

# Passy-Muir<sup>®</sup> Valve (PMV) Speaking Valve Protocol

## Introduction

This PMV 007 aqua green speaking valve may be used with ventilated patients. Use of this valve is dependent upon the patient's ability to tolerate cuff deflation (Dikeman & Kazandjian, 1995). As the valve opens on inspiration, it allows air to enter the airway via the tracheostomy and automatically closes at the end of inspiration, therefore, creating a "column of air" within the upper airway and larynx that allows for phonation and restores positive subglottic pressure. As this is a one way valve, no exhalation parameters will be fed back to the ventilator as all exhalation will take place via the patient's nose and mouth.

## Benefits of PMV

- Improved communication
- Facilitates swallowing by restoring positive subglottic pressure
- Smell and taste restored
- Facilitates secretion management by restoring subglottic pressure to enable a stronger cough and reduced need for suctioning
- Promotes restoration of intrinsic PEEP and facilitates improvements in oxygenation
- May assist in ventilator weaning
- Facilitates pharyngeal/laryngeal sensation
- May improve nutritional status by assisting oral feeding
- General psychological enhancement
- Improved assessment capabilities
- Vocal cord stimulation by increasing laryngeal airflow and sensation

If further advice is needed about communication, please contact the Speech & Language Therapy department on extension 3007.

## Patient Selection Criteria for PMV

- Tracheostomy in situ
- Able to tolerate cuff deflation and have a sufficient oral air leak. NB. Cannot be used with foam cuffed tracheostomies
- Awake, alert, responsive and attempting to communicate
- Haemodynamically stable (minimal vasopressor requirements)
- PS of <16 cmH<sub>2</sub>O and PEEP <8cmH<sub>2</sub>O on spontaneous mode with FiO<sub>2</sub> ≥0.4

## Contraindications for Speaking Valve use

1. Inability to tolerate full cuff deflation
2. Airway obstruction
3. Unstable medical/pulmonary status
4. Laryngectomy
5. Anarthria
6. Severe / laryngeal stenosis
7. High risk aspiration
8. Unconscious patients

## Procedure for using a Passy-Muir® Valve (PMV) in a ventilated patient

Action	Rational
Discuss cuff deflation and use of PMV with the medical team and wider MDT prior to commencing procedure	The patient needs to be haemodynamically stable, in order to tolerate cuff deflation and ventilator adjustments.
Where possible, provide a full explanation to the patient	To minimise patient anxiety and maximise co-operation
Look for evidence of upper airway problems	E.g. vocal cord dysfunction, subglottic stenosis may be a contra-indication to this procedure
Sit patient as upright as possible	To reduce aspiration risk and aid communication
Check HR/BP/RR/Vt/SpO <sub>2</sub> /ETCO <sub>2</sub>	Baseline parameters are essential to determine tolerance of cuff deflation and use of PMV
The patient should be on PS of <16H <sub>2</sub> O and a PEEP <8cmH <sub>2</sub> O on spontaneous mode on FiO <sub>2</sub> ≥0.4 with stable ABG's or SpO <sub>2</sub> ≥92-94%	Otherwise the patient is unlikely to tolerate the PMV
Change the ventilator into NIV/mask ventilation mode and change alarms setting (see below) . <b>***Know your ventilator</b> –You must be competent at ventilator changes (see end of document) and know how to set the alarms to prevent continuous alerts and automated switching to backup / apnoea ventilation	To compensate for expiratory air leak
Consider whether an increase in PS and/or PEEP may be required	The sustained positive pressure from the ventilator will pass into the upper airways as well as into the lungs (Hoit 2003), and may encourage expectoration of secretions from the top of the cuff. The increased Vt may aid phonation
Suction orally and via tracheostomy tube prior to cuff deflation	To reduce the risk of aspiration, minimise residual secretions and aid PMV tolerance
Slowly deflate cuff with a 10ml syringe while carrying out synchronous suction. Check for airflow at mouth. <b>Signs of intolerance:</b> patient reports dyspnoea / loud expiratory wheeze / tachypnoea / tachycardia / hypoxia / hypercapnia / continuous coughing. <b>If this occurs, re-inflate cuff</b>	To ensure that cuff deflation is tolerated and vital signs are stable
Allow the patient to adjust to the cuff deflation and subsequent change in ventilation	To ensure the patient is comfortable
Once the patient is tolerating cuff deflation insert the Passy Muir valve ( <b>see diagram</b> ) into the ventilator circuit as close to the tracheostomy as possible	
Check for signs of PMV intolerance – reported dyspnoea/ patient distress / loud expiratory wheeze / tachypnoea / tachycardia / hypoxia / hypercapnia / Inspiratory/expiratory wheeze/ continuous coughing. <b>If this occurs, remove PMV and re-inflate cuff</b>	To monitor success and tolerance of procedure. To ensure patient safety Minimise compromise to the patient's condition
If the PMV is tolerated assess patient's ability to phonate. Begin trial attempts at phonation by asking the patient to say "ah" or count from 1 to 5	To ensure trans-glottic airflow Automatic speech such as counting is often easier for the patient than spontaneous speech

Action	Rational
If the patient's voice sounds "wet" or "gurgly" ask them to cough and clear secretions. Refer to SLT if there is a persistent weak, gurgly or hoarse voice	Any secretions present may affect voice clarity. SLT can provide a specialist assessment
Continue to monitor for signs of intolerance	<b>Remove the speaking valve if not tolerated or patient fatiguing</b>
Remove the speaking valve at the end of the trial period. Re-inflate the tracheostomy tube cuff using the MOV technique or cuff manometer. Return the ventilator to pre-procedure settings	To ensure the cuff is sufficiently inflated To return to base-line settings
Dependant on how well the PMV is tolerated, liaise with the MDT for its use in the weaning plan, and clearly document	To ensure consistency and progression of treatment.
Clean the valve daily by rinsing in soapy, warm water Rinse thoroughly in warm running water and allow to air dry fully before its next use. Once dry store in the box provided by the manufacturer with the patients name on it.	To comply with the manufacturer's instructions. Each speaking valve is guaranteed to last for a minimum of 2 months
Document all actions on the St George's Tracheostomy ICP weaning plan. If the initial trial is successful please place the aqua marine sticker provided in the speaking valve pack onto the pilot balloon line	To ensure effective communication amongst the multidisciplinary team To comply with documentation standards A warning label alerting staff to deflate cuff prior to PMV placement

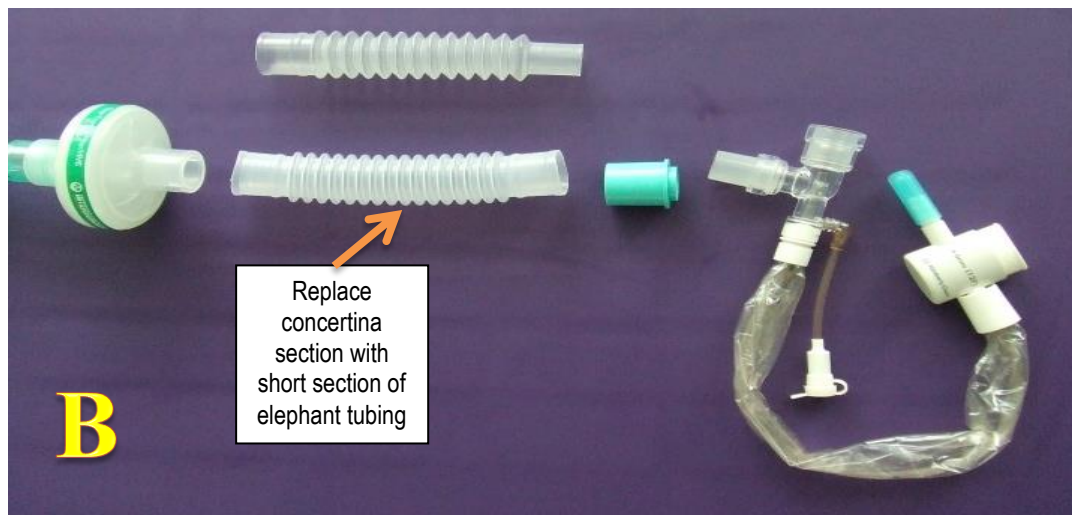
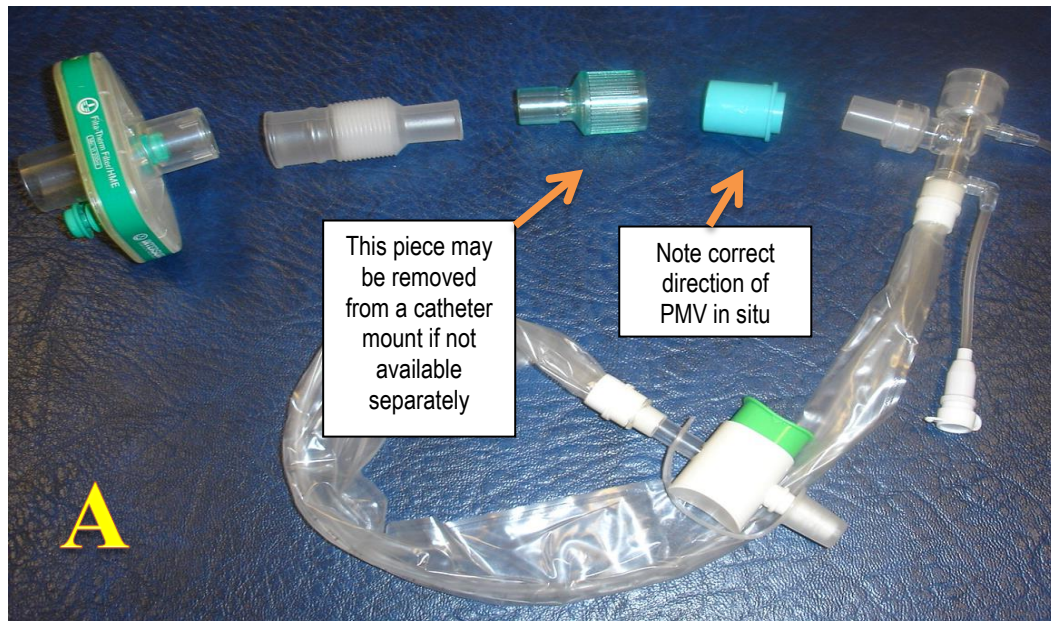
### To convert ventilator to NIV/mask ventilation

1. Press 'start/standby' button
2. Select standby – click rotary knob to confirm
3. Alarms 'standby activated' – press 'alarm reset' and click rotary knob to confirm
4. Select 'tube/mask' tab. Select 'mask' button on screen – click rotary knob to confirm
5. Press 'start/standby' button twice to start ventilation.
6. Turn off the Apnea and Minute Volume alarms to prevent continuous alarming by turning the alarm parameters UP until they read OFF

### Considerations during procedure

1. Assessing airway patency following cuff deflation – note percentage leak on the ventilator; if leak is <30% patient is unlikely to tolerate PMV
2. During synchronised suction and cuff deflation the patient may experience coughing due to mobilisation of secretions. These usually settle quickly
3. The valve does not need to be placed directly on the hub of the tracheostomy tube but must remain as close to the tube as possible, within the ventilator circuit.
4. Once the cuff is deflated you can no longer use exhaled Vt measurements.
5. **Humidification** does not affect valve function but the performance of an HMEF will be reduced as exhaled air no longer passes through the filter that traps moisture. This can result in airway desiccation and deterioration in sputum viscosity. This is particularly prevalent when using dedicated NIV / mask ventilators.
6. **Do not administer nebulised drugs when the PMV is in situ** as it precipitates on the valve and can cause it to become sticky and therefore reduce its effectiveness

## Position of Passy-Muir® Valve in ventilator circuit (choose A or B)



## Trouble shooting with a PMV

### Unable to tolerate / unable to phonate

- Is the inspiratory pressure support enough? *Try increasing to compensate for leak / give larger  $V_t$  to sustain phonation*
- Is the leak around the tracheotomy adequate? *If not, consider downsizing the tube*
- Is there subglottic stenosis / vocal cord dysfunction / bulbar impairment? *Requires direct visualisation (flexible nasendoscopy) to diagnose / exclude*

### Continuous coughing

- Dry gas is irritant. *Try nebulised 5% saline at the beginning of procedure prior to PMV insertion and repeat as required*
- Is patient unable to manage own saliva? *Refer to SALT and evaluate as to whether the patient will ever be able to manage to own saliva (try a hyoscine patch or any other alternative)*