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## MEDICAL PROCEDURES

### ADULT PATIENT ASSESSMENT

<b>B</b>	EMT – B	<b>B</b>
<b>I</b>	EMT – I	<b>I</b>
<b>P</b>	EMT – P	<b>P</b>

#### INDICATIONS

- Any patient requesting a medical evaluation that is too large to be measured with a Broselow - Lutten Resuscitation Tape

#### PROCEDURE

1. Scene size-up: universal precautions, scene safety, environmental hazards assessment, bystander safety, and patient/caregiver interaction
2. Assess need for additional resources
3. Initial assessment: general impression as well as the status of a patient's airway, breathing, and circulation
4. Control major hemorrhage and assess overall priority of patient
5. Assess mental status and disability (e.g., GCS, AVPU)
6. Perform a focused history and physical based on patient's chief complaint
7. Assess need for critical interventions
8. Complete critical interventions and perform a complete secondary exam to include a baseline set of vital signs as directed by protocol
9. Maintain an ongoing assessment throughout transport, to include patient response/possible complications of interventions, need for additional interventions, and assessment of evolving patient complaints/conditions

#### KEY POINTS

##### Dealing with the family:

- REMAIN CALM, show efficiency and competence, even if you don't really feel it.
- Show a caring concerned manner for both the family and the patient. If you have negative feelings about the situation (for example if it is an injury as a result of neglect or abuse), try to not let them show. This will only increase hostility between yourself and the family.
- Honestly inform them of what you are doing and what you think is wrong with the patient.
- Reassurance is important for the family as well. Involve them in the care (for example, holding the oxygen or talking to the patient to calm them). This will help develop some trust between you and the family.

## MEDICAL PROCEDURES

### PEDIATRIC PATIENT ASSESSMENT

#### INDICATIONS

- Any child that can be measured with the Broselow – Luten Resuscitation Tape

<b>B</b>	EMT – B	<b>B</b>
<b>I</b>	EMT – I	<b>I</b>
<b>P</b>	EMT – P	<b>P</b>

#### PROCEDURE

1. Scene size-up: universal precautions, scene safety, environmental hazards assessment, need for additional resources, bystander safety, and patient/caregiver interaction
2. Assess patient using the pediatric triangle of ABCs:
  - Airway and appearance: speech/cry, muscle tone, inter-activeness, look/gaze, movement of extremities
  - Work of breathing: absent or abnormal airway sounds, use of accessory muscles, nasal flaring, body positioning
  - Circulation to skin: pallor, mottling, cyanosis
3. Establish spinal immobilization if suspicion of spinal injury
4. Establish responsiveness appropriate for age (e.g. AVPU, GCS)
5. Color code using Broselow - Luten tape
6. Assess disability (pulse, motor function, sensory function, pupillary reaction)
7. Perform a focused history and physical exam (pediatric patients easily experience hypothermia and thus should not be left uncovered any longer than necessary to perform an exam). Include Immunizations, Allergies, Medications, Past Medical History, last meal, and events leading up to injury or illness where appropriate
8. Record vital signs (BP > 3 years of age, cap refill < 3 years of age)
9. Treat chief complaint as per protocol

#### KEY POINTS

- Illness and injuries in children can cause significant anxiety for prehospital personnel as well as panic in the patient, family, and bystanders. It is important for the EMT to remain calm and take control of the patient and situation.

##### Dealing with the child:

- Tell them what's happening. It is important to remember to communicate with the child.
- Relate and speak on their developmental level.
- Be honest with them. Don't say "this won't hurt" if it will. Explain actions.
- Try to enlist their cooperation, if possible.
- Do not separate child from the parent unless they are ill enough to require significant interventions like airway positioning and ventilation.
- Reassure the child frequently.

##### Dealing with the family:

- REMAIN CALM - Show efficiency and competence, even if you don't really feel it.
- Show a caring concerned manner for both the family and the patient. If you have negative feelings about the situation (for example, if it is an injury as a result of neglect or abuse), try to not let them show. This will only increase hostility between yourself and the family.
- Honestly inform them of what you are doing and what you think is wrong with the patient.
- Reassurance is important for the family as well. Involve them in the care (for example, holding the oxygen or talking to the patient to calm them). This will help develop some trust between you and the family.

## AIRWAY / BREATHING

### AEROSOL / INHALER TREATMENT

#### AEROSOL TREATMENT

INDICATIONS	SIGNS AND SYMPTOMS	CONTRAINDICATIONS
<ul style="list-style-type: none"> <li>Patients experiencing bronchospasm</li> </ul>	<ul style="list-style-type: none"> <li>Shortness of breath</li> <li>Wheezing</li> <li>History of COPD / Asthma</li> <li>Unable to complete full sentences</li> <li>Accessory muscle use</li> <li>Nasal flaring</li> <li>Fatigue</li> </ul>	<ul style="list-style-type: none"> <li>Allergy to medication</li> <li>Arrhythmias</li> </ul>

I	EMT – I	I
P	EMT – P	P

#### PROCEDURE

1. Gather the necessary equipment
2. Assemble the nebulizer kit
3. Instill the premixed medication into the reservoir well of the nebulizer
4. Connect the nebulizer device to oxygen at 6 liters per minute or adequate flow to produce a steady, visible mist
5. Instruct the patient to inhale normally through the mouthpiece of the nebulizer - the patient needs to have a good lip seal around the mouthpiece
6. The treatment should last until the solution is depleted - tapping the reservoir well near the end of the treatment will assist in utilizing all of the solution
7. Monitor the patient for medication effects - this should include the patient's assessment of his/her response to the treatment and reassessment of vital signs, EKG, and breath sounds
8. Document the treatment, dose, and route in the patient care report (PCR)

#### PERSONAL INHALER TREATMENT

INDICATIONS	SIGNS AND SYMPTOMS	CONTRAINDICATIONS
<ul style="list-style-type: none"> <li>Patients experiencing bronchospasm</li> </ul>	<ul style="list-style-type: none"> <li>Shortness of breath</li> <li>Wheezing</li> <li>Patient has own prescribed inhaler</li> </ul>	<ul style="list-style-type: none"> <li>Medication has expired</li> <li>Patient has received maximum dose</li> </ul>

B	EMT – B	B
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#### PROCEDURE

1. Make sure that personal inhaler is at room temperature or warmer
2. Follow the instructions for either gentle or vigorous shaking
3. Instruct patient to seal lips around opening of inhaler, using spacer if present
4. Instruct patient to inhale deeply while depressing the inhaler
5. Instruct patient to hold breath as long as possible
6. Follow Airway Protocol

#### KEY POINTS

- Use mouthpiece if patient is able to hold nebulizer effectively
- Use nebulizer mask if patient is unable to hold nebulizer effectively

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## AIRWAY / BREATHING

### CONTINUOUS POSITIVE AIRWAY PRESSURE (CPAP) DEVICE

INDICATIONS	SIGNS AND SYMPTOMS	CONTRAINDICATIONS
<ul style="list-style-type: none"> <li>Breathing patient whose condition is not improving with oxygen therapy</li> <li>Respiratory distress due to pulmonary edema, asthma, CHF, or COPD</li> <li>Patients 15 years of age or older</li> </ul>	<ul style="list-style-type: none"> <li>Dyspnea and tachypnea</li> <li>Chest pain</li> <li>Hypertension</li> <li>Tachycardia</li> <li>Anxiety</li> <li>Altered LOC</li> <li>Rales and wheezes</li> <li>Frothy sputum (severe cases)</li> <li>Accessory muscle use</li> <li>SPO<sub>2</sub> &lt; 94%</li> </ul>	<ul style="list-style-type: none"> <li>Respiratory arrest</li> <li>Agonal respirations</li> <li>Unconscious</li> <li>Shock</li> <li>Pneumothorax</li> <li>Penetrating chest trauma</li> <li>Persistent nausea and vomiting</li> <li>Facial anomalies, facial trauma</li> <li>Known blebs</li> <li>Apnea</li> <li>Hypercarbia</li> <li>Respiratory compromise</li> <li>B/P &lt; 90 systolic</li> </ul>

<b>B</b>	EMT – B	<b>B</b>
<b>I</b>	EMT – I	<b>I</b>
<b>P</b>	EMT – P	<b>P</b>

#### PROCEDURE

- Ensure there is a patent airway
- Administer 100% oxygen via appropriate delivery system and perform appropriate patient assessment, including vital signs, SPO<sub>2</sub> reading and cardiac rhythm
- Verbally instruct the CPAP procedure to the patient
- Apply CPAP device, starting at 5 cm H<sub>2</sub>O
- Slowly titrate the pressure appropriately:
  - CHF / PULMONARY EDEMA = 10 cm H<sub>2</sub>O
  - ALL OTHER SOB / DYSPNEA = 5 cm H<sub>2</sub>O
- Continuously reassess the patient, obtaining vital signs every 5 minutes
- Monitor continuous SPO<sub>2</sub>
- Monitor continuous end tidal carbon dioxide monitoring (with nasal prongs) if available
- Follow the appropriate set of standing orders for your specific device for continued treatment
- Contact Medical Control as soon as possible to allow for prompt availability of hospital CPAP equipment and respiratory personnel

#### KEY POINTS

- The use of CPAP has long been recognized as an effective treatment for patients suffering from exacerbation of congestive heart failure and COPD. CPAP has recently shown promise in the out-of-hospital setting as well, by demonstrating favorable results in the treatment of acute congestive heart failure.
- You may use an aerosol treatment inline with CPAP
- The use of CPAP for the treatment of patients who might otherwise receive endotracheal intubation holds several benefits:
  - CPAP is a less invasive procedure with lesser risk of infection
  - CPAP eliminates the necessity of weaning the patient off an ET tube and ventilator
  - CPAP eliminates the necessity of sedating or paralyzing an alert patient by ALS or the emergency department staff in order to perform laryngoscopy
  - CPAP allows the alert patient to have a continued dialogue with his / her caregivers, allowing for the exchange of additional medical history. It also allows for the patient to be involved in the decision-making process for his / her care

**For circumstances in which the patient does not improve or continues to deteriorate despite CPAP and/or medicative therapy, terminate CPAP administration and perform BVM ventilation and endotracheal intubation if necessary**

## AIRWAY / BREATHING

### ESOPHAGEAL COMBITUBE

INDICATIONS	SIGNS AND SYMPTOMS	CONTRAINDICATIONS
<ul style="list-style-type: none"> <li>In an apneic patient when endotracheal intubation is not possible or not available</li> <li>Patient must be &gt; 4 feet (37Fr) or &gt;5 feet (41Fr)</li> <li>Patient must be unconscious</li> </ul>	<ul style="list-style-type: none"> <li>Respiratory and/or cardiac arrest</li> <li>Respiratory insufficiency when the patient is totally unconscious and unresponsive to outside stimuli</li> <li>After attempts at endotracheal intubation have not been successful</li> <li>EMT-Bs and EMT-Is may use the Esophageal Combitube as a primary airway in the above stated situations</li> </ul>	<ul style="list-style-type: none"> <li>Responsive victims (gag reflex present)</li> <li>Known esophageal disease or cirrhosis</li> <li>Caustic poison ingestion</li> <li>Foreign body in the trachea</li> <li>History of esophageal trauma or injury</li> <li>Presence of a tracheostomy or laryngectomy</li> <li>Suspected narcotic overdose or hypoglycemia prior to the administration of Narcan and/or Glucose</li> </ul>

<b>B</b>	EMT – B	<b>B</b>
<b>I</b>	EMT – I	<b>I</b>
<b>P</b>	EMT – P	<b>P</b>

### PROCEDURE

1. Preoxygenate the patient with 100% O<sub>2</sub>
2. Lubricate the tube
3. Remove dentures and/or suction any secretion from mouth and oropharynx
4. Remove oral airway if in use; place head and neck in neutral position
5. Grasp the patient's tongue and jaw with your gloved hand and pull forward
6. Gently insert the tube until the teeth are between the printed rings
7. Inflate line 1 (blue pilot balloon) leading to the pharyngeal cuff with 100 cc of air
8. Inflate line 2 (white pilot balloon) leading to the distal cuff with 15 cc of air
9. Ventilate the patient through the longer blue tube
  - Auscultate for breath sounds and sounds over the epigastrium
  - Look for the chest to rise and fall
10. If breath sounds are positive and epigastric sounds are negative, continue ventilation through the blue tube - the tube is in the esophagus
  - In the esophageal mode, stomach contents can be aspirated through the #2 white tube relieving gastric distention
11. If breath sounds are negative and epigastric sounds are positive, attempt ventilation through the shorter #2 white tube and reassess for lung and epigastric sounds - if breath sounds are present and the chest rises, you have intubated the trachea and continue ventilation through the shorter tube
12. Confirm tube placement using end-tidal CO<sub>2</sub> detector and/or esophageal bulb device
13. Secure the Combitube with appropriate securing device
14. Monitor SPO<sub>2</sub> and/or end tidal CO<sub>2</sub>

**DO NOT FORCE THE COMBITUBE INTO POSITION**

If the tube does not advance easily redirect it or withdraw and attempt one more insertion; if unsuccessful, continue ventilation with an oral airway and BVM

**REMOVAL OF THE COMBITUBE**

**INDICATIONS**

- If the patient begins to breathe spontaneously and effectively AND is resisting the presence of the Combitube

**PROCEDURE**

7. Turn victim on his/her side
8. Have suction equipment ready with large bore suction catheter in position
9. Deflate the pharyngeal cuff (blue pilot bulb)
10. Deflate the distal cuff (white pilot bulb) and remove the airway
11. Suction any emesis. A significant number of patients will vomit at this point.

**KEY POINTS**

- The Combitube is a single patient use device and is not to be cleaned and reused.
- You should not take more than ten seconds during any one attempt at inserting the Combitube. This will help prevent hypoxia.
- Insertion of the suction catheter may be initiated any time it is desirable to evacuate the stomach contents.
- In the event of cervical spine injury, be sure that the head, neck and back are secured in place during insertion of the tube. This is done to prevent any further injury.
- If lung sounds are present and gastric sounds absent with ventilations through the longer blue port, the Combitube has been placed in the esophagus.

## AIRWAY / BREATHING

### ESOPHAGEAL KING LT AIRWAY

INDICATIONS	SIGNS AND SYMPTOMS	CONTRAINDICATIONS
<ul style="list-style-type: none"> <li>In an apneic patient when endotracheal intubation is not possible or not available</li> <li>Patient must be unconscious</li> </ul>	<ul style="list-style-type: none"> <li>Respiratory and/or cardiac arrest</li> <li>Respiratory insufficiency when the patient is totally unconscious and unresponsive to outside stimuli</li> <li>After attempts at endotracheal intubation have not been successful</li> <li>EMT-Bs and EMT-Is may use the King Lt Airway as a primary airway in the above stated situations</li> </ul>	<ul style="list-style-type: none"> <li>Responsive victims (gag reflex present)</li> <li>Known esophageal disease or cirrhosis</li> <li>Caustic poison ingestion</li> <li>Foreign body in the trachea</li> <li>History of esophageal trauma or injury</li> <li>Presence of a tracheostomy or laryngectomy</li> <li>Suspected narcotic overdose or hypoglycemia prior to the administration of Narcan and/or Glucose</li> </ul>

### PROCEDURE

<b>B</b>	EMT – B	<b>B</b>
<b>I</b>	EMT – I	<b>I</b>
<b>P</b>	EMT – P	<b>P</b>

1. Choose the proper size tube based on patient's height, test all cuffs, have a spare King Airway ready
2. Lubricate the tube, avoid the ventilatory openings
3. Preoxygenate the patient with 100% O<sub>2</sub>
4. Remove dentures and/or suction any secretion from mouth and oropharynx
5. Remove oral airway if in use; place head and neck in sniffing or neutral position insuring no gag reflex present
6. With the King Airway rotated laterally 45-90° such that the blue orientation line is touching the corner of the mouth, introduce tip into moth and advance behind base of tongue. Never force the tube into position.
7. As tube passes under tongue. Rotate tube back to midline (blue orientation line faces chin).
8. Without exerting excessive force, advance King Airway until base of connector aligns with teeth or gums.
9. Fully inflate cuffs using the maximum volume of the syringe included in the EMS kit.
10. Attach the breathing circuit or resuscitator bag to the 15 mm connector of the King Airway. While gently bagging the patient to assess ventilatorn, simultaneously withdrawl the airway until ventilation is easy and free flowing (large tidal volume with minimal airway pressure).
11. Depth markings are provided at the proximal end of the King Airway which refer to the distance from the distal ventilatory openings. When properly placed with the distal tip and cuff in the upper esophagus and the ventilatory openings aligned with the opening to the larynx, the depth markings give an indication of the distance, in cm, to the vocal cords.
12. Confirm proper position by auscultation, chest movement and verification of CO<sub>2</sub> by capnography.
13. Readjust cuff inflation to 60 cm H<sub>2</sub>O (or to just seal volume).
14. Secure King Airway to patient using tape or other accepted means. A bite block can also be used, if desired. **DO NOT COVER THE PROXIMAL OPENING OF THE GASTRIC ACCESS LUMEN OF THE King Airway.**
15. Monitor SPO<sub>2</sub> and/or end tidal CO<sub>2</sub>

## REMOVAL OF THE KING AIRWAY

Once it is in the correct position, the King Airway is well tolerated until the return of protective reflexes. King Airway removal should always be carried out in an area where suction equipment and ability for rapid intubations are present. For the King airway removal, it is important that both cuffs are completely deflated.

### KEY POINTS

- The King Airway is a single patient use device and is not to be cleaned and reused
- You should not take more than ten seconds during any one attempt at inserting the Airway, this will help prevent hypoxia
- Insertion of the suction catheter may be initiated any time it is desirable to evacuate the stomach contents
- In the event of cervical spine injury, be sure that the head, neck and back are secured in place during insertion of the tube, this is done to prevent any further injury

## AIRWAY / BREATHING

### ENDOTRACHEAL INTUBATION

INDICATIONS	SIGNS AND SYMPTOMS	CONTRAINDICATIONS
<ul style="list-style-type: none"> <li>An unconscious patient without a gag reflex who is apneic or is demonstrating inadequate respiratory effort</li> </ul>	<ul style="list-style-type: none"> <li>Unstable airway</li> <li>Respiratory arrest</li> <li>Cardiac arrest</li> <li>GCS less than 8 without a treatable cause (for example, hypoglycemia)</li> </ul>	<ul style="list-style-type: none"> <li>Patient intolerance is only a relative contraindication to this procedure.</li> </ul>

I	EMT – I	I
P	EMT – P	P

#### PROCEDURE

1. Cervical immobilization should be applied to the patient when indicated by mechanism of injury or when it is deemed necessary
2. Prepare all equipment and have suction ready
3. Hyperoxygenate the patient with 100% O<sub>2</sub> prior to attempt
4. Suction the pharynx as needed
5. Open the patient's airway and holding the laryngoscope in the left hand, insert the blade into the right side of the mouth and sweep the tongue to the left
6. Use the blade to lift the tongue and epiglottis (either directly with the straight blade or indirectly with the curved blade)
7. Once the glottic opening is visualized, slip the tube through the cords and continue to visualize until the cuff is past the cords
8. No more than 30 seconds may be used per attempt
  - a. Re-ventilation for at least 30 seconds after each attempt
  - b. Some situations such as copious vomiting or bleeding may require suction attempts longer than 30 seconds; these are the exception, not the norm
9. Remove the stylet
10. Inflate the cuff of the endotracheal tube with 10 cc of air
11. Attach the bag-valve device to the ET tube and ventilate the patient
12. Assess for tube placement:
  - a. Confirmation of lung sounds in the apices and bases bilaterally, absence of epigastric sounds
  - b. Good compliance with bag-valve ventilation.
  - c. Color change of end tidal CO<sub>2</sub> detector (purple to yellow)  
Not reliable in cardiac arrest with a long down time
  - d. Chest rise with ventilation
13. If placement cannot be confirmed or obtained, the ETT shall be removed, an oral airway placed, and the patient shall be ventilated with a bag-valve-mask
14. If proper placement is confirmed, the cm markings on the tube at the level of the teeth shall be noted and secure the tube with a commercial tube holder
15. Document ETT size, time, result (success), and placement location by the centimeter marks either at the patient's teeth or lips in the patient care report (PCR); document all devices used to confirm initial tube placement and document positive or negative breath sounds before and after each movement of the patient
16. Routinely reassess for proper tube placement; the initial tube placement and all reassessments must be documented

#### KEY POINTS

- It is essential to have complete and detailed documentation concerning the placement of the endotracheal tube. The documentation MUST include:
  1. Placement- direct visualization of the tube passing through the vocal cords
  2. Confirmation- equal lung sounds, no sounds over the epigastric area, positive color change in the CO<sub>2</sub> detector, and chest wall movement with ventilations. Also, consider changes in the patient's SpO<sub>2</sub>.
- Applying c-collar may assist in minimizing ETT movement
- If there is any doubt about proper placement, the tube shall be removed
- Tube placement must be confirmed; after it is initially placed, after every movement, any significant change in patient status, and prior to entering the Emergency Department
- Continually monitor the patient's SpO<sub>2</sub>, ease of ventilation, heart rate, and presence of JVD
- A common complication of endotracheal intubation and/or manual ventilation is a pneumothorax and tension pneumothorax. Refer to the Chest Decompression Protocol.

- Intubation does NOT have to be attempted in pediatric patients if their airway can be effectively managed with BVM ventilations

## TUBE REMOVAL

If the patient begins to breathe spontaneously and effectively and is resisting the presence of the tube, removal of the tube may be necessary. The following procedures will be followed:

1. Explain procedure to victim
2. Prepare suction equipment with large-bore catheter and suction secretions from endotracheal tube, mouth and pharynx
3. The lungs should be completely inflated so that the patient will initially cough or exhale as the tube is taken from the larynx; this is accomplished in 2 ways:
  - a. The patient is asked to take the deepest breath they possibly can and, at the very peak of the inspiratory effort, the cuff is deflated and the tube removed rapidly; or
  - b. Positive pressure is administered with a hand-held ventilator and, at the end of deep inspiration, the cuff is deflated and the tube rapidly removed
4. Prepare to suction secretions and gastric content if vomiting occurs
5. Appropriate oxygen is then administered
6. The patient's airway is immediately evaluated for signs of obstruction, stridor or difficulty breathing; the patient should be encouraged to take deep breaths and to cough

## TUBE SIZING

The size of tube that can be passed easily into most adults is 8.0 mm (id). Therefore this tube should be tried first on the average adult. The size of tube is judged by the size of the adult, not by age.

For children, the proper tube is usually equal to the size of the child's little finger. The following guide will also help in determining the proper size tube:

- Premature.....3mm (id)      18-24 months.....5-6mm (id)
- 14-24 weeks....4mm (id)      2-4 years.....6mm (id)
- 6-12 months....4-5mm (id)      4-7 years.....6-7mm (id)
- 12-18 months....5mm (id)      7-10 years.....7mm (id)

### KEY POINTS

- All the above tube sizes are still dependent on the child's size rather than consideration of age
- Children before puberty should have a cuffless tube, or if the tube has a cuff it should not be inflated after insertion

## AIRWAY / BREATHING

### END TIDAL CO<sub>2</sub> DEVICE

INDICATIONS	SIGNS AND SYMPTOMS	CONTRAINDICATIONS
<ul style="list-style-type: none"> <li>The end-tidal CO<sub>2</sub> detector shall be used with all endotracheal, Combitube, or King airways</li> </ul>	<ul style="list-style-type: none"> <li>Shortness of breath</li> <li>Wheezing</li> <li>History of COPD / Asthma</li> <li>Unable to complete full sentences</li> <li>Accessory muscle use</li> <li>Nasal flaring</li> <li>Fatigue</li> </ul>	This device is not to be used for: <ul style="list-style-type: none"> <li>Detection of hypercarbia</li> <li>Detect mainstem bronchial intubation</li> <li>During mouth to tube ventilation</li> </ul>



<b>B</b>	EMT – B	<b>B</b>
<b>I</b>	EMT – I	<b>I</b>
<b>P</b>	EMT – P	<b>P</b>

#### PROCEDURE

1. Remove detector from package (Do not remove end caps until ready to use device)
2. Attach end-tidal CO<sub>2</sub> detector to Combitube, King or endotracheal tube
3. Ventilate the patient with six breaths of moderate tidal volume
4. Note color change - a color change or CO<sub>2</sub> detection will be documented on each respiratory failure or cardiac arrest patient
5. Compare color of indicator on full end-expiration to color chart on product dome
6. The CO<sub>2</sub> detector shall remain in place with the airway and monitored throughout the prehospital care and transport - Any loss of CO<sub>2</sub> detection or color change is to be documented and monitored as procedures are done to verify or correct the airway problem
7. Tube placement should be verified frequently and always with each patient move or loss of color change in the end-tidal CO<sub>2</sub> detector
8. The detector may left in place during ventilation to assist in monitoring tube placement
9. If initial intubation attempts fail, the detector can be used for re-intubation on the same patient provided the indicator color still matches the "CHECK" color standard on product dome
10. Document the procedure and the results on/with the Patient Care Report (PCR)

## AIRWAY / BREATHING

### NEEDLE CRICOTHYROTOMY (ONLY IF TRAINED)

INDICATIONS	SIGNS AND SYMPTOMS	CONTRAINDICATIONS
<ul style="list-style-type: none"> <li>• Failed Airway Protocol</li> <li>• Management of an airway when standard airway procedures cannot be accomplished or have failed in a patient greater than or equal to 8 years of age</li> <li>• Unable to intubate by another route</li> <li>• Cervical spine injuries</li> <li>• Maxillo/facial trauma</li> <li>• Laryngeal trauma</li> </ul>	<p>Oropharyngeal obstruction from:</p> <ul style="list-style-type: none"> <li>• Edema from infection, caustic ingestion, allergic reaction, and/or inhalation injuries</li> <li>• Foreign body</li> <li>• Mass lesion</li> </ul>	<ul style="list-style-type: none"> <li>• Postoperative bleeding</li> <li>• Late bleeding</li> <li>• Abscess behind packing</li> <li>• Cellulitis of neck</li> <li>• Subcutaneous emphysema</li> <li>• Voice change</li> <li>• Feeling of lump in throat</li> <li>• Persistent stoma</li> <li>• Obstructive problems</li> <li>• Misplacement of the airway</li> </ul>
<b>P</b>	<b>EMT – P</b>	<b>P</b>

## PROCEDURE

1. If time permits, prep with appropriate antiseptic solution
2. Have suction supplies available and ready
3. Locate the cricothyroid membrane utilizing anatomical landmarks
4. Secure larynx laterally between thumb and forefinger
5. Relocates the cricothyroid membrane (in the midline between thyroid cartilage and cricoid cartilage)
6. Using the syringe and the finder needle supplied in the commercial needle cricothyrotomy kit (or a 5-cc syringe attached to a 10 to 14 gauge catheter-over-needle device if needed), insert the needle through the cricothyroid membrane at a 45 to 60 degree caudal angle
7. Confirm entry of needle in trachea by aspirating air through the syringe
8. If air is present, change the angle of insertion to 60 degrees
9. Advance the device to the level of the stop guide
10. Slide the plastic cannula along the needle into the trachea until the flange rests against the neck
11. Carefully remove the needle and syringe
12. Secure the cannula with the provided anchoring device
13. Attach the connecting tube to the 15mm connection
14. Attach a BVM to the connecting tube
15. Confirm placement by auscultation and observing patient for adequate chest rise; make certain ample time is used not only for inspiration but expiration as well
16. If unable to obtain an adequate airway, resume basic airway management and transport the patient as soon as possible
17. Regardless of success or failure of needle cricothyrotomy, notify the receiving hospital at the earliest possible time of a surgical airway emergency
18. Document time/procedure/confirmation/change in patient condition/time on the patient care record (PCR)

## KEY POINTS

### Guidelines for Sizing

- Adult (4.0 mm) Quick Trach: Any patient greater than 100 pounds (45kg) and greater than 2 years (24 months) in age
- Pediatric (2.0 mm) Quick Trach: Any patient less than 100 pounds (45 kg) and greater than 2 years (24 months) in age

## AIRWAY / BREATHING

### NEEDLE CHEST DECOMPRESSION

INDICATIONS	SIGNS AND SYMPTOMS	CONTRAINDICATIONS
<ul style="list-style-type: none"> <li>Tension pneumothorax with significant dyspnea</li> </ul>	<ul style="list-style-type: none"> <li>Severe or significant dyspnea</li> <li>Increasing dyspnea</li> <li>Tachypnea</li> <li>Hyporresonance</li> <li>Absent breath sounds on the affected side</li> <li>Tachycardia</li> <li>Possibly diminished breath sounds on the unaffected side</li> <li>Tracheal deviation (rare/late sign)</li> <li>Hypotension</li> <li>Distended neck veins</li> <li>Chest pain</li> <li>Extreme anxiety</li> <li>Altered LOC/coma</li> </ul>	<ul style="list-style-type: none"> <li>Insufficient training</li> </ul>

**P**      **EMT – P**      **P**

#### PROCEDURE

12. Confirm presence of a tension pneumothorax or identify strong clinical evidence in a rapidly deteriorating patient in the setting of major trauma
13. Locate the insertion site at the second intercostal space at the midclavicular line on the affected side of the chest
14. Prep the insertion site; use sterile gloves and utilize aseptic procedure to the fullest extent possible under the circumstances.
15. Insert the 2 inch, 16 gauge angiocath (1 inch, 18 gauge angiocath in patients less than 8 years) with a 10cc syringe attached, by directing the needle just over the top of the third rib (2nd intercostal space) to avoid intercostal nerves and vessels which are located on the inferior rib borders
16. Advance the catheter 1-2 inches (3/4 - 1 inch in patients less than 8 years) through the chest wall; pull back on the plunger of the syringe as the needle is advanced; tension should be felt until the needle enters the pleural space (a pop or give may also be felt); do not advance the needle any further.

In a tension pneumothorax, air under pressure should be released when the needle enters the pleural cavity. This will be heard as a rush of air through an open catheter-over-the-needle. If you are using a syringe attached to the catheter-over-the-needle you should be able to withdraw air by pulling out on the barrel of the syringe.

17. Withdraw the needle and advance the catheter until flush with the skin. Listen for a gush or hiss of air which confirms placement and diagnosis. Caution: this is frequently missed due to ambient noise.
18. Dispose of the needle properly and never reinsert into the catheter
19. Once the presence of a tension pneumothorax has been confirmed:
  - a. Remove the needle, leaving the catheter in place
  - b. Tape the catheter in place
  - c. A three-way stopcock can be used
9. Secure the catheter and rapidly transport the patient providing appropriate airway assistance

#### KEY POINTS

- A tension pneumothorax can occur in any situation in which a simple pneumothorax occurs
- A tension pneumothorax can occur WITHOUT trauma
- Some patients who are at risk of developing a tension Pneumothorax include those receiving positive pressure ventilation, any patient with blunt or penetrating trauma, and those with pre-existing lung diseases such as COPD
- Cover all penetrating chest trauma with an occlusive dressing taped on three sides
- In some cases of penetrating chest trauma, placing an occlusive dressing on the wound will convert an open pneumothorax to a closed tension pneumothorax. In these cases, treatment consists of removing the dressing and converting the wound back to an open pneumothorax. This may be the only treatment needed.
- DO NOT perform a chest decompression if the patient is not in significant respiratory distress and is otherwise stable.
- Major trauma victims should have catheter-over-the-needles placed on both sides of the chest with or without one-way valve devices, if all of the following are present:
  20. Obvious chest trauma
  21. Patient intubated
 Difficulty bagging, tracheal deviation, or absent breath sounds on one/both sides

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## AIRWAY / BREATHING

### PULSE OXIMETRY

INDICATIONS	SIGNS AND SYMPTOMS	CONTRAINDICATIONS
<ul style="list-style-type: none"> <li>• Patients with suspected hypoxemia</li> <li>• All cases of respiratory distress</li> <li>• For the treatment of primary respiratory or cardiac disease</li> <li>• All cases of altered or depressed level of consciousness</li> <li>• Drug overdoses</li> <li>• Any patient requiring intubation or BVM support</li> <li>• Major trauma</li> <li>• Smoke Inhalation (may not be accurate due to CO)</li> <li>• Any patient on home oxygen, home ventilator, or BiPAP</li> </ul>	<ul style="list-style-type: none"> <li>• Dyspnea</li> <li>• Tachypnea</li> <li>• Tachycardia</li> <li>• Bradycardia (late sign in adults)</li> <li>• Altered mental status</li> <li>• Pallor, cyanosis</li> <li>• Diaphoresis</li> <li>• Prolonged capillary refill</li> <li>• Accessory muscle use</li> <li>• Abnormal breath sounds</li> </ul>	<ul style="list-style-type: none"> <li>• Poor perfusion; must be applied with good perfusion</li> <li>• Patients with history of anemia</li> <li>• Patients with suspected high carboxyhemoglobin / methemoglobin (CO poisoning, smoke inhalation, heavy cigarette smokers)</li> </ul>

<b>B</b>	EMT – B	<b>B</b>
<b>I</b>	EMT – I	<b>I</b>
<b>P</b>	EMT – P	<b>P</b>

#### PROCEDURE

1. Turn the machine on and allow for self-tests
2. Apply probe to patient's finger or any other digit as recommended by the device manufacturer
3. Allow machine to register saturation level
4. Record time and initial saturation percent on room air if possible on/with the patient care report (PCR)
5. Verify pulse rate on machine with actual pulse of the patient
6. Monitor critical patients continuously until arrival at the hospital. If recording a one-time reading, monitor patients for a few minutes as oxygen saturation can vary
7. Document percent of oxygen saturation every time vital signs are recorded and in response to therapy to correct hypoxemia
8. In general, normal saturation is 97-99%. Below 94%, suspect a respiratory compromise.
9. Use the pulse oximetry as an added tool for patient evaluation. Treat the patient, not the data provided by the device.
10. The pulse oximeter reading should never be used to withhold oxygen from a patient in respiratory distress or when it is the standard of care to apply oxygen despite good pulse oximetry readings, such as chest pain
11. Factors which may reduce the reliability of the pulse oximetry reading include:
  - Poor peripheral circulation (blood volume, hypotension, hypothermia)
  - Excessive pulse oximeter sensor motion
  - Fingernail polish (may be removed with acetone pad)
  - Carbon monoxide bound to hemoglobin
  - Irregular heart rhythms (atrial fibrillation, SVT, etc.)
  - Jaundice

**All patients who require vital signs to be taken should have oxygen saturation measured and recorded as part of the vital signs**

**Measure oxygen saturation before applying oxygen and repeat the measurement after oxygen has been applied, do not delay oxygen administration in patients experiencing severe respiratory distress**

### TREATMENT GUIDELINES

SPO <sub>2</sub> READING	INTERPRETATION	ACTION
100% TO 95%	Ideal Range	No supplemental oxygen is needed
95% TO 90%	Mild to Moderate Hypoxemia	Check airway, start oxygen therapy via nasal cannula @ 4-6 lpm
90% TO 85%	Severe Hypoxemia	Check airway, start aggressive oxygen therapy, high flow oxygen via nonrebreather mask @ 15 lpm. Consider bag valve mask ventilation with 100% oxygen if the patient does not have adequate ventilations.
85% OR LESS	Respiratory Failure	Assist ventilations with 100% oxygen and bag valve mask; consider CPAP or intubation

### KEY POINTS

- 100% oxygen should be administered to all patients despite a good SpO<sub>2</sub> if they are hypoxic
- Make sure that all dirt and nail polish or any obstructive covering is removed to prevent the unit from giving a false reading
- Attempt to obtain a room air reading and a reading with supplemental oxygen
- Do not read while B/P being taken, may give false readings
- Oxygen saturation measurements must routinely be recorded as part of the run report; include those measurements taken as part of routine vital signs and those measurements taken before and after oxygen administration.
- Although the pulse oximeter displays the heart rate, the unit should not be used in place of the cardiac monitor and a physical assessment of the heart rate
- Oxygen saturation readings may be inaccurate in any situation where the flow of blood through the finger is impaired, such as:
  1. Hypotension or shock with poor peripheral perfusion
  2. Peripheral vascular disease
  3. Extremity injury with restriction of peripheral perfusion
  4. Cold extremities
- Oxygen saturation readings may be incorrectly high in situations such as carbon monoxide poisoning
- Many patients with COPD have chronic low oxygen readings and may lose their respiratory drive if administered prolonged high oxygen therapy; routinely assess pulse oximetry as well as respiratory drive when administering oxygen to these patients; do not withhold oxygen from any patient that requires it.
- The room air pulse oximetry reading is NOT required if the patient has been placed on supplemental oxygen prior to EMS arrival

## AIRWAY / BREATHING

### SUCTIONING

INDICATIONS	SIGNS AND SYMPTOMS	PRECAUTIONS
<ul style="list-style-type: none"> <li>Any patient who is having trouble maintaining an airway and fluid is noted in the oropharynx, endotracheal tube, or tracheostomy</li> <li>Tracheal suctioning should also be performed when rhonchi is heard in the intubated patient or tracheotomy patients</li> </ul>	<ul style="list-style-type: none"> <li>Obstruction of the airway (secondary to secretions, blood, or any other substance) in a patient currently being assisted by an airway adjunct such as a naso-tracheal tube, endotracheal tube, Combitube, tracheostomy tube, or a cricothyrotomy tube</li> </ul>	<ul style="list-style-type: none"> <li>The patient must be well oxygenated before attempting this procedure</li> </ul>

<b>B</b>	EMT – B	<b>B</b>
<b>I</b>	EMT – I	<b>I</b>
<b>P</b>	EMT – P	<b>P</b>

#### PROCEDURE:

##### ORAL SUCTIONING

- Body substance isolation procedures must be used
- Assess the need for suctioning
- If the patient requires artificial ventilations, hyperventilate the patient for 30 seconds prior to suctioning
- Select an appropriate size suction catheter
  - A soft flexible suction catheter or a whistle tip can be used if only fluids need to be removed
  - A Yankauer or a Tonsil Tip should be used for thick fluids, small particles, or large volumes
- Prepare a cup of sterile water or saline to flush the catheter after suctioning and in between attempts
- While maintaining aseptic technique, quickly insert the catheter into the patient's mouth until it is at the desired depth
- Apply suction and withdraw the catheter. Suction no more than 15 seconds per attempt.
- Immediately after each suction attempt, hyperventilate the patient (one breath every two seconds) for thirty seconds with 100% oxygen if the patient's ventilations require assistance
- Repeat this procedure as needed until the airway is clear

##### TRACHEAL SUCTIONING

- Body substance isolation procedures must be used
- Assess the need for suctioning
- Hyperventilate the patient prior to suctioning
- Select an appropriate size suction catheter
  - A soft flexible suction catheter or a whistle tip should be used
  - Yankauer or a Tonsil Tip should NOT be used
- Prepare a cup of sterile water or saline to flush the catheter after suctioning and in between attempts
- While maintaining aseptic technique, quickly insert the catheter into the endotracheal or tracheal tube until it is at the desired depth
- Apply suction and withdraw the catheter using a gentle rotating motion. Suction no more than 15 seconds per attempt
- Immediately after each suction attempt, hyperventilate the patient (one breath every two seconds) for thirty seconds with 100% oxygen
- Repeat this procedure as needed until the airway is clear

## KEY POINTS

### General

- In order to maintain aseptic technique, keep the distal end of the catheter in the wrapper when not being used
- If the suction catheter needs to be set down between suction attempts, place it back inside its wrapper
- Patients who require assisted ventilations should be hyperventilated before and after every suction attempt
- DO NOT suction for more than 15 seconds per attempt
- DO NOT insert farther than the desired depth
- If a backboarded patient vomits, turn the board on its side and then suction

### Oral Suctioning

- If using a soft flexible suction catheter, determine the length by holding it against the patient's face; measure from the edge of the patient's mouth to the tip of the ear lobe

### Tracheal Suctioning

- Even though endotracheal tubes isolate the trachea, if there is fluid present in the lower airway, oxygenation will be reduced
- There are many patients at home with tracheotomy tubes; these tubes have a tendency to become obstructed because the patient cannot cough normally; EMS is often called when these tubes become obstructed
- This procedure should be performed with aseptic technique; use an unopened sterile catheter for every patient
- Use the largest sized suction catheter that will fit down the endotracheal tube
- Estimate the length by looking at the distance between the end of the tube and the sternal notch; this approximates the level of the carina
- If tracheal secretions are extremely thick and unable to be removed, administer 2-3 ml of sterile saline followed by 2 BVM ventilations and then perform suctioning

## AIRWAY / BREATHING

### TRANSPORT VENTILATION DEVICE

INDICATIONS	SIGNS AND SYMPTOMS	CONTRAINDICATIONS
<ul style="list-style-type: none"> <li>Transport of an intubated patient</li> </ul>	<ul style="list-style-type: none"> <li>Pt. currently breathing with ventilation device</li> </ul>	<ul style="list-style-type: none"> <li>Insufficient training</li> </ul>

I	EMT – I	I
P	EMT – P	P

#### PROCEDURE

1. Confirm the placement of tube as per Airway Protocol
2. Ensure adequate oxygen delivery to the respirator device
3. Pre - oxygenate the patient as much as possible with bag-valve mask
4. Remove BVM and attach tube to respiration device
5. Per instructions of device, set initial respiration values. For example, set an inspiratory:expiratory ratio of 1:4 (for every 1 second of inspiration, allow 4 seconds and expiration) with a rate of 12 to 20
6. Assess breath sounds; allow for adequate expiratory time; adjust respirator setting as clinically indicated
7. If any worsening of patient condition, decrease in oxygen saturation, or any question regarding the function of the respirator, remove the respirator and resume bag-valve mask ventilations
8. Document time, complications, and patient response on the patient care report (PCR)

#### KEY POINTS

- Transportation ventilators may be used on successfully intubated patients according to the manufacturer's directions
- It must be noted that this is a short term adjunct, which must be monitored at all times to prevent tube displacement; if the patient begins to show any signs of further deterioration, the entire airway must be re-evaluated and a bag-valve mask should be used until the airway can be successfully stabilized

## CIRCULATION / SHOCK

### PERIPHERAL INTRAVASCULAR (IV) LINE

INDICATIONS	SIGNS AND SYMPTOMS	CONTRAINDICATIONS
<ul style="list-style-type: none"> <li>Any patient where intravenous access is indicated (significant trauma or mechanism, emergent or potentially emergent medical condition)</li> </ul>	<ul style="list-style-type: none"> <li>Dehydration</li> <li>Hypovolemia</li> <li>Need for drug therapy</li> </ul>	<ul style="list-style-type: none"> <li>Hypersensitivity to IV catheter</li> </ul>

I	EMT – I	I
P	EMT – P	P

#### PROCEDURE

1. Universal precautions
2. Prepare equipment
3. Inspect the IV solution for expiration date, cloudiness, discoloration, leaks, or the presence of particles
4. Connect IV tubing to the solution in a sterile manner, fill the drip chamber half full and then flush the tubing bleeding all air bubbles from the line
5. Place a tourniquet around the patient's extremity to restrict venous flow only
6. Select a vein and an appropriate gauge catheter for the vein and the patient's condition; the initial attempt should be the dorsum of hand, further attempts should proceed to the forearm and then the antecubital fossa if necessary
7. Prep the skin with an antiseptic solution
8. Insert the needle with the bevel up into the skin in a steady, deliberate motion until the bloody flashback is visualized in the catheter
9. Advance the catheter into the vein, never reinsert the needle through the catheter, dispose of the needle into the proper container without recapping
10. Draw blood samples when appropriate
11. Remove the tourniquet and connect the IV tubing
12. Open the IV to ensure free flow of the fluid and then adjust the flow rate as per protocol or as clinically indicated
13. Secure IV using appropriate measures to ensure stability of the line
14. Check for signs of infiltration
15. Adjust flow rate
16. Document the procedure, time and result (success) in the patient care report (PCR)

#### KEY POINTS

- IV's will be started by the EMT-Intermediate and/or the Paramedic as allowed by each patient care protocol
- IV placement must not delay transport of any critical patient involved in trauma
- Generally, no more than two (2) attempts or more than two minutes should be spent attempting an IV; if unable to initiate IV line, transport patient and notify hospital IV was not able to be started
- IVs may be started on patients of any age providing there are adequate veins and patient's condition warrants an IV
- All IV rates should be at KVO (minimal rate to keep vein open) unless administering fluid bolus
- Extreme care should be made to discard of all IV sharps in the appropriate sharps container immediately after cannulation, no sharps should be found on patient/ sheets after transport to the hospital
- Any venous catheter which has already been accessed prior to EMS arrival may be used
- Upper extremity IV sites are preferable to lower extremity sites
- Lower extremity IV sites are contraindicated in patients with vascular disease or diabetes
- In post-mastectomy patients, avoid IV, blood draw, injection, or blood pressure in arm on affected side

## CIRCULATION / SHOCK

### EXTERNAL JUGULAR INTRAVASCULAR (IV) LINE

I	EMT – I	I
P	EMT – P	P

INDICATIONS	SIGNS AND SYMPTOMS	CONTRAINDICATIONS
<ul style="list-style-type: none"> <li>External jugular vein cannulation is indicated in a critically ill patient &gt; 12 years of age who requires intravenous access for fluid or medication administration and in whom an extremity vein is not obtainable</li> <li>External jugular cannulation can be attempted initially in life threatening events where no obvious other peripheral site is noted</li> </ul>	<ul style="list-style-type: none"> <li>Dehydration</li> <li>Hypovolemia</li> <li>Need for drug therapy</li> </ul>	<ul style="list-style-type: none"> <li>Only (1) attempt per patient</li> <li>Start IV away from head, towards feet</li> </ul>

#### PROCEDURE

1. Place the patient in a supine head down position. This helps distend the vein and prevents air embolism.
2. Turn the patient's head toward the opposite side if no risk of cervical injury exists.
3. Position yourself at patient's head
4. Locate external jugular vein
5. Prep the site as per peripheral IV site
6. Select IV catheter
  - a. On adults, a large bore (16ga or 18ga) may be used
  - b. Use 2" IV catheter when available
7. Align the catheter with the vein and aim toward the same side shoulder
8. Tourniqueting the vein lightly with one finger above the clavicle, puncture the vein midway between the angle of the jaw and the clavicle and cannulate the vein in the usual method
9. Attach the IV and secure the catheter avoiding circumferential dressing or taping
10. Secure IV using appropriate measures to ensure stability of the line
11. Check for signs of infiltration
12. Adjust flow rate

**ONLY (1) ATTEMPT SHOULD BE MADE DURING EXTERNAL JUGULAR IV  
DO NOT ATTEMPT AN IV ON THE OTHER SIDE OF THE NECK**

Document the procedure, time, and result (success) on/with the patient care report (PCR)

## CIRCULATION / SHOCK

### SALINE LOCK PROCEDURE

I	EMT – I	I
P	EMT – P	P

#### PROCEDURE

1. Prepare equipment: Attach pre-pierced adapter to extension tubing, inject saline (approx. 1cc) in to tubing and leave syringe attached to tubing
2. The initial attempt should be the dorsum of hand, further attempts should proceed to the forearm; the antecubital fossa should not be used for saline locks
3. Apply tourniquet
4. Cleanse site with alcohol
5. Insert the needle with the bevel up into the skin in a steady, deliberate motion until the bloody flashback is visualized in the catheter
6. Advance the catheter into the vein; never reinsert the needle through the catheter, dispose of the needle into the proper container without recapping
7. Draw blood samples when appropriate
8. Remove the tourniquet and connect the IV tubing
9. Attach IV tubing and push remaining saline through tubing and catheter, remove syringe
10. Secure IV using appropriate measures to ensure stability of the line
11. Check for signs of infiltration

#### KEY POINTS

- Saline lock is preferred for patients who do not need immediate IV medication or fluids
- Saline locks can be used whenever a patient requires an IV primarily for medication administration, or for any patient where the IV would have been ran at TKO rate (except for traumas and cardiac/respiratory arrest)
- A saline lock should not be used with a 14 or 16 gauge IV unless attached to IV tubing and a bag of normal saline
- Extreme care should be made to discard of all IV sharps in the appropriate sharps container immediately after cannulation, no sharps should be found on patient/ sheets after transport to the hospital

#### Blood Draws

- Blood specimen drawing should be performed whenever the patient has a medical condition requiring an IV
- Blood draws are not required if the IV site may become compromised, trauma, or the patient's condition dictates otherwise
- Blood tubes should be labeled with the patient's name and initialized by the drawer of the specimen, and placed in a biohazard bag
- If the tube does not draw a vacuum, discard tube and try another of the same color
- Tube should be rotated upright, not shaken, when mixing additives and blood
- Blood alcohol levels are to be taken in the ED, not the EMS vehicle

**INTRAOSSIOUS (IO) INFUSION**

**ADULT INTRAOSSIOUS INFUSION - F. A. S. T. 1 SYSTEM: (For Paramedics trained in technique)**

INDICATIONS	SIGNS AND SYMPTOMS	CONTRAINDICATIONS
<ul style="list-style-type: none"> <li>• Inability to obtain peripheral access in a patient greater than 12 years of age that requires access in an emergency manner</li> <li>• May administer all medication and dose the same as a peripheral IV</li> </ul>	<ul style="list-style-type: none"> <li>• Unresponsive</li> <li>• Cardiopulmonary arrest</li> <li>• Decompensated shock</li> </ul>	<ul style="list-style-type: none"> <li>• The patient is <b>NOT</b> unconscious and unresponsive</li> <li>• The patient is postictal and is awakening</li> <li>• The patient has an estimated weight of less than 100 lbs. (45kg)</li> <li>• Vascular access is prophylactic and is not emergently required</li> <li>• Patient has an infection or injury overlying the upper sternum (manubrium)</li> <li>• Inability to accurately determine the landmarks require for placement</li> </ul>

**P EMT – P P**

**PROCEDURE: F.A.S.T. 1 SYSTEM**

1. Identify the insertion site. The F.A.S.T. 1 Intraosseous Sternal Infusion System recommended site is the manubrium on the midline and 1.5 cm below and inferior to the suprasternal notch; proper placement of the patch helps assure insertion at this site; this is referred to as the **ATarget Zone®**.
2. Use universal precautions
3. Explain procedure to patient if they are conscious
4. Prep site with sterile iodine solution such as Betadine and clean with alcohol as a sterile procedure
5. Locate the sternal notch with index finger and apply patch; verify that target zone is midline over the manubrium
6. Remove sharp protector and position introducer in the target perpendicular to the skin
7. Push introducer with gradually increasing force until the introducer release is heard and felt
8. Remove the introducer and replace the sharp protector
9. Connect the infusion tubing to the male connector on the patch
10. Attach the female connector and begin running fluids; check for infiltration.
12. Apply protector dome to site
13. Ensure the removal kit accompanies patient to the hospital and is given to ED personnel with removal instructions taped to IV bag for transport

**ONLY (1) ATTEMPT SHOULD BE MADE USING THIS DEVICE**

**INTRAOSSEROUS (IO) INFUSION EZ-IO**

**INTRAOSSEROUS INFUSION EZ-IO ADULT SYSTEM: (For Paramedics trained in technique)**

INDICATIONS	SIGNS AND SYMPTOMS	CONTRAINDICATIONS
<ul style="list-style-type: none"> <li>• Wt. &gt;40 kg</li> <li>• Unable to access peripheral IV</li> </ul>	<ul style="list-style-type: none"> <li>• Altered level of consciousness</li> <li>• Arrhythmias</li> <li>• Burns</li> <li>• Cardiac arrest</li> <li>• Dehydration</li> <li>• Head injury</li> <li>• Hypotension</li> <li>• Respiratory arrest</li> <li>• Seizures</li> <li>• Shock</li> <li>• Traumatic injuries</li> <li>• Other medical conditions when immediate vascular access is required</li> </ul>	<ul style="list-style-type: none"> <li>• Fracture of the tibia or humerus</li> <li>• Previous orthopedic procedures</li> <li>• Pre-existing medical condition</li> <li>• Infection at the insertion</li> <li>• Inability to locate landmarks</li> <li>• Excessive tissue over the insertion site</li> </ul>

**PROCEDURE**

**P EMT – P P**

1. Select site: Tibia medial to the tibial tuberosity on flat plane of tibia or Humerus upper lateral humeral head, outer aspect
2. Provide routine medical care
3. Locate the anatomical site and prep with Betadine and/or alcohol
4. Infiltrate the site (just below the dermis) with several cc's of 1% Lidocaine
5. Load the needle onto the driver
6. Firmly stabilize the area near (not under) the insertion site
7. Firmly press the needle against the site at a 90° angle and operate the driver, use firm, gentle pressure
8. As the needle reaches the bone, stop and be sure that the 5mm marking on the needle is visible; if it is, continue to operate the driver
9. When a sudden decrease in resistance is felt and the flange of the needle rests against the skin, remove the driver and remove the stylet from the catheter
10. Slowly Inject 1-2cc bolus of Lidocaine into bone marrow prior to NS flush in conscious patients
11. Use a syringe to infuse 10-20 cc's 9%NS
12. If no s/s of infiltration are found, attach the IV line and infuse fluids and medications as normal (IV bag will need to be under pressure)
13. Secure the needle and dress the site

**INTRAOSSUEOUS (IO) INFUSION MANUAL PEDIATRIC SYSTEM**

**INTRAOSSUEOUS INFUSION - PEDIATRIC SYSTEM:**

<b>INDICATIONS</b>	<b>SIGNS AND SYMPTOMS</b>	<b>CONTRAINDICATIONS</b>
<ul style="list-style-type: none"> <li>Life threatening illness or injury in a child 6 years of age (72 months) after effective ventilation is established</li> </ul>	<ul style="list-style-type: none"> <li>Unresponsive</li> <li>Cardiopulmonary arrest</li> <li>Decompensated shock</li> <li>This procedure is indicated primarily in children less than 8 years old</li> </ul>	<ul style="list-style-type: none"> <li>A pediatric patient who is conscious or responsive to pain</li> <li>A pediatric patient who is 7 years old or older</li> <li>Gross infection, osteomyelitis, or cellulitis at the intended site (use the other leg if possible)</li> <li>Fracture at or above the intended site (use the other leg if possible)</li> <li>Unsuccessful IO attempt (use the other leg if possible)</li> </ul>

**P EMT – P P**

**PROCEDURE:**

**Manual IO Device:**

- Expose the lower leg
- Identify the tibial tubercle (bony prominence below the knee cap) on the proximal tibia; the insertion location will be 1-2 cm (2 finger widths) below this and medially
- Prep the site as per peripheral IV site
- Attempt to have feet in flexed position against board or sandbag
- Needle insertion varies between 70 and 90 degree angle to the skin surface, approximately one to two finger breadths distal to the tibial tuberosity; with a straight steady push and/or rotary motion, push needle through subcutaneous tissue and bone until a drop or pop is felt
- Remove the trocar and attach the IV
- Once the needle has reached the bone marrow, saline should be injected via syringe to clear needle
- Observe for signs of subcutaneous infiltration
- The needle should feel firm in position and stand upright without support
- Stabilize and secure the needle with a hemostat, 4x4 pads and tape
- Infusion via this route is the same as venous access without limit to rate of administration, drugs pushed or fluid type infused, pressure infusor may be necessary to facilitate flow
- Document the procedure, time, and result (success) on/with the patient care report (PCR)

**INTRAOSSIOUS (IO) INFUSION EZ-IO PEDIATRIC**

**P** EMT – P **P**

**INTRAOSSIOUS INFUSION EZ-IO PEDIATRIC SYSTEM: (For Paramedics Trained in Technique)**

- Patient Weight between 3 to 39 Lbs.
- Follow procedures for EZ-IO Adult System protocol (page 27)

**IF ATTEMPT UNSUCCESSFUL, REMOVE NEEDLE AND APPLY PRESSURE TO AREA FOR 5 MINUTES.**

**INTRAOSSIOUS INFUSIONS OF FLUID MAY CAUSE SUBCUTANEOUS INFILTRATION, OSTEOMYELITIS, OR SUBCUTANEOUS INFECTIONS.**

**KEY POINTS**

- An IO can administer any medication or fluid that can be administered by an IV.
- Consider using a three-way stopcock, and a syringe with the IV tubing. Use the pull-push method to infuse fluid.
- A blood pressure cuff may have to be used to apply pressure to the IV bag to maintain an adequate flow rate.
- An IO can be attempted prior to attempting an IV if the patient is in cardiac arrest or is in decompensated shock

## CIRCULATION / SHOCK

### RESQPOD

An Impedance Threshold Device (ITD) that provides Perfusion on Demand (POD) by regulating pressure in the thorax during CPR.

INDICATIONS	SIGNS AND SYMPTOMS	CONTRAINDICATIONS
<ul style="list-style-type: none"> <li>To be used during CPR with either a BVM, ET tube or BID (KingLT or Combitube)</li> </ul>	<ul style="list-style-type: none"> <li>Cardiac Arrest</li> </ul>	<ul style="list-style-type: none"> <li>Spontaneously breathing patients</li> </ul>

<b>B</b>	EMT – B	<b>B</b>
<b>I</b>	EMT – I	<b>I</b>
<b>P</b>	EMT – P	<b>P</b>

The ResQPOD:

- Doubles blood flow to the heart
- Increases blood flow to the brain by 50%
- Doubles systolic BP
- Increases survival rates
- Increases the likelihood of successful defibrillation
- Circulates drugs more effectively

#### Using the ResQPOD on a facemask (BVM)

1. Connect the ResQPOD to the facemask
2. Open the airway. Maintain a tight face seal throughout chest compressions using the 2 handed technique.
3. Connect the ventilation source to the ResQPOD. (Bag or mouthpiece)
4. Perform CPR at 30:2 ratio

#### Using the ResQPOD on an ET tube or BID.

1. Confirm tube placement and secure.
2. Connect the ResQPOD to the tube.
3. Connect the ventilation source
4. Perform continuous chest compressions @ 100/min.
5. Remove clear tab and turn on the timing assist light. Ventilate asynchronously at the timing light flash rate of 10/min. **DO NOT HYPERVENTILATE**
6. Place Capnography or ETCO2 detector between the ResQPOD and the ventilation source.

## CIRCULATION / SHOCK

### RESQGARD

An Impedance Threshold Device (ITD) that provides a rapid non-invasive way to treat low blood pressure in spontaneously breathing patients.

INDICATIONS	SIGNS AND SYMPTOMS	CONTRAINDICATIONS
Treats Hypotension due to: <ul style="list-style-type: none"> <li>• Orthostatic Intolerance</li> <li>• Early sepsis</li> <li>• Anesthesia &amp; analgesia</li> <li>• Dehydration</li> <li>• Blood Loss</li> <li>• Unknown causes</li> </ul>	<ul style="list-style-type: none"> <li>• Hypotension in Breathing patients</li> </ul>	<ul style="list-style-type: none"> <li>• Low or no respiratory drive</li> <li>• Intolerance to device</li> </ul>

### PROCEDURE:

<b>B</b>	EMT – B	<b>B</b>
<b>I</b>	EMT – I	<b>I</b>
<b>P</b>	EMT – P	<b>P</b>

Using the ResQGard on a facemask:

1. Connect the ResQGard to the facemask
2. Explain to the patient that they will feel slight resistance when inhaling. This means the device is working and helping to improve blood flow.
3. Hold the mask over the nose and mouth, maintaining a tight facemask seal. Attach the strap when patient is comfortable with the device.
4. Have the patient breathe @ 10-16/min. Inhaling slowly (over 2-3 secs.) and deeply: exhale normally.

Using the ResQGard with a mouthpiece:

1. Connect the ResQGard to the mouthpiece.
2. Explain to the patient that they will feel slight resistance when inhaling. This means the device is working and helping to improve blood flow.
3. Place the mouthpiece into the mouth and maintain a tight seal with the lips.
4. Breathe in through the mouth only @ 10-16/min. An optional nose clip prevents breathing through the nose.
5. Have the patient breathe @ 10-16/min. Inhaling slowly (over 2-3 secs.) and deeply: exhale normally.
  - Attach supplemental O<sub>2</sub> as needed.
  - Monitor vitals frequently.
  - If BP rises to acceptable level or patient will not tolerate, remove the ResQGard.
  - Reapply if BP drops again.

## MEDICAL

### BLOOD GLUCOSE ANALYSIS

INDICATIONS	SIGNS AND SYMPTOMS	CONTRAINDICATIONS
<ul style="list-style-type: none"> <li>Patients with suspected hypoglycemia (diabetic emergencies, change in mental status, bizarre behavior, etc.)</li> <li>Medical alert tags</li> <li>Drug / Toxic ingestion</li> </ul>	<ul style="list-style-type: none"> <li>Decreased mental status</li> <li>Change in baseline mental status</li> <li>Bizarre behavior</li> <li>Hypoglycemia: cool, diaphoretic skin</li> <li>Hyperglycemia: warm, dry skin; fruity breath; Kussmaul resps; signs of dehydration</li> </ul>	<ul style="list-style-type: none"> <li>Insufficient training</li> </ul>

<b>B</b>	EMT – B	<b>B</b>
<b>I</b>	EMT – I	<b>I</b>
<b>P</b>	EMT – P	<b>P</b>

### PROCEDURE

1. Gather and prepare equipment
2. Blood samples for performing glucose analysis may be obtained simultaneously with intravenous access
3. Place correct amount of blood on reagent strip or site on glucometer per the manufacturer's instructions
4. Time the analysis as instructed by the manufacturer
5. Document the glucometer reading and treat the patient as indicated by the analysis and protocol
6. Repeat glucose analysis as indicated for reassessment after treatment and as per protocol

### KEY POINTS

- Be aware of AMS as presenting sign of an environmental toxin or Haz-Mat exposure and protect personal safety.
- It is safer to assume hypoglycemia than hyperglycemia if doubt exists.
- Do not let alcohol confuse the clinical picture. Alcoholics frequently develop hypoglycemia.
- Low glucose (< 70), normal glucose (70 - 120), high glucose (> 250).
- Consider Restraints if necessary for patient's and/or personnel's protection per the restraint procedure.

## MEDICAL

### MEDICATION INJECTION

INDICATIONS	SIGNS AND SYMPTOMS	CONTRAINDICATIONS
<ul style="list-style-type: none"> <li>When medication administration is necessary and the medication must be given via the SQ or IM route or as an alternative route in selected medications</li> </ul>	<ul style="list-style-type: none"> <li>Determined per protocol</li> </ul>	<ul style="list-style-type: none"> <li>Allergy to medication per protocol</li> <li>Aspiration of blood</li> </ul>

I	EMT – I	I
P	EMT – P	P

#### INTRAMUSCULAR (IM)

##### PROCEDURE

1. Receive and confirm medication order or perform according to standing orders
2. Prepare equipment and medication expelling air from the syringe
3. Explain the procedure to the patient and reconfirm patient allergies
4. The possible injection sites for intramuscular injection include the arm, buttock and thigh, injection volume should not exceed 1 cc for the arm and not more than 2 cc in the thigh or buttock.
5. The thigh should be used for injections in pediatric patients and injection volume should not exceed 1 cc
6. Expose the selected area and cleanse the injection site with alcohol
7. Hold intramuscular syringe at 90 degree angle, with skin pinched and flattened
8. Insert the needle into the skin with a smooth, steady motion
9. Aspirate for blood
10. Inject the medication
11. Withdraw the needle quickly and dispose of properly without recapping
12. Apply pressure to the site
13. Monitor the patient for the desired therapeutic effects as well as any possible side effects
14. Document the medication, dose, route, and time on/with the patient care report (PCR)

#### SUBCUTANEOUS (SG)

##### PROCEDURE

1. Receive and confirm medication order or perform according to standing orders
2. Prepare equipment and medication expelling air from the syringe
3. Explain the procedure to the patient and reconfirm patient allergies
4. The most common site for subcutaneous injection is the arm. Injection volume should not exceed 1 cc
5. The thigh should be used for injections in pediatric patients and injection volume should not exceed 1 cc
6. Expose the selected area and cleanse the injection site with alcohol
7. Hold subcutaneous syringe at 45 degree angle
8. Insert the needle into the skin with a smooth, steady motion
9. Aspirate for blood
10. Inject the medication
11. Withdraw the needle quickly and dispose of properly without recapping
12. Apply pressure to the site
13. Monitor the patient for the desired therapeutic effects as well as any possible side effects
14. Document the medication, dose, route, and time on/with the patient care report (PCR)

**MEDICAL**

**ORTHOSTATIC BLOOD PRESSURE MEASUREMENT**

<b>INDICATIONS</b>	<b>SIGNS AND SYMPTOMS</b>	<b>CONTRAINDICATIONS</b>
<ul style="list-style-type: none"> <li>• Patient situations with suspected blood / fluid loss / dehydration</li> <li>• Patients &gt; 8 years of age, or patients larger than the Broselow-Luten tape</li> </ul>	<ul style="list-style-type: none"> <li>• Abdominal pain</li> <li>• Dizziness / Lightheaded</li> <li>• Pregnancy</li> <li>• Syncope</li> </ul>	<ul style="list-style-type: none"> <li>• Prepare for patient being unsteady on feet</li> <li>• Unstable patient</li> </ul>

<b>B</b>	EMT – B	<b>B</b>
<b>I</b>	EMT – I	<b>I</b>
<b>P</b>	EMT – P	<b>P</b>

**PROCEDURE**

1. Assess the need for orthostatics
2. Obtain patient’s pulse and blood pressure while supine
3. Have patient stand for one minute
4. Obtain patient’s pulse and blood pressure while standing
5. If pulse has increased by 20 bpm or systolic blood pressure decreased by 20 mmHg, the orthostatics are considered positive
6. If patient is unable to stand, orthostatics may be taken while the patient is sitting with feet dangling
7. If positive orthostatic changes occur while sitting, DO NOT continue to the standing
8. Document the time and vital signs for supine and standing positions in the patient report (PCR)
9. Determine appropriate treatment based on protocol

position care

## MEDICAL

### PAIN ASSESSMENT

INDICATIONS	SIGNS AND SYMPTOMS	CONTRAINDICATIONS
<ul style="list-style-type: none"> <li>Injury / Illness requiring pain management</li> </ul>	<ul style="list-style-type: none"> <li>Abdominal pain</li> <li>Chest pain secondary to infarction or angina</li> <li>Acute urinary retention</li> <li>Fractures</li> <li>Severe burns</li> <li>Kidney stones</li> <li>Musculoskeletal trauma</li> </ul>	<ul style="list-style-type: none"> <li>Altered level of consciousness</li> <li>Head injuries</li> <li>Chest injuries (blunt or penetrating)</li> <li>Intoxication</li> <li>Maxillofacial injuries</li> <li>Psychiatric problems</li> <li>Pediatric patients under 12 years of age</li> <li>Pregnancy</li> <li>Respiratory distress</li> </ul>

<b>B</b>	EMT – B	<b>B</b>
<b>I</b>	EMT – I	<b>I</b>
<b>P</b>	EMT – P	<b>P</b>

#### PROCEDURE

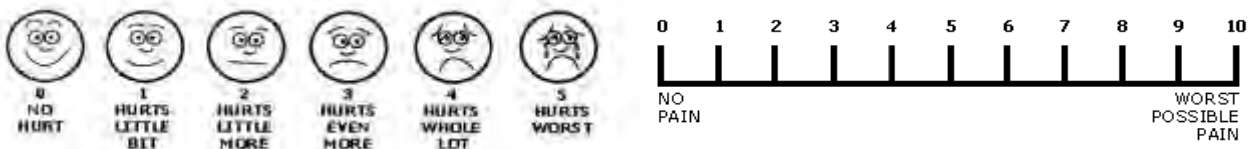
- Initial and ongoing assessment of pain intensity and character is accomplished through the patient's self report
- Pain should be assessed and documented during initial assessment, before and after starting pain control treatment, and with each set of vitals
- Pain should be assessed using the appropriate approved scale
- Two pain scales are available: the 0 - 10 and the Wong - Baker "Faces" scale
- 0-10 Scale: the most familiar scale used by EMS for rating pain with patients. It is primarily for adults and is based on the patient being able to express their perception of the pain as related to numbers. Avoid coaching the patient, simply ask them to rate their pain on a scale from 0 to 10, where 0 is no pain at all and 10 is the worst pain ever.
- Wong - Baker "Faces" scale: this scale is primarily for use with pediatrics but may also be used with geriatrics or any patient with a language barrier. The faces correspond to numeric values from 0-10. This scale can be documented with the numeric value or the textual pain description.

#### KEY POINTS

Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage  
Pain is subjective (whatever the patient says it is)

##### The Wong-Baker Faces Pain Rating Scale

Designed for children aged 3 years and older, the Wong-Baker Faces Pain Rating Scale is also helpful for elderly patients who may be cognitively impaired. It offers a visual description for those who don't have the verbal skills to explain how their symptoms make them feel.



To use this scale, your doctor should explain that each face shows how a person in pain is feeling. That is, a person may feel happy because he or she has no pain (hurt), or a person may feel sad because he or she has some or a lot of pain.

##### A Numerical Pain Scale

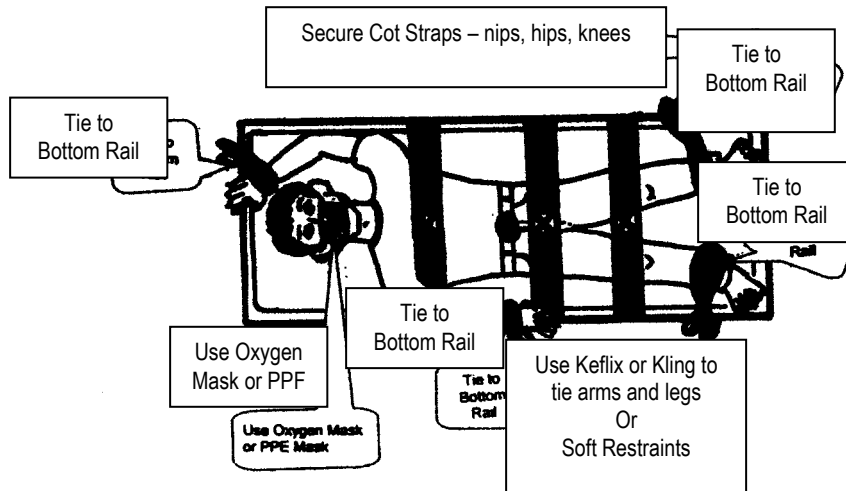
A numerical pain scale allows you to describe the intensity of your discomfort in numbers ranging from 0 to 10. Rating the intensity of sensation is one way of helping your doctor determine treatment. Numerical pain scales may include words or descriptions to better label your symptoms, from feeling no pain to experiencing excruciating pain. Some researchers believe that this type of combination scale may be most sensitive to gender and ethnic differences in describing pain.

## MEDICAL

### PATIENT RESTRAINT

INDICATIONS	SIGNS AND SYMPTOMS	CONTRAINDICATIONS
<ul style="list-style-type: none"> <li>Immobilization of an extremity for transport, either due to suspected fracture, sprain, or injury</li> <li>Immobilization of an extremity for transport to secure medically necessary devices such as intravenous catheters</li> </ul>	<ul style="list-style-type: none"> <li>Patient out of control and may cause harm to self or others</li> <li>Necessary force required for patient control without causing harm</li> <li>Head trauma</li> <li>Alcohol/Drug related problems</li> <li>Metabolic disorders (i.e. hypoglycemia, hypoxia, etc.)</li> <li>Psychiatric/Stress related disorders</li> </ul>	<ul style="list-style-type: none"> <li>None if warranted</li> </ul>

<b>B</b>	EMT – B	<b>B</b>
<b>I</b>	EMT – I	<b>I</b>
<b>P</b>	EMT – P	<b>P</b>



### KEY POINTS

- Soft restraints are to be used only when necessary in situations where the patient is potentially violent and may be of danger to themselves or others. EMS providers must remember that aggressive violent behavior may be a symptom of medical conditions.
- Patient health care management remains the responsibility of the EMS provider. The method of restraint shall not restrict the adequate monitoring of vital signs, ability to protect the patient's airway, compromise peripheral neurovascular status or otherwise prevent appropriate and necessary therapeutic measures. It is recognized that evaluation of any patient parameters requires patient cooperation and thus may be difficult or impossible.
- All restraints should have the ability to be quickly released, if necessary.
- Restraints applied by law enforcement (i.e. handcuffs) require a law enforcement officer to remain available to adjust restraints as necessary for the patient's safety. This policy is not intended to negate the need for law enforcement personnel to use appropriate restraint equipment to establish scene control.
- Patients shall not be transported in a face down prone position to endure adequate respiratory and circulatory monitoring and management.
- Restrained extremities should be monitored for color, nerve and motor function, and pulse quality.
- Place mask on patient for body secretion protection. May use TB mask, or non-rebreather if patient needs oxygen.
- Use supine or lateral positioning ONLY.
- Frequent distal neurovascular checks are required.
- DOCUMENT methods used and reason for restraint.

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## TRAUMA

### CERVICAL SPINE IMMOBILIZATION

INDICATIONS	SIGNS AND SYMPTOMS	CONTRAINDICATIONS
<ul style="list-style-type: none"> <li>Need for spinal immobilization as determined by protocol</li> </ul>	<ul style="list-style-type: none"> <li>Traumatic injury</li> <li>Suspected traumatic injury</li> <li>Unresponsive / Altered LOC of unknown origin</li> <li>Mechanism of Injury</li> </ul>	<ul style="list-style-type: none"> <li>Insufficient training</li> </ul>

<b>B</b>	EMT – B	<b>B</b>
<b>I</b>	EMT – I	<b>I</b>
<b>P</b>	EMT – P	<b>P</b>

#### PROCEDURE

- Gather a backboard, straps, C-collar appropriate for patient's size, tape, and head rolls or similar device to secure the head
- Explain the procedure to the patient
- Place the patient in an appropriately sized C-collar while maintaining in-line stabilization of the C-spine. This stabilization, to be provided by a second rescuer, should not involve traction or tension but rather simply maintaining the head in a neutral, midline position while the first rescuer applies the collar.
- Once the collar is secure, the second rescuer should still maintain their position to ensure stabilization (the collar is helpful but will not do the job by itself)
- Place the patient on a long spine board with the log-roll technique if the patient is supine or prone. For the patient in a vehicle or otherwise unable to be placed prone or supine, place them on a backboard by the safest method available that allows maintenance of inline spinal stability.
- Stabilize the patient with straps and head rolls/tape or other similar device. Once the head is secured to the backboard, the second rescuer may release manual in-line stabilization.
- NOTE: Some patients, due to size or age, will not be able to be immobilized through inline stabilization with standard backboards and C-collars. Never force a patient into a non-neutral position to immobilize them. Such situations may require a second rescuer to maintain manual stabilization throughout transport to the hospital.
- Document the time of the procedure in the patient care report (PCR)

## KEY POINTS

- Use of a backboard for stabilization injuries other than the neck or to move the patient, does not automatically require cervical immobilization
- Use of cervical immobilization in adult trauma patients should always be followed with long board immobilization, including straps
- Never leave patients alone if they are fully immobilized; be prepared to turn the long board while maintaining C-spine stabilization if the patient begins to vomit
- A C-collar by itself does NOT adequately immobilize the patient
- Document the decision to not provide cervical spine immobilization if not performed

### **Trauma**

In trauma cases the neck should be immobilized under any of the following circumstances:

- The patient complains of neck pain, pain on palpation, or pain with range of motion
- The patient complains of numbness, tingling, or motor weakness in any extremity
- Mechanism of injury with other distracting injuries
- The patient has a head injury, altered mental status, or language barrier, which limits the patient's ability to describe pain, numbness or weakness
- Any time the paramedic or EMT judges that cervical immobilization is necessary
- Mechanism of injury with patient intoxication
  - If the history suggests a mechanism of injury, which could result in cervical injury in a patient who is intoxicated, cervical immobilization must be provided whether or not the patient is alert and oriented
  - This does not mean that every grossly intoxicated patient who is unable to provide reliable responses should have cervical immobilization
    - If the mechanism of injury is such that a neck injury is not a reasonable possibility, cervical immobilization is not indicated ; I.E. if a call involves a grossly intoxicated person who has an isolated ankle injury after a simple fall

### **Pediatric Considerations:**

Small children (less than 8 years of age) have relatively large heads. Use of standard cervical immobilization and backboards will result in cervical flexion. Use an immobilization method that avoids flexion of the neck. Current approved methods include, but are not limited to;:

- Devices which have a recess for the child's occiput (Pedipak with padding applied)
- Placing the patient into the sniffing position by placing padding under the shoulders and lower back
- Cervical collars should be used along with any of these modifications, unless there is not an appropriate size c-collar; if a circumstance prevents the use of a c-collar, other approved methods of immobilization include;
  - Manual immobilization
  - Blanket or towel roll immobilization
  - Tape immobilization

## TRAUMA

### HELMET REMOVAL

REMOVAL OF HELMET	LEAVE HELMET IN PLACE
<ul style="list-style-type: none"> <li>• Inability to access, assess and maintain airway and breathing</li> <li>• Improperly fitted helmet allowing for excessive head movement within helmet</li> <li>• Proper C-spine alignment and immobilization cannot be achieved</li> <li>• Cardiac arrest</li> <li>• EMT's are trained in technique</li> </ul>	<ul style="list-style-type: none"> <li>• Helmet fits well with little or no movement of head in helmet</li> <li>• No impending airway or breathing problems</li> <li>• Removal may cause further injury</li> <li>• Proper C-spine alignment and immobilization can be achieved with helmet in place</li> <li>• There is no interference with the ability to assess and reassess airway and breathing</li> </ul>

<b>B</b>	EMT – B	<b>B</b>
<b>I</b>	EMT – I	<b>I</b>
<b>P</b>	EMT – P	<b>P</b>

## KEY POINTS

### Helmet Types

1. Sport (Football, Ice Hockey, Field Hockey, Fencing, Baseball)
  - Typically open anteriorly
  - Easier to access airway
  - If shoulder pads are used in conjunction with helmet and helmet is removed then shoulder pads need to be removed simultaneously for proper C-spine alignment
2. Motorcycle/ Bike/ Skateboarding
  - When full-faced, airway is harder to access and maintain
  - Face shield may be removed for airway access

#### SPORT HELMET PROCEDURE

1. Most athlete type helmets fit tightly, especially football. They should be left in place.
2. All are equipped to have the facemask removed separate from the helmet. In most cases, removal of facemask is all that is needed, as the alignment of the C-spine can be done with shoulder pads and helmet in place.
3. Removal of the facemask may be done by cutting snubber straps that hold it in place to access the airway.
4. **Removal:**
  - If the helmet must be removed due to unusual circumstances, at least 4 people are needed.
  - Shoulder pads need to simultaneously be removed. When shoulder pads are involved, use forearms to stabilize helmet and place hands at the base of the neck grasping the shoulder area.
  - While maintaining manual c-spine, the helmet's inside face pads may be loosened by use of a tongue blade to unsnap them with a twisting motion. Then, cut the shoulder pads laces and straps and all shirts and jerseys from the end of the sleeve to the center to allow for quick removal.

- Lift the patient flat up for removal of equipment. The helmet should be grasped and tilted slightly to remove – **DO NOT SPREAD SIDES OR BACK EDGE OF HELMET, IT WILL IMPINGE UPON NECK.**
- At same lift, pull off shoulder pads and clothing.
- Lower patient down and apply C-collar.

## MOTORCYCLE/ BIKE/ SKATEBOARDING HELMET PROCEDURE

1. Usually do not fit tightly and may allow movement of head inside helmet
2. If head can move, no C-spine immobilization is possible
3. Some have separate face piece that can be moved for airway access
4. Some have full face design that is not moveable where chin section is a rigid continuation of the helmet
5. C-spine alignment is difficult due to no shoulder padding; must create a pad to form straight alignment
6. If unable to secure C-spine or airway, the helmet should be removed at the scene
7. **Removal:**
  - Take eyeglasses off before removal of the helmet
  - One EMT stabilizes the helmet by placing hands on each side of the helmet with fingers on mandible to prevent movement
  - Second EMT removes any straps by cutting them
  - Second EMT places one hand on the mandible at the angle of the jaw and the other hand posteriorly at the occipital region
  - The EMT holding the helmet pulls the sides of the helmet outwards away from the head and gently slips the helmet halfway off and stops
  - The EMT maintaining stabilization of the neck repositions hold by sliding the posterior hand superiorly to secure the head from falling back after complete helmet removal
  - Helmet is then completely removed

## OBSTETRICS

### NORMAL CHILDBIRTH

INDICATIONS	SIGNS AND SYMPTOMS	CONTRAINDICATIONS
<ul style="list-style-type: none"> <li>Imminent delivery with crowning</li> </ul>	<ul style="list-style-type: none"> <li>Urge to push</li> <li>Visible crowning</li> </ul>	<ul style="list-style-type: none"> <li>See Gynecological Emergencies</li> </ul>

<b>B</b>	EMT – B	<b>B</b>
<b>I</b>	EMT – I	<b>I</b>
<b>P</b>	EMT – P	<b>P</b>

#### PROCEDURE

1. Delivery should be controlled so as to allow a slow controlled delivery of the infant. this will prevent injury to the mother and infant
2. Support the infant's head as needed
3. Check the umbilical cord surrounding the neck; if it is present, slip it over the head, if unable to free the cord from the neck, double clamp the cord and cut between the clamps
4. Suction the airway with a bulb syringe (mouth then nose)
5. Grasping the head with hands over the ears, gently pull down to allow delivery of the anterior shoulder
6. Gently pull up on the head to allow delivery of the posterior shoulder
7. Slowly deliver the remainder of the infant
8. Clamp the cord 2 inches from the abdomen with 2 clamps and cut the cord between the clamps
9. Record APGAR scores at 1 and 5 minutes
10. Follow the Newly Born Protocol for further treatment
11. The placenta will deliver spontaneously, within 5-15 minutes of the infant, do not force the placenta to deliver; contain all tissue in a plastic bag and transport
12. Massaging the uterus may facilitate delivery of the placenta and decrease bleeding by facilitating uterine contractions
13. Continue rapid transport to the hospital

## PHARMACOLOGY

### NITRONOX - NITROUS OXIDE ADMINISTRATION

INDICATIONS	SIGNS AND SYMPTOMS	CONTRAINDICATIONS
<ul style="list-style-type: none"> <li>Injury/illness requiring pain management</li> <li>Patient able to self-administer</li> </ul>	<ul style="list-style-type: none"> <li>Chest pain secondary to infarction or angina</li> <li>Acute urinary retention</li> <li>Fractures</li> <li>Severe burns</li> <li>Kidney stones</li> <li>Musculoskeletal trauma</li> </ul>	<ul style="list-style-type: none"> <li>Altered level of consciousness</li> <li>Head injuries</li> <li>Chest injuries (blunt or penetrating)</li> <li>Intoxication</li> <li>Maxillofacial injuries</li> <li>Psychiatric problems</li> <li>COPD (because of the 50% oxygen mixture)</li> <li>Pediatric patients under 12 years of age</li> <li>Pregnancy</li> <li>Respiratory distress</li> <li>Abdominal pain</li> </ul>

I	EMT – I	I
P	EMT – P	P

#### PROCEDURE

1. Instruct patients to administer Nitronox to themselves by placing the mask tightly against their face and breathing deeply and slowly
2. Allow mask to fall away from face spontaneously when effects are felt
3. Check blood pressure - Nitronox may cause BP to drop in some cases

#### KEY POINTS

- Nitronox is a self-administered analgesic gas containing a mixture of 50% oxygen and 50% nitrous oxide
- Nitronox is supplied in a carrying case containing two cylinders, one of nitrous oxide and one containing oxygen, with a mixing valve and supply tubing. These agents are mixed on administration to deliver a 50% concentration of each to the patient. Negative pressure is required to open the valve, so the patient must have an airtight seal at the face mask.
- Nitronox can be given to any patient who is alert and complaining of severe pain
- Nitronox should never be administered by the EMT or Paramedic, only self-administration by the patient is to be used
- Upon administration of Nitronox, constantly monitor patient to see that he/she does not fall asleep with mask in place
- The side effects of nitrous oxide, in addition to analgesia, include lightheadedness, drowsiness, nausea and vomiting, changes in heart rate and respiratory rate are minimal
- Nitrous oxide and oxygen are both non-flammable gases, but both support combustion, for this reason do not use Nitronox in areas where there is a combustion hazard.

**There is an increased risk of liver cancer and birth defects to individuals who are exposed to repeated applications of nitrous-oxide. For this reason Nitronox should be used in a well-ventilated environment.**

## SPECIAL OPERATIONS

### NERVE AGENT EXPOSURE - MARK 1 KIT

INDICATIONS	SIGNS AND SYMPTOMS	CONTRAINDICATIONS
<ul style="list-style-type: none"> <li>• Exposure to chemical, biologic, radiologic, or nuclear hazard</li> <li>• Potential exposure to unknown substance/hazard</li> <li>• For use by Fire, EMS, and Police personnel <b><u>only</u></b></li> </ul>	<ul style="list-style-type: none"> <li>• Visual disturbances</li> <li>• Headache</li> <li>• Nausea/Vomiting</li> <li>• Salivation</li> <li>• Lacrimation</li> <li>• Respiratory distress</li> <li>• Diaphoresis</li> <li>• Seizure activity</li> <li>• Respiratory arrest</li> </ul>	<ul style="list-style-type: none"> <li>• Nerve agent exposure (e.g. VX, Sarin, Soman, etc.)</li> <li>• Organophosphate exposure (pesticide)</li> <li>• Vesicant exposure (e.g. Mustard Gas, etc.)</li> <li>• Respiratory Irritant exposure (e.g. Hydrogen Sulfide, Ammonia, Chlorine, etc.)</li> </ul>

P                      EMT – P                      P

### KEY POINTS

- If Triage/MCI issues exhaust supply of Mark 1 kits, use atropine, give 2 mg dose for patients greater than 90 pounds (>40kg)
- Follow local HAZMAT protocols for decontamination and use of personal protective equipment
- For patients with major symptoms, there is no limit for atropine dosing
- Carefully evaluate patients to ensure they have not been exposure to another agent (e.g., narcotics, vesicants, etc.)
- Each Mark 1 kit contains 600 mg of pralidoxime (2-PAM) and 2 mg of atropine
- If the presence of a nerve agent is suspected by presentation of symptoms of large numbers of patients, personnel should immediately contact dispatch to notify other responding units and command staff
- The patient and/or crew must be decontaminated prior to transport. DO NOT transport a contaminated patient to a treatment facility
- SLUDGEM: Salivation, Lacrimination, Urination, Defication, Gastrointestinal upset, Emesis, Muscle twitching
- When the nerve agent has been ingested, exposure may continue for some time due to slow absorption from the lower bowel, and fatal relapses have been reported after initial improvement
- If dermal exposure has occurred, decontamination is critical and should be done with standard decontamination procedures; patient monitoring should be directed to the same signs and symptoms as with all nerve or organophosphate exposures
- Continued medical monitoring and transport is mandatory
- Atropine must be given first, do not give anything else until the effects of atropine become Apparent. only when the effects of the atropine have been seen can you then give 2 - PAM CL
- Pralidoxime (2-PAM CL) is most effective if administered immediately after the poisoning but not before atropine, especially for severe exposures

**SPECIAL OPERATIONS**

**NERVE AGENT EXPOSURE - MARK 1 KIT**

<b>B</b>	EMT - B	<b>B</b>
<b>I</b>	EMT - I	<b>I</b>
<b>P</b>	EMT - P	<b>P</b>
<b>M</b>	MED CONTROL	<b>M</b>

ENSURE SCENE SAFETY AND PROPER PPE

UNIVERSAL PATIENT CARE PROTOCOL

Obtain history of exposure  
Observe for specific toxidromes  
Initiate triage and/or decontamination as

Assess for presence of major or minor symptoms

MINOR SYMPTOMS:  
  
Salivation  
Lacrimation

ATROPINE 2 mg IV/IM  
15 minutes until symptoms resolve

PRALIDOXIME 2 grams  
(15 – 25 mg/kg for PEDS)  
IV over 30 minutes

Monitor for appearance

MAJOR SYMPTOMS:  
  
Altered LOC  
Seizures  
SOB

MARK 1 KIT x 3, IM  
Rapidly

If Seizures:  
VALIUM 5-10 mg IV/IM

ATROPINE 2 mg IV/IM  
q 5 minutes until symptoms resolve

**CONTACT MEDICAL CONTROL**

TRANSPORT

## SPECIAL OPERATIONS

### TASERED PATIENT

**ALL PATIENTS SUBJECTED TO TASER USE MUST BE TRANSPORTED TO THE HOSPITAL FOR MEDICAL EVALUATION**

<b>B</b>	EMT-B	<b>B</b>
<b>I</b>	EMT - I	<b>I</b>
<b>P</b>	EMT - P	<b>P</b>

#### INDICATIONS

- Any patient that was subjected to taser use

#### PROCEDURE

3. Follow Universal Patient Care Protocol
4. Confer with Law Enforcement Officer regarding the patient's behavior prior to EMS arrival
5. Refer to the appropriate medical protocol if the patient has a life-threatening injury or medical illness or continues to be combative
6. Determine the location of the Taser probes, do not remove probes unless they interfere with patient care
7. Perform a 12-Lead EKG and continuously monitor the patient's EKG, if the patient has a dysrhythmia, refer to the appropriate protocol.

#### KEY POINTS

- With the increased use and deployment of TASERS by our area's local law enforcement agencies, EMS providers must be aware of the appropriate medical assessment of the tasered patient. The TASER is designed to transmit electrical impulses that temporarily disrupt the body's central nervous system. Its Electro-Muscular Disruption (EMD) Technology causes an uncontrollable contraction of the muscle tissue, allowing the TASER to physically debilitate a target regardless of pain tolerance or mental focus.
- All patients subjected to taser use must be assessed for trauma and medical causes for the combative behavior
- Always apply the cardiac monitor and obtain a strip for patients with irregular / abnormal pulse, elderly, pacer, AICD, known CAD, and excited delirium
- The patient's vital signs must be reassessed every 5 minutes
- Determine if the patient used any mind altering stimulants, has a cardiac history, and the date of their last Tetanus shot
- The cord or wire may be cut, but leave the probes embedded in the patient
- Removal of the probe if necessary: (Remove one at a time)
  - Stabilize the skin surrounding the puncture site by placing one hand by where the probe is embedded.
  - Pull the probe straight out from the puncture site in one fluid motion.
- TASER barbs that do penetrate the skin and are removed in the field are to be treated as "contaminated sharps" and are to be placed in an appropriate "red box" sharps container. Use small single use containers as law enforcement may wish to hold custody of the barbs after removal.

## OTHER OPERATIONS

### INFECTIOUS EXPOSURE

- University Hospitals has established a Pre-Hospital Providers Exposure to Infectious Disease(s) Policy.
- It is designed to provide you with guidelines that must be followed in the event of an exposure.

#### The Policy states:

- Any pre-hospital provider who believes he/she has suffered a significant exposure through contact with a patient may submit a written request for the notification of the presence of a contagious or infectious disease in the patient and/or results of any test performed on the patient to determine the presence of a contagious or infectious disease.**
- Infection Control or designee will notify any prehospital provider who has been identified as having been exposed to a contagious or infectious disease.**
- As required by Ohio Revised Code §3701.248, any UH system hospital will respond to a prehospital provider's written request for notification of the presence of a contagious or infectious disease or the results of any test performed on the patient to determine the presence of a contagious or infectious disease in a patient received by UH.**
- Go to our website [www.uhems.org](http://www.uhems.org) to print off the policy and forms that you will need to fill out if you have an exposure.

## OTHER OPERATIONS

### BLOOD COLLECTION FOR EVIDENCE (OHIO SENATE BILL 58)

Ohio Senate Bill 58 became Law in September 2010.

The Law includes provisions for EMS providers to withdraw blood for the purpose of evidence collection in cases involving allegations of operating watercraft or vehicles under the influence.

The language of the bill states that drawing blood “may” not “shall” be done for evidence collection “in the course of” providing emergency medical treatment.

- You CANNOT be dispatched or called by the police for the sole purpose of performing phlebotomy when the person does not require emergency medical treatment.
- The Medic/EMTI in charge can refuse law enforcements request to draw the blood if doing so would interfere with life saving patient care or outcome.
- The patient must consent to the collection of blood for evidence purposes.  
(If unconscious, Implied Consent applies)
- The Police Officer making the request must be present at all times during the draw and must provide the Medic/EMTI with the evidence collection kit.
- EMS Providers MUST use the evidence kit provided by law enforcement to obtain the blood samples for evidence.