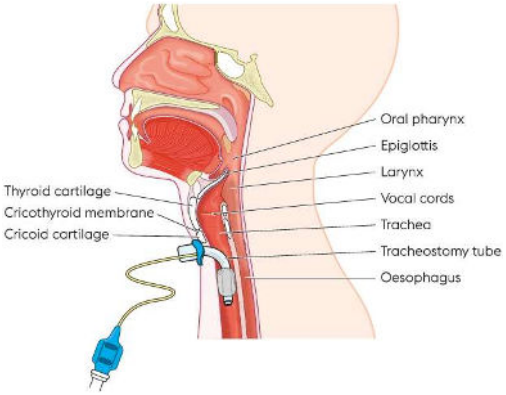




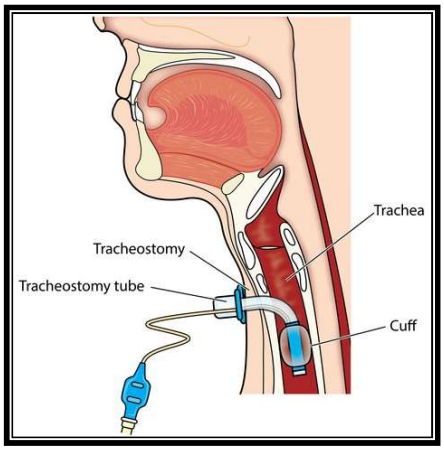
Tracheostomy Care and Respiratory Assistance

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Thank you Missah. In this lesson, we begin to examine Advanced medical devices, specifically those associated with respiratory support.
We begin with Tracheostomy care and its associated apparatus. We examine C-PAP equipment and home ventilators. These systems are relatively straight forward. However, if you are unfamiliar with a specific device or unsure as how to help out, consider the caregiver, patient, or medical control for guidance.
Good studying.

TRACHEOSTOMY

- Surgical opening through neck (stoma) into trachea in which breathing tube is placed
  - ✓ Tracheal stoma provides a path between the neck and the trachea
  - ✓ Kept open by plastic tracheostomy tube
  - ✓ Tubes bypass nose and mouth
- A bag-valve mask (BVM) fits on end of tube
- Patient may or may not be able to speak



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A tracheostomy is a medical procedure allowing air to enter the lungs via a cut in the neck below the vocal cords. A tube is usually placed through this opening to provide an airway, and to remove secretions from the lungs. Breathing is done through the tracheostomy tube rather than through the nose and mouth. It may be temporary or permanent.

A tracheostomy is usually done for one of three reasons:

1. to bypass an obstructed upper airway.
2. to clean and remove secretions from the airway, and
3. to more easily, and usually more safely, deliver

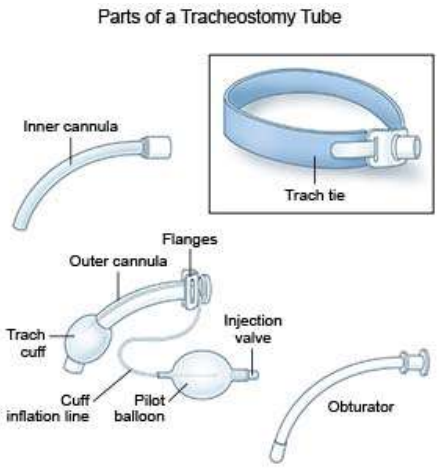
oxygen to the lungs.

All tracheostomies are performed due to a lack of air getting to the lungs. Airway, lung problems, and neuromuscular issues are the primary reasons for the procedure.

Note that a bag-valve-mask fits on the end of the tracheostomy tube. Also, a patient may or may not be able to speak.

TRACHEOSTOMY | PARTS AND DEVICES

- Outer Cannula, Inner Cannula, Obturator
- Several types and styles
  - ✓ Cuffed Tube with either a Disposable or reusable Inner Cannula
  - ✓ Cuffless Tube with Disposable or Reusable Inner Cannula
  - ✓ Fenestrated Cuffed Tracheostomy Tube
  - ✓ Fenestrated Cuffless Tracheostomy Tube
- Routine Care
  - ✓ Keep stoma clean and dry
  - ✓ Suction as needed



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A commonly used tracheostomy tube consists of three parts: outer cannula with flange or neck plate, inner cannula, and an obturator. The outer cannula is the outer tube that holds the tracheostomy open. A neck plate extends from the sides of the outer tube and has holes to attach cloth ties or a Velcro strap around the neck. The inner cannula fits inside the outer cannula. It has a lock to keep it from being coughed out, and it is removed for cleaning. The obturator is used to insert a tracheostomy tube. It fits inside the tube to provide a smooth surface that guides the tracheostomy tube when

it is being inserted.

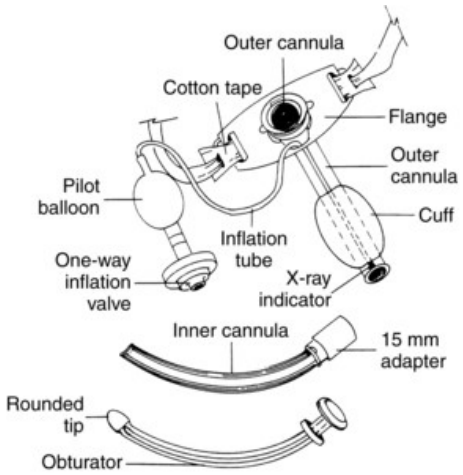
You may have to determine if the tracheostomy is cuffed or cuffless. Medical control may need to know if it is fenestrated allowing speech. You may also have to find out the gauge or diameter of the tube and when it was last changed.

There are various types of tracheostomy tubes available on the slide. The patient should have been given the tube that best suits their condition. You can read more about this in the text that follows.

- Cuffed Tube with either a Disposable or reusable Inner Cannula are used to obtain a closed circuit for ventilation
- Cuffless Tube with Disposable or Reusable Inner Cannula are used for patients who are ready for decannulation.
- Fenestrated Cuffed Tracheostomy Tube are Used for patients who are on the ventilator but are not able to tolerate a speaking valve to speak
- Fenestrated Cuffless Tracheostomy Tube are Used for patients who have difficulty using a speaking valve

Tracheostomy tubes | Complications

- Common problems
- Bleeding
- Air trapped around the pneumothorax or under the skin
- Tubes are prone to obstruction by mucus or foreign bodies
- DOPE mnemonic (causes of obstruction)



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Complications commonly associated with a tracheostomy include bleeding, air trapped around the lungs (pneumothorax), and air trapped in the deeper layers of the chest.

In addition, there may be air trapped underneath the skin around the damage to the esophagus, or injury to the nerve that moves the vocal cords.

Also, the Tracheostomy tube can be blocked by blood clots, mucus or pressure of the airway walls. Blockages may be prevented by suctioning, humidifying the air, and

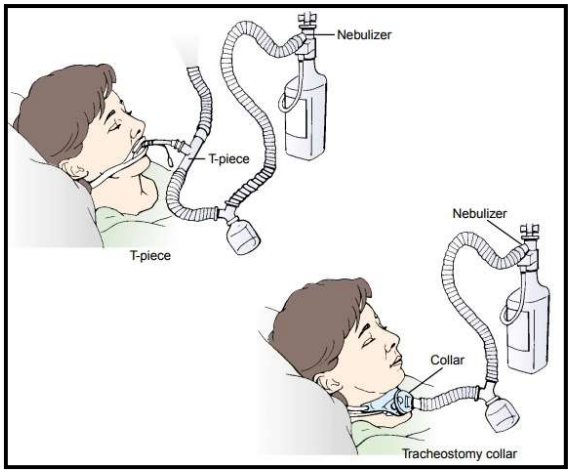
selecting the appropriate tracheostomy tube.

The DOPE mnemonic helps to recognize cause of obstruction. DOPE stands for:

- Displacement of the endotracheal tube
- Obstruction anywhere along the airway circuit
- Pneumothorax or Lungs, and
- Equipment failure such as ventilator malfunction or disconnect

Oxygen Administration to Tracheostomy Patients

- Laryngectomy Patients
  - ✓ Breath through the stoma
- Tracheostomy Patients
  - ✓ Have a cannula
- Attach Oxygen tube to the protruding component
- Associated risks
- Be prepared to suction



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We next discuss oxygen administration to laryngectomy and tracheostomy patients with a neck stoma. In these patients, the neck stoma is the only airway. The process is similar, the difference is that the laryngectomy patient has a permanent stoma, while the tracheostomy patients neck stoma is generally non-permanent.

Laryngectomy patients have had their larynx removed and breathe solely through an opening in their neck, the stoma. Hence, it is useless to administer oxygen through their nose and or their mouth. They often wear a plaster tube or button with a protective filter. Various filter

types are available.

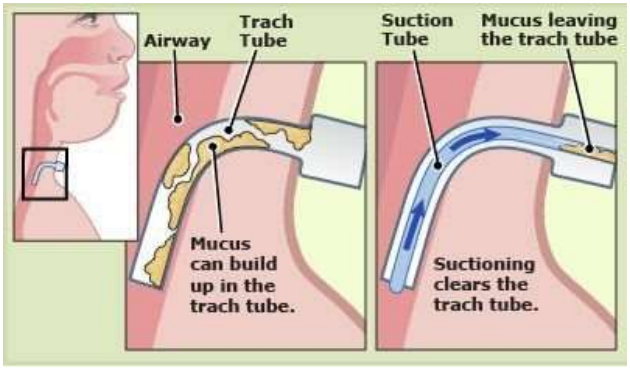
For oxygen administration: Remove the filter, the tube can be left in place. Note that Special devices can be used on the tube or button for this purpose.

The oxygen tube may be attached to the protruding component. The primary risk of oxygen administration through a tracheostomy is that the mucus dries in the windpipe, causing a hard plug to form, which can become dislodged, and can cause airway constriction and shortness of breath. This is called a mucus plug and is the most common emergency with tracheostomy patients.

Simply suction the airway using a soft, French style suction catheter. Be sure not to insert the tip any farther than you are able to see it. Then suction the airway for up to 10 seconds at a time, as many times as necessary to clear the plug.

TRACHEOSTOMY | EMT CARE CONSIDERATIONS

- EMT assessment and transport
- Check tube
- If clogged, insert whistle-tip catheter into stoma
- Patient may buck during suction
- May need to ventilate with BVM
- During transport, elevate patient's head to allow drainage



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EMT level care for a tracheostomy patient in respiratory distress should focus on causes that may be easily correctible. When on a call for an adult or pediatric patient with an established tracheostomy, the EMT should first consult with the patient's caregivers for assistance. And then

1. Assess the tracheostomy tube, looking for possible causes of distress, such as a detached oxygen source.
2. If the patient's breathing is adequate but exhibits continued signs of respiratory distress, administer high-flow oxygen via non-rebreather mask or blow-

by, as tolerated over the tracheostomy.

3. Suction any VISIBLE mucus plugs to help clear the airway, but do not suction deep into the tracheostomy itself.
4. If the patient’s breathing is inadequate, assist ventilations using a bag-valve-mask device with high-flow oxygen.
5. If on a ventilator, remove the patient from the ventilator prior to using the BVM as there may be a problem with the ventilator or oxygen source. And lastly
6. During transport, elevate the patient's head to allow drainage.

Respiratory Devices | CPAP and BiPAP

- Continuous positive airway pressure (CPAP) devices
- Form of noninvasive positive pressure ventilation (NPPV)
- Prevents alveoli from collapsing
- Bilevel positive airway pressure (BiPAP)
- Care Considerations



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So, as we begin to discuss advanced medical devices, you will undoubtedly encounter situations when they are not working. The most important thing the EMT must take into consideration, is what the device is doing for the patient, and how important the device is to the patient's survival.

So we start with a C-PAP device. CPAP is an acronym for Continuous positive airway pressure

C-PAP is noninvasive positive pressure ventilation, provided by a device that blows oxygen or air under constant low pressure through a tube and mask. The

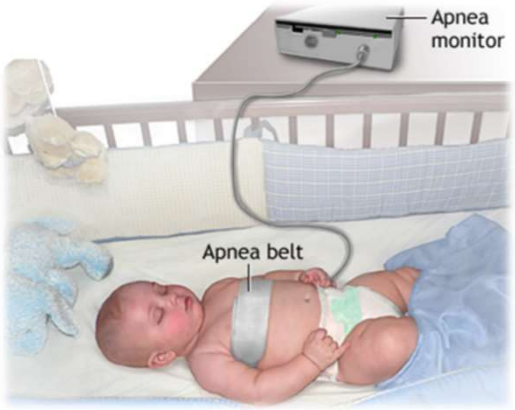
purpose is to prevent the alveoli in the lungs from collapsing at the end of a breath. It is often prescribed for patients who have sleep apnea.

Bilevel positive airway pressure or BiPap is another type of positive pressure ventilator. BiPap patients receive higher air pressure when breathing in. This setting is different from other types of ventilators. For instance, C-PAP delivers the same amount of pressure as you breathe in and out. Different medical problems may respond better to one device or the other.

EMT care considerations for C-PAP and BiPAP patients begin with a standard primary and secondary assessment for the nature of the call. In these cases, it is unlikely equipment failure is the reason you are on scene. Note that the patient may wish to bring their machine to the hospital. And be sure to Alert the hospital personnel of use of one of these devices in advance.

Respiratory Devices | Apnea Monitors

- Used for infants:
  - ✓ With ongoing apnea
  - ✓ Experiencing severe reflux
  - ✓ Needing to be on oxygen or a breathing machine
- Used for 2-3 months after birth
- Sounds alarm if the infant experiences bradycardia or apnea
- Bring the apnea monitor to the hospital with the patient



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A home apnea monitor is a machine used to monitor a baby's heart rate and breathing after coming home from the hospital. Apnea is breathing that slows down or stops from any cause. An alarm on the monitor goes off if the infant experiences bradycardia or apnea.

A monitor may be needed for a baby with ongoing apnea, experiencing severe reflux, or needing to be on oxygen or a breathing machine

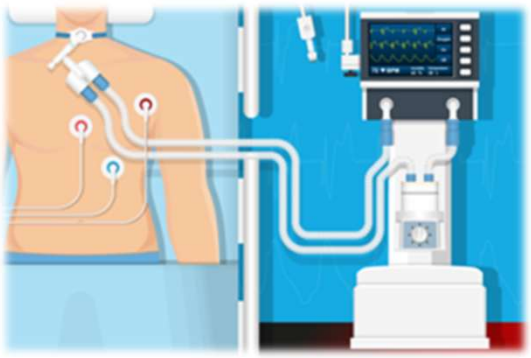
The American Academy of Pediatrics recommends that home monitors should not be used to reduce the risk of sudden infant death syndrome. Babies should be put on

their backs or sides to sleep to reduce the chance of SIDS.

Babies usually wear a home apnea monitor for 2 to 3 months.

Respiratory Devices | Home ventilators

- Differ from CPAP and BiPAP devices
- BiPAP has 2 pressures – for inhalation and 1 for exhalation
- Ventilators used for patients that cannot breathe on their own
- Also used non-invasively with a mask at home



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Home ventilators differ from C-PAP and BiPAP breathing machines, as they will maintain a patient's respiratory rate if the person's breathing stops or becomes too slow. Ventilators also can regulate the pressure level needed by the patient.

Ventilators are used for patients that cannot breathe on their own or when someone suffers from a severe respiratory disease. Life support ventilators can be used 24 hours per day. Often when a patient suffers from a neuromuscular disease, or has experienced a severe traumatic accident that has left them unable to breathe

on their own.

In the home setting, ventilators are also used non-invasively with a mask for patients with severe COPD.

VENTILATORS | EMT CONSIDERATIONS

- Device Management is a Paramedic Level function
- Consider contacting ALS or Medical Control with suspected device issues
- SCOPE – Suction, Connections, Obstructions, Pneumothorax, Endotracheal Tube Dislodgement



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So, Ventilator Device Management is a Paramedic Level function.

Hence, for the EMT, with a suspected device malfunction, and the caregiver or patient is unable to assist, consider contacting ALS or medical control. Also Consider the SCOPE mnemonic for managing the situation. Suction, Connections, Obstructions, Pneumothorax, and Endotracheal Tube Dislodgement.

For ALS trained staff, the protocol for adult and pediatric patients on their own ventilator is.

1. If the ventilator is operational, transport the patient and caregiver, with the ventilator on previously prescribed ventilator settings.
2. If the ventilator is inoperable, assist the caregiver with troubleshooting using the SCOPE mnemonic
3. Use a BVM and transition to an EMS ventilator as necessary and available.
4. Note that all patients receiving mechanical ventilation will have an appropriate size BVM with mask, an appropriately sized OPA, and a 10cc Luer lock syringe readily accessible.

VENTILATORS | CARE CONSIDERATIONS

- If ventilator malfunctions:
  - ✓ Remove patient from ventilator
  - ✓ Ventilate manually w/BVM
  - ✓ Make sure vent tube has no mucus build-up
- During Transport
  - ✓ Patients require assisted ventilation throughout transport
  - ✓ Assure that BVM is connected to oxygen
  - ✓ If transporting ventilator, secure device



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With ventilators, Common problems include mucus plugs and mechanical failures.

If the ventilator continues to function, but may be degraded, ensure that the ventilator tube does not have any mucus buildup, and then suction as needed. During transport, it may be easier to use a BVM while moving the patient to the ambulance, depending on the location of the ventilator and the situation. If the ventilator is left attached to the patient, make sure it is firmly affixed to the stretcher to prevent movement in the ambulance during transport

And, If the ventilator malfunctions and there is no ALS support present, remove the patient from the ventilator, then ventilate manually with a BVM, and make sure the vent tube has no mucus build-up

Note that During Transport, patients require assisted ventilation throughout the trip. Assure that BVM is connected to oxygen, and If the ventilator is left attached to the patient, make sure it is firmly affixed to the stretcher to prevent movement in the ambulance during transport.

Well, we have come to the end of this chapter regarding respiratory care challenges. Missah will be with you next to discuss more advanced medical devices.

Good studying.