Chapter 8 Airway Management and Ventilation

Airway management and ventilation are the and most critical steps in the initial assessment of every patient you will encounter.

Respiratory Problems

Airway Obstruction

The is the most common cause of airway obstruction.

Other Causes:
- Foreign bodies
- 
- Laryngeal spasm and edema
- 

The Tongue as an Airway Obstruction

Inadequate volume respirations can compromise adequate oxygen intake and carbon dioxide removal

Respiratory System Assessment

Primary Assessment

- Is the airway ?
- Is breathing adequate?
- Look, listen, and feel.
- If patient is not breathing, open the airway and ventilations as necessary.

- Look.
- Listen.
- Feel.

Bag-valve-mask ventilation

Secondary Assessment: Focused History

- 
- Symptom development
- Associated symptoms
- Past medical history
- history
- Does anything make symptoms better or worse?

Physical Examination

Inspection

- Skin
- Patient's position
- 
- Modified forms of respiration
- Rate
Modified Forms of Respiration
- Forceful Exhalation: forceful exhalation of a large volume of air
- Sneezing: sudden, forceful exhalation through the nose
- Hiccoughing (Hiccups): sudden inspiration caused by spasm of the diaphragm with spastic closure of the glottis
- Slow, Deep, Involuntary Inspiration: slow, deep, involuntary inspiration
- Grunting: a forceful expiration that occurs through closed epiglottis

Abnormal Respiratory Patterns (1 of 2)
- Deep, Slow or Rapid, Gasping: common in diabetic ketoacidosis.
- Progressively Increasing Tidal Volume, Followed by a Declining Volume, Separated by Periods of Apnea at the End of Expiration Indicating Terminal Illness or Injury (Ataxic) Respirations

Abnormal Respiratory Patterns (2 of 2)
- Ataxic Respirations: repeated episodes of gasping ventilations separated by periods of apnea, indicating increased intracranial pressure
- Central Neurogenic Respirations: deep, rapid respirations, indicating increased intracranial pressure
- Shallow, Slow, or Infrequent Breathing: indicating brain anoxia

Ausculation
- Listen at the mouth and nose for adequate air movement.
- Listen with a ____________ for normal or abnormal air movement.

Position for Auscultating Breath Sounds.

Palpation
- Palpate chest wall for tenderness, abnormal motion, crepitus, and subcutaneous emphysema.
- Assess compliance of lungs.

Non-Invasive Respiratory Monitoring
Pulse Oximetry
- A measurement of hemoglobin oxygen saturation in the ____________ tissues
- Will detect problems with oxygenation ____________ than monitoring other vitals
- Measures the oxygen ____________ percentage (SaO2)

Pulse Oximeter

Capnography
- The measurement of exhaled carbon ____________ concentration
- Devices are called End Tidal Carbon Dioxide (ETCO2) Detectors
● Used to determine correct placement of ________________________________ airways
● Disposable or reusable units are available
● Accuracy is good but ________________________________ cardiac arrest will lower ETCO2 levels

26 Colorimetric End-Tidal CO2 Detector
27 Electronic End-Tidal CO2 Detector
28 Combined devices check pulse oximetry, ETCO2, blood pressure, pulse, respiratory rate, and temperature.
29 Waveform Capnography
   ● Provides monitoring of ________________ effectiveness
   ● < ________________ mmHg has been shown to have no chance of ROSC
   ● < ________________ mmHg indicates ineffective compressions
   ● Sharp increase can indicate ROSC
   ● These readings based on patients properly intubated with ETT
   ● Post-cardiac arrest target range for PETCO2 for patient who achieves ROSC is ____________________ - ____________________ mm Hg
30 Waveform Capnography
31 Esophageal Detector Device (EDD)
   ● Determines correct placement of ________________________________ intubation tubes
   ● May be rigid or ________________________________ type syringe
   ● If bulb refills easily, tube placement is ________________________________
   ● Trachea is rigid, esophagus is ________________________________
32 Esophageal Detector Device
33 An esophageal intubation detector-bulb style.
34 If the bulb does not refill, the tube is ________________________________ placed.
35 If bulb refills easily upon release, it indicates ________________________________ placement.
36 Manual Airway Maneuvers
37 Personal Protective Equipment
38 Head Tilt/ Chin Lift
39 Jaw-Thrust Maneuver
40 Modified Jaw Thrust in Trauma
41 Jaw-Lift Maneuver
42 ________________________________ Maneuver (Cricoid Pressure)
43 Airway before applying Sellick’s
44 Airway with Sellick’s applied (note compression on the esophagus)
Basic Mechanical Airways

Nasopharyngeal airway, inserted

Advanced Airway Management

Endotracheal Intubation

Endotracheal intubation is clearly the method of advanced airway management in prehospital emergency care.

Equipment Needed

- Laryngoscope Blade and Handle
- Activating Laryngoscope Light Source

Laryngoscope Blades

Macintosh Blades: _______________ Blades
Miller Blades: _______________ Blades
Sizes from _________ to _________

Macintosh (Curved) Blades

- Designed to fit into the ____________________________
- When lifted ____________________________, blade elevates the tongue, and indirectly the epiglottis, allowing you to see the glottic opening (vocal cords)
- Permits more room for visualization
- Less trauma to ____________________________

Placement of Macintosh blade into Vallecula

Miller (Straight) Blades

- Designed to fit under the ____________________________
- Lifts the epiglottis directly
- Preferred in ____________________________
- Preferred in adults with large ____________________________

Placement of the Miller blade under the epiglottis

Endotracheal Tubes

- Lengths range from 12 cm to 32 cm
Endotracheal Tubes
- Pilot ________________________________ indicates whether the distal cuff is inflated
- Pilot balloon is normally inflated with ________ cc of air from a syringe
- Normal Adult Sizes
  - Females: _________ to _________ mm
  - Males: _________ to _________ mm

Other Equipment
- ____________________________________ : malleable plastic covered wire used to direct the ETT by bending the distal end
- 10mL syringe: used to inflate cuff
- Tube-Holding Devices: used to secure tube
- Magill Forceps: scissor-style clamps used to remove foreign bodies or direct ETT
- Lubricant: ________________________________ soluble solution (KY)
- Bite Block (oral airway or commercial device)

Endotracheal Intubation Indications
- Respiratory or cardiac arrest.
- Unconsciousness ___________________ gag reflex.
- Risk of ________________________________ .
- Obstruction due to foreign bodies, trauma, burns, or ____________________________________ .
- Respiratory insufficiency due to disease.
- Pneumothorax, hemothorax, hemopneumothorax with ________________________________ difficulty.

Advantages of Endotracheal Intubation
- Isolates trachea and permits complete control of ________________________________ .
- Impedes gastric ________________________________ .
- Eliminates need to maintain a mask seal.
- Offers direct route for suctioning.
- Permits administration of some ________________________________ .

Disadvantages of Endotracheal Intubation
Requires considerable training and experience.
Requires specialized ____________________________.
Requires direct ____________________________ of vocal cords.
Bypasses ____________________________ airway’s functions of warming, filtering, and humidifying the inhaled air.

Compliations of Endotracheal Intubation
- Equipment ____________________________
- ____________________________ breakage and soft tissue lacerations
- Hypoxia
- ____________________________ intubation
- Endobronchial intubation
- Tension pneumothorax

Orotracheal Intubation

Orotracheal Intubation Procedure (1 of 5)
Position patient supine
- ____________________________ with 100% oxygen

Prepare Equipment
- Check handle and light on blade, close handle
- Inflate cuff and check for ____________________________
- Insert ____________________________ and bend as needed (do not allow stylet to be exposed on distal end of ETT)
- Lubricate as needed
- Prepare suction equipment

Orotracheal Intubation Procedure (2 of 5)
Remove ____________________________ if present
- Place in “ ____________________________ position”. Flex neck forward and head backward
- Hold laryngoscope in ____________________________ hand
- Have partner apply ____________________________ maneuver (cricoid pressure)
- Insert blade into right side of mouth and sweep tongue

Orotracheal Intubation Procedure (3 of 5)
- Move blade to ____________________________
  - Advance Macintosh until distal end is at base of the tongue in valucula
  - Advance Miller until the distal end is under the epiglottis
- Lift the handle slightly upward and and toward the feet at _________ ° Angle
  - Do not pry on ____________________________
  - Observe for vomitus, fluids, or foreign bodies
  - ____________________________ as needed

Orotracheal Intubation Procedure (4 of 5)
- Adjust blade until landmarks are visible
- Hold ETT in ____________________________ hand and advance through right corner of mouth
- Visualize tube passing through the vocal ____________________________ with cuff advancing 1-2cm past cords
Hold tube in place and remove blade
Use BVM to ventilate in tube
Inflate cuff with ________ to __________cc of air

Orotracheal Intubation Procedure (5 of 5)

Check for proper tube placement
- _____________________________ Both Lungs
- Auscultate Over _____________________________

Attach ETCO2 Monitor
Ventilate the patient
Secure tube
Document tube _____________________________
Recheck tube _____________________________ periodically

Check for proper tube placement
- ____________________________________ Both Lungs
- Auscultate Over ____________________________________

Attach ETCO2 Monitor
Ventilating the patient
Secure tube
Document tube _____________________________
Recheck tube _____________________________ periodically

Apply _____________________________ Maneuver and Insert Laryngoscope.

Visualize _____________________________ and Insert the ETT Between the Vocal Cords until top of cuff is just below the vocal cords.

- _____________________________ visualized through laryngoscopy
cuff, ventilate, and Auscultate.

Confirm Placement With an _____________________________ Detector.

- _____________________________ tube.
- _____________________________ ETT placement.

Continuously _____________________________ and reconfirm the placement of the endotracheal tube.

Assuring Proper Placement

- The most reliable confirmation of tube placement is _____________________________ of tube passing through cords
- Presence of bilateral lung sounds
- Absence of breath sounds over epigastrium
- _____________________________ end-tidal CO2
- Presence of _____________________________ in tube
- Absence of vomitus in tube
- Absence of vocal sounds

Key Points in Intubations (1 of 2)

- Limit attempts to ________ seconds or less. If unable to intubate, re-oxygenate before reattempting
- Advance distal cuff no more than 1-2cm past vocal cords to avoid Endobronchial intubation
- Check lung sounds in _____________________________ lungs AND epigastric sounds
- Have suction ready before attempting
● If unsuccessful after 2nd attempt, consider alternative airway device (king airway or combitube)
● ______________________________________ the tube

89 Key Points in Intubations (2 of 2)
● Intubation may NOT be a ______________________________________ . If the airway can be controlled with other maneuvers, consider the true benefit of intubation.
  - Consider personnel AND patient need
● However, remember that ETT is the ONLY means to totally ______________________________________ the airway
● Do NOT ______________________________________

90 Lighted Stylet for Endotracheal Intubation

91 Insertion of Lighted Stylet ETT

92 Lighted Stylet ETT in Position

93 Transillumination of a Lighted Stylet

94 Blind (Digital) Intubation
● Prepare as normal
● Insert bite block
● Insert left middle and index fingers into mouth and “walk” hand down midline and palpate ______________________________________
● Advance tube pushing with right hand
● Use middle and index finger to direct ETT between epiglottis and your ______________________________________
● Attach BVM and continue as normal

95 Blind Orotracheal Intubation by Digital Method

96 Digital Intubation
● Insert your middle and ______________________________________ fingers into patient’s mouth

97 Digital Intubation—Insertion of the ETT

98 Digital Intubation
● Walk your ______________________________________ and palpate the patient’s epiglottis.

99 Endotracheal Intubation with In-line Stabilization

100 Pre-oxygenate patient and apply c-spine stabilization.

101 Apply Sellick’s Maneuver and intubate.

102 Ventilate Patient and Confirm Placement.

103 Secure ETT and Apply a Cervical Collar.

104 Reconfirm Placement.

105 Rapid Sequence Intubation
● AKA pharmacologically assisted intubation (PAI)
● RSI: giving ______________________________________ to sedate and temporarily paralyze a patient to facilitate intubation
A patient who needs intubation may be awake. RSI paralyzes the patient to facilitate endotracheal intubation.

The Pediatric Airway
- Smaller and more ________________________________ than an adult.
- Tongue proportionately larger.
- Epiglottis floppy and round.
- Glottic opening higher and more ________________________________
- Vocal cords slant upward, and are closer to the base of the tongue.
- Narrowest part is the ________________________________ cartilage.

Pediatric ET Sizes
- ETT Size in mm =
  \((\text{Age in years} + 16)\)

- Alternative method: use an ETT the size of the infant’s little finger

Pediatric ETT Sizes (Page 498)

Endotracheal Intubation in a Child
- Pre-oxygenate the child.
- Position the head.
- Insert the laryngoscope.
- Insert ETT and ventilate the child.
- Confirm placement and secure ETT.

Nasotracheal Intubation May be Useful in Some Situations:
- Possible ________________________________ injury
- Clenched ________________________________
- Fractured jaw, oral injuries, or recent oral surgery
- Facial or airway swelling
- ________________________________
- Arthritis preventing sniffing position

Nasotracheal Intubation Not Recommended in Some Situations:
- Possible ________________________________ fractures
- Suspected basilar ________________________________ fracture
- Deviated septum or nasal destruction
- Cardiac or respiratory arrest

Advantages of Nasotracheal Intubation
- The head and neck can remain in ________________________________ position.
- It does not produce as much gag response and is better tolerated by the awake patient.
- It can be secured more easily than an orotracheal tube.
- The patient cannot ________________________________ the ETT.

Disadvantages of Nasotracheal intubation
- More difficult and ________________________________ -consuming to perform than orotracheal intubation.
- Potentially more ________________________________ for patients.
May kink or clog more easily than an orally placed tube.

Poses a greater risk of ____________________________

Improper ____________________________ is more likely when performing blind nasotracheal intubation.

Blind nasotracheal intubation requires that the patient be ____________________________

Nasotracheal Intubation

- Prepare patient and equipment
- Select the larger ____________________________
- Apply topical anesthesia
- Insert with bevel facing the ____________________________
- Listen for respiratory sounds
- Advance with next ____________________________ breath
- Inflate and confirm placement

Blind Nasotracheal Intubation

Field Extubation

- ____________________________ done

If needed to be done:
- Suction oropharynx
- Deflate cuff
- Turn head or roll onto side if possible
- Remove ETT upon ____________________________ or cough
- Be prepared for ____________________________
- Provide ____________________________
- Reassess patient

Esophageal Tracheal CombiTube (ETC)

Advantages of CombiTube (1 of 2)

- Provides alternate airway control when conventional intubation techniques are unsuccessful or unavailable.
- Insertion is rapid and easy and does not require ____________________________ of the larynx or special equipment.
- Pharyngeal balloon anchors the airway behind the hard

- Patient may be ____________________________ regardless of tube placement.

Advantages of CombiTube (2 of 2)

- Significantly diminishes gastric ____________________________ and regurgitation.
- Can be used on ____________________________ patients, since the neck can remain in neutral position during insertion and use.
- If tube is placed in ____________________________ , gastric contents can be suctioned for decompression through the distal port.

Disadvantages of CombiTube (1 of 2)

- Maintaining adequate ____________________________ seal is difficult on some CombiTubes.
- Suctioning ____________________________ secretions is impossible when the
airway is in the esophagus.

- Cannot be used in conscious patients or in those with a gag reflex.
- Cuffs can cause esophageal, tracheal, and hypopharyngeal ischemia.
- Pt must be at least __________’ tall

**Disadvantages of CombiTube (2 of 2)**

- Does not isolate and completely protect the ____________________________
- Cannot be used in patients with ____________________________ disease or caustic ingestions.
- Cannot be used with ____________________________ patients.
- Placement of CombiTube is not foolproof—errors can be made if assessment skills are inadequate.

**Placing a CombiTube (1 of 3)**

- Pre-oxygenate the patient
- Check equipment
  - Inflate and check ____________________________________
- Place patient’s head in ____________________________________ position
- Lubricate as needed
- Insert the CombiTube gently in ____________________________________ using tongue-jaw-lift maneuver until teeth are between 2 black lines

**Placing a CombiTube (2 of 3)**

- Inflate pharyngeal cuff with ____________ cc of air and distal cuff with ____________ - ____________ cc of air
- Ventilate through the longer ____________________________ port with BVM (#1)
- Check lung sounds
- If lung sounds present, tube is in the ____________________________, continue to ventilate

**Placing a CombiTube (3 of 3)**

- If lung sounds absent, ventilate through the shorter ____________________________ port (#2)
- If lung sounds now present, the tube is in the ____________________________
- Attach ____________________________
- ____________________________ tube

**More on the CombiTube**

- ____________________________ tube may be placed through port #2 if in esophagus
- Drugs can be given down tube if in the ____________________________ (Port #2)
- You must know where the tube is placed!
  - Many physicians and ER personnel are NOT familiar with the CombiTube

**ETC Airway—Tracheal Placement**

**ETC Airway—Esophageal Placement**

**Other Intubation Devices**

- Laryngeal mask airway (__________)
- Pharyngo-tracheal lumen airway (__________)

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Laryngeal Mask Airway

Pharyngo-Tracheal Lumen Airway (PtL)

Advantages of the PtL Airway

- Can function in either the ____________________________ or esophageal position.
- No face ____________________________ to seal.
- Does not require direct visualization.
- Can be used in trauma patients, since the neck can remain in neutral position during insertion and use.
- Helps protect the trachea from upper airway bleeding and ____________________________.

Disadvantages of the PtL Airway (1 of 2)

- Does not isolate and completely protect the ____________________________ from aspiration.
- The oropharyngeal balloon can ____________________________ out of the mouth anteriorly, partially dislodging the airway.
- ____________________________ around the PtL is extremely difficult, even with the oropharyngeal balloon deflated.

Disadvantages of the PtL Airway (2 of 2)

- Cannot be used in ____________________________ patients or those with a gag reflex.
- Cannot be used in pediatric patients.
- Can only be passed ____________________________.

Esophageal Gastric Tube Airway (EGTA)

- The EGTA is a ____________________________ tube. A cuff just proximal to the distal, open port blocks air to the esophagus.

Esophageal Obturator Airway

- The EOA is a hollow tube with a ____________________________ end and a distal cuff intended to block air from the esophagus.

Contraindications to EOA Insertion

- Age less than ________ years.
- Height less than ________ feet or more than ________ feet, 7 inches.
- Possible ingestion of ____________________________ poisons.
- History or esophageal disease or ____________________________.

King Airway

- Single ____________________________ esophageal device
- Used by all levels
- Primary airway device for many ____________________________
- ____________________________ device for Intermediates and Paramedics; if unable to intubate
**Advantages/ Disadvantages of King Airway**

- Only _________ ventilation port
  - No need to determine placement
  - Placement is ____________________________ only; very slim chance of tracheal placement
- Allows placement of ____________________________ tube (in LTS-D)
- No ET route for ____________________________
- Will not help with obstructed airways

**Types**

- King Airway ____________:
  - No port for gastric tube
- King Airway ____________:
  - Has port for gastric tube

**King Airway Types**

1. LT-D
2. LTS-D

**Adult King Airway Sizes**

1. Size 3
   - _________-_________’ Tall
   - ____________________________ Flange
   - Inflation: 40-55cc’s
2. Size 4
   - _________-_________’ Tall
   - ____________________________ Flange
   - Inflation: 50-70cc’s
3. Size 5
   - Over _________’ Tall
   - ____________________________ Flange
   - Inflation: 60-80cc’s

**Pediatric Airway Sizes**

- Available only in LT-D
- Size 2
  - _________-_________” Tall
  - ____________________________ Flange
  - Inflation: 25-35cc’s
- Size 2.5
  - _________-_________” Tall
  - ____________________________ Flange
  - Inflation: 30-40cc’s

**Indications**

- For EMTs
  - Unconscious and no ____________________________ reflex
- 1st line airway control device
  ● For Intermediates and Paramedics
  - After unsuccessful ____________________________ attempts
  - ____________________________ or “Backup” device

151 Contraindications
  ● Conscious with gag reflex
  ● Under ____________” tall (2’ 11”)
  ● Ingestion of ____________________________ substances
  ● Patients with known ____________________________ disease

152 Procedure (1 of 6)
  ● Select appropriate size based on patient’s ____________________________
  ● Test cuffs (remove air)
  ● Apply ____________________________ -based lubricant
  ● Pre-oxygenate
  ● Position patient in “__________________________” or neutral position

153 Procedure (2 of 6)
  ● Holding the King at the connector with ____________________________ hand, hold the patient’s mouth open and apply chin lift unless contraindicated due to ____________________________ and/or Spinal immobilization

154 Procedure (3 of 6)
  ● With the King rotated laterally ____________-____________ degrees, such that the blue orientation line is touching the corner of the mouth, introduce tip into the mouth and advance behind the base of the tongue, Never ____________________________ the tube into position

155 Procedure (4 of 7)
  ● As the tip passes under tongue ____________________________ tube back to midline (blue orientation line faces chin).
  ● Without exerting excessive force, advance the King until base of connector aligns with ____________________________ or gums.

156 Procedure (5 of 7)
  ● ____________________________ the cuffs based on the listed volumes for the tube size used.
  ● Attach BVM and verify placement by ALL of the following criteria:
    - Rise and fall of ____________________________
    - Bilateral breath sounds
    - Absent ____________________________ sounds
    - CO2 measurement (capnography)

157 Procedure (6 of 7)
  ● If ventilation is difficult, ____________________________ out very slightly until ventilation is performed easily.
  ● Re-verify placement
    - Lung sounds, absent epigastric sounds, etc
  ● ____________________________ Tube

158 Procedure (7 of 7)
  ● If there is any question about the proper placement of the King Airway,
the cuffs and remove the airway. Ventilate the patient with BVM for 30 seconds and repeat insertion procedure.

- Continue to __________________________ the patient for proper airway placement throughout prehospital treatment and transport.

**Key Points**

- Must guess the patient's __________________________
- Lubricate
- At ALS level, introduction may be aided with __________________________
- Not used for any patient under 35" tall
- Use is **required** by SPEMS
- Attach __________________________ if an adult in cardiac arrest

**Foreign Body Removal Under Direct Laryngoscopy**

Direct visualization of the Larynx with a Laryngoscope may enable the removal of an obstructing foreign body.

**Foreign Body Removal with Direct Visualization and Magill Forceps**

**Surgical Airways**

The only indication for a surgical airway is the __________________________ to establish an airway by any other method.

**Anatomical Landmarks for __________________________**

**Needle Cricothyrotomy (1 of 3)**

- Position patient
  - Palpate __________________________ portion of the thyroid cartilage and cricothyroid cartilage. The indentation between the two is the cricothyroid membrane
- Attach a large bore IV needle to a 10 or 20mL syringe
  - Adults: ________ or ________ gauge
  - Pediatrics: ________ or ________ gauge

**Needle Cricothyrotomy (2 of 3)**

- Insert needle into cricothyroid membrane at __________________________, at 45° angle toward the feet
- Advance the needle no more than ________ cm, then aspirate with the syringe
- After placement confirmed, hold needle still and advance catheter. Withdraw needle
- Secure catheter

**Needle Cricothyrotomy (3 of 3)**

- If needed ventilate with __________________________ jet ventilations
- Use of __________________________ will work with adapter from a small ETT

**Locate/ Palpate __________________________ Membrane.**

**Proper Positioning for Cricothyroid Puncture**

**Advance the __________________________ With the Needle.**

**Cannula properly placed in trachea**

**Ventilation with Needle**
Cricothyrotomy

### Surgical (Open) Cricothyrotomy (1 of 2)
- Locate ___________________________ membrane
- Clean the area with ___________________________ -containing solution if time permits
- Stabilize the cartilages with one hand, while using a scalpel in the other hand to make a 1 to 2 cm ___________________________ incision over the membrane
- Make a 1cm incision in the ___________________________ plane through the membrane

### Surgical (Open) Cricothyrotomy (2 of 2)
- Insert ___________________________ into the membrane and spread it open
- Insert a ___________________________ ETT (6.0 to 7.0) or tracheostomy tube
- Inflate the cuff
- Confirm placement
- ___________________________ the tube

### Locate Cricothyroid ___________________________.

### Stabilize ___________________________ and Make a 1- 2 cm Vertical Skin Incision Over Cricothyroid Membrane.

### Make a ________ cm horizontal incision through the cricothyroid membrane.

### Using a ___________________________ Hemostat, Spread Membrane Incision Open.

### Insert an ETT (6.0) or ___________________________ (6.0).

### ___________________________ the cuff.

### ___________________________ Placement.

### Ventilate.

### Secure tube, reconfirm placement, ___________________________ patient.

### Patients with Stoma Sites
- Patients who have had a laryngectomy or tracheostomy breathe through a ___________________________.
- There are often problems with excess ___________________________, and a stoma may become plugged.

### Tracheostomy Cannulae

### Suctioning
- Anticipating ___________________________ when managing an airway is the key for successful outcomes.
- Be prepared to suction all airways to remove blood or other secretions and for the patient to ___________________________.

### Suctioning Techniques
- Wear protective eyewear, gloves, and face mask.
- Determine depth of catheter insertion.
- With suction off, insert catheter.
- Turn on suction and suction while removing catheter (no more than ______ seconds).
- ____________________________________ the patient.

### Tracheobronchial Suctioning
- Suctioning through the ETT to remove secretions or mucous plugs
- Use ___________________________ technique
- Use only soft-tip catheter
- Insert tip until ___________________________ is felt
- Apply suction for __________-_________ seconds while pulling out
- __________-_________cc of sterile water may need to be injected prior to suctioning

### Gastric Decompression (1 of 3)
- Common problem with ventilating a nonintubated patient is gastric distention.
- Occurs when the procedure's high ___________________________ trap air in the stomach.
- Once patient has gastric distention, you should place a tube in the stomach for gastric decompression, using either the ___________________________ or orogastric approach.

### Gastric Decompression (2 of 3)
To place a nasogastric or orogastric tube:
- Prepare patient’s head in ___________________________ position while preoxygenating.
- Determine length of tube insertion by measuring from epigastrum to the angle of the jaw, then to the tip of the ___________________________.
- If patient is awake, suppress the gag reflex with a topical ___________________________ applied into the posterior oropharynx or with IV lidocaine.

### Gastric Decompression (3 of 3)
- Lubricate the distal tip of the gastric tube and gently insert into the nares and along the nasal floor, or into the oral cavity at midline. Advance tube gently, and if patient is awake, encourage ___________________________ to facilitate tube’s passage.
- Advance to predetermined mark on tube.
- Confirm placement by ___________________________.
- Apply ___________________________ and note gastric contents that pass through the tube.
- Secure the tube in place.

### Oxygenation

### Oxygen Delivery Devices
- Nasal cannula: up to _________% O2 @ 6 lpm
- Venturi mask: adjustable from _________-_________%
- Simple face mask: _________-_________% @ 6 to 10 lpm

**Get This.......Never withhold ___________________________ from any patient for whom it is indicated**
• Partial rebreather mask: up to __________% @ 10 lpm
• Nonrebreather mask > __________% @ 15 lpm
• Small-volume nebulizer
• Oxygen humidifier

196 Ventilation Methods
  • Mouth-to- __________________________
  • Mouth-to-nose
  • Mouth-to- __________________________
  • Mouth-to- __________________________
  • Bag-valve device
  • __________________________ valve device
  • Automatic transport __________________________

197 Bag-valve-mask with built-in __________________________ ETCO₂ detector

198 Ventilation of Pediatric Patients
  • Mask seal can be more difficult.
  • Bag size depends on age and size of child.
  • Ventilate according to current __________________________ .
  • Obtain __________________________ rise and fall with each breath.
  • Assess adequacy of __________________________ by observing chest rise, listening to lung sounds, and assessing __________________________ improvement.

199 Demand Valve and Mask

200 Portable Mechanical Ventilator

201 ResQPod

202 ResQPDM
  • ResQPod is an Impedance __________________________ Device (ITD)
  • Provides “Perfusion on Demand” (___________) by regulating pressures in the thorax during states of hypotension
  • AHA 2005 Guidelines designated the ITD as a Class IIa recommendation (highest recommendation) for adult patients in cardiac arrest
  • Higher recommendation than any __________________________

203 How It Works (1 of 3)
  • During normal CPR, air flows in and out of chest during __________________________
  • Compression increases pressure in the lungs, which forces small __________________________ of air out of the open airway
  • As the chest recoils during the decompression phase, a slight __________________________ sucks the small puff of air back into the airway in an effort to equalize the intra- and extrathoracic pressures.

204 How It Works (2 of 3)
  • An ITD temporarily blocks, or __________________________, the airway immediately after the compression when exhalation releases the puff of air
Chest recoil proceeds normally, but air cannot rush into the airway to equalize the pressure. The rapidly expanding intrathoracic space pulls _______________ into the heart from the great vessels resulting in improved blood return (pre-load) to the heart.

**How it Works (3 of 3)**
- Prevents unnecessary air from entering the ________________________ during CPR.
- As the chest recoils, the vacuum (negative pressure) in the thorax is greater.
- This vacuum pulls more blood back into the heart, _______________ blood flow.
- Increases cardiac output, BP, and ________________________ rates.

**Benefits of the ResQPOD**
- _______________ blood flow to the heart
- Increases brain blood flow by 50%
- Doubles systolic BP
- Increases survival rates
- Increases likelihood of successful ________________________
- Beneficial in all arrest rhythms
- Circulates drugs more effectively
- Timing ________________________ for ventilations

**Indications**
- ________________________ in cardiac arrest
  - Onset of puberty
  - Not for use in infants and _______________ = No ResQPOD
- NOT indicated for apneic patients with a heart beat; only cardiac arrest
  - No ________________________ = No ResQPOD

**Use on a BVM or Mouth to Mask**
- Connect to face mask, remove light ________________________
- Open airway
- Establish/MAINTAIN a tight seal. Best accomplished with 2 rescuers
- Connect BVM
- _______________ compression per light flash
- Ventilate after each 30 compressions (____________ light flashes)

**Use With ET or King Airway**
- ________________________ placement
- Connect to airway device and BVM, remove light tab
- Perform ________________________ compressions
- Ventilate with every light flash (____________/min)

**Key Points of ResQPOD**
- Used only on adults in ________________________ arrest
- If patient regains pulse and/or spontaneous respirations, _______________ the ResQPOD, but continue to ventilate as needed
- MUST maintain a constant seal if using with BVM only
- Must be attached to device ________________________ to patient
Other Points

- These are expensive ($________ each) so do not open unless you are going to use it.
- They do have ________________________________ dates