Airway management and ventilation are the 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

16 □ Modified Forms of Respiration
• _________________________________: 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
• Grunting: a forceful expiration that occurs through closed epiglottis

17 □ Abnormal Respiratory Patterns (1 of 2)
• _________________________________ respirations
  – Deep, slow or rapid, gasping; common in diabetic ketoacidosis.
• _________________________________ respirations
  – Progressively increasing tidal volume, followed by a declining volume, separated by periods of apnea at the end of expiration indicating terminal illness or _________________________________ injury

18 □ Abnormal Respiratory Patterns (2 of 2)
• _________________________________ (Ataxic) Respirations:
  – Repeated episodes of gasping ventilations separated by periods of apnea, indicating increased intracranial pressure
• Central Neurogenic _________________________________
  – Deep, rapid respirations, indicating increased intracranial pressure
• _________________________________ Respirations
  – Shallow, slow, or infrequent breathing indicating brain anoxia

19 □ Auscultation
• Listen at the mouth and nose for adequate air movement.
• Listen with a _________________________________ for normal or abnormal air movement.

20 □ Position for auscultating breath sounds.

21 □ Palpation
• Palpate chest wall for tenderness, _________________________________, abnormal motion, crepitus, and subcutaneous emphysema.
• Assess compliance of lungs.

22 □ Non-Invasive Respiratory Monitoring

23 □ 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)

24 □ How it Works
● An ___________________________ sensing unit (sensor) clips to the patient
● Infrared light transmitted through the ___________________________ bed senses the oxygen level
● Oximeter displays the percentage of oxygen saturation, a pulse wave or light, and pulse rate

25 □ Conditions Affecting Reading
● Cool or cold finger or sight
● ___________________________ fingernail polish
● Wet or dirty finger or sight
● Use of ___________________________ or BP cuff on side of probe
● Tight or restrictive ___________________________
● Decompensated Shock (low BP)

26 □ Readings of Pulse Ox
● The average, non-smoking, patient will have a reading of ________ % or above
● COPD patients will normally have a reading of ________ to ________ %
● Application of oxygen should increase the reading rapidly
● Readings above ________ % is desirable in most cases

27 □ Cautions in Pulse Oximetry
● Oxygen should never be ___________________________ from a patient whose condition or appearance indicates the need for oxygen, even if the pulse ox shows a high reading
● Pulse ox will show a high reading in patients with carbon monoxide poisoning
● Chronic ___________________________ will have an inflated reading due to 10 to 15% increase in carbon monoxide in the blood

28 □ Key Points on Pulse Ox
● Pulse ox reading does not determine the need for ___________________________ administration
● The chief complaint or mechanism of injury should be used to determine the need for ___________________________; regardless of pulse ox reading
● Don’t withhold oxygen because of pulse ox readings
● TREAT THE ___________________________ , NOT THE PULSE OX!!!!!

29 □ Capnography
● At the cellular level Oxygen and ___________________________ combine to produce energy for cells. Carbon Dioxide is created as a waste product and is diffused into the blood and is carried back to the lungs.
● This is known as the ___________________________ Cycle

30 □ Capnography
● Measures the carbon dioxide levels in exhaled air: End Tidal CO2
(__________________________ )
Types
- Continuous ____________________________________
- ____________________________________ devices
- Electronic sensing devices

May not be very accurate after prolonged cardiac arrest; especially the colormetrics

Now part of the ____________________________ confirmation process of advanced airways

Capnography

Colormetric Capnography
- Changes from ____________________________ to ____________________________ in the presence of CO2
- Numbers correspond with CO2 levels
- Not very accurate long term
- Once color changes, it will ____________________________ change back

Waveform Capnography
- Highly recommended by the ____________________________ through their ACLS and PALS programs
- Use is rapidly growing in EMS and emergency medicine
- Further uses are expected with more ____________________________
- Can be a valuable tool if used correctly

Waveform Capnography has two components:
1. A ____________________________ Value: Gives a numerical value of the peak ETCO2
2. ____________________________ : Shows a visual graph of the patient’s respiration
   - Both components are important, and can aid in treating patients.
   - Think of it as the end tidal number as your heart rate and the waveform as the ECG.

Phases of Waveform Capnography

Phase I (AB)
- Respiratory ____________________________
- Represents post inhalation and dead air exhalation (air that has not reached the alveoli).
- No ____________________________ is present

Phase II (BC)
- Respiratory ____________________________ (exhalation upstroke)
- Air is being ____________________________ that is rich in CO2

Phase III (CD)
- Respiratory ____________________________ (exhalation plateau)
- The end of phase III is the ____________________________ ETCO2 and is where we get our numerical value

Phase IV (DE)
• __________________________ Phase (inhalation downstroke)
• Represents __________________________

40 Normal Waveform
• __________________________ measures CO2 levels
• Horizontal measures __________________________
• Normal ETCO2 values
  – Between ______-_______mmHg
  – Normal respiratory rate is 12-20

41 Benefits of Waveform Capnography
• Provides a “real time” look at respirations
• Allows for __________________________ of an advanced airway
• Aids in determination of the effectiveness of chest __________________________
• Helps to monitor for __________________________ (Return of Spontaneous Circulation) and loss of spontaneous circulation
• Helps us to recognize loss of paralysis/sedation of RSI (PAI) patients

42 Waveform Capnography and the Patient’s Respirations (1 of 2)
It is a real time look at the pt’s respiratory cycle:
• Waveform capnography shows us a real time waveform of each __________________________.
• If a patient were to suddenly become __________________________, it could be several minutes before you see any changes in the pt’s O2 sats. With waveform you be able to see it instantly.

43 Waveform Capnography and the Patient’s Respirations (2 of 2)
• It can help us determine how __________________________ and the cause of the patient’s respiratory distress
• It can also help us determine how effective our __________________________ is for the respiratory distress.

44 Waveform Capnography as a Confirmation Device for ETT (1 of 2)
• One of the easiest and most accurate ways to verify proper __________________________ tube placement.
• ETCO2 is considered the standard for confirming ETT placement.
• It provides documented __________________________ that the ET Tube is in the trachea.

45 Waveform Capnography as aConfirmation Device for ETT (2 of 2)
• It cannot determine if the tube is in the right main stem bronchi. __________________________ sounds still need to be auscultated.
• It is more reliable than __________________________ metric devices.
  – Able to constantly monitor the waveform.
• Goal is to maintain ETCO2 readings between 30 and 34mmHg for perfusing patients

46 Which Tracing Confirms Proper ETT Placement?
Waveform Capnography and Chest Compressions (1 of 2)

It can help show effectiveness of chest compressions:

- Circulation is needed for the gas exchange in the lungs.
- Without a pulse, the patient’s ETCO2 are going to ____________________________.
- During CPR try to keep your ETCO2 levels as ____________________________ as possible by “Pushing hard and pushing fast” on chest.

Waveform Capnography and Chest Compressions (2 of 2)

- ETCO2 readings of less than _______mmHg has been shown to have NO chance of ROSC.
- ETCO2 readings should be maintained at or above _______mmHg at all times during CPR.
- Adjustments of rate, hand position, or ____________________________ can be made to assure proper ETCO2.

Waveform Capnography and Spontaneous Circulation

- It can help determine ROSC:
  - During CPR if you see a sudden ____________________________ in your ETCO2 it is a good indication that the pt has ROSC.
- It can help determine the loss of spontaneous circulation.
  - A sudden ____________________________ in the pt’s ETCO2 can be an indication that the pt has lost pulses.

Waveform Capnography and RSI (PAI) (1 of 2)

- Waveform capnography can help detect when a patient is coming out of ____________________________ or sedation.
- By looking at waveform we can see when a pt is starting to wake up from PAI and needs to be ____________________________.

Waveform Capnography and RSI (PAI) (2 of 2)

- Will see signs of a pt waking up in the waveform long before other traditional signs such as:
  - Increase ____________________________ rate
  - Tearing
  - “__________________________” the tube
  - Purposeful movement

Sign of Loss of Paralysis/Sedation

- Notice the ____________________________ at the end of the waveform.
  - Sign that the pt is starting to ____________________________ on their own.
- If you notice the notch, this indicates need for additional sedatives/analgesics to maintain sedation.

Waveform and Hyperventilation

- With hyperventilation, patient is blowing off more CO2.
- ETCO2 values are going to be ____________________________ . Note that the waves start to get ____________________________ and more frequent.
Waveform and Hypoventilation
• With hypoventilation, the respirations are __________________________ and the pt is retaining CO2.
• ETCO2 readings are higher. Note that the waves are less frequent and starting to get __________________________

Waveform and Apnea
• With apnea, the patient is no longer __________________________ CO2
• Waveform with go __________________________ and you will not get a numerical reading.

Waveform and Bronchocontriction (Shark Fin)
• During __________________________ (asthma/COPD) it takes longer for the air to be exhaled and uneven alveolar emptying. This cause phase II and III to __________________________ giving a shark fin appearance.
  – The more pronounced the shark fin the more __________________________ the bronchoconstriction.

Waveform and Bronchodilators
• The waveform can also determine how __________________________ bronchodilators are working.
  – During and after a breathing treatment, if you notice the waveform start to level out and the ETCO2 go back to a __________________________ range it is a sign that patient’s condition is improving

Capnography of Asthma Patient

Changing ETCO2 values in Asthma (1 of 2)
Mild Asthma:
• A pt with a mild asthma attack the ETCO2 will begin to __________________________ (<_________) due to the pt hyperventilating to compensate for the respiratory distress.
Moderate Asthma:
• As the respiratory distress starts to get worse the pt’s ETCO2 will begin to __________________________ to a normal level.

Changing ETCO2 values in Asthma (2 of 2)
Severe Asthma:
• As the respiratory distress becomes severe pt’s ETCO2 will rise to a __________________________ number due to fatigue, air trapping, and moving little air.
• ETCO2 may rise to dangerous levels (>________)
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 __________________________

Esophageal Detector Device

An esophageal intubation detector-bulb style.

If the bulb does not refill, the tube is __________________________ placed.

If bulb refills easily upon release, it indicates __________________________ placement.

Manual Airway Maneuvers

Personal Protective Equipment

Head Tilt/Chin Lift

Jaw-Thrust Maneuver

Modified Jaw Thrust in Trauma

Jaw-Lift Maneuver

___________________________ Maneuver (Cricoid Pressure)

Airway before applying Sellick’s

Airway with Sellick’s applied (note compression on the esophagus)

Basic Mechanical Airways

Basic Mechanical Airways

- __________________________ Airway
- __________________________ Airway

Nasopharyngeal airway, inserted

Advanced Airway Management

Endotracheal Intubation

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

Equipment Needed

- __________________________ (with blades)
- Endotracheal Tube (ETT)
- 10cc syringe
- __________________________
● BVM
● Suction Device
● __________________________ Block
● __________________________ Forceps
● Tape or commercial securing device

83 Engaging Laryngoscope Blade and Handle

84 Activating Laryngoscope Light Source

85 Laryngoscope Blades
● Macintosh Blades: __________________________ Blades
● Miller Blades: __________________________ Blades
● Sizes from _______ to _______

86 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 __________________________

87 Placement of Macintosh blade into Vallecula

88 Miller (Straight) Blades
● Designed to fit under the __________________________
● Lifts the epiglottis directly
● Preferred in __________________________
● Preferred in adults with large __________________________

89 Placement of the Miller blade under the epiglottis

90 Endotracheal Tubes
● Lengths range from 12 cm to 32 cm
● BVM or other ventilation devises connects to proximal end
● Most have __________________________ to seal the trachea
● Tube Diameters range from _______mm to _______mm
  – 2.5mm to 4.5mm are normally __________________________
  – Tubes from 5.0 and larger are __________________________

91 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

92 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)

93 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.

94 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 ______.

95 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.

96 Complications of Endotracheal Intubation
• Equipment ______
• ______ breakage and soft tissue lacerations
• Hypoxia
• ______ intubation
• Endobronchial intubation
Tension pneumothorax

**Orotracheal Intubation**

1. **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

2. **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

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

4. **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

5. **Orotracheal Intubation Procedure (5 of 5)**
   - Check for proper tube placement
     - _________________ Both Lungs
     - Auscultate Over _________________

---

*Note: Fill in the blanks with appropriate terms.*
● Attach ETCO2 Monitor
● Ventilate the patient
● Secure tube
● Document tube ______________________________
● Recheck tube ______________________________ periodically

108 □ ___________________________ patient.
109 □ ___________________________ equipment.
110 □ Apply ___________________________ Maneuver and Insert Laryngoscope.
111 □ Visualize ___________________________ and Insert the ETT Between the Vocal Cords until top of cuff is just below the vocal cords.

112 □ ___________________________ visualized through laryngoscopy
113 □ ___________________________ cuff, ventilate, and Auscultate.
114 □ Confirm Placement With an ___________________________ Detector.
115 □ ___________________________ tube.
116 □ ___________________________ ETT placement.
117 □ Continuously ___________________________ and reconfirm the placement of the endotracheal tube.

118 □ 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

119 □ 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 combi-tube)
● ___________________________ the tube

120 □ 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 ________________________________

121 Lighted Stylt for Endotracheal Intubation
122 Insertion of Lighted Stylet ETT
123 Lighted Stylet ETT in Position
124 Transillumination of a Lighted Stylt

125 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

126 Blind Orotracheal Intubation by Digital Method

127 Digital Intubation

– Insert your middle and ________________ fingers into patient’s mouth

128 Digital Intubation

– Walk your ________________ and palpate the patient’s epiglottis.

129 Digital Intubation—Insertion of the ETT

130 Endotracheal Intubation with In-line Stabilization

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

132 Apply Sellick’s Maneuver and intubate.

133 Ventilate Patient and Confirm Placement.

134 Secure ETT and Apply a Cervical Collar.

135 Reconfirm Placement.

136 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.

137 □ 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.

138 □ Pediatric ET Sizes
- ETT Size in mm = (Age in years + 16)
  ________________
- Alternative method: use an ETT the size of the infant’s little finger

139 □ Pediatric ETT Sizes (Page 498)

140 □ Endotracheal Intubation in a Child
141 □ Pre-oxygenate the child.
142 □ Position the head.
143 □ Insert the laryngoscope.
144 □ Insert ETT and ventilate the child.
145 □ Confirm placement and secure ETT.

146 □ 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

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

148 □ 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

162 □ ETC Airway—Tracheal Placement

163 □ ETC Airway—Esophageal Placement

164 □ Other Intubation Devices

● Laryngeal mask airway _______

● Pharyngo-tracheal lumen airway _______

● ____________________________ gastric tube (EGTA)

● Esophageal ____________________________ airway (EOA)

165 □ Laryngeal Mask Airway

166 □ Pharyngo-Tracheal Lumen Airway (PtL)

167 □ 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 ____________________________

168 □ 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.

169 □ 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 ____________________________.

170 □ Esophageal Gastric Tube Airway (EGTA)

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

171 □ Esophageal Obturator Airway

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

172 □ 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 ____________________.

173  King Airway

174  King Airway

- Single ____________________ esophageal device
- Used by all levels
- Primary airway device for many ____________________
- ____________________ device for Intermediates and Paramedics; if unable to intubate

175  King Airway

176  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

177  Types

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

178  King Airway Types

1. LT-D
2. LTS-D

179  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
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

Contraindications

- Conscious with gag reflex
- Under __________” tall (2’ 11”)
- Ingestion of ____________________ substances
- Patients with known ____________________ disease

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

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

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

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.

187 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)

188 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

189 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

190 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

191 Foreign Body Removal Under Direct Laryngoscopy

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

193 Foreign Body Removal with Direct Visualization and Magill Forceps

194 Surgical Airways

195 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.
- ____________________________ the patient.
- 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
Once patient has gastric distention, you should place a tube in the stomach for gastric decomposition, 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

Get This………Never withhold ________________________ from any patient for whom it is indicated

Oxygen Delivery Devices

- Nasal cannula: up to _______ % O2 @ 6 lpm
- Venturi mask: adjustable from ______ - ______ %
- Simple face mask: ______ - ______ % @ 6 to 10 lpm
- Partial rebreather mask: up to ______ % @ 10 lpm
- Nonrebreather mask > ______% @ 15 lpm
- Small-volume nebulizer
- Oxygen humidifier

Hyperoxia

- Hyperoxia is a condition where tissues and organs are exposed to an excess supply of oxygen or a ________________________ than normal partial pressure of oxygen
- Extended hyperoxia can lead to vasodilation and oxygen ________________________

Oxygen Toxicity

- AKA oxygen ________________________ and oxygen poisoning
- Generally affects the CNS and/or the ________________________ system
- Can cause disorientation, breathing problems, and ________________________ disturbances
- Can cause oxidative damage to cell membranes, collapse of the ________________________ , and seizures
229 □ **Oxygen Toxicity**
- Most damaging to patients with __________________________ and/or stroke conditions
- The AHA and ASA now recommends that these patients NOT receive oxygen unless their O2 sats are less than ________% or the patient is showing S/S of hypoxia

230 □ **Avoiding Hyperoxia**
- To avoid, utilize delivery devices on cardiac/stroke patients to maintain oxygen saturation levels between ________ and ________%. Avoid 100% saturation level
- Caution: Do not ___________________________ oxygen from a patient that may be hypoxic or in need of oxygen

231 □ **Ventilation Methods**
- Mouth-to- __________________________
- Mouth-to-nose
- Mouth-to- __________________________
- Mouth-to- __________________________
- Bag-valve device
- __________________________ valve device
- Automatic transport __________________________

232 □ **Bag-valve-mask with built-in __________________________ ETCO₂ detector**

233 □ **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.

234 □ **Demand Valve and Mask**

235 □ **Portable Mechanical Ventilator**

236 □ **ResQPod**

237 □ **ResQPod**
- 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 __________________________

238 □ **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.

**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 ______________________.
• 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