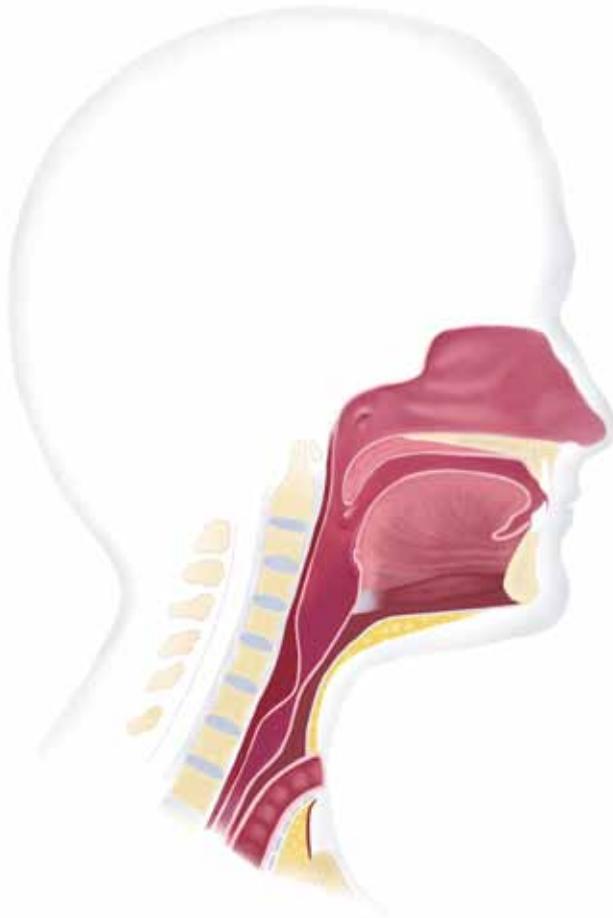


Rescue Breathing for Laryngectomees and other Neck Breathers

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Dr. Brook was diagnosed with throat cancer in 2006 and received radiation therapy. Two years later, he had his larynx removed and currently speaks with a tracheoesophageal prosthesis.

Dr. Brook also maintains a blog of his personal experiences as a patient with throat cancer. The site also contains discussions of informative topics relating to head and neck cancer and laryngectomees. His blog can be found at: dribrook.blogspot.com

Disclaimer

This document is not intended to be all inclusive. It does not provide all the information that the reader needs to know about CPR and it does not substitute for CPR training. CPR courses are available through many sources that are available locally.

This document also does not intend to educate about elective airway management in neck breathers, and it also does not include methods of cardiac resuscitation.

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Summary

Laryngectomees and other neck breathers are at great risk of getting inadequate acute care when they experience breathing difficulties or need cardiopulmonary resuscitation. It is essential that medical personnel learn to identify neck breathers and differentiate partial neck breathers from total neck breathers. Respiratory problems unique to neck breathers are mucus plugs, and foreign body aspiration.

Although partial neck breathers inhale and exhale mainly through their stoma they still have a connection between their lungs, and their nose, and mouth. In contrast there is no such connection in total neck breathers. Both partial and total neck breathers should be ventilated through their tracheostomy site. However, the mouth need to be closed and the nose sealed in partial neck breathers to prevent air escape. An infant or toddler bag valve mask should be used in ventilating through the stoma.

Introduction

Laryngectomees and other neck breathers are at great risk of getting inadequate acute care when they experience breathing difficulties or need cardiopulmonary resuscitation (CPR)¹. Many of emergency department (ED) and emergency response services (EMS) personnel do not recognize a patient who is a neck breather, do not know how to administer oxygen to them in the proper way, and may erroneously give mouth-to-mouth breathing when mouth-to-stoma breathing is indicated. This can lead to devastating consequences because it can deprive sick people from the oxygen they need to survive².

Many medical personnel are not familiar with the care of laryngectomees (total neck breathers) because laryngectomy is a relatively rare procedure. Most laryngeal cancers are detected and treated early. A total laryngectomy is only indicated for large tumors and for tumors that come back after previous treatment.

The goals of this document is to educate and raise the awareness about the special needs of laryngectomees and other neck breathers, explain the anatomical changes after laryngectomy, explain how laryngectomees speak and how to recognize them, distinguish between total and partial neck breathers, and describe the procedures and equipment used in rescue breathing for total and partial neck breathers.

The laryngectomee

The most common indication for laryngectomy is cancer of the larynx (voice box). Many laryngectomees also suffer from other medical problems due to their malignancy and its treatment that usually includes radiation and surgery and may also include chemotherapy. Due to the removal of their larynx, they also have difficulties in speaking and use various methods to communicate.

Possible causes of breathing difficulties in laryngectomees are for example (partial) airway blockage due to foreign body aspiration³ or mucus plug. However, they may also suffer from other medical conditions such as heart, lung and vascular problems that are often age related.

Total laryngectomy

The anatomy of laryngectomees is different than the normal anatomy. After total laryngectomy the patient is breathing through the stoma where the tracheostomy opens in the neck. There is no longer a connection between the trachea and the mouth and nose (Figure 1).

Laryngectomees may be difficult to recognize because many cover their stoma with a foam cover, ascot, or a garment (Figure 2). Many of them also use Heat and Moisture Exchangers (HMEs) or Automatic Speaking Valves that are applied over the stoma (Figure 2).

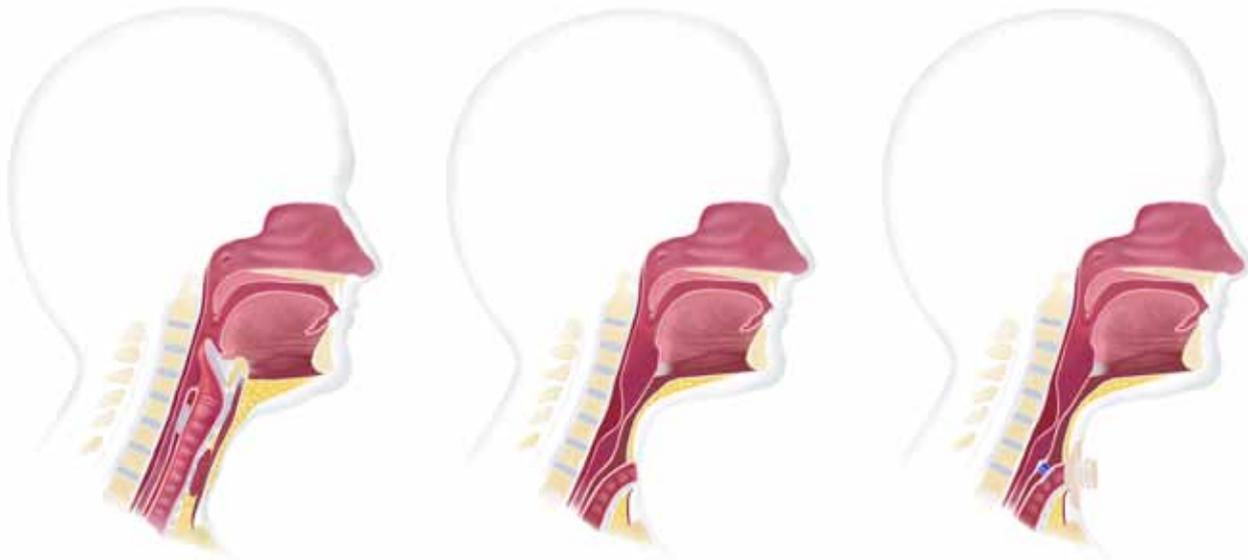


Figure1. Schematic drawing of normal anatomical situation (left), and anatomical situation after total laryngectomy without a voice prosthesis and heat and moisture exchanger (HME) in place (middle), and with a voice prosthesis and HME in place (right).



Figure 2. Uncovered laryngectomy tracheostoma with voice prosthesis visibly in situ (top left), laryngectomy stoma covered with a bib (top right), laryngectomy stoma covered by an HME (bottom left), laryngectomy stoma covered by a handsfree speaking valve (bottom right).

Communication

Laryngectomees use a variety of methods of communication. These include writing, silent articulation, sign language and three speech methods. These methods are esophageal, voice prosthesis through tracheo-esophageal puncture (TEP), and electronic larynx (artificial larynx device) speech. Each of these methods substitutes the vibration generated by the vocal cords with another source while the actual formation of words is done by the tongue and lips.

Esophageal speech

In esophageal speech the vibrations are generated by air that is “belched” out from the esophagus (Figure 3). This method does not require any instrumentation.

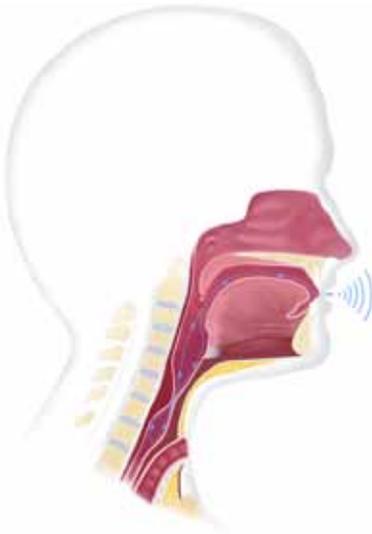
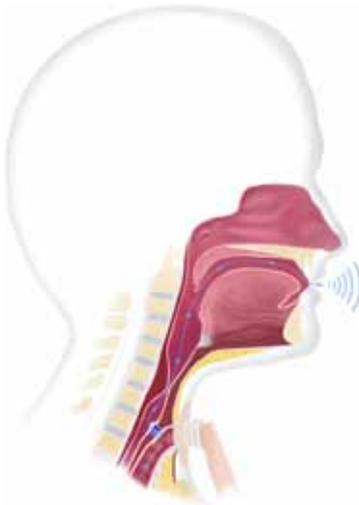


Figure 3. Esophageal speech

Tracheoesophageal speech

In tracheoesophageal speech with a voice prosthesis, pulmonary air is exhaled from the trachea into the esophagus through a small silicone prosthesis that connects the two, and the vibrations are generated by the lower pharynx (Figure 4). To divert the exhaled air through the prosthesis into the esophagus the stoma needs to be temporarily occluded. This can be done by sealing it with a finger or by pressing on a Heat and Moisture Exchanger (HME) (Figure 5).



A Heat and Moisture Exchanger partially restores the lost nasal functions. Some use a Hands Free HME (automatic speaking valve) that is occluded by a brief increased exhalation pressure when one starts to speak.

The HME or automatic speaking valve can be attached in front of the stoma in different ways: by means of an adhesive baseplate that is taped to the skin in front of the stoma, or by means of a laryngectomy tube or stoma button that is placed inside the stoma.

Figure 4. Schematic drawing of tracheoesophageal speech using a voice prosthesis, and stoma occlusion with an HME.



Figure 5. Photo of stoma occlusion on an HME, attached by means of an adhesive base plate, for tracheoesophageal speech.

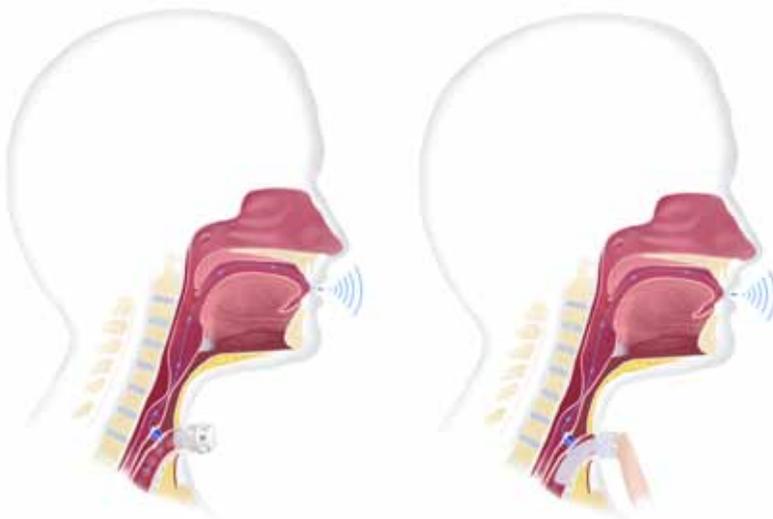


Figure 6. Schematic drawing of an HME with automatic speaking valve attached by means of a stoma button (left) and of an HME by means of a laryngectomy tube (right).

Electro or artificial Larynx speech

The vibrations in the third method are generated by an external electric vibrator (called Electro or artificial -Larynx) which is placed on the cheeks or under the chin (Figure 7).



Figure 7. Schematic drawing of speech with an electrolarynx.

Differentiation between partial neck breathers from total neck breathers

It is important for medical personnel to differentiate partial neck breathers from total neck breathers (laryngectomees) because their management is different than that of total neck breathers.

In total neck breathers the trachea is not connected to the upper airways and all breathing is through the tracheostomy site.

In contrast in partial neck breathers although there is tracheostomy site there is still a connection between the trachea and the upper airway. Even though partial neck breathers breathe mainly through their stoma, they are able to breathe air through the mouth and nose (Figure 8).

The extent of breathing through the upper airways in these individuals varies and a tracheostomy tube is present in many of them. The tube may be protruding from the stoma and is often tied behind the neck. Failure to recognize this condition may lead to inappropriate treatment.



Figure 8. Schematic drawing of a patient with a tracheostomy tube in situ (partial neck breather).

Prepare for Rescue Breathing

The steps in rescuing a neck breather are to first determine their unresponsiveness; then activate the emergency medical services; position the person raising their shoulders; expose the neck and remove anything covering the stoma (filter, cloth) that may prevent access to the airway; secure the airway by checking the neck for a stoma, remove anything that blocks the airways such as the filter or HME if present; and clear any mucous from the stoma.

It is not necessary to remove the stoma's housing unless it blocks the airway. In emergency situations, laryngectomy tubes and stoma buttons may be removed carefully if they are blocking the airway. The voice prosthesis should not be removed, unless it is blocking the airway. The voice prosthesis generally does not interfere with breathing or suctioning. If the prosthesis is dislodged it should be removed and replaced with a catheter to prevent aspiration and fistula closure. If present the tracheal tube may need to be suctioned after insertion of 2-5 cc of sterile saline or removed (outer & inner) to clear any plugs. The stoma should be wiped and suctioned. The next step is to listen for breathing sounds over the stoma. The chest may fail to rise because the tracheostomy tube is blocked.

If a tracheostomy tube is used for resuscitation it should be shorter than the regular one so that it can fit the length of the trachea. Care should be used in inserting the tube so that it does not dislodge the voice prosthesis (see Figure 9). This may require the use of a tube with a smaller diameter.

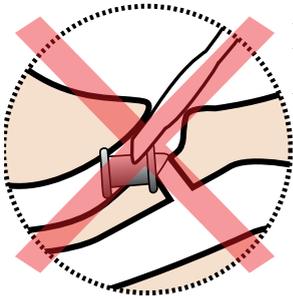


Figure 9. If a tracheostomy tube is used for resuscitation, care should be used in inserting the tube so that it does not dislodge the voice prosthesis.

If the patient is breathing normally he/she should be treated as any unconscious patient. The oxygen delivered should be humidified if prolonged administration is required.

It may be difficult to detect carotid artery pulse in the neck of some laryngectomees because of post radiation fibrosis. Some patients may not have a radial artery pulse in one of their arms if tissues from that arm were used for a free flap to reconstruct the upper esophagus.

Ventilation in neck breathers

The actual rescue breathing for neck breathers is generally similar to the one performed on normal individual with one major exception. In neck breathers ventilation and oxygen administration is done through the stoma (mouth to stoma, Figure 9 – left) or using a mask (infant/toddler or adult turned through 90°, Figure 9 – right). It is useless to try mouth-to-mouth ventilation.

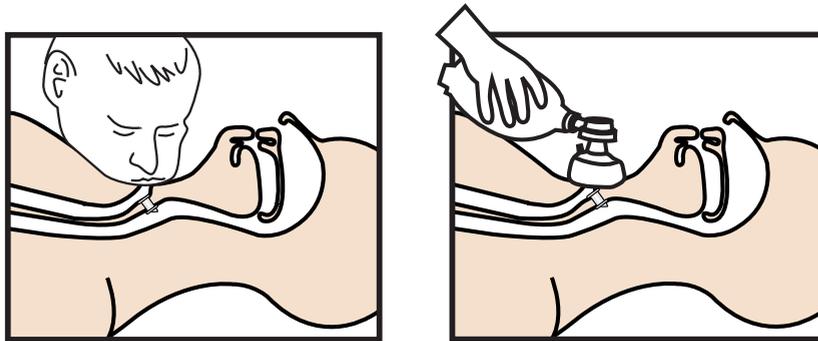


Figure 9. Mouth-to-stoma breathing (left) and mask (right).

Ventilation in partial neck breathers

Although partial neck breathers inhale and exhale mainly through their stoma they still have a connection between their lungs and their nose and mouth. Therefore air can escape from mouth and/or nose in partial neck breathers thus reducing the efficacy of ventilation. Partial neck breathers should also receive ventilation through their stoma. However, in these individuals the mouth should be kept close and the nose sealed to prevent air escape.

Communication during respiratory distress

Laryngectomees may have difficulties in communication during respiratory distress and if possible they should be allowed to do so by writing or through flash cards. Laryngectomees and other neck breathers can assist in preventing life threatening mishaps by carrying an emergency card, displaying an emergency card in their car, and/or wearing a bracelet or a neck chain that identifies them as a neck breather. It is also important for them to carry a list of their medical conditions, the medication they take, the names of their doctors and contact information. They should also communicate their needs ahead of time by calling the national or local emergency services, the police department and the Emergency Medical Services (EMS) in their community. They or their doctors should contact the EDs in their areas so that their personnel would be able to recognize neck breathers and know how to deliver assistance to them.

It is very important for (Emergency Department) ED and EMS personnel to be vigilant and recognize that some of their patients may not breathe through the mouth and nose. The knowledge of health care providers in communities may vary. Even though the care of neck breathers is taught at CPR courses, many health care providers are not familiar with them. The proper administration of oxygen and ventilation through the stoma, and the specific details of CPR to neck breathers should be practiced periodically. Hopefully the medical and EMS community will maintain their knowledge and teaching about the proper treatment of neck breathers so that effective care of these individuals is provided in urgent circumstances.

A slide presentation about the emergency care of neck breather can be downloaded from <http://dribrook.blogspot.com/> or by contacting the author at ib6@georgetown.edu

Dr Brook is the author of: My Voice-a physician's personal experience with throat cancer. (<https://www.createspace.com/900004368>)

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