonates “ah” appears best to make the rating [47]. Forty-seven out of 60 stroke patients had an abnormal voice quality in one study [52].

Abnormal volitional cough has, likewise, received more positive correlations with dysphagia than negative [52, 59, 60, 63, 67] and can be rated by asking the patient to cough and rating the strength as well as the quality (wet/dry) of the cough.

6. Other Measures.

In addition to the above measures, ratings of dysarthria and oral apraxia may be made. Dysarthria has received support as a correlate of swallowing function [47, 52, 60, 63, 64, 66, 67]. Logemann et al. [64] reported particular correlation with oral stage dysphagia. With the gathering of historical information and general communication with the patient, a rating of dysarthria is easily derived from a trained speech-language pathologist. Oral apraxia can be determined by asking the patient to pretend to blow out a match, cluck their tongue, or whistle, though correlations to dysphagia are not as significant. Palpating the larynx and assessing laryngeal elevation during a dry swallow (CN V, VII, XII) may also help determine the safety of continuing on to the next step, though no evidence exists to support this.

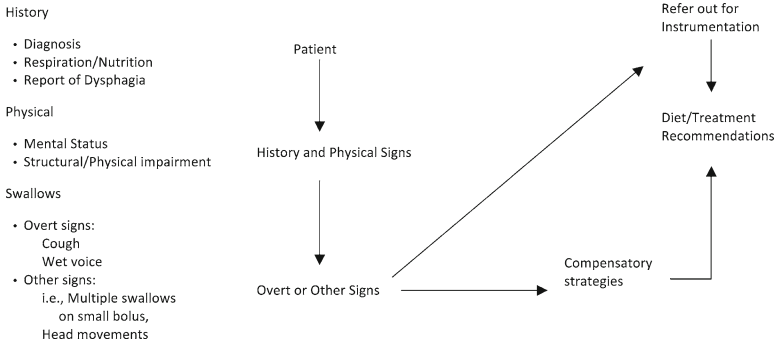


Fig. 2.1. CSE no onsite instrumentation.

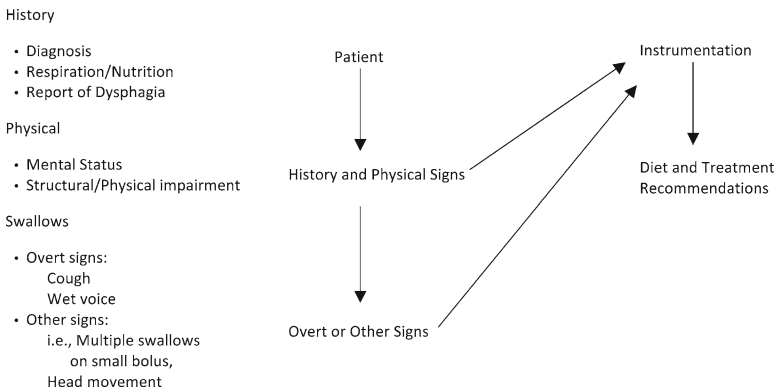


Fig. 2.2. CSE onsite instrumentation.

Trial Swallows

Not all clinical swallowing examinations should include actual swallows. Information from the historical/medical section and the physical examination of the patient should determine the need and safety for conducting trial swallows. A patient who is attentive and cooperative, has no current respiratory problems or signs of physical distress, and has at least some laryngeal elevation and function in the physical exam would be a good candidate for trial swallows. A patient with current respiratory problems and decreased mental status and cooperation may not be a good candidate—though this can be influenced by setting.

Figures 2.1 and 2.2 provide examples of how decision-making during a CSE might be influenced by setting.

In Fig. 2.1, the clinician works in a setting, such as a nursing home, with no onsite instrumentation. Red flags in the patient's history and physical exam may raise concerns regarding dysphagia. If concerns are significant enough, the clinician may deem it necessary to have the patient transported to a facility for instrumental swallowing assessment prior to oral feeding. On the other hand, the clinician may feel the benefits of trial swallows outweigh the risks and commence, cautiously, with trial swallows and even compensatory strategies to determine if overt signs can be reduced with modest manipulations of posture or the bolus.

In Fig. 2.2, the clinician works in a setting, such as a medical center, with onsite instrumental options. With red flags in the history and physical, this clinician may be much less likely to perform trial swallows without instrumentation because he can quickly and easily move to an instrumental exam before making diet or treatment recommendations.

When trial swallows are performed, they can be discontinued at any time—and should be if signs of problems occur and risks appear greater than the benefits. If the expectation is to define swallowing ability and determine course of treatment, a variety of bolus sizes and consistencies need to be evaluated. Daniels et al. [68] observed that single measures or volumes were not sufficient to define dysphagia on videofluoroscopy. It makes sense they would be insufficient in a clinical exam, as well. Different studies and protocols for CSEs exist and recommend differing volumes and consistencies, but small and larger boluses across thin liquid, puree or pudding, and solid consistencies is considered standard and necessary unless in the course of the examination signs of impairment appear. Often, if no signs of impairment are noted with boluses ranging from 1 to 20 mL, clinicians will even test the patient with multiple swallows, such as a 3 oz swallow test [69, 70]. The 3 oz swallow has also been reported to help determine the presence of aspiration when used as part of a comprehensive CSE [41, 71].

While administering trial swallows, the clinician should attend to a number of important measures. Listening to the patient's voice before and after a swallow for wetness or gurgly quality has been reported to correlate with the presence or absence of penetration/aspiration of liquids [41, 47, 60, 63, 64]. Some recommend the patient say "ah," while others prefer the patient to gently breathe in through the nares and hum to prevent the likelihood of material in the larynx from passing into the trachea. There is little doubt the presence of coughing and/or throat clearing is often a sign of laryngeal penetration/aspiration. It has been reported in two studies to be one of the most sensitive and specific signs of aspiration [41, 47] and is listed as important in many others [60, 64,

67, 72]. Due to the potential for silent aspiration, the *lack* of a cough reflex appears to provide limited information unless accompanied by other signs of swallowing impairment.

The larynx should be palpated for timing and completeness of the swallow, as well as the number of swallows. This can be accomplished by placing the index finger on the thyroid notch and remaining fingers on the thyroid cartilage [73] or by using the four finger method, where the index finger is placed submentally, the middle finger is placed on the hyoid, and the last two fingers are placed on the superior and inferior borders of the thyroid cartilage [40]. Poor laryngeal elevation on palpation may indicate reduced laryngeal elevation and closure, especially when it occurs in conjunction with other signs of dysphagia—such as coughing or a wet voice. Multiple swallows on small boluses may indicate pharyngeal weakness and inability to clear the pharynx of the bolus [64]. And examining the oral cavity before and after the swallow may help determine the patient's ability to transport the bolus effectively from the oral cavity into the pharynx.

If the clinician observes signs of dysphagia during the trial swallows but does not have access to instrumentation, he may decide it is necessary to attempt to manipulate the bolus consistency, temperature, or volume during oral intake or alter the patient's posture and/or eating behaviors to improve safety and ease of nutritional intake. Many compensatory strategies (i.e., thickening liquids, tucking the chin, turning the head) can be attempted, but safety must be paramount. If such strategies are not obviously improving the passage of the bolus, terminating the study and referring the patient out for an instrumental examination is likely necessary.

Finally, adjuncts to the CSE can include cervical auscultation [74, 75] to listen to breathing sounds during and after the swallows and/or SpO₂ levels, which has received mixed results in terms of its correlation with aspiration [76, 77]. Additional observations such as the patient's ability to feed self, level of assistance—if applicable, and ability to maintain posture and strength throughout examination should be noted. These observations can also be made very effectively with a meal observation.

Summary

The Clinical Swallowing Examination (CSE) is not a screening instrument, though determining the presence or absence of dysphagia is important. The CSE allows the speech-language pathologist to integrate

information from the patient's history/medical record, physical/neurologic/cognitive function, and, when deemed necessary, actual swallows, to develop a better overall understanding of a patient's functional feeding and swallowing ability. Many times patients will be referred on for additional instrumental testing after the CSE, and sometimes the CSE can be an endpoint in and of itself. Observation of the patient eating a meal, if applicable, is often another useful step in the evaluation process. It is critical to understand that while aspiration is of paramount importance, a dysphagia evaluation is about much more. The clinician must determine a patient's ability to safely take food and liquid in amounts appropriate for nutritional needs without compromising overall health status. A physical evaluation of these abilities is an essential part of any comprehensive evaluation for dysphagia [47, 52].

References

1. Martino R, Foley N, Bhogal S, Diamant N, Speechley M, Teasell R. Dysphagia after stroke: incidence, diagnosis, and pulmonary complications. *Stroke*. 2005;36:2756–63.
2. Cavalot AL, Ricci E, Schindler A, Roggero N, Albera R, Utari C, et al. The importance of preoperative swallowing therapy in subtotal laryngectomies. *Otolaryngol Head Neck Surg*. 2009;140:822–5.
3. Rihn JA, Kane J, Albert TJ, Vaccaro AR, Hilibrand AS. What is the incidence and severity of dysphagia after anterior cervical surgery? *Clin Orthop Relat Res*. 2011;469:658–65.
4. Miller N, Allcock L, Hildreth AJ, Jones D, Noble E, Burn DJ. Swallowing problems in Parkinson disease: frequency and clinical correlates. *J Neurol Neurosurg Psychiatry*. 2009;80:1047–9.
5. Langmore SE, Kasarskis EJ, Manca ML, Olney RK. Enteral tube feeding for amyotrophic lateral sclerosis/motor neuron disease. *Cochrane Database Syst Rev*. 2006;(4):CD004030.
6. Thomas FJ, Wiles CM. Dysphagia and nutritional status in multiple sclerosis. *J Neurol*. 1999;246:677–82.
7. Skoretz SA, Flowers HL, Martino R. The incidence of dysphagia following endotracheal intubation: a systematic review. *Chest*. 2010;137:665–73.
8. Platteaux N, Dirix P, Dejaeger E, Nuyts S. Dysphagia in head and neck cancer patients treated with chemoradiotherapy. *Dysphagia*. 2010; 25:139–52.
9. Martino R, Silver F, Teasell R, Bayley M, Nicholson G, Streiner DL, et al. The Toronto Bedside Swallowing Screening Test (TOR-BSST®): development and validation of a dysphagia screening tool for patients with stroke. *Stroke*. 2009;40:555–61.
10. Streiner DL. Diagnosing tests: using and misusing diagnostic and screening tests. *J Pers Assess*. 2003;81:209–19.
11. Hinchey JA, Shephard T, Furie K, Smith D, Wang D, Tonn S. Formal dysphagia

screening protocols prevent pneumonia. *Stroke*. 2005;36:1972–6.

12. Lindsay PBP, Bayley MM, Hellings CB, Hill MMM, Woodbury EBM, Phillips SM. Canadian best practice recommendations for stroke care (Updated 2008). *CMAJ*. 2008;179:E1–93.
13. Duncan PW, Zorowitz R, Bates B, Choi JY, Glasberg JJ, Graham GD, et al. Management of adult stroke rehabilitation care: a clinical practice guideline. *Stroke*. 2005;36:e100–43.
14. Intercollegiate Stroke Working Party. National clinical guidelines for stroke. London: Royal College of Physicians; 2004.
15. National Stroke Foundation. Clinical guidelines for acute stroke management. Melbourne, Australia: National Stroke Foundation; 2007
16. Martino R, Pron G, Diamant NE. Screening for oropharyngeal dysphagia in stroke: insufficient evidence for guidelines. *Dysphagia*. 2000;15:19–30.
17. Perry L. Screening swallowing function of patients with acute stroke. Part one: identification, implementation and initial evaluation of a screening tool for use by nurses. *J Clin Nurs*. 2001;10:463–73.
18. Bours GJ, Speyer R, Lemmens J, Limburg M, de Wit R. Bedside screening tests vs. videofluoroscopy or fiberoptic endoscopic evaluation of swallowing to detect dysphagia in patients with neurological disorders: systematic review. *J Adv Nurs*. 2009;65:477–93.
19. Lam K, Lam FK, Lau KK, Chan YK, Kan EY, Woo J, et al. Simple clinical tests may predict severe oropharyngeal dysphagia in Parkinson's disease. *Mov Disord*. 2007;22:640–4.
20. Clave P, Arreola V, Romea M, Medina L, Palomera E, Serra-Prat M. Accuracy of the volume-viscosity swallow test for clinical screening of oropharyngeal dysphagia and aspiration. *Clin Nutr*. 2008;27:806–15.
21. Nathadwarawala KM, Nicklin J, Wiles CM. A timed test of swallowing capacity for neurological patients. *J Neurol Neurosurg Psychiatry*. 1992;55:822–5.
22. Suiter DM, Leder SB. Clinical utility of the 3-ounce water swallow test. *Dysphagia*. 2008;23:244–50.
23. Manor Y, Balas M, Giladi N, Mootanah R, Cohen JT. Anxiety, depression and swallowing disorders in patients with Parkinson's disease. *Parkinsonism Relat Disord*. 2009;15:453–6.
24. Barker J, Martino R, Reichardt B, Hickey EJ, Ralph-Edwards A. Incidence and impact of dysphagia in patients receiving prolonged endotracheal intubation after cardiac surgery. *Can J Surg*. 2009;52:119–24.
25. Platteaux N, Dirix P, Dejaeger E, Nuyts S. Dysphagia in head and neck cancer patients treated with chemoradiotherapy. *Dysphagia*. 2010;25:139–52.
26. Ramsey DJ, Smithard DG, Kalra L. Early assessments of dysphagia and aspiration risk in acute stroke patients. *Stroke*. 2003;34(5):1252–7.
27. Mann G. MASA: the Mann assessment of swallowing ability. Clifton Park: Singular; 2002.
28. Crary MA, Mann GD, Groher ME. Initial psychometric assessment of a functional oral intake scale for dysphagia in stroke patients. *Arch Phys Med Rehabil*. 2005;86:1516–20.
29. Martino R, Pron G, Diamant NE. Oropharyngeal dysphagia: surveying practice patterns of the speech-language pathologist. *Dysphagia*. 2004;19:165–76.

30. McCullough GH, Wertz RT, Rosenbek JC, Dinneen C. Clinicians' preferences and practices in conducting clinical/bedside and videofluoroscopic swallowing examinations in an adult, neurogenic population. *Am J Speech Lang Pathol.* 1999;8:149–63.
31. Mathers-Schmidt BA, Kurlinski M, Department of Communication S, Disorders WWUBWUSABM-Swe. Dysphagia evaluation practices: inconsistencies in clinical assessment and instrumental examination decision-making. *Dysphagia.* 2003;18(2):114–25.
32. Wallace KL, Middleton S, Cook IJ. Development and validation of a self-report symptom inventory to assess the severity of oral-pharyngeal dysphagia. *Gastroenterology.* 2000;118:678–87.
33. Belafsky PC, Mouadeb DA, Rees CJ, Pryor JC, Postma GN, Allen J, et al. Validity and reliability of the eating assessment tool (EAT-10). *Ann Otol Rhinol Laryngol.* 2008;117:919–24.
34. Cook IJ, Kahrilas PJ. AGA technical review on management of oropharyngeal dysphagia. *Gastroenterology.* 1999;116:455–78.
35. Andrews J. Amyotrophic lateral sclerosis: clinical management and research update. *Curr Neurol Neurosci Rep.* 2009;9:59–68.
36. Calcagno P, Ruoppolo G, Grasso MG, De Vincentiis M, Paolucci S. Dysphagia in multiple sclerosis—prevalence and prognostic factors. *Acta Neurol Scand.* 2002;105:40–3.
37. Gasiorowska A, Fass R. Current approach to dysphagia. *Gastroenterol Hepatol.* 2009;5:269–79.
38. Mann G, Hankey GJ, Cameron D. Swallowing function after stroke: prognosis and prognostic factors at 6 months [see comments]. *Stroke.* 1999;30:744–8.
39. Gallagher L. The impact of prescribed medication on swallowing: an overview. *Perspect Swallow Swallow Disord (Dysphagia).* 2010;19:98–102.
40. Logemann JA. Evaluation and treatment of swallowing disorders. Austin: Pro-Ed; 1998.
41. McCullough GH, Rosenbek JC, Wertz RT, McCoy S, Mann G, McCullough K. Utility of clinical swallowing examination measures for detecting aspiration post-stroke. *J Speech Lang Hear Res.* 2005;48:1280–93.
42. Hughes TAT, Wiles C. Clinical measurement of swallowing in health and in neurogenic dysphagia. *Q J Med.* 1996;89:109–16.
43. Lazarus C, Logemann JA, Huang CF, Rademaker AW. Effects of two types of tongue strengthening exercises in young normals. *Folia Phoniatr Logop.* 2003;55:199–205.
44. Yeates EM, Molfenter SM, Steele CM. Improvements in tongue strength and pressure-generation precision following a tongue-pressure training protocol in older individuals with dysphagia: three case reports. *Clin Interv Aging.* 2008;3:735–47.
45. Hewitt A, Hind J, Kays S, Nicosia M, Doyle J, Tompkins W, et al. Standardized instrument for lingual pressure measurement. *Dysphagia.* 2008;23:16–25.
46. Yoshida M, Kikutani T, Tsuga K, Utanohara Y, Hayashi R, Akagawa Y. Decreased tongue pressure reflects symptom of dysphagia. *Dysphagia.* 2006;21:61–5.
47. McCullough GH, Wertz RT, Rosenbek JC. Sensitivity and specificity of clinical/bedside examination signs for detecting aspiration in adults subsequent to stroke. *J Commun Disord.* 2001;34:55–72.
48. Utanohara Y, Hayashi R, Yoshikawa M, Yoshida M, Tsuga K, Akagawa Y. Standard values of maximum tongue pressure taken using newly developed disposable tongue pressure measurement device. *Dysphagia.* 2008;23:286–90.

49. White R, Cotton SM, Hind J, Robbins J, Perry A. A comparison of the reliability and stability of oro-lingual swallowing pressures in patients with head and neck cancer and healthy adults. *Dysphagia*. 2009;24:137–44.
50. Robbins J, Kays SA, Gangnon RE, Hind JA, Hewitt AL, Gentry LR, et al. The effects of lingual exercise in stroke patients with dysphagia. *Arch Phys Med Rehabil*. 2007;88:150–8.
51. Volonte MA, Porta M, Comi G. Clinical assessment of dysphagia in early phases of Parkinson's disease. *Neurol Sci*. 2002;23 Suppl 2:S121–2.
52. Mann G, Hankey GJ. Initial clinical and demographic predictors of swallowing impairment following acute stroke. *Dysphagia*. 2001;16:208–15.
53. Pace CC, McCullough GH. The association between oral microorganisms and aspiration pneumonia in the institutionalized elderly: review and recommendations. *Dysphagia*. 2010;25:307–22.
54. Langmore SE, Terpenning MS, Schork A, Chen Y, Murray JT, Lopatin D, et al. Predictors of aspiration pneumonia: how important is dysphagia? *Dysphagia*. 1998;13:69–81.
55. Groher ME, McKaig TN. Dysphagia and dietary levels in skilled nursing facilities. *J Am Geriatr Soc*. 1995;43:528–32.
56. Chasen M, Bhargava R. A retrospective study of the role of an occupational therapist in the cancer nutrition rehabilitation program. *Support Care Cancer*. 2010;18:1589–96.
57. Murphy BA, Dietrich MS, Wells N, Dwyer K, Ridner SH, Silver HJ, et al. Reliability and validity of the Vanderbilt Head and Neck Symptom Survey: a tool to assess symptom burden in patients treated with chemoradiation. *Head Neck*. 2010;32:26–37.
58. Horner J, Massey EW, Riski JE, Lathrop DL, Chase KN. Aspiration following stroke: clinical correlates and outcome. *Neurology*. 1988;38:1359–62.
59. Horner J, Massey EW, Brazer SR. Aspiration in bilateral stroke patients. *Neurology*. 1990;40:1686–8.
60. Daniels SK, Brailey K, Priestly DH, Herrington LR, Weisberg LA, Foundas AL. Aspiration in patients with acute stroke. *Arch Phys Med Rehabil*. 1998;79:14–9.
61. Leder SB. Videofluoroscopic evaluation of aspiration with visual examination of the gag reflex and velar movement. *Dysphagia*. 1997;12:21–3.
62. Linden P, Kuhlemeier KV, Patterson C. The probability of correctly predicting subglottic penetration from clinical observations. *Dysphagia*. 1993;8:170–9.
63. Daniels SK, Ballo LA, Mahoney MC, Foundas AL. Clinical predictors of dysphagia and aspiration risk: outcome measures in acute stroke patients. *Arch Phys Med Rehabil*. 2000;81:1030–3.
64. Logemann JA, Veis S, Colangelo L. A screening procedure for oropharyngeal dysphagia. *Dysphagia*. 1999;14:44–51.
65. Davies AE, Kidd D, Stone SP, MacMahon J. Pharyngeal sensation and gag reflex in healthy subjects. *Lancet*. 1995;345:487–8.
66. Horner J, Buoyer FG, Alberts MJ, Helms MJ. Dysphagia following brain-stem stroke. *Arch Neurol*. 1991;48:1170–3.
67. Schroeder MF, Daniels SK, McClain M, Corey DM, Foundas AL. Clinical and cognitive predictors of swallowing recovery in stroke. *J Rehabil Res Dev*. 2006;43:301–10.

68. Daniels SK, Schroeder MF, DeGeorge PC, Corey DM, Foundas AL, Rosenbek JC. Defining and measuring dysphagia following stroke. *Am J Speech Lang Pathol.* 2009;18:74–81.
69. DePippo KL, Holas MA, Reding MJ. Validation of the 3-oz water swallow test for aspiration following stroke. *Arch Neurol.* 1992;49:1259–61.
70. Suiter DM, Leder SB, Karas DE. The 3-ounce (90-cc) water swallow challenge: a screening test for children with suspected oropharyngeal dysphagia. *Otolaryngol Head Neck Surg.* 2009;140:187–90.
71. McCullough GH, Wertz RT, Rosenbek JC, Mills RH, Webb WG, Ross KB. Inter- and intrajudge reliability for videofluoroscopic swallowing evaluation measures. *Dysphagia.* 2001;16:110–8.
72. Daniels SK, Brailey K, Foundas AL. Lingual discoordination and dysphagia following acute stroke: analyses of lesion localization. *Dysphagia.* 1999;14:85–92.
73. Groher ME, Crary MA. *Dysphagia: clinical management in adults and children.* Maryland Heights: Mosby/Elsevier; 2010.
74. Borr C, Hielscher-Fastabend M, Lucking A. Reliability and validity of cervical auscultation. *Dysphagia.* 2007;22:225–34.
75. Leslie P, Drinnan MJ, Zammit-Maempel I, Coyle JL, Ford GA, Wilson JA. Cervical auscultation synchronized with images from endoscopy swallow evaluations. *Dysphagia.* 2007;22:290–8.
76. Wang TG, Chang YC, Chen SY, Hsiao TY. Pulse oximetry does not reliably detect aspiration on videofluoroscopic swallowing study. *Arch Phys Med Rehabil.* 2005;86:730–4.
77. Morgan AT, Omahoney R, Francis H. The use of pulse oximetry as a screening assessment for paediatric neurogenic dysphagia. *Dev Neurorehabil.* 2008;11:25–38.

Manual of Diagnostic and Therapeutic Techniques for
Disorders of Deglutition

Shaker, R.; Easterling, C.; Belafsky, P.C.; Postma, G.N.
(Eds.)

2013, IX, 412 p. 72 illus., 31 illus. in color., Softcover

ISBN: 978-1-4614-3778-9