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Introduction: Due to various respiratory complications that prevent patients from breathing adequately through the nose and mouth, patients may require an artificial airway with the use of a tracheostomy tube. (We will refer to a "tracheostomy tube" as a "trach-tube" for abbreviation purposes).

When patients require a trach-tube they will be aphonic (i.e., without voice) due to the breathing cycle of inhaled and exhaled air

Photo Credit: Dr. Jamie D. Fisher

being breathed directly through the tracheostomy tube, never reaching the level of the vocal folds to provide vibration for voicing/verbalizing. An intervention that speech-language pathologists (SLPs) can utilize to assist patients requiring trach-tubes to voice/verbalize is a speaking valve.

Why: Effective communication is necessary for our patients to convey their wants, needs, and wishes regarding plan of care and any end-of-life decision. Our patients desire and need to be able to effectively communicate with medical staff and especially their families. Patients requiring trach-tubes initially present without a means for voicing/verbal communication, which can result in frustration and reduced quality of life (Hess, 2005; Patak et al., 2006). A speaking valve can assist these patients in restoring their ability to voice/verbalize. As SLPs, before we can assess and treat communication with the use of a speaking valve, we need to first understand how speaking valves work.

How: Although there are many brands and designs of speaking valves, generally, the valves all work similarly by "opening" (via a membrane, flap, ball, etc.) which allows air to be inhaled through the speaking valve to the lungs. However, when air is exhaled the speaking valve will "close" keeping air from escaping out of the trach-tube and forced up to the level of the vocal folds, thereby creating vibration for voicing/verbalization.

In order to utilize a speaking valve you MUST first deflate the cuff on the trach-tube. This is of the utmost important because if the cuff is not deflated and the speaking valve is placed, the patient will NOT be able to breathe. An inflated cuff on a trach-tube will prevent exhaled air from moving through the vocal folds, and a speaking valve will not allow exhaled air to escape from the trach-tube; in other words the patient will not be able to exhale or complete the cycle of breathing. Once the patient's cuff is deflated the speaking valve can be placed directly on the trach-tube (see Figure 1), which will allow for inhaling/exhaling and completion of the breathing cycle.
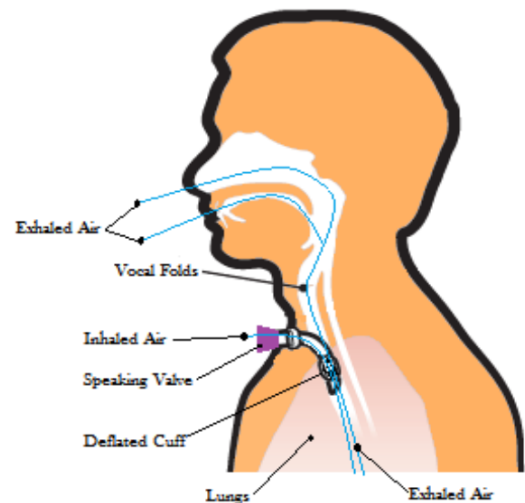
Figure 1

Photo Credit: Dr. Jamie D. Fisher

Speaking Valves Commonly Used in Clinical Practice

Passy-Muir Speaking Valves
www.passymuir.com

The Passy-Muir ® Speaking Valve (PMSV) was invented by David Muir for use by patients requiring tracheostomy and ventilator-dependent allowing benefits of voicing/verbalizing. The patented "No Leak" membrane design of the PMSV is always in a closed position until the patient inhales.

Passy Muir Speaking Valves & Adapters
Photo Credit: Dr. Jamie D. Fisher

The valve opens easily with less than normal inspiratory pressures and closes automatically at the end of the inspiratory cycle without air leak and without patient expiratory effort. The closed position of the PMSV allows the patient to create a positive airway pressure and restores the patient to a more normal "closed respiratory system". PMSV can be used both on (in-line with adapters) and off the ventilator with both pediatric and adult patients. This includes non-ventilator dependent tracheostomized patients, patients who are weaning from the ventilator and patients who are ventilator dependent. For more information about the PMSV and it's features please visit: www.passymuir.com

Video on how PMSV work: https://www.youtube.com/watch?v=9yn5ekGJ0Qw

Shikani Speaking Valves
www.theairwaycompany.com

The Shikani Speaking Valve ™ (SSV) is a speaking valve based on a ball design rather than a membrane or flapper design. The ball inside the SSV moves inside a chamber, along eccentrically positioned ramps which guide and direct the ball towards the front and/or the back of the chamber, with each inhalation and exhalation.
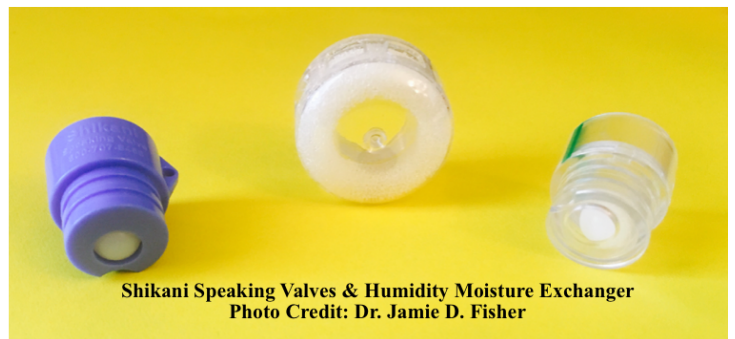
Shikani Speaking Valves & Humidity Moisture Exchanger
Photo Credit: Dr. Jamie D. Fisher

The patient can vary the position of the SSV by rotating it 180° up or down; this allows the ball to be positioned inside the chamber of the SSV either in the "biased open" (or "12 o'clock" or "valve "up" position), or in the "biased closed" (or "6 o'clock" position or valve "down" position). This feature gives the patient full control of the use of the valve, and of how airflow is directed into the upper airway, and of when to speak and when to breathe. The SSV can be used with the Shikani Humidity Moisture Exchanger allowing patients to receive the benefits of speech along with humidification and filtering of inhaled air. For more information about the SSV and its features please visit: www.theirwaycompany.com

Video on how SSV works: https://www.youtube.com/watch?v=Bpxt1hdMLP4

Shiley ™ Speaking Valves
www.medtronic.com

The Shiley ™ Speaking Valve is intended for use on alert, awake tracheostomy patients who can breathe independently without assisted mechanical ventilation. It permits voicing/verbalizing without finger occlusion.

Shiley Speaking Valves with & without Supplemental Oxygen Port
Photo Credit: Dr. Jamie D. Fisher

The valve design is lightweight minimizing additional pressure on the stoma site, it attaches securely to any tracheostomy tube with a 15 mm connector, and has an option of a supplemental oxygen port. For more information about the Shiley ™ Speaking Valve and its features please visit:
http://www.medtronic.com/covidien/en-us/products/tracheostomy/shiley-speaking-valves.html

References:

Hess, D. (2005). Facilitating speech in the patient with a tracheostomy. Respiratory Care, 50, 519–525.

Patak L., Gawlinski A., Fung N., Doering L., Berg J., & Henneman E. (2006) Communication boards in critical care: patients' views. Applications in Nursing Research, 19, 182–190.

Website Resources:
www.passymuir.com
www.theairwaycompany.com
www.medtronic.com