

## **Safety of Tracheostomy Speaking Valve Use during Sleep**

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### **Problem:**

The Passy-Muir speaking valve (PMV) is a removable one-way airflow valve that enables tracheostomy patients to breathe in through the tracheostomy tube and to exhale through the upper airway. Benefits attributed to PMV include return of verbal communication, improved cough, and improved swallowing function. The PMV is formally indicated for wake time use only; however, beneficial effects may be hastened if patients were also permitted to sleep with the PMV in place. To date, the use during sleep has not been reported.

### **Methods:**

To determine if patients can safely sleep with a PMV on, a prospective study of the safety of speaking valve use on tracheostomy patients during sleep was performed; 10 male patients (mean age, 70) gave informed consent. Subjects were recorded with an Edentrace II cardiopulmonary monitor from 11pm to 5am. Each subject was recorded 2 consecutive nights: one with the PMV on and one with it off (tracheostomy open). The order of nights was randomized. All recordings took place in an ICU or other monitored setting. The variables of interest were cumulative time with SaO<sub>2</sub> < 90% (CT90), apnea index (AI), apnea – hypopnea index (AHI), and nursing observation reports of distress or problems. With the PMV on, airflow was measured at the nares and mouth. With the PMV off, airflow was measured at the tracheostomy tube opening.

### **Results:**

Mean values: CT90: 2.5% open/4.4% PMV. AI: 0.2 open/0.4 PMV. AHI: 1.1 open/2.2 PMV.

### **Conclusion:**

PMV use for one night in seriously ill tracheostomy patients was not associated with apneas or significant desaturations. No respiratory distress or cardiac arrhythmias were observed during nocturnal PMV use. Studies for longer durations of nocturnal PMV use are justified.

### **Significance:**

The beneficial effects of the re-establishment of airflow to the upper air may be hastened if patients were also permitted to sleep with the PMV in place.