

# Implementing In-Line Speaking Valves During Mechanical Ventilation

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## Abstract

The Passy Muir Valve (PMV) is a one-way speaking valve that allows a patient with a tracheostomy to inspire through the trach tube and exhale through the upper airway and vocal cords. The PMV provides opportunity for increased communication for respiratory patients, decreasing psycho-emotional distress and increasing overall quality of life while the tracheostomy is placed. Additionally, the PMV also improves secretion management and swallowing leading to a reduced risk of aspiration. While it is common to delay intervention until a patient is no longer using mechanical ventilation, a review of literature has indicated benefits to initiating PMV intervention prior to ventilator weaning. A PMV may be placed in-line during mechanical ventilation with the proper knowledge and support from the patient's respiratory team. By placing a PMV in-line during mechanical ventilation, a patient may experience benefits during the ventilator weaning process and rehabilitation. Beginning early PMV trials provides opportunities for improving overall communication, swallow function, and respiratory status. This session will provide an overview of the mechanisms, inclusionary criteria, procedures, and outcomes of implementing in-line speaking valves during mechanical ventilation.

## Introduction

### Overview

When a tracheostomy is placed, individuals may lose the ability to communicate because their exhalations are no longer directed through the upper airway and vocal tract. Additionally, the patient may have difficulty producing adequate pressure when initiating a swallow, increasing their risk of aspiration. A common way to restore communication and swallow function following tracheostomy is by deflating the cuff and placing a speaking valve. The Passy Muir Valve (PMV) is a one-way speaking valve that allows a patient with a tracheostomy to inspire through the trach tube and exhale through the upper airway and vocal cords. A PMV may be placed in-line during mechanical ventilation with the proper knowledge and support from the patient's respiratory team, providing opportunities for improving overall communication, swallow function, and respiratory status.

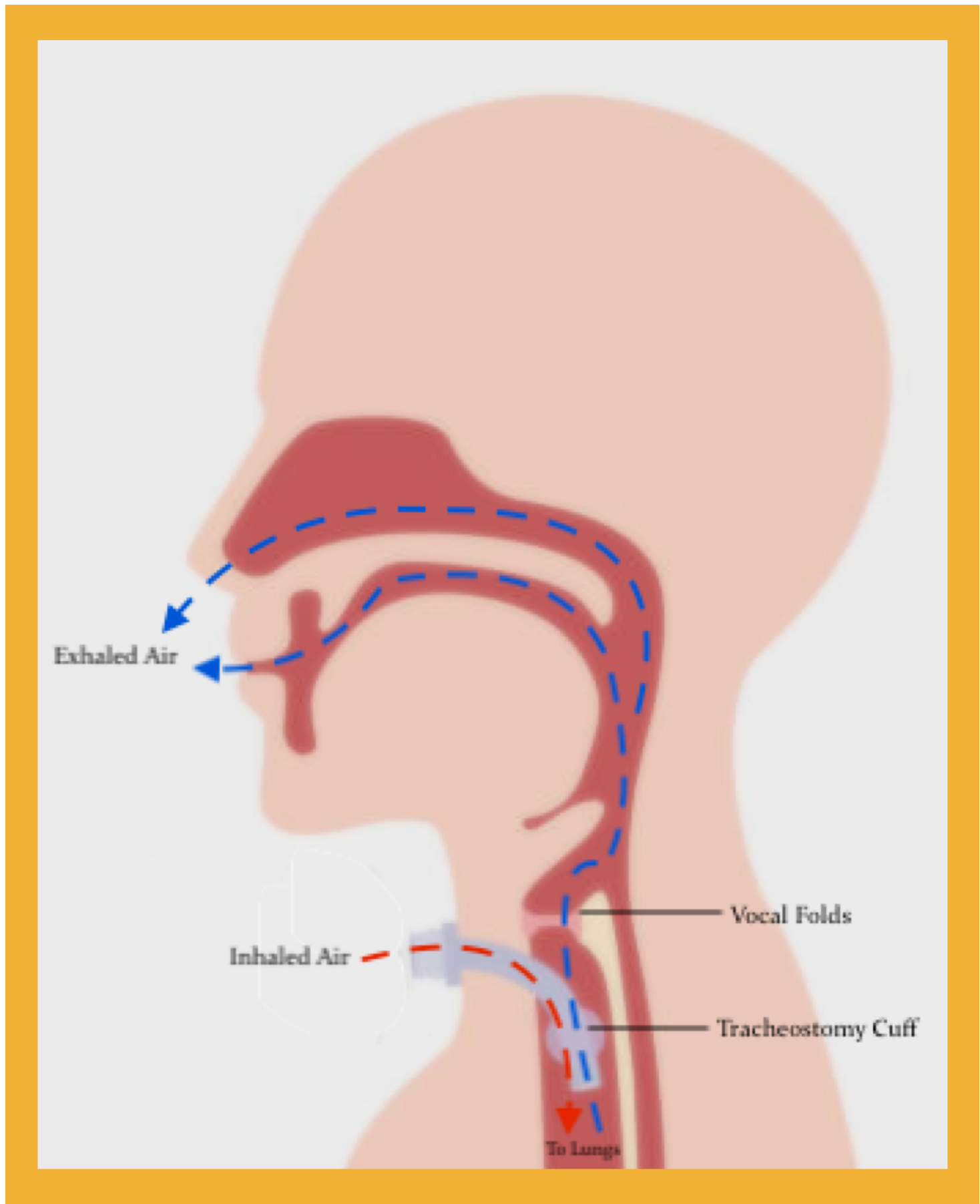
### Outcomes

**Communication.** Research indicates that the inability to communicate is one of the greatest frustrations faced during mechanical ventilation (Bier et. al., 2004). While other avenues for restoring communication exist (e.g., lip reading, written language, gestures, etc.), using one's voice is oftentimes the most natural and preferred mode of communication. Additionally, recent data indicates that restoring communication during mechanical ventilation has a positive effect on psycho-social distress and overall quality of life (Sudderath, 2016).

**Swallow Function.** Without adequate subglottic pressure during their swallow, tracheostomy patients are at risk of aspiration and negatively impacting their respiratory rehabilitation (Sutt et al., 2022). Speaking valves provide the opportunity to restore the upper airway and achieve proper subglottic pressure. By providing earlier PMV evaluations and interventions during mechanical ventilation, patients are able to begin swallow trials and exercises, allowing them to progress safely to an oral diet faster.

**Respiratory Status.** In the past, clinicians have been hesitant to implement speaking valves during mechanical ventilation due to concerns that valve use may impede weaning. However, recent data suggests that speaking valves do not impact ventilation negatively or increase length of stay in the ICU. In fact, by restoring airflow to via the upper airway, speaking valves enable laryngeal rehabilitation, which is imperative for weaning from ventilation and making progress toward decannulation (Ciampitti, 2016).

## Mechanisms and Physiology



## Inclusionary Criteria\*

- Medically stable
- Able to tolerate cuff deflation
- Airway patency
- Lung compliance

\*Inclusionary criteria for in-line PMV assessment may vary according to facility policy and procedures.

### Contraindications

- Severe airway obstruction
- Severe risk of aspiration
- Inflated tracheostomy tube of any kind – including foam-filled cuffs
- Thick or copious secretions
- Tracheal edema

## Learning Outcomes:

Participants will be able to:

- Explain the basic mechanisms and physiology involved with in-line speaking valve placement.
- Understand the effects of early speaking valve use to overall communication, respiratory status, and swallowing.
- Distinguish and apply inclusionary criteria for in-line speaking valve placement.

## Assessment

### General Patient Information

- Primary diagnosis
- Airway history
- Tracheostomy type, size and date

### Bedside Assessment Prior to Speaking Valve Trial

- Vital signs (pre and post HR, SpO2, RR, etc.)
- Secretion management
- Vent settings (mode, Vt, respiratory rate, PEEP, FiO2, etc.)
- Weaning schedule

### Procedure

- Obtain baseline vital signs
- Explain procedure to patient and family members
- Suction tracheostomy and oral cavity
- Slowly deflate cuff
- Turn PEEP (Positive End-Expiratory Pressure) off – natural PEEP will be restored upon cuff deflation
- Adjust vent limits and alarms – following facility and RT policies
- Repeat suction if necessary
- Place speaking valve in-line with ventilator – use adaptor if needed
- Monitor vital signs while speaking valve is placed
- Assess ability to cough and secretion management
- Assess speech and overall vocal quality
- Observe patient for overall tolerance, monitoring baselines for significant change in vitals
- Remove speaking valve at sign of fatigue, distress, or drop in vitals
- Turn PEEP on
- Return vent limits and alarms to baseline settings

### Data Collection

- Date and time or trial
- Toleration
- Secretion management
- Presence of cough
- Voice quality
- Back pressure upon removal
- Presence of anxiety or distress
- Vitals throughout trial

## References

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