

Pediatric Videofluoroscopic Swallow Studies

Competency for Speech-Language Pathologists

Leann Schow, MS, CCC-SLP, BCS-S





9177 Aero Drive, Suite B
San Diego, CA 92123

email: information@pluralpublishing.com
website: <https://www.pluralpublishing.com>

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Preface

“The pediatric videofluoroscopic swallow study—so how hard can it be? Feed the kid and take some pictures. It can’t be all *that* complex.” Having had 8 years of experience with adult modified barium swallow studies, I felt confident I could do this test with children. My confidence lasted until the first time I tried it with a real, live, crying baby and felt properly humbled upon arrival and downright overwhelmed when the fluoroscopy time ran out. At that point, my formal training had included 1 hour of dysphagia training from my master’s-level graduate program (nicely inserted in the middle of the dysarthria course) and a few continuing education courses plus the hands-on experience of modified barium swallow studies with adults. So what made me qualified to conduct a swallow study of a vulnerable child? Not much.

Having trained many speech-language pathologists (SLPs) in pediatric videofluoroscopic swallow study (VFSS), I have noticed a common misunderstanding that deserves to be addressed at the outset. New trainees typically arrive at the experience excited to become quasi-radiologists. The allure of reading x-ray pictures is real. Educational training materials are already in existence for SLPs to conquer the basics of reading images. Bonnie Martin-Harris, speaking of the BaBy_{VFSS}ImP, a standardized method for assessing swallowing in bottle-fed infants, said, “Dr. Lefton-Greif and I realize this is just one tool. This is a description of the patient’s physiologic impairment . . . But the clinician has to put all the clinical circumstances together with this information in order to come up with an appropriate management plan” (Martin-Harris, 2025). While the accurate reading of images is critical, the pediatric VFSS is *much, much more!* This book addresses the *much, much more* of the VFSS.

The purpose of this book is to provide the SLP with academic content critical to attaining competency in the multiple details that go into conducting a successful pediatric VFSS.

Fortunately, over time our world has made progress in this area, and many clinicians, scientists, professors, engineers, radiologists, and organizations have contributed to the efforts to accurately evaluate the swallowing of pediatric patients via VFSS. In 1998, Arvedson and Lefton-Greif published *Pediatric Videofluoroscopic Swallow Studies: A Professional Manual with Caregiver Guidelines*, which was the first comprehensive collection of practical and scientific information on the subject (Arvedson & Lefton-Greif, 1998). Then, in 2019, a joint committee of the Special Interest Group on Swallowing and Swallowing Disorders (Dysphagia) (SIG13) and the American Board of Swallowing and Swallowing Disorders (AB-SSD)

developed comprehensive competency checklists for conducting various aspects of dysphagia evaluation and treatment: the Dysphagia Competency Verification Tool (DCVT). The material was described as a consensus-based tool and shared by the American Speech-Language-Hearing Association (ASHA) as a resource for SLPs (ASHA, 2019). Thus, a clear structure emerged. This was a significant step in defining the essential knowledge and skills SLPs need to address dysphagia with adults and children.

The DCVT addresses competencies across a variety of topics within dysphagia evaluation and treatment, including the following:

- clinical swallow assessment and dysphagia treatment
- videofluoroscopic swallow study (VFSS) competency
- fiberoptic endoscopic evaluation of swallowing with and without sensory testing (FEES/ST) competency
- high-resolution manometry (HRM) competency
- continued competency review
- specialization and professional development

The express purpose of the tool is to assess clinical competence of clinicians providing dysphagia services. The DCVT is “intended to be a resource for clinicians to use for self-assessment and for employers, supervisors, or preceptors to use as a tool for evaluating and documenting dysphagia knowledge and skill competencies” (ASHA, 2019).

The prerequisites for use of the DCVT are as follows:

- Graduation from an accredited speech-language pathology program
- Knowledge of typical anatomy and physiology, including neuroanatomy and physiology, pertaining to the swallowing mechanism and related systems across the age continuum
- Knowledge of relevant risk factors and clinical indicators of dysphagia across the age continuum (ASHA, 2019)

Graduate students are also invited to use the DCVT to prepare for their careers.

With the advent of the DCVT, organizations involved in the evaluation and treatment of pediatric patients with dysphagia were faced with the realities of how to develop and implement an action plan. Medical institutions accredited by The Joint Commission must demonstrate through a competency assessment that staff are qualified to perform all aspects of

their job, including those who may be conducting pediatric VFSS. According to The Joint Commission, “The competency assessment looks at whether the clinical staff has the skills, knowledge, and abilities to perform the assigned job duties. Competency must be assessed by staff who understands the skills and knowledge required by the job responsibilities” (The Joint Commission, 2022).

To meet The Joint Commission competency assessment requirements, training for pediatric VFSS at children’s hospitals often involves finding a mentor, observing the mentor conducting pediatric VFSS, and then conducting a certain number of VFSSs with the mentor. As one involved in the training of SLPs to conduct pediatric VFSS, I receive feedback from trainees that they love the process of “watch-shadow-do,” but they also need core knowledge: academic information on the line items of the DCVT. This amounts to foundational information designed to refine the clinician into a master, one who intimately understands the field and can apply concepts to each unique patient.

This book focuses specifically on the DCVT for the VFSS and goes one step further by considering the competencies within the pediatric population. Per ASHA, “Experience in adult swallowing disorders does not qualify an individual to provide swallowing assessment and intervention for children. Understanding adult anatomy and physiology of the swallow provides a basis for understanding dysphagia in children, but SLPs require knowledge and skills specific to pediatric populations” (ASHA, n.d.-b). ASHA advises, “Before beginning pediatric dysphagia services, seek out additional training” (ASHA, n.d.-a). As indicated in the ASHA Code of Ethics¹ “SLPs who serve a pediatric population should be educated and appropriately trained to do so” (ASHA, 2023).

This text may be used as an instructional tool or a reference. A PluralPlus companion website is provided with instructor materials including chapter PowerPoints and quizzes. Book content may be introduced prior to watch-shadow-do processes of training or used concurrently. The knowledge and skills covered in the text are thorough enough for newcomers to pediatrics or pediatric SLPs new to VFSS. Those who already have clinical expertise, supervisor or expert, will also

benefit from the content, which offers in-depth material for each topic.

This book is written in first and second person. While academic in nature, the intent is to be inclusive of all SLPs striving to give the best possible care to the precious children on this planet. I speak in terms of “We” because we are more when we are together—scientists, professors, and clinicians. We have mountains to climb: the complexity of pediatric feeding disorder leaves many questions to be answered by science. Yet our patients need our help today. We will make progress when we keep our minds and hearts open to different points of view as well as new ideas. In this attitude, we embark together—a body of educated, observant, open-minded, nurturing, and kind professionals. Good things will come.

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¹American Speech-Language-Hearing Association. (2016). Code of ethics. <https://www.asha.org/policy/et2016-00342/>

Introduction

The purpose of this text is to provide the speech-language pathologist (SLP) with academic content critical to attaining competency conducting pediatric videofluoroscopic swallow studies (VFSSs) according to the Dysphagia Competency Verification Tool (DCVT).

The DCVT for VFSSs lists 30 line items that are each addressed within the chapters of this book. These line items have been numbered for easy reference and have been grouped together in various ways to facilitate presentation of concepts. Chapters are organized into six sections moving from “Foundational Knowledge and Pre-Videofluoroscopic Swallow Study,” “Videofluoroscopic Swallow Study,” “Patient and

Caregiver Considerations,” through “Post-Videofluoroscopic Swallow Study.” Next, a critical section addressing “Etiologies” is included. The final section, “Speech-Language Pathologist Mental Health,” concludes with a discussion of mental health issues, designed to foster resilience and fortitude for SLPs in their important VFSS work with children and families. Individual chapters identify the DCVT line items addressed and include a one-sentence “essence” statement, basics, additional details, case study, and tips. Clinical tools are provided at the end of the text to support the practical and functional SLP in the business of taking care of children with dysphagia and pediatric feeding disorder.

About the Author



Leann Schow, MS, CCC-SLP, BCS-S, is a board-certified speech-language pathologist at Primary Children's Hospital in Salt Lake City, Utah. She brings extensive experience in the evaluation and treatment of children with pediatric feeding disorder and has developed particular expertise in the pediatric videofluoroscopic swallow study, having conducted over 5,000 of these studies.

Leann has served as an instructor at both Idaho State University and the University of Utah. She is currently pursuing a PhD at the University of Utah, where her research interests focus on pediatric videofluoroscopic swallow study, dysphagia, targeted interventions, and clinical outcomes. Her goal is to contribute meaningful research that advances understanding and care for children affected by feeding and swallowing disorders.

Dysphagia Competency Verification Tool

Privilege: Videofluoroscopic Swallow Study (VFSS)

CPT: 92611

Applicant name: _____

Date training initiated: _____ **Date competency attained:** _____

Preceptor name(s): _____

Prerequisites: Privileges in Clinical Swallow Assessment and Dysphagia Treatment

Age group: Premature infants (<38 weeks gestational age) _____ Neonate (0–30 days) _____ Infant (1 mo–1 year) _____
 Toddler (1–3) _____ Child (3–12) _____ Adolescent (13–18) _____ Adult (18–65) _____ Geriatric (65+) _____

Key: SA = Self-Assessment PA = Preceptor Assessment T = Training C = Competent

	Instructions: Applicant will perform procedure with supervision from preceptor until the applicant demonstrates the expected standard of care and skills needed to independently perform the procedure with each age group requested.	SA: Baseline rating		PA: Date competency demonstrated	
		SA Rating	PA Rating	SA Rating	Date
1	Verbalizes the indications, contraindications, risks, benefits, and precautions (e.g., radiation exposure) for videofluoroscopic examination				
2	Identifies patients who are and are not appropriate for VFSS				
3	Describes the elements of a comprehensive exam and facility-specific protocol				
4	Verbalizes roles of the personnel involved in study				
5	Demonstrates appropriate setup for VFSS				
6	Educates the patient and family/caregiver regarding the purpose and process of examination, as appropriate				
7	Communicates the reason for the exam to the radiologist or other medical staff				
8	Identifies radiographic anatomical landmarks, including typical and atypical anatomy				
9	Follows a standardized protocol for bolus presentation				
Procedure-Related Skills		SA Rating	PA Rating	SA Rating	Date

This tool is consensus based and provided as a resource for members of the American Speech-Language-Hearing Association. Information included in this tool does not represent official American Speech-Language-Hearing Association policy. *continues*

10	Evaluates the integrity of airway protection before, during, and after swallowing			
11	Obtains lateral and anterior–posterior views, as able			
12	Implements postures, maneuvers, sensory enhancements, and bolus modifications, as appropriate, based on radiographic findings and the individual's overall functioning level			
13	Evaluates the effectiveness of postures, maneuvers, bolus modifications, and sensory enhancement techniques, as appropriate, based on radiographic findings and the individual's overall functioning level			
14	Evaluates the individual's tolerance of and ability to perform and repeat appropriate therapeutic interventions as appropriate, based on radiographic findings and the individual's overall functioning level			
15	Conducts the examination in a timely manner to minimize radiation exposure			
16	Monitors possible adverse reactions to the examination (e.g., changes in breathing pattern, level of alertness, agitation, pallor, etc.)			
17	Reviews the recorded VFSS			
18	Identifies and documents the physiologic components of swallowing			
19	Identifies and documents the impact of anatomic and physiologic impairment (i.e., location and severity of residue, laryngeal penetration, presence, timing, and approximate percentage of aspiration)			
20	Documents the patient's apparent awareness of and response to residue, laryngeal penetration, and/or aspiration (i.e., cough, throat clear, second swallow)			
21	Documents compensatory postures, maneuvers, delivery methods, sensory enhancements, and bolus modifications attempted—and the effectiveness of each			
22	Documents the individual's tolerance of and response to study (e.g., ability to follow directions, fatigue factor, and ability to repeat therapeutic interventions)			
23	If esophageal screening is completed, describes any suspected anatomic and/or physiologic abnormalities of the esophagus which might impact the pharyngeal swallow, deferring to radiology for diagnostic statements			
24	Formulates treatment and management strategies based on patient performance and integrates patient, family, and caregiver input into treatment plan			
25	Interprets and documents findings in a written report, including diagnosis, severity, prognosis, recommendations, and goals			
26	Discusses the results and consults with appropriate medical personnel in a collaborative model, as possible			
27	Refers for additional instrumental swallowing examinations (e.g., FEES, HRM), as appropriate, based on findings			
28	Incorporates radiation safety techniques (e.g., time, distance, shielding) for all individuals within the radiology suite during the examination			
	Procedure-Related Skills	SA Rating	PA Rating	Date

continues

29	Informs appropriate personnel (e.g., radiation safety officer) of any special circumstances that might impact the clinician's ability to participate in the videofluoroscopic swallowing exam and take appropriate action to ensure personal safety				
	Population- and Setting-Specific Skills (e.g., Trach/Vent, HNC, NICU, etc.)				
30	Describes best practices for providing interventions when complicated and/or special medical conditions are seen which may have an impact on an individual's feeding and swallowing (<i>population/setting specific skills may be added below</i>)				

Clinician Name/Initials: _____

Primary Preceptor/Initials: _____

Date Privileging Process Initiated: _____

continued

Indications and Contraindications

Dysphagia Competency Verification Tool Line Item

- 1 Verbalizes the indications, contraindications, risks, benefits, and precautions (e.g., radiation exposure) for videofluoroscopic examination

In Essence

The pediatric videofluoroscopic swallow study (VFSS), which is also known as the modified barium swallow (MBS) study (MBSS) (Martin-Harris et al., 2020), is a specific procedure for specific patients under specific circumstances.

Basics

A thorough understanding by the speech-language pathologist (SLP) of the purposes for which the pediatric VFSS is conducted is foundational. This starting point allows SLPs to consider its applicability for each patient for whom they hold responsibility.

Details

Comprehensive Assessment

SLPs are taught throughout training to consider individuals within the context of the whole person. We do not refer to individuals by their medical diagnosis, and we consider each person as a unique individual. This allows us to approach each patient afresh, without bias, but with knowledge and reasoning fine-tuned for the individual. The well-known statement, “Consider the whole patient,” is philosophy that aligns with the work of the World Health Organization (WHO). The WHO

proposes two components of comprehensive assessment of the whole patient: (a) the consideration of disease and (b) the consideration of functioning (WHO, 2023).

The *International Statistical Classification of Diseases and Related Health Problems (ICD)* is a detailed resource that supports the first component of a comprehensive assessment. This catalog of diseases and related health problems is a resource developed and maintained by the Centers for Disease Control and Prevention’s National Center for Health Statistics under authorization of the WHO. The *ICD* is updated annually. Medical professionals with diagnostic authority are qualified to identify/diagnose medical conditions and/or diseases. These professionals include (but are not limited to) physicians, physician assistants, psychologists, psychiatrists, physical therapists, occupational therapists, and dietitians. SLPs diagnose conditions of pediatric feeding disorder (PFD) and dysphagia (American Speech-Language-Hearing Association [ASHA], 2004; Goday et al., 2019).

The second component of the comprehensive assessment is addressed by the *International Classification of Functioning, Disability, and Health (ICF)*. ASHA considers the *ICF* to be the framework for our field. The *ICF* is broken down further into the following subsections: Functioning and Disability (which include Body Functions and Structures as well as Activity and Participation) and Contextual Factors (which include Environmental Factors and Personal Factors). Let us consider some basic examples within the *ICD* and the *ICF* Comprehensive Assessment model noted in Figure 1–1.

Although this information may seem self-explanatory, it is critical we understand the content, as it becomes immediately pertinent when we engage in clinical assessment or treatment. We must keep in mind that a diagnosis does not dictate a treatment plan for PFD or dysphagia. Equally important is the concept that an evaluation such as a pediatric VFSS does not dictate a treatment plan. Each pediatric patient must be considered within the context of disease as well as functioning. Herein is where the pediatric VFSS becomes so effective. It is

Comprehensive Assessment		
International Classification of Diseases and Related Health Problems (ICD)	International Classification of Functioning, Disability, & Health (ICF)	
	Functioning & Disability	Contextual
<p>Disease Examples</p> <ul style="list-style-type: none"> • <i>trisomy 21</i> • <i>cerebral palsy</i> • <i>extreme prematurity</i> • <i>chronic respiratory failure</i> <p>Related Health Problems Examples</p> <ul style="list-style-type: none"> • <i>hypotonia</i> • <i>developmental delays</i> • <i>retinopathy of prematurity</i> • <i>tracheostomy/ventilator dependent</i> 	<p>Body Functions & Structures Examples</p> <ul style="list-style-type: none"> • <i>pharyngeal phase of swallowing</i> • <i>tongue</i> • <i>epiglottis</i> <p>Activity & Participation Examples</p> <ul style="list-style-type: none"> • <i>family meals</i> • <i>having ice cream and cake at a friend's birthday party</i> 	<p>Environmental Factors Examples</p> <ul style="list-style-type: none"> • <i>divorced parents resulting in child residing in two homes</i> • <i>religious belief barring tube feedings</i> <p>Personal Factors Examples</p> <ul style="list-style-type: none"> • <i>two-year-old</i> • <i>female</i> • <i>Caucasian</i>

Figure 1–1. Comprehensive assessment.

a potentially powerful procedure that may be used within the context of the whole child to better understand the patient’s presentation and needs.

Indications

Under what circumstances should a patient receive a VFSS? Arvedson and Lefton-Greif state:

Regardless of age, VFSS examinations should be completed only for infants or children (a) with documented or suspected oropharyngeal swallowing impairments; (b) who demonstrate the medical stability, ability, and readiness to

participate in the procedure; and (c) with anticipated findings that will impact management plans. (Martin-Harris et al., 2020)

To justify a VFSS, dysphagia must be diagnosed or suspected, the child must have feeding readiness, and the study should influence management.

Indications for VFSS include the overarching requisite of feeding readiness plus at least one of the following six reasons:

1. Medical diagnosis associated with dysphagia: There are hundreds of individual medical diagnoses associated with dysphagia. These may include but are not limited to neurological and developmental disorders (such as

prematurity or genetic syndromes); congenital and other heart disease (such as hypoplastic left heart syndrome); aerodigestive disease (such as esophageal atresia or laryngomalacia); disorders that affect oral, nasal, or pharyngeal function (such as cleft lip/palate); and iatrogenic disorders (such as post intubation). In addition to a diagnosis such as prematurity, comorbidities can impact deglutition function. Some diagnoses may not cause dysphagia but nevertheless tend to co-occur with dysphagia. These include conditions such as gastroesophageal reflux and sleep apnea and may also include children who are struggling to gain weight (also known as “failure to thrive”).

2. Respiratory signs: Patients referred for VFSSs sometimes have respiratory signs that have not been explained (or not fully explained) by their other medical diagnoses. Respiratory signs may include (but are not limited to) breathing/oxygen problems evident from a monitor, supplemental oxygen dependence, shortness of breath, wheezing, chronic cough, frequent and/or severe respiratory illnesses, stuffy/runny nose, frequent unexplained fever (high temperature/febrile), back and/or chest that feels rattly, or congested breathing (Figure 1–2). Concerning chest x-rays and multiple emergency room visits or hospitalizations for bronchitis or pneumonia are additional markers of poor respiratory health. For these patients, medical providers may be seeking to find information regarding the potential role aspiration may be playing in their presentation.
3. Pharyngeal signs: This category is a very common cause of referral for VFSS and involves concern for events occurring during swallowing or associated with feedings.

This may include but is not limited to coughing, choking, aerophagia/gulping, stridor, squeaky noises, reflexive lacrimation/eyes watering, cyanosis, blue/purple skin color, sensation of bolus impaction, and wet or gurgled phonation.

4. Disruptive feeding behaviors: Infants and children for whom swallowing is not going well may develop behaviors that interrupt feedings. When these children are referred for VFSS, the practitioner is typically seeking information to sort out the cause of the disruptive behaviors. In other words, they are considering what role dysphagia may be playing in the child’s presentation.
5. Sudden-onset feeding/swallowing problems: The sudden onset of feeding/swallowing problems is another important category that may result in referral for VFSS. Reasons for abrupt onset may include illness, psychosocial trauma, foreign-body ingestion, new medical diagnosis, or iatrogenic causes. Newly presenting feeding difficulties may happen in situations of child illness with general malaise, sore throat, or oral conditions such as sublingual gland tumor or thrush. Some children have rapid development of feeding problems after traumatic experiences, such as children who choke and then refuse to eat thereafter, raising the need to rule out dysphagia. Other cases may result from the swallowing of a foreign body such as a small toy, coin, or button battery. Acute onset of feeding difficulties can also occur with medical conditions such as Chiari malformation, spinal muscular atrophy, brain tumor, degenerative neurological conditions, stroke, status post intubation, or placement of new tracheostomy. The care, protection, and management of these children can be powerfully impacted by a timely



Figure 1–2. A young girl with respiratory signs. *Source:* Halfpoint/Shutterstock.com.

VFSS. It is also the case that some infants/children following severe illness or major surgery may have a sudden change from their previous feeding. In these circumstances, it may be difficult to sort out which of the issues are due to disruptive feeding behaviors as compared to physiological dysphagia. The abrupt emergence of feeding difficulties warrants VFSS referral to differentially diagnose and manage the child's care.

6. Repeat/follow-up VFSS: Repeat or follow-up VFSS referral is undertaken to gather patient-specific information about possible changes or resolution of the child's dysphagia. This is an especially important category for referral, as an initial VFSS is only the beginning of dysphagia diagnosis and management. Follow-up VFSS at appropriate intervals enables the SLP to deal with the realities, as opposed to assumptions, of the child's dysphagia over time.

Contraindications

ASHA describes several contraindications for VFSS (ASHA, 2023), which fall into two categories of inadvisability. These include situations where the patient is unable to participate in a way that will allow diagnosis of their dysphagia pathophysiology or there exists potential for harm (above and beyond radiation). A summary of six contraindications is as follows:

1. Anticipation that patient will not/cannot participate in feeding: This may include concern for lack of feeding readiness, disruptive feeding behaviors, absence of swallow, sedation, fatigue, agitation, low level of cognitive function, or "nil per os" (nothing by mouth [NPO]) for another procedure.
2. Medical instability: Heart rate, respiratory rate, or oxygen saturation outside normal/expected parameters may be contraindications for specific patients. Additional medical instability may take the shape of dependence on high levels of supplemental oxygen that theoretically may interfere with the infant or child's ability to coordinate swallowing and breathing. A patient with new tracheostomy may be best served by waiting until the first tracheostomy change prior to considering VFSS. This allows for a decrease in edema/swelling and limits the risk of accidental decannulation that would possibly require a return to the operating room for replacement. Medically ill children who are at risk of decompensation should not be brought to the fluoroscopy suite for VFSS. Patients with medical interventions requiring multiple lines or tubes such as chest tubes may be at too much risk to manage the transfer necessary to be positioned for VFSS imaging. Clearly, collaborative decision-making with medical teams is critical.

3. Patient size/posture: Some patients who are obese may be unable to be managed with the fluoroscopy equipment and seating systems available. VFSS may also be contraindicated for children whose posture or excess movement does not allow positioning to obtain a true lateral image.
4. Ataxia telangiectasia: It is important to note that patients with ataxia telangiectasia (aka Louis-Bar syndrome) should avoid assessment via VFSS. These patients incur cellular damage such as chromosomal breakage and radioresistant DNA synthesis with exposure to ionizing radiation (Rothblum-Oviatt et al., 2016).
5. Unrepaired diagnosed tracheoesophageal fistula (TEF): These patients are at risk for getting barium in the mediastinum should it leak from the esophagus, which could cause serious infection.
6. Allergy to barium: This is an extremely rare condition with occurrence reported to be one in a million patients who have true allergy to barium (Agency for Toxic Substances and Disease Registry, 2023; Callahan et al., 2017; Drugs.com, 2023; Janower, 1986; Muroi et al., 1997).

It is apparent, even in the beginning chapter of this text, that children with PFD are complicated. Even the referral of the pediatric patient for VFSS may not be a straightforward matter. However, the SLP can use the succinct list of six indications and six contraindications to simplify and give structure to this first phase of the process (Figure 1–3).

Oral Feeding Readiness

Some additional discussion of oral feeding readiness is warranted. What exactly is feeding readiness? Oral feeding readiness is an overarching requisite to conduct VFSS. There must be some reasonable expectation the infant/child will be able to feed orally during the VFSS. Infants and children who have been feeding orally on a regular basis logically demonstrate feeding readiness and may participate in VFSS. But what about those who have never fed orally or who have been primarily dependent on alternative hydration/nutritional support (such as feeding tubes or total parenteral nutrition)? While the temptation may be to say only infants/children with feeding experience should participate in VFSS, the matter is complex and deserves careful consideration of several issues.

A definitive and consistent guideline does not exist for beginning or resuming oral feedings (Crowe et al., 2016). SLPs and medical organizations may have different approaches or facility-specific guidelines to determining feeding readiness. As with many things in the world of PFD, in the absence of a definite guideline, the SLP considers the individual patient

Pediatric Videofluoroscopic Swallow Study	
Indications	Contraindications
<p>Feeding readiness plus one or more of the following:</p> <ul style="list-style-type: none"> • Medical diagnosis associated with dysphagia • Respiratory signs • Pharyngeal signs • Feeding disruptive behaviors • Sudden onset feeding/swallowing problems • Repeat/follow-up VFSS 	<ul style="list-style-type: none"> • Anticipation patient will not/cannot participate in feeding (due to lack of feeding readiness, disruptive feeding behaviors, absence of swallow, sedation, fatigue, agitation, or NPO for another procedure) • Medical instability (heart rate, respiratory rate, dependence on high levels supplemental oxygen) • Patient size/posture unable to be positioned/managed by equipment • Ataxia telangiectasia • Unrepaired diagnosed tracheoesophageal fistula (TEF) • Allergy to barium

Figure 1–3. Pediatric videofluoroscopic swallow study indications and contraindications.

to make decisions regarding readiness. Some patient presentations and issues for consideration include the following:

1. Patients with immature neurophysiology: Infants born prematurely and/or with medically complex conditions such as congenital heart disease, genetic abnormalities, or neurological disorders may lack neurological and physical development as well as neurobehavioral and sensorimotor experiential factors to feed orally. Many of these patients also do not have the history of parental feeding for the oral feeding dyad. Some protocols to determine readiness in these infants may consist of parameters regarding evaluating the infant's state regulation and/or nonnutritive sucking skills. Other guidelines to assess readiness may include clinical evaluation of feedings with very slow bottle nipples, such as the Dr. Brown's Ultra-Preemie, or on limited volumes of liquid (such as 10 ml). Still other protocols may focus on infant-directed feeding signs such as rooting, active feeding engagement, or "stop-feeding-me" cues.
2. Patients with high respiratory and/or dysphagia risk: Some children who have high respiratory risk, complex or fragile medical presentation, or diagnoses associated with pharyngeal dysphagia, may have received only nonoral feedings since birth. These children are deemed high enough risk by their medical team that they have not been feeding orally. Many such pediatric patients are referred to VFSS to determine safety prior to beginning oral feedings.
3. Patients with lack of feeding experience: When aspiration risk is deemed low, feeding therapy may be conducted to give the patient some exposure to build acceptance of oral feedings and theoretically to promote feeding skill prior to VFSS.

4. Age of the patient: Some infant/neonatal intensive care/cardiac intensive care units (NICUs, CICUs) have protocols based on gestational age, requiring the infant to be at least 37 weeks' gestation prior to VFSS testing. Some facilities put off VFSS until the infant qualifies for manufacturer guidelines (such as gestational age and weight) to take liquid thickeners. Young infants with a certain degree of feeding readiness who have never fed orally will likely engage with the nipple (this is essentially reflexive feeding). Some older infants who have not had the opportunity to orally feed may not willingly feed when given the chance. This may reflect volitional as opposed to reflexive control of feeding. Note that suckling may be elicited in the absence of volitional feeding as this is a reflex/stereotypy that does not integrate until older ages in infancy.
5. Time without oral feedings: Another category of children who have not been feeding orally includes those who have previously been oral feeders but who have been NPO, which means no oral feedings for a period of time due to illness, injury, surgery, intubation, and/or treatment of a medical condition. These children are sometimes referred for VFSS to determine safety to resume oral feedings. Brief periods of NPO for established feeders will likely have little consequence on a patient's willingness to engage. However, extended periods of time NPO and disease or surgery can have an impact on willingness to feed.
6. Endurance, cardiorespiratory stamina, and state: The infant/child should demonstrate strength and endurance sufficient to sustain a wakeful state and engage in feeding without agitation or dropping into sleep. Young infants may become overwhelmed by stimulation, such as a feeding opportunity, and "escape" or avoid by closing their eyes and falling asleep. Children who have sustained a neurological insult such as a traumatic brain injury should be functioning at least at a revised Rancho Los Amigos Level of Function VI (confused, appropriate) (Lin & Wroten, 2024) for VFSS to be indicated. At lower levels of cognition, participation in the study may be inconsistent or nonexistent.
7. Nonnutritive sucking: Nonnutritive sucking may be a good indicator of readiness for nutritive feedings in young infants. The elicitation and self-regulatory factors of nonnutritive suckling do not necessarily translate directly into nutritive sucking. The refusal of a pacifier (particularly in an older infant) does not preclude them from engaging in nutritive sucking.
8. Breastfeeding infants: Infants who breastfeed and bottle-feed interchangeably typically are good candidates for VFSS participation. Young infants who have only breastfeeding experience will likely take a bottle during VFSS without disruptive feeding behaviors. Older infants who only breastfeed may not accept a bottle during VFSS. These older babies and particularly those with history of refusing bottles may be unpredictable. Sometimes they latch and accept a bottle during VFSS and other times completely refuse.
9. Respiratory status: Historically, SLPs have asserted the importance of avoiding oral feedings for patients requiring high levels of respiratory support. Infants requiring nasal cannula positive airway pressure (nCPAP) demonstrate a significantly increased risk of laryngeal penetration and aspiration events (Ferrara et al., 2017). It is hypothesized that various forms of supplemental oxygen support may have a sensory and motor impact on swallowing. A rule of thumb has been to limit VFSS to those patients receiving ≤ 2 L of oxygen per minute via nasal cannula. Sometimes medical teams in their eagerness to feed may ask for oral feedings (e.g., post intubation) sooner than patient medical status has allowed supplemental oxygen to be decreased to an ideal level. In these circumstances, SLPs have the opportunity to discuss pros and cons with their medical team. Research may ultimately guide recommendations on oral feeding with respiratory support in recognition of variability across the pediatric age span due to changes in body size, respiratory function, and swallow physiology. Considerations of discharge timing, rural patient home locations not allowing for access for a later study, and families and medical teams determined to feed for quality of life despite respiratory readiness may cause the SLP to conduct VFSS sooner than would otherwise be ideal to provide information on safety to manage patient care. Note that patients with trach/vent may participate in VFSS (see Chapter 22).
10. The ill inpatient: A recurring question faced by SLPs in the inpatient medical setting is, "Should we conduct VFSS if the infant/child is an inpatient with a respiratory virus?" Various opinions abound. Medical teams and SLPs consider multiple factors in making these decisions. Unless state or respiratory support needs are playing a big role, children who have a virus may be ill or recovering from an illness, but these issues may not necessarily impact swallowing safety. Some authors advocate for VFSS when an infant is "clinically stable" (Khoshoo et al., 2001). It is also notable the same authors report that previously healthy infants hospitalized for respiratory syncytial viral bronchiolitis who are tested after recovery from the acute phases of illness frequently demonstrate aspiration (Khoshoo & Edell, 1999). A general guideline is pediatric patients who are febrile or on high levels of oxygen support should probably postpone until later in their stay or post discharge. Sometimes medical teams prefer to discharge patients home and order VFSS on an outpatient basis to be conducted once respiratory symptoms resolve. Another perspective applicable in some circumstances is that completing a VFSS while the

patient is an inpatient can provide needed swallowing intervention information and training to a family who may otherwise be lost to care and follow-up once discharged. This phenomenon has been documented in the literature with the authors' advocating for "working to schedule as many appointments as possible prior to discharge" (Yagiela et al., 2019, 2024).

11. The ill outpatient: Another common scenario is caregivers who call prior to their child's outpatient VFSS appointment explaining their child is "sick" with a cough or runny nose and has been experiencing these symptoms for quite some time. They wonder if they should keep their appointment. The irony in many of these cases is the child may be having respiratory symptoms in part or fully due to aspiration, which is why their provider has referred them for VFSS in the first place. Caregivers should be given the authority to make the final judgment call, but they may be advised that if the child is not febrile (running a temperature), they may come in for VFSS assessment.

Risks/Precautions

The primary risk with the pediatric VFSS is radiation exposure. An additional risk is the financial cost of the procedure (incurred by providers, payers, and the patient's family). A visit to a medical facility may be considered a risk for potential exposure to viruses/illness for the patient and family. This is particularly concerning for medically compromised children such as those with fragile immune systems, complex medical conditions, or frail respiratory health.

Benefit

The primary benefit of the VFSS is the obtaining of diagnostic information to guide treatment.

Words from the Wise

In our efforts to address indications and contraindications, we would do well to consider the statement popularly attributed to Dr. William Osler, Canadian physician and one of four primary founding professors of The Johns Hopkins Hospital: "The good physician (*or in our case SLP*) treats the disease; the great physician treats the patient who has the disease" (Ronen et al., 2020, p. 1279).

Tips

Tip 1: Think big—always consider the whole patient.

Tip 2: Keep an open mind while you are gathering information about the patient to allow you to sort through indications and contraindications.

Tip 3: Physicians appreciate respectful discussions of indications and contraindications, so do not hesitate to advocate for or against VFSS for individual patients.

Case Study

A 2-month-old patient "Henry" is referred by his pediatrician for a "Swallow Study with Small Bowel Follow Through." Order details include "gastroesophageal reflux." The parents report they have brought their baby to the hospital for a test to determine if Henry has reflux.

Indications

Feeding readiness: yes

Medical condition(s) associated with dysphagia: no

Respiratory symptoms: no

Pharyngeal symptoms: no

Disruptive feeding behaviors: no

Sudden onset of feeding problems: no

Repeat VFSS: no

Summary: Only feeding readiness is met; no other indications are met.

Next Steps

A call to the pediatrician's office reveals concern for gastroesophageal reflux with no swallowing or respiratory issues. The pediatrician is provided basic information on the purposes of the tests: upper GI series, esophagram, and VFSS. The pediatrician provides clarification that he really intends for Henry to have an upper GI. The SLP is off the hook on this one.

References

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