East Central Illinois EMS System

Procedures

2024

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Blind Insertion Airway - i-gel®

Clinical Indications:

- Inability to adequately ventilate a patient with a bag valve mask or longer EMS transport distances require a more advanced airway
- Inability to secure an endotracheal tube in a patient who does not have a gag reflex
- Appropriate intubation is impossible due to patient access or difficult airway anatomy

Procedure:

1. Pre-oxygenate the patient with 100% oxygen if time permits.
2. Select the appropriate tube size for the patient.
3. Remove the device from the protective cradle and inspect for any signs of damage.
4. Place water-soluble lubricant in the middle of the protective cradle.
5. Lubricate the back, sides and front of the i-gel with a thin layer of lubricant.
6. Grasp along the integral bite block and face the cuff outlet toward the patient's chin.
7. Insert the i-gel into the mouth in the direction towards the hard palate.
8. Glide the device down and back along the hard palate with continuous but gentle pressure, until resistance is met.
9. The tip of the airway should be located in the upper esophageal opening and the cuff should be located against the laryngeal framework. The incisors should be resting on the integral bite block.
10. Tape to secure or use a commercial tube holder.
11. Connect the i-gel to a BVM and assess for breath sounds and air entry.
12. Confirm tube placement (i.e. $EtCO_2$, chest rise, breath sounds, absent epigastric sounds)
13. Continue to monitor airway with continuous waveform capnography and pulse oximetry.
14. Reassess i-gel placement after every move and upon arrival in the ED.

i-gel Size	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	Small Adult	30-60 kg
4	Medium Adult	50-90 kg
5	Large Adult +	90+ kg

Blind Insertion Airway - i-gel®

The i-gel® supraglottic airway

i-gel®

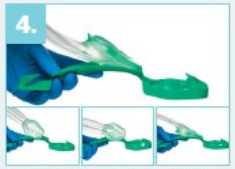
Preparations for use

Adult sizes

Open the i-gel package, and on a flat surface take out the protective cradle containing the device.

Remove the i-gel and transfer it to the palm of the same hand that is holding the protective cradle, supporting the device between the thumb and index finger.

Place a small bolus of a water-based lubricant, such as K-Y Jelly®, onto the middle of the smooth surface of the protective cradle in preparation for lubrication.



Grasp the i-gel with the opposite (free) hand along the integral bite block and lubricate the back, sides and front of the cuff with a thin layer of lubricant.

Inspect the device carefully, confirm there are no foreign bodies or a BOLUS of lubricant obstructing the distal opening. Place the i-gel back into the protective cradle in preparation for insertion.

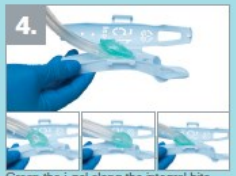
Go to step 6. for insertion technique

Paediatric sizes

Open the i-gel package, and on a flat surface take out the cage pack containing the device.

Open the cage pack and transfer the i-gel into the lid of the cage.

Place a small bolus of a waterbased lubricant, such as K-Y Jelly®, onto the middle of the smooth surface of the cage pack ready for use.



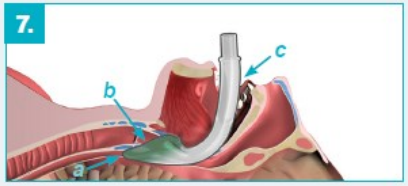
Grasp the i-gel along the integral bite block and lubricate the back, sides and front of the cuff with a thin layer of lubricant.

Inspect the device carefully, confirm there are no foreign bodies or a BOLUS of lubricant obstructing the distal opening. Place the i-gel back into the cage pack in preparation for insertion.

Go to step 6. for insertion technique

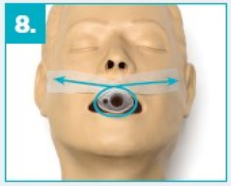
Insertion technique

Remove the i-gel from the protective cradle or cage pack. Grasp the lubricated i-gel firmly along the integral bite block. Position the device so that the i-gel cuff outlet is facing towards the chin of the patient. The patient should be in the 'sniffing the morning air' position with head extended and neck flexed. The chin should be gently pressed down before proceeding. Introduce the leading soft tip into the mouth of the patient in a direction towards the hard palate.



Glide the device downwards and backwards along the hard palate with a continuous but gentle push until a definitive resistance is felt.

The tip of the airway should be located into the upper oesophageal opening (a) and the cuff should be located against the laryngeal framework (b). The incisors should be resting on the integral bite block (c).



The i-gel should be taped down from 'maxilla to maxilla'.

Patient Size	Size	Weight
Neonate	1	2-5kg
Infant	1.5	5-12kg
Small paediatric	2	10-25kg
Large paediatric	2.5	25-35kg
Small adult	3	30-60kg
Medium adult	4	50-90kg
Large adult	5	90+kg

Important notes to the recommended insertion technique

Sometimes a feel of 'give-way' is felt before the end point resistance is met. This is due to the passage of the bowl of the i-gel through the faucial pillars. It is important to continue to insert the device until a definitive resistance is felt.

Once definitive resistance is met and the teeth are located on the integral bite block, do not repeatedly push the i-gel down or apply excessive force during insertion.

It is not necessary to insert fingers or thumbs into the patient's mouth during the process of inserting the device.

Visit the i-gel website www.i-gel.com

This poster does NOT constitute a comprehensive guide to the preparation, insertion and use of the i-gel. The user should first familiarise themselves with the Instructions for Use supplied with the product before attempting to use the i-gel. Additionally, a User Guide is available by contacting Intersurgical or by visiting our website www.i-gel.com
The i-gel must always be separated from the protective cradle or cage pack prior to insertion. The cradle is not an introducer and must never be inserted into the patient's mouth. K-Y Jelly® is a registered trademark of Johnson and Johnson Inc.

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Blind Insertion Airway - King Airway

Clinical Indications:

- Inability to adequately ventilate a patient with a bag valve mask or longer EMS transport distances require a more advanced airway
- Inability to secure an endotracheal tube in a patient who does not have a gag reflex
- Appropriate intubation is impossible due to patient access or difficult airway anatomy

Contraindications:

- Responsive patients with an intact gag reflex
- Patients with known esophageal disease
- Patients who have ingested caustic substances

Procedure:

1. Pre-oxygenate the patient with 100% oxygen if time permits.
2. Select the appropriate tube size for the patient.
3. Apply a water-based lubricant to the beveled distal tip and posterior aspect of the tube.
4. Hold the King Airway Device at the connector with your dominant hand. With your non-dominant hand, hold the patient's mouth open and apply chin lift unless contraindicated by c-spine precautions.
5. Gently insert the tube rotated laterally 45-90 degrees so that the blue orientation line is touching the corner of the mouth. Once the tip is at the base of the tongue, rotate the tube back to midline.
6. Insert the airway until the base of the connector is in line with the teeth and gums.
7. Inflate the pilot balloon with air depending on the size of the device used.
8. Ventilate the patient while gently withdrawing the airway until the patient is easily ventilated.
9. Confirm tube placement (i.e. $EtCO_2$, chest rise, breath sounds, absent epigastric sounds)
10. Secure tube using tape or commercial device.
11. Reassess placement after every move and upon arrival in the ED.

Size	Patient Criteria	Cuff Volume (mL)
2	35-45 inches or 12-25 kg	25 - 35
2.5	41-51 inches or 25-35 kg	30 - 40
3	4-5 Feet	40 - 55
4	5-6 Feet	50 - 70
5	Greater than 6 Feet	60 - 80

Chest Tube Management

Clinical Indications:

- For management of chest tubes during inter-facility transfers

Procedure:

1. Document the reason for the placement of the chest tube.
2. Make sure the chest tube and tubing are secured to the patient with tape.
3. Ensure that the dressing over the insertion site is securely taped and occlusive. Use a felt tip marker to mark the depth of the tube; if there are markings, note the depth of the tube on the transfer chart. Make sure the tube is sutured, wired, or taped so it cannot be accidentally pulled out.
4. Assess the function of the chest tube and drainage system before initiating patient transport.
5. The drainage system should be lower than the patient's chest and remain upright at all times.
6. If attached to a suction device, find out if the suction can be discontinued for transport; if not, attach to portable suction and/or suction in unit. If mechanical suction is ordered, the amount of mechanical suction must be specified.
7. Do not clamp tubes for transport. This is likely to cause a tension pneumothorax.
8. Should the chest tube be connected to a one way Heimlich valve, assure connection is tight. Monitor valve for continued proper function.
9. All tubing and connections should be monitored with all patient movements to maintain patency of the system.
10. Coil the tubing and secure it to the edge of the stretcher. Avoid creating dependent loops, kinks or pressure on the tubing.
11. Evaluate breath sounds and reassess for development of a tension pneumothorax. Document findings.
12. Ensure adequate analgesia and administer ordered pain medication, as needed.
13. Frequently assess vital signs and the amount and color of the drainage from the drainage system. Document drainage amount during transport.

Continuous Positive Airway Pressure (CPAP)

Clinical Indications:

- The suspected CHF, COPD, asthma or pneumonia patient
- To ease significant labored respirations and the work of breathing in patients on supplemental oxygen who may otherwise require intubation
- Exhibiting hypoxemia (O_2 saturation <94% at any time) not resolved by supplemental oxygen therapy
- Patient currently on BiPap / CPAP at referring facility with satisfactory improvement in oxygenation and ventilation
- Must have SBP ≥ 90 mmHg

Contraindications:

- Cardiac or respiratory arrest / apnea
- Unable to follow commands
- Unable to maintain their own airway
- Agitated or combative behavior and unable to tolerate mask
- Vomiting and/or active GI bleed
- Respiratory distress secondary to trauma
- Suspicion of pneumothorax
- Facial trauma or impossible face seal
- Hypotension with SBP <90 mmHg

Procedure:

1. Ensure all necessary equipment is available and assembled (follow manufacturer's directions for preparation of your particular device).
2. Choose appropriate sized device mask for patient.
3. Explain the procedure to the patient. Be prepared to coach the patient for claustrophobia or anxiety.
4. Ensure oxygen is flowing prior to placing CPAP mask on patient's face.
5. Place mask on patient's face using bridge of nose as a guide. Secure cap around patient's head and tighten Velcro straps on each side. Adjust extender on forehead to fit tightly on patient's face.
6. Apply CPAP at recommended H_20 pressure, 5-10 cm H_20, or continue current H_20 pressure if CPAP already in use. Start with 5 cm PEEP.
7. Recheck mask for leaks and adjust straps as needed to minimize air leaks.
8. Monitor vital signs and symptoms, pulse oximetry and waveform capnography.
9. If patient condition is deteriorating (decreasing LOC, decreasing O_2 sat, or any exclusion criteria become evident), remove CPAP and assist respirations with BVM ventilations.

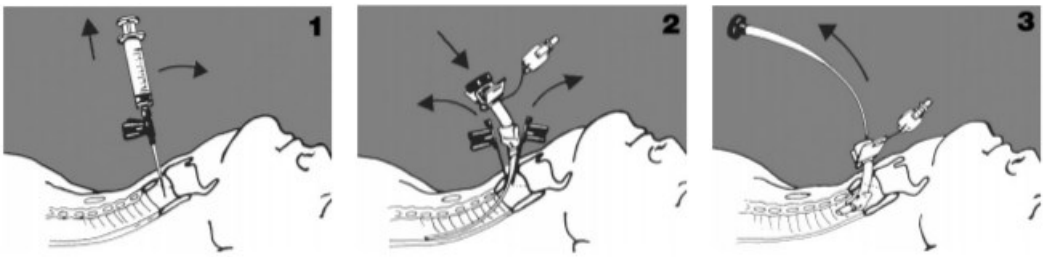
Cricothyrotomy - Pertrach®

Clinical Indications:

- >12 years of age
- In need of airway control as a life-saving measure, and control cannot be attained despite 3 attempts using more conventional methods
    - These methods may include securing airway by means such as oropharyngeal airway and BVM device, a blind insertion airway device or intubation by direct visualization

Procedure:

1. Identify the landmarks of the neck and identify the cricothyroid membrane.
2. Prepare the anterior neck by cleansing with antiseptic cleansing solution.
3. Remove dilator from the package and protective sheath and advance it into the tracheostomy tube.
4. With the non-dominant hand, stabilize the skin over the cricothyroid membrane.
5. Using the scalpel, make a 1-2 cm vertical incision through the skin over the cricothyroid membrane (optional but may make insertion of dilator and tube easier).
6. Attach break-away needle to 10 cc syringe. Insert needle perpendicular through incision, through cricothyroid membrane and into lumen of the trachea. While advancing the splitting needle, lightly pull back on the plunger of the syringe. When air bubbles occur or you feel a break in resistance, stop advancing the needle.
7. Stabilize needle with your hand and remove syringe.
8. Insert tip of dilator into the hub of splitting needle. Squeeze wings of needle together to split the needle. Remove both halves of the needle, leaving dilator in trachea.
9. Using firm but gentle pressure, insert dilator and tracheostomy tube into position until flange is against the skin.
10. Remove dilator.
11. Inflate cuff until you have control of the airway.
12. Attach BVM to cannula and ventilate patient with 100% oxygen.
13. Confirm lung sounds in the usual manner.
14. Attach cannula to neck using cloth umbilical tape.



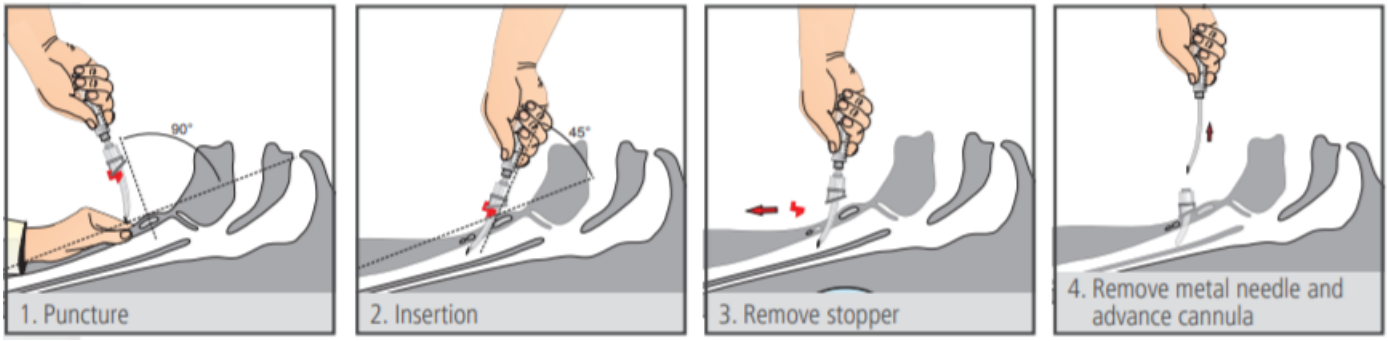
Cricothyrotomy - QuickTrach®

Clinical Indications:

- >12 years of age
- In need of airway control as a life-saving measure, and control cannot be attained despite 3 attempts using more conventional methods
    - These methods may include securing airway by means such as oropharyngeal airway and BVM device, a blind insertion airway device or intubation by direct visualization

Procedure:

1. Identify the landmarks of the neck and identify the cricothyroid membrane.
2. Prepare the anterior neck by cleansing with antiseptic cleansing solution.
3. With the non-dominant hand, stabilize the skin over the cricothyroid membrane.
4. Using the syringe and the finder needle supplied in the QuickTrach kit, insert the needle through the cricothyroid membrane at a 90-degree angle caudally (toward the feet).
5. Confirm entry of needle in trachea by aspirating air and/or bubbles through the syringe.
6. If air and/or bubbles present, change the angle of insertion to 45-degrees.
7. Advance the device to the level of the stop guide.
8. Remove the stop guide and slide the plastic cannula along the needle into the trachea until the flange rests against the neck.
9. Carefully remove the needle and syringe.
10. Secure the cannula with the provided anchoring device.
11. Attach the connecting tube to the 15mm connection.
12. Attach BVM to connection tube and ventilate patient with 100% oxygen.
13. Confirm lung sounds in the usual manner.
14. Attach cannula to neck using cloth umbilical tape.



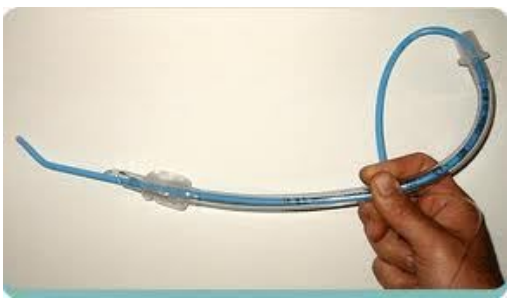
Endotracheal Tube Introducer: Bougie

Clinical Indications:

- Patients meet clinical indications for oral intubation
- Initial intubation attempt(s) unsuccessful
- Predicted difficult intubation

Procedure:

1. Prepare, position and oxygenate the patient with 100% oxygen.
2. Select proper ETT without stylet, test cuff and prepare suction.
3. Lubricate the tip of the Bougie with a water-soluble lubricant.
4. Using laryngoscopic techniques, visualize the vocal cords if possible using Sellick / 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 ETT 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 ETT over the Bougie passing the tube to its appropriate depth.
10. Once the ETT is correctly placed, hold the ETT securely and remove the Bougie.
11. Inflate the cuff with 3 - 10 mL of air.
12. Confirm appropriate placement with waveform capnography, symmetrical chest-wall rise, auscultation of equal breath sounds over the chest and a lack of epigastric sounds with ventilations using a BVM.
13. Secure the tube using commercial device.
14. Document ETT size, time, result (success), and placement location by the centimeter marks either at the patient’s teeth or lips. Document all devices used to confirm initial tube placement. Also document positive or negative breath sounds before and after each movement of the patient.
15. Continuously monitor $EtCO_2$ to detect tube dislodgement or obstruction. Reconfirm correct placement after each patient movement.



Needle Chest Decompression

Clinical Indications:

Patients with hypotension, clinical signs of shock, and at least one of the following signs:

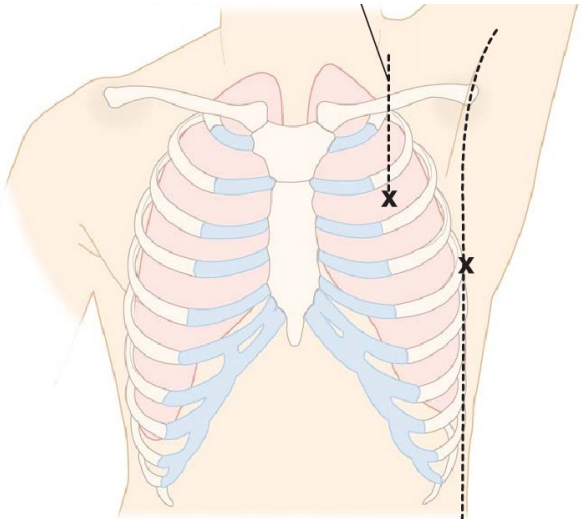
- Jugular vein distention
- Tracheal deviation away from the side of the injury (often a late sign)
- Absent or diminished breath sounds on the affected side
- Hyper-resonance to percussion on the affected side
- Increased resistance when ventilating the patient

Patients in traumatic arrest with chest or abdominal trauma for whom resuscitation is indicated. These patients may require bilateral chest decompression even in the absence of the signs above.

Procedure:

1. Administer high flow oxygen.
2. Identify the site:
    - Locate the second intercostal space in the mid-clavicular line on the same side as the pneumothorax
    - If unable to place anteriorly, lateral placement may be used at the fourth intercostal space in the mid-axillary line
3. Prepare the site by cleansing with antiseptic cleansing solution.
4. Insert the appropriate catheter into the skin perpendicular to the chest wall over the appropriate rib and direct it just over the top of the rib (superior border) into the intercostal space.
5. Advance the needle-catheter through the parietal pleura until a “pop” is felt and air or blood exits under pressure through the catheter, then advance the catheter only to chest wall.
6. Remove the needle, leaving the plastic catheter in place.
7. Secure the catheter hub to the chest wall using a commercial seal with a one-way valve or create a flutter valve from the finger of an exam glove.

***The procedure for needle thoracostomy in pediatric patient is unchanged from that of adults. It is expected that a shorter distance will need to be traversed to enter the pleural space in children due to the thinner chest wall and thus a shorter needle should be used for pediatric patients (i.e. 1.5”-2”)*



Orotracheal Intubation

Clinical Indications:

- Inability to adequately ventilate a patient with a bag valve mask or longer EMS transport distances require a more advanced airway
- An unconscious patient without a gag reflex who is apneic or is demonstrating inadequate respiratory effort

Procedure:

1. Prepare, position and oxygenate the patient with 100% oxygen.
2. Have suction and bougie ready.
3. Assess for airway difficulty and have back up plan and equipment ready.
4. Select proper ETT size. Assure that cuff is functioning.
5. Open the patient's airway and holding the laryngoscope in the left hand, insert the blade into the right side of the mouth and sweep the tongue to the left.
6. Use the blade to lift the tongue and epiglottis (either directly with the straight blade or indirectly with the curved blade).
7. Using laryngoscope, visualize vocal cords. (Use Sellick maneuver / BURP to assist you). If using video laryngoscope, follow manufacturer guidelines for use.
8. Once the glottis opening is visualized, pass the tube through the vocal cords and continue to visualize until the cuff is past the cords.
9. Limit each intubation attempt to 30 seconds with BVM ventilations between attempts.
10. Remove the laryngoscope and then the stylet from the ETT.
11. Inflate the cuff with 3 - 10 mL of air.
12. Confirm appropriate placement with waveform capnography, symmetrical chest-wall rise, auscultation of equal breath sounds over the chest and a lack of epigastric sounds with ventilations using a BVM.
13. Secure the tube using commercial device.
14. Document ETT size, time, result (success), and placement location by the centimeter marks either at the patient's teeth or lips. Document all devices used to confirm initial tube placement. Also document positive or negative breath sounds before and after each movement of the patient.
15. Continuously monitor $EtCO_2$ to detect tube dislodgement or obstruction. Reconfirm correct placement after each patient movement.

Ventilator Management

Clinical Indications:

- Management of the ventilation of a patient during a prolonged or interfacility transport of an intubated patient

Procedure:

1. Transporting personnel should review the operation of the ventilator with the treating personnel (physician, nurse, or respiratory therapy) in the referring facility prior to transport if possible.
2. All ventilator settings, including respiratory rate, FiO2, mode of ventilation, and tidal volumes should be recorded prior to initiating transport. Additionally, the recent trends in oxygen saturation experienced by the patient should be noted.
3. Prior to transport, specific orders regarding any anticipated changes to ventilator settings as well as causes for significant alarm should be reviewed with the referring medical personnel as well as medical control.
4. Once in the transporting unit, confirm adequate oxygen delivery to the ventilator.
5. Frequently assess breath sounds to assess for possible tube dislodgment during transfer.
6. Frequently assess the patient's respiratory status, noting any decreases in oxygen saturation or changes in tidal volumes, peak pressures, etc.
7. It is strongly recommended that the airway be monitored continuously through capnography and pulse oximetry.
8. If any significant change in patient condition, including vital signs or oxygen saturation or there is a concern regarding ventilator performance / alarms, remove the ventilator from the endotracheal tube and use a BVM with 100% oxygen. Contact medical control immediately.

Waveform Capnography

Clinical Indications:

- Shall be used with the use of all invasive airway procedures including endotracheal, cricothyrotomy, or Blind Insertion Airway Devices (i-gel & King airway)
- Should also be used on all respiratory patients, including asthma, COPD and CHF with use of CPAP
- Should be used on all cardiac arrests

Procedure:

Tube Capnography Sensor: Attach capnography sensor to the BIAD, endotracheal tube, or oxygen delivery device.
Nasal Cannula Capnography Sensor: Place nasal prongs into patient's nose, plug sensor into monitor. Attach supplemental oxygen if needed.

1. Turn on monitor and verify $EtCO_2$ display is on and functioning.
2. Connect $EtCO_2$ tubing to monitor.
3. Note CO_2 level and waveform changes. These will be documented on each respiratory failure, cardiac arrest, or respiratory distress patient. Normal range is 35-45 mmHg.
4. Waveform capnography shall remain in place with the airway and be monitored throughout the prehospital care and transport.
5. Any loss of CO_2 detection or waveform indicates an airway problem and should be immediately evaluated for loss of airway or circulatory compromise and should be documented.
6. In all patients with a pulse an $EtCO_2$ reading > 20 mmHg is expected.
7. During cardiac arrest, good compressions will show a value of >10 mmHg. A spike in $EtCO_2$ may indicate ROSC.

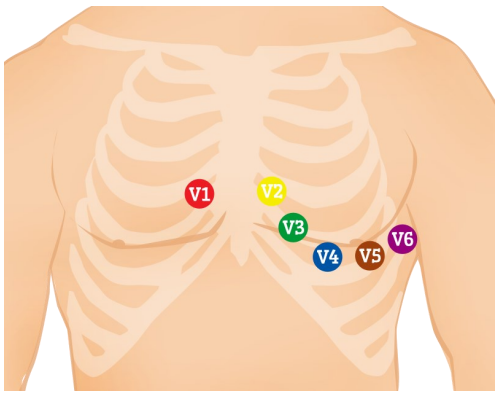
12-Lead ECG

Clinical Indications:

- Suspected cardiac patient (CHF, pulmonary edema, dysrhythmias, palpitations)
- Suspected Acute Coronary Syndrome (chest, jaw, arm, epigastric discomfort, etc.)
- Suspected tricyclic overdose
- Electrical injuries
- Syncope
- Shortness of breath

Procedure:

1. If patient is unstable, definitive treatment is the priority. If patient is stable or stabilized after treatment, perform a 12-lead ECG.
2. Prepare ECG monitor and connect patient cable with electrodes.
3. Enter the required patient information (patient name, etc.) into the 12-lead ECG device.
4. Expose chest and prep as necessary (i.e. hair removal). Modesty of the patient should be respected.
5. Apply chest leads and extremity leads using the following landmarks:
    - RA — Right arm
    - LA — Left arm
    - RL — Right leg
    - LL — Left leg
    - V1 — 4th intercostal space at right sternal border
    - V2 — 4th intercostal space at left sternal border
    - V3 — Directly between V2 and V4
    - V4 — 5th intercostal space at midclavicular line
    - V5 — Level with V4 at left anterior axillary line
    - V6 — Level with V5 at left midaxillary line



6. Instruct patient to remain still.
7. Press the appropriate button to acquire the 12-lead ECG.
8. If the monitor detects signal noise (such as patient motion or a disconnected electrode), the 12-lead acquisition will be interrupted until the noise is removed.
9. Once acquired, transmit the ECG data to the appropriate hospital.
10. Contact the receiving hospital to notify them that a 12-lead ECG has been sent and confirm they received the 12-lead.
11. Monitor the patient while continuing with the treatment protocol.

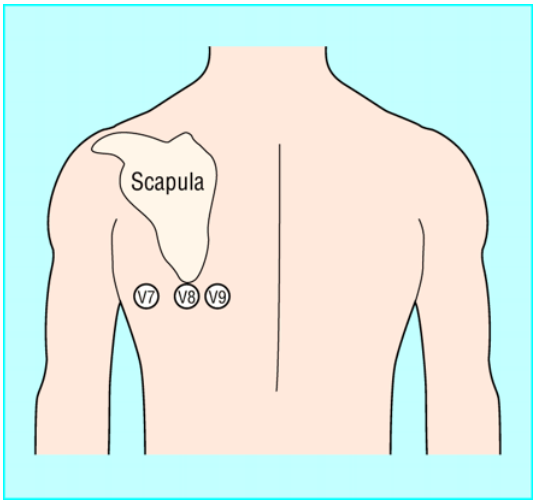
Posterior ECG

Clinical Indications:

- Suspected cardiac patient
- Reciprocal changes in leads V1-V3. Posterior MI is suggested by the following changes:
  - Horizontal ST depression
  - Tall, broad R waves (>30 ms)
  - Upright T waves
  - Dominant R wave (R/S ratio >1) in V2

Procedure:

1. Acquire and transmit normal 12-lead ECG. Continue cardiac monitoring.
2. Locate V7 position:
   - Posterior 5th intercostal space
   - Left posterior axillary line
3. Move V4 lead to V7 position
4. Locate V8 position:
   - In line with V7 the posterior 5th intercostal space
   - Tip of the left scapula
5. Move V5 lead to V8 position.
6. Locate V9 position:
   - In line with V8 position
   - Left paraspinal border
7. Move V6 lead to V9 position
8. Instruct patient to remain still.
9. Press the appropriate button to acquire the 12-lead ECG.
10. If the monitor detects signal noise (such as patient motion or a disconnected electrode), the 12-lead acquisition will be interrupted until the noise is removed.
11. Once acquired, transmit the ECG data to the appropriate hospital.
12. Re-label the 3 altered leads on the ECG strip.



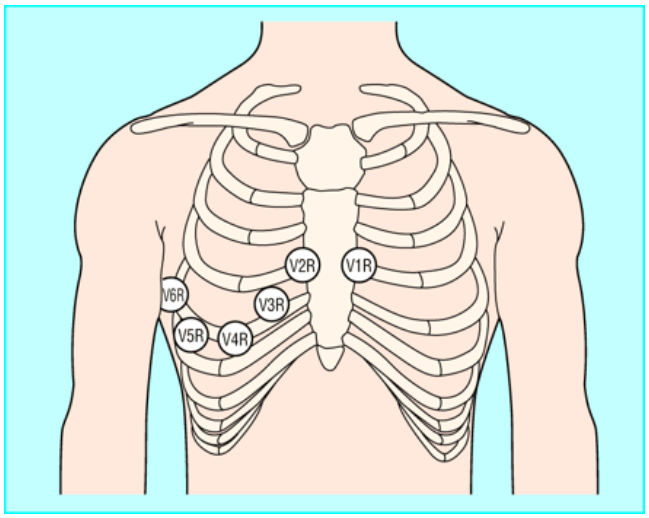
Right-Sided ECG

Clinical Indications:

- Suspected cardiac patient
- Inferior STEMI patients with ST elevation in V1 and ST elevation in lead III > lead II
    - Isoelectric ST segment in V1 with marked ST depression in V2

Procedure:

1. Acquire and transmit normal 12 lead ECG. Continue cardiac monitoring.
2. Apply limb leads V1– V6 in mirror– image position on the right side of chest.
    - V1R-4th intercostal space at left sternal border (original V2 placement)
    - V2R -4th intercostal space at right sternal border (original V1 placement)
    - V3R -Directly between V2 and V4
    - V4R -5th intercostal space at midclavicular line
    - V5R -Level with V4 at left anterior axillary line
    - V6R -Level with V5 at left midaxillary line
3. Instruct patient to remain still.
4. Press the appropriate button to acquire the 12 lead ECG.
5. If the monitor detects signal noise (such as patient motion or a disconnected electrode), the 12-lead acquisition will be interrupted until the noise is removed.
6. Once acquired, transmit the ECG data to the appropriate hospital.
7. Re-label the 3 altered leads on the ECG strip.



Synchronized Cardioversion

Clinical Indications:

- Unstable patient with a tachydysrhythmia (rapid atrial fibrillation / flutter, supraventricular tachycardia, ventricular tachycardia)
- Patient is not pulseless (the pulseless patient requires unsynchronized cardioversion, i.e., defibrillation)

Procedure:

1. Ensure the patient is attached properly to a monitor / defibrillator capable of synchronized cardioversion.
2. Have all equipment prepared for unsynchronized cardioversion / defibrillation if the patient fails synchronized cardioversion and the condition worsens and rhythm deteriorates into VF / pulseless VT.
3. Consider the use of pain or sedating medications.
4. Set monitor / defibrillator to synchronized cardioversion mode watching for R wave markers on each QRS complex.
5. Set energy selection to the appropriate setting per the appropriate protocol.
6. Make certain all personnel are clear of patient.
7. Press and hold the shock button to cardiovert. Stay clear of the patient until you are certain the energy has been delivered. NOTE: It may take the monitor / defibrillator several cardiac cycles to synchronize so there may a delay between activating the cardioversion and the actual delivery of energy.
8. Note patient response and perform immediate unsynchronized cardioversion / defibrillation if the patient's rhythm has deteriorated into pulseless VT / VF, following the procedure for Defibrillation-Manual.
9. Repeat until maximum setting or until efforts succeed. Consider discussion with medical control if cardioversion is unsuccessful after 2 attempts.

Transcutaneous Pacing

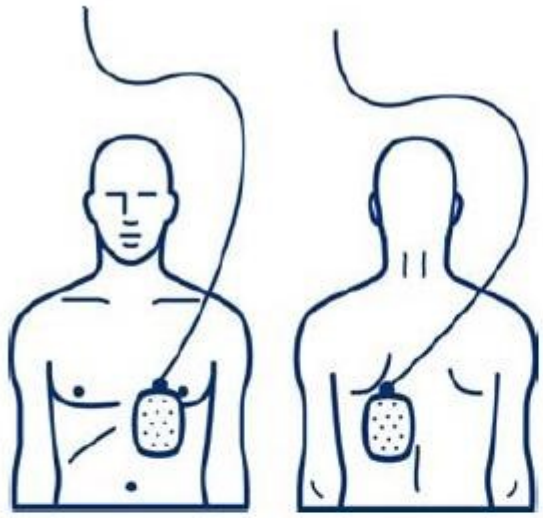
Clinical Indications:

- Patients with symptomatic bradycardia (less than 60 per minute) with signs and symptoms of inadequate cerebral or cardiac perfusion such as:
  - Chest Pain
  - Hypotension
  - Pulmonary edema
  - Altered mental status, confusion, etc.
  - Ventricular ectopy

Procedure:

1. Attach standard four-lead monitor.
2. Apply defibrillation / pacing pads to chest and back:
   - One pad to left mid chest next to sternum
   - One pad to mid left posterior chest next to spine.
3. Select pacing mode on the monitor.
4. Adjust heart rate to 70 BPM for an adult and 100 BPM for a child.
5. Note pacer spikes on ECG screen.
6. Slowly increase output until capture of electrical rhythm on the monitor.
7. If unable to capture while at maximum current output, stop pacing immediately.
8. If capture observed on monitor, check for corresponding pulse and assess vital signs.
9. Consider the use of sedation or analgesia if patient is uncomfortable.

Anterior-Posterior Placement for Pacing (Standard)



Vector Change and Double Sequential Defibrillation

Clinical Indications:

- Vector Change
  - Persistent V-Fib/V-Tach refractory to standard defibrillation after THIRD defibrillation
- Double Sequential Defibrillation
  - Persistent V-Fib/V-Tach refractory to THREE standard defibrillations and ONE vector change defibrillation.

Procedure:

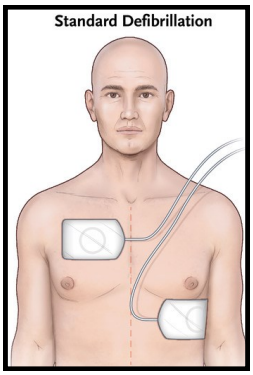
1. Continue high quality CPR per CARDIAC ARREST Protocol

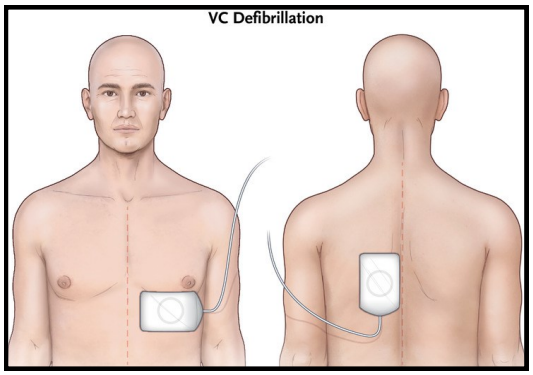
VECTOR CHANGE

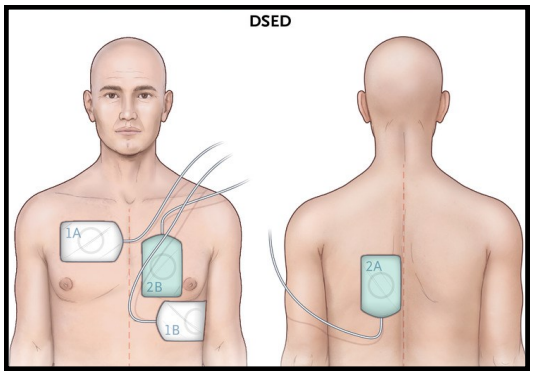
2. Prepare the anterior-posterior sites for attachment of additional sets of defibrillation pads.
3. Place pads from the standard anterior-lateral position to the anterior-posterior position.
4. Once pads are in place in new location, defibrillate per protocol.
5. Immediately resume chest compression.

DOUBLE SEQUENTIAL DEFIBRILLATION *(Requires two defibrillators)*

5. If patient remains in persistent V-Fib/V-Tach despite THREE standard defibrillations and ONE vector change defibrillation, consider double sequential defibrillation.
6. Connect the second set of pads to a second cardiac monitor.
7. Charge both monitors to maximum energy level.
8. After ensuring all providers are clear of the patient, simultaneously depress both shock buttons to defibrillate the patient.
9. Immediately resume chest compressions.







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External Jugular Access

Clinical Indications:

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

Procedure:

1. Place the patient in a supine head down position. This helps distend the neck vein and prevents air embolism
2. Turn the patient's head toward the opposite side if no risk of cervical injury exists.
3. Prep the site as per peripheral IV site.
4. Align the catheter with the vein and aim toward the same side shoulder.
5. "Tourniqueting" the vein lightly with one finger above the clavicle, puncture the vein midway between the angle of the jaw and the clavicle and cannulate the vein in the usual method.
6. Attach the IV lock and secure the catheter avoiding circumferential dressing or taping.

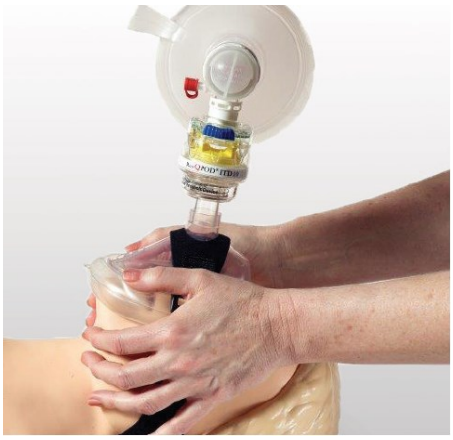
Impedance Threshold Device - ResQPOD®

Clinical Indications:

- Adult patients in cardiopulmonary arrest

Procedure (Facemask):

1. Connect the ResQPOD to facemask.
2. Open airway. Establish and maintain tight face seal with mask throughout chest compressions; a head strap or 2-handed technique is recommended.
3. Connect ventilation source to top of ResQPOD, or mouthpiece if performing mouth to mask ventilation.
4. Perform CPR at recommended compression to ventilation ratio.
5. Place $EtCO_2$ detector between ResQPOD and ventilation source (preferred).



Procedure (Advanced Airway):

1. Confirm ETT placement and secure with commercial tube holder.
2. Connect the ResQPOD to ETT or BIAD.
3. Connect ventilation source to the ResQPOD.
4. Perform continuous chest compression.
5. Turn on timing assist lights. Ventilate asynchronously at timing light flash rate of 10/min.
6. Place $EtCO_2$ detector between ResQPOD and ventilation source (preferred).

Intraosseous Access - ARROW® EZ-IO®

Clinical Indications:

- Rapid, regular IV access is unavailable with any of the following:
  - Cardiac arrest
  - Multisystem trauma with severe hypovolemia
  - Severe dehydration with vascular collapse and/or loss of consciousness
  - Respiratory failure / respiratory arrest
  - Burns

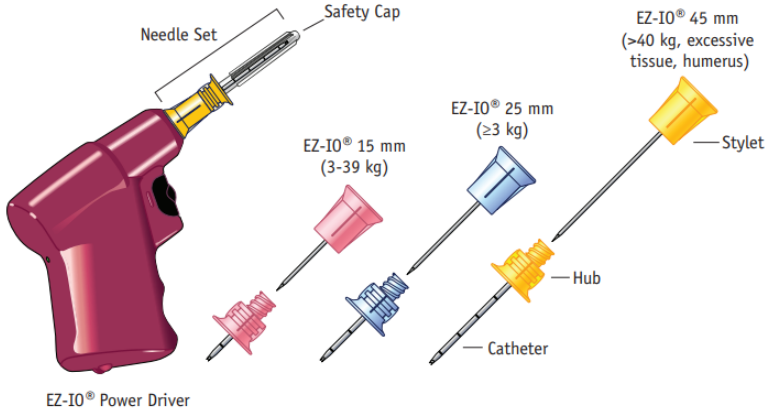
Contraindications:

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

Needle Selection:

Select EZ-IO® Needle Set based on patient weight, anatomy and clinical judgment. The EZ-IO® Catheter is marked with a black line 5 mm proximal to the hub. 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 the 5 mm black line above the skin.

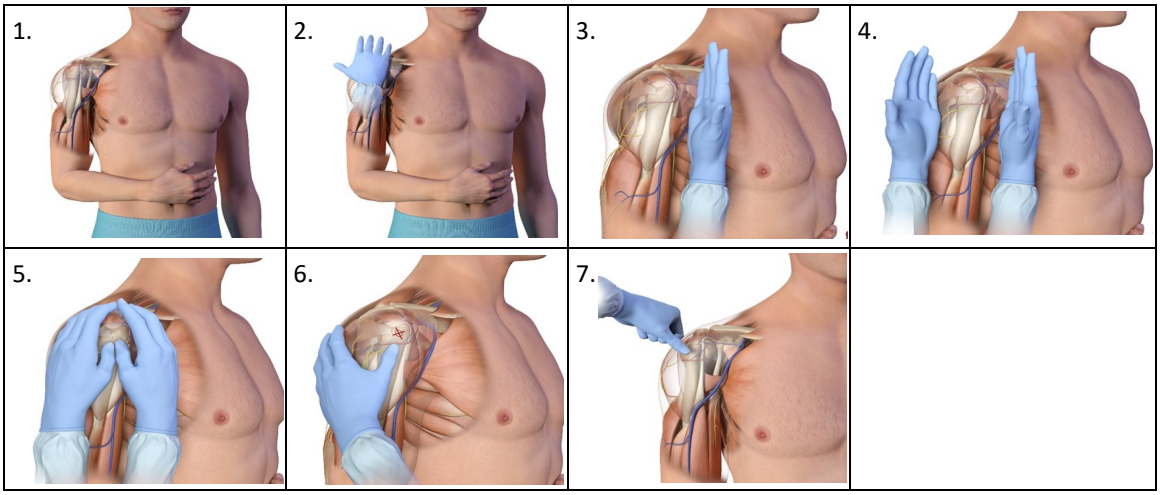
1. EZ-IO® 45 mm Needle Set (yellow hub) should be considered for proximal humerus insertion in patients 40 kg and greater and patients with excessive tissue over any insertion site
2. EZ-IO® 25 mm Needle Set (blue hub) should be considered for patients 3 kg and greater
3. EZ-IO® 15 mm Needle Set (pink hub) should be considered for patients approximately 3-39 kg



Procedure Continues

Proximal Humerus Identification:

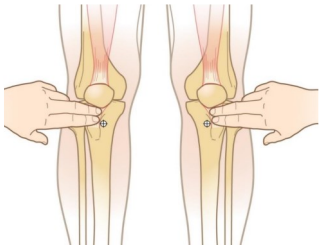
1. Place the patient's hand over the abdomen (elbow adducted and humerus internally rotated).
2. Place your palm on the patient's shoulder anteriorly
   - The area that feels like a "ball" under your palm is the general target area
   - You should be able to feel this ball, even on obese patients, by pushing deeply
3. Place the ulnar aspect of one hand vertically over the axilla.
4. Place the ulnar aspect of the opposite hand along the midline of the upper arm laterally.
5. Place your thumbs together over the arm.
   - This identifies the vertical line of insertion on the proximal humerus.
6. Palpate deeply as you climb up the humerus to the surgical neck.
   - It will feel like a golf ball on a tee - the spot where the "ball" meets the "tee" is the surgical neck
7. The insertion site is on the most prominent aspect of the greater tubercle, 1 to 2 cm above the surgical neck.



Proximal Tibia Identification:

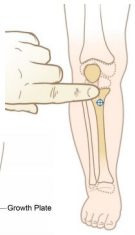
Adult:

1. Extend the leg.
2. Insertion site is approximately 2 cm medial to the tibial tuberosity, or approximately 3 cm (two finger widths below the patella and approximately 2 cm medial, along the flat aspect of the tibia.



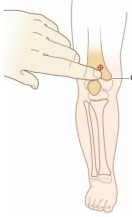
Infant / Child:

1. Extend the leg.
2. Insertion site is approximately 1 cm medial to the tibial tuberosity, or just below the patella (approximately 1 cm or one finger widths) and slightly medial (approximately 1 cm or one finger width), along the flat aspect of the tibia.



Distal Femur (Adult/Infant/Child):

1. Secure the leg out-stretched to ensure the knee does not bend.
2. Identify the patella by palpation. The insertion site is just proximal to the patella (Infant/Child approx. 1cm; Adults approx. 2cm) and approximately 1-2 cm medial to midline.



Procedure Continues

Intraosseous Access - ARROW® EZ-IO®

Adult Insertion Technique:

1. Use a clean, “no touch” technique, maintaining asepsis.
2. Prepare supplies.
3. Prepare the site by using antiseptic of your choice; stabilize the extremity.
4. Remove the needle set cap.

Proximal Humerus

1. Aim the needle set at a 45-degree angle to the anterior plane and posteromedial.
2. Push the needle set tip through the skin until the tip rests against the bone.

   The 5 mm mark must be visible above the skin for confirmation of adequate needle set length
3. Gently drill into the humerus approximately 2 cm or until the hub is close to the skin; the hub of the needle set should be perpendicular to the skin.

Tibia

1. Aim the needle set at a 90-degree angle to the bone.
2. Push the needle set tip through the skin until the tip rests against the bone.

   The 5 mm mark must be visible above the skin for confirmation of adequate needle set length
3. Gently drill, advancing the needle set approximately 1-2 cm after entry into the medullary space or until the needle set hub is close to the skin.

Infant/Child Insertion Technique:

1. Use a clean, “no touch” technique, maintaining asepsis.
2. Prepare supplies.
3. Prepare the site by using antiseptic of your choice; stabilize the extremity.
4. Remove the needle set cap.

Proximal Humerus

1. Aim the needle set at a 45-degree angle to the anterior plane and posteromedial.
2. Push the needle set tip through the skin until the tip rests against the bone.

   The 5 mm mark must be visible above the skin for confirmation of adequate needle set length
3. Gently drill into the humerus approximately 2 cm or until the hub is close to the skin; the hub of the needle set should be perpendicular to the skin.

Tibia and Distal Femur

1. Aim the needle set at a 90-degree angle to the bone.
2. Push the needle set tip through the skin until the tip rests against the bone.

   The 5 mm mark must be visible above the skin for confirmation of adequate needle set length
3. Gently drill, advancing the needle set approximately 1-2 cm after entry into the medullary space or until the needle set hub is close to the skin.

Procedure Continues

Intraosseous Access - ARROW® EZ-IO®

Insertion Completion:

1. Hold the hub in place and pull the driver straight off; continue to hold the hub while twisting the stylet off the hub with counter clockwise rotations; catheter should feel firmly seated in the bone (1st confirmation of placement);
    - Dispose of all sharps and biohazard materials using standard biohazard practices and disposal containers.
    - If using the NeedleVISE® 1 port sharps block, place on stable surface and use a one-handed technique.
2. Place the EZ-Stabilizer® Dressing over the hub.
3. Attach a primed extension set to the catheter hub, firmly secure by twisting clockwise.
4. Pull the tabs off the dressing to expose the adhesive, apply to the skin.
5. Aspirate for blood / bone marrow (2nd confirmation of placement).*

    **Inability to withdraw / aspirate blood from the catheter hub does not mean the insertion was unsuccessful.*
6. Proceed with technique below, based on situation:

Adult - Responsive to Pain:

a. Prime extension set with **2% LIDOCAINE.**

Note that the priming volume of the EZ-Connect® Extension Set is approximately 1 mL

b. Slowly infuse **2% LIDOCAINE 40 mg IO** over 120 seconds.

c. Allow to dwell in IO space for 60 seconds.

d. Flush with **5 to 10 mL** of **NORMAL SALINE.**

Adult - Unresponsive to Pain:

a. Prime extension set with **NORMAL SALINE.**

Note that the priming volume of the EZ-Connect® Extension Set is approximately 1 mL

b. Flush with **5 to 10 mL** of **NORMAL SALINE**

Infant/Child - Responsive to Pain:

a. Prime extension set with **2% LIDOCAINE.**

- *Note that the priming volume of the EZ-Connect® Extension Set is approximately 1 mL*
- *For small doses of lidocaine, consider administering by carefully attaching syringe directly to needle hub (prime extension set with normal saline)*

b. Slowly infuse **2% LIDOCAINE 0.5 mg/kg mg IO** over 120 seconds (max 40 mg).

c. Allow to dwell in IO space for 60 seconds.

d. Flush with **2 to 5 mL** of **NORMAL SALINE.**

Infant/Child - Unresponsive to Pain:

a. Prime extension set with **NORMAL SALINE.**

Note that the priming volume of the EZ-Connect® Extension Set is approximately 1 mL

b. Flush with **2 to 5 mL** of **NORMAL SALINE**

7. Stabilize and monitor site and limb for extravasation or other complications.

Hemorrhage Control
-Tourniquet-

Clinical Indications:

- Life threatening hemorrhage that cannot be controlled by other means, such as direct pressure.
- Serious or life threatening extremity hemorrhage and operational considerations (location, tactical or hazmat environment, etc.) prevent the use of standard hemorrhage control techniques.

Procedure:

1. Apply commercially made tourniquet approximately 2-3 inches proximal to the wound / injury.
    a. Do NOT apply tourniquet over a joint. If wound is over a joint or just distal to a joint, apply the tourniquet just proximal to the joint.
    b. Do NOT apply tourniquet over a fracture.
2. Tighten tourniquet until bleeding stops and/or distal pulse is absent.
3. Document time of application and location of tourniquet and ensure that receiving facility is aware of time of placement.
4. Tourniquet should be easily visible on affected limb.
5. Manage pain per the PAIN MANAGEMENT Protocol.
6. If bleeding continues, place a second tourniquet proximal to the first.
7. For thigh wounds, consider placement of two tourniquets, side-by-side, and tighten sequentially to eliminate distal pulse.
8. Do not release a properly applied tourniquet until the patient reaches definitive care.

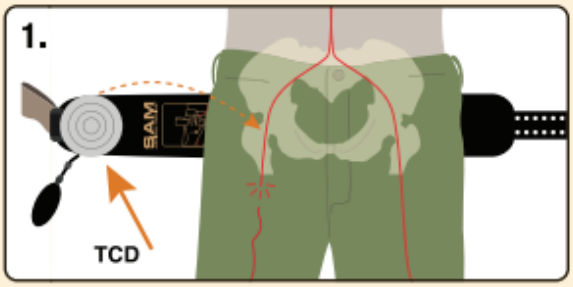
Hemorrhage Control
-SAM® JunctionalTourniquet-

Clinical Indications:

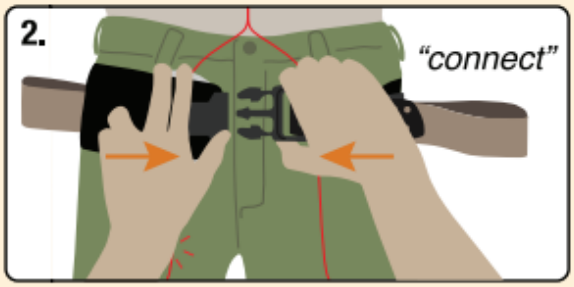
- Serious or life threatening hemorrhage from a site is not amenable to tourniquet placement (i.e. junctional injury).

Procedure:

TO CONTROL DIFFICULT BLEEDS IN THE INGUINAL AREA
Part No. SJT 102,101

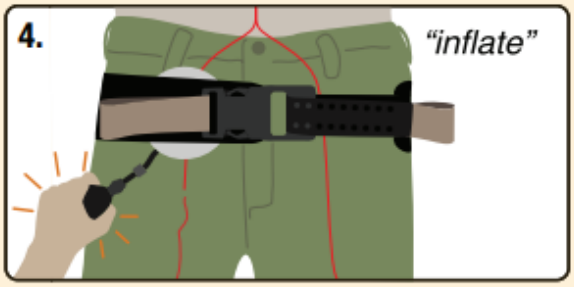


Slide the belt underneath the patient, positioning the Target Compression Device (TCD) over the area to be compressed. Use sterile gauze or hemostatic dressing if targeting directly over a wound. **For bi-lateral application, use a second TCD.**



Hold the TCD in place and connect the belt using the buckle.

Pull the **BROWN HANDLES** away from each other until the buckle secures. You will hear an audible click. Fasten excess belt in place by pressing it down on the Velcro. You may hear a second click once the belt is secure.



Use the hand pump to inflate the TCD until hemorrhage stops. Monitor patient during transport for hemorrhage control and adjust the device if necessary. **TO REMOVE**, unbuckle the belt.

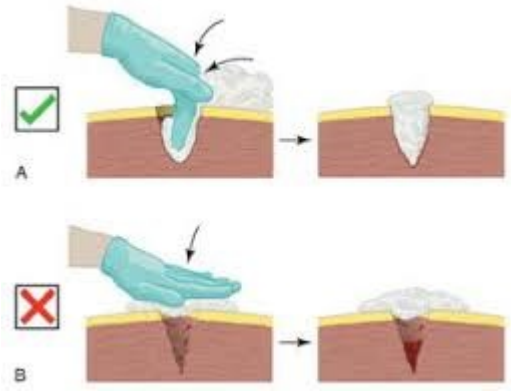
Hemorrhage Control
-Wound Packing / Hemostatic Gauze-

Clinical Indications:

- Serious hemorrhage that can not be controlled by other means.

Procedure:

1. Apply direct pressure to bleeding site.
2. If the bleeding site is not amenable to tourniquet placement (i.e. junctional injury), pack wound tightly with a hemostatic gauze and apply direct pressure. Consider using a Junctional Hemostatic Device if available.
    a. Begin packing the gauze into the wound with your finger, while maintaining pressure on the wound.
    b. Completely and tightly pack the wound to stop the bleeding.
    c. Hold direct pressure on the wound for **3 minutes**.
    d. After applying manual pressure for 3 minutes, place a pressure dressing over the wound.



High Performance CPR

Purpose:

- To improve the overall survival rate of sudden out-of-hospital cardiac arrest patients within the East Central Illinois EMS System. Research indicates that High Performance CPR (HP CPR) along with Code Resource Management (CRM) can save lives. In order to have effective HP CPR ALL involved must work as team. This systematic change in treatment and management of cardiac arrest patients is based on research and practices being used in many other high performance EMS systems across the county. Minimal breaks in compressions, full chest recoil, adequate compression depth, and adequate compression rate are all components of CPR that can increase survival from cardiac arrest. Together, these components combine to create high performance CPR (HP CPR).

Procedure:

1. **Effective Compressions**
    a. CPR should be initiated immediately upon identification of cardiac arrest as long as the scene is safe.
    b. Compressors should be rotated **every 2 minutes.**
    c. Ideally, one compressor is on each side of the patient's chest (one person compressing and the other person ready to start).
    d. Maintain compression depth of **at least 2 inches.**
    e. Compression should allow for complete chest recoil/decompression between compressions (50% Compression / 50% Decompression).
    f. Compressor shall also rotate when a decrease in ETCO2 is observed.
2. **Continuous Compressions**
    a. Compressions at a rate of **100-120 per minute** for 2 minutes (use of a metronome is recommended). (Compression Fraction > 60%)
    b. Do NOT interrupt chest compressions during the 2 minute cycle for ANY reason.
    c. Treatments such as ventilations, IV/IO access, or intubation shall be done while CPR is ongoing.
    d. After completion of a two-minute cycle, a phase to assess pulses and/or defibrillate will be limited to <10 seconds.
3. **Defibrillation**
    a. Turn on the AED/monitor as soon as cardiac arrest is confirmed.
    b. Chest compressions should NOT be interrupted to remove clothing or place defibrillation pads.
    c. Compressions should continue during charging of the AED; pausing only for analysis and shock delivery.
    d. Compressors will hover over the patient with hands ready during defibrillation so compressions can start IMMEDIATELY after a defibrillation.
    e. NO PULSE CHECKS AFTER SHOCKS.
    f. Manual Defibrillator:
        i. Charge to appropriate energy level as the end of the compression cycle nears (approx. 1 minute and 45 seconds into a two-minute cycle).
        ii. At the end of the two-minute cycle, the patient will be cleared, the rhythm will be interpreted rapidly and then the patient will either be defibrillated or the defibrillator energy will be cancelled.
        iii. This sequence must be performed within **10 seconds**.
        iv. Rhythm interpretation will not occur after a shock, but only after the two-minute cycle of CPR is performed.

Procedure Continues

High Performance CPR

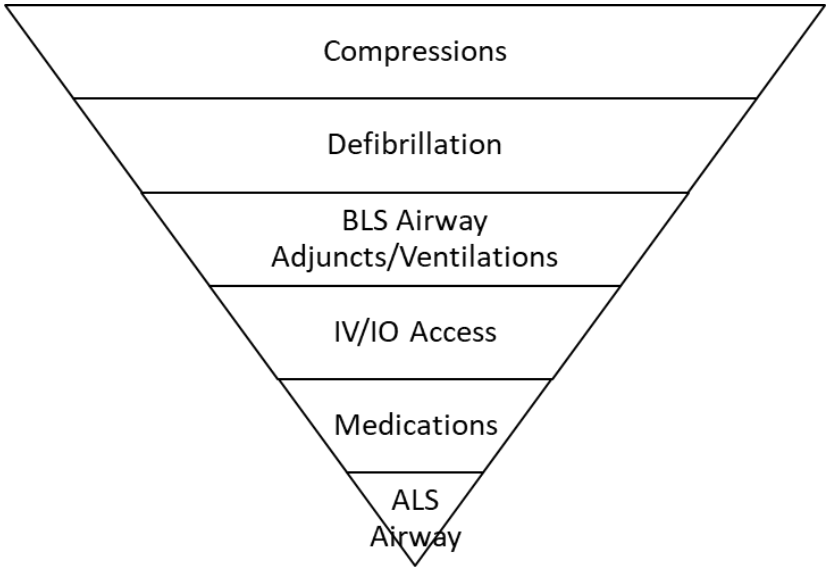
Procedure:

4. **Ventilations**
    a. Once an advanced airway is in place, ventilations will be performed WITHOUT STOPPING chest compression.
    b. Once an advanced airway is in place, ventilations will be asynchronous with compressions during the recoil phase (**1 ventilation for every 10 compressions** which equates to about **1 ventilations every 6 seconds**).
    c. Compressions should NOT be interrupted to place an advanced airway.
5. **Mechanical CPR Devices**
    **Mechanical CPR devices should be used in accordance with the devices specific instructions.
    a. Per AHA 2015 manual chest compression remain the standard of care for the treatment of cardiac arrest.
    b. Mechanical CPR devices may be reasonable alternative to conventional CPR in specific settings where delivery of high-quality manual compressions may be challenging or dangerous for the provider:
        i. Limited rescuers available
        ii. Prolonged CPR
        iii. CPR during hypothermic cardiac arrest
        iv. CPR in a moving ambulance
    c. Placement of mechanical CPR device should not create excessive interruptions in compressions.
    d. Mechanical CPR devices should be deployed by providers who have received proper training on the device and a trained provider should accompany any patient who the device is being used on for the duration of transport.
    e. Upon arrival at the hospital, the mechanical CPR device should be left in place and active until the receiving ED staff advises otherwise.
    f. Impedance Threshold Devices (ITD) should only be considered when using mechanical CPR devices that are capable of doing active compression-decompression CPR.
6. **Advanced Life Support**
    a. ALS providers will address manual defibrillation, IV/IO access medication administration and advanced airway placement, as indicated.
        *** However, intubation is no longer a primary focus of cardiac arrest management and any advanced airway intervention should NOT interrupt chest compressions.
    b. Capnography should be utilized to optimize CPR performance and evaluation of ROSC.
        i. EtCO2 > 10 mm Hg is indicative of quality CPR.
        ii. Abrupt sustained increase in EtCO2 is indicative of potential ROSC.
7. **Transport Considerations**
    a. Medical Cardiac Arrests generally do not benefit from “load-n-go” situations.
    b. Patient’s best chance of survival is obtaining ROSC on scene (working where found).
    c. Consider “load-n-go” for traumatic arrests.
    d. Transport rapidly after obtaining ROSC, and after prolonged resuscitation for persistent V-fib/ Pulseless V-Tach.

Procedure Continues

Code Resource Management:

1. Crews should coordinate their duties keeping the call priorities in mind. Intervention priorities are (in order of highest to lowest):



2 Provider Crew:

Provider 1 – Chest Compressions
Provider 2 – Ventilate, attach/operate AED/Defibrillator, assume crew leader responsibilities.
(providers rotate positions every two minutes)
**Roles remain the same even if providers are ALS equipped

3 Provider Crew:

Provider 1 – Chest Compressions
Provider 2 – Crew Leader, attach/operate AED/defibrillator
Provider 3 – Ventilate
(Providers 1 and 3 rotate every two minutes)
**Roles remain the same even if providers are ALS equipped

4 Provider Crew:

Provider 1 – Chest Compressions
Provider 2 – Attach/operate AED/Defibrillator
Provider 3 – Ventilate
Provider 4 – Crew Leader (Preferably ALS)
(Providers 1, 2, and 3 rotate every two minutes)
**Once first two roles have begun treatment, ALS providers will establish IV/IO and administer medications

Greater Than 4 Providers:

Utilize the same initial assignments as the four provider crew. The crew leader will assign additional roles such as informing the family of patient status, gathering patient information, and documenting the medical interventions performed on the call. If resources allow, rotate additional providers to do chest compressions to achieve optimal performance.

Procedure Continues

High Performance CPR

Positions for 6-Person High-Performance Teams*

Resuscitation Triangle Roles

Compressor

- Assesses the patient
- Performs compressions according to local protocols
- Rotates every 2 minutes or earlier if fatigued

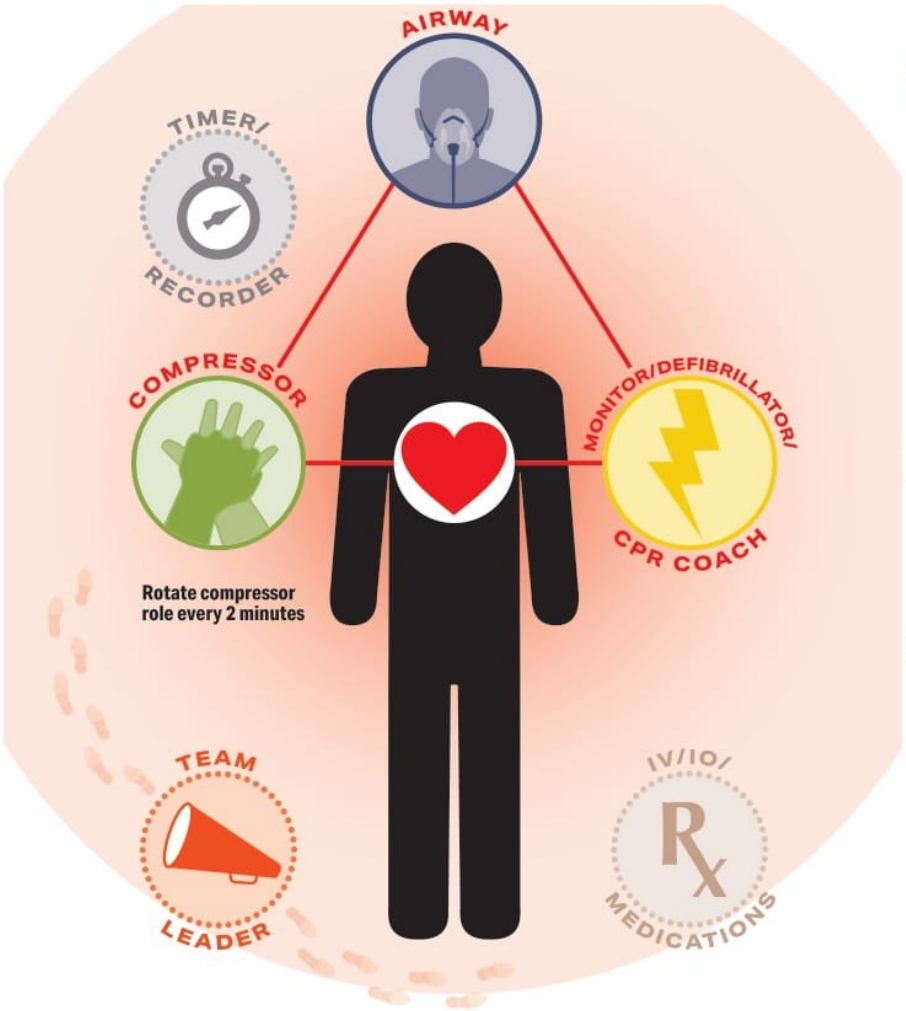
Monitor/Defibrillator/ CPR Coach

- Brings and operates the AED/monitor/defibrillator and acts as the CPR Coach if designated
- If a monitor is present, places it in position where it can be seen by the Team Leader (and most of the team)

Airway

- Opens the airway
- Provides bag-mask ventilation
- Inserts airway adjuncts as appropriate†

The team owns the code. No team member leaves the triangle except to rotate compressors or to protect his or her safety.



Leadership Roles

Team Leader

- **Every resuscitation team must have a defined leader**
- Assigns roles to team members
- Makes treatment decisions†
- Provides feedback to the rest of the team as needed
- Assumes responsibility for roles not defined

IV/IO/Medications†

- An ALS provider role
- Initiates IV/IO access
- Administer medications

Timer/Recorder

- Records the time of interventions and medications (and announces when these are next due)
- Records the frequency and duration of interruptions in compressions
- Communicates these to the Team Leader (and the rest of the team)

*This is a suggested team formation. Roles may be adapted to local protocol.
†Roles and tasks are performed by advanced providers.

Mechanical CPR Device - LUCAS™

Clinical Indications:

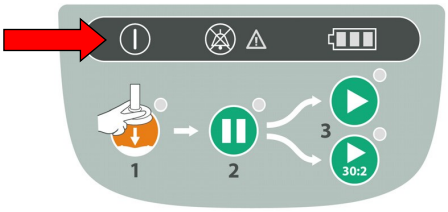
- Adult patient in non-traumatic cardiac arrest
  - Intended for use as an adjunct to manual CPR when effective manual CPR is not possible (e.g. during patient transport or extended CPR when fatigue may prohibit the delivery of effective / consistent compression to the victim, or when insufficient EMS personnel are available to provide effective CPR)

Contraindications:

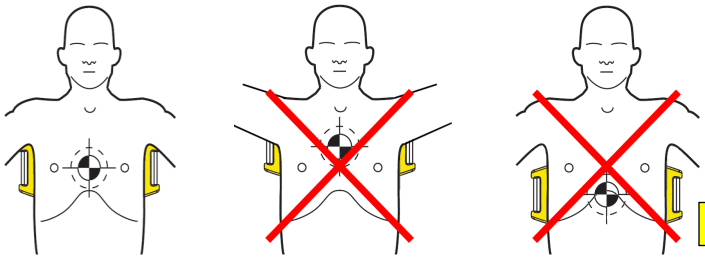
- Pediatric patients in cardiac arrest
- Patients suffering traumatic cardiac arrest
- Patients who do not fit within the device
  - Patients who are too large and with whom you cannot press the pressure pad down 2 inches
  - Patients who are too small and with whom you cannot pull the pressure pad down to touch the sternum

Placement Procedure:

1. All therapies related to the management of a patient in cardiac arrest should be continued as outlined in the protocols.
   a. Manual chest compression should be initiated **immediately** while the LUCAS™ device is being placed on the patient.
   b. Limit interruptions in chest compressions to **10 seconds or less**.
   c. **Early defibrillation** should be considered and provided as indicated.
   d. **Do NOT delay manual CPR for the LUCAS**. Continue manual CPR until the device can be placed.
2. While resuscitative measures are initiated, unpack the LUCAS™ device and place on the patient in the following manner:
   a. Push **ON/OFF** on the user control panel for 1 second to start the self test.



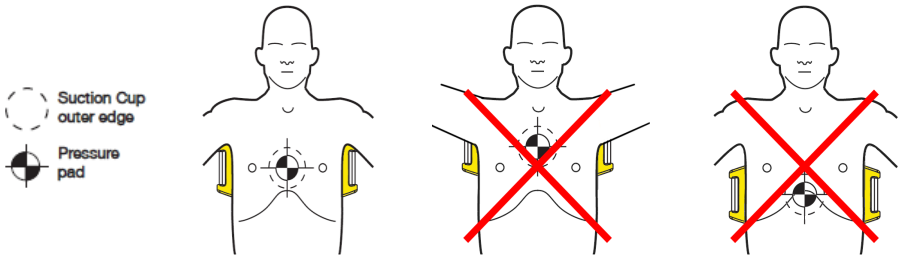
   b. **Back Plate Placement** - Remove the LUCAS™ back plate from the carrying bag and place under the patient, immediately below the arm pits. Placement should occur during a scheduled discontinuation of compressions (e.g. after five cycles of 30:2 or two minutes of uninterrupted compressions)



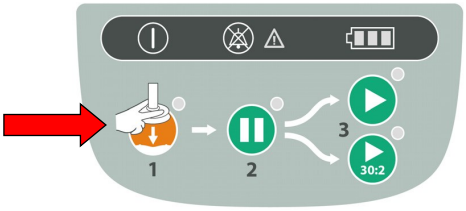
Procedure Continues

Placement Procedure:

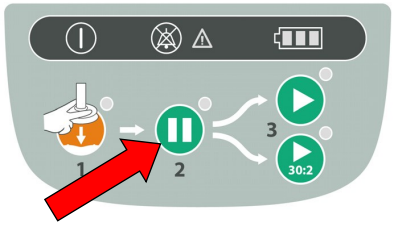
c. Continue manual CPR.
d. Hold the handles on the support legs to remove the LUCAS™ upper part from the bag. Pull the release rings once to make sure that the claw locks are open.
e. Approach the patient from the side opposite the person performing CPR.
f. Attach the support leg that is nearest to you to the back plate and listen for a “click”. Stop CPR and attach the other support leg to the back plate and listen for a “click”.
g. Pull up once to make sure that the parts are correctly attached.
h. Use two fingers to ensure that the pressure pad in the suction cup is in the correct position. 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.



i. Press the orange **ADJUST Mode (1)** button on the control panel. Push the suction cup down with two fingers until the pressure pad touches the patient's chest without compressing the chest.



j. Press the **PAUSE Mode (2)** button to lock the start position once the position of the suction cup and compression arm is in satisfactory position.
   – If the position is incorrect, press the **ADJUST Mode (1)** button, adjust the suction cup and/or compression arm and press the **PAUSE Mode (2)** button once in satisfactory position.

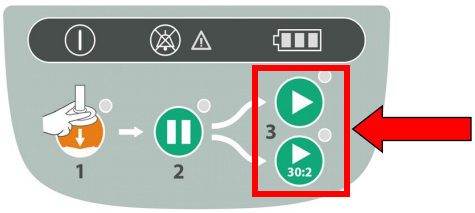


Procedure Continues

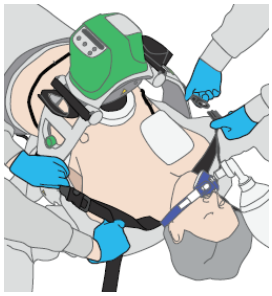
Mechanical CPR Device - LUCAS™

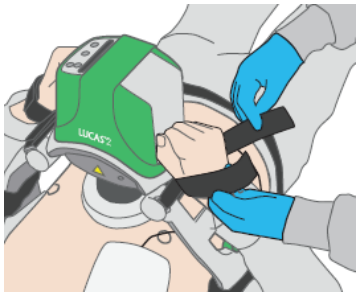
Placement Procedure:

3. **Start Compressions**.
    a. If an advanced airway is NOT in place, press the green **ACTIVE (30:2)** button.
    b. If an advanced airway is in place, press the green **ACTIVE (continuous)** button.



4. **Patient Stabilization / Transport**
    a. Remove the cushion strap from the carrying bag and extend the cushion strap fully at the buckles.
    b. Carefully lift the patient's head and put the cushion behind the patient's neck. Position the cushion as near to the patient's shoulders as possible.
    c. Connect the buckles on the support leg straps with the buckles on the cushion strap, making sure that the straps are not twisted.
    d. Tighten the cushion strap.
    e. Place the patients arms in the wrist straps provided at the top of the LUCAS™ Device.





Miscellaneous Procedure:

1. **Defibrillation**:
    a. Defibrillation can be performed while LUCAS™ operates.
    b. You can apply the defibrillation electrodes before or after LUCAS™ has been put in position.
    c. Position the defibrillation electrodes so that they are not under the suction cup.
    d. Defibrillation should be performed according to the appropriate protocol and following the instructions from the manufacturer of the defibrillator.
2. **Pulse Checks**
    a. To analyze the heart rhythm and/or check for return of spontaneous pulses, press the **PAUSE Mode** button. Rhythm checks should be done every 2 minutes and limited to no more than 10 seconds.
3. **Malfunction of LUCAS™ Device**
    a. If disruption or malfunction of the LUCAS™ Device occurs, immediately revert to Manual CPR.

Mechanical CPR Device - ZOLL® AutoPulse®

Clinical Indications:

- Adult patient in non-traumatic cardiac arrest
  - Intended for use as an adjunct to manual CPR when effective manual CPR is not possible (e.g. during patient transport or extended CPR when fatigue may prohibit the delivery of effective/ consistent compression to the victim, or when insufficient EMS personnel are available to provide effective CPR)

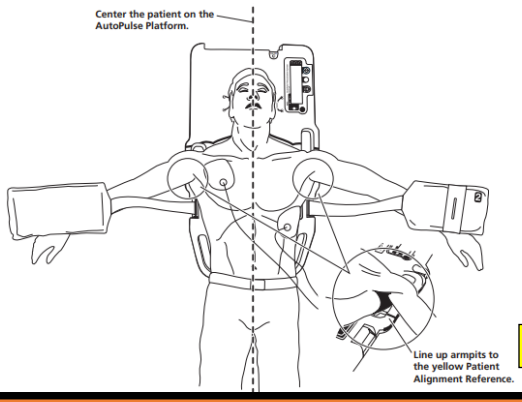
Contraindications:

- Pediatric patients in cardiac arrest
- Patients suffering traumatic cardiac arrest
  - Patients who do not fit within the AutoPulse® Operating Parameters.

Patient Parameter	AutoPulse® Specification
Patient chest circumference permitted	29.9 to 51.2 in (76 to 130 cm)
Patient chest width permitted	9.8 to 15 in (25 to 38 cm)
Maximum patient weight permitted	300 lbs. (136 kg)

Procedure:

1. All therapies related to the management of a patient in cardiac arrest should be continued as outlined in the protocols.
   a. Manual chest compression should be initiated **immediately** while the AutoPulse® device is being placed on the patient.
   b. Limit interruptions in chest compressions to **10 seconds or less**.
   c. **Early defibrillation** should be considered and provided as indicated.
   d. **Do NOT delay manual CPR for the AutoPulse®**. Continue manual CPR until the device can be placed.
2. While resuscitative measures are initiated, power up the AutoPulse® by pressing the On/Off button located on the top ("head") edge of the AutoPulse® Platform.
   a. The AutoPulse® illuminates the green Power LED on the User Control Panel and performs its self-tests.
   b. The AutoPulse® will indicate that it is ready for use.
3. Briefly stop CPR and sit the patient up and remove patient's clothing to ensure skin-to-platform contact.
4. Slide the AutoPulse® Platform into position behind the sitting patient and lay the patient down onto the platform.
   a. The patient should be centered and the patient's armpits should be aligned with the yellow patient alignment lines on the platform.

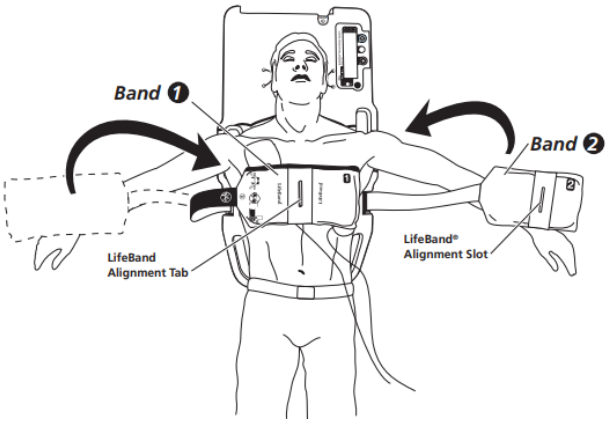


Procedure Continues

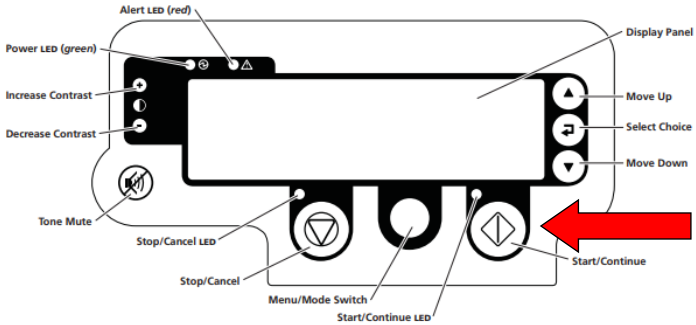
Mechanical CPR Device - ZOLL® AutoPulse®

Procedure:

5. Close the LifeBand® around the patient's chest.
    a. Place band 1 on top of patient's chest.
    b. Locate mating slot of band 2 over the alignment tab 1.
    c. Press the bands together to engage and secure the Velcro fastener.
    d. Lift up the LifeBand® to its fullest extension, ensuring that the side bands are at a 90 degree angle to the platform, that they are not twisted and that there are no obstructions.
    e. Center the LifeBand® on the patient's chest, placing it such that its center is over the area upon which manual compressions are conducted.



6. Press and release the **Start / Continue** button once. The AutoPulse® automatically adjusts the bands to the patient's chest.
    a. The AutoPulse® will pause for 3 seconds to allow you to verify that the patient is properly aligned and that the LifeBand® has taken up any slack in the bands.
    b. If the patient is not properly aligned, press the **Stop / Cancel** button, realign the patient , and begin compression again.
7. After the 3 second verify patient alignment pause is complete, compressions will automatically begin. You may press the **Start / Continue** button to immediately initiate compressions ahead of that time.
    a. Depending on the Mode setting in Administrative Menus, the AutoPulse® will perform 30:2 or Continuous compressions.



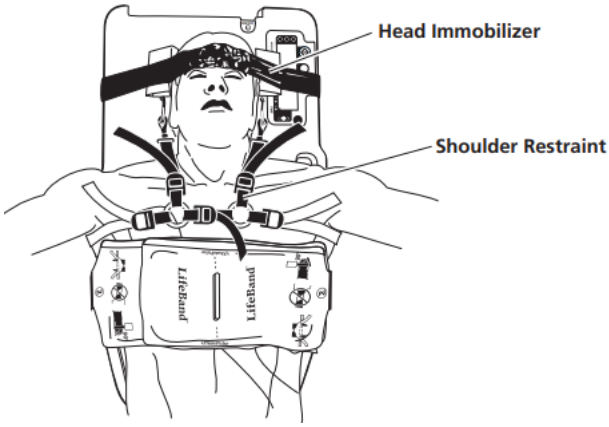
8. To access the patient or to pause the AutoPulse® for any reason , press the **Stop / Cancel** button.
9. To restart compression, press the **Start / Continue** button.

Procedure Continues

Mechanical CPR Device - ZOLL® AutoPulse®

Procedure:

10. **Patient Stabilization / Transport**
    a. Attach the Shoulder Restraint to keep the patient properly aligned on the AutoPulse® Platform.
    b. The Head Immobilizer assists in keeping the patients head from moving, especially when combined with a cervical collar.



11. Always ensure the following:
    a. Make sure that the patient's armpits and the upper edge of the LifeBand® are aligned with the yellow line on the AutoPulse®.
    b. Make sure that the LifeBand® is not twisted and properly mated with the Velcro.
    c. Maintain the LifeBand® at 90 degrees with the AutoPulse® Platform. Ensure that the LifeBand® is not impeded by anything such as the patient's arms, clothing, straps, and buckles that may interfere with the movement of the LifeBand®.
12. **Malfunction of AutoPulse® Device**
    a. If disruption or malfunction of the AutoPulse® Device occurs, immediately revert to Manual CPR.

Physical Restraints

Clinical Indications:

- Any patient who may harm themselves or others may be gently restrained to prevent injury to the patient or crew. This restraint must be in a humane manner and used only as a last resort. Other means to prevent injury to the patient or crew must be attempted first. These efforts could include reality orientation, distraction techniques, or other less restrictive therapeutic means. Physical or chemical restraint should be a last resort technique.

Procedure:

1. Attempt less restrictive means of managing the patient.
2. Unless the patient poses an immediate threat to self or others or is suffering from an immediately life-threatening condition, **Medical Control** must be contacted prior to the use of restraints or transports of any patient against his/her will.
3. Request law enforcement assistance wherever and whenever possible.
4. Ensure adequate personnel are present. This generally means four people, one for each of the patient's extremities. It is desirable to have female personnel present when a female patient is being restrained.
5. Restrain the patient in a lateral or supine position. No devices such as backboards, splints, or other devices will be on top of the patient. The patient will never be restrained in the prone position.
6. The patient's upper extremities should be restrained with one arm at or above the level of the head and one arm at or below the waist level if possible, unless clinically inappropriate.
7. The patient must be under constant observation of the EMS crew at ALL times. This includes direct visualization of the patient as well as cardiac and pulse oximetry monitoring whenever possible. The patient should not be left alone after application of restraints.
8. The extremities that are restrained will have a circulation check at least every 15 minutes. The first of these checks should occur as soon after placement of the restraints as possible. This MUST be documented in the patient care report (PCR).
9. Documentation in the PCR should include the reason for the use of restraints, the type of restraints used, and the time restraints were placed.
10. If the above actions are unsuccessful, or if the patient is resisting the restraints, consider administering medications per the AGITATED OR VIOLENT PATIENT / BEHAVIORAL EMERGENCIES Protocol.
11. If a patient is restrained by law enforcement personnel with handcuffs or other devices EMS personnel cannot remove, a law enforcement officer must accompany the patient to the hospital in the transporting ambulance.
12. **All restraints should have the ability to be quickly released, if necessary.**

Prohibited Techniques:

- Secure or transport in a prone position with or without hands and feet behind the back (hobbling or "hog-tying").
- "Sandwiching" patients between backboards.
- Techniques that constrict the neck or compromise the airway.

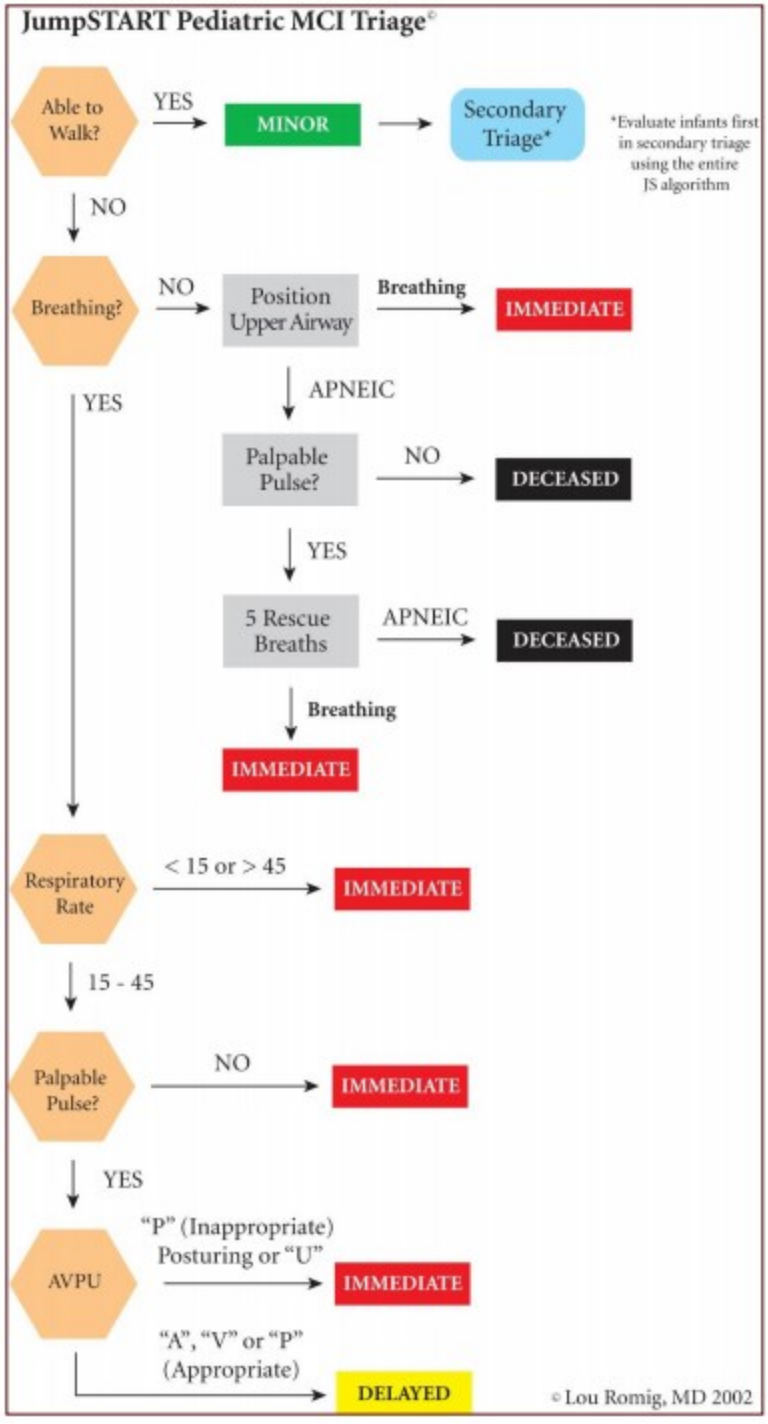
JumpSTART© Triage

Clinical Indications:

- Anytime an event overwhelms the available resources and the victim appears to be a child

Procedure:

1. Start where you stand.
2. Identify the uninjured or "walking wounded" and direct them to a designated area.
3. Move in an orderly and systematic manner through the remaining victims, stopping at each person for a quick assessment and tagging focusing on Respirations, Perfusion and Mental Status. The stop at each patient should not take more than 30-60 seconds.



START Triage

Clinical Indications:

- Anytime an event overwhelms the available resources and the victim appears to be an adult

Procedure:

1. Start where you stand.
2. Identify the uninjured or “walking wounded” and direct them to a designated area.
3. Move in an orderly and systematic manner through the remaining victims, stopping at each person for a quick assessment and tagging focusing on Respirations, Perfusion and Mental Status. The stop at each patient should not take more than 30-60 seconds.