

# SCOTT COUNTY DEPARTMENT OF PUBLIC HEALTH

## EMS PROCEDURES

*Emergency Medical Responder, EMT, Advanced EMT, and Paramedic*  
(ADULT & PEDIATRIC)



*“Your Health, Our Priority”*

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<b>Procedures Table of Contents</b>	
<b>Procedure</b>	<b>Page Number</b>
Introduction	3
12 Lead Electrocardiogram Acquisition	4-5
Airway - Intubation Oral	6-7
Airway - Intubation Nasal	8-9
Airway – KING	10
Airway – Supraglottic	11
Airway Needle Cricothyrotomy	12
Cardioversion, Electrical	13
CO Poisoning Monitoring	14
CO Poisoning Triage Algorithm	15
Continuous Positive Airway Pressure (CPAP)	16-17
Glucose Monitoring	18
Intranasal medication administration	19
Intraosseous Infusion (Peds and Adult)	20-22
Ketamine Administration (Behavioral)	23
Lab Draws	24
Maintenance of Non-Medicated IVs	25
Mechanical CPR LUCAS Device	26-30
Medication Infusions	31
Needle Thoracostomy	32
Pacing, External Demand Cardiac	33
Pulse Oximetry Procedure	34
Taser Dart Removal	35
Tourniquet Application	36-37
Wound Packing	38-39

# **INTRODUCTION**

**This document contains EMS procedures to implement in conjunction with the EMS Protocols. The service medical director may approve the use of these procedures (authorization and change pages of the EMS Protocols) as needed.**

## 12 LEAD ELECTROCARDIOGRAM ACQUISITION

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### Purpose:

1. To obtain a diagnostic quality 12 Lead ECG for the patient with a suspected acute cardiac event.

### Indications:

1. Chest pain or pressure in any patient over age 25
2. Syncopal episode in any patient over age 25
3. Unexplained respiratory distress
4. Atypical cardiac pain (i.e., shoulder, arm, or jaw pain in absence of chest pain, especially in patients with past cardiac history or irregular pulse. Check for history of illicit drugs such as cocaine and methamphetamine use

### Precautions:

1. Care must be taken to avoid an unnecessary extension of scene time
2. Obvious ECG changes may or may not be present in the patient experiencing an acute myocardial infarction. Patients on whom a 12 Lead ECG is performed should be strongly encouraged to accept transport by ambulance to a hospital.

### Contraindications:

1. On scene 12 Lead ECG acquisition of the unstable patient
2. On scene 12 Lead ECG acquisition of the trauma patient

### Procedure:

1. Turn monitor "ON"
2. Assure limb and precordial leads are appropriately connected to monitor
3. Prepare patient's skin for electrode application by:

- a. Shaving excessive hair at the electrode site
  - b. Cleaning oily or dirty skin with an alcohol pad, then drying briskly
4. Avoid locating electrodes over tendons and major muscle masses
  5. Identify electrode sites and apply electrodes as follows:
    - a. RUE or RA-right arm
    - b. LUE or LA-left arm
    - c. RLE or RL-right leg
    - d. LLE or LL-left leg

*(The limb lead electrodes are typically placed on the wrists and ankles, but may be placed anywhere along the limbs. Do not place the limb lead electrodes on the torso when acquiring a 12-lead ECG.)*

### Precordial Lead Placement

1. V1-Fourth intercostal space to the right of the sternum
2. V2-Fourth intercostal space to the left of the sternum
3. V3-Directly between leads V2 and V4
4. V4-Left fifth intercostal space, midclavicular line
5. V5-Level with V4, left anterior axillary line
6. V6-Level with V5, left mid-axillary line

## 12 LEAD ELECTROCARDIOGRAM ACQUISITION (Continued)

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### Procedure

1. Encourage the patient to relax all muscles and remain as still as possible; prevent any tension on ECG cable
2. Press "12 Lead" once; acquisition takes approximately 10 seconds
  - a. 12 Lead ECG will automatically print
  - b. Avoid acquiring ECG in a moving vehicle
3. Activate a "**MI Alert**" in patients with 12 Lead ECG ST elevation of  $> 1\text{mm}$  in 2 or more contiguous leads
  - a. Transport the patient lights and sirens to a receiving facility with interventional cath lab capabilities
  - b. Local Scott County receiving facilities with interventional cath lab capabilities include Genesis Medical Center, East Campus, and Unity Point Trinity Bettendorf Campus.
4. Leave ECG electrodes in place; if LifePak 15 detects continuing ST segment elevation of  $\geq 1\text{mm}$ , another 12 Lead ECG will automatically be generated
5. If the monitor detects "signal noise" (such as patient movement or a disconnected electrode), the 12 lead acquisition is interrupted until the noise is removed. Take appropriate action as necessary to eliminate noise.
6. In the event of an Inferior Wall MI (Elevation in leads II, III & AVF) obtain an additional ECG with a V4R lead placed
7. If possible, transmit 12 Lead ECG via modem to Medical Control

## AIRWAY-INTUBATION ORAL

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### **Purpose:**

1. To ventilate the lungs and oxygenate the patient
2. To prevent aspiration of gastric contents

### **ORAL APPROACH**

#### **Indications:**

1. Inability of the rescuer to ventilate the unconscious patient with less invasive methods
2. Inability of the patient to protect his/her airway (i.e., absence of gag reflex)
3. Prolonged need for chest compressions during resuscitation (cardiac arrest)
4. Respiratory arrest
5. Rapidly deteriorating ventilatory status

#### **Precautions:**

1. Have suction source readily available
2. Do not interrupt ventilations for longer than 20 seconds
3. Manual in-line stabilization must be utilized during intubation attempts in the presence of suspected or known trauma
4. Laryngotracheal anesthesia may be used to relieve laryngeal spasm during intubation procedure
5. Exercise caution to prevent dislodgement of patent ET tube once it is inserted

#### **Complications:**

1. Trauma to the lips, mouth, teeth, or oral mucosa
2. Vomiting and aspiration
3. Reflex sympathetic and parasympathetic stimulation
  - i. Increased intracranial pressure
  - ii. Bronchospasm
  - iii. Hyper- and/or hypotension
  - iv. Brady- and/or tachycardias
  - v. Other arrhythmias
4. Main bronchus intubation (typically right)
5. Esophageal Intubation

## AIRWAY-INTUBATION ORAL (Continued)

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### Procedure:

1. Place nasal cannula on patient at 15 lpm Oxygen while preparing for and during the procedure.
2. Assemble all equipment (ET tube, blades/handle, syringe, Eschmann Stylet, lubricant, confirmation devices, bag-valve, and suction) Load Eschmann stylet with ET tube for placement.
3. Position patient supine with head hyperextended (maintain manual in-line stabilization for suspected/known cervical spine trauma)
4. Hyperoxygenate the patient with 100% oxygen for at least one minute; avoid excessive breath rate or tidal volumes
5. Consider administration of **LIDOCAINE** 1.5 mg/kg IV slowly in the head injured or reactive airway patient
7. Apply water-soluble lubricant to the distal end of the tube and insert Eschmann Stylet into the tube.
8. Visualize the vocal chords while lifting the epiglottis with a laryngoscope blade
9. Advance Eschmann stylet and the ET tube into the trachea. Advance ET tube to appropriate depth and withdraw Eschmann Stylet
10. Confirm placement of the tracheal tube
  - i. Primary Confirmation Techniques
    - Observation of bilateral chest rise and fall with each ventilation and exhalation and ABSENCE of breath sounds over the epigastric region
    - Auscultation with a stethoscope to verify the presence of breath sounds with each ventilation over:
      - Right and left sides of the anterior chest and Right and left midaxillary lines
    - Positive end-tidal or exhaled CO<sub>2</sub> detector Color-metric or waveform (evaluate for color change after 6 ventilations-may **not** change color in cardiac arrest).
    - Esophageal detector device (immediate re-expansion of deflated bulb attached to ET tube; false positives may occur with the morbidly obese/late pregnancy patient, copious tracheal secretions, status asthmaticus, or gastric inflation from BVM)
  - ii. In the event that esophageal placement is suspected, IMMEDIATELY remove the tube and provide BVM until tracheal intubation or alternative airway placement (i.e., Air Q or KING AIRWAY) can be achieved
11. Secure Tube with commercially available tube holder or tape and monitor breath sounds and compliance regularly

***All intubated patients must have a CO<sub>2</sub> detector in place, regardless of the presence/absence of color change or numeric value change***

## AIRWAY-INTUBATION NASAL

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### NASAL APPROACH

#### Additional Indications:

1. Suspected/known cervical trauma in the presence of some respiratory effort
2. Unsuccessful orotracheal attempt in the presence of some respiratory effort
3. Respiratory compromise with an intact gag reflex

#### Precautions:

1. Avoid bilateral attempts and nasal bleeding from performing multiple attempts.
2. Select an ET tube one size smaller than would be used for orotracheal intubation

#### Contraindications:

2. Apnea
3. Suspected hypoglycemia with unconsciousness: treat hypoglycemia and ventilate patient first using BVM
4. Maxillofacial trauma

#### Procedure:

1. Assemble all equipment (ET tube, lubricant, confirmation devices, bag-valve, and suction)
2. Position patient supine with head hyperextended (maintain manual in-line stabilization for suspected/know cervical spine trauma)
3. Hyperoxygenate the patient with 100% oxygen for at least one minute; avoid excessive breath rate and tidal volumes
4. Consider administration of **LIDOCAINE** 1.5 mg/kg IV slowly in the head injured or reactive airway patient
6. Apply water-soluble lubricant to the distal end of the tube.
7. Administer **PHENYLEPHRINE (Neosynephrine)** 0.5%, 1-2 sprays into both nares
8. Use gentle, steady pressure to advance the tube into the posterior pharynx
9. Advance the tube into the trachea as the patient inhales

## AIRWAY-INTUBATION NASAL (Continued)

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10. Continue to advance the tube until good air exchange is noted by listening over the end of the tube. Once present, advance the tube 1 inch further and inflate the cuff.
11. Confirm placement of the nasotracheal tube
  - i. Primary Confirmation Techniques
    - Observation of bilateral chest rise and fall with each ventilation and exhalation and ABSENCE of breath sounds over the epigastric region
    - Auscultation with a stethoscope to verify the presence of breath sounds with each ventilation over:
      - Right and left sides of the anterior chest and
      - Right and left midaxillary lines
  - ii. Secondary Confirmation Techniques
    - Positive end-tidal or exhaled CO<sub>2</sub> detector (evaluate for color change after 6 ventilations-may **not** change color in cardiac arrest).
    - Esophageal detector device (immediate re-expansion of deflated bulb attached to ET tube; false positives may occur with the morbidly obese/late pregnancy patient, copious tracheal secretions, status asthmaticus, or gastric inflation from BVM)
  - iii. In the event that esophageal placement is suspected, IMMEDIATELY remove the tube and provide BVM until tracheal intubation or alternative airway placement can be achieved
12. Secure the tube carefully with tape; note and document cm marking at the nare.
13. A maximum of **ONE** attempt may be made.

***All intubated patients must have a CO2 detector in place, regardless of the presence/absence of color change or numeric value change***

## AIRWAY-KING AIRWAY

### Purpose:

Need for rapid airway control in an unresponsive patient without a gag reflex

### Indications:

Failed intubation attempt, challenging position of a patient or provider level of training

### Contraindications:

1. Less than 4 feet tall
2. Responsive patients or patients with an intact gag reflex
3. Known Esophageal disease

### Preparation:

1. Choose the correct KING LT-D size (See sizing chart)
2. Test cuff and inflation system for leaks by inflating with provided syringe
3. Apply lubricant to beveled distal tip and posterior aspect of tube. Do not apply Lubricant to or near the ventilator openings

### Procedure:

1. Pre-oxygenate patient by placing nasal cannula on patient at 15 lpm Oxygen while preparing for and during the procedure.
2. Position head in the "sniffing position". For suspected cervical spine injuries, place patient in a neutral position
3. Hold KING LT-D in dominant hand and use the non-dominant hand to hold mouth open and apply chin lift
4. Rotate KING LT-D 45-90 degrees such that the blue orientation line is touching the corner of the mouth
5. Introduce the device tip into mouth and advance behind base of the tongue. As the tube passes the tongue, rotate back to midline
6. Without exerting excessive force, advance tube until base of connector is aligned with teeth or gums
7. Using the provided syringe, inflate the cuffs with the appropriate volume
8. Attach BVM and assess ventilation, if needed withdraw the KING LT-D until ventilation is free flowing and easy compliance
9. Confirm proper placement by auscultation, Chest movement, equal lung sounds and capnography with no gastric sounds
10. Document depth markings
11. Secure KING LT-D with tape or commercially available tube securing device
12. Reassess placement and ventilations often

***All advanced airway patients must have a CO2 detector in place, regardless of the presence/absence of color change or numeric value change***

Adult		
Size 3	Size 4	Size 5
Yellow	Red	Purple
4-5 feet (122-155 cm)	5-6 feet (155-180 cm)	greater than 6 feet (>180 cm)
50-60 ml	70-80 ml	80-90 ml

## AIRWAY- SUPRAGLOTTIC

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### Indications-

Supraglottic airways are indicated for use as a primary airway application in patients who are unable to be intubated. It can be used as an aid for difficult intubations if indicated. Supraglottic airways are sized for patients based on weight.

### Contraindications-

Supraglottic airways are contraindicated in patients at high risk for emesis and aspiration. Supraglottic airways should not be used in a patient who is conscious or has an intact gag reflex.

### Cautions / Warnings-

1. Do not apply excessive force for insertion or removal of the device.
2. Immediately assess for adequate ventilation after insertion of an airway
3. Do not overinflate cuffs
4. Watch for aspiration and remove device and suction if emesis occurs

### Airway Insertion

1. Lubricate the external surfaces including the mask cavity ridges.
2. Open the patient's mouth and elevate the tongue. Elevating the tongue lifts the epiglottis off of the posterior pharyngeal wall and allows easy passage into the pharynx. A mandibular lift is especially recommended. A tongue blade placed at the base of the tongue also works well for this purpose.
3. Place the front portion of the mask between the base of the tongue and the soft palate at a slight forward angle, if possible.
4. Pass the mask into position within the pharynx by gently applying gentle inward and downward pressure by using the curvature of the of the mask and airway tube as a guide. Continue to advance until fixed resistance to forward movement is felt. Correct placement is determined by this resistance to further advancement.
5. Secure the airway in place and attach end tidal capnography.
6. Attach the Bag valve device and check to be sure it is secure. Check for adequate ventilation by watching for adequate chest rise.

### Airway Removal

1. Have suction equipment available.
2. Gently withdraw the airway with a forward rotational motion.
3. Suction the oropharynx if necessary.

Airway Size	0.5	1.0	1.5	2.0	2.5	3.5	4.5
Patient Weight	<4kg	4-7kg	7-17kg	17-30kg	30-50kg	50-70kg	70-100kg

## AIRWAY- NEEDLE CRICOTHYROTOMY

**Indications:** A qualified EMS provider\* may use this skill when unable to gain airway access by other means, or there is an upper airway obstruction.

**Contraindications:**

1. Pre-existing laryngeal pathology.
2. Anatomical barriers
3. Anticoagulation therapy.

**Complications:**

1. Injury to surrounding tissue.
2. Hemorrhage.
3. Infection.
4. Edema.
5. Aspiration of blood.
6. Subcutaneous and mediastinal emphysema.

**Procedure/Treatment:**

1. Stabilize the patient's head in the neutral position.
2. Identify the cricothyroid membrane and prepare the skin.
3. Stabilize the cricoid and thyroid cartilages with the nondominant hand.
4. Once the cricothyroid membrane has been identified, insert the 14 or smaller gauge (larger diameter) gauge over-the needle catheter device just below the midpoint of the cricothyroid membrane with the needle angled at 45 degrees caudally.
5. Withdraw the needle carefully while advancing the plastic catheter caudally into the trachea.
6. Aspirate with the attached 10 cc syringe.
7. Attach the hub of the catheter to:

Option A-Commercially Manufactured Jet Insufflation Device	Option B-Prepared Ventilation Device
A. The connecting end of a jet insufflator	A. Adapter and then to a connector between the oxygen and the cannula
B. Attach high pressure oxygen tubing to oxygen source	B. Turn oxygen to 15 liters per min
C. Ventilate at 12 breaths/min with a <b>1:4 ratio</b> to allow for exhalation <ol style="list-style-type: none"> <li>1. Adults-50 psi</li> <li>2. Children <math>\leq</math> 8 years-30 psi</li> </ol>	C. Ventilate with BVM connected and ventilation rate 12/min. at a <b>1:4</b> ratio to allow for exhalation.

**\*Qualified EMS provider:** A certified Paramedic who has demonstrated the skills necessary to competently perform this procedure and has the approval of the medical director.

## CARDIOVERSION, ELECTRICAL

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**Purpose:** To restore an effective heart rhythm in the **hemodynamically unstable** patient with tachycardia. The unstable condition **MUST** be related to the tachycardia. Signs and symptoms of instability may include:

1. Chest pain
2. Shortness of breath
3. Decreased level of consciousness
4. Hypotension
5. Shock
6. Pulmonary congestion; CHF
7. Acute MI

**Indications:**

1. Ventricular Tachycardia with a pulse
2. Supraventricular tachycardia

**Precautions:**

1. Delay of cardioversion because of problems with synchronization resulting in worsening patient condition
2. Risk of thromboembolic complications (i.e., stroke) in patients with history of atrial fibrillation duration > 48 hours

**Procedure:**

1. Place defibrillation pads on the patient as directed by the manufacturer
2. **Engage the synchronization mode by pressing the “sync” control button**
3. Consider sedation for the alert patient **FENTANYL 50mcg OR MIDAZOLAM 5 mg (VERSED)**
4. Turn on defibrillator
5. Attach monitor leads to the patient and device
6. Look for markers on the “R” waves indicating sync mode
7. If necessary, adjust monitor gain/EKG size until sync markers occur with each R wave
8. Announce to team members: “Charging defibrillator...stand clear”
9. Press “Charge” button
10. When the defibrillator is charged, announce the shock
11. Press and hold the “shock” button
12. Check the monitor. If tachycardia persists, increase the joules according to the electrical cardioversion protocol
13. **Remember to reset the sync mode after EACH synchronized cardioversion;** most defibrillators default back to the unsynchronized mode.  
This default allows an immediate shock if the cardioversion produces VF

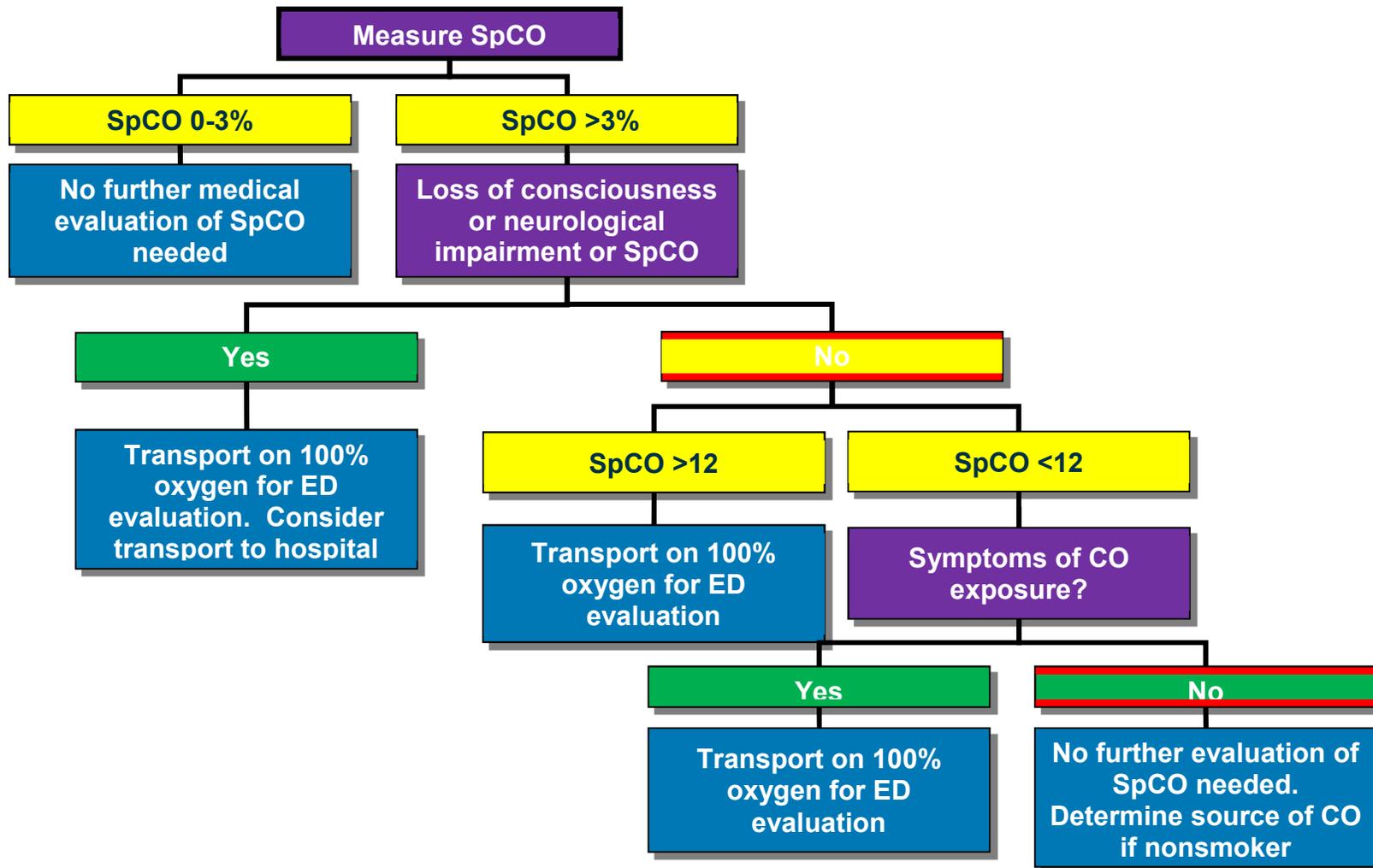
**Zoll Energy Levels**

150j, 200j Narrow Complex and 200j Wide complex  
Peds: 1j/kg followed by 2j/kg

**Physio Control Energy Levels**

Atrial fibrillation- 100 to 200 j, 300j, 360j  
Monomorphic V-tach with pulse- 100j, 200j, 300j, 360j  
Atrial flutter or SVT- 50j, 100j, 200j, 300j 360j  
Peds: 1j/kg followed by 2j/kg

## CO POISONING ALGORITHM



## CO POISONING MONITORING

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- Scene safety, protect yourself:
  - Consider SCBA
- Remove patient from the poisonous environment
- ABC's (airway, breathing and circulation)
- Check CO level with Pulse CO-Oximeter
- High levels treated with 100% oxygen:
  - Decrease half-life of CO in blood
  - Increase delivered oxygen in blood
  - Support ventilations as needed
- Transport to closest, most appropriate facility
- Consider hyperbaric treatment center:
  - Adults >25%, Pedi & Pregnant female >15%
  - Neurologic compromise
- Monitor vital signs and SpCO

SpCO %	Clinical Manifestations
0-4%	None - Normal
5-9%	Minor Headache
10-19%	Headache, Shortness of Breath
20-29%	Headache, Nausea, Dizziness, Fatigue
30-39%	Severe Headache, Vomiting, Vertigo, ALOC
40-49%	Confusion, Syncope, Tachycardia
50-59%	Seizures, Shock, Apnea, Coma
60% -up	Coma, Death

## CONTINUOUS POSITIVE AIRWAY PRESSURE (CPAP)

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**Purpose:** Relief of respiratory distress in those adult patients with COPD, CHF / Pulmonary Edema refractory to traditional therapy. The patient must have spontaneous respirations.

**Indications:**

1. CHF: pulmonary congestion with O<sub>2</sub> sat of 90% or less
2. Suspected Pulmonary Edema with O<sub>2</sub> sat of 90% or less
3. COPD with respiratory compromise with O<sub>2</sub> sat of 90% or less

**Contraindications:**

1. Penetrating chest trauma
2. Severe hypotension (systolic pressure of less than 90 mmHg)
3. Persistent nausea / vomiting
4. Obtundation
5. Questionable ability to protect their own airway.

**Precautions:**

1. If the patient cannot control their airway, appropriate airway management is indicated.
2. Some patients may not tolerate this therapy, and must be reassured and informed of the purpose and effectiveness of CPAP.
3. If in the event the patient cannot tolerate the therapy, prepare for airway maintenance and ventilation.
4. Monitor lung sounds for evidence of barotrauma (Pneumothorax).
5. Patients with decreased level of consciousness who are unable to follow instructions are not candidates for this therapy.
6. This therapy is designed for use in patients who have an increased work of breathing, and may be evident in one or more of the following findings:
  - a. Use of accessory breathing muscles
  - b. Rapid, shallow breaths
  - c. Anxiety or impending doom
  - d. Cyanosis
  - e. Pulse oximetry less than 90%
7. If CPAP therapy is effective, the aforementioned findings (#6) should improve.
8. If the patient fails to exhibit improvement, the Paramedic needs to re-assess the patient and consider other adjunctive measures.
9. Advise the patient of the need for and efficacy of CPAP therapy.

## CONTINUOUS POSITIVE AIRWAY PRESSURE (CPAP) Continued

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10. Connect the CPAP to either the portable “D” oxygen cylinder or to the main “M” or “H” oxygen via the ports on the walls of the ambulance via a regulator capable of delivering 15 lpm.
11. Turn oxygen source on
12. Assemble the CPAP as follows:

Attach the head-strap to the mask. Adjust CPAP pressure into the mask per manufacturer’s recommendations.

- i. Severe Distress – 10 cmH<sub>2</sub>O Setting
- ii. Moderate Distress -- 7.5 cmH<sub>2</sub>O Setting
- iii. Minor Distress – 5.0 cmH<sub>2</sub>O Setting

***Pulmonary edema will require the 10 cm H<sub>2</sub>O Setting, COPD may require the 5 cmH<sub>2</sub>O pressure***

13. Apply the mask to the patient, assuring a patent seal of the mask to the face. Continuously reassure the patient. The patient may be more comfortable if they hold the mask to their face as opposed to having it strapped to their face. Again, make sure that an effective seal is maintained.
14. Monitor vital signs and pulse oximetry every 5 minutes.
15. CPAP therapy should be given continuously during transport.
16. If life-threatening airway or respiratory emergencies develop, discontinue CPAP therapy and provide appropriate management per protocol.
17. Documentation of CPAP therapy should include at a minimum:
  - a. CPAP pressure used
  - b. Any supplemental oxygen applied to the mask to increase FIO<sub>2</sub>.
  - c. Vitals signs every 5 min including pulse oximetry
  - d. Documentation as to the effectiveness or any adverse reactions to the CPAP therapy.
  - e. Interventions performed prior to CPAP therapy.

***Additional Information: You may attach a nebulizer to the CPAP therapy mask via T piece between generator and mask.***

## GLUCOSE MONITORING (Blood)

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Services choosing to provide Glucose Monitoring shall follow the guidelines set out by the Clinical Laboratory Improvement Amendment (CLIA) and follow a protocol approved by the service program's medical director.

### Indications:

1. Known diabetic with signs & symptoms of blood sugar derangements
2. Altered mental status
3. Signs/symptoms of a stroke, to rule out hypoglycemia
4. Cardiac arrest
5. Seizures
6. Provider index of suspicion for unknown condition

### Precautions:

1. Use approved procedure to minimize exposure to infectious agents by the patient and the provider
2. Correlate reading with patient's clinical condition

### Procedure:

Obtain a fresh blood sample from the patient by either of the following:

1. Capillary technique
  - ❑ Clean fingertip thoroughly with alcohol pad
  - ❑ Puncture fingertip and allow a large drop of blood to form
  - ❑ Wipe puncture site with clean, dry cotton ball
  - ❑ Allow large drop of blood to form again to place on reagent/test strip
2. Venous technique
  - ❑ Using sterile procedure, draw/acquire small blood sample from the IV catheter/needle for testing

### Interpretation:

1. Visual: perform visual interpretation according to manufacturer's guidelines
2. Metered: obtain metered reading according to manufacturer's guidelines
3. Correlate reading with the patient's clinical condition

## INTRANASAL MEDICATION ADMINISTRATION

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**Purpose:** To administer medications as an alternate route to enteral means

**Indication:** Need for medication administration in a patient with no IV access or where IV attempts would compromise safety of patient or crewmembers

**Contraindications:**

1. Patient with nasal fractures
2. Inability to breathe through the nose
3. Epistaxis

**Preparation:**

1. Choose correct medication and dosage
2. Choose proper syringe if drawing from a vial
3. Collect administration device (MAD)

**Procedure:**

1. Confirm patency of nare by occluding the opposite nare
2. Measure the amount of medication to be administered in a syringe or bristoject using standard procedures
3. Attach atomizer (MAD) to syringe or bristoject
4. Carefully insert atomizer (MAD) into the vestibule of a nare
5. Administer the desired amount of medication
6. Place a gloved finger over the nare for 1-2 minutes to help ensure absorption
7. Monitor the patient for onset of action or reaction of medication administration
8. Limit administration volume to 1ml per nare

## INTRAOSSIOUS INFUSION

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### Jamshidi Needle

**Indications:** A qualified EMS provider\* may use this skill for pediatric patients in whom venous access is impractical in a life threatening situation.

**Contraindications:** Fractured bones, previous attempts and any other known imperfection of the bone.

### **Procedure/Treatment:**

1. Identify insertion site and cleanse the skin with approved antiseptic.
2. Insert the needle at the appropriate angle to avoid the epiphyseal plate. A twisting or boring motion should be utilized to overcome resistance of the cortex.
3. Advance the needle, feeling a "pop" and lack of resistance of needle passing through the cortex.
4. Remove the stylet and attempt to aspirate bone marrow into a saline filled syringe.
  - a) Inject 2-5 cc of saline to verify placement and flush away clots and/or marrow blocking the needle. Observe for any swelling at the site. **(Do Not Aspirate Marrow)**
5. Verify placement further by the needle standing in position without support. Stabilize needle with gauze and tape.
6. Connect IV fluids to the site and run the fluid looking for signs of infiltration. Use connecting tubing between IV and needle.
7. Multiple punctures in a single bone should not be attempted.

**\*Qualified EMS provider:** A certified Paramedic or Advanced EMT who has demonstrated skills necessary to competently perform this procedure and has the approval of the medical director.

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## INTRAOSSIOUS INFUSION (Continued)

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### Vidacare EZ-IO

#### INDICATIONS:

- EZ-IO® 25mm (40 kg and over) & EZ-IO® 15mm (3–39 kg) EZ-IO® 45mm (40 kg and over with excessive tissue)
- For adults and pediatrics anytime in which vascular access is difficult to obtain in emergent, urgent or medically necessary cases. Adult Intraosseous should be considered PRIOR to peripheral IV attempts in Cardiac arrest (medical or traumatic)
- Intravenous fluids or medications are urgently needed and a peripheral IV cannot be established in 2 attempts or 90 seconds AND have a very unstable, life threatening situation
- It is not to be used when routine IV access is unsuccessful or difficult to establish (1)
- Fracture of the bone selected for IO infusion (consider alternate site) (1)
- Excessively thick tissue at insertion site with the absence of anatomical landmarks (consider alternate site) (1)
- Previous significant orthopedic procedures (i.e. prosthetics devices such as a knee replacement)
- IO within 24 hours at selected site (1)
- Infection at the site selected for insertion (consider alternate site) (1)

#### CONTRAINDICATIONS:

- Fracture of the bone selected for IO infusion (consider alternate site)
- Excessive tissue at insertion site with the absence of anatomical landmarks (consider alternate site)
- Previous significant orthopedic procedures (prosthesis – consider alternative sites)
- IO within 24-48 hours at selected site
- Infection at the site selected for insertion (consider alternate site)

#### CONSIDERATIONS: (1)

##### Flow rate:

Due to the anatomy of the IO space, flow rates may appear to be slower than those achieved with an IV catheter.

- Ensure the administration of an appropriate rapid SYRINGE BOLUS (flush) prior to infusion **NO FLUSH = NO FLOW**
  - Rapid syringe bolus (flush) the EZ-IO 25mm® with 10 ml of Normal Saline
  - Rapid syringe bolus (flush) the EZ-IO 15mm® with 5 ml of Normal Saline
  - Repeat syringe bolus (flush) as needed
- To improve continuous infusion flow rates always use a syringe, pressure bag or infusion pump

##### Pain:

Insertion of the EZ-IO AD® & EZ-IO PD® in conscious patients has been noted to cause mild to moderate discomfort (usually no more painful than a large bore IV). However, IO Infusion for conscious patients has been noted to cause severe discomfort

- Prior to IO syringe bolus (flush) or continuous infusion in alert patients, SLOWLY administer **LIDOCAINE 2%** (Preservative Free) through the EZ-IO hub. Ensure that the patient has no allergies or sensitivity to Lidocaine.
  - EZ-IO AD® Slowly administer 40 mg (2 ml of 100mg/5ml) **LIDOCAINE 2%** (Preservative Free)
  - EZ-IO PD® Slowly administer 0.5 mg /kg **LIDOCAINE 2%** (Preservative Free)

#### PRECAUTIONS:

- The EZ-IO AD® & EZ-IO PD® are not intended for prophylactic use (1)

1. *Vidacare Corporation*. [Online] 2007. [Cited: Feburary 27, 2007.] <http://www.vidacare.com/reports/EZIOCombinedProtocol07.pdf>.

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## INTRAOSSIOUS INFUSION (Continued)

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### **EQUIPMENT:** (1)

- EZ-IO® Driver
- Appropriate size Intraosseous Needle Set based on patient size and weight
  - EZ-IO 15mm 3-39 kg, EZ-IO 25mm 40 kg and greater, EZ-IO 45mm 40 kg and greater with excessive tissue
- Alcohol Swab
- EZ-Connect® or Standard Extension Set
- 10 ml Syringe Normal Saline. Pressure Bag or Infusion Pump
- 2 % **LIDOCAINE** (preservative & epinephrine free)
- EZ-IO® wristband

### **PROCEDURE:** (1)

If the patient is conscious, advise of EMERGENT NEED for this procedure and obtain patient consent

1. Wear approved Body Substance Isolation Equipment (BSI)
2. Determine EZ-IO 15, 25, or 45mm Indications. Rule out Contraindications
3. Locate appropriate insertion site (FDA cleared including –Proximal Tibia, distal tibia, and Proximal Humerus)
4. Prepare insertion site using aseptic technique
5. Prepare the EZ-IO® driver and appropriate needle set
6. Position the driver at the insertion site with the needle set at a 90-degree angle to the bone surface.
7. Gently pierce the skin with the Needle Set until the Needle Set tip touches the bone.
8. Ensure visualization of at least one black line on the Needle Set prior to insertion into the bone.
9. Penetrate the bone cortex by squeezing driver's trigger and applying gentle, consistent, steady downward pressure (allow the driver to do the work).
  - a. **Do not use excessive force.** In some patients insertion may take longer than 10 seconds, if the driver sounds like it is slowing down during insertion, reduce pressure on the driver to allow the RPMs and the needle tip to do the work.
  - b. In the unlikely event that the battery on the Driver fails, clinicians may manually finish inserting the EZ-IO Needle Set. Grasp the Needle Set and gently insert into the intraosseous space with rotational movement and gentle pressure. This may take several minutes.
  - c. On adult patients, when accessing the tibia using the 25mm Needle Set or the proximal Humerus using the 45mm Needle Set, you may stop by releasing the trigger when the hub is almost flush with the skin.
  - d. On pediatric patients, when you feel a decrease in resistance indicating the Needle Set has entered the medullary space, release the trigger.
10. Stabilize site
11. Remove EZ-IO® driver from needle set while stabilizing catheter hub
12. Remove stylette from catheter, by turning counter-clockwise place approved sharps container
13. Connect primed EZ-Connect
14. Confirm placement
15. Syringe bolus (flush) the EZ-IO® catheter with the appropriate amount of Normal Saline
16. Secure site with EZ-Stabilizer if needed.
17. If the patient is responsive to pain, slowly administer appropriate dose of 2% Lidocaine, (Preservative and Epinephrine Free) (Cardiac Lidocaine) IO for anesthetic effect prior to the normal saline syringe bolus (flush).
18. Begin infusion, utilizing a pressure delivery system (syringe bolus, pressure bag or infusion pump) for continuous infusions where applicable
19. If EZ-Stabilizer was not used, Dress site, secure tubing and apply wristband as directed
20. Monitor EZ-IO® site and patient condition – Remove catheter within 24 hours.

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## KETAMINE FOR BEHAVIORAL

---

**Purpose:** To make EMS environment safe for a patient and providers

**Indications:**

1. An Excited Delirium patient
2. A patient who poses a safety risk for themselves or care givers

**Precautions:**

1. Maintain vigilance in watching and maintaining airway status.

**Procedure:**

1. A RASS Scale value must be obtained before administration and every 5 minutes after administration of **KETAMINE**
2. Select proper weight range for the patient being administered the **KETAMINE**
3. Draw up the proper dosage of medication verified with another provider ensuring the 6 rights of administration in a safety syringe
4. 200 mg IM Injection 50-69kg (110-150lbs), 300 mg IM Injection 70-89kg (151-199lbs), 400 mg 90kg (200lbs) or greater
5. With enough assistance to maintain scene safety administer the **KETAMINE** in the lateral aspect of the upper thigh
6. ETCO2 must be measured and monitored on all patients after **KETAMINE** is administered as soon as safe to do so.
7. Oxygen by a minimum of Nasal Cannula must be administered to the patient after the administration of **KETAMINE**
8. Vital signs must be obtained before administration and every 5 minutes after administration to include pulse, Blood Pressure, respirations
9. May repeat 100mg IM every 5 minutes if needed up to a total of 500mg
10. When safe, Establish IV access and apply a cardiac monitor.

**RASS Scale (Richmond Agitation Sedation Scale)**

+4	Combative	-1	Drowsy
+3	Very Agitated	-2	Light Sedation
+2	Agitated	-3	Moderate Sedation
+1	Restless	-4	Deep Sedation
0	Alert and Calm	-5	Unresponsive / Unarousable

## LAB DRAW PROCEDURE

---

**Purpose:**

Drawing lab specimens in the prehospital setting can lead to a reduced time in door to drug times for a Patient experiencing a stroke

**Indications:**

1. Patients experiencing stroke like symptoms that meet the criteria for activating a Stroke Alert

**Contraindications:**

1. Inability to establish an IV line
2. Critical patient that taking the time to draw labs would contribute to a decline in patient condition.

**Precautions:**

1. Lab samples should not be obtained after an IV line has been flushed with fluids or medications
2. Do Not delay patient care or transport to obtain lab samples

**Equipment:**

1. IV Initiation equipment (Tourniquet, alcohol prep, tape, bio-occlusive, Saline lock or flushed tubing)
2. Vacutainer
3. Lab specimen tubes (Blue, Green, Purple)
4. Labels (to include first and last name, date of birth, time drawn)
5. Specimen bag

**Procedure:**

1. Wear approved Body Substance Isolation Equipment (BSI)
2. Select site for IV initiation and venous sapling of lab specimen and apply IV tourniquet proximal to the desired puncture site
3. Cleanse the desired puncture site in a circular motion from inside to outside the puncture area
4. Perform venipuncture and remove the needle placing it in an approved puncture proof container
5. Attach the vacutainer to the IV catheter
6. Insert each tube in order and fill to the appropriate level
  - a. Blue – Must be full
  - b. Green – Fill at least half way
  - c. Purple – Fill at least a quarter full
7. Write patient first and last name, Date of Birth and time acquired on a label and affix to each tube and the specimen bag
8. Hand specimen bag to lab personnel on arrival at the destination facility ED

## MAINTENANCE OF NON-MEDICATED IV's

---

### Discontinuing an IV:

#### Procedure

1. Advise or receive orders from medical direction to discontinue IV.
2. Take appropriate BSI precautions.
3. Explain procedure to the patient and/or family members.
4. Turn off IV fluid by closing pressure wheel on administrative tubing.
5. Remove tape and other securing material from IV tubing and catheter.
6. Remove IV catheter and administration tubing still connected.
7. Cover the puncture site with an alcohol wipe, 2x2, or 4x4 and hold pressure until bleeding stops.
8. Cover wound with appropriate dressing (Band-Aid).
9. Discard IV administration set, fluid, and catheter in an approved fashion.
10. Document discontinuance of IV.

### Changing IV Fluids:

#### Rationale

1. during long distance transfers.
2. Change of fluids by medical direction.

#### Procedure

1. Check orders/authorization for change of IV fluids from medical direction.
2. Check for correct IV fluid.
3. Prepare new IV solution, remove covers.
5. Turn off IV flow rate by closing pressure wheel on administration tubing.
6. Invert IV container, remove the IV container to be changed from the administration set, maintaining a sterile environment.
7. Invert the new solution container; puncture the replacement solution container with spike of administration set.
8. Turn IV container over (upright).
9. Fill drip chamber of administration set to marked line if needed.
10. Adjust IV flow rate to desired amount.
11. Reassess IV site and flow.
12. Discard used IV container in an appropriate manner.
13. Document procedure.

#### Precautions

1. Do not allow an IV to "run dry".
2. If the drip chamber is empty, will need to "bleed" air from the tubing before adjusting the IV flow rate

## MECHANICAL CPR LUCAS

---

This procedure describes the appropriate methods to apply, operate, and discontinue the LUCAS device in patients > 8 years of age requiring mechanical chest compression related to cardiac arrest.

### Indications

1. The Lucas may be used in patients 8 years of age and older who have suffered cardiac arrest, where manual CPR would otherwise be used.

### Contraindications

1. Patients < 8 years of age. (size dependent)
2. Patients suffering obvious signs of penetrating traumatic injury directly beneath the suction cup.
3. Patients who do not fit within the device.
  - a. Patients who are too large and with whom you cannot press the pressure pad down 2 inches.
  - b. Patients who are too small and with whom you cannot pull the pressure pad down to touch the sternum

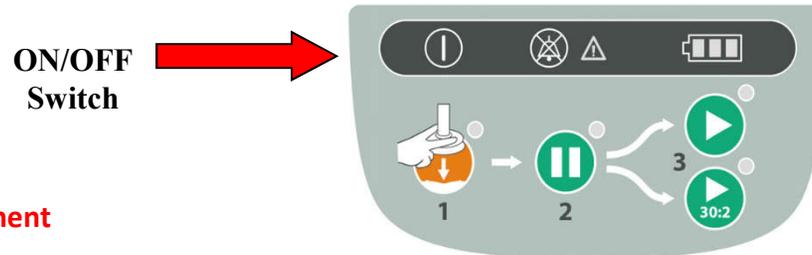
### Protocol for Placement

1. Ensure that at least one round (2 minutes) of manual CPR has been conducted
2. All therapies related to the management of cardiopulmonary arrest should be continued as currently defined
3. Initiate resuscitative measures following Current AHA Guidelines
  - a. Early defibrillation should be considered and provided as indicated based on clinical presentation.
  - b. Manual chest compressions should be initiated **immediately** while the LUCAS device is being placed on the patient.
  - c. **Limit interruptions in chest compressions to 10 seconds or less.**
  - d. **Do not delay manual CPR for the LUCAS. Continue manual CPR until the device can be placed.**
4. While resuscitative measures are initiated, the LUCAS device should be removed from its carrying device and placed on the patient in the following manner.

## MECHANICAL CPR LUCAS (Continued)

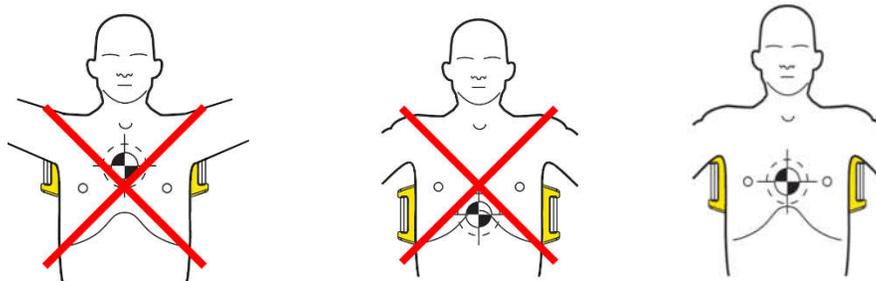
### Activate Unit

- Push ON/OFF button for one second to start self test and power up unit **WHILE STILL IN THE BACKPACK!**



### Backplate Placement

- The backplate should be centered on the nipple line and the top of the backplate should be located just below the patient's armpits



- A.** In cases for which the patient is already on the stretcher, place the backplate underneath the thorax. This can be accomplished by log-rolling the patient or raising the torso (**Placement should occur during a scheduled discontinuation of compressions [e.g., after five cycles of 30:2 or two minutes of uninterrupted compressions]**).

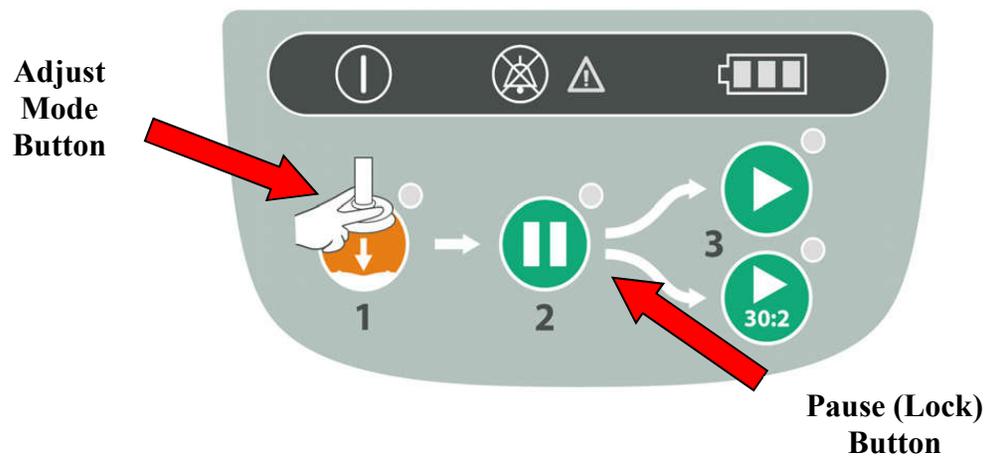
### Position the Compressor

## MECHANICAL CPR LUCAS (Continued)

- Remove the LUCAS device from its carrying case using the handles provided on each side.
- With the index finger of each hand, pull the trigger to ensure the device is set to engage the backplate. Once this is complete, you may remove your index finger from the trigger loop.
- **Approach the patient from the side opposite the person performing manual chest compressions.**
- Attach the claw hook to the backplate on the side of the patient opposite that where compressions are being provided.
- Place the LUCAS device across the patient, between the arms of who is performing manual CPR.
- At this point manual CPR is discontinued and that person assists attaching the claw hook to the backplate on their side.
- Pull up once to make sure that the parts are securely attached.

### Adjust the Height of the Compression Arm

- Use two fingers (V pattern) to make sure that the lower edge of the Suction Cup is immediately above the end of the sternum. If necessary, move the device by pulling the support legs to adjust the position
- Press the Adjust Mode Button on the control pad labeled #1 (This will allow you to easily adjust the height of the compression arm).

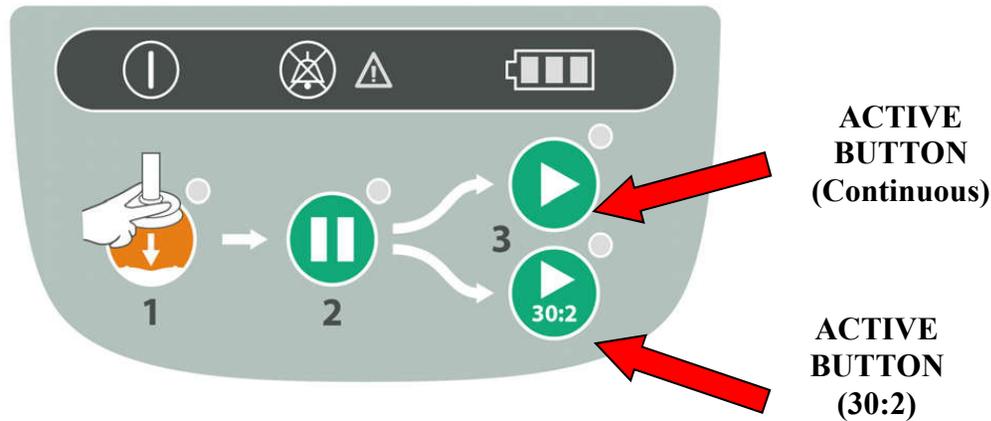


- To adjust the start position of the compression arm, manually push down the SUCTION CUP with two fingers onto the chest (without compressing the patient's chest)
- Once the position of the compression arm is satisfactory, push the green PAUSE button labeled #2 (This will lock the arm in this position), then remove your fingers from the SUCTION CUP.
- If the position is incorrect, press the ADJUST MODE BUTTON and repeat the steps.

## MECHANICAL CPR LUCAS (Continued)

### Start Compressions

- If the patient is not intubated, you will be providing compression to ventilation ratio of 30:2 push ACTIVE (30:2) button to start
- If the patient is intubated and you will be providing continuous compressions push ACTIVE (continuous) button



### Patient Adjuncts

- Place the cushion strap behind the patient's head and attach the straps to the LUCAS device. (This will minimize LUCAS movement.)
- Place the patient's arms in the wrist straps.

### Using the LUCAS during the Resuscitation

#### Defibrillation

- Defibrillation can and should be performed with the LUCAS device in place and in operation
- One may apply the defibrillation electrodes either before or after the LUCAS device has been put in position
  - The defibrillation pads and wires should not be underneath the suction cup
  - If the electrodes are already in an incorrect position when the LUCAS is placed, you must apply new electrodes
- Defibrillation should be performed according to current AHA Guidelines and following the instructions of the defibrillator manufacturer.
- If the rhythm strip cannot be assessed during compressions, press the PAUSE BUTTON (The duration of interruption of compressions should be kept as short as possible and should not be > 10 seconds. There is no need to interrupt chest compressions other than to analyze the rhythm).
- Once the rhythm is determined to require defibrillation, the appropriate ACTIVE BUTTON should be pushed to resume compressions while the defibrillator is charging and then the defibrillator should be discharged.

## MECHANICAL CPR LUCAS (Continued)

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### Pulse Checks/Return of Spontaneous Circulation (ROSC)

- Pulse checks should occur intermittently while compressions are occurring
- If the patient moves or is obviously responsive, the LUCAS Device should be paused and the patient evaluated.
- If there is a change in rhythm, but no obvious indication of responsiveness or ROSC, a pulse check while compressions are occurring should be undertaken. If the palpated pulse is asynchronous, one may consider pausing the LUCAS Device. If the pulse remains, reassess the patient. If the pulse disappears, immediately restart the LUCAS Device.

### Discontinuation of Resuscitation Efforts

- Discontinuation of resuscitative measures can occur following 30 minutes of Lucas Device runtime and will involve physician oversight.

### Disruption or Malfunction of Lucas Device

- If disruption or malfunction of the LUCAS device occurs, immediately revert to Manual CPR.

### Power Supply

- Battery Operation
  - When fully charged, the Lithium Polymer battery should allow 45 minutes of uninterrupted operation
- There is an extra battery in the Lucas backpack
- The battery is automatically charged when the device is plugged into a wall outlet and not in operation. The device should be stored with two charged batteries ready for immediate deployment.
- When the orange Battery LED shows an intermittent light, replace the battery or connect to a wall outlet.
- Consider connecting the LUCAS Device to wall power for prolonged use.



**Power Supply Cord Slot  
(For charging and AC  
operation)**

## MEDICATION INFUSIONS

---

**PURPOSE:** To properly administer drug therapy in the out of hospital setting

**PRECAUTIONS:**

1. Ensure patency of IV line
2. Assure proper drug concentrations
3. Use only microdrip tubing (60 drop/mL) to assure accurate delivery of medication
4. Piggyback all medication infusions into main IV line
5. Meticulous attention to the drip rate is required; check vital signs every 5 minutes

### DOPAMINE

1. Premixed solution consisting of **400 mg/250 mL** of Dextrose 5% and Water, resulting in a 1600 mcg/mL concentration.
2. Use only when systolic BP drops **below 90 mm Hg**; Do NOT Use in hypovolemic shock.
3. Adult drip rates:

Weight	Drip Rate (microdrops/minute)
55 to 120 lbs.	5 drops/minute
120 to 300 lbs.	10 drops/minute

4. The initial dose may be increased by **10 drops/minute** every **3** minutes until **50 drops per minute** or a systolic BP of 90 mm Hg is reached.

### EPINEPHRINE

1. Add 1 mg Epinephrine 1:1,000 **to a** 1,000 mL bag of Normal Saline attached to a micro drip IV set
2. Medication label must be applied to the 1,000 mL NS bag immediately after Epinephrine is added to IV solution.
3. Adult drip rate at 60 micro drops per minute.

### TXA (Tranexamic Acid)

1. Add 1 gram TXA to a 100 mL bag of Normal Saline attached to a micro drip IV set
2. Medication label must be applied to the 100 mL NS bag immediately after TXA is added to IV solution.
3. Adult drip rate at 60 micro drops per minute.

## NEEDLE THORACOSTOMY (Chest Decompression)

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**Indications:** A qualified EMS provider\* may use this skill for respiratory compromise associated with one or more of the following:

1. Tension Pneumothorax.
2. Absent or greatly decreased breath sounds over the hemothorax area.
3. Trachea shifted to unaffected side and/or JVD.
4. Subcutaneous emphysema.
5. Multiple rib fractures.

**Procedure/Treatment:**

1. If at all possible, perform this procedure when en-route to the receiving facility, lights and siren
2. Expose and cleanse anterior chest at level of the 5<sup>th</sup> intercostal space anterior axillary or 2<sup>nd</sup> intercostal space mid clavicular on the affected side.
3. Find 5<sup>th</sup> intercostal space anterior axillary line or 2<sup>nd</sup> intercostal space mid clavicular with gloved finger.
4. Using 14 gauge over-the-needle catheter and syringe attached direct needle over the 6<sup>th</sup> rib into the 5<sup>th</sup> intercostal space anterior axillary third rib into the 2<sup>nd</sup> intercostal space mid clavicular or over the 6<sup>th</sup> rib into the 5<sup>th</sup> intercostal space anterior axillary.
5. Apply enough pressure to push the needle through the intercostal muscle and into the pleural cavity.
6. You should pull back air in the syringe or if no syringe on the needle you should hear a rush of air, either of these are considered a positive placement.
7. Remove the needle leaving catheter in place and securing with tape.
8. Connect to one-way valve or a commercially available chest seal device (i.e., Asherman chest seal)
9. Assess patient for improvement in status.

**\*Qualified EMS provider:** A certified Paramedic who has demonstrated the skills necessary to competently perform this procedure and has the approval of the medical director.

## PACING, EXTERNAL DEMAND CARDIAC

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**INDICATIONS:** A qualified EMS provider\* may use this skill for the following:

1. Profound bradycardia with hemodynamic compromise.

**PRECAUTIONS:**

1. Not to be used on children under 12 unless Medical Control ordered.
2. The patient must be monitored with both the defibrillation/pacing pads and the patient electrode cable

**CONTRAINDICATIONS:** Noninvasive pacing is contraindicated for the treatment of ventricular fibrillation. Severe hypothermia is a relative contraindication to pacing a patient with bradycardia.

**SPECIAL CONSIDERATION:** Patients with implantable pacemakers may require higher energy and rate

**PROCEDURE:**

1. Turn on pacemaker
2. set the rate @ 80 BPM start the amperage @ 0mA
3. Assess the patient for both mechanical and electrical capture.
4. Increase the output in 10 mA increments till mechanical capture occurs; this will be dependent upon the electrical resistance of the patient. Following capture, back amperage down in increments of 5 mA to ensure lowest possible setting.
5. The patient will experience pain or discomfort with this and treat as appropriate with
  - a) **FENTANYL** 50 mcg IV/IO slow over 2-3 minutes maybe repeated every 5-10 minutes to a total of 100mcg
  - OR**
  - b) **MIDAZOLAM** (Versed) 5mg IV / IO, IM, or Intranasal slow push every 5-10 minutes to a total of 10mg
6. The adjustment of the amperage to maintain capture may be necessary with prolonged use or with discomfort of the patient.

If at any point the **BRADYCARDIC** paced patient goes into either V-fib or V-tach, immediately shut pacer off and proceed to deliver an unsynchronized defibrillation per manufacturer's recommendation with the defibrillator.

**Assessing Mechanical Capture**

Mechanical capture of the ventricles is evidenced by signs of improved cardiac output, including a palpable pulse, rise in blood pressure, improved level of consciousness, improved skin color and temperature. Chest compressions **MUST** continue in the absence of mechanical capture or a palpable pulse. Skeletal muscle contractions occur with current delivery and may be evident with energy levels as low as 10 mA. They are not indicative of mechanical or electrical capture and generally become more vigorous as the current is increased. Strong contractions may make it difficult to accurately palpate a pulse.

**\*Qualified EMS provider:** A certified Paramedic who has the skills necessary to competently perform this procedure and the approval of their medical director.

## PULSE OXIMETRY

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Application of the pulse oximeter is not a priority in the initial management of the critically ill or injured patient. The pulse oximeter can be used to help monitor the patient's oxygenation after the usual procedures to stabilize the patient are completed (ABC's management).

### **Procedure/Treatment:**

1. Start treatment based on initial assessment to stabilize the patient while applying pulse oximeter.
2. Position patient comfortably and support dependent extremity used for monitoring.
3. Remove finger nail polish. Polish can falsely alter saturation.
4. Attach sensor probe to finger or bridge of nose. May also use the earlobe or toes.

### **Potential problems:**

1. Inaccuracy if O<sub>2</sub> saturation less than 70%.
2. Possible interference with ambient light.
3. Presence of carboxyhemoglobin will produce normal reading in the presence of severe tissue hypoxemia.
4. Presence of nail polish on finger being assessed.
5. Vasoconstriction, cold extremities or hypotension
6. Anemia.

## TASER DART REMOVAL

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Taser devices are frequently used by law enforcement to incapacitate subjects that are out of control or pose a threat to law enforcement officers. These devices are also for sale to and used by the general public. This procedure provides steps to remove taser darts after the device has been used.

### **Procedure/Treatment:**

1. Ensure the cartridge is removed from the weapon (electrical source).
2. Expose the area in which the dart has penetrated the skin. Assess motor and sensory function.
3. Because the barb on the dart is relatively small, there is no need to attempt to clip or remove the barb prior to removal.
4. A groove is present inline with the barb. It may be helpful to apply slight pressure in the opposite direction of the groove to facilitate removal.
5. Grab the dart with a single hand, use the other hand to stabilize the wound site, and pull firmly to disengage the dart from the skin and subcutaneous tissue.
6. There may be minimal bleeding that can be controlled in the traditional manner. In the event the barb has penetrated a blood vessel, provide direct pressure until bleeding is controlled.
7. Recheck motor and sensory function.

### **Potential problems:**

1. Do not remove the dart if there is a problem with motor or sensory function in any location.
2. Do not remove the dart if it is located in a sensitive area defined as the face or genitals.

### **Additional Notes:**

1. Pacemakers should not be affected by the Taser. FDA standards for these implantable devices require that they can withstand extremely high energy shocks (i.e. up to 360J): Implantable Medical Device requirements 90/385/1EC). The X26 TASER delivers 0.07 joules per pulse to the load. The M26 TASER delivers 0.50 joules per pulse to the load.

Preliminary studies show that cardiac monitoring is unnecessary (Academic Emergency Medicine, 2005, 12(5): S1, page 71

## TOURNIQUET APPLICATION

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### **Purpose:**

Use of a tourniquet can safely and effectively assist in the care of patients with uncontrollable extremity bleeding in the extremities safely and effectively with appropriate precautions.

### **Indications:**

1. Extremity injury with active bleeding uncontrolled with direct pressure.
2. Extremity amputation above a wrist or ankle.
3. Arterial bleeding in an extremity from a significant injury.
4. Impaled object not allowing direct pressure to injury site with profuse bleeding that prohibits the application of direct pressure to the injury site.
5. Significant bleeding from multiple extremity locations which overwhelms resources, or the need for other emergent interventions.

### **Contraindications:**

1. Bleeding that is able to be controlled with direct pressure, elevation, or pressure points.

### **Considerations:**

1. Tourniquet application should be completed early if direct pressure is not effective.
2. Application may be done prior to attempting direct pressure, elevation, or pressure points if bleeding or patient condition warrants.
3. Significant injury with mangled tissue will not respond to direct pressure and a tourniquet should be the first treatment for bleeding.
4. Blood pressure cuffs will require frequent pressure monitoring to maintain compression.

### **Precautions;**

1. Once applied, tourniquets must not be removed in the pre-hospital setting.
2. Tourniquets should not be made of a narrow material

## TOURNIQUET APPLICATION (Continued)

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### Equipment:

1. Personal Protective Equipment
2. Commercially available tourniquet.

### Procedure:

1. Wear approved Body Substance Isolation Equipment (BSI)
2. Complete patient assessment for life threatening injuries and correct if possible. (Refer to Initial Patient Care Protocol)
3. Gather and prepare equipment.
4. Rule out Contraindications.
5. Locate appropriate site proximal to the injury.
6. Visually inspect injured extremity and if possible avoid placement of a tourniquet over a joint, angulated or open fracture, or puncture site.
7. Place dressing directly over the wound if possible.
8. Apply tourniquet proximal to the injury and incrementally apply enough tension to stop bleeding.
9. Ensure that bleeding has stopped. Apply a second tourniquet adjacent to the initial one if necessary and reassess.
10. Complete ALS procedures and give IV or IO fluid bolus (250ml per Scott County Protocol) as appropriate based on patient condition.
11. Frequently re-assess and document circulation, motor and sensation distal to tourniquet application.
12. Label patient with time of tourniquet application.
13. Activate a Field Trauma Alert and notify Medical Control of tourniquet application.
14. Do not cover tourniquet (keep tourniquet visible).

## WOUND PACKING

---

### **Purpose:**

Use of wound packing can safely and effectively assist in the care of patients with uncontrollable bleeding that cannot be controlled by other means safely and effectively while taking appropriate precautions.

### **Indications:**

1. Injury with active bleeding uncontrolled with direct pressure or tourniquet application.
2. Arterial bleeding from a significant injury.
3. Significant bleeding from multiple extremity locations that overwhelms resources, or the need for other emergent interventions.

### **Contraindications:**

1. Bleeding that is controlled with direct pressure or tourniquet.

### **Considerations:**

1. Wound packing must be completed early if direct pressure or tourniquet application is not effective.
2. Significant injury with mangled tissue will not respond to direct pressure and wound packing should be the first treatment for bleeding.

### **Precautions:**

1. Once inserted, wound packing must not be removed in the pre-hospital setting.

### **Equipment:**

1. Personal Protective Equipment
2. Commercially wound packing equipment.

## WOUND PACKING

---

### Procedure:

1. Wear approved Body Substance Isolation Equipment (BSI)
2. Complete patient assessment for life threatening injuries and correct if possible. (Refer to Initial Patient Care Protocol)
3. Gather and prepare equipment.
4. Rule out Contraindications.
5. Locate appropriate site of the injury by exposing the injury area.
6. Visually inspect injury and determine material needed.
7. Wound packing is not indicated for hollow body cavities.
8. Insert material incrementally in all directions enough to tightly fill the open wound to stop bleeding.
9. If vessel causing bleeding can be identified, focus the packing and pressure directly to that area.
10. If liquid free blood is present it can be removed but use caution not to remove forming clots.
11. Ensure that bleeding has stopped and apply direct pressure over the wound after packing.  
3 minutes for hemostatic gauze and 10 minutes for non-hemostatic gauze
12. Complete ALS procedures and give IV or IO fluid bolus (250ml per Scott County Protocol) as appropriate based on patient condition (see trauma protocol).
13. Frequently re-assess and document circulation, motor and sensation distal to wound packing.
14. Note location, amount of material used and time inserted and convey to receiving facility on report.
15. Activate a Field Trauma Alert and notify Medical Control of Bleeding control procedures.