# *Delivery of inhalational Agents- Airway Maintenance*

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# *Delivery of inhalational Agents- Airway Maintenance*

- *Is one of the most important tasks of the anesthesiologists.*
- *Inhalational agents may be delivered via:*

1. *Face mask (FM).*
2. *Laryngeal Mask Airway (LMA) or other Supraglottic Airway Device (SAD).*
3. *Tracheal Tube (ETT).*

# *Use of Face Mask*

- ***Inhalational anesthesia usually involves the use of FM.***
- ***Has many types and sizes.***
- ***Must select correct fit to provide a gas-tight seal.***
- ***Excessive dead space should be avoided in children :***

***(Randell-Baker& Soucek Mask)***

# *Use of Face Mask*

- ***Correct head position. (Mandible is held 'into' the FM).***
- ***Use bony contact points rather than soft tissue to prevent airway obstruction.***
- ***Observation of the airway.***
- ***Signs of airway obstruction:***

1. ***Indrawing in supasternal and supraclaviular soft tissue.***
2. ***Noisy ventilation or inspiratory stridor.***
3. ***Paradoxical movement of thorax and abdomen.***

# *Use of Face Mask*

- *Oropharyngeal (Guedel) Airway (OPA) may assist maintenance of the airway.*
- *Appropriate stage of anesthesia (more than stage 2 or light stage 3) is required before insertion of the airway, as it may produce laryngospasm or breath-holding.*
- *Local anesthetic spray or gel may help insertion at an earlier stage.*
- *Nasopharyngeal airway (NPA) may be better tolerated.*


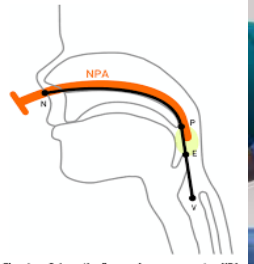


Fig. 1 – Schematic figure of measurements. NPA (orange) denotes the nasopharyngeal airway adjunct, N the nostril, P the distal end of the soft palate, E the epiglottis and V the level of the vocal cords. Green circle shows area of acceptable placement.

# *Use of Face Mask*

***Indications:***

1. ***Short non-invasive procedures e.g. dental or orthopedic manipulations.***
2. ***Before insertion of the LMA or ETT. With or without OPA or NPA.***

# *Use of LMA and other SAD*

***Indications:***

1. ***To provide patent airway without need for FM holding by the anesthetist.***
2. ***To avoid tracheal intubation during spontaneous ventilation.***
3. ***In cases of difficult intubation ,either as an alternative or to facilitate intubation via intubating (ILMA).***

# *Use of LMA and other SAD*

***Contraindications:***

1. ***A patient with full stomach or conditions of delayed gastric emptying (e.g. pregnancy, trauma & emergency cases, opioid used, greasy food and Gastro-intestinal obstruction).***
2. ***Risk of regurgitation (e.g. hiatus hernia lower esophageal stricture).***
3. ***Oropharyngeal surgery where the cuff imped surgical access.***

# *Use of LMA and other SAD*

***Conduct of LMA insertion:***

- ***Adequate depth of anesthesia is required.***
- ***i.v. induction with Propofol has fewer difficulties than Thiopentone as it suppresses pharyngeal reflexes.***
- ***Appropriate size LMA is chosen according to the body weight.***
- ***Largest size possible is used to create a seal with cuff inflation less than the maximum.***
- ***Reinforced LMA is useful to facilitate surgical access or avoid possible kinking.***

## TABLE 21.4

### Laryngeal Mask Airway Sizes

| Mask Size | Patient Weight (kg) | Cuff Volume (mL) |
|---|---|---|
| 1 | <5 | 2–5 |
| 1.5 | 5–10 | 5–7 |
| 2 | 10–20 | 7–10 |
| 2.5 | 20–30 | 12–14 |
| 3 | >30 | 15–20 |
| 4 | n/a | 25–30 |
| 5 | n/a | 35–40 |

After Brimacombe et al. 1996

# *Use of LMA and other SAD*

***Conduct of LMA insertion:***

1. ***Extend the patient's head.***
2. ***The mandible is held down by the assistant.***
3. ***Deflate the cuff.***
4. ***Direct into the pharynx along the hard palate.***
5. ***The cuff is swept distally to the laryngopharynx.***
6. ***Re-inflate the cuff until the larynx is sealed.***
7. ***Observe the reservoir bag or the inflation of the lungs with gentle manual inflation, for airway patency.***
8. ***Secure the LMA with a tape or bandage.***

# *Use of LMA and other SAD*

***Alternative SADs :***

1. ***Igel.***
2. ***Pro-seal LMA.***
3. ***Supreme LMA (SLMA).***
4. ***Intubating LMA (ILMA) or Fastrach LMA.***
5. ***Cobra Peri-Laryngeal Airway(PLA).***




***The anesthetist needs experience to appreciate the differences in insertion techniques from that of classic LMA.***

# *Tracheal Intubation*

***Indications:***

1. ***Provision of a clear airway (e.g. when difficult FM is anticipated as in edentulous patient.***
2. ***Unusual and prolonged position (e.g. prone or sitting).***
3. ***Head and neck surgery, nasotracheal intubation may be required.***
4. ***Protection of the respiratory tract from blood, gastric contents in emergency surgery or patient with esophageal obstruction where the use of cuffed tube for adults is mandatory.***
5. ***During IPPV/Relaxant techniques.***
6. ***To facilitate suction of the respiratory tract.***
7. ***During thoracic operations.***

# *Tracheal Intubation*

***Contraindications:***

***Few C/I as in emergency situations ,hypoxemia must be relieved if at all possible before insertion of tracheal tube.***

# *Tracheal Intubation*

***Preparation:***

1. ***Check availability and functioning of all necessary equipment, including aids to intubation.***
2. ***Presence of a 'dedicated',trained and experienced assistant.***
3. ***Correct size laryngoscope ,check the bulb and battery function.***
4. ***Check patency of tube and integrity of its cuff.***

# *Tracheal Intubation*

***Choice of Equipment:***

- ***Laryngoscopes:***

1. ***Straight blade (e.g. Magill) for children who have large, V-shaped and floppy epiglottis. The blade is passed posterior to and lifts the epiglottis anteriorly.***
2. ***Curved blade (e.g.Macintosh) for adults who have U-shaped tense and smaller epiglottis . The blade is passed anterior to the epiglottis in the vallecula.***
3. ***McCoy blade with the movable distal end for appropriate patients.***

# *Tracheal Intubation*

- ***Tracheal Tubes:***

1. ***Modern disposable tracheal tubes made of inert PVC , are used in the majority of cases.***
2. ***Reinforced (non-kinking) tracheal tubes are used in head, neck and throat surgery when pressure or kinking of the tube is anticipated.***

***Insertion of tracheal tube:***

1. ***Oro-tracheal (usually).***
2. ***Naso-tracheal particularly in oral surgery.***

# *Tracheal Intubation*

***Length of the Tracheal Tube:***

1. ***Usually exceeds the required length for oral tracheal intubation, thus it should be cut to the appropriate length before use.***
2. ***During thoracic surgery bronchial intubation may be necessary to ventilate the lungs independently ;thus it should not be cut or use bronchial blockers or Double Lumen Tubes(DLT).***

# *Tracheal Intubation*

***Selection of Tracheal Tube size and length:***

1. ***For selecting the appropriate Internal Diameter (ID) of the T.T. in pediatric patients, use the formula(Age/4+4)mm. A tube 0.5mm smaller and 0.5mm larger should be prepared. The usual adult sizes required are 8.5-9.0 mm ID for males and 7.0-8.0 mm ID for female.***
2. ***For selecting the appropriate length for Oral T.T. in children , use the formula (Age/2+12)cm;and Nasal T.T. ,use the formula(Age/2+15) and slightly smaller size tube.The usual adult length is where the black marker is at the level of the vocal cords.***
3. ***Non-cuffed tubes for pediatric age group and cuffed tubes for adults which may be high volume-low pressure or low volume high pressure.***

# *Tracheal Intubation*

***Tracheal Tube Connector:***

- ***The T.T. is connected to the anesthetic breathing system using an appropriate connector. e.g.***

1. ***Curved connector for nasal tube.***
2. ***Light weight plastic with low dead space connector for children .***
3. ***Connector with suction port for thoracic surgery.***

- ***Ensure patency of the T.T. connector.***
- ***Should be wrapped until before their use.***