Emergency Airway

Effective airway management and ventilation are important lifesaving interventions that all EMS providers must be able to perform. The approach to airway management should generally proceed in a stepwise fashion, from basic to advanced, since basic maneuvers can sustain life until an advanced airway can be established. However, providers should use clinical judgment in determining which interventions are most appropriate for a particular patient.

Indications for Airway Management and Ventilation

1. Airway Management
   A. Airway obstruction
   B. Need for positive pressure ventilation (see below)
   C. Airway protection, such as an unconscious patient without a gag reflex.
   D. Trauma patient with a Glasgow Coma Score of 8 or less.
2. Positive Pressure Ventilation
   A. Respiratory or cardiac arrest (including agonal respirations)
   B. Respiratory failure (inadequate respiratory rate/volume)

Contraindications for Airway Management and Ventilation

1. Nasopharyngeal airway insertion and nasotracheal intubation are contraindicated in mid-face trauma.
2. Presence of a gag reflex may be a contraindication to some specific airway interventions.
3. Specific supraglottic airways may have contraindicated due to caustic ingestion or known esophageal varicies.

<u>Pre-Medical Control</u>
MFR/EMT/SPECIALIST/PARAMEDIC

1. In cases of foreign body airway obstruction, refer to **Foreign Body Airway Obstruction** section. When the airway is not self-maintained, open the airway using basic maneuvers (chin lift or jaw thrust). Patients with a potential cervical spine injury should have a modified jaw thrust performed attempting to minimize neck flexion and extension.
2. Perform oral pharyngeal suctioning as needed to remove body fluids and minimize risk of aspiration. When possible suctioning should be limited to no more than 15 seconds and should not extend beyond the pharynx.
3. In unconscious patients without a gag reflex, insert a properly sized oropharyngeal airway. Immediately remove upon return of gag reflex.
4. In unconscious patients with gag reflex, consider insertion of a properly sized nasopharyngeal airway, using water-soluble lubrication when available.
5. In patients requiring bag-valve-mask ventilations, consider inserting both oro- and nasopharyngeal airways to optimize ventilations.
6. In patients with respiratory arrest or significant respiratory depression (e.g., adult patient with respiratory rate less than 8) perform bag-valve-mask (BVM) ventilations. Note: BVM ventilations should be performed by 2 rescuers whenever possible. Use supplemental oxygen and reservoir system and avoid high-impulse ventilations.

7. Ventilate at appropriate rate. AVOID HYPERVENTILATION! Generally appropriate rates for ventilation are:
   A. Adults >8 y/o 8-12 breaths / minute
   B. Children 1-8 y/o 20 breaths / minute
   C. Infants < 1 y/o 25 breaths / minute
8. A pocket mask or face shield is an acceptable alternative for single rescuer ventilations.
9. When caring for patients with stomas, use pediatric masks to achieve seal.
10. For patients with a tracheostomy tube and home ventilator connect BVM (without mask) directly to tracheostomy tube and ventilate at appropriate rates.

EMT/SPECIALIST/PARAMEDIC

11. Providers may consider continuing basic airway management techniques if airway is able to maintained adequately in the adult patient.
12. Providers must continue basic airway management, unless the airway is unable to be adequately maintained, in the pediatric patient (8 or under).
13. MCA-approved supraglottic airways (e.g., Combitube, King Laryngeal Tracheal Tube) may be used to secure the airways in unconscious patients that do not have a gag reflex.
14. In cardiac arrest patients, supraglottic airways are considered equivalent to endotracheal intubation and are appropriate as a first-line advanced airway and should be used early when endotracheal intubation cannot be readily performed without interrupting chest compressions. Use of supraglottic airways in cardiac arrest patients may allow for earlier transition to continuous chest compressions.
15. Each MCA must select at least one state-authorized supraglottic airway for use in their system.
16. Supraglottic airways should be placed in accordance with manufacturer's instructions for use (see appropriate procedure) and must be confirmed by auscultation for absence of gastric sounds and presence of bilateral lung sounds and by positive end-tidal CO2 levels by waveform capnography (preferred) or by use of colorimetric qualitative end-tidal CO2 detectors. Additional clinical findings consistent with a properly placed airway include chest expansion, improvement in patient's color, and improvement in pulse oximetry (when available).
17. Supraglottic airway placement should be re-confirmed at frequent intervals throughout the care of the patient, particularly after each patient movement.
18. CPAP (when available) should be considered for patients with severe respiratory distress that do not improve with supplemental oxygen administration in accordance with the **CPAP/BiPAP Administration Procedure.**

PARAMEDIC

19. Orotracheal intubation under direct laryngoscopy may be performed in adult patients who are unable to protect their own airway (e.g., no gag reflex), require sustained positive pressure ventilation, and/or are in cardiac arrest.
20. Orotracheal intubation under direct laryngoscopy may be performed in pediatric patients (< 8 years old) who are unable to protect their own airway (e.g., no gag reflex), require sustained positive pressure ventilation, and/or are in cardiac arrest ONLY when basic airway management techniques (e.g., 2-person mask ventilation with oropharyngeal airway) are

ineffective.

21. When approved by local MCA, nasotracheal intubation may be performed for spontaneously breathing patients in severe respiratory distress who have a patent gag reflex. Caution should be used as this technique is difficult to perform and has a high failure rate. See optional **Nasotracheal Intubation** section**.**
22. Deep tracheal suctioning may be performed when indicated using sterile technique and suctioning only during withdrawal of catheter.
    A. Maximum suction time:
        a. Adults (>8 years old): maximum 10 seconds
        b. Children (1 to 8 years old): maximum 10 seconds
        c. Infants (< 1 year old) maximum 5 seconds

23. When approved by local MCA, needle and/or surgical cricothyroidotomy may be performed where massive facial trauma precludes the possibility of successful intubation, in cases of complete airway obstruction that cannot be corrected, in situations when other basic and advanced airway management techniques are unsuccessful in achieving effective ventilation and/or oxygenation.
24. Endotracheal (ET) medications <u>may not be given via the endotracheal tube unless IV or IO routes of administration cannot be obtained.</u>
    A. If IV or IO access is not available, the following medications may be given via the endotracheal tube:
        a. Atropine, Epinephrine, Naloxone, Lidocaine
        b. Adults – ET doses should be 2 to 2.5 times that of the IV dosage. Children – ET doses should be 2 to 3 times that of the IV dosage. All dosages for pediatric epinephrine administered ET are 1:1000 concentration.
25. Use of sedation to facilitate advanced airway placement is <u>contraindicated</u>. Sedation for tube tolerance following successful tube placement is indicated in accordance with the **Patient Sedation Procedure**.

FOREIGN BODY AIRWAY OBSTRUCTION

This procedure is intended for situations in which a severe foreign body airway obstruction (FBAO) has occurred. EMS personnel must be able to rapidly initiate treatment in such cases. Note: Sudden cardiac arrest that occurs while a person is eating is frequently dispatched as "choking". EMS personnel should consider these cases to be potential cardiac arrests.

Indications for Obstructed Airway Procedures

Attempt to relieve the obstruction only if signs of severe obstruction develop:

1. Patient is unable to speak;
2. Patient's cough becomes silent;
3. Patient's respiratory difficulty increases and is accompanied by stridor;
4. Patient suspected of airway obstruction becomes unresponsive;
5. Patient is unresponsive, not breathing, and is unable to be ventilated using the 2-person bag-valve-mask ventilation technique with oropharyngeal airway.

Note: Conscious patients who are able to speak and have a forceful cough should be encouraged to continue coughing and do not require interventions unless the above occur.

MFR/EMT/SPECIALIST/PARAMEDIC

1. In conscious (responsive) adults and children ≥1 year of age, deliver abdominal thrusts in rapid sequence until the obstruction is relieved.
2. Administer chest thrusts in conscious patients in place of abdominal thrusts when:
   A. Abdominal thrusts are ineffective (optional consideration)
   B. Patient is obese and rescuer is unable to encircle the patient's abdomen
   C. Patient is in the later stages of pregnancy (e.g., greater than 20 weeks)
   D. Patient is under 1 year of age
3. If the adult patient becomes unresponsive or is found unresponsive and is unable to be ventilated using the 2-person bag-valve-mask technique with oropharyngeal airway:
   A. Begin immediate CPR in accordance with current American Heart Association Guidelines regardless of presence of pulse.
   B. With each set of ventilations, visually inspect the mouth for evidence of foreign body and remove if present.
   C. Bag-valve-mask ventilations should be performed using the two-rescuer technique with an oropharyngeal airway and special attention to maintain an effective mask seal.
   D. Continue CPR, alternating 30 compressions with two attempted ventilations.
4. For conscious infants (under 1 year old) with evidence of severe FBAO deliver repeated cycles of 5 back blows (slaps) followed by 5 chest compressions until the object is expelled or the patient becomes unresponsive. Note: Abdominal thrusts are not recommended for infants because they may damage the infant's relatively large and unprotected liver.
5. If the patient becomes unresponsive or is found unresponsive and is unable to be ventilated using the 2-person bag-valve-mask technique with oropharyngeal airway:
   A. Start CPR with chest compressions (do not perform a pulse check).
   B. After 30 chest compressions, open the airway and visually inspect the mouth for a foreign body, remove it but do not perform blind finger sweeps as this may

push obstructing objects farther into the pharynx and may damage the oropharynx.

C. Attempt to give 2 breaths and continue with cycles of chest compressions and ventilations until the object is expelled.

PARAMEDIC

6. Begin or continue basic FBAO treatment as described above.
7. For unconscious patients, while chest compressions are being provided, perform direct laryngoscopy. If foreign body is visible, remove using adult or pediatric Magill forceps.
8. If unsuccessful in visualizing foreign body, consider brief trial of abdominal thrusts while performing direct laryngoscopy.
9. Once FB is removed, perform endotracheal intubation if able to be readily accomplished or place supraglottic airway and begin ventilations.

PARAMEDIC
Oral Endotracheal Intubation Procedure
The table below is the required elements for every patient care record in which endotracheal intubation is attempted.

Documentation Points

✓ Size of ET tube	✓ Visualization of vocal cords
✓ Number of attempts	✓ Suction required
✓ ET Tube measurement (cm) at teeth	✓ Chest rise with ventilation
✓ Ventilation compliance	✓ Bulb syringe check documented if used
✓ Capnography used	✓ ETCO2/Capnography reading
✓ Equality of lung sounds	✓ Absence of epigastric sounds
✓ Method for securing ET tube	✓ Any complications with intubation procedure

Technique for Oral Endotracheal Intubation:

1. Ventilate the patient with 100% oxygen using BVM and 2-person technique.
2. Gather equipment:
   A. appropriate size ETT with stylet
   B. syringe
   C. laryngoscope with blades
   D. suction
   E. bag-valve-mask (BVM)
   F. commercial device for securing tube after placement
   G. waveform capnography (preferred) or colorimetric capnometry for confirmation
   H. pulse oximeter, if available
3. If no suspicion of cervical spine injury, position patient with head elevated and extended.
4. If cervical spine injury suspected, have 2nd person stabilize head and neck in neutral position.
5. Perform direct laryngoscopy.
   A. If using a curved blade, place the tip anterior to the epiglottis into the vallecula.
   B. If using a straight blade, directly lift the epiglottis with the tip of the blade.
   C. For infants and children less than 4-6 years old, a straight blade is recommended.
   D. For commercial video laryngoscopy systems (approved by MCA), follow manufacturer's instructions for use regarding placement.
6. In the adult patient the ET tube should be advanced through the cords until the proximal portion of the balloon is passed 2 to 3 cm beyond the vocal cords. Unless otherwise contradicted by auscultation, the tube should be 21 cm at the incisors (or corner of the mouth) in females and 23 cm in males.
7. In pediatric patients, the ET tube should be advanced to the depth recommended based on patient's weight. In general the ET tube should be advanced to a depth that is approximately 3 times the size of the ET tube (e.g., a 4.0 tube should be advanced to ~12 cm).
8. In general, attempts should be limited to less than 30 seconds each.
9. No more than two attempts should be may be made prior to considering a supraglottic airway and/or continuing with basic airway management techniques.

10. In cardiac arrest patients, limit interruptions of compressions to no more than 10 seconds.
11. If using a cuffed tube, inflate the balloon.
12. Confirm tube placement by absence of gastric sounds and by presence of bilateral breath sounds and with waveform capnography (preferred) or colorimetric capnometry.
13. Document the procedure including all the above confirmation techniques for each oral intubation attempt. Maintain airway monitoring once established. For documentation purposes an oral attempt is defined as anytime an ET tube passes patient's lips.
14. Airway placement should be re-confirmed at frequent intervals throughout the care of the patient, particularly after each patient movement.

PARAMEDIC
Nasotracheal (NT) Intubation – Optional MCA Approved Intervention

☐ **MCA Included** ☐ **MCA Not Included**

The table below is the required elements for every patient care record in which endotracheal intubation is attempted.

Documentation Points

✓ Size of ET tube	✓ Specific indication(s) for NT intubation
✓ Number of attempts	✓ Suction required
✓ ET Tube measurement (cm) at nare	✓ Chest rise with ventilation
✓ Ventilation compliance	✓ Color-metric Endtidal CO_2
✓ Capnography used	✓ ETCO2/Capnography reading
✓ Equality of lung sounds	✓ Absence of epigastric sounds
✓ Method for securing ET tube	✓ Any complications with intubation procedure

Indication: Spontaneously breathing adult patient with a gag reflex in need of advanced airway.

Contraindications:
1. Patients without spontaneous respiratory effort.
2. Patients with mid-face and nasal trauma.
3. Relative contraindication - known bleeding disorder.
4. Patients that are candidates for CPAP, if available, and not already attempted.

Technique for Nasotracheal Intubation:
1. Ventilate patient with 100% oxygen.
2. Gather equipment: Same as for orotracheal intubation except:
   A. Stylet is not used
   B. Water soluble lubricant needed, preferably lidocaine jelly
3. Liberally lubricate nares and the distal portion of the tube. If available, lidocaine jelly on a nasal pharyngeal airway should be used.
4. Secure the tube connector to the tube with firm pressure prior to beginning procedure.
5. Insert ET tube into nares with the bevel against the septum.
6. Advance the tube posteriorly with gentle pressure. If resistance is encountered may attempt gentle back and forth rotation of tube while advancing.
7. As tube is advanced into nasopharynx, listen for airflow through the ET tube. Advance the tube until airflow appears loudest. If using tip-controlled ET tube, direct tube tip anteriorly.
8. In synch with inhalation rapidly advance tube until airflow is clearly heard through tube.
9. Advance tube until the adapter is approximately 1 cm from nares.
10. Inflate balloon, attach ventilation device, and confirm as for orotracheal intubation. Right main stem intubation is uncommon. If chest rise is limited to right side, carefully withdraw tube (with balloon deflated) until breath sounds become equal.
11. Secure tube and reassess tube placement at frequent intervals.

EMT/SPECIALIST/PARAMEDIC
Combitube Supraglottic Airway – Optional MCA Approved Intervention

☐ **MCA Included** ☐ **MCA Not Included**

The table below is the required documentation elements for every patient care record in which a Combitube insertion is attempted.

Documentation Points

✓ Size of Combitube Airway	✓ Time of attempt(s)
✓ Number of attempts	✓ Suctioning required
✓ Ventilation compliance	✓ Chest rise with ventilation
✓ Capnography used	✓ ETCO2/Capnography reading
✓ Equality of lung sounds	✓ Any complications with procedure
✓ Absence of epigastric sounds	✓ Which tube is used for ventilation

Indications:
For use in unconscious patients with absent gag reflex, who require assisted ventilation. May be used as a rescue device for failed endotracheal intubation or as a primary advanced airway technique.
May be preferred over ET intubation in cardiac arrest patients to minimize interruptions in chest compressions.

Contraindications:
1. Patient with an intact gag reflex
2. Patient under 5 feet tall for a regular adult, 4 feet for Combitube SA
3. Patients in whom esophageal disease is suspected
4. Patients in whom caustic substance ingestion is suspected.
5. Presence of a tracheostomy

Equipment:
1. Combitube is available in 2 sizes, 41F and 37F (SA)
2. Combitube SA is preferred in most patients between 4 and 6 feet tall.
3. Support equipment: Bag-valve-mask, suction, capnography, securing device
4. Use appropriate size and inflation volumes for patient based on table below.

Combitube Size and Inflation Volume Tab

Airway Type	Patient Height	Proximal Balloon #1 Inflation Volume	Distal Balloon #2 Inflation Volume
Combitube 41F	> 5 Feet	50-75 cc initially (100 cc maximum)	15 cc
Combitube SA 37F	> 4 Feet	50-75 cc initially (85 cc maximum)	12 cc
Note: In most patients under 6 feet the Combitube SA (37F) is preferred.			

Procedure for Combitube Airway Insertion

1. Provide bag-valve-mask ventilation using 2-person technique with an oropharyngeal airway, avoiding hyperventilation, and performing pharyngeal suctioning as needed.
2. Test cuff inflation system by injecting the maximum inflation volume listed in table above for the size of the tube.
3. Deflate cuffs completely before insertion, leaving syringe attached to connector.
4. Lubricate tip of Combitube with water soluble medical lubricant.
5. Position patient with head/neck in a neutral position (or slightly flexed if no suspected spinal injury).
6. With gloved hand, lift mandible (jaw) forward.
   A. Alternatively, may use a curved laryngoscope blade to establish path for insertion (S,P)
   B. Insert Combitube into mouth following the same curvature as the pharynx.
7. Gently advance Combitube (along midline) deep into the pharynx until the patient's teeth (gums) lie between the two circular ring markings on the outer end of the airway.
   A. If resistance is felt while advancing, assure the mandible is fully displaced forward.
   B. Do not forcibly advance the airway against resistance.
   C. If resistance continues to be felt, withdraw the Combitube and reinsert.
8. Without holding the Combitube, inflate the Blue Port #1 (proximal pharyngeal balloon) with 50-75 cc of air using the large syringe. Combitube may be slightly displaced outward.
9. Inflate the White Port #2 (distal esophageal balloon) with 12 cc of air (Combitube SA 37 F) or 15 cc of air (Combitube 41 F) using the small syringe.
10. Attach the bag-valve ventilator to the Blue Tube (#1) and begin ventilations while assessing for placement.
    A. Assess for chest rise, listen for absence of gastric (stomach sounds), then listen for bilateral breath sounds. Measure end tidal CO2 as early as possible.
    B. If chest rises, no gastric sounds and bilateral breath sounds are present and CO2 detected, continue ventilating through Blue Tube #1. Tube should be in esophagus.
    C. If chest does not rise and if gastric sounds are present when ventilating through Blue Tube #1, immediately switch to Clear Tube #2. If chest rises, no gastric sounds and bilateral breath sounds are present and CO2 detected, continue ventilations through Clear Tube #2. Tube should be in trachea.

    D. If ventilation through either tube does not produce chest rise, absent gastric sounds, bilateral breath sounds and detection of CO2, then immediately fully deflate both balloons and remove Combitube, reinsert oropharyngeal airway and resume 2-person bag-valve mask ventilations prior to re-attempting procedure.
11. If ventilations are successful through Blue Tube #1 but an air leak is detected at the mouth, place additional air into Blue Port #1 in 10 cc increments while ventilating (85 cc maximum for 37 F or 100 cc maximum for 41 F) until air leak resolves.
12. If ventilating successfully through Blue Tube #1 and gastric distension is present, insert suction catheter (provided) through Clear Tube #2, attach suction and decompress stomach.
13. The large pharyngeal balloon generally is sufficient to keep the Combitube in place during

pre-hospital care. Additionally securing the Combitube with tape or similar means is recommended when extensive patient movement is likely to occur (e.g., during extrication).

14. Constant monitoring of the patency of the airway must be done throughout the care of the patient. End tidal CO2 monitoring, evaluating chest rise and re-auscultation of gastric and breath sounds should be performed at frequent intervals.
15. Both the pharyngeal and esophageal balloons are at risk for being punctured during insertion from sharp teeth. If either balloon is punctured the airway will not work effectively and must be removed. This can be detected by the pilot cuffs being unable to maintain air.
16. Combitube should be removed if patient becomes develops a gag reflex. Alternatively, paramedics may sedate as needed for tube tolerance per **Sedation Procedure**.

EMT/SPECIALIST/PARAMEDIC
King LTS/D™ Supraglottic Airway – Optional MCA Approved Intervention

☐ **MCA Included** ☐ **MCA Not Included**

The table below is the required documentation elements for every patient care record in which a King LTS/D insertion is attempted.

Documentation Points

✓ Size of King Airway used	✓ Time of attempt(s)
✓ Number of attempts	✓ Suctioning required before placement
✓ Ventilation compliance	✓ Chest rise with ventilation
✓ Capnography used	✓ $ETCO_2$/Capnography reading
✓ Equality of lung sounds	✓ Absence of epigastric sounds
✓ Method for securing King Airway	✓ Any complications with procedure
✓ Gastric decompression performed	

Indications:

For use in unconscious patients without gag reflex, who require ventilation. May be used as a rescue device for failed endotracheal intubation or as a primary advanced airway technique. Consider in cardiac arrest patients to minimize interruptions in compressions.

Contraindications:

1. Responsive patients with a gag reflex
2. Patients who are under 35 inches tall (#2 KLTD) or 4 feet (#3 KLTD/S)
3. Patients in whom esophageal disease is suspected
4. Patients in whom caustic substance ingestion is suspected.

Equipment:

1. King LTD: Disposable King Airway that does not have gastric access.
2. King LTDS: Disposable King Airway that provides gastric access to allow for gastric decompression using an 18F gastric tube (preferred for adults).
3. Supplies: Water-soluble lubricant, bag-valve-mask, capnography, securing device.
4. Use appropriate size and inflation volumes for patient based on table below.

King Airway Size and Inflation Volume Table

Size	Airway Type	Patient Height	Connector Color	Inflation Volumes
2	KLTD	35-45 Inches	Green	25-35 cc
2.5	KLTD	40-51 Inches	Orange	30-40 cc
3	KLTD	4-5 Feet	Yellow	45-60 cc
	KLTDS			40-55 cc
4	KLTD	5-6 Feet	Red	60-80 cc
	KLTDS			50-70 cc
5	KLTD	>6 Feet	Purple	70-90 cc
	KLTDS			60-80 cc
(King Airway Instructions for Use, King Systems, Noblesville, IN)				

King LTS/D Procedure:

1. Provide bag-valve-mask ventilation using 2-person technique with an oropharyngeal airway, avoiding hyperventilation, and performing pharyngeal suctioning as needed.
2. Test cuff inflation system by injecting the maximum inflation volume listed in table above for the size of the tube.
3. Deflate cuffs completely before insertion, leaving syringe attached to connector.
4. Lubricate the beveled distal tip and posterior aspect of the tube avoiding introduction of lubricant in or near the ventilatory openings.
5. Position the patient's head (ideal position is the sniffing position but the neutral position can be used).
6. Holding the King at the connector, hold the patient's mouth open and apply chin lift unless contraindicated due to trauma and/or spinal immobilization,
7. With the King rotated laterally 45-90 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 force the tube into position.
8. As the tip passes under tongue rotate tube back to midline (blue orientation line
9. faces chin).
10. Without exerting excessive force, advance the King until base of connector aligns with teeth or gums.
11. Inflate the cuff based on the listed volumes for the tube size used.

12. Attempt ventilation. If resistance is met and/or no chest rise occurs, carefully withdraw the airway approximately 1 cm at a time while attempting to ventilate. When airway is in supraglottic position, patient should easily ventilate and chest should rise and fall.
13. Attach bag, valve device and verify placement by <u>ALL</u> of the following criteria:
    - ✓ Rise and fall of chest
    - ✓ Bilateral breath sounds
    - ✓ Absent epigastric sounds
    - ✓ CO2 measurement (capnography)
14. Secure the airway, preferably with a commercial tube holding device appropriate for the King Airway.
15. If there is any question about the proper placement of the King Airway, deflate the cuffs and remove the airway, Ventilate the patient with BVM for 30 seconds and repeat insertion procedure or consider other airway management options.
16. Continue to monitor the patient for proper airway placement throughout prehospital treatment and transport.
17. Following successful placement, consider gastric decompression using a lubricated 18F gastric tube.
18. King Airway should be removed if patient becomes develops a gag reflex. Alternatively, paramedics may sedate as needed for tube tolerance per **Sedation Procedure**.

PARAMEDIC
Cricothyrotomy

☐ Cricothyrotomy MCA Not Included
☐ Surgical Cricothyrotomy-MCA Included
☐ Needle Cricothyrotomy-MCA Included
☐ Commercial Percutaneous Cricothyrotomy – MCA Approved
Approved Device(s) :_____

NOTE: If MCA selects Commercial Percutaneous Cricothyrotomy; training program must be submitted with this protocol.

The table below is the required documentation elements for every patient care record in which a cricothyrotomy is attempted.

Documentation Points

✓ Type of cricothyrotomy attempted	✓ Indication for cricothyrotomy
✓ Number of attempts	✓ Time of attempt(s)
✓ Ventilation compliance	✓ Previous advanced airway attempt(s)
✓ ETCO2/Capnography reading	✓ Chest rise with ventilation
✓ Equality of lung sounds	✓ Post-cricothyrotomy pulse oximetry
✓ Any complications with procedure	✓

The cricothyroid membrane is located subcutaneously between the thyroid cartilage ("Adam's apple") and cricoid cartilage. There are three methods for performing a cricothyrotomy: surgical cricothyrotomy, needle cricothyrotomy, and percutaneous cricothyrotomy using a state and local MCA-authorized commercial kit. 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 a large bore ($\geq$ 14 ga) IV catheter inserted percutaneously and requires a commercial transtracheal jet insufflation device for optimal use. The percutaneous cricothyrotomy uses a commercial kit to perform the cricothyrotomy.

Patients less than age 8 may have a needle cricothyrotomy performed or approved pediatric percutaneous kit. Patient's age 8 or greater may undergo a needle, surgical, or commercial percutaneous 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 intubate or effectively manage with basic techniques or supraglottic airway.

<u>Pre-Medical Control</u>

Technique for Surgical Cricothyrotomy:

1. Gather necessary equipment in addition to that needed for oral intubation
   A. antiseptic solution
   B. scalpel
   C. tracheal hook (recommended)

   D. gum elastic bougie (recommended)
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 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 a ~1 cm **horizontal incision** through the lower portion of the membrane.
6. Enlarge the hole and advance the ET tube into the airway, and inflate the balloon.
   A. Care should be taken to assure tube is inserted into the trachea and not a false passage.
   B. When available, use a tracheal hook to displace the inferior aspect of the membrane anteriorly so as to facilitate tube placement.
   C. When available, insert a gum elastic bougie through the incised membrane and advance until resistance is felt at the level of the carina. Then advance the ET tube over the bougie (recommended technique)
7. Verify correct placement using usual techniques, including end tidal CO2 detection.
8. Maintain continuous CO2 monitoring once established.
9. Apply dressing to area.

Pre-Medical Control

Technique for Needle Cricothyrotomy:

1. Gather necessary equipment:
   A. antiseptic solution
   B. transtracheal jet insufflation device (preferred)
   C. alternatively use an improvised ventilation system using a 3 mm ET tube adapter connected directly to the catheter Luer lock and to bag-valve device. This system provides only temporary limited oxygenation.
   D. IV catheter ($\geq$ 14 gauge) and syringe (5-10 cc). Do not use needle safety catheters that do not allow for connection of syringe.
2. Identify cricothyroid membrane.
3. Prep the site with antiseptic solution.
4. Connect the IV catheter to a syringe.
5. Stabilize the larynx and re-identify the cricothyroid membrane.
6. Direct the IV catheter posteriorly and inferiorly at an angle of ~45 degrees to the skin.
7. Insert the IV catheter through the skin, maintaining negative pressure on the syringe. Entry of air and loss of resistance signifies entry into the larynx.
8. Advance the catheter into the larynx and retract the needle.
9. Caution must be used to ensure the catheter does not bend.
10. Ventilate using a commercial transtracheal jet insufflation device (preferred).
11. Alternatively, ventilate by connecting Luer lock end of catheter to 3 mm ET tube adapter and then attach to bag-valve system. This system does not allow for effective ventilation but may provide temporary oxygenation until definitive airway can be established.
12. Deliver 100% O_2 at 20 bursts/minute with Inspiratory/Expiratory (I:E) of 1:2.

Pre-Medical Control

Technique for Percutaneous Cricothyrotomy Using Approved Commercial Kit:

1. Prepare necessary equipment.
2. Note: Only state and local MCA approved commercial percutaneous cricothyrotomy kits may be used.
3. Follow Instructions for Use provided by device manufacture.