

ABSTRACT

Title of Document: PATTERNS OF SPEAKING VALVE USE DURING
FEEDING AND BARRIERS TO PATIENT COMPLIANCE

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and Speech Sciences

Speaking valves have potential swallowing benefits for patients with tracheostomy. However, not all patients who are candidates for speaking valves use them during oral intake. Therefore, the following study sought to identify factors in clinician recommendations for speaking valve use in swallowing, as well as perceived barriers to patient compliance with these recommendations. Survey responses were obtained from 83 speech-language pathologists in medical settings; results showed that clinicians' opinions of the current literature were significantly associated with their preferences for valve use with their patients. No significant factors were found for patient compliance. A qualitative analysis of participants' responses is provided.

PATTERNS OF SPEAKING VALVE USE DURING FEEDING
AND BARRIERS TO PATIENT COMPLIANCE

By

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Dedication

I am grateful to have seen my loving God's hand throughout this process and each day of my life. He continues to make the impossible possible.

This thesis is dedicated to my parents.

You continue to be my best role models and strongest supporters.

Your faith in me has meant more than any academic recognition, and your countless sacrifices have enabled me to complete my education and pursue this career.

Thank you.

Finally, this project is offered for the patients who have taught me the meaning of this profession, in the effort that they may benefit from this and future research.

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Chapter 1: Introduction

Speaking and swallowing are two processes that are often taken for granted by healthy individuals. For people who have undergone a tracheostomy, or a surgically created opening in the front of the neck through which to breathe, these processes become more complicated. A tracheostomy is performed to provide adequate airflow to the lungs, and may be required in the treatment of conditions such as neck injury, tumor in the mouth or neck, tracheal collapse, laryngeal paralysis, and the inability to clear secretions from the airway. This procedure drastically changes the aerodynamic properties of the upper respiratory system, creating an open system which affects speaking and swallowing. A one-way speaking valve is a device that can be used with a tracheostomy to restore many features of a normally closed respiratory system, most notably the ability to vocalize. While the valve is contraindicated for some patients, such as those with upper respiratory obstruction or impaired cognition, the device offers benefits to many patients who are candidates. Although the one-way speaking valve was initially developed as a method of communication for patients in this population, recent literature indicates that the device may provide important clinical benefits for improving swallowing function, as well as communication. The use of the speaking valve is recommended during swallowing assessment and oral intake in many sources. However, little information is available regarding patterns of speech-language pathologists' (SLPs') recommendations regarding the use of speaking valves during assessment and oral intake, factors which are involved in determining this recommendation, and barriers which may exist to patient compliance with SLP recommendations. It is possible that SLP education, including familiarity with relevant literature, influences recommendations for

speaking valve use with oral intake in this population. It is also possible that barriers exist which reduce patient compliance with SLP recommendations, such as contradictory advice regarding valve use from multiple healthcare team members. The present study aims to determine which aspects of clinician education are factors in determining recommendations for speaking valve use, to determine which elements of patient education are factors in patient compliance, and to identify existing barriers to patient compliance.

Chapter 2: Implementation of Speaking Valves in Swallowing

Management

Overview of Tracheostomy and Speaking Valves

The presence of a tracheostomy tube reduces upper respiratory airflow and prevents the generation of adequate subglottic pressure for phonation. Speech production in patients with tracheostomy requires tube occlusion during exhalation, in order to redirect expiratory airflow through the upper respiratory tract so that air passes over the vocal folds. Some varieties of tracheostomy tube are equipped with an inflatable cuff that fills the space between the tube and the patient's trachea, theoretically creating a seal that prevents aspiration of foreign material and ensures proper delivery of supplemental oxygen or mechanical ventilation. Cuff inflation is a direct contraindication for tube occlusion, as the presence of both conditions prevents exhalation; tube occlusion for phonation requires either full deflation of the cuff or the use of a cuffless tube (Tippett, 2000).

There are several options for producing the change in airflow necessary for speech production in patients with tracheostomy, and each works to enable phonation by redirecting airflow through the upper respiratory tract. One option is digital occlusion, in which the patient or clinician places a thumb over the opening of the tube simultaneously to exhalation in order to produce phonation for speech. A second option is a tracheostomy plug or button, which fits on the proximal opening of the cannula and prevents airflow through the tube during both inhalation and exhalation; this option is typically used while a patient is preparing for decannulation, or removal of the tracheostomy tube, to ensure he or she can independently generate sufficient airflow through the upper respiratory tract. A third option is the use of a one-way speaking valve, which fits on the proximal opening of the cannula. The valve opens during inhalation to allow air to pass through the tracheostomy tube and closes during exhalation to allow air to exit through the larynx, enabling phonation. The term “one-way speaking valve” is often used to refer to the unidirectional flow of air through the device, as the valve allows air to pass through the valve only during inhalation. Speaking valves are available in many varieties, including the Hopkins, Montgomery, Shiley Phonate, Hood, Shikani-French, and Passy-Muir valves. These varieties differ slightly in their design but function very similarly toward the common goal of facilitating unidirectional airflow that enables phonation (Tippett, 2000).

Although the speaking valve was originally developed to address the communication needs of patients with tracheostomy, the valve offers benefits for swallowing function. Initially, documentation of the valve’s swallowing benefits was largely anecdotal and took the form of single case studies, but the recent literature

includes more objective investigations into this clinical question. A growing body of literature suggests that these swallowing benefits are related to the restoration of positive subglottic air pressure accomplished by the speaking valve (Eibling & Diez-Gross, 1996; Stachler, Hamlet, Choi, & Fleming, 1996), and positive subglottic pressure is a condition of swallowing in normal individuals (Diez-Gross, Atwood, Grayhack, & Shaiman, 2003; Diez-Gross, Steinhauer, Zajac, & Weissler, 2006).

Dysphagia in Patients with Tracheostomy

Historically, researchers have documented dysphagia and aspiration in patients who have had a tracheostomy procedure (Betts, 1965; Bonnano, 1971; Cameron, Reynolds, & Zuidema, 1973; Pinkus, 1973; Bone, Davis, Zuidema, & Cameron, 1974; Muz, Mathog, Miller, Rosen, & Borrero, 1987; DeVita and Spierer-Rundback, 1990). Opposing findings have suggested that swallowing changes in this population develop as a result of an underlying medical conditions rather than the presence of the tracheostomy (Donzelli, Brady, Wesling, & Theisen, 2005; Leder, Joe, Ross, Coelho, and Mendes 2005; Sharma et al., 2007). However, several more recent studies have corroborated the initial findings regarding this clinical question, and currently the larger body of research provides strong evidence for the development of swallowing changes due to the presence of a tracheostomy tube (Elpern, Scott, Petro, & Ries, 1994; Tolep, Getch, & Criner, 1996; Finder, Yellon & Charron, 2001, Romero et al., 2010).

The Use of Speaking Valves to Address Swallowing

Supporting Literature

There is substantial evidence both supporting and refuting the benefits of the one-way speaking valve for swallowing, and each study has approached the topic in a slightly different manner. Muz, Hamlet, Mathog, & Farris (1994) evaluated 18 head and neck cancer patients with tracheostomies using scintigraphy, a technique in which aspiration can be quantified using radioactive boluses whose movement is tracked during swallowing. The authors evaluated each patient's swallowing under two conditions: with an open tracheostomy tube and with the tube occluded. All of the patients aspirated under the open tube condition. When the tube was occluded, half of these patients experienced no aspiration. Among the half that did aspirate under tube occlusion, the aspiration was reduced in frequency and severity in all patients except for one, illustrating the benefit of valve use for swallowing with these patients. Similarly, Stachler, Hamlet, Choi, & Fleming (1996) studied 11 patients with known or suspected aspiration, using VFSE with the Passy-Muir valve in place and scintigraphy both with and without the valve in place. Observers estimated the percentage of each bolus that was aspirated, and found that eight of 11 patients aspirated significantly less while wearing the valve while three of 11 saw no improvement. These findings suggest that a speaking valve may offer swallowing benefits to a majority of patients, but not all. In a related study, Dettelbach, Gross, Mahlmann, & Eibling (1995) studied 11 patients with tracheostomy and known aspiration, using videofluoroscopic swallow evaluation (VFSE) under two conditions: with an open tracheostomy tube and with a speaking valve in place. They compared the presence and severity of aspiration across the two conditions and found that all 11

patients showed reduced or eliminated aspiration when wearing the valve. It is worth noting that two patients aspirated to a degree that they were unable to complete the VFSE trials without the valve in place. However, after the valve was placed these patients were able to complete the remaining trials. The authors also reported that during valve trials, patients more often detected aspirated material and attempted to clear it, and produced a stronger cough, which more effectively cleared the aspirated material. These findings were supported in a later study by Elpern, Okonek, Bacon, Gerstung, & Skrzynski (2000), where VFSE was used to study 15 patients with tracheostomy during trials of thin liquid both with and without a valve in place. Seven of 15 patients aspirated without the valve, and in these seven patients aspiration was eliminated with valve use. In a later study, Suitor, McCullough, & Powell (2003) used VFSE to evaluate 14 patients across the three conditions of cuff inflated, cuff deflated with open tube, and cuff deflated with one-way valve in place, and measured severity of aspiration using an eight-point penetration-aspiration scale (Rosenbek, Robbins, Roecker, Coyle, & Wood, 1996). Suitor and her colleagues found that while cuff inflation or deflation status did not significantly affect penetration-aspiration ratings, but that ratings were significantly reduced with valve placement for thin liquid trials. Suitor and colleagues noted also that valve placement was significantly beneficial for some patients, but not all, and emphasized the need for thorough swallowing evaluation that includes valve trials in order to determine swallowing strategies for individual patients.

Collectively, the above findings indicate that a valve reduces but does not eliminate the frequency of aspiration and that the benefits of valve use vary among individual patients. These findings also emphasized the potential benefit of valve use in

patients who experience aspiration of liquids and the importance of evaluating valve candidacy during swallowing assessment. This literature supports the potential benefit of using a one-way speaking valve to address swallowing deficits in patients with tracheostomy, and also highlights the need to evaluate patients for valve candidacy on an individual basis.

Non-supporting Literature

Some published findings refute the benefits of the speaking valve for airway protection during swallowing. Leder, Ross, Burrell, & Sasaski (1998) studied the swallowing patterns of 16 head and neck cancer patients with tracheostomy using VFSE and found no differences in aspiration status across open and occluded conditions. In a similar investigation, Leder (1999) studied the swallowing of 20 patients with tracheostomy and previously confirmed aspiration, after successfully fitting the patients with a one-way speaking valve two to seven days prior to swallowing evaluation. Leder found that patients who aspirated before using the valve continued to aspirate with valve use, and patients who swallowed without aspiration prior to valve use continued to swallow safely with valve use. Leder, Joe, Hill, & Traube (2001) used manometry, an endoscopic study measuring pressure, to compare the pharyngeal and upper esophageal pressures during swallowing in 11 patients with tracheostomy. Using FEES to determine the aspiration status of each patient, manometric measures were obtained for each patient across the two conditions of an open and occluded tracheostomy tube. Leder et al. compared pressure changes with occlusion across aspirating and non-aspirating patients, and found that pressures did not change significantly with occlusion for either group.

These results are similar to those found previously by Leder, Tarro, & Burrell (1996) and Leder, Ross, Burrell, & Sasaski (1998), and to those found later by Donzelli, Brady, Wesling, & Theisen (2006). These findings do not indicate that the use of the one-way speaking valve improves swallowing function, and may suggest that other biomechanics of swallowing should be considered.

The Role of Clinician Education in Speaking Valve Use

Clinician education is a factor that underlies all aspects of swallowing management, including recommendations for the use of the speaking valve in swallowing assessment and oral intake. While this area is in need of further research, isolated studies document that increased SLP education yields benefits for clinical decision-making. Logemann, Lazarus, Keeley, Sanchez, and Rademaker (2000) demonstrated that a four-hour training program immediately and significantly improved clinicians' accuracy in interpreting VFSE. In addition, dysphagia training is effective when administered to non-SLP members of a multidisciplinary team, and facilitates more well-coordinated clinical decisions among team members (Davis & Copeland, 2005). The available literature indicates that formal clinician training is lacking in particular areas of medical SLP practice. For example, Warren-Forward and her colleagues (2008) documented the lack of formal instruction in radiation safety practices among medical SLPs and recommended that university-level education be provided in this area. There is no known research on the role of education in clinician recommendations for valve use during swallowing assessment and oral intake.

Barriers to Patient Compliance in Speaking Valve Use

No known research has investigated barriers to patient compliance with SLP recommendations for speaking valve use during oral intake. Barriers to effective treatment in other areas of clinical practice have been studied, and it is likely that barriers exist in this target population, as well.

In order for patients to comply with clinician recommendations, it is necessary for patients to be given consistent recommendations by clinicians across multiple disciplines. One barrier to compliance is the need for more effective multidisciplinary communication, the importance of which is highlighted by the documentation of inconsistency in treatment protocol and lack of communication among care providers. In one startling study, Higgins and Maclean (1997) documented six cases in which life-threatening or fatal complications of aspiration might have been prevented by involvement of a multidisciplinary team in clinical decision-making. Tracheostomy and swallowing management decisions in these six cases included: discharge from ICU prior to swallow evaluation, allowing oral intake of liquid against SLP recommendation, decisions regarding cuff inflation/deflation schedule without swallow evaluation, and change in type or size of cannula without SLP consultation. Higgins and Maclean strongly emphasized the hazards of a poorly organized care team and the critical role of the SLP in the continuum of care. This study suggests that inconsistency in recommendations across multidisciplinary clinicians may present barriers to patient compliance.

In another study of multidisciplinary collaboration in decision making, Crimlisk, Horn, Wilson, and Marino (1996) surveyed tracheostomy care providers at 64 hospital

facilities. They documented that 63 percent of respondents reported performing cuff deflation every 8 to 12 hours, despite the fact that the American Association of Critical-Care Nurses procedure manual (Boggs, 1993) recommends cuff deflation only every 48 to 72 hours or when complications develop. In addition, only 31 percent of respondents reported using positive pressure during cuff deflation, although this technique has been shown to facilitate clearance and suctioning of secretions collected above the cuff and reduce the risk of aspirating collected secretions during cuff deflation. Crimlisk, Horn, Wilson, and Marino further speculated that variations in cuff management practices are due at least in part to insufficient clinician knowledge of guidelines. They emphasized the need for both communication regarding treatment protocol and increased collaboration among healthcare providers to facilitate an effective continuum of care for patients with tracheostomy. Collectively, the above literature suggests that gaps in communication among care providers can form barriers to effective treatment, and indicate the need for further research in this area that specifically addresses patients with speaking valves.

Rationale and Objectives

The purpose of the present study is to determine which aspects of clinician education are factors in determining recommendations for speaking valve use, to determine which elements of patient education are factors in patient compliance, and to identify existing barriers to patient compliance.

Relevant literature recommends the use of the speaking valve in both swallowing assessment and oral intake. However, little information is available regarding how often SLPs recommend the use of speaking valves during assessment and oral intake, which

factors are involved in determining this recommendation, and which barriers may exist to patient compliance with SLP recommendations. Clarifying the process of valve recommendation for swallowing management and the barriers to patient compliance with these recommendations could better equip SLPs to manage the swallowing of their patients with tracheostomy, and potentially lead to more positive swallowing outcomes for these patients. The present study will therefore address the following questions:

- 1) Do clinicians with more thorough swallowing education more frequently recommend the use of a speaking valve during oral intake?
- 2) Do patients who receive more education regarding valve use more frequently comply with clinician recommendations?
- 3) Which barriers, if any, impede patient compliance with clinician recommendations?

Method

Participants

An electronic mail invitation to participate in this survey was sent to 426 speech-language pathologists. Recruited SLPs were members of the Maryland Speech-Language Hearing Association (MSHA) electronic interactive mailing list and/or staff members at medical facilities in the Maryland and Washington, D.C. areas. Potential respondents who were recruited from medical facilities were initially contacted by phone to provide their email addresses and permission to send the e-mail invitation. E-mail invitations

were sent to potential participants from July 1, 2011 through July 8, 2011. The survey was closed and responses were collected on July 26, 2011.

Procedure

Participants accessed the survey from a web link in the invitation e-mail. The survey was hosted by SurveyMonkey, a web-based service for survey administration. To protect data transferred over the internet, SurveyMonkey used Secure Sockets Layer (SSL) technology to encrypt data and prevent its unauthorized use. Respondents were informed through a disclosure page at the beginning of the survey that participation was optional and that completion of the survey served as consent to participate. Participants were also informed that responses were anonymous and contact information was not required unless he or she desired to have his or her name entered in a drawing to earn three continuing education units at no cost as a gift for participation in the study. Responses to individual survey items contained no personal information and were anonymous. The institutional review board of the University of Maryland, College Park approved the protocol for this study prior to distribution of the survey.

Questionnaire Development

A 19-item questionnaire was developed in order to collect information across four areas: demographic information, clinician education, clinician practice patterns, and patient compliance.

Demographic Information

Questionnaire items one through five gathered demographic information about respondents. This information consisted of the type of facility in which the respondent practiced, extent of experience practicing speech-language pathology, and extent of experience assessing swallowing. In addition, respondents were asked whether they ever used a one-way speaking valve with their patients, and whether they ever used the valve during swallowing assessment; these two items were part of a “skip pattern” used in the questionnaire. This feature allowed respondents to skip items that would be irrelevant for their particular caseloads; for example, a participant responding “no” to the question regarding speaking valve use would be directed past the questions pertaining to speaking valve use to the remainder of the questionnaire items.

Clinician Education

Questionnaire items 15 through 18 addressed clinician education, in terms of respondents’ opinions about the current literature, type of continuing education opportunities pursued, number of relevant journal articles read, and perceived competence at managing patients in this population. For each of these items, respondents were given space to include optional comments explaining their answers. For forced-choice items, an “other” option was provided for participants whose desired response was not listed in the answer choices.

Clinician Practice Patterns

Items six through 11 gathered information about clinician practice patterns, addressing the frequency of speaking valve use during instrumental assessment, reasons for or against use of the valve during assessment, frequency of recommendations for valve use during oral intake, and reasons for or against the recommendation of valve use with oral intake. All items in this section featured an optional comments section to allow respondents to provide helpful explanations along with their answers or to include information not available in the answer choices.

Patient Compliance

Questionnaire items 12 through 14 addressed patient education and compliance with SLP recommendations for valve use during oral intake. These items asked SLPs to report the type of information typically included in a patient education session for the use of a speaking valve, to estimate the percentage of patients who comply with recommendations for valve use at the time of discharge, and to share beliefs about barriers to patient compliance.

Results

Response Rate

Eighty-three surveys, of 426 distributed, were completed partially or in full, which represents an overall response rate of 19.5 percent. This response rate was expected and is similar to the previously documented rate of 20.7 percent for a web-based survey (Kaplowitz, Hadlock, & Levine, 2004). However, for the emails sent directly to

hospital staff who had agreed to participate during a screening phone call, the response rate was 100 percent. One possible explanation for the lower response rate of SLPs recruited through the MSHA mailing list is that many of these clinicians worked in non-medical facilities, such as schools, and thus were ineligible to participate; this is supported by the fact that only one of 83 participants worked in a non-medical facility. Another, more likely, explanation is a lack of interest in participation among the email recipients.

Demographics

General demographic information was collected from all participants, including type of medical facility, total years of SLP experience, and years of SLP experience in swallowing. The majority of participants, 71 percent (n = 59), practiced in a hospital setting, 9.6 percent (n = 8) in acute care, 3.6 percent (n = 3) in out-patient rehabilitation, 2.4 percent (n = 2) in a skilled nursing facility, and 13.3 percent (n = 11) selected the “other” category and specified the facility type. Responses in the "other" category consisted of combinations of the other categories (1), long-term care (2), specialty rehabilitation (1), outpatient clinic (1), special education facility (1), otolaryngology clinic (4), and physician clinic (1).

Participants’ total years of overall SLP experience ranged from zero to 40 years with a mean of 11.1 years. The most frequent response, selected by 36.1 percent (n = 30), was 5-10 years of practice. Experience of 0-4 years was reported by 25.3 percent (n = 21), 11-20 years by 20.5 percent (n = 17), 21-30 by 12 percent (n = 10), 31-40 years by 4.8 percent (n = 4), and no response was selected for 1.2 percent (n = 1). Participants

represented a broad range of experience levels, with the majority of participants (81.9 percent, n = 68) reporting between zero and 20 years of practice.

Years of specialty experience in swallowing assessment and/or treatment (as compared to total years of overall SLP experience) ranged from zero to 35 years with a mean of 10.2 years. The most frequent response, selected by 38.6 percent (n = 32), was 5-10 years of specialty experience. A response of 0-4 years was selected by 24 percent (n = 20), 11-20 years by 21.7 percent (n = 18), 21-30 years by 10.8 percent (n = 9), 31-40 years by 1.2 percent (n = 1), and no response was indicated for 3.6 percent (n = 3). Participants represented a broad range of experience in specialty practice, with the majority of participants (84.3 percent, n = 70) reporting between zero and 20 years of specialty experience in swallowing.

Figure 1. Types of Facilities Surveyed

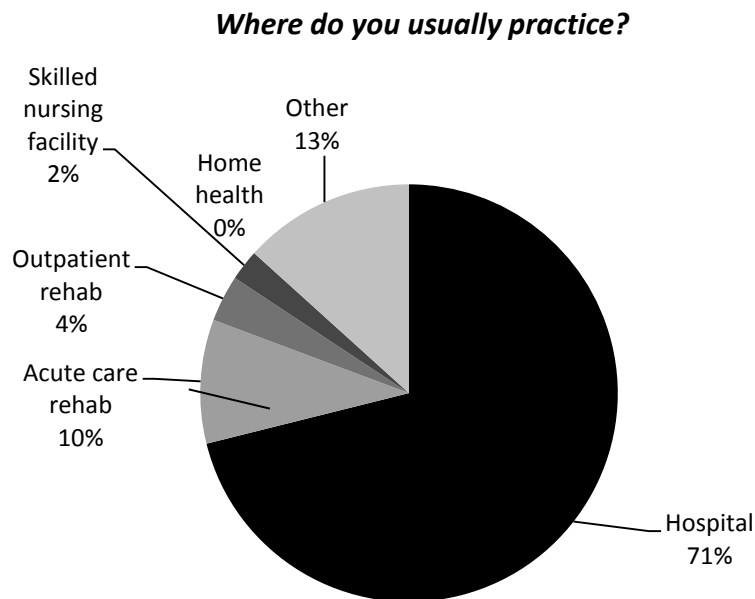


Figure 2. Total Years of SLP Experience

In total, how many years have you practiced as a speech-language pathologist?

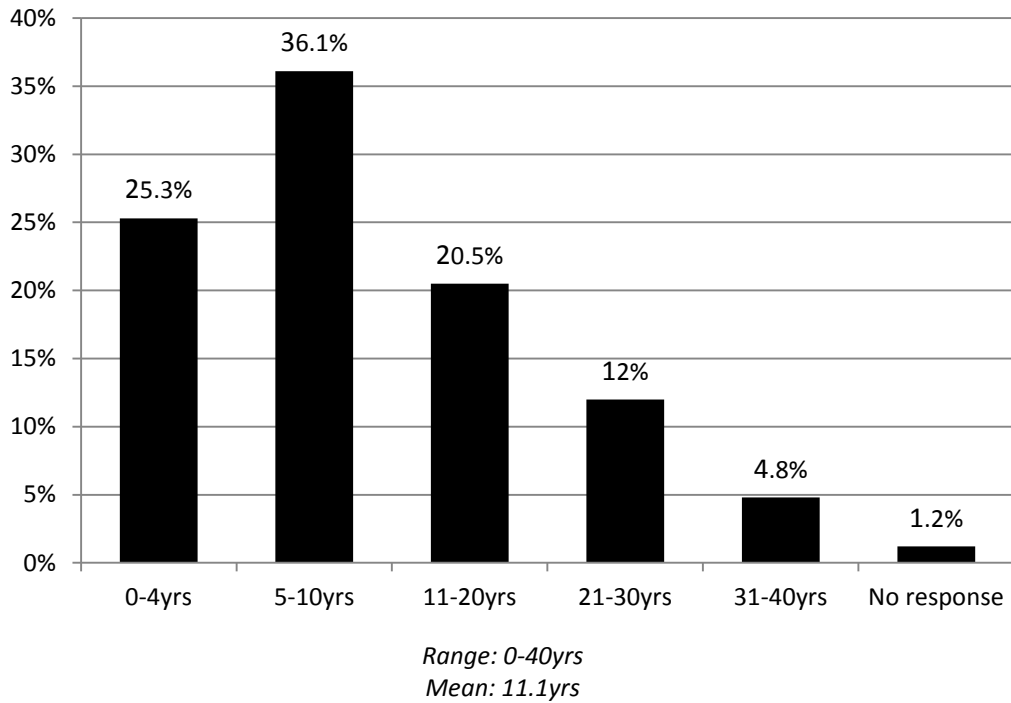
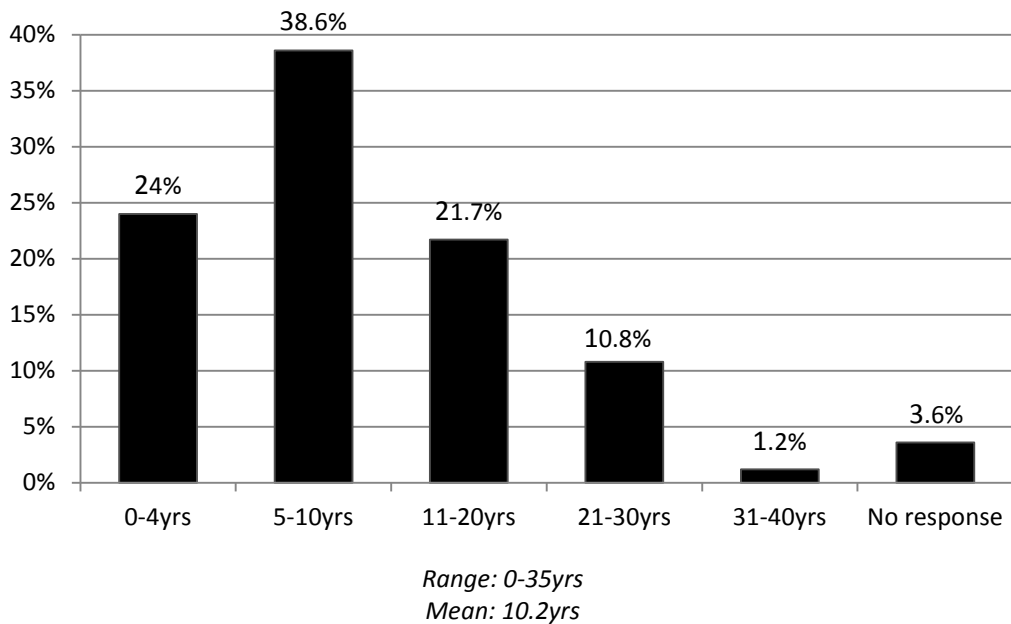


Figure 3. Years of Clinical Experience in Swallowing

How many years have you been practicing continuously in a position that involves swallowing assessment/treatment?



Screening Questions

Following the general demographic questions at the beginning of the survey, participants were asked to answer two basic screening questions regarding their use of speaking valves for patients with tracheostomy. Each screening question included a skip pattern that was built in to the survey; upon selecting an answer of “no” to either question, the survey engine automatically directed participants past questions that would be irrelevant based on the negative response.

An answer of “no” to the first screening question (“Do you ever use a one-way speaking valve with your patients who have a tracheostomy?”) caused the survey to bypass the remaining questions pertaining to speaking valve use in clinical practice and directed participants to the next sections of the survey. Ninety-five percent of participants (n = 79) reported using a one-way speaking valve with patients who have a tracheostomy. Four percent (n = 3) did not provide a response and one percent (n = 1) responded with “no;” the single participant who responded “no” was automatically directed to the remaining relevant questions at the end of the survey.

An answer of “no” to the second screening question (“Do you ever use a one-way speaking valve during swallowing assessment- either bedside evaluation or videofluoroscopy?") caused the survey engine to bypass questions pertaining specifically to the use of the valve in assessment, and directed participants to the remaining relevant items. Ninety-three percent of participants (n = 77) responded “yes” to this item, five percent (n = 4) did not provide a response, and two percent (n = 2) responded with “no.” The two respondents selecting “no” were directed to skip further questions pertaining to valve use in assessment.

Figure 4. Screening Question I: General Use of Speaking Valves

Do you ever use a one-way speaking valve with your patients who have a tracheostomy?

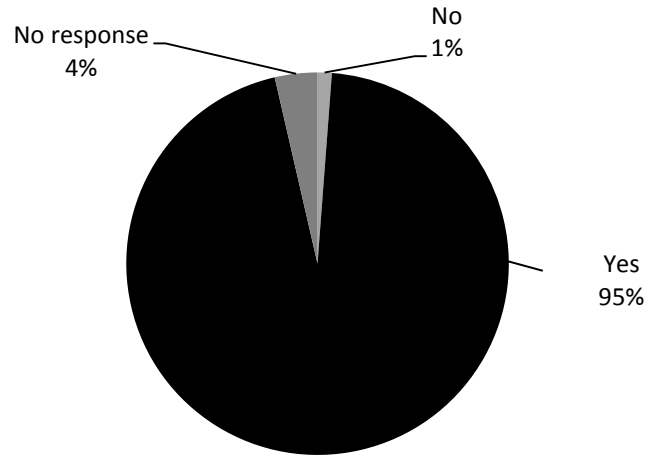
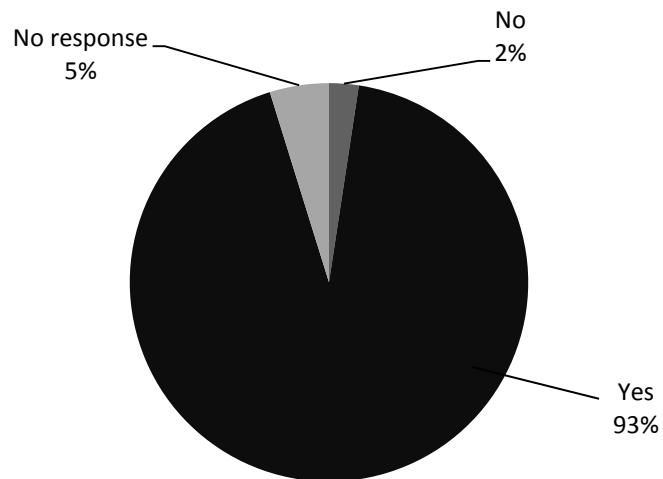


Figure 5. Screening Question II: Use of Speaking Valve in Assessment

Do you ever use a one-way speaking valve during swallowing assessment (either bedside evaluation or videofluoroscopy)?



Clinician Education

Elements of clinician education pertaining to swallowing assessment and treatment were measured using three multiple-choice items and one open-ended item. The multiple-choice items allowed for multiple answer selections and all items included space for open-ended comments to be entered along with answer selections. These questions addressed participants' opinions of the current literature, pursuit of continued education, number of journal articles read annually, and comfort level in delivering services to patients with tracheostomy.

Opinions of the Current Literature

In response to the multiple-choice question regarding opinions of the current literature, 77.1 percent (n = 64) of clinicians responded that wearing a speaking valve during feeding may decrease aspiration risk, 53 percent (n = 44) responded that swallowing evaluation should be completed both with and without the valve, and only 1.2 percent (n = 1) responded that speaking valve use during feeding may increase aspiration risk. No response was entered for this question from 7.2 percent of respondents (n = 6). "Other" was selected by 13.3 of respondents (n = 11) and these responses are listed in the table below.

Figure 6. Clinician Opinions of the Literature

Please check all that apply. In my opinion, the published literature shows that:

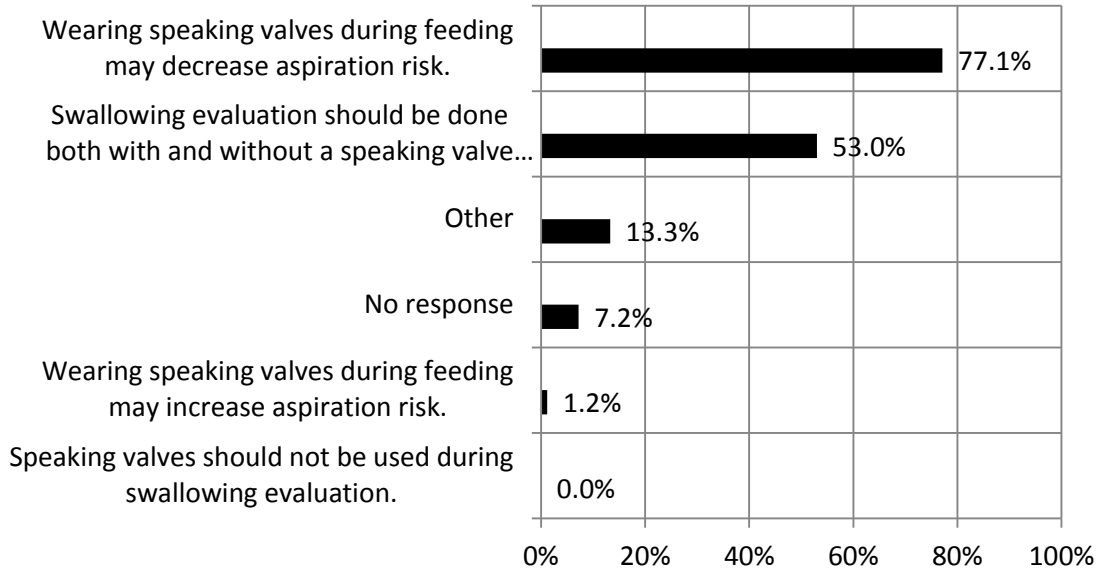


Figure 7. Clinician Comments Regarding Current Literature:

1. Case dependent for increased aspiration risk with/without PMSV.
2. If patient can tolerate valve, it should be worn with meals.
3. We will usually do an MBS to determine safety if pt unable to tolerate valve or in case pt is able to tolerate valve but may have an event where they don't have valve on and want to eat (i.e. if it's lost, noncompliance, etc).
4. I am not sure if literature recommends that you assess swallowing with and without the speaking valve, but I usually do with my patients to see if the speaking valve improves the swallow function.
5. If applicable I would recommend a pmv trial prior to oral intake to ensure PMV tolerance and increase patient knowledge/comfort level with PMV in place.
6. Wearing speaking valve assist with weaning process by strengthening the lungs.
7. Wearing/not wearing PMV does not effect swallowing, statistically signific.
8. A speaking valve should be worn during all oral intake as tolerated. If not fully tolerated an instrumental swallow evaluation should be complete both with and without the valve.
9. The valve allows for subglottic pressure restoration, may restore laryngeal and pharyngeal sensation, and may potentially decrease the aspiration risk. It also allows for an improved cough.
10. Most information is quite conflicting at this time. In fact, I admire you taking this on for a masters thesis because there is such conflicting information to sift through. Best of luck!
11. Most of the published literature, especially Leder, Suiter compilation shows that the valve Really does not affect the swallowing. Most of Roxanne Gross's research says that it does,.... but she is determined to demonstrate that closing the system does help the swallow. I wonder if her research is biased.

Avenues for Continued Education

In response to the question addressing continued education opportunities in swallowing assessment and treatment, 68.7 percent (n = 57) reported a seminar or lecture outside of their facility of employment, 61.4 percent (n = 51) reported independent reading of relevant literature, 44.6 percent (n = 37) reported mentorship from a SLP or non-SLP colleague, 43.4 percent (n = 36) reported a self-study course, 30.1 percent (n = 25) reported a seminar or lecture sponsored by their facility, and 12 percent (n = 10) read literature distributed by their facility. No response was provided by 7.2 percent (n = 6) of respondents. The two most frequently reported types of continued education were seminars outside of the facility of employment and independent reading of the literature.

Optional comments, in addition to an answer selection, were provided by 4.8 percent of participants (n = 4) and these are listed in the table below. Note that MBSImP™©, the Modified Barium Swallow Impairment Profile, is a recently developed tool aiming to standardize the modified barium swallow assessment through increased accuracy, objectivity, and consistency (Martin-Harris, et al., 2008). The modes of continued education mentioned in the comments below provide a few specific examples of the broad categories represented in the answer choices for this question.

Figure 8. Avenues for Continued Education

***Which of the following continuing education opportunities in swallowing assessment/treatment have you found to be helpful during the past year?
Please check all that apply.***

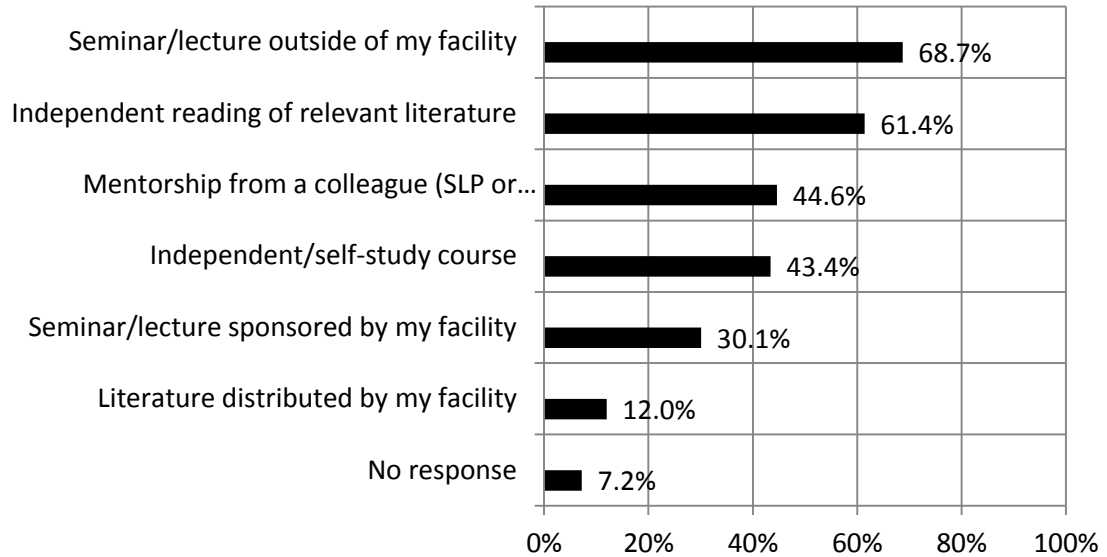


Figure 9. Clinician Comments Regarding Continued Education:

1. MBSImP
2. Passy-Muir, Inc. provides some good, free (but basic) on-line CEUs (both tele-con style and self study) re: the use of valves and swallowing.
3. I often seek out mentoring from our pulmonologists and respiratory therapists.
4. Need to have a wide variety of all avenues.

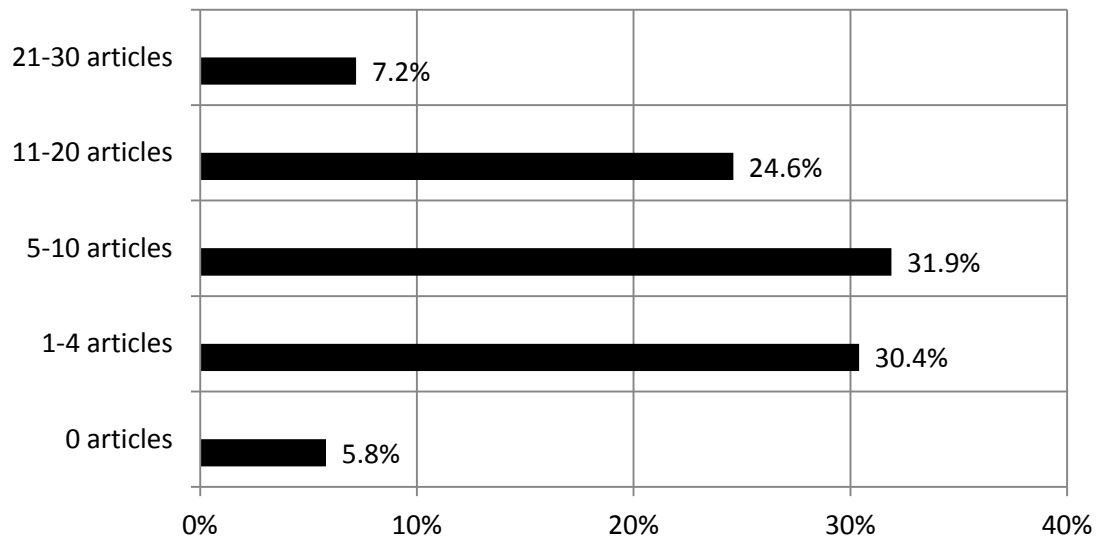
Number of Journal Articles Read Annually

In response to the multiple-choice question regarding the number of journal articles participants have read in the past year, 5.8 percent (n = 4) reported zero articles, 30.4 percent (n = 21) reported 1-4 articles, 31.9 percent (n = 22) reported 5-10 articles,

24.6 percent (n = 17) reported 11-20 articles, and 7.2 percent (n = 5) reported 21-30 articles. Eight participants provided no response. Six responses, ranging from 50 articles to 300 articles, were omitted from statistical analysis due to their questionable accuracy; given the relatively specialized body of research in question and the time investment required in reading, it is highly unlikely that clinicians would have read as many as 300 articles in this area within one year. Thus, responses that were analyzed represented a range from zero to 30, with a median of 6 articles. The majority of participants (86.9 percent, n = 64) reported reading between zero and 20 articles in the past year.

Figure 10. Number of Journal Articles Read Annually

Approximately how many journal articles related to swallowing assessment/treatment have you read in the past year?



Range: 0-30 articles

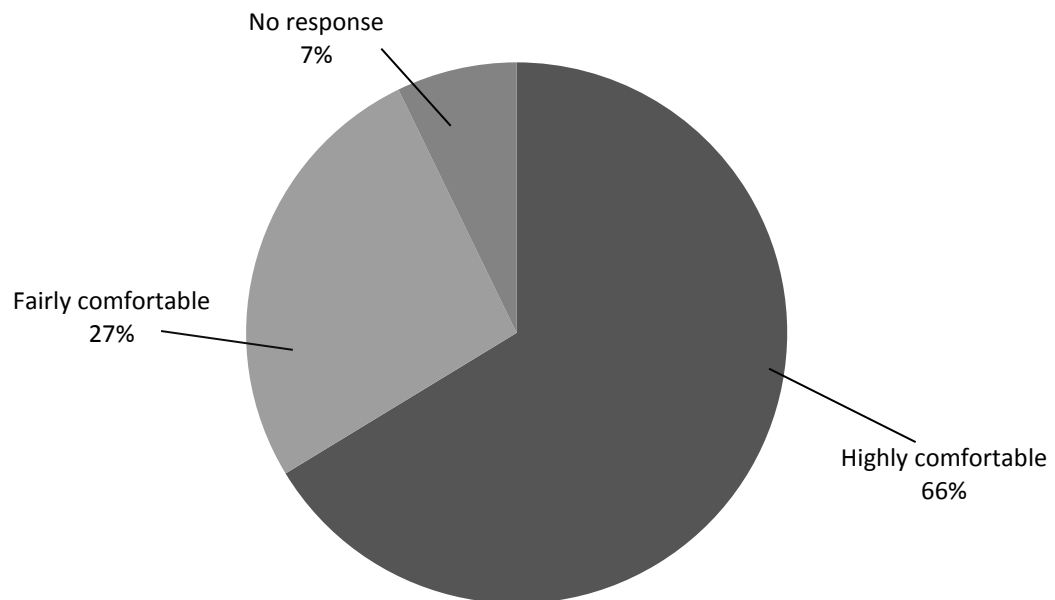
Median: 6 articles

Comfort Level in Managing Patients with Tracheostomy

In response to the multiple-choice question addressing respondents' comfort levels in treating patients in this population, 66.3 percent (n = 55) selected "highly comfortable," 26.5 percent (n = 22) selected "fairly comfortable," and 7.2 percent (n = 6) provided no response. No participants provided a response of "not very comfortable" or "I refer such cases to colleagues."

Figure 11. Comfort Level in Managing Patients with Tracheostomy

How would you rate your comfort level in evaluating and treating swallowing in patients with tracheostomy?



Clinician Practice Patterns in Valve Use

Specific aspects of clinician practice patterns, with regard to the use of speaking valves for swallowing assessment and treatment, were measured. Six questions addressed the frequency of speaking valve use during instrumental assessment, the reasons for or

against use of the valve during assessment, the frequency of recommendations for valve use during oral intake, and the reasons for or against the recommendation of valve use during oral intake.

Valve Use During Instrumental Swallowing Assessment

This aspect of clinician practice patterns was addressed using the following open-ended question: “When you are asked to perform swallowing evaluations for patients with tracheostomy, approximately what percentage of the time do you evaluate the patient both with and without the valve under videofluoroscopy?” Zero participants provided a response to this item. However, subsequent questions investigating the reasons for or against valve use during overall assessment (not limited to instrumental assessment) yielded a much higher response rate. One possible explanation for this is that participants’ use of the valve specifically during videofluoroscopic evaluation of swallowing, as opposed to other types of assessment, was limited and therefore too difficult to estimate in frequency.

Reasons for Valve Preference During Assessment

Two items measured clinicians’ reasons for valve use during swallowing assessment (whether instrumental or non-instrumental assessment). These questions and their responses are displayed in the charts below.

Participants’ reasons for using a speaking valve during swallowing assessment were addressed using a checklist format, in which respondents selected all applicable answer choices. In response, 72.3 percent (n = 60) of participants selected “to determine

whether the patient’s swallowing safety is impacted by the valve,” 67.5 percent (n = 56) selected “to aid in planning a valve recommendation for the patient,” 62.7 percent (n = 52) selected “because the valve is likely to show swallowing benefits,” 7.2 percent (n = 6) did not make an answer selection, and 15.7 percent (n = 13) selected “other” and entered a text response. These text submissions are displayed in the table below.

Figure 12. Reasons for Valve Use During Assessment

***For which reason(s) do you use a speaking valve during swallowing assessment?
Check all that apply.***

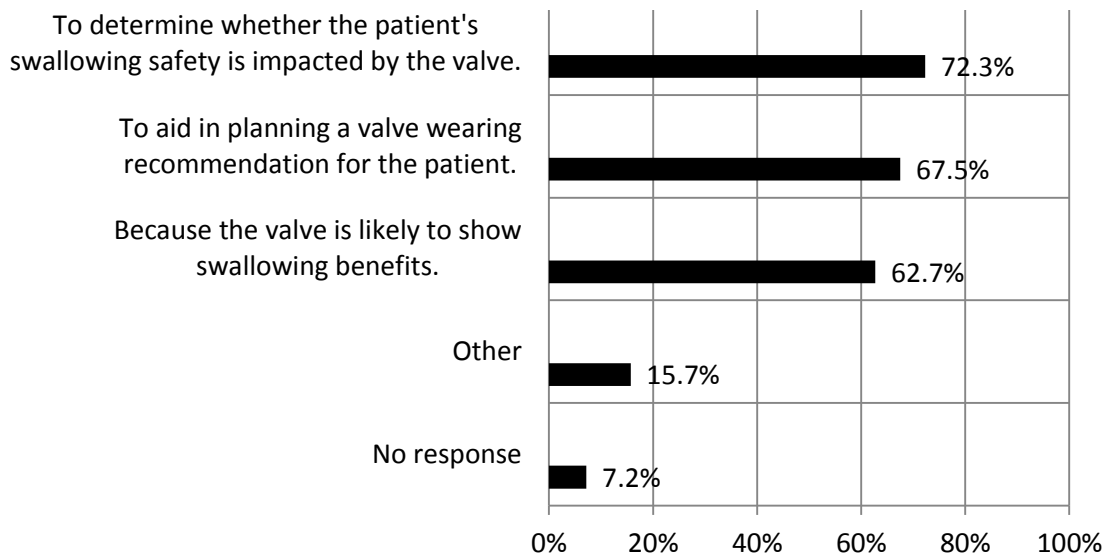


Figure 13. Open-ended Responses Regarding Valve Use During Assessment:

1. So the patient may communicate more effectively during the evaluation process.
2. The valve assists in restoring upper airway airflow and in my experience heightens the patient's sensation in the upper and lower pharyngeal and laryngeal areas, which then improves sensation and therefore airway protection.
3. Research has shown that PMVs aid in improving patient's swallowing. At our hospital we prefer our patients to tolerate the valve for the length of a meal 20-30 minutes prior to a swallow eval. If a patient does not tolerate after 2-3 sessions with will do a MBS. Sometimes we do an MBS despite toleration of the valve. It is dependent on the patient and their status (respiratory, vocal, language/cognition level, etc). [sic]
4. To restore more normal swallow/ respiratory pattern.
5. Will usually assess tolerance for speaking valve prior to initiation of swallowing assessment when indicated.
6. Improve airway protection. (cough) Improve taste and smell. [sic]
7. So the pt can better achieve VF closure during swallowing for potentially improved airway protection.
8. Enhance utility of observable s/s [signs/symptoms] of aspiration.
9. To check for vocal quality changes during swallow eval.
10. Any or all of the above, dependent on the pt.
11. To assess changes in respiratory function associated with valve use, toward the end-point of decannulation.
12. To assess vocal quality only.
13. To hear the patient's voice.

Four of these participants reported using valves for the purpose of judging voice quality as an indicator of aspiration, one indicated using valves only for enabling patient communication and participation during assessment, one reported using valves to test respiratory status and progress toward decannulation, two indicated that valve use during assessment depended on each patient's particular needs, and five stated that their reasons for valve use during assessment were to improve airway protection and/or restore the normal relationship between respiration and swallowing.

Participants' reasons for not using speaking valve during swallowing assessment were addressed using a checklist format, in which respondents selected all applicable answer choices. In response, 91.6 percent (n = 76) indicated as a reason patients' inability

to tolerate valve placement (e.g., due to oxygen desaturation, upper airway obstruction, or reduced alertness), 6 percent (n = 5) provided the reason that patients were being evaluated for palliative care, 3.6 percent (n = 3) stated that the valve is unlikely to show swallowing benefits, 6 percent (n =5) provided the reason that patients’ swallowing behavior during evaluation is unlikely to represent their swallowing during normal oral intake, 4.8 percent (n = 4) provided no response, and 12 percent (n = 10) selected “other” and provided a text response.

Figure 14. Reasons For Not Using Valve During Assessment

***For which reason(s) do you NOT use a speaking valve during swallowing assessment?
Check all that apply.***

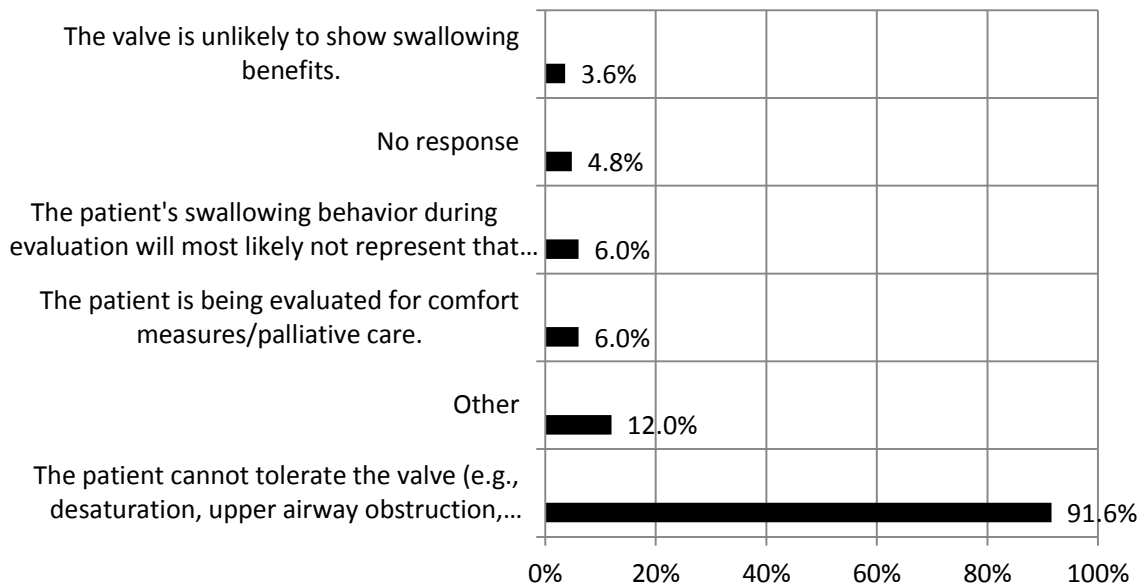


Figure 15. Open-ended Responses Regarding Reasons Not Using Valve During Assessment:

1. In our hospital, we generally do not use Speaking Valves in-line while a patient is on the ventilator; valves are utilized when pt's are on trach collar and can tolerate cuff deflation. [sic]
2. MD does not want speaking valve yet/wants cuff inflated.
3. I will trial the PMV prior to a swallow evaluation to see if they can tolerate the valve and if they can then I will assess the swallow with the PMV in place and then remove the PMV and see if it makes a difference, especially during an MBS. If no difference is made despite the PMV in place I still encourage the patient to wear to assist in communication, weaning, coughing etc.
4. I may remove to see if there are expectorations through the trach cannula, especially any bolus material.
5. If the patient is aphonic with the valve; O2 sats are below 90; pt is lethargic.
6. Ease of suctioning, etc as needed. The private duty nurses do not give us an option on this.
7. I typically attempt to "normalize" the upper airway prior to swallowing assessment, if possible, i.e., determine why the patient is unable to tolerate the speaking valve (e.g., recommend smaller trach tube if trach tube is too large relative to patient's trachea). If anatomical [sic] upper airway obstruction is present, a speaking valve may not be an option - this is not necessarily a contraindication for a swallowing assessment. [sic]
8. I typically will not initiate a bed-side eval unless the person tolerates a valve. If they cannot tolerate a valve, I will do an MBS without a valve vs. a bedside due to the increased risk of ASP without the valve. [sic]
9. The patient cannot tolerate the valve from a respiratory perspective, yet is physiologically stable without the valve.
10. It is not necessary to have the valve on during swallowing [sic] evaluations.

Factors in Recommendation for Valve Use During Oral Intake

Two items measured factors in participants' recommendations for valve use during oral intake. These questions and their responses are displayed in the charts below.

A checklist format, in which respondents selected all applicable answer choices, was used to identify factors leading to the recommendation for valve use during oral intake. In response, 21.7 percent (n = 18) selected "to restore subglottic pressure during swallowing," 20.5 percent (n = 17) indicated "to improve communication and social participation," 19.3 percent (n = 16) reported "to enable a productive cough," 16.9 percent (n = 14) selected "to reduce the risk of aspiration," 2.4 percent (n = 2) marked "to

improve patient’s appearance,” 2.4 percent (n = 4) selected “other” and submitted a text response, and 75.9 percent (n = 63) did not provide a response. It is unclear why this question yielded such a low response rate, but it is possible that factors leading to a recommendation for valve use recommendation vary too greatly across patients for clinicians to summarize these factors in a short response.

Figure 16. Factors Leading to Valve Recommendation

For which reason(s) do you recommend that a patient wear the valve with oral intake? Check all that apply.

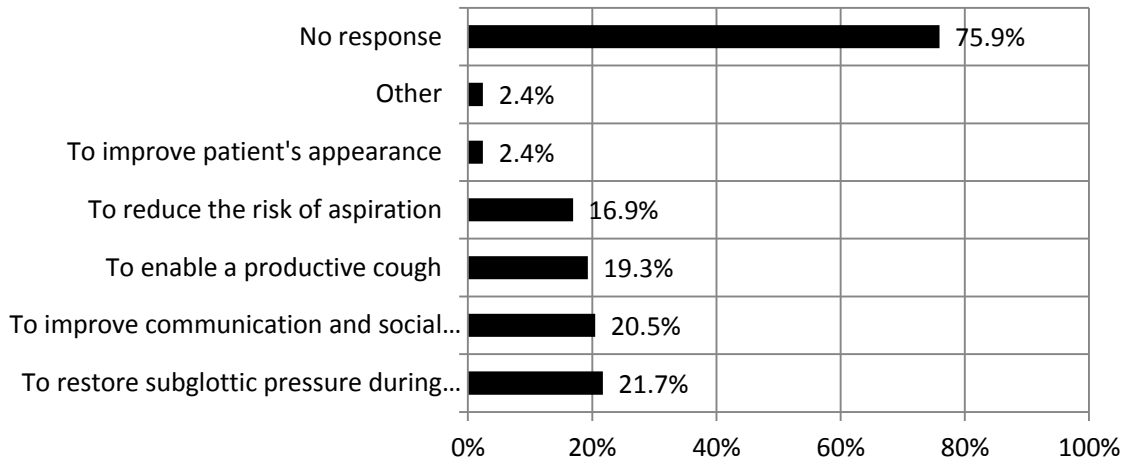


Figure 17. Open-ended Responses Regarding Factors Leading to Valve Recommendation:

1. I am hesitant to say that the valve will reduce the risk of aspiration across the board without having completed a modified barium swallow study with each patient with trials of the valve donned and doffed.
2. If wearing the valve impacts pt risk of aspiration. So, if they aspirate when it is not worn. [sic]

A second checklist item was used to identify contraindications for valve use during oral intake which would discourage clinicians from making this recommendation for particular patients. Responses showed that 86.7 percent (n = 72) reported as a contraindication the inability of patients to tolerate the valve (e.g., due to compromised medical status, upper airway obstruction, or reduced alertness), 21.7 percent (n = 18) provided the reason of lack of support with valve placement from other medical team

members (e.g., nurses or respiratory therapists), 15.7 percent (n = 13) provided the reason that patients are not likely to comply with a recommendation for valve use if one were given, 7.2 percent (n = 6) provided the reason that patients are receiving palliative care, 3.6 percent (n = 3) indicated that other medical team members recommend cuff inflation (an absolute contraindication to valve placement) during meals, 3.6 percent (n = 3) of participants indicated that they prefer to recommend cuff inflation during meals, 2.4 percent (n = 2) provided the reason that patients may feel self-conscious about wearing the valve, 9.6 percent (n = 8) selected “other” and entered a text response, and 6 percent (n = 5) provided no response.

Figure 18. Factors Against Valve Recommendation

For which reason(s) do you NOT recommend that a patient wear the valve with oral intake? Check all that apply.

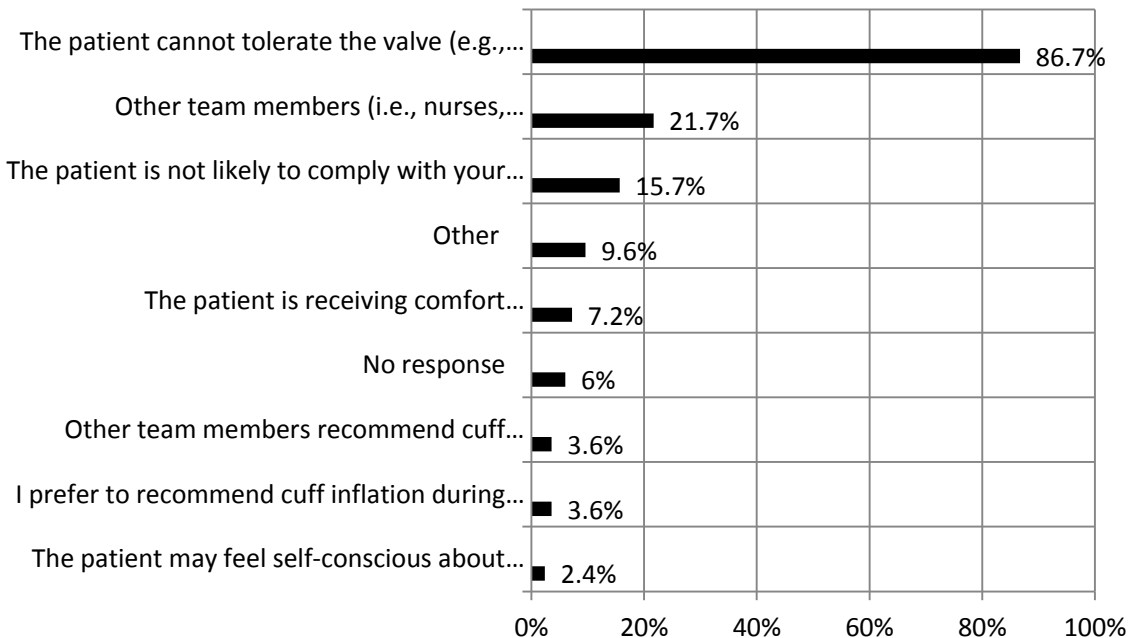


Figure 19. Open-ended Responses Regarding Factors Against Valve Recommendation:

1. In response to #1: I do not push the valve if the patient does not want to wear it. This does not happen often, but I view the valve as a tool to improve the patients quality of life; if they choose not to wear it, despite my recommendations I do not push it. I inform them of all of its benefits, but in the end it is up to the patient. [sic]
2. With vent dependent patients may utilize cuff deflation only instead of in-line speaking valve if cuff deflation demonstrates the same benefit on an instrumental study as the in-line speaking valve. [sic]
3. VFSS shows it does not affect swallow and pt chooses to not wear it. [sic]
4. Usually 100% assistance is provided with placing the PMV in the acute hospital setting to ensure full cuff deflation. If recommendations cannot be followed then patient must be able to tolerate po without PMV placement also to reduce risk of aspiration until patient, family, RN, and medical team understand importance of PMV with all oral intake to reduce risk of aspiration. [sic]
5. In our facility, respiratory therapists are "in charge" of valves. We make recommendations but may not follow up after a few trials.
6. The patient cannot tolerate the valve from a respiratory perspective, yet without the valve is physiologically stable.
7. For our vent patients, the vent alarms continually go off when our patients use in-line speaking valves; if a patient has trouble with anxiety, we often cannot have the valve on if an SLP or RT is not in the room to continually silence the alarm. That isn't realistic for some of our patients.
8. If they cannot tolerate the device it is not used, period.

Frequency of Participants' Recommendation for Valve Use During Oral Intake

Using one multiple-choice question, participants were asked to select an estimated percentage to reflect the frequency with which they tend to make a recommendation for valve use during oral intake intake. In response, 65.1 percent (n = 54) indicated that they make this recommendation for approximately 75-100 percent of patients, 14.5 percent (n = 12) selected 50-74 percent of patients, 7.2 percent (n = 6) selected 25-49 percent of patients, 2.4 percent (n = 2) selected 1-24 percent of patients, 4.8 percent (n = 4) selected zero percent of patients, and 6 percent (n = 5) selected "cannot recall." In addition, 14.5 percent of participants (n = 12) provided additional comments regarding this item.

Figure 20. Frequency of Valve Recommendation

Following swallowing evaluation, for approximately what percentage of patients do you recommend that the valve be worn with oral intake? If you cannot recall this information, please state so.

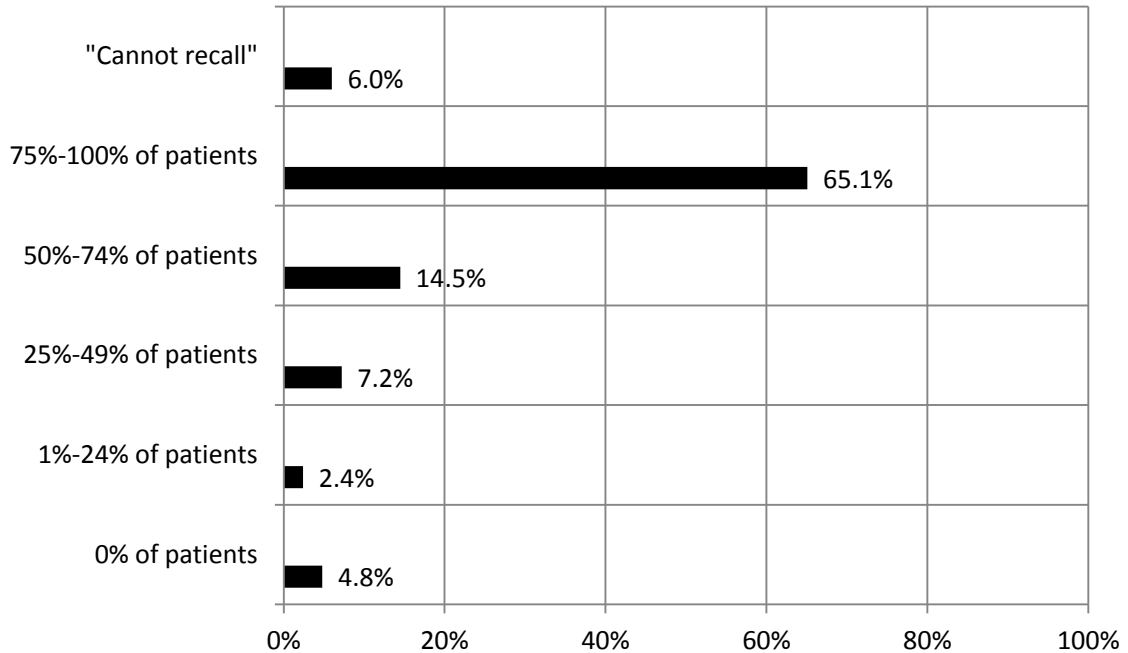


Figure 21. Open-ended Responses Regarding Frequency of Valve Recommendation:

1. If patient is appropriate for a valve - I recommend they wear it as much as tolerated including with oral intake.
2. We will usually have completed an MBS to determine patient's oral intake safety with valve and when NOT wearing the valve in the event that they are unable to tolerate valve placement.
3. We generally recommend all pts on trach collar that can tolerate a valve utilize the valve when eating.
4. As long as speaking valve is medically indicated and patient is tolerating without difficulty for at least 20-30 minutes.
5. If the patient can tolerate. I also will try MBSS with both use of valve and not use so that the proper recs can be made. [sic]
6. Again, this decision is made by the nurse, under direction of physician, who is not on site. [sic]
7. If patient is able to tolerate the speaking valve - then I typically recommend that the valve be worn at all times while patient is awake (if patient is able to independently remove and replace valve).
8. All patients are instructed to wear PMV during all oral intake intake if they are able to fully tolerate a PMV evaluation. [sic]
9. If they tolerated the valve during the assessment, then I certainly recommend it be ON during all oral intake intake [sic]. This is based on clinical experience, and based on Suiter's article (albeit an N=8 with pts post stroke).
10. As a general precaution, we ask all pts to wear it. Those I agree to not having to wear it are those that cannot tolerate or complain of discomfort or fatigue when worn. BUT, we only allow this if it has been demonstrated on instrumental swallow evaluation that the pt is safe without the valve on.
11. I dont recommend the valve to be on for oral intake other than it is important for the patient to be able to communicate during feedings.
12. If for no other reason, so that the patient can communicate during meals.

Patient Compliance

Three survey items gathered information about patient compliance with SLP recommendations for speaking valve use with oral intake. These three questions addressed the type of information typically included in a patient education session for the use of a speaking valve, an estimated percentage of patients who comply with recommendations for valve use at the time of discharge, and clinician perceptions about barriers to patient compliance.

Content of Patient Education Session

Clinicians were asked to select from a checklist topics that are typically included in a patient education session regarding speaking valve use. In response, 90.4 percent (n = 75) reported covering the ways in which valve placement impacts a particular patient's swallowing, 89.2 (n = 74) reported including how often the patient should wear the valve with oral intake, 75.9 percent (n = 63) reported discussing the dangers of aspiration and warning signs the patient should watch for, 33.7 percent (n = 28) selected "other" and entered a text response, and 6 percent (n = 5) did not provide a response. The text submissions included the following topics: valve placement and removal; physiologic changes with tracheostomy and the valve; how to use the valve for speech, cough, and toileting; importance of cuff deflation, safety guidelines and reasons for removal; how to monitor oxygen saturation while wearing the valve; and valve care and cleaning.

Figure 22. Content of Patient Education Session

After determining that a patient is a valve candidate, which of the following topics do you cover in your patient education session regarding valve use?

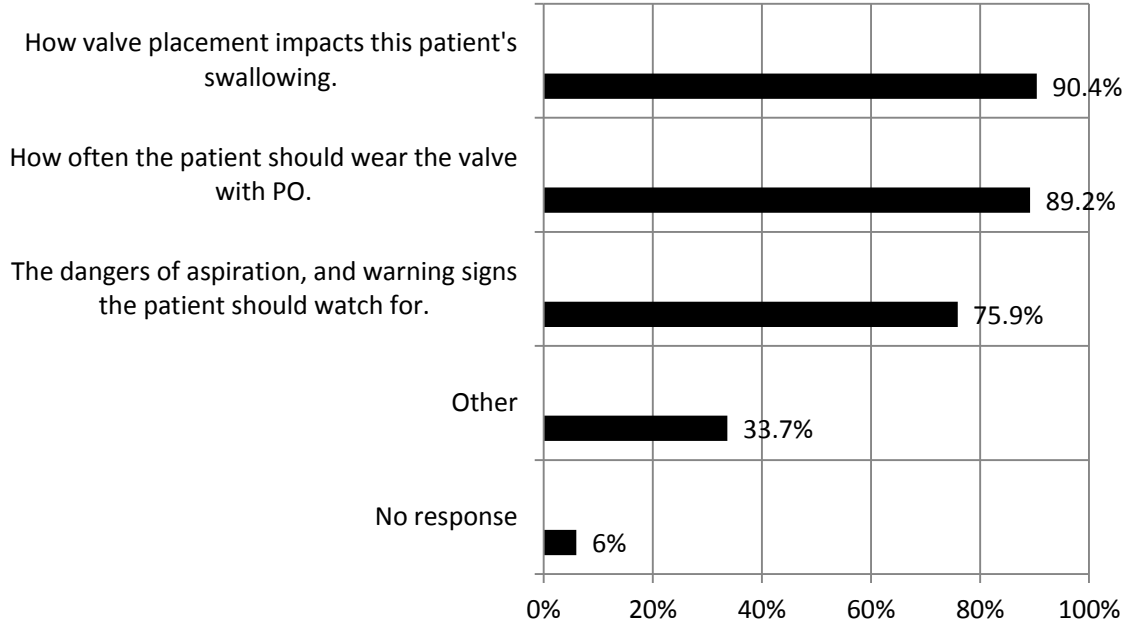


Figure 23. Clinician Comments Regarding Content of Patient Education Session:

1. Daily care of the speaking valve; how to don/doff (when patient deemed cognitively intact and Able to perform this).
2. Physiological changes with PMSV.
3. How to don/doff valve.
4. Placement, removal & care of valve; guidelines for use (cuff deflation, vital monitored, supervision...)
5. Recommendations to defer valve while sleeping.
6. How the valve works to allow for conversation. Signs that they should remove valve ie increased rate of breathing, effort of breathing, difficulty breathing etc. [sic]
7. Instructions for placement and removal; instructions for patient/family/nursing, contraindications.
8. How to wear the valve in general...i.e cuff down, not while sleeping, etc. [sic]
9. Also discuss basic trach education, indications for valve use and removal, importance of full cuff deflation with the speaking valve, and how to clean the speaking valve.
10. Cleaning, signs of CO₂ retention. [sic]
11. Valve wearing "schedule" (how long they can wear valve), precautions, suctioning needs.
12. Cuff deflation, non use in sleep, Usually this all happens before swallowing is addressed.
In our hospital, many patients are not able to be in charge of valve use- I often put up recs for RN and RT and go into more depth with family if they are around.
13. How the speaking works using a diagram for speaking and swallowing.
14. O₂ sats below 90 and removing the valve.
15. Note: I am not in the position of making primary recommendations for speaking valves.
Students from my school may follow my encouragement, but recommendations are made through outside agencies where they are followed for medical care.
16. The risk factors and importance of cuff deflation when wearing speaking valve; how to place and remove speaking valve.
17. Placement, removal, cleaning, impacts of valve on speech, cough, and abdominal fixation for bowel movements and lifting, how often patient should wear valve in general (not just with oral intake).
18. How the valve functions, benefits of the valve for communication and swallowing, care/cleaning of the valve, placement/removal of the valve, red flags to indicate immediate valve removal, and importance of full cuff deflation for valve use.
19. Care and use recommendations, safety issues (such as not placing the valve while the cuff is inflated), general education on anatomy/physiology of the valve use.
20. Self-placement and removal, cleaning and storage, when to take valve off.

Figure 23, Continued. Participant Comments Regarding Content of Patient Education Session:

21. Basic valve care and safety precautions: cuff deflation, hours of wear, cleaning, placing/removing, etc.
22. How to know when to remove the valve.
23. Most of the time we wait until the patient is changed to a cuffless valve before we do valve trials. But, if the patient has a cuffed trach we must do a lot to ensure the cuff is fully deflated prior to placing the valve. We also make it clear that the patient should not wear the valve when sleeping, instruct the patient and family on care/cleaning of the valve, and instruct the patient on how to don and doff the valve. We instruct the patient to IMMEDIATELY remove the valve if they feel any shortness of breath.
24. Train pt on placing on the valve and removing it safely...
25. When to place, when to remove, signs to monitor, cuff deflation, general trach and valve education, and how valve can improve swallow safety.
26. How to take it off and put it on; contraindications for use.
27. I educate in how to don and doff the valve, to not wear the valve during sleeping. I do not educate that the valve needs to be on during feedings, only for communication.
28. How to place and remove; how to clean; how to monitor O2 saturation; not to sleep in the valve.

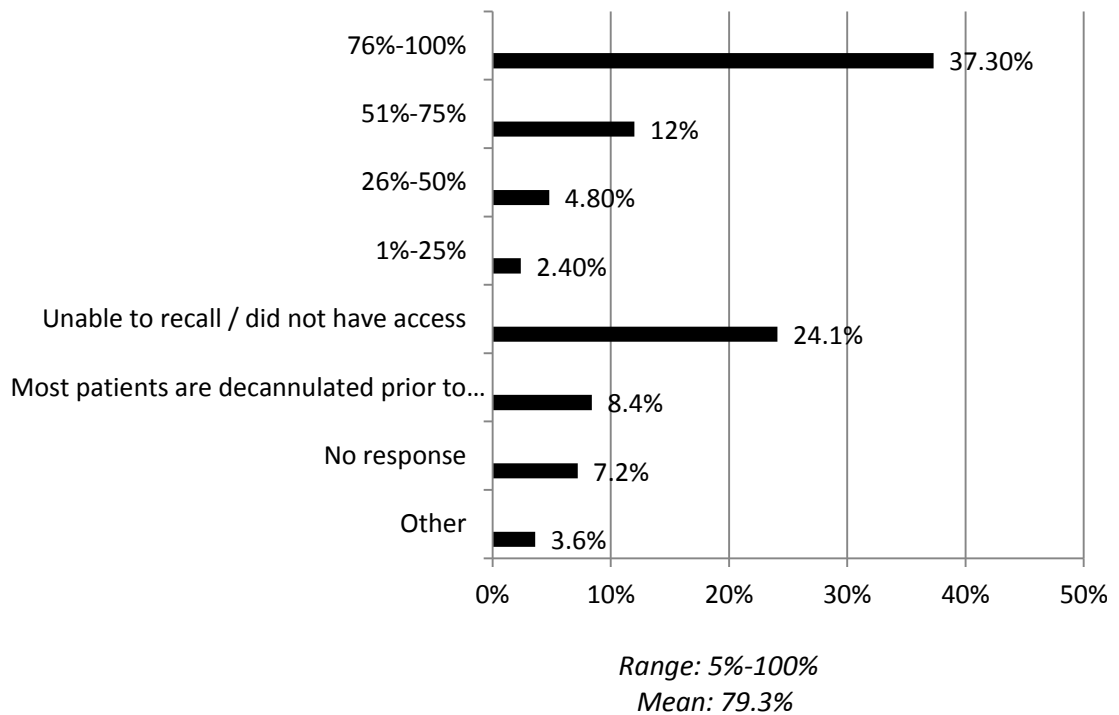
Patient Compliance with Recommendations for Valve Use

Using an open-ended question, participants were asked to estimate the percentage of their patients who were compliant with their recommendation for valve use during oral intake at the time of discharge. Open-ended responses were sorted into categories to facilitate discussion. Responses showed that 37.3 percent (n = 13) of participants reported compliance for 76-100 percent of patients, 12 percent (n = 10) reported compliance for 51-74 percent of patients, 4.8 percent (n = 4) reported compliance for 26-50 percent of patients, 2.4 percent (n = 2) reported compliance for 1-25 percent of patients, 8.4 percent (n = 7) stated that most patients are decannulated prior to discharge and therefore this question is not applicable, 24.1 percent (n = 20) were unable to recall or did not have access to this information, 3.6 percent (n = 3) entered a text response rather than a percentage, and 7.2 percent (n = 6) provided no response. Responses ranged from 5

percent to 100 percent of patients who were compliant, with a mean of 79.3 percent. Text responses consisted of “most, if not all,” “100 percent compliance for patients who were independent with valve placement, but unsure for patients who required assistance,” “usually [they are] very long-term trach patients and do not wear the valve at meals because they are hardly eating [and] very low level.

Figure 24. Patient Compliance

To the best of your knowledge, approximately what percentage of your patients with a speaking valve wore it during meals at the time of discharge? If you did not have access to this information, please state so.



Barriers to Patient Compliance

Using a checklist format in which participants selected all applicable answer choices, participants were asked to indicate what they have observed to be barriers to patient compliance. In response, 67.5 percent (n = 56) indicated that nursing staff is too busy to assist patients with valve placement, 60.2 percent (n = 50) that patients sometimes do not understand the importance of valve use even after an education session, 24.1 percent (n = 20) indicated that patients report valve use during oral intake is uncomfortable and/or inconvenient, 12 percent (n = 10) indicated that other medical team members (e.g., medical doctor, respiratory therapist, or nurse) recommend cuff inflation instead of valve placement during oral intake, 15.7 percent (n = 13) selected “other” and entered a text response, and 7.2 percent (n = 6) did not provide a response. Open-ended responses mentioned nursing non-compliance, patient dependence on assistance for valve placement, respiratory therapist non-compliance, and high compliance with no notable barriers.

Figure 25. Clinician-Perceived Barriers to Patient Compliance

Which, if any, of the following do you believe to be barriers to patient compliance with your valve wearing recommendation? Please check all that apply.

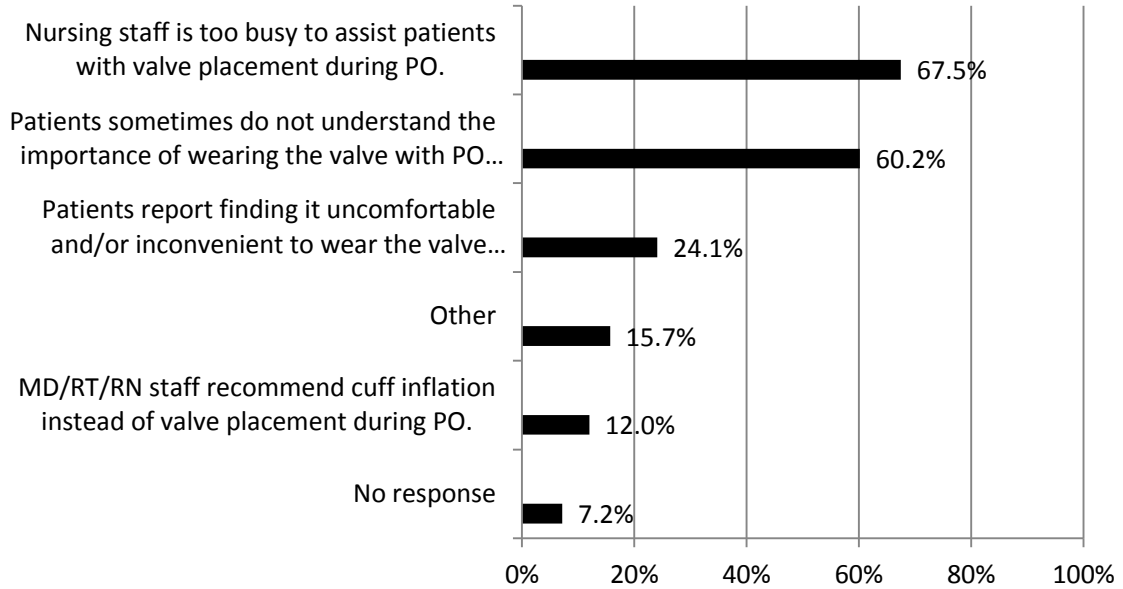


Figure 26. Open-ended Responses Regarding Barriers to Patient Compliance:

1. Valve lost.
2. Patients are unable to independently place/remove valve.
3. Nursing compliance-we obtain an order for speaking placement with meals when it is clinically indicated which help with compliance. We also teach patients/families how to place and remove the speaking valve when it is indicated.
4. Some patients are kept with non-fen inner cannula in place because they need Suctioning frequently, so the RT does not bother to change the IC and replace the valve when finished, and then they are just fed.
5. I honestly have not had any barriers. Our recommendations are always followed, as it is a Doctor's order.
6. Medical staff outside of our school tell nurses to remove the valve for eating.
7. Unable to independently remove valve if needed.
8. If the patient is not independent with valve placement.
9. No typical barriers.
10. Patient forgets.
11. 100% of patients with recommendations to wear valve while eating comply.

Participants' Additional Comments

Participants were provided with space at the end of the survey to enter additional comments they felt would be useful. Ten participants submitted an additional comment.

Figure 27. Participants' Additional Comments:

1. The reason for the tracheostomy (obstruction versus pulmonary compromise) has a greater impact on swallowing function than the presence of the tracheostomy.
2. Appropriate vent settings for use with valve and swallow eval.
3. I have found that nursing staff can be noncompliant with speaking valve use because they may not understand the swallowing/trach mechanism. I have also found that many of the nurses at a given facility don't have adequate training or education in using speaking valves or completing swallowing strategies for patients with trach/vent. Our facility is in the process of implementing a standard competency for all nursing staff for speaking valves and swallowing strategies specifically related to trach/vent pts. Hopefully this will increase nursing's comfort level with using the speaking valve and implementing the recommended swallowing strategies for these pts.
4. Research O2 sats, positioning, free water, keeping the patient's mouth clean.
5. Patient's level of comfort/anxiety impact their tolerance of speaking valves.
6. Much more education needed for doctors re: SLP tx for trach.
7. During my teaching, I have learned that it is more beneficial when a patient is able to wear a speaking valve to return sensation, however if patients are unable to tolerate speaking valve than assessment/instrumental must be completed without valve.
8. Education is key! We, as SLPs, must continue to push ourselves, grow, and pursue valuable education opportunities [sic] once out of graduate school.
9. Be flexible.
10. The important information is WHY the person was on a vent and trached, oftentimes it is because of respiratory or medically fragile issues, these are the reasons for dysphgia [sic]... not the placement of a tracheostomy tube.

Statistical Analysis

Certain questionnaire items were amenable to statistical analysis while others gathered mainly qualitative information. The items used in computation were arranged in two-by-two contingency tables and submitted to Fisher's Exact Test. Each computed variable was assigned two conditions, and responses from participants were coded as one of these two conditions based on criteria specific to each item. The two conditions were

selected to most effectively compare variables of interest in SLPs who make more frequent versus less frequent recommendations for valve use during oral intake. The following comparisons were analyzed using Fisher's Exact Test. For all analyses, the 0.05 significance level was used.

Factors in Clinician Recommendations

Fisher's Exact Test was computed for three two-by-two comparisons to examine factors in clinician recommendations for valve use during oral intake. The conditions for the clinician recommendation variable were: 1) a recommendation for valve use for 75 percent-100 percent of patients, and 2) a recommendation for valve use for 0 percent-74 percent of patients. Conditions were selected that divided responses for the frequency of valve recommendation at 75 percent in order to compare factors in SLPs who recommended valve use during oral intake for the majority of their patients (75%-100%) versus those who recommended the valve less frequently (0%-74%). The variable of clinician recommendations was paired with each of the following variables, which are shown below along with their bivariate conditions:

- Clinician opinions of the literature: 1) responses indicating that valve use may reduce aspiration, and 2) all other responses.
- Years of clinical experience in swallowing: 1) nine years and greater, and 2) zero to eight years (determined using a median split).
- Number of journal articles read annually: 1) seven articles and greater, and 2) zero to six articles (determined using a median split).

The table below shows the p -value for each of these three comparisons. The relationship between clinician recommendations and opinions of the literature was shown to have a p -value of 0.041, indicating that the clinicians' opinions of the literature are significantly associated with their recommendations. The other two factors were not significantly associated with clinician recommendations. However, the p -value for the number of articles read annually appears to reflect some level of association between this variable and the clinician recommendations, although the association is not considered statistically significant.

Table 1. Results of Fisher's Exact Test Conducted for Factors in Clinician Recommendations

Variable	Valid Cases	p-value
Opinions of the Literature	77	0.041
Years of Clinical Experience in Swallowing	75	1.000
Number of Journal Articles Read Annually	69	0.058

Patient Education and Patient Compliance

Three two-by-two comparisons examined aspects of patient education as factors in patient compliance with clinician recommendations for valve use during oral intake. The conditions for the patient compliance variable were 1) reported patient compliance of 76 percent-100 percent, and 2) reported patient compliance of 0 percent-75 percent. These conditions were selected to most effectively compare factors that differ between the highest reported rates of patient compliance and the lower reported rates. The variables of patient education I, II, and III each represent a topic that may be present in a

clinician-delivered patient education session regarding valve use. The variable of patient compliance was paired with each of the following variables, which are shown below along with their bivariate conditions:

- Patient education I: 1) How the valve affects swallowing AND how often to wear the valve with oral intake, and 2) all other responses.
- Patient education II: 1) How the valve affects swallowing, and 2) all other responses.
- Patient education III: 1) How often to wear the valve with oral intake, and 2) all other responses.

The test results below show that none of these three factors were significantly associated with patient compliance. The p-value for the education element “how the valve affects swallowing” was not able to be computed because such a high portion of respondents (90.4%) selected this answer choice that it appeared to be measuring a constant.

Table 2. Results of Fisher's Exact Test Conducted for Elements of Patient Education

Variable	Valid Cases	<i>p</i>-value
Patient Education I: How valve affects swallowing AND how often to wear valve with oral intake.	45	0.467
Patient Education II: How valve affects swallowing.	45	Unable to compute
Patient Education III: How often to wear valve with oral intake.	47	0.560

Clinician-Perceived Barriers to Patient Compliance

Three two-by-two comparisons examined clinician-perceived barriers to patient compliance with recommendations for valve use during oral intake. The variable of patient compliance was paired with each of three clinician-perceived barriers to compliance, which are displayed below along with their bivariate conditions:

- Barrier I: 1) Staff is too busy to assist with valve placement, and 2) all other responses.
- Barrier II: 1) Patients do not understand valve importance despite education, and 2) all other responses.
- Barrier III: 1) MD/RT/RN recommends cuff inflation, and 2) all other responses.

The test results below indicate that none of these barriers perceived by clinicians were significantly associated with patient compliance.

Table 3. Results of Fisher's Exact Test Conducted for Clinician-Perceived Barriers to Patient Compliance

Variable	Valid Cases	<i>p</i>-value
Barrier I: Staff is too busy to assist with valve placement.	49	0.724
Barrier II: Patients do not understand valve importance.	48	0.276
Barrier III: MD/RT/RN recommends cuff inflation.	45	0.166

Discussion

The purpose of the present study was to address the following questions:

- 1) Do clinicians with more thorough swallowing education more frequently recommend the use of a speaking valve during oral intake?
- 2) Do patients who receive more education regarding valve use more frequently comply with clinician recommendations?
- 3) Which barriers, if any, impede patient compliance with clinician recommendations?

Clinician Education and Recommendations

Opinions of the Literature

Three elements of clinician education were examined for their relationship to clinician recommendations: opinions of the literature, years of clinical experience in swallowing, and number of journal articles read annually. These three relationships were examined using a Fisher's Exact Test. Of these three, only clinician opinions of the literature were found to be significantly related to clinician recommendations for valve use, in that clinicians who believed that the valve was helpful recommended valve use more often. Considering that opinions of the literature were significant, while the number of journal articles was not, these results suggest that the type of articles being read is more relevant than the number of articles. Further, since the question addressing opinions of the literature pertained to the very narrow practice area of speaking valve application for swallowing, while the question regarding journal reading asked how many articles are read in the area of dysphagia in general, it is possible for clinicians to have extensive

knowledge of the broader dysphagia literature but be relatively unfamiliar with the literature specific to valve use for swallowing treatment. Therefore, these results suggest that the type of journal articles read by clinicians, rather than the number of articles, may be one influential factor in determining recommendations for valve use during oral intake. In addition, qualitative comments provided by participants in response to the survey item addressing opinions of the literature included citations to specific articles both supporting and refuting the use of the valve during oral intake, which further illustrated the role of opinions of the literature in clinician recommendations.

Avenues for Continued Education

Information about participants' continued education opportunities was gathered for qualitative analysis. The most popular response was a seminar/lecture outside of the facility of employment (68.7%), followed closely by independent reading of relevant literature (61.4%). The results from this item lend further support to the role of clinicians' opinions of the literature in recommendations. It is interesting to note that while 61.4 percent reported that they found it helpful to pursue independent reading of relevant literature, only 12 percent reported that they found it helpful to read literature distributed by their facility. This finding may suggest one of three things: facilities distributed literature but clinicians did not find it helpful, facilities distributed literature but clinicians did not read it, or facilities did not distribute literature to clinicians. Although these results reflect a need to establish a shared foundation of literature among clinicians, further research is required to determine how and why clinicians choose to read journal articles.

Establishing a shared foundation of literature knowledge among clinicians may streamline collaboration in the care of patients with tracheostomy. When juxtaposed with a study by Higgins and Maclean (1997), which documented life-threatening and fatal cases of aspiration resulting from dissension among tracheostomy team members, a shared foundation of literature knowledge among clinicians on the tracheostomy team seems especially critical.

There was wide variability in clinicians' report of the number of journal articles read annually, and the report of large numbers (e.g., 200-300) warrants doubt regarding response accuracy. The possibility for bias in these responses makes it difficult to determine how the number of journal articles read actually relates to clinician recommendations. In addition, the variability among responses raised questions regarding the type of articles clinicians are reading and the factors that determine how influential a particular article will be on clinician practice patterns. There are several possible factors that warrant further investigation into the ability of a journal article to influence clinician opinions, such as the type of journal in which an article is published, the publicity surrounding a piece of research and/or its authors, the length of an article, the accessibility of an article, the readability and/or complexity of an article, and the opinions of colleagues regarding a particular piece of research.

Clinician Practice Patterns in Valve Use

While the data collected for clinician practice patterns in valve use were not amenable to statistical analysis, they did provide some insight into the factors leading to valve use during swallowing assessment and treatment. The majority of participants

indicated that they use a valve during assessment for the following reasons: to determine whether valve use impacts a patient's swallowing safety, to aid in planning a recommendation for valve use, and because the valve is likely to show swallowing benefits. The majority of respondents also indicated that their main reason for not using a valve was a patient's inability to tolerate the valve (e.g., due to upper airway obstruction or anxiety), followed by a terminal diagnosis. These indications and contraindications for valve use during assessment are consistent with the literature, as are the open-ended comments that mentioned the restoration of subglottic pressure, the restoration of the normal relationship between swallowing and respiration, and the restoration of pharyngeal and laryngeal sensation.

One particular area in which clinician responses reflected a lack of consensus regarding recommendations in the literature is the selection of palliative care as a reason for not recommending valve use. Patients with terminal diagnoses who are receiving palliative treatment may benefit from the use of a speaking valve during oral intake if it increases swallowing safety and therefore capacity for oral feeding, as the ability to eat and drink is associated with patients' perceptions of quality of life (Bandeira et al., 2008; Chen et al., 2009, Tippett, 2000).

Above all, these comments reflected recommendations in the current literature by emphasizing the variability of individual patients' response to the valve and the importance of assessing each patient to determine valve benefit for swallowing. However, a portion of answer selections and comments stated the goal of valve placement to be only voice restoration, which reflects a small subset of the literature on valves and aspiration rather than the body of literature as a whole. This pattern of

discrepancy was also seen in the frequency of valve recommendation; nearly two thirds of participants reported recommending the valve for 75-100 percent of patients, while approximately one tenth of participants recommended the valve for 50-74 percent of patients, approximately one tenth recommended the valve for 25-49 percent of patients, approximately 5 percent of participants reported never recommending the valve, and approximately 2 percent of participants recommended the valve for one to 24 percent of patients. Collectively, these results indicate a lack of consensus among clinicians with regard to valve application for swallowing.

It is also possible that outside factors not addressed in the current study influence the frequency of clinician recommendations for valve use, such as the level of impairment present among patients in different facilities. For example, it may be possible that clinicians who primarily treat patients with severe cognitive impairments recommend valve use less often than clinicians who primarily treat patients with little to no cognitive impairment. Another possible factor may be the type of clinical training SLPs received; it is possible that the practice patterns and opinions of the literature held by supervisors during clinical training is an influential factor in clinicians' later opinions of the literature and valve recommendation practices.

Patient Education and Compliance

Three elements of patient education were examined for their relationship to patient compliance: 1) How often the patient should wear the valve with oral intake, 2) the dangers of aspiration and warning signs, and 3) how often the patient should wear the valve with oral intake along with the dangers of aspiration and warning signs. These

relationships were examined using a Fisher's Exact Test and none of the three were shown to be significant. Lack of variability and questionable accuracy are two aspects of these results that must be discussed.

The extreme lack of variability among these responses made their relationship to patient compliance difficult to analyze, as all three combinations of patient education elements were included in such a large majority of participant responses that they almost served as a constant rather than a variable. Since all three elements of patient education were present across clinicians with both high and low compliance rates, it is possible that significant aspects of patient education exist outside of those targeted in this study. Both of these explanations are supported by the comments provided in response to this item; the 28 comments contained almost identical content regarding elements of the patient education session. This further suggests that while the targeted elements of patient education are relevant for valve use, they are occurring with such high frequency, or are reported so inaccurately, that they are not significant factors in patient compliance.

The most important factor to consider in interpreting the responses for patient education is that this information was provided via clinician report rather than patient report. Relying on clinician report for a large group of patient education situations presents the potential for inaccurate recall of information, biased reporting of information, and presentation of information from the clinicians' point of view rather than the patients'. In order for patient education to have taken place, a patient must have understood the information being presented; when clinicians report that they have presented certain information to patients, this does not necessarily mean that the patients have understood the information. In addition, it is possible that there is very little

standardization in the process of patient education regarding valve use given the variability among patients; it is very unlikely that each patient education session is delivered in precisely the same manner. Therefore, since clinicians were asked to report using generalizations about a large group of patients, it is possible that responses did not reflect the actual education provided to each patient.

Barriers to Patient Compliance

Patient Dependence and Lack of Team Support

Fisher's Exact Test was used to examine the relationship between patient compliance and three clinician-perceived barriers: 1) staff is too busy to assist patient with valve placement, 2) patient does not understand valve importance despite education, and 3) other medical team members recommend cuff inflation. None of these three factors were shown to be significant. However, qualitative examination of these results, particularly participants' open-ended comments, yielded useful information. Clinician comments for the question item addressing barriers can be generally categorized into two groups: 1) the patient is dependent on assistance for placing the valve, and 2) nurses and respiratory therapists remove the valve for cleaning and do not replace it for oral intake, despite the SLP's recommendation to do so. These comments provided more insight than the statistical analysis into the problem of patient compliance. These results suggest that once a valve has been recommended, two of the most common barriers that SLPs perceive to prevent the follow-through of the recommendation are patient dependence on assistance with valve placement and lack of available assistance from other medical team members.

In addition, other question items that did not specifically address patient compliance also yielded useful information regarding the barriers perceived by SLPs. The question item addressing reasons for not recommending valves revealed that 21.7 percent of participants choose not to recommend valve use with oral intake because they perceive there will be inadequate assistance with valve placement. This reveals that lack of team support with valve placement not only presents a barrier between recommendation and compliance, but may be a barrier to the recommendation itself. Through examination of these results it appears that there may be a self-fulfilling prophecy in the problem of patient compliance: patients can be non-compliant with recommendations because they require assistance, assistance is not provided from support staff, and because SLPs anticipate lack of compliance they may tend not to recommend valve use during oral intake for patients who are dependent on assistance.

Elective Non-Compliance

One SLP-perceived barrier to compliance that was not targeted in this study but became apparent through participants' open-ended comments is that of patients' elective non-compliance, even after the delivery of education and the provision of assistance with valve placement. Participants' comments regarding valve use revealed the difficult situation clinicians face when patients elect not to use the valve despite clinician recommendations to do so, even after receiving an education session. These comments emphasized that after education and recommendations have been provided, a decision regarding valve use is ultimately the patient's choice and must be respected accordingly. In response to the question item regarding clinicians' reasons for not using valves, 15.7

percent of participants indicated that they choose not to recommend valve use because they feel the patient is unlikely to comply. These results illustrate that patient compliance is not only an outcome of clinician recommendations, but can also be a factor in determining clinician recommendations.

One very important aspect to consider in these comparisons is that patient compliance was measured by clinician report. Therefore, data reflect clinicians' estimations of patient compliance rather than actual compliance. It is possible that clinician-reported compliance was a) inaccurate due to difficulty recalling this information, b) misleading because of generalizations made across a large number of patients, or c) biased because clinicians attempted to provide desirable responses.

Limitations

This study had several limitations:

- The most significant limitation lies in the fact that all of the data gleaned from this study are based on clinician report. Without interviewing the patients themselves and other staff members on the multidisciplinary teams that served those patients, and without reviewing the patients' charts, the accuracy of the clinician reports is questionable.
- Another significant limitation is the fact that clinicians were asked to make generalizations about their patients as a group rather than to provide data for individual patients. Each patient's case involves a unique combination of factors that lead to compliance or noncompliance, and the formation of generalizations based on a

large number of patients may have masked relevant aspects of education that differed among patients.

- The survey items were susceptible to response bias, and it is possible that participants provided responses that were perceived as more correct or desirable.

One example is the participant who responded that he/she read 300 journal articles annually in the area of dysphagia assessment and treatment; this is highly unlikely and probably represents a biased response. In each area addressed by the survey items (clinician education, clinician practice patterns, and patient compliance), it was possible for participants to discern which responses would make themselves appear more competent to the investigator.

- The survey item that measured clinicians' opinion of the literature was in reality measuring clinicians' opinions of the issue of valve use, and was not sensitive to whether those opinions are literature-based or drawn from other sources. These opinions provided in response to this item do not necessarily reflect clinicians' familiarity with the literature, as they could have been drawn from other sources, including the opinions of colleagues and the publicity of particular research or clinical approaches.

- The sample size ($n = 83$) was relatively small, making it difficult to generalize the responses from the sample to those of other SLPs working with this population.

- The sample was relatively homogeneous, as most participants practiced in similar hospital settings within a small geographic area. However, this was difficult to avoid due to the fact that clinicians working with patients with

tracheostomy already represent a very small portion of the speech-language pathology field and tend to practice mainly in the hospital setting.

Conclusions

Based on the results of the present study, the following conclusions can be drawn:

- Clinicians who believe that speaking valves are useful for improving swallowing safety are more likely to recommend that patients use them during oral intake.

However, these opinions are not necessarily based on the available literature and may be drawn from other sources of information, such as colleagues' opinions or the publicity of particular clinical approaches.

- Clinicians report that one primary avenue for continued education in the area of dysphagia is independent reading of relevant journal articles; however, it is unclear which aspects of journal articles make them more or less influential in the practice patterns of the clinicians who are reading them. It is possible that influential factors include the accessibility of a particular journal, the length of a particular article, or the opinions of colleagues regarding a piece of literature.

- There is substantial discrepancy among clinicians in the frequency of recommendations for valve use during oral intake; this may stem from a lack of consensus among clinicians regarding the implications of the current literature.

- According to clinician perception, two notable barriers to patient compliance with clinician recommendations for valve use are: a) patients' dependence on assistance with valve placement, and b) a lack of assistance from medical team members with valve placement.

- Clinicians perceive that despite receiving education and assistance with valve placement, patients may elect to remain non-compliant with clinician recommendations for valve use.
- Clinicians may choose not to recommend valve use with oral intake if they perceive that a) patients will be non-compliant or b) patients will not receive necessary assistance with valve placement from other medical team members.

Directions for Further Research

The present study revealed several areas in which further research may yield benefits for increasing both literature-based recommendations regarding valve use for swallowing and patient compliance with clinician recommendations:

- While the current study suggests that clinicians do not necessarily form opinions about clinical practice based on the literature alone, it is unclear which aspects of published literature contribute to the level of influence a particular article will have on the practice patterns of its readers. It would be useful to research the specific type of literature that is being read by SLPs working with this population to determine what makes an article more likely to be read and more likely to be influential in SLPs' clinical practice. Gaining this information may be helpful for authors and department managers who are working to get the most relevant articles into the hands of clinicians who work with this population. Possible factors that warrant further investigation into the ability of a journal article to influence clinician opinions include the type of journal in which an article is published, the publicity surrounding a piece of research and/or its authors, the

length of an article, the accessibility of the article, and the opinions of colleagues regarding a particular piece of research.

- The present study revealed a lack of understanding of how the perspectives of SLPs compare to those of nurses, respiratory therapists, and patients on the issues of valve implementation and patient compliance. Understanding of other team members' perspectives is necessary for enhancing multidisciplinary collaboration that facilitates patient compliance.
- There is very little data available that illuminates patients' perspectives on education and compliance; learning which factors patients perceive to be most influential may help guide clinical practice to better facilitate patient compliance.

Appendices

Appendix A

Participant E-mail Letter

Hello,

My name is Anne Sasdelli and I am a speech-language pathology graduate student at the University of Maryland Department of Hearing and Speech Sciences, completing my master's thesis under the supervision of Dr. Barbara Sonies.

I am interested in patient compliance and education in the use of speaking valves. For this project, I am asking SLPs who serve patients with tracheostomies to complete a brief 12- item questionnaire. In order to analyze the data properly, I need to collect a sufficient quantity of responses. Therefore, I really need your help! I would very much appreciate your time in completing the survey and assisting me with this project. If you have colleagues or co-workers who also see patients with tracheostomies, I would be grateful if you would ask them to complete this questionnaire, as well. You can refer them to the survey website at:

All individuals who complete this survey will be entered into a drawing to win up to 4.0 CE through journal reading sponsored by the University of Maryland, at no cost to the winner. A single respondent will be drawn.

Below is the link to the online survey. Your completion of this survey is optional and serves as your consent to participate in this research. Your responses are entirely anonymous; however, you will have the option to provide your name and contact information at the end of survey if you would like to give permission for me to contact you for further information about your responses, and if you would like to be entered into the drawing for CEUs.

Thank you very much for your assistance and please do not hesitate to contact me with any questions or concerns.

Thank you,

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Appendix B

Electronic Survey

1. Where do you usually practice?

- Hospital
- Acute care rehabilitation facility
- Outpatient rehabilitation facility
- Skilled nursing facility
- Home health care
- Other (please specify): _____

2. In total, how many years have you practiced as a speech-language pathologist?

3. How many years have you been practicing continuously in a position that involves swallowing assessment/treatment? _____

4. Do you ever use a one-way speaking valve with your patients who have a tracheostomy?

- No
- Yes

[if no, skip to question 11]

5. Do you ever use a one-way speaking valve during swallowing assessment (either bedside evaluation or videofluoroscopy)?

- No
- Yes

[if no, skip to question 8]

6. When you are asked to perform swallowing evaluations for patients with tracheostomy, approximately what percentage of the time do you evaluate the patient both with and without the valve under videofluoroscopy? _____%

7. For which reason(s) do you use a speaking valve during swallowing assessment?
Check all that apply.

- To determine whether the patient's swallowing is impacted by the valve.
- To aid in planning a valve wearing recommendation for the patient.
- Because the valve is likely to show swallowing benefits.
- Other (please specify) _____

8. For which reason(s) do you NOT use a speaking valve during swallowing assessment.
Check all that apply.

- The patient cannot tolerate the valve (e.g., desaturation, upper airway obstruction, reduced alertness).
- The patient is being evaluated for comfort measures/palliative care.
- The valve is unlikely to show swallowing benefits.
- The patient's swallowing behavior during evaluation will most likely not represent that of normal oral intake.
- Other (please specify) _____

9. Following swallowing evaluation, for approximately what percentage of patients do you recommend that the valve be worn with oral intake? If you cannot recall this information, please state so.

- 0%
- 1%-24%
- 25%-49%
- 50%-74%
- 75%-100%

Comments (optional): _____

10. For which reason(s) do you recommend that the valve be worn with oral intake?
Check all that apply.

- To improve communication and social participation
- To improve patient's appearance
- To enable a productive cough
- To reduce the risk of aspiration
- To restore subglottic pressure during swallowing
- Other (please specify): _____

11. For which reason(s) do you NOT recommend that a patient wear the valve with oral intake? Check all that apply.

- The patient may feel self-conscious about valve appearance
- The patient cannot tolerate the valve (e.g., medically unstable, upper airway obstruction, reduced alertness).
- The patient is receiving comfort measures/palliative care.
- The patient is not likely to comply with your valve wearing recommendation.
- Other team members (e.g., nurses, respiratory therapists, physicians, etc.) do not assist with valve placement during oral intake.

12. After determining that a patient is a valve candidate, which of the following topics do you cover in your patient education session regarding valve use? Check all that apply.

Please check all that apply. I believe that relevant literatures shows:

- How often the patient should wear the valve with oral intake.
- How valve placement impacts this patient's swallowing safety, based on evaluation results.
- The dangers of aspiration, and warning signs the patient should watch for.
- Other (please specify): _____

13. To the best of your knowledge, approximately what percentage of your patients with a speaking valve wore it during meals at the time of discharge? If you did not have access to this information, please state so. _____%

14. Which, if any, of the following do you believe to be barriers to patient compliance with your valve wearing recommendations? Check all that apply.

- Nursing staff is too busy to assist patients with valve placement during oral intake.
- MD/RT/RN staff recommend cuff inflation instead of valve placement during oral intake.
- Patients sometimes do not understand the importance of wearing the valve with oral intake according to recommendations, even after your education session.
- Patients report finding it uncomfortable and/or inconvenient to wear the valve during oral intake.
- Other (please specify): _____

15. Please check all that apply. In my opinion, the published literature shows that:
- Speaking valves should not be used during swallowing evaluation.
 - Swallowing evaluation should be done both with and without a speaking valve for each patient.
 - Wearing speaking valves during feeding may increase aspiration risk.
 - Wearing speaking valves during feeding may decrease aspiration risk.
 - Other (please specify): _____

16. Which of the following continuing education opportunities in swallowing assessment/treatment have you found to be helpful during the past year? Please check all that apply.
- seminar/lecture sponsored by my facility
 - seminar/lecture outside of my facility
 - mentorship from a colleague (SLP or other)
 - literature distributed by my facility
 - independent/self-study course
 - independent reading of relevant literature
 - Other (please specify): _____

17. Approximately how many journal articles related to swallowing assessment/treatment have you read in the past year? _____

18. How would you rate your own comfort level in evaluating and treating swallowing in patients with tracheostomy?
- Highly comfortable
 - Fairly comfortable
 - Not very comfortable
 - I refer such cases to colleagues.

19. Below is space to enter any other information/comments related to your experience serving patients with tracheostomies that you feel may be helpful to this research. Thank you!

20. Your responses to this survey are anonymous. However, if you would like to give permission for me to contact you with further questions, and would like to be entered in a drawing to win 4.0 free CEUs, please enter your name and/or phone number below.

References

- Bandeira, A., Azevedo, E., Vartanian, J., Nishimoto, I., Kowalski, L., & Carrara-de Angelis, E. (2008). Quality of life related to swallowing after tongue cancer treatment. *Dysphagia*, *23*, 183-192.
- Betts, R.H. (1965). Post-tracheostomy aspiration. *New England Journal of Medicine*, *273*, 155.
- Boggs, R.L. (1993). Airway management. In R.L. Boggs & M. Wooldridge-King (Eds.), *AACN procedure manual for critical care* (pp. 1-51). Philadelphia: W.B. Saunders.
- Bonanno, P.C. (1971). Swallowing dysfunction after tracheostomy. *Annals of Surgery*, *171*(1), 29-33.
- Bone, D.K., Davis, J., Zuidema, G.D., & Cameron, J.L. (1974). Aspiration pneumonia: Prevention of aspiration in patients with tracheostomies. *The Annals of Thoracic Surgery*, *18*(1), 30-37.
- Cameron, J.L., Reynold, J., & Zuidema, G.D. (1973). Aspiration in patients with tracheostomies. *Surgery, Gynecology & Obstetrics*, *100*, 68-70.
- Chen, P., Golub, J., Hapner, E., & Johns, M. (2009). Prevalence of perceived dysphagia and quality-of-life impairment in a geriatric population. *Dysphagia*, *24*, 1-6.
- Crimlisk, J.T., Horn, M.H., Wilson, D.J., & Marino, B. (1996). Artificial airways: A survey of cuff Management practices. *Heart & Lung*, *25*(3), 225-235.
- Davis, L., & Copeland, K. (2005). Effectiveness of computer-based dysphagia training for direct patient care staff. *Dysphagia*, *20*, 141-148.

- Dettelbach, M.A., Gross, R.D., Mahlmann, J., & Eibling, D. (1995). Effect of the Passy-Muir valve on aspiration in patients with tracheostomy. *Head & Neck, 17*(4), 297-302.
- DeVita, M.A., & Spierer-Rundback, L. (1990). Swallowing disorders in patients with prolonged orotracheal intubation or tracheostomy tubes. *Critical Care Medicine, 18*(12), 1328-1330.
- Diez-Gross, R., Atwood, C.W., Grayhack, J.P., & Shaiman, S. (2003). Lung volume effects on pharyngeal swallowing physiology. *Journal of Applied Physiology, 95*(6), 2211-2217.
- Diez-Gross, R., Steinhauer, K.M., Zajac, D.J., & Weissler, M.C. (2006). Direct measurement of subglottic air pressure while swallowing. *The Laryngoscope, 116*, 753-761.
- Donzelli, J., Brady, S., Wesling, M., & Theisen, M. (2005). Effects of the removal of the tracheotomy tube on swallowing during the fiberoptic endoscopic exam of the swallow (FEES). *Dysphagia, 20*, 283-289.
- Donzelli, J., Brady, S., Wesling, M., & Theisen, M. (2006). Secretions, occlusion status, and swallowing in patients with a tracheotomy tube: A descriptive study. *ENT-Ear, Nose, & Throat Journal, 85*(12), 831-834.
- Eibling, D.E., & Gross, R.D. (1996). Subglottic air pressure: A key component of swallowing efficiency. *The Annals of Otolaryngology, Rhinology, & Laryngology, 105*, 253-258.
- Elpern, E.H., Scott, M.G., Petro, L., & Ries, M.H. (1994). Pulmonary aspiration in mechanically ventilated patients with tracheostomies. *Chest, 105*, 563-566.

- Elpern, E.H., Okonek, M.B., Bacon, M., Gerstung, C., & Skrzynski, M. (2000). Effect of the Passy-Muir tracheostomy speaking valve on pulmonary aspiration in adults. *Heart & Lung, 29(4)*, 287-293.
- Finder, J.D., Yellon, R., & Charron, M. (2001). Successful management of tracheostomized patients with chronic saliva aspiration by use of constant positive airway pressure. *Pediatrics, 107*, 1343-1345.
- Higgins, D.M., & Maclean, J.C. (1997). Dysphagia in the patient with a tracheostomy: Six cases of inappropriate cuff deflation or removal. *Heart & Lung, 26(3)*, 215-220.
- Kaplowitz, M., Hadlock, T., & Levine, R. (2004). A comparison of web and mail survey response rates. *Public Opinion Quarterly, 68(1)*, 94-101.
- Leder, S.B., Tarro, J.M., & Burrell, M.I. (1996). Effect of occlusion of a tracheotomy tube on aspiration. *Dysphagia, 11*, 254-258.
- Leder, S.B., Ross, D.A., Burrell, M.I., & Sasaki, C.T. (1998). Tracheotomy tube occlusion status and aspiration in early postsurgical head and neck cancer patients. *Dysphagia, 13*, 167-171.
- Leder, S.B. (1999). Effect of a one-way tracheostomy speaking valve on the incidence of aspiration in previously aspirating patients with tracheostomy. *Dysphagia, 14*, 73-77.
- Leder, S.B., Joe, J.K., Hill, S.E., & Traube, M. (2001). Effect of tracheotomy tube occlusion on upper esophageal sphincter and pharyngeal pressures in aspirating and nonaspirating patients. *Dysphagia, 16*, 79-82.
- Leder, S.B., Joe, J.K., Ross, D.A., Coelho, D.H., & Mendes, J. (2005). Presence of a

- tracheotomy tube and aspiration status in early, postsurgical head and neck cancer patients. *Head & Neck*, 27, 757-761.
- Logemann, J.A., Lazarus, C.L., Keeley, S.P., Sanchez, A., & Rademaker, A.W. (2000). Effectiveness of four hours of education in interpretation of radiographic studies. *Dysphagia*, 15, 180-183.
- Martin-Harris, B., Brodsky, M.B., Michel, Y., Castell, D.O., Schleicher, M., Sandidge, J., Maxwell, R., & Blair, J. (2008). MBS measurement tool for swallow impairment-MBSImp: Establishing a standard. *Dysphagia*, 23, 392-405.
- Muz, J., Mathog, R., Miller, P., Rosen, R., & Borrero, G. (1987). Detection and quantification of laryngotracheopulmonary aspiration with scintigraphy. *Laryngoscope*, 97, 1180-1185.
- Muz, J., Hamlet, S., Mathog, R., & Farris, R. (1994). Scintigraphic assessment of tracheostomized patients. *Head and Neck*, 16, 17-20.
- Pinkus, N.H. (1978). The dangers of oral feeding in the presence of cuffed tracheostomy tubes. *Medical Journal of Australia*, 1, 1238-1240.
- Romero, C., Marambio, A., Larrondo, J., Walker, K. Lira, M., Tobar, E., Cornejo, R., & Ruiz, M. (2010). Swallowing dysfunction in nonneurologic critically ill patients who require percutaneous dilatational tracheostomy. *CHEST*, 137(6), 1278-1282.
- Rosenbek, J., Robbins, J., Roecker, E. Coyle, J., & Wood, J. (1996). A penetration-aspiration scale. *Dysphagia*, 11, 93-98.
- Sharma, O., Oswanski, M., Singer, D., Buckley, B., Courtright, B., Raj, S., Waite, P., Tatchell, T., & Gandaio, A. (2007). Swallowing disorders in trauma patients: Impact of tracheostomy. *The American Surgeon*, 73, 1117-1121.

- Stachler, R.J., Hamlet, S.L., Choi, J., & Fleming, S. (1996). Scintigraphic quantification of aspiration reduction with the Passy-Muir valve. *The Laryngoscope*, *106*, 231-234.
- Suiter, D.M., McCullough, G.H., & Powell, P.W. (2003). Effects of cuff deflation and one-way tracheostomy speaking valve placement on swallow physiology. *Dysphagia*, *18*, 284-292.
- Tippett, D.C. (Ed.). (2000). *Tracheostomy and ventilator dependency: Management of breathing, speaking, swallowing*. New York: Thieme Medical Publishers, Inc.
- Tolep, K., Getch, C.L., & Criner, G.J. (1996). Swallowing dysfunction in patients receiving prolonged mechanical ventilation. *Chest*, *109*, 167-172.
- Warren-Forward, H., Mathisen, B., Best, S., Boxswll, P., Finlay, J., Heasman, A., Hodis, D., Morgan, C., & Nixon, J. (2008). Australian speech-language pathologists' knowledge and practice of radiation protection while performing videofluoroscopic studies. *Dysphagia*, *23*, 371-377.