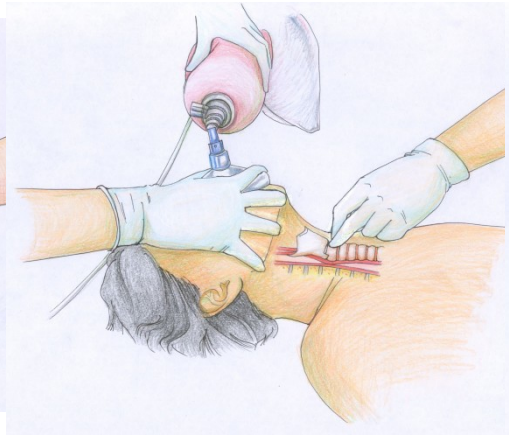
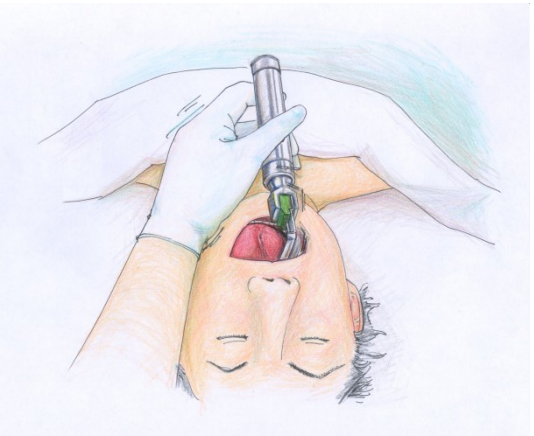
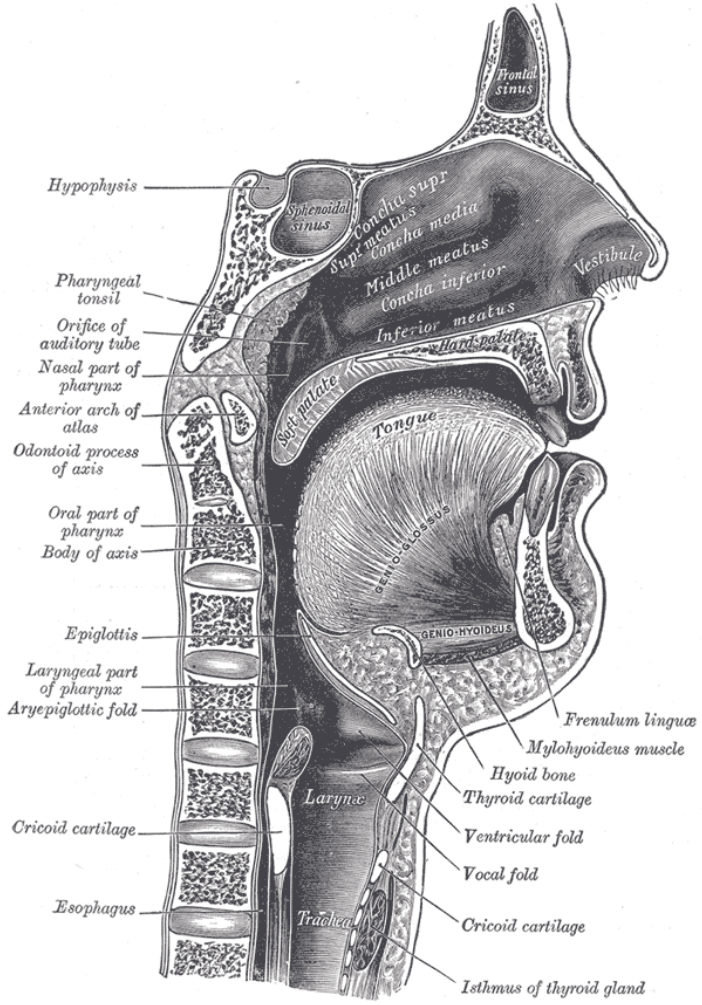
Airway intubation

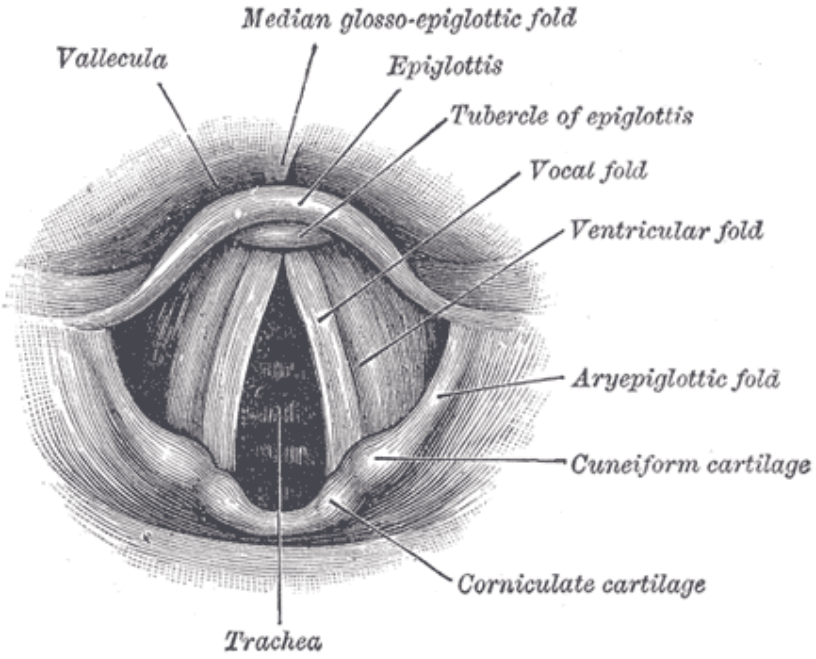


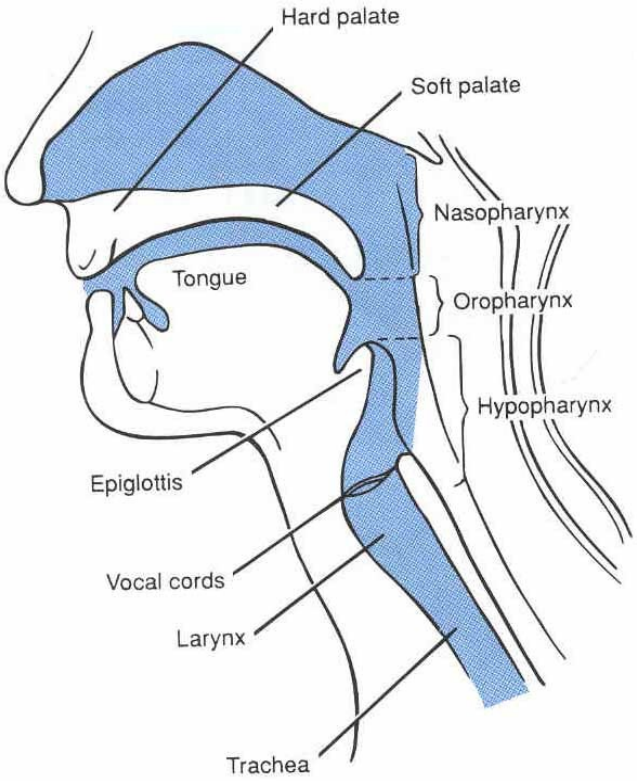


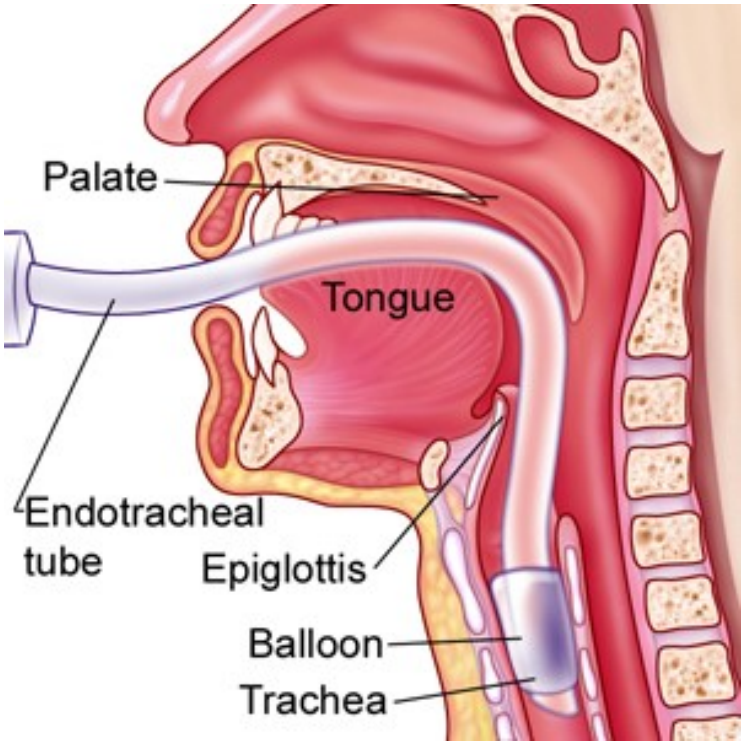
Joana Almeida

Anatomy


Hypophysis
Pharyngeal tonsil
Orifice of auditory tube
Nasal part of pharynx
Anterior arch of atlas
Odontoid process of axis
Oral part of pharynx
Body of axis
Epiglottis
Laryngeal part of pharynx
Aryepiglottic fold
Cricoid cartilage
Esophagus
Frontal sinus
Sphenoidal sinus
Concha supr.
Supr. meatus
Concha media
Middle meatus
Concha inferior
Inferior meatus
Vestibule
Hard palate
Soft palate
Tongue
GENIO-GLOSSUS
GENIO-HYOIDEUS
Frenulum linguæ
Mylohyoideus muscle
Hyoid bone
Thyroid cartilage
Larynx
Ventricular fold
Vocal fold
Trachea
Cricoid cartilage
Isthmus of thyroid gland

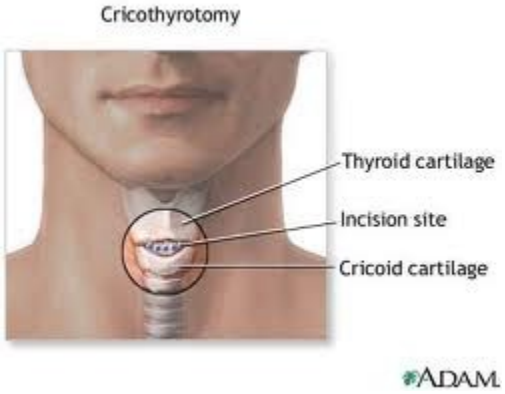

Median glosso-epiglottic fold
Vallecula
Epiglottis
Tubercle of epiglottis
Vocal fold
Ventricular fold
Aryepiglottic fold
Cuneiform cartilage
Corniculate cartilage
Trachea


Hard palate
Soft palate
Nasopharynx
Tongue
Oropharynx
Hypopharynx
Epiglottis
Vocal cords
Larynx
Trachea


Palate
Tongue
Endotracheal tube
Epiglottis
Balloon
Trachea

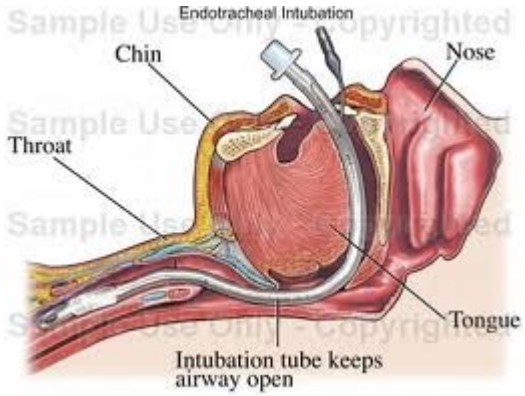
Methods:

- Endotracheal intubation
  - Orotracheal
  - Nasotracheal
- Cricothyrotomy
- Tracheotomy



Endotracheal Intubation

- Placement of a flexible plastic tube into the trachea to:
  - maintain an open airway,
  - serve as a conduit through which to administer certain drugs.
- Is performed in critically injured, ill or anesthetized patients:
  - to facilitate ventilation of the lungs, including mechanical ventilation,
  - to prevent the possibility of asphyxiation or airway obstruction.



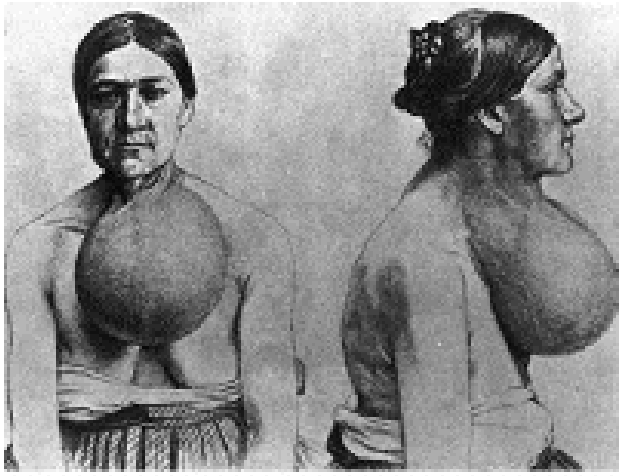
Indications:

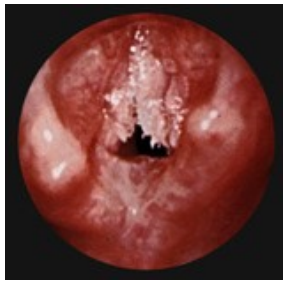
- **For supporting ventilation in patient with pathologic disease**:
  - Upper airway obstruction,
  - Respiratory failure,
  - Loss of consciousness
- **For supporting ventilation during general anaesthesia**:
  - Type of surgery:
    - Operative site near the airway,
    - Thoracic or abdominal surgery,
    - Prone or lateral surgery,
    - Long period of surgery
- **Patient has risk of pulmonary aspiration**
- **Difficult mask ventilation**

Airway Assessment

1) Condition that associated with **difficult** intubation:

- Congenital anomalies → Pierre Robin syndrome , Down's syndrome
- Infection in airway → Retropharyngeal abscess, Epiglottitis
- Tumor in oral cavity or larynx
- Enlarge thyroid gland →trachea shift to lateral or compressed tracheal lumen



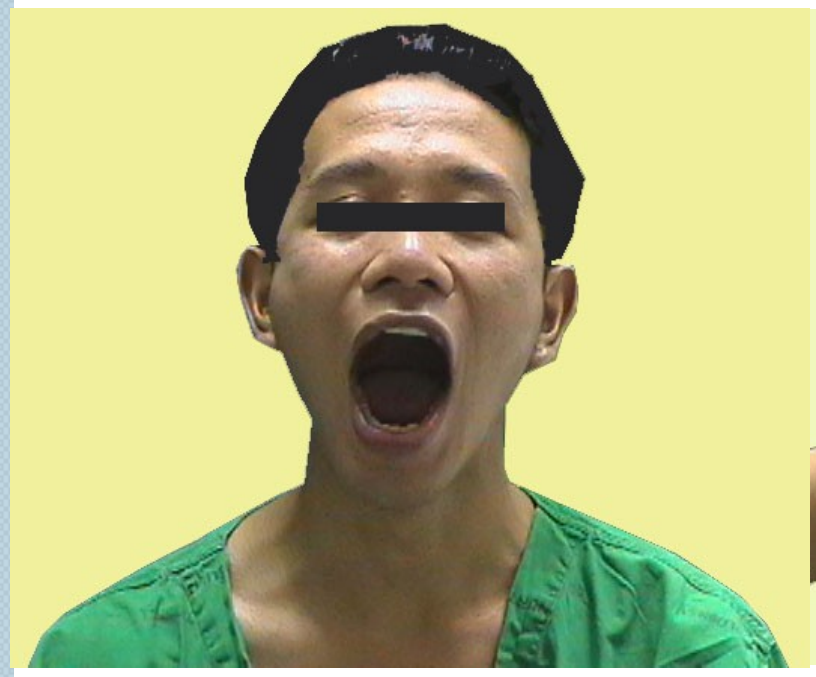


Continuation...

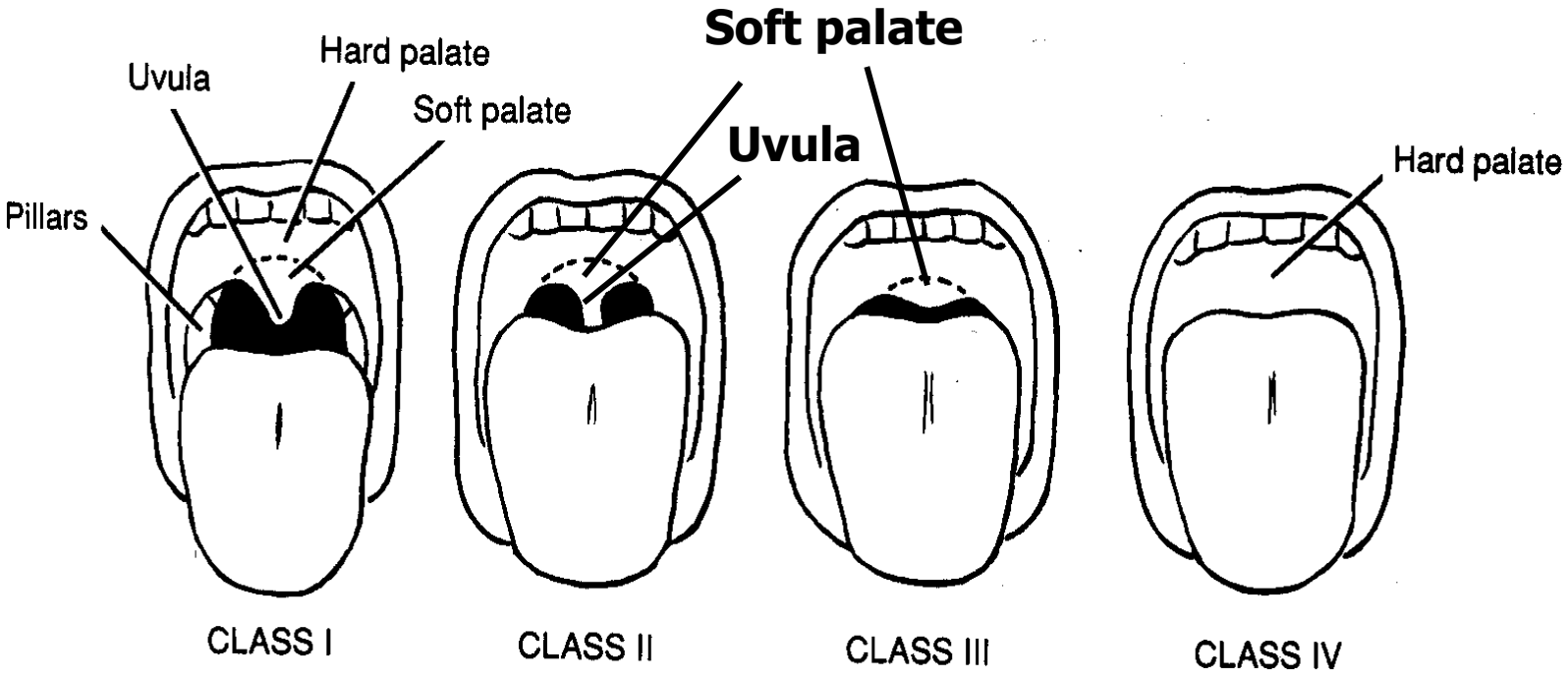
- Maxillofacial ,cervical or laryngeal trauma
- Temperomandibular joint dysfunction
- Burn scar at face and neck
- Morbidly obese or pregnancy

Airway Assessment

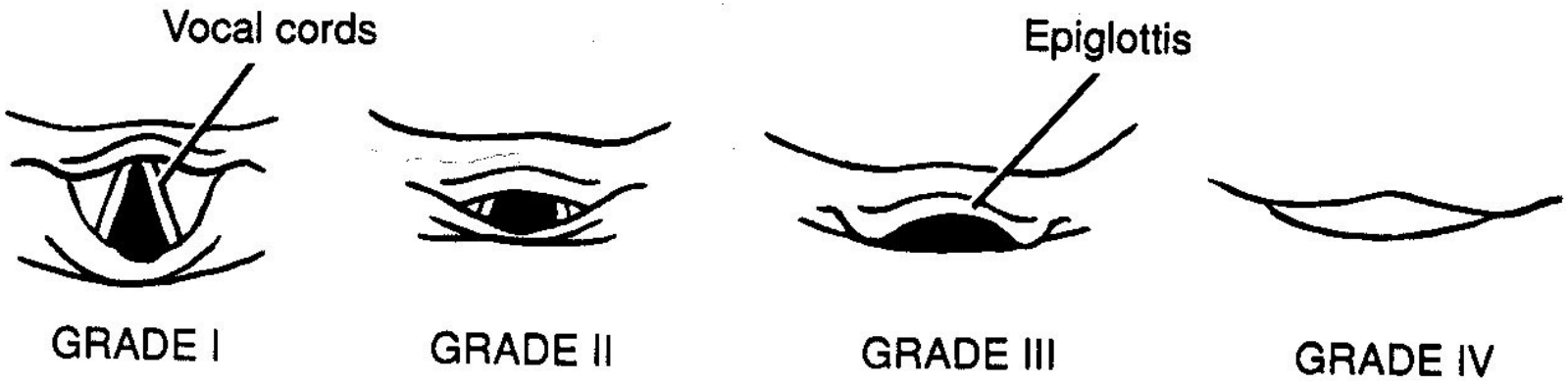
2) Interincisor gap : normal → more than cms



3) **Mallampati classification**: Class → may be difficult intubation

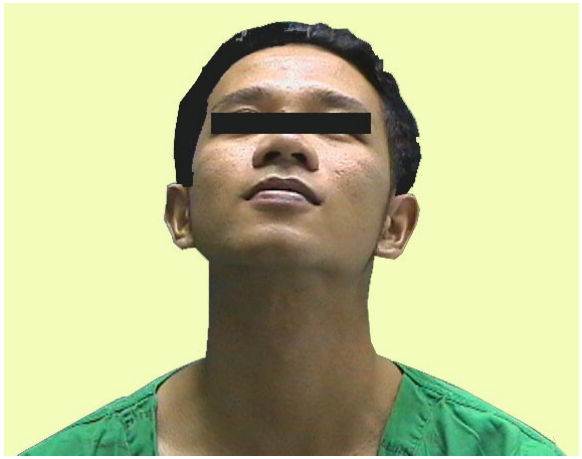


Laryngoscopic view

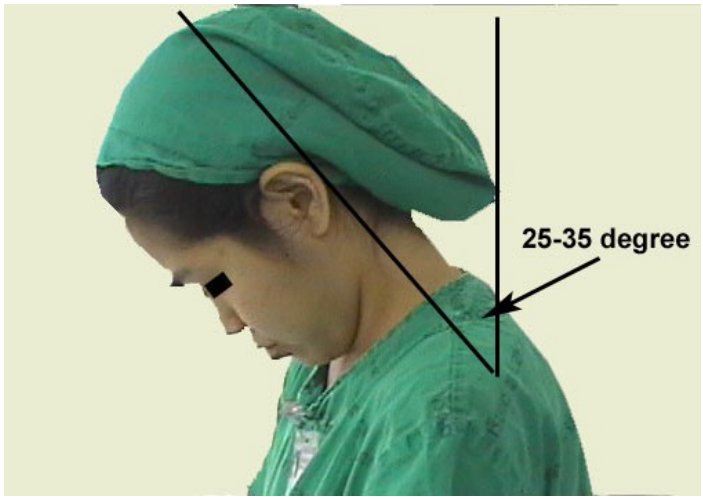


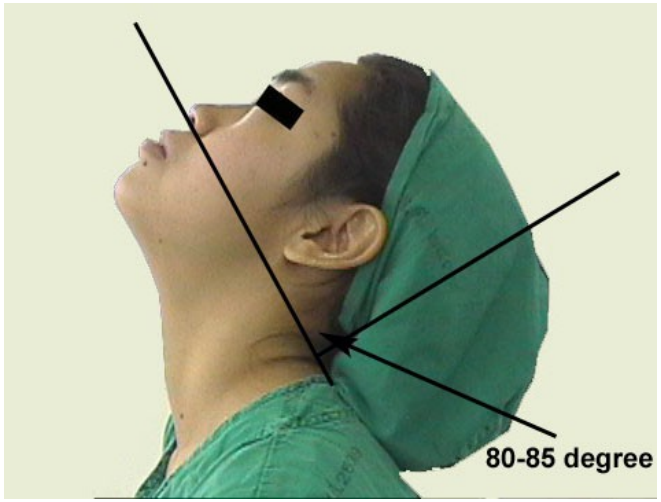
- **Grade → risk for difficult intubation!**

4) **Thyromental distance** : more than cms



5) Flexion and extension of neck





6) Movement of temperomandibular joint (TMJ)

Grinding

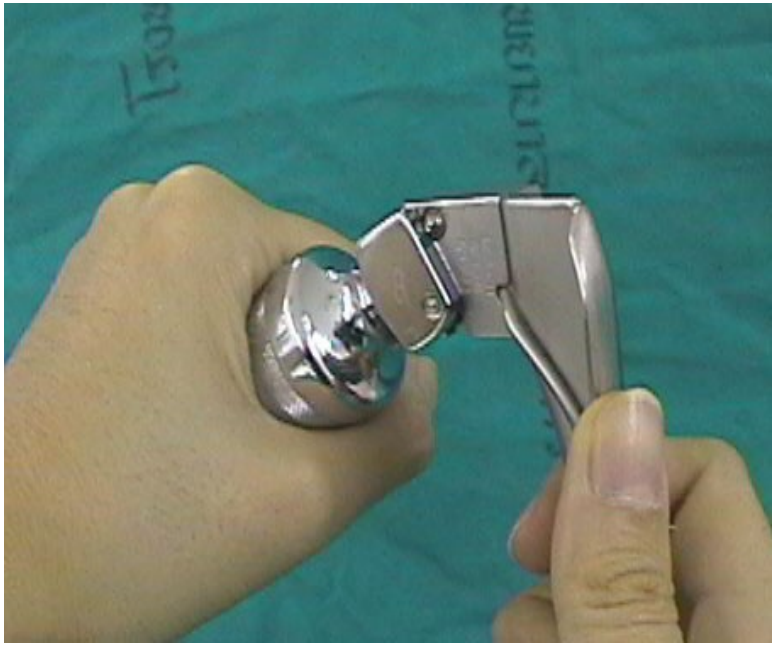
Preparing the procedure...

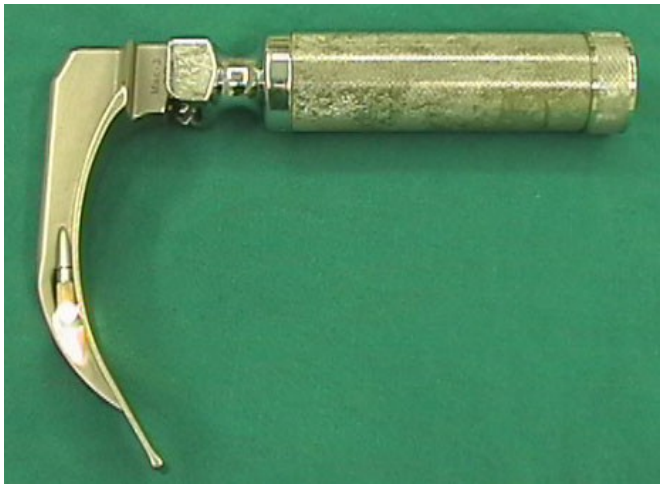
Essentials that **must be present** to ensure a **safe intubation!**

They can be remembered by the mnemonic **SALT**

- **Suction**. This is extremely important. Often patients will have material in the pharynx, making visualization of the vocal cords difficult.
- **Airway.** the oral airway is a device that lifts the tongue off the posterior pharynx, often making it easier to mask ventilate a patient. The inability to ventilate a patient is bad. Also a source of O2 with a delivery mechanism (ambu-bag and mask) must be available.
- **Laryngoscope.** This lighted tool is vital to placing an endotracheal tube.
- **Tube**. Endotracheal tubes come in many sizes. In the average adult a size 7.0 or 8.0 oral endotracheal tube will work just fine.

1) Laryngoscope : handle and blade



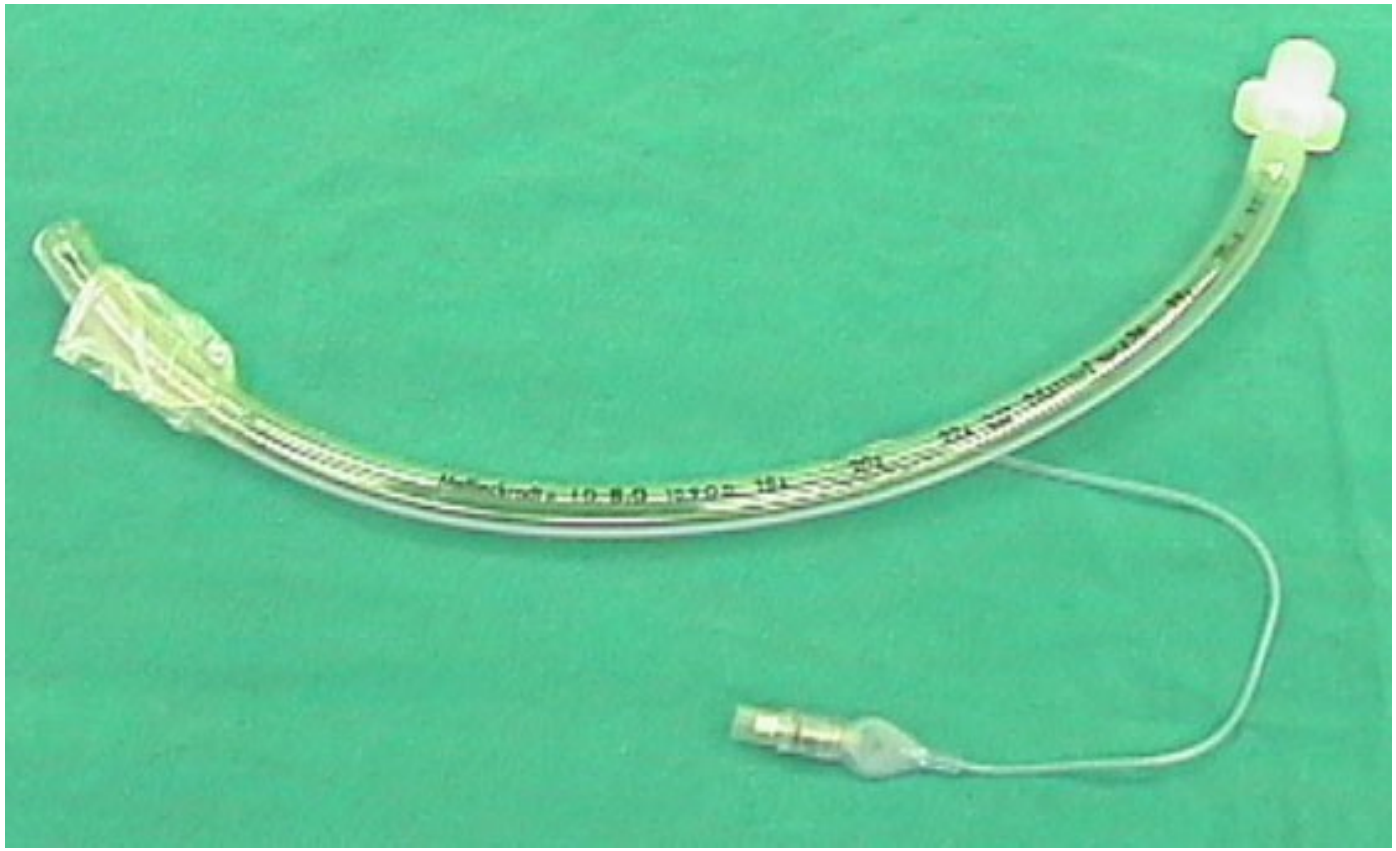


LARYNGOSCOPIC BLADE

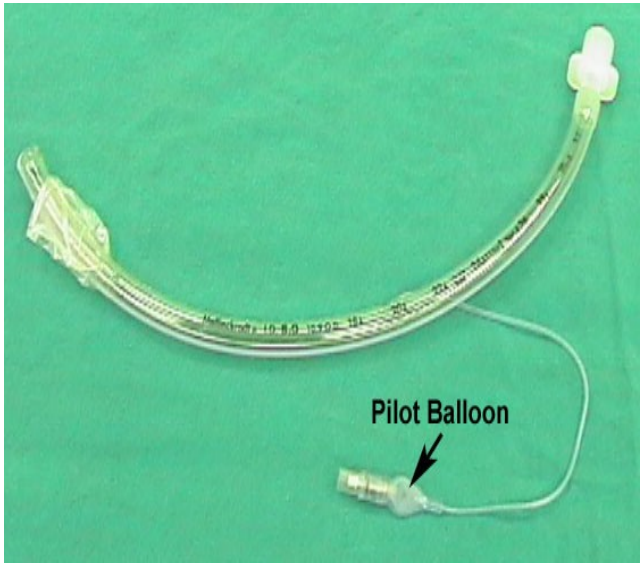
- Macintosh (curved) and Miller (straight) blade
- Adult : Macintosh blade, small children : Miller blade

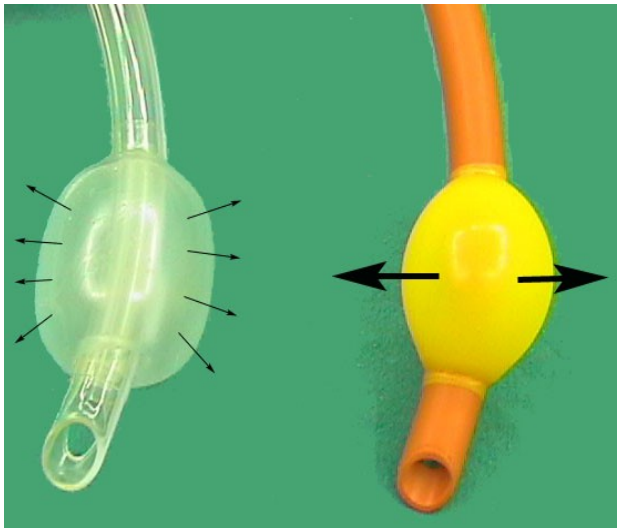
Miller blade **Macintosh blade**

2) Endotracheal tube



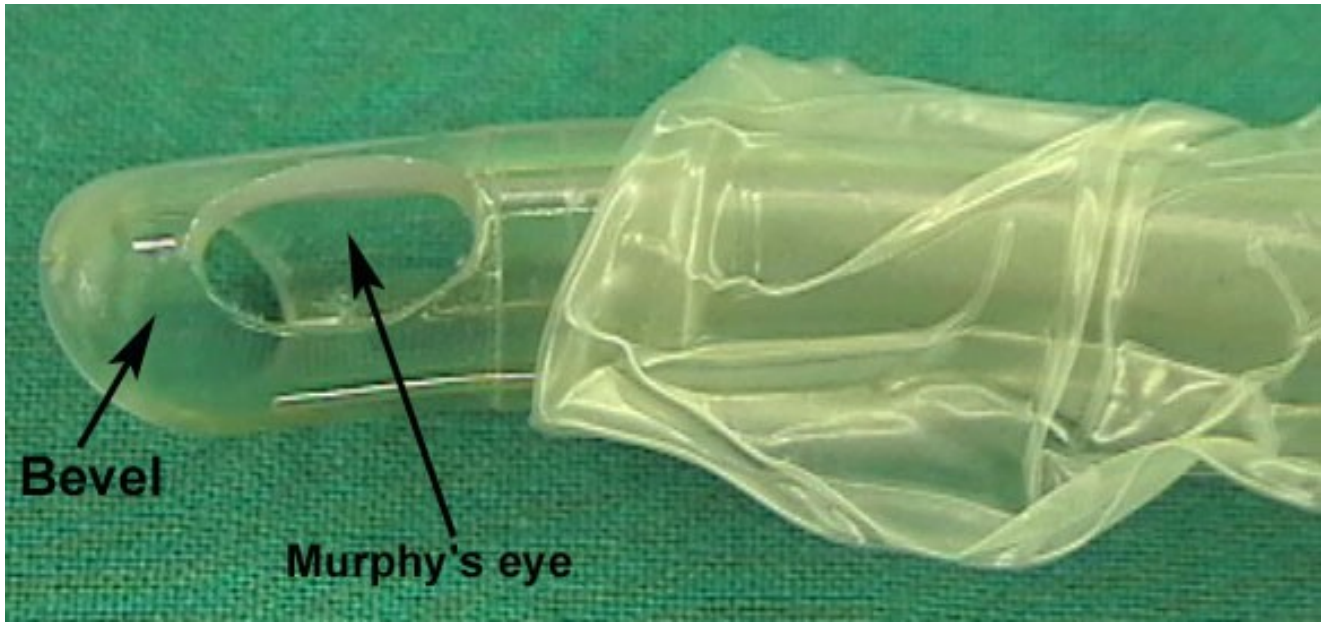
Endotracheal tube cuff





High volume **Low volume**

Low pressure cuff **High pressure**



Instruments used...

1. Self-refilling bag-valve combination (eg, **Ambu bag**) or bag-valve unit (Ayres bag), connector, tubing, and oxygen source. Assemble all items before attempting intubation.

2. Tincture of **benzoin and** precut **tape**.

3. Introducer (stylets or **Magill forceps**).

4. Suction apparatus (tonsil tip and catheter suction).

5. **Syringe**, 10-mL, to inflate the cuff.

6. **Mucosal anesthetics** (eg, 2% lidocaine)

7. Water-soluble sterile lubricant.

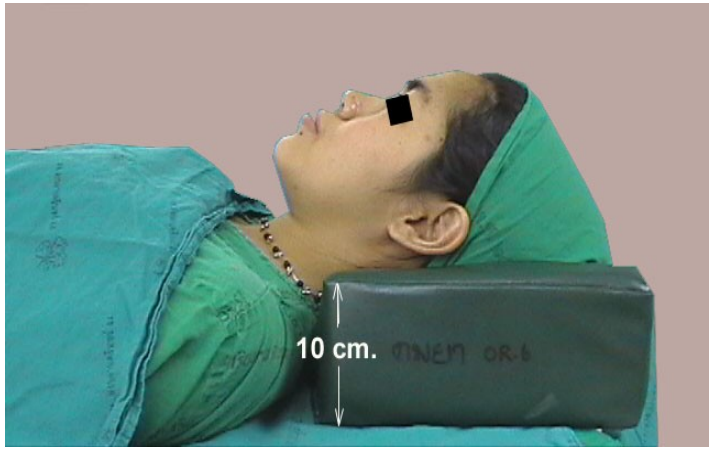
8. **Gloves**.

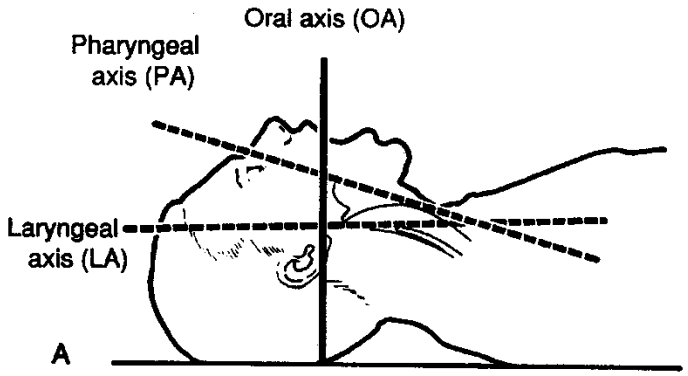
Tecnique:

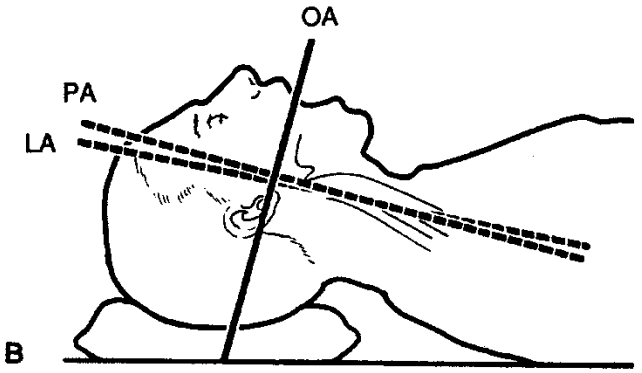
Sniffing position

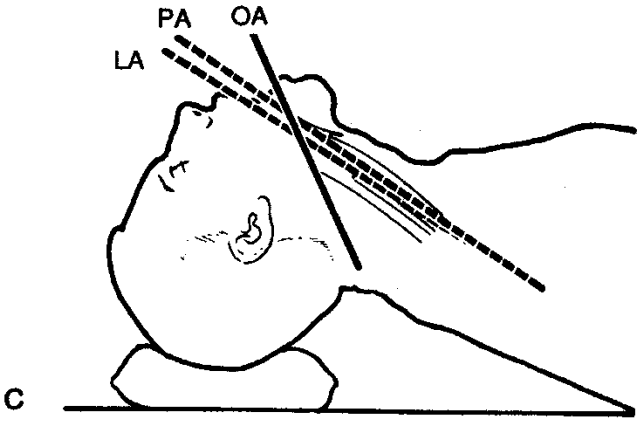
Flexion at lower cervical spine

Extension at atlanto-occipital joint

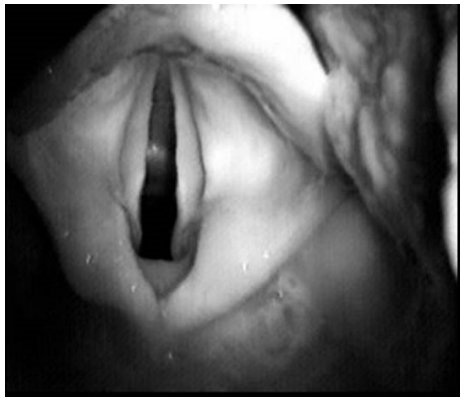








MADgicWand™ Mucosal Atomization Device for atomizing topical solutions. With 5mL syringe



Topical Anesthesia: Anesthetize the mucosa of the oropharynx, and upper airway with **lidocaine 2%,** if time permits and the patient is awake.

Direct Laryngoscopy:

1. Place the patient in the sniffing position.

2. Check the laryngoscope and blade for proper fit, and make sure that the light works.

3. Make sure that all materials are assembled and close at hand.

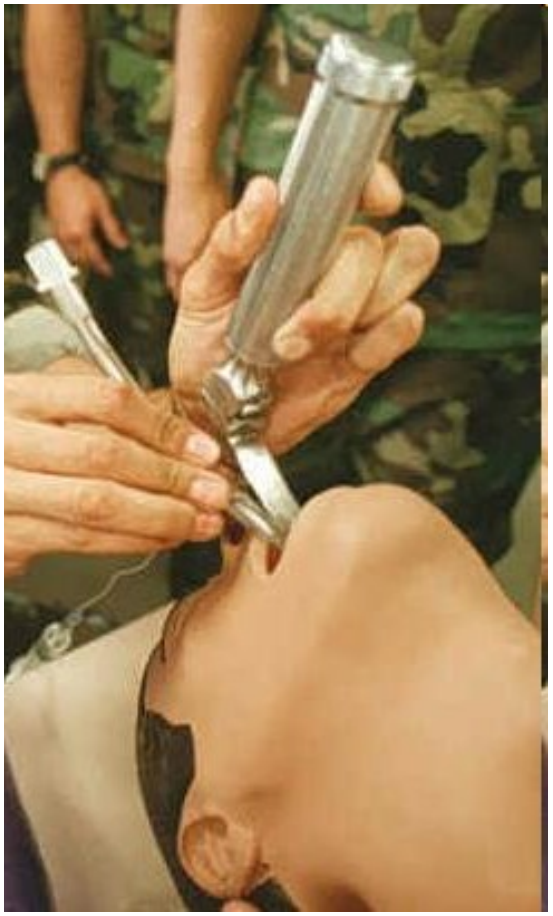
a) **Open the patient's mouth** with the right hand, and remove any dentures.

b) Grasp the **laryngoscope in the left hand**

c) Spread the patient's lips, and **insert the blade** between the teeth, being careful not to break a tooth.

d) Pass the **blade to the right of the tongue**, and advance the blade **into the hypopharynx**, pushing the tongue to the left.

e) **Lift the laryngoscope upward and forward**, without changing the angle of the blade, to expose the vocal cords.



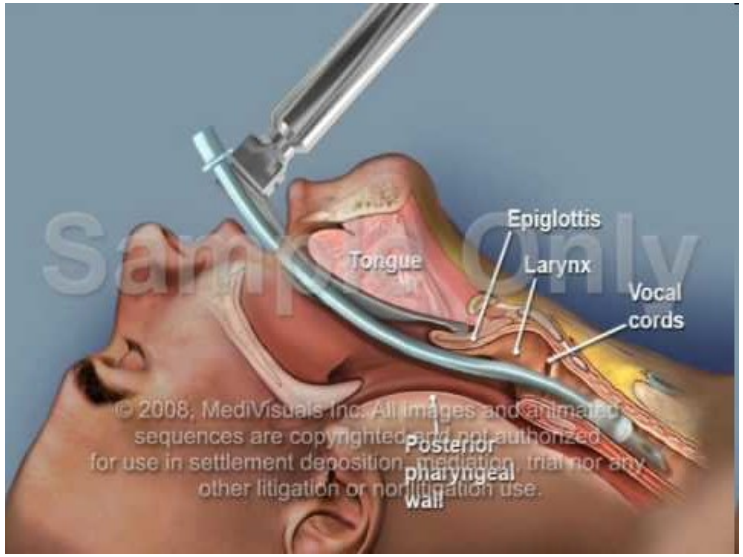
Curved blade technique

f) The anesthesiologist then takes the endotracheal tube, made of flexible plastic, in the right hand and starts inserting it through the mouth opening.

g) The tube is inserted through the cords to the point that the cuff rests just below the cords

h) Finally, the cuff is inflated to provide a minimal leak when the bag is squeezed

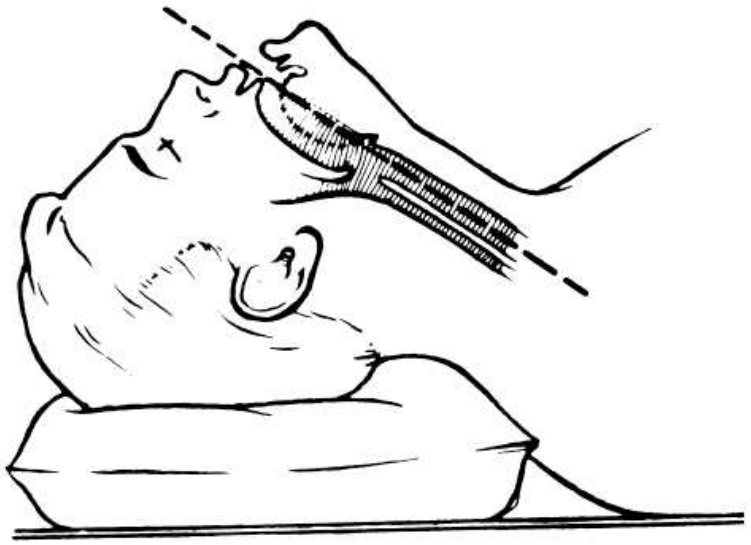
Using a stethoscope , the anesthesiologist listens for breathing sounds to ensure correct placement of the tube



Straight blade technique

Follow the steps outlined for curved blade technique, but **advance the blade down the hypopharynx**, and **lift the epiglottis** with the tip of the blade to **expose the vocal cords**.

The tip of the laryngoscope **blade fits below the epiglottis**, which is no longer visible with the blade in position.



- Video:
  - http://www.youtube.com/watch?v=tKz2zadEX_0&feature=related

Complications:

1. Tube **malpositioning** (esophageal intubation)
2. **Tube malfunction** or physiologic responses to airway instrumentation
3. Trauma such as **tooth damage**, lip/tongue/mucosal **laceration**, sore throat, dislocated mandible
4. **Mucosal inflammation** and **ulceration** and excoriation of nose can occur while the tube is in place
5. **Laryngeal malfunction** and aspiration, glottic, subglottic or tracheal **edema** and **stenosis**, vocal cord granuloma or **paralysis during extubation**

Physiologic responses to intubation include hypertension, tachycardia, intracranial hypertension, and laryngospasm

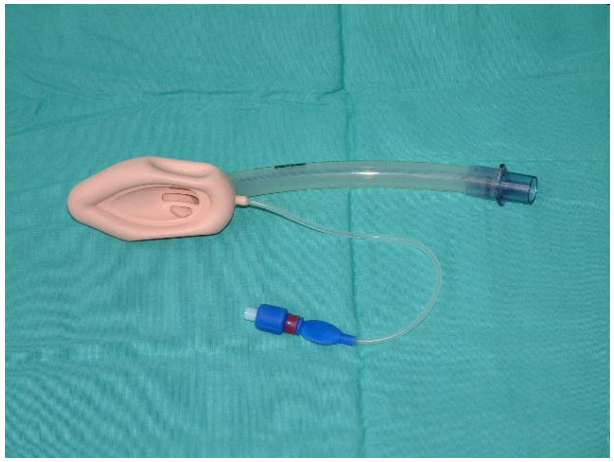
Laryngeal Masks (LMA)

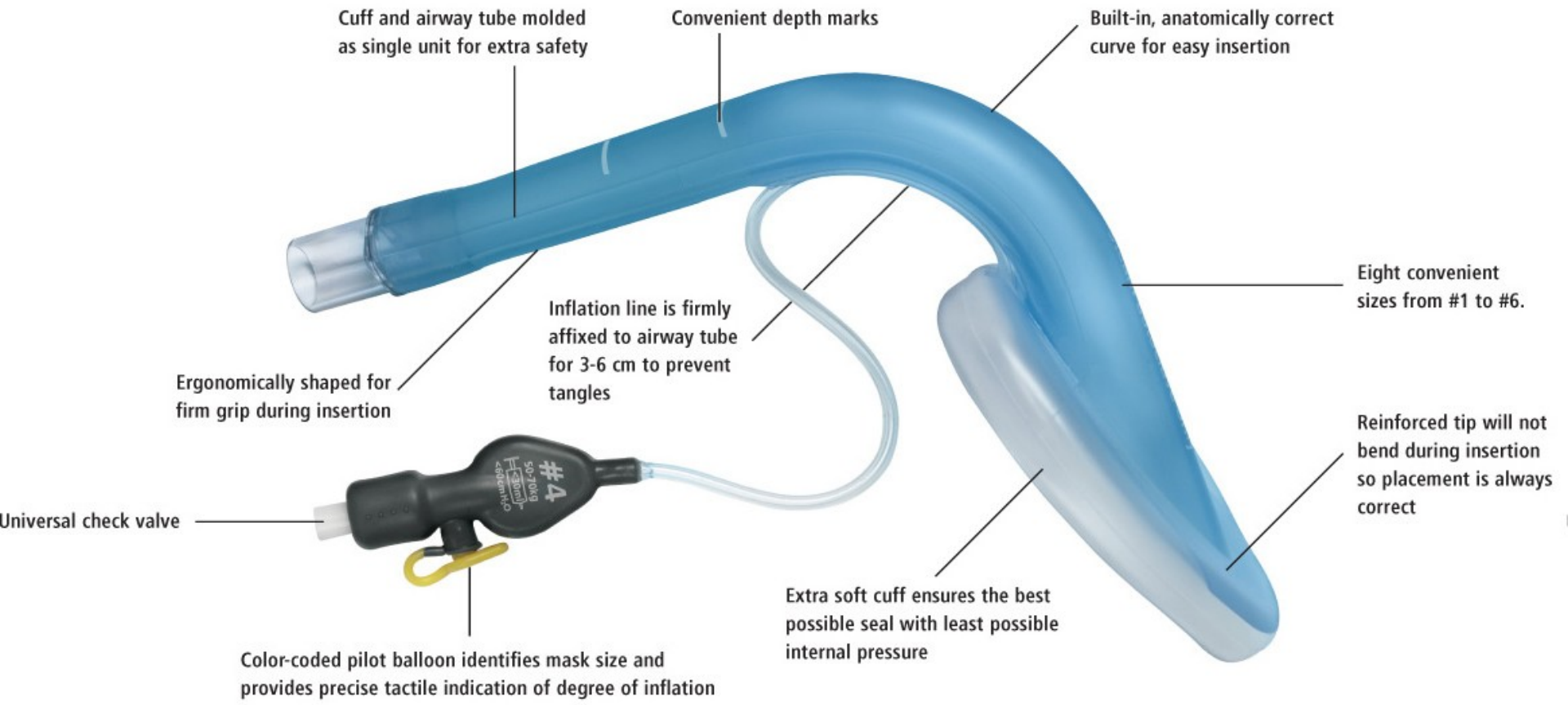
The Laryngeal Mask Airway is an **alternative airway** device used for anesthesia and airway support.

- They cause **less pain** and coughing than an endotracheal tube, and are much **easier to insert** .

It **consists of an inflatable silicone mask and rubber connecting tube**. It is inserted blindly into the **pharynx**, forming a low-pressure seal around the laryngeal inlet and permitting gentle positive **pressure ventilation**.

All parts are latex-free




Cuff and airway tube molded as single unit for extra safety
Convenient depth marks
Built-in, anatomically correct curve for easy insertion
Eight convenient sizes from #1 to #6.
Inflation line is firmly affixed to airway tube for 3-6 cm to prevent tangles
Ergonomically shaped for firm grip during insertion
Universal check valve
Reinforced tip will not bend during insertion so placement is always correct
Extra soft cuff ensures the best possible seal with least possible internal pressure
Color-coded pilot balloon identifies mask size and provides precise tactile indication of degree of inflation

Laryngeal Masks

Indications:

When **endotracheal intubation is not necessary** or it's difficult

Contraindications:

- Non-fasted patients
- Morbidly obese patients
- Obstructive or abnormal lesions of the oropharynx

Air entry is confirmed by listening for air entry into the lungs with a stethoscope

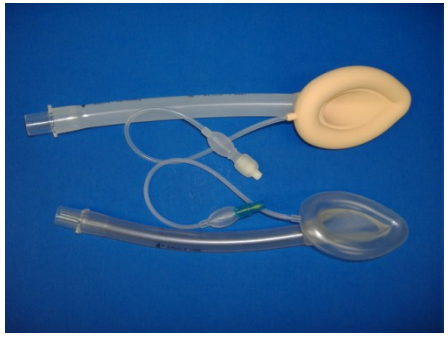
Short Procedure:

1. The **cuff of the mask is deflated** before insertion and **lubricated**.
2. The patient is **sedated** or fully anaesthetized if conscious, and their neck is extended and their **mouth opened widely**.
3. The **apex** of the mask, with its open end pointing **downwards toward the tongue**, is pushed backwards towards the uvula.
4. The cuff follows the natural bend of the oropharynx, and its long walls come to **rest over the piriform fossa**.
5. Once placed, the cuff around the mask is i**nflated** with air to create a tight seal.

Advantages vs. Disadvantages

Advantages:

•Allows rapid access
•Does not require laryngoscope
•Relaxants not needed
•Provides airway for spontaneous or controlled ventilation
•Tolerated at lighter anesthetic planes



Disadvantages:

- Does not fully protect against aspiration in the non-fasted patient
- Requires re-sterilization

Nasoendotracheal intubation

- Advantages:
  -) Comfortable for prolong intubation in postoperative period
  -) Suitable for oral surgery : tonsillectomy , mandible surgery
  -) For blind nasal intubation
  -) Can take oral feeding
  -) Resist for kinking and difficult to accidental extubation

Disadvantages:

-) Trauma to nasal mucosa
-) Risk for sinusitis in prolong intubation
-) Risk for bacteremia
-) Smaller diameter than oral route → difficult for suction

Contraindication for nasoendotracheal intubation

) Fracture base of skull

) Coagulopathy

) Nasal cavity obstruction

) Retropharyngeal abscess

Complication of endotracheal intubation

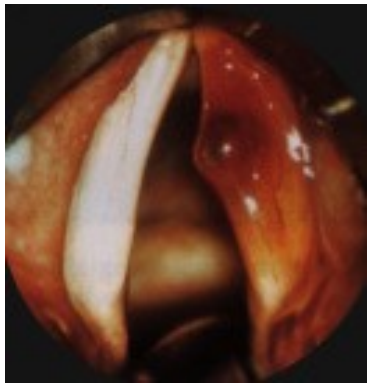
1) During intubation

2) During remained intubation

3) During extubation

4) After extubation

) During intubation



- Trauma to lip, tongue or teeth
- Hypertension and tachycardia or arrhythmia
- Pulmonary aspiration
- Laryngospasm
- Bronchospasm
- Laryngeal edema
- Arytenoid dislocation → hoarseness
- Increased intracranial pressure
- Spinal cord trauma in cervical spine injury
- Esophageal intubation

2) During remained intubation

- Obstruction from klinking , secretion or overinflation of cuff
- Accidental extubation or endobronchial intubation
- Disconnection from breathing circuit
- Pulmonary aspiration
- Lib or nasal ulcer in case with prolong period of intubation
- Sinusitis or otitis in case with prolong nasoendotracheal intubation

3) During Extubation

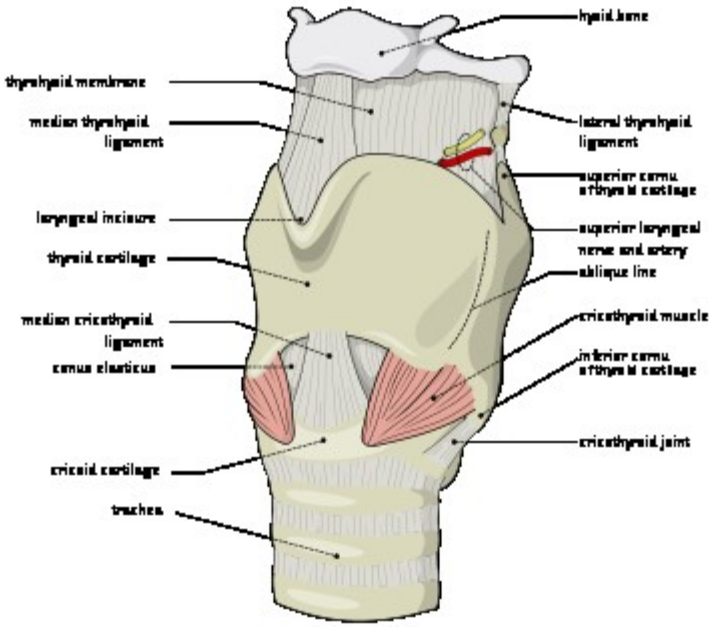
- Laryngospasm
- Pulmonary aspiration
- Edema of upper airway

4) After Extubation

- Sore throat
- Hoarseness
- Tracheal stenosis (Prolong intubation)
- Laryngeal granuloma

Cricothyrotomy

- Incision made through the skin and cricothyroid membrane to establish a patent airway during certain life-threatening situations, such as airway obstruction by a foreign body, angioedema, or massive facial trauma.
- Is easier and quicker to perform than tracheotomy, does not require manipulation of the cervical spine and is associated with fewer complications.
- Used almost exclusively in emergency circumstances



Tracheotomy

- Making an incision on the front of the neck and opening a direct airway through an incision in the trachea.
- Allows a person to breathe without the use of their nose or mouth
- Used primarily in situations where a prolonged need for airway support is anticipated.

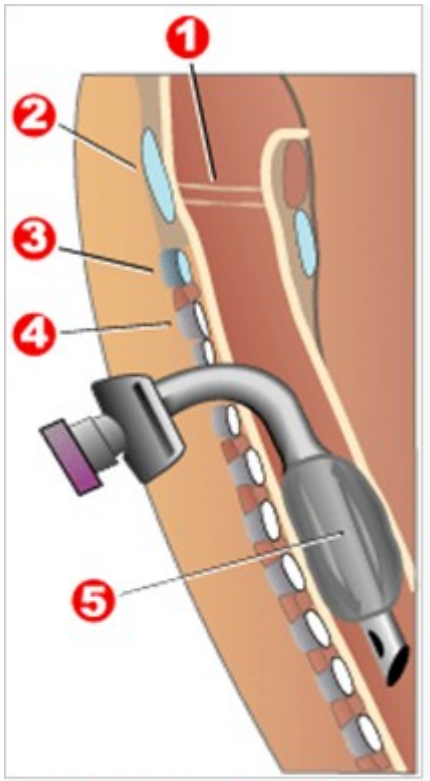


Diagram of a tracheostomy tube in the trachea:
1 - Vocal folds
2 - Thyroid cartilage
3 - Cricoid cartilage
4 - Tracheal rings

Thanks for your attention!