EMS Procedure Guidelines

Lincoln Fire & Rescue
Emergency Medical Services
EMS Procedure Guidelines

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Changes highlighted in Yellow.

EMS Procedure Guidelines

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12-LEAD ECG

AUTHORIZATION:

1. BLS Provider
    a. BLS providers are authorized to apply the 12-lead electrodes and cables and obtain a 12-lead tracing.
    b. BLS providers are not authorized to interpret the 12-tracing.
2. ALS Provider
    a. ALS providers must interpret the 12-lead tracing.

INDICATIONS:

1. All 12-leads should be obtained within 10 minutes of arrival a patient side. Obtaining a 12-lead should be strongly considered on patients 18 and older with the following impressions: Acute Coronary Syndrome, Chest Pain/Discomfort
    a. STEMI, N-STEMI
    b. Cardiac Arrythmia/Dysrhythmia
    c. Acute Respiratory Distress, Shortness of Breath
    d. Pulmonary Edema
    e. Syncope/Fainting
    f. Fatigue, Malaise
    g. Nausea with vomiting
    h. ROSC

PRECAUTIONS:

1. Treatment of lethal dysrhythmias (e.g., VF, pulseless VT) and life-threatening problems associated with airway, breathing, and circulation should be initiated prior to obtaining a 12-lead ECG.

PRODEDURE:

1. Prepare all the equipment and ensure the cable is in good repair. Check to make sure there are adequate leads and materials for prepping the skin.
2. Prep the skin. Dirt, oil, sweat and other materials on the skin can interfere with obtaining a quality tracing.
3. Place the four limb leads in accordance with manufacturer's recommendations. Limb lead electrodes are typically placed on the wrists and ankles as shown in Figure 1. The limb lead electrodes can be placed anywhere along the limbs. Do not place the limb lead electrodes on the torso when acquiring a 12-lead ECG.

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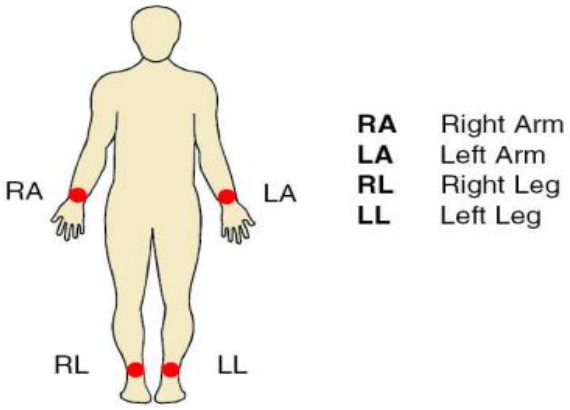
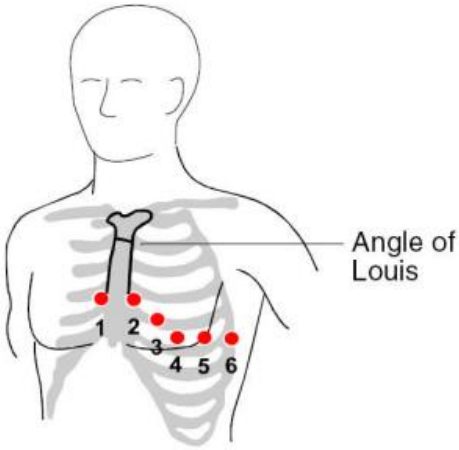


Figure 1 – Limb lead electrode placement

4. Place the precordial leads in accordance with manufacturer's recommendations. Precordial leads are typically placed as shown in Figure 2. Proper lead placement is important for accurate diagnosis.



Lead	Lead Location
V1	Fourth intercostal space to the right of the sternum
V2	Fourth intercostal space to the left of the sternum
V3	Directly between leads V2 and V4
V4	Fifth intercostal space at mid-clavicular line
V5	Level with V4 at left anterior auxiliary line
V6	Level with V5 at left midaxillary line

Figure 2. – Precordial lead electrode placement

a. Locating the V1 position (fourth intercostal space) is critically important because it is the reference point for locating the placement of the remaining V leads. To locate the V1 position:
    i. Place your finger at the notch in the top of the sternum.
    ii. Move your finger slowly downward about 1.5 inches (3.8 centimeters) until you feel a slight horizontal ridge or elevation. This is the Angle of Louis where the manubrium joins the body of the sternum.
    iii. Locate the second intercostal space on the patient's right side, lateral to and just below the Angle of Louis.
    iv. Move your finger down two more intercostal spaces to the fourth intercostal space, this is the V1 position.
    v. Place V1 by attaching the positive electrode to the identified location.

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b. Place V2 by attaching the positive electrode to the left of the sternum at the fourth intercostal space.
c. Place V4 by attaching the positive electrode at the mid-clavicular line at the fifth intercostal space. (Note: V4 must be placed prior to V3)
d. Place V3 by attaching the positive electrode in the line midway between lead V2 and V4.
e. Place V5 by attaching the positive electrode at the anterior axillary line as the same level as V4.
f. Place V6 by attaching the positive electrode to the midaxillary line at the same level as V4.

CAUTION: When placing electrodes on female patients, always place leads V3-V6 under the breast rather than on the breast.

CAUTION: Never use the nipples as reference points for locating the electrodes for male or female patients, because nipple locations may vary widely.

5. Ensure that all leads are attached.
6. Activate 12-lead function.
7. Record the tracing.
8. Select the appropriate facility and transmit the 12-lead
    a. Select the hospital radio channel and monitor the channel in the event the base physician needs to contact you for additional information.

CONSIDERATIONS:

1. Perform the 12-lead ECG within five (5) minutes or as soon as possible.
2. If the patient's clinical condition changes, acquire an additional 12-lead ECG.
3. If a patient refuses or if you are transporting to Bryan Health West Campus, consider transmitting the 12 lead to a receiving hospital for a base physician over read.

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CO AND SpCO MEASUREMENT

AUTHORIZATION:

1. BLS Provider

INDICATIONS:

1. Multiple patients presenting with symptoms.
2. Headache, dizziness, syncope, weakness, altered mental status, and/or lethargy.
3. Nausea, vomiting, and/or abdominal complaints.
4. Any ill or injured patient with vague complaints.
5. Shortness of breath, chest pain.
6. CO detector(s) alarming.
7. Extended time on or near fire-ground.

PROCEDURE:

1. Apply finger probe on patient. Consider covering probe with towel.
2. Initial CO assessment parameters.
    a. 0-5% - Considered normal in non-smokers. When greater than 3% with symptoms, consider high flow oxygen and evaluate environment for CO sources. Consider measuring others in same room/office/vehicle as patient. In absence of symptoms, no further medical evaluation of SpCO needed.
    b. 5-10% - Considered normal in smokers, abnormal in non-smokers. If symptoms present, consider high flow oxygen and inquire if others are ill. Evaluate environment for CO sources.
    c. 10-15% - Abnormal in any patient. Assess for high flow oxygen. Evaluate environment for CO sources.
    d. Greater than 15% - Significantly abnormal in any patient. Administer high flow oxygen, assess for symptoms, and consider transport. Evaluate environment for CO sources.
    e. Greater than 30% - Transport immediately. Administer high flow oxygen. Patient will likely be transferred to hyperbaric facility. Evaluate environment for CO sources.
3. CO reassessment parameters
    a. 0-5% - If symptoms, persist, recommend transport regardless of SpCO readings. If symptoms resolved, no further medical evaluation of SpCO needed.
    b. 5-10% - If symptoms persist, recommend transport regardless of SpCO readings. If symptoms resolve and SpCO remains greater than 5% in any patient, recommend further medical evaluation. Non-smokers should be encouraged to have their home/work environment evaluated for CO.
    c. 10-15% - If symptoms persist or SpCO remains greater than 10 % in any patient, recommend transport. Encourage patient to have their home/work environment evaluated for CO.

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d. Greater than 15% - Recommend transport regardless of symptoms. Ensure that others in the patient's home or workplace are not ill.
e. Greater than 30% - Transport immediately. Administer high flow oxygen. Patient will likely be transferred to hyperbaric facility. Evaluate environment for CO sources.

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CONTINUOUS POSITIVE AIRWAY PRESSURE (CPAP)

AUTHORIZATION:

1. ALS Provider

INDICATIONS:

1. Any patient who is in respiratory distress with signs and symptoms consistent with asthma, COPD, pulmonary edema, or CHF, and who is:
    a. Awake and able to follow commands.
    b. Is over 18 years old and can fit the CPAP mask.
    c. Has the ability to maintain an open airway.
    d. AND exhibits two or more of the following:
        i. A respiratory rate greater than 25 breaths per minute.
        ii. SPO2 of less than 94% at any time.
        iii. Use of accessory muscles during respirations.

CONTRAINDICATIONS:

1. Patient is in respiratory arrest/apneic.
2. Patient is suspected of having a pneumothorax or has suffered trauma to the chest.
3. Patient has a tracheostomy.
4. Patient is actively vomiting or has upper GI bleeding.
5. Patient systolic blood pressure is less than 90 mmHg.

PROCEDURE:

1. Explain the procedure to the patient.
2. Ensure adequate oxygen supply to ventilation device.
3. Initiate continuous SPO2 and ETCO2 monitoring.
4. Place the patient on cardiac monitor and record rhythm strips with vital signs.
5. Place the delivery device over the mouth and nose.
6. Secure the mask with provided straps.
7. Set PEEP valve to five cmH2o initially, may titrate to max of 10 cmH2o.
8. Check for air leaks.
9. Monitor and document the patient's respiratory response to treatment.
10. Check and document vital signs every five minutes.
11. Administer appropriate medication as needed. (Continuous nebulized Albuterol for COPD/Asthma and repeated administration of nitroglycerin spray for CHF)
12. Continue to coach patient to keep mask in place and readjust as needed.
13. Advise receiving facility that CPAP has been initiated.
14. If respiratory status deteriorates, remove device, and consider positive pressure ventilation via BVM and/or placement of non-visualized airway or endotracheal intubation.

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REMOVAL PROCEDURE:

1. CPAP therapy needs to be continuous and should not be removed unless the patient can't tolerate the mask or experiences respiratory arrest or begins to vomit.
2. If the patient is removed from CPAP therapy, consider positive pressure ventilation with a Bag-Valve-Mask, the placement of a non-visualized airway and/or endotracheal intubation.

SPECIAL NOTES:

1. Do not remove CPAP until directed by hospital staff or physician.
2. Watch patient for gastric distention, which can result in vomiting.
3. Procedure may be performed on patient with a "**Do Not Resuscitate Order".**
4. Due to changes in preload and afterload of the heart during CPAP therapy, a complete set of vital signs must be obtained every five minutes.

KEY POINTS:

1. Continuous Positive Airway Pressure (CPAP) has been shown to rapidly improve vital signs and gas exchange; reduce the work of breathing, decrease the sense of dyspnea, and decrease the need for endotracheal intubation in patients who suffer from shortness of breath secondary to asthma, COPD, pulmonary edema, and CHF. In patients with CHF, CPAP improves hemodynamics by reducing left ventricular preload and afterload.

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CRICOTHYROTOMY – NEEDLE

AUTHORIZATION:

1. ALS Provider

INDICATION:

1. To establish emergency airway access on patients less than 8 years old when other conventional means of securing an airway fail due to trauma or airway obstruction.
2. This is a last resort maneuver for securing an airway.

CONTRAINDICATIONS:

1. Age greater than 8 years.
2. Ability to ventilate the patient and maintain the airway by other means.
3. Ability to intubate the trachea with an endotracheal tube.
4. Inability to identify the cricothyroid membrane.

PRECAUTIONS:

1. Patients with airway injuries may have significant spinal injuries. Whenever possible, the cervical spine should be immobilized before beginning the procedure. Care should always be exercised to avoid additional spinal injuries.
2. Whenever possible and appropriate, utilize aseptic technique for the procedure.

NECESSARY EQUIPMENT

1. 14 G, 1.25” long IV needle-over-catheter.
2. 3-, 5-, or 10-mL syringe.
3. Alcohol wipes.
4. Twill tape.
5. 15 mm adapter off a 3.0 mm ET tube.
6. BVM with high flow oxygen source.

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PROCEDURE:

1. Identify the clinical indications for needle cricothyroidotomy.
2. Place patient in supine position.
3. Palpate cricothyroid membrane between thyroid cartilage and cricoid cartilage. (Figure 4)
4. Cleanse area well with alcohol swabs.
5. Attach 14 G over-the-needle catheter to the syringe.
6. Puncture skin mid-line and directly over the cricothyroid membrane.
7. Direct needle caudally at 45-degree angle. (Figure 5)
8. Advance needle through lower half of cricothyroid membrane, aspirating as needle is advanced.
9. Aspiration of air identifies position is tracheal lumen.
10. Remove needle and gently advance catheter.
11. Attach catheter needle hub to #3.0 mm pediatric ETT adapter.
12. Connect ETT adapter to Bag Valve.
13. Confirm position by auscultation and visualization of lung inflation.
14. Secure apparatus to neck with twill tape.
15. Document the procedure and the patient's response.

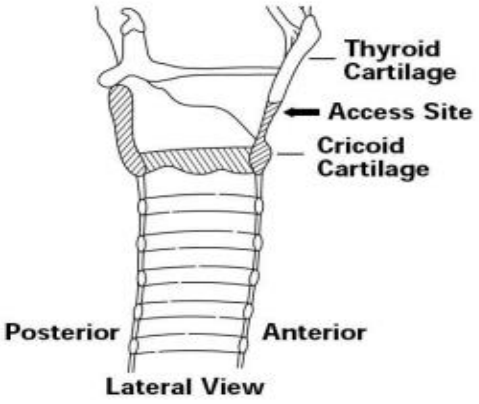

Figure 4

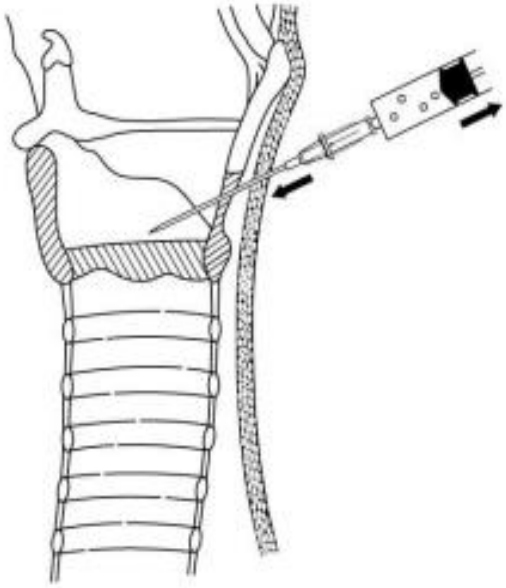

Figure 5

COMPLICATIONS:

1. Asphyxia.
2. Subcutaneous or mediastinal emphysema or bleeding.
3. Hematemesis.
4. Vocal cord damage.
5. Esophageal or thyroid perforation.
6. Posterior tracheal wall perforation.
7. Inadequate ventilation.
8. Hypercapnia/Hypercarbia.

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CRICOTHYROTOMY – SURGICAL

AUTHORIZATION:

1. ALS Provider

INDICATION:

Establish emergency airway access on patients that are eight years old or older when other conventional means of securing an airway fail due to trauma or airway obstruction. This is a last resort maneuver for securing an airway.

CONTRAINDICATIONS:

1. Ability to intubate the trachea.
2. Ability to ventilate the patient and maintain the airway by other means.
3. Inability to identify the cricothyroid membrane.

PRECAUTIONS:

1. Suspected laryngeal fractures.
2. Bleeding disorders.

NECESSARY EQUIPMENT:

1. 6.0 Endotracheal Tube (may utilize other sizes if indicated by patient size or condition).
2. #15 Scalpel blade.
3. Bougie.
4. 10mL syringe.
5. Tube restraint.
6. Stethoscope.
7. ETCO2 Circuit.
8. Sterile gloves if available.
9. Alcohol wipes.
10. Sterile Dressings.
11. Suction.
12. BVM with oxygen source.

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PROCEDURE:

1. Hyperextend the patient's neck. (Unless cervical spine injury is suspected) This position brings the larynx and cricothyroid membrane into the extreme anterior position.
2. Use standard isolation precautions. Preferably, don sterile gloves if available.
3. Locate the cricothyroid membrane between the cricoid and thyroid cartilages by palpating the depression caudal (towards the feet) to the midline thyroid cartilage.
4. Cleanse the area well with povidone-iodine solution or alcohol.
5. Make a midline, vertical 1.5-2 cm skin incision in the neck over the cricothyroid membrane. Insert scalpel through the cricothyroid membrane. Make a small incision in the membrane. There should be air escape at this point.
6. Note: Brisk bleeding may occur. Do not waste time attempting to control bleeding.
7. Insert the bougie into the incision. Remove the scalpel. Insert your gloved finger into the incision next to the bougie and use your finger to dilate the opening. In an obstructed airway, the patient should be able to inhale air in at this point if still conscious. Proceed to step 9.
8. **Optional procedure:** Once the incision is made; rotate the scalpel blade 90° and widen the incision, first to one side, then rotate the blade 180° and widen to the other side. Insert the bougie next to the scalpel blade. Proceed to step 9.
9. Insert the 6.0 ET tube over the bougie and advance until the cuff is immediately inferior to the incision.
10. Remove the bougie ensuring the tube remains in place.
11. Inflate the ETT cuff with 5-10 mL of air. Inflate the pilot balloon enough to prevent air leaking around the balloon.

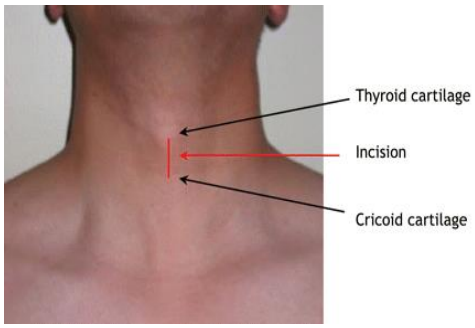

Figure 6

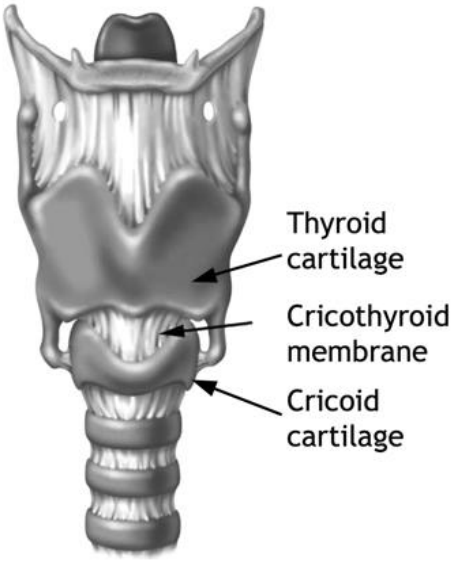

Figure 7

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12. Ventilate patient with 100% 02.
13. Immediately assess tube placement by auscultating the chest in the axillae and apex locations and over the epigastrium. Bilateral breath sounds and no sound over the epigastrium is the goal.
14. Remove or reposition the tube as needed and then secure with twill tape.
15. Capnography must be used in conjunction with frequent auscultation to verify correct ET Tube placement. ETCO2 levels should be maintained at 35-40 mm/Hg (30-35 mm/Hg for head injury patients with signs of impending brain stem herniation).
16. Document the procedure and patient response.

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DEFIBRILLATION – MANUAL

AUTHORIZATION:

1. ALS Provider

INDICATIONS:

1. Ventricular fibrillation and pulseless ventricular tachycardia.

PROCEDURE:

1. Turn on monitor/defibrillator.
2. Apply defibrillation electrodes to the patient according to the manufacturer's recommended placement and in accordance with the monitor/defibrillator manufacturer's recommendation (anterior-lateral).
    a. Ensure the electrodes do not touch and there is room for the LUCAS device suction cup.
    b. Pediatric electrodes may be used on children 1-8 years old in a shockable rhythm.
        i. Pediatric energy reducing electrodes are not compatible with the Life Pak 15 and are not used for manual defibrillation.
    c. Pediatric electrodes may be placed either anterior-lateral or anterior-posterior for manual defibrillation.
    d. Pediatric electrodes can only be placed anterior-lateral when used in the AED mode.
3. Connect defibrillation electrodes to Life Pak 15 therapy cable.
    a. Ensure therapy cable is plugged into Life Pak 15
4. Select energy level at 360J.
    a. Pediatric energy level for initial defibrillation 2 J/kg, energy levels for subsequent defibrillations 4 J/kg.
5. Visually check the monitor display and assess the rhythm. (Subsequent steps assume VF/VT is present).
6. Press CHARGE button on defibrillator controls. CPR should be provided while the defibrillator charges (when possible), until it is time to "clear" the victim for shock delivery.
7. When the defibrillator is charged, give the shock as quickly as possible. State firmly in a forceful voice your intent to shock:
    a. Check to make sure you are clear of contact with the patient, stretcher, and equipment and that no one continues to touch the patient or stretcher. Don't forget about the person providing ventilations. That person's hands should not be touching the ventilation adjuncts, including the tracheal tube.
8. Press the **DISCHARGE** button.
9. Immediately after shock delivery, resume CPR (beginning with chest compressions) without delay and continue for five cycles (or about two minutes if an advanced airway is in place), and then check the rhythm.

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DIRECT LARYNGOSCOPY ENDOTRACHEAL INTUBATION

AUTHORIZATION:

1. ALS Provider

INDICATIONS:

1. Respiratory arrest.
2. Unresponsive medical or trauma patients who lack a gag reflex.
3. Cardiopulmonary arrest.
4. Patients with a GCS less than 8.
5. Conscious patients with respiratory distress who are unable to ventilate adequately.

CONTRAINDICATION:

1. Epiglottitis

NECESSARY EQUIPMENT:

1. BVM with oxygen source
2. Laryngoscope blade and handle
3. Twill tape
4. Appropriate size ETT and stylet
5. 10 cc syringe
6. Stethoscope
7. ETCO2 circuit
8. Airway filter
9. Magill forceps
10. Oropharyngeal Airway (For initial airway management and / or use as a bite block)
11. I-gel (If unable to intubate)

PROCEDURE: (MAXIMUM OF 2 ATTEMPTS per PROVIDER)

1. Use standard isolation precautions including eye protection. Use a facemask and gown when splashing is likely.
2. Open the airway and pre-oxygenate the patient with a bag-valve-mask supplied with 100% oxygen for at least one minute. (BVM ventilation requires cricoid pressure until the tube is confirmed to be in the trachea) Ventilation should be repeated for a minimum of one minute anytime 30 seconds without ventilation has elapsed for an intubation attempt.
3. Auscultate for breath sounds to establish a baseline.
4. Assemble and check the equipment including:
    a. Check the distal cuff for leaks.
    b. Lubricate the distal end of the endotracheal tube with a water-soluble lubricant. (Optional)

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   c. Ensure the stylet, if used, is recessed two CM from the distal end of the endotracheal tube.
   d. The laryngoscope is bright, white, and tightly secured in place.
5. Turn on the suction unit and attached the appropriate tip.
6. Place the head and neck into a "sniffing position" to align the three axis of the mouth, pharynx, and trachea.
   a. When there is a potential for cervical spine injury, ensure the head is firmly held in a neutral position during intubation.
7. Holding the handle in the left hand, insert the laryngoscope blade into the right side of the patient's mouth. Using a sweeping motion, displace the tongue to the left.
8. Move the blade slightly toward the midline and advance it until the distal end is positioned at the base of the tongue.
9. Visualize the tip of the epiglottis and then place the laryngoscope blade into the proper position.
   a. Curved (Macintosh) blade is advanced into the vallecula.
   b. Straight (Miller) blade is inserted under the epiglottis.
10. Lift the laryngoscope slightly upward and forward to displace the mandible and airway structures without allowing the blade to touch the teeth.
11. Keeping the left wrist straight, use the shoulder and arm to continue lifting the mandible and tongue at a 45° angle to the ground until the glottis is exposed. If necessary, have another provider apply cricoid pressure.
12. Grasp the endotracheal tube in the right hand, holding it the same way a pencil is grasped. Hold the tube horizontal to the ground. Advance it through the right corner of the patient's mouth, directing the distal end of the tube up or down to pass it into the pharynx.
13. Insert the endotracheal tube into the glottic opening and advance it until the cuff disappears slightly (one to two cm) past the vocal cords. Observe the tube as it enters the glottic opening.
14. Hold the tube in place with a free hand. Do not release the tube before it is secured in place. With your other hand, remove the stylet and then insert the oropharyngeal airway between the teeth or gums as a bite block.
15. Inflate the distal cuff with the prefilled syringe. Use only the minimum amount of air necessary to create an effective seal and prevent air leakage. Do not overinflate the cuff.
   a. Ensure the syringe is removed after the distal cuff is inflated.
16. Attach a bag-valve-mask to the tube.
   a. Place the ETCO2 circuit and airway filter onto the ET tube with the BVM.
   b. Ensure supplemental oxygen @ 15 L/min is attached to the BVM via oxygen connecting tube.
17. Deliver several breaths with the bag-valve-mask and confirm proper tube placement as follows:
   a. Auscultate over the epigastrium.
   b. Auscultate the chest bilaterally at the axillae, apices, and the bases for the presence of equal, bilateral lung sounds.
   c. Observe for symmetrical chest rise and fall with each breath.

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   d. Observe patient for clinical improvement. (I.E., pulse oximetry, skin condition).
18. Confirm proper tube placement with a ETCO2 detection circuit:
    a. ETCO2 DETECTION / MONITORING – CAPNOGRAPHY
        i. ETCO2 should be maintained at 35-45 mm/Hg.
        ii. For head-injured patients with signs of impending brain stem herniation, maintain @ 30-35 mm/Hg.
19. Note and record the depth of the endotracheal tube at the teeth.
20. Ventilate the patient with the bag-valve-mask supplied with 100% oxygen as indicated.
    a. During CPR: Deliver 8 to 10 breaths per minute. Deliver each breath over about one second while chest compressions are delivered at a rate of at least 100 per minute, and do not attempt to synchronize the compressions with the ventilations.
    b. Patients with a perfusing rhythm: Deliver approximately 10 to 12 breaths per minute (one breath every 5 to 6 seconds). Deliver these breaths over one second.
21. Secure the endotracheal tube in place with a commercial device or twill tape while continuing ventilatory support.
22. Re-confirm tube placement after the tube is secured, after every patient movement and at regular intervals. Application of a cervical collar and immobilization device will help prevent the patient from moving in such a way as to dislodge the endotracheal tube.

SEDATION:

1. If patient regains consciousness or gag reflex returns AND the patient's airway needs continued protection AND the patient is hemodynamically stable.
    a. Give Midazolam 2.5 mg slow IVP titrated to effect.

COMPLICATION: ESOPHAGEAL INTUBATION

1. Deflate the distal cuff.
2. Remove ET tube from patient.
3. Vigorously suction the oropharynx as needed.
4. Pre-oxygenate the patient prior to re-intubation if an additional attempt is permitted.

COMPLICATION: ENDOBRONCHIAL INTUBATION

1. Loosen the securing device.
2. Deflate the distal cuff.
3. For a right main stem bronchus intubation, continue ventilating and slowly withdraw the tube while simultaneously auscultating the left side of the chest.
4. Stop withdrawing the tube once breath sounds are heard on the left side.
5. Auscultate both sides of the chest. Breath sounds should be heard equally and bilaterally.
6. Note and record the tube depth, re-inflate the distal cuff, and secure the tube in place.

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SEDATION:

1. Refer to ALS Treatment Protocols

EXTUBATION:

Extubation is indicated if the patient can protect and maintain an open airway, the risks for needing to re-intubate are significantly reduced and the patient is not sedated. This should rarely if ever be performed in the field!

To perform the procedure:

1. Ensure adequate oxygenation.
2. Confirm patient responsiveness.
3. Suction the oropharynx.
4. Deflate the distal cuff.
5. Remove the endotracheal tube on cough or respiratory expiration.

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ENDOTRACHEAL TUBE INTRODUCER (BOUGIE) or (POCKET BOUGIE)

AUTHORIZATION:

1. ALS Provider

INDICATIONS:

1. Difficult intubation with a restricted view of the glottic opening.
2. Predicted difficult intubation.

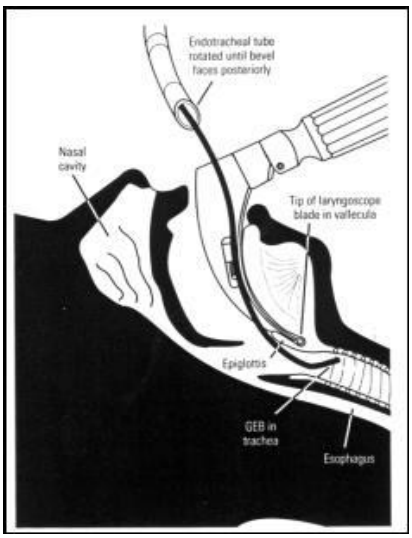

Figure 8

CONTRAINDICATIONS:

1. Three attempts at orotracheal intubation.
2. ETT size less than 6.0 mm.

PROCEDURE:

1. Prepare position and oxygenate the patient with 100% oxygen.
2. Select proper sized ET tube without stylet, test cuff and prepare suction.
3. Lubricate the distal end and cuff of the endotracheal tube (ETT) and the distal 1/2 of the Endotracheal Tube Introducer (Bougie). (Note: Failure to lubricate the Bougie and the ETT may result in being unable to pass the ETT).
4. Using laryngoscope technique, visualize the vocal cords if possible, using Sellick's/BURP as needed.
5. Introduce the Bougie with curved tip anteriorly and visualize the tip passing the vocal cords or above the arytenoids if the cords cannot be visualized.
6. Once inserted, gently advance the Bougie until you meet resistance or "hold-up". (If you do not meet resistance, you have a probable esophageal intubation and insertion should be reattempted or the failed airway protocol implemented as indicated)
7. Withdraw the Bougie ONLY to a depth sufficient to allow loading of the ETT while maintaining proximal control of the Bougie.
8. Gently advance the Bougie and loaded ET tube until you have hold-up again, thereby assuring tracheal placement and minimizing the risk of accidental displacement of the Bougie.
9. While maintaining a firm grasp on the proximal Bougie, introduce the ET tube over the Bougie passing the tube to its appropriate depth. **It is recommended that 2 providers perform steps 9-11.**
10. If you are unable to advance the ETT into the trachea; and the Bougie and ETT are adequately lubricated, withdraw the ETT slightly and rotate the ETT 90 degrees COUNTERCLOCKWISE to

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turn the bevel of the ETT posteriorly. If this technique fails to facilitate passing of the ETT you may attempt direct laryngoscopy while advancing the ETT. (This will require an assistant to maintain the position of the Bougie and, if so desired, advance the ETT)

11. Once the ETT is correctly placed, hold the ET tube securely and remove the Bougie.
12. Confirm tracheal placement according to the intubation protocol, inflate the cuff with 3 to 10 cc of air, auscultate for equal breath sounds and reposition accordingly.
13. When final position is determined secure the ET tube, reassess breath sounds, apply end tidal CO2 monitor, and record and monitor readings to assure continued tracheal intubation.

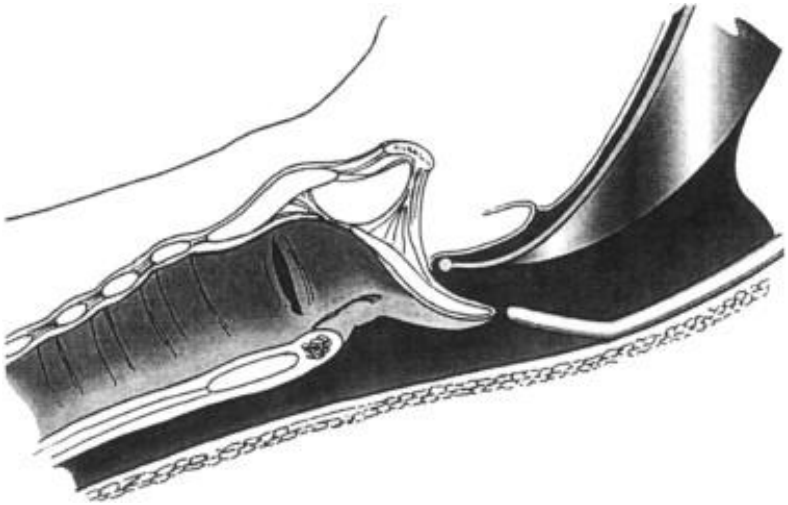

Figure 8:

The bougie tip advances toward the epiglottis as the laryngoscope blade lifts the floor of the mouth to visualize the glottic opening. (Courtesy of Phelan MP: Use of the endotracheal bougie introducer for difficult intubations. Am J Emergency Med 22:479-482, 2004.)

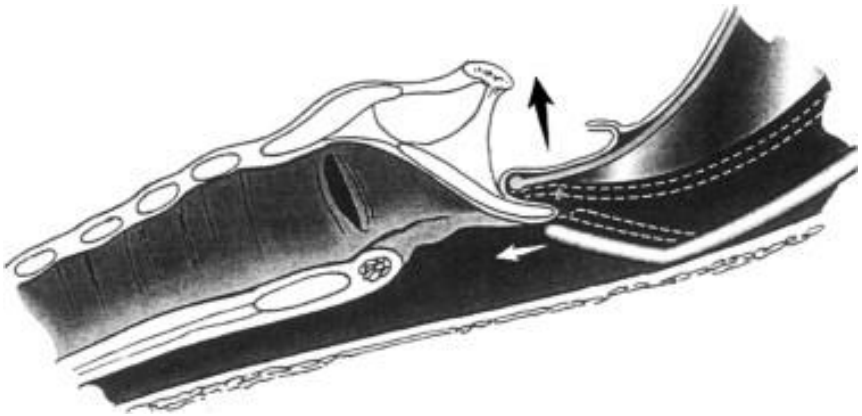

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Figure 9:

The top of bougie passes just beneath the epiglottis. (Courtesy of Phelan MP: Use of the endotracheal bougie introducer for difficult intubations. Am J Emergency Med 22:479-482, 2004.)

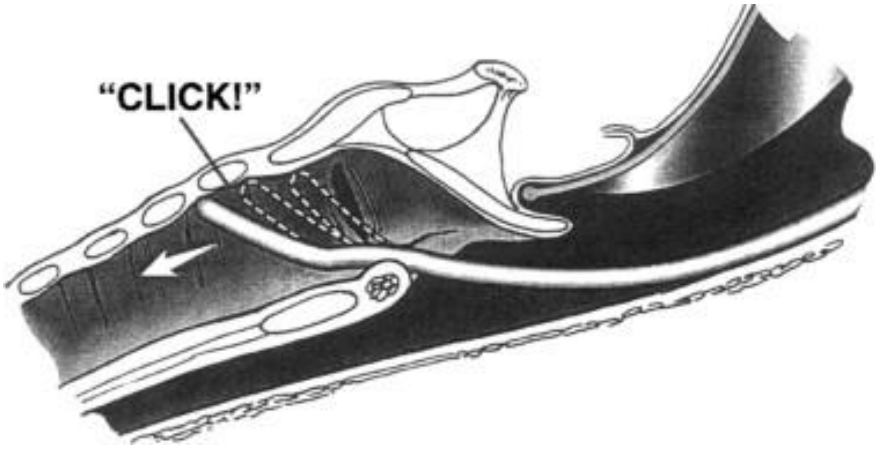

Figure 10:

Vibrations, or clicks, can be palpated as the soft tip of the bougie passes against the rigid tracheal rings. (Courtesy of Phelan MP: Use of the endotracheal bougie introducer for difficult intubations. Am J Emergency Med 22:479-482, 2004.)

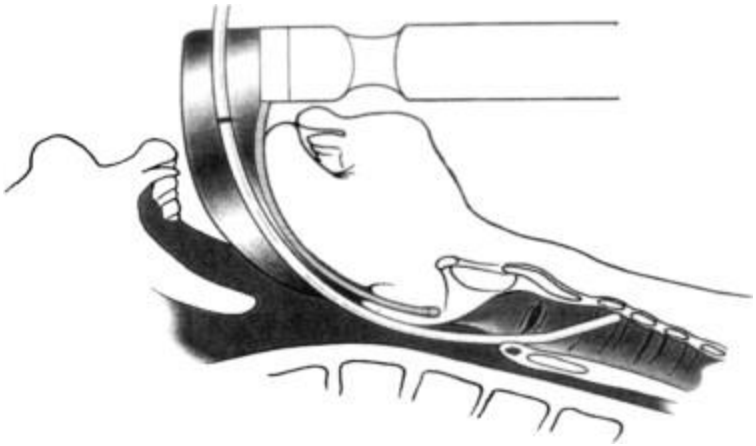

Figure 11:

After presuming the bougie is in the trachea, the bougie is pulled back a few centimeters to keep the tip inside the trachea. The endotracheal tube is threaded onto the distal end of the bougie. Advancement of the bougie must be avoided when sliding the endotracheal tube over the bougie. On some bougie a thick black mark is present 15 cm from the distal end of the device, which helps the operator determine how far to withdraw the bougie before inserting the endotracheal tube. (Courtesy of Phelan MP: Use of the endotracheal bougie introducer for difficult intubations. Am J Emergency Med 22:479-482, 2004.)

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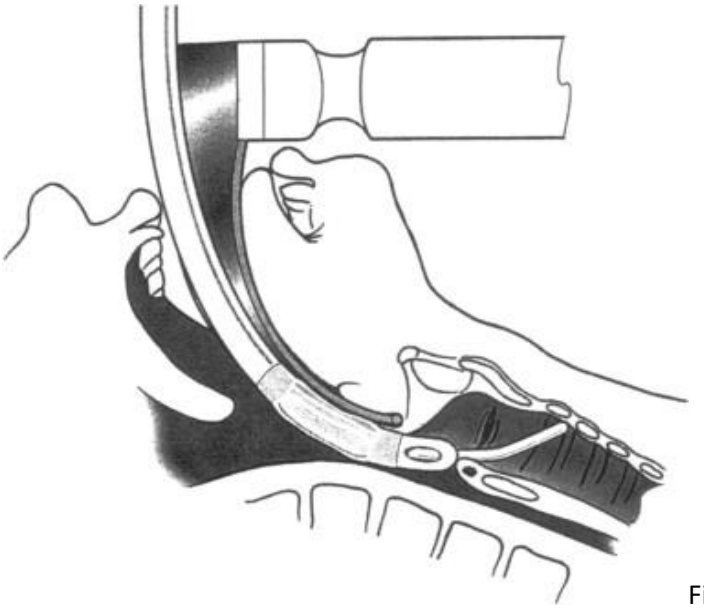

Figure 12:

The bougie must be prevented from advancing down the trachea as the endotracheal tube is "railroaded" over the bougie. As the tip of the endotracheal tube reaches the vocal cords a hold-up usually occurs, preventing further advancement. (Courtesy of Phelan MP: Use of the endotracheal bougie introducer for difficult intubations. Am J Emergency Med 22:479-482, 2004.)

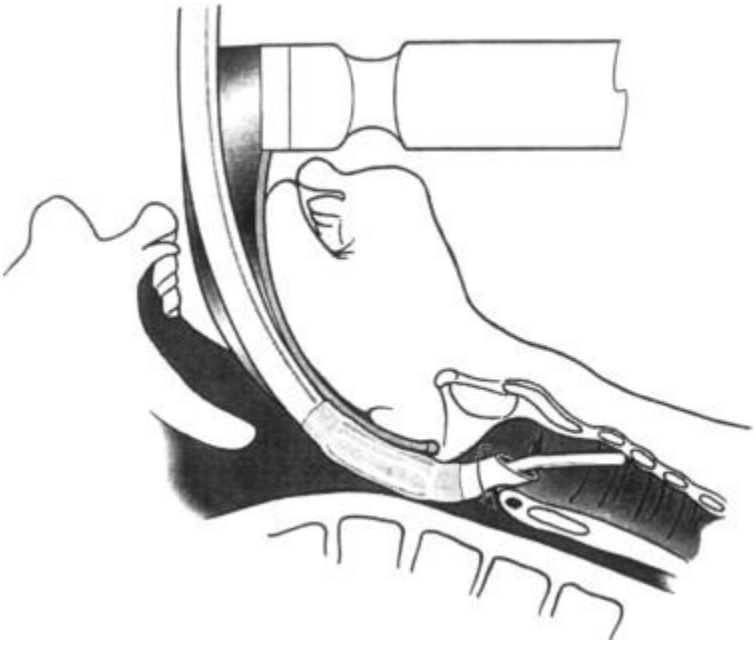

Figure 13:

The endotracheal tube needs to be rotated approximately 90° to avoid the hold-up. The endotracheal tube is advanced and the bougie is pulled out. Standard means for assessing correct placement of the endotracheal tube are then performed. (Courtesy of Phelan MP: Use of the endotracheal bougie introducer for difficult intubations. Am J Emergency Med 22:479-482, 2004.)

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ETCO2 DETECTION / MONITORING – CAPNOGRAPHY

AUTHORIZATION:

1. BLS Provider:
    a. BLS Providers are authorized to apply the appropriate $ETCO_2$ circuit and acquire the numerical reading from the monitor/defibrillator.
2. ALS Provider:
    a. ALS Providers only are authorized to interpret capnography waveforms.

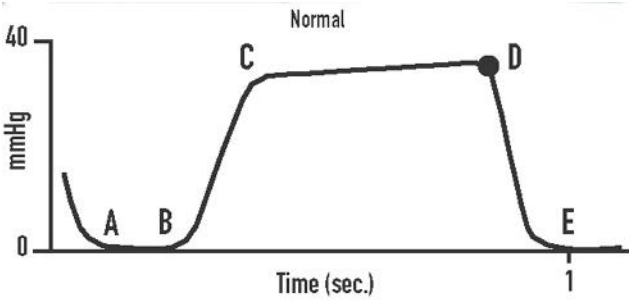
INDICATIONS:

1. Confirmation, monitoring and documentation of endotracheal intubation or I-gel placement.
2. Confirmation, monitoring and documentation of ROSC during CPR.
3. Assessment, monitoring and documentation of the respiratory status of non-intubated patients experiencing respiratory distress including but not limited to asthma and COPD.
4. Assessment, monitoring and documentation of respiratory status post controlled medication administration.

PROCEDURE: – INTUBATED PATIENTS

1. Confirm tube placement via physical exam as outlined in the INTUBATION, ENDOTRACHEAL PROCEDURE: guideline.
2. After verifying proper tube placement, apply the capnography circuit and use according to manufacturer's instructions.
3. Secure the endotracheal tube and resume ventilations at the appropriate rate. Do not use continuous hyperventilation.
4. Observe the waveform and numerical values that appear during exhalation.
5. ETCO2 numerical values and corresponding capnograph should be compared to normal values and morphology (Figure 3.).

Normal ETCO2 Values
35 – 45 mm/Hg



Waveform Labels	
A	End of inhalation
B	Beginning of exhalation
B-D	Exhalation of alveolar gas
D	End exhalation and point of maximal or highest CO2 concentration (end-tidal CO2)
D-E	Inhalation

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Figure 3

PROCEDURE: – NON-INTUBATED PATIENTS

1. Patients should be assessed, oxygenated, and ventilated with the appropriate delivery device dependent upon their presenting degree of respiratory distress or obstruction.
2. Interface the end-tidal CO2 sampling device with the oxygen delivery device being used. (I.E., nasal sampling device used under a non-rebreather mask).
3. Observe for a waveform and numerical values to appear during exhalation.
4. ETCO2 numerical values and corresponding capnograph should be compared to normal values and morphology. (Figure 3)
    a. **NOTE**: ETCO2 monitoring should be discontinued while administering nebulized medications.
5. ETCO2 numerical values and capnograph should be monitored following controlled medication administration to determine the patient's response to the intervention and the need for additional intervention.

CONSIDERATIONS:

1. Capnography is only an adjunct to careful patient assessment.
2. Do not use capnography as the sole method of assessing correct tube placement, especially in the pulseless patient.
3. Capnography may not indicate right mainstem bronchus intubation or pyriform placement.

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I-GEL INSERTION

AUTHORIZATION:

1. BLS Providers

INDICATIONS:

1. Cardiac arrest patient.
2. Apneic patient when endotracheal intubation is not possible or not available.
3. Failed airway.

CONTRAINDICATIONS / PRECAUTIONS:

1. History of esophageal foreign body, disease, or caustic ingestion.
2. Obstructive lesions below the glottis.
3. Trismus, limited mouth opening, pharyngo-perilaryngeal abscess, trauma, or mass.
4. Stoma.
5. Conscious or semi-conscious patients with an intact gag reflex.
6. Do not use excessive force to insert the device.
7. As with all supraglottic airway devices, particular care should be taken with patients who have fragile and vulnerable dental work, in accordance with recognized airway management.
8. Use care to avoid the introduction of lubricant in or near the ventilatory openings.

I-gel Size	Patient Criteria	Patient Size	Patient Weight
1		Neonate	2-5 kg
1.5		Infant	5-12 kg
2		Small pediatric	10-25 kg
2.5		Large pediatric	25-35 kg
3	4-5 feet (122-155 cm)	Small adult	30-60 kg
4	5-6 feet (155-180 cm)	Medium adult	50-90 kg
5	6 feet (> 180 cm)	Large adult	90+ kg

PROCEDURE:

1. Take and maintain appropriate body substance isolation precautions including eye protection.
2. Determine and select appropriate airway for size of patient.
3. Lubricate per the manufacturer's recommendations.
4. Grasp the lubricated I-gel firmly along the integral bite block. (Tube portion of the device) Position the device so that the I-gel cuff outlet is facing toward the chin of the patient.
    a. NOTE: be sure that there is only a thin layer of lubricant on the end of the I-gel to avoid blowing it into the lungs with bag valve mask ventilations.
    b. Suction the upper airway PRIOR to insertion as needed.
5. The patient should be in the "sniffing" position, with head extended and neck slightly flexed forward. **If cervical injury is suspected, use modified "jaw thrust" instead of flexion at the neck.** The chin should be gently pressed down/inferior before proceeding to insert the I-gel.

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6. Introduce the leading soft tip into the mouth of the patient in a direction toward the hard palate.
    a. Pediatric patients have proportionately larger tongues than adult patients. Using a tongue depressor to displace the tongue while inserting the i-gel into the mouth of a pediatric patient will help facilitate proper placement of the device.
7. Glide the device downwards and backwards along the hard palate with a continuous, but gentle push until a definitive resistance is felt.
8. WARNING: Do not apply excessive force to the device during insertion. It is not necessary to insert your fingers or thumbs into the oral cavity of the patient during insertion of this device. If there is resistance during insertion, a 'jaw thrust' and slight rotation of the device is recommended.
9. At this point, the tip of the device should be located into the upper esophageal opening and the cuff should be located against the laryngeal framework. The incisors should be resting on the integral bite block. (Figure 1)

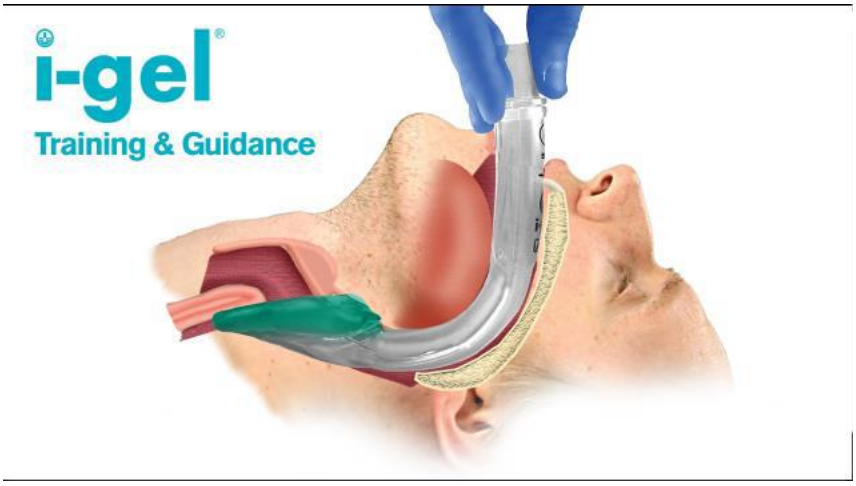

Figure 1.

POST PLACEMENT:

1. Auscultate breath sounds, check for chest rise and confirm placement with ETCO2 monitoring and SpO2 monitoring as allowed by protocol.
    a. Attach pulse oximeter probe and ETCO2 circuit.
    b. ETCO2 monitoring.
        i. Head injuries: 30-35 mmHg.
        ii. All other patients should be between 35-40 mmHg.
2. Secure the device in place.
    a. Adult sizes – use the supplied airway support strap.
    b. Pediatric sizes – use cloth tape to secure device in place (method would be similar to securing an ET tube with tape. An example is illustrated below (Figure 2, Figure 3)

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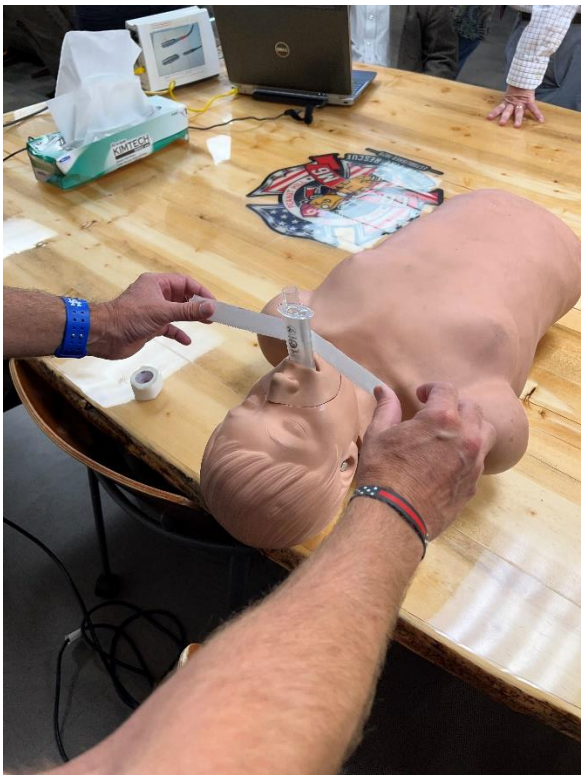
Figure 2.


Figure 3.

3. Place suction catheter into side port and advance to appropriate position, apply suction to decompress the stomach.
4. Continue to monitor the patient.
    a. Sedate per protocol as necessary. **(System ALS Providers Only)**
5. Consider definitive airway placement, if necessary and possible. **(System ALS Providers Only)**
    a. Endotracheal tube placement.

INDICATIONS FOR I-GEL REMOVAL:

1. Patient regains consciousness.
    a. Consider sedation and/or paralytics if authorized. (**System ALS Providers Only)**
2. Protective gag reflex returns.
    a. Consider sedation and/or paralytics if authorized. (**System ALS Providers Only)**
3. Ventilation is inadequate.
4. Improperly placed I-gel airway.

REMOVAL:

1. Ensure suctioning equipment is ready, roll patient onto left side.
2. Carefully remove I-gel airway with gentle, but firm traction. Suction as needed.
3. Insert an oropharyngeal or nasopharyngeal adjunct, as needed.

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4. Continue ventilations with a BVM at 10-15 LPM flow, as needed or place on non-rebreather mask at 15 LPM.
5. Document time of removal and ongoing vitals.

KEY POINTS:

1. This is NOT a definitive airway and aspiration can occur with this device.
2. Preload the OG port with a 12 French suction catheter to prevent any fluid leakage from this hole during insertion.
3. Apply a small amount of lubricating gel to the tip of the I-gel to aid in insertion, but do not over lubricate!
4. Do not leave in place for greater than 4 hours.

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INTRAOSSEOUS INSERTION – EZ-IO®

AUTHORIZATION:

1. ALS Providers

INDICATION:

For intraosseous access anytime in which vascular access is difficult to obtain in emergent, urgent, or medically necessary cases for up to 24 hours.

CONTRAINDICATIONS:

1. Fracture in target bone.
2. Previous, significant orthopedic procedures at insertion site, prosthetic limb or joint.
3. IO access (or attempted IO access) in the targeted bone within the past 48 hours.
4. Infection at area of insertion.
5. Excessive tissue (severe obesity) and/or absence of adequate anatomical landmarks.

CONSIDERATIONS:

1. Due to the anatomy of the IO space, you may note flow rates to be slower than those achieved with IV catheters.
    a. Ensure the administration of a 10 mL rapid bolus (flush) with a syringe.
    b. Use a pressure bag or pump for continuous infusions if needed.
2. Insertion of the EZ-IO® in conscious patients causes mild to moderate discomfort and is usually no more painful than a large bore IV. However, IO for conscious patients has been noted to cause severe discomfort, therefore, prior to IO syringe bolus or continuous infusion in alert patients, SLOWLY administer Lidocaine 2% through the EZ-IO® catheter into the medullary space in the following dosing regimens. Ensure that the patient has no allergies or sensitivity to Lidocaine.
    a. Adult - Lidocaine 20-40 mg SIOP
    b. Pediatric - Lidocaine 0.5 mg/kg to a maximum of 20 mg SIOP

PRECAUTIONS:

The EZ-IO® is not intended for prophylactic use.

EQUIPMENT:

1. EZ-IO ® power driver
2. 10 mL syringe
3. EZ-IO® needle set
4. Normal saline IV solution and tubing
5. Alcohol or povidone-iodine swab
6. EZ-Stabilizer
7. Extension set or EZ-Connect ®
8. Pressure bag (optional)
9. Needle VISE ® Sharps Block or sharps container
10. Lidocaine 2% (intravenous lidocaine) (optional)

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EZ-IO ® NEEDLE SET SELECTION

Select EZ-IO ® Needle Set based on patient weight (kg), anatomy, and clinical judgment. The EZ-IO ® Needle Set is marked with black lines. Prior to drilling, with the EZ-IO ® Needle Set inserted through the soft tissue and the needle tip touching bone, adequate needle length is determined by the ability to see at least one black line outside the skin.

INSERTION SITE IDENTIFICATION AND INSERTION TECHNIQUE:

Palpate site to locate appropriate anatomical landmarks for needle set placement and to estimate soft tissue depth overlying the insertion site. Utilize the correct technique below based on patient and site selected.

1. **Proximal humerus site identification (Adult)**
    a. Using either method below, adduct elbow, rotate humerus internally:
        i. Place the patient's hand over the abdomen with arm tight to the body.
        ii. Place the arm tight against the body, rotate the hand so the palm is facing outward, thumb pointing down.
    b. Place your palm on the patient's shoulder anteriorly.
        i. The area that feels like a ball under your palm is the target area.
        ii. You should be able to feel this ball, even on obese patients, by pushing deeply.
    c. Place the ulnar aspect of your hand vertically over the axilla. Place the ulnar aspect of your other hand along the midline of the upper arm laterally.
    d. Place your thumbs together over the arm; this identifies the vertical line of insertion on the proximal humerus.
    e. Palpate deeply up the humerus to the surgical neck.
        i. This may feel like a golf ball on a tee – the spot where the ball meets the tee is the surgical neck.
        ii. The insertion site is 1-2 cm above the surgical neck, on the most prominent aspect of the greater tubercle.
    f. Proximal humerus insertion technique (Adult)
        i. Push the needle set tip through the skin until the tip rests against the greater tubercle, aim needle at an approximate 45-degree angle as if aiming toward the opposite hip.
            1. The 5 mm mark, which is the black line closest to the hub, must be visible above skin for needle set length confirmation.
        ii. Squeeze trigger and apply gentle, steady pressure, immediately release the trigger when you feel a sudden "give" or loss of resistance as the needle set enters the medullary space. For most adults, needle set should be advanced until hub is flush or against skin.
            1. Use caution, and do not apply excessive pressure, as this may cause the driver to slow and/or stop.

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2. **Distal femur site identification (Infant/Pediatric)**
    a. Secure site with leg outstretched to ensure knee does not bend. The insertion site is approximately 1-2 cm proximal to the superior border of the patella and approximately 1 cm medial to the mid-line (depending on patient anatomy). Aim the needle set tip at a 90-degree angle to the bone for insertion.
    b. Distal femur insertion technique (Infant/Pediatric)
        i. Push the needle set tip through the skin until the tip rests against the femur. Aim the needle set at a 90-degree angle to the bone.
            1. The 5 mm mark, which is the black line closest to the hub, must be visible above skin for needle set length confirmation.
        ii. Squeeze trigger and apply gentle, steady pressure, immediately release the trigger when you feel a sudden "give" or loss of resistance as the needle set enters the medullary space.
            1. Use caution, and do not apply excessive pressure, as this may cause the driver to slow and/or stop
            2. Avoid recoil – do NOT pull back on the driver when releasing the trigger.

3. **Proximal tibia site identification (Adult)**
    a. Extend the leg. Insertion site is approximately 2 cm medial to the tibial tuberosity along the flat aspect of the tibia (depending on patient anatomy). If the tibial tuberosity is not present; with the leg extended, the insertion site is approximately 3 cm below the inferior border of the patella and approximately 2 cm medial, along the flat aspect of the tibia (depending on patient anatomy). Aim the needle at a 90-degree angle to the bone for insertion.
    b. Proximal tibia insertion technique (Adult)
        i. Push the needle set tip through the skin until the tip rests against the tibia. Aim the needle set at a 90-degree angle to the bone.
            1. The 5 mm mark, which is the black line closest to the hub, must be visible above skin for needle set length confirmation.
        ii. Squeeze trigger and apply gentle, steady pressure, immediately release the trigger when you feel a sudden "give" or loss of resistance as the needle set enters the medullary space.
            1. Use caution, and do not apply excessive pressure, as this may cause the driver to slow and/or stop.

4. **Proximal tibia site identification (Infant/Pediatric)**
    a. Extend the leg. If the tibial tuberosity can be palpated the insertion site is approximately 1 cm medial to the tibial tuberosity. If the tibial tuberosity cannot be palpated, the insertion site is approximately 1-2 cm below the patella and approximately 1 cm medial,

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along the flat aspect of the tibia (depending on patient anatomy). Aim the needle set tip at a 90-degree angle to the bone for insertion.

b. Proximal tibia insertion technique (Infant/Pediatric)
    i. Push the needle set tip through the skin until the tip rests against the tibia. Aim the needle set at a 90-degree angle to the bone.
        1. The 5 mm mark, which is the black line closest to the hub, must be visible above skin for needle set length confirmation.
    ii. Squeeze trigger and apply gentle, steady pressure, immediately release the trigger when you feel a sudden "give" or loss of resistance as the needle set enters the medullary space.
        1. Use caution, and do not apply excessive pressure, as this may cause the driver to slow and/or stop
        2. Avoid recoil – do NOT pull back on the driver when releasing the trigger.

PROCEDURE:

1. Always observe body substance isolation (BSI) procedures and aseptic techniques when using the EZ-IO®.
2. Clean the insertion site. (Use aseptic technique) Use povidone-iodine swab and/or alcohol to clean the site prior to powering the EZ-IO® into position.
3. Prepare the EZ-IO® driver and needle set:
4. Open the EZ-IO® case.
5. Remove the driver and one EZ-IO® needle.
6. Open the EZ-IO® needle package and attach the needle set to the driver. (You should feel a “snap” as the small magnet connects)
7. Remove the safety cap from the needle set. One way to remove the cap from the needle set (with the needle facing you) is to grasp the cap tightly and rotate clockwise to loosen and remove. Attempting to “pull” the cap off may remove the entire needle set from the driver – rotating counterclockwise will cause the catheter and stylet to separate.
8. Begin insertion of the EZ-IO® Needle Set.
9. Holding the EZ-IO® driver in one hand, stabilize the leg near the insertion site with the opposite hand. Make sure your hands and fingers are a safe distance from the path of insertion. Be cautious of sudden patient movements.
10. Position the driver at the insertion site with the needle at a 90-degree angle to the surface of the bone. Power the needle set through the skin at the insertion site until you feel the needle set tip encounter the bone itself.
11. At this point if there is any doubt that the needle set is not long enough, verify that you can see the 5 mm marking on the catheter itself. (This is the mark closest to the flange) If this mark is not visible, you should abandon the procedure as the needle set may not be long enough to penetrate the IO space.
12. Continue to insert the EZ-IO®.

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13. Apply firm and steady pressure on the driver and power through the cortex (hard, outer surface) of the bone, ensuring the driver is always maintained at a 90-degree angle.
14. Stop when the needle flange touches the skin or a sudden decrease in resistance is felt. This indicates entry into the bone marrow cavity (intramedullary space).
15. Remove driver from the needle set.
16. While supporting the needle set in one hand, gently pull straight up on the driver, and lift away.
17. Return the driver to its case.
18. Remove the stylet from the catheter. (Figure 8) While grasping the hub firmly with one hand, rotate the stylet counterclockwise. (Unscrew the stylet from the catheter). Pull the stylet out of the catheter and consider placing it into the empty cartridge, now called the stylet shuttle. The stylet shuttle must then be placed in an FDA–approved biohazard container as soon as possible. Do not replace or attempt to "recap" the stylet.
19. Confirm proper EZ-IO® catheter tip position. Proper placement of the IO catheter tip can be confirmed through any of the following:
    a. The IO catheter stands straight up at a 90–degree angle and is firmly seated in the tibial bone.
    b. Blood at tip of the stylet (sometimes visible).
    c. Aspiration of a small amount of bone marrow with a syringe.
    d. A free flow of drugs or fluids without difficulty and with no evidence of leakage (extravasation) underneath the skin.
20. Attach the primed EZ-Connect or any standard Luer lock extension set to the EZ-IO® hub and slowly administer the Lidocaine bolus. Then use a syringe to flush the IO space with 10 mL of normal saline. (Figure 9) Prior to fluid administration be certain to flush the EZ-IO® catheter with 10 mL of fluid. A rapid syringe flush will "clear the pathway" allowing for an acceptable infusion rate.
21. Initiate the infusion. Administer the infusion or medications per your local medical protocol. A pressure infuser may be necessary to maintain adequate flow rates.
22. Apply the wristband and a dressing. The wristband is designed as a reminder of EZ-IO® placement and need for timely removal. The EZ-IO® catheter may be secured in place with a standard dressing.

REMOVAL

1. Remove EZ-Connect ® Extension Set.
2. Lift and remove EZ-Stabilizer ® Dressing.
3. Stabilize cannula hub and attach a Luer lock syringe to the hub.
4. Holding the syringe and hub together as one unit, and maintaining axial alignment, twist clockwise and pull straight out. Do not rock or bend the cannula.
5. Dispose of cannula with syringe attached into sharps container.
6. Dress site per institutional protocol/policy.

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NOTE: Removal of the extension or fluid administration set, without proper protection of the EZ-IO® hub (in the form of a sterile cap, port or extension set), could cause bleeding or infection.
NOTE: If hub-catheter separation occurs use an appropriate hemostat to grasp and gently remove the catheter in the same manner as suggested above (rotating while gently pulling).

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LUCAS™ DEVICE

AUTHORIZATION:

1. BLS Providers

INDICATIONS:

1. The LUCAS™ may be used in patients 12 years of age and older who have suffered cardiac arrest, where manual CPR would otherwise be used.

CONTRAINDICATIONS:

1. Patients less than 12 years of age.
2. Patients who do not fit within the device.
    a. If the unit snaps onto the backboard and the suction cup does not compress the patient's chest while in the start position, it will operate as intended.
    b. Patients who are too small that you cannot pull the pressure pad down to touch the sternum.

PROTOCOL FOR PLACEMENT:

1. All therapies related to the management of cardiopulmonary arrest should be continued as currently defined in protocol with **a goal of obtaining a return of spontaneous circulation (ROSC) before brain damage occurs.**
2. Initiate resuscitative measures following current LF&R protocols.
    a. Immediately begin performing high quality manual compressions while applying the defibrillation pads. Do not delay manual CPR for the LUCAS™.
    b. Rhythm analysis with early defibrillation should be provided, if necessary, based on clinical presentation.
    c. Obtain vascular access.
    d. Administer the appropriate medications.
    e. Place an i-gel airway, consider an advanced airway if needed.
    f. Turn the LUCAS™ device "on" when removing from the carrying case. This will allow the device to perform a "self-test".
    g. Consider applying the LUCAS™ device to the patient after the fifth cycle of manual compressions if needed. Continue manual CPR until the device can be placed. Limit interruptions in chest compressions to 10 seconds or less.
    h. Prepare the patient for transportation if appropriate.
    i. Consider using the scoop stretcher for movement of the patient.
3. When resuscitative measures are initiated, the LUCAS™ device should be removed from the carrying case and placed on the patient in the following manner.
    a. Back Plate Placement:
        i. The back plate should be centered on the nipple line and the top of the back plate should be located just below the patient's armpits.

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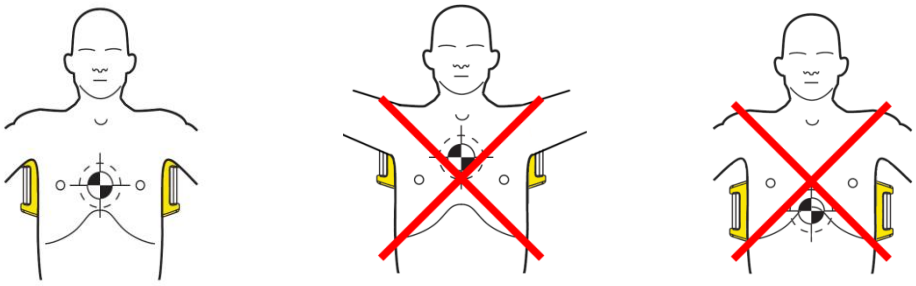
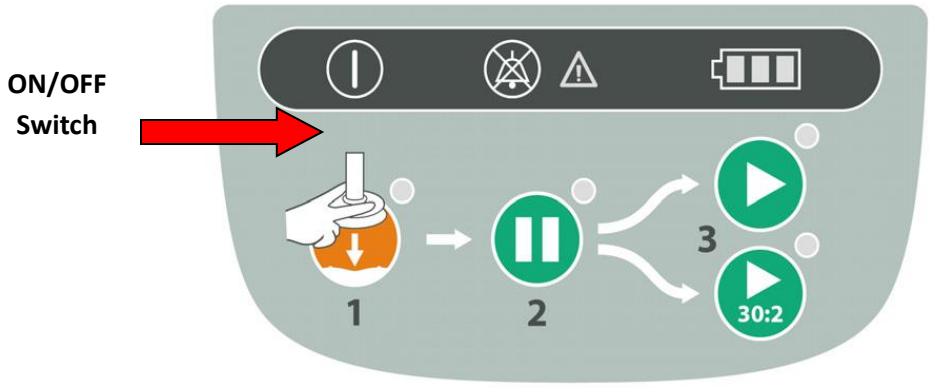


ii. In cases for which the patient is already on the stretcher, place the back plate underneath the thorax. This can be accomplished by log-rolling the patient or raising the torso (Placement should occur after two minutes of uninterrupted compressions]).

5. Position the Compressor:

i. Turn the LUCAS™ Device on. (The device will perform a 3 second self test.)

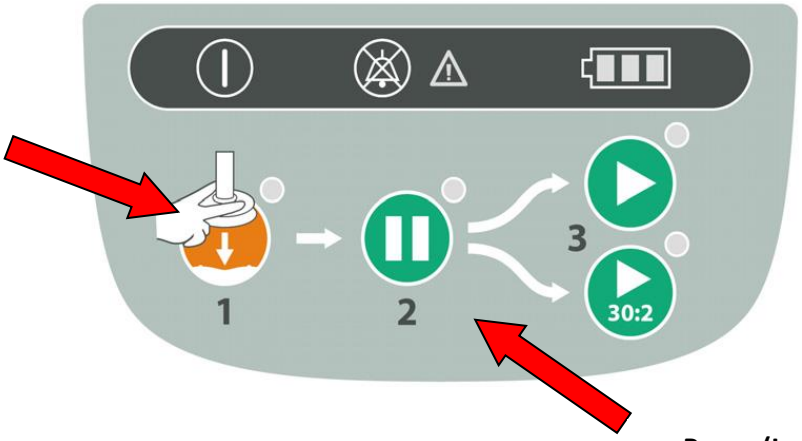


ii. Remove the LUCAS™ device from the carrying case using the handles.
iii. With the index finger of each hand, pull the trigger to ensure the device is set to engage the back plate. Once this is completed remove your index finger from the trigger loop.
iv. Approach the patient from the side opposite the person performing manual chest compressions.
v. Attach the claw hook to the back plate on the side opposite of the person providing compressions.
vi. Place the LUCAS™ device across the patient, between the staff member's arms who is performing manual CPR.
vii. At this point the staff member performing manual CPR stops and assists attaching the claw hook to the back plate on their side.
viii. Pull up once to make sure that the parts are securely attached.

EMS Procedure Guidelines

6. Adjust the Height of the Compression Arm:

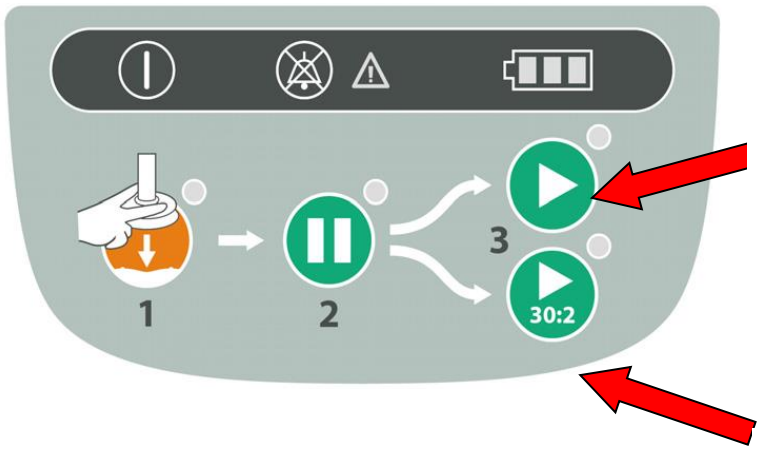
   i. Use two fingers (V pattern) to make sure that the lower edge of the Suction Cup is immediately above the end of the sternum. If necessary, move the device by pulling the support legs to adjust the position.



   ii. Press the Adjust Mode Button on the control pad labeled #1. (This will allow you to easily adjust the height of the compression arm).
   iii. 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).
   iv. 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).
   v. If the position is incorrect, press the ADJUST MODE BUTTON and repeat the steps.

EMS Procedure Guidelines

7. Start Compressions:
    i. Begin delivering mechanical compressions by pushing the ACTIVE (continuous) button.



ACTIVE BUTTON

(Continuous)

ACTIVE BUTTON

(30:2)

8. Using Patient Adjuncts:
    i. Place the neck roll behind the patient's head and attach the straps to the LUCAS™ device.
        a. This will prevent the LUCAS™ from migrating toward the patient's feet.
    ii. Place the patient's arms in the straps provided.

USING THE LUCAS™ DURING THE RESUSCITATION:

1. Defibrillation:
    i. Defibrillation can and should be performed with the LUCAS™ device in place and in operation.
    ii. Defibrillation electrodes should be applied before the LUCAS™ device has been put in position.
        a. The defibrillation pads and wires should not be underneath the suction cup.
        b. If the electrodes are already in an incorrect position when the LUCAS™ is placed, you must apply new electrodes.
    iii. Defibrillation should be performed according to LF&R protocols and following the instructions of the defibrillator manufacturer.
    iv. Rhythm analysis cannot be assessed during compressions. The device should be stopped for analysis by pushing the PAUSE BUTTON (The duration of interruption of compressions should be kept as short as possible and should not

EMS Procedure Guidelines

be greater than 10 seconds. There is no need to interrupt chest compressions other than to analyze the rhythm).

v. 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.

2. Pulse Checks/Return of Spontaneous Circulation (ROSC):

   i. Pulse checks should occur intermittently while compressions are occurring.

   ii. If the patient moves or is obviously responsive, the LUCAS™ Device should be paused and the patient evaluated.

   iii. 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, consider pushing the pause button on the LUCAS™ Device. If the pulse is palpable, reassess the patient. If the pulse is impalpable, immediately restart the LUCAS™ Device.

3. Malfunction or Disruption of LUCAS™ Device:

   i. If malfunction or disruption of the LUCAS™ device occurs, immediately begin manual chest compressions.

DEVICE MANAGEMENT:

1. Power Supply

   i. Battery Operation

      a. When fully charged, the Lithium Polymer battery should allow 45 minutes of uninterrupted operation.

      b. Only leave the LUCAS™ device plugged in long enough to charge the battery. Once the battery is fully charged, unplug the LUCAS™ and store in the cabinet.

      c. Make sure that the cord is always with the LUCAS™ device.

      d. During use if the orange Battery LED shows an intermittent light, the battery should be replaced, or the device should be connected to a wall outlet.

   ii. The LUCAS™ Device can be connected to wall power in all operational modes (The battery must be installed for the LUCAS™ Device to remain operational).

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Power Supply Cord Slot (for charging and AC operation)

CARE OF THE LUCAS™ DEVICE AFTER USE:

1. Remove the Suction cup and the Stabilization Strap (if used, remove the Patient Straps).
    iii. Clean all surfaces and straps with a cloth and warm water with an appropriate cleaning agent.
    iv. Let the device and parts dry.
    v. Replace the used battery with a fully charged battery.
    vi. Remount (or replace) the Suction Cup and straps.
    vii. Repack the device into the carrying bag.
    viii. Recharge the battery after every use.

WEDNESDAY CHECKS OF THE LUCAS™:

1. The LUCAS™ device should be removed from the storage case and inspected for damage.
2. Working with the crew the LUCAS™ device should be placed on the provided CPR mannequin (only use the mannequin provided with the LUCAS™ device to prevent damage to the device) and allow to run for ten (10) minutes.
3. Recharge the battery after every use.
4. Place the device back in the storage case.
5. The captain or acting captain should document the training in indication they performed the training.

EMS Procedure Guidelines

MUCOSAL ATOMIZATION DEVICE

AUTHORIZATION:

1. ALS Providers

INDICATIONS:

1. Nasal administration of medications as specified in the specific treatment guidelines.
2. Lack of IV/IO access.

CONTRAINDICATIONS:

1. Epistaxis
2. Nasal trauma

PROCEDURE FOR NASAL DRUG DELIVERY USING MUCOSAL ATOMIZATION DEVICE:

1. Medication from a vial
    i. Draw up medication into a syringe using appropriate transfer needle.
    ii. Remove air from syringe.
    iii. Perform LF&R medication cross-check.
    iv. Remove needle and place atomization device onto syringe.
    v. Place device into nostril, stop when resistance is felt.
    vi. Compress the syringe plunger to spray atomized solution into the nasal cavity.
    vii. Administer ½ dose into each nostril.
    viii. Do not exceed 1 mL per nostril.

2. Medication from a pre-filled syringe
    i. Assemble medication preload and medication atomization device (MAD).
        i. Do not prime the device as this can deliver most of the medication into the air.
    ii. Perform LF&R medication cross check.
    iii. Place the head in a neutral/sniffing position.
    iv. Insert the tip of the MAD into the nostril and gently pull outward to enlarge the nostril. Ensure the MAD remains parallel to the septum.
    v. Depress the vial, administering 1 mg in each nostril.
    vi. Discard the medication and MAD device as appropriate.

PRECAUTIONS:

1. Evaluate the effectiveness of the medication administration and consider repeating and/or changing the route of administration if desired effect is not received.
2. Nasal administration does not work for every patient.
3. Nasal administration is less likely to be effective if the patient has been abusing inhaled vasoconstrictors such as cocaine.

EMS Procedure Guidelines

4. Nasal administration is less likely to be effective in cases of previous nasal surgery or septal deviation.

MEDICATIONS THAT MAY BE ADMINISTERED VIA INTRANASAL ROUTE:

1. Naloxone (Naloxone) only with 2 mg/2 mL concentration.
2. Fentanyl (Sublimaze) for pain management.

EMS Procedure Guidelines

NARCAN® NASAL SPRAY

AUTHORIZATION:

1. BLS Providers

INDICATION:

1. Known or suspected narcotic overdose.

PRECAUTIONS:

1. Do not remove or test the NARCAN Nasal Spray until ready to use.
2. Each NARCAN Nasal Spray has 1 dose and cannot be reused.
3. Do not test the device. There is only one dose per device.
4. NARCAN Nasal Spray freezes at temperatures below 5°F (-15°C). If this happens, the device will not spray.

PROCEDURE

1. Lay the person on their back to receive a dose of NARCAN Nasal Spray.
2. Remove NARCAN Nasal Spray from the box. Peel back the tab with the circle to open the NARCAN Nasal Spray.
3. Hold the NARCAN Nasal Spray with your thumb on the bottom of the red plunger and your first and middle fingers on either side of the nozzle.
4. Tilt the person's head back and provide support under the neck with your hand. Gently insert the tip of the nozzle into one nostril until your fingers on either side of the nozzle are against the bottom of the person's nose.
5. Press the red plunger firmly to give the dose of NARCAN Nasal Spray.
6. Remove the NARCAN Nasal Spray from the nostril after giving the dose.

EMS Procedure Guidelines

POSITIVE-END EXPIRATORY PRESSURE (PEEP)

AUTHORIZATION:

1. BLS Provider
    a. BLS providers are authorized to apply the PEEP valve to the BVM and ventilate the patient only under the direction of an on-scene ALS provider.

INDICATION:

1. Positive-End Expiratory Pressure (PEEP) is indicated for all patients receiving artificial ventilations via a Bag-Valve ventilation device (BVM) unless contraindicated.

CONTRAINDICATION:

1. Cardiac Arrest
2. Hypotension or MAP less than 65
3. Suspected pneumothorax

PRECAUTIONS:

1. Excessive PEEP over distends alveoli, increases dead space and work of breathing, reduces lung compliance, and compresses alveolar capillaries, reducing oxygenation and risking pulmonary barotrauma.
2. Increased intrathoracic pressure can progressively decrease cardiac output and is most notable when PEEP is greater than 15 cm H_20. The higher the level of PEEP (over 5 cm H_20), the more likely the patient will experience a variety of adverse consequences, both ventilatory and hemodynamic

PROCEDURE:

1. Inspect the PEEP valve to make sure it is free of obstructions.
2. Firmly attach the inlet connector of the PEEP valve to the ventilation delivery device.
3. Rotate the adjustment cap to the desired PEEP setting (5 cm H_20 is generally an appropriate initial PEEP setting).
4. Increase PEEP in stepwise fashion as necessary, allowing time for the patient to equilibrate with each change before further adjustments are made.
    a. The goal is to reach the lowest PEEP needed to adequately ventilate the patient. Higher PEEP results in greater negative hemodynamic impact.
    b. Maximum allowed PEEP settings
        i. Pediatric – 5 cm H_2O
        ii. Adult - 10 cm H_2O
5. Ventilate with just enough volume to see chest rise, approximately 6–8 mL/kg ideal body weight.

EMS Procedure Guidelines

a. Over-inflation (e.g., excessive tidal volume) and overventilation (e.g., excessive minute ventilation) are both undesirable and potentially harmful.
b. Continuously monitor $EtCO_2$ to guide tidal volume and minute ventilation.

KEY POINTS:

1. PEEP improves oxygenation or decreases risk of developing hypoxemia, by increasing functional residual capacity (FRC), and tidal ventilation. PEEP may assist in meeting airway goals by decreasing intrapulmonary shunting of blood and better matching perfused lung to ventilated lung tissue, thus improving arterial oxygenation. It does not open fully collapsed alveoli but re-expands partially collapsed ones. It does not decrease extravascular lung water but redistributes it.
2. Continuous wave-form capnography shall be monitored:
    a. In patients without primary pulmonary pathology (i.e., acute respiratory distress syndrome (ARDS), COPD), maintain EtCO2 of no less than 35 and up to 40 mmHg. Patients with specific disease processes such as acute acid-base disorders (i.e., DKA, lactic acidosis due to severe sepsis or trauma), acute respiratory failure due to primary pulmonary pathology, or post-cardiac arrest will have different EtCO2 parameters due to their underlying disease.
    b. In patients with severe head injury with signs of herniation (unilateral dilated pupil or decerebrate posturing), modest hyperventilation to decrease EtCO2 to no less than 30 mmHg may be considered for a brief time.

EMS Procedure Guidelines

PREEXISTING VASCULAR ACCESS DEVICE

Peripherally Inserted Central Catheters (PICC) may be used in emergency situations. PICC lines are located on the arm and usually contain saline but other central lines may be flushed with Heparin. Only PICC lines may be accessed. If a PICC line must be accessed, withdraw, and discard at least 20 ml of blood and maintain sterility.

AUTHORIZATION:

2. ALS Providers

INDICATION:

2. Obtaining venous access when peripheral access in not obtainable or is inadequate.

CONTRAINDICATION:

4. Other peripheral access is readily available.

PROCEDURE:

1. Set up a normal saline IV with emphasis on fully flushing the IV tubing.
2. Expose the access device area.
3. Prepare equipment:
    a. Alcohol pads or equivalent.
    b. Several sterile 4x4 pads.
    c. Three (3) 10 mL syringes.
    d. Surgical mask.
4. Use one 10 mL syringe to draw 10 mL of normal saline from the IV bag.
5. Open a 4x4 dressing and place it around the tip of the access port to create a sterile field.
6. Apply surgical mask.
7. Cleanse the tip of the port aggressively with an alcohol pad or equivalent cleanser (i.e., povidone- iodine solution, etc.).
8. Remove the cap to the port, expel air from a 10 mL syringe,and attach empty syringe to the catheter port.
9. Unlock the clamp on the access line, if applicable, and aspirate blood from the port. Aspirate at least 20 mL of blood and discard. Blood should aspirate freely. If it does not, replace the cap and **DO NOT** use the access port.
10. Lock the clamp, if applicable, and remove the syringe with the aspirated blood. Dispose of the syringe in a biohazard container.
11. Connect the syringe containing 10 mL of normal saline to the port, unlock the clamp, and flush the device. The line should flush easily. Re-clamp the line.
12. Remove the syringe and connect the IV to the port. Unclamp the line and adjust flow rate as needed.

EMS Procedure Guidelines

COMPLICATIONS:

1. Infection: Strict adherence to aseptic technique is crucial when handling any PICC line.
2. Air embolism: The PICC Line provides a direct line into the central circulation; introduction of air into these devices can be hazardous.
    a. Do not remove injection cap from catheter unless catheter is clamped.
    b. Do not allow IV fluids to run dry.
    c. Always expel air from preload/syringe prior to administration.
3. Thrombosis: A blood clot within the vascular system caused by improper handling and maintenance of the PICC line. Dislodging a clot can cause pulmonary embolus or vascular damage.
    a. Follow medications with 5 mL normal saline.
    b. Do not inject medications or fluids if resistance is met. When establishing patency, draw back first.
4. Catheter damage: Should damage occur to the external catheter, clamp immediately between the skin exit site and the undamaged area to prevent air embolism or blood loss.
5. Bleeding: If a device is damaged from trauma, maintain direct pressure as for an arterial bleed.

KEY POINTS:

Under no circumstances are pre-hospital providers allowed to access a fistula. You may continue to use a fistula only if it has been accessed in the dialysis center and the dialysis nurse gives permission.

EMS Procedure Guidelines

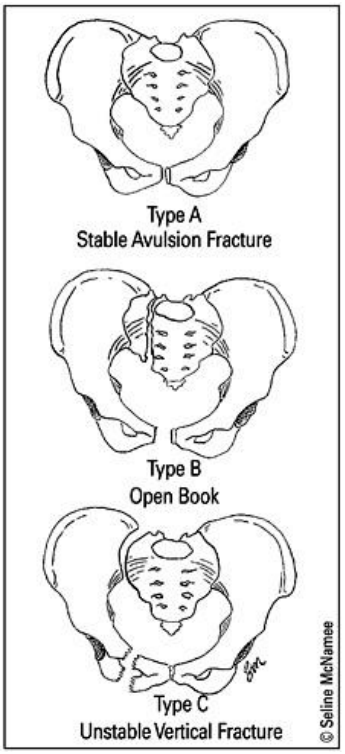
SAM Pelvic Sling II

AUTHORIZATION:

- BLS Providers

INDICATIONS:

1. The SAM Pelvic Sling II is a non-invasive, circumferential pelvic belt intended to stabilize pelvic fractures during transport to a definitive care facility. It is indicated for application by prehospital and medical professionals or trained personnel, to individuals who have, or are suspected of having, a pelvic ring fracture where hemorrhage might occur.
2. For **trauma red patients** with a suspected pelvic fracture, apply the SAM Pelvic Sling only if the patient exhibits the following:
    a. Abrasions and contusions around the pelvic area.
    b. Hematoma above the inguinal ligament, to the scrotum, or the thigh.
    c. Low back pain especially when pelvis is stressed
    d. Bilateral hip pain that may radiate into the groin
    e. Traumatic hemorrhagic shock without another source of hemorrhage



CONTRAINDICATIONS:

1. Do not utilize the SAM Pelvic Sling II if anatomical landmarks are absent.
2. The use of the SAM® Pelvic Sling II is not recommended in children; therefore, it should not be used in patients < 13 years of age.

PRECAUTIONS:

1. Remove objects from patient's pockets and clothing prior to application.
2. Monitor the patient's skin for pressure injury while in use.
3. Device is single use only.

PROCEDURE:

6. The SAM® Pelvic Sling II should be applied by a minimum of 2 trained personnel.
7. Gather equipment and supplies, as needed. Anticipate need for complete spinal immobilization.
8. Assess pelvic area, distal circulation, sensation, and motor function of lower extremities.
9. Remove objects from patient's pockets or pelvic area. In male patients, make certain genitalia are elevated out of groin area.

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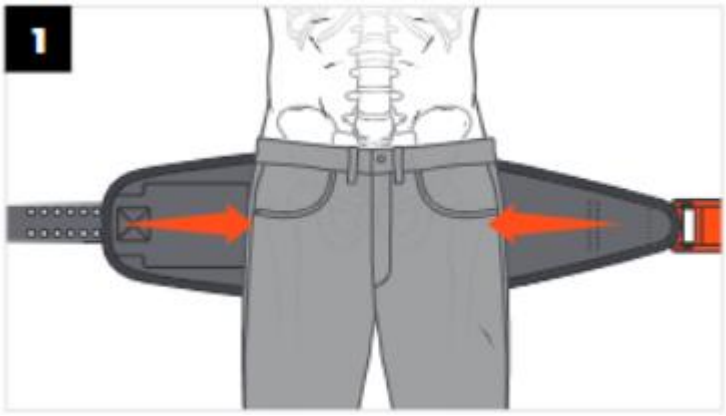
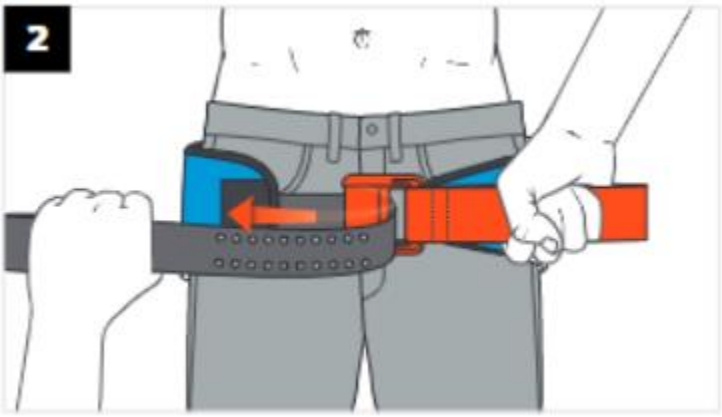
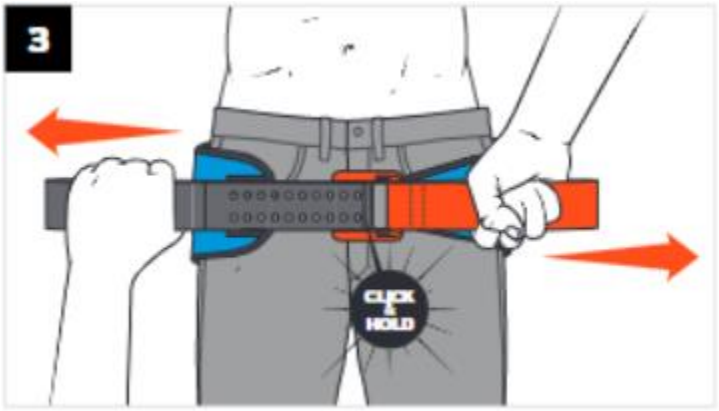
10. Place SAM Pelvic Sling II black side up beneath patient at level of trochanters (hips).



11. Place BLACK STRAP through buckle and pull completely through.



12. Hold ORANGE STRAP and pull BLACK STRAP in opposite direction until you hear and feel the buckle click. Maintain tension and immediately press BLACK STRAP onto surface of SAM® Pelvic Sling to secure.



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a. NOTE: Do not be concerned if you hear a second “click” after SAM Pelvic Sling II is secured. The Velcro® attachment secures the Sling in place at the correct force, regardless of buckle engagement.

13. Reassesses distal circulation, sensation, and motor function after splint application.
14. Anticipate need for additional pharmacologic pain relief.

EMS Procedure Guidelines

SELECTIVE SPINAL IMMOBILIZATION

AUTHORIZATION:

- BLS Providers

INDICATIONS:

1. Mechanism of injury
    a. Mechanisms that have been associated with a higher risk of injury are:
        i. Motorized vehicle crashes
        ii. Axial loading injuries to the spine
        iii. Falls greater than 10 feet

2. Finding associated with spine injury:
    a. Complaints of midline neck or spine pain with or without palpation
    b. Any abnormal mental status (including extreme agitation)
    c. Focal neurologic deficit (any abnormal sensation, numbness, tingling, and/or weakness)
    d. Any evidence of alcohol or drug intoxication
    e. Another severe or painful distracting injury
    f. A communication barrier that prevents accurate assessment
    g. Patient meets trauma activation criteria (exception listed below)
    h. Torticollis in children
    i. EMS provider judgement

3. Patient over 65 with a ground level fall shall have a c-collar considered.

CONTRAINDICATIONS:

1. Patients with penetrating injury to the neck should not be placed in a cervical collar or other spinal precautions regardless of whether they are exhibiting neurologic symptoms or not.

PRECAUTIONS:

1. Patients that are unable to tolerate a cervical collar should be immobilized in a position of comfort using towel rolls or headblocks.

PROCEDURE:

1. Apply an appropriately sized cervical collar
2. If extrication is required:
    a. Self-extrication is appropriate for adults and children in a booster seat.
    b. For infants and toddlers already strapped in a car seat with a built-in harness, utilize the car seat as the extrication device.
3. Ambulatory:
    a. Ambulatory patients will not generally require a scoop stretcher or LSB and may be safely immobilized on the stretcher with cervical collar.

EMS Procedure Guidelines

i. Bring stretcher to patient and assist the patient onto the stretcher with minimal spinal movement.

4. Non-ambulatory:
    a. Use scoop stretcher or LSB to TRANSFER patient to the stretcher with minimal spinal movement and then remove the device if possible and secure to the stretcher.

5. Do **not** transport patients on a scoop stretcher or LSB, unless the clinical situation warrants the use.
    a. An example of this may be facilitation of immobilization of multiple extremity injuries or an unstable patient where removal of a board will delay transport and/or other treatment priorities.

EMS Procedure Guidelines

SUCTIONING – TRACHEOBRONCHIAL

AUTHORIZATION:

1. ALS Providers

INDICATION:

1. Perform tracheobronchial suctioning to remove mucus plugs or secretions causing respiratory compromise in an intubated patient.

PRECAUTIONS:

1. Because tracheobronchial suctioning can bring about hypoxia, the patient must be oxygenated before and after the procedure.
2. If possible, a sterile technique should be used.
3. Monitor the cardiac rhythm. If dysrhythmias or if bradycardia develops, the suctioning should be stopped and the patient re-oxygenated.
4. Limit suction force to a maximum of 80 to 120 mm/Hg in pediatrics.

PROCEDURE:

15. Use standard isolation precautions including eye protection. Use a facemask and gown when splashing is likely.
16. Pre-oxygenate with a bag-valve-mask device supplied with 100% oxygen.
17. Determine the appropriate length of insertion, using the patient's suprasternal notch and the proximal end of the airway adjunct as endpoints.
18. Open the catheter package.
19. Lubricate the catheter tip with a water-soluble gel or dip in saline. This facilitates passage of the catheter through the endotracheal tube.
20. Insert the suction catheter into the opening of the endotracheal tube. Pass the catheter to the predetermined depth.
21. Turn the suction unit on or place the thumb over the suction control opening.
    a. It may be necessary to inject 3 to 5 mL of saline into the endotracheal tube to loosen tenacious secretions.
22. Withdraw the catheter rotating it between the fingertips. Limit suctioning to 15 seconds. In infants and children, shorter suction time should be used.
23. Flush out the suction catheter and tubing with saline and evaluate the need for additional suctioning and the patency of the airway.
24. Ventilate the patient with a bag-valve-mask device supplied with 100% oxygen.

EMS Procedure Guidelines

SYNCHRONIZED CARDIOVERSION

AUTHORIZATION:

- ALS Providers

INDICATIONS:

1. A patient experiencing any supraventricular or ventricular tachycardia (rate greater than 150 bpm) with unstable signs and symptoms related to the tachycardia. Unstable signs and symptoms include but are not limited to altered mental status, ongoing chest pain, hypotension, or other signs of shock.

CONTRAINDICATIONS:

2. Ventricular fibrillation and pulseless ventricular tachycardia.
3. Poison or drug-induced tachycardia.

PRECAUTIONS:

1. Urgent cardioversion is generally not needed if heart rate is less than or equal to 150 bpm.
2. Reactivation of sync mode is required after each attempted cardioversion.
3. Prepare to defibrillate immediately if cardioversion causes VF.
4. Synchronized cardioversion cannot be performed unless the patient is connected to monitor leads; lead select switch must be on lead I, II, or III and not on “paddles.”
5. If cardioversion is needed and it is impossible to synchronize a shock (e.g., the patient’s rhythm is irregular), use high-energy unsynchronized shocks.

PROCEDURE:

1. Consider pain management according to Paramedic Treatment Protocols.
2. Turn on monitor/defibrillator.
    a. Select lead II on lead select switch. **Make sure the lead select switch is not placed in paddles mode.**
3. Attach monitor leads to the patient. Make sure the monitor displays the patient's rhythm clearly without artifact.
4. Engage the synchronization mode by pressing the "SYNC" control button.
5. Look for markers on R waves indicating sync mode.
6. If necessary, adjust R-wave gain until sync markers occur with each R wave.
7. Position defibrillation pads on the patient.
8. Select appropriate energy level:
    a. Adult with unstable SVT or V-tach with a pulse.
        i. First synchronized shock at 100 J.
            1. If no conversion, proceed to next energy setting.
        ii. Second synchronized shock at 200 J.

EMS Procedure Guidelines

1. If no conversion, repeat at current energy setting.

iii. Third synchronized shock at 300 J.

1. If no conversion, consider use of medications.

b. Pediatric patient with unstable tachycardia.

i. First synchronized shock at 1 J/kg.

1. If no conversion, proceed to next energy setting.

ii. Second synchronized shock at 2 J/kg.

9. Activate the ECG recorder to provide a constant recording of the rhythm.
10. Announce to team members "Charging defibrillator – stand clear!"
11. Make one more quick check of the monitor to confirm that tachycardia continues.
12. Press the CHARGE button on the monitor.
13. When the defibrillator is charged, give the shock as quickly as possible. State firmly in a forceful voice your intent to shock:
    a. Check to make sure you are clear of contact with the patient, stretcher, and equipment and that no one continues to touch the patient or stretcher. Don't forget about the person providing ventilations. That person's hands should not be touching the ventilation adjuncts, including the tracheal tube.
14. **PRESS and HOLD** the **DISCHARGE** button until the device discharges. (There can be a delay of several seconds while the device attempts a proper synchronization between the last part of the R wave and the discharge of current.)
15. Assess the patient's LOC and vital signs.
16. Check the monitor. If tachycardia persists, increase the joules according to step # 8 of this protocol and repeat shock process.
17. Reset the sync mode after each discharge of current because most defibrillators default to unsynchronized mode. This default allows immediate defibrillation if cardioversion produces VF.
18. Repeating cardioversion after initial three shocks can only be done after contacting the base physician **[Medical Direction].**

EMS Procedure Guidelines

THORACENTESIS – NEEDLE

AUTHORIZATION:

- ALS Providers

INDICATION:

1. A patient presenting with a suspected tension pneumothorax.
2. Closed or penetrating chest trauma with respiratory distress.
3. Absent breath sounds on the side of the injury.
4. Systolic blood pressure less than 90 mm/Hg in adults or less than 80 mmHg in children, with signs of shock.
5. Difficulty ventilating with a BVM.
6. Anxiety and restlessness.
7. Tachypnea.
8. Cyanosis.
9. Hypotension.
10. Jugular vein distention.
    a. May not be present with significant hypovolemia or hypotension.
11. Narrow pulse pressure.
12. Tracheal deviation. (Late sign and may not present)

EQUIPMENT:

1. 10 G (3” long) over-the-needle catheter.
2. Alcohol wipes.
3. Tape and sterile dressing.

PROCEDURE:

1. Identify the second intercostal space on the side of the pneumothorax.
2. Place a finger on the clavicle at its midpoint.
3. Run this finger straight down the chest wall to locate the first palpable rib below the clavicle.
4. The second intercostal space lies just below this rib, midway between the clavicle and the nipple line. (Figure 1)

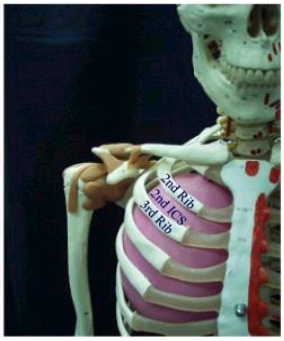

Figure 1

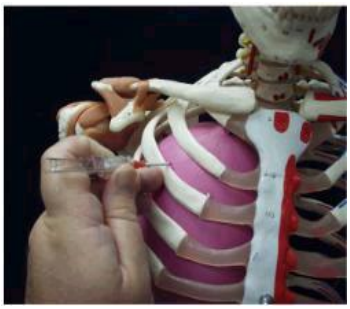
Figure 2

EMS Procedure Guidelines

5. Alternate Method: Place your finger at the notch in the top of the sternum.
    a. Move your finger slowly downward about 1.5 inches (3.8 centimeters) until you feel a slight horizontal ridge or elevation. This is the Angle of Louis where the manubrium joins the body of the sternum.
    b. Locate the second intercostal space on either side, lateral to and just below the Angle of Louis.
    c. Cleanse the area with an alcohol or povidone-iodine swab.
6. May consider 5th intercostal space at the mid-axillary line.
7. Select 10 G (3" long) over-the-needle catheter. Remove the flash chamber cap.
8. Attach a syringe filled with sterile water or saline to the needle hub of the catheter (optional).
9. Advance the needle into the second intercostal space. Assure you enter the thoracic cavity by passing the needle just over the top of the third rib to avoid interference with the blood vessels and nerves that run along the underside of the rib. (Figure 2)
10. As you enter the pleural space, you will feel a pop and note bubbling air through the fluid in the syringe. (If used)
11. Advance the catheter into the chest and then withdraw the needle and syringe. Be careful not to kink the catheter.
12. Secure the catheter in place with tape, being careful not to block the port or kink the catheter.
13. Monitor the patient's vital signs and breath sounds for a recurring tension pneumothorax.
14. If signs and symptoms are not relieved by the initial needle thoracotomy, or signs and symptoms recur, decompress the chest again by placing additional catheters adjacent to the original catheter.

COMPLICATIONS:

1. Local cellulitis.
2. Local hematoma.
3. Pleural infection, emphysema.
4. Pneumothorax.

CONSIDERATIONS:

1. For an open pneumothorax, immediately cover the open area with a gloved hand. Once materials are available, cover the area with an occlusive dressing.
2. An open pneumothorax that has been sealed with an occlusive dressing may result in a tension pneumothorax. In that instance, the increase in pleural pressure may be relieved by briefly removing the dressing. If that air release does not occur or the patient's condition remains unchanged, gently spread the chest wound open with a gloved hand, allowing the trapped air to escape.

EMS Procedure Guidelines

TRANSCUTANEOUS CARDIAC PACING

AUTHORIZATION:

- ALS Providers

INDICATIONS:

1. Hemodynamically unstable bradycardia refractory to medications.
2. Symptomatic high-degree AV block.

PRECAUTIONS:

1. Limit use of the carotid pulse to confirm mechanical capture. Electrical stimulation causes muscular jerking that may mimic a carotid pulse.

PROCEDURE:

1. Turn on monitor/defibrillator.
2. Select lead II on lead select switch. Make sure the lead select switch is not placed in paddles mode.
3. Attach monitor leads to the patient. Make sure the monitor displays the patient's rhythm clearly without artifact.
    a. If the patient's condition permits, obtain 12 Lead ECG prior to pacing.
4. Identify pacing electrode sites. If necessary, shave hair to ensure good skin contact or use alternative pacing electrode positions in patients with excessive body hair.
5. For anterior-lateral pacing electrode placement:
    a. Place the anterior electrode below the right clavicle lateral to sternum.
    b. Place the lateral (apex) electrode lateral to left nipple with the center of the electrode on the midaxillary line.
6. For anterior-posterior pacing electrode placement:
    a. Place the anterior electrode over the left precordium. The upper edge of the electrode should be below the nipple. Avoid placement over the nipple, the diaphragm, or the bony prominence of the sternum if possible.
    b. Place the posterior electrode behind the heart in the infra-scapular area. For patient comfort, place the cable connection away from the spine. Do not place the electrode over the bony prominences of the spine or scapula.
7. Muscle fasciculation's will typically be seen at ~50 mA and the patient will experience pain levels at ~ 40-50 mA.
    a. Consider pain management according to Paramedic Treatment Protocols.
8. Activate pacing function by pressing the PACER button.
9. Ensure the monitor is sensing the R wave. Increase the gain if necessary.
10. Set the rate at 80 bpm.

EMS Procedure Guidelines

11. Slowly increase current output from the minimum setting (40 mA) until electrical capture is achieved.
    a. Electrical capture is usually characterized by a widening of the QRS complex (looks like a PVC) and a broad T wave, with the T wave opposite the polarity of the QRS complex. Sometimes only a change in the intrinsic morphology indicates pacing.
12. Assess the hemodynamic response (mechanical capture) to pacing by assessing pulse and blood pressure.
    a. Take pulse at the right carotid or right femoral artery to avoid confusion between the jerking muscle contractions caused by the pacer.
    b. May consider increasing pacer rate to a maximum of 100 beats per minute to obtain a blood pressure of 100 mmHg systolic.
    c. If mechanical capture cannot be obtained, consider moving the precordial pacing electrode to a different location.
        i. If capture still cannot be obtained, consider discontinuing pacing attempt and treating with medications or contacting the base physician for further options **[Medical Direction]**.
13. Obtain an ECG tracing of the patient's paced rhythm. Attach the strip to the patient care report.

EMS Procedure Guidelines

TOURNIQUET

AUTHORIZATION:

- BLS Providers

INDICATIONS:

1. A life-threatening extremity hemorrhage that cannot be controlled by any other means.
2. Serious or life-threatening extremity hemorrhage and tactical considerations prevent the use of standard hemorrhage control techniques.

Contraindications:

1. Non-extremity hemorrhage.
2. Proximal extremity location where tourniquet application is not practical.

Procedure:

1. Place tourniquet proximal to wound.
2. Tighten per manufacturer instructions until hemorrhage stops and/or distal pulses in affected extremity disappear.
3. Secure tourniquet per manufacturer instructions.
4. Note time of tourniquet application and communicate this to receiving care providers.
5. Dress wounds per standard wound care protocol.
6. If delayed or prolonged transport and tourniquet application time greater than 45 minutes: consider re-attempting standard hemorrhage control techniques and removing tourniquet.
7. If one tourniquet is not sufficient or not functional to control hemorrhage, consider the application of a second tourniquet more proximal to the first.

EMS Procedure Guidelines

VEIN CANNULATION – EXTERNAL JUGULAR

AUTHORIZATION:

- ALS Providers

INDICATION:

1. When peripheral IV access is critically indicated but an upper extremity vein cannot be catheterized.

CONTRAINDICATION:

1. The external jugular vein is not visible.

PROCEDURE:

1. Prepare all equipment as for peripheral IV access in an upper extremity.
2. Place the patient in a supine and/or in the Trendelenburg position. This position will increase blood flow to the chest and neck, thus distending the vein and making it easier to see. Additionally, the Trendelenburg position decreases the chance of air entering the circulatory system during cannulation.
3. Turn the patient's head away from the side of the access site. This maneuver makes the site easier to see and reach. Do not perform this maneuver if the patient has traumatic head and/or neck injuries.
4. Identify the external jugular vein. The external jugular can be located between the angle of the jaw and the middle third of the clavicle.
5. Using a circular motion, cleanse the site thoroughly with an alcohol wipe or povidone-iodine. Allow the area to dry before penetrating the skin.
6. Occlude venous return by placing a finger on the external jugular just above the clavicle. Never apply a venous constricting band around a patient's neck.
7. Position the venipuncture device parallel with the vein, midway between the angle of the jaw and the clavicle. Point the catheter at the medial third of the clavicle and insert it, bevel up, at a 10° to 30° angle. Cannulate the vein in the usual method.
8. Connect an injection port or an extension set and the IV tubing to the catheter hub. Be careful not to contaminate either the hub or connector before insertion.
9. Open the IV flow control valve and run the IV infusion for a brief period to ensure that the line is patent. To ensure proper IV flow rates, the IV container must hang 30 to 36 inches above the insertion site.
10. Secure the catheter, administration set tubing and sterile dressing in place with tape or a commercial device.
11. Adjust the IV to the appropriate flow rate for the patient's condition.

EMS Procedure Guidelines

VEIN CANNULATION – PERIPHERAL

AUTHORIZATION:

- ALS Providers

INDICATIONS:

1. To obtain venous access for the administration of medications and/or fluids.

PRECAUTIONS:

1. IV therapy is an invasive vascular procedure that carries a number of risks, including bleeding, infiltration and infection. Because performing venipuncture can be very difficult in some patients, it requires maintenance of ongoing skill proficiency.

CONSIDERATIONS:

1. Prehospital vein cannulation efforts should be limited to two attempts per provider.
2. Preparations for vein cannulation should be coordinated with rescue efforts so patient transport is not delayed.

PROCEDURE:

1. Explain the need for IV cannulation and describe the procedure to the patient.
2. Select the IV fluid to be used. Check to make sure that it is the proper fluid, clean, without particulate matter, not outdated and not leaking.
    a. Saline locks may be used for intravenous medication delivery are established using aseptic technique, in an expedient manner. IV extension tubing attached to a 10cc pre-filled syringe should be utilized for routine adult saline lock administration. Saline locks should be used on patients who require medication administration only. If at any time, the patient's clinical presentation changes to require intravenous fluids, an IV can be established utilizing the already placed IV extension tubing.
3. Select an appropriately sized catheter:
    a. Adults: 14 to 16 gauge for trauma, for volume replacement or cardiac arrest.
    b. Adults: 18 to 20 gauge for medical conditions.
    c. Children: Based on clinical judgment or job aids such as a length-based resuscitation device.
4. Select the proper administration set (e.g., macro-, or micro-drip).
    a. Attach a macrobore IV extension set to all routine adult IV administrations.
5. Prepare the IV bag and administration set using an aseptic technique to prevent contamination.
6. Prepare other equipment including tape, occlusive dressings, injection port, 4X4, etc.
7. Use standard isolation precautions.
8. Place the patient in a comfortable position with the selected extremity lower than the heart.
9. Apply a tourniquet. Avoid keeping the tourniquet in place for more than two minutes.

EMS Procedure Guidelines

10. Select a suitable vein by palpation or sight. Avoid areas where a valve is situated.
11. Using a circular motion, cleanse the site thoroughly with an alcohol wipe or povidone-iodine. Allow the area to dry before penetrating the skin.
12. Stabilize the vein by anchoring it with the thumb and stretching the skin downward.
13. Perform venipuncture without contaminating the equipment or the site.
    a. Hold the end of the venipuncture device between the thumb and the index/middle fingers. Avoid touching any portion of the catheter because a contaminated device is not usable.
    b. Depending on the type of venipuncture device and manufacturer recommendations, hold the needle at a 15°, 30°or 45°angle to the skin.
    c. Penetrate the skin with the bevel of the needle pointed up. If possible, penetrate the vein at its junction or bifurcation with another vein; it is more stable at this location.
    d. Enter the vein with the needle from either the top or the side. Normally, a slight "pop" or "give" is felt as the needle passes through the wall of the vein. Be careful not to enter too fast or too deeply; the needle can go through the back wall of the vein.
    e. Note when blood fills the flashback chamber of the needle.
    f. Lower the venipuncture device and advance it another 0.5 cm until the tip of the catheter is well within the vein.
    g. While holding the needle stable, advance the catheter into the vein until the hub is against the skin.
    h. Once the catheter is within the vein, apply pressure to the vein beyond the catheter tip.
    i. Release the tourniquet from the patient's arm.
    j. Withdraw the needle.
14. Dispose of the needle in a proper biomedical waste container.
15. Connect an injection port or an extension set and the IV tubing to the catheter hub. Be careful not to contaminate either the hub or connector before insertion.
16. Open the IV flow control valve and run the IV infusion for a brief period to ensure that the line is patent. To ensure proper IV flow rates, the IV container must hang 30 to 36 inches above the insertion site.
17. Secure the catheter, administration set tubing and sterile dressing in place with tape or a commercial device. The tubing should be looped and secured with tape above the IV cannulation site.
18. Adjust the IV to the appropriate flow rate for the patient's condition.

Formula to Calculate IV Flow Rate:
$\text{Flow Rate (gtts/min)} = \frac{\text{Volume to be infused (mL) X properties of administration set (gtts/mL)}}{\text{Time of infusion (in minutes)}}$

EMS Procedure Guidelines

VIDEO LARYNGOSCOPY ENDOTRACHEAL INTUBATION

AUTHORIZATION:

- ALS Providers

INDICATIONS:

1. Respiratory arrest.
2. Unresponsive medical or trauma patients who lack a gag reflex.
3. Cardiopulmonary arrest.
4. Patients with a GCS less than 8.
5. Conscious patients with respiratory distress who are unable to ventilate adequately.

CONTRAINDICATION:

1. Epiglottitis.

NECESSARY EQUIPMENT:

1. BVM with oxygen source.
2. Video Laryngoscope (McGrath® Mac), charged battery, and disposable blade.
3. Commercial securing device or twill tape.
4. Appropriate size ETT.
5. Stylet.
6. 10 cc syringe.
7. Stethoscope.
8. ETCO2 circuit
9. Viral filter.
10. Magill forceps.
11. Oropharyngeal Airway. (For initial airway management and / or use as a bite block)
12. I-gel. (If unable to intubate)

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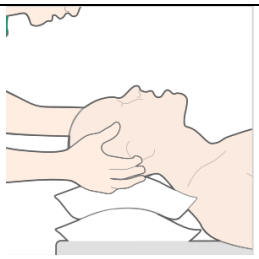
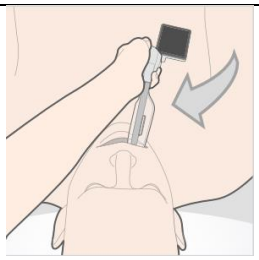
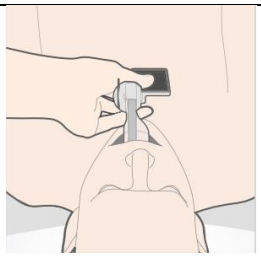
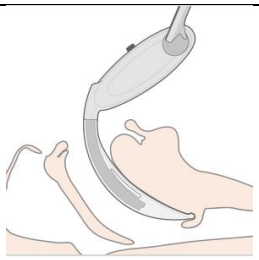
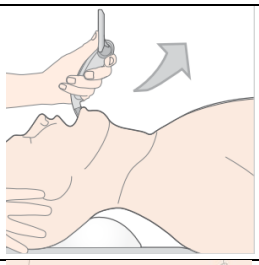
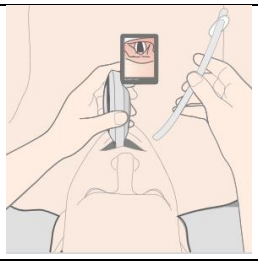
PROCEDURE:

1. If possible, position the patient in the optimal position for direct laryngoscopy.	
2. Look into the mouth; insert the blade into the right side of the mouth.	
3. Move the device to a central position while sweeping the tongue to the left.	
4. Advance the tip of the McGRATH® MAC blade into the vallecula.	
5. Visualize the epiglottis on the screen. Lift the anatomy forwards and upwards to expose a direct and indirect view of the glottis. When the device is in the optimal position the glottis should be viewed in the central upper section of the screen.	
6. Advance the tube gently and atraumatically through the vocal cords. Tube placement can be performed either by looking directly in the mouth, indirectly on the screen or a combination of both(1).	

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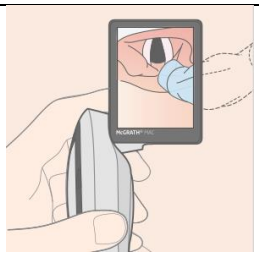
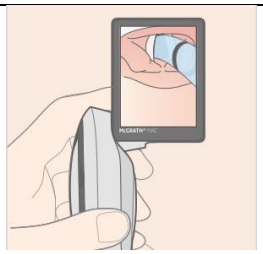
7. Indirectly visualize the tube placement through the vocal cords. In optimal tube placement technique, the E.T. tube will enter from the right hand side of the display.	
8. The screen view can be used to confirm the correct insertion depth of the endotracheal tube.	

9. Inflate the distal cuff with the prefilled syringe. Use only the minimum amount of air necessary to create an effective seal and prevent air leakage. Do not overinflate the cuff.
    a. Ensure the syringe is removed after the distal cuff is inflated.
10. Remove the laryngoscope.
11. Attach a bag-valve-mask to the tube.
    a. Place the ETCO2 circuit and viral filter onto the ET tube with the BVM.
    b. Ensure supplemental oxygen @ 15 L/min is attached to the BVM via oxygen connecting tube.
12. Deliver several breaths with the bag-valve-mask and confirm proper tube placement as follows:
    a. Auscultate over the epigastrium.
    b. Auscultate the chest bilaterally at the axillae, apices, and the bases for the presence of equal, bilateral lung sounds.
    c. Observe for symmetrical chest rise and fall with each breath.
    d. Observe patient for clinical improvement. (I.E., pulse oximetry, skin condition).
13. Confirm proper tube placement with a ETCO2 detection circuit:
    a. ETCO2 DETECTION / MONITORING – CAPNOGRAPHY
        i. ETCO2 should be maintained at 35-45 mm/Hg.
        ii. For head-injured patients with signs of impending brain stem herniation, maintain @ 30-35 mm/Hg.
14. Note and record the depth of the endotracheal tube at the teeth.
15. Ventilate the patient with the bag-valve-mask supplied with 100% oxygen as indicated.
    a. During CPR: Deliver 8 to 10 breaths per minute. Deliver each breath over about one second while chest compressions are delivered at a rate of at least 100 per minute, and do not attempt to synchronize the compressions with the ventilations.
    b. Patients with a perfusing rhythm: Deliver approximately 10 to 12 breaths per minute (one breath every 5 to 6 seconds). Deliver these breaths over one second.

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16. Secure the endotracheal tube in place with a commercial device or twill tape while continuing ventilatory support.
17. Re-confirm tube placement after the tube is secured, after every patient movement and at regular intervals. Application of a cervical collar and immobilization device will help prevent the patient from moving in such a way as to dislodge the endotracheal tube.

SEDATION:

1. Refer to ALS Treatment Protocols

COMPLICATION: ESOPHAGEAL INTUBATION

1. Deflate the distal cuff.
2. Remove ET tube from patient.
3. Vigorously suction the oropharynx as needed.
4. Pre-oxygenate the patient prior to re-intubation if an additional attempt is permitted.

COMPLICATION: ENDOBRONCHIAL INTUBATION

1. Loosen the securing device.
2. Deflate the distal cuff.
3. For a right main stem bronchus intubation, continue ventilating and slowly withdraw the tube while simultaneously auscultating the left side of the chest.
4. Stop withdrawing the tube once breath sounds are heard on the left side.
5. Auscultate both sides of the chest. Breath sounds should be heard equally and bilaterally.
6. Note and record the tube depth, re-inflate the distal cuff, and secure the tube in place.

EXTUBATION:

Extubation is indicated if the patient can protect and maintain an open airway, the risks for needing to re-intubate are significantly reduced and the patient is not sedated. This should rarely if ever be performed in the field.

To perform the procedure:

1. Ensure adequate oxygenation.
2. Confirm patient responsiveness.
3. Suction the oropharynx.
4. Deflate the distal cuff.
5. Remove the endotracheal tube on cough or respiratory expiration.

EMS Procedure Guidelines

Approved by:

_____ Medical Director (Print)

_____ Medical Director Signature

_____ Date

(A signed copy is available at the EMS Division)

Last edited March 3, 2025