

An anatomical illustration of a human head and neck in profile, showing the internal structures of the mouth, throat, and trachea. A tracheostomy tube is shown inserted into the trachea through a surgical incision in the neck. The tube is connected to a blue ventilator circuit. The background is dark blue with a wavy, fabric-like texture.

TRACHEOSTOMY

Dr. Mamoon Ameen

Tracheotomy

Surgical opening of the trachea.

Tracheostomy

Creation of a stoma at the skin surface which leads into the trachea.

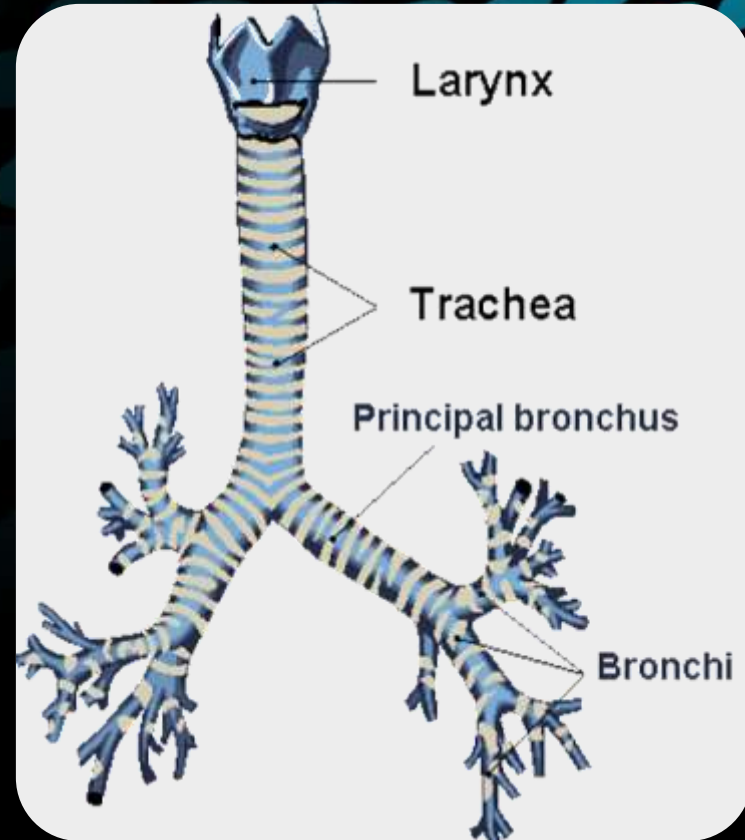
Tracheostomy History

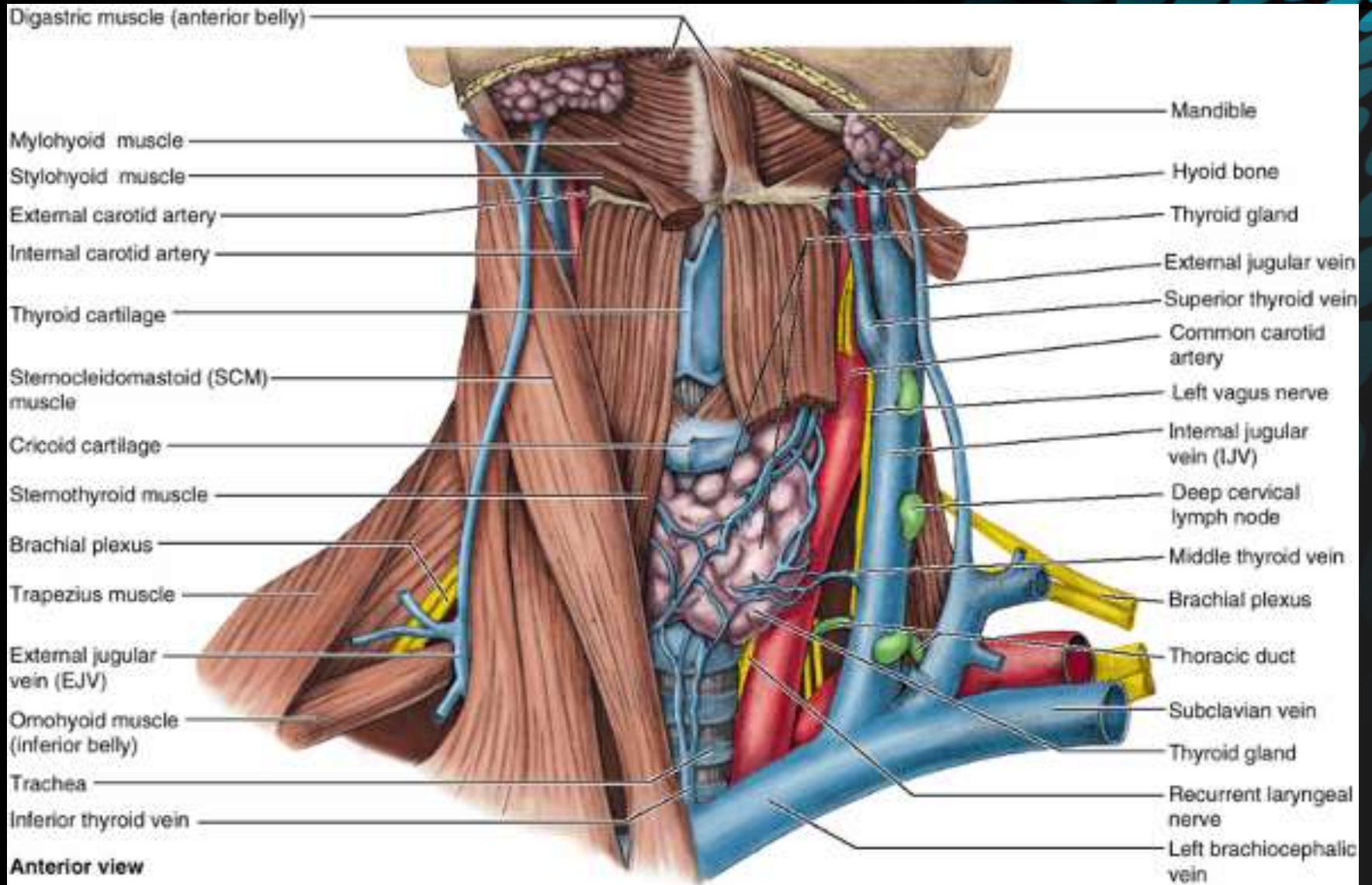
- The Tracheostomy is one of the oldest surgical procedure.
- It can be traced back to Egyptian tablets from 3600 B.C.
- **1546** : first well-documented tracheostomy by **Antonius Musa Brasavola**,
- **1921**: **Chevaliar Jackson** – standardized the technique of the tracheostomy .
- Modern percutaneous tracheostomy (PCT) developed by **Toye and Weinstein in 1969**.



ANATOMY

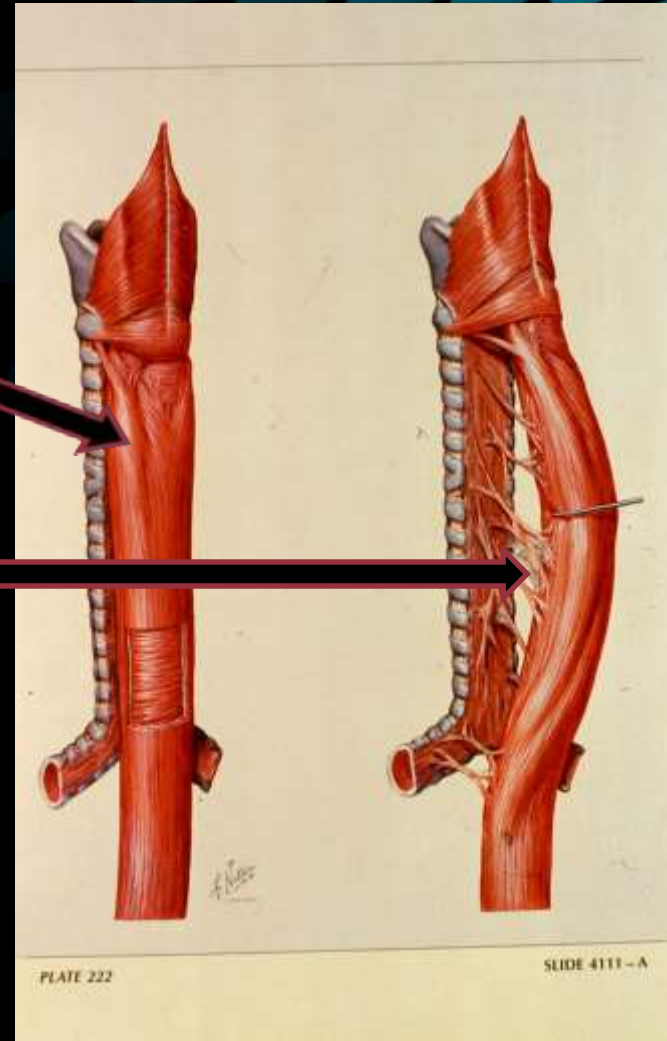
- Trachea lies in midline of the neck extending from cricoid cartilage (C6) superiorly to the tracheal bifurcation at the level of sternal angle (T5).
- Comprises 16–20 C shaped cartilage rings.
- Becomes intra-thoracic at 6th cartilaginous ring.
- Length 10–12cm.
- Diameter 15–20mm.

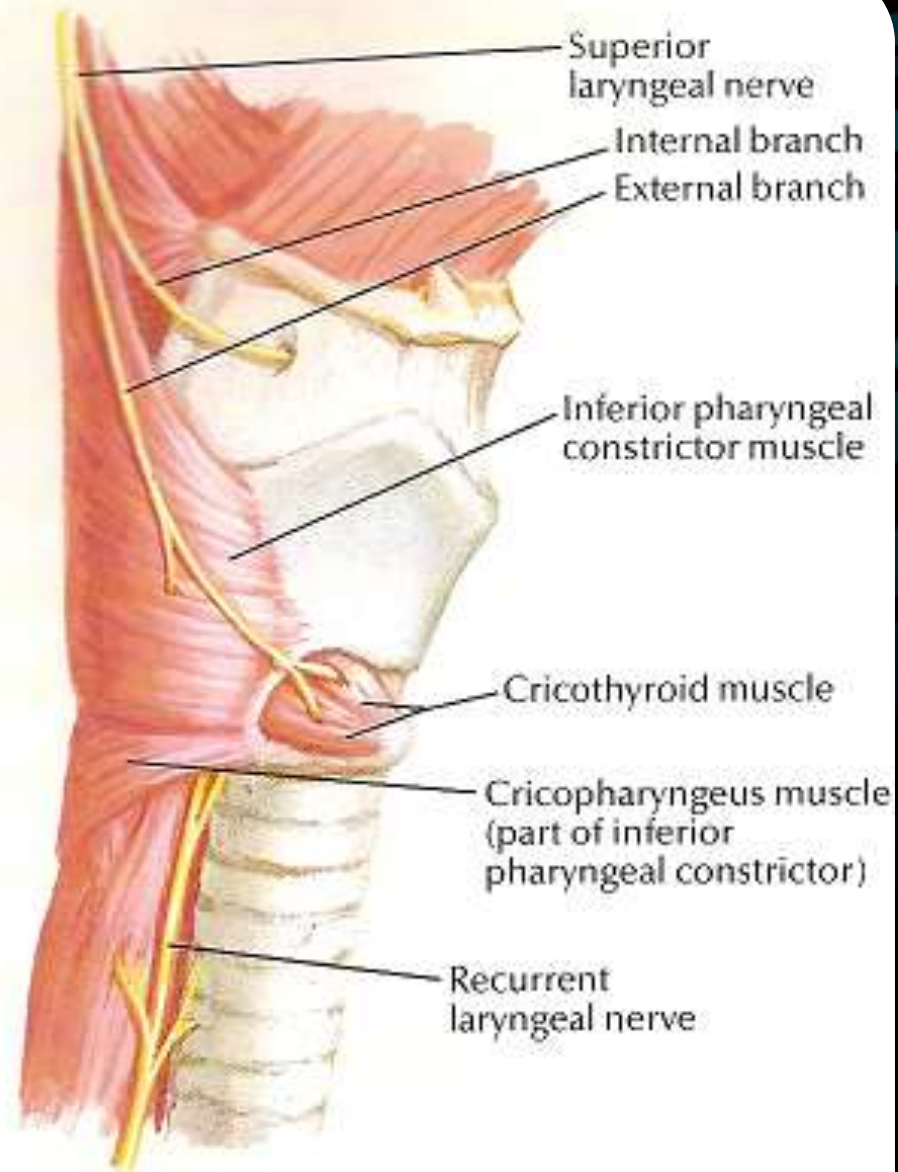




- ◆ **Esophagus lies Posterior**

- ◆ **Note Trachealis muscle**





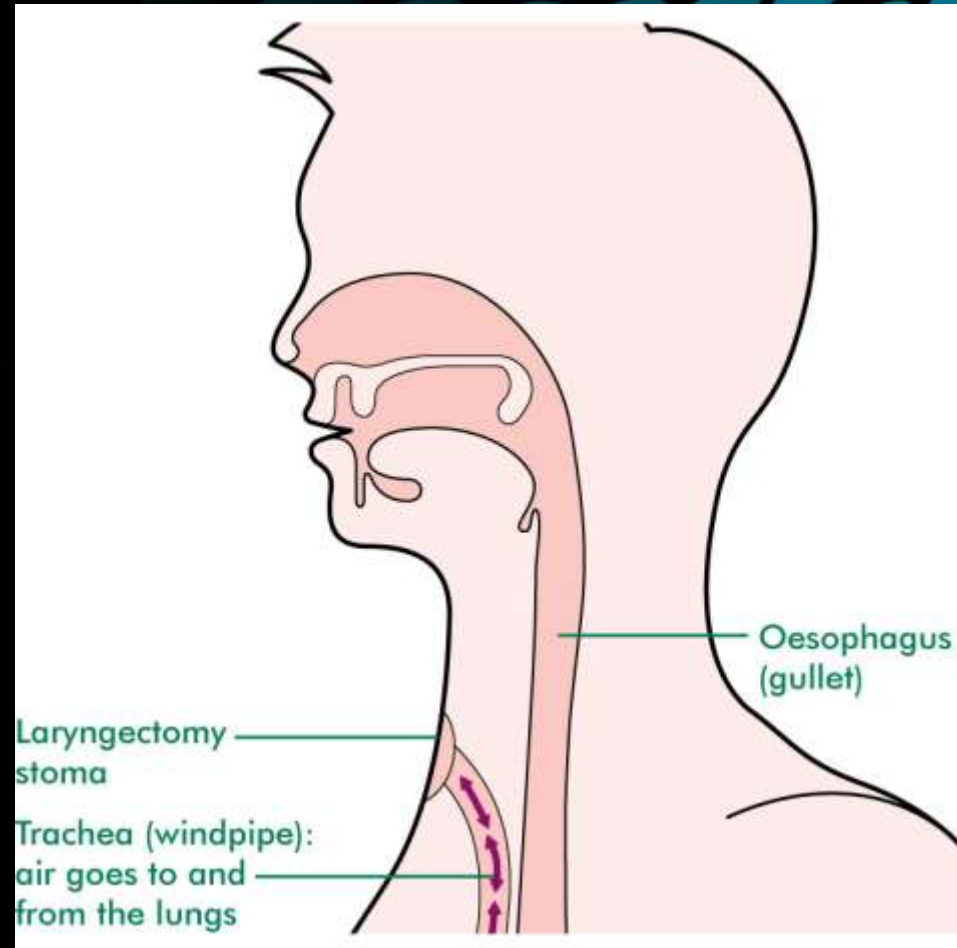
Right lateral view

Types of tracheostomy

- Depending on the timing
 - Elective /routine
 - Emergency
- Depending on the cause
 - Permanent
 - Temporary
- Depending on site
 - High
 - Mid
 - Low

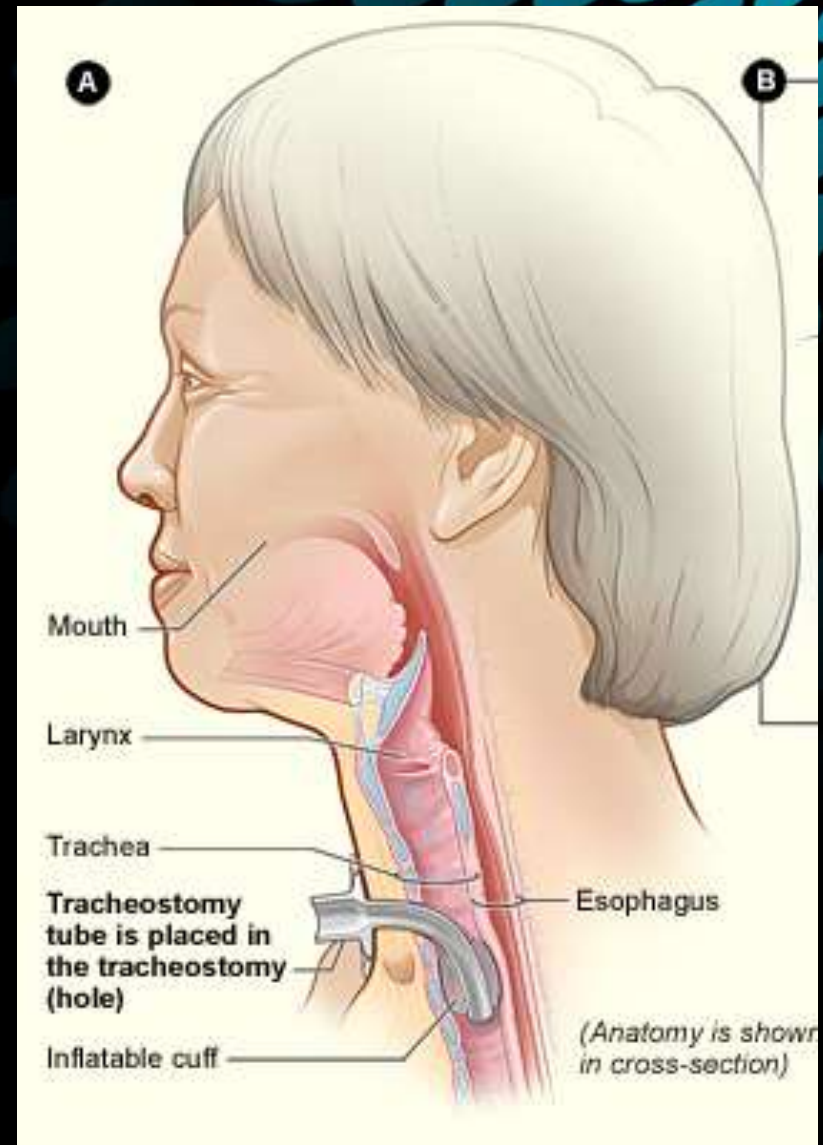
Permanent Tracheostomy

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



Temporary Tracheostomy

- 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

- 1. Upper Airway Obstruction.**
- 2. Pulmonary Ventilation.**
- 3. Pulmonary Toilet.**
- 4. Elective Procedure**

Upper Airway Obstruction

- Tumors (of oropharynx, larynx, upper trachea)
- Infections (epiglottitis, severe tracheobronchitis)
- Bilateral Vocal Cord Paralysis
- Trauma (laryngeal, maxillofacial fractures)
- Foreign body obstruction
- Subglottic or tracheal stenosis

Pulmonary Ventilation

- **Tracheostomy should be performed in a patient still requiring ventilation through an endotracheal tube for more than a one week.**

Pulmonary Toilet

- **Removal of secretions**
 - **congestive cardiac failure, infection, pulmonary edema and bulbar palsy**
 - **Those who cannot cough and clear their chest**
- **Prevent aspiration**

Elective Procedures

- **For major head and neck operations that effect the patency of airway**
- **In patients with uncertain general conditions particularly cardiovascular or pulmonary defficiency pt.**
- **Better too often than too late**

Preoperative workup

- HISTORY
- Physical assessment
- Anesthesiological assessment
- CBC
- caugulation profile
- informed consent

Types of Tracheostomy technique

- 1) Cricothyroidotomy**
- 2) open tracheostomy**
- 3) Percutaneous procedure**

Cricothyroidotomy

- Emergency procedure
- When endotracheal intubation is impossible
- Contraindicated
 - In children less than 11 years
 - Trauma to larynx or cricoid cartilage
- Subglottic oedema & stenosis are very likely
- Keep only for 3-5 days

Surgical steps of Cricothyroidotomy

supine position, neck extended, L.A, stabilize larynx



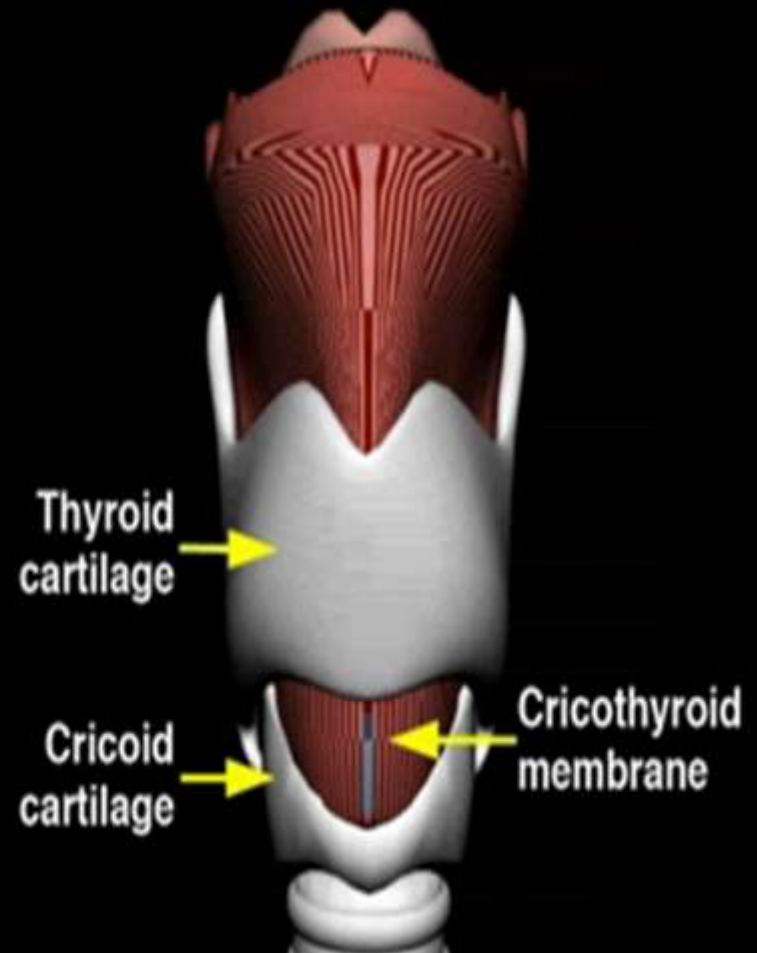
Thyroid cartilage is gripped between thumb and middle finger



move your finger down to palpate cricoid cartilage



space between thyroid and cricoid cartilage is cricothyroid membrane



1cm vertical incision thru skin and
sub cut. tissue



use curved hemostat for blunt dissection thru planes



use horizontal incision on cricothyroid membrane



insert troussseau dilator and dilate membrane
vertically



Insert tracheostomy tube



inflate cuff with 10cc syringe



attach bag valve unit and ventilate pt.



Secure tracheostomy tube with ties and sutures



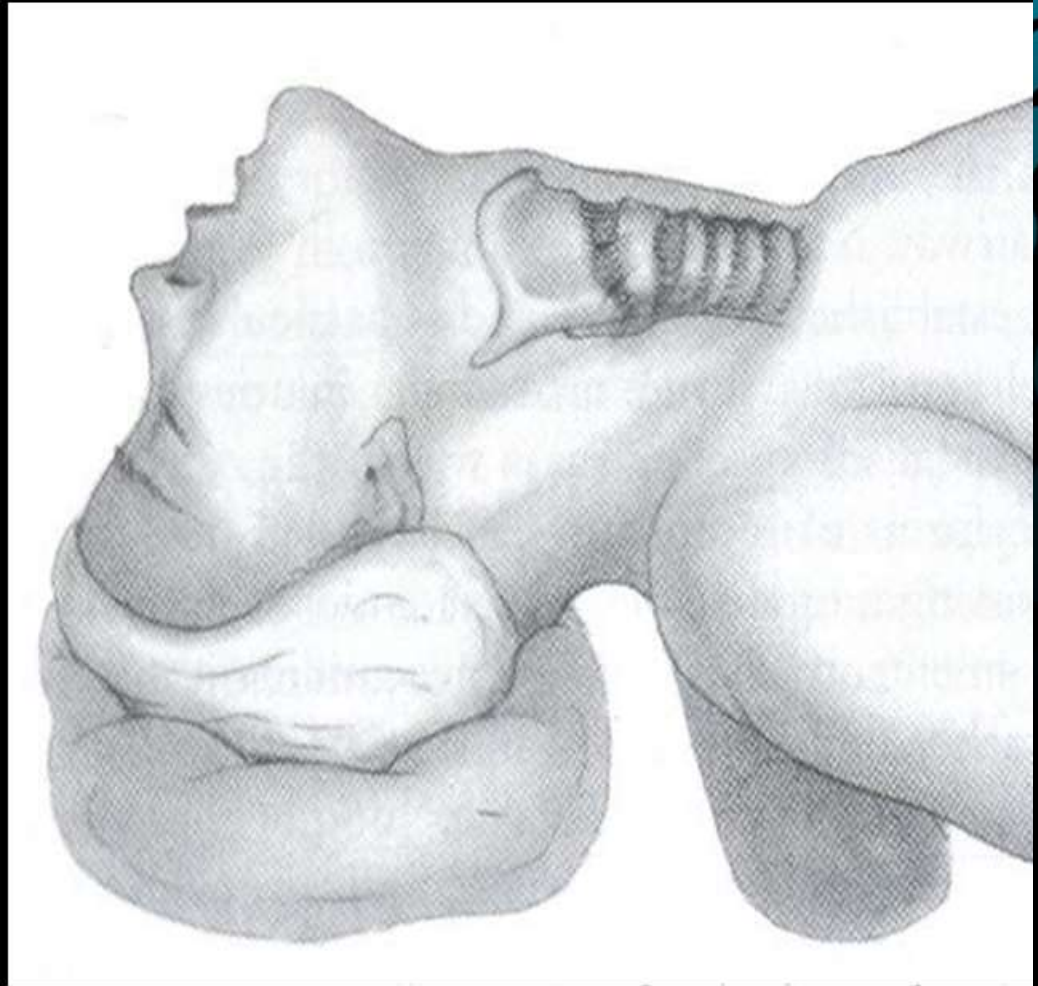
Surgical steps of open tracheostomy

1. Airway control

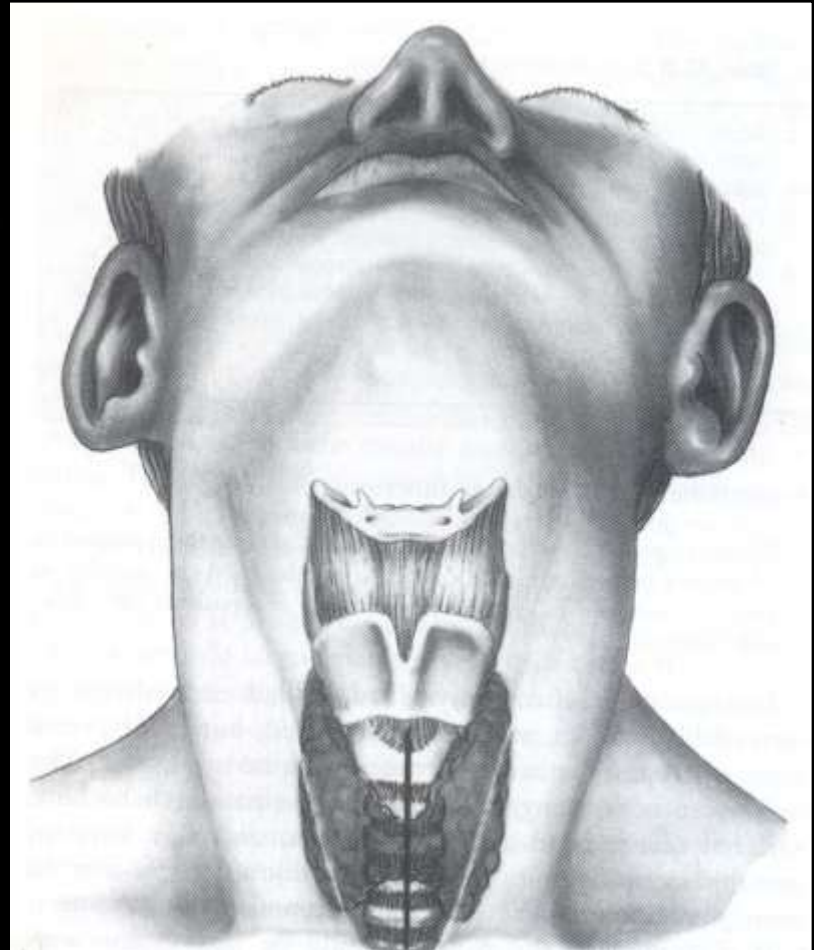
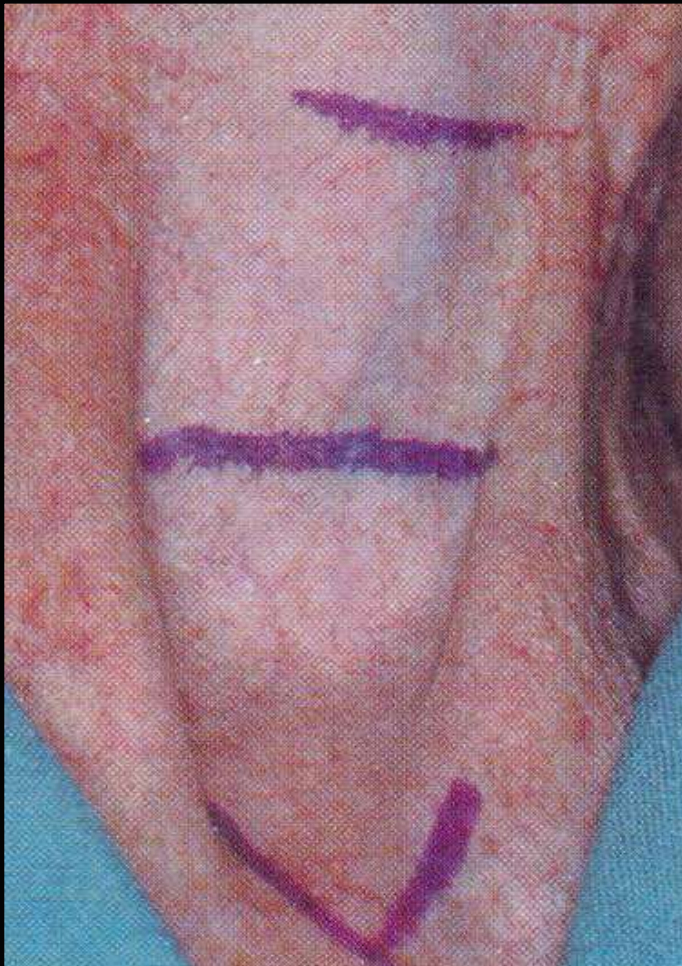
2. Patient position-
supine ,neck extended
,pillow under the shoulder

3. Anesthesia

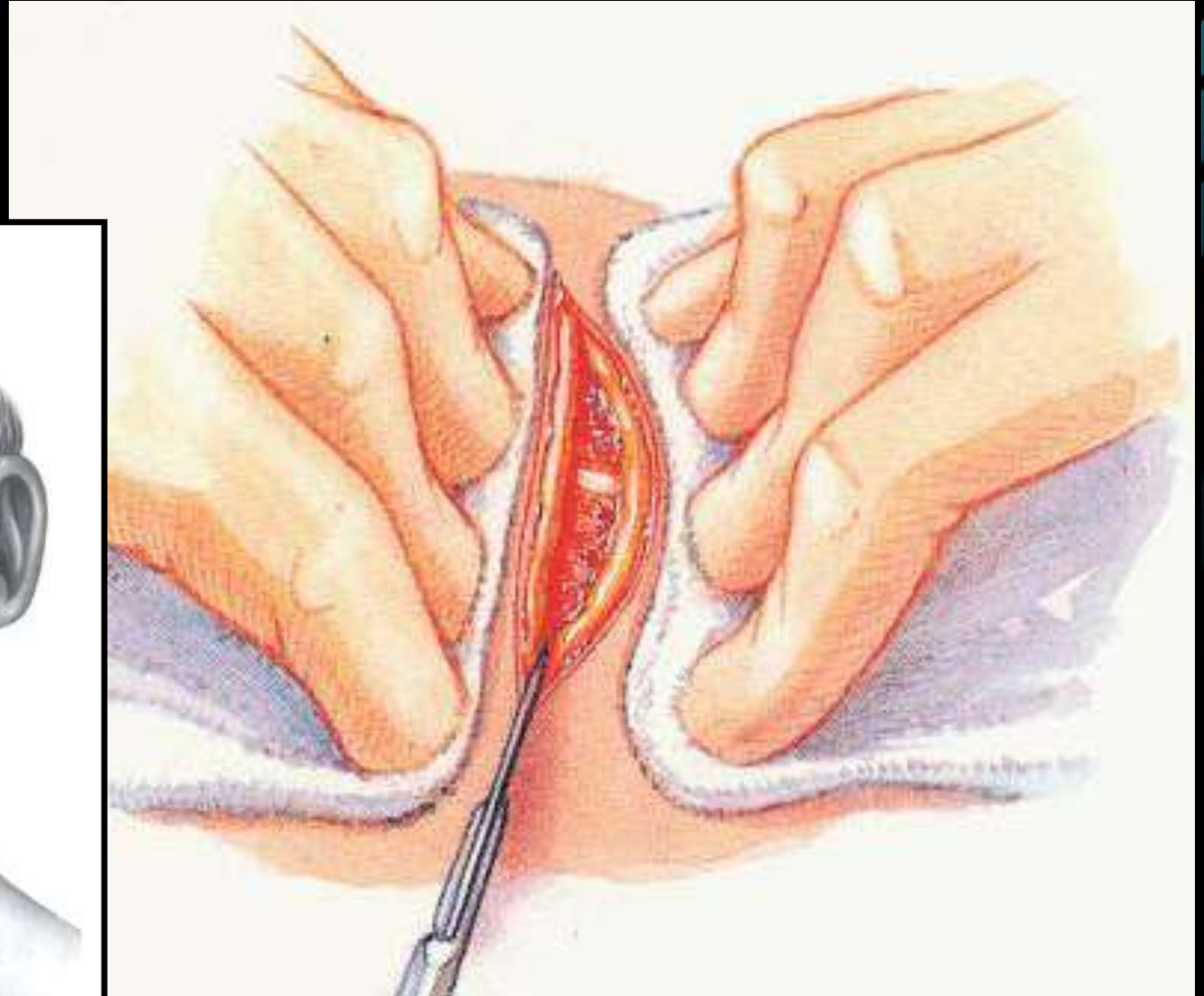
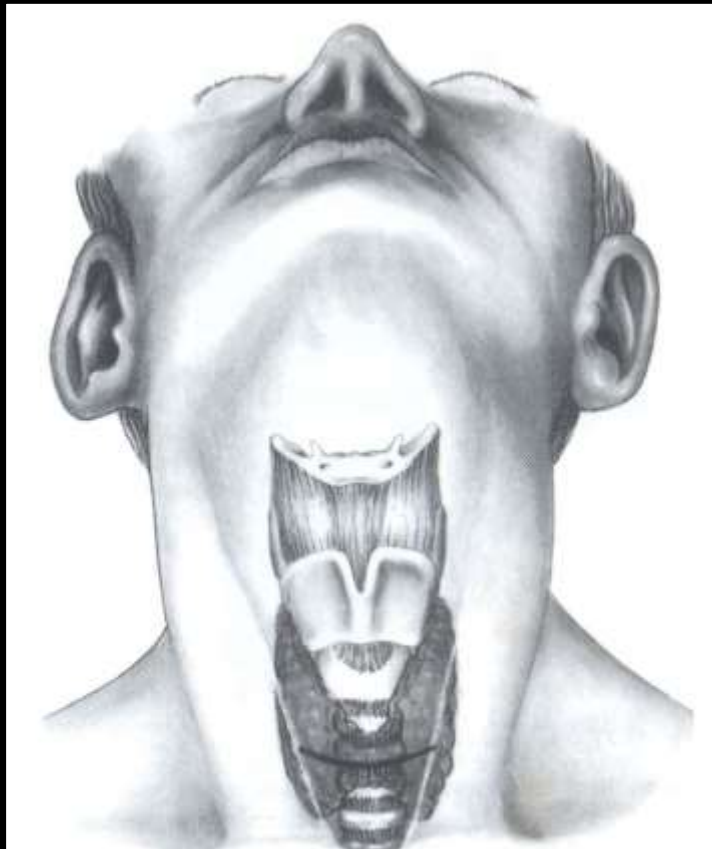
- Not necessary if pt is unconscious or in emergency situations
- If conscious ,1-2% lignocain +epinephrine is infiltrated in the line of incision and area of dissection
- Sometime general anesthesia with intubation is used



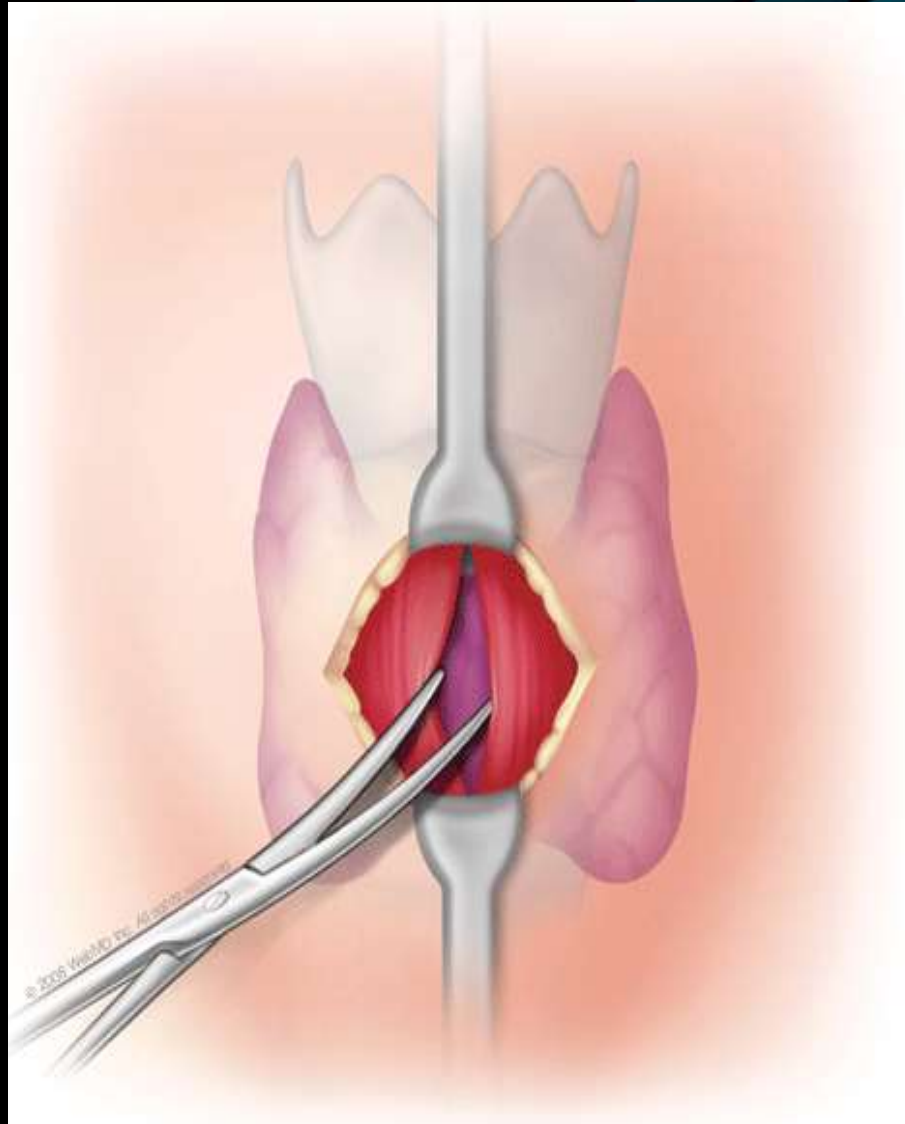
Identify the landmarks



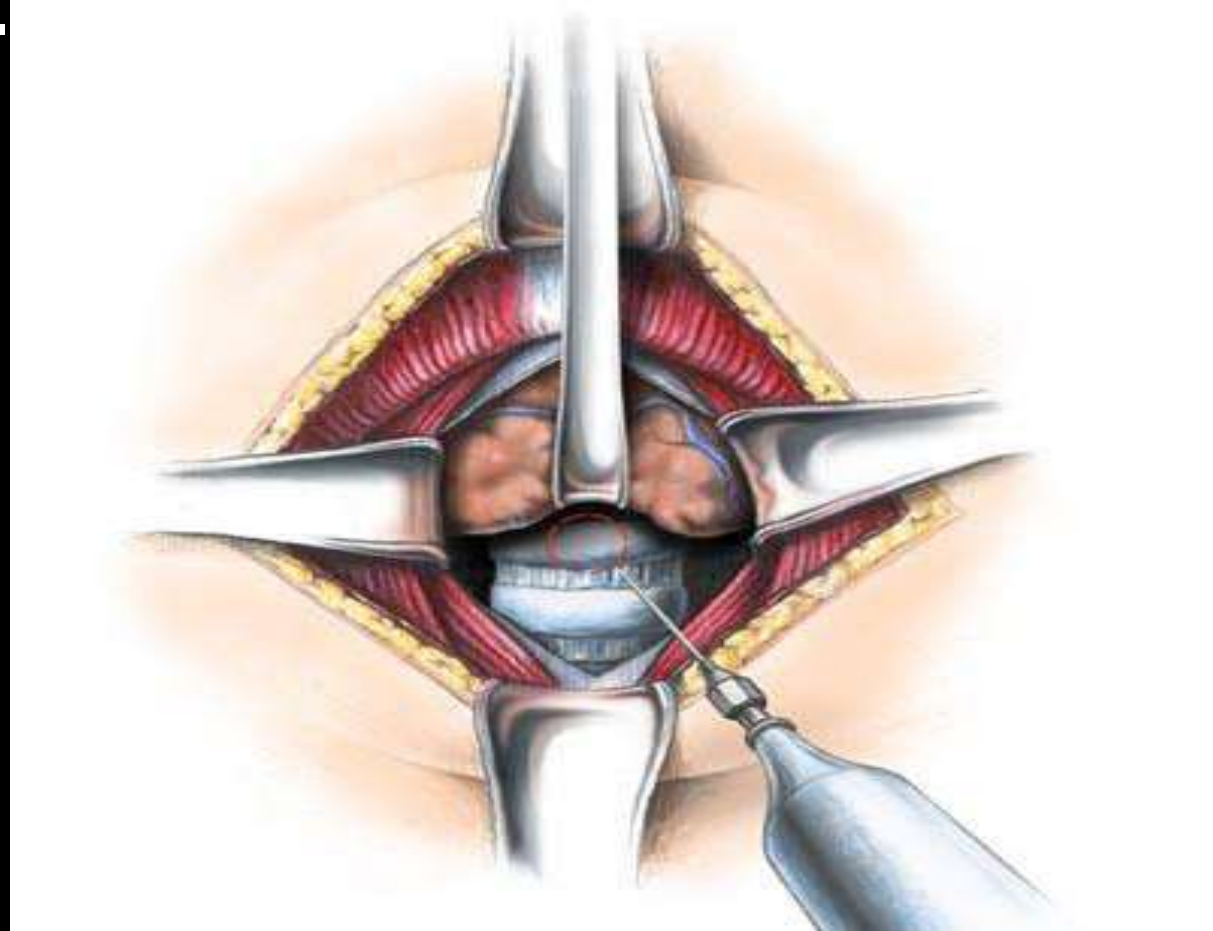
a tranverse Incision 1 cm below the cricoid
or halfway between the cricoid and the
sternal notch.

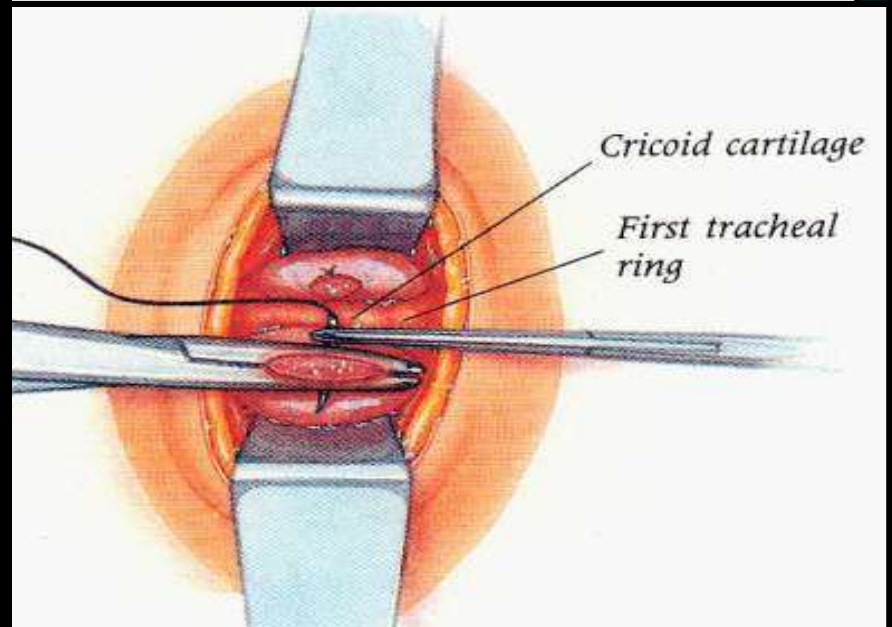
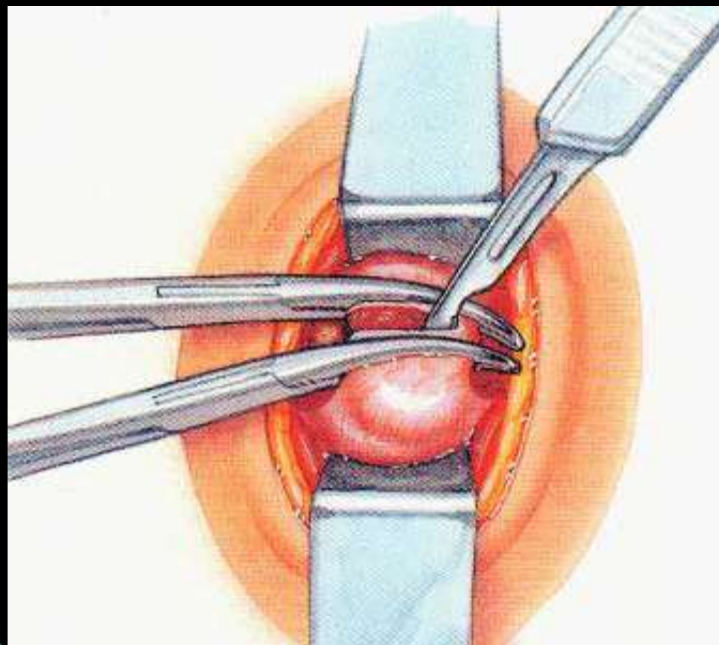
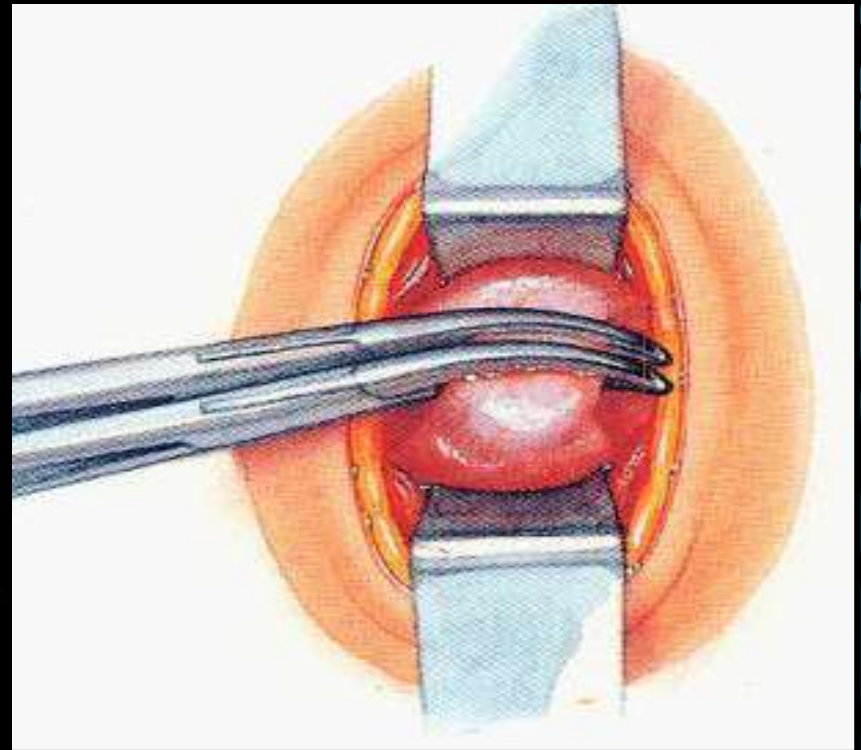
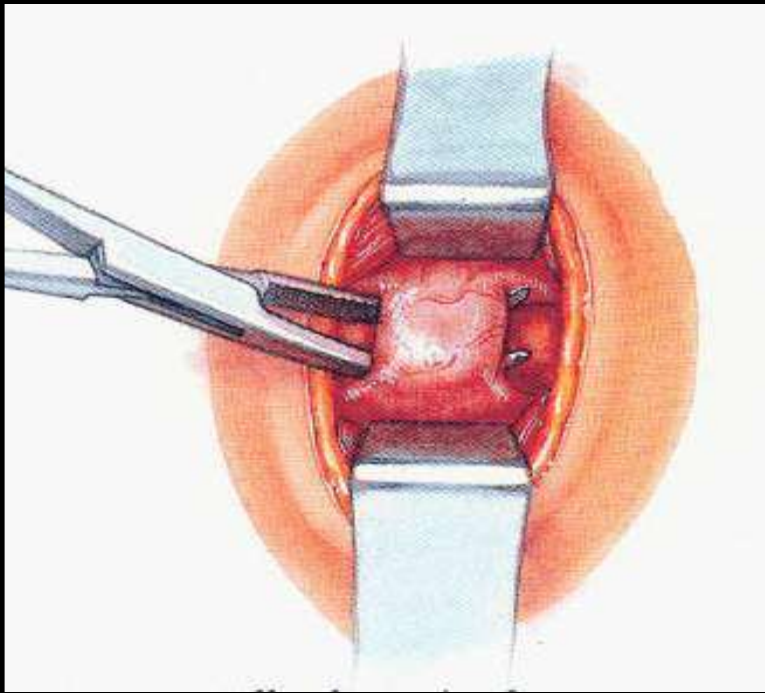


Retractors are placed, the skin is retracted, and the strap muscles are visualized in the midline. The muscles are divided along the raphe, then retracted laterally



- The thyroid isthmus lies in the field of the dissection.
- Typically, the isthmus is 5 to 10 mm in its vertical dimension.
- Retract it up.





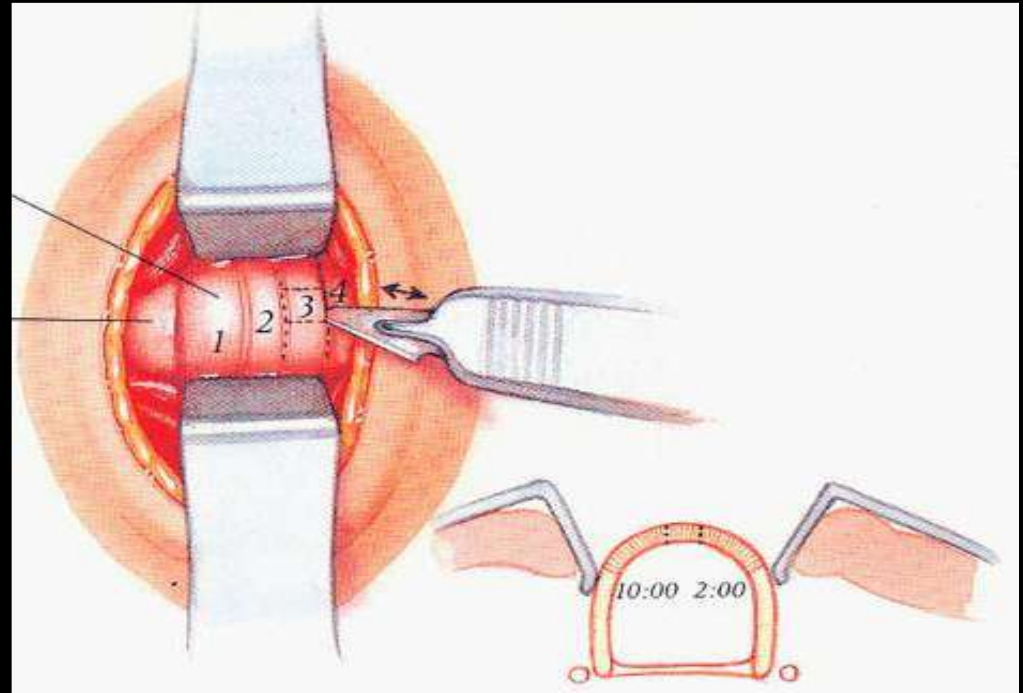
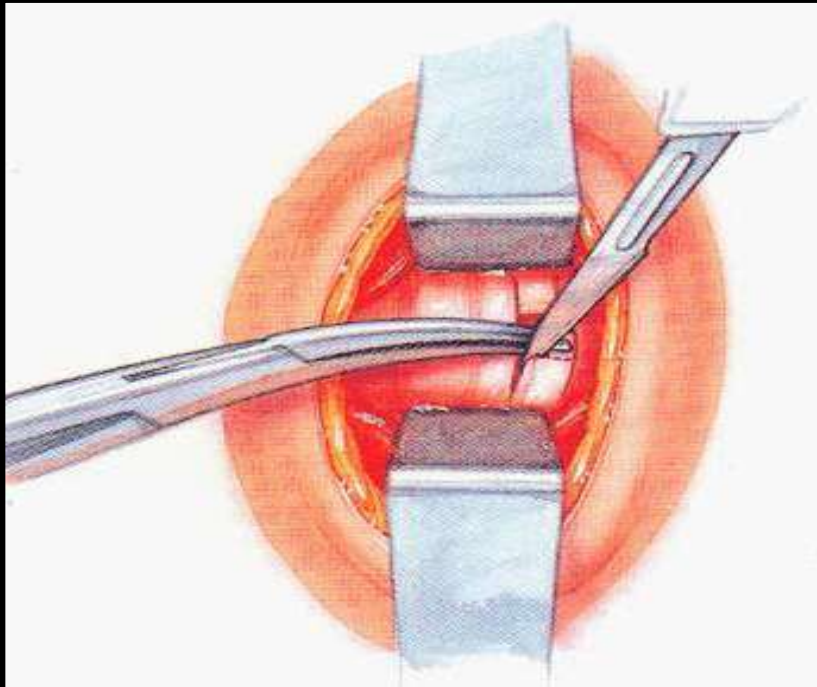
Cricoid cartilage

First tracheal ring

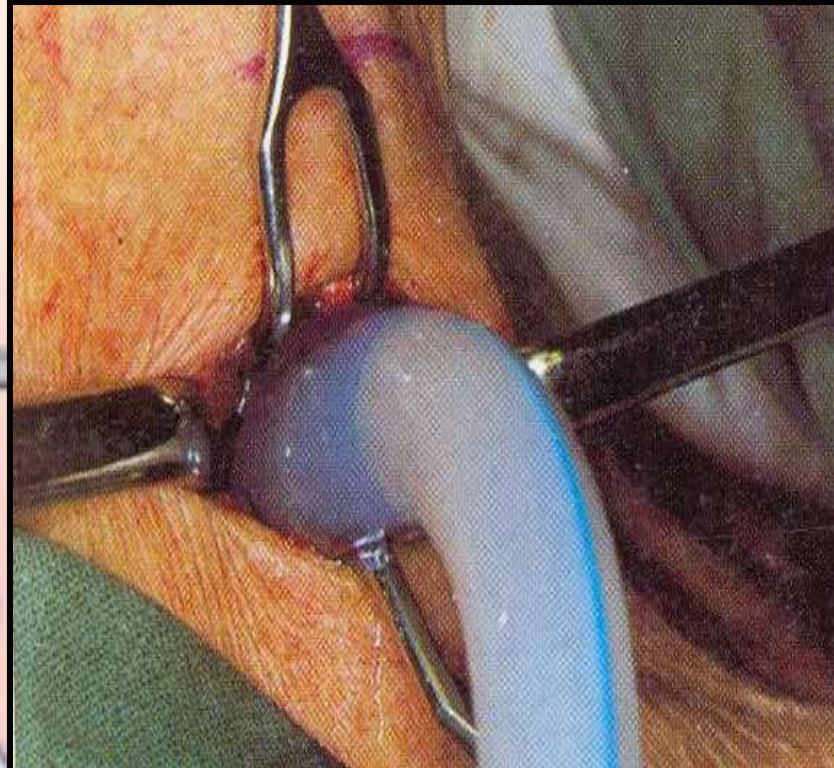
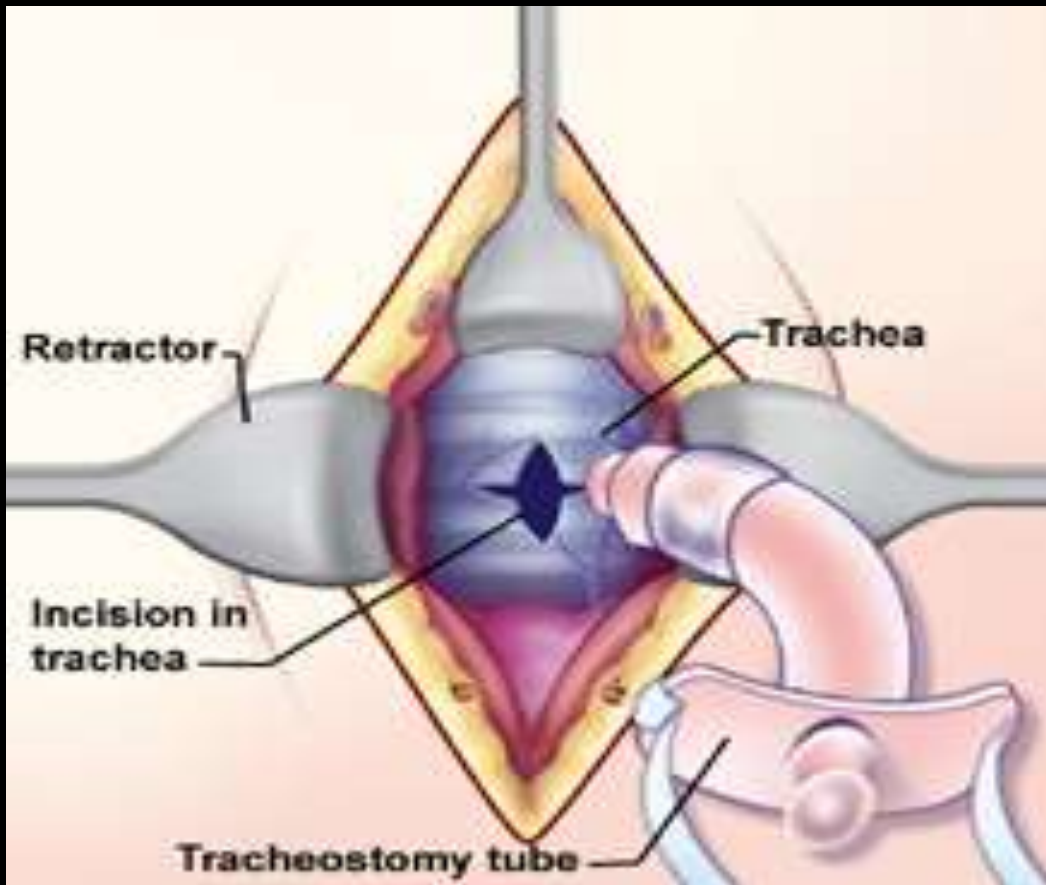
Identify trachea.

Anesthetist should remove any tapes used to secure the endotracheal tube and prepare to withdraw the tube slowly under direct vision by the surgeon.

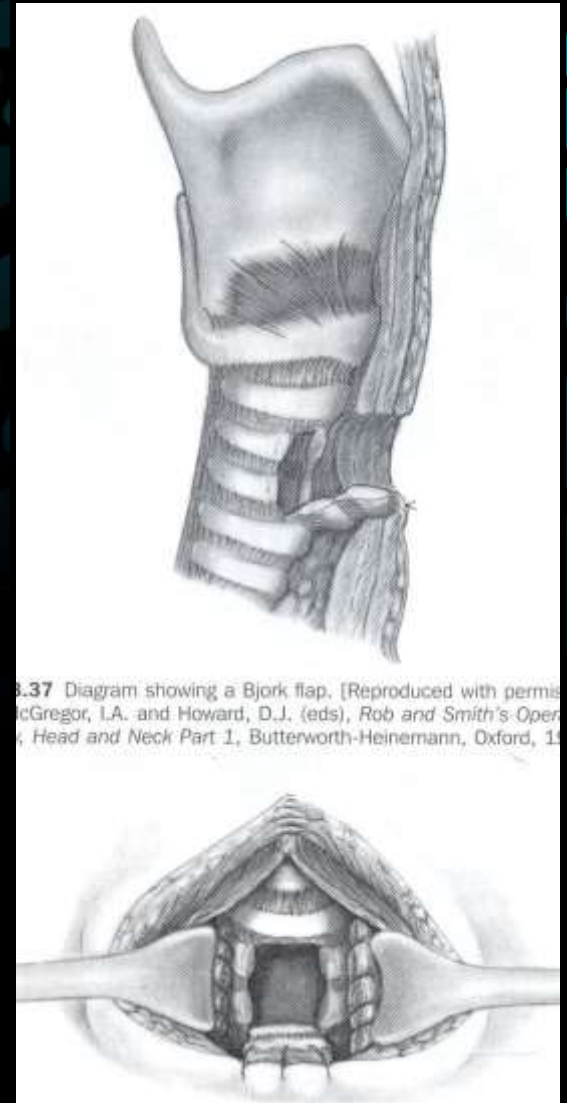
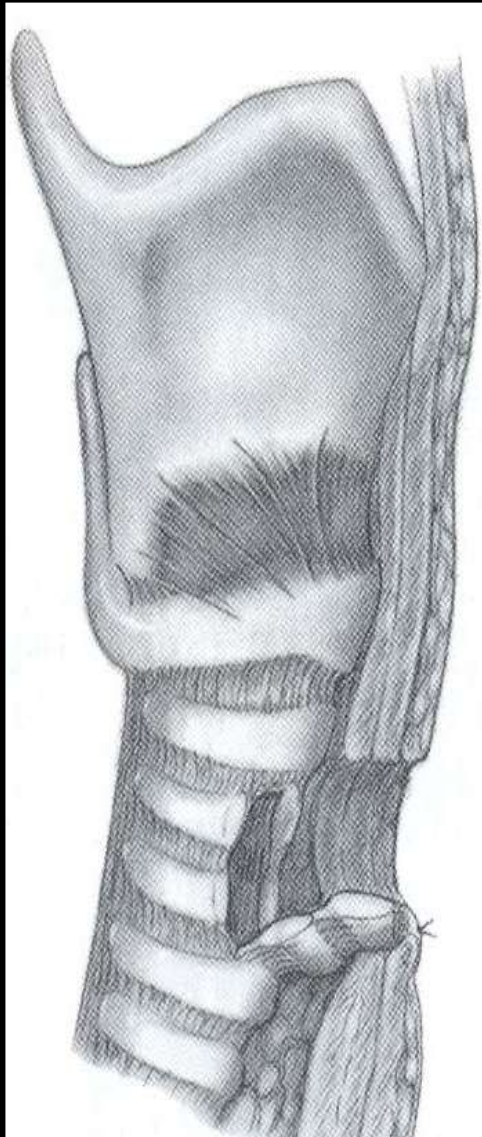
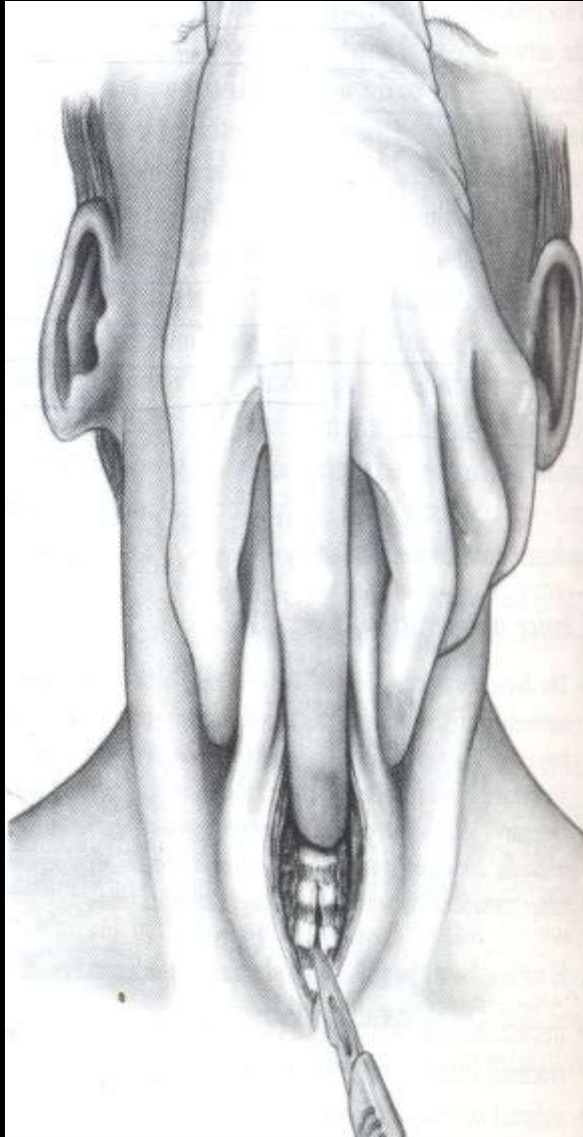
Then place the tracheal incision in the second or third tracheal interspace.



Tube is inserted and secured

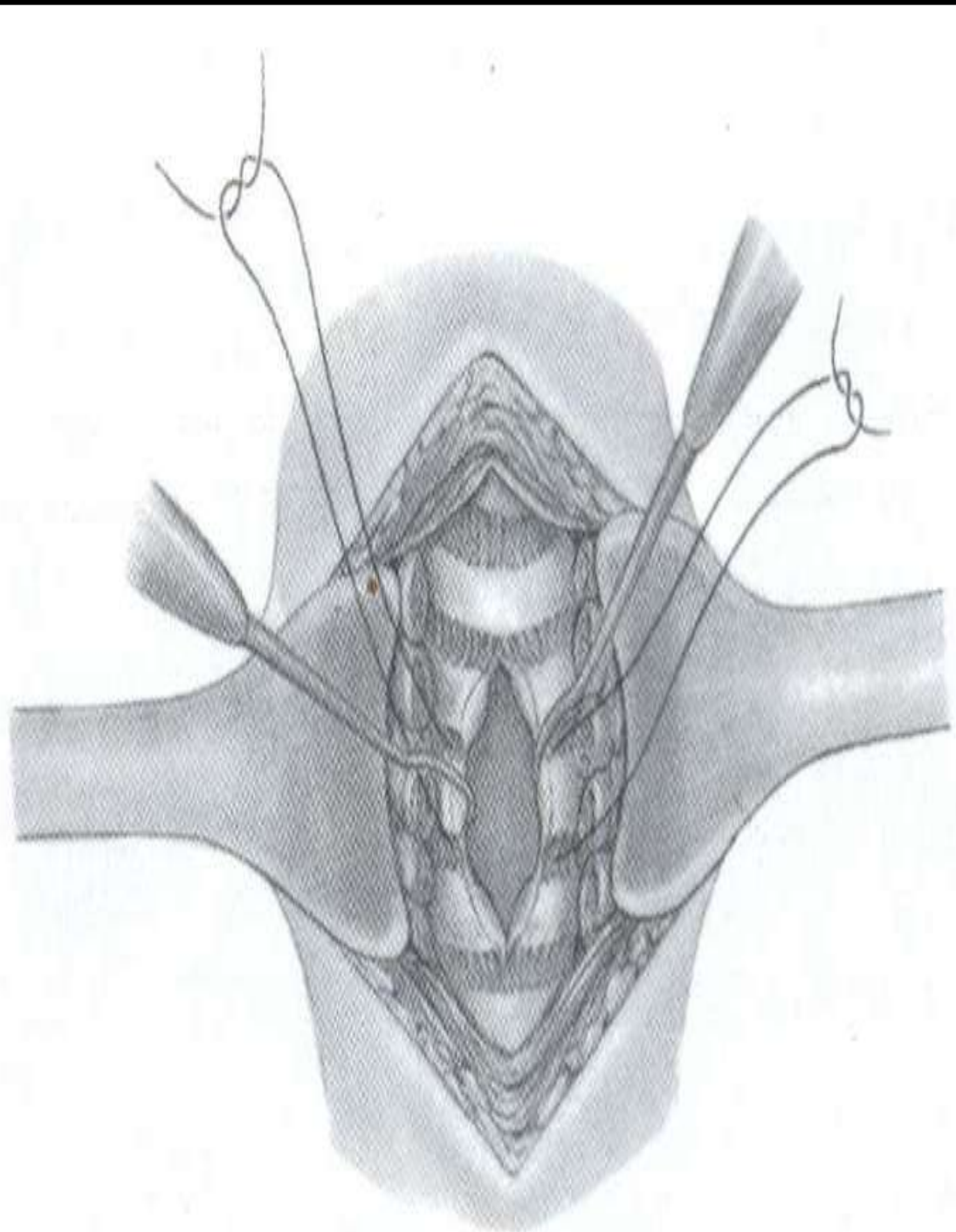


Bjork flap



Pediatric tracheostomy

- Better done under general anesthesia
- Neck shouldnt be extended too much
- Always divide the thyroid isthmus
- Vertical incision in trachea b/w 2nd and 3rd ring.
- No excision of ant. Wall of trachea
- Margins of tracheal incision sutured to skin



Percutaneous Dilatational Tracheostomy

- ICU Bed Side Tracheostomy
- Use of guide wire and Dilators
- Under the vision of Bronchoscope through endotracheal tube
- Less time ,Less Expensive
- Not suitable for thick neck and children and emergency

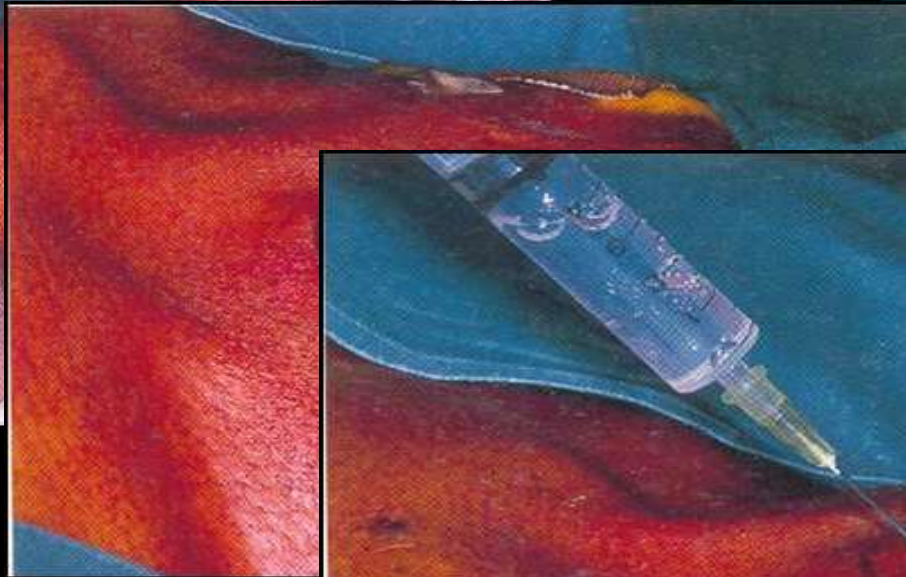
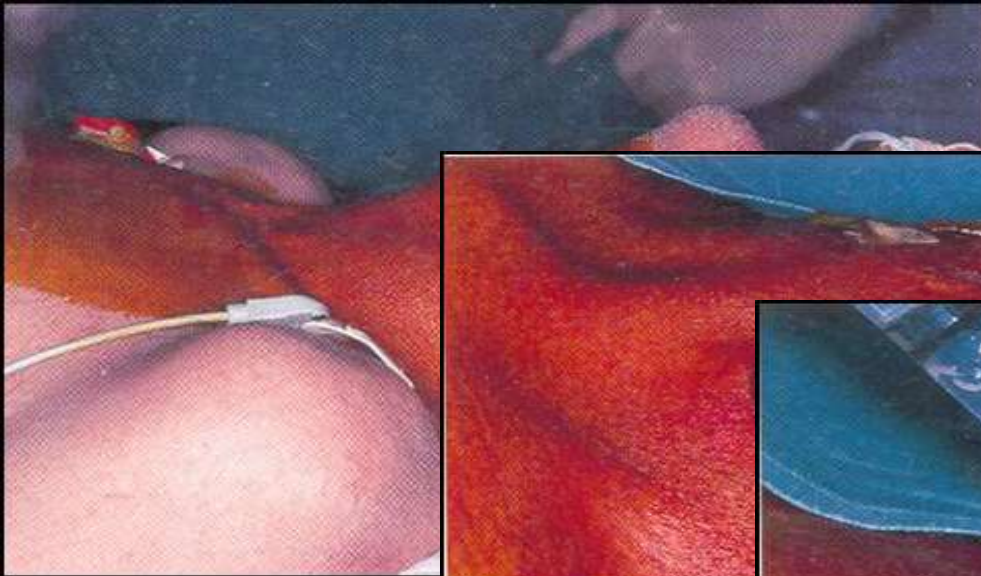
Percutaneous Dilatational Tracheostomy

- Several variants of the percutaneous tracheostomy technique have been developed.
- ✓ Using a wire guided sharp forceps (Griggs technique)
- ✓ using a single tapered dilator (BlueRhino)
- ✓ passing the dilator from inside the trachea to the outside (Fantoni's technique);
- ✓ using a screw like device to open the trachea wall (PercTwist).

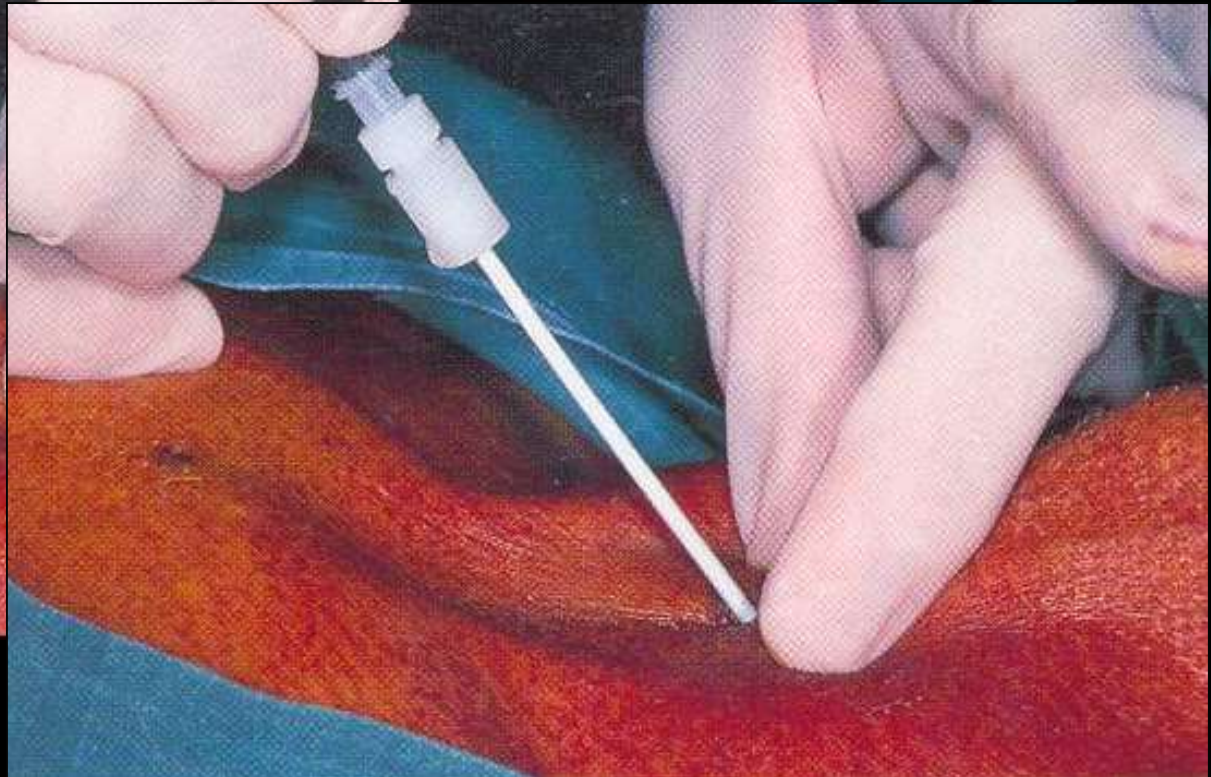
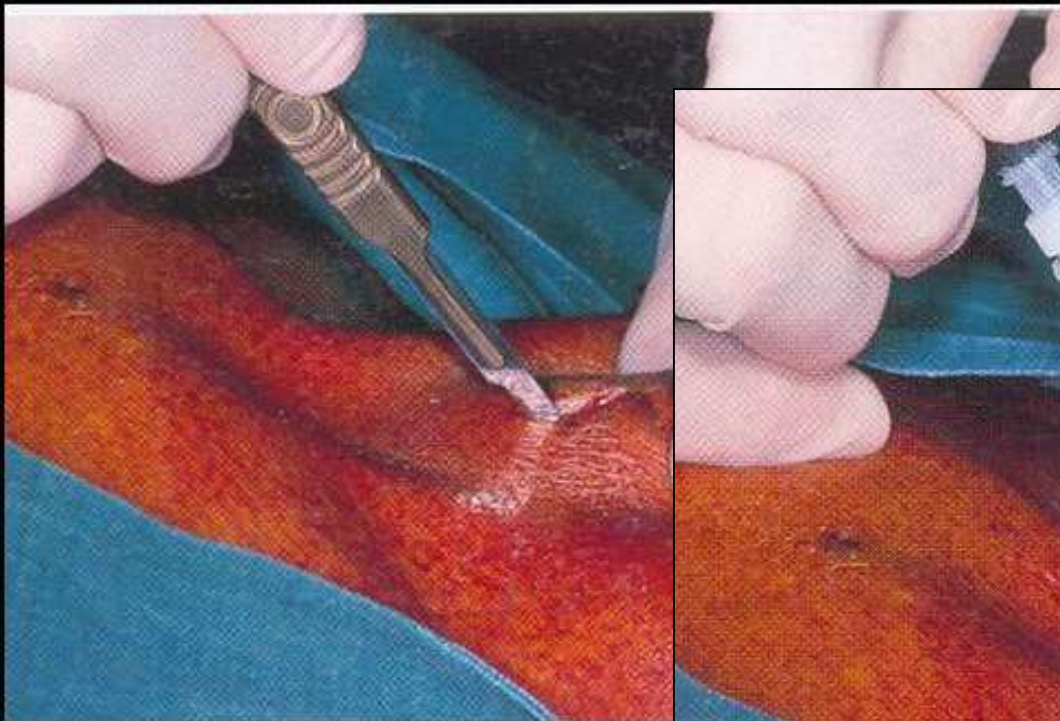
Percutaneous Dilatational steps

[illegible]

Patient is placed like that in open tracheostomy.
1st, 2nd, 3rd tracheal ring identified .
local anesthesia is given subcutaneously .

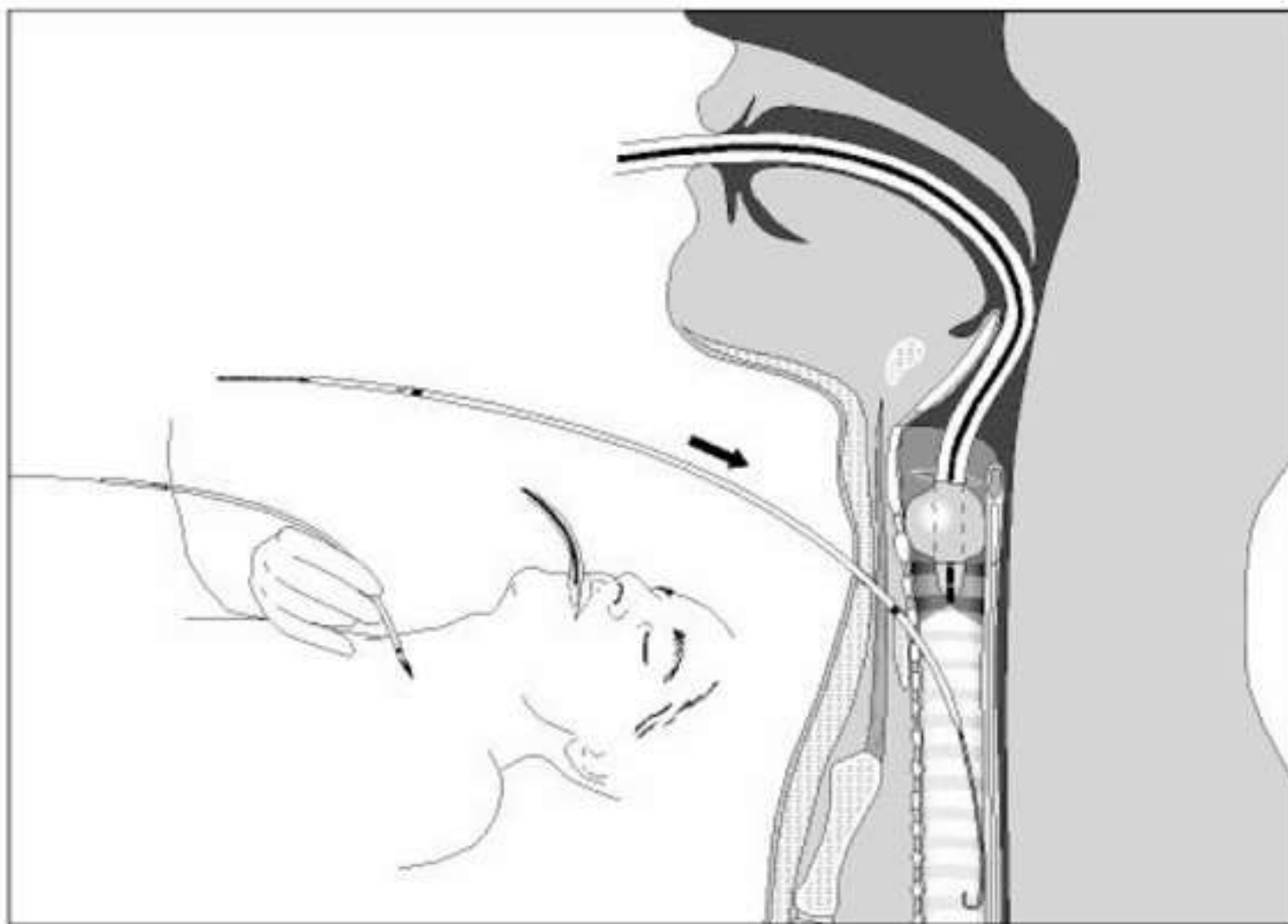


- 1.5 cm vertical incision is made and blunt dissection is performed to expose the pretracheal fascia. The trachea is palpated and the intended site is punctured with a 14G intravenous cannula in a postero-caudal direction.



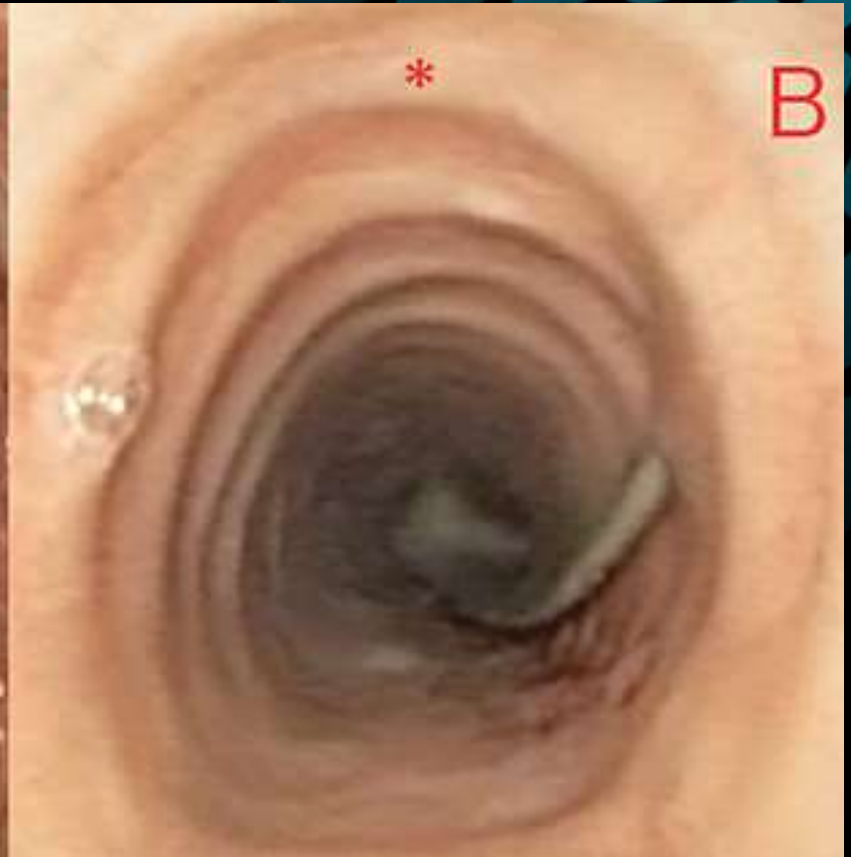
The entry of the IV cannula in trachea is confirmed by aspiration of air into a saline filled syringe. A guide wire is inserted through the cannula, and the cannula is withdrawn,





→The tracheal opening is dilated over the guide wire until a stoma of sufficient size to accommodate the tracheostomy tube is created.





A tracheostomy tube is placed over the guide wire and dilator through the passage created.



Post-Op Management

X-Ray soft tissue neck

Analgesics

Antibiotics

IV fluid until able to tolerate orally

Risk factors for complications

- Age: infants and adults over 75
- Obesity
- Smoking
- Poor nutrition
- Recent illness, especially an upper-respiratory infection
- Alcoholism
- Chronic illness
- Diabetes

Complications of Tracheostomy

- **Immediate**

- Haemorrhage
- Air embolism
- Apnea
- Local damage (thyroid cartilage ,cricoid cartilage, recurrent laryngeal nerve)
- Cardiac arrest
- Pneumothorax/pneumomediastinum

Complications of Tracheostomy

- **Intermediate**

- Dislodgement/displacement of the tube
- Subcutaneous emphysema
- Pneumothorax/pneumomediastinum
- Scabs and crusts
- Infection
- Tracheal necrosis
- Tracheo-esophageal fistula
- dysphagia

Complications of Tracheostomy

- **Late**
 - Tracheal stenosis
 - Difficulty with decannulation
 - Tracheocutaneous fistula /scar

Types of tracheostomy tubes

- Plastic and metal
- Cuffed and uncuffed
- Fenestrated and unfenestrated
- Single and double lumen

Metal tubes

- Metal tubes are constructed of silver or stainless steels.
- Metal tubes are not used commonly because they are
 - expensive,
 - rigid construction
 - uncuffed
 - lack connector to Ventilator



Plastic tubes

- Can be made with cuff
- It has connector to anesthetic machine and ventilator
- Cause less mechanical damage to trachea



Cuffs

- To protect airway

uncuffed

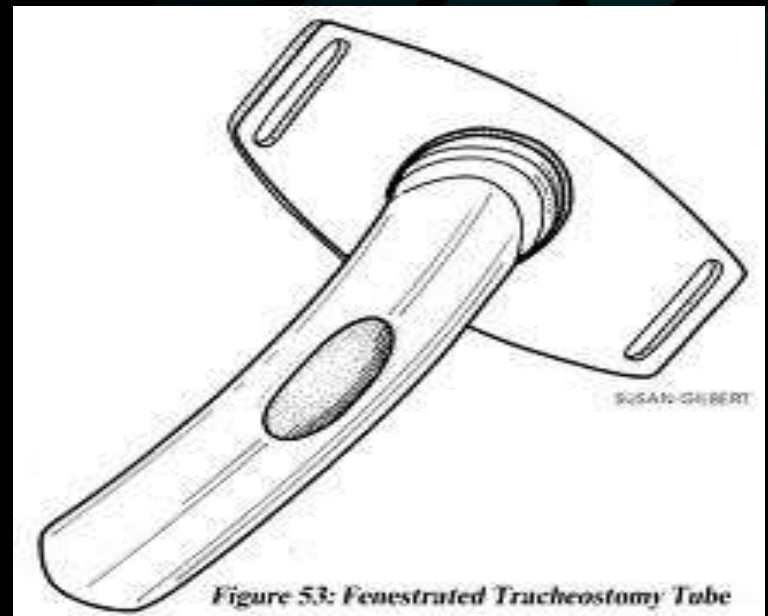


cuffed



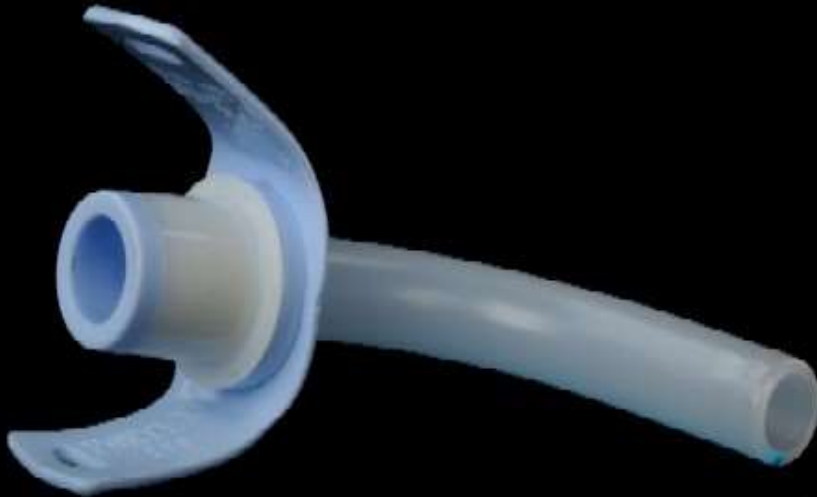
Fenestration

- Allow patient to ventilate past tube via upper airway
- Allow speech



Single/Double lumen

- Double lumen allows easy cleaning
- ◆ Single lumen has a greater internal diameter



Tracheostomy care

Suctioning

Regular gentle suctioning

Not aggressive and not too much deep

Skin care

Meticulous wound and stoma care

To prevent irritation and secondary inflammation due to discharge

Inner tube care

Once or more daily removed and clean.

Tracheostomy care

Humidification

Artificial nose” to prevent crusting of secretions

Tube position

To prevent decubitus of trachea

Not to cover with blanket!!

Tracheostomy care

CARE OF CUFF

- **When to inflate the cuff**
 - Immediately post-operatively - to prevent aspiration of blood or serous fluid from the wound
 - To seal the trachea during mechanical ventilation
 - To prevent aspiration of leakage from tracheo-oesophageal fistula
 - To prevent aspiration due to laryngeal incompetence
- **Deflate:**
 - first suction the oropharynx.
 - Cuff should be deflated atleast 5mins every hr.

Changing the tracheostomy tube

Indications: soiled,, blocked, cuff rupture

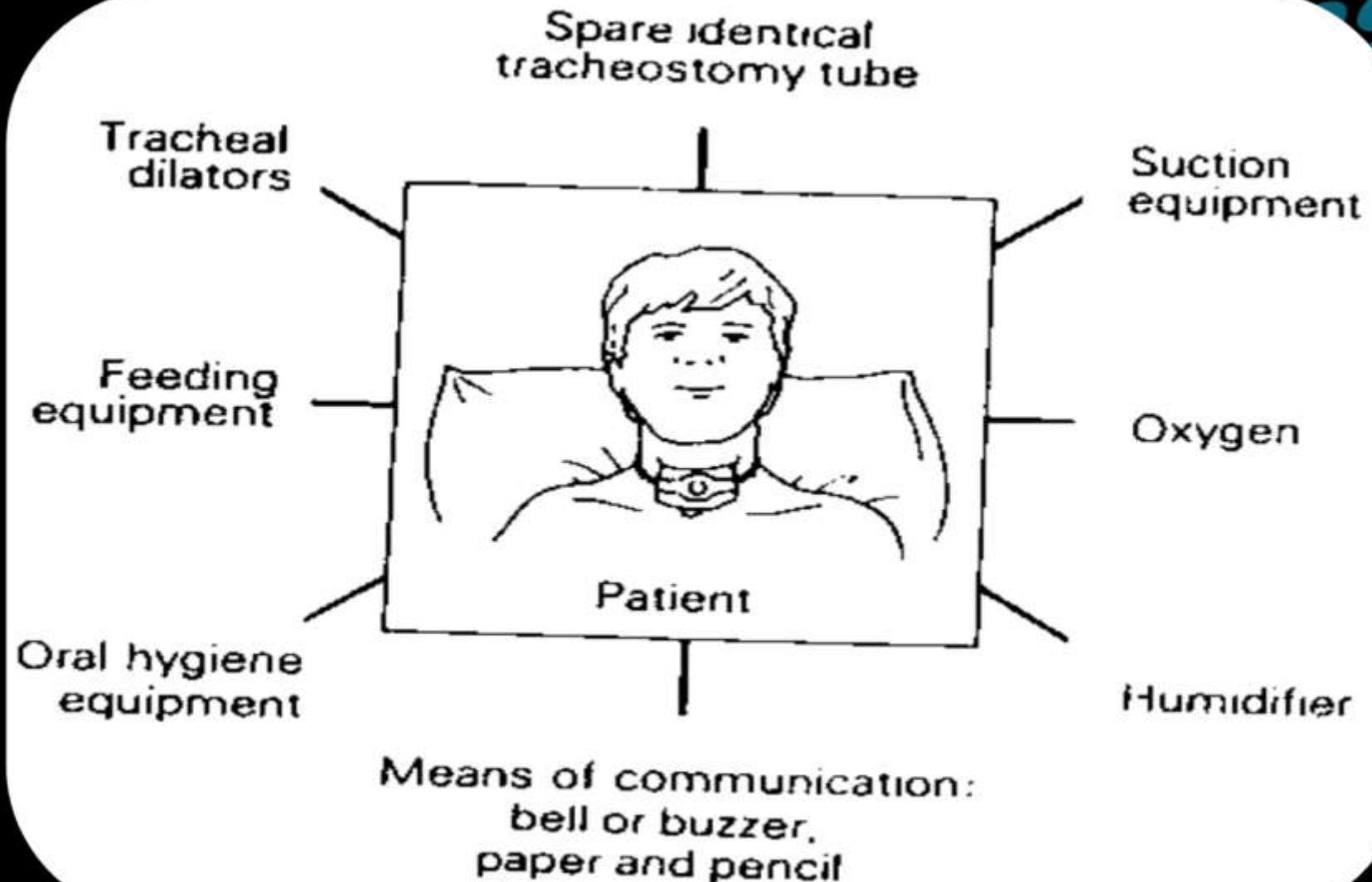
Changed to smaller size or
another type

- Avoid within 1st week.
- First tube changed by the surgeon.
- Difficult cases (obese, short and thick neck), be prepared for endotracheal intubation.

HOME CARE

- Education and training of the attendant
- Should have suction catheter and suction machine
- Educate them When to come to hospital

All these should be placed beside pt. with tracheostomy



Decanulation

- Should be left in place no longer than necessary
- As soon as the patient's condition permits, reduced the size of tube to avoid physiologic dependence on a large tube,
- Check for adequacy of the airway, ability to swallow and handle secretions for 24 hrs and then plug the tube.
- If Occlusion tolerated for 24 hrs, the tube is removed & the tracheocutaneous fistula is taped shut.

Decannulation

- Bronchoscopy before decannulation in the pediatric patient,
- Immediately after decannulation, the patient must be closely observed, and means for reestablishing the airway must be at hand.
- Healing of the wound take place in few days or week.
- Rarely secondary closure of the wound is required.

Minitrachoestomy

Vertical stab incision made through the cricothyroid membrane under local anesthesia allows the insertion of a 4 mm cannula to provide ready access and delivery of oxygen

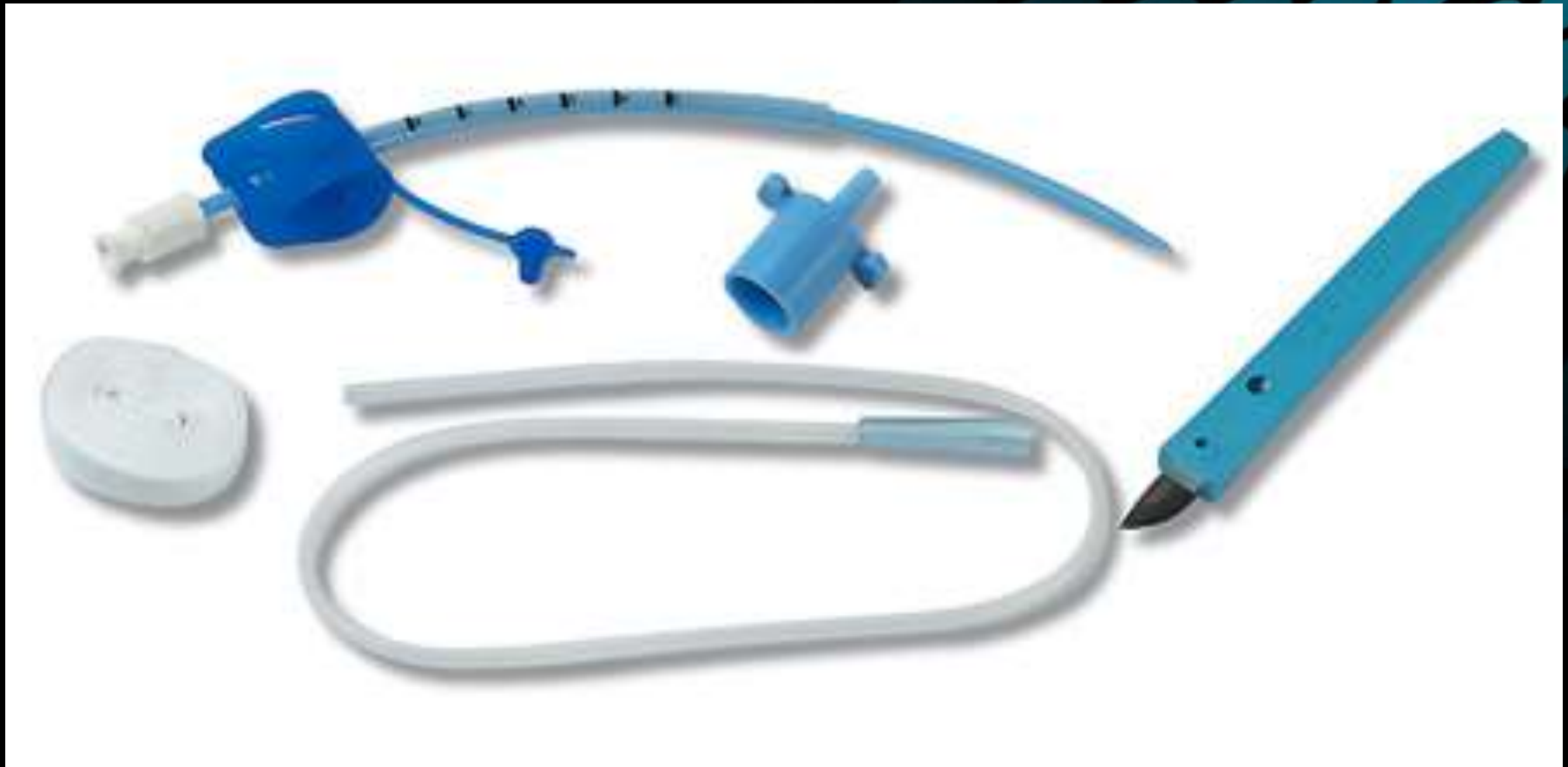
Described by Mathews and Hopkinson in 1984

Indications

To remove chest secretions (thoracotomy)

Respiratory failure

Mini tracheostomy kit



THANK YOU

