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Ventilator Issue

Madonna Rehabilitation Hospital

Fresh Air Camp

Ask our Clinical Specialist

Interview: Dr. Dikeman & Dr. Kazandjian

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Tracheostomy & Ventilator Swallowing and Speaking Valves

Ventilator Issue

The number of patients requiring prolonged acute mechanical ventilation is steadily increasing. So are the healthcare costs associated with caring for these patients. Therefore, it is imperative that healthcare providers identify and utilize evidence-based practices that will decrease the length of time these patients are spending on the ventilator and in the hospital. Early use of the Passy-Muir® Valve with ventilator dependent patients has been shown to have many clinical and cost-savings benefits, including improved patient outcomes, improved quality of life, and expedited weaning. In this issue we have the experts explain both the ***"WHY"*** *and the* ***"HOW"*** *of in-line ventilator application of the Passy-Muir Valve. We hope that by reading this issue you too can Discover the Difference!*

Did you KNOW?

605,898

The projected number of adult discharges requiring prolonged mechanical ventilation in the year 2020.

$60 billion

The expected national bill in the year 2020 associated with prolonged mechanical ventilation.

Source: Zilerberg, et al. Critical Care Medicine 2008.

Madonna Rehabilitation Hospital – *A Center for Excellence*

By Linda Dean, RRT, Clinical Specialist and Julie Kobak, MA, CCC-SLP, Vice President of Clinical Education

In August, we had the pleasure of making a site visit to Madonna Rehabilitation Hospital in Lincoln, Nebraska. We originally learned about this hospital after reading an article they had published in the ASHA Leader about their multi-disciplinary team model and use of the Passy-Muir® Valve for tracheostomized and ventilator patients. They also presented their experiences and successes at both the AARC and ASHA national conventions. Their independent research validates many of the benefits of in-line application of the Passy-Muir Valve and it was clear from their articles and presentations that they were a special team. It was great to see them in action at the bedside, and witness them practice their keys to success.

Rebecca Wills, BA, LCP, CRT-NPS with Mr. Gearhart

Within 48 hours of admission, every patient is evaluated by the respiratory therapist and the speech language pathologist for placement of the Passy-Muir® Valve.

Madonna Rehabilitation Hospital is a long term acute care (LTAC) and rehabilitation facility that has become a referral site for adult and pediatric patients throughout the United States. As we toured the beautiful facility, equipped with state-of-the art technology, the clinicians told us about their approach to the care of tracheostomized and ventilator patients. Within 48 hours of admission, every patient is evaluated by the respiratory therapist and the speech language pathologist for placement of the Passy-Muir® Valve. The multidisciplinary team has developed a flow chart for assessment and treatment including objective criteria for valve tolerance. The team explained to us that use of the Passy-Muir® Valve is a critical step to weaning and enables the clinicians to assess communication, voice, swallowing, and ability to manage secretions. Even some of the most medically complicated patients have been successful using the valve in-line, including those on full ventilatory support. Using this multi-disciplinary approach, the team weans patients from mechanical ventilation, with eventual decannulation. Carrie Windhorst, MA, CCC-SLP, explained that their patients also begin oral feeding sooner, liberate from tube feedings, and have improved secretion clearance. With improved communication with family and staff, the patients experience improved psychological well-being.

Carrie Windhorst, MS,CCC-SLP with Mr. Gearhart

We met several patients during our visit, including Bernard "Butch" Vylihdal (cover photo) who transferred to Madonna Rehabilitation Hospital from an acute care hospital, ventilator dependent secondary to trauma, COPD, and lower lobe resection due to chronic atelectasis. For over a month at the acute care hospital, the cuff on his tracheostomy tube was inflated so he was unable to communicate. He was also NPO and completely dependent on PEG tube feedings. On the day of his admission to Madonna Hospital, Cheryl Wagoner, MA, CCC-SLP and Jackie Kiritsy, RRT, worked together to complete a Passy-Muir Valve assessment and place the valve in-line. He tolerated the valve very well, which allowed Mr. Vylihdal to speak and participate in a clinical swallow evaluation and begin an oral diet that day. Just six days later, Mr. Vyhlidal's diet was advanced to a regular diet and he was able to enjoy a hamburger and some potato chips. It was so exciting to witness this success story! We visited numerous patients that day and each of them was a testimony to the fact that Madonna Rehabilitation Hospital is truly a center of excellence and a model for all LTAC and rehabilitation facilities.

Cheryl Wagoner, MS, CCP-SLP (left) and Jackie Kiritsy, RRT (right) with Mr. Vargas

The Madonna Rehabilitation Team

Click here for patient videos

FRESH AIR CAMP

By Julie Kobak, MA, CCC-SLP, Vice President of Clinical Education

Did you ever see a ventilator and wheelchair dependent child riding a horse? How about climbing a tree suspended 20-30 feet off the ground? Or swimming in a pool with a dozen other tracheostomized and ventilator dependent children? Doesn't sound possible? Only something that one could dream about? Well this is exactly what the campers at the **Fresh Air Camp** in Cleveland Ohio got to experience during the second week of June. Fresh Air Camp celebrated its 10th year of making dreams come true for tracheostomized and ventilator dependent children and I had an incredible experience volunteering for a day at the camp.

Fresh Air Camp was developed by medical professionals from Cleveland and Akron Hospitals to allow children with special needs who have never experienced a night away from home (unless it was in the hospital) doing what all children are supposed to do while away at camp – have a great time! The children stay 6 days and 5 nights having camp fires, fishing, making crafts, holding talent shows, and playing sports. Over 200 volunteers make this camp possible, including physicians, nurses and therapists who volunteer a week of their time to provide the 24 hour medical care to the campers. The coordinators of the camp spend the entire year organizing the volunteers and the donated supplies and materials so that the children can attend camp at no cost.

The day I visited, it happened to rain exceptionally hard in the morning, limiting activities to the indoors. This didn't hamper the fun in the least bit as the children enjoyed numerous crafts, a clown show, made cupcakes, played bingo, and had an exciting game of adapted indoor hockey – I was exhausted! There was not an activity that a child was excluded from based on their physical limitations. Everything is made possible for these children and for one week they get to forget their troubles and have crazy fun! The camp brochure says "Once you experience Fresh Air Camp, you will never be the same". For me this was certainly true. I can't wait to go back next year!

Check out a ventilator camp near you:

Camp Pelican, Lion's Camp, Leesville, LA, www.camppelican.org
Light the Way Camp, Alex City, AL, www.ventkidsofalabama.com
Trail's Edge Camp, Mayville, MI, www.med.umich.edu/mott/trailsedge/index.html
Camp Inspiration, Double H Hole in the Woods Ranch, Lake Luzerne, NY, www.doublehranch.org
Fresh Air Camp, Camp Cheerful, Strongsville, OH, www.freshaircamp.org
CHAMP Camp, Ashley, OH, www.champcamp.org
PA Vent Camp, Hershey, PA, www.paventcamp.com
VACC Camp, Miami, FL, www.vacccamp.com/about/index.asp

Ask our Clinical Specialist

The following questions were answered by Linda Dean, RRT, a respiratory therapist with 25 years of experience as an acute, sub-acute, long term care provider, and clinical instructor. She has been a clinical educator for Passy-Muir, Inc. since 1997.

Is it possible to use the Passy-Muir® Valve with ventilator patients?

The Passy-Muir® Valve was invented and originally used by David Muir, who was ventilator dependent secondary to muscular dystrophy. David wanted to be able to communicate while being mechanically ventilated, and he did so successfully by using his valve in the circuit of his ventilator.

Before placing the Passy-Muir Valve in the ventilator circuit, the cuff must be completely deflated. Ventilating tracheostomized patients with cuffs deflated is not something that is usually taught in the classroom, therefore many respiratory therapists are unfamiliar with this practice. However, many tracheostomized patients successfully ventilate with cuffs in the deflated position (Bach, J. and Alba, A. 1990). Most ventilators today, including critical care ventilators, are compatible with in-line Passy-Muir Valve use. The following are keys to successful in-line use:

- understanding how to ventilate the patient with the cuff completely deflated
- knowing ventilator setting changes that enhance toleration
- realizing the importance of collaboration between the speech-language pathologist and respiratory therapist during initial assessment and placement of the valve.

All members of the team must be educated and competent in valve application and appreciate what each member of the team contributes to the care of the patient.

When we put the Passy-Muir Valve in-line, the ventilator constantly alarms. Why does this happen and what can I do about it?

When the Passy-Muir® Valve is placed in-line with the ventilator circuit the patient is exhaling all air through the upper airway. Therefore, there will be no exhaled volume returned to the ventilator (V_T and V_E will read "0"). This causes the exhaled volume alarm to activate. In addition, when you deflate the cuff to use the Passy-Muir Valve, you create a leak in the system which can result in peak airway pressures decreasing and low pressure alarms activating. Every brand of ventilator handles alarm settings differently. Some ventilators and modes of ventilation allow the respiratory therapist to turn off volume alarms and set an alternative low pressure alarm. For assistance with alarm adjustments pertaining to a specific type of ventilator or mode, contact a Clinical Specialist at Passy-Muir, Inc.

Why would my patient's respiratory rate suddenly increase with in-line valve placement?

The patient may be increasing his respiratory rate in an effort to compensate for volume loss on inspiration. When the cuff is deflated, some of the inspired volume may leak through the upper airway instead of being directed into the lungs. As a result, the patient takes more frequent breaths in an effort to achieve the desired V_E (minute ventilation).

Additionally the patient may speak on inhalation instead of exhalation, which will result in volume loss to the lungs as well. If the patient's voice is quiet and the chest rise is less, these are indications that the patient is having difficulty coordinating speech with the exhalation phase. It is critical at this time, and often the first goal of therapy, to teach the patient how to coordinate speech and breathing. Sometimes it may be helpful to the patient if you increase the set tidal volume, which will help to augment ventilation to the lungs, until the patient can learn to inhale with the ventilator, and speak during exhalation only.

We are noticing a large, continuous flow of air and continuous coughing that my patient cannot tolerate. What should I do?

For acute care ventilators, the first thing that may need to be adjusted is the PEEP setting. PEEP may be a continuous flow of gas that can create air turbulence in the throat when the cuff is deflated, causing the ventilator to auto-cycle, and/or make the patient cough a great deal. Turning the PEEP off, or adjusting it to a lower level, should eliminate these symptoms.

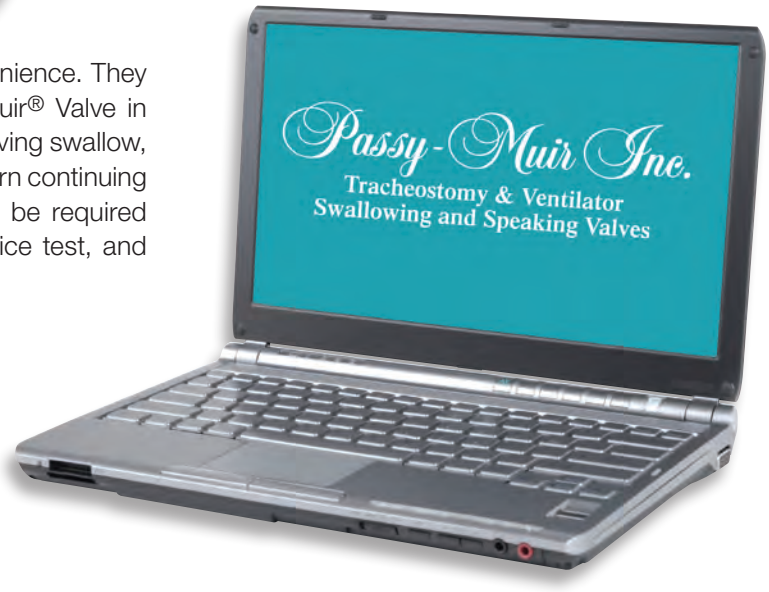
Secondly, a long, continuous breath may be the result of a Pressure Support breath that the patient cannot cycle into exhalation. This is often the result of weak oral and pharyngeal muscles. Time or flow limiting PS breaths will help the patient remain synchronous with the ventilator. Expiratory % sensitivity, inspiratory cycle off, and e-sense/$T_{I\,SPONT}$ (1 second in adults) are some common options that help the respiratory therapist to time or flow limit a PS breath.

Contact us with your clinical questions:
800-634-5397
Clinicalspecialist@passy-muir.com

FREE CEUs

Self-Study Webinars

These self-study webinar courses can be taken at your convenience. They are designed to increase clinical knowledge of the Passy-Muir® Valve in the areas of assessment and placement, dysphagia and improving swallow, pediatric issues, ventilator application, and team building. To earn continuing education credit for each course offered, the participant will be required to view the one hour recorded webinar, pass a multiple-choice test, and complete an evaluation.



Webinar Courses Include:

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- Ventilator Basics for the Non-Respiratory Therapist
- Ventilator Application of the Passy-Muir Valve
- Pediatric Tracheostomy and Use of the Passy-Muir Valve
- Pediatric Ventilator Application of the Passy-Muir Valve
- Swallow Function: Passy-Muir Valve Use for Evaluation & Rehabilitation

To register visit:
passy-muir.com/ceu

Passy-Muir, Inc, is an approved provider of continuing education through ASHA, AARC, CCMC and the California Board of Nursing.

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Featured Clinical Experts

Marta Kazandjian, M.A., CCC, BRS-S and Karen Dikeman, M.A., CCC, BRS-S are board recognized specialists in swallowing and swallowing disorders and co-authors of "Communication and Swallowing Management of the Tracheostomized and Ventilator Dependent Adult" as well as peer reviewed articles and book chapters. They have led national and international seminars.

Marta Kazandjian is Director of Speech Pathology at the Silvercrest Center for Rehabilitation and Nursing and the Center for Digestive Diseases and Swallowing Disorders at New York Hospital Queens in N.Y. Karen Dikeman is Assistant Vice President of Rehabilitation at the Silvercrest Center for Rehabilitation and Nursing.

What is the speech pathologist's role for weaning of ventilator patients?

For some patients, speech pathology intervention can facilitate the ventilator weaning process. The placement of a tracheostomy tube, especially in the presence of an inflated tracheostomy tube cuff, affects the normal flow of air to the larynx. This disruption of normal airflow and air pressures potentially impacts both voicing and deglutition. The clinical literature does not support a direct, or "causal" relationship between tracheostomy, mechanical ventilation, and swallowing impairment, however, the clinical course of these often medically fragile patients frequently includes a disruption of both communication and swallowing. Deglutition and respiration are, in essence, shared systems.

Speech pathology intervention for cuff deflation and in-line speaking valve placement can initially assist with communication during the weaning process. Whenever possible, restoration of vocal communication is preferred, but when this is not feasible, an alternative method of communication can be provided to the ventilator dependent patient. The ability to communicate and call for assistance can reduce the anxiety associated with ventilator dependency and aid in the weaning process as spontaneous breathing trials or changes in ventilator modes are initiated by the medical team. The increased work of breathing or respiratory effort may result in physiologic changes that cause discomfort for the patient. With Passy-Muir® Valve placement, the patient can describe these sensations, and receive reassurance or interventions, as needed.

Clinicians Marta Kazandjian, MA, CCC, BRS-S (left) and Karen Dikeman, MA, CCC, BRS-S, with their patient Cynthia Lieske

Remediation of swallowing impairment can assist in the weaning and decannulation process by restoring airflow and subglottic pressures to the upper airway, and addressing airway protection deficits. Instrumental assessments such as FEES and/or videofluoroscopic swallowing evaluations provide objective documentation of swallowing abilities and candidacy for an oral diet. FEES is particularly useful for the ventilator dependent patient, visualizing secretion management as a precursor to offering an oral bolus. Additionally, gross aspiration of secretions can lead to repeated respiratory infections and pneumonia, interfering with an effective weaning process.

Why does the Passy Muir® Valve in line assist with weaning of the ventilator patient?

Normalization of airflow, which occurs with placement of a Passy-Muir® Valve, can assist in restoration of a functional cough. Some researchers have identified swallowing function and the ability to clear the airway from tracheal secretions, or cough function, as two factors impacting the feasibility of weaning long term mechanically ventilated patients (Ceriana et al, 2003). In order to cough, a patient must be able to accumulate positive subglottic air pressure and release it with considerable force through the vocal folds. This is not possible with an open tracheostomy tube. Restoring both a closed system and positive subglottic air pressure can be achieved with an in-line Passy-Muir Valve (Diez-Gross, 2006). Valve placement may also assist some ventilator dependent patients with documented swallowing impairment. During instrumental assessments, we evaluate ventilator dependent patients with and without the Passy-Muir Valve. In some cases, patients demonstrate improved airway protection and pharyngeal clearance with the valve, as they are able to throat clear, cough, and generate increased spontaneous swallows during the instrumental study.

Based on these findings, our staff may recommend increased valve wear time during the day, specifically during meals. On our ventilator unit, a physician order for an oral diet may include the words, "must use speaking valve during all meals." Improving safe and adequate oral intake by reducing repeated episodes of aspiration increases the likelihood of a successful weaning attempt.

An added potential benefit of Passy-Muir® Valve placement in-line is the generation of physiologic or "auto-PEEP." PEEP (positive end expiratory pressure), refers to the amount of air that remains in the lungs after expiration. This keeps the lungs and alveoli inflated to insure oxygen delivery. Consistent oxygenation enables the patient to tolerate the changes in ventilator settings and the increased work of breathing that occurs during weaning, as ventilator support is withdrawn or reduced.

What advice would you give a team of clinicians who are just starting to use Passy-Muir® Valves in line in a ventilator weaning program?

Ventilator weaning units have been developed in many subacute and long-term care facilities to meet the needs of individuals who have failed weaning efforts in acute care settings. There are variations in methods of weaning. In one, the patient is withdrawn from the ventilator under supervision for brief periods of spontaneous breathing trials. An alternative protocol involves gradually reducing ventilator support by changing the mode or type of ventilation used, and may incorporate the Passy-Muir® Valve. These different methods are typically used depending on the patient's overall acuity level. Regardless, the multiple potential influences on weaning success have created awareness that the process is facilitated by collaborative, interdisciplinary care (Dikeman, Kazandjian, Lerner, 2009). Placement of the Passy-Muir® Valve in line is one of the best illustrations of this collaborative process. After the speech pathologist obtains a physician order for one-way valve placement for an appropriate candidate, the assessment must be coordinated with the respiratory therapist.

Education of all team members, the physician, respiratory therapist, nurse, registered dietician and other rehabilitation professionals, is integral in incorporating the Passy-Muir® Valve into ventilator and weaning protocols. In some instances, other medical professionals may be reluctant to allow cuff deflation and valve placement. Education regarding the benefits of valve placement during the weaning protocol will increase the team's interest and realization that the valve has benefits beyond communication and swallowing. Proper policies and procedures, developed in advance, will ensure patient safety and team comfort during initial attempts at valve placement. Finding a team member with particular interest in the Passy-Muir® Valve, obtaining their support, and selecting an optimal first candidate will also expedite the process. Perhaps most importantly, the speech pathologist has a responsibility to seek the knowledge necessary to introduce the valve to the interdisciplinary team. There are a multitude of resources available in the literature, as well as support from Passy Muir, Inc., to assist the speech pathologist in providing effective education to the ventilator team.

Ceriana, P., Carlucci, A., Rampulla, P., Delmastro, M., Piaggi, G., DeMattia, E., et al. (2003). Weaning from tracheostomy in long-term mechanically ventilated patients: Feasibility of a decisional flow chart and clinical outcome. Intensive Care Medicine; 29(5): 845-848.

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Gross, R., Steinhauer, K., Zajack, D., & Weissler, M. (2006) Direct measurement of subglottic air pressure while swallowing. Laryngoscope; 116:753-761.

BECAUSE YOU NEED TO...

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Talk-Muir is published by Passy-Muir, Inc. for tracheostimized and ventilator-dependent patients, their caregivers and medical professionals in order to provide:

- Interesting news and stories
- Resources and clinical tips
- Information about new educational opportunities
- Upcoming events and more

Story contributions and comments are welcome.

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