

Tracheostomy Care

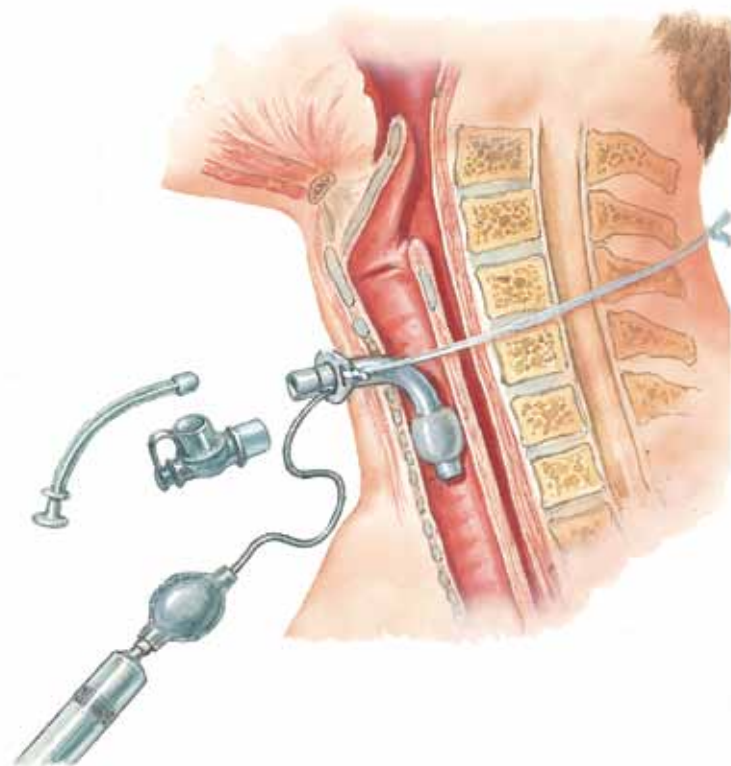
The tracheostomy is one of the oldest known surgical procedures. The first reference to this procedure is found in an ancient Indian book of medicine, the Rig-Veda, written in 1500 BC. However, Chevalier Jackson is credited with describing the modern day tracheostomy in 1909. As recently as the mid 1980's, the percutaneous tracheostomy was introduced as an alternative to the surgical technique. This bedside method is considered minimally invasive and more cost effective than surgery.

Respiratory Therapy in Tracheostomy Management

When an individual has an obstructed airway, needs secretions cleared, has difficulty breathing, needs prolonged mechanical ventilation (greater than 14-21 days) or has a need to facilitate ventilator weaning, tracheostomy tube placement may become necessary. For individuals requiring long-term ventilation, a tracheostomy tube has a number of advantages over translaryngeal intubations, including: Improved stability (allowing individuals to have greater participation in therapy), more discharge options, greater comfort, and freeing of the larynx for speech and eating. The tracheostomy also helps avoid trauma to the teeth, oropharynx, vocal cords and larynx.

Tracheostomy tubes are available in a wide range of sizes, shapes and types. They are made of hard or soft plastic or metal material. The size is generally determined by the size of the person; both diameter and the length are considered when determining the appropriate tube. However, the manner in which the tube will be used is also a consideration when determining size. A person requiring full ventilation, for example, may need a larger diameter. Stable individuals who are ready for weaning may benefit from smaller tube diameters.

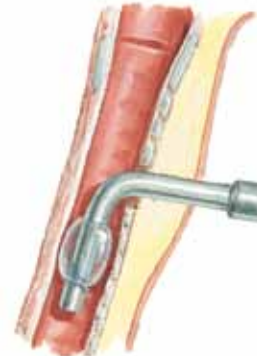
Tracheostomy tubes may be cuffed or uncuffed. A cuff is used to seal the airway to allow for full ventilation. A cuff can be filled with air or foam. When a cuff is used, care must be taken to decrease the risk of tracheal injury. Tracheostomy cuffs have also been used to decrease the risk of gross aspiration (the accidental spilling of liquids into the airway). There are conflicting opinions on the benefits of using inflated cuffs to reduce the risk of aspiration. In general, unless a person is receiving mechanical ventilation, the tracheostomy cuff should be deflated, allowing the client to move air both through and



Uncuffed Trach



Cuffed Trach



around the tube, decreasing the work of breathing. If emergency ventilation is required, the cuff can be re-inflated to allow for full mechanical ventilation.

Some tracheostomy tubes have both an inner and outer cannula. The inner cannula is designed to be removed for easier cleaning. The inner cannula may be disposable or non-disposable. The non-disposable cannulas are cleaned using appropriate technique and reinserted.

Fenestrated tubes can be used to facilitate speech. These tubes have single or multiple openings on the outer curve of the tube. When the tube is capped to occlude the proximal opening, the fenestrations allow air to flow into the larynx, giving way for the production of speech.

Tracheostomy Care *continued*

Tracheostomy tube dependant clients require specialized care and equipment. Because their upper airway's natural mechanism for warming and humidifying inspired air is bypassed, it is essential to compensate for this via a moist air setup. This system generally includes a nebulizer, tracheostomy collar, compressed air/ oxygen, large bore tubing and a drain trap. This system must be closely monitored. If an individual is left to breathe un-humidified air, their secretions can become thick and dry, which may cause potentially life- threatening mucus plugs.

Suctioning the airway when a tracheostomy tube is present is essential to prevent mucus plugs. The frequency of suctioning is unique to each individual. Some people have a strong productive cough requiring less frequent intervention, while others may have a weak or non-existent cough which requires very frequent suctioning. Care must be taken to ensure proper suctioning technique is used. Depending on the setting, clean or sterile technique should be used to decrease the risk of infection.

Tracheostomy care is essential to prevent infection and maintain a patent airway. As in suctioning, the technique used to provide this care depends on the setting where it is provided and the type of tube being cleaned. Care should include the cleaning of the tube and the stoma (the surgical opening). The ties used to secure the tracheostomy tube should also be changed. Care should be taken to ensure the ties are tight enough to secure the tube in the airway, but not so tight as to cause injury to tissue.

Tracheostomy tubes require changing from time to time, and a spare tube should always be on hand. Having a small diameter tube on hand for difficult re-insertions is recommended. Each facility has its own protocol on the frequency of routine changes. Although the recommended frequency of tube changes is not clearly documented, in general, tubes should be changed when cracked, malfunctioning, or dirty. Special care is required with mechanical ventilation so the flow of air is not interrupted for prolonged periods of time during changes.

As an individual improves in their ability to maintain a patent airway and their respiratory status improves, tracheostomy tube weaning can be considered. This is typically accomplished by first ensuring the person can tolerate a deflated cuff. Once cuff deflation is tolerated, the decision is made to either cap the tracheostomy tube or downsize the diameter. In the process of tracheostomy capping, a plastic cap or plug is used to occlude the tube opening. This allows the patient to only breathe around the tube and through their mouth and nose. Care should be taken to ensure the diameter of the tube is small enough to allow for this

to occur. In tracheostomy tube down-sizing, progressively smaller tubes are inserted into the airway over the period of a few days, allowing the stoma to gradually close and encourage mouth/nose breathing. When the last tube is removed, a dry sterile dressing is placed over the stoma. The stoma should close completely in a couple of days. The weaning process should be individualized to meet each individual's tolerance to the procedure, and a combination of down-sizing and capping is the preferred method.

The ultimate goal for a respiratory therapist is to assist in weaning individuals from a tracheostomy tube whenever possible. Some patients will require the ongoing use of a tracheostomy tubes due to respiratory muscle weakness and their inability to maintain a patent airway. or those that require long-term use, the goal should be to achieve the greatest amount of independence while maintaining a high quality of life. These individuals should have access to a full therapeutic treatment team and benefit from therapy as their physical ability allows. With a coordinated effort, they may be able to regain the ability to talk (using the appropriate equipment), eat and enjoy social and community activities.

Speech-Language Pathologist & Tracheostomy Management

The principal role of the speech-language pathologist (SLP) in regard to patients with tracheostomy tubes is to optimize speech and swallowing. This population provides a challenging set of characteristics requiring high levels of competency, skill and knowledge in the basics of speech and swallowing. They also must be knowledgeable on the anatomy and physiology of the respiratory and phonatory systems (normal and disordered) and understand normal respiratory and metabolic values, airway management techniques, and endotracheal and tracheostomy tubes. These skills are developed and enhanced with an interdisciplinary team that includes physicians, respiratory care practitioners, nurses, registered dieticians and social workers. Central to this team is the speech-language pathologist. The SLP serves to enhance and develop the potential for communication and oral intake by providing functional outcome-specific feedback to team members, the patient and family.

The first and most important function of the SLP is to assess communication skills in order to provide an efficient and effective means of self-expression. To determine the best system, SLPs must assess an individual's cognitive level, physical limitations and communication needs. Not all individuals will be a candidate for a system, but if one is deemed appropriate, communication may take two forms; nonverbal and verbal.

Tracheostomy Care *continued*

Nonverbal communication includes writing, gestures, lip reading, communication boards and electronic augmentative communication systems. These methods rely on physical movements to transmit a message. Despite being viable communication strategies, each has limitations. Writing requires fine motor coordination and demands literacy on the part of both communication partners. Gestures limit the number of messages the person can convey. Lip reading demands good articulation and an absence of neuro-muscular involvement. Augmentative systems can become very costly to purchase. Despite the limitations, nonverbal communication may be an appropriate and effective means of communication especially for those with poor articulation.

Verbal methods of communication utilize a natural or artificial sound source. Because verbal communication is the most effective and efficient, it should be considered first. Speech following tracheostomy tube placement is affected at the very basic level. With the presence of a tube, airflow is diverted away from vocal cords. With the diversion of air, the cords no longer vibrate as the air passes through them to produce sound. The person is rendered aphonic (absence of voice). Some air may leak up to the vocal cords but may not be forceful enough to drive the cords into vibration, or may only allow enough force for very short utterances. Despite the interference with normal sound production there are a number of options for speaking with a tracheostomy. Options include:

- Plugging the tracheostomy tube by holding a finger/placing a cap over the tube
- Covering the tracheostomy tube with the chin
- Tracheostomy speaking valve. A one-way valve that allows air in, but not out. This forces air around the tracheostomy tube, through the vocal cords and out the mouth upon exhalation, enabling vocalization.
- Fenestrated tracheostomy tubes have an opening allowing air to pass through the vocal cords.
- Electrolarynx or artificial larynx is a hand held device placed on the neck surface that vibrates when activated and mechanically resonates when words or sounds are mouthed.
- A talking tracheostomy tube. Speech is obtained through a line directly above the cuff. An outside air source is used to force air through the vocal cords.
- A SpeakEZ that combines a heat moisture exchanger (HME) with a built-in speech valve.

Swallowing

The presence of a tracheostomy tube has the potential to negatively impact swallowing and increase the risk of aspiration. The effects of the tube are not fully understood, but it is documented that aspiration risk increases particularly if there are concurrent structural and/or neurological difficulties. Incidence of aspiration was noted at levels of 15-77%. The most common problems are delayed swallow, latent glottal closure, poor laryngeal elevation and reduced or absent subglottic pressures. Due to the increased risk of aspiration, SLPs must demonstrate hypervigilance in regard to assessment and treatment. Their initial role is to complete a thorough case history, assess cranial nerve function in regard to oral motor skills and then perform a swallowing evaluation. The swallowing evaluation may take various forms including:

- A blue dye test. Blue dye is placed on the back of the tongue every four hours. Suctioned secretions from the tracheostomy are monitored for the presence of blue dye. The presence of blue dye may indicate the patient is aspirating their own secretions.
- Bedside/clinical swallowing assessment. Different foods and liquids are presented for oral consumption and the SLP makes recommendations based on clinical observations—presence or absence of coughing, eye watering, reddened face. The limitation of the test is that the exact cause of the disorder cannot be determined.
- Videofluoroscopic Swallow Study. In this method, the SLP uses fluoroscopy to assess the dynamic process of swallowing. Video recordings of the study are reviewed to determine the integrity of the swallow mechanism in real-time.
- Fiber Endoscopic Evaluation of Swallowing. This method has the SLP using a fiber-optic endoscope. It makes use of a flexible endoscope to view the laryngeal structures before and after the swallow. The procedure is videotaped to review for additional analysis.

The speech-language pathologist must also manage oral intake. Strategies used to assist those with dysphagia and a tracheostomy parallel that for persons without a tube. However, some special considerations and strategies are exclusive to the presence of a tracheostomy tube: Dry swallows after every bite, a series of single swallows to allow breathing time between swallows and frequent rest breaks due to the extra effort of breathing while eating. The SLP may recommend occluding the tracheostomy tube during swallowing to restore subglottic pressures. This may improve safety. Both the use of finger

Tracheostomy Care *continued*

occlusion and a one-way speaking valve have been shown to effectively decrease the risk of aspiration. Simple alterations in diet consistency, for both solids and liquids, can also reduce aspiration risk.

Conclusion

Caring for individuals with tracheostomies has evolved due to advances in medical care and the ability to treat infections and manage chronic pulmonary conditions. Patients are not only being treated in acute care settings, such as hospitals, but also in their homes or a community based rehabilitation centers. Care must be tailored to the individual's functional outcome and their environment and these decisions are made in collaboration with the patient's treatment team. ❖

About the Authors...

Monique Kurkowski, RRT, CBIS, is the Admissions Coordinator and Registered Respiratory Therapist at Rainbow. She obtained her associate degree from Henry Ford Community College in Dearborn, Michigan and has specialized in the field of traumatic brain injury rehabilitation since 1993. Respiratory therapists (RT), Registered Respiratory Therapists (RRT) and respiratory therapy technicians—also known as Respiratory Care Practitioners (RCP)—specialize in the assessment and treatment of breathing disorders. Airway management is the number-one skill needed by a respiratory therapist. Skill in vascular assessment for intravenous lines (IV) and arterial line or arterial blood gas (ABG) is also required. RTs work closely with other medical disciplines such as physicians, nurses, speech therapists and physical therapists. Respiratory therapists only act on a physician's order, except where there are written protocols or, in the event of an emergency, with no physician present. Respiratory therapists are now required to be licensed by the State of Michigan.

Angie McCalla, MS, CCC-SLP, CBIS, has a Masters of Science in Speech-Language Pathology from Bowling Green State University in Ohio and a Bachelor of Science in Communication Disorders from Central Michigan University. She has extensive experience in a variety of sub-acute settings providing care and rehabilitation including the University of Michigan Medical Center PM&R Speech-Language Pathology Department. There she completed an internship focusing on evaluation and treatment of neurological trauma patients and completed an internship at Blanchard Valley Hospital in Ohio. Memberships include: American Speech Language Hearing Association (ASHA).

Speech-Language Pathology is the study of human communication disorders. These disorders can be congenital or acquired, and can affect individuals of any age. The practice of speech-language pathology includes prevention, diagnosis, habilitation, and rehabilitation of communication, swallowing, or other upper aerodigestive disorders; elective modification of communication behaviors; and enhancement of communication. This includes services that address the dimensions of body structure and function, activity, and/or participation.

Copyright January 2007 – Rainbow Rehabilitation Centers, Inc. All rights reserved. Printed in the United States of America. No part of this publication may be reproduced in any manner whatsoever without written permission from Rainbow Rehabilitation Centers, Inc. For information, contact the editor at:

RainbowVisions Magazine
Rainbow Rehabilitation Centers, Inc.
5570 Whittaker Road, Ypsilanti, MI 48197, USA
E-mail: rainbowvisions@rainbowrehab.com