

Dysphagia Evaluation Practices: Inconsistencies in Clinical Assessment and Instrumental Examination Decision-Making

Barbara A. Mathers-Schmidt, PhD,¹ and Mary Kurlinski, MA²

¹Department of Communication Sciences and Disorders, Western Washington University, Bellingham, Washington and ²Children's Therapy Program, Affiliated Health Services, Mt. Vernon, Washington, USA

Abstract. The purpose of this study was to determine the nature of swallowing evaluation practices in western Washington, specifically in terms of (a) components of the clinical examination most commonly used, (b) consistency of clinical examination practices across clinicians, and (c) consistency of clinical decision-making (instrumental vs. noninstrumental) given specific patient scenarios. A 21-question survey was sent to 150 speech-language pathologists who provide services to dysphagia patients. Of the 72 (48%) surveys that were returned, 64 provided the data for the study. The results revealed that clinicians who responded to the survey differ somewhat regarding which components they include in a clinical examination of swallowing. There was a high degree of consistency for 11 of the 19 components. Inconsistency across clinicians was revealed in four areas: assessment of sensory function, assessment of the gag reflex, cervical auscultation, and assessment of trial swallows using compensatory techniques. Clinicians agreed in their recommendations on two of the six clinical case scenarios. In general, participating clinicians varied widely in their clinical decision-making. These findings are compared with other studies where variability in clinical practice has raised concerns.

Key words: Dysphagia — Deglutition — Deglutition disorders — Clinical/bedside assessment — Instrumental assessment.

Speech-language pathologists have been involved in serving patients with dysphagia for several decades. As our work with this population has increased, numerous policy statements have been published to define our role [1–3], determine requisite knowledge base and skills [1,2,4], establish policies and guidelines for intervention [1–3,5], and identify areas for research [1,5]. The American-Speech-Language-Hearing Association (ASHA) statements specify that the speech-language pathologist's scope of practice includes both the clinical/bedside examination and instrumental assessment of the oral, pharyngeal, and upper esophageal function in patients with dysphagia.

The clinical/bedside examination for dysphagia (hereafter referred to as the clinical examination) is considered a noninstrumental procedure that typically includes the following: gathering information regarding the current swallowing problem, reviewing medical history, observing signs relevant to the patient's medical status, conducting a structural/functional examination of speech and swallowing structures, and observing the patient during trial swallows [6,7]. The results of this examination determine whether further instrumental assessment of dysphagia is warranted. Generally, the clinical examination is recognized as one component of the comprehensive evaluation. However, Miller [6, pp. 161] stated that "in some cases the findings of the clinical examination for dysphagia will be consistent with a previously diagnosed

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Correspondence to: Barbara Mathers-Schmidt, Ph.D., Department of Communication Sciences and Disorders, Western Washington University, MS 9078, Bellingham, WA 98225, USA. Telephone: (360) 650-3172; fax: (360) 650-2843; E-mail: Barbara.Mathers-Schmidt@wwu.edu

condition, and this examination will be sufficient to establish an effective management and treatment plan.”

Among the instrumentation-based approaches to studying dysphagia, the videofluoroscopic swallowing study (VFSS), or modified barium swallow, is considered the gold standard for detection of aspiration. Although protocols vary somewhat, the evaluation typically involves examination of the oral, pharyngeal, and cervical esophageal structures and physiology while the patient swallows a variety of consistencies of material [7,8]. While the cost:benefit ratio of VFSS warrants consideration [9], many studies have documented that VFSS is critical for identifying laryngeal penetration and aspiration, for determining potential cause of the dysphagia, and for developing efficacious treatment [8–15]. In fact, according to Logemann [10, pp. 337–338], “Without a modified barium swallow, accurate swallowing therapy cannot be planned, and time and money can be wasted in attempting to evaluate and treat the patient’s dysphagia at the bedside.”

Instrumental dysphagia examination also includes fiberoptic endoscopic evaluation of swallowing (FEES), ultrasonography, manometry, and scintiscanning [2]. It has been suggested that FEES is the preferred procedure under certain circumstances; for example, a patient who is extremely ill or uncooperative might not tolerate the VFSS, or a patient’s restriction to the ICU might preclude the VFSS [16]. Bastian [17] noted that a videotaped FEES is preferable to VFSS when patients require frequent reassessment, thereby avoiding the radiation exposure that would occur with VFSS. Some experts have suggested that the FEES provides details about the pharyngeal stage of swallowing that cannot be appreciated on VFSS [18]. Studies comparing FEES with VFSS have revealed that the two procedures are equally sensitive in identifying aspiration [19,20]; one study suggested that the FEES is actually more sensitive than VFSS in identifying risk factors associated with dysphagia [21]. Other studies have supported the use of ultrasonography for detecting oral-stage abnormalities [22] and scintigraphy for identifying and quantifying aspiration and bolus flow over time [23]. The pressure changes measured by manometry indicate the effectiveness of esophageal peristaltic activity, the pharyngeal contractile wave, and upper esophageal sphincter opening. This procedure is used in conjunction with VFSS to identify pharyngeal and cricopharyngeal region abnormalities [22].

Much of the research in dysphagia has focused on the efficacy of specific diagnostic methods,

both clinical and instrumental [e.g., 9,13–15,19–21,23,24], with support for the various techniques providing sometimes conflicting clinical information. For example, Mari et al. [9] highlighted the value of the clinical examination and demonstrated the predictive value of the 3-oz water swallow test and history of cough on swallowing when identifying aspiration risk in patients with neurological diseases. Linden et al. [13] emphasized the failure of clinical examination to predict subglottal penetration in one-third of their cases, therefore leading to the conclusion that VFSS is the only reliable way to identify potentially life-threatening subglottal penetration.

It is not surprising that despite the above-mentioned professional guidelines, there is recent evidence of variability in assessment practices [25,26]. O’Donoghue and Bagnall’s [25] review of the literature revealed inconsistencies in VFSS protocols for assessing dysphagia in both the pediatric and adult populations. McCullough et al. [26] focused more broadly on clinicians’ preferences and practices in evaluating neurogenic dysphagia. They found that clinicians vary regarding what they think should be included in the clinical protocols for conducting both clinical examinations and VFSS. Similarly, clinicians differed in terms of the percentage of patients on whom they estimated using certain evaluation practices. In particular, standard deviations indicated substantial variability regarding the nature of oral motor and trial swallow measures used. The variability of mean practice scores for VFSS was similarly impressive; only thin liquid trials, delayed swallow reflex, and oral transit time had reasonably restricted ranges and standard deviations.

To our knowledge, there is no research focusing on *consistency* across clinicians in terms of how frequently they include certain components in their clinical examinations for dysphagia. Furthermore, while research has supported varying points of view regarding the need for instrumentation-based evaluation of dysphagia, there have been no studies looking at actual clinical practice in making such decisions. This study was undertaken to add to our understanding of current clinical practice. The purpose was to determine dysphagia evaluation practices in western Washington State, specifically in terms of (1) components of the clinical examination most commonly used, (2) consistency of clinical examination practices across clinicians, and (3) consistency of clinical decision-making (instrumental vs. noninstrumental) given specific patient scenarios.

Methods

Participants

A 21-question survey was sent to 150 speech-language pathologists in western Washington State. The 150 recipients were selected randomly from a pool of 326 ASHA-certified clinicians living within the designated geographical area and providing services to individuals with swallowing disorders. Seventy-two (48%) of the surveys were completed and returned. Eight questionnaires were withdrawn from the data pool since the respondents indicated that they had no clinical experience with dysphagia patients during the last year. The remaining 64 surveys provided the data summarized and analyzed below. Background information regarding the participants is provided in Table 1. The majority (73%) of the clinicians who responded had six or more years of experience as speech-language pathologists. The median was six to ten years of experience. Fifty-eight (90.6%) participants reported that they work 20 or more hours per week. The majority (68.2%) of the clinicians reported that 50% or more of their caseload in the last year comprised dysphagia assessment and intervention. Educational background varied, ranging from no classroom training prior to providing services to dysphagia patients ($N = 18$, 28.1%) to more than 16 hours of classroom training ($N = 13$, 20.3%); the median response was in the 1–5 hours category. Supervised clinical training background ranged from no supervised clinical experience prior to treating patients ($N = 13$, 20.3%) to more than 16 hours of supervised clinical training ($N = 23$, 35.9%); the median response was 6–10 hours of supervised clinical training. Given the instrumentation types listed, VFS was the most commonly available procedure, with 37 (57.8%) of the clinicians reporting that VFS is available within the facility where they work. Twenty-seven participants indicated that there are no instrumental diagnostic procedures available in their facilities.

Survey

The second author developed the survey by referring to published protocols, published dysphagia research, and protocols used in local swallowing clinics. Two certified speech-language pathologists, each with more than 20 years of dysphagia experience, reviewed the survey to establish its clarity and content validity. In addition to requesting demographic information, the survey elicited information regarding the frequency with which clinicians include listed components in a clinical examination for dysphagia. Participants indicated frequency of using a method or measure by circling a corresponding number, 1–5, where 1 = never, 2 = seldom, 3 = half the time, 4 = usually, 5 = always.

The survey also contained six detailed patient scenarios. The survey form, including the scenarios, is presented in the Appendix. The participants were asked to read each scenario and indicate the next course of action recommended for that patient. Response options were as follows: videofluoroscopic study (modified barium swallow evaluation), fiberoptic endoscopic evaluation of swallowing, ultrasonography, pharyngeal manometry/manofluorography, scintiscanning, no instrumental evaluation (and recheck patient as indicated), and others. Rules were developed for judging “other” responses. The use of these rules insured consistent interpretation of the respondents’ answers. The second author reviewed all of the responses to the scenario questions (6 scenario questions \times 60 surveys = 360 questions) and completed the data entry process two times, with 100% agreement. Eight surveys (6 scenario questions \times 8 surveys) were randomly selected and reviewed by the first author,

Table 1. Survey participant demographics ($N = 64$)

	N	%
SLP experience in years ^a		
1–5 years	17	27
6–10 years	16	25.4
11–15 years	13	20.6
16–20 years	11	17.5
>20	6	9.5
Hours worked/week		
1–9	3	4.7
10–19	3	4.7
≥ 20	6	90.6
All or most of caseload		
Children	11	17.2
Adolescents	2	3.1
Adults	11	17.2
Seniors	41	64.1
% of caseload dysphagia		
1–9	7	10.9
10–24	5	7.8
25–49	9	14.1
50–74	31	48.4
≥ 75	12	18.8
Hours of dysphagia training prior to treating patients		
None	18	28.1
1–5	18	28.1
6–10	11	17.2
11–15	4	6.3
≥ 16	13	20.3
Hours of supervised experience prior to treating patients		
None	13	20.3
1–5	10	15.6
6–10	12	18.8
11–15	6	9.4
≥ 16	23	35.9
Instrumental diagnostic procedures ^b available in your facility		
VFSS only	33	51.6
VFSS and FEES	2	3.1
VFSS and scintiscanning	1	1.6
All available	1	1.6
None available	27	42.2

^aMissing data for one subject; $N = 63$.

^bChoices: Videofluoroscopy (VFSS), fiberoptic endoscopic evaluation of swallowing (FEES), ultrasonography, pharyngeal manometry or manofluorography, scintiscanning, other.

with a 98% level of agreement between clinicians. The researchers discussed the discrepancies and reached 100% interjudge agreement.

Analysis

Descriptive statistics (percentages) were calculated to examine the degree to which specific clinical components are used, the consistency of their use, and the consistency of decision-making across clinicians. To determine which components of the clinical examination are most commonly used, the percentage of responses for each answer option (never, seldom, half the time, usually, or always) was calculated. The total number of interpretable responses varied slightly across components. Missing data points were due to par-

Table 2. Frequency and percentage of use of clinical examination components

	N	Never		Seldom		Half the time		Usually		Always	
		No.	%	No.	%	No.	%	No.	%	No.	%
Obtain patient history (hc)	63							2	3.2	61	96.8
Patient interview/patient perception of problem (hc)	62			1	1.6	2	3.2	10	16.1	49	79
Screening/assessment of language abilities (mc)	63			5	7.9	6	9.5	20	31.7	32	50.8
Screening/assessment of mental status (mc)	63	1	1.6	1	1.6	3	4.8	16	25.4	42	66.7
Assessment of speech function (mc)	63	1	1.6	2	3.2	5	7.9	20	31.7	35	55.6
Structural/Functional oral motor examination (hc)	62					2	3.2	7	11.3	53	85.5
Adequacy of dentition for chewing (hc)	62							8	12.9	54	87.1
Assessment of sensory function (ic)	62	1	1.6	3	4.8	12	19.4	17	27.4	29	46.8
Presence/strength of gag reflex (ic)	62	5	8.1	9	14.5	12	19.4	11	17.7	25	40.3
Presence/strength of volitional cough (hc)	62					1	1.6	10	16.1	51	82.3
Use of a variety of bolus types (mc)	63					1	1.6	18	28.6	44	69.8
Adequacy of lip seal (hc)	63							10	15.9	53	84.1
Judgement of efficiency of oral movements (hc)	63					1	1.6	5	7.9	57	90.5
Judgement of pharyngeal delay (hc)	61	2	3.3					2	3.3	57	93.4
Adequacy/strength of laryngeal excursion (hc)	60			1	1.7	1	1.7	5	8.3	53	88.3
Assessment of vocal quality (pre/postswallow) (hc)	61							8	13.1	53	86.9
Indirect laryngoscopy (hc)	62	51	82.3	7	11.3	1	1.6	2	3.2	1	1.6
Cervical auscultation (ic)	58	27	46.6	17	29.3	6	10.3	4	6.9	4	6.9
Trails with compensatory techniques (ic)	61	1	1.6	1	1.6	9	14.8	26	42.6	24	39.3

^ahc = highly consistent; mc = moderately consistent; ic = inconsistent practice across clinicians.

ticipant omission of an item or multiple options selected for one item. The “usually” and “always” options were combined and components were categorized into one of three groups: components usually/always used by 90% or more of the respondents, components usually/always used by 50–90% of the respondents, and components usually/always used by less than 50% of the respondents. Consistency of clinical examination practice was determined by calculating how many components were used with the same frequency across clinicians. Data were categorized as follows: highly consistent—75% of respondents indicated the same frequency of use; moderately consistent—50–75% indicated the same frequency of use; and inconsistent—less than 50% of respondents indicated the same frequency of use for a particular clinical component.

The responses to the clinical scenarios were analyzed to determine whether clinicians would pursue an instrumental evaluation as the next course of action. First, the percentage of clinicians choosing each clinical option was determined. The responses were then combined into two categories, instrumental and noninstrumental. For each clinical scenario, response frequencies and percentages were calculated for instrumental vs. noninstrumental clinical options. Responses were eliminated from the data pool if a respondent chose more than one answer and did not clearly indicate what the next course of action would be. (Valid subjects/total subjects per scenario: Scenario 1, 58/64; Scenario 2, 58/64; Scenario 3, 60/64; Scenario 4, 61/64; Scenario 5, 60/64; Scenario 6, 62/64.)

Results

Components of the Clinical/Bedside Examination for Dysphagia

The frequencies and percentages of responses indicating how frequently respondents use the listed methods or measures in a clinical/bedside examina-

tion are presented in Table 2. The categorization of components, according to combined percentages for “usually” or “always” used, is presented in Table 3.

Twelve of the 19 components surveyed were usually or always used by more than 90% of the respondents. These components are as follows: patient history (100%); patient interview (95.1%); mental status assessment (92.1%); structural and functional oral motor examination (96.8%); adequacy of dentition (100%); presence and strength of volitional cough (98.4%); use of a variety of bolus types (98.4%); adequacy of lip seal (100%); judgment of efficiency of oral movements (98.4%); judgment of pharyngeal delay (96.7%); adequacy and strength of laryngeal excursion (96.7%); and vocal quality pre- and postswallow (100%). Only 58% of the respondents indicated that they usually or always assess gag reflex. The least commonly used clinical examination components were indirect laryngoscopy and cervical auscultation. In fact, 93.6% of the respondents indicated that they never (82.3%) or seldom (11.3%) use indirect laryngoscopy, and 75.9% indicated that they never (46.6%) or seldom (29.3%) use cervical auscultation.

Consistency of Clinical Examination Practices

Consistency of clinical examination practice across clinicians is indicated in Table 2. When more than 75% of the respondents indicated the same answer on the 5-

Table 3. Components included in a clinical examination for dysphagia

A. Components usually/always used by >90% of respondents	
Patient history	100.0%
Assessment of vocal quality (pre/postswallow)	100.0%
Adequacy of lip seal	100.0%
Adequacy of dentition for chewing	100.0%
Use of a variety of bolus types	98.4%
Presence strength of volitional cough	98.4%
Judgement of efficiency of oral movements	98.4%
Structural/functional oral motor examination	96.8%
Judgement of pharyngeal delay	96.7%
Adequacy/strength of laryngeal excursion	96.7%
Patient interview/patient perception of problem	95.1%
Assessment of mental status	92.1%
B. Components usually/always used by 50–90% of respondents	
Assessment of speech function	87.3%
Assessment of language abilities	82.5%
Trials with compensatory techniques	81.9%
Assessment of sensory function	74.2%
Presence/strength of gag reflex	58.0%
C. Components usually/always used by ≤50% of respondents	
Cervical auscultation	13.8%
Indirect laryngoscopy	4.8%

point scale, this was considered as highly consistent clinical practice. If 50–75% of the respondents selected the same answer, clinical practice for that component was considered to be moderately consistent. If less than 50% of the clinicians selected the same answer, clinical practice was considered to be inconsistent. As can be seen in Table 2, clinical practice is highly consistent for 11 of the 19 components. For all but one of those 11 components, the respondents were highly consistent in *always* using a particular component. In the case of indirect laryngoscopy, the respondents were highly consistent in *never* (82.3%) using that method in a clinical examination of dysphagia. Clinical practice is moderately consistent for 4 of the 19 components. The responses suggested inconsistency across clinicians for four of the components: assessment of sensory function, assessment of presence and strength of the gag reflex, cervical auscultation, and trials with compensatory techniques.

Consistency of Clinical Decision-Making (Instrumental vs. Noninstrumental)

The responses to the clinical scenarios are summarized in Table 4. The total number of instrumental examination recommendations is indicated for each scenario, along with the specific types of instrumentation comprising that total. Responses in the “other” cat-

egory included referrals to another professional; diet recommendations; treatment recommendations such as head turning, chin tucking, or alternating solids and liquids; family-member education; and additional clinical investigation of symptoms. Clinicians were most consistent with one another in their response to Scenario 6, where 88.7% indicated that the next course of action should involve instrumental examination. Similarly, after reviewing Scenario 3, 83.3% of the clinicians determined that an instrumental examination was needed. In comparison to the other scenario responses, the responses to Scenario 2 were most evenly distributed between the instrumental (51.7%) and noninstrumental options (46.6%). Only 41% of the respondents clearly indicated that an instrumental examination was warranted in Scenario 4. In that scenario, 50.8% of the responses were in the “other” category, where the case usually was referred to another professional who would make the next clinical decision. Overall, 67.1% of the responses to the six scenarios clearly indicated the need for an instrumental evaluation, 21.2% indicated noninstrumental recommendations, and 11.7% were classified as “other,” where the next step was not clearly instrumental or noninstrumental in nature. The most frequently recommended instrumental procedure was VFSS alone, which accounted for 86.3% of the instrumental assessment recommendations.

Analysis of Factors Influencing Clinical Decision-Making

In an effort to determine what might be influencing clinical decision-making, the authors addressed two potential factors: instrumentation availability and clinical experience with dysphagia patients. The available data were recoded to create meaningful categories for further analysis. Based on the responses to question 11 regarding availability of instrumental diagnostic procedures, two categories were created. The “VFSSplus” category included the 37 (57.8%) clinicians who indicated that they at least had access to VFSS. The “none available” category included the remaining 27 (42.2%) clinicians. The responses to the clinical scenarios were recoded as well. The instrumentation category included any response that involved a referral for an instrumentation-based diagnostic procedure. The noninstrumentation category included all responses that indicated no instrumental evaluation was recommended for that case. The relationship between instrumentation availability and clinical decision-making was determined for each clinical scenario.

Table 4. Recommendation in response to patient scenarios

	Response	Frequency	% of response
Scenario 1:	Instrumental	34	58.6
	(VFS)	34	58.6
	Noninstrumental	23	39.7
	Other	1	1.7
Scenario 2:	Instrumental	30	51.7
	(VFS)	30	51.7
	Noninstrumental	27	46.6
	Other	1	1.7
Scenario 3:	Instrumental	50	83.3
	(VFS)	38	63.3
	(VFS + espophagram/GI exam)	7	11.7
	(espophagram)	2	3.3
	(FEES)	2	3.3
	(manometry/manofluorography)	1	1.7
	Noninstrumental	3	5
	Other	7	11.7
Scenario 4:	Instrumental	25	41
	(FEES)	9	14.8
	(VFS)	6	9.8
	(espophagram)	3	4.9
	(FEES + espophagram/GI exam)	3	4.9
	(VFS + espophagram/GI exam)	2	3.3
	(ultrasonography)	1	1.6
	Noninstrumental	5	8.2
Other	31	50.8	
Scenario 5:	Instrumental	47	78.3
	(VFS)	47	78.3
	Noninstrumental	12	20
	Other	1	1.7
Scenario 6:	Instrumental	55	88.7
	(VFS)	53	85.5
	(VFS + espophagram)	1	1.6
	(Scintigraphy/scintiscanning)	1	1.6
	Noninstrumental	6	9.7
	Other	1	1.6

Given the modest sample size and the occasional skewing of the data, the strength and direction of the relationships were estimated using a gamma test statistic. A chi-squared analysis was used to determine whether the differences in the table were beyond chance. As can be seen in Table 5, the availability of instrumentation was not related to response choices in the six clinical scenarios.

The demographic information also was recorded to create dysphagia experience categories. This involved combining the data regarding percent of caseload dysphagia, hours of dysphagia training, and hours of supervised dysphagia experience. (See survey questions 5–7.) The resultant total scores ranged from 4 (indicating very little dysphagia experience) to 16 (highly experienced in dysphagia). The relationships between dysphagia experience and clinical decision-

making were estimated using a gamma test statistic. A chi-squared analysis was used to determine the statistical significance of the results. These results are presented in Table 6. The statistical analysis indicates that there is not a significant relationship between experience in the area of dysphagia and clinical decision-making. Nevertheless, an examination of the data for Scenario 1 reveals a slight tendency for the less experienced clinicians to choose instrumental evaluation as the next step: 75% of the low-experience group chose instrumentation, whereas 59.5% of the moderate-experience group and 46.2% of the high-experience group chose instrumentation. For Scenario 5, the relationship between experience and clinical decision-making might be considered marginally significant, given the small sample size ($p = 0.20$; $p = 0.03$ for a one-tail test of signifi-

Table 5. Relationship between instrumentation availability and recommendation for instrumental assessment

Scenario	Gamma	Chi-squared	<i>p</i>
1	0.294	1.254	0.263
2	0.267	1.05	0.306
3	0.16	0.217	0.641
4	-0.184	0.501	0.479
5	0.305	1.013	0.314
6	-0.319	0.579	0.447

Table 6. Relationship between clinician experience and recommendation for instrumental assessment

Scenario	Gamma	Chi-squared	<i>p</i>
1	0.324	1.728	0.18
2	0.169	0.619	0.734
3	0.223	0.531	0.767
4	-0.042	0.291	0.865
5	0.484	3.215	0.2
6	0.148	1.863	0.395

cence). In this case, the majority of the respondents (78.3%) chose instrumental examination. However, only the more experienced clinicians suggested that no instrumental examination was necessary.

Discussion

Clinical Examination Components Used and Consistency Across Clinicians

The results of this study suggest that clinicians differ somewhat regarding the components they include in a clinical examination for dysphagia. It may be impressive that 12 of the 19 components were usually or always used by the vast majority of the clinicians and that the other 2 methods—indirect laryngoscopy and cervical auscultation—were never or seldom used by 93.6% and 75.9% of the clinicians, respectively. However, the degree of clinical inconsistency is somewhat disquieting. For example, even though a high percentage of clinicians indicated that they usually or always evaluate speech function (87.3%), language abilities (82.5%), and mental status (92.1%), across clinicians there was only a moderate degree of consistency in such practice. These are surprising findings given that 1997 practice standards [3] dictated that these components should be included in any swallowing assessment. Since it is common for an individual with a swallowing disorder to have a co-existing communication disorder [6], the components arguably are essential to a complete clinical exami-

nation for dysphagia. An appreciation of a patient's speech motor control and cognitive status contributes to diagnosing dysphagia, understanding its etiology, and determining an appropriate course of treatment. It also is interesting to note that indirect laryngoscopy was consistently *excluded* from the routine clinical examination conducted by the survey respondents. Miller [6] has advocated the use of indirect laryngoscopy in a clinical evaluation, both before and after a patient's swallow, since this technique allows detection of pooling and laryngeal penetration. It could be that most of the respondents have not been trained in using indirect laryngoscopy and have not sought such training. Only 74.2% of the respondents usually or always assess sensory function, and there was inconsistency across clinicians in including this component. Even though it is unlikely that loss of sensation alone will cause dysphagia, stimulation of intact sensory responses triggers chewing, salivary flow, and swallowing reflexes [6]; hence, sensory testing may provide important information. It is not surprising that only 58% of the respondents indicated that they usually or always assess the gag reflex and that this was an area of inconsistency across clinicians. Contradictory views have been expressed regarding the value of assessing the gag reflex. Logemann [22] stated that the gag reflex is not related to swallowing function, while Miller [6] suggested that the patient's response to gag reflex stimulation might provide some information about the function of the pharyngeal musculature. A review of the current research revealed conflicting reports of the reliability of either the pharyngeal or palatal gag in predicting aspiration [29]. The inconsistency in assessing gag likely reflects this inconsistency in our tutorials and research findings.

McCullough et al. [29] also found evidence of fairly consistent clinical practice in terms of: obtaining patient history and patient interview; assessing voluntary cough; judging vocal quality after the swallow; and estimating oral movement efficiency, pharyngeal delay, and adequacy of laryngeal excursion. They found that clinicians reported using cervical auscultation only 34% of the time, which is somewhat higher than the frequency of use reported by clinicians in this study. In other areas of their study, which involved a more detailed survey of specific clinical preferences and practices than those considered in the present study, they too found considerable variability across clinicians.

Clinical Decision-Making

In response to only two of the six scenarios did clinicians show strong agreement in what they would

recommend as the next course of action. In these two hypothetical cases, Scenario 3 and Scenario 6, clinicians agreed that an instrumental evaluation was warranted (83.3% and 88.7%, respectively). The responses to Scenario 3 seemed to reflect an awareness of the need to investigate possible esophageal obstruction, since most clinicians indicated that an instrumental evaluation was necessary or at least recommended a referral to another specialist. Only three participants stated that no instrumental evaluation was warranted. In Scenario 6, clinical examination had guided prior decisions regarding diet upgrade for a patient who now has developed aspiration pneumonia. The high-percentage agreement of survey respondents likely reflects clinicians' concerns regarding the possibility of silent aspiration. Their recommendations may have been influenced by studies that have indicated that reliable detection of silent aspiration is possible only with VFSS [9–15] or FEES [19,20].

In general, participating clinicians varied widely in their clinical decision-making. Participants were moderately consistent in recommending instrumental evaluation in Scenario 5, a case where some experts might argue that no instrumental evaluation is necessary. It could be that the clinical examination findings are sufficient for guiding diet modification recommendations; therefore, an instrumental evaluation would not be cost-effective. There was a fairly even split between instrumental evaluation and no instrumental evaluation recommendations in response to Scenario 1 and Scenario 2. The majority of the respondents did not directly recommend an instrumental evaluation in only one case—Scenario 4. However, of the 36 “noninstrumental” responses, only 5 explicitly stated that the next course of action was “no instrumental evaluation.” The other 31 participants responded in the “other” category, where they indicated that the patient should be referred to a specialist. One might infer that this specialist, likely a gastroenterologist, would conduct an instrumental assessment.

Overall, clinicians recommended instrumental assessment procedures three times more often than noninstrumental alternatives. The clinicians may have been influenced by research that disputes the predictive value of clinical indicators in determining swallowing safety [13–15]. The fact that only two-thirds of the respondents reported that they *always* conduct a clinical examination for dysphagia before recommending an instrumental evaluation may indicate that instrumental evaluations are being recommended prematurely or inappropriately. VFSS was the most frequently recommended instrumental

assessment procedure. This may be related to the vast literature supporting the use of VFSS [e.g., 8–15,22]. It also may be that clinicians are most likely to recommend instrumental assessment when equipment is readily available. Of the responding clinicians, 58% had access to VFSS within their work facility and 97% had local access to VFSS. By contrast, FEES, the other instrumental assessment tool that has been widely studied [17–21], was available on the premises to only 4.7% of the respondents and locally available to only 53%. Finally, instrumentation choice may relate to clinician experience and training since 87.5% of the respondents indicated that they are qualified to participate in VFSS, whereas only 3.1% indicated that they are qualified to participate in FEES.

Although the study was not originally designed to consider what factors influence clinical decision-making, the background information provided by participants permitted an analysis of two factors—instrumentation availability and clinical experience. The disagreement among clinicians seemed to be random in most cases. The finding that, in general, experience did not seem to be related to clinicians' responses was also seen in the study by Wilcox et al. [27], although they too did not explicitly study this “experience-related” factor. In the present study, neither instrumentation availability nor clinician experience in working with dysphagia patients seemed to play a role, with one exception. The relationship between experience and clinical choice was marginally significant for Scenario 5, where the more experienced clinicians tended to recommend no instrumental evaluation, and the less experienced clinicians tended to recommend VFSS.

This study was limited by our restricting the survey sample to clinicians in western Washington State. It might be interesting to see if similar results would be found in other regions of the country. In addition, the “other” option in the case scenarios segment warrants modification. If clinicians were instructed to describe specifically what the “other” recommendation involves, a more accurate interpretation of responses would be possible. The survey also might be modified to collect more precise and detailed information about clinician training and experience so that the link between these factors and clinical practice could be ascertained.

This study's findings of clinician variability both in conducting clinical examinations and in making clinical decisions are consistent with other recent studies [26,27]. Although one would expect a certain amount of disagreement based on profes-

sional biases, we need to insure that clinicians are practicing according to prevailing standards. Since this survey was administered, ASHA’s official guidelines, “Clinical Indicators for Instrumental Assessment of Dysphagia” [5], have been published. It may be that as more clinicians become aware of these guidelines, we will see more consistency in clinical practice. It also is clear that there is insufficient research support for some of the components included in the clinical examination [26]. As research is conducted to determine the reliability and validity of assessment measures, perhaps we will see a refinement of the assessment protocols and an increase in consistency across clinicians.

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Appendix: Survey of Dysphagia Evaluation Practices

1) How many years have you been practicing Speech-Language Pathology? *Please circle the number that corresponds to your answer.*

1. 1-5 2. 6-10 3. 11-15 4. 16-20 5. 20+

2) What portion of your total current caseload is spent working with each of the following patient populations? *Circle the number(s) that correspond to your answer(s).*

	All	Most	Half	Some	None
Children (0-11 years)	1	2	3	4	5
Adolescents (12-17 years)	1	2	3	4	5
Adults (18-54 years)	1	2	3	4	5
Seniors (65+ years)	1	2	3	4	5

3) In which job setting(s) do you currently work? If you work in more than one setting, indicate the amount of time you currently work in each.

Job Setting	All	Most	Half	Some	None
Acute Care Facility	1	2	3	4	5
Skilled Nursing Facility	1	2	3	4	5
In-patient Rehabilitation Facility	1	2	3	4	5
Out-patient Facility	1	2	3	4	5
Other: _____	1	2	3	4	5

4) How many hours per week do you work as a Speech-Language Pathologist?

1. 1-9 2. 10-19 3. 20-29 4. 30-39 5. 40+

5) Within the last year, what percentage of your total patient caseload consisted of the evaluation/management of swallowing disorders?

1. None 2. 1-9% 3. 10-24% 4. 25-49% 5. 50-74% 6. 75%+

6) Prior to treating patients independently, how many hours of classroom (lecture-format) training did you receive in dysphagia evaluation/management?

1. None 2. 1-5 3. 6-10 4. 11-15 5. 16+

7) Prior to treating patients independently, how many hours of supervised clinical experience did you gain in dysphagia evaluation/management (in graduate school and/or on-the-job)?

1. None 2. 1-5 3. 6-10 4. 11-15 5. 16+

8) Which stages of swallowing function are you qualified to assess using clinical and/or instrumental methods of evaluation? *Circle all the numbers that apply.*

1. Pre-oral 2. Oral 3. Pharyngeal 4. Upper Esophageal

9) When a patient is referred to you for a swallowing evaluation, how frequently do you conduct a clinical (i.e., “bedside”) examination for dysphagia prior to determining the need for an instrumental diagnostic procedure?

1. Never 2. Seldom 3. Half the Time 4. Usually 5. Always

10) In which instrumental diagnostic procedures(s) are you qualified to participate? (*That is, in which are you able to administer the procedure independently or with another professional, and/or able to analyze the results.*) *Please circle all the numbers that apply.*

1. Videofluoroscopy (Modified Barium Swallow Evaluation)
2. Fiberoptic Endoscopic Evaluation of Swallowing
3. Ultrasonography
4. Pharyngeal Manometry/Manofluorography
5. Scintiscanning
6. Other: _____

11) Indicate which of the following instrumental diagnostic procedures are available at the facility in which you work? *Circle the number that corresponds to each of your answers.*

	Available	Not available	Don't know
a. Videofluoroscopy	1	2	3
b. Fiberoptic Endoscopic Evaluation of Swallowing	1	2	3
c. Ultrasonography	1	2	3
d. Pharyngeal Manometry/Mano-fluorography	1	2	3
e. Scintiscanning	1	2	3

12) Indicate which of the following instrumental diagnostic procedures are available within 30 miles of the facility in which you work? *Circle the number that corresponds to each of your answers.*

	Available	Not available	Don't know
a. Videofluoroscopy	1	2	3
b. Fiberoptic Endoscopic Evaluation of Swallowing	1	2	3
c. Ultrasonography	1	2	3
d. Pharyngeal Manometry/Manofluorography	1	2	3
e. Scintiscanning	1	2	3

13) How frequently are your recommendations for dysphagia evaluation services limited by regional access to instrumentation?

1. Never 2. Seldom 3. Half the Time 4. Frequently 5. Always

	Background Information		Current Status of Patient		
	Never	Seldom	Half the Time	Usually	Always
a. Obtain Patient History: <i>Includes obtaining medical/social history, as well as general medical respiratory, and nutritional/hydration status.</i>	1	2	3	4	5
b. Patient Interview/Patient Perception of Problem	1	2	3	4	5
c. Screening/Assessment of Language Abilities	1	2	3	4	5
d. Screening/Assessment of Mental Abilities	1	2	3	4	5
e. Assessment of Speech Function: <i>Includes all parameters of speech: articulation; voice quality, rate, volume; prosody; resonance; and respiration.</i>	1	2	3	4	5
	Structural/Functional Oral Motor Examination				
f. Structural/Functional Oral Motor Examination	1	2	3	4	5
g. Adequacy of Dentition for Chewing	1	2	3	4	5
h. Assessment of Sensory Function	1	2	3	4	5
i. Presence/Strength of Gag Reflex	1	2	3	4	5
j. Presence/Strength of Volitional Cough	1	2	3	4	5
	Swallowing Function				
k. Use of Variety of Bolus Types	1	2	3	4	5
l. Adequacy of Lip Seal	1	2	3	4	5
m. Judgment of Efficiency of Oral Movements	1	2	3	4	5
n. Judgment of Pharyngeal Delay	1	2	3	4	5
o. Adequacy/Strength of Laryngeal Excursion	1	2	3	4	5
p. Assessment of Vocal Quality (pre/post-swallow)	1	2	3	4	5
q. Indirect Laryngoscopy	1	2	3	4	5
r. Cervical Auscultation	1	2	3	4	5
s. Trials with Compensatory Techniques	1	2	3	4	5

- 14) How frequently are your recommendations for dysphagia evaluation services affected by third party reimbursement?
 1. Never 2. Seldom 3. Half the Time 4. Frequently 5. Always
- 15) How frequently do you include each of the following components in a clinical (i.e., “bedside”) examination for dysphagia?
For each component listed below, circle the number that corresponds with your answer.

Patient Scenarios

Please read the following patient scenarios and indicate the next course of action you would recommend. As with all responses to this survey, your answers will not be judged or graded, and will be kept strictly confidential.

1. A patient who has been previously diagnosed with amyotrophic lateral sclerosis (ALS) has developed symptoms of swallowing dysfunction. The results of the clinical examination for dysphagia are consistent with patient complaints and ALS diagnosis, and indicate moderate oral-pharyngeal dysphagia. What would you do?
 Circle only one answer.
 a. Videofluoroscopic Study (Modified Barium Swallow Evaluation)
 b. Fiberoptic Endoscopic Evaluation of Swallowing
 c. Ultrasonography
 d. Pharyngeal Manometry/Manofluorography
 e. Scintiscanning
 f. No instrumental evaluation Re-check patient as indicated
 g. Other: _____
2. A patient with a history of several episodes of aspiration pneumonia, general poor health, and a confused mental state is referred for a swallowing evaluation. During the clinical

examination for dysphagia the patient is unable to maintain attention to chewing and swallowing, tongue movements are inefficient, and laryngeal excursion is incomplete. No cough or throat clear is observed. After recommending the patient take nothing by mouth, what would you do?

Circle only one answer.

- a. Videofluoroscopic Study (Modified Barium Swallow Evaluation)
 b. Fiberoptic Endoscopic Evaluation of Swallowing
 c. Ultrasonography
 d. Pharyngeal Manometry/Manofluorography
 e. Scintiscanning
 f. No instrumental evaluation. Re-check patient as indicated
 g. Other: _____
3. A patient with an unremarkable medical history is referred for a swallowing evaluation. The patient complains of difficulty swallowing solid foods and describes the sensation of a “sticking” or “catching” feeling in his throat during every swallow of solid food. The clinical examination does not reveal any signs or symptoms of dysphagia other than the patient’s apparent difficulty swallowing solids. What would you recommend?
 Circle only one answer.
 a. Videofluoroscopic Study (Modified Barium Swallow Evaluation)
 b. Fiberoptic Endoscopic Evaluation of Swallowing
 c. Ultrasonography
 d. Pharyngeal Manometry/Manofluorography
 e. Scintiscanning
 f. No instrumental evaluation. Re-check patient as indicated
 g. Other: _____
4. A patient with complaints suggestive of gastroesophageal reflux describes how his symptoms have progressively worsened over

the last month. He has a medical history of adult-onset asthma, but no other health problems. During the clinical examination you note hoarseness in his voice, although no symptoms of dysphagia are observed. What would you recommend?

Circle only one answer.

- a. Videofluoroscopic Study (Modified Barium Swallow Evaluation)
- b. Fiberoptic Endoscopic Evaluation of Swallowing
- c. Ultrasonography
- d. Pharyngeal Manometry/Manofluorography
- e. Scintiscanning
- f. No instrumental evaluation. Re-check patient as indicated
- g. Other: _____

5. A patient with a long-term history of high blood pressure and a left cerebro-vascular accident (CVA) two weeks prior is referred for a swallowing evaluation. The clinical examination reveals a harsh vocal quality and right-sided weakness in the lower face and tongue. Also, during test swallows with a spoon thick substance, pre-oral stage movements are slow, pharyngeal response is judged to be delayed 4–10 seconds, and laryngeal excursion is inconsistent. What would you recommend?

Circle only one answer.

- a. Videofluoroscopic Study (Modified Barium Swallow Evaluation)
- b. Fiberoptic Endoscopic Evaluation of Swallowing
- c. Ultrasonography
- d. Pharyngeal Manometry/Manofluorography
- e. Scintiscanning
- f. No instrumental evaluation. Re-check patient as indicated
- g. Other: _____

6. You have been following the progress of a patient who had a bilateral CVA four weeks ago. This patient has demonstrated improved strength and coordination of the oral-pharyngeal musculature over time, and you have gradually upgraded her diet with no observed problems or complications. Today, however, the medical chart indicates that the patient has developed aspiration pneumonia. No prior instrumental procedures have been performed. What would you recommend?

Circle only one answer.

- a. Videofluoroscopic Study (Modified Barium Swallow Evaluation)
- b. Fiberoptic Endoscopic Evaluation of Swallowing
- c. Ultrasonography
- d. Pharyngeal Manometry/Manofluorography
- e. Scintiscanning
- f. No instrumental evaluation. Re-check patient as indicated
- g. Other: _____

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