

AIRWAY MANAGEMENT GENERAL GUIDELINES

PARAMETERS

An adequate patent airway is the **HIGHEST PRIORITY WITH EVERY PATIENT**. All EMTs must be skilled and practiced in all approved airway management techniques at their level, and use careful judgment in the selection of a technique.

FIRST RESPONDER and BASIC PROCEDURES

1. Approved airway maneuvers
 - a. Jaw thrust and chin lift
 - b. Visual inspection, auscultation, and feeling for air exchange
 - c. Oropharyngeal suction
 - d. Nasopharyngeal trumpet
 - e. Oropharyngeal airway
 - f. Multi-lumen airway (Combitube, PTL) (**Except First Responder**)
 - g. Laryngeal airway device (LMA, COBRA, etc.)
 - h. Cricoid Pressure (Sellick Manuever)
2. Carefully and repeatedly assess the patency and adequacy of a patient's airway.
3. Document the method used to maintain the airway on the EMS report.
4. Traumatic airway management
 - a. Manually stabilize the cervical spine prior to airway maneuvers.
 - b. Protection of the cervical spine and recognition of possible mid-face trauma are of major concern but do not preclude the use of any airway adjunct when indicated in critical patients.

INTERMEDIATE PROCEDURES

5. Approved airway maneuvers
 - a. Same as Basic Procedures

PARAMEDIC PROCEDURES

6. Approved airway maneuvers
 - a. Endotracheal intubation
 - b. Nasotracheal intubation
 - c. Surgical cricothyrotomy

AIRWAY MANAGEMENT / SUCTIONING - OROPHARYNGEAL

LEVEL OF AUTHORIZATION

First Responder, Basic, Intermediate and Paramedic

RATIONALE

The use of suction with appropriate devices clears fluid and debris, thus preventing airway compromise.

DESIRED EFFECT

Properly performed, suctioning should remove all visible secretions and debris without causing trauma to the oral cavity. Suctioning should prevent aspiration of foreign materials into the lungs during inspiration or ventilatory attempts.

INDICATIONS

The patient is unable to eliminate accumulated secretions or debris without assistance.

CONTRAINDICATIONS

None

PROCEDURE

1. Consider placing patient in the recovery position (on their side) to allow for drainage if spinal precautions are not a consideration.
2. Select a suction catheter (Yankauer, Whistle-tip, rigid, etc.) that will work best in removing the substance accumulated.
3. Use universal precautions (eye protection, mask, gloves, etc.).
4. Insert the suction catheter no deeper than the rescuer can visualize.
5. Apply suction while removing catheter.
6. Continue suctioning until the substance is removed and the airway is clear.
7. Repeat as necessary.
8. Maintain ventilatory support with supplemental oxygen.

(Continued next page)

AIRWAY MANAGEMENT / SUCTIONING - OROPHARYNGEAL (cont.)**SPECIAL CONSIDERATION**

1. Suctioning can stimulate the vagus nerve causing bradycardia and hypotension.
2. ***Lengthy suctioning attempts can lead to hypoxia***, which can cause serious cardiac dysrhythmias due to decreases in myocardial oxygen supply.
3. Suction may stimulate coughing which may increase intracranial pressure.
4. Maintaining suction while removing the catheter will prevent suctioned fluids and debris from dropping back into the mouth.
5. Attempting to ventilate the patient before the airway is clear may lead to aspiration.

AIRWAY MANAGEMENT / SUCTIONING - ENDOTRACHEAL

LEVEL OF AUTHORIZATION

Paramedic

RATIONALE

The use of endotracheal suction, with appropriate devices, clears pulmonary secretions and debris, preventing or alleviating airway compromise.

DESIRED EFFECT

Properly performed, endotracheal suctioning should remove pulmonary secretions, resulting in improvement of lung sounds. The clearing of secretions would decrease airway resistance and increase tidal volume delivery during positive pressure ventilation.

INDICATIONS

1. There is a need to remove accumulated pulmonary secretions as evidenced by one or more of the following:
 - a. Course lung sounds or "noisy" respirations.
 - b. Visible secretions are noted in the endotracheal tube.
 - c. Suspected aspiration of gastric or upper airway secretions.
 - d. Inability of the patient to produce an effective cough.
2. The need to maintain the patency and integrity of the endotracheal tube.

CONTRAINDICATIONS

When indicated, there are no absolute contraindications to endotracheal suctioning. Failure to suction in order to avoid a possible adverse reaction may result in patient death.

PROCEDURE

1. Cleanse hands.
2. Assemble required equipment.
 - a. Commercial suction kit or:
 - i. Sterile catheter
 - ii. Sterile gloves
 - iii. Sterile basin
 - iv. Eye protection

(Continued next page)

AIRWAY MANAGEMENT / SUCTIONING - ENDOTRACHEAL (cont.)

- b. Manual resuscitator
 - c. Sterile water
 - d. Water soluble lubricant
 - e. Vacuum gauge or pump and trap
3. Position the patient
 4. Pre-oxygenate the patient, if appropriate, and the airway is clear of material.
 5. Instill normal saline if required to loosen mucus.
 6. Apply sterile gloves using sterile technique.
 7. Insert the appropriate size suction catheter with suction off until resistance is met.
 8. Suction the airway while removing the catheter.
 - a. Application of vacuum limited to no more than 15 seconds.
 - b. Sterile technique must be maintained
 9. Oxygenate the patient after suctioning.
 10. Repeat as necessary

SPECIAL CONSIDERATION

1. Prolonged suctioning may lead to hypoxia /hypoxemia which can cause serious cardiac dysrhythmias due to decreases in myocardial oxygen supply.
2. Failure to use sterile technique may lead to infection.
3. Suctioning may stimulate the vagus nerve causing bradycardia and hypotension
4. Suctioning may stimulate coughing which may increase intracranial pressure

AIRWAY MANAGEMENT / OROPHARYNGEAL AIRWAY

LEVEL OF AUTHORIZATION

First Responder, Basic, Intermediate and Paramedic

RATIONALE

The oropharyngeal airway (OPA) should be used as an adjunct to maintain an open airway for patients that are unable to protect their airway due to a decreased level of consciousness.

DESIRED EFFECT

When properly placed, this device should conform to the curvature of the palate and hold the base of the tongue away from the posterior oropharynx. Air should pass around and through the device, and adequate ventilations should be observed.

INDICATIONS

This device should be used in a patient who is semi-conscious or unconscious with a depressed or absent gag reflex that is unable to self protect their own airway, and in need of ventilatory assistance.

CONTRAINDICATIONS

The device should not be used on patients with an intact gag reflex, because its insertion may stimulate vomiting or laryngospasm. It should be used with caution if oral trauma is present.

PROCEDURE

1. The correctly sized airway should be selected by measuring from the corner of the patient's mouth to the bottom of their ear (angle of the jaw). If you do not have the correct size, **DO NOT** insert the next biggest or next smallest size.
2. Use universal precautions (eye protection, mask, gloves, etc.).
3. Taking cervical spine precautions, bring the tongue forward.
4. Insert the oral airway into the patient's mouth with the tip pointing upward (toward the palate) or to the side and rotate while inserting.
5. If a tongue depressor is used, it is not necessary to rotate the airway.
6. The device will be correctly inserted if the curvature of the airway conforms to the patient's tongue and the flange will rest just above the teeth.

(Continued next page)

AIRWAY MANAGEMENT / OROPHARYNGEAL AIRWAY (cont.)**SPECIAL CONSIDERATION**

1. Oral airways do not isolate the trachea from the esophagus, therefore vomiting may result in aspiration of stomach contents.
2. Manual maneuvers must still be used to maintain an adequate airway.
3. OPAs may be easily dislodged, and require monitoring to assure and maintain correct placement.
4. *If improperly inserted, they may actually cause obstruction of the airway.*
5. If the airway cannot be properly inserted because the teeth are clenched, a nasopharyngeal airway should be considered.

AIRWAY MANAGEMENT / NASOPHARANGEAL AIRWAY

LEVEL OF AUTHORIZATION

First Responder, Basic, Intermediate and Paramedic

RATIONALE

The nasopharyngeal airway (NPA) should be used as an adjunct to maintain an open airway on patients that are unable to protect their own airway due to a depressed level of consciousness.

DESIRED EFFECT

When properly placed, this device should relieve soft tissue obstruction in the upper airway, providing an opening for ventilation without stimulating the patient to vomit.

INDICATIONS

This device is used to assist in the maintenance of an open airway in a conscious or unconscious patient, with or without a gag reflex, who is unable to self protect their airway, and in need of ventilatory assistance.

CONTRAINDICATIONS

1. Suspected basilar skull fractures
2. Active nosebleeds
3. Suspected nasal fractures.

PROCEDURE

1. The correctly sized airway should be selected by measuring from the tip of the patient's nose to the bottom of their ear (angle of the jaw) and the diameter should be slightly smaller than the patient's nostril.
2. Use universal precautions (eye protection, mask, gloves, etc.).
3. Check for obstructions or fractures to the nose.
4. Lubricate the device with a water-soluble gel, being careful not to block the tip.
5. With the bevel tip directed toward the nasal septum, insert the airway. If resistance is felt, remove the airway and attempt in the other nostril.

(Continued next page)

AIRWAY MANAGEMENT / NASOPHARANGEAL AIRWAY (cont.)

6. Insert until the flange is resting against the nostril opening.

SPECIAL CONSIDERATION

1. NPAs do not isolate the trachea from the esophagus, therefore vomiting may result in aspiration of stomach contents.
2. NPAs may cause severe nosebleeds if forcefully inserted.
3. NPAs may kink or clog, causing obstruction of the airway.
4. A tube too long may pass into the esophagus and result in hypoventilation and gastric distention.
5. NPAs should never be used in the presence of a suspected basilar skull fracture, as the tube can unintentionally enter into the brain.

AIRWAY MANAGEMENT / COMBITUBE®

LEVEL OF AUTHORIZATION

Basic, Intermediate and Paramedic

RATIONALE

The Combitube® multilumen airway (MLA) should be used as an adjunct to maintain an open airway, while isolating the gastrointestinal tract from the respiratory tract in patients that are unable to protect their own airway due to a depressed level of consciousness.

DESIRED EFFECT

When properly placed, this device should prevent aspiration of stomach contents, prevent gastric distention and provide a seal in the oropharynx to allow for adequate ventilations. The tube is intended for esophageal placement, however it will also function if inadvertently inserted into the trachea. It is *imperative* that the correct ventilation port be used and that adequate lung sounds are present and epigastric sounds are absent.

INDICATIONS

1. The patient is semi-conscious or unconscious with a depressed or absent gag reflex who is unable to self protect their own airway, and in need of ventilatory assistance.
2. Endotracheal intubation cannot be performed
3. Endotracheal intubation has been unsuccessful or unavailable.
4. Access to the patient's head is inhibited due to entrapment.
5. Direct visualization of the larynx is not possible due to secretions, vomit or profuse bleeding.

CONTRAINDICATIONS

1. Patients with an intact gag reflex
2. Patients under 5 feet tall (adult size)
3. Patients under 4 feet tall (small adult size)
4. Known or suspected (alcoholics) esophageal disease. (Relative contraindication)
5. Patients suspected of ingesting a corrosive substance. (Relative contraindication)

(Continued next page)

AIRWAY MANAGEMENT / COMBITUBE® (cont.)**PROCEDURE**

1. Pre-oxygenate the patient, if possible, with a ventilatory device using 100% oxygen.
2. Check the patient's mouth for sharp objects, braces, or foreign bodies.
3. Select the correct size device (adult, small adult)
4. Both cuffs of the Combitube® should be checked for leakage. Syringes should be removed after checking.
5. Use universal precautions (eye protection, mask, gloves, etc.).
6. Lubricate the tube with a water-soluble gel, being careful not to block the tip.
7. Assess patient for gag reflex (eyelash test)
8. If C-spine injuries are **NOT** suspected:
 - a. The patient's head should be placed in a neutral position with the tongue pulled forward.
 - b. Blindly insert Combitube® until the teeth lie between the two black lines.
9. If C-spine injuries **ARE** suspected:
 - a. Manually stabilize the patient's head in a neutral position to minimize C-spine movement.
 - b. Blindly insert Combitube® until the teeth lie between the two black lines.
10. Inflate proximal cuff and distal cuffs per manufacturer's recommendations. (Additional air may be added to proximal cuff and distal cuffs if the seals are inadequate).
11. Ventilate the patient with a BVM through the colored tube.
12. Listen for lung and epigastric sounds and watch for chest rise to verify tube placement. Pulse oximetry and/or end tidal CO₂ detector (if available) should be used to confirm adequate oxygenation.
13. After assessing tube placement, do one of the following:
 - a. If you are 100% confident you're ventilating the lungs, then continue ventilating.
 - b. If you are in doubt and suspect you are not ventilating lungs, then move ventilatory device to the clear tube and ventilate. Repeat step 6 and if 100% confident you're ventilating lungs, then continue ventilating.

(Continued next page)

AIRWAY MANAGEMENT / COMBITUBE® (cont.)

14. Occasionally check pilot balloons to assure cuff remains inflated.
15. Rapidly transport the patient to the nearest medical facility.
16. Monitor the patient's vital signs and secure patient in the event they become conscious.
17. If removal is necessary due to the patient's inability to tolerate the device or to facilitate endotracheal intubation:
 - a. Decompress the stomach (esophageal placement only) with the catheter included with the Combitube® through the white tube.
 - b. Deflate the proximal cuff (colored tube) completely.
 - c. Turn the patient on their side.
 - d. Deflate the distal cuff (white tube) completely.
 - e. Suction while removing to prevent aspiration.

SPECIAL CONSIDERATION

1. Sharp dental work or debris may puncture the proximal cuff.
2. The MLA should not be removed prior to endotracheal intubation unless visualization of the cords is not possible.
3. ***Failure to recognize proper tube placement may result in patient death.***
4. If patient is adequately ventilated with a MLA, ET intubation may not be necessary.
5. If epigastric sounds are noted after confirming proper tube placement, add air to the distal cuff.

AIRWAY MANAGEMENT / KING AIRWAY®

LEVEL OF AUTHORIZATION

Basic, Intermediate and Paramedic

RATIONALE

The KING Airway LTDS® is a single lumen airway (SLA) that should be used as an adjunct to maintain an open airway, while isolating the gastrointestinal tract from the respiratory tract in patients that are unable to protect their own airway due to a depressed level of consciousness.

DESIRED EFFECT

When properly placed, this device should prevent aspiration of stomach contents, prevent gastric distention and provide a seal in the oropharynx to allow for adequate ventilations. The tube is intended for esophageal placement. It is *imperative* that the correct placement be confirmed and that adequate lung sounds are present and epigastric sounds are absent.

INDICATIONS

1. The patient is semi-conscious or unconscious with a depressed or absent gag reflex who is unable to self protect their own airway, and in need of ventilatory assistance.
2. Endotracheal intubation cannot be performed
3. Endotracheal intubation has been unsuccessful or unavailable.
4. Access to the patient's head is inhibited due to entrapment.
5. Direct visualization of the larynx is not possible due to secretions, vomit or profuse bleeding.
6. Comes in several sizes from size 2 – 5 and is able to be used in pediatric patients 33” and above.

CONTRAINDICATIONS

1. Patients with an intact gag reflex
2. Known or suspected (alcoholics) esophageal disease. (Relative contraindication)
3. Patients suspected of ingesting a corrosive substance. (Relative contraindication)

(Continued next page)

AIRWAY MANAGEMENT / KING AIRWAY® (cont.)**PROCEDURE**

1. Pre-oxygenate the patient, if possible, with a ventilatory device using 100% oxygen.
2. Check the patient's mouth for sharp objects, braces, or foreign bodies.
3. Select the correct size device based on height
4. Both cuffs of the KING AIRWAY® should be checked for leakage. The Syringe should be removed after checking.
5. Use universal precautions (eye protection, mask, gloves, etc.).
6. Lubricate the tube with a water-soluble gel, being careful not to block the tip.
7. Assess patient for gag reflex (eyelash test)
8. If C-spine injuries are **NOT** suspected:
 - a. The patient's head should be placed in a neutral position with the tongue pulled forward.
 - b. Blindly insert KING AIRWAY® until resistance is met.
9. If C-spine injuries **ARE** suspected:
 - a. Manually stabilize the patient's head in a neutral position to minimize C-spine movement.
 - b. Blindly insert KING AIRWAY® until resistance is met.
10. Inflate both cuffs per manufacturer's recommendations. (Additional air may be added to the cuffs if the seals are inadequate).
11. Ventilate the patient with a BVM through connector.
12. Listen for lung and epigastric sounds and watch for chest rise to verify tube placement. Pulse oximetry and/or end tidal CO2 detector (if available) should be used to confirm adequate oxygenation.
13. After assessing tube placement, do one of the following:
 - a. If you are 100% confident you're ventilating the lungs, then continue ventilating.
 - b. If you are in doubt and suspect you are not ventilating lungs, then move ventilatory device to the clear tube and ventilate. Repeat step 6 and if 100% confident you're ventilating lungs, then continue ventilating.

(Continued next page)

AIRWAY MANAGEMENT / KING AIRWAY® (cont.)

14. Occasionally check pilot balloons to assure cuff remains inflated.
15. Rapidly transport the patient to the nearest medical facility.
16. Monitor the patient's vital signs and secure patient in the event they become conscious.
17. If removal is necessary due to the patient's inability to tolerate the device or to facilitate endotracheal intubation:
 - a. Decompress the stomach (esophageal placement only) with a catheter through the suction port.
 - b. Turn the patient on their side..
 - c. Deflate the cuffs completely
 - d. Suction while removing to prevent aspiration.

SPECIAL CONSIDERATION

1. Sharp dental work or debris may puncture the proximal cuff.
2. The SLA should not be removed prior to endotracheal intubation unless visualization of the cords is not possible.
3. ***Failure to recognize proper tube placement may result in patient death.***
4. If patient is adequately ventilated with a SLA, ET intubation may not be necessary but may be accomplished by using a bougie tube with blind ET insertion.
5. If epigastric sounds are noted after confirming proper tube placement, add air to the distal cuff.

AIRWAY MANAGEMENT / LARYNGEAL MASK AIRWAY (LMA)

LEVEL OF AUTHORIZATION

First Responder, Basic, Intermediate and Paramedic

RATIONALE

Laryngeal Mask Airways (LMA) is used as an adjunct to maintain an open airway in patients that are unable to protect their own airway due to a decreased level of consciousness, edema or restrictive airway conditions.

DESIRED EFFECT

When properly placed, this device seals the larynx, leaving the distal opening of the tube just above the glottis, providing a clear, secure airway. Although the LMA does not ensure absolute protection against aspiration, studies have shown that regurgitation is less likely and that aspiration is uncommon.

INDICATIONS

1. The patient is experiencing, or is likely to experience, upper airway compromise.
2. The patient is in respiratory or cardiac arrest.
3. The patient has edema, which may result in complete obstruction.
4. The patient has inadequate rate or depth of respiration.
5. The patient is unconscious and unable to self protect their own airway.
6. Endotracheal intubation has been unsuccessful or blind insertion is necessary.

CONTRAINDICATIONS (relative)

1. Patients greater than 14 weeks pregnant
2. Patients with multiple or massive injury
3. Massive thoracic injury
4. Massive maxillofacial trauma
5. Patients at risk of aspiration

PROCEDURE

1. Pre-oxygenate the patient, if possible, with 100% oxygen while assembling equipment.
2. Use universal precautions (eye protection, mask, gloves, etc.).

(Continued next page)

AIRWAY MANAGEMENT / LARYNGEAL MASK AIRWAY (LMA) (cont.)

3. Select the appropriate size airway:

AIRWAY SIZE	PATIENT	MAXIMUM INFLATION VOLUME
1	Neonates/Infants up to 5kg	4 ml
1.5	Infants 5 to 10 kg	7 ml
2	Infants/Children 10 to 20 kg	10 ml
2.5	Children 20 to 30kg	14ml
3	Children 30kg to 50 kg	20 ml
4	Adults 50-70 kg	30 ml
5	Adults 70-100 kg	40ml
6	Adults > 100 kg	50ml

4. Assemble and inspect all equipment.
- Visually inspect the LMA cuff for tears or other abnormalities.
 - Inspect the tube to ensure that it is free of blockage or loose particles.
 - Deflate the cuff to ensure that it will maintain a vacuum.
 - Inflate the cuff to ensure that it does not leak.
 - Completely deflate cuff prior to insertion.
5. Lubricate the LMA just prior to insertion.
- Use a water-soluble lubricant.
 - Lubricate the back of the mask thoroughly, avoiding excessive amounts.
- Note: Inhalation of the lubricant following placement may result in coughing or obstruction.**
6. If C-spine injuries are **NOT** suspected:
- Extend the patient's head and flex the neck.
 - Avoid LMA fold over by:
 - Use an assistant to pull the lower jaw downwards.
 - Visualize the posterior oral airway
 - Ensure that the LMA is not folding over in the oral cavity as it is inserted.
 - Suction as needed.
 - Apply Sellick maneuver as needed.
7. Grasp the LMA by the tube, holding it like a pen as near as possible to the mask end.
8. Place the tip of the LMA against the hard palate to flatten it out.
9. Using the index finger, keep pressing upwards as you advance the mask into the pharynx to ensure the tip remains flattened and avoids the tongue.
10. Press the mask into the posterior pharyngeal wall using the index finger.
11. Guide the mask downward into position.

(Continued next page)

AIRWAY MANAGEMENT / LARYNGEAL MASK AIRWAY (LMA) (cont.)

12. Grasp the tube firmly with the other hand and withdraw you index finger from the pharynx.
13. Gently press downward with your other hand to ensure the mask is filly inserted.
14. Inflate the mask with the recommended volume of air avoiding over-inflation.
15. Avoid touching the LMA tube while it is being inflated unless the position is obviously unstable.
- 16 Connect the LMA to a ventilatory device and ventilate the patient. Listen for lung and epigastric sounds and observe for bilateral chest rise. If available, a pulse oximeter and an end tidal CO2 detector may be use as adjuncts to verify tube placement and adequate oxygenation.
17. Insert a bite-block to prevent occlusion of the tube if the patient bites down.
18. Secure the tube.
19. Check periodically to ensure proper tube placement and cuff inflation.

SPECIAL CONSIDERATION

1. Time is lost when equipment malfunctions. All equipment should be inspected at the beginning of every work shift.
2. Inadvertent delays in oxygenation can result from lengthy intubation efforts or failure to provide ventilatory support between attempts.
4. Patient movement may dislodge the tube. Every time the patient is moved, re-verification of tube placement is necessary.

AIRWAY MANAGEMENT / INTUBATION - ENDOTRACHEAL

LEVEL OF AUTHORIZATION

Paramedic

RATIONALE

Endotracheal intubation should be used as an adjunct to maintain an open airway, while isolating the gastrointestinal tract from the respiratory tract in patients that are unable to protect their own airway due to a decreased level of consciousness, edema or restrictive airway conditions.

DESIRED EFFECT

When properly placed, this device should prevent aspiration of stomach contents, prevent gastric distention and provide a definitive airway for adequate ventilations. The tube must be inserted into the trachea, therefore it is *imperative* that correct placement is verified by visualization of the tube passing through the vocal cords, assessment of adequate lung sounds and absence of epigastric sounds.

INDICATIONS

1. The patient is experiencing, or is likely to experience, upper airway compromise.
2. The patient is in respiratory or cardiac arrest.
3. The patient has edema, which may result in complete obstruction.
4. The patient has inadequate rate or depth of respiration.
5. The patient is unconscious and unable to self protect their own airway.

CONTRAINDICATIONS

When indicated, there are no absolute contraindications to endotracheal intubation.

PROCEDURE

1. Pre-oxygenate the patient, if possible, with 100% oxygen while assembling equipment.
2. Use universal precautions (eye protection, mask, gloves, etc.).

(Continued next page)

AIRWAY MANAGEMENT / INTUBATION - ENDOTRACHEAL (cont.)

3. If C-spine injuries are **NOT** suspected:
 - a. Position the patient's head and neck by placing the head into a "sniffing position". Flexing the neck forward and the head backward can accomplish this.
 - b. Insert the laryngoscope blade into the right side of the patient's mouth and with a sweeping action displace the tongue to the left. Manipulate the blade to expose the vocal cords.
 - c. Insert the endotracheal tube once vocal cords have been visualized to a depth that allows for good ventilation of both lungs.
 - d. Suction as needed.
 - e. Apply Sellick maneuver as needed.

Note: If C-spine injuries are suspected, manually stabilize the patient's head to minimize C-spine movement.

4. Inflate the cuff and ventilate the patient with a BVM. Listen for lung and epigastric sounds and observe for bilateral chest rise. If available, a pulse oximeter and an end tidal CO₂ detector may be use as adjuncts to verify tube placement and adequate oxygenation.
5. After assessing tube placement, do one of the following:
 - a. If you are confident the tube is in the trachea, inflate cuff with 5-10 cc's of air. Ventilate again repeating step 4. If still confident, continue ventilating with 100% oxygen. Secure the tube.
 - b. If you are in doubt and suspect esophageal placement, remove tube, oxygenate the patient and consider another attempt at intubation, or insert another airway device.
6. Check periodically to ensure proper tube placement and cuff inflation.

SPECIAL CONSIDERATION

1. Time is lost when equipment malfunctions. All equipment should be inspected at the beginning of every work shift.
2. Endotracheal intubation requires direct visualization of the vocal cords, which requires practice to eliminate improper placement and oral trauma.
3. Inadvertent delays in oxygenation can result from lengthy intubation efforts or failure to provide ventilatory support between attempts.
4. Patient movement may dislodge the tube. Every time the patient is moved, re-verification of tube placement is necessary.
5. ***Failure to recognize proper tube placement may result in patient death.***

AIRWAY MANAGEMENT / INTUBATION - NASOTRACHEAL

LEVEL OF AUTHORIZATION

Paramedic

RATIONALE

Nasotracheal intubation should be used as an adjunct to maintain an open airway, while isolating the gastrointestinal tract from the respiratory tract in patients that are unable to protect their own airway due to a decreased level of consciousness, edema or constrictive airway conditions.

DESIRED EFFECT

When properly placed, this device should prevent aspiration of stomach contents, prevent gastric distention and provide a definitive airway for adequate ventilations. The tube must be inserted into the trachea, therefore it is *imperative* that correct placement is verified by assessment of adequate lung sounds and absence of epigastric sounds.

INDICATIONS

1. The patient is not apneic or in cardiac arrest, but is experiencing, or is likely to experience, upper airway compromise.
2. The patient has edema, which may result in complete obstruction.
3. The patient's mouth cannot be opened.
4. The patient has oral or maxillofacial injuries.
5. The patient is conscious or unconscious, but unable to protect their airway.

CONTRAINDICATIONS

1. Apnea
2. Nasal fractures
3. Basilar skull fractures
4. Nasal obstruction
5. Deviated nasal septum

(Continued next page)

AIRWAY MANAGEMENT / INTUBATION - NASOTRACHEAL (cont.)**PROCEDURE**

1. Pre-oxygenate the patient, if possible, with 100% oxygen while assembling equipment.
2. Use universal precautions (eye protection, mask, gloves, etc.).
3. Administer **PHENYLEPHRINE** [1-2 "squirts"] in the nostril used for insertion.
4. Lubricate the ET tube with 2% lidocaine jelly or other water-soluble solution. (Pre-insertion of a nasopharyngeal airway into the selected nostril may be considered and removed prior to insertion of the ET tube).
5. Place the patient's head and neck into a relaxed position. If spinal injury is possible, use "C" spine precautions.
6. Insert the ET tube into the selected nostril along the floor of the nostril or facing the nasal septum to avoid damage to the turbinates. Have suction ready. Vomiting and bleeding in the posterior pharynx may occur, secondary to trauma from insertion of the tube.
7. As the tube passes into the posterior pharynx, auscultate for respiratory sounds with a stethoscope or other device. With the next inhaled breath, advance the tube into the glottic opening until the distal cuff is just past the vocal cords. At this point, the patient may cough, or strain. Esophageal placement may cause gagging.
8. Ventilate the patient prior to inflating the cuff, and listen for lung and epigastric sounds. Observe for bilateral chest rise, and if available, apply a pulse oximeter and a CO2 detector as adjuncts to verify tube placement.
9. After assessing tube placement, do one of the following:
 - a. If you are confident the tube is in the trachea, inflate cuff with 5- 0 cc's of air. Ventilate again repeating step 8. If still confident, continue ventilating with 100% oxygen. Secure the tube.
 - b. If you are in doubt and suspect esophageal placement, remove tube, oxygenate the patient and consider another attempt at intubation, or insert another airway device.
10. Check periodically to ensure proper tube placement.

(Continued next page)

AIRWAY MANAGEMENT / INTUBATION - NASOTRACHEAL (cont.)**SPECIAL CONSIDERATION**

1. Nasotracheal intubation is more time consuming than orotracheal intubation. The patient should be breathing adequately enough to hear air exchange during insertion.
2. It is potentially more traumatic for patients.
3. "Blind" nasotracheal intubation requires that the patient be breathing.
4. Inadvertent delays in oxygenation can result from lengthy intubation efforts or failure to provide ventilatory support between attempts.
5. Patient movement may dislodge the tube. Every time the patient is moved, re-verification of tube placement is necessary.
6. ***Failure to recognize proper tube placement may result in patient death.***

AIRWAY MANAGEMENT / CRICOTHYROTOMY

LEVEL OF AUTHORIZATION

Paramedic

RATIONALE

Cricothyroidotomy is a surgical procedure that allows a rapid entrance to the trachea for ventilatory purposes for patients who cannot be intubated, orally or nasally, but are in need of airway management.

DESIRED EFFECT

When properly performed, this procedure should prevent aspiration of stomach contents, prevent gastric distention and provide a definitive airway for adequate ventilations. The tube must be inserted into the trachea, therefore it is *imperative* that correct placement is verified by assessment of adequate lung sounds and absence of epigastric sounds.

INDICATIONS

1. Severe facial or nasal injuries that make oral or nasal intubation impossible
2. The patient's airway cannot be adequately managed by any conventional means.
3. Foreign body obstruction of the upper airway that cannot be removed by conventional means
4. Laryngeal edema resulting in occlusion of the upper airway.
5. Crushing injuries to the neck resulting in obstruction.

CONTRAINDICATIONS

1. Acute laryngeal disease caused by trauma or infection.

PROCEDURE

1. Assemble equipment:
 - a. Scalpel and blade
 - b. Large curved hemostats or extra scalpel handle
 - c. Small ET tube (up to 6.0 in adults) or tracheotomy tube, if available
 - d. Antiseptic solution, 4X4 dressings
 - e. Ventilatory device with oxygen source

(Continued next page)

AIRWAY MANAGEMENT / CRICOTHYROTOMY (cont.)

2. Expose the neck and identify the trachea. Palpate the prominent thyroid notch superior and the cricoid cartilage inferior. In the space between the two lies the cricothyroid membrane.
3. Make a vertical incision and expose the anatomy. When cricothyroid membrane has been exposed, make horizontal incision (approximately ½ inch) through the cricothyroid membrane. Incise as close to the cricoid cartilage as possible until opening is sufficient enough to allow passage of ET tube.
4. Maintain the opening with the scalpel handle, hemostats or gloved finger.
5. Insert the ET tube about 1-1/2 inches into the trachea.
6. Check breath sounds, inflate cuff if present, and ventilate patient with high flow oxygen and ventilatory device. Secure tube.
7. Control bleeding and dress wound.

AEROMEDICAL REQUEST

LEVEL OF AUTHORIZATION

First Responder, Basic, Intermediate and Paramedic

RATIONALE

Aeromedical transport is an option that should be considered when a patient's illness or injury requires immediate hospital intervention. It may also be applicable in cases where ground transport may not be feasible or available. Aeromedical response to many areas of the state would exceed the time necessary to transport by ground ambulance to a medical facility. However, under some circumstances this service should be considered such as in multiple casualty incidents, prolonged extrication, poor road conditions, and heavy traffic conditions. In some situations, it may be preferable to begin transport and have the aeromedical service meet the ambulance at a pre-determined location.

DESIRED EFFECT

Aeromedical transport services should be notified early to standby for anticipated use during an EMS response to a potentially life threatening incident. This early notification combined with a rapid request for actual aeromedical response when it is determined that the situation dictates its use, should decrease the time from the onset of injury or illness until definitive patient care can be provided in an appropriate medical facility.

INDICATIONS

1. Multiple casualty incidents involving critical patients.
2. Prolonged extrication of critical patients.
3. Poor road conditions that would make it difficult to respond an ambulance to or from the scene.
4. Heavy traffic conditions that would increase response and transport times considerably.
5. Patients whose condition warrants immediate medical attention available only at a distant medical facility.

CONTRAINDICATIONS

1. None when necessary. However unsafe flying conditions and landing areas must be considered for the safety of the flight crews and aircraft.

(Continued next page)

AEROMEDICAL REQUEST (cont.)

PROCEDURE

1. Requests for aeromedical transport may be made by:
 - a. Law enforcement
 - b. Fire or EMS personnel
 - c. Hospital staff
 - d. Search and rescue field coordinators
 - e. Private citizens with prior approval

2. Safety concerns should be discussed and addressed prior to arrival of the aircraft:
 - a. Landing zone should be blocked off for bystander safety.
 - b. Approach the aircraft only when signaled by a member of the flight crew.
 - c. Only essential personnel should approach the aircraft.
 - d. Do not approach from the rear of the aircraft.
 - e. Use extreme caution in windy conditions, may cause overhead blades to dip.
 - f. Wear ear and eye protection, and secure hats or head cover.
 - g. On sloping landing zone, approach from the downhill slope.

3. Requirements for establishing a landing zone:
 - a. 100' X 100' fairly flat area.
 - b. Area should be clear of overhead obstacles such as wires.
 - c. Protection for patient from noise and wind
 - d. Remove debris from landing area

4. Never approach the aircraft until signaled to do so by the flight crew.

CARDIAC MONITORING

LEVEL OF AUTHORIZATION

First Responder, Basic, Intermediate and Paramedic

RATIONALE

Cardiac monitoring should be used at any time there is a possible cardiac problem such as chest pain, irregular pulse, decreased LOC, abnormal blood pressure, or a history of cardiac problems. It can also be considered as an adjunct for patients with severe trauma, **but should not precede emergency procedures.**

DESIRED EFFECT

Cardiac monitoring, when performed correctly, should provide a mechanism for monitoring and documenting cardiac activity in the pre-hospital environment. This may be accomplished several ways, including printed EKG rhythm strips, internal recordings, or telemetry.

INDICATIONS

1. Possible cardiac problems with associated chest pain, or signs and symptoms associated with a silent AMI
2. Suspected drug overdose
3. Hypertension/CVA/TIA
4. Head injury
5. Chest trauma
6. Respiratory problems
7. Metabolic problems (dehydration, DKA, acidosis, etc.)

CONTRAINDICATIONS

None when indicated. Caution should be used when placing electrodes on skin damaged from trauma, burns, or chemicals. Cardiac monitoring, if indicated, should not delay emergency treatment or delay transport.

PROCEDURE

1. Make sure the skin is free of debris that will interfere with electrode contact (sweat, body hair, dirt, etc.)

(Continued next page)

CARDIAC MONITORING (cont.)

2. Attach electrodes to skin surface and attach leads to the monitor and patient.
3. Turn on monitor, adjust the gain or sensitivity to the proper level.
4. Record and report rate, regularity, origin of electrical activity and note any ectopy.
5. If possible, tracings should be printed before, during, and after delivery of procedures or medication.
6. Tracings should be printed to document a change in rhythm, rate, or any significant irregularity. Label strip with time, patient name.

12-Lead EKG

1. With the advent of thrombolytic therapy, early diagnosis of acute myocardial infarction has become more important. American Heart Association guidelines recommend a "door-to-needle time" of 30 minutes for thrombolytic administration. A pre-hospital 12-lead could speed diagnosis and shorten time until thrombolysis.
2. A 12-lead EKG is not a treatment and should be considered only if time and personnel are available. Do not attempt to obtain a 12-lead unless all other appropriate assessment and treatment guidelines have been met. For example, a 12-lead is of no value in cardiac arrest unless there is a return of a spontaneous pulse.
3. If 12-lead placement is done enroute, consider stopping the ambulance if the tracing is poor, but only long enough to capture an adequate EKG.

PROCEDURE

1. Placement of limb leads:
 - a. Left deltoid
 - b. Right deltoid
 - c. Left side anterior below waistline
 - d. Right side anterior below waistline
2. Placement of precordial leads:
 - a. V1 fourth intercostal space to right of sternum
 - b. V2 fourth intercostal space to left of sternum
 - c. V3 between V2 and V4
 - d. V4 fifth intercostal space mid-clavicular
 - e. V5 between V4 and V6
 - f. V6 fifth intercostal space midaxillary

CARDIAC PACING-TRANSCUTANEOUS

LEVEL OF AUTHORIZATION

Paramedic

RATIONALE

Transcutaneous (external) pacing provides a safe method of increasing the heart rate on patients with symptomatic bradycardias, including high degree AV blocks, and asystole **SECONDARY** to witnessed bradycardia.

DESIRED EFFECT

During transcutaneous pacing, the heart is stimulated with externally applied cutaneous electrodes that deliver an electrical impulse at a controlled rate. When performed correctly, the external pacemaker should control the patient's heart rate, and mechanical activity until definitive treatment is available. This should cause an increase in both pulse rate and blood pressure, along with increased LOC.

INDICATIONS

1. Hemodynamically significant bradycardias that have not responded pharmacologic therapy.
2. "Overdrive" pacing (limited by the maximum pacing rate of the device) to terminate malignant supraventricular and ventricular tachycardias.
3. Asystole, secondary to a witnessed bradycardia.
4. Patients who are in cardiac arrest due to drug overdose, especially if the rhythm is a profound bradycardia or pulseless electrical activity.
5. Metabolic disturbances causing symptomatic bradycardias.

CONTRAINDICATIONS

1. Severe hypothermia
2. Bradyasystolic cardiac arrest of more than 20 minutes
3. Bradycardia in children unless hypoxia or hypoventilation has been ruled out.

(Continued next page)

CARDIAC PACING-TRANSCUTANEOUS (cont.)**PROCEDURE**

1. Initiate IV, oxygen, and EKG monitoring
2. Run an initial strip as soon as monitor is attached to the patient. Use multiple leads in viewing cardiac electrical activity.
3. If the patient is conscious, explain the procedure.
4. Obtain vital signs.
5. Apply the transcutaneous pacing electrodes, insuring sufficient contact with patient's skin to allow complete electrical flow.
6. Turn pacer **ON** and set **PACING RATE** at 70 - 80 per minute.
7. Set the **CURRENT** according to manufacturer's requirements.
8. Check the monitor for electrical capture by noting whether or not a QRS complex follows every pacemaker spike. If this is not the case, the pacemaker current is not depolarizing the ventricles. Increase the current gradually until there is consistent capture. Use the minimal energy level required to get capture. Check for mechanical capture by palpating for a pulse that corresponds with the cardiac monitor.
9. Monitor the patient's condition, maintaining a close watch on pulse rate and blood pressure. If the patient is conscious and exhibits signs of discomfort, consider analgesia/sedation.

CARDIOVERSION

LEVEL OF AUTHORIZATION

Paramedic

RATIONALE

Cardioversion (synchronized electrical shock) is used to terminate tachycardias, other than pulseless ventricular tachycardia and ventricular fibrillation, in patients who are hemodynamically unstable or do not respond to pharmacological intervention. Synchronization reduces the chances that a shock will induce VF.

DESIRED EFFECT

Successful cardioversion should immediately terminate the tachycardia and decrease the potential for development of secondary complicating dysrhythmias.

INDICATIONS

1. Supraventricular tachycardia in a patient who is hemodynamically unstable.
2. Atrial fibrillation with a rapid ventricular response.
3. Atrial flutter with a rapid ventricular response.
4. Ventricular tachycardia with a pulse.

CONTRAINDICATIONS

1. Ventricular tachycardia without a pulse.
2. Polymorphic ventricular tachycardia (Torsades de Pointes).
3. Contraindicated (relative) when digitalis toxicity is suspected as the cause of the rhythm. When patient is decompensated and you suspect digitalis toxicity, give bolus of Lidocaine 1mg/kg before cardioverting and start at 50 joules.
4. Immediate cardioversion is usually not needed for rates <150. Consider other causes.

(Continued next page)

CARDIOVERSION (cont.)

PROCEDURE

1. Consider sedation with Midazolam or Diazepam (**follow Drug Guidelines**).
2. Turn on synchronizer switch. Set the energy level to 50-100 joules for adults; 1-2 joules/kg for children.
3. Make sure the synch mode is capturing. The gain may have to be adjusted to increase the "size" of the QRS to allow for synchronization.
4. Place electrode gel on paddles or position defibrillation pads appropriately.
5. Apply paddles to chest with firm pressure (approximately 25 pounds).
6. Call clear, and ensure that the patient area is clear.
7. Depress the discharge buttons simultaneously and continue to hold them until the energy is discharged (there may be a short delay).
8. If rhythm is unchanged, repeat cardioversion at higher energy level.
9. If rhythm changes, follow appropriate guidelines.
10. If the device is unable to synchronize due to irregularity of the rhythm (polymorphic ventricular tachycardia) and no firing occurs, deliver an unsynchronized shock.

CHEST TUBE MONITORING

LEVEL OF AUTHORIZATION

Paramedic

RATIONALE

Trauma, disease, or surgical interventions can interrupt the closed negative-pressure system of the lungs which may result in total collapse of the lung. A chest tube, along with a closed chest drainage system, is attached to promote drainage of air and fluid which may leak into the pleural cavity. Chest tubes must be closely monitored for patency to prevent pneumothorax or hemothorax and promote lung re-expansion.

DESIRED EFFECT

When monitored properly, air and fluids are removed from the pleural space and normal intra-pleural and intra-pulmonic pressures are maintained.

INDICATIONS

Inter-facility transfers requiring monitoring of a pre-established, patent chest tube.

CONTRAINDICATIONS

None, when the chest tube is indicated and must be monitored.

PROCEDURE

A. Monitoring:

1. Monitor the patient's vital signs (SpO₂ and ETO₂ if available) and breath sounds over affected lung area.
2. Assess for increasing respiratory distress and/or chest pain.
3. Observe the following:
 - a. Chest tube dressing for leakage.
 - b. If necessary, remove dressing and inspect tube at the entrance of the thorax for loose sutures and tube displacement.
 - c. Patency of the tube (kinks, dependent loops or clots).
 - i. Water level in the water seal should fluctuate with breathing, rising with inspiration and falling with expiration. If patient is on mechanical ventilation, this pattern is reversed because of the positive pressure.
 - ii. Fluctuations stop when the lung is fully re-expanded, or when tube is kinked.
 - d. Drainage system, which should be upright and below the level of the tube insertion.
4. Chest tubes should only be clamped (toothless clamps) only under specific circumstances:
 - a. To assess for air leaks.

(continued next page)

CHEST TUBE MONITORING (cont.)

- b. To rapidly empty or change collection bottle or chamber.
 - c. To change disposable systems. Have the new system ready to be connected before clamping the tube.
5. Position the patient to permit optimal drainage (do not remove LSB/Immobilization equipment on trauma patients):
 - a. Semi-Fowler's position to evacuate air (pneumothorax).
 - b. High Fowler's position to drain fluid (hemothorax).
6. Assure tube connection between chest and drainage tubes are intact, taped well and secured in multiple locations.
 - a. Water-seal vent must be without occlusion.
 - b. Suction-control chamber vent must be without occlusion when suction is used.
 - c. Suction should be 15-30cm H₂O and intermittent.
7. Coil excess tubing on mattress next to patient and secure to gurney, assure there is a dependent loop.
8. Adjust tubing to hang in a straight line from the top of the mattress to the drainage chamber.

B. Troubleshooting:**Air Leak:**

1. In patients receiving mechanical ventilation with PEEP, if continuous bubbling is seen in water-seal bottle/chamber, a possible leak exists between the patient and water seal.
 - a. Locate leak.
 - b. Tighten loose connection between patient and water seal.
 - c. Leak is corrected when constant bubbling is stopped.
2. Bubbling continues, indicating that the air leak has not been corrected.
 - a. Cross-clamp chest tube at the dressing site. If bubbling stops, air leak is inside the patient's thorax (lung) or at the chest tube insertion site.
 - b. Unclamp tube and notify medical control immediately. **Leaving the chest tube clamped may cause a tension pneumothorax.**
 - c. Reinforce chest dressing.
3. The bubbling continues, indicating that the leak is not in the patient's chest or at the insertion site.
 - a. Gradually move clamps down drainage tubing away from the patient and toward the suction-controlled chamber, moving one clamp at a time.
 - b. When bubbling stops, leak is in the section of tubing or connection distal to the clamp.
 - c. Replace tubing or secure connection and release clamp.
4. Bubbling continues, indicating that the leak is not in the tubing.
 - a. Check the drainage system for leak.
 - b. Change the drainage system if indicated.

(continued next page)

CHEST TUBE MONITORING (cont.)**Tension Pneumothorax Develops:**

1. If severe respiratory distress or chest pain develops:
 - a. Determine that the chest tubes are not clamped, kinked or occluded.
 - b. Correct problem if found.
 - c. Do not “milk” the chest tube if a clot is found without first clamping the tube proximal of clot.
2. Absence of breath sounds on affected side:
 - a. Notify medical control immediately
3. Hyper-resonance on affected side, mediastinal shift to unaffected side, tracheal shift to unaffected side, hypotension or tachycardia is present:
 - a. Contact Medical Control and consider **chest decompression** on the affected side.

Water Seal (if water bottle system is used)

1. Water-seal bottle is broken.
 - a. Insert distal end of water-seal tube into sterile solution so that tip is 2 cm below surface.
 - b. If no sterile solution is available, double clamp chest tube while preparing new bottle.
 - c. Replace bottle and release clamps.
2. Water-seal tube is no longer submerged in sterile fluid:
 - a. Add sterile solution to water-seal bottle until distal tip is 2 cm under surface.
 - b. Set water-seal bottle upright so that tip is submerged.

Note: If unable to determine location of equipment leak or malfunction, clamp tube, disconnect device at proximal connection and replace with Heimlich Valve. Unclamp tube, reassess patient.

Note: Consider placement of Heimlich Valve in series between patient and Pleura-Vac/Atrium type device as a safety mechanism.

Chest Tube Inadvertently Pulled (Partial or Complete):

1. Identify if leak in system exists. (If proximal tube port is not outside pleural cavity, tube is still functional).
2. If a leak exists, gently remove tube completely and rapidly close surgical site with direct pressure and occlusive dressing.
3. Notify Medical Control and consider diversion to closer facility.
4. Be prepared to emergently decompress for tensioning.

COMMUNICATIONS - MEDICAL CONTROL

LEVEL OF AUTHORIZATION

First Responder, Basic, Intermediate and Paramedic

RATIONALE

Voice contact should be made with the receiving hospital as soon as possible to allow the hospital time to prepare for the patient(s) (staff, appropriate treatment room, etc.) and at any time when medical information or advice is needed to supplement or clarify written protocols.

DESIRED EFFECT

Patient care should be transferred from pre-hospital providers to hospital providers in an informed and efficient manner. This allows for an excellent continuum of care leading to a more positive outcome. Pre-hospital decision making will be more informed, thus reducing chances for incorrect treatment modalities.

INDICATIONS

Communications with the receiving facility should be performed on every call, including calls involving refusal of service. The emergency department should be contacted as soon as possible on all incidents involving multiple patients. On-line medical control should be consulted, if possible, with questions on treatment.

CONTRAINDICATIONS

None when used appropriately.

PROCEDURE

1. Communication may be in the form of radio (UHF or VHF), cellular telephone, or conventional telephone.
2. The following information should be included in voice communications:
 - a. Name of receiving hospital.
 - b. Identify ambulance service and unit number.
 - c. Number of patients.
 - d. Patients age and sex.
 - e. Chief complaint or problem
 - f. Physical findings
 - g. Vital signs and LOC

(Continued next page)

COMMUNICATIONS - MEDICAL CONTROL (cont.)

- h. Pertinent history, as needed, to clarify problem (i.e. mechanism of injury, nature of illness, PQRSTU, SAMPLE).
 - i. Treatment given and patient's response.
 - j. Estimated time of arrival.
3. If applicable, advise the emergency department of any pertinent changes in patient's condition during transport.
4. Verbal communication of patient condition and written report should be given to ER nurse or Physician.

SPECIAL CONSIDERATIONS

1. Situations may exist when radio communications should not preclude patient care, either by pre-hospital or emergency department personnel, due to insufficient manpower or difficult terrain.
2. Consider the use of Santa Fe control or other dispatch agency to relay information when direct communication is not possible.

DEFIBRILLATION - MANUAL

LEVEL OF AUTHORIZATION

Paramedic

RATIONALE

The most frequent initial rhythm in sudden cardiac arrest is ventricular fibrillation (VF). The most effective treatment for VF or pulseless ventricular tachycardia (VT) is defibrillation. The effectiveness of defibrillation rapidly diminishes after the patient goes into arrest. The sooner a patient can be defibrillated after arrest, the greater the chance for conversion and subsequent survival with an intact neurological status.

DESIRED EFFECT

Time and cause of arrest are critical factors that affect survival. If performed correctly and quickly, assuming that damage to the myocardium is not too severe, defibrillation depolarizes the cells in the electrical conduction system simultaneously to allow for return of an organized rhythm.

INDICATIONS

1. Patients in cardiopulmonary arrest, with no advanced directives, who are in VF or VT.

CONTRAINDICATIONS

1. Patient is in cardiopulmonary arrest, but is not in ventricular fibrillation or ventricular tachycardia.
2. Patient is in an environment that is unsafe for defibrillation (i.e., lying in water, ungrounded conductive surface, etc.).

PROCEDURE

1. Place the patient and rescuers in a safe environment.
2. Expose the chest and make sure it is free from sweat or objects that will impede electrical current.
3. Apply conductive gel to the defibrillator paddles or appropriate pads to the chest.

(Continued next page)

DEFIBRILLATION - MANUAL (cont.)

4. Turn on the defibrillator and ensure you are monitoring the EKG through the appropriate leads or paddles.
5. Select the energy level, 360 joules on monophasic devices, device dependant on biphasic devices follow the manufactures recommendations (usually 150 joules), and charge the capacitor.
6. If paddles are being used, place them in the proper position and apply firm downward pressure.
7. If pads are used, place firmly on the chest appropriately.
8. Make sure the patient and the area is clear by shouting "**CLEAR**" and looking to the feet then head.
9. Deliver the shock by depressing both discharge buttons simultaneously or discharge button(s).
10. After the defibrillation, immediately resume CPR for 5 cycles.
11. Re-evaluate the patient and repeat if indicated.

DEFIBRILLATION – SEMI-AUTOMATIC

LEVEL OF AUTHORIZATION

First Responder, Basic, Intermediate, and Paramedic

RATIONALE

The most frequent initial rhythm in sudden cardiac arrest is ventricular fibrillation (VF). The most effective treatment for VF or pulseless ventricular tachycardia (VT) is defibrillation. The effectiveness of defibrillation rapidly diminishes after the patient goes into arrest. The sooner a patient can be defibrillated after arrest, the greater the chance for conversion and subsequent survival with an intact neurological status.

DESIRED EFFECT

Time and cause of arrest are critical factors that affect survival. If performed correctly and quickly, assuming that damage to the myocardium is not too severe, defibrillation depolarizes the cells in the electrical conduction system simultaneously to allow for return of an organized rhythm.

INDICATIONS

1. Patients in cardiopulmonary arrest, with no advanced directives, who are in ventricular fibrillation.
2. Patients in cardiopulmonary arrest, with no advanced directives, who are in ventricular tachycardia, and have **NO** palpable pulses.

CONTRAINDICATIONS

1. Patient is in cardiopulmonary arrest, but is not in ventricular fibrillation or ventricular tachycardia.
2. Patient is in an environment that is unsafe for defibrillation (i.e., lying in water, ungrounded conductive surface, etc.).
3. Children under 8 years of age.

PROCEDURE

1. Place the patient and rescuers in a safe environment.
2. Expose the chest and make sure it is free from sweat or objects that will impede electrical current.
3. Turn on the defibrillator.

(Continued next page)

DEFIBRILLATION – SEMI-AUTOMATIC (cont.)

4. Apply appropriate pads to the chest and to the device.
5. Initiate analysis of the rhythm.
6. Make sure the patient and the area is clear by shouting "CLEAR" and looking to the feet then head.
7. Deliver the shock by depressing the discharge button(s).
9. After the defibrillation, immediately resume CPR for 5 cycles.
10. Re-evaluate the patient and repeat if indicated.

ENDOTRACHEAL MEDICATION ADMINISTRATION

LEVEL OF AUTHORIZATION

Intermediate, Paramedic

RATIONALE

Endotracheal (ET) administration of certain medications provides a rapid alternative when an IV cannot be established and medications must be administered immediately. Absorption may be almost as fast as the IV route for some medications.

DESIRED EFFECT

When performed properly, medication is absorbed into the pulmonary capillaries of the lungs allowing for a rapid and predictable parenteral effect.

INDICATIONS

- 1 Intubated patient in cardiac or respiratory arrest without immediate IV access.
2. Intubated patient, with a need for immediate ET applicable medications.

CONTRAINDICATIONS

Drugs that are not lipid-soluble.

PROCEDURE

1. Drugs that may be administered via the ET route are **L**idocaine, **E**pinephrine, **A**tropine, **V**asopressin and **N**alaxone.
2. Ensure adequate ventilation of the patient's lungs through the endotracheal tube.
3. Hyperventilate the patient (12-15 breaths per minute) while the medication is being prepared.
4. Remove the ventilation device and administer 2-2.5 times the normal dosage of medication ordered (diluted in normal saline with 10ml total fluid per dose) down the ET tube using a catheter.
 - a. Epinephrine should be administered using 2 -2.5mg of 1:1000 diluted in normal saline. (Children 0.1 mg/kg, 1:1000)
5. Resume positive pressure ventilations, administering several large volume ventilations to ensure that the medication gets into the pulmonary tree.

Note: IV is always the preferred medication route.

GLUCOMETRY

LEVEL OF AUTHORIZATION

First Responder, Basic, Intermediate and Paramedic

RATIONALE

Automated glucometry provides an indication of the patient's blood-sugar level, and is used as an adjunct in decision making.

DESIRED EFFECT

When performed properly, the glucometer should provide the user a quantitative blood glucose level in milligrams per deciliter. Normal for adults is 60-120 mg/deciliter. In the newborn < 40mg / deciliter and in the child < 60 mg/deciliter are considered hypoglycemic.

INDICATIONS

1. Suspected hypo/hyperglycemia.
2. Altered mental status.
3. Unconscious from an unknown cause.

CONTRAINDICATIONS

None when indicated

PROCEDURE

1. Clean fingertip or earlobe and allow thorough drying.
2. Allow fingertip to hang dependent for 10-15 seconds.
3. Apply personal protection equipment.
4. Pierce the side of the finger pad with lancet.
5. "Milk" the finger to obtain an adequate drop of blood for the "sample".
6. Apply drop to the test strip and insert into glucometer.
7. Dispose of sharps and biohazard waste in proper containers.
8. Note the reading on the glucometer.

INJECTIONS (SQ & IM)

LEVEL OF AUTHORIZATION

First Responder, Basic, Intermediate, and Paramedic

RATIONALE

When medication administration is necessary and the medication must be given via the SQ or IM route, or as an alternative route for selected medications when IV access is not obtainable.

DESIRED EFFECT

When performed properly, subcutaneous and intramuscular medications are absorbed slowly into the blood stream resulting in a delayed onset of action and prolonged effect.

INDICATIONS

1. Emergency administration of appropriate drugs when IV access is not or can not be readily established, or in situations where SQ and IM are the required route of administration.

CONTRAINDICATIONS

1. No absolute contraindications.

PROCEDURE

1. Confirm medication order and route of administration.
2. Verify drug and concentration.
3. Using universal precautions, draw up correct dose and make sure all air is expelled from the syringe.
4. Explain the procedure and desired effects to the patient. Reconfirm patient allergies.
5. The most common site for subcutaneous injection is the arm. Injection volume should not exceed 1 cc.
6. The approved sites for intramuscular injection are limited to the deltoid and thigh. Injection volume should not exceed 2 cc in the deltoid and 3 cc in the thigh.
7. The injection volume should not exceed 1 cc in pediatric patients.

(Continued next page)

INJECTIONS (SQ & IM) (cont.)

8. Expose the selected area and cleanse the injection site with alcohol.
9. Reconfirm drug and drug dose.
10. Insert the needle into the skin with a smooth, steady motion as follows:

SQ: 45 degree angle
Skin pinched up

IM: 90-degree angle
skin flattened

11. Aspirate for blood. If blood is noted, remove the needle and prepare a new syringe.
12. If no blood is noted, inject the medication.
13. Withdraw the needle quickly and dispose of all equipment properly into a sharps container. Do not recap the needle.
14. Apply pressure to the site until bleeding is stopped. Cover wound with a bandage.
15. Monitor the patient for the desired therapeutic effects as well as any possible side effects.
16. Document the medication, dose, route, time, and patient response.

INTRANASAL DRUG ADMINISTRATION

LEVEL OF AUTHORIZATION

Basic, Intermediate, and Paramedic

RATIONALE

Intranasal (IN) drug administration provides a safe, rapid, and effective way to administer emergency drugs in both pre-hospital and clinical settings. It offers an easy and convenient method of administration that requires minimal training. It is painless and it decreases the possibility of exposures to blood-borne diseases.

DESIRED EFFECT

When performed properly, intranasal medications are absorbed via the rich vascular plexus of the nose and directly enter the circulation.

INDICATIONS

1. Emergency administration of drugs when IV access is not or can not be readily established.

CONTRAINDICATIONS

1. No absolute contraindications.
2. If there is something wrong with the nasal mucosa, it may not absorb medications effectively:
 - a. Vasoconstrictors
 - b. Bloody nose, nasal congestion, mucous discharge
 - c. Destruction of nasal mucosa from surgery, trauma or cocaine abuse.

PROCEDURE

1. Assess ABC's
2. For pulseless patients, initiate CPR
3. For apneic or hypoventilating patients, assist ventilations.
4. Load syringe with appropriate dose of medication and attach the Mucosal Atomizer Device (MAD). Dose may be administered with ½ doses in each nostril, i.e. Naloxolone.
5. Place atomizer within the nostril.

(Continued next page)

INTRANASAL DRUG ADMINISTRATION (cont.)

6. Briskly compress syringe to administer correct drug dose. Have a towel available to catch any secretions
7. Remove and repeat process in the other nostril, if indicated, until the full therapeutic dose is administered.
8. Continue ventilating patient and secure airway as needed.

INTRAOSSEOUS INFUSION - TIBIAL (PEDIATRIC)

LEVEL OF AUTHORIZATION

Intermediate, Paramedic

RATIONALE

Intraosseous (IO) infusion allows for a rapid emergency vascular access when peripheral IVs have not been successful, or when the situation deems it appropriate. IO lines may be used for fluid resuscitation and/or delivery of medications. This procedure is for treatment of potentially life threatening conditions.

DESIRED EFFECT

When performed properly, intravenous solutions and medications will pass from the marrow cavities into large venous channels and then into the systemic circulation causing the desired effect.

INDICATIONS

1. Fluid replacement in unresponsive children under 6 years of age when peripheral access is not obtainable.
2. Medication administration for children in cardiac arrest.
3. Unresponsive, critically ill children, with impaired vascular access due to obesity or edema.
4. Burn or other injury preventing accesses to the venous system at other sites.

CONTRAINDICATIONS

1. Trauma to the extremity
2. Fracture proximal to the IO site
3. Congenital bone disease or bony lesion at the site
4. Osteomyelitis
5. Cellulitis or other indicators of infection at the injection site

(Continued next page)

INTRAOSSEROUS INFUSION - TIBIAL (PEDIATRIC) (cont.)

PROCEDURE

1. Identify landmarks and prepare the insertion site with antiseptic solution. Sites for insertion include:
 - a. 2 to 3 cm below the tibial tuberosity in the flat surface of anterior tibia.
 - b. 2 to 3 cm above the medial malleolus in the flat surface of the anterior tibia.
2. The IO needle is inserted, angling the shaft 15 degrees away from the growth plate, into the flat tibial surface. Placement is detected when a "pop" can be felt and the needle and the needle should be firmly anchored to the bone.
3. Remove the stylet and attempt to aspirate marrow into a saline filled syringe. If marrow can not be aspirated, but saline can be flushed in easily without evidence of swelling around the site, the needle should remain in place.
4. Saline is then infused (5 cc) by syringe to verify placement and to clear the IO needle of any foreign objects.
5. Attach standard IV tubing and infuse medications or fluid quickly to prevent clotting of needle. Fluid may not flow by gravity alone.
6. The needle should be secured with tape or other device.

Note: Only one attempt in one leg at EMT-I level. Contact should be made with Medical Control.

THIS IS A 100% QA REVIEW SKILL

INTRASOSEOUS INFUSION – EASY IO

LEVEL OF AUTHORIZATION

Intermediate, Paramedic

RATIONALE

Intraosseous (IO) infusion allows for a rapid emergency vascular access when peripheral IVs have not been successful, or when the situation deems it appropriate. IO lines may be used for fluid resuscitation and/or delivery of medications. This procedure is for treatment of potentially life threatening conditions.

DESIRED EFFECT

When performed properly, intravenous solutions and medications will pass from the marrow cavities into large venous channels and then into the systemic circulation causing the desired effect.

INDICATIONS

1. Fluid replacement or emergent medication administration in patients when peripheral access is not obtainable.
2. Burn or other injury preventing accesses to the venous system at other sites.

CONTRAINDICATIONS

1. Trauma to the extremity
2. Fracture proximal to the IO site
3. Congenital bone disease or bony lesion at the site
4. Osteomyelitis
5. Cellulitis or other indicators of infection at the injection site

(Continued next page)

INTRAOSSUEOUS INFUSION – EASY IO (cont.)

PROCEDURE

1. Identify landmarks and prepare the insertion site with antiseptic solution. Sites for insertion include:
 - a. 2 to 3 cm below the tibial tuberosity in the flat surface of anterior tibia. Ped or Adult
 - b. 2 to 3 cm above the medial malleolus in the flat surface of the anterior tibia. Ped or Adult
 - c. 2 to 3 cm below the top of the shoulder on the medial aspect of the humerus, Adult only
2. Use of the IO driver, needle is inserted, angling the shaft 15 degrees away from the growth plate, into the flat tibial surface. Placement is detected when a "pop" can be felt and the needle and the needle should be firmly anchored to the bone and base of the needle is skin level.
3. Remove the stylet and attempt to aspirate marrow into a saline filled syringe. If marrow can not be aspirated, but saline can be flushed in easily without evidence of swelling around the site, the needle should remain in place.
4. Saline is then infused (5 cc) by syringe to verify placement and to clear the IO needle of any foreign objects.
5. Attach standard IV tubing and infuse medications or fluid quickly to prevent clotting of needle. Fluid may not flow by gravity alone.
6. The needle should be secured with tape or other device.

Note: Only one attempt at EMT-I level. Contact should be made with Medical Control for additional attempts.

THIS IS A 100% QA SKILL

INTRAOSSIOUS INFUSION - STERNAL

LEVEL OF AUTHORIZATION

Intermediate, Paramedic

RATIONALE

Intraosseous (IO) infusion allows for a rapid emergency vascular access when peripheral IVs have not been successful, or when the situation deems it appropriate. IO lines may be used for fluid resuscitation and/or delivery of medications. This procedure is for treatment of potentially life threatening conditions.

DESIRED EFFECT

When performed properly, intravenous solutions and medications will pass from the marrow cavities into large venous channels and then into the systemic circulation causing the desired effect

INDICATIONS

1. The Sternal IO is indicated in the management of a critically ill or critically injured adult (14 years or older) patient in whom peripheral intravenous access is unsuccessful.

CONTRAINDICATIONS

1. The sternal IO is contraindicated in the patients with severe osteoporosis or bone-softening conditions, or anatomic anomaly of the sternum.
2. The Sternal IO is relatively contraindicated in patients with burns over the sternum, chest trauma with suspected fracture sternum, or previous midline sternotomy.

PROCEDURE

1. Assemble necessary equipment and check contamination and expiration dates.
 - a. BSI equipment.
 - b. Medications, intravenous solutions and tubing.
 - c. Sternal Intraosseous introducer system or comparable device.
 - d. Infusion Tube.
 - e. Protective dome or comparable device.
 - f. SHARPS container.
2. Site of choice for Sternal IO injection is the manubrium of the sternum.

(Continued next page)

INTRAOSSEOUS INFUSION - STERNAL (cont.)

3. Apply gloves for personal and patient protection.
4. Prepare the insertion site with iodine and then alcohol and allow to dry for at least 15 seconds.
5. Locate the anatomical landmark of the suprasternal notch and place an index finger in the suprasternal notch, perpendicular to the surface of the manubrium.
6. Follow directions regarding specific introducing devices (FAST 1).
7. Once the device has been inserted, verify placement by attaching a syringe and aspirating a small amount of bone marrow. If no aspiration of bone marrow, flush with 10cc NS and attempt to infuse a small amount of fluid.
8. Attach the IV solution tubing and assure that the line is patent.
9. Place a protective dome or similar device over the infusing site or stabilize the catheter in place.
10. Continue to monitor and assess flow and patient response. Assess the site for any signs of infiltration.

THIS IS A 100% QA SKILL

IV THERAPY (EXTREMETIES)

LEVEL OF AUTHORIZATION

Intermediate, Paramedic

RATIONALE

Intravenous fluid therapy provides a rapid route for replacement of fluid lost through hemorrhage, replacement of electrolytes, and for the introduction of medications directly into the vascular system.

DESIRED EFFECT

When performed correctly, IV access provides a route that allows fluids and drugs to produce a pharmacological effect that is almost immediate.

INDICATIONS

1. Fluid replacement
2. Electrolyte replacement
3. Medication administration

CONTRAINDICATIONS

None when the procedure is indicated.

PROCEDURE

1. If the patient is conscious, explain why the IV is necessary and what the procedure entails.
2. Assemble the necessary equipment, check for contamination and expiration dates.
3. Insert tubing into the IV bag using aseptic technique, squeeze the drip chamber and fill halfway and allow the fluid to run through the tubing to purge all air.
4. Apply a tourniquet above the venipuncture site.
5. Select an appropriate catheter and prepare additional equipment (i.e. sterile dressings, tape, syringes, vacutainers, etc.).
6. Apply gloves for personal and patient protection.
7. Prepare the puncture site using an antiseptic solution to cleanse the site.

(Continued next page)

IV THERAPY (cont.)

8. Stabilize the vein and with the bevel of the catheter facing up, insert the catheter into the vein.
9. Advance the needle and catheter approximately 2mm beyond the point where blood return in the hub of the needle was noted. Slide the catheter over the needle into the vein without moving the needle. Once the catheter is completely in the vein, remove the needle and dispose of it into a "sharps" container.
10. Remove the tourniquet and attach the tubing and flush the line by opening the tubing clamp wide open.
11. Secure the IV site with tape or other device and cover the injection site with a sterile dressing.
12. Set flow at desired rate.
13. Check for signs of infiltration and document the procedure.
14. Document the IV.

IV THERAPY (EXTERNAL JUGULAR)

LEVEL OF AUTHORIZATION

Intermediate, Paramedic

RATIONALE

External jugular cannulation provides a route for intravenous fluid therapy when other peripheral veins have not provided suitable IV access. It provides a rapid route for replacement of fluid lost through hemorrhage, replacement of electrolytes, and for the introduction of medications directly into the vascular system

DESIRED EFFECT

When performed correctly, external jugular IV access provides a route that allows fluids and drugs to produce a pharmacological effect that is almost immediate.

INDICATIONS

- 1 External jugular vein cannulation is indicated in a critically ill patient ≥ 8 years of age who requires intravenous access for fluid or medication administration and in whom an extremity vein was not attainable.
2. External jugular cannulation can be attempted initially in life threatening events where no obvious peripheral site is noted or obtainable.

CONTRAINDICATIONS

1. Infection over the insertion site.
2. Lack of anatomic landmarks due to neck size, shape or deformities.
3. Suspected or proven fracture of the cervical spine.
4. With coagulopathies, other more easily compressible sites should be considered.
5. Unsuccessful contralateral attempt at insertion with resultant hematoma.

PROCEDURE

1. If the patient is conscious, explain why the IV is necessary and what the procedure entails.
2. Assemble the necessary equipment, check for contamination and expiration dates.

(Continued next page)

EXTERNAL JUGULAR (cont.)

3. Insert tubing into the IV bag using aseptic technique, squeeze the drip chamber and fill halfway and allow the fluid to run through the tubing to purge all air.
4. Select an appropriate catheter (10 gauge or larger 1 ½ to 2”) and prepare additional equipment (i.e. sterile dressings, tape, syringes, vacutainers, etc.).
5. Attach a 5cc syringe to catheter.
6. Apply gloves for personal and patient protection.
7. Place the patient in a supine or Trendelenberg position. This helps to distend the jugular veins and reduces the possibility of an air embolism.
8. Turn the patient’s head toward the opposite side if there is no possibility of cervical spine injury.
9. Prep the selected site as per peripheral IV site.
10. Align the catheter with the vein and aim in a caudal position (toward the clavicle).
11. Lightly place a finger just above the clavicle to produce a “tourniqueting” effect. Puncture the vein midway between the angle of the jaw and the clavicle and cannulate the vein in the usual manner and aspirate for blood return.
12. Attach an IV line and secure the catheter avoiding circumferential dressing or taping.
13. Assure patency of the line.
14. Document the IV.

THIS IS A 100% QA SKILL

NASAL GASTRIC TUBES

LEVEL OF AUTHORIZATION

Paramedic

RATIONALE

Nasal gastric tubes are used when the patient's stomach is severely distended or evacuation of gastric contents is necessary. The procedure should be attempted on conscious patients with an intact gag reflex or unconscious patients whose airway is protected.

DESIRED EFFECT

When properly placed, the tube should allow for the evacuation of stomach contents without compromising the patient's airway.

INDICATIONS

1. Evacuation of stomach contents, including air.
2. Administration of medication (activated charcoal).
3. Diaphragmatic hernia
4. Other per MCEP

CONTRAINDICATIONS

1. Patients with severe facial trauma.
2. Epiglottitis or croup

PROCEDURE

1. Assemble equipment:
 - a. NG Tube
 - b. 50 ml irrigation syringe
 - c. Water soluble jelly.
 - d. Gloves
 - e. Cup of water and straw, if possible
 - f. Adhesive tape
 - g. Saline for irrigation
 - h. Emesis basin
2. Use Universal Precautions
3. If possible, have the patient sit upright with support.
4. Inspect the nose for deformity or obstruction and determine the best (biggest) nostril for insertion.

NASAL GASTRIC TUBES (cont.)

5. Measure the tube, from ear lobe to the tip of the nose to the "epigastrium mark" and mark the correct length on the tube.
6. Lubricate the tube with water-soluble gel (6-8 inches).
7. Insert the tube in the selected nostril gently towards the posterior nasopharynx while directing the tube towards the patient's ear.
8. When the tube has reached the nasopharynx, gently rotate 180 degrees.
9. Insert into the oropharynx and instruct the patient to swallow. **DO NOT FORCE.**
10. Continue insertion until the tube reaches the pre-measured point and aspirate stomach contents with a syringe.
11. Inject 30 cc of air and listen over the epigastric area for sounds.
12. If placement is correct, secure the tube properly (downward) and attach to low level suction.
13. Document the procedure.

Note: The most lethal complication (while rare) of a Nasal Gastric tube is airway obstruction. If unable to insert nasally, may be inserted orally.

NEBULIZED DRUG ADMINISTRATION

LEVEL OF AUTHORIZATION

First Responder, Basic, Intermediate, and Paramedic

RATIONALE

Small volume nebulizers (SVN), provides a route of administration that carries the drug, in a fine mist, directly to the site of action in the lungs.

DESIRED EFFECT

When performed correctly SVN, using albuterol, should reverse bronchial constriction.

INDICATIONS

1. Wheezing associated with asthma
2. COPD
3. Anaphylaxis (after administration of Epinephrine)

CONTRAINDICATIONS

1. Hypersensitivity

PROCEDURE

1. Assemble equipment and attach the nebulizer to an oxygen source.
2. Add the appropriate amount of drug to the mist chamber.
3. Turn on the oxygen bottle and set the regulator per manufacturer's specifications or until a fine mist is produced.
4. Place the mouthpiece into the patient's mouth and have them periodically inhale and hold the drug in their lungs as long as possible. The patient should be encouraged to cough. Continue administration until the entire drug has been administered.
5. Monitor the patient for effectiveness.
6. The nebulizer can be attached to a BVM to facilitate administration of the drug in conjunction with positive pressure ventilation.

**Note: Airborne spread of disease should be a consideration.
Caution should be used with acute cardiac presentation or CHF.**

OXYGEN ADMINISTRATION

LEVEL OF AUTHORIZATION

First Responder, Basic, Intermediate and Paramedic

RATIONALE

Administration of supplemental oxygen, using appropriate oxygen delivery devices, provides increased concentrations of oxygen for use by the body tissues. Oxygen should be administered whenever it is clinically indicated.

DESIRED EFFECT

When performed correctly, oxygen administration will elevate arterial oxygen tension, increase oxygen content of arterial blood. This provides the body tissues with improved oxygenation for metabolism, alleviating ischemia, reducing acidosis, and reducing intracranial pressure.

INDICATIONS

1. Suspected hypoxemia or respiratory distress from any cause
 - a. Included but not limited to:
 - i. Acute chest pain
 - ii. Pulmonary congestion
 - iii. Respiratory / Cardiopulmonary arrest
 - iv. Shock
 - v. Seizures
 - vi. Head injuries
 - vii. CVA /TIA
 - viii. Acute and chronic disorders

CONTRAINDICATIONS

Oxygen should never be withheld from anyone who needs it. Patients with a hypoxic drive should be monitored closely.

PROCEDURE

1. Administration of oxygen and selection of delivery devices is situation dependent. Decisions should be based on hypoxic status, rate and depth of ventilation and seriousness of injury or illness.

(Continued next page)

OXYGEN ADMINISTRATION (cont.)

- a. Low Concentration - A nasal cannula is well tolerated by patients that are able to breath through their noses, and will deliver a concentration of 24 - 44% when adjusted to a flow rate of 1 - 6 L/min. It should be used on patients with adequate tidal volume with minimal or no respiratory distress or oxygenation problems. Flow rates > 6 l/min may dry mucous membranes in the nasal passages and a simple facemask should be considered.
- b. Moderate Concentration - A simple facemask should be considered for patients who are in a low to moderate degree of distress with adequate tidal volume. It will deliver 40-60% oxygen at a flow rate of 8 - 10 L/min. To avoid re-breathing of carbon dioxide, the flow rate should be at least 5 L/min. The mask should be monitored for condensation, indicating hypoventilation, and debris such as vomit and sputum.
- c. High Concentration - The non-rebreather mask should be used on patients with serious respiratory problems, but adequate tidal volume, and can deliver 80-100% oxygen at a flow rate of 10 - 16 L/min. Do not let the bag completely deflate between breaths.
- d. High Concentration/Assisted - For patients with in inadequate rate or depth of ventilations, positive pressure ventilatory devices should be used. These include BVMs, demand valve resuscitators, and automatic transport ventilators. These devices are capable of delivering 80 - 100% oxygen, under pressure, to assure both adequate minute volume and concentration of oxygen.
- e. Use humidified oxygen for asthma patients, COPD patients, wheezing and/or stridor in children, inhalation burns or long transports exceeding 30 minutes. Use *warm* humidified oxygen on hypothermic patients.

PLEURAL DECOMPRESSION

LEVEL OF AUTHORIZATION

Paramedic

RATIONALE

A pneumothorax (traumatic or spontaneous) may exacerbate into tension pneumothorax leading to a decreased lung capacity, decreased cardiac output and severe hypoxia.

DESIRED EFFECT

When performed properly, pleural decompression should relieve air pressure in the chest cavity and allow for adequate ventilations.

INDICATIONS

1. Tension pneumothorax

CONTRAINDICATIONS

None when indicated

PROCEDURE

1. Universal precautions
2. Prep the area with an antiseptic solution. Two preferred locations are:
 - a. The second intercostal space, mid-clavicular just above the 3rd rib.
 - b. The fourth intercostal space, mid-axillary just above the 5th rib.
3. Insert a 14 - 10 gauge angiocath, or commercial device, just above the rib until air rushes out.
4. Remove the needle, leaving the catheter in place.
5. Place some type of flutter valve over the catheter if the patient is breathing spontaneously.
6. Tape and secure to chest.
7. Re-assess lung sounds. A second needle may have to be inserted, or both sides of the chest may require decompression.

Note: If improperly performed, the technique may actually cause a pneumothorax or damage underlying vasculature and organs.

THIS IS A 100% QA SKILL

PNEUMATIC ANTI-SHOCK GARMENT (PASG/MAST)

LEVEL OF AUTHORIZATION

Basic, Intermediate, Paramedic

RATIONALE

When inflated, the device applies circumferential pneumatic counter pressure to the structures beneath the garment, causing compression of the blood vessels under the garment. This pressure may possibly help to stabilize blood pressure, which would affect blood flow to the heart, brain, and lungs. This same pressure may help to control bleeding, and stabilize fractures of the lower limbs and pelvis.

DESIRED EFFECT

When applied correctly, the garment should increase peripheral vascular resistance, control hemorrhage, and provide stabilization to fractures located under areas of the body covered by the device.

INDICATIONS

1. Control active bleeding (internal or external) in areas covered by the device.
2. Stabilization of fractures of the pelvis and lower limbs

Note: Transport time is a relative factor. PASG should be considered if the transport time is expected to be > 30 minutes, however in critical patients time required to apply the device versus its benefits, must be considered.

CONTRAINDICATIONS

1. There are no absolute contraindications. Relative contraindications include:
 - a. Pulmonary edema
 - b. Increased intracranial pressure
 - c. Pregnancy (beyond second trimester)
 - d. Penetrating objects
 - e. Abdominal evisceration
 - f. Active bleeds above the site of the garment

(Continued next page)

PNEUMATIC ANTI-SHOCK GARMENT (PASG/MAST) (cont.)**PROCEDURE****Inflation:**

1. Prepare the PASG and if the patient is being placed on a spine-board, place the garment on the board prior to moving the patient.
2. Position the patient and remove clothing in areas that will be covered by the garment.
3. Quickly palpate abdomen, pelvis and lower extremities.
4. Apply PASG.
5. Be sure pants do not extend above rib margin.
6. Obtain baseline vital signs prior to inflation.
7. Inflate the legs and abdomen to 90 mm Hg or until the Velcro® pulls.
 - a. **NEVER** inflate abdominal section alone.
 - b. **DO NOT** inflate over burns.
 - c. The application of **PASG SHOULD NOT DELAY TRANSPORT.**
8. For injuries limited to the extremities, inflate leg section only with enough air to stop hemorrhage and/or splint suspected fractures.
9. Record time of inflation.
10. Auscultate lung sounds in all fields for adequacy of ventilation after inflation.
11. Recheck vital signs.
12. Do not deflate in the pre-hospital setting without physician orders.

Deflation:

1. Should occur in a medical facility, by physician order only, large bore IVs in place.
2. Obtain baseline set of vitals.
3. Deflate abdominal compartment slowly.
4. Deflate one leg at a time, and if systolic BP drops 5 mm Hg., stop deflation.
5. Re-inflate PASG if needed and if vital signs stabilize, continue deflation.

POSITIVE PRESSURE VENTILATION

LEVEL OF AUTHORIZATION

First Responder, Basic, Intermediate, Paramedic

RATIONALE

A significant decrease in the patient's rate or depth of breathing will lead to, hypercarbia, hypoxia, and a lowered pH. Assisted ventilation is indicated when this condition exists. The procedure must provide enough force to overcome resistance of the lungs and chest wall, as well as the respiratory passageways. Adequate ventilation pressures and volumes, combined with an adequate rate, will provide an adequate minute volume.

DESIRED EFFECT

When performed correctly, an adequate tidal volume (6-7 ml/kg with supplemental oxygen or 10 ml/kg on room air) should be provided, under adequate pressure (< 20 cmH₂O in non-intubated patients). Inspiratory pressures in intubated patients should be titrated to provide adequate gas exchange. Combined with a proper rate, this should produce an adequate exchange of gasses (O₂ and CO₂) at the alveolar level.

INDICATIONS

1. Patients that are in respiratory or cardiac arrest.
2. Patients that are breathing, but have inadequate rate or depth of ventilation.
3. Patients that need assistance in controlling ventilatory rate.

CONTRAINDICATIONS

None when ventilatory assistance is indicated

PROCEDURE

1. Manually insure that the patient has a patent airway using the head tilt-chin lift maneuver or in case of suspected trauma, the jaw-thrust.
2. Ventilate the patient, assessing for chest rise while ensuring the airway is open. Continue ventilations until airway adjunct has been inserted.
3. Insert appropriate airway adjunct (i.e. oropharyngeal, nasopharyngeal, Combitube®, laryngeal device, endotracheal tube, etc).

(Continued next page)

POSITIVE PRESSURE VENTILATION (cont.)

4. Ensure that the ventilatory device is connected to a supplemental oxygen source, if available, using an adequate oxygen flow (8-12 lpm with an oxygen concentration \geq 40%).
5. If the patient is non-intubated, make sure the mask is properly sealed on the patient's mouth and nose. If the patient is intubated, connect the device to the tube, assuring a proper fit.
6. Ventilate the adult patient at a rate of 10-12 bpm, with inspiratory time of 1 - 2 seconds if supplemental oxygen is available. If supplemental oxygen is not available, use an inspiratory time of 2 seconds. Inspiratory/expiratory times should be at a 1:2 ratio. For infants, ventilate at 20-30 bpm, with an inspiratory time of 0.5 - 1.0 seconds and for children, 12-20 bpm at 1 - 1.5 seconds.
7. Auscultate lung sounds and watch for symmetric chest rise.
8. Avoid inspiratory pressures >20 cmH₂O in non-intubated patients which can lead to gastric distention or barotrauma. Cricoid pressure should be considered.
9. Continuously monitor the ventilatory device to ensure there are no malfunctions of equipment or use.
10. Airway adjuncts should be monitored for proper placement.

SPINAL MOTION RESTRICTION

LEVEL OF AUTHORIZATION

First Responder, Basic, Intermediate, Paramedic

RATIONALE

Stabilization of the spinal column prior to moving the patient from the scene, and during transport, may prevent further damage, which could result in permanent neurological deficit.

DESIRED EFFECT

When performed correctly, spinal immobilization should provide stabilization for the fracture, or displacement, above and below the site. Limiting movement may also help to reduce pain.

INDICATIONS

Spinal immobilization should be considered for all patients that have been subjected to forces that could potentially cause injury to the spinal column. Patient complaint of spinal pain, spinal tenderness, spinal deformity, neurological deficits or abnormalities must also be considered for cause to immobilize. Absence of complaints or visual injury does not confirm there is no injury. Drug use and distracting injuries may mask spinal injuries during assessment.

CONTRAINDICATIONS (RELATIVE)

1. On scene, if patient is unstable and in need of rapid extrication and transport. Use manual C-spine stabilization.
2. Unsafe environment.

PROCEDURE

Supine and hemodynamically stable:

1. Manually stabilize the head without airway compromise.
2. Check for pulse, movement, and sensation in extremities.
3. Bring head to the eyes forward position if no pain or resistance is met.
4. Apply correctly sized cervical collar without compromising the airway.
5. Place patient on long spine board with minimum movement using straddle slide or 4 person log roll.

(Continued next page)

SPINAL MOTION RESTRICTION (cont.)

6. Secure the body, then the head to long spine board.
7. Recheck pulse, movement, and sensation in extremities.

Supine and hemodynamically unstable:

1. This procedure should be used when extrication times would negatively impact the survival of an unstable supine patient.
2. Manually stabilize the head without airway compromise.
3. Check for pulse, movement, and sensation in extremities.
4. Bring head to the eyes forward position if no pain or resistance is met.
5. Apply correctly sized cervical collar without compromising the airway.
6. Place patient on full body spinal device with minimum movement using straddle slide log roll.
7. If adequate personnel are available, "hand stabilize" the patient to the board while moving to the ambulance.
8. If time and manpower permits, secure body then the head to long spine board while enroute.
9. Recheck pulse, movement, and sensation in extremities

Seated and hemodynamically stable:

1. Manually stabilize the head without airway compromise.
2. Check for pulse, movement, and sensation in extremities.
3. Bring head to the eyes forward position if no pain or resistance is met.
4. Apply correctly sized cervical collar without compromising the airway.
5. Place KED, or other appropriate device, behind patient with minimum movement.
6. Secure torso to KED or other device.
7. Secure head to the KED or other device.
8. Recheck pulse, movement, and sensation in extremities.

(Continued next page)

SPINAL MOTION RESTRICTION (cont.)

9. Move patient as a unit onto long spine board and secure as above.

Seated and hemodynamically unstable:

1. This procedure should be used when extrication time would negatively impact the survival of an unstable seated patient.
2. Manually stabilize the head without airway compromise.
3. Check for pulse, movement, and sensation in extremities.
4. Bring head to the eyes forward position if no pain or resistance is met.
5. Apply correctly sized cervical collar without compromising the airway.
6. Use manual spinal immobilization to rapidly extricate the patient from the seated position onto a long spine board.
7. If possible, secure body then the head to long spine board while en-route.
8. Recheck pulse, movement, and sensation in extremities.

Standing and hemodynamically stable:

1. Manually stabilize the head without airway compromise.
2. Check for pulse, movement, and sensation in extremities.
3. Bring head to the eyes forward position if no pain or resistance is met.
4. Apply correctly sized cervical collar without compromising the airway.
5. Place board behind patient.
6. Secure body to long spine board.
7. Secure head to the long spine board.
8. Lower board and patient as a unit.
9. Recheck pulse, movement, and sensation in extremities.

(Continued next page)

SPINAL MOTION RESTRICTION (cont.)**Standing and hemodynamically unstable:**

1. This procedure should be used when extrication time would negatively impact the survival of an unstable standing patient.
2. Manually stabilize the head without airway compromise.
3. Check for pulse, movement, and sensation in extremities.
4. Bring head to the eyes forward position if no pain or resistance is met.
5. Apply correctly sized cervical collar without compromising the airway.
6. Place board behind patient.
7. Lower board and patient as a unit.
8. As soon as possible secure body to long spine board.
9. Secure head to the long spine board.
10. Recheck pulse, movement, and sensation in extremities.

SPLINTING

LEVEL OF AUTHORIZATION

First Responder, Basic, Intermediate, Paramedic

RATIONALE

Isolated extremity trauma itself is rarely life threatening, however, complications of poorly managed injuries may result in significant loss of function and disability. The development of hemorrhagic shock is also a concern and the most important and immediate danger. Careful management of the extremity may prevent exacerbation of the existing injury and help preserve future function.

DESIRED EFFECT

When performed correctly, the fracture site, along with the joint above and below, will be immobilized. This should prevent further injury, help control bleeding and reduce pain.

INDICATIONS

1. Injury to the extremity with associated pain, swelling, numbness, tingling, deformity, or loss of function.
2. Amputation, if not completely severed.
3. Stabilize IV sites.

CONTRAINDICATIONS

None when indicated. Splinting should not be done on scene if the patient is unstable.

PROCEDURE

1. Manually stabilize injured extremity.
2. Cut or remove clothing to expose injury.
3. Check distal circulation, pulse, and neurological status.
4. Select and prepare appropriate splint.
5. Apply splint without moving fracture site regularly during transport.
6. Pad where applicable.

(Continued next page)

SPLINTING (cont.)

7. Immobilize above and below injury.
8. Re-check distal circulation, pulse, and neurological status.

TRACTION SPLINT

LEVEL OF AUTHORIZATION

First Responder, Basic, Intermediate, Paramedic

RATIONALE

The use of traction on a mid-shaft fracture of the femur helps in relieving spasms or tension to the muscles, stabilizes the fractured bone ends, and prevents additional damage to the surrounding arteries, veins and tissues. Relief of tension and spasms also assists in alleviating pain.

DESIRED EFFECT

When performed correctly, the fracture site, along with the joint above and below, will be immobilized. This should prevent further injury, help control bleeding and reduce pain.

INDICATIONS

1. Mid-shaft fracture to the femur.
2. Lower extremity fractures (with no traction applied).

CONTRAINDICATIONS

1. Fractures to the head of the femur.
2. Fractures to the lower third of the femur.
3. Associated fractures to the pelvis, patella, tibia, fibula.
4. Partial amputation of the extremity.
5. Critical patients should not have the device applied on scene.

PROCEDURE

1. Manually stabilize injured extremity.
2. Remove clothing to expose injury.
3. Remove shoe and sock.
4. Check distal circulation and neurological status

(Continued next page)

TRACTION SPLINT (cont.)

5. Adjust splint to proper length beside uninjured leg.
6. Apply the splint according to manufacturer's instructions.
7. Pull traction on the injured extremity.
8. Secure extremity to splint.
9. Recheck distal circulatory status, pulse, movement, and sensation.

Note: Intermediates and paramedics, prior to applying traction splint, may administer analgesics.

SPECIAL CONSIDERATION

1. Application of a traction splint to an open fracture of the femur with protruding bone ends may lead to further damage and infection. Medical control should be consulted prior to applying traction in this situation.

WOUND CARE / BLEEDING

LEVEL OF AUTHORIZATION

First Responder, Basic, Intermediate, Paramedic

RATIONALE

Proper wound care prevents further contamination and control of hemorrhage. This may prevent hypotension or subsequent infections.

DESIRED EFFECT

When performed correctly, the wound will be covered with a sterile dressing and held securely in place by a bandage. Bleeding will be controlled and both venous and arterial circulation will be unobstructed.

INDICATIONS

All open wounds that are exposed to contamination

CONTRAINDICATIONS

None when indicated.

PROCEDURE

1. If bleeding is uncontrolled, apply:
 - a. Direct pressure
 - b. Direct pressure combined with elevation (of the extremity)
 - c. Pressure bandage
 - d. Temporary (< 1 hour) tourniquet (if pressure and elevation ineffective) used to allow delivery of patient to hospital or get assistance to continue with direct pressure
 - e. Long term (> 1 hour) tourniquet as a last resort, but don't delay until the patient has exsanguinated
2. Place dressing over the wound and firmly secure with a suitable bandage.
3. Assess circulation distal to the bandage and neurological status.
4. Patients that are not transported should be advised to see a physician regarding tetanus status.

SPECIAL CONSIDERATION

1. If bleeding continues after the bandage is applied and especially if the bandage becomes soaked with blood, remove the bandage and apply direct pressure directly to the bleeding site(s).