

# Perspectives

Recovery Strategies from the OR to Home

## In This Issue

This issue of *Perspectives* focuses on the special nursing challenges of tracheostomies. It presents the highlights of an educational symposium on *Tracheostomy Issues* held at the 2002 Society of Otorhinolaryngology and Head-Neck Nurses (SOHN) Congress in San Diego. The panel reviewed the basics of tracheostomy and discussed the intimate, delicate problems that face nurses in their daily work with patients who endure this invasive, often life-saving, procedure. The symposium was funded through an unrestricted educational grant from Dale Medical Products, Inc. The three panelists included Margaret Hickey, Ann Luther and Penelope Fisher.

**Margaret Hickey**, RN, MSN, CORLN, reviewed the basics of tracheostomy – from definition to a detailed, step-by-step description of this vital procedure. She described what complications occur during postoperative recovery.

**Ann P. Luther**, MSN, RN, CS, Cm, CORLN, described the specialty tubes for tracheostomies including tube handling and care and important nursing implications of several types of tubes commonly used in modern patient care.

**Penelope Stevens Fisher**, MS, RN, CORLN, focused on stoma care for the tracheostomy patient.

The article that follows is based on Margaret Hickey's presentation. The case report was presented by Penny Fisher.

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## Symposium report:

# Focus on Tracheostomy

By Margaret Hickey, RN, MSN, CORLN

Tracheotomies were first portrayed on Egyptian tablets in 3600 BC. Hindu spiritual texts from 2000 BC contain references to this complex surgical procedure. The first modern tracheotomy was attempted in 600 AD in Rome, but the first successful modern procedure was not completed until the 15th century.

An interesting bit of American history is tied to our predecessors' ability to perform a tracheotomy. George Washington, father of our country, died due to an upper airway obstruction. His physician had read about tracheotomies but was unwilling to perform one, because the mortality rate was high. Reportedly, only 32% of people survived after a tracheotomy. Not until the early 1900s did Chevalier Jackson perfect the tracheotomy and publish a text that detailed the procedure. Even today, some of his techniques and equipment are still used.

Tracheotomy and tracheostomy are often used interchangeably, but they are different terms. Tracheotomy describes the procedure, usually performed in the operating room,

which makes a surgical incision (stoma) into the trachea. Tracheostomy is used to describe the opening or hole that remains, once the stoma is created.

## Rationale

Tracheotomies are performed to manage airway obstruction. When needed, the tracheostomy provides an excellent way to bypass an upper airway obstruction or provide a route for long-term mechanical ventilation. Tracheotomies may be performed in medical emergencies, such as trauma, or as elective postoperative procedures to manage a situation in which the upper airway will be compromised due to surgical changes or postoperative edema. A tracheotomy may be elected to establish a long-term access for mechanical ventilation or manage obstructive sleep apnea.

## Procedure

The tracheotomy can be done at bedside under local anesthesia, e.g., in the intensive care unit (ICU), or under general anesthesia in the operating room (OR). In either setting,



the patient's head is hyperextended by a towel or shoulder roll, which is positioned behind the neck for support. The surgical incision may be either vertical or horizontal. [The rule of thumb is the least amount of anatomical disturbance is best].

To minimize trauma to the trachea, the tracheotomy is usually performed between the second and third tracheal ring.

Another common technique is the percutaneous tracheotomy. It can be performed either between the first and second tracheal ring or between the second and third ring (Fig. 1). This procedure is most often performed in the ICU at bedside. A needle is inserted percutaneously, followed by an introducer or series of introducers that dilate the patient's trachea until it is large enough to allow a tracheostomy tube to be passed over the same guide wire into place.

### Physiological alterations

Once the tracheotomy is performed and a tracheostomy tube is placed, the patient's normal physiological state is altered. Airway resistance decreases, as the upper airway is bypassed. There are differences in gas temperature and humidification. Inspired air is no longer warmed and moistened naturally. This procedure has a significant impact on the sense of smell, as air is no longer pulled into the nares to stimulate the olfactory nerve. The cough is weakened, as the patient is unable to maximize thoracic pressure. Even an occluded tube does not provide the normal increase in subglottic pressure that promotes a strong cough. Speech is altered. As air no longer passes through the vocal cords normally, the patient is unable to speak normally. Swallowing is significantly altered because of the mechanical restrictions of the tracheostomy tube.

The trachea is made of C-shaped rings. The opening of the C lies adjacent to the esophagus to al-

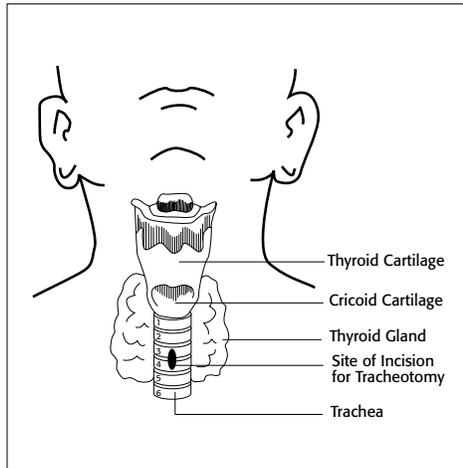


Figure 1

low food to pass easily into the stomach. A tracheostomy tube fixes the trachea to the skin and restricts the larynx from rising as it should to help the epiglottis close off the airway. The tube may mechanically constrict the esophagus, as it interferes with the natural pliancy of the trachea.

Permanent tracheal stomas will mature, usually in four to nine weeks, barring unforeseen complications. Maturation of the tracheal stoma in an alaryngeal patient is paramount for voice restoration.

### Complications

Tracheostomy complications can be divided into two groups: early complications, which occur in the first week, and late complications, which occur in subsequent weeks, months or years.

#### Early complications

**Apnea**, secondary to tracheostomy, can be a life-threatening complication. It is more likely to occur in very small children with chronic airway obstruction. The introduction of the tracheostomy tube suddenly decreases the anatomic dead space, diminishing respiratory drive. Anatomic dead space fills with inspired air at the end of each inspiration. This air is not used in gas exchange but is exhaled unchanged.

An **air leak** or surgical emphysema is typically self-resolving. A

pneumothorax or a pneumomediastinum occurs in about 2 to 5% of adults but is more common among children with a frequency of up to 17%. Using a bronchoscope or endotracheal tube decreases the inspiratory force and decreases the risk of air leakage.

A serious problem, **accidental decannulation** is possibly the most common complication, occurring two or three days after the tracheostomy tube is inserted. When the tube becomes dislodged at this time, the tract has not had time to mature. Reinsertion of the tube can be difficult. Stay sutures can be placed during the tracheotomy to provide a safety net to aid in recannulation after accidental decannulation. About 2 to 3 inches of thick suture material is tacked onto the trachea during the tracheotomy then brought forward and taped onto the patient's skin. Nurses must be careful not to cross the sutures. If, for whatever reason, the patient becomes accidentally decannulated, reinsertion of the tracheostomy tube into the trachea is aided by grasping the stay sutures and pulling outward to open the tracheal stoma.

A twist on accidental decannulation is the creation of a false passage, which occurs when the tube is accidentally dislodged, yet remains in the neck. The patient appears to be appropriately cannulated, but no air exchange is possible, because the tube has moved from the trachea and created a tract in the subcutaneous tissue. The patient may subsequently progress to pulmonary arrest.

**Airway obstruction** can occur in patients who have had a tracheotomy in the immediate postoperative period or within the first week after the procedure. The most common initial cause of obstruction is dried blood and mucous. In the days that follow, during healing, mucous is the more likely culprit. Obstruction can occur when the tube presses against the tracheal wall.

**Hemorrhage** occurs as an early complication but is more common later. Patients often have some blood-tinged secretions after the trauma of tracheotomy. A major complication rarely occurs in the early postoperative course.

**Damage to the larynx or recurrent laryngeal nerve** may be a complication of surgery.

#### *Late complications*

**Accidental decannulation** continues to be a threat after the first week of surgery. As weeks pass, the tracheostomy tract begins to mature and reinsertion of the tube becomes easier. However, the risk of decannulation does not go away. The importance of securing that tube appropriately continues, while the patient remains at risk.

**Airway obstruction** after the first week is most commonly related to a mucous plug. This complication is preventable with appropriate humidification and suctioning. Nursing care is key to minimizing airway obstruction. Nurses provide the pulmonary toilet care for patients who are unable to provide for themselves. They teach patients and their families appropriate pulmonary toilet care and emergency measures to take if the mucous plug is coughed into the tracheostomy tube. These measures include how to remove the cannula, when one is present, and how to suction the tube.

**Hemorrhage** may be a life-threatening emergency in these patients. The most common vessel at risk is the innominate artery, which lies anterior to the trachea. Erosion of this artery can result from mechanical damage, which happens as the tracheostomy tube moves in and out with respiration, particularly when a patient requires continuous mechanical ventilation. Erosion may also result from infection. A warning sign, commonly called a sentinel bleed, may present as blood-tinged

*When needed, the tracheostomy provides an excellent way to bypass an upper airway obstruction or provide a route for long-term mechanical ventilation.*

mucous, signaling the potential for an innominate artery bleed.

**Infection** usually presents as a later complication, as it takes a few days for bacteria to colonize the wound and the immune system to mount a response. Infection may occur at the wound or stoma site or a pulmonary infection may develop into pneumonia. Infections, typically pneumonia, may occur after supra-glottic laryngectomy or in patients with significantly impaired swallowing. The physical insult of placing a tracheostomy tube in the neck increases a patient's risk for aspiration and subsequent pneumonia.

Wound colonization with bacteria is found in up to 36% of patients. The most common bacterial pathogen is *Pseudomonas aureus*. Bacterial colonization alone does not cause infection but is a key primer. Bacterial colonization increases the risk of granuloma formation. Despite these factors, treatment with prophylactic antibiotics to prevent colonization remains controversial.

**Tracheal stenosis** may occur over time after a series of events. Tracheal malacia (tracheal dilation) can result from capillary blood flow oc-

clusion. Afterwards, tracheal stenosis (tracheal narrowing) can occur.

A common cause of capillary blood flow occlusion is the cuffed tube. It should only be used when a cuff is needed, e.g., to seal off an airway for mechanical ventilation or to assist in minimizing aspiration. It is key that the cuff pressure not exceed 30 mm Hg – even at that pressure, capillary blood flow can be occluded.

**Granuloma formation** may occur secondary to the presence of a foreign object, such as a tracheostomy tube, or from infection. The body forms granulation or scar tissue in response to either pressure, mechanical irritation or inflammation. A common site for granuloma production is located just distal to the tracheostomy tube, most likely due to the continual friction of the tube against the mucosal surface.

A tracheostomy tube that is not well secured will increase the risk of movement and, potentially, tracheal wall damage and granuloma formation. A tracheo-esophageal fistula may develop due to mechanical irritation. Patients with infection, poor nutrition and in a catabolic state are at higher risk.

#### **Tracheostomy tubes**

A key concept in patient management is to understand how to care for the tracheostomy tube. Simply put, the tracheostomy tube is a piece of equipment that functions as a secure airway through soft tissues. However, it cannot be managed in isolation without considering how it relates to the patient's special needs and well-being.

What are the patient's comorbidities? What is the purpose of the tracheostomy tube? Does it bypass an upper airway obstruction? Does it function as a temporary or permanent measure after a surgical procedure, enable prolonged mechanical ventilation or provide access for pulmonary toilet (suctioning)? Knowing

the answers to these basic questions will guide nursing decisions that affect the individualization of patient care.

The human trachea is dynamic, as the cartilaginous rings are able to flex and change the tracheal diameter. In contrast, the tracheostomy tube is an artificial mechanism that is not pliant or responsive to changes in tracheal diameter. A cuffed tracheostomy tube or a tube that is too large for the airway may cause a particular insult. The size of tracheostomy tube must be appropriate to the patient. A balance must be found between choosing a minimal tube diameter and ensuring an adequate airway. Commonly, a man may be fitted with a size 8 tube, while a woman usually needs a size 6, but this choice needs to be individualized and a smaller tube should be used, whenever appropriate.

#### Types of tubes

A number of different types and models of tracheostomy tubes are available. These tubes are either cuffed or uncuffed. They may have an air or foam cuff. They may have an inner cannula or only a single cannula tube. They come in different diameters, lengths and curvatures. For example, the laryngectomy tube, which is used for a patient who has a permanent laryngectomy stoma, is shorter and not as steeply curved as a standard tracheostomy tube. This length and curvature is well-suited to the location of a laryngectomy stoma, which is lower than a tracheostomy stoma.

#### Tube design

Many varieties of tracheostomy tubes are available in different sizes. (Fig. 2) Tubes are made of soft latex or firmer PVC materials. Each has a faceplate, which lies against the patient's skin. These faceplates vary in design. Some are flexible and contin-

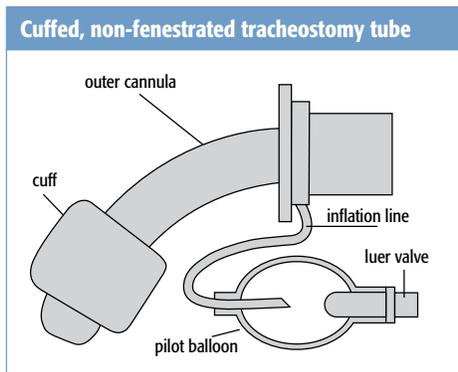


Figure 2

uous with the tube; others are made of PVC and swivel in response to patient movement. Some tubes have an adjustable faceplate that moves up or down the length of the tube.

Tubes may come with an inner cannula. These cannulas are either re-usable or disposable. Disposable cannulas are now used more often in the acute setting. Tubes may also be fenestrated. Air passes from the patient's lungs through the interior cannula and out a variety of openings along the tube. This tube is used for weaning a patient off a tracheostomy tube, as it tests the viability of the upper airway. It permits the patient to speak, as it allows air to pass through the vocal cords. The inner cannula of a fenestrated tube, when inserted, seals off the fenestration and air cannot pass through the upper airway.

Originally, tracheostomy tubes were not cuffed. Cuffed tubes were designed after ventilators were developed, as there was a need to seal off the airway to allow for positive-pressure ventilation. Early tubes were metal with slip-on cuffs. These cuffs were not fixed to the tube and had a tendency to migrate, increasing the potential for airway occlusion. When PVC tubes were developed, the cuff was molded into the plastic or PVC, which helped to eliminate cuff migration. Unfortunately, the cuff still led to complications, specifically tracheal malacia, since early cuffs were high-pressure and low-volume.

Today, tracheostomy cuffs are

high-volume and low-pressure. They distribute cuff pressure over a larger area of the trachea, minimizing the risk of tracheal stenosis. Tracheostomy cuffs can be filled with air, foam or water. Air-filled, low-pressure cuffs have pilot balloons. In some tracheostomy models, these balloons have a safety valve, which opens and releases pressure when cuff pressure exceeds 20 to 25 mm Hg. Foam cuffs minimize tracheal pressure through an open system. The pilot balloon is open at all times, which allows higher pressure within the trachea to displace air in the foam cuff into the atmosphere. Once the trachea relaxes, the foam re-expands.

Pediatric tubes may be equipped with a tight-to-the-shaft cuff, which is typically filled with water. This cuff does not add much to the diameter of the tube. It works well for children who will eventually be taken off ventilator support, because when the cuff is deflated, air can pass around the trachea, allowing speech.

#### Specialty tubes

The Ossoff-Stinson laryngectomy (OSL) tube is indicated for non-ventilator-dependent patients who need tracheal access. It is used primarily for patients who have undergone total or near-total laryngectomy. This tube is particularly useful for patients who have an elliptically shaped stoma that tends to flatten when the patient lowers the neck or when stoma retraction occurs in patients who have had radiation therapy.

This tube must be entirely removed for cleaning, as it cannot be adequately cleaned in place. A web-like obstruction may form over the entrance of the tube if it is not vigilantly cleaned. A water-soluble lubricant is helpful for insertion, especially when the tube fits tightly within the stoma. Instruct the patient to hyperextend the neck slightly dur-

ing insertion to open the stoma.

Short OSL tubes are easily extruded by coughing. Ensure that they are stabilized with a secure holder, such as the Dale tracheal tube holder.

The non-irritating, silicone Montgomery Safe-T-Tube has a T-shaped construction with internal and external limbs. It ranges from sizes 10 to 16. The most common adult sizes are 11 to 13. The external limb can be tilted to suction the tube. Ring washers assist in preventing posterior displacement. In addition to the standard model, several versions are available for specific patient needs. Its primary indication is to maintain a patent airway in instances of tracheal stenosis, after laryngeal injuries, such as crushing or laryngeal fracture, and after tracheal reconstruction and re-anastomosis.

With this tube, it is important to provide constant humidity. Initially, a humidified collar is used postoperatively. Instillation of 5 to 10 ml of saline is recommended, as needed, as often as every 2 to 4 hours in the early postoperative period. The physician may order the instillation of other substances to thin viscous secretions.

Plugging this tube allows for normal humidification and phonation. The tube should be plugged as soon as the patient can tolerate it. Routine skin and tube care are important to maintain proper tube function. Multiple cleanings with a small tracheostomy brush may be required to clear the T-section of tube.

Patients and their families need to be instructed in how to suction the tube properly. The external limb is gently tilted to allow the suction catheter to pass beyond the 45 degree angle. Emergency removal of the tube must be reviewed prior to discharge.

### Tracheostomy care

The basics of tracheostomy care include clearing the airway or suctioning, cuff management, humidifi-

cation, securing the tube, cleansing the tube and patient care.

### Suctioning

Suctioning should be performed with a sterile technique, while the patient is hospitalized. If the patient requires suctioning at home, a clean technique can be used. Suctioning should occur only when the patient needs it. The act of suctioning creates mechanical irritation to the mucosa of the bronchi and, if done unnecessarily, will actually increase mucous production. If a patient is on a ventilator, suctioning will be required. However, it is important to assess the patient's breath sounds and the tenacity and character of secretions.

If a patient is not ventilator-dependent, the cough should be assessed. If the patient has a strong cough and is able to clear secretions adequately, suctioning is not needed. The patient should be placed in an upright position and instructed to take three deep breaths, followed by a strong cough – the same deep breathing and coughing technique that is used with postoperative non-tracheostomized patients. The cough is typically weaker in patients who have a tracheostomy tube, because they are unable to muster negative thoracic pressure.

One controversy over suctioning patients with a tracheostomy is whether “to bag or not to bag”. Mechanical bagging increases the inspiratory volume and may help to mobilize secretions as well as increase oxygenation prior to the trauma of suctioning. However, bagging patients may place undo pressure on surgical anastomosis after head and neck surgery. If patients are able to take deep breaths on their own with oxygen delivered via a tracheostomy mask, they do not need to be hyper-ventilated with an Ambu bag.

A small pilot study has evaluated patients' oxygen saturation via

a pulse oximeter prior to, during and after suctioning, when they take deep breaths. In this study, oxygen saturation was maintained during and after suctioning. (Hickey, 1989 data on file).

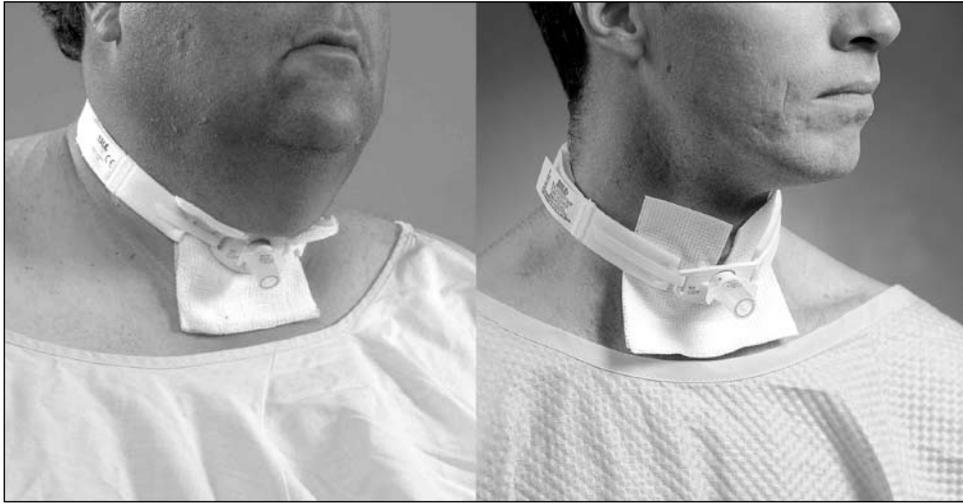
### Cuff management

The rule of thumb in tracheostomy cuff management is the least is best. If patients do not need a cuff, change to an uncuffed tube. If the patient is on a ventilator, the cuff will be needed to seal the airway, so that positive pressure ventilation can be provided.

Another purpose of the tracheostomy cuff is to decrease the risk of aspiration. The cuff does not prevent aspiration; it only serves to minimize the risk. Cuff management is necessary to limit damage to the mucosal capillary and subsequent necrosis from tracheal malacia and/or stenosis.

It is important to monitor cuff pressure closely. Enough air should be placed in the cuff to allow the patient to be adequately ventilated if on a ventilator or to seal the airway of spontaneously breathing patients. To inflate the cuff, from 5 to 7 ml of air are injected into the inlet port to achieve a seal. A one-way valve prevents the injected air from escaping.

Two methods are used to minimize cuff pressure. In the minimal leak (ML) technique, air is injected into the cuff until no leak is heard. Air is then withdrawn until a small leak is heard on inspiration. The minimal occlusive volume (MOV) technique results in higher cuff pressures but creates a better seal. MOV is achieved by inflating the cuff until no leak is heard on inspiration, withdrawing a small volume of air until a small leak is heard on inspiration, then adding a small amount of air until no leak is heard (e.g., 0.1 ml). With MOV, the total intra-cuff pressure should not exceed 18 to 22 mm Hg or 25 to 30 mm of water. Document the



**Figure 3.** Velcro™-type hook fasteners are used to secure tube. Available in a range of sizes to accommodate larger neck circumferences (Dale Medical Products, Plainville MA).

amount of instilled air that created the occlusion and monitor cuff pressures every 8 hours.

Patients can be extremely sensitive to changes in cuff pressure and coughing is not unusual during cuff manipulation. Routine cuff deflation is no longer recommended with high-volume, low-pressure cuffs. However, when the cuff needs to be deflated, the patient's oropharynx should be suctioned to remove any secretions that may have pooled atop the inflated cuff. Using a syringe, slowly aspirate air from the inlet port.

#### *Humidification*

The tracheostomy tube brings inspired air directly into the lungs and bypasses the natural warming and humidification provided by the upper airway mucosa. It is important for the tracheostomized patient to have adequate airway humidification. Patients on a ventilator will receive continuous humidification via the ventilator circuitry. If the patient is using a tracheostomy mask, complete humidification can be provided via a heated cascade. However, spontaneously breathing patients need to rely on other methods.

One technique is to instill 2 to 3 mm of normal saline into the tracheostomy tube while the patient inhales deeply. This method not only moist-

ens the secretions in the tracheostomy tube and upper trachea but helps to stimulate cough and mobilize secretions.

A cold mist humidifier can increase room humidification, which is particularly important in dry climates or areas with forced air heating. Or, the patient can sit in a steam-filled bathroom. A moistened tracheostomy bib, worn over the tracheostomy, helps to add moisture to every inhaled breath. A heat-moisture exchanger can be attached to the end of the tracheostomy tube. This apparatus is most often used for children. Adult sizes may be heavy and cumbersome.

#### *Holders*

A major complication of tracheostomy is accidental decannulation, which has the potential for respiratory arrest. It is important to secure the tube appropriately, especially when changing the holder, while maintaining patient comfort by minimizing friction and pressure on the neck.

Traditionally, twill tape was used to secure the tracheostomy tube. It must be tied securely, yet with enough give to enable the nurse to slip two fingers under the tape. Twill tape is not flexible and does not adapt well to patient movement. It is difficult to change, as one person

must hold the tracheostomy tube in place while a second person threads the tape through the slots on the faceplate and ties it securely.

Today, specialized tracheostomy tube holders, such as the Dale tracheostomy holder, are available. This holder has a wider diameter neckband that distributes pressure and prevents skin irritation. Velcro™-type hook fasteners are used to secure the tube, making it easier and faster to apply. The holder has elastic in the band, promoting tube security and allowing patient movement (Fig. 3).

Regardless of whether twill tape or a tracheostomy tube holder is used, either device must be changed whenever wet or soiled.

#### *Cleaning is vital*

Tracheostomy tubes and the wound site need to be kept clean. If the tube has an inner cannula, it needs to be removed and either replaced, if disposable, or cleansed, if reusable. Reusable inner cannulas should be cleaned with a mixture of hydrogen peroxide and water solution, then rinsed thoroughly with water. Hydrogen peroxide breaks down mucous, which can build up and occlude the cannula; however, it can damage healthy tissue and must be rinsed off diligently.

The stoma site should be cleaned regularly. Ensure that the skin under the faceplate is cleaned. Again, hydrogen peroxide can be used, if needed, to remove crusts, but it should be rinsed off with clean water.

The patient may use a tracheostomy dressing to collect any drainage or mucous, as needed. This dressing may not be needed on a well-healed stoma. If a tracheostomy dressing is used, the gauze should not be cut, as this exposes the patient to loose threads, which can be inhaled accidentally.

## Patient care

Caring for a patient with a tracheostomy tube can often be challenging. The key to optimizing care in this special patient population is to understand the basic principles of tracheostomy in the context of the individual's unique situation and needs.

### Case report

Mr. K. is a 58-year-old man in rehabilitation after multi-modality care for stage T-2 squamous cell cancer of the larynx. Initially, he was treated with radiation therapy, but cancer, extending into the left pyriform sinus, recurred after two months. He developed a palpable node on the left jugular chain and was treated with a total laryngectomy. During surgery, he had a neck dissection with a pectoral major flap. One of 12 remaining nodes was positive for squamous cell cancer. When told that he had one cancerous node, Mr. K. elected not to have immediate chemotherapy.

On day 21 after surgery, he developed a fistula in the stay-line sutures. The fistula measured 6 cm in length, extending into the floor of his mouth. This complication posed a significant problem due to the tracheostomy. All of the secretions from his mouth came directly into the stoma and shunted directly into his airway.

The nurse's action plan was to slow the secretions, then devise a treatment strategy. Because of the pectoral major flap, the nurse used a regular, half-inch gauze strip packing, impregnated alternately with either 3% acetic acid or normal saline. The patient and his caregiver were taught how to change the packing.

One week after treatment began, Mr. K. developed a larger fistula. His suture line, at every insertion point of needle and suture, threatened to break down and fistulize. The packing treatment continued for a third week. A debate began over whether the patient needed a second surgery.

Mr. K.'s tracheal stoma button was taped to a skin protector. To secure it snugly, the nurse used a gauze pad, impregnated with either saline or acetic acid.

On week three, Mr. K. started to turn the corner. By mid-week, he was 90% healed and surgery was canceled. During the third week, the nurse added a gentle, 10-cc intraoral mouth swish-and-swallow with acetic acid, which progressed to normal saline. Mr. K.'s recovery continued uneventfully.



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La Roche College, Pittsburgh, PA, she worked at the University of Pittsburgh Cancer Institute. She is a former Director of the Tulane Cancer Center, New Orleans, LA.

### Symposium Panelists

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*Perspectives*, a quarterly newsletter focusing on postoperative recovery strategies, is distributed free-of-charge to health professionals. *Perspectives* is published by Saxe Healthcare Communications and is funded through an education grant from Dale Medical Products Inc. The newsletter's objective is to provide nurses and other health professionals with timely and relevant information on postoperative recovery strategies, focusing on the continuum of care from operating room to recovery room, ward, or home.

The opinions expressed in *Perspectives* are those of the authors and not necessarily of the editorial staff, Cross Country University, or Dale Medical Products Inc. The publisher, Cross Country University and Dale Medical Corp. disclaim any responsibility or liability for such material.

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After reading this article, the learner should be able to:

1. Identify the early and late complications of a tracheotomy
2. Describe the various types of tracheostomy tubes and specialty tubes.
3. Describe appropriate nursing care when managing a patient with a tracheostomy

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1. **The first tracheostomy was performed by Chevalier Jackson in the early 1900s.**

True or False

2. **A tracheotomy is usually performed:**

- a. Between the second and third tracheal ring
- b. Between the third and fourth tracheal ring
- c. At the cricoid cartilage
- d. All of the above

3. **A tracheostomy alters which of the following physiological processes?**

- a. Ability to speak
- b. Sense of smell
- c. Ability to swallowing
- d. All of the above

4. **The most common early tracheotomy complication is**

- a. Hemorrhage
- b. Accidental decannulation
- c. Apnea
- d. Subcutaneous emphysema

5. **An inflated cuff on a tracheostomy tube guarantees prevention of aspiration.**

True or False

6. **The tracheostomy tube cuff pressure should not exceed**

- a. 25-30 mm Hg
- b. 18-20 mm Hg
- c. 10-15 mm Hg
- d. None of the above

7. **The Ossoff-Stinson laryngectomy (OSL) tube;**

- 1. **Is a specialty tube ideal for individuals with elliptical laryngectomy stomas**
- 2. **Needs to be entirely removed to be cleaned**
- 3. **Like stoma buttons do not require tracheostomy ties**
  - a. 1
  - b. 1 and 2
  - c. 2 and 3
  - d. All of the above

8. **A spontaneously breathing tracheostomized patient should be suctioned:**

- a. Routinely every 1-2 hours
- b. Once a shift
- c. When unable to clear secretions with cough
- d. A minimum of once a day

9. **Cleaning the inner cannula of a tracheostomy tube should be done with:**

- 1. **Sterile saline only**
- 2. **100% hydrogen peroxide**
- 3. **A mixture of hydrogen peroxide and water**
- 4. **Thoroughly rinsing peroxide with water**
  - a. 1
  - b. 2
  - c. 2 and 4
  - d. 3 and 4

10. **A tracheostomy or laryngectomy tube holder should have all of the following characteristics except:**

- a. Comfort
- b. Security
- c. Non-absorbency
- d. All of the above

Mark your answers with an X in the box next to the correct answer

1	TRUE	FALSE	3	A	B	C	D	5	TRUE	FALSE	7	A	B	C	D	9	A	B	C	D				
	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
2	A	B	C	D	4	A	B	C	D	6	A	B	C	D	8	A	B	C	D	10	A	B	C	D
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Participant's Evaluation

1. What is the highest degree you have earned? 1. Diploma 2. Associate 3. Bachelor's 4. Master's 5. Doctorate  
Using 1 =Strongly disagree to 6= Strongly agree rating scale, please circle the number that best reflects the extent of your agreement to each statement.

Strongly Disagree

Strongly Agree

2. Indicate to what degree you met the objectives for this program:

■ 1. Identify the early and late complications of a tracheotomy	1	2	3	4	5	6
■ 2. Describe the various types of tracheostomy tubes and specialty tubes.	1	2	3	4	5	6
■ 3. Describe appropriate nursing care when managing a patient with a tracheotomy	1	2	3	4	5	6

3. Have you participated in a home study in the past?  Yes  No

4. How many home-study courses do you typically use per year? \_\_\_\_\_

5. What is your preferred format?  video  audio-cassette  
 written  combination

6. What other areas would you like to cover through home study? \_\_\_\_\_

For Iowa nurses, you may submit the evaluation to Iowa Board of Nursing.

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E-mail: perspectivesinnursing.org