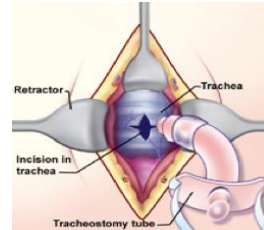


# TRACHEOSTOMY

Department of Otolaryngology and Head & Neck Surgery,  
St. James's Hospital.



“To create an opening (stoma) into the windpipe (trachea).”



## Physiology Benefits

- Reduce respiratory dead space
- Reduce the “work” of breathing
- Assist in clearing of secretions



## Physiology Disadvantages

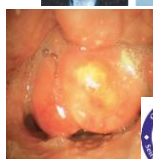
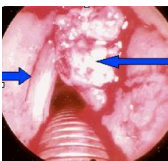
- Reduced humidification of inspired air infections / drying / crusting
- Swallowing impaired laryngeal elevation
- Psychological / Perception
- Reduction in smell and taste



## Indications for Tracheostomy

### 1. Bypass upper airway obstruction

- Tumours
- Trauma
- Infections
- Post Operative swelling

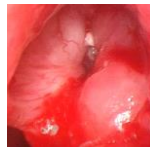


### 2. Assist in prolonged respiration / prevent subglottic stenosis/ failure to extubate

Reduced dead space

No sedation required

Valuable ICU beds



### 3. Assist with clearance of respiratory secretions

Chronic respiratory failure

Poor cough : Neurological / Motor-neuron disease / Chest trauma  
Burns



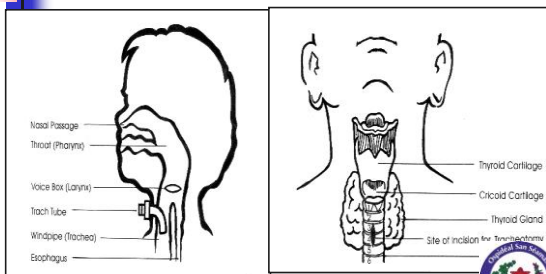
### 4. Prevention of aspiration of oral and gastric secretions

Stroke / Tumour impairment

Bilateral Vocal Cord Paralysis



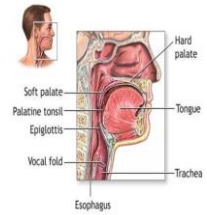
## Anatomy



## Airway Anatomy

### Nasal airway

Warms and humidifies air  
Filters matter  
Primary pathway for breathing  
Lined with epithelium  
Infants are nose breathers



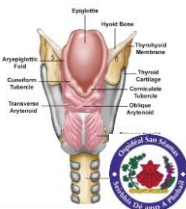
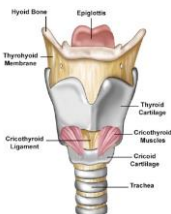
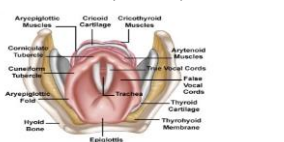
### Oral airway

Entrance to pharynx

## Airway Anatomy

### Larynx

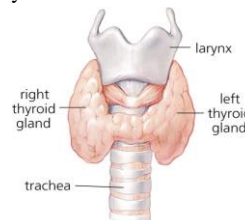
- Group of cartilages, organ of phonation
- Narrowest portion of the airway in adult  
Vulnerable to stenosis
- Closes for swallowing or coughing  
Protects airway from aspiration



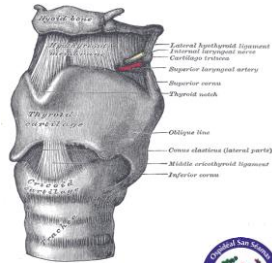
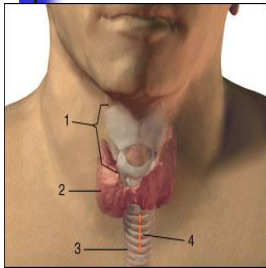
## Trachea and Lower Airways

12cm in length in adults, 16-20 cartilage rings

Thyroid - 2nd and 5th cartilage ring



## Surgical Landmarks



## Surgical Technique

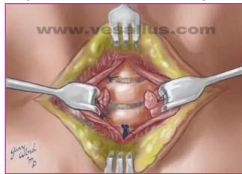


This is an open procedure that is performed in the operating Theatre by the Ear Nose and Throat, Oral and Maxillofacial, Plastics, or Cardiothoracic Surgeons. The patient is positioned with the neck hyper-extended. Skin incision between cricoid cartilage and suprasternal notch. Inc located over the second and third tracheal ring.

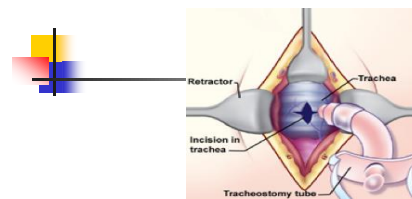
Horizontal incision gives better cosmetics.



Strap muscles, major blood vessels and thyroid are retracted as required. The thyroid isthmus is divided ( in some cases) if bulky.



Step 4:



Opening into trachea should lie at the level of the 2<sup>nd</sup> 3<sup>rd</sup> or the 3<sup>rd</sup> 4<sup>th</sup> tracheal ring.

- If include 1<sup>st</sup> ring can cause subglottic stenosis later.
- In children only vertical incision should be made.
- Tube size: Is dependent on the size of the patient. Typically size 6- 8mm for female, 8 -9mm for male.
- Cuff checked for leaks before insertion.
- Once tube is inserted obturator/introducer should be removed immediately.



## Post-Operative

- Complete haemostasis should be obtained
- Wound must not be closed too tightly, as this may lead to surgical emphysema.
- Flange of the tube should be sutured to skin.
- Gauze pad should be avoided during first 24 hours because it obscures sign of bleeding.



## Portex TRACHEOSTOMY TUBE COMPONENTS



Cuffed Portex subglottic tube. (All cuffed tubes have balloon attached)



## Complications

### Immediate

- Haemorrhage
- Air embolism
- Apnoea
- Cardiac arrest
- Local damage - Thyroid, cricoid, recurrent laryngeal nerve



### Intermediate

- Dislodgement of tube
- Surgical emphysema
- Pneumothorax, pneumomediastinum
- Scab and crust formation
- Tracheal necrosis
- Tracheoarterial fistula
- Tracheoesophageal fistula
- Dysphagia



### Late complications

- Stenosis of trachea
- Difficulty with decannulation
- Tracheocutaneous fistula



## ADVANTAGES OF TRACHEOSTOMY OVER ENDOTRACHEAL INTUBATION

- Reduces patient discomfort
- Reduces need for sedation
- Improves ability to maintain oral and bronchial hygiene
- Reduces risk of glottic trauma
- Reduces dead space and reduces work of breathing
- Augments process of weaning from ventilatory support



## POST OPERATIVE CARE

- Monitor to prevent dislodgement
- Use heated humidification to deliver 40% Oxygen
- Leave cuff inflated for 1<sup>st</sup> 24hrs
- Do not change tube - minimum first 48hrs
- Inspect inner cannula at least once every 4 hr
- Suction as needed



## RISK OF DAMAGE TO THE TRACHEAL MUCOSA

- Suctioning
- Inadequate tracheostomy tube
- Malpositioning of tube
- Poor operation technique
- Excessive cuff pressure
- Damage may vary from **traumatisation to necrosis** and can lead to **bleeding and stenosis including death of the tissue. The most frequent long term damage is tracheal stenosis and tracheomalacia**



## Decannulation

- Tolerate tube capped for full 24 hrs  
(for ENT post op patients only)
- Tracheocutaneous tract may need some time to close. Dressing to exit site must be air tight.
- After decannulation it is recommended that the patient should stay in hosp for at least 2 days



## Percutaneous Tracheostomy

- Indicated in patients likely to require ventilatory support for more than 2 weeks
- Performed at the bedside in an ITU
- Has significant cost benefits compared to open procedure
- Performed using a guide-wire and dilators
- Bronchoscopic guidance used to reduce the complication rate



## Percutaneous Tracheostomy

- May be associated with a reduced risk of bleeding and infection
- Success rates of 98% have been reported
- Mortality related to the procedure is less than 0.5%
- Complications occur in 5-15% of patients
- Re-insertion of a displaced tube may be more difficult



## Cricothyroidotomy

Indicated if laryngeal airway cannot be secured  
**Short term airway (usually inserted in emergency situations only)**



### Methods

1. IV catheter
2. Nu-trake cricoth
3. Formal surgical procedure



### Monitor for:

Subglottic stenosis and surgical emphysema

