Interpretation of
Videofluoroscopic Swallow
Studies of Adults

A study guide to improve diagnostic skills and treatment planning

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Published by:

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Table of Contents

I. Introduction .........................................................................................................................5
II. The Modified Barium Swallow ..........................................................................................7
III. Orienting Yourself to the Radiographic Image ...............................................................10
IV. Selecting Your Treatment Strategies .............................................................................12
V. Selecting Your Recommendations ....................................................................................21
VI. Writing the Report ............................................................................................................24
VII. Counseling the Patient and Significant Others ..............................................................26
VIII. Subjects in the Videos: Their Age, Medical Diagnosis, and the Disorders that You Should Have Identified for Each Subject .........................................................27
Chapter I

Introduction

This eCourse’s videos and manual are designed to help you improve and test your skills in reading radiographic studies of oropharyngeal swallow in adults (videofluoroscopic swallow studies (VFSS) or the modified barium swallow (MBS)). There is another eCourse with videos and manual available from Northern Speech Services which focuses on reading radiographic studies of infants and children (e08).

This eCourse contains 25 swallowing studies, some of which include all of the swallows included in a typical modified barium swallow and others are sample swallows from a long series completed on the patient. The goal of both the manual and the videos is to provide you with experience in orienting yourself to the radiographic anatomy and to interpret the study in terms of its normalcy for the patient’s age and gender, the swallowing disorders present, the effects of those disorders including aspiration and residue, and the treatment strategies that could be appropriately attempted during the radiographic study for each patient. The videos will also give you experience in making recommendations regarding the patient’s need for swallowing therapy and the type of therapy to be provided, the appropriateness of oral or non-oral feeding, the nature of oral feeding, if appropriate, and the need for any further evaluation.

This manual is organized so that the results of each x-ray (in terms of its normalcy and nature of swallowing disorders) are provided to you in Section VIII of this manual. In this same section of this manual, you will find the recommendations appropriate for the patient. These include the need and appropriateness of therapy, including specific techniques that would be
appropriate and the recommendations for referral to other professionals such as gastroenterology or neurology and the nature of the diet to be provided if oral intake is appropriate. It is suggested that as you look at each patient’s radiographic study, you begin by identifying anatomy and then define the swallow disorders followed by your decisions regarding management of the patient. You can use these videos and manual as a test for yourself as well as a learning tool. It is suggested that you not look ahead at the answer for each tape but that you force yourself to make your own decisions before referring to the answer key.

The remainder of this manual will present the results for each of the 25 patients and the recommendations for therapy, oral intake, etc.
Chapter II

The Modified Barium Swallow

The modified barium swallow is designed to reveal the movements of the structures in the oral cavity, pharynx and larynx, and upper cervical esophagus during swallow. The typical procedure described in Logemann (1993) includes boluses representing a variety of sizes of thin liquids, including cup drinking, pudding, and masticated materials. In addition to giving patients two of each of these kinds of boluses, the clinician may decide to introduce other food boluses representing areas of difficulty for the patient. At least two swallows of each bolus type are needed in order to get a good view of the patient’s swallow physiology. In a “standard” modified barium swallow, patients receive 14 boluses: 1 ml thin liquid, 3 ml thin liquid, 5 ml thin liquid, 10 ml thin liquid, cup drinking of thin liquid, pudding (E-Z-EM pudding), and ¼ of a Lorna Doone cookie with 1 ml of E-Z-EM pudding to provide contrast. The cookie is included in order to examine chewing ability. If a patient has no chewing ability, then there is no need to introduce the cookie. The study may be further modified if the patient exhibits significant swallowing difficulties resulting in either aspiration or severe residue remaining in the oral cavity or pharynx. There are a number of interventions that can be introduced during x-ray to examine their effectiveness in either eliminating aspiration or reducing the oral or pharyngeal residue after the swallow. Providing the patient with interventions defines what will be successful for them and enable them to continue eating. The introduction of various strategies to improve the swallow also provides the clinician with data showing the efficacy or effectiveness of the various strategies. The videotape can then be used as a teaching tool with the staff including the patient’s physician, nurses, etc., and the patient’s family and significant others.

Liquids are given first because, if a patient aspirates, liquids are most easily expectorated from
the lungs and will not block the airway as thicker foods can. Small calibrated volumes are first given to minimize any amount of aspiration that may occur. Thus, the number of swallows given will vary from patient to patient, depending upon the nature of the patient’s dysfunctions in swallow and the number of intervention strategies available for their particular disorders. In some patients who are unable to follow directions or who are wearing a neck brace as examples, few interventions can be attempted. In general, interventions are presented in the following order from simplest to more difficult: changing head or body posture, introducing sensory techniques such as thermal tactile stimulation or particular types of bolus such as sour boluses or carbonated boluses, and finally, swallow maneuvers which require voluntary control and ability to follow direction. There are a number of subject-related variables in addition to ability to follow directions which will affect the selection of a particular intervention. For example, if the patient fatigues easily, swallow maneuvers may not be appropriate as they require more muscle energy. The patient’s medical diagnosis may also limit their ability to use certain interventions. For example, the patient with motor neuron disease may fatigue more than should occur after a swallow maneuver. Thus, the clinician must consider all of these variables as they define whether or not the patient can use particular treatment strategies.

The modified barium swallow is generally used when patients have a pharyngeal abnormality in swallow that is suspected but not visible at the bedside. In many patients with oral dysfunction only, a modified barium swallow is not needed. However, there are times when the patient with an apparent severe oral impairment which may occur, for example, after head injury, may require a modified barium swallow to be sure no pharyngeal deficit is present and allow the clinician to move more aggressively in therapy for the oral disorders. Not all patients with swallowing or feeding disorders require a radiographic study. The recommendation for
such a study should be based upon the need to understand the patient’s physiology, not to determine if or whether they are aspirating. The request to the patient’s physician in order to get an order for a modified barium swallow should focus on the need to identify the swallow abnormalities such that appropriate treatment can be utilized. The clinician’s responsibility when a patient aspirates is not to stop the radiographic study but rather to introduce a treatment strategy to eliminate the aspiration. The goal of the modified barium swallow is to define conditions under which the patient can eat safely, not to stop patients from eating orally.
Chapter III
Orienting Yourself to the Radiographic Image

When a lateral radiographic image is initially observed, the clinician should orient themselves to the image by initially finding the hyoid bone which is generally immediately inferior and posterior to the lower edge of the mandible, and then looking further posterior to find the epiglottis. The epiglottis is a long cartilage extending from the base of tongue down into the thyroid cartilage to which it is attached by a ligament. Once the epiglottis is identified, looking downward from the epiglottis is the airway entrance, the larynx, and then the trachea. Looking just anteriorly to the tip of the epiglottis is the valleculae, above which one can follow the base of tongue up and toward the oral cavity. At the tip of the uvula is the separation between the base of tongue and back of tongue. Above the tip of the uvula is the oral tongue; below the uvula is the base of tongue. Both parts of the tongue are critical in swallow. The oral tongue places food on the teeth in order to facilitate chewing, mixes the food with saliva as it comes off the teeth, and replaces the food on the teeth. When chewing is complete, the oral tongue subdivides the piece of the bolus appropriate for its viscosity and initiates the oral stage of swallow. The thicker or more viscous the foods, the smaller the volume of bolus swallowed in a single swallow. The base of tongue is the primary pressure generator in the pharynx during the swallow, activating as the tail of the bolus reaches it. Activation of base of tongue to contact the anteriorly moving pharyngeal wall too early can result in part of the bolus being squeezed back into the mouth or the nose rather than being propelled downward into the esophagus. The base of tongue activity with the pharyngeal wall occurs later and later in the swallow as the bolus volume increases in normal swallowers.
The anterior-posterior image of the oral cavity and pharynx has very different landmarks than the lateral view. With the head in a normal position, the oral cavity is not easily visible, except the surface of the oral tongue when it holds the bolus and initiates backward movement to start the swallow. When the bolus passes over the back of tongue and begins its descent into the valleculae, the valleculae are clearly identifiable as scalloped in shape. The scallop shape of the valleculae results from the hyo-epiglottic ligament which holds the epiglottis to the hyoid bone. As the bolus descends from the valleculae being propelled by base of tongue, the bolus divides as it passes through the pharynx in approximately 80% of normal adults to enter the esophagus through the upper esophageal sphincter. Approximately 20% of normal adults swallow down only one side of the pharynx. Thus, the anterior-posterior image is examined in order to define the symmetry/asymmetry of the swallow and the movement of the lateral pharyngeal walls as they move inward.
Chapter IV
Selecting and Introducing Your Treatment Strategies

A very important part of the radiographic study is introducing treatment strategies to improve the patient’s swallow and evaluating these treatments in terms of their effectiveness for the individual patient. Unfortunately, because we are using x-ray, we cannot evaluate all treatment strategies to see how effective each one is, but we can introduce selected strategies to fit the patient’s anatomic and physiologic swallowing disorders.

There are four possible types of treatment strategies that can be introduced during the radiographic study: 1) posture changes, 2) heightening sensory input prior to this patient’s swallow attempt, 3) voluntary swallowing maneuvers or gestures, and 4) presentation of different food consistencies other than thin liquids. A fifth type of management, exercise programs, may be effective for the patient but cannot be evaluated during the radiographic study because they take time to take effect. Exercise programs may include range of motion exercises, resistance or strengthening exercises, the Shaker exercise, and exercise programs designed to improve coordination of swallow. The first four of these types of management strategies are presented here, as they can be visualized on x-ray.

Postural Strategies. Postural strategies can change the direction of food flow and the relative position of structures in the pharynx. For example, the chin down posture narrows the airway entrance and pushes the tongue base posteriorly, thus improving airway protection and potentially improving tongue base to pharyngeal wall contact (Shanahan et al., 1993; Welch et al., 1993). Table 1 below presents each posture according to the disorder for which it is appropriate.
Table 1. Postural techniques generally most appropriate for each swallow disorder and the physiologic/anatomic effect(s) of the posture on pharyngeal dimensions or bolus flow. Use of postural techniques are generally the first management procedure evaluated during the radiographic swallow study (modified barium swallow) if a patient regularly gets food or liquid into their airway.

<table>
<thead>
<tr>
<th>Disorder observed on Fluoroscopy</th>
<th>Posture Applied</th>
<th>Physiologic/Anatomic Effect of Posture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inefficient oral transit (Reduced posterior propulsion of bolus by tongue)</td>
<td>Chin up</td>
<td>Utilizes gravity to clear oral cavity</td>
</tr>
<tr>
<td>Delay in triggering the pharyngeal swallow (Bolus past ramus of mandible but pharyngeal swallow is not triggered)</td>
<td>Chin down</td>
<td>Widens valleculae to prevent bolus entering airway; and narrows airway entrance</td>
</tr>
<tr>
<td>Reduced tongue base retraction (Residue in valleculae)</td>
<td>Chin down</td>
<td>Pushes tongue base backward toward pharyngeal wall</td>
</tr>
<tr>
<td>Unilateral laryngeal dysfunction (Aspiration during swallow)</td>
<td>Chin down</td>
<td>Places epiglottis in more posterior, protective position</td>
</tr>
<tr>
<td>Reduced laryngeal closure (Aspiration during the swallow)</td>
<td>Head rotated to damaged side and chin down</td>
<td>Increases vocal fold closure by applying extrinsic pressure; narrows laryngeal entrance. Places epiglottis in more protective position.</td>
</tr>
<tr>
<td>Reduced pharyngeal contraction (Residue spread throughout pharynx)</td>
<td>Lying down on one side</td>
<td>Eliminates gravitational effect on pharyngeal residue</td>
</tr>
<tr>
<td>Unilateral pharyngeal paresis (Residue on one side of pharynx)</td>
<td>Head rotated to damaged side</td>
<td>Eliminates damaged side from bolus path</td>
</tr>
<tr>
<td>Cricopharyngeal dysfunction (Residue in pyriform sinuses)</td>
<td>Head rotated</td>
<td>Pulls cricoid cartilage away from posterior pharyngeal wall, reducing resting pressure in cricopharyngeal sphincter</td>
</tr>
</tbody>
</table>

**Heightening sensation prior to swallow.** There are two swallow disorders which appear to relate to sensory abnormalities: 1) delayed onset of the oral motion to initiate the swallow in the mouth, and 2) the delay in triggering the pharyngeal swallow. The oral onset
may be facilitated by presenting the bolus with greater pressure of the spoon to the tongue or by presenting a bolus with stronger sensation such as a sour, sweet or carbonated bolus (Bülow, Olsson, & Ekberg, 2003; Logemann, 1998; Logemann et al., 1995). In your clinical assessment of the patient at bedside, you may have identified particular flavors that increase your patient’s oral movements and positive reactions to one or more flavors, textures or temperatures. Flavors or carbonation can be introduced in x-ray by mixing them with barium. Initially, the first and second swallow should be neutral, such as plain barium, and of the same volume, to establish a baseline measure of timing of the onset or pharyngeal delay in the swallow. Then the bolus with heightened sensation should be presented to determine if the patient elicits a faster onset of the oral or pharyngeal stages. If the patient has an adverse reaction to any of these tastes or other stimuli, this should be noted. The volume of the neutral swallows and the bolus with greater sensation should be the same volume. Then, boluses can be enlarged to see if the effectiveness continues.

**Voluntary swallow maneuvers or gestures.** Many patients spontaneously attempt to use or make changes in their swallows to compensate for a particular swallow abnormality. Various studies have observed the super-supraglottic swallow or the Mendelsohn maneuver being used spontaneously (Mendell, 2005; Mokhlesi et al., 2002). Table 2 presents the swallow maneuvers or voluntary controls that have been used in swallowing and their effects on swallow physiology. Such voluntary controls are also used by normal subjects, especially in more stressful swallowing situations such as cup drinking. Again, the abnormality for which each voluntary gesture or maneuver is appropriate is also identified.
Table 2. Effects of Swallow Maneuvers That Are Visible During Swallow on X-ray

<table>
<thead>
<tr>
<th>Disorder/ (Symptoms)</th>
<th>Posture</th>
<th>Sensory Stimulation</th>
<th>Most Appropriate Swallow Maneuvers</th>
<th>Exercise Programs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced lip closure (food lost from mouth)</td>
<td>Chin up</td>
<td></td>
<td></td>
<td>Lip resistance exercises</td>
</tr>
<tr>
<td>Reduced oral tongue range of motion (reduced tongue vertical or lateral motion)</td>
<td>Head down, then elevated</td>
<td></td>
<td></td>
<td>Range of motion tongue exercises</td>
</tr>
<tr>
<td>Reduced oral tongue strength (increasing residue as food thickens)</td>
<td>Chin up</td>
<td></td>
<td>Tongue strength; resistance exercises</td>
<td></td>
</tr>
<tr>
<td>Pharyngeal delay (bolus passes trigger point but no pharyngeal swallow)</td>
<td>Chin down</td>
<td>Thermal-tactile stimulation</td>
<td>Supraglottic swallow</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sour, carbonated, cold bolus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduced velopharyngeal closure (nasal regurgitation)</td>
<td>Chin up</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduced laryngeal elevation (residue on top of larynx, visibly reduced elevation)</td>
<td>Lie down</td>
<td></td>
<td>Mendelsohn maneuver</td>
<td></td>
</tr>
<tr>
<td>Unilateral pharyngeal wall disorder (residue on damaged side, in pyriform sinus)</td>
<td>Head rotation to damaged side</td>
<td></td>
<td>Supraglottic swallow</td>
<td></td>
</tr>
<tr>
<td>Bilateral pharyngeal wall disorder (residue equal in both pyriform sinuses, on both walls)</td>
<td>Lie down</td>
<td></td>
<td>Supraglottic swallow (as a compensation)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Tongue holding maneuver (Not used to eat – It is awkward.)</td>
<td></td>
</tr>
</tbody>
</table>

Be sure to examine the combination of posture and swallow maneuvers where feasible.
Table 2 (continued). Effects of Swallow Maneuvers That Are Visible During Swallow on X-ray  

<table>
<thead>
<tr>
<th>Disorder/ (Symptoms)</th>
<th>Posture</th>
<th>Sensory Stimulation</th>
<th>Most Appropriate Swallow Maneuvers</th>
<th>Exercise Programs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral and pharyngeal weakness on the same side (residue in mouth and pharynx on same side)</td>
<td>Lean or tilt to stronger side</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduced airway entrance closure (penetration)</td>
<td>Chin down</td>
<td>Chin down and head turned if damage is asymmetrical</td>
<td>Supraglottic swallow</td>
<td>Effortful breathhold</td>
</tr>
<tr>
<td>Reduced laryngeal closure (aspiration during swallow)</td>
<td>Chin down and head turned if damage is asymmetrical</td>
<td></td>
<td>Supraglottic swallow or Super-supraglottic swallow</td>
<td>Adduction exercises Effortful breathhold</td>
</tr>
<tr>
<td>Reduced tongue base (residue in valleculae)</td>
<td>Chin down</td>
<td></td>
<td>Effortful swallow</td>
<td></td>
</tr>
<tr>
<td>Reduced cricopharyngeal opening (residue in pyriform sinuses, visible reduced width of opening)</td>
<td>Head rotation</td>
<td></td>
<td>Mendelsohn maneuver</td>
<td>Shaker exercise Mendelsohn maneuver</td>
</tr>
</tbody>
</table>

Be sure to examine the combination of posture and swallow maneuvers where feasible.
Again, not all voluntary controls can be utilized during the modified barium swallow study because of the radiographic exposure, but you can select the specific voluntary control you wish the patient to use. Unfortunately, patients who cannot follow direction cannot use voluntary maneuvers. However, there can be exceptions. For example, patients with a delay in triggering the pharyngeal swallow who aspirate on some volumes of thin liquids may actually do better with cup drinking in which they spontaneously use a super-supraglottic swallow airway protection maneuver as they bring the liquid into their mouth. We see this in many normal elderly individuals as a spontaneous compensation, making cup drinking safer than swallowing single boluses of thin liquids. This needs to be evaluated radiographically for each patient.

Within the samples included on the videotape, there are several in which patients have utilized voluntary controls. As Table 2 notes, it is important to examine the effects of combining a posture change with a voluntary maneuver to achieve most successful swallow.

**Changing bolus viscosity.** Bolus viscosity or thickness of the bolus can certainly be increased and introduced if no other therapeutic strategy appears to work effectively for the patient. Generally, we try to avoid thickening boluses such as liquids unless absolutely necessary. There are nectar and honey-thickened bariums produced by E-Z-EM which can be used to test the effects of thickened liquids on swallow function. Realize, however, that thickening boluses makes them more difficult to swallow since greater lingual and pharyngeal pressure is needed to swallow a thicker bolus. If you have questions about this, there is an online course available through Northern Speech Services on selecting bolus viscosities for dysphagic patients. Because many patients dislike the thickening of foods, which affects their compliance with this recommendation, we try not to introduce this strategy unless absolutely necessary. Therefore, it is the last strategy that we consider introducing as treatment in x-ray.
Our goal in the modified barium swallow is to identify the situations in which the patient can take something, at least one food consistency, orally. This is important from a psychological standpoint as well as to maintain more normal swallowing physiology. During the radiographic study, it is our job to identify the conditions under which the patient is able to eat rather than keeping them from eating orally. In a given radiographic study, we may, in fact, try one intervention from each of the four categories: a posture change, heightening sensory input if the disorder falls in the sensory category, a voluntary maneuver if the patient can follow direction and if none of the prior strategies are effective, the thickening of foods, particularly liquids. If a patient exhibits aspiration or excessive residue, it is our responsibility to identify those optimal conditions for the patient. This can be utilized as a quality assurance measure for radiographic studies. Should the report of a radiographic study use the words “excessive residue” or “aspiration,” there should be a statement regarding the effectiveness, or lack thereof, of treatment strategies introduced during the radiographic study or at the very least, a rationale for why such strategies could not be introduced. Obviously, patients with neck bracing are not able to use postural changes and patients with dementia or other language impairments may not be able to follow direction well enough to utilize voluntary controls. Selecting the treatment strategies does require that you read or interpret the radiographic study immediately, understand the patient’s other medical problems, and introduce the strategies that you believe are appropriate.
References:


E-Z-EM, Inc. Global headquarters are located at 1111 Marcus Avenue, Suite LL26, Lake Success, NY 11042. Website: [http://www.ezem.com](http://www.ezem.com)


Chapter V
Selecting Your Recommendations

There are a number of recommendations that usually result from the radiographic study of oropharyngeal swallow or the modified barium swallow. These include recommendation regarding: 1) oral versus non-oral feeding; 2) whether swallowing treatment is appropriate and if so, which treatment strategies are best for the patient’s dysfunction; 3) if oral diet is approved, the nature of the food viscosities to be presented; 4) counseling for family and patient; and 5) follow-up by another professional such as the gastroenterologist or the dietitian. Each of these recommendations will be discussed.

**Oral versus non-oral feeding.** Placing a patient on non-oral feeding is a serious recommendation which can significantly affect their quality of life. Generally, clinicians recommend non-oral feeding when there is unremitting aspiration on all food consistencies without positive effect of any therapy procedure. However, there are no firm guidelines regarding this recommendation. I have observed clinicians who place a patient on non-oral feeding when aspiration occurs on only one food type or there is penetration. In neither case would I recommend non-oral feeding. If we can identify a diet on which the patient can swallow effectively with no aspiration, then I will recommend that the patient take that food consistency or those food consistencies orally. Patients can take other consistencies that are unsafe through non-oral means. The use of oral and non-oral feeding are, in fact, a continuum, and it is our job to identify the food types on which the patient can safely maintain oral intake. We must, however, document the need for any particular food consistencies with an instrumental study to be sure that these consistencies are effective in eliminating aspiration or increasing the volume of oral intake.
The question of whether patients should be made non-oral because of penetration is an important one. In general, penetration, during which food enters the airway during swallow but is removed from the airway as the swallow continues, is a question the clinician must decide. I will typically allow patients who penetrate to take oral intake, particularly on those foods on which they do not penetrate. Introduction of a postural change may eliminate penetration, but if penetration is not eliminated, there is a small amount of evidence that the risk is increased that the patient who penetrates only may get pneumonia (Pikus et al., 2003). As we know, the frequency of penetration in normal individuals increases with age, such that if we were to eliminate oral intake on patients with penetration, it may damage quality of life in patients who are older (Daggett et al., in press).

Swallowing Treatment or Not. Swallowing treatment generally involves sensory stimulation, practice of swallow maneuvers, and active exercise such as range of motion exercises and strengthening exercises. In general, treatment requires patient alertness, direction following, and motivation to practice the prescribed procedures. The clinician must evaluate the patient’s situation and determine whether the patient’s condition is appropriate for active therapy. If the clinician believes the patient has strong recovery potential, the clinician may decide active therapy is not needed. A majority of dysphagic patients can benefit from active therapy.

Referrals to other professionals. In many cases, the radiographic study identifies disorders or potential disorders of another type that require another professional’s input. For example, patients who present with disorders in swallow that appear to be related to undiagnosed neurologic disease need to be referred to a neurologist. While speech-language pathologists do not make the diagnosis of neurologic disease, we do often indicate that the patient’s swallow
looks like the swallow of a patient with Parkinson’s disease, motor neuron disease, or other neurologic disease, and we refer the patient to a neurologist or suggest this referral.

Many of our patients need to be seen regularly, and at times intensively, by the dietitian. This recommendation is an important one to assure adequate nutrition and hydration. If any sort of backflow of food is noted, the clinician may need to refer the patient to a gastroenterologist for further assessment or the radiologist may need to conduct a barium swallow in the next few days after the patient has completed the modified barium swallow. This will obviously depend on the patient’s ability to swallow larger volumes of barium without aspirating. After interacting with the patient, a referral to social work or other psychosocial counselors may also be needed. These are simply examples of other referrals that may need to be made. It is not an inclusive list. Other professionals may be involved as well.

All of these recommendations should be included at the end of the report.

Need for reevaluation. Need for any reevaluation should be noted. Patients with progressive neurologic disease may need to be reexamined in 3 to 6 months. For example, depending on their disease progression, the patient who penetrates without aspiration today may aspirate in the next 3 to 12 months. Alerting the patient to let you know if their swallow changes is important to scheduling reevaluation.

References

Chapter VI
Writing the Report

At the end of the videofluoroscopic swallow study or modified barium swallow, a report needs to be written for the patient’s chart or to the patient’s referring physician which describes the patient’s abnormalities in swallow and their symptoms, the effects of interventions attempted, the diet recommendations, the swallowing therapy recommendation, suggested referral(s) to any other professionals, and the time of reevaluation if appropriate.

In general, the report should be short and describe the swallow physiology as much as possible. Remember that most readers are not experts in swallowing. Checklists are usually not as helpful to referring parties such as physicians as are narrative reports that do not use a large amount of professional jargon but that actually describe the patient’s swallow physiology. The information included in this manual for each of the patients whose swallow samples are included on the videotape could serve as the report for that patient.

In the report, it is not necessary to include a description of every individual swallow, but rather to describe the overall pattern of swallow physiology and its abnormalities. Usually the report begins with a brief history and a description of any abnormalities in oral preparation followed by the oral stage, then the triggering of the pharyngeal swallow and the pharyngeal stage. If the swallow is normal, it should be described as normal. Providing observations and measurements such as oral transit time or pharyngeal delay time without the statement of normalcy or abnormality of the swallow is not helpful to those reading the report who are not swallowing experts. The report should also comment on the patient’s sensory awareness of residue (Do they dry swallow spontaneously to clear the residue?) or aspiration (Do they cough to clear the aspirated material?).
The treatment procedures introduced in the modified barium swallow should be described and their effectiveness defined. Usually it is helpful to keep a copy of your report in the patient’s file in your office as well as in the patient’s medical chart in the acute care hospital or nursing home. Usually the report is written at the time of the modified barium swallow in the acute care setting and placed in the patient’s chart or in the computer chart, whichever is available. If the patient is an outpatient, the report may be written within the next 24 hours but should be made available to the patient’s physician within that period of time. Often a phone call to the physician is also a good form of communication to educate them about the results of the patient’s swallow study or answer any of their questions.
Chapter VII

Counseling the Patient and Significant Others

A part of the modified barium swallow should be to educate the patient and their family and significant others regarding the nature of the patient’s swallowing function, the types of treatment to be given, and any follow-up recommendations. This counseling may involve showing these individuals the radiographic study to illustrate the types of problems the patient is experiencing. Describing the appropriate diet for the patient and the rationale for that diet in terms of aspiration or inefficient swallowing is critical. Without this kind of information, the patient or family may “sneak” food, thinking that they are helping the patient to “get well.” There are many “old wives’ tales” about feeding patients who are ill and helping them recover, so it is understandable why family members or patients themselves may sneak food. Also, food and eating is a pleasurable function and patients may frequently miss their favorite foods. Emphasizing the risk of getting pneumonia or other illness if the wrong food consistencies are eaten is important in helping the patient and family to accept the restrictions that may come after the radiographic study. Often counseling must be repeated frequently including the statement that as soon as the patient’s swallowing improves, oral intake will be expanded. If the patient needs non-oral feeding for a period of time, the patient and significant others should be counseled that the non-oral feeding is temporary and can always be removed when the patient’s swallow improves. Most patients and families are not well informed about non-oral feeding and need education.
Chapter VIII

Subjects Who Comprise the Radiographic Studies In This eCourse

There are 25 samples of radiographic studies included in the videos accompanying this Manual. In this section of the manual, there is one page for each subject. You should note the structural and physiologic abnormalities you observe on the first page. Then go to the next page to see the disorders you should have noted, which are in bold in the report. If you missed some disorders, go back and review the patient’s videofluorographic study. When you have made your notes regarding the types of disorders you see on the video for the patient, you can then write a report summarizing these, if you’d like. In this way, you can write your own report and compare your observations in your draft report with the correct observations in the report on the next page of each study.

The eCourse videos are meant to display a number of different oropharyngeal swallow disorders and to give you the opportunity to practice reading videofluoroscopic studies. I hope that you will enjoy viewing these videos and practicing report writing.

Jeri Logemann, Ph.D., CCC-SLP, BRS-S
**Patient # 1**

Use this space to make your notes about the symptoms and structural abnormalities and/or swallowing disorders that you see on this patient’s videofluoroscopic study. Also note anything else the patient might do that you feel is unusual. Also make your recommendations in the space below. Then compare your notes with the description of the patient’s swallow on the next page.

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**Recommendations:**

Swallowing Therapy (Yes, No, Type):

Feeding (Oral, non-oral, or restrictions):

Further evaluation:
Modified Barium Swallow Report: Patient #1

On swallows of 1 ml liquid, oral tongue function was adequate for manipulation and propulsion of the bolus from the oral cavity. This 60-year-old patient with a diagnosis of brainstem stroke has a nasogastric tube in place. The patient is leaning backward against the back of a gurney. These are 1 ml liquid swallows. Oral transit times are normal. There were multiple attempts at triggering the pharyngeal swallow; however, a normal pharyngeal response with tongue base contact to the pharyngeal wall, airway closure, and opening of the upper esophageal sphincter (UES) was not observed. Attempts with head turn (to either side) or sustained laryngeal elevation (Mendelsohn maneuver) were not successful in opening the UES. Some laryngeal elevation on swallow attempts was noted, but it was very reduced. Patient aspirated small amounts of the liquid during this study. A weak cough was elicited in response.

Summary: Severe pharyngeal dysphagia with absent pharyngeal swallow. Aspiration noted. Recommend non-oral feeding. These results were explained briefly to patient after the test. Suggest re-evaluation following several weeks of intensive swallowing therapy including thermal-tactile stimulation.
Patient # 2

Use this space to make your notes about the symptoms and structural abnormalities and/or swallowing disorders that you see on this patient’s videofluoroscopic study. Also note anything else the patient might do that you feel is unusual. Also make your recommendations in the space below. Then compare your notes with the description of the patient’s swallow on the next page.

Recommendations:

Swallowing Therapy (Yes, No, Type):

Feeding (Oral, non-oral, or restrictions):

Further evaluation:
Modified Barium Swallow Report: Patient #2

This 62-year-old patient with a diagnosis of Parkinson’s Disease exhibits two swallows of pudding followed by two swallows of masticated material (cookie). On all swallows, oral transit time is slightly slowed (2-3 seconds). Other than slow tongue movement, there is no specific tongue abnormality. This patient does not regularly exhibit the typical tongue pumping seen in many patients with Parkinson’s disease. The pharyngeal swallow regularly triggers 2 to 3 seconds late, with bolus reaching the valleculae prior to triggering of the pharyngeal swallow. When the pharyngeal swallow triggers, there is reduced tongue base movement of a mild amount, resulting in mild residue in the valleculae after the swallow. The pudding swallows were characterized by slowed oral tongue movement (2 seconds) followed by delayed trigger of the pharyngeal swallow. When the pharyngeal swallow triggered, there was mild residue in the valleculae after the swallow. On swallows of consecutive boluses of thin liquid from a cup, the airway remained closed throughout the consecutive swallows, a normal variant of cup drinking.

Feeding Recommendation: Full oral intake.

Patient #3

Use this space to make your notes about the symptoms and structural abnormalities and/or swallowing disorders that you see on this patient’s videofluoroscopic study. Also note anything else the patient might do that you feel is unusual. Also make your recommendations in the space below. Then compare your notes with the description of the patient’s swallow on the next page.

Recommendations:

Swallowing Therapy (Yes, No, Type):

Feeding (Oral, non-oral, or restrictions):

Further evaluation:
Modified Barium Swallow Report: Patient #3

This 58-year-old patient reportedly has been unable to eat by mouth since a stroke in November, 2001. He received all nutrition by PEG tube but sometimes “tries food and liquid.” He reported pneumonia in December 2002 with a collapsed lung. On swallows of thin liquids, oral transit times were slowed (3 seconds) with a delay in triggering the pharyngeal swallow. During the delay, the bolus fell to the pyriform sinuses and on the first swallow attempt after struggling, the patient brought the liquid back into his mouth from the pyriform sinus and attempted to reswallow it. This is followed by several swallow attempts which are unsuccessful when the patient brings material back into his mouth. In doing this, he protects his airway. Then, he produces several swallows that are quite weak but do result in very small amounts entering his esophagus. After each of these swallow attempts, the patient brings the residual back to his mouth again. These repeated swallow attempts result in small opening of the upper esophageal sphincter but reduced laryngeal upward-forward motion and reduced tongue base posterior motion. There appears to be very little pressure exerted on the bolus. The patient is capable of protecting his airway during most of this, though as the residue builds, there is some leakage into the airway in very small amounts. The voluntary maneuver of bringing food back to the mouth from the pharynx is a safety procedure for the patient but is also one that interferes with the productive swallow.

No consistent cough occurred with aspiration. A head turn posture (in either direction) did not significantly change the pharyngeal function or eliminate aspiration after the swallow.

Summary: Severe pharyngeal dysphagia with reduced tongue base retraction and laryngeal elevation resulting in inefficiency and aspiration.

Recommendations: 1) non-oral feeding for nutrition/NPO; 2) exercises to improve pharyngeal trigger, laryngeal elevation and tongue base retraction.
Patient #4

Use this space to make your notes about the symptoms and structural abnormalities and/or swallowing disorders that you see on this patient’s videofluoroscopic study. Also note anything else the patient might do that you feel is unusual. Also make your recommendations in the space below. Then compare your notes with the description of the patient’s swallow on the next page.

Recommendations:

Swallowing Therapy (Yes, No, Type):

Feeding (Oral, non-oral, or restrictions):

Further evaluation:
Modified Barium Swallow Report: Patient #4

Patient #4 has undergone an oral composite resection involving removal of over half of the mandible with reconstruction with metal. The oral tongue has been partially removed (approximately 50%). There are many small volume swallows exhibited here on thin liquids. Oral tongue movement is moderately reduced with significant difficulty moving food from the front to the back of the mouth and pharynx. There is a mild delay (under 5 seconds) in triggering the pharyngeal swallow. During the delay, the bolus tends to drip to the pyriform sinuses. During this time, the patient has the airway closed so that there is no aspiration. When the pharyngeal swallow triggers, the pharynx empties moderately well with moderate residue remaining in the valleculae and pyriform sinus, indicating reduced tongue base movement and reduced laryngeal elevation. In most cases, the patient is doing a super-supraglottic swallow, holding his breath tightly so that when the x-ray begins, the bolus has fallen to the pyriform sinus but the airway is well protected. The residue tends to be greatest in the pyriform sinuses.

This patient is ready to begin some oral intake on thin and thicker liquids with the limitation being his oral tongue movement for propulsion of the bolus.

Summary: Mild to moderate pharyngeal dysphagia, though fairly functional swallow for liquids only, with use of airway protection (super-supraglottic swallow). Severe oral dysphagia.

Liquid Consistency: Thin liquid only.

Other Feeding Recommendations: Use of super-supraglottic swallow sequence for all liquids.

Other Recommendations: Consider referral to Dental Center for palatal reshaping prosthesis.
Patient #5

Use this space to make your notes about the symptoms and structural abnormalities and/or swallowing disorders that you see on this patient’s videofluoroscopic study. Also note anything else the patient might do that you feel is unusual. Also make your recommendations in the space below. Then compare your notes with the description of the patient’s swallow on the next page.

Recommendations:

Swallowing Therapy (Yes, No, Type):

Feeding (Oral, non-oral, or restrictions):

Further evaluation:
Modified Barium Swallow Report: Patient #5

Patient #5 has undergone an anterior cervical fusion involving the 4th to 7th cervical vertebra in September 2004 for degenerative disc disease and has had a swallowing problem since that time. He has developed a postoperative voice problem. He has a gastrostomy and is not taking solid food orally. He reported vomiting several times today and at other points recently. He saw a gastroenterologist for his GI difficulty. Two weeks ago, he suffered a stroke which apparently did not change or affect his swallowing. However, he does have an expressive language problem including memory and word finding. He reported receiving some therapy for his word finding problem and for his voice. His voice is currently moderately severely hoarse. The patient was not sure whether he had received any swallowing therapy. He is taking small amounts of liquid and soft foods orally but taking most of his nutrition through a gastrostomy.

During swallows of 1 ml, 3 ml, 5 ml, 10 ml, and cup drinking of thin liquids, pudding, and masticated material (cookie), the patient exhibited reduced hyolaryngeal elevation, resulting in poor upper esophageal sphincter opening and residue in the pyriform sinuses. There was aspiration of this residue after the swallow of 3 ml of thin liquid with no cough elicited. When the patient’s head was gently turned partially to his left, which he was able to do despite his fusion, he achieved a much improved swallow with minimal residue. This swallow improvement with head rotation continued on all liquid bolus volumes, pudding, and cookie.

Recommendations: It is recommended that the patient eat with his head turned to the left on all food viscosities and attempt to increase oral feeding. Solid foods such as vegetables and meat can be eaten if they are pre-chopped somewhat (not blended). Chopping the meat will break up any tough fibers without losing the consistency of meat. According to the patient’s gastroenterologist, the patient should try to eat more solid food to facilitate improvement in his GI function. It was also recommended that the patient receive language therapy for his language problem post-stroke. The patient’s swallow function should be reevaluated in 1 month.
Patient #6

Use this space to make your notes about the symptoms and structural abnormalities and/or swallowing disorders that you see on this patient’s videofluoroscopic study. Also note anything else the patient might do that you feel is unusual. Also make your recommendations in the space below. Then compare your notes with the description of the patient’s swallow on the next page.

Recommendations:

Swallowing Therapy (Yes, No, Type):

Feeding (Oral, non-oral, or restrictions):

Further evaluation:
Modified Barium Swallow Report: Patient #6

This patient, a 59-year-old male with left true vocal fold cancerous tumor treated with chemoradiation, was evaluated at 3 months post-chemoradiation with 1 and 3 ml of thin liquids. Patient #6 exhibits some **cervical osteophytes on the inferior anterior corners of each vertebral body**. The osteophytes point downward, not anteriorly, which is an unusual position.

**Oral tongue function was grossly adequate** for manipulation and propulsion of the bolus. The **pharyngeal swallow triggered on time**. During the pharyngeal stage of swallow, minimal material entered the cervical esophagus below C6 (likely due to an **esophageal stricture**). The majority of the bolus entered the laryngeal vestibule, but was coughed out and expectorated. Further trials or consistencies were not attempted at this time. The patient exhibits reduced tongue base motion which results in residue in the valleculae. The patient also exhibits on the third and fourth swallows a discoordinated swallow with some material entering the airway. The patient also uses the same **voluntary maneuver** to squeeze material back into the oral cavity that was exhibited on Patient #2. This maneuver is protective and generally is self-learned as the patient struggles to swallow with severe difficulty. Aspiration in this case resulted from the discoordination in the swallow and material getting into the airway prior to its closure during the swallow.

**Summary:** Moderate pharyngeal dysphagia and severe esophageal dysphagia.

**Nutritional Intake:** NPO.

**Recommendations:** To see GI next week. Continue swallow therapy per protocol.
Patient #7

Use this space to make your notes about the symptoms and structural abnormalities and/or swallowing disorders that you see on this patient’s videofluoroscopic study. Also note anything else the patient might do that you feel is unusual. Also make your recommendations in the space below. Then compare your notes with the description of the patient’s swallow on the next page.

**Recommendations:**

Swallowing Therapy (Yes, No, Type):

Feeding (Oral, non-oral, or restrictions):

Further evaluation:
Modified Barium Swallow Report: Patient #7

Patient #7 is a 49-year-old male admitted following a 12 foot fall; diagnosis of herniated nucleus pulposis. Anterior cervical disectomy with fusion performed. Patient was extubated this morning. Complains of difficulty swallowing. Physicians insist on a modified barium swallow. Patient #7 exhibits an anterior cervical fusion. In this case, the fusion extends from C3 to C5. This patient also has a nasogastric tube in place. Oral tongue function was adequate for manipulation and propulsion of the bolus. The pharyngeal swallow triggered on time. On the first swallow attempt, 1 ml thin liquid, the patient exhibits no airway closure, with parts of the bolus entering the airway directly as the pharyngeal swallow triggers. This was a thin liquid swallow. The second swallow exhibited some penetration of a very tiny amount but no aspiration. The third swallow resulted in greater residue in the valleculae, indicating reduced tongue base retraction. There is aspiration of residue after the swallow on later swallows in the series. Again, the residue is related to reduced tongue base retraction, as indicated by the location of the residue which is in the valleculae. Laryngeal elevation is also severely reduced, which is typical of patients who have had an anterior cervical fusion. The patient is aware of the residue and generally repeatedly swallows with residue. The greater the residue, the more repeat swallow attempts. There is a mild amount of residue clinging to the nasogastric tube but the nasogastric tube is not the major source of the swallow problem. As food increases in thickness, there is increased residue in the valleculae as would be expected when there is a reduction in tongue base motion. The thicker the food, the greater the pressure needed to clear it efficiently from the valleculae. There is a tendency for premature spillage during masticated boluses. This is normal during chewing. The bolus often comes into the pharynx bit by bit during chewing. This is the normal part of the swallow. There is a mild delay in triggering the pharyngeal swallow on the masticated boluses. There is also residue remaining in the valleculae after the masticated swallows, which was seen on other types of swallows as well for this patient.

Summary: Moderate pharyngeal dysphagia with aspiration of thin liquids.

Food Consistency: Dysphagia pureed.

Liquid Consistency: Nectar thick liquids.

Diet Recommendations: Primary nutrition with nectar-thick liquids with thin pureed foods as supplement. Please crush meds in applesauce.

Other Recommendations: Initiate swallow therapy for base of tongue retraction, laryngeal elevation, airway closure.
Patient #8

Use this space to make your notes about the symptoms and structural abnormalities and/or swallowing disorders that you see on this patient’s videofluoroscopic study. Also note anything else the patient might do that you feel is unusual. Also make your recommendations in the space below. Then compare your notes with the description of the patient’s swallow on the next page.

Recommendations:

Swallowing Therapy (Yes, No, Type):

Feeding (Oral, non-oral, or restrictions):

Further evaluation:
Modified Barium Swallow Report: Patient #8

Patient #8 is a 29-year-old man with probable occulopharyngeal muscular dystrophy. The patient complained of swallowing problems for 3 years and coughing with eating. He eats a normal diet. Swallows of 3 ml, 5 ml, 10 ml, cup drinking of thin liquids, 3 ml of pudding and ¼ cookie are within normal limits. **Oral and pharyngeal transit times are within normal limits.** There is **no oral or pharyngeal residue.** **No aspiration** is noted.

The patient is initially swallowing thin liquids and exhibits a variable pharyngeal delay. **Oral transit times are normal with no motility problems.** Even on pudding boluses, there is a slight pharyngeal delay. **This pharyngeal delay, however, is within normal limits and no aspiration or penetration is seen.** There is a slightly longer delay on swallows of pudding and masticated materials but again, the delay is within normal limits. **When the pharyngeal swallow triggers, the pharynx empties well.** There is no residue and no aspiration or penetration on any swallows. This is essentially a normal swallow.

**Summary:** Functional oropharyngeal swallow.

**Recommendation:** Normal general diet.
Patient #9

Use this space to make your notes about the symptoms and structural abnormalities and/or swallowing disorders that you see on this patient’s videofluoroscopic study. Also note anything else the patient might do that you feel is unusual. Also make your recommendations in the space below. Then compare your notes with the description of the patient’s swallow on the next page.

Recommendations:

Swallowing Therapy (Yes, No, Type):

Feeding (Oral, non-oral, or restrictions):

Further evaluation:
Modified Barium Swallow Report: Patient #9

Patient is an 87-year-old man with a history of a series of strokes. The last one was less than 2 years ago. He has been on a general diet with honey-thick liquids. The patient’s caregiver gives him thermal-tactile stimulation 6 times per day. His caregiver reports coughing with oral intake.

At the opening of the first visible swallow, the patient’s trachea is already soiled with barium, indicating that a previous swallow resulted in aspiration. The patient exhibits normal oral transit times with no motility problems. The pharyngeal swallow triggers late, allowing some material to enter the airway on some swallows. This occurs on liquid swallows. The patient uses chin down posture at times but not consistently so, despite repeated instruction to do so. When the pharyngeal swallow triggers, there is mild residue in the valleculae, indicated reduced tongue base motion, and a smaller amount in the pyriform sinuses, indicating reduced laryngeal elevation. There is penetration on many swallows because of the reduced laryngeal elevation. There are osteophytes on the 3rd, 4th, and 5th vertebra at the anterior inferior corners. These appear to have only minimal effect on the swallow. The residue in the valleculae is variably dry swallowed on a second or third swallow attempt. Deep penetration occurred on a pudding swallow followed by aspiration on another pudding swallow. With successive swallows, there was increasing residue in the pyriform sinuses. There was no cough in response to any aspiration. The pharyngeal delay on the pudding swallows resulted in the bolus moving further into the pharynx before the pharyngeal swallow triggered. On those boluses where the material had progressed further inferiorly into the pharynx before the pharyngeal swallow triggered, the penetration and aspiration occurred.

Summary: Moderate pharyngeal dysphagia with continued aspiration of thin and nectar-thick liquids.

Recommendations: Honey-thick liquids via spoon. Initiate swallow therapy for base of tongue retraction and laryngeal elevation. Staff monitoring of posture is needed because of the patient’s inconsistency.
Patient #10

Use this space to make your notes about the symptoms and structural abnormalities and/or swallowing disorders that you see on this patient’s videofluoroscopic study. Also note anything else the patient might do that you feel is unusual. Also make your recommendations in the space below. Then compare your notes with the description of the patient’s swallow on the next page.

**Recommendations:**

Swallowing Therapy (Yes, No, Type):

Feeding (Oral, non-oral, or restrictions):

Further evaluation:
Modified Barium Swallow Report: Patient #10

Patient is a 49-year-old man living in China diagnosed with cancer of the base of tongue. Currently, he is post surgery, chemotherapy, and radiation. He has undergone a head and neck surgical resection involving the anterior mandible and the anterior tongue. Approximately one-third of the oral tongue has been resected. The patient’s anterior mandible has been reconstructed with metal. This patient exhibits a second delay in triggering the pharyngeal swallow with bolus landing in the pyriform sinus during the delay and then spilling over the arytenoid cartilage and down the posterior wall of the trachea. There were several coughing responses after the aspiration. When the pharyngeal swallow triggers, the base of tongue does not move posteriorly adequately, resulting in residue remaining in the valleculae. Laryngeal elevation is also affected, resulting in residue in the pyriform sinuses. This patient is highly sensitive to his aspiration and repeatedly coughs in attempt to clear it. Despite repeated dry swallow attempts after each food swallow, there is residue in the valleculae which frequently falls toward the airway. A brief anteroposterior view reveals an essential symmetry between the residue on the two sides of the pharynx.

On 1 ml thin liquid, 1 ml nectar, 1 ml honey, and 1 ml pudding consistencies, oral tongue function was mildly reduced for manipulation and propulsion of the bolus. Narrowing noted in the upper cervical esophagus, a probable cervical esophageal stricture. Summary: Overall weak pharyngeal swallow response with aspiration of all consistencies. Possible esophageal component to dysphagia as well.

Feeding Recommendations: Counseled regarding results of test and risk of aspiration. For now, will continue oral intake as before. Will discuss further with surgeon. Also recommended evaluation of esophagus and dilation if indicated.

Other Recommendations: Initiate swallow therapy focused on base of tongue retraction, laryngeal elevation, airway closure. Consider referral to gastroenterologist.
Patient #11

Use this space to make your notes about the symptoms and structural abnormalities and/or swallowing disorders that you see on this patient’s videofluoroscopic study. Also note anything else the patient might do that you feel is unusual. Also make your recommendations in the space below. Then compare your notes with the description of the patient’s swallow on the next page.

Recommendations:

Swallowing Therapy (Yes, No, Type):

Feeding (Oral, non-oral, or restrictions):

Further evaluation:
Modified Barium Swallow Report: Patient #11

Patient #11 is a 70-year-old female with right oral tongue squamous cell carcinoma who has undergone right hemiglossectomy and right supraomohyoid neck dissection and a free flap resection. She has completed a course of postoperative chemoradiation. She uses a PEG for nutrition but drinks water and tries baby food. Muscositis is improving.

This patient exhibits normal oral transit times with no motility problems. Mastication is slightly slowed but generally within normal limits. The pharyngeal swallow triggers slightly late (1 second), especially on swallows of thicker foods. During the x-ray study, she is given 1 to 10 ml of thin liquids. When the pharyngeal swallow triggers, there is mild to moderate residue in the valleculae because of reduced base of tongue motion. After approximately 6 or 7 swallows, the patient coughs and clears material that has penetrated after each swallow and entered the airway to the point of the true vocal folds. This is a good example of a patient who does not cough after every swallow but instead coughs after a group of swallows. Either of these strategies can be effective in clearing material from the airway. Airway entrance closure was mildly reduced, resulting in penetration of thin liquids only. As the bolus becomes thicker, there is greater residue in the valleculae, which is typical when a difficulty with generating adequate pressure, especially at the tongue base, occurs. The patient typically dry swallows when there is residue in the valleculae, indicating good sensation of the material remaining after the swallow (residue).

Summary: Mild to moderate pharyngeal dysphagia with occasional liquid aspiration and mildly reduced efficiency of swallow.

Diet Recommendations: Mechanical soft diet.

Other Recommendations:
1. Use of small sips for liquids with caution, multiple swallows.
2. Increase intake of soft solids, using small liquid wash.
3. Initiate swallow therapy to improve base of tongue retraction and airway closure.
Patient #12

Use this space to make your notes about the symptoms and structural abnormalities and/or swallowing disorders that you see on this patient’s videofluoroscopic study. Also note anything else the patient might do that you feel is unusual. Also make your recommendations in the space below. Then compare your notes with the description of the patient’s swallow on the next page.

Recommendations:

Swallowing Therapy (Yes, No, Type):

Feeding (Oral, non-oral, or restrictions):

Further evaluation:
Modified Barium Swallow Report: Patient #12

Patient is a 27-year-old man with history of craniofacial disorder (deviated septum, open bite, hearing loss). He reported choking on food and spitting up saliva. He believes his swallow problems are slightly worse recently. There is normal oral transit time with no motility problems. The pharyngeal swallow occasionally triggers slightly late. The residue in the pyriform sinus might be unilateral. Therefore, the patient’s head is rotated and swallows are observed with head rotation. These rotated swallows result in much better clearance of the bolus, reinforcing the fact that this residue in the pyriform sinus is unilateral. As in the prior patient #11, the residue in patient #12 increases as bolus viscosity increases. In contrast to patient #11, patient #12 exhibits greatest residue in the pyriform sinuses. Again, this is typical of a problem in generating adequate pharyngeal pressure. During chewing, the patient tends to munch with a more vertical pattern rather than a rotary tongue pattern of chewing. There is no aspiration and no penetration during these swallows. Head rotation might be used to facilitate better clearance of the bolus into the esophagus with less pharyngeal residue in the pyriform sinuses. However, since the patient is not aspirating, there is no absolute necessity to use head rotation unless it enables the patient to take even more food orally. This was the case with this patient.

Recommendations: Initiate swallow therapy to improve base of tongue retraction and laryngeal elevation.

Diet: Recommend general diet; no restrictions noted.
Patient #13

Use this space to make your notes about the symptoms and structural abnormalities and/or swallowing disorders that you see on this patient’s videofluoroscopic study. Also note anything else the patient might do that you feel is unusual. Also make your recommendations in the space below. Then compare your notes with the description of the patient’s swallow on the next page.

Recommendations:

Swallowing Therapy (Yes, No, Type):

Feeding (Oral, non-oral, or restrictions):

Further evaluation:
Modified Barium Swallow Report: Patient #13

Patient #13 is a 75-year-old woman who is swallowing various volumes of thin liquids. She has odonaphagia, post-polio syndrome and tremor, and complains of recent choking on meat. She is reportedly fearful of choking but eats a regular diet. Medications include neurontin, fosomax, nexium (but no formal diagnosis of GERD).

On several swallows there is prolonged laryngeal elevation at the end of swallow, much like a Mendelsohn maneuver. When each swallow is completed, whether or not laryngeal elevation is prolonged, there is very mild residue coating the valleculae and the posterior side of the epiglottis. This is normal for this person’s age. There are no swallow abnormalities. The prolonged elevation at the end of the swallow is seen in some normal subjects, partially in women over age 60. In this patient’s case, the prolonged laryngeal elevation may represent her fear of swallowing.

Recommendation: Continue general diet. Recommend that patient see a gastroenterologist for possible GERD.
Use this space to make your notes about the symptoms and structural abnormalities and/or swallowing disorders that you see on this patient’s videofluoroscopic study. Also note anything else the patient might do that you feel is unusual. Also make your recommendations in the space below. Then compare your notes with the description of the patient’s swallow on the next page.

**Recommendations:**

- **Swallowing Therapy (Yes, No, Type):**

- **Feeding (Oral, non-oral, or restrictions):**

- **Further evaluation:**
Modified Barium Swallow Report:  Patient #14

This patient is a 50-year-old male admitted with exacerbation of congestive heart failure. Sustained cardiac arrest, respiratory arrest, pulmonary embolism, and acute renal failure. He was transferred to Medical Intensive Care Unit and intubated. Failed extubation twice, he was trached on a week later. He was on a ventilator for swallow test, requiring cuff inflation.

There is also a nasogastric tube in place. Oral transit times are normal with no motility problems. Oral tongue movement is normal. On the 1 ml liquid swallows, there was a 3-second delay in triggering the pharyngeal swallow. During that delay, the bolus dropped to the pyriform sinuses. On the third swallow (3 ml), there was penetration as the pharyngeal swallow triggered. The larynx elevated and the pyriform sinuses shortened, thus dumping material into the airway. There was no cough in response to that aspiration. A very tiny amount of the liquid remains in the airway entrance, just above the true vocal folds. When the pharyngeal swallow triggered, there was good emptying of the pharynx with minimal residue. On the swallow of 5 ml, there was some premature spillage of the liquid bolus into the pyriform sinus before the oral stage was initiated. When the oral stage was initiated and the pharyngeal swallow triggered, the pharynx emptied well. There was minimal residue on the back of the tongue and a very tiny amount of residue in the pyriform sinuses, both of which are within normal limits. This swallow pattern, repeated on subsequent liquid swallows, was characterized by a slight delay in triggering the pharyngeal swallow followed by generally good pharyngeal emptying and slight penetration into the airway entrance. On almost all swallows, there was some premature spillage before the oral swallow was initiated because of mildly reduced tongue control. On larger volume swallows (10 ml), the bolus cleared the upper esophageal sphincter and then a small amount was returned to the pyriform sinuses. There was also mild residue coating the oral tongue and hard and soft palates after the swallow. On pudding boluses, there was mild oral residue which created the need for a follow-up “dry” swallow, meaning no new material was introduced but the remaining bolus was swallowed. The “dry swallow” indicates that the patient was aware of the oral residue. This occurs because greater muscle effort is needed to swallow more viscous boluses. There was no coughing seen in response to any penetration which is normal (Daggett et al., in press).


Recommendations: Patient start swallow therapy (thermal-tactile stimulation) to improve pharyngeal trigger. Also consider referral to gastroenterologist because of esophageal to pharyngeal backflow.
Patient #15

Use this space to make your notes about the symptoms and structural abnormalities and/or swallowing disorders that you see on this patient’s videofluoroscopic study. Also note anything else the patient might do that you feel is unusual. Also make your recommendations in the space below. Then compare your notes with the description of the patient’s swallow on the next page.

**Recommendations:**

Swallowing Therapy (Yes, No, Type):

Feeding (Oral, non-oral, or restrictions):

Further evaluation:
Modified Barium Swallow Report: Patient #15

Patient #15 is a 67-year-old female with a diagnosis of laryngeal carcinoma post supraglottic laryngectomy, modified radical neck dissection, and trach 10/5/04. Now decannulated, she has been receiving swallow therapy to improve airway entrance closure. She was treated for pneumonia several weeks ago. She is eating soft foods and liquids with head turned right. She is using a PEG tube for supplemental nutrition. The patient has a history of hypertension, Crohn’s disease, insulin-dependent diabetes mellitus, breast cancer with right mastectomy, GERD, iatrogenic cirrhosis, chronic respiratory insufficiency, bowel resection, and parathyroidism.

The first swallow of 1 ml liquid results in normal oral and pharyngeal transit times for the majority of the bolus. However, about one-third of the bolus remains in the valleculae and the airway entrance. Laryngeal elevation is poor, which enables the bolus to enter the airway entrance. The residue left in the airway entrance enters the airway after the swallow to the vocal folds and a very small amount below the vocal folds. Then, a cough is triggered that effectively clears that material. Head rotation was then attempted to improve airway protection. The head was rotated to the right side. A 1 ml swallow with the head rotated reveals less material entering the airway entrance but still a very tiny amount penetrating through the true vocal folds. There is also a slight delay in triggering the pharyngeal swallow. A dry swallow clearing some oral residue results in the same pattern of penetration into the airway entrance to true vocal folds. On the next swallows, there is a breathhold (super-supraglottic swallow) attempted which does result in much less penetration. Note that the airway entrance closes early on those swallows where breathhold is attempted.

The 5 ml swallow beginning at 00035281 is an excellent example of early effortful breathhold (super-supraglottic swallow) which prevents material from entering the airway entrance. This swallow is followed by a cough. This is the usual sequence for a super-supraglottic swallow, which closes the airway entrance before and during the swallow with a cough at the end to clear any material that may be resting near the airway entrance after the swallow. At the end of this swallow, there is a very slight coating on the anterior wall of the trachea, which was there before the swallow but is more noticeable at the end of the swallow. The next swallow exhibits the same super-supraglottic swallow, beginning with the effortful breathhold before the actual oral stage of the swallow begins. This swallow also ends with a cough. A bit of residue left in the pharynx from this swallow penetrates the laryngeal entrance and remains on the surface of the true vocal folds. It is particularly visible at the beginning of the next swallow. The last swallow is a good example of how, when the breath is held, it consolidates whatever residue is present and the residue left from the prior swallow becomes more visible.

Summary: Moderate pharyngeal dysphagia. Aspiration of thin liquids and foods without compensations. Super-supraglottic swallow eliminated aspiration with thin liquids. Head rotation right was effective to eliminate aspiration of foods.

Food Consistency: Dysphagia mechanical soft diet.

Liquid Consistency: No liquid restriction noted when super-supraglottic swallow used.

Other Feeding Recommendations: Must use breathholding maneuver with liquids and head turn right with foods. Advance to general diet with compensations as tolerated.

Other Recommendations: Continue swallow therapy to improve laryngeal elevation, tongue base retraction, and airway closure.

Recommendations: Continue swallowing therapy. If patient can maintain caloric intake and hydration by mouth, recommend PEG tube removal.
Patient #16

Use this space to make your notes about the symptoms and structural abnormalities and/or swallowing disorders that you see on this patient’s videofluoroscopic study. Also note anything else the patient might do that you feel is unusual. Also make your recommendations in the space below. Then compare your notes with the description of the patient’s swallow on the next page.

Recommendations:

Swallowing Therapy (Yes, No, Type):

Feeding (Oral, non-oral, or restrictions):

Further evaluation:
Modified Barium Swallow Report: Patient #16

Patient #16 is a 24-year-old male with no medical diagnosis. The patient is currently on a general diet and reported no problems with his swallowing.

The lateral view reveals the bolus in the oral cavity waiting to initiate the swallow. After the first 1 ml swallow, there is very slight residue in the pyriform sinuses which is within normal limits. The oral stage of swallow is normal in its timing and oral tongue movement. The pharyngeal swallow triggers well. When the pharyngeal swallow triggers, the pharynx empties well except for a very small amount of residue in the pyriform sinuses, which is within normal limits. All of the remaining liquid swallows, including 1 ml, 3 ml, and 5 ml as well as 10 ml, are normal with no motility problems. The same very small amount of residue remains in the pyriform sinuses which is again within normal limits.

Normal diet can be maintained orally. No further evaluated is needed.
Patient #17

Use this space to make your notes about the symptoms and structural abnormalities and/or swallowing disorders that you see on this patient’s videofluoroscopic study. Also note anything else the patient might do that you feel is unusual. Also make your recommendations in the space below. Then compare your notes with the description of the patient’s swallow on the next page.

Recommendations:

Swallowing Therapy (Yes, No, Type):

Feeding (Oral, non-oral, or restrictions):

Further evaluation:
Modified Barium Swallow Report: Patient #17

Patient #17 is an 81-year-old female with no medical diagnosis. This patient was seen as part of a study examining the effects of bolus characteristics on swallowing in normal subjects. She is currently taking a general diet and is maintaining her weight. She reported no problems with her swallowing.

This patient is swallowing two 1 ml boluses of thin liquid, two 3 ml boluses, two 5 ml boluses, two 10 ml boluses, two 3 ml pudding boluses, and two cookies coated with barium pudding. In all boluses, oral transit times were normal with no motility problems. There was essentially no residue in the oral cavity after the swallow. Occasionally there was a coating on the oral tongue but this is normal. The pharyngeal swallow routinely triggered well. On swallows of masticated material, there was a tendency for the bolus to hesitate slightly in the valleculae. This is normal on a masticated bolus. When the pharyngeal swallow triggered, the pharynx emptied well with very little residue. There was no aspiration and these swallows are normal for this person’s age and gender.

No swallowing therapy is needed. A normal oral diet should be continued. No further evaluation is needed.
Patient #18

Use this space to make your notes about the symptoms and structural abnormalities and/or swallowing disorders that you see on this patient’s videofluoroscopic study. Also note anything else the patient might do that you feel is unusual. Also make your recommendations in the space below. Then compare your notes with the description of the patient’s swallow on the next page.

Recommendations:

Swallowing Therapy (Yes, No, Type):

Feeding (Oral, non-oral, or restrictions):

Further evaluation:
Modified Barium Swallow Report: Patient #18

The patient, a 55-year-old female, participated in a research project examining the effects of bolus characteristics on swallowing in normal subjects. There is no significant medical history or complaints of swallowing difficulties. This individual is swallowing 1, 3, and 5 ml boluses of thin liquids as well as several swallows of pudding and several swallows of masticated material (cookie). On all swallows, oral transit time is normal with no motility problems. On the boluses requiring mastication, there is a tendency for premature spillage to the valleculae, which is entirely normal when chewing a bolus. The pharyngeal swallow normally does not trigger during mastication until chewing is completed and the oral stage of swallow has been initiated. This patient exhibits typically normal triggering of the pharyngeal swallow followed by good emptying of the pharynx. On several swallows, there is a slight amount of residue on the aryepiglottic fold, but this is minimal and it is within normal limits. No aspiration or penetration was seen.

Recommendations: Continue normal oral diet.
Patient #19

Use this space to make your notes about the symptoms and structural abnormalities and/or swallowing disorders that you see on this patient’s videofluoroscopic study. Also note anything else the patient might do that you feel is unusual. Also make your recommendations in the space below. Then compare your notes with the description of the patient’s swallow on the next page.

Recommendations:

Swallowing Therapy (Yes, No, Type):

Feeding (Oral, non-oral, or restrictions):

Further evaluation:
Modified Barium Swallow Report: Patient #19

Mr. W, age 53, underwent videofluoroscopic examination of his swallowing as part of a research project examining the effects of bolus characteristics on swallowing in normal subjects. There is no significant medical history or complaints of swallowing difficulties. This individual swallows 1, 3, 5, 10 ml volumes of thin liquid, two of each, followed by two gulps of liquid from a cup. Oral transit times are normal for all swallows of thin liquids. There is a very mild coating of material remaining on the oral tongue which is again within normal limits. The pharyngeal swallow triggers well. After the swallow but as boluses get larger, there is slightly more residue in the valleculae until the residue increases on liquid gulps from a cup. It is still a mild amount of residue. On pudding swallows, there is slightly more residue in the valleculae, indicating mildly reduced tongue base retraction. The patient typically dry swallows on larger amounts of residue even when they are mild. This is a normal behavior when there is any residue more than coating in the pharynx and indicates the patient’s sensory awareness of the residue. Laryngeal elevation is normal.

On boluses of masticated materials, there is good oral control of the food, though there is tendency for some premature spillage occasionally to occur prior to the swallow triggering. This is a normal behavior. On boluses of masticated material, the residue in the pyriform sinuses is about the same volume as observed on swallows of pudding consistency. Following the swallows of boluses involving mastication, two small volumes (1 ml) of thin liquid were swallowed. These swallows resulted in clearance of any residue left from the pudding or masticated boluses. On the last 3 to 4 swallows, the greater horns of the hyoid bone projecting posteriorly from the hyoid body are particularly visible. In many radiographic studies, the body of the hyoid is clear but the greater horns that project backward are not easily visible. On this swallow, these were quite clear. No aspiration occurred on any of these swallows.
Use this space to make your notes about the symptoms and structural abnormalities and/or swallowing disorders that you see on this patient’s videofluoroscopic study. Also note anything else the patient might do that you feel is unusual. Also make your recommendations in the space below. Then compare your notes with the description of the patient’s swallow on the next page.

**Recommendations:**

- Swallowing Therapy (Yes, No, Type):

- Feeding (Oral, non-oral, or restrictions):

- Further evaluation:
Modified Barium Swallow Report: Patient #20

This patient, age 46, has a diagnosis of hoarseness and dysphagia over the past 2 weeks and chest pains for the past 2-3 days. He has sustained a 40-50 pound weight loss over the past 2-3 weeks and reported decreased hearing in his right ear. This patient’s initial swallow had good timing with normal oral transit and normal pharyngeal triggering. After the swallow, there is mild residue in the valleculae to which the patient responds by dry swallowing. This is a normal response to residue. This is a sign of the patient’s sensory awareness of the bolus residue. The swallow beginning at frame number 00380009 shows interesting changes as the volume was increased to 3 ml. We see the same normal oral transit clearing the oral cavity as on the 1 ml boluses, normal triggering of the pharyngeal swallow but increased residue in the pyriform sinuses and valleculae after the swallow. Then this material from the pyriform sinuses slides into the airway below the true vocal folds and is aspirated. The patient swallows several more times to clear the residue. There is no cough in response to these very small amounts of aspiration. On the next swallow of 3 ml, the patient continues to prolong breathhold with multiple swallows on one breathhold. The next bolus (5 ml) results in multiple swallows but not on the same breathhold. At the end of that swallow, there is residue on the base of tongue, in the valleculae, and in the airway entrance, including on the aryepiglottic folds. Again, there is no coughing in response to any of the swallows on which there is a very tiny amount of aspiration of the residue after the swallow. Now head rotation is attempted to improve airway entrance closure. When there is a disorder of airway entrance closure, it is often unilateral so that head rotation to what is perceived as the weaker side will often reduce aspiration. This is another 5 ml bolus with head rotation. Residue remains in the pyriform sinuses after the swallow. Each swallow of a bolus is followed by one or two more “dry” swallows. There is frequently very slight trace aspiration at the end of the several swallows on each bolus. Again, however, there is no cough. On the last swallows of 10 ml, the patient is prolonging laryngeal closure and elevation at the end of the swallow, which delays the onset of aspiration, but there is aspiration after the swallow.

Food consistency: Dysphagia mechanical diet

Liquid consistency: Nectar-thickened liquids.

Other feeding recommendations: Encourage use of Mendelsohn maneuver with all oral intake.

Other recommendations: Initiate swallow therapy to strengthen base of tongue retraction and laryngeal elevation. Consider consultation with otolaryngologists for persistent hoarseness of voice.
Patient #21

Use this space to make your notes about the symptoms and structural abnormalities and/or swallowing disorders that you see on this patient’s videofluoroscopic study. Also note anything else the patient might do that you feel is unusual. Also make your recommendations in the space below. Then compare your notes with the description of the patient’s swallow on the next page.

Recommendations:

Swallowing Therapy (Yes, No, Type):

Feeding (Oral, non-oral, or restrictions):

Further evaluation:
Modified Barium Swallow Report: Patient #21

Patient #21 is 49 years of age and has a diagnosis of cortical stroke. This patient exhibits small osteophytes at C4 and 5.

On the first 1 ml swallow, there was normal oral transit time with no motility problems. The pharyngeal swallow triggered late, after the bolus had fallen to the pyriform sinuses. When the pharyngeal swallow triggered, the contents of the pyriform sinus partially dumped into the airway as the larynx lifted, resulting in aspiration of approximately 25% of the bolus. No cough was visible. Chin-down posture was attempted, but the chin-down posture was not executed well. In fact, the chin remained almost horizontal in relation to the neck and the aspiration occurred again during the onset of laryngeal lifting when the pharyngeal swallow finally triggered. Then, a 1 ml nectar-thickened bolus was attempted and oral transit was again normal with no motility problems. The pharyngeal swallow triggered very slightly late but no aspiration occurred. Moving to a 3 ml bolus, the pharyngeal delay again resulted in the bolus reaching the pyriform sinuses and when the pharyngeal swallow triggered, there was emptying of material into the airway as the larynx began to elevate during the pharyngeal swallow.

On swallow #00000000, the patient was instructed to do a breathhold and then to initiate the swallow. When performing a breathhold, the narrowing of the airway entrance should be seen, but this was not visible on this swallow. When the pharyngeal swallow triggered with the patient’s breathhold attempt, there was still aspiration of approximately 15% of the bolus. Swallows of nectar resulted in no aspiration as did swallowings of pudding, though there was a small amount of residue remaining in the valleculae and on the posterior surface of the epiglottis. There was also a very small amount of penetration on several of these swallows. On the swallows requiring chewing, again there was no aspiration. Throughout these swallows, laryngeal elevation was mild to moderately reduced. On the bolus requiring mastication, there was increased residue requiring another dry swallow. The patient again dry swallowed after the masticated boluses to clear residue, indicating good sensory awareness of residue.

Recommendations:

Swallowing therapy: Super-supraglottic swallow, Mendelsohn maneuver, thermal-tactile stimulation

Feeding: Continued nonoral feeding
Patient #22

Use this space to make your notes about the symptoms and structural abnormalities and/or swallowing disorders that you see on this patient’s videofluoroscopic study. Also note anything else the patient might do that you feel is unusual. Also make your recommendations in the space below. Then compare your notes with the description of the patient’s swallow on the next page.

**Recommendations:**

Swallowing Therapy (Yes, No, Type):

Feeding (Oral, non-oral, or restrictions):

Further evaluation:
Modified Barium Swallow Report: Patient #22

Patient #22 is 61 years of age and has undergone a posterior cervical vertebral fusion, from C4 to C7. On the first two 1 ml bolus swallows, oral transit times were normal with no motility problems. The pharyngeal swallow triggered well. When the pharyngeal swallow triggered and the bolus entered the esophagus, a small Zenker’s diverticulum was noted at C6 to C7. The diverticulum captured a small amount of the bolus. The remainder of the bolus moved through the esophagus. With successive liquid boluses, the diverticulum collected a larger amount of material. Despite the fusion, the patient was able to rotate his head somewhat to each side. Swallows with head rotation were attempted in order to define whether one particular posture might close the entrance to the Zenker’s diverticulum and facilitate the swallow of the remaining bolus past the diverticulum. Head rotation to the patient’s left did result in a much smaller amount of material entering the diverticulum, even on thicker food. Swallows following this rotated position with the head in a forward position resulted in much increased material entering the diverticulum. Repeated dry swallows with the head rotated to the left succeeded in milking some of the residue out of the diverticulum, though there was still material left there when the patient finished dry swallowing.
Use this space to make your notes about the symptoms and structural abnormalities and/or swallowing disorders that you see on this patient’s videofluoroscopic study. Also note anything else the patient might do that you feel is unusual. Also make your recommendations in the space below. Then compare your notes with the description of the patient’s swallow on the next page.

**Recommendations:**

Swallowing Therapy (Yes, No, Type):

Feeding (Oral, non-oral, or restrictions):

Further evaluation:
Patient #23 has a diagnosis of carotid pseudo-aneurysm and is 73 years old. During swallows of 1 to 3 ml of thin liquid, **oral transit times were normal** with **no motility problems**. There was **no residue** remaining in the oral cavity. As the bolus moved through the pharynx, the **pharyngeal swallow triggered well**. **Laryngeal lifting in response** to triggering of the pharyngeal swallow was **mildly reduced**. A small amount of **air can be seen in the laryngeal entrance**, indicating the **larynx has not lifted and opened sufficiently**. After these liquid swallows, there was **mild residue coating the valleculae, epiglottis, and residing in the pyriform sinuses**. On these liquid swallows, the **base of tongue does not make complete contact with the posterior pharyngeal wall**, indicating a probable **mild reduction in pressure generation in the pharynx**. Residue in the pharynx increases slightly as volume of the bolus increases. There is **increased penetration into the laryngeal entrance with no coughing**, even though the **material reaches the superior surface of the true vocal folds**. On the second swallow of a larger volume 10 ml, there was a **cough at the end after penetration**. On a **cup drinking swallow**, there was **aspiration and that resulted in a cough**. The aspiration was of a small amount. On **swallows of pudding, the residue increased slightly**, not as much as might be expected with the apparent reduction in **tongue base pressure**. However, the **second swallow of the pudding resulted in significantly more residue**. The patient repeatedly **dry swallowed** to try to clear that material, indicating good awareness of the residue. Head rotation did not result in improved swallow or clearance of the bolus. On swallow 010230, there was clearly a **moderate to severe reduction in tongue base motion visible form the amount of bolus in the valleculae**, which was not cleared with the subsequent swallow. Even repeated swallows did not result in clearing the valleculae because of the tongue base weakness. Chin-down posture was attempted to bring the tongue base closer to the posterior pharyngeal wall and hopefully improve pressure generation. It did, in fact, result in clearing more of the residue and reducing residue remaining in the valleculae. Because of reduced laryngeal lifting, there was also reduced cricopharyngeal opening, visible particularly on these pudding bolus swallows. **The width of opening of the upper esophageal sphincter was quite narrow**. A front view of the oral cavity and pharynx revealed **greater residue on the patient’s right, our left**, indicating a mild to moderate reduction in pharyngeal wall contraction on one side or **unilateral pharyngeal wall weakness**. This certainly adds to the apparent reduction in pressure generation. An anteroposterior view with the head turned revealed that when the head was **rotated right, the bolus entered the left pyriform sinus and very little was cleared**. A lateral view with the patient attempting several procedures to improve tongue base motion including pulling the tongue straight back, producing a gargle attempt and a yawn, did not result in greatly improved tongue base movement. The patient was also asked to repeat **ka / ka/ ka/ ka** which is a **back of tongue exercise**, causing **vertical tongue motion**. It is clear to see that **ka / ka/ ka** or any production of velar consonants /k/ and /g/ involves vertical tongue movement and will **not exercise the anteroposterior movement of the base of tongue**.

**Recommendations:** Swallowing therapy focused on tongue base exercises, Mendelsohn maneuver.

**Feeding:** Continue non-oral feeding.

**Reevaluation:** When clinical improvement seen.
Patient #24

Use this space to make your notes about the symptoms and structural abnormalities and/or swallowing disorders that you see on this patient’s videofluoroscopic study. Also note anything else the patient might do that you feel is unusual. Also make your recommendations in the space below. Then compare your notes with the description of the patient’s swallow on the next page.

Recommendations:

Swallowing Therapy (Yes, No, Type):

Feeding (Oral, non-oral, or restrictions):

Further evaluation:
Modified Barium Swallow Report: Patient #24

Patient #24 is a 52-year-old woman who has undergone an oral composite resection including 20% of the lateral oral tongue and one side of the mandible. When you turn on the radiographic study of patient #24, you should see the unilateral reconstruction of the mandible with a titanium metal rod which attaches to the mandible just posterior to the symphysis and goes to the temporomandibular joint. On all liquid boluses, there is good oral transit with no motility problems and no residue. The patient does tend to double swallow on most liquid boluses, even smaller sizes. The pharyngeal swallow occasionally triggered slightly late so that the liquid bolus reaches the pyriform sinus before the pharyngeal swallow is triggered. However, there is no aspiration and no penetration. On larger boluses, the patient tends to hold the airway closed longer and sometimes holds the airway closed during the first and second swallow of the bolus instead of interrupting between the two. It is perfectly normal to keep the breath held (airway closed) during sequential swallows of liquid. On swallows of pudding, there is residue on the back and base of tongue which the patient responds to by swallowing a second and occasionally a third time. She does not hold the airway shut during those repeated swallows, which is normal for swallows of a thicker food. The residue indicates reduced tongue base retraction. She was not verbally prompted to repeat the swallow in response to the residue. There is a speech sample after the second pudding swallow as she responds to the question of whether or not there is any food left behind. At the beginning of the first cookie swallow, there is mild to moderate residue remaining from the pudding in both the valleculae and the pyriform sinuses, but most often in the valleculae. Again, with the cookie material, she tends to have greater residue. On the second new bolus of cookie, the patient held the tongue base against the posterior pharyngeal wall longer in what appeared to be an attempt to clear the residue by increasing pressure from the tongue base. The anterior-posterior view revealed greater residue on the patient’s right. At that point, the patient’s head was turned and she cleared more residue with the head rotated than she did in the normal head position. These swallows are of pudding. The fact that her earring is in place does obstruct a bit of the view but it is also still clear that she was able to swallow more of the bolus when her head was rotated. Chin down was used in an attempt to improve base of tongue action. However, there was very little improvement in clearing the bolus. In fact, residue actually increased a bit with her chin down. Head rotation to the patient’s right was again evaluated, showing much better bolus clearance. This patient exhibits a unilateral pharyngeal weakness which is significantly helped by head rotation but chin down has no effect. This tells us that the issue is unilateral pharyngeal wall impairment much more than it is base of tongue.

Recommendation: Swallowing therapy using the effortful swallow.

Feeding: Continued oral feeding.
Patient #25

Use this space to make your notes about the symptoms and structural abnormalities and/or swallowing disorders that you see on this patient’s videofluoroscopic study. Also note anything else the patient might do that you feel is unusual. Also make your recommendations in the space below. Then compare your notes with the description of the patient’s swallow on the next page.

Recommendations:

Swallowing Therapy (Yes, No, Type):

Feeding (Oral, non-oral, or restrictions):

Further evaluation:
Modified Barium Swallow Report: Patient #25

Patient #25 is a 60-year-old man who suffered a subcortical stroke. Oral transit times were normal. This patient exhibits a delay in triggering the pharyngeal swallow of approximately 1 second. The delay enables the bolus to spill to the pyriform sinus prior to the triggering of the pharyngeal swallow. This pattern makes one worry that as the bolus enlarges there will be spillover into the airway but, in fact, that does not occur with this patient. The pharyngeal delay shortens slightly as the bolus gets larger and the patient is not aspirating during the delay. Even as the bolus reaches the 10 ml and larger cup volume, aspiration does not occur. As the patient switches to a pudding consistency, the pharyngeal delay is much more visible with the bolus “hanging up” on the back and base of the tongue, waiting for the pharyngeal swallow to trigger. When the pharyngeal swallow triggers on the pudding material, there is a very small dot of residue in the pyriform sinus which would be considered normal. The final swallow of masticated material reveals the most severe pharyngeal delay with the bolus clinging to the back and base of the tongue, waiting for the pharyngeal swallow to trigger. The patient had more significant difficulty triggering the pharyngeal stage of swallow on the masticated bolus, but when the swallow was finally triggered, there was the same normal pharyngeal emptying except for a very small amount of residue clinging to the pyriform sinus and posterior pharyngeal wall. This residue is within normal limits. There was no aspiration and no penetration on any of these swallows.

Diet: Full oral feeding and normal oral diet.

Recommendations: Thermal-tactile stimulation to improve the pharyngeal trigger.
This is the end of the radiographic studies. If there were things in each narrative report that you need to review or that you did not see, go back to that report and reexamine the section.