Emergency Airway Procedure

Appropriate airway management is often the most important intervention a pre-hospital care provider makes, as ensuring adequate oxygenation and ventilation is crucial to the survival of every patient. The approach to airway control should proceed in a stepwise fashion, from basic to advanced, since basic maneuvers can sustain life until an advanced airway can be established. All of the following procedures may be performed prior to radio contact unless otherwise indicated.

INDICATIONS FOR AIRWAY INTERVENTION:

1. Airway obstruction
2. Need for positive pressure ventilation
   A. Apnea or inadequate respiratory effort
   B. Impending respiratory failure
   C. Patients who, as a result of trauma, have a Glasgow Coma Score of 8 or less.
3. Airway protection, such as an unconscious patient without a gag reflex.

<u>Pre-Medical Control</u>

MFR/EMT/SPECIALIST/PARAMEDIC

1. Open the airway using the basic maneuvers (chin lift or jaw thrust). Patients with a potential cervical spine injury should not have their neck hyper extended.

2. Attempt to ventilate using BVM or other approved device. Provide supplemental oxygen.

3. In cases of airway obstruction, refer to the **Obstructed Airway Procedure** for basic care until directed back to this procedure for cricothyrotomy per MCA approval.

EMT/SPECIALIST/PARAMEDIC

4. Providers may consider continuing basic manual airway maintenance if airway is able to maintained adequately in the **adult patient**.

5. Providers **must** continue basic manual airway maintenance, unless the airway is unable to be adequately maintained, in the **pediatric patient (8 or under).**

6. Combitube or King Airway (supraglottic airway) insertion may be performed to secure the airway in unconscious and apneic patients. In cardiac arrest patients, the supraglottic airway should be considered early in patients whom oral intubation is perceived to be technically difficult. Each MCA must choose to use one or both of these devices.

SPECIALIST/PARAMEDIC

7. (LALS/ALS) Endotracheal intubation may be performed via the orotracheal or nasotracheal route. Orotracheal intubation is the accepted method for unconscious patients without a gag reflex. Patients who still have spontaneous respiratory efforts may be nasotracheally intubated if approved by the local MCA.

PARAMEDIC

8. In cases where facial trauma precludes the possibility of successful intubation, in cases of complete airway obstruction unrelieved by dislodging efforts, and when basic ventilation efforts are not successful, a cricothyrotomy should be performed. Patients less than age 8 may have a needle cricothyrotomy performed; age 8 or greater may undergo either a needle or a surgical cricothyrotomy, as approved by local medical control.

9. Any intubated patient must have correct tube position verified by use of waveform capnography/capnometry or other MCA approved secondary confirmation device. This should not supplant standard methods of verifying correct tube placement (breath sounds combined with epigastric auscultation, chest rise, etc.). Paramedics must be familiar with the use and limitations of waveform capnography/capnometry or other MCA approved secondary confirmation device. Maintain assessment of proper airway placement.

OROTRACHEAL INTUBATION
SPECIALIST/PARAMEDIC

<u>Pre-Medical Control</u>
Technique for Oral Endotracheal Intubation:

1. Ventilate the patient with 100% oxygen.
2. Gather equipment:
   - appropriate size ETT
   - stylet
   - syringe
   - laryngoscope
   - suction
   - BVM
   - device for securing tube after placement
   - waveform capnography/capnometry or other MCA approved secondary confirmation device
   - pulse oximeter, if available
3. Place the laryngoscope blade along the right side of the tongue, moving the tongue to the left as the blade is advanced. Lift the blade anteriorly, using caution to avoid using the teeth as a fulcrum. If using a straight blade, lift the epiglottis with the tip of the blade. If using a curved blade, place the tip anterior to the epiglottis into the vallecula. Proper neck position and external cricoid pressure will facilitate visualization.
4. For infants and children, a straight blade is usually used.
5. The tube should be advanced through the cords until the proximal portion of the balloon (if present) is passed 2 to 3 cm beyond the vocal cords.
6. Oral intubation attempts should be limited to less than 30 seconds each.
7. A maximum of two attempts may be made prior to considering alternative airway techniques, e.g. Combitube, King, bag valve mask, etc. In cardiac arrest patients, a supraglottic airway should be considered early in patients for whom oral intubation is perceived to be technically difficult.
8. If using a cuffed tube, inflate the balloon
9. Confirm adequate tube placement by auscultation of bilateral breath sounds and absence of gurgling over the stomach. Ensure you are hearing ventilation through the tube and not

spontaneous sounds around the tube. As a general rule, the tube should be at 21 cm. at the gum line for adult females and 23 cm. for adult males. Confirm tube placement with an waveform capnography/capnometry or other MCA approved secondary confirmation device. Document all the above confirmation techniques for each oral intubation. Maintain airway monitoring once established. For documentation purposes an oral attempt is defined as: anytime an ET tube passes patient's lips.

MEDICATIONS VIA THE ENDOTRACHEAL TUBE
PARAMEDIC

1. **Medications may not be given via the endotracheal tube unless IV or IO routes of administration are not able to be obtained.**
   a. If IV or IO routes of administration are not able to be obtained, the following medications may be given via the endotracheal tube:
      - Atropine, Epinephrine
      - Adults – Dosages given via this route need to be 2 to 2.5 times that of the IV dosage.
      - Children – Dosages given via this route need to be 2 to 3 times that of the IV dosage. All dosages for pediatric epinephrine administered ET are 1:1000 concentration.

NASOTRACHEAL INTUBATION
SPECIALIST/PARAMEDIC

☑ Included
☐ Not included

Contraindications:

1. Patients without spontaneous respiratory effort.
2. Relative contraindication - known bleeding disorder.
3. Patients that are candidates for CPAP, if available and not already tried.

<u>Pre-Medical Control</u>
Technique for Nasotracheal Intubation:

1. Ventilate patient with 100% oxygen.
2. Gather equipment:
   - nasal pharyngeal airway
   - appropriate size ETT
   - syringe
   - laryngoscope
   - suction
   - BVM
   - device or tape for securing tube after placement
   - waveform capnography/capnometry or other MCA approved secondary confirmation device

3. Liberally lubricate nares and the distal portion of the tube. If available, lidocaine jelly on a nasal pharyngeal airway should be used while preparing the patient equipment for the procedure. Secure the BVM to tube connector to the tube with firm pressure prior to beginning procedure. (Small plastic piece at the top of the ET tube)

4. Insert ET tube into nares with the bevel against the septum.

5. Advance the tube posteriorally, using gentle pressure.

6. If resistance is met, cephalad traction or rotation of the tube may facilitate passage, or alternatively, a smaller tube may be required.

7. Slight flexion of the head or lifting of the jaw (if C-spine is not a concern) may facilitate passage.

8. Listen for air movement through the tube. When sound is the loudest, observe the respiratory pattern of the patient and briskly advance the tube at the beginning of an inspiration.

9. If the tube is not correctly positioned, pull back and repeat the procedure timing to the patient's inspiration.

10. Inflate the balloon when successfully passed the cords.

11. Confirm adequate tube placement by auscultation of bilateral breath sounds and absence of gurgling over the stomach. Ensure you are hearing ventilation through the tube and not spontaneous sounds around the tube. Confirm tube placement with waveform capnography/capnometry or other MCA approved secondary confirmation device. Document all the above confirmation techniques for each nasal intubation. As a general rule, the nasotracheal tube should protrude from the nose no more than 1-2 cm when in the correct position. Maintain assessment of the airway.

12. Document all the above confirmation techniques for each nasal intubation. For documentation purposes a nasal attempt is defined as: anytime an ET tube is passed through a nare and is advanced toward the cords. If a tube is pulled back from the cords and is again advanced forward, it is considered another attempt.

13. Assure that the patient is oxygenated between nasal intubation attempts. If the patient is deteriorating between attempts (decreases in LOC or declining O2 saturations), remove the ET tube from the nare and assist ventilations.

14. Attempts at nasal intubation are limited to two attempts per provider, or if only one provider is licensed to perform the procedure then three total attempts.

15. If unsuccessful, assist the patient with respirations.

16. If a patient becomes unresponsive, two attempts at oral intubation may be attempted per the aforementioned standard. Assure that the patient is adequately ventilated between all attempts.

SUPRAGLOTTIC COMBITUBE AIRWAY
EMT/SPECIALIST/PARAMEDIC

☑ Included
☐ Not included

Indications for Combitube Airway use:

1. Patient is unconscious and apneic.
2. (LALS/ALS) Supraglottic airway may be considered in place of ET attempts, but must be considered if ET attempts are unsuccessful
3. In cardiac arrest patients, the Combitube airway should be considered early in patients whom oral intubation is perceived to be technically difficult.

Contraindications to Combitube Airway use:

1. Patient with an intact gag reflex
2. Patient under 5 feet tall for a regular adult, 4 feet for small adult tube
3. Patients with known esophageal disease (e.g. esophageal varices)
4. Patients with suspected caustic substance ingestion
5. Presence of a tracheostomy

Pre-Medical Control
Technique for Combitube Airway Insertion:

1. (BLS) For cardiac arrest patients, prior to attempting a Combitube airway follow the protocol for General Cardiac Arrest. Also refer to the AED protocol.

2. (BLS) The Combitube airway should be placed when convenient to minimize the interruption of CPR.

3. (BLS/LALS/ALS) Ventilate the patient prior to Combitube insertion (avoid hyperventilation).

4. Gather equipment:
   - Combitube Airway
   - Suction
   - BVM
   - Device for securing the tube after placement

5. Insert the thumb of a gloved hand into the patient's mouth, grasping the tongue and lower jaw between the thumb and index finger and lift upward.

6. With the other hand, hold the Combitube airway with the curve in the same direction as the curve of the pharynx. Insert the tip into the mouth and advance carefully behind the teeth to the appropriate depth for the device. CAUTION: Do not force the Combitube airway. If it does not advance easily, re-direct it or withdraw it and re-insert.

7. If the Combitube airway is not successfully placed within 30 seconds, remove it and ventilate the patient for 30 seconds using basic methods before re-attempting insertion.

8. Inflate the cuffs of the Combitube airway according to the manufacturer's recommendations.

9. Ventilation and Combitube placement confirmation:

    - Begin ventilation through the longer (distal) tube, marked #1. Watch for chest rise. If auscultation of breath sounds are positive and auscultation of gastric air sounds is negative, continue ventilation.
    - If no chest rise, negative lung sounds, and/or positive gastric air sounds with ventilation through the distal tube, begin ventilation through the shorter (proximal) #2 tube. Confirm ventilation with chest rise, presence of auscultated lung sounds, and absence of gastric air sounds.
    - If there is no chest rise or positive lung sounds through either tube, remove the device, ventilate the patient for 30 seconds, and repeat the insertion/inflation/ventilation procedures.
    - Continue to ventilate the patient through the tube which resulted in lung sounds using a BVM.
    - ALS – Confirm combitube placement with waveform capnography/capnometry or other MCA approved secondary confirmation device. Maintain CO2 monitoring once established.

10. If two consecutive attempts at Combitube airway placement fail to result in a proper placement and ventilation, do not attempt placement again. Ventilate the patient using basic methods and equipment.

SUPRAGLOTTIC <u>KING AIRWAY</u>
EMT/SPECIALIST/PARAMEDIC

☑ Included

☐ Not included

Indication for King Supraglottic Airway

1. An alternative to endotracheal intubation for airway management in patients 35 inches tall or greater to secure a patent airway and deliver ventilations.

Contraindications for King Supraglottic Airway

1. Responsive patients with an intact gag reflex.
2. Patients with known esophageal disease.
3. Any patients that have ingested caustic substances.
4. Patients who are less than 35 inches tall or less than 12 kg.

<u>Pre-Medical Control</u>

Technique for King Supraglottic Airway Placement

1. Assemble airway equipment while continuing ventilations.
    a. Choose the correct tube size based on the patient's height.
        - 35 – 45 inches (12 – 25 kg) = size 2
        - 41 – 51 inches (25 – 35 kg) = size 2.5
        - 4 to 5 feet tall = size 3
        - 5 to 6 feet tall = size 4
        - Greater than 6 feet tall = size 5

2. Apply chin lift and introduce the King airway in to the corner of the mouth.
3. Advance tip under the base of the tongue while rotating the tube back to midline.

4. Without excessive force, advance the tube until the base of the connector is aligned with the patient's teeth or gums.
5. Inflate cuff based on tube size.
   A. Size 2 = 25 – 35 ml
   B. Size 2.5 = 30 – 40 ml
   C. Size 3 = 50 ml
   D. Size 4 = 70 ml
   E. Size 5 = 80 ml

6. Attach the BVM. While gently bagging slowly withdraw the tube until ventilation is easy to administer a large tidal volume with minimal airway pressure.
7. Adjust cuff inflation, if necessary, to obtain an airway seal at peak ventilation pressure.
8. Assess for proper tube placement.
   A. Assess breath sounds.
   B. Assure chest rise and fall
   C. **(ALS)** Confirm combitube placement with waveform capnography/capnometry or other MCA approved secondary confirmation device. Maintain continuous CO2 monitoring once established.
   D. Continue to reassess that tube is properly placed and that patient ventilation is easy and free flowing with chest rise and adequate breath sounds.
   E. If at anytime the provider is unsure of proper placement – deflate cuff, remove and use BVM for ventilation.

CRICOTHYROTOMY PARAMEDIC

Surgical	**Needle**
☑ Included	☑ Included
☐ Not included	☐ Not included

The cricothyroid membrane is located subcutaneously between the thyroid cartilage ("Adam's apple") and cricoid cartilage. There are two methods for performing a cricothyrotomy - the surgical approach and needle cricothyrotomy. The surgical technique uses a scalpel blade to create an opening in the cricothyroid membrane through which an endotracheal tube is inserted. The needle technique uses an angiocath inserted percutaneously.

Patients less than age 8 may have a needle cricothyrotomy performed; age 8 or greater may undergo either a needle or a surgical cricothyrotomy, as approved by local medical control.

Indications for Cricothyrotomy:
1. Total airway obstruction not relieved by other methods.
2. Airway compromise from injuries that make oral or nasal intubation impractical.
3. Inability to ventilate and inability to intubate.

<u>Pre-Medical Control</u>
Technique for Surgical Cricothyrotomy:
1. Gather necessary equipment in addition to that needed for oral intubation
   - antiseptic solution
   - scalpel
   - if a cricothyrotomy kit or device requires the skin to first be cut with a scalpel, it is considered to be a surgical cricothyrotomy device

2. Identify cricothyroid membrane

3. Prep the site with antiseptic solution

4. While stabilizing the larynx with one hand, use the opposite hand to make a 3-4 cm. **vertical incision** through the skin in the midline over the cricoid membrane.

5. After identification of the cricoid membrane, use the scalpel to make approximately a 1cm. **horizontal incision** through the lower portion of the membrane.

6. Enlarge the hole and place the ET tube into the airway, and inflate the balloon.

7. Verify correct placement using usual techniques, including waveform capnography/capnometry or other MCA approved secondary confirmation device. Maintain continuous CO2 monitoring once established.

Pre-Medical Control
PARAMEDIC
Technique for Needle Cricothyrotomy:

1. Gather necessary equipment:
   - antiseptic solution
   - BVM or jet insufflation valve-type device
   - Needle (14 gauge)

2. Identify cricothyroid membrane.

3. Prep the site with antiseptic solution.

4. Connect the angiocath to a syringe.

5. Stabilize the larynx and identify the cricothyroid membrane.

6. Direct the angiocath posteriorally and toward the torso at an angle of less than 45 degrees to the skin.

7. Insert the angiocath through the skin, maintaining negative pressure on the syringe. Entry of air and loss of resistance signifies entry into the larynx.

8. Advance the cannula into the larynx and remove the angiocath.

9. Caution must be used to ensure the catheter does not bend.

10. The patient may be ventilated using a commercially available pressure device, or via a BVM connected to the adapter top of a number 3 endotracheal tube.

11. Deliver 100% O_2 at 20 bursts/minute with Inspiratory/Expiratory (I:E) of 1:2.

NOTES: BVM use through an angiocath may deliver insufficient quantities of oxygen. Air may be forced out through the nose and mouth in addition to the lungs and may also blow secretions out of the patient's nose and mouth.