SNS COLLEGE OF ALLIED HEALTH SCIENCES

SNS Kalvi Nagar, Coimbatore - 35

Affiliated to Dr MGR Medical University, Chennai

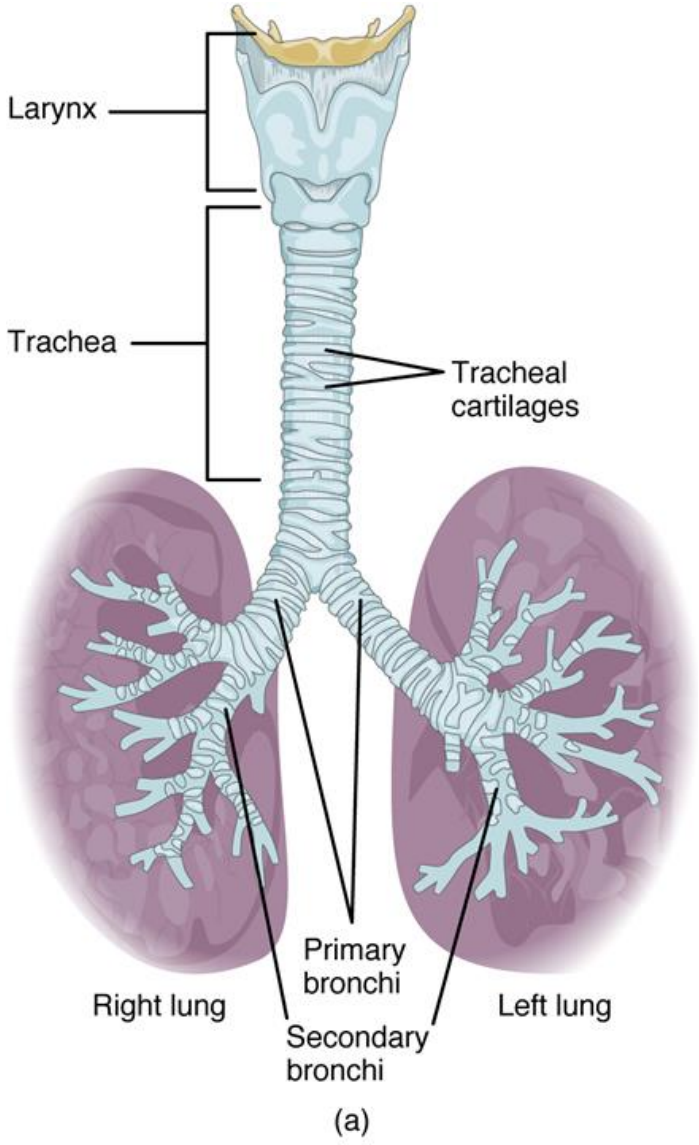
DEPARTMENT OF CARDIOPULMONARY PERFUSION CARE TECHNOLOGY

COURSE NAME: Introduction to Surgery

TOPIC : TRACHEOSTOMY

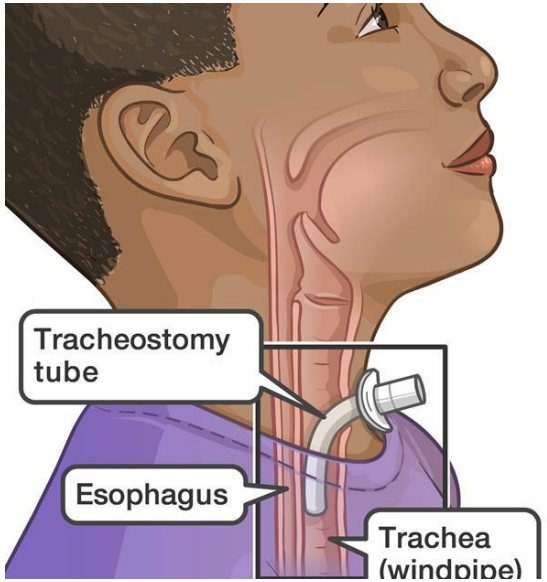
TRACHEA

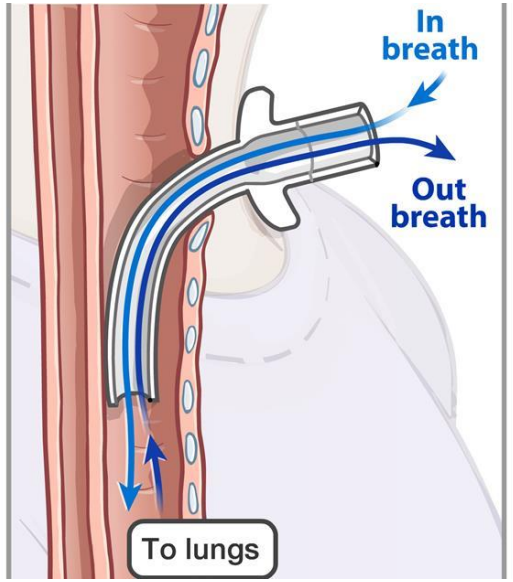
- The trachea and bronchial tree form a system of airways that allow the passage of air to the lungs to take place in gas exchange.
- The trachea is about 10cm long and extends from the level of the 6th cervical vertebrae (at the cricoid cartilage) to the 4th thoracic vertebrae.
- It is an elastic structure held open by incomplete C-shaped cartilaginous tracheal rings joined posteriorly by the trachealis muscle.
- The trachea divides into the right and left main bronchi at the carina which is at the level of the 5th thoracic vertebrae.
- The carina is the most sensitive area of the trachea for triggering the cough reflex.



TRACHEOSTOMY

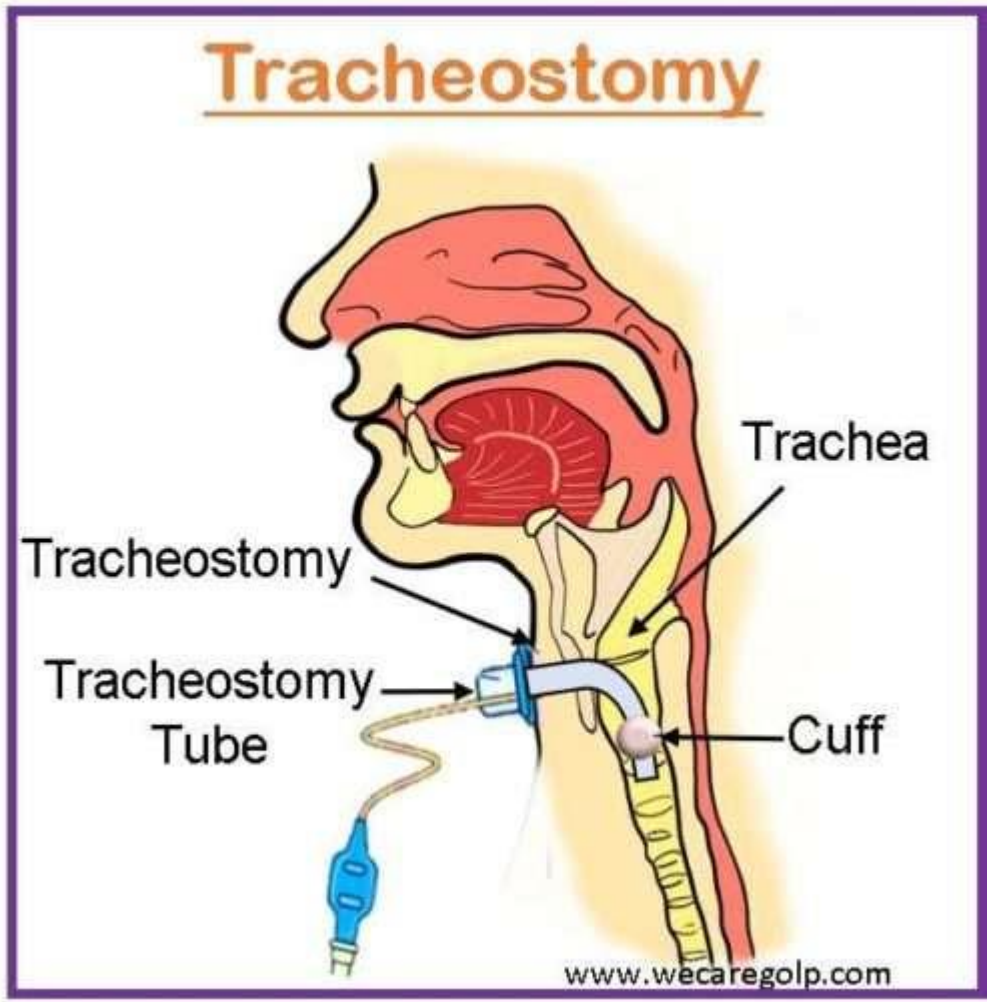
- A surgical procedure performed to open an artificial airway in the neck through an incision in the trachea
- A Tracheostomy is given when the patient is unable to maintain a patent airway and is at risk for severe respiratory distress.
- Opening is made in the 2nd and 3rd tracheal rings
- May be either temporary or permanent





BENEFITS OF TRACHEOSTOMY

- Relieve airway obstruction
- Protects airway
- Improves alveolar ventilation
- Removal of tracheobronchial secretions
- Intermittent Positive Pressure Ventilation
- Decrease in ventilatory dead space
- Decrease in airway resistance
- Less need for sedation
- Faster weaning
- Increased patient safety and mobility
- Ability to communicate



TRACHEOSTOMY TUBE

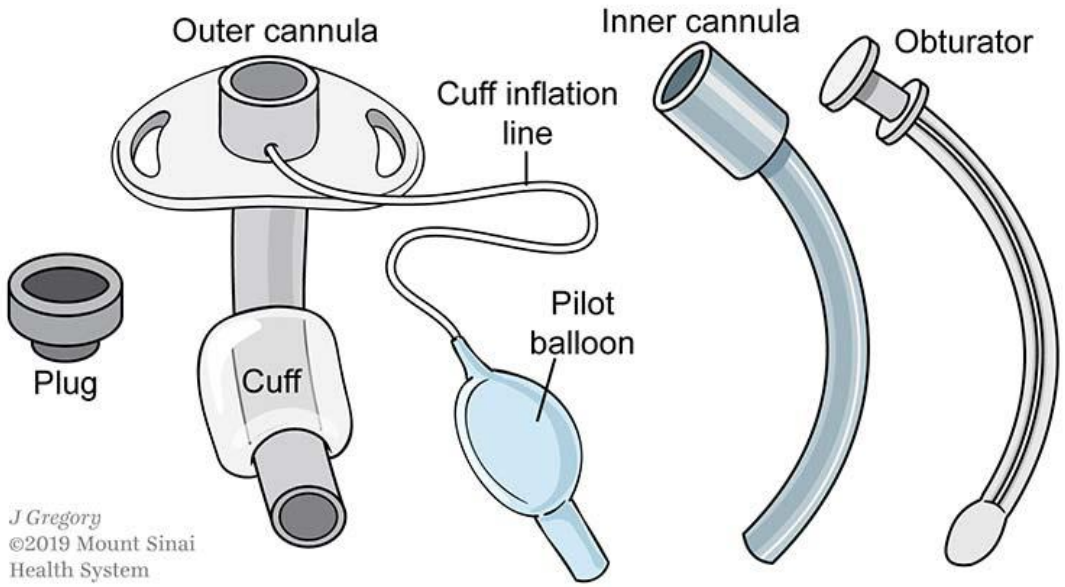
Neck plate / palette -Piece that braces against the patient's outer neck to hold the tube in place.

Outer cannula - Rigid plastic tube that serves as the hull of the tracheostomy tube.

Inner cannula - Removable tube that fits within and runs along the outer cannula lumen.

- Removal of it allows secretions to be cleared from the lumen more easily without removing the entire outer tube.
- The inner cannula can attach to a bag-valve-mask or ventilator.

Obturator - Used during insertion of tube to provide structure.



TRACHEOSTOMY TUBE

Cuffed tubes are required for ventilating, otherwise air leak occurs with each breath delivered

Uncuffed tubes are typically reserved for those who don't require ventilation, i.e. they are awake and alert

Fenestrated - The fenestration is an opening along the dorsal surface of the outer cannula that allows for air passage to vocal cords and consequently, speech during exhalation

TRACHEOSTOMY TUBE & SIZES

Valves - One-valves can be placed overlying the outer tip of the inner cannula.

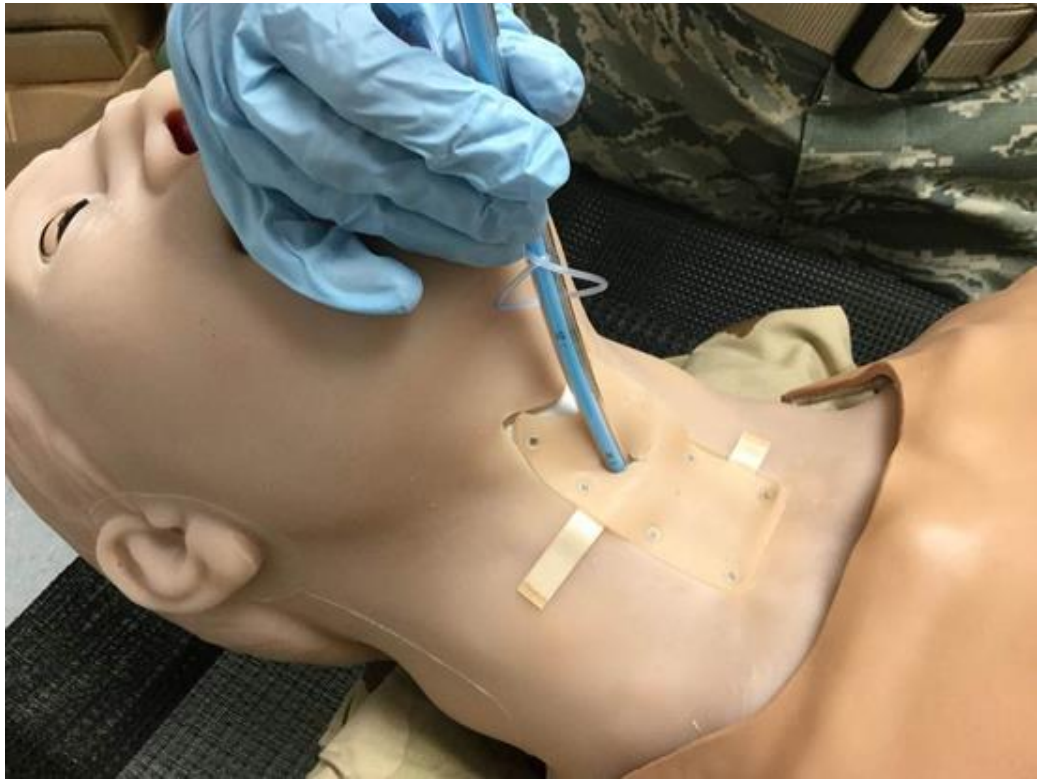
They allow for inward air movement, but not outward, allowing exhalations to be redirected physiologically across the vocal cords and out the mouth/nose facilitating speech.

The pilot balloon port is attached to tubing that inflates the cuff at the base of the tracheostomy tube to hold it in place within the trachea.

Tube size (ID)	Age/weight
3 mm	Term >3 kg up to <8 months
3.5 mm	8 months to <2 years
4 mm	2 to <4 years
4.5 mm	4 to <6 years
5 mm	6 to <8 years
5.5 mm	8 to <10 years
6 mm	10 to <12 years
6.5 mm	12 to <14 years
7 mm	14 to <16 years

INDICATIONS

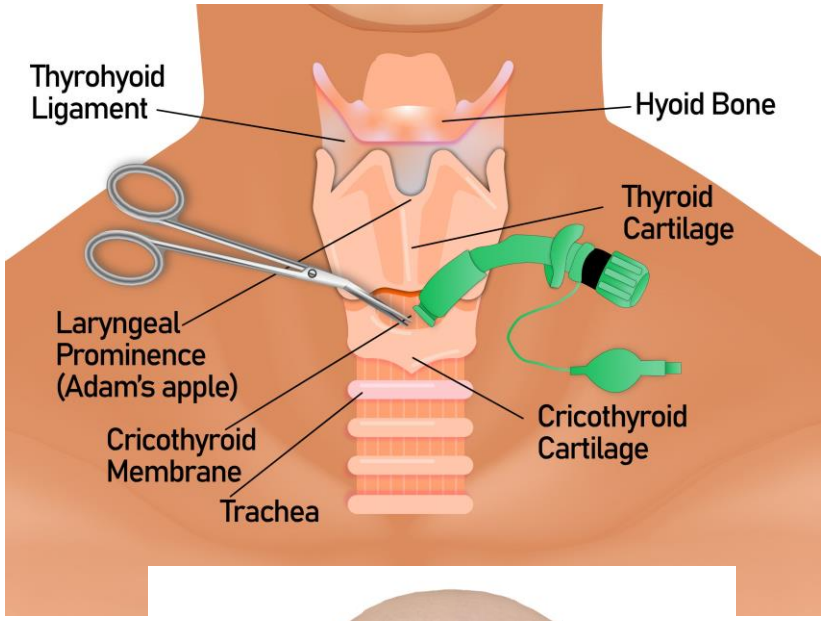
- Prolonged intubation.
- Facilitation of ventilation support
- Inability of patient to manage secretions.
- Upper airway obstruction
- Inability to intubate
- Adjunct to major head and neck surgery.
- Adjunct to management of major head and neck trauma.

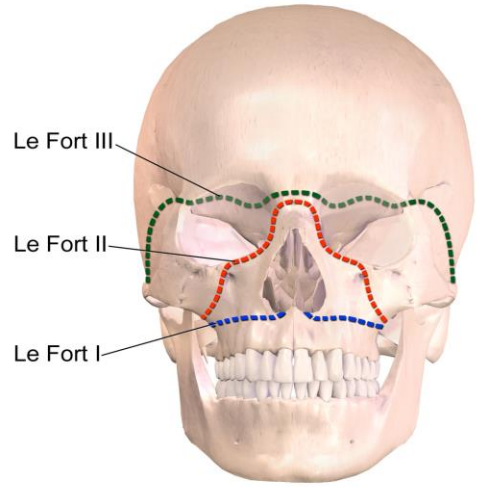


INDICATIONS FOR EMERGENCY TRACHEOSTOMY

Indications for **emergent tracheostomy** include:

- Acute upper airway obstruction with failed endotracheal intubation (foreign body, angioedema, infection, anaphylaxis, etc.)
- Post-cricothyrotomy (if a cricothyrotomy has been placed it should be immediately formalized into a tracheostomy once an airway has been secured)
- Penetrating laryngeal trauma
- LeFort III fracture

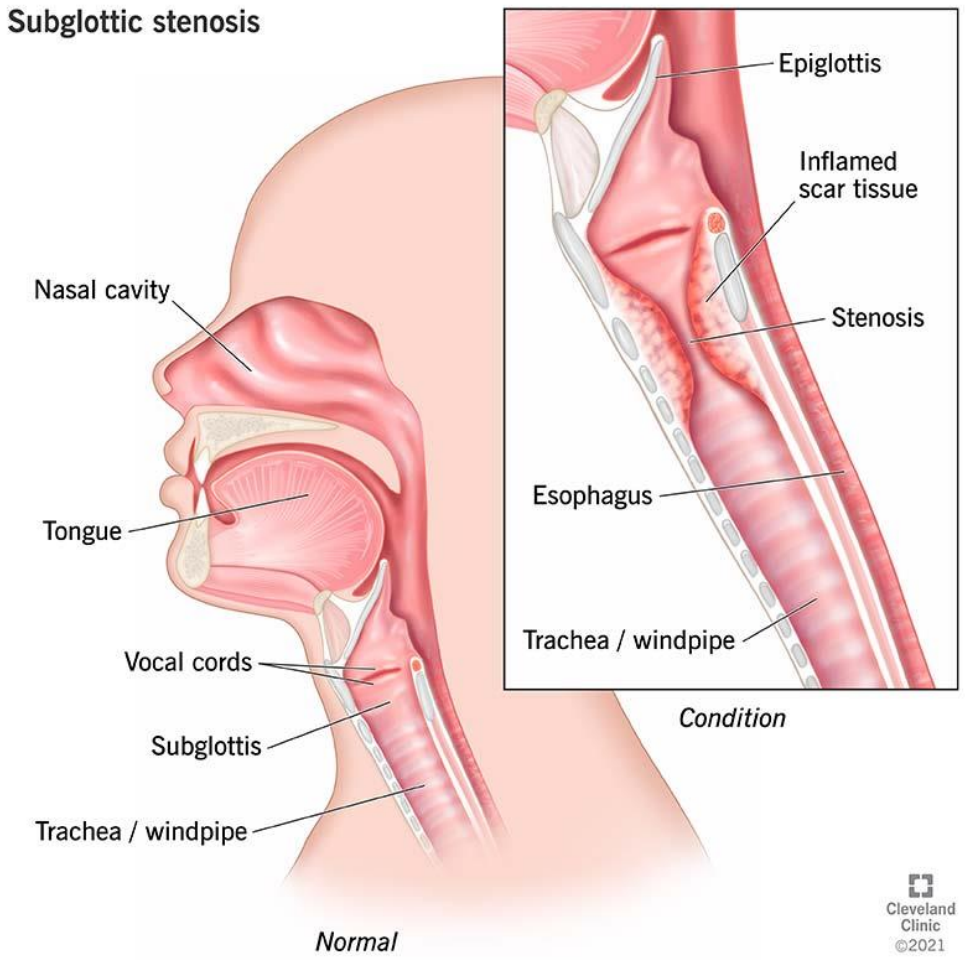




Three Types of Le Fort Osteotomy

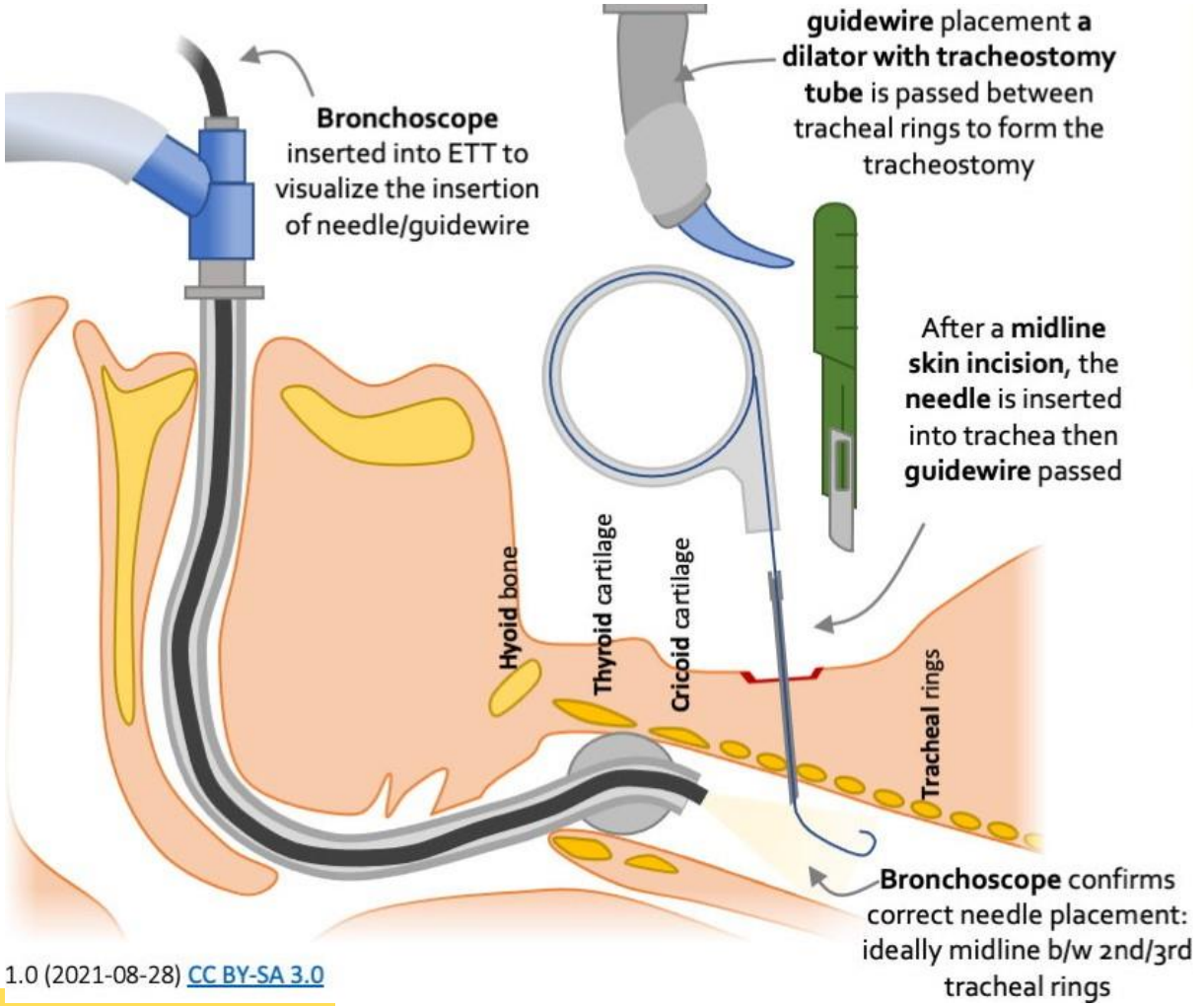
DISADVANTAGES & HAZARDS OF TRACHEOSTOMIES

- Complications at cuff site (e.g., tracheal stenosis)
- Requires specialized skill set, equipment personnel for insertion
- Stoma site bleeding and infection
- Mucosal drying and thickening of secretions
- Subsequent scar at stoma site



PERCUTANEOUS DILATIONAL TRACHEOSTOMY

- Percutaneous dilatational tracheostomy (PDT) is a commonly performed procedure in critically sick patients.
- It can be safely performed bedside by intensivists.
- Percutaneous Tracheostomy involves Seldinger technique and dilatation of trachea between rings.



EQUIPMENTS NEEDED & PATIENT POSITION

- Flexible video bronchoscope
- Tracheostomy tube
- Scalpel
- Introducer needle
- J Guidewire
- Small tracheal dilator
- Tracheostomy tube introducer

Position: neck extension with a roll placed in between scapula
Sterilize and drape anterior neck

Landmarks: Palpation, Bronchoscopy ± ultrasound identification of tracheal rings. 2nd and 3rd tracheal ring ideal insertion site.

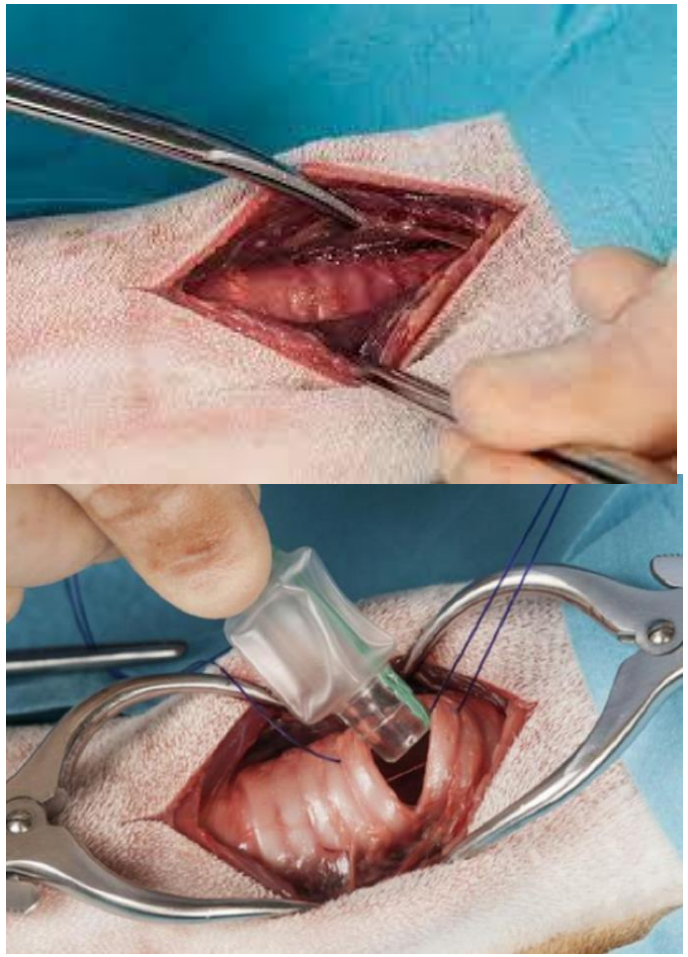
Local Analgesia: Lidocaine w or w/o epinephrine

PROCEDURE

- Make 2 cm vertical skin incision, can be done after guidewire advanced if preferred.
- With bronchoscope identify tracheal rings and thyroid cartilage.
- Insert needle midline, 12'oclock during direct visualization.
- Advance J guidewire.
- Use small dilator over guidewire.
- Single-stage tracheal dilator over guidewire, remove.
- Tracheostomy tube is inserted with the loading dilator over the guidewire.
- Bronchoscopic confirmation of tracheostomy tube position.
- Tracheostomy tube is connected to the ventilator.
- Tracheostomy secured with sutures (optional) and neck ties.

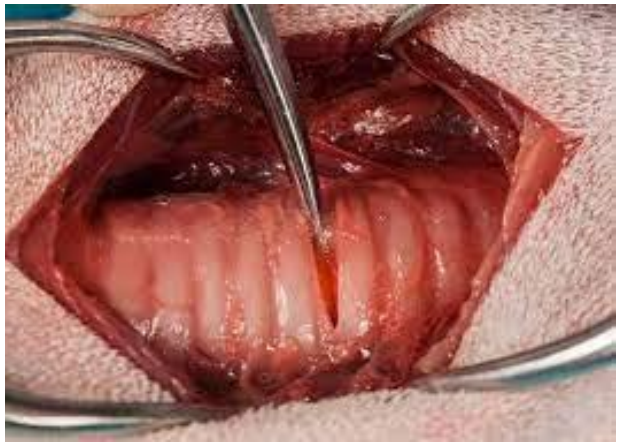
SURGICAL TRACHEOSTOMY

- Incision through skin and dissection through subcutaneous tissues performed.
- Strap muscles identified and divided vertically in the midline.
- Identification of the thyroid isthmus is carried out.
- Hemostasis and dissection of isthmus are achieved with bipolar diathermy.
- This step is usually necessary to improve visualisation of the trachea.
- Exposure of the trachea by blunt dissection. Deeper retractors are placed for adequate visualisation on each side.



SURGICAL TRACHEOSTOMY

- Tracheotomy window created at the level of the 3rd and 4th tracheal rings. This step is done with sharp dissection using a blade 15 knife.
- Checking of the tracheostomy tube.
- Insertion of the tracheostomy tube.
- The cuff is inflated with air and an inner tube is inserted if needed.
- A sterile connector is used to connect the tracheostomy tube with the anaesthetic machine.
- The tracheostomy tube is secured in position with sutures



THANK YOU

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