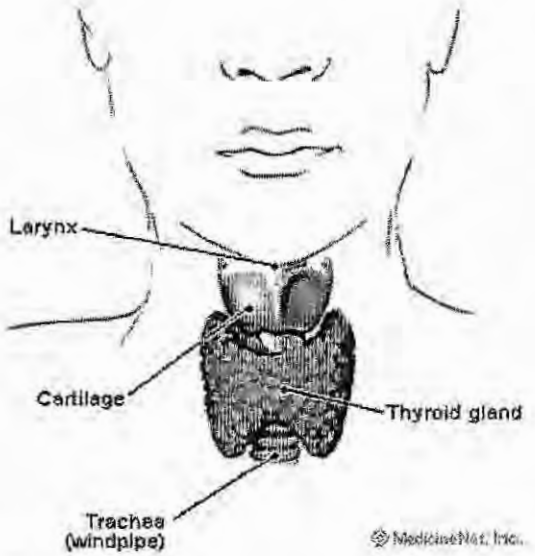
Tracheostomy Inservice

Definition of Trachea

- **Trachea:** A tube-like portion of the breathing or "respiratory" tract that connects the "voice box" (larynx) with the bronchial parts of the lungs.
- Each time we inhale (breathe in), air goes into our nose or mouth, then through the larynx, down the trachea, and into our lungs. When we exhale (breathe out), the air goes out the other way.
- The esophagus, the tube that carries food from the mouth to the stomach, is just behind the trachea and the larynx. The openings of the esophagus and the larynx are very close together in the throat. When we swallow, a flap called the epiglottis moves down over the larynx to keep food out of the windpipe.



What is a Tracheostomy

Tracheotomy is a surgical procedure that is usually done in the operating room under general anesthesia. A *tracheotomy* is an incision into the trachea (windpipe) that forms a temporary or permanent opening which is called a *tracheostomy*. Sometimes the terms "tracheotomy" and "tracheostomy" are used interchangeably. The opening, or hole, is called a *stoma*. The incision is usually vertical in children and runs from the second to the fourth tracheal ring.

A tube is inserted through the opening to allow passage of air and removal of secretions. Instead of breathing through the nose and mouth, the child will now breath through the tracheostomy tube.

After a tracheotomy procedure, the child usually stays in the hospital for about five days, unless there is a complicating condition. It takes about two weeks to recover fully from the surgery.

Management of children with tracheostomies is a complex process that required careful coordination and consistent follow-up. Parents need to be comfortable with all aspects of tracheostomy care before taking the child home. Nursing services should also be arranged before discharge from the hospital.
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Airway problems that may require a tracheostomy

- Airway burns from inhalation of corrosive material, smoke or steam
- Congenital abnormalities of the airway
- Foreign body obstruction
- Infection, such as Epiglottitis or Subglottic Stenosis
- Large tongue or small jaw that blocks airway
- Laryngeal injury or spasms
- Laryngectomy
- Obstructive sleep apnea
- Severe neck or mouth injuries
- Subglottic Web
- Tracheomalacia
- Trencher Collins and Pierre Robin Syndromes
- Tumors, such as Cystic Hygroma
- Vocal Cord Paralysis (VCP)

Lung Problems That May Require a Tracheostomy

- Chest wall injury
- Chronic pulmonary disease to reduce anatomic dead space
- Diaphragm dysfunction
- Need for prolonged respiratory support, such as Bronchopulmonary Dysplasia (BPD)

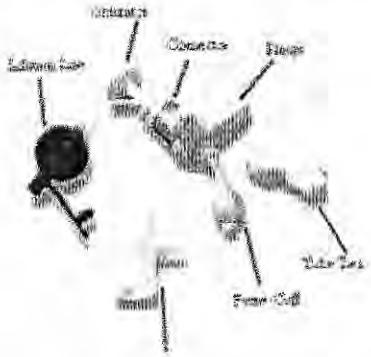
Other Reasons for a Tracheostomy

- Anaphylaxis (severe allergic reaction)
- Aspiration related to muscle or sensory problems in the throat
- Disorders of respiratory control such as Congenital Central Hypoventilation or Central Apnea
- Facial surgery and facial burns
- Fracture of cervical vertebrae with spinal cord injury
- Long-term unconsciousness or coma
- Neuromuscular diseases paralyzing or weakening chest muscles and diaphragm

Types of Tracheostomy Tubes

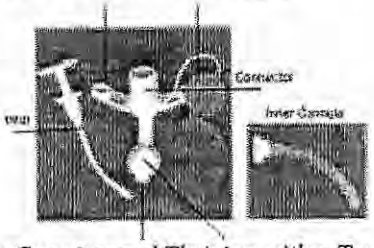
A tracheostomy (trach) tube is a curved tube that is inserted into a tracheostomy stoma (the hole made in the neck and windpipe). There are several different brands of tracheostomy tubes, but all have similar parts. In double-cannula tubes, the inner cannula is inserted and locked in place after the obturator is removed; it acts as a removable liner for the more permanent, outer tube. The inner cannula can be withdrawn for brief periods to be cleaned. The main parts of a double cannula tracheostomy tube are the outer tube (or cannula), the inner tube (or cannula) and the obturator. The obturator is used only to guide the outer tube during insertion and is removed immediately after the outer tube is in place. The outer tube has ties to secure it in place around the child's neck.

Parts of a Tracheostomy Tube
Single Cannula Silicone Tube



Bivona Fome-Cuff Tracheostomy Tube
(Photograph Courtesy of Portex Limited, Hythe, Kent CT21 6JL. UK)

Parts of a Tracheostomy Tube
Tube with inner Cannula



(Photographs from *Growing and Thriving with a Tracheostomy*
by Ann Marie Ramsey and Colin Macpherson, photography by Joe Welch,
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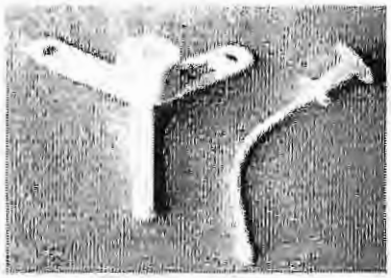
Many of the smaller plastic tracheostomy tubes do not have an inner tube. They are called single-cannula tubes. For infants and small children, the trach tube is usually a single-cannula plastic tube and is generally not cuffed (even if mechanical ventilation is required). The tube size and type is determined by the doctor depending on the reason for the trach tube as well as the size, age and medical needs of the child.

Tracheostomy tubes can be made of metal, plastic or silicone. Plastic and silicone tubes are increasingly popular because they are lightweight and there is less crusting of secretions.

Metal tube with inner cannula and obturator

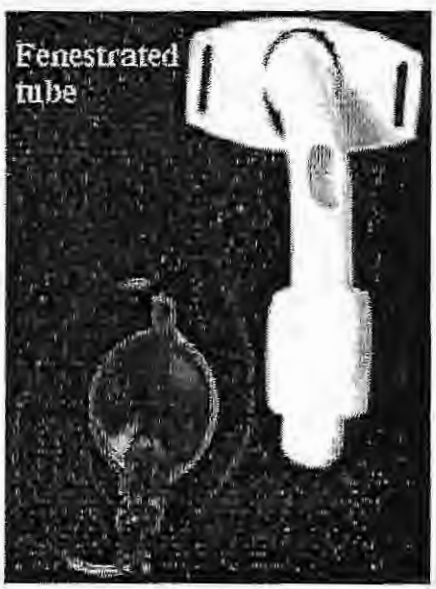


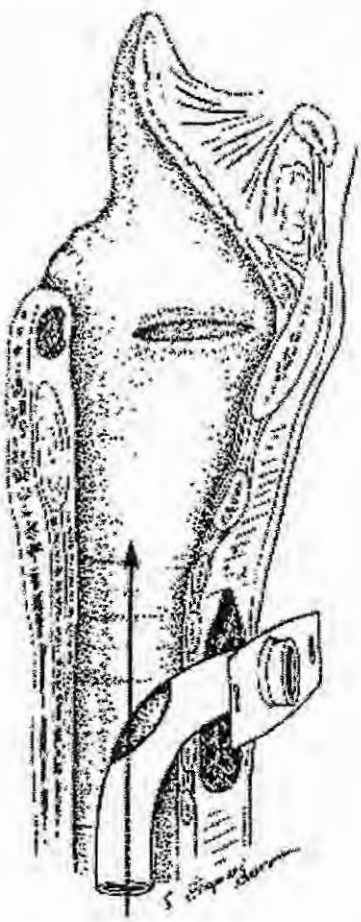
Single Cannular Shiley Pediatric Tracheostomy Tube
Obturator at Right

Tracheostomy tubes come in many varieties, including cuffed, uncuffed and fenestrated. A cuff is a soft balloon around the distal (far) end of the tube that can be inflated to allow for mechanical ventilation in patients with respiratory failure. The cuffs are inflated with air, foam or sterile water. There are several types of cuffs. The low volume cuff is similar to a balloon, a high volume cuff is barrel-shaped. The high volume cuff may be better to avoid complications such as stenosis, because it spreads the pressure out, rather than pushing on one spot in the airway. Tight to shaft (TTS) balloons by Bivona are instilled with sterile water. These work well for children who can be off the ventilator at times. When the balloon is deflated, the tube allows air around tube for vocalization. In small children, cuffed tubes may not be needed, however, in older children a low-pressure cuff may be needed to achieve an adequate seal.

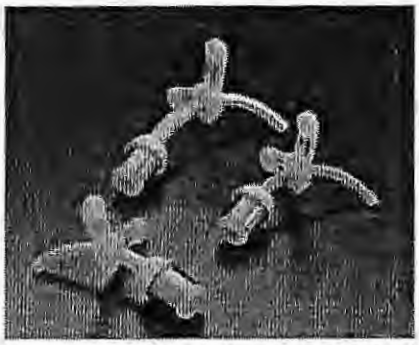
For children who are not ventilator dependant, the tracheostomy tube should allow some airflow around the tube to avoid damage to the tracheal wall and to permit speech.

Fenestrated tubes have an opening in the tube that permits speech through the upper airway when the external opening is blocked, even if the tube is too big to allow airflow around the outer cannula. Fenestrated tubes are not recommended for small children, because they can obstruct the opening with granulation tissue. The opening of the hole must be at a correct angle to prevent problems. Also, in an emergency, a solid inner cannula must be inserted in order to ventilate the child through the trach





A Tracheal Button is a rigid cannula that can be placed into the tracheostomy stoma after removal of a tracheostomy tube. The button does not extend into the tracheal lumen. The tracheal button requires a mature stomal tract, and is generally used as a long-term solution for people with obstructive sleep apnea, which cannot be treated by other means. It is generally kept closed during the day to be unobtrusive, and opened at night to eliminate sleep apnea. Since the tube does not extend far into the airway itself (like a standard tracheotomy tube), it is easy to breath and talk normally with the device in place. It does not need to be opened during the day, since there is no fixed airway obstruction, as in laryngotracheal stenosis. In sleep apnea, the blockage is due to dynamic collapse of the soft tissue



NEW! Bivona® Uncuffed Neonatal and Pediatric FlexTend™ Silicone Tracheostomy Tubes

Note:

- Some trach tubes such as Bivona tubes contain metal fibers and must be changed for a plastic trach tube for MRI tests.
- In small children, cuffed tubes may not be needed, however, in older children a low pressure cuff may be needed to achieve an adequate seal.
- For children who are not ventilator dependent, the tracheostomy tube should allow some airflow around the tube to avoid damage to the tracheal wall and to permit speech.

Changing a Tracheostomy Tube

The tracheostomy tube is typically changed every 1-4 weeks to prevent mucus build-up and for cleanliness. This may very depending on the particular child. Check with the doctor for frequency of trach change. Always change the trach tube with two people present (unless this is not possible in an emergency). Change the trach tube before a feeding or at least 2 hours after a feeding.

Supplies

- Same size trach tube with obturator
- Size smaller trach tube with obturator
- Trach ties
- Small blanket or towel roll
- Blanket for mummy restraint (if needed)
- Sterile water soluble lubricant
- Blunt ended scissors
- Tweezers or hemostats
- Suction machine
- O2 blow-by (if ordered)
- Good light source
- The kitchen or dining room table covered with a pad or blanket may be a good place for a trach change.

Procedure

- Explain the procedure in a way appropriate for a child's age and understanding. Use a calm gentle approach. If you are anxious, the child may sense this.
- Wash hands.
- Cut trach ties to the appropriate length, cut the ends of the tape at an angle to make it easier to thread through the hole in the trach wing (flange) and to prevent fraying. Or wrap a piece of tape around the end of the tie similar to the end of a shoe lace to make it easier to thread.

- Inspect all tubes for cracks, tears, or decreased flexibility before use, especially if tubes are reused. For cuff tubes, inflate cuff to check function and check for leaks (deflate completely before inserting).
  Bring trach tie through one end of new trach tube. Avoid touching the part of the tube that is inserted into the trachea. Try to keep it sterile.
- Insert obturator into new tube; be sure it slides in and out easily. The obturator helps to guide the tube, and the rounded tip adds protection to the stoma during insertion.
- Place a small amount of sterile water soluble lubricant (surgilube or KY Jelly) on the end of the new trach tube and place the tube in sterile tray or clean surface until ready to insert. Note: *Never* use Vaseline or petroleum as a lubricant. Some doctors do not recommend using lubricant, because of the danger of aspiration. If you do use a lubricant, use it sparingly and wipe off excess.
- Have a suction machine and O2 handy if needed.
- Place the child on his/her back with a small blanket or towel roll under his/her shoulders to help with hyperextension. It might be helpful to wrap the child in a blanket mummy-style, if he/she is not cooperative. The child may also sit up for the trach change.
- Administer oxygen if ordered.
- Cut the old trach ties while holding onto trach tube. *Always hold the tube when ties are not secure*; a cough can dislodge the tube.
- Gently remove the old trach tube (follow angle of the tube, an upward and outward arc).
- Insert the new tube in a smooth curving motion directing the tip of the tube toward the back of the neck in a downward and inward arc (like inserting a suction catheter).
- *Do not force the tube!*
- Remove the obturator *immediately* while holding the tube securely with the other hand. Remember that the child cannot breath with the obturator in place.
- Changing the trach tube will cause the child to cough; *do not let go of the tube.*
- Thread the trach tie through other end of tube and tie, allowing one finger between the neck and the ties. Tweezers or hemostats may be needed to thread ties through the hole of the wing of tracheostomy tube. Once the ties are properly adjusted, secure with a double or triple square knot and cut off the excess tape (*Never* tie in a bow).
- Inspect old tube for color, mucus plugs or odor, then discard. Most plastic pediatric trach tubes are disposable and are not washed and reused. Metal tracheostomy tubes are washed, then boiled to sterilize and reused.
- When changing trach tube, observe for skin irritation, breakdown, and signs of infection.
- Remember to praise the child. A trach change can be emotionally difficult for some children.

Tracheostomy Ties

Tracheostomy ties will need to be changed more often than the tube if they become soiled, wet, loose or cause pressure on the child's skin. Some specialists recommend changing ties daily, although this is usually not necessary in home care. However, infants with short fat necks, overweight children, and children on high humidification will probably need daily tie changes. Trach tie changes should also be done with two people. Twill tape comes with the tracheostomy tube or by the roll. If possible, secure new ties before removing old ties to decrease chances of the trach tube dislodging. There are several different techniques for securing the tracheostomy ties. The important things to remember are to use a knot, not a bow, and to be sure the ties are snug, but not too tight. You should be able to slip one finger under the ties. Change the position of the knot slightly with each change to avoid skin breakdown from the knot. If skin irritation does occur, place a gauze pad under the ties or use soft Velcro ties instead. Check tension of trach ties several times a day, because ties may loosen.

Some Ways to Secure Trach Ties

- Use one long piece of twill tape and thread half the length through one side of trach tube. Then bring one end around the back of the neck and through the other side of the trach tube and tie the two ends in a triple knot in the back of the neck.
- Mallinckrodt (maker of Shiley Tracheostomy Tubes) recommends cutting two lengths of twill tape, each long enough to fold in half and still reach around the child's neck. Thread the folded end of one of the ties through one of the holes on the trach tube, going from skin side out. Pull the tie through until it forms a loop. Draw the ends through the loop until the tie is secured to the tube. Repeat on the other side of the trach tube. Bring the loose ends of both ties around to the back of the neck and tie them together using a square knot.
- Cut two pieces of twill tape long enough to fit around the neck and tie. Cut the tie at an angle to prevent fraying. Cut a 1/4 inch slit in each tape about 1 inch from the end. Insert the cut end of the tape through the neck plate hole from back to front. Pull the other end of the tape through the hole in the tape using tweezers or hemostats. Pull tightly while holding the tube. Repeat this on other the other side. Bring both ties together and tie in a triple square knot.
- Velcro straps, such as the Dale tracheostomy tube holder. Note: Velcro holders are comfortable and easy to adjust; however, keep in mind that toddlers and children with developmental disabilities may be able to release Velcro. If you clean and reuse Velcro ties, be sure the Velcro still holds securely after washing.
- Cotton shoe laces can be fun, as they come in many different colors and designs and are easy to thread.
- Umbilical cord tape or hemming tape from a sewing store can also make good trach ties.
- Metal trach holders are good because they do not trap moisture and they are reusable. However, they are also hard to find. Some parents have had these custom made by jewelers. Note: Keep wire cutters handy incase of an emergency when using metal trach holders.
- Dog-tag chains (army ID tag chains) can also be adapted for a chain trach holder. Check your local Army Surplus store. For ties other than metal, keep a sample size tie handy for easy measuring and cutting of new ties.

Risk Factor Associated with Difficult Tracheostomy Tube Changes

- When the stoma is scarred, calcified, distorted or obscured by granulation tissue
- When the trachea is deviated or rotated
- When the trachea is narrowed or smaller than normal
- When the patient is a child
- When the patient is obese
- If the tube must be placed quickly in an emergency
- If it is a new or recent tracheostomy
- If the person performing the change is not well-trained

Techniques for a Difficult Trach Change

- The obturator helps make insertion easy and trauma-free. Always keep an obturator on hand should the tube need an emergency change.
- Reposition the child if needed
- If the tube cannot be completely inserted, hold the tube in place, remove the obturator to let the child breathe, then continue to insert to tube.
- If still unable to insert tube, remove the tube, re-lubricate and try again.
- If this is unsuccessful, try to insert the one size smaller tube.
- Try spreading the skin around stoma and try to insert tube as the child is breathing in.
- If needed, insert a suction catheter through the smaller tube and guide the suction catheter into the trach stoma. Then slide the trach tube over the suction catheter and into the stoma. Remove the suction catheter. Click on thumbnail