

Tracheostomy

Dr. Ali lafta salman
Board certified in Otolaryngology
F.I.B.M.S- C.A.B.M.S

Definition

Tracheotomy is the term used to describe the surgical opening of the trachea.

Also describe the creation of a stoma at the skin surface which leads into the trachea

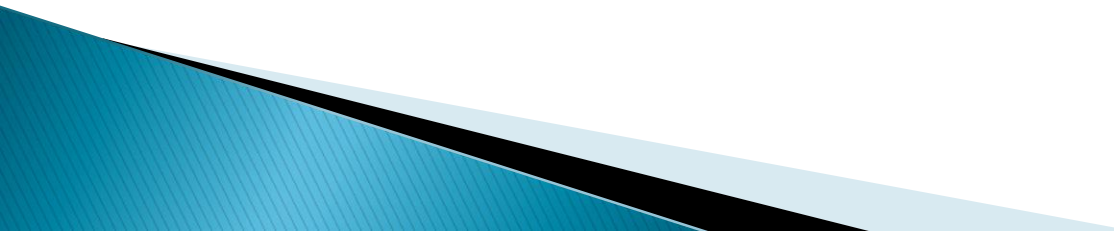
-



Tracheostomy may be either temporary or permanent.

Permanent tracheostomy is an elective procedure carried out as part of an operation involving removal of the larynx, such as a laryngectomy or laryngopharyngectomy, or as part of a diversion procedure for aspiration problems. The trachea is permanently disconnected from the pharynx and the proximal end of the trachea is sutured to the skin.

A temporary tracheostomy may be in use permanently; however, it differs from a permanent tracheostomy in that there is still a communication between the pharynx and the lower airway via the larynx. In a permanent tracheostomy the only access to the lower airway is via the tracheostome.



INDICATIONS

Upper airway obstruction

This is no longer the most common indication for tracheostomy. Owing to improvements in the design of intubating laryngoscopes and the development of alternative management strategies

Removal of secretions

secretions can be aspirated with minimal upset to the patient. In addition, the reduction in respiratory dead space makes it easier for the patient to breathe. Conditions which tend to result in such an accumulation of secretions are congestive cardiac failure, infection, pulmonary oedema and bulbar palsy.

Prolonged ventilation

The tracheostomy tube is more secure than a nasotracheal or orotracheal tube and the reduction of respiratory dead space facilitates the process of weaning the patient off the ventilator.

the timing of the tracheostomy has yet to be defined.- While some studies demonstrate a marked increase in post-intubation laryngotracheal stenosis if patients are intubated for greater than ten days, others have argued that anything up to three weeks is acceptable

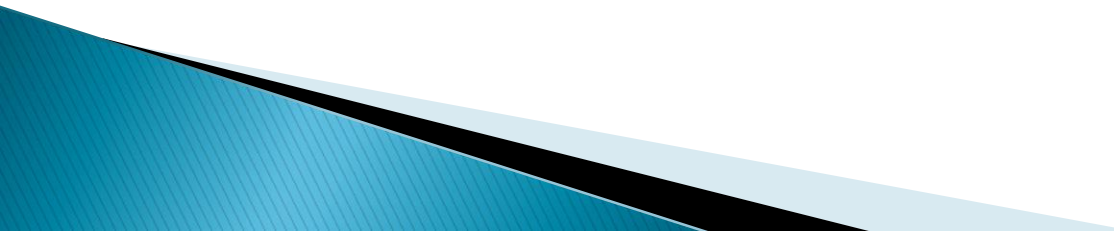
Early tracheostomy has been shown to reduce the duration of ventilation and hospital stay in trauma patients

Part of another procedure

is an integral part of many head and neck procedures. In circumstances where postoperative swelling can be predicted,

This should be regarded as mandatory for all major resections involving the oral cavity or pharynx, and where there is any doubt then a tracheostomy should be performed

Advantages of tracheostomy

- 1-Reduce dead space by 50%
 - 2-Reduction in air resistance
 - 3-Easier tracheobronchial secretion toilet
 - 4-Facilitate using of ventilation support
- 

Technique

The open surgical tracheotomy can be performed in the operating room or at the bedside in a monitored setting such as the ICU. The procedure is most commonly performed under general anesthesia in a previously intubated patient. Occasionally, when the patient presents in acute distress, the procedure is performed in the nonintubated patient under local anesthesia, while the patient breathes spontaneously.

The patient is placed on the operating table with a bolster underneath the shoulders to extend the neck and expose the laryngotracheal landmarks. The procedure begins with the palpation of the landmarks of the neck, including the thyroid cartilage, cricoid cartilage, and sternal notch.

A 2–3 cm incision is carried out in a vertical or horizontal fashion.

The **horizontal incision** provides a more cosmetically pleasing postoperative scar, as it follows the relaxed skin tension lines. This benefit decreases, however, the longer the tracheostomy remains in place.

Vertical incision **avoids** the anterior jugular venous system, therefore minimizing cumbersome bleeding in cases of emergency tracheotomies.

Vertical incisions start just **below** the cricoid cartilage, whereas **horizontal** incisions are made either two finger's breadths below the cricoid cartilage or halfway between the cricoid cartilage

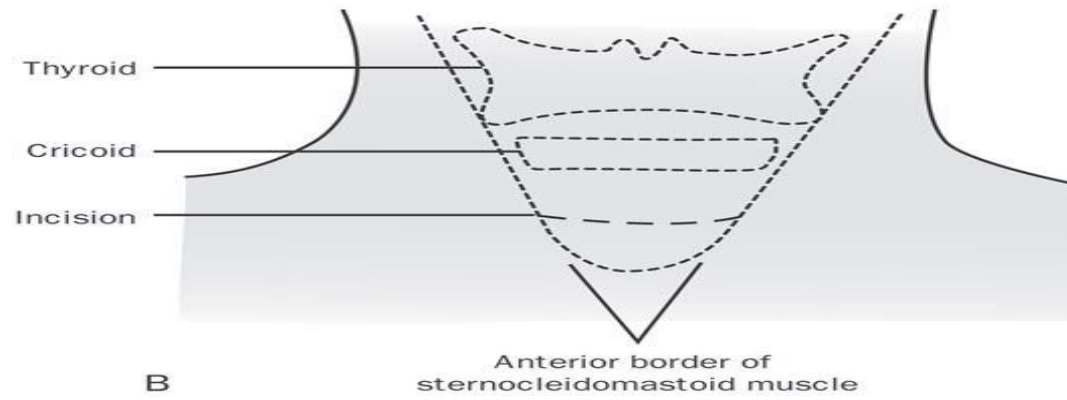
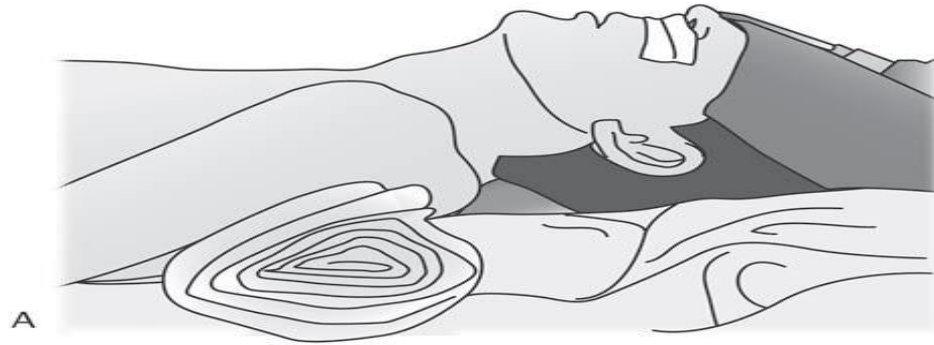
and the sternal notch, typically over the interspace between the **second** and **third** tracheal rings.

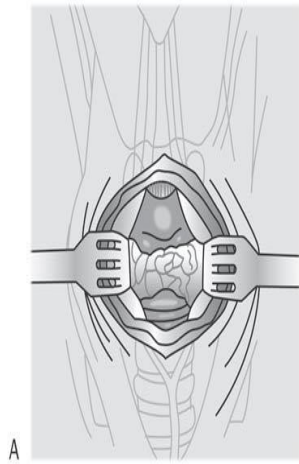
The subcutaneous tissues are then divided. Care should be exercised at this stage to avoid damage to the anterior jugular vein, which, when identified, should be lateralized or ligated in order to avoid unnecessary bleeding.

Once identified, the strap muscles should be divided vertically along their midline raphe until the thyroid isthmus is exposed. The isthmus can be retracted superiorly, inferiorly, or divided and ligated to expose the second and third tracheal rings, where the tracheal window will be performed.

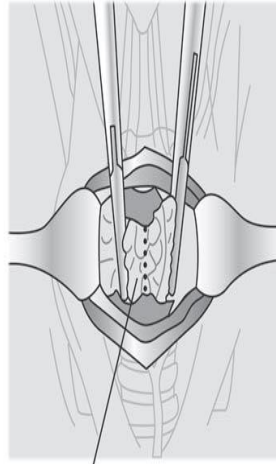
There are multiple incision types for entrance into the trachea. Some surgeons prefer a single horizontal intercartilaginous incision, or make a tracheal window by removing a centimeter-wide portion of the anterior aspect of the second or third tracheal ring.

Once the trachea is entered, a **tracheotomy dilator** is used to **optimize exposure to the tracheal lumen**, taking care to prevent excess trauma to the cartilaginous framework of the trachea. Upon visualization of the endotracheal tube within the lumen, the anesthesiologist is asked to withdraw the tube until the posterior tracheal wall is visualized. The tracheostomy tube is then introduced into the lumen of the trachea under direct visualization. Once successfully placed, the tracheostomy tube should be secured into place with **nonabsorbable sutures** placed through the flanges of the tube, as well as tracheostomy ties placed around the patient's neck.



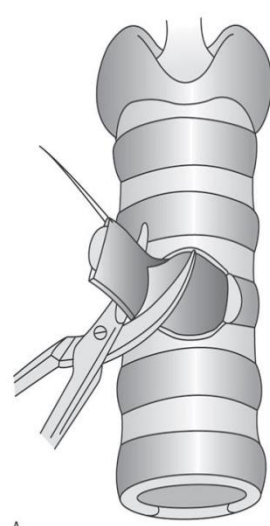


A

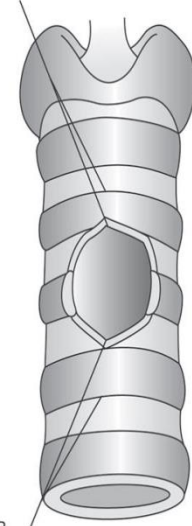


B

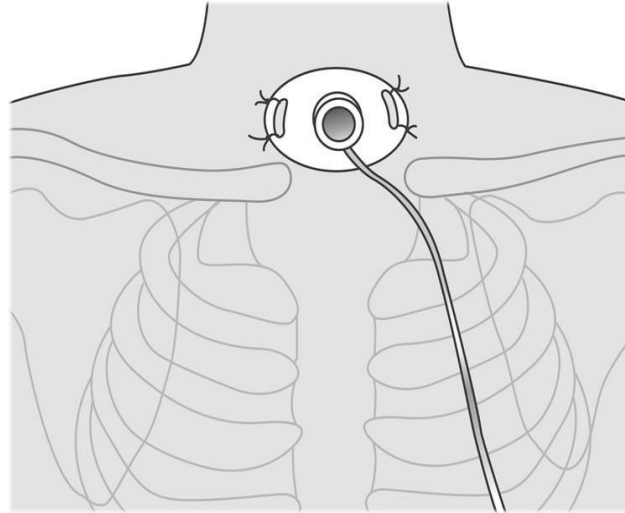
Thyroid
isthmus



A



B



Postoperative Care

1–In the **initial** postoperative period, the patient is usually placed in an intensive care setting in order to continuously monitor vital signs. Indeed, subtle changes in the patient's behavior, pulse, blood pressure, or respiratory rate may herald an obstruction of the tracheotomy tube with dried blood or secretions which requires immediate attention.

2–Tracheal **suctioning** must be performed as frequently as needed

3–The **humidification** of inhaled air is important for the mucociliary transport of secretions and to prevent the obstruction of the airway with dried secretions

4–The tracheostomy tube is rarely changed before the third postoperative day to allow the tract to mature and **to avoid tissue collapse that would seal off the airway**. Tube replacement done after the first 72 hours in adult and 5–7 days in children.

5–**wound care** to prevent infection

6–A post-tracheostomy **chest X-ray** is often advisable to detect possible complications of trapped air, below the skin, leading to subcutaneous emphysema, pneumomediastinum, pneumothorax, or infection.

Complications of Tracheostomy

Early Complications

1–Mild **bleeding** is the most common early complication

Major hemorrhage is unusual and most often involves a branch of the superior thyroid artery.

2– **Tube obstruction** is the most common cause of ventilatory insufficiency in a post-tracheostomy patient and most often results from a mucous plug.

3– **Displacement** of the tracheostomy tube or dislocation of the tube from the tracheal lumen poses a considerable risk in the postoperative period.

4–Tracheostomy tube replacement in the early postoperative period and during the first tube change should be done under direct vision. Blind reinsertion poses the risk of creating a false passage for the tube

5– **Subcutaneous emphysema** results from the forced entrance of air into the fascial planes of the neck, usually resulting from closing the tracheostomy incision too tightly. Tube obstruction or displacement can also lead to escape of air into the fascial planes. Crepitus and soft tissue swelling can involve the neck, face

6– **Pneumothorax** occurs in less than 5% of tracheostomies and can result from damage to the pleural apices during dissection that veers away from the midline.

Late Complications

1–Innominate artery erosion causing **Tracheo–innominate fistula** most commonly occurs at the tip of the tracheostomy tube.

2–significant infections occur rarely. Local cellulitis can generally be managed with local cleansing measures and topical antibiotics. Uncontrolled local infection can lead to such serious complications as mediastinitis, peristomal tissue loss, or tracheo–innominate fistula.

3–**Dysphagia and aspiration** Tracheostomies have been shown to decrease the protective glottic closure reflexes of both the true and false vocal cords.

4– **Granulation tissue** may form in the peristomal area due to chronic mucosal and skin irritation.

5– Tracheostomies may contribute to **subglottic stenosis** by causing chronic irritation to the Tracheal mucosa

6– **tracheo–esophageal fistula**

Types of tracheostomy tubes

1– Metal, either silver or stainless steel.

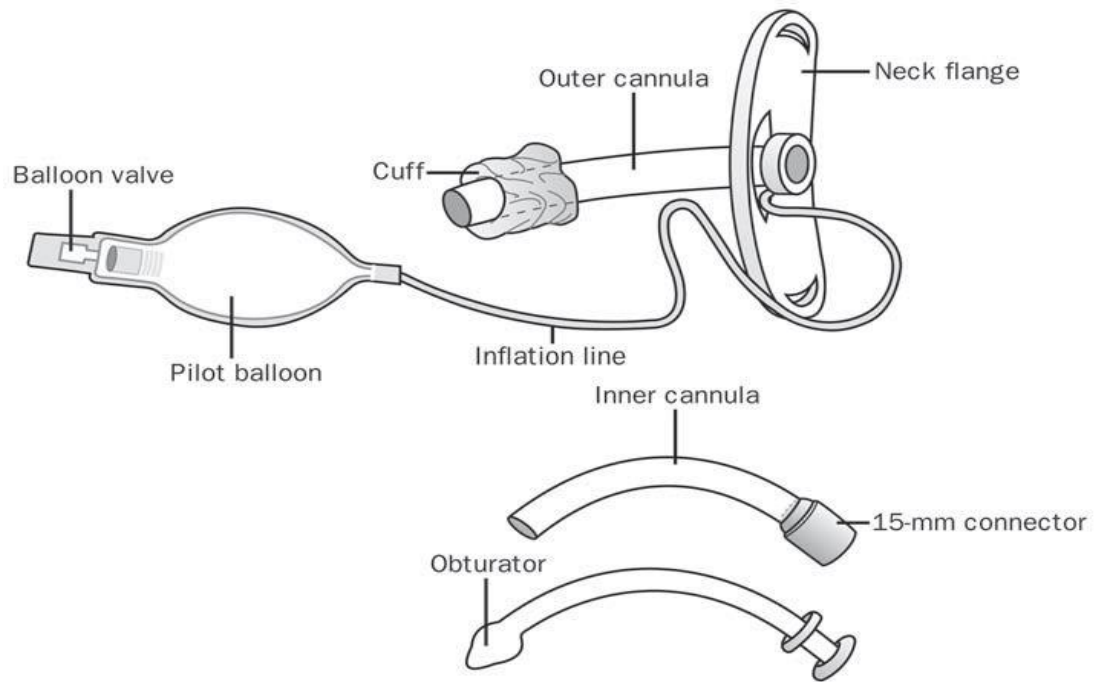
2–Medical–grade plastics such as polyvinyl chloride, polyurethane, silicone, or a combination

Plastic tubes have the advantages of being cheaper, lighter, easier to modify for special needs, and, depending on the material, more pliable. These softer materials have allowed for cuffs at the distal end of the tube so due to presence of cuff plastic tube can be used with ventilator ,or in patient with risk of aspiration like comatose patient .it is also can be used with radiotherapy

Metal tracheostomy Tubes cannot be connected to a ventilator and can not be used in patient with risk of aspiration because they do not have cuffs

Parts of tracheostomy tubes

1-plastic tube



Metal tube

1-Outer tube

2-Inner tube

3-oturator



Thank you

